Alaska Division of Public Health

Prevention Promotion Protection

Alaska Measles Clinical Guidance: Identification and Testing of Suspected Measles Cases

July 16, 2019

Measles remains a common disease in many parts of the world, including Europe, Asia and Africa. Recent measles outbreaks in other states have sparked concern about the risk to Alaskans. International travel, travel outside of Alaska within the United States, and contact with international visitors can pose a risk for exposure to measles.

While providers should consider measles in patients with fever and descending rash, measles is unlikely in the absence of confirmed measles cases in your community or a history of travel or exposure to travelers. This guidance discusses which patients should be prioritized for testing.

Testing for measles should be based on:

A. Measles symptoms

- *Fever*, including subjective fever (see page 2 for a more detailed description).
- *Rash that starts on the head and descends* (see page 2 for a more detailed description).
- Usually 1 or 2 of the "3 Cs" – *cough, coryza and conjunctivitis*.

B. Risk factors increasing the likelihood of a measles diagnosis

- In the prior 3 weeks: travel outside of Alaska within the United States, transit through U.S. international airports, or interaction with foreign visitors, including at U.S. tourist attractions.
- Confirmed measles cases in your community.
- Never immunized with measles vaccine and born in 1957 or later.

Recent MMR vaccine recipients

Fever and rash may occur in ~5% of MMR vaccine recipients, typically 6-12 days after immunization. Such reactions can be clinically identical to measles infection, and result in positive laboratory testing for measles. However, this reflects exposure to measles vaccine virus rather than the wild virus, and such patients are not infectious for measles. If a recently vaccinated patient has fever and rash but none of the risk factors for measles described above, measles is extremely unlikely and testing is usually unnecessary.

If, after consideration of symptoms and risk factors, you suspect measles, please contact the Alaska Section of Epidemiology (AK-SOE) *immediately* at (907) 269-8000 or 800-478-0084 (after hours). Polymerase chain reaction (PCR) is the preferred testing method for measles, and can only be performed in public health laboratories including the Alaska State Virology Laboratory (ASVL) in Fairbanks. Measles IgM testing is frequently falsely positive and is not preferred. See below for specific testing guidance (page 3).

Isolation

Measles suspects should be isolated for four days after they develop a rash. Such persons should be kept out of school and avoid any public places. Airborne precautions should be followed in healthcare settings.

Section of Epidemiology Infectious Disease Program | Phone 907-269-8000 | Fax 907-563-7868 | Email: infdisease@alaska.gov
http://dhss.alaska.gov/dph/Epi/id/Pages/default.aspx

With measles, FEVER typically

- Precedes the rash;
- Is high;
- Persists after the rash erupts; and
- Peaks on day 2 or 3 after rash onset, but can persist with secondary infection.

With measles, the RASH typically

- Is an erythematous maculopapular eruption that usually appears 14 days after exposure
- Starts on the forehead at the hairline and behind the ears and then spreads downwards over the trunk to the extremities; in vaccinated people the rash may be less intense and not spread to the entire body.
- Is most confluent on the face and upper body and initially blanches on pressure
- Clears on the third or fourth day in the same order it appeared and assumes a non-blanching brownish appearance; duration is usually 6-7 days, but sometimes less in vaccinated people.
- Consider taking a photo of the rash to share with the Alaska Section of Epidemiology.
- See page 4 for possible alternative diagnoses, including drug reactions.

Other symptoms may include

- At least one of the prodromal 3 Cs--cough, coryza and conjunctivitis.
- White (Koplik) spots in the mouth early in illness.
- Feeling miserable; especially in children.
- In previously vaccinated persons, symptoms may be milder and all 3 Cs may not be present.

Who to test

Testing is indicated for patients presumed to be susceptible, with clinically compatible illness, and suspected exposure to other cases. Symptoms compatible with measles include:

- Cough
- Conjunctivitis (red, watery eyes)
- Coryza (runny nose)
- High fever (could be up to 104°F)
- Rash that appears 3-5 days after the fever

Laboratory testing for suspected measles patients

- **If you suspect measles, immediately contact the AK-SOE at (907) 269-8000 or 800-478-0084 (after hours).**
- The best chance of measles RNA detection by PCR is within 3 days of rash onset. Testing prior to rash onset may yield a false negative result. If you are concerned that a patient is infected and starting to develop prodromal symptoms, isolate the patient and collect specimens as soon as the rash develops.
- Samples submitted to the ASVL without prior approval for testing will be held until AK-SOE can confer with the provider.
- Use of commercial laboratories instead of the ASVL may delay laboratory confirmation of the diagnosis of measles.

