PICNet PROVINCIAL INFECTION CONTROL NETWORK OF BRITISH COLUMBIA

Interim Guidelines for Baseline Assessment and Management of Health Care Workers (HCW) who are Cases or Contacts of Measles (Rubeola)

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British Columbia Provincial Infection Control Network

Table of Contents

Vaccine Preventable Diseases Working Group Members 2
Introduction 3
Background 3
Baseline Assessment of Employee Immunity and Vaccination Status 3
Management of Health Care Worker Cases of Measles 5
Management of Health Care Worker Contacts of a Case of Measles 5
References 7

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Introduction

In 2010, an outbreak of measles occurred in the province of British Columbia (BC). The virus was probably brought to BC by travelers visiting the province during late February or early March; two different genotypes have been identified in samples collected during the outbreak. Cases were initially diagnosed in the Lower Mainland, among individuals who were un/under immunized. The outbreak spread to all five geographic Health Authorities and as of June 20, 2010 there have been 80 confirmed cases. Fifty one (60%) of cases have presented to an Emergency Department and 17 (20%) have been admitted to hospital. One case required admission to the Intensive Care Unit (ICU). The protection of healthcare workers (HCW) who have been exposed or who may be exposed to cases has become a significant issue. Documentation of their measles immunity status is missing for many HCWs and there is variation in the approaches taken by the Health Authorities to assess and provide pre- and post-exposure protection of HCWs. The Vaccine Preventable Diseases Working Group was tasked with developing guidelines and recommendations for adequate protection against measles and management of HCW who have been exposed to cases.

Background

Measles is an acute illness classically characterized by fever, cough, coryza, conjunctivitis and an erythematous maculopapular rash which begins on the head and spreads to the rest of the body. Koplik spots are pathognomonic but are not always seen. Approximately 1 out of every 1000 cases results in encephalitis, which may lead to permanent brain damage. The case fatality rate is approximately 1 per 3000 cases. Measles is extremely contagious; it is generally transmitted by the airborne route but can also be transmitted by direct contact with respiratory droplets. The average incubation period is 8 to 12 days from exposure to onset of prodromal symptoms but ranges from 7 to 18 days. Cases are contagious from 1 to 2 days before onset of symptoms (2 to 4 days before onset of rash) to 4 days after appearance of rash. Immunocompromised individuals may have prolonged excretion of the virus in their respiratory secretions and therefore may remain contagious for the duration of the illness.

Baseline Assessment of Employee Immunity and Vaccination Status

Live measles vaccine was licensed in Canada in 1963. In 1969 BC recommended that all infants (at 12 months of age or older), preschoolers and susceptible school children receive a dose of live measles (rubeola) vaccine.

Prior to that time, measles outbreaks were common and almost all children were infected. The combined measles, mumps and rubella (MMR) vaccine was introduced into BC's publicly-funded immunization program in 1981 and a single dose was recommended for measles protection. In 1996, in the face of ongoing measles outbreaks, BC conducted a measles-rubella vaccine campaign for children from 19 months of age through to grade 12.

Starting in 1998, a second dose of measles vaccine (given as MMR) was recommended for those aged 18 months through 18 years, for adequate measles protection. Beginning in 2005, a second dose of measles vaccine (given as MMR) was recommended for all health care workers born after 1956.

The efficacy of a single dose of live measles vaccine given at 12 or 15 months of age is estimated to be 90% to 95%. With a second dose, almost 100% of those vaccinated are considered immune.

Immunity to measles is particularly important for adults at high risk of exposure, including health care workers. People who were born before 1957 are generally considered immune to measles through infection with wild virus. The 1957 cut-off is different than the National Advisory Committee on Immunization (NACI) recommended cut-off year of 1970. BC pre-natal blood specimens tested in 1999 showed a difference of 5% in the measles IgG seroprevalence between those born prior to 1957 vs. those born 1957 to 69, and a 2% difference between those born 1957 to 1969 and those born from 1970 to 1980. Individuals born in 1957 or later should receive two doses of live measles-containing vaccine for adequate measles protection, generally given as MMR. Please note that the 1957 cut-off date is currently under review in BC and may change. This recommendation will then be updated.

HCW are considered immune to measles if they fulfill one of the following criteria:

- they were born prior to 1957 OR
- they can produce documentation of receipt of two doses of live measles-containing vaccine (generally given as MMR) OR
- they have a letter from their physician confirming a clinical illness compatible with measles in the past and documented appropriate lab confirmation (presence of measles-specific IgM, rise in convalescent measles-specific IgG, virus detection by PT-PCR testing or isolation on cell culture) OR
- they have documented serological proof of immunity (a measles-specific IgG reactive result of at least 200mIU/ml, or "positive" results using a test that is equivalent to a value of at least 200 mIU/ml). A study is underway to compare results from the assay previously used in BC to measure measles IgG to results from an assay that measures IgG in mIU/ml. This will allow interpretation of earlier results with respect to the international standard.

