



Measles Healthcare Exposure Investigation Quicksheet

SUSPECT MEASLES PATIENTS IN HEALTHCARE SETTINGS

- Ensure that your facility has a protocol in place to identify suspect measles cases and to place them in an airborne infection isolation room (AIIR), if available, or at a minimum, in a private room as soon as possible after the patient enters the facility.
- The protocol should include training triage staff to recognize measles symptoms, identifying which rooms are most suitable for a suspect measles case, and ensuring that all staff have documentation of immunity to measles
- Collect information on patient’s symptoms as well as epidemiological risk factors for measles.
- Epidemiological risk factors for measles include any of the following ‘exposures’ in the past 21 days:
 - Known contact with a measles case or an ill person with fever and a rash
 - Contact with an international visitor who arrived in the U.S. within the past 21 days
 - Travel outside the U.S., Canada or Mexico
 - Domestic travel through an international airport
 - Visited a U.S. venue popular with international visitors such as a large theme park
 - Lives in or visited a U.S. community where there are measles cases
- Consider measles in patients of any age or vaccination status who have [symptoms compatible with measles](#). Symptoms include fever, descending maculopapular rash and usually at least one or two of the “3 C’s”. Vaccinated persons may not have all the “C’s”. Presence of an epidemiologic risk factor should increase suspicion for measles.
- Once measles is suspected:
 - Mask patient and follow guidelines for [infection control](#) (see “Resources” section) and contact your facility infection control staff immediately.
 - Contact your [local health department](#) (see “Resources” section).

ABRIDGED INFECTION CONTROL MEASURES FOR SUSPECTED MEASLES PATIENTS

1. Immediately place a surgical mask on a patient suspected to have measles.
2. Do not allow patient to stay in the waiting area.
3. Immediately move patient to an AIIR and close the door.
4. The patient may remove their mask only when in an AIIR with the door closed.

5. If an AIIR is not available, place patient in a single person exam room with a closed door OR evaluate patient in an outside location away from other patients.
6. Only essential visitors and staff should be in the patient room. All staff should use N95 or PAPR along with standard precautions (gowns, gloves, and use of hand hygiene when exposure to blood or body fluids is likely).
7. Staff known to be susceptible to measles should not enter the room.
8. Collect throat swab and urine for PCR testing if measles is still suspected after obtaining the clinical history and performing a physical exam. Do not keep the patient to obtain a urine specimen. A sterile collection cup can be given to the patient for home collection.
9. Keep exam room vacant for 1-2 hours prior to cleaning after patient with suspected measles has left. The room can be cleaned using standard cleaning procedures.
10. If the patient is discharged home, advise patient to remain home until 4 days after rash onset or until measles is ruled out.

Please see [CDPH Healthcare Facility Infection Control Recommendations for Suspect Measles Patients](#) for more details (see “Resources” section).

LABORATORY DIAGNOSIS OF MEASLES

The preferred method for measles testing is reverse transcription polymerase chain reaction (RT-PCR) of urine specimens and throat or nasopharyngeal swabs.

Measles IgM antibody testing is not preferred because it is often falsely positive, and may also be falsely negative if blood is collected <72 hours of rash onset.

If a patient is suspicious for measles, the [local health department](#) should be contacted prior to obtaining specimens for measles PCR testing and can help with specimen submission to the appropriate public health laboratory (see “Resources” section). Commercial labs cannot perform measles PCR testing. See detailed information on [measles testing](#) in “Resources” section.

MEASLES CONTACT INVESTIGATION

Measles infectious period

From four days before rash onset through four days after rash onset (day of rash onset is day 0).



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Measles exposure area

Sharing the same airspace with a person with measles during the infectious period (4 days prior to the day of rash onset through 4 days after the day of rash onset).

Although there are no established guidelines for “shared airspace,” knowledge of the facility’s air handling system is helpful. Often the shared airspace is defined as the waiting room, exam rooms, and related hallway areas.

Measles exposure time period

If the number of air changes per hour (ACH) in the air space is unknown, persons who were in the same airspace from the time the infectious patient arrived in the area until 1 hour after the infectious person left the area or was placed in an AIIR are considered exposed. Although CDC recommends using a 2 hour window when the number of ACH is unknown, there is only one report in the literature of measles transmission >60 minutes after an infectious person has left an area.

If the number of ACH in the area is known, and is ≥ 12 , the time window may be reduced to 35 minutes. See Tables B.1 and B.2 in [CDC’s Guidelines for Environmental Infection Control in Health-Care Facilities](#) (in “Resources” section).

There is no need to extend the exposure time window beyond 1 hour.

Per CDC guidance, AIIRs built in 2001 and later must have ≥ 12 ACH (AIIRs built before 2001 must have ≥ 6 ACH); 99.9% of airborne-contaminants will be removed in 35 minutes from AIIRs with ≥ 12 ACH.

There is no guidance on the length of time needed to constitute a measles exposure, although transient exposure, e.g., unmasked patient walking through an area, is not typically considered an exposure.

Exposure investigation steps

Forming a multidisciplinary management team based on the facility resources can be extremely helpful in the investigation.

If measles is suspected:

1. Contact infection control staff and the [local health department](#) immediately (see “Resources” section).
2. Determine if the patient was masked before or immediately upon entry to facility and immediately placed in an AIIR. If not, then an exposure investigation must be conducted (Steps 3-9).

3. Define exposure area and time period (see definitions above). The local health department and the CDPH Immunization Branch (510-620-3737) are available for consultation.
4. Identify all exposed patients, visitors, and staff in the affected airspace from the time the patient entered the facility until one hour after the patient left if ACH in the affected area is unknown. If ACH in area is known, use Table 1.B in [CDC’s Guidelines for Environmental Infection Control in Health-Care Facilities](#) (see “Resources” section).
5. While waiting for laboratory confirmation of a highly suspect case:
 - Check the measles immunity status of exposed staff.
 - Identify exposed patients and staff who are likely to be unvaccinated or who are at high-risk for severe infection: infants <12 months of age, pregnant women, and [severely immunocompromised persons](#) (see definition in “Resources” section). Consider identifying all children <18 months of age as the first dose of MMR vaccine is recommended between 12-15 months of age.
 - Ascertain whether immunization data are available for exposed patients. If no immunization data is in patient medical records, the California Immunization Registry (CAIR) may be queried. The local health department and CDPH can help check CAIR if the facility does not have access.
 - Plan for the logistics of serologic testing for measles immunity (measles IgG testing) and administering intramuscular (IM) and intravenous (IV) immune globulin (IG) or MMR vaccine as post-exposure prophylaxis (PEP) according to recommendations (see [CDPH Measles Quicksheet](#) in “Resources” section).
 - Healthcare facilities typically do not stock IMIG so it may need to be rapidly ordered (see “Resources” section).
 - Hospital pharmacies typically have IVIG in stock if it is needed.
 - Healthcare facilities may wish to establish a dedicated location to draw blood for measles serology and administer measles PEP.



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If the suspect measles case is confirmed:

6. Contact patients (or their parents) who are likely to be unvaccinated (infants <12 months of age), potentially unvaccinated (infants 12-18 months of age), or high-risk (pregnant or immunocompromised) by phone as soon as possible. It should be determined:
 - If infants aged 12-18 months of age have received a dose of MMR vaccine;
 - If pregnant women can produce records of two doses of MMR vaccine;
 - If immunocompromised people are severely immunocompromised per [IDSA criteria](#) (see “Resources”); and
 - If anyone else was with the patient at the time of the exposure, and whether they are high-risk (as above), unvaccinated, or a healthcare worker.
7. Contact all other potentially exposed patients
 - If the number of patients is manageable, these patients should also be contacted by phone.
 - If number of patients is too large for phone calls to be practical, a certified letter may be sent, or in some healthcare systems, an email. CDPH has template interview forms and letters (see [CDPH Measles Toolkit](#) in “Resources” section).
 - Determine if the patient or anyone who was with them at the time of the exposure is high-risk (as above), unvaccinated, or a healthcare worker.
8. Attempt to determine measles immunity status of patient and other exposed persons (see Table and [CDPH Measles Quicksheet](#) in “Resources” section).
9. If PEP is indicated, and it is within the time window for the indicated PEP, it is the healthcare facility’s responsibility to arrange for PEP administration.
 - Unvaccinated people ≥ 12 months of age without contraindications for MMR vaccine should receive MMR vaccine PEP <72 hours of exposure. MMR vaccine given ≥ 72 hours after exposure will protect against future exposures, but not current exposure.
 - Unvaccinated infants <12 months of age should receive intramuscular immune globulin (IMIG) if it is ≤ 6 days of exposure.
 - Susceptible pregnant women should receive intravenous immune globulin (IVIG) if it is ≤ 6 days of exposure
 - If a pregnant woman thinks she was vaccinated but doesn’t have records, measles IgG testing may be done if there is time to get back results and give IVIG if needed.
 - Severely immunocompromised people should receive IVIG regardless of their measles immunity status if it is ≤ 6 days of exposure.

- Contact the [Licensing & Certification Program](#) if a confirmed measles case was not immediately masked and placed in an AIIR upon facility entry, if healthcare or other facility personnel are diagnosed with measles, or if there is a measles outbreak in the facility (≥ 3 linked cases). This applies to all healthcare facilities regulated by the L&C program (general acute care hospitals, ambulatory facilities, home health agencies, etc.).
10. Provide the list of exposed susceptible contacts (measles IgG negative, known unvaccinated, or who do not have a presumption of immunity) to your local health department for additional follow-up. Susceptible contacts who do not receive PEP may need to be placed on home quarantine.

RESOURCES

- [Local health department contacts](#):
https://www.cdph.ca.gov/Programs/CCLHO/CDPH%20Document%20Library/LHD_CD_Contact_Info_ADA.pdf
- [CDPH Healthcare Facility Infection Control Recommendations for Suspect Measles Patients](#):
<https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/Immunization/Measles-HCFacilityICRecs.pdf>
- [CDPH Measles Quicksheet](#):
<https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/Immunization/Measles-Quicksheet.pdf>
- [Measles Laboratory Testing Guidance](#):
<https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/Measles-Testing-InformationVRDL.pdf>
- [CDPH Measles Toolkit](#):
<http://izcoordinators.org/outbreaks/measles-toolkit/>
 - To login, use the username: “Measles Group” and the password: “Vaccinate!”
- [Information on IG administration](#) is available at:
<https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/Immunization/Measles-IGPEPQuicksheet.pdf>
 - One source of IG is FFF Enterprises in Temecula, California, which can be reached 24/7 at 1-800-843-7477 for rapid ordering
- [CDC/HICPAC Guidelines for Environmental Infection Control in Health-Care Facilities](#)
 - Table B.1. ACH and time required for airborne-contaminant removal by efficiency and Table B.2. Ventilation requirements for areas affecting patient care in hospitals and outpatient facilities at:
<https://www.cdc.gov/infectioncontrol/pdf/guidelines/environmental-guidelines.pdf>



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ASSESSING MEASLES IMMUNITY

Contacts who are not classified as high-risk[†] can be presumed to be immune to measles for the purposes of measles case investigations if they:

- were born
 - in the U.S. prior to 1957; or
 - outside the U.S. prior to 1970 **AND** moved to the U.S. in 1970 or later;[‡] or
 - in any country in 1970 or later and attended a U.S. primary or secondary school;[‡] or
- have written 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
- have a documented IgG+ test for measles; or
- laboratory confirmation of previous disease; or
- served in the U.S. armed forces; or
- entered the U.S. in 1996 or later with an immigrant visa or have a green card[‡]

[†]Additional evidence of immunity is required for exposed high-risk persons, e.g., healthcare personnel of any age, non-immune pregnant women, immunocompromised people, household contacts of a case, or persons in settings with known unvaccinated persons (e.g., infant care settings). Additional evidence of immunity may also be required during an outbreak. Immunity can be presumed in a high-risk person if they have:

- documentation of a positive measles IgG test; or
- documentation of two doses of measles vaccine given in 1968 or later, separated by at least 28 days, with the first dose on or after the first birthday

[‡]Unless known to be unvaccinated for measles, e.g., having a medical contraindication to vaccination or being philosophically or religiously opposed to vaccinations.

2013 IDSA DEFINITION OF SEVERE IMMUNOCOMPROMISE

The [IDSA Guideline](#) (see “Resources”) definition of high-level immunosuppression is below. Consider consulting with patient’s treating physician to determine the level of immunosuppression.

- Patients with high-level immunosuppression include those:
 - with combined primary immunodeficiency disorder (e.g., severe combined immunodeficiency);
 - receiving cancer chemotherapy;
 - within 2 months after solid organ transplantation,
 - with HIV infection with a CD4 T-lymphocyte count <200 cells/mm³ for adults and adolescents and percentage <15 for infants and children;
 - receiving daily corticosteroid therapy with a dose ≥ 20 mg (or >2 mg/kg/day for patients who weigh <10 kg) of prednisone or equivalent for ≥ 14 days; and
 - receiving certain biologic immune modulators, that is, a tumor necrosis factor-alpha (TNF- α) blocker or rituximab.

After hematopoietic stem cell transplant, duration of high-level immunosuppression is highly variable and depends on type of transplant (longer for allogeneic than for autologous), type of donor and stem cell source, and post-transplant complications such as graft versus host disease and their treatments.