



# MEASLES (Rubeola)

(Red measles, hard measles, 10-day measles, morbilli)



## BOX 1: Key Measles Facts



**Agent:** Measles (rubeola) virus

**Reservoir/Source:** Human/Respiratory tract secretions and fomites.

**Symptoms:** Febrile maculopapular rash illness accompanied or preceded by the “3 C’s” - cough, coryza, conjunctivitis. Fever is typically high (over 101°F). Rash begins at hairline, face and then proceeds downward and outward. Atypical and modified symptoms are common.

**Complications:** otitis media, pneumonia, dehydration, convulsions and acute encephalitis.

**Differential Diagnoses:** Kawasaki, rubella, scarlet fever, enteroviruses and other febrile rash exanthems. See Box 3 for details.

**Incubation:** From exposure to rash onset, 7-21 days with an average of 14 days.

**Communicability and Transmission:** From 4 days before onset of rash to 4 days after its appearance via direct contact with infectious droplets or by airborne spread. See Box 4.

**Specimen Collection/Lab Testing:** Throat, urine and serum, see Box 2 for details.

**Specific Treatment:** Supportive care only; antiviral agent not available.

**Post-exposure Immuno-prophylaxis:** Yes, see Box 5 for details.

**Recommended Vaccinations:** See Box 6

**Reportable Criteria:** Report by phone immediately upon suspicion of measles: 888-397-3993 (for Los Angeles County). **Do not wait for laboratory confirmation before reporting.**

**Report Forms to be completed:**

- [MEASLES \(RUBEOLA\) CASE REPORT \(CDPH-8345\)](#)
- [MEASLES EXPOSURE INTERVIEW FORM](#)
- [MEASLES CONTACT LINE LIST FORM](#)

## OVERVIEW OF MEASLES CHAPTER

**Investigation Types - Four investigations are detailed step-by-step, in the following order:**

- ✓ Investigation of a Single Suspected Case of Measles (*Steps 1–11*)
- ✓ Investigation of Asymptomatic Contacts of a Measles Case (*Steps 1-10*)
- ✓ Investigation of More than 1 Measles Case at A Venue (*Steps 1-2*)
- ✓ Public Health Specimen Collection Only from a Suspected Case or Contact (VPDCP Referral)

**Hyper-links:** All protocols, tools, forms and references accompanying each investigation are hyper-linked in a box located immediately before the steps of each type of investigation

**Boxes – Six inset boxes detail key concepts and guidelines routinely referenced in measles investigations and referred to in the investigation steps:**

- ✓ Box 1 – Measles Facts
- ✓ Box 2 – Measles Specimen Collection/Lab Testing
- ✓ Box 3 – Alternative Conditions that Result in Fever and Rash
- ✓ Box 4 – Determining Susceptibility & Risk to Measles
- ✓ Box 5 – Post-Exposure Immuno-Prophylaxis for Contacts
- ✓ Box 6 – Vaccination Recommendations

**Task Legend:**

- Phone notification, coordination or consultation required
- Task to be completed in a critical time frame
- Task requiring detailed documentation
- Task requiring reference to additional guidelines



## INVESTIGATION OF A SINGLE SUSPECTED CASE OF MEASLES

### *Reference Protocols/Tools (if there is no link to the document, please contact VPDC or CFS):*

- Vaccine Preventable Disease Control Program Measles Investigation Checklist 1 for Symptomatic Case-Patients
- [Public Health Nursing Practice Manual \(ACD: Individual\)](#)
- CFS Administration Algorithm – PHN Process for Monitoring a Measles Suspect or Contact Once Reported by Vaccine Preventable Disease Control Program
- “Public Health Nursing Home Visit REQUIRED Algorithm” (B-73 Part IV [Public Health Nursing Home Visit Protocol](#))
- Measles Activity Log - Vaccine Preventable Disease Control Program
- [MEASLES \(RUBEOLA\) CASE REPORT \(CDPH-8345\)](#)

### 1. 📞 **Measles Report Notification**

- a. If the Vaccine Preventable Disease Control Program (VPDCP) did not refer the suspect measles case-patient to the health district of the case-patient’s residence, the health district and/or the evaluating medical provider must immediately notify VPDCP of the case-patient by calling the main line at 213-351-7800 and asking to speak to the surveillance person on duty.
- b. VPDCP will then immediately conduct the initial assessment of the case-patient to determine if the case-patient requires further investigation or follow up by the health district.