While the published literature supports a putative protective level of measles-specific IgG being at least 200 mIU/ml, serological testing of HCWs in the pre-exposure context is not recommended for establishment of measles immunity and HCWs should be discouraged from seeking testing. This is because HCW must demonstrate evidence of immunity against a variety of vaccine preventable diseases, including mumps, against which protection is available only with administration of combined measles, mumps and rubella vaccine, and for which there is no known serological correlate of protection. In BC, current guidelines for HCW protection against mumps include one dose of mumps-containing vaccine for those born between 1957and 1969 and two doses for those born after 1969. Serological testing for

measles may have a role in the post-exposure context; see "Management of HCW Contacts of a Case of Measles".

The most opportune time for assessment of immunization status is at the time of employment. Acceptable documentation requires a written record that includes the day, month and year of vaccine receipt.

HCWs with a medical contraindication to receipt of MMR vaccine should consult with their local Occupational Health provider or Medical Health Officer.

Management of Health Care Worker Cases of Measles

Health care workers who are diagnosed with measles should be excluded from work until at least five days after the onset of rash AND until the HCW is completely recovered with resolution of the rash. Prior to return to work the HCW should contact their local Occupational Health provider with information from a health care provider concerning:

- clinical presentation
- date of rash onset
- date of resolution of rash and other symptoms
- lab confirmation of measles illness

Exclusion may be extended if the HCW remains symptomatic. HCWs working with immunocompromised patients may be excluded beyond day 5, at the discretion of the local Occupational Health provider and/or the Medical Health Officer.

Management of Health Care Worker Contacts of a Case of Measles

A contact of a case of measles is defined as an individual who has spent any length of time in a room or enclosed space while the measles case was present or for up to two hours after the case has left the room/space.

Available data suggests that the live measles virus vaccine, if given within 72 hours of measles exposure, will prevent or modify disease, although not in all circumstances. The vaccine will also induce protection against subsequent measles infection. Therefore, vaccination is the intervention of choice for exposed HCWs without evidence of immunity, unless contraindicated.

The HCW contacts' vaccination status should be assessed. Actions taken are based on this assessment.

HCWs Who Are Considered Immune To Measles:

If the HCW was born prior to 1957:

- No vaccine required as natural immunity is assumed
- The HCW may continue to work

If the HCW was born on or after January 1, 1957 and has documented evidence of two doses of live measles-containing vaccine or prior documented measles disease:

- No further vaccine required
- The HCW may continue to work

HCWs Who Are Considered Susceptible to Measles:

If the HCW was born on or after January 1, 1957 and has documented evidence of receiving one dose of live measles-containing vaccine:

- Draw a blood specimen for measles IgG and give a dose of MMR vaccine immediately thereafter (ideally within three days of exposure, with day of exposure counted as day 0). If MMR vaccine is contraindicated for medical reasons (e.g. immunocompromised or pregnant), immune globulin (IG) should be offered within 6 days of exposure to prevent or modify measles disease.
- When serostatus is unknown or pending or if the HCW is found to be IgG seronegative, they must remain off work between day 5 (post first exposure) and day 21 (post last exposure), inclusive, regardless of receipt of MMR vaccine or IG post-exposure.
- If the HCW is found to have protective levels of IgG they may return to work.

If the HCW was born on or after January 1, 1957 and has no documented evidence of receiving any live measles-containing vaccine:

- Draw a blood specimen for measles IgG and give a dose of MMR vaccine immediately thereafter (ideally within three days of exposure with day of exposure counted as day 0). If MMR vaccine is contraindicated for medical reasons (e.g. immunocompromised or pregnant), immune globulin should be offered within 6 days of exposure to prevent or modify measles disease.
- When serostatus is unknown or pending or if the HCW is found to be IgG seronegative, they must remain off work between day 5 (post first exposure) and day 21 (post last exposure), inclusive, regardless of receipt of MMR vaccine or IG post-exposure.
- If the HCW is found to have protective levels of IgG they may return to work.
- Give a second does of MMR vaccine at least 28 days after the first.

Regardless of measles IgG status, HCWs also need to be assessed for immunity to mumps and rubella. Vaccine for measles, mumps and rubella is only available in Canada as MMR vaccine, thus HCWs who have been assessed as immune to one virus contained in the vaccine may need additional doses of MMR to ensure immunity to the other viruses. Immunity to one virus contained in the vaccine is not a contraindication to receiving additional doses of MMR vaccine, as there is no increased risk of side effects with additional doses of the vaccine.

References

Chen RT, Markowitz LE, Albrecht P, et al. Measles antibody: reevaluation of protective titers. Journal of Infect Diseases 1990;162:1036-42.

American Academy of Pediatrics. *Mumps.* In: Pickering, L.K.ed. *Red Book: 2006 Report of the Committee on Infectious Diseases.* 27th edition. Elk Grove Village, Illinois: American Academy of Pediatrics, 2006: pages 464-68.

BC Communicable Disease Control Manual (BCCDC Immunization Manual)
http://www.bccdc.org/content.php?item=193

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

Skowronski DM, Buxton J, Wilton L, Chow N, Cook D, King A et al. Evaluation of current recommendations for adult measles, mumps and rubella immunization in BC. 1999 [unpublished].