PROVINCIAL LABORATORY MEDICINE SERVICES
Provincial Health Services Authority
BCCDC Public Health Lab

BC Centre for Disease Control
Provincial Health Services Authority

MEMORANDUM

DATE: May 29, 2025

RE: Update on clinical features and testing strategies for measles

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Dear colleagues,

There has been a resurgence of measles activity globally and in Canada with a risk of further spread in under-vaccinated populations. Please see resources under "References and further information" below for up-to-date measles activity information and public health guidance. Feel free to use the information in this memo for further distribution within your community of practice.

With increased activity and consultations in BC and across Canada, we would like to share the sentinel clinical features of measles and testing strategies, with attention to identification of modified measles cases and subacute sclerosing panencephalitis (SSPE).

Modified Measles
Modified measles is a mild and/or atypical presentation of measles in persons who have some degree of immunity, including from vaccination. Note that classic measles can occur in people who are partially or fully immunized.

Subacute sclerosing panencephalitis (SSPE)
Complications of the central nervous system can occur and are associated with measles virus infection acquired earlier in life. SSPE is a very rare, but fatal condition that may occur years after acute infection. If an SSPE case is suspected, please inform your local health authority MHO and the BCCDC Medical Microbiologist on call for coordination of specialized testing.

Public Health Reporting
If an acute measles infection is suspected at your facility, please remember to inform your local public health communicable disease unit. It is recommended that your microbiology team, in collaboration with your health authority MHO team, assess for urgency of diagnosis, and support follow-up. If expedited or after-hour testing is required, contact the BCCDC Microbiologist on call (604-661-7033, or BCCDC_MicroOncall@bccdc.ca). For comprehensive infection prevention and control (IPAC) advice, please refer to the PICNet Measles page and your local IPAC resources.

Clinical Presentation
Measles is a highly contagious airborne viral infection with up to 90% infectivity in exposed, non-immune individuals. The incubation period for measles ranges from 7 to 21 days (generally around 10 days), and the clinical presentation typically presents in the following phases:

1. **Viral prodrome:** Fever and malaise, followed by cough, coryza (runny nose) and conjunctivitis.

2. **Mucosal rash:** 2-3 days after symptom onset, an enanthem (mucosal rash) characterized by Koplik spots, white/gray elevations with an erythematous base on the buccal mucosa or palate, can be seen. This

enanthem is typical but not unique to measles, can be seen with other respiratory viruses and may be absent in measles.

3. **Skin rash:** 3-5 days after prodrome onset, the exanthem (skin rash) of measles typically appears. This is characterized by an erythematous, maculopapular rash beginning on the face and spreading to the neck, back and trunk, and subsequently extremities.

The differential diagnosis of measles includes common respiratory viruses of childhood such as influenza, respiratory syncytial virus, adenovirus and parainfluenza; as well as other viral causes of rash in children including enterovirus, human herpesvirus 6, parvovirus B19, and rubella, as well as rheumatologic and bacterial causes of rash. Notably, coxsackievirus and other enteroviruses that cause hand foot and mouth disease can also present with maculopapular rash with mucosal involvement.

Who to test

The diagnosis of measles should be considered in patients presenting with a febrile rash illness and other clinically compatible symptoms (cough, coryza, conjunctivitis), in the setting of potential exposure or travel to an area of high measles prevalence, and particularly in the absence of measles immunity.

Measles testing

The sensitivity of diagnostic tests has been assessed as high shortly after the onset of rash, when most cases present for care. However, this does not negate the value of testing during the prodrome stage especially when there is a high pretest probability of infection. The sensitivity of PCR testing during the respiratory prodrome period is likely also high.

Nucleic acid testing (NAT)/PCR:

A nasopharyngeal or throat swab for PCR is the preferred method for diagnosis of acute measles. This test is most sensitive if collected within 7 days of rash onset when the viral load is highest. A urine sample for PCR can also be submitted. Virus sheds in urine for up to 14 days after rash onset so can be useful for diagnosis when case presentation is >7 days after rash onset.

Samples that are positive for measles virus are further tested to determine the infecting genotype, including measles vaccine strain.

In cases of modified measles, the virus can be detected however the viral load is lower and often insufficient for genotyping.

Routine measles NAT testing is performed at the BCCDC Public Health Laboratory 6 days per week and turnaround time (TAT) is generally ~24 hours after specimens are received. Testing can be expedited by request.

Serological testing for Acute Measles (IgM and IgG):

Measles serology testing (IgM and IgG) is a complementary method for laboratory confirmation that can be considered but NAT is preferred. Serology provides a longer collection window from rash onset, so it is most useful in suspect cases who did not have samples collected for NAT shortly after rash onset. Note: IgM antibodies can be detected ~3 days after rash onset but 20% of measles cases will not have a reactive IgM in the first 3 days. A follow-up sample should be collected if IgM serology results are inconclusive or negative. IgG antibodies develop ~7 days after rash onset and plateau 2-3 weeks later. Collection of a convalescent sample 10 to 30 days after the first sample is recommended only if the case is not confirmed by PCR.

In cases of modified measles, serology provides less value as IgG is likely to be positive at baseline and IgM may not rise.

Routine measles serology is tested Monday to Friday, with a TAT of ~2-3 days after specimens are received. Testing can be expedited by request.

Serological testing for Measles Immunity (IgG)
Measles IgG testing **should not** be routinely performed to confirm immunity. In cases where immunization records are not available and immunity is unknown, immunization with a measles-containing vaccine is preferred. Measles IgG testing can be requested on a case-by-case basis when there is a potential exposure to measles and immune status cannot be ascertained by clinical history.

Other testing:
Depending on clinical presentation, testing for other viral diagnoses with a respiratory viral NAT panel should also be considered and can either be performed from the same nasopharyngeal swab sample, or from a separate swab sent to a local laboratory based on expected turnaround time and at the discretion of the local microbiology team. Enterovirus NAT testing can be performed from a skin swab for individuals presenting with vesicular or pustular skin lesions. Testing for bacterial infection (e.g. streptococcal disease) and rheumatologic conditions should be directed by clinical suspicion and patient presentation.

References and further information:
BC case count and exposure locations: http://www.bccdc.ca/health-info/diseases-conditions/measles
National case reports: https://health-infobase.canada.ca/measles-rubella/
Updated (May 2025) PHAC Guidance: https://www.canada.ca/en/public-health/services/diseases/measles/health-professionals-measles/guidance-management-measles-cases-contacts-outbreaks-canada.html
BCCDC guidance: http://www.bccdc.ca/resource-gallery/Documents/Guidelines%20and%20Forms/Guidelines%20and%20Manuals/Epid/CD%20Manual/Chapter%201%20-%20CDC/Measles.pdf
PICNet guidance: https://picnet.ca/guidelines/pathogens/measles/
Measles vaccines: Canadian immunization guide: https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-12-measles-vaccine.html
BCCDC PHL testing information: http://www.elabhandbook.info/PHSA/Default.aspx

Thank you,

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