### 2. 🕒 **Within 24 hours of notification by the Vaccine Preventable Disease Control Program, the health district will proceed with the next steps of the case and contact investigations.**

- a. At least one home visit is required within the first 24 hours from receipt of the case-patient assignment to conduct a face-to-face interview.
- b. If unsuccessful in reaching the case-patient after 3 attempts within 24 hours, a second home visit attempt is required within 48 hours from receipt of the assignment.
- c. If still unsuccessful in interviewing the case-patient, consult with PHN Supervisor for **immediate** referral to PHI.
- d. If at any point in the investigation, the case-patient becomes non-compliant with instructions to submit requested information or adherence to isolation/exclusion procedures, consult with PHN Supervisor for **immediate** referral to PHI.
- e. Obtain all documents in the IRIS file cabinet and read all the IRIS notes provided by the Vaccine Preventable Disease Control Program lead investigator.

### 3. **Clinical Assessment of Case-patient and Collection of Key Symptom Data:**

- a. Case-patient needs to be evaluated by a County or non-County clinician.
  - i. If already evaluated prior to first reporting to Public Health, the VPDCP will obtain the medical notes and will upload them to the IRIS file cabinet along with the VPDCP Initial Assessment Form of case-patient, upon referring to the health district.
- b. **? Clinical Assessment Findings:**

The following key info must be verified and compared with the Vaccine Preventable Disease Control Program’s findings which will be provided in the IRIS file cabinet and Notes/Remarks:

  - i. Fever onset date and duration
  - ii. Rash onset date and rash duration



- iii. Rash onset location on body and progression on body over time.
- iv. Presence or recent history of the 3 “C’s” (cough, coryza, conjunctivitis)
- v. Case-patient’s immune-compromised state at the time of exposure to measles and current time

#### 4. Isolation/Exclusion of Case-patient from Activity

- a. **Symptoms of febrile rash:** Regardless of measles immunity status, the case-patient should immediately not be allowed to attend school, participate in any social or academic activities and attend large public gatherings/venues until Public Health has determined the case-patient does not have measles.
- b. **Confirmed to have measles by Public Health:** Regardless of measles immunity status, the case-patient cannot attend school or participate in any social or academic activities until the 5<sup>th</sup> day after rash onset.
- c. **Hospitalized:** Prompt airborne isolation is required for 4 days after onset of rash. In immunocompromised case-patients, isolation should be maintained for the duration of the illness.
- d. **Fomites:** Disinfect fomites soiled with nose and throat secretions and urine.
- e. **Consult:** Contact the VPDCP for all other institutional exposure isolation procedures.

#### 5. Obtain needed specimens for measles testing: urine, throat and serum

- a. **Specimen Collection/Lab testing details:** See Box 2
- b. Coordinate with VPDCP
- c. If specimens are required to be collected by the health district, adhere to the follow guidelines:
  - i. **Specimen Collection outside of the Public**



### **BOX 2: Measles Specimen Collection/Lab Testing**



**Collect all the following specimens in consultation with the VPDC Program.**

**PCR testing can only occur at the State lab. Do NOT send throat/urine specimens to a commercial lab for testing**

#### Testing for Patients with a Rash:

- **Throat (Test: PCR)**
  - Timeline: Collect within 2 weeks of rash onset
  - Equipment:
    - Use sterile synthetic-non-organic swab (e.g., Dacron)
    - Place swab after collection into liquid viral or universal transport medium.
- **Urine (Test: PCR)**
  - Timeline: Collect within 2 weeks of rash onset
  - Equipment:
    - Collect 10-50 ml urine in a sterile container from the first part of the urine stream.
- **Serum (Test: IgM test for recent infection/vaccination)**
  - Timeline: Acute Serum - Optimally collect at least 72 hours after rash onset.
  - Equipment:
    - Collect 7-10 ml of blood in a serum separator tube (SST, red-gray rubber stopper or gold plastic stopper).
    - Capillary blood 2-5 tubes (finger or heel stick) can be used for pediatric patients.
    - If acute IgM is negative, a convalescent serum specimen may be requested 14-28 days later.

#### Immunity Testing for Asymptomatic Patients:

- **Serum (Test: Measles IgG only)**
  - Equipment is same as IgM serum test above

#### Storage and Lab Requisition Forms

- Call the Public Health Lab courier to pick-up specimens M-F 8:00am –5:00pm: 562-658-1460.
- Lab forms available at [http://publichealth.lacounty.gov/ip/VPDspecimen\\_collection.htm](http://publichealth.lacounty.gov/ip/VPDspecimen_collection.htm)
- *All specimens should be stored at 4°C/39°F until pick-up and shipped cold (i.e., not directly in contact with frozen icepacks). If unable to ship within 48 hours, freeze specimen immediately at -70°C (except for urine – centrifuge. store 4°C).*



- Health Center/off-site:** If the case-patient is still infectious, it would be ideal to collect specimens in a setting in which the case-patient cannot potentially expose others such as a negative pressure isolation room.
- ii. The staff member(s) collecting specimens must have documented immunity to measles (2 documented MMRs or a positive measles IgG titer).
  - iii. **Specimen Collection at the health center:** If the case-patient is still infectious and specimens must be collected at a public health center, do the following:
    1. Request the case-patient come to the health center at the end of the day or early in the morning to avoid other patients being seen at or 2 hours after the case-patient has departed the clinic.
    2. A PHN or other health center staff member who has documented immunity to measles (2 documented MMRs or a positive measles IgG titer) should meet the case-patient outside the health center to ensure the case-patient is not symptomatic.
    3. If the case-patient is symptomatic, specimen collection should ideally occur outside the health center. If this cannot take place, then an N-95 mask must be immediately placed on the case-patient and s/he should be escorted away from other patients directly to a private room to be evaluated and specimens collected. The room should not be used again until 2 hours have passed after the case-patient has departed the room.
  - d. Once specimens are collected, arrange for Public Health Lab courier pick up of specimen, per *Box 2 Storage and Lab Requisition Forms*
  - e. 📞 Notify the VPDCP of the specimens by emailing the VPDCP investigation lead staff member or by calling the main

line at 213-351-7800 and asking for the surveillance person on duty.

## 6. Immunization History, Prophylaxis, Attempted Treatments

- a. **Recent Vaccinations:** Determine from case-patient and evaluating clinician if the case-patient received any vaccinations during the last 3 months, notably an MMR. *Obtain the vaccination record.*
- b. 📄 **Immune-globulin:** Determine from case-patient and evaluating clinician if the case-patient received any IG within the last one year. *Document the date.*
- c. 📄 **Antibiotics:** Determine from case-patient and evaluating clinician if the case-patient received any antibiotics within the most recent 4 weeks. *Document the antibiotic name, dosage, indication, treatment start and completion dates.*
- d. **Immunization History:** Determine case-patient's immunization history including number of doses of measles vaccine and dates administered. *Obtain the vaccination record.*

## 7. 📄 Establish the possible source(s) of exposure to the case (7-21 days prior to rash onset)

- a. **Measles Activity Log:** Provide the case-patient with the VPDCP Measles Activity Log (if not already given) to elicit all possible sites and dates the case-patient could have been exposed to measles.
  - i. Prefill the possible exposure dates on the activity log (VPDCP can assist with the dates)
- b. **Key information to document:**
  - i. Did the case-patient travel anywhere in the U.S./outside the U.S. or attend any large public gatherings/parks during the 4 weeks before the rash onset date? (Record dates of travel/exit and re-entry into U.S.)
  - ii. Did the case-patient have any out-of-town visitors during the 4 weeks before the rash onset date? Document Details.





- iii. What is the occupation of the case-patient and where does s/he work? Healthcare worker? Specifics of the work site – health care facility, infant care settings, school, detention facility, etc.)?

**8. Identify contacts exposed to the case-patient**

- a. **Infectious Period:** Determine the exact dates of the infectious period of the case-patient (4 days before and through the 4th day after rash onset)
- b. **Measles exposure definition:** Sharing the same air space with a measles case-patient while infectious (e.g., same classroom, carpool, household, clinic waiting room/hallway, airplane, etc.) **OR** having been present in these areas within two hours after the measles case-patient had departed.
- c. **Exposure Sites:** Establish the sites and venues where the case-patient may have visited while infectious (e.g., households, carpool, school, daycare, worksite, gym, social activities, clubs, religious activities, airplanes, pharmacies, clinics, etc.)
  - i. **Measles Activity Log:** Provide the case-patient with the VPDCP measles activity log (if not already given) to elicit all possible sites and dates the case-patient could have exposed others to measles during the infectious period. Prefill the infectious period dates on the log.
- d. **Key information to document:**
  - i. Has the case-patient been around any high risk contacts: infants less than 12 months of age, pregnant women, immunocompromised persons, health care workers?
- e. Once asymptomatic contacts to the case-patient have been identified and a measles diagnosis has been verified in consultation with VPDCP, proceed to the section 'INVESTIGATION OF ASYMPTOMATIC CONTACTS OF A MEASLES CASE'

**9. Determine the diagnosis of measles in the case-patient in collaboration with VPDCP**

- a. **Presumptive Diagnosis:** A presumptive diagnosis of measles is based on clinical and epidemiological grounds.
- b. **Final Confirmatory Diagnosis:** In consultation with the VPDCP a final

**BOX 3: Alternative Conditions that Result in Fever and Rash**

- **Bacterial Conditions**
  - Meningococcemia
  - Secondary syphilis
  - Disseminated gonococcal infection
  - Bacterial endocarditis
  - Scarlet fever
  - Rat bite fever
  - Lyme disease
  - Relapsing fever
  - Leptospirosis
  - Murine typhus
  - Rickettsialpox
  - Tickborne Rickettsial diseases
  - Sylvatic and epidemic typhus
  - Scrub typhus
  - Capnocytophaga canimorsus* infection
  - Mycoplasma pneumoniae* infection
  - Typhoid and paratyphoid fevers
- **Viral Conditions**
  - Hand, foot, and mouth disease
  - Roseola
  - Rubella
  - Mononucleosis
  - Acute (primary) HIV infection
  - Cytomegalovirus infection
  - Human parvovirus B19 infection
  - Chickenpox
  - Colorado tick fever
  - West Nile virus disease
  - Chikungunya virus disease
  - Dengue fever
  - Zika virus disease
  - Viral hemorrhagic fevers
- **Other Conditions**
  - Drug eruptions
  - Kawasaki disease
  - Thrombotic thrombocytopenic purpura
  - Immune thrombocytopenic purpura
  - Immune complex vasculitis
  - Toxic shock syndrome
  - Erythema multiforme
  - Stevens-Johnson syndrome



confirmatory measles diagnosis will be determined by taking into consideration all the following factors:

- i. **Lab Results:** Review the laboratory results from all available specimens, including those that may indicate an alternative diagnosis to measles. See *Box 3, Alternative Conditions that Result in Fever and Rash*
- ii. **Recent vaccination:** Determine whether the case was vaccinated with a measles-containing vaccine up to 8 weeks prior to symptom development (*IgM antibodies can also be detected in individuals recently vaccinated against measles*)
- iii. **Clinical Presentation:** Verify the clinical presentation (both health district and VPDCP assessments)
- iv. **Immune-compromised status:** Verify if contact was immune-compromised
- v. **Exposure Source:** Verify exposure to measles either from travel abroad, out-of-country visitors, or direct linkage to another case
- vi. **Immunity Status:**
  1. See Box 4, *Determining Susceptibility & Risk Status to Measles*
  2. Birth before 1957 is not a reliable indicator of immunity, particularly in healthcare personnel

**10. Complete Measles Case Report Form/Epi Form (CDPH-8345)**

- 11. Case-Patient investigation check:** Refer to the VPDCP Measles Investigation Checklist 1 for Symptomatic Case-Patients to ensure you've completed all the steps of the investigation



**BOX 4: Determining Susceptibility & Risk Status to Measles**



- A **high risk individual** is considered susceptible to measles if s/he cannot produce evidence of additional immunity. High risk contacts include the following persons:
  - Healthcare personnel of any age
  - Pregnant women
  - Immunocompromised persons
  - Household contacts of a confirmed case
  - Persons in settings with ≥5% known unvaccinated persons (e.g., infant care settings, schools)
  - Recent international travelers
  - **Evidence of additional immunity required for high risk contacts, in order of acceptable proof:**
    - Documentation with dates of receipt of **two** doses of measles-containing vaccine given in 1968 or later, separated by at least 28 days, with the first dose on or after the first birthday OR
    - Documentation of a positive measles IgG test
- A **non-high risk individual** is considered susceptible to measles if s/he cannot produce documentation of immunity against measles. *Required documentation of immunity, in order of acceptable proof:*
  - Documentation with date of receipt of at least **one** dose of measles-containing vaccine given on or after their first birthday in 1968 or later OR
  - Documentation of a positive measles IgG test



## INVESTIGATION OF ASYMPTOMATIC CONTACTS OF A MEASLES CASE

**Reference Protocols/Tools (if there is no link to the document, please contact VPDC or CFS):**

- Vaccine Preventable Disease Control Program Measles Investigation Checklist 2 for Asymptomatic Contacts of a Measles Case
- Vaccine Preventable Disease Control Program Exclusion Guidance for Contacts of Confirmed Measles Cases
- CFS Administration Algorithm – PHN Process for Monitoring a Measles Suspect or Contact Once Reported by Vaccine Preventable Disease Control Program
- “Public Health Nursing Home Visit REQUIRED Algorithm” (B-73 Part IV [Public Health Nursing Home Visit Protocol](#))
- **MEASLES CONTACT LINE LIST**
- **MEASLES EXPOSURE INTERVIEW FORM**
- NOTIFICATION LETTERS
  - Exposure and Self-Isolation Notification to Susceptible Adults Exposed to Measles
  - General Measles Notification Letter to All Individuals at an Exposed Facility/School
  - Notification and Guidance to Facility Administrators Where Exposure to Measles Occurred
  - For Schools Only: Measles Exposure and Isolation Notification to Parents of Unvaccinated Students
  - For Schools Only: Measles Readmission Extension Notification to Parents of Unvaccinated Students
  - General Notification to All Individuals at an Exposed Facility/School at the End of the Measles Situation

1. **Identify all contacts and sites/venues where case-patient visited during infectious period (4 days before and through the 4th day after rash onset)**
  - a. Based upon information provided by the measles case-patient (*refer to Step 8 in the ‘INVESTIGATION OF A SINGLE SUSPECTED CASE OF MEASLES’*).
  - b. **Measles exposure definition:** Sharing the same air space with a measles case-patient while infectious (e.g., same classroom, carpool, household, clinic waiting room/hallway, airplane, etc.) **OR** having been present in these areas within two hours after the measles case-patient had departed.
2. **Determine contacts at each exposure site**
  - a. Conduct a site visit as soon as possible to all exposure sites/venues of the measles case to primarily establish a venue contact, identify the level of comingling, any other adjacent or linked venues, different campuses that share site/venue, building proximities, etc.
  - b. ✍ Using the MEASLES CONTACT LINE LIST (contact VPDCP or CFS for line list), generate a list of the names of the contacts exposed during the infectious period of the case at each exposure site(s) along with their measles immunity status.
  - c. Immediately obtain documented proof of measles immunity status of contacts if available.
    - i. 🕒 If documentation cannot be produced within 1 business day, measles IgG antibody testing only must be performed at a public health center immediately, especially if the contact may have plans to travel out of town. See Step 5 below.
3. **Initial Assessment of Each Exposure Site/Contact within 48 hours of Identification**
  - a. At least one exposure site visit is required during the first 24 hours from the receipt of the contact investigation assignment or disclosure of the exposure site by the case-patient in order to conduct a face-to-face interview with a site liaison.



- b. Within 24 hours of the receipt of the contact investigation assignment or disclosure of the exposure site by the case-patient, the PHN will make at least 3 attempts to reach each exposure site, with at least one attempt being an in-person visit.
- c. If unsuccessful in reaching the exposure site(s), a second site visit attempt is required within 48 hours from receipt of the assignment or disclosure of the exposure site(s) by the case-patient.
- d. If still unsuccessful in reaching the exposure site, see PHN Supervisor for additional instructions including consultation with VPDCP as to whether referral to PHI is warranted for a specific exposure site.
- e. If at any point in the investigation, the contact or exposure site becomes non-compliant with the need to submit required information or adherence to isolation/exclusion procedures, see PHN Supervisor for additional instructions including consultation with VPDCP as to whether referral to PHI is warranted for specific exposure site.
- f. Complete the **MEASLES EXPOSURE INTERVIEW FORM** to begin a thorough assessment of the susceptibility, risk and symptom status of every contact identified and listed in the measles contact line list for each exposure site.
- g. **School/Educational Facility Exposure Sites:**
  - i. Do not depend upon the school to notify Public Health of the susceptibility status of contacts (e.g., unvaccinated or under-vaccinated students staff, volunteers, etc.).
  - ii. If VPDCP has not done so already, request the school provide a copy of the immunization records of all students in the school ASAP. Alternatively, Public Health staff, with the school's assistance, can review all the immunization records during the first visit at the exposure site.
  - iii. Upon Public Health review of all records to verify the susceptibility status of the students, Public Health will decide which students need to be excluded from attending school. Refer

to the document, **'VACCINE PREVENTABLE DISEASE CONTROL PROGRAM GUIDANCE FOR EXCLUSION OF EXPOSED CONTACTS OF CONFIRMED MEASLES CASES'**

- h. **Geographic risk at an exposure site:** Determine from the facility which individuals share offices, classroom(s), wards, carpools, etc. or participated in other activities with the measles case(s) while the case(s) was infectious.
- i. **Health Care Facility Exposure Sites**  
 Notify VPDCP of any health care facility exposure sites. VPDCP will coordinate the contact investigations with the facility.

**4. Verify susceptibility and risk status of each contact using Box 4**



**5. Obtain any needed blood specimens from contact for immunity testing**

- a. **When to collect specimens for a contact?** If the contact cannot produce documented proof of measles immunity within 1 business day based upon their risk status in **Box 4**, then immediately arrange for blood/serum to be collected from the contact via Public Health for measles IgG testing only, especially if the contact may have plans to travel out of town, per **Box 2 Serum Equipment Instructions**.
- b. If blood/serum is required to be collected by the health district/Public Health, adhere to the follow guidelines:
  - i. **Specimen Collection outside of the Public Health Center/off-site:** It would be ideal to collect specimens in a setting in which the contact cannot potentially expose others if s/he develops symptoms since s/he may possibly be infectious at the time (e.g., at contact's home or in their car)
    - 1. The staff member(s) collecting specimens must have documented immunity to measles (2 documented MMRs or a positive measles IgG titer).
  - ii. **Specimen Collection at the health center:** If the blood/serum is collected







at a public health center, do the following:

1. Request the contact come to the health center at the end of the day or early in the morning to avoid other patients being seen at or 2 hours after the contact has departed the clinic in the event the contact may have symptoms unbeknownst to the PHN.
2. A PHN or other health center staff member who has documented immunity to measles (2 documented MMRs or a positive measles IgG titer) should meet the contact outside the health center to ensure the contact is not symptomatic.
3. If the contact has any kind of symptoms, specimen collection should ideally occur outside the health center. If this cannot take place, then an N-95 mask must be immediately placed on the case-patient and s/he should be escorted away from other patients directly to a private room to be evaluated and specimens collected. The room should not be used again until 2 hours have passed after the contact has departed the room.
  - a. If contact has a rash, urine and throat specimens, in addition to blood/serum, should also be collected.
- c. Once any specimen is collected, arrange for Public Health Lab courier pick up of specimen, per **Box 2 Storage and Lab Requisition Forms**
- d.  Notify the VPDCP of the blood or other specimens and symptom status of the contact by emailing the VPDCP investigation lead staff member or by calling the main line at 213-351-7800 and asking for the surveillance person on duty.
- e.  Record lab specimen collection and testing information along with results on the **MEASLES EXPOSURE INTERVIEW FORM**.

## 6. & Immuno-prophylaxis of contacts

- a. If the contact meets the criteria for receipt of MMR or Immune Globulin (IG) as listed in *Box 5*, then arrange with evaluating medical provider or within Public Health for contact to receive appropriate immune-prophylaxis even if the case-patient with whom the contact was exposed has not yet been confirmed to have measles.
- b.  Record on the **MEASLES EXPOSURE INTERVIEW FORM** whether the contact received an MMR or IG after exposure.

## 7. Exposure Notification and Isolation/Exclusion of Contacts from Activity

- a. **Exposure Notification Letters:** See CFS Website or VPDCP for most current site-specific exposure notification letters to all exposed contacts, regardless of susceptibility status. Do NOT create any new exposure notification letters without first consulting with the VPDCP.
- b. **Isolation/Exclusion Procedures:**
  - i. ***Which contacts should be isolated/excluded?*** After a thorough risk assessment, all susceptible contacts (See *Box 4*) to a case-patient confirmed to have measles should be instructed to not attend school, work or any other activities or social gatherings in the community or other households until instructed by Public Health.
    1.  ***Timeframes of isolation of all asymptomatic and susceptible contacts:***

**Start Date of Contact Isolation:** As soon as possible upon Public Health determination of susceptibility and risk

**End Date of Contact Isolation:**

      - a. ***Immuno-prophylaxis was not administered to Contact:*** 21 days from the last exposure date to the measles case while the case was infectious.
      - b. ***IG administered to Contact after Exposure:*** 28 days from the last exposure date



- to the case while the case was infectious
- c. **MMR administered to Contact after Exposure:** 14 days after receiving MMR dose unless the contact is a household member of a measles case, in which case the exclusion may be longer.
2. Alternate arrangements for being out of school or work can be arranged by the case-patient with DPH's input: home study plan, working from home, etc.
- ii. For detailed guidance on isolation/exclusion of exposed contacts from school or worksite attendance based upon susceptibility and risk status, see document *Vaccine Preventable Disease Control Program Exclusion Guidance for Contacts of Confirmed Measles Cases*'
  - iii. Educate susceptible contacts that while excluded from school and/or work, they should not attend any other activities or social gatherings in the community or other households.

## 8. Monitoring of Contacts for Symptom Development

- a. **How long to monitor contacts?**  
*Determine the surveillance period for each exposure site:* The end of the surveillance period for the contacts from each exposure site is 21 days from the most recent case's last date of attendance at the exposure site while infectious.
  - i. **MMR administered to Contact after Exposure:** The contact will need to be monitored for 21 days after the last date of exposure to the case-patient while the case-patient was infectious.
  - ii. **IG administered to Contact after Exposure:** Contact should receive an initial assessment and a final verification of symptom development 28 days after the last date of exposure to the case while the case was infectious.

- iii. Record this date on the MEASLES EXPOSURE INTERVIEW FORM for each contact
  - iv. Please note, this surveillance period can change if more cases develop at the exposure site.
- b. **Which contacts to monitor and how to monitor?**  
**All contacts, regardless of susceptibility status to measles:** Should receive, at a minimum, an initial assessment and a final verification after the end of the exposure site's surveillance period regarding the development of symptoms
    - i. The assessment and final verification of each contact can be conducted by either a PHN directly or a designated contact at the exposure site who subsequently notifies the PHN.
    - ii. Use the MEASLES EXPOSURE INTERVIEW FORM to record all this information.

