

# Measles Frequently Asked Questions

## Suspect measles cases and diagnostics

### 1. What is considered a suspect measles case?

- a) Measles should be considered in patients of any age who have a fever, plus at least one of the three “Cs” (cough, coryza, or conjunctivitis), and a descending rash that starts on the face, especially if the patient has an epidemiological risk factor within the last 21 days. Epidemiologic risk factors include:
  - i. Contact with a known measles case or ill person with fever and rash
  - ii. International travel or contact with an international traveler
  - iii. Domestic travel through an international airport
  - iv. Visited a large venue with international visitors such as a theme park
  - v. Lives or travels to a community where there are measles cases/outbreaks, including in the U.S.

### 2. Does measles infection lead to different signs and symptoms in adults and children?

- a) Classic measles infection in an unvaccinated patient leads to similar signs and symptoms in adults and children, which includes fever, rash, and typically at least one of the three “Cs” (cough, coryza, or conjunctivitis).
- b) If a patient has pre-existing immunity through vaccination or maternal antibodies, they may have milder signs and symptoms and an absent or atypical rash.

### 3. If a clinician suspects that a patient may have measles, what should they do?

- a) If a patient with suspected measles is at your healthcare facility:
  - i. Immediately mask the patient (if > 2 years old) and isolate them in an airborne isolation room (AIIR), if possible. If no AIIR is available, please place the patient in a private room with the door closed and keep the room vacant for 1 hour after patient leaves.
  - ii. Place the patient in High Level Respiratory Isolation and ensure signage is placed on the outside of patient’s door.
  - iii. Alert the infection prevention and control (IPC) team, if applicable.

- iv. Work with the IPC team to contact SFDPH Communicable Disease (628-217-6100) immediately.
- b) If a patient with suspected measles is at home (i.e., identified via telehealth):
  - i. Ask the patient to self-isolate at home, away from non-household and unimmunized individuals such as infants. The patient should isolate until measles has been ruled out, or until their presumed infectious period (4 days prior to rash onset to 4 days post rash onset) is over.
  - ii. Contact SFDPH Communicable Disease (628-217-6100) immediately and ensure the Infection Control team is aware.

#### **4. When should SFDPH Communicable Disease be notified?**

- a) When measles is suspected in an ill person with a fever, plus at least one of the three “Cs” (cough, coryza, or conjunctivitis), and a descending rash that starts on the face, especially if the patient has an epidemiological risk factor within the last 21 days (see above for epidemiologic risk factors).
  - i. Ensure that the Infection prevention and control (IPC) team is aware, if applicable.

#### **5. Who approves testing, and what is the process?**

- a) SFDPH Communicable Disease provides approval for all testing for patients suspected of having measles, which is performed at the San Francisco Public Health Laboratory.
- b) Clinicians with patients suspected of having measles should reach out to Communicable Disease at 628-217-6100 (24/7) for testing consultation and approval.
  - i. Ensure that the infection prevention and control team (if you have one at your facility) is aware of all suspect cases.
- c) Approval is provided by the Medical Director of the Communicable Disease Program or Population Health Division on-call physician; this decision will take into consideration the patient’s immune status, clinical suspicion, and differential diagnosis.

#### **6. What specimens are needed for measles testing?**

- a) Throat (preferred) or nasopharyngeal (NP) swab PLUS urine (when possible). It is not necessary for measles testing to obtain both throat and NP swab.

- b) Specimens can be collected prior to approval by Communicable Disease and can be discarded if testing is not indicated.

**7. How should specimens be handled and stored?**

- a) Use a Dacron swab in liquid viral or universal transport media.
- b) Urine 10-50 mL, preferably unprocessed.
- c) Specimens should be refrigerated between 2 and 8 degrees Celsius for less than 24 hours and will be transported via a local courier on cold packs to the Public Health Laboratory.
- d) If longer storage is necessary, store at -70°C or colder (urine specimens must be processed before freezing).
- e) Additional instructions can be found on the [SFDPH Public Health Laboratory website](#).

**8. What type of testing occurs at the Public Health Laboratory?**

- a) The SFDPH Public Health Laboratory will conduct real-time reverse transcriptase polymerase chain reaction (PCR) testing for the presence of measles virus RNA.

**9. What is the testing turnaround time?**

- a) Turnaround time is generally within 24 hours once specimen is received in lab.
- b) Highly suspicious cases can be expedited, as resources allow.

**10. What about serologic testing? Do you recommend IgM testing?**

- a) The gold standard test to diagnose or rule out acute measles infection is a PCR test.
- b) IgM can have both false-positive and false-negative results; therefore, it is only recommended in specific situations (ex: more than 3 days after rash onset).
- c) IgM testing is only conducted at the California Department of Public Health Laboratory or at commercial laboratories.
- d) By contrast, IgG testing is used to determine immunity to measles, not for the diagnosis of acute infection.

