



A Tradition of Stewardship  
A Commitment to Service

**HEALTH & HUMAN SERVICES AGENCY: Public Health Division**  
**Communicable Disease Control**  
*Preventing conditions that challenge health, while protecting and promoting the well being of the entire community*

**GUIDANCE FOR CLINICIANS: Managing Patients Suspected of Having Measles**

*The purpose of this checklist is to provide you step-by-step guidance when evaluating patients suspected to have measles, with the goal of a reduction in the spread of measles in the general community while also allowing for an expeditious investigation with Public Health.*

**For questions, please call Napa County Public Health Communicable Disease Control:**  
**(707) 253-4231 Business Hours: 8:00am – 5:00pm Monday through Friday**  
**(707) 204-4359 After Business Hours / Weekends: Ask for On Call Manager**

**See “CDPH Measles Clinical Guidance” for more information. (appendix 1)**

**Step 1: Immediately isolate the suspected patient with measles, using Airborne Transmissible Diseases precautions.**<sup>1,2</sup>

- 1a. Airborne precautions should be followed in healthcare settings.
- 1b. Regardless of prior immunity status, all healthcare staff entering the room should use respiratory protection consistent with airborne infection control precautions (use of an N95 respirator or a respirator with similar effectiveness in preventing airborne transmission).

***Note: The preferred placement for patients who require airborne precautions is in a single-patient airborne infection isolation room (AIIR) or negative air pressure room. Patient should remain completely isolated from other patients to prevent possible exposure of measles.***

**Step 2: Assess if the patient has measles-like symptoms.**<sup>3</sup>

- 2a. Assess if patient has any of the following symptoms and obtain onset dates:
  - Fever
  - Cough
  - Coryza
  - Conjunctivitis
  - Maculopapular rash: Determine rash progression on body

***Inset 1. What are some common differential diagnoses to measles?***  
Kawasaki, rubella, scarlet fever, enteroviruses and other febrile rash exanthems.

**Step 3: Immediately call and report the patient suspected of having measles to Public Health while the patient is still at the clinic.**<sup>4</sup>

- 3a. Call (707) 253-4231 from **8:00am – 5:00pm Monday to Friday** and ask to speak to the **Public Health Nurse**. After these business hours and on weekends, call (707) 204-4359 and ask for the on call manager.
- 3b. Inform the patient, Public Health will be in contact to further assist the patient and their family/friends as well as prevent the spread of measles in the general community.
- 3c. Fax the following information to Public Health at (707) 299-4479**
  - Medical Records
  - Immunization Records (if available)
  - All lab results assessing respiratory illness
  - Travel History in the last 2 months
  - Patient Demographics:
    - ✓Name
    - ✓Address
    - ✓Date of Birth
    - ✓Place of Birth
    - ✓Telephone number(s)
    - ✓Gender
    - ✓Race/Ethnicity
    - ✓Years lived in the US

#### Step 4. Collect appropriate measles specimen(s) for a timely diagnosis.<sup>2</sup>

- 4a. Obtain **all** of the following three specimens for measles laboratory testing and submit using the **Napa-Solano-Yolo-Marin Public Health Laboratory submittal form** (*appendix 2*):
  - ✓ **Throat for PCR:** Use sterile synthetic swab and place into liquid viral/universal transport media
  - ✓ **Urine for PCR:** 10 – 50 ml midstream, clean-catch (first morning void preferred)
  - ✓ **Serum for IgM/IgG:** 7 - 10 ml in gold top serum separator tube
- 4b. For more detailed measles testing information and laboratory guidance, please refer to the **Napa County Measles Laboratory Guidance** (*appendix 3*).
- 4c. If specimens cannot be collected at the clinic, do **not** refer the patient to another facility to obtain specimens (i.e., commercial lab, other medical clinic). Notify PublicHealth.

#### Step 5. Assess for evidence of immunity in patient suspected for measles.<sup>2</sup>

- 5a. Determine whether patient has one of the following:
  - At least 1 documented MMR dose from the United States that was administered  $\geq 12$  months of age.
  - Documented IgG (+) test for measles
- 5b. If documentation is not available, serum should be collected to measure measles IgG antibody levels. However, a positive IgG result in a symptomatic patient may indicate the patient is incubating measles.

#### Step 6. Identify high-risk contacts/exposure sites to measles.<sup>2</sup>

- 6a. Identify if the patient has been in recent contact with any of the following:
  - Infants <12 months of age
  - Pregnant Women
  - Persons unimmunized for measles
  - Healthcare workers (including staff at facility)
  - Childcare workers (including staff at facility)

#### Step 7. Notify patient to remain isolated until no longer infectious.

- 7a. If the measles suspect is inpatient at your facility, they **cannot** be discharged without approval from the Napa County Public Health Officer. For discharge approval, please contact the Napa County Public Health Communicable Disease line at (707) 253-4231 (after hours & weekends: (707) 204-4359 ask for manager on-call)
- 7b. If the measles suspect is at an outpatient facility, instruct patient immediately to self-isolate and they are **not** allowed to attend school/work, participate in any social or academic activities, have visitors, or be out in the general public until Napa County Public Health contacts the patient.

#### Step 8. Identify and address potential measles exposures in hospital/clinic.

- 8a. Contact Napa County Department of Public Health for **specific** guidance on exposures.
  - Communicable Disease (707) 253-4231 from 8:00am-5:00pm M-F.
  - Note: In the event of a measles exposure at a health care facility a list should be completed for all staff and patient exposures ASAP.

**Inset 2. Who is considered exposed to measles in a healthcare facility?**  
Anyone present at facility 2 hours before suspect's arrival and 2 hours after suspect's departure.

#### References:

1. Title 8 California Code of Regulations: ATD Standards. CDPH. <https://www.cdph.ca.gov/Programs/CCDC/PHP/DEODC/OHB/Pages/ATDStd.aspx>
2. Measles. For Healthcare Professionals. CDC. <https://www.cdc.gov/measles/hcp/index.html>.
3. Measles. Signs and Symptoms. CDC. <https://www.cdc.gov/measles/about/signs-symptoms.html>.
4. Title 17, California Code of Regulations (CCR) §2500, §2593, §2641.5- 2643.20, and §2800-2812 Reportable Diseases and Conditions. CDPH. <https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/ReportableDiseases.pdf>



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# Appendix 1: CDPH Measles Clinical Guidance



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KAREN L. SMITH, MD, MPH  
Director and State Health Officer

State of California—Health and Human Services Agency  
California Department of Public Health



GAVIN NEWSOM  
Governor

## Measles Clinical Guidance: Identification and Testing of Suspect Measles Cases April 2019

Measles continues to circulate in much of the world, including Europe, Asia and Africa. International travel, domestic travel through international airports, and contact with international visitors can pose a risk for exposure to measles. When measles is imported into the United States, additional transmission can occur locally.

While providers should consider measles in patients with fever and a 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 measles testing.

### Testing for measles can 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 North America, transit through U.S. international airports, or interaction with foreign visitors, including at a U.S. tourist attraction.
- Confirmed measles cases in your community.
- Never immunized with measles vaccine and born in 1957 or later.

#### Recent MMR vaccine recipients

Fever and rash 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 you have questions, please consult your [local health department](http://tinyurl.com/y2pdczrx) (<http://tinyurl.com/y2pdczrx>).

If after consideration of symptoms and risk factors, you suspect measles, **please contact your [local health department](http://tinyurl.com/y2pdczrx) (<http://tinyurl.com/y2pdczrx>) immediately. Polymerase chain reaction (PCR) is the preferred testing method for measles, and can only be performed in public health laboratories.** Measles IgM testing is frequently falsely positive and is not preferred. See below for more specific testing guidance.

- **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**
  - Starts on the forehead at the hairline and behind the ears and then spreads downwards to the rest of the body; in vaccinated people the rash may be less intense and not spread to the entire body.
  - Is erythematous and maculopapular, progressing to confluence in the same order as the spread of the rash. Confluence is most prominent on the face.
  - Clears on the third or fourth day in the same order it appeared; duration is usually 6-7 days, but sometimes less in vaccinated people.
  - Is initially red and blanches with pressure, then fades to a coppery appearance, and finally to a brownish discoloration that does not blanch with pressure.
  - Not itchy until at least the fourth day after onset.
  - Consider taking a photo of the rash to share with the local public health department.
  - See page 3 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 for children.
  - In previously vaccinated persons, symptoms may be milder and all 3 Cs may not be present.

**Laboratory testing for suspect measles patients** (see: <http://tinyurl.com/ydhh9u85>)

→ **If you suspect measles, please immediately contact your local health department** (<http://tinyurl.com/y2pdczrx>) per California reporting laws.

- PCR is the preferred testing method for measles, and can only be performed at public health laboratories. Serologic testing for measles infection can result in falsely positive IgM test results, and serologic testing performed at commercial laboratories may not provide timely results.
- **Specimen collection for measles testing**
  - For patients presenting  $\leq 7$  days of rash onset:
    - **PCR testing, rather than serologic testing, is recommended**
      - Obtain a Dacron throat swab (rather than NP swab) and place in viral transport media.
      - Collect 10-50 ml of urine in a sterile container.
  - For patient presenting  $> 7$  days after rash onset:
    - Obtain a Dacron throat swab (rather than NP swab) and place in viral transport media.
    - Collect 50-100 ml of urine for PCR testing in a sterile centrifuge tube or urine specimen container.
    - Serology: Draw 7-10 ml blood in a red-top or serum separator tube; spin down if possible.  
**Note:** capillary blood (approximately 3 capillary tubes to yield 100  $\mu$ l of serum) may be collected in situations where venipuncture is not preferred, such as children  $< 1$  year of age.

## Isolate suspect measles patients

*If measles is suspected please isolate the patient according to public health guidance.* See complete infection control guidance at: <http://tinyurl.com/yxes3amk>.

## 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



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# Appendix 2: Napa Solano Yolo Marin Public Health Lab Submittal Form



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**NAPA-SOLANO-YOLO-MARIN COUNTY PUBLIC HEALTH LABORATORY**

2201 COURAGE DRIVE MS 9-200, FAIRFIELD, CA 94533; TELEPHONE (707) 784-4410; FAX (707) 423-1979

Lab use only

**SUBMITTER INFORMATION**

**PATIENT DEMOGRAPHICS—PLEASE FILL COMPLETELY AND CLEARLY**

Patient last name	First name	Birthdate	<input type="checkbox"/> Male <input type="checkbox"/> Female	Date collected
Address		Medical record no.	Time collected	

**TEST SITE INFORMATION— PLEASE FILL COMPLETELY AND CLEARLY**

Practitioner name	Practitioner NPI #	Accession #	Diagnosis code
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**SPECIMEN SOURCE/TYPE—PLEASE CHECK APPROPRIATE BOX(ES)**

<input type="checkbox"/> Blood (whole)	<input type="checkbox"/> CSF	<input type="checkbox"/> Serum	<input type="checkbox"/> Throat	Other:
<input type="checkbox"/> Bronchial wash	<input type="checkbox"/> Isolate	<input type="checkbox"/> Sputum	<input type="checkbox"/> Lesion, location:	
<input type="checkbox"/> Cervical	<input type="checkbox"/> NP swab	<input type="checkbox"/> Stool		

**TESTS REQUESTED—PLEASE CHECK APPROPRIATE BOX(ES)**

<p><b>BACTERIOLOGY &amp; DIRECT TESTS</b></p> <input type="checkbox"/> Enteric stool culture Pathogen(s): _____ <input type="checkbox"/> Stool culture for clearance Pathogen(s): _____ <input type="checkbox"/> Campylobacter culture <input type="checkbox"/> E. coli O157/STEC culture <input type="checkbox"/> CRE confirmation <input type="checkbox"/> Isolate ID/rule-out Organism: _____ <input type="checkbox"/> Rapid Strep test <input type="checkbox"/> Throat culture <input type="checkbox"/> Wound culture + sensitivity <input type="checkbox"/> Urine culture + sensitivity <input type="checkbox"/> Urinalysis <input type="checkbox"/> Urine microscopy <input type="checkbox"/> Gram stain <input type="checkbox"/> Wet mount <input type="checkbox"/> Pregnancy test <input type="checkbox"/> Occult blood test <input type="checkbox"/> KOH stain	<p><b>MYCOBACTERIOLOGY</b></p> <input type="checkbox"/> Acid fast smear + culture <input type="checkbox"/> Acid fast smear only <input type="checkbox"/> TB GeneXpert <input type="checkbox"/> Acid fast blood culture <input type="checkbox"/> Mycobacterium ID (HPLC) <input type="checkbox"/> Quantiferon TB Gold Plus <input type="checkbox"/> T.SPOT.TB*  <p><b>MYCOLOGY</b></p> <input type="checkbox"/> Fungal Culture <input type="checkbox"/> Fungal ID  <p><b>MOLECULAR TESTING</b></p> <input type="checkbox"/> Chlamydia + Gonorrhea + Trichomonas PCR <input type="checkbox"/> Herpes PCR <input type="checkbox"/> Influenza PCR <input type="checkbox"/> Measles PCR <input type="checkbox"/> Mumps PCR <input type="checkbox"/> Norovirus PCR <input type="checkbox"/> Pertussis PCR	<p><b>SEROLOGY</b></p> <input type="checkbox"/> HIV (serum) <input type="checkbox"/> RPR syphilis screening <input type="checkbox"/> RPR syphilis titer/prozone <input type="checkbox"/> TP-PA syphilis confirmation <input type="checkbox"/> Hepatitis B or C antibody*  <p><b>PARASITOLOGY</b></p> <input type="checkbox"/> Ova and parasites (stool) <input type="checkbox"/> Cryptosporidium + Giardia <input type="checkbox"/> Parasite ID: _____ <input type="checkbox"/> Blood parasites. Travel history: _____  <p><b>USE TEST-SPECIFIC FORM</b></p> ➤ Blood lead test ➤ Tick ID & Borrelia test ➤ Zika testing  <p><b>OTHER</b></p> <input type="checkbox"/> Specify: _____  *Referred to another laboratory.
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**COMMENTS/SPECIAL INSTRUCTIONS:**

