

CDC/IDSA Clinician Call

Focus on Measles

April 17, 2024

Q&A

Updated April 30, 2024

This is the Q&A transcript from the Zoom webinar held on April 17, 2024. The views and opinions expressed here are those of the presenters and do not necessarily reflect the official policy or position of the CDC or IDSA. Involvement of CDC and IDSA should not be viewed as endorsement of any entity or individual involved.

- 1. If a person who needs a measles vaccine has a pregnant household member, is it safe to administer the vaccine to the person? or would that not be safe for the pregnant householder?**

Thomas (Dan) Filardo, MD: Yes, it is safe for household members of pregnant people to be vaccinated with MMR vaccine.

- 2. Can you please clarify recommendations for prenatal screening for measles immunity? Is written documentation of MMR vaccination x 2 sufficient, or should IgG be checked for every pregnant patient?**

Thomas (Dan) Filardo, MD: Written documentation of MMR vaccination is considered presumptive evidence of immunity for measles, and serology screening would not be required for all patients. Patients without documented MMR, therefore with unknown immunity, can receive IgG testing.

- 3. So, if you have been immunized and you were born in 1963 you should get an additional shot?**

Thomas (Dan) Filardo, MD: Adults born after 1957 have presumptive evidence of immunity if they have received 1 documented dose of MMR, unless they are in high-risk settings (e.g., healthcare workers, postsecondary education students, or international travelers). Some people who received measles vaccine during 1963-1967 may have received the inactivated vaccine, which was later shown to not be as effective; this vaccine was given to less than a million people in total. People who received the inactivated vaccine should receive MMR. There's some more information on our CDC measles FAQ site here: <https://www.cdc.gov/measles/about/faqs.html>

4. Why are adults born after 1957 with one documented MMR NOT recommended to have a 2nd dose before international travel? Is this basically a cost-benefit analysis?

Thomas (Dan) Filardo, MD: Apologies for any confusion. The two-dose recommendation before international travel applies to children >12 months of age, and to adults.

5. Excellent review by Dr. Filardo. Question. vaccine storage was a major barrier to distribution in remote areas. Improvements on the horizon for improved, easily transportable vaccines?

Thomas (Dan) Filardo, MD: Certainly not an expert in this realm of measles, but our branch at CDC is actively involved in the development of microneedle patch formulations for delivery of measles vaccination, which could allow for delivery in places where there are logistical concerns (e.g., cold chain).

6. If someone potentially had Measles before, how likely will they get measles again? If they get a titer, will it show immunity from previous infection?

Thomas (Dan) Filardo, MD: People with measles are considered to have lifelong immunity; repeat infection with measles has been reported in a very rare instances in case reports. An IgG level would show immunity from previous infection. As I highlighted, presumptive evidence of immunity requires laboratory-confirmed measles infection, given that many other infections can mimic measles (e.g., parvovirus, HHV-6), so a self-reported measles infection history does not qualify here.

7. How long is the Vitamin A treatment recommended for?

Thomas (Dan) Filardo, MD: Vitamin A is administered on 2 days back-to-back; there is additional information on CDC's website here for dosing:
<https://www.cdc.gov/measles/hcp/index.html>

8. In addition to throat swab PCR- would you suggest blood sample PCR or urine PCR for higher sensitivity of diagnosis?

Thomas (Dan) Filardo, MD: Recommendations differ a little bit by jurisdiction; in general, CDC recommends a throat swab or NP swab for PCR, and considering urine in addition to (but not replacing) the NP/OP. This can help improve sensitivity, especially if testing is after the optimal time frame for an NP/OP swab (within 3 days of rash onset). Blood sample PCR is generally limited to research settings; CDC does not perform it, and I don't know of state public health labs that perform it either.

9. Is the definition of immunity in pregnant women 1 dose of measles vaccine after the 1st birthday or is it 2 doses of appropriately timed measles vaccines?

Tina Tan, MD, FIDSA, FPIDS, FAAP: Immunity in pregnant women today is really 2 doses of measles vaccine after their first birthday that are appropriately timed. Two doses of vaccine have been recommended since 1990-1991 and is considered to be the definition of up to date.

10. Can you please discuss IGIM (Intramuscular IG)? any caveats or limitations?

Tina Tan, MD, FIDSA, FPIDS, FAAP: IGIM can be used however the volume that will need to administer usually prevents it from being given.

11. Has a specific timeframe been defined for 'prolonged exposure' to a measles case? For example, if a vaccinated/immune individual is exposed to a measles case for a prolonged period of time, what is the timeframe for the prolonged period of time?

Christopher Prestel, MD, FAAP: For healthcare settings, a specific timeframe is not defined for exposure to someone with measles. Instead, the recommendations discuss exposure as someone who is in a shared air space with an infectious measles patient at the same time or in a shared air space vacated by an infectious measles patient within the prior 2 hours.

More information on healthcare settings is available in the interim infection prevention and control recommendations for measles:

<https://www.cdc.gov/infectioncontrol/pdf/guidelines/Measles-Interim-IC-Recs-H.pdf>

12. Can we get copies of the pictures of measles for health alerts to providers who mostly haven't seen it in their careers?

Christopher Prestel, MD, FAAP: Many of the measles photos are publicly available through PHIL which can be accessed at this link:

<https://www.cdc.gov/measles/symptoms/photos.html>

13. Would you recommend testing fully immunized children if there is no travel or known exposures, but the rash is suggestive and there is no alternative confirmed etiology?

Thomas (Dan) Filardo, MD: Testing decisions are always challenging; CDC has published a testing flowsheet that could be considered here:

<https://www.cdc.gov/measles/toolkit/state-health-departments.html> . Generally, it's safe to say that measles is very unlikely in fully immunized people with known travel or exposures, but the decision to test is always in the hands of the provider if there still is concern (clinical characteristics, severity of illness), and contacting public health about the suspect case can also be helpful.

14. Re: the efficacy slide - one of the lessons of the COVID-19 pandemic seems to have been to be very specific when referring to vaccine efficacy. In this case, do the figures refer to efficacy against infection? Symptomatic illness? Severe disease/hospitalization?

Thomas (Dan) Filardo, MD: Great point. The general %s reported for MMR are vaccine effectiveness (not efficacy), and these are prevention against infection. 1 dose is considered 93% effective, 2 doses considered 97% effective.

15. Face Mask- Is CