

Mumps

Revision Dates

Case Definition	March 2018
Reporting Requirements	March 2018
Epidemiology/Public Health Management	March 2018

Case Definition

Confirmed Case

Laboratory confirmation of infection in the absence of recent immunization with mumps-containing vaccine^(A):

- Detection of mumps virus RNA by nucleic acid testing (NAT) such as reverse transcription polymerase chain reaction (RT-PCR) or isolation of mumps virus from an appropriate clinical specimen^(B);

OR

- Positive serologic test for mumps IgM^(C) antibody in a person who has mumps compatible illness^(D) and/or other manifestations of mumps such as oophoritis, orchitis or meningitis;

OR

Mumps compatible illness^(D) and/or other manifestations of mumps such as oophoritis, orchitis or meningitis in a person who is epidemiologically-linked to a laboratory-confirmed case.

Probable Case (Outbreak Only)

Mumps compatible illness^(D) and/or other manifestations of mumps such as oophoritis, orchitis or meningitis unexplained by another more likely diagnosis, in the absence of appropriate laboratory tests and **NOT** epidemiologically linked to a laboratory-confirmed case.

^(A) Six to 23 days after MMR immunization, approximately 5% of immunized children experience malaise and fever, with or without rash, lasting up to 3 days. Parotitis, rash, lymphadenopathy, and joint symptoms also occur occasionally after MMR immunization.⁽⁷⁾ Recent immunization is defined as receiving a mumps-containing vaccine within 28 days. See diagnosis section for testing of individuals recently immunized.

^(B) Refer to the [Provincial Laboratory for Public Health \(ProvLab\) Guide to Services](#) for current specimen collection and submission information.

^(C) IgM serology has the potential for false positive findings. (See diagnosis section)

^(D) Mumps compatible illness is classically characterized by acute onset of unilateral or bilateral tender, self-limited swelling of the parotid or other salivary gland lasting two or more days, and without other apparent cause.

Reporting Requirements

1. Physicians, Health Practitioners and others

Physicians, health practitioners or others shall notify the Medical Officer of Health (MOH) (or designate) of the zone, of all confirmed cases in the prescribed form by mail, fax or electronic transfer within 48 hours (two business days).

2. Laboratories

All laboratories shall report all positive laboratory results by mail, fax or electronic transfer within 48 hours (two business days) to the:

- Chief Medical Officer of Health (CMOH) (or designate), and
- MOH (or designate) of the zone.

3. Alberta Health Services and First Nations and Inuit Health Branch

- The MOH (or designate) of the zone where the case currently resides shall forward the initial Notifiable Disease Report (NDR) of all confirmed cases to the CMOH (or designate) within two weeks of notification and the final NDR (amendment) within four weeks of notification.
- In an outbreak situation, the MOH (or designate) of the zone where the case currently resides shall forward the NDR of all probable cases (in addition to confirmed cases) to the CMOH (or designate) in the above prescribed form.
- In order to analyze data in a timely fashion, AH may adjust reporting timelines (NDR) during an unusual outbreak (e.g. non-FMP timelines to FMP timelines). The decision to adjust timelines will be made by AH, in consultation with AHS/FNIHB. For more information refer to the Alberta Communicable Disease Outbreak Response Manual for Unusual Outbreaks.
- For out-of-province and out-of-country reports, the following information should be forwarded to the CMOH (or designate) by phone, fax or electronic transfer within 48 hours (two days) including:
 - name,
 - date of birth,
 - out-of-province health care number,
 - out-of-province address and phone number,
 - positive laboratory report and
 - other relevant clinical/epidemiological information.

Etiology

Mumps is an acute viral illness caused by the mumps virus (family *Paramyxoviridae*, genus *Rubulavirus*).⁽¹⁾

Clinical Presentation

Asymptomatic infections occur in up to 30% of cases.^(1,2) Prodromal symptoms of mumps are non-specific and may include a low-grade fever, malaise, headache, myalgia, anorexia. Some cases may manifest primarily as a respiratory tract infection.⁽²⁾ However, most will develop swelling and tenderness of one or more salivary glands, usually involving the parotid (causing parotitis) and less frequently the sublingual or submaxillary glands. Parotitis usually lasts 7–10 days and may be unilateral or bilateral.

Complications include encephalitis, meningitis, deafness, orchitis and oophoritis. Orchitis occurs in 20-30% of males after puberty, but rarely results in sterility.^(1,2) Oophoritis occurs in approximately 5% of women after puberty.⁽³⁾ In immunized people complications are less frequent. The risk of spontaneous abortion may be increased if mumps infection occurs during the first trimester of pregnancy, however there is no firm evidence that mumps during pregnancy causes congenital malformations.⁽¹⁾

Reservoir

Humans.⁽¹⁾

Transmission

Mumps is transmitted through direct contact with respiratory secretions, saliva or respiratory droplets of an infected person, and indirectly through contaminated fomites.^(4,5)

Incubation Period

The incubation period of mumps is typically 16–18 days, and can range between 12–25 days.⁽¹⁾

Period of Communicability

A person is most infectious from 2 days before to 5 days after the onset of parotitis. Asymptomatic infections can be communicable.⁽¹⁾ In immunized persons the duration of viral shedding is shorter.⁽⁶⁾

Host Susceptibility

In general, people of all ages who have not had mumps or who have been partially or not immunized, are at risk of infection.^(4,7) In Canada, it is assumed that most adults born before 1970 have acquired immunity due to mumps infection, however, there may be some individuals who have not had mumps and are therefore still susceptible.⁽⁴⁾ Individuals born in 1970 or later who have not received two doses of appropriately spaced mumps-containing vaccine after their first birthday OR no history of previous disease (laboratory-confirmed at the time of illness), are considered susceptible. Health care workers (HCW), military personnel, students in post-secondary educational settings, individuals exposed to a mumps outbreak and travellers to destinations outside North America who are susceptible, are considered at greatest risk of acquiring disease.⁽⁴⁾

As HCWs are at increased risk of both acquiring mumps if susceptible and potentially transmitting it to people at high risk of severe disease, all HCWs, regardless of age, are considered susceptible unless they have had documented mumps disease or are fully immunized (See [Appendix A: HCW Mumps Pre-Exposure Algorithm](#)).

The effectiveness of the mumps vaccine has been estimated at 62% – 91% for one dose, and 76% – 95% for two doses.⁽⁴⁾ Despite high vaccination rates, outbreaks have occurred in young adults associated with sports teams and academic facilities in Canada, USA and Europe.^(6,8,9)

Incidence in Alberta

Mumps became notifiable in Alberta in 1979.⁽¹⁰⁾ The rate of mumps cases was highest in 1981 (99.1 per 100,000 population). Upon the introduction of mumps-containing vaccine to the routine childhood immunization schedule in 1982 and the addition of a second dose in 1996, the rate of mumps decreased to an average rate of 1.5 per 100,000 population between 2000–2016. Despite these lower rates, disease outbreaks do occur sporadically in the province. Annual case counts may be accessed through the [Interactive Health Data Application \(IHDA\)](#).

Public Health Management

Diagnosis

The diagnosis of mumps can be difficult; and in some instances laboratory results together with clinical and epidemiologic information need to be considered in order to make the diagnosis.⁽¹¹⁾ A positive mumps NAT (nucleic acid test [e.g., RT-PCR]) result is definitive as it indicates a recent infection.⁽¹²⁾

Mumps IgM antibodies are usually present after the first 5 days of onset of illness in an unvaccinated person reaching a maximum level one week later. Mumps IgM antibodies may be present for several weeks or months following the illness.⁽¹³⁾ However, in immunized cases the IgM antibody response can be delayed, or in some cases absent.⁽¹⁾ Furthermore, these individuals shed the virus for a shortened period thus reducing the sensitivity of the mumps RT-PCR assay in confirming the clinical diagnosis.⁽¹²⁾

To maximize the laboratory diagnosis of mumps, a buccal swab and/or serum should be submitted based on the onset of symptoms and immunization status as presented in Table 1 below. A urine sample should also be collected in individuals with orchitis, oophoritis and meningitis to maximize virus detection.⁽¹⁴⁾ Urine samples may test positive for up to 7 days post symptom onset. See Table 1 for more information on laboratory testing.

Table 1: Laboratory Testing

Onset of parotitis ⁽ⁱ⁾ before testing	Immunization status	Test request and sample
Day 3 and before ⁽ⁱⁱ⁾	Not applicable	Order mumps NAT on buccal swab
> 3 to ≤ 5 days	Not immunized or unknown status	Order mumps NAT on buccal swab Order mumps IgM & IgG serology
	Immunized (1 or 2 doses)	Order mumps IgM & IgG serology after day 5
After day 5 ⁽ⁱⁱⁱ⁾	Not applicable	Order mumps IgM & IgG serology
With orchitis/oophoritis and/or meningitis (onset at any time)	Not applicable	Order mumps NAT on buccal swab AND urine Order mumps IgM & IgG serology

⁽ⁱ⁾ Although parotitis is the most common manifestation, if not present, other mumps compatible symptoms can be used as a guide to testing.
⁽ⁱⁱ⁾ Samples for molecular testing (NAT) in the first 3 days after onset are strongly encouraged as infected vaccinated individuals have either a delayed or no serologic response in 13-45% of cases, but shed the virus and are thus, infectious.
⁽ⁱⁱⁱ⁾ Collecting blood after day 5 and up to 10 days after onset of parotitis has been shown to increase the IgM positive rate to 70%. In unvaccinated individuals, the IgM response is nearly always detected at 3 to 5 days after the onset of parotitis.

Individuals with recent immunization who become infected with mumps, undergo testing as described above. Samples are also sent to the National Microbiology Lab (NML) for genotype testing to determine if person is infected with wild type or vaccine type mumps virus.

Other viral illnesses such as influenza, Epstein-Barr virus or “mono”, parainfluenza and blocked ducts can mimic mumps infection. These should be considered as part of the differential diagnosis if there is no contact with a mumps case.^(3,15) 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 confirmatory methods as IgM serology has the potential for false positive findings.⁽¹¹⁾ See Table 2 for common combinations of Mumps test results and interpretations.

Table 2: Mumps Test Result Interpretation

Mumps NAT result	IgM antibody result	IgG antibody result	Comments/Interpretation
+	-	-	Recent infection, consider infectious
	+ or Ind	+ or Ind	
Inconclusive	+ or Ind	+ or Ind	Recent infection with low titre of virus; consider infectious
	-	+	
-	+ or Ind	+ or Ind	Suggests recent infection or recent immunization. Immunized persons may still become infected
	+ or Ind	-	
-	-	-	Susceptible. Not currently infected

Ind = Indeterminate serology result

Key Investigation

- It is recommend that individuals under investigation for mumps, self-isolate from work, school or other activities where they may be in contact with susceptible individuals.
- Ensure all appropriate clinical specimens have been collected (buccal swab, blood and/or urine).⁽¹⁶⁾
- Obtain a history of illness including signs, symptoms and date of parotitis onset.
- Determine mumps immunization history including:
 - type of vaccine,
 - number of doses,
 - date administered.
- Determine the possible source of infection:
 - identify recent travel history (during the incubation period) or contact with a recent traveller,
 - identify contact with a known mumps case or a person with mumps-like illness,
 - assess for similar symptoms in other members of the household.
- Confirm the individual meets the case definition.
- Determine the case's period of communicability, which is from 2 days before to 5 days after the onset of parotitis.⁽¹⁾
- Assess the potential for further transmission during the period of communicability based on:
 - the activities of the case,
 - the transmission setting.
- Identify contacts that may have had significant exposure in high transmission settings.
 - **Significant exposure is defined as** 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) or unprotected face-to-face interaction i.e. within two meters of an infectious mumps case where droplet transmission is likely to have occurred.⁽¹¹⁾

- **High transmission settings include** households, childcare/schools, healthcare, athletic teams, parties, residence halls, other group living situations, etc. where the risk of transmitting mumps is high. ^(11,15)

Management of a Case

- Provide information about disease transmission and infection control measures to minimize transmission including:
 - practicing proper hand hygiene,
 - avoiding sharing drinking glasses or utensils,
 - covering coughs and sneezes with a tissue or forearm.
- Advise case to stay at home (self-isolate) for 5 days after the onset of parotitis or other salivary gland swelling (and/or other symptoms, if parotitis is absent).
- Inform the case that if medical attention is required to contact health care facility or health care provider prior to presenting.
- The MOH may exclude confirmed and probable cases from daycare, schools, employment, other group settings and public places for five days after the onset of parotitis, or other salivary gland swelling (and/or other symptoms, if parotitis absent).
- **Health Care Workers (HCW)** who are cases **shall** be excluded by MOH from work for 5 days after the onset of parotitis, or other salivary gland swelling (and/or other symptoms, if parotitis is absent). See Table 3 for definition of HCW.

Table 3: Health Care Worker Definition

HCW means:
<ul style="list-style-type: none"> ○ all health practitioners* and ○ all individuals at increased risk for exposure to, and/or transmission of, a communicable disease because they work, study, or volunteer, in one or more of the following health care environments: <ul style="list-style-type: none"> ▪ hospital, ▪ nursing home, supportive living accommodation, or home care setting, ▪ mental health facility, ▪ community setting, ▪ office or clinic of a health practitioner, ▪ clinical laboratory. <p>* Note: <i>The Public Health Act states "Health practitioner means any person who provides health care or treatment to any person"</i></p>

- Cases admitted to a health care facility should be managed with droplet precautions in addition to routine precautions until 5 days after the onset of parotitis, or other salivary gland swelling (and /or other symptoms, if parotitis is absent).

Treatment of a Case

- Supportive.⁽²⁾

Management of Contacts (non-Health Care Workers)

- Only identified contacts in high transmission settings who have had significant exposure to an infectious mumps case should be assessed for susceptibility.
- Contacts born after 1970 who have no history of laboratory confirmed mumps disease at the time of illness **AND** have not received two doses of appropriately spaced mumps containing vaccine after one year of age are considered susceptible.

- Susceptible contacts should be educated about signs and symptoms of infection and instructed to call Public Health if symptoms do occur.
- If medical attention is required, inform the contact to call their health care facility or provider prior to presenting.
- Susceptible contacts should be offered mumps containing vaccine according to current [Alberta Immunization Policy \(AIP\)](#) recommendations. **NOTE:** Post-exposure mumps immunization does not prevent or alter the clinical severity of mumps from current exposure. Should the current exposure to mumps not result in an infection, the vaccine should confer protection against future exposures.⁽¹¹⁾

Management of Contacts (Health Care Workers)

- Only susceptible HCWs in acute care, long-term and home care settings who have **unprotected exposure** to a confirmed and/or probable mumps case, may be excluded: from day 10 after first exposure to day 25 after last exposure. The date of last exposure is counted as day 0. See [Appendix B: HCW Mumps Post Exposure Algorithm](#) for more detailed information.
 - **Unprotected exposure** is defined as: direct contact with the oral/nasal secretions of a case or face-to-face interaction i.e. within two meters of an infectious mumps case without the use of proper personal protective equipment and where droplet transmission is likely to have occurred.
- Susceptible HCWs in acute care, long-term care and home care settings are routinely managed by site-specific Occupational Health and Safety (OHS) or Infection Prevention and Control (IPC) protocols as per other occupational exposure incidents.
- Susceptible HCWs in other settings may be managed on a case-by-case basis at the discretion of the MOH.

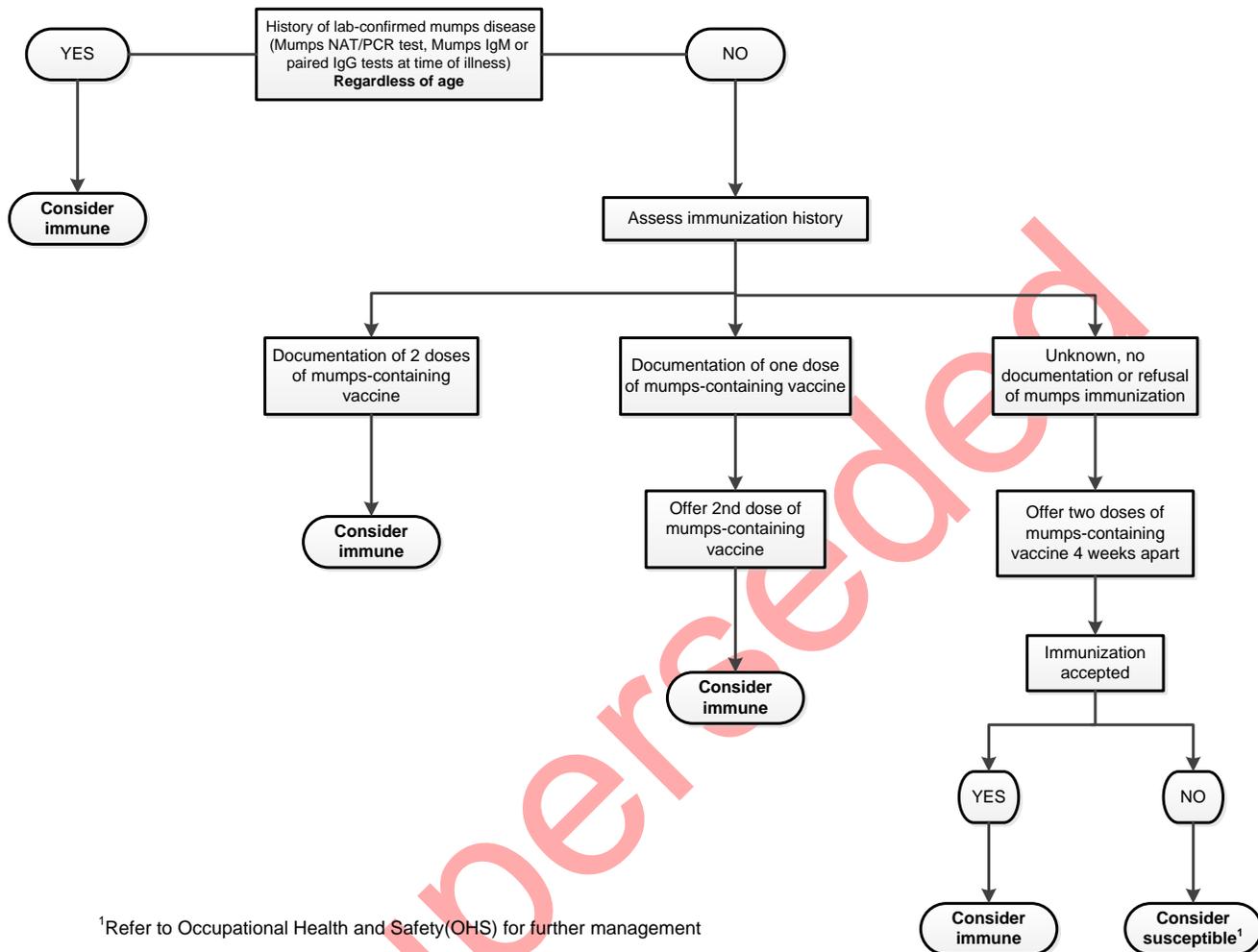
Management of Outbreaks⁽¹¹⁾

- Identifying susceptible contacts and providing individualized follow-up in high transmission outbreak settings is resource intensive. Public messaging may be used as an alternative to notify a large number of contacts. Key messages include:
 - signs and symptoms of mumps infection,
 - self-care as appropriate and prompt reporting to Public Health if symptoms develop
 - notification to health care providers/facilities before presenting for medical attention
 - importance of immunization, including how to determine current immunization status/access immunizations as required in accordance with the *AIP*.

Preventive Measures

- Educate the public on the risks of mumps infection and the importance of immunization. Refer to the *AIP* for current mumps vaccine recommendations.
- Assess **all** HCW for mumps immunity upon commencement of employment. If no history of previous disease (laboratory confirmed at the time of illness) or documentation of two appropriately spaced doses of mumps containing vaccine after one year of age, recommend/offer vaccine(s). See [Appendix A: HCW Mumps Pre-Exposure Algorithm](#).
- Educate public on how to prevent transmission of mumps including:⁽¹¹⁾
- practicing good hand hygiene and respiratory etiquette,
 - avoid sharing drinks or any other items used on the nose or mouth and
 - clean frequently touched household surfaces.