**Susceptible Contacts Only:** Using the Measles Exposure Interview Form, all susceptible contacts should be monitored 1-2 times per week via the preferred method of communication.

- iii. The contact should be instructed to call the PHN as soon as symptoms develop and to self-isolate and not seek medical care at a health care facility before calling the facility first to provide notification of the measles-like symptoms and exposure.
- c. **Exposure Site Assessment:** An exposure site as a whole should be monitored for the duration of its surveillance period for the development of further cases. If more cases develop, new exposure notification letters may need to be sent to contacts.
  - d. If the contact does not develop symptoms by the end of the surveillance period, submit the measles exposure interview form directly to the VPDCP lead investigation staff.

## 9. If a Contact Develops Symptoms



- a. During surveillance monitoring, if a contact develops symptoms, do the following:
  - i. Immediately notify the VPDCP either by calling the VPDCP lead investigator or if not available, by calling the VPDCP main line at 213-351-7800 and asking to speak to the surveillance person on duty.
  - ii. Obtain medical notes if the contact was evaluated by a clinician.
  - iii. Begin the steps detailed in the 'INVESTIGATION OF A SINGLE SUSPECTED CASE OF MEASLES'

situation either through Incident Command or directly from the VPDCP.

**PUBLIC HEALTH  
SPECIMEN COLLECTION  
ONLY FROM A  
SUSPECTED CASE OR  
CONTACT (VPDCP referral)**





10. **Contact investigation check:** Refer to the 'Vaccine Preventable Disease Control Program Measles Investigation Checklist 2 for Asymptomatic Contacts of a Measles Case-Patient' to ensure you've completed all the steps of the investigation

**INVESTIGATION OF MORE  
THAN 1 MEASLES CASE  
AT A VENUE**

1. **Immediately notify the Vaccine Preventable Disease Control Program**
  - a. Immediately call the VPDCP if more than one suspected measles case is identified or reported at a venue, facility, or anywhere in the community. Call the VPDCP main line at 213-351-7800 and ask to speak to the surveillance person on duty.
2. **For each case, follow all procedures detailed in the Investigation of a Single Suspected Case of Measles and the Investigation of Asymptomatic Contents to a Measles Case**
3. **Additional Procedures Specific to the Outbreak Venue/Community**
  - a. Request any specific protocols and exposure notification protocols from the AMD, Nurse Manager or PHN Supervisor that are developed in response to this

1. **VPDCP Referral to the health district**
  - a. VPDCP will determine the nearest Public Health Center to the case-patient's or contact's home residence or worksite, if the latter is requested. The case-patient or contact will be notified that a Public Health Center staff member will be in contact with them to set up a date/time appointment for specimen collection.
  - b. VPDCP will call the PHN Supervisor and/or AMD to request specimens to be collected at a Public Health Center within a specified time frame from a case-patient or contact to a case-patient.
  - c. If requested by the PHN Supervisor or AMD, an email request will also be sent or an IRIS incident generated by VPDCP Epidemiology Unit staff.
2. **CASE-PATIENT: Specimens needed are urine, throat and serum**
  - a. *Specimen Collection/Lab testing details:* See Box 2
  - b. Case-patient needs to be called by a Public Health Center staff member within 1 business day of referral received by VPDCP to arrange an appointment.
  - c. **Specimen Collection outside of the Public Health Center/off-site:** If the case-patient is still infectious, it would be ideal to collect specimens in a setting in which the case-patient cannot potentially expose others (e.g., at case-patient's home or in their car)
    - i. The staff member(s) collecting specimens must have documented immunity to measles (2 documented MMRs or a positive measles IgG titer).



