

**Recommendations for Baseline Assessment and  
Management of Health Care Workers (HCW) who are  
Cases or Contacts of Mumps**

**Occupational Health and Mumps Vaccine  
Expert Working Group**

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## **Introduction**

In 2008, an outbreak of mumps occurred in the province of British Columbia (BC). Cases were initially noted in members of a faith-based community, living in the Fraser Health region, who have traditionally refused immunization for vaccine preventable diseases. As cases occurred in the community, and were admitted to health facilities, issues arose regarding the protection of those HCWs who had experienced or who were at risk of experiencing close, unprotected exposure to cases. When HCW in the affected region were surveyed, Workplace Health in Fraser found that documentation of their mumps immunization status was lacking in the majority of cases. A literature review revealed a wide range of approaches to what constituted “immunity to mumps” in HCWs. As a result, making decisions regarding the need to furlough exposed individuals was very challenging. In order to address these issues, an expert group was established, spearheaded and facilitated by the Provincial Infection Control Network of BC (PICNet). This group was tasked with developing guidelines for what constitutes adequate protection to mumps infection and recommendations for managing HCWs who, through their work or in the community, are exposed to cases of mumps. This document contains those guidelines and recommendations.

## **Background**

Mumps is an acute viral infection classically characterized by fever, swelling and tenderness of one or more of the salivary glands (usually the parotid glands), headache and myalgia. One-third of post-pubertal males that develop parotitis may also experience orchitis. Other presentations are common and some cases are asymptomatic. The incubation period ranges from 12 to 25 days and is usually between 16 and 18 days. Virus has been isolated from saliva from seven days before to nine days after onset of parotitis. Maximum infectiousness occurs between approximately 2 days prior to the onset of symptoms to 4 days after. Asymptomatic infections can be communicable. The virus is spread through droplets expelled from the respiratory tract during activities such as coughing, singing, talking or laughing. It should be noted that neither wild type infection nor vaccination provides a lifelong guarantee of immunity.

## **Baseline Assessment of Employee Immunity and Vaccination Status**

While this document focuses on mumps, it is necessary to begin with some background information on the Measles Mumps Rubella (MMR) vaccine, as mumps vaccine is only delivered in BC as part of the MMR vaccine.

Immunity to both measles and mumps is particularly important for adults at high risk for exposure, including health care workers. People residing in BC and born before 1957 are generally considered immune to measles through exposure to wild virus. (Note that the 1957 cut-off is different from the NACI-recommended cut-off year of 1970 due to a difference in the

observed sero-prevalence of measles immunity in BC residents according to birth year.) Individuals born in 1957 or later should receive two doses of measles-containing vaccine for adequate measles protection, generally given as MMR. Serologic testing pre or post immunization is not necessary or recommended.

As mumps vaccine was licensed in Canada in 1969, people born prior to 1970 were previously considered immune through exposure to wild virus. However, for those born after 1956 and before 1970, a single dose of mumps-containing vaccine (generally given as MMR) is now recommended, as experience has shown that a significant number of people in this group may not be immune. It should be noted that this recommendation exceeds that of the National Advisory Committee on Immunization which is permissive not prescriptive. Persons born after 1969 should receive two doses of mumps-containing vaccine, generally given as MMR. Cases of mumps have occurred in persons born after 1969 who only ever received one dose of mumps-containing vaccine and protection is improved with the second dose. Serologic testing pre or post immunization is neither necessary nor recommended. Note that, for practical purposes, because measles and mumps vaccine are available in Canada only as the combination vaccine MMR, the requirements for measles protection also meet the requirements for mumps protection.

The Working Group recommends that the following age-based criteria for vaccination, outlined in Table 1, be used when assessing employees. The most opportune time for assessment of immunization status is upon employment.

**Table 1. Number of doses of MMR vaccine recommended by year of birth for BC HCWs**

Date of Birth	Measles	Mumps
Prior to 1957	0 doses	0 doses
1957 to 1969	2 doses	1 dose
1970+	2 doses	2 doses

- ◆ Please see BCCDC Prevention and Control (the BCCDC Immunization Manual) for details <http://www.bccdc.org/content.php?item=193>
- ◆ It should be noted that everyone, regardless of age, needs one lifetime dose of rubella containing vaccine or documented serological evidence of immunity (i.e. 10 IU/l or greater). As rubella vaccine is only available as a component of MMR, it should be noted that giving a dose of rubella vaccine to an already rubella immune person poses no additional risk to the recipient.
- ◆ For implementation or practical purposes, health authorities may use 1957 as the cut-off date for vaccination with two doses of MMR (for both measles and mumps protection), as MMR is the only measles-containing vaccine available in Canada
- ◆ For HCWs born before 1957, neither measles nor mumps vaccine is required. If exposed, these staff do not require immunization with MMR nor do they need to be furloughed, as natural immunity is assumed.

## Evidence of Immunity to Mumps for HCWs

**Evidence of immunity** to mumps for HCWs includes any of the following:

- Clinical diagnosis of acute mumps **and** documented laboratory confirmation of same
- Born before 1957 (consider immune)
- Born between 1957 through 1969 and documented evidence of one dose of mumps-containing vaccine
- Born 1970 or later and documented evidence of two doses of mumps-containing vaccine.

**Acceptable documentation includes:**

- Immunization card with dates (d/m/y)
- A physician record of immunization (d/m/y)
- Laboratory results confirming acute mumps infection (d/m/y) with a compatible clinical picture.

It should be noted that verbal information without the accompanying documentation is not acceptable evidence of immunity.

## Role of Serologic Testing for Immunity to Mumps

Given that there is no known serologic threshold that correlates with immunity to mumps, mumps serology is not to be used for assessment of immunity. A reactive mumps serology may be used in decisions to furlough exposed HCWs if no other information is available. See “Management of Close Contacts of a Case of Mumps”.

See Figure 1 and Appendix 1 for an algorithm related to post-exposure management and more detailed information around the role of serologic testing in assessing immunity to mumps.

## Management of HCW Cases of Mumps

Health care workers (HCW) who are diagnosed with mumps should generally be furloughed at least until five days after the onset of classical clinical symptoms (e.g. parotitis, sialadenitis, pancreatitis, orchitis). This exclusion may be extended up to nine days if the HCW remains symptomatic. HCWs working with immuno-compromised or other vulnerable patients should be furloughed for nine days after the onset of classical clinical symptoms, or reassigned to another area after day five, at the discretion of Occupational Health.

The diagnosis of mumps depends on the correlation of both clinical and laboratory findings as each alone may not be sufficiently sensitive.

For *surveillance* purposes, an individual is considered to have mumps if he/she has:

- Unilateral parotitis and an epidemiological link to a laboratory-confirmed case **or**
- Bilateral parotitis **or**
- Laboratory confirmation of mumps by RT-PCR **or**
- Positive serologic test for mumps IgM antibody and a clinical picture compatible with acute mumps.

## Management of Close Contacts of a Case of Mumps

A close contact is defined as an individual with direct unprotected contact with the oral secretions of a case or close contact (now determined to be within two metres) with a case (see Council of Canadian Academies 2007 and CDC Guidelines for Isolation Precautions 2007). Personal protective equipment (PPE) should be worn in accordance with the Public Health Agency of Canada's recommendations and/or best practice guidelines.

HCWs who are close contacts of a case of mumps in the community should report to Occupational Health and/or Infection Prevention and Control immediately. Immunity cannot be completely assured regardless of date of birth or immunization history. Therefore, all exposed HCWs should be educated about the signs and symptoms of mumps. If they develop symptoms of mumps, they should **not** come to work, should seek medical care and should notify Occupational Health and/or Infection Control.

HCWs who are close contacts of a case of mumps within the facility should report to Occupational Health and/or Infection Prevention and Control if not already identified by those programs during the course of an investigation.

A close contact's vaccination status should be assessed (see Figure 1):

### **If a HCW was born prior to 1957:**

- No doses of vaccine are required as natural immunity is assumed.
- The HCW can continue to work.

### **If the HCW was born 1957 through 1969 and has documented evidence of having received one dose of mumps-containing vaccine:**

- No further doses of vaccine are required.
- The HCW can continue to work.

### **If the HCW was born after 1969 and has documented evidence of having received two doses of mumps-containing vaccine:**

- No further doses of vaccine are required.
- The HCW can continue to work.

### **If the HCW was born after 1969 and has documented evidence of having received one dose of mumps-containing vaccine:**

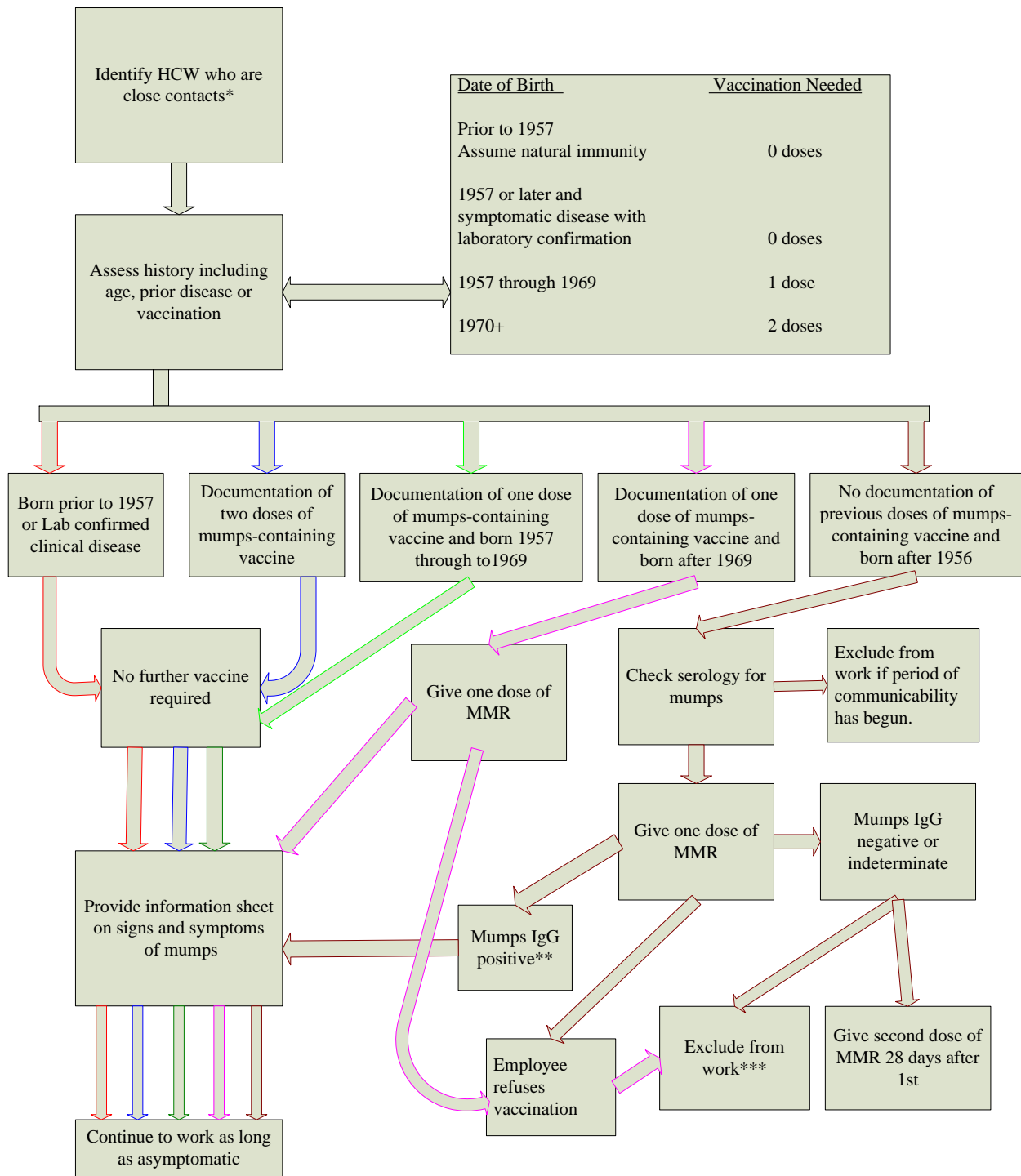
- He/she should receive one additional dose of MMR.
- The HCW can continue to work.
- If the HCW refuses the dose of MMR that person should be furloughed beginning on day 10 after the first exposure to the case through day 26 after the last contact with the case (where the day of exposure is day 1).

**If the HCW was born after 1956 and does not have documented evidence of having received any previous doses of mumps-containing vaccine:**

- Serology of the exposed HCW drawn before the exposure is acceptable and once immunized with the appropriate number of doses of MMR vaccine based on year of birth, these HCWs can continue to remain at work as long as they remain asymptomatic.
- S/he should immediately receive one dose of MMR after serology is taken.
  - If the HCW refuses the dose of MMR that person should be furloughed beginning on day 10 after the first exposure to the case through day 26 after the last contact with the case (where the day of exposure is day 1).
- While awaiting the results of mumps serology, the HCW should be off work if the period of communicability has begun (beginning on day 10 after the first exposure to the case where the day of exposure is day 1).
  - If the mumps IgG is positive, and s/he has received one dose of MMR, the HCW can then return to work. Those HCW born after 1969 should receive a second dose of MMR 28 days later to ensure the individual is protected against measles and rubella.
  - If the mumps IgG is negative, the HCW should receive a second dose of MMR 28 days after the first. That person should be furloughed beginning on day 10 after the first exposure to the case through day 26 after the last contact with the case (where the day of exposure is day 1).

It should be noted that a reactive serology for mumps IgG cannot be used for establishing immunity to mumps as no international standard has been set for serum levels of IgG that are considered protective. A positive serology should only be used for the practical purposes of deciding if an exposed individual needs to be furloughed. A reactive serology does provide evidence that the individual has had either prior exposure to natural disease or immunization. A dose of MMR is given to these individuals post exposure as a booster in order to stimulate an anamnestic response. This recommendation is based on the expert opinion of the working group members and experience from the 2007 mumps outbreak that occurred in Nova Scotia. All exposed HCW should be provided with education on signs and symptoms of mumps and only work if they remain asymptomatic.

**Figure 1. Management of health care workers who are close contacts of a case of mumps**



\*Close contact (exposure) for health care workers is defined as providing patient care with unprotected close contact within two metres of a confirmed case during the maximal communicable period (2 days before and 5 days after onset of classical signs and symptoms).

\*\*Will need a second dose of MMR if born after 1969.

\*\*\*Contacts should be excluded from day 10 after the first contact with the case through day 26 after the last contact with the case (where day of exposure is day 1).

# Management of Casual Contacts of a Case of Mumps

A casual contact is defined as an individual with unprotected contact greater than two metres from a case.

Casual contacts of a case should be educated about the signs and symptoms of mumps and their mumps vaccination history should be reviewed. They do not need to be excluded from work. If they develop symptoms of mumps, they should **not** come to work, should seek medical care and should notify Occupational Health and/or Infection Control.

## 1. Tracing Contacts of cases of mumps

Given the relatively low risk for transmission of mumps to a susceptible contact, it is reasonable to use two days before and 5 days after onset of classical signs and symptoms of mumps when tracing contacts exposed to a case, as this covers the time period when the index case is likely to be most infectious.

## Furloughing Asymptomatic HCWs

Asymptomatic HCWs should be furloughed from day 10 after the first contact through day 26 after the last contact with a case of mumps if:

the HCW was born after 1956, has no documentation of immunity and

- a) On serological testing is IgG negative OR
- b) IgG is present on serologic testing but the sample was taken on or after day 7 after the first exposure to the case. By this time it is no longer possible to distinguish pre-existing antibody from a new response to acute infection and the result cannot be interpreted.

## Return to Work for Symptomatic HCW

1. If the HCW has classical symptoms (e.g. parotitis, sialadenitis, pancreatitis, orchitis) he/she may consider return to work after 5 days of isolation following onset, provided that they are clinically well.
2. If the HCW continues to be unwell with symptomatic disease after 5 days, extend their time off work until well. HCWs working with immuno-compromised or other vulnerable patients should be furloughed for nine days after the onset of classical clinical symptoms, or reassigned to another area after day five, at the discretion of Occupational Health.
3. In both instances these assessments are independent of any laboratory results.