## Response to a measles case

### 11. If a test is positive, what is the initial public health response?

- a. Once a positive test result is known, SFDPH Communicable Disease will reach out to the case to review medical history, determine symptoms and onset, assess who the case may have exposed during their infectious period, and begin contact tracing. During this call, education is provided on the duration of isolation and what to do if the case requires additional medical care (ex: call ahead and notify of measles diagnosis prior to arrival).

### 12. What are the types of post-exposure prophylaxis (PEP) for close contacts, and when can they be given? How effective are they?

- a) Measles, mumps, rubella vaccine (MMR) PEP: Susceptible persons 6 months and older with one or no documented doses of MMR may receive a dose of the MMR vaccine as PEP, if not contraindicated. **MMR PEP must be administered within 72 hours after first exposure to be effective.** Persons who received MMR PEP within 72 hours of exposure may discontinue quarantine but are still excluded from high-risk settings.
  - i. If a reportedly fully vaccinated individual has no documentation of MMR vaccination, they may receive an additional dose of MMR vaccine. A third dose of MMR vaccine is safe and not contraindicated for most people.
- b) Immune globulin (IG) PEP: IG PEP is recommended for high-risk individuals, including infants under 6 months, unvaccinated pregnant persons, and severely immunocompromised individuals, who are not candidates for MMR. **IG PEP can be administered up to 6 days after first exposure for effective protection.** Persons receiving IG PEP must still be excluded from high-risk settings during their incubation period.
  - i. Individuals not immune to measles who receive IG PEP should get MMR vaccine 6 months (for intramuscular IG) or 8 months (for intravenous IG) after receiving IG to protect themselves in the future against measles.
- c) For dosing, please see the [Immune Globulin information sheet](#) or [CDPH Measles Quicksheet](#).

- d) Research is preliminary, but effectiveness ranges from 83-100% for MMR PEP and 76%-100% for IG PEP. Source: [Post-exposure prophylaxis for the prevention of measles: A systematic review - ScienceDirect](#)

### **13. Why is a close contact placed under quarantine and what does that mean?**

- a) Close contacts, without documented evidence of measles immunity (ex: positive measles IgG titer, or documentation of 2 MMR vaccines) who have not received measles PEP are at high risk for acquiring measles and spreading it to others.
- i. The goal of quarantine is to limit measles exposures to others should they themselves become infected with the virus.
  - ii. Persons under quarantine are asked to isolate at home from day 7 after their first exposure to measles through day 21 after their last date of exposure, and to monitor for symptoms.
  - iii. If a contact suspects they are immune but does not have documentation, they can obtain IgG to confirm immune status and if positive, avoid quarantine.

### **14. Why are exposed contacts placed under exclusion and what does that mean?**

- a) Persons without documented evidence of measles immunity (ex: 2 MMR vaccinations, or a positive measles IgG titer) who have evidence of either partial vaccination (ex: 1x MMR vaccination) or who have received measles PEP, are considered at elevated risk of acquiring measles and passing it on to others.
- i. Persons under exclusion, not otherwise placed in quarantine, are asked to avoid high-risk settings (ex: healthcare settings, daycare settings with persons under 12 months of age, settings with pregnant persons) to limit possible exposures to populations at-risk for severe measles disease should they themselves become infected with measles.
  - ii. These individuals are asked to avoid high-risk settings from day 7 after their first exposure to day 21 after their last exposure but may go to work or school if not in a high-risk setting. If IG PEP is received, exclusion is extended to 28 days after their last measles exposure because these individuals can have a prolonged incubation period or modified or atypical symptoms if they experience infection.

## **15. What are the types of symptom monitoring for exposed contacts?**

- a) Passive symptom monitoring: During passive symptom monitoring, the exposed contact is advised to report any symptoms during the specified period of time to SFDPH and their provider. This applies to:
  - i. Exposed contacts who are fully vaccinated
  - ii. Exposed contacts with 1 documented MMR dose or who meet the [presumption of immunity criteria](#)
  - iii. Exposed contacts who are not at risk for severe disease, received PEP, and do not have contact with a high-risk setting (i.e. healthcare, infant care setting)
- b) Active symptom monitoring: During active symptom monitoring, specific exposed contacts will be contacted every day during the specified period of time and asked if they are experiencing any new symptoms. Any report of new symptoms will automatically be reported to SFDPH. This applies to:
  - i. Exposed contacts at risk for severe disease (pregnant individuals who are unvaccinated or received only 1 MMR dose, unvaccinated infants <12 months, and severely immunocompromised individuals)
  - ii. Exposed contacts at high risk for transmission (household contacts and unvaccinated or under-vaccinated individuals)
  - iii. Exposed contacts who work in or are part of a high-risk setting (i.e. healthcare, infant care setting)

## **16. How long are exposed contacts monitored for symptoms?**

- a) Exposed community contacts are monitored by SFDPH Communicable Disease for symptoms from 7 days after first exposure through 21 days from last exposure.
- b) If the exposed contact received IG PEP, the monitoring period is extended through 28 days as IG may prolong the incubation period for measles or result in milder or atypical symptoms.
- c) Exposed healthcare worker contacts are monitored by Occupational Health.