- ii. **Specimen Collection at the health center:** If the case-patient is still infectious and specimens must be collected at a public health center, do the following:
    - 1. Request the case-patient come to the health center at the end of the day or early in the morning to avoid other patients being seen at or 2 hours after the case-patient has departed the clinic.
    - 2. A PHN or other health center staff member who has documented immunity to measles (2 documented MMRs or a positive measles IgG titer) should meet the case-patient outside the health center to ensure the case-patient is not symptomatic.
    - 3. If the case-patient is symptomatic, specimen collection should ideally occur outside the health center. If this cannot take place, then an N-95 mask must be immediately placed on the case-patient and s/he should be escorted away from other patients directly to a private room to be evaluated and specimens collected. The room should not be used again until 2 hours have passed after the case-patient has departed the room.
  - d. Once specimens are collected, arrange for Public Health Lab courier pick up of specimens, per *Box 2 Storage and Lab Requisition Forms*
  - e.  Notify the VPDCP of the specimens by emailing the VPDCP investigation lead staff member or by calling the main line at 213-351-7800 and asking for the surveillance person on duty.
- 3. CONTACT EXPOSED TO A CASE-PATIENT: Specimens needed are blood only unless the contact is symptomatic**
- a.  *Specimen Collection/Lab testing details: See Box 2 Serum*
  - b. **Immunity testing** for asymptomatic contacts requires measles IgG testing only
  - c.  The Contact needs to be called by a Public Health Center staff member
- within 1 business day of referral received by VPDCP to arrange an appointment
  - d. **Specimen Collection outside of the Public Health Center/off-site:** It would be ideal to collect specimens in a setting in which the contact cannot potentially expose others since s/he may possibly be infectious at the time (e.g., at contact's home or in their car)
    - ii. The staff member(s) collecting specimens must have documented immunity to measles (2 documented MMRs or a positive measles IgG titer).
  - e. **Specimen Collection at the health center:** If the blood/serum is collected at a public health center, do the following:
    - 1. Request the contact come to the health center at the end of the day or early in the morning to avoid other patients being seen at or 2 hours after the contact has departed the clinic.
    - 2. A PHN or other health center staff member who has documented immunity to measles (2 documented MMRs or a positive measles IgG titer) should meet the contact outside the health center to ensure the contact is not symptomatic.
  - f. If the contact has any kind of symptoms, specimen collection should ideally occur outside the health center. If this cannot take place, then an N-95 mask must be immediately placed on the case-patient and s/he should be escorted away from other patients directly to a private room to be evaluated and specimens collected. The room should not be used again until 2 hours have passed after the contact has departed the room.
  - g. If the contact has a rash, urine and throat specimens, in addition to blood/serum, should also be collected. The contact should then be investigated as a case-patient.
  - h. Once any specimens are collected, arrange for Public Health Lab courier pick up of specimens, per *Box 2 Storage and Lab Requisition Forms*
  - i.  Notify VPDCP of the specimens and symptom status of the contact by emailing the VPDCP investigation lead





staff member or by calling the main line and asking for the surveillance person on duty.

**BOX 5: Post-Exposure Immuno-prophylaxis for Contacts**

- **MMR** < 72 hours of first exposure. *No harm has been noted if vaccine is given later in incubation period; however, later vaccination may not prevent measles*
- **Immune globulin (IG)** ≤ 6 days of first exposure if vaccine not an option
  - Infants 0-5 months of age
    - IMIG 0.5 ml/kg within 6 days of exposure
  - Infants 6 months – 11 months:
    - MMR vaccine within 72 hours preferred OR
    - IMIG 0.5 ml/kg (max dose 15 mL) within 6 days of exposure
  - Children >12 months of age:
    - MMR vaccine within 72 hours preferred OR
    - IVIG 400 mg/kg within 6 days of exposure
  - Susceptible Pregnant women:
    - 400 mg/kg IVIG within 6 days of exposure
  - Severely immunocompromised patients:
    - 400 mg/kg IVIG within 6 days of exposure (unless already receiving IVIG as party of therapy)
- **Contraindications:**
  - IG not to be given to persons with immunoglobulin A deficiency or history of anaphylactic reaction to IG
  - IMIG not be given to persons with severe thrombocytopenia or coagulation disorder that would contraindicate IM injections



**BOX 6: Vaccination Recommendations**



- **Measles-Mumps-Rubella (MMR) Vaccine**
  - Live-attenuated vaccine
  - Two doses are recommended for all persons over 12 months of age unless otherwise contraindicated (**see below**).
  - **Recommended schedule**
    - First dose is administered at 12-15 months of age
    - Second dose is administered at 4-6 years of age.
  - **Special populations:**
    - School aged children, college students, Other Postsecondary Educational Institutions
    - Health Care Personnel born during or after 1957
    - International Travelers >6 months of age
    - Women of child-bearing age
    - Household/Close contacts of immunocompromised Persons
    - Persons with HIV who do not have evidence of severe immunosuppression.
      - The minimum interval between doses is at least 28 days.
      - If a dose of measles vaccine was given before the first birthday, it should be repeated after first birthday
- **Contraindications to MMR**
  - Pregnant person or a woman who intends to become pregnant in the next 1 month.
  - Anaphylaxis due to neomycin, severe allergic reaction to any component of vaccine or prior MMR
  - Patients with immunosuppression (1) primary or acquired immunodeficiency, (2) blood dyscrasias, leukemia, lymphoma (3) family history of congenital/hereditary immunodeficiency unless immunocompetent (4) systematic immunosuppressive therapy including corticosteroids >2 mg/kg of body weight (or >20 mg/kg/day) administered >2 weeks.
  - High fever or severe illness
  - Vaccine should be given 14 days before or deferred for 3 to 11 months after immune globulin or blood transfusion depending on the product received.