# Appendix 1

## Laboratory Diagnosis of Mumps in Vaccinated versus Unvaccinated People

For mumps, unlike rubella and hepatitis B virus, no International Standard IgG concentration has been correlated with clinical immunity.

For individuals born prior to 1957, most are assumed to have been exposed to circulating wild mumps virus during their childhood and they are thought to be immune for life. Evidence of immunity to mumps has been typically based on detection of anti-mumps IgG.

The value of mumps serology is greatest in people with no known history of mumps vaccination and who are young enough not to have been exposed to wild type virus. In these individuals a negative anti-mumps IgG confirms the lack of immunity and acute mumps in an unvaccinated person will typically manifest both a reactive anti-mumps IgG and IgM on clinical presentation.

Recent outbreaks in previously mumps immunized populations confirm that while natural infection typically is associated with long term immunity and a detectable anti-mumps IgG, post vaccination immunity is not lifelong and the detection of anti-mumps IgG does not correlate completely with protection against mumps.

Furthermore, outbreaks in individuals vaccinated against mumps confirm that individuals with detectable anti-mumps IgG can become infected with mumps and that they may or may not manifest anti-mumps IgM at the time of clinical presentation. As a result, serology and even convalescent serologic testing is typically not helpful in guiding management. In addition, recent literature suggests that individuals with partial immunity (a vaccination history and reactive anti-mumps IgG) shed mumps virus for a shorter period of time of approximately 6 days and therefore nucleic acid based detection (e.g., PCR) of parotid secretions may be negative despite clinical manifestations unless a sample is obtained early during the course of the clinical illness.

## References

- a. American Academy of Pediatrics. *Mumps*. In: Pickering, L.K.ed. *Red Book: 2006 Report of the Committee on Infectious Diseases*. 27<sup>th</sup> edition. Elk Grove Village, Illinois: American Academy of Pediatrics, 2006: pages 464-68.
- b. Heyman D. *Control of communicable diseases manual*. 19th ed. Washington DC: American Association of Public Health, 2007.
- c. BC Communicable Disease Control Manual (BCCDC Immunization Manual) <http://www.bccdc.org/content.php?item=193>
- d. Centers for Disease Control. *Notice to Readers: Updated Recommendations of the Advisory Committee on Immunization Practices (ACIP) for the Control and Elimination of Mumps*. MMWR 2006, June 9;55(2);629-630. [http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5522a4.htm?s\\_cid=mm5522a4\\_e](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5522a4.htm?s_cid=mm5522a4_e)
- e. Centers for Disease Control. *Vaccines and Preventable Diseases: Mumps – Prevention & Control of Mumps in Healthcare Settings*. Retrieved November 26, 2008. <http://www.cdc.gov/vaccines/vpd-vac/mumps/outbreak/control-hcw.htm>
- f. Centers for Disease Control. Updated Recommendations for Isolation of Persons with Mumps. MMWR. 2008 October 10; 57 (40); 1103-1105. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5740a3.htm>
- g. Centers for Disease Control. *Guidelines for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings 2007*. Retrieved April 8, 2009. <http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/Isolation2007.pdf>
- h. Council of Canadian Academies. *Influenza Transmission and the Role of Personal Protection Respiratory Equipment: An Assessment of the Evidence*. 2007 Retrieved March 11, 2009 at [http://www.scienceadvice.ca/documents/\(2007-12-19\)\\_Influenza\\_PPPE\\_Final\\_Report.pdf](http://www.scienceadvice.ca/documents/(2007-12-19)_Influenza_PPPE_Final_Report.pdf)
- i. Nova Scotia Health Promotion and Protection. Nova Scotia Infectious Disease Advisory Committee. *Updated recommendations for health care workers who are case or contacts of mumps*. May 14, 2007. <http://www.gov.ns.ca/hpp/mumps/index.html>
- j. National Advisory Committee on Immunization. *Statement on Mumps Vaccine*. CCDR 2007 August 1;33(ACS-8). [http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/07vol33/acs-08/index\\_e.html](http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/07vol33/acs-08/index_e.html)

- k. Public Health Agency of Canada. *Prevention and Control of Occupational Infections in Health Care*. *CCDR* 2002 March;28S1.  
<http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/02vol28/28s1/index.html>