## **Immunization**

### **17. What is the vaccination schedule for measles?**

- a) Children should receive 2 doses of MMR vaccine, at 12-15 months of age for dose 1 and 4-6 years for dose 2. Doses should be administered at least 28 days apart.
  - i. Children 6-11 months of age with planned international travel or domestic travel to areas with active measles transmission should receive an MMR dose at least two weeks before traveling and then complete the 2-dose series starting at 12 months of age.
  - ii. Children 12 months and older who have only received one MMR dose can receive their second MMR early at least two weeks prior to traveling.
- b) Adults aged  $\geq 19$  years should receive at least 1 MMR vaccine dose to protect against measles.
  - i. Many adults have indications for receiving 2 doses of MMR to protect themselves and others. A second MMR dose is recommended for health care workers, international travelers, post-secondary education students, close contacts of people with immunocompromising conditions, and people with HIV without evidence of severe immunosuppression.
- c) Adults born before 1957, anyone with laboratory evidence of immunity by serology, or anyone with a laboratory-confirmed measles infection, have presumptive immunity against measles and do not require additional MMR vaccination.
  - i. However, it is recommended that health care workers born before 1957 without laboratory evidence of immunity receive 2 MMR doses, especially in high-risk areas or outbreak settings.

**18. What is the vaccine effectiveness for 1 and 2 doses?**

- a) The effectiveness of 1 MMR dose against measles is 93% and 2 doses is 97% per CDC.
- b) No vaccine is 100% effective; however, vaccinated individuals who experience infection with measles generally experience less severe illness compared to unvaccinated individuals and are less likely to transmit measles to others.

- c) Studies have shown that the MMR vaccine provides highly durable protection against measles.

**19. Why could an IgG be negative if an individual is vaccinated?**

- a) IgG levels may wane over time following MMR vaccination and a small proportion of individuals may not mount an antibody response, although these individuals develop protective cellular immunity not measured by antibody tests.
- b) Individuals who have received 2 documented doses of MMR are considered immune regardless of IgG status.

**20. Should patients check their serology to confirm immunity? If so, at what cadence?**

- a) Routinely checking serology following 2-dose MMR vaccination is not recommended. As above, antibody levels may decline over time but previously vaccinated individuals still have protective cellular immunity not measured by antibody tests. Valid documentation of receiving two doses of MMR supersedes results of serological testing for measles.
- b) If an individual is not sure if they received MMR vaccine earlier in life, giving an MMR vaccine is generally recommended (and is safe and effective) rather than checking serology for immunity.

**21. Are there recommendations for additional doses or boosters for specific populations?**

- a) MMR booster doses are generally not required for individuals who have completed a 2-dose MMR vaccine series but may be indicated in several situations.
  - i. Children who received an early MMR dose at 6-11 months should receive a regular 2-dose MMR vaccine series starting at 12 months of age.
  - ii. If an individual received a second MMR dose <24 days after the first dose, the second dose is considered invalid and they should receive an additional MMR dose at least 28 days after the last dose received for protection against measles.

- iii. A small number of individuals (<1 million) vaccinated from 1963-1967 received an inactivated measles vaccine that did not provide durable protection and is no longer used (Pfizer-Vax Measles-K). Individuals vaccinated during this period who received an inactivated vaccine or with unknown type of measles vaccine should receive vaccination using the current highly effective live MMR vaccine.

## **22. Can a booster of MMR be given to a patient if strongly desired?**

- a) Individuals who have been vaccinated with two valid doses of live MMR vaccine after 12 months of age are considered protected against measles for life and additional (booster) doses are not generally recommended.
  - i. Two doses of MMR has an estimated effectiveness of 97% against measles, and the small number of individuals who experience measles infection after MMR vaccination are much less likely to experience severe illness or transmit infection to others compared to unvaccinated individuals.
- b) Many adults who received only one prior MMR dose have an indication for a second vaccine dose (see above question 17b).
- c) If an individual strongly desires an additional dose of MMR and decides to be vaccinated, the vaccine is safe with a very low risk of adverse effects.

## **Resources:**

1. [Learn about measles | SF.gov](#)
2. [San Francisco Department of Public Health Confirms Measles Case in San Francisco Infant | SF.gov](#)
3. [Health Advisory: Measles Case Confirmed in San Francisco | SF.gov](#)
4. [Measles Investigation Quicksheet](#)
5. [Measles Healthcare Exposure Investigation Quicksheet](#)