PHSA Laboratories

BCCDC Public Health Laboratory

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Guidelines for Serological and Virological Diagnosis of Acute Measles

Acute measles is confirmed by detection of anti-measles IgM and/or detection of viral RNA from a nasopharyngeal (NP) or a throat swab and urine. Note that recent vaccination with MMR vaccine can also result in fever and a rash and induce a positive IgM and detectable measles RNA.

Individuals who experience fever and mild rash 7-12 days following their first dose of MMR and have not been exposed to a known measles case should not be tested. Further, the differential diagnosis of fever and maculopapular rashes includes infections with other viruses (rubella, HHV-6, parvovirus B19, enterovirus, EBV, adenovirus, dengue, Zika, and influenza) and bacteria (Scarlet fever caused by *Streptococcus pyogenes*).

For a suspected measles case collect the following:
1) Nasopharyngeal (NP) or throat swab for measles RNA, and
2) A urine sample for measles RNA, and
3) Serum for anti-measles IgM and IgG.

- For NP or throat swabs submit a **red-top** or **blue-top** COPAN swab in universal transport media (UTM). UTM maintains sample integrity.
- Submit urine (min. 5 mL, 50 mL optimal) in a sterile urine container.

PCR: Measles RNA is detected reliably in NP/throat swabs within 7 days of rash onset when the viral load is highest. Simultaneous collection of a urine sample improves the detection yield by about 6% because measles RNA is shed in urine for up to 12 days following rash onset. Testing for measles RNA is highly sensitive and specific, and positive samples are automatically genotyped to determine the source of wild-type infections and can also identify the vaccine strain.

Serology: Anti-measles IgM antibodies are often positive by the time the rash appears, but in a subset of patients can be negative until 3 days after rash onset. Serology is also useful if more than 7 days have passed since rash onset, when virus shedding diminishes but the IgM remains positive. Measles IgG testing should not be routinely performed to confirm immunity, but can requested when immune status cannot be ascertained by the clinical history and there is a potential exposure to measles.

- Submit clotted blood (min. 3 mL) in a SST (gold top) tube

elab Handbook: further details about measles testing can be found on the specific measles pages here:
http://www.elabhandbook.info/PHSA/Default.aspx
PCR Lab Requisition: please use the Virology Requisition form
http://www.bccdc.ca/resource-gallery/Documents/Guidelines%20and%20Forms/Forms/Labs/VI%20Req.pdf
Serology Lab Requisition: please use the Serology Screening Requisition form
http://www.bccdc.ca/resource-gallery/Documents/Guidelines%20and%20Forms/Forms/Labs/SerologyReq.pdf

Sincerely,

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References: Garcia (2010). Differential diagnosis of viral exanthemas. Open Vacc J 3:65-68; Rosenberg *et al.* (2010). Rash associated with pandemic (H1N1) influenza. CMAJ 182:E146; van Binnendijk *et al.* (2003). Evaluation of serological and virological tests in the diagnosis of clinical and subclinical measles virus infections during an outbreak of measles in the Netherlands. J Infect Dis 15:898-903.