DATE/TIME RECEIVED

DATE/TIME REPORTED



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# Appendix 3: Napa County Laboratory Guidance



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### Napa County Measles Laboratory Testing Guidance

**Healthcare providers in Napa County must FIRST contact the Napa County Public Health Department at 707-253-4231 (after hours & weekends: 707-204-4359 ask for On Call Manager) for measles virus consultation and testing approval. At this time, measles RT-PCR testing can only be done at a Public Health Laboratory.**

- ✓ RT-PCR is the preferred method for confirming an acute case of measles
- ✓ Only patients with symptoms consistent with measles will be considered for PCR testing
- ✓ Detection of measles RNA by RT-PCR may be successful as late as 10-14 days post rash onset

### Specimen collection instructions for RT-PCR

**Collection of both a throat swab and urine improves the odds of detecting viral RNA. Submit to the Napa Solano Yolo Marin Public Health Lab using the submittal form (*appendix 2*). **BE SURE TO ADD PRESENTING SYMPTOMS WITH ONSET DATE AND VACCINATION HISTORY IN THE COMMENTS SECTION****

**Throat (Oropharyngeal) or NP Swab** - Throat swab is the preferred respiratory specimen over nasopharyngeal

- Collect within 2 weeks of rash onset.
- Use a sterile synthetic swab (e.g., Dacron).
  - *Note that the same swab type and viral transport media that are used for influenza or other respiratory viral panel PCR's are appropriate for measles PCR testing*
- Throat swab: Vigorously swab tonsillar areas with sterile swab.
- Nasopharyngeal swab: firmly rub posterior nasopharynx with sterile swab.
- Place swab into **liquid** viral or universal transport media. Do *not* use bacterial transport media.

#### Urine

- Collect 10-50 ml urine in a sterile container, within 2 weeks of rash onset
- Collect from the first part of the urine stream. The first morning void is ideal but not required
- Process the urine: Centrifuge at 500-600 x g for 10 minutes at 4°C. Resuspend the pellet in 2-3 ml of viral transport medium. If processing is not possible, store and ship the sample at 2° - 8°C within 24 hours.

**Serum IgM or IgG testing** – Serum is desired from any previously vaccinated patient as soon as measles is suspected when collecting throat swab and urine. Collection of serum from unvaccinated persons is unnecessary but can be useful if rash onset was >2weeks earlier.

- Collect 7-10 ml of blood in a red top or serum separator tube. Capillary blood (finger or heel stick) can be used for pediatric patients, if necessary; at least 3-5 capillary tubes are needed.
- The optimal time for collecting acute blood is at least 72 hours after rash onset. Serum collected before then may be falsely negative, but can be tested.
- If initial IgM testing is negative in an unvaccinated person and measles is strongly suspected, a second serum sample and specimens for PCR should be collected.
- IgG testing can be done on case contacts to determine prior exposure to the virus.

### Specimen storage instructions

**All specimens collected for measles testing should be stored between 2-8°C for up to 72 hours after collection**