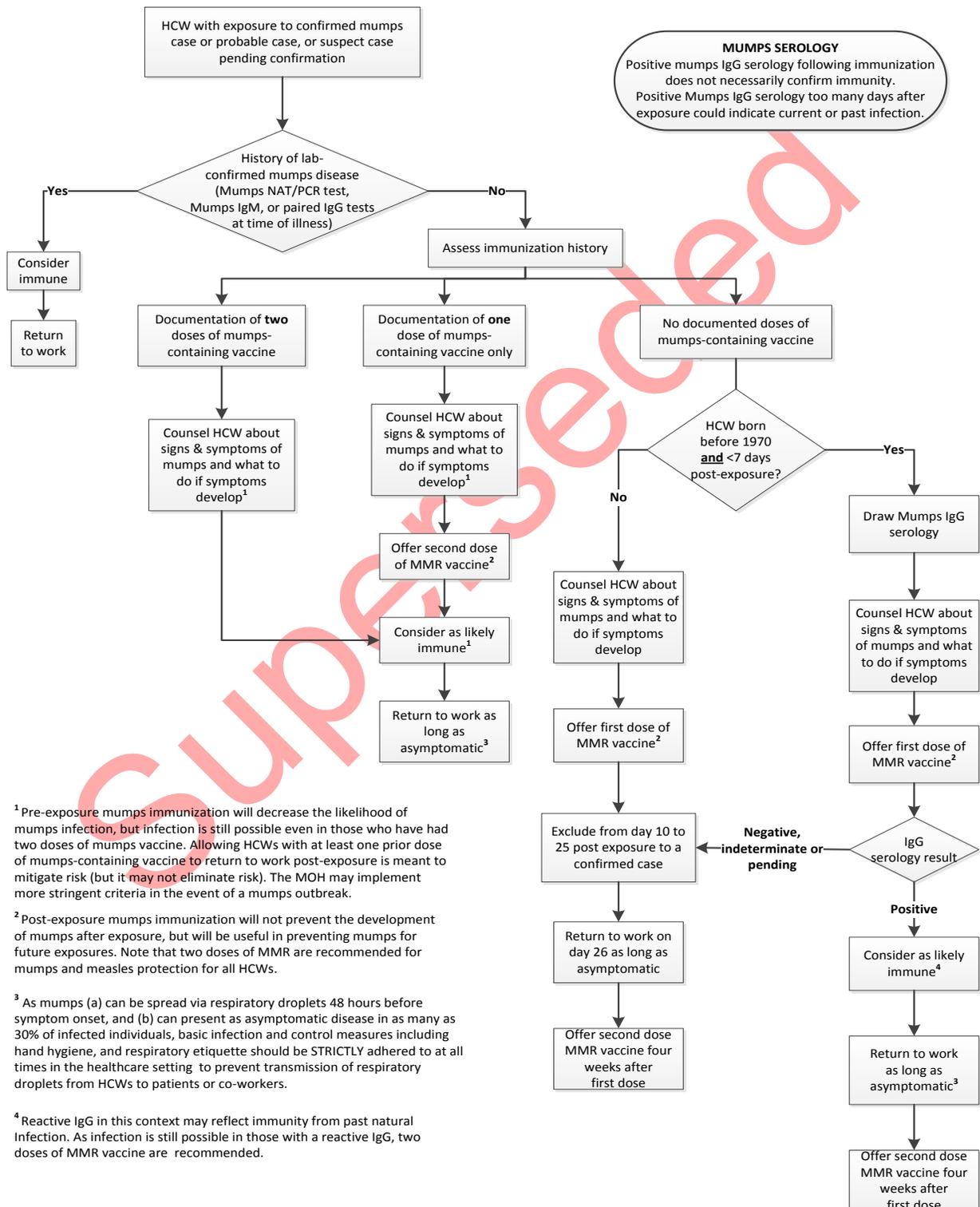
Appendix A: HCW Mumps Pre-Exposure Algorithm



Note: This algorithm is to guide assessment of immunization status of HCW prior to an exposure to mumps.

Appendix B: HCW Post-Exposure Algorithm

HCW Mumps Post-Exposure Algorithm For Acute Care, Long-Term Care and Home Care Settings



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