Specimen collection for measles testing

Appropriate Clinical Specimens for Laboratory Testing*			
Testing Method	Sample Type	Storage and Transport	Turnaround time
PCR†±	Throat/NP swab** Urine**	• Store all specimens at 4°C. • Ship inoculated viral UTM and/or urine to ASVL on cool packs (4°C) by an expedited delivery method.	1-3 days after receipt at ASVL.
Serologic††	Collect 7-10 mL of blood in SST (serum separator tubes – tiger top, marble top, or yellow top without additives; 1 mL minimum	• Centrifuge tube to separate serum. • Store specimen at 4°C and ship on cool packs.	

*Only patients with symptoms consistent with measles will be considered for PCR testing.
†PCR is the preferred method for confirming an acute case.
**Collection of both a respiratory swab and urine within 2 weeks of rash onset improves the odds of detecting viral RNA.
± Sequencing will be performed on PCR-positive specimens to determine viral genome.
†† Serologic testing may only be performed in conjunction with PCR sample testing from suspected measles cases.

- For patients presenting ≤7 days of rash onset:
  - Collect Throat or Nasopharyngeal (NP) Swab Specimen
    - Use a sterile synthetic swab (e.g. Dacron)
      - **Throat swab**: vigorously swab tonsillar areas and posterior nasopharynx with sterile Dacron swab.
      - **NP swab**: firmly rub nasopharyngeal passage with sterile Dacron swab.
    - Place swab into universal transport media (UTM)
  - Collect 7-10 mL of blood in SST (serum separator tubes – tiger top, marble top, or yellow top without additives; 1 mL minimum. Centrifuge to separate serum.

- For patient presenting >7 days after rash onset:
  - Collection of both a respiratory (throat or NP swab specimen, as described above) *and* urine within 2 weeks of rash onset improves the odds of detecting viral RNA.
    - **Urine**: 50-100 mL urine in a clean/sterile leak-proof container, not UTM. Collect from the first part of the urine stream. The first morning void is ideal.
  - Collect 7-10 mL of blood in SST (serum separator tubes – tiger top, marble top, or yellow top without additives; 1 mL minimum. Centrifuge to separate serum.

ASVL lab requisition slip:
http://www.dhss.alaska.gov/dph/Labs/Documents/publications/FbxSupplyReq.pdf

Expedite sample shipments to the ASVL. Contact them directly for specific instructions on shipping and handling.

Alaska State Virology Laboratory
1051 Sheenjek Dr.
Fairbanks, AK 99775
PH 907-371-1000

Alternative diagnoses to consider for patients with fever and rash

- **Drug eruption**: history of current or recent medication, especially an antibiotic
- **Other non-infectious rashes**: hives or atopic dermatitis with coincidental febrile illness
- **Varicella (chickenpox)**: vesicular lesions on erythematous base
- **Enteroviruses (e.g., hand-foot-and-mouth disease)**: oral ulcers, rash on hands, feet, buttocks
- **Mononucleosis syndrome (EBV, CMV, HIV)**: risk factors (young adulthood, MSM, IDU), sore throat or tonsillitis, prominent adenopathy, splenomegaly, atypical lymphocytosis
- **Parvovirus B-19 (also known as erythema infectiosum, or 5th disease)**: slapped cheek appearance in children, arthritis and diffuse rash in adults
- **HHV-6 (also known as roseola infantum, exanthem subitum, or 6th disease)**: disease of very young children (usually under 2 years of age), high fever followed by defervescence and the appearance of rash on trunk
- **Rubella (German measles)**: history of international travel; mild illness with low-grade fever; arthralgias prominent in adults; prominent postauricular, posterior cervical, and suboccipital adenopathy
- **Group A streptococcal infection (with scarlet fever rash)**: sore throat, "sandpapery" rash, circumoral pallor, strawberry tongue, positive strep test
- **Meningococcemia**: abrupt onset of flu-like illness with marked myalgias (especially the legs); skin evolves from pallid or mottled with cold hands to petechial then hemorrhagic rash, severe headache and mental status change if meningitis present
- **Kawasaki disease**: children <5 years, fissured lips, strawberry tongue, erythema and edema of hands and feet, periungual desquamation, adenopathy
- **Travel-, animal-, and tick-related**: broad differential diagnoses of fever and rash
- **Influenza**: influenza cases with rash have been reported

Resources

- CDC Measles-Healthcare Professionals: http://www.cdc.gov/measles/hcp/index.html
- SOE Measles webpage: http://dhss.alaska.gov/dph/Epi/id/Pages/measles/default.aspx

Reference

Adapted from the measles clinical guidance released by the California Department of Public Health, 2/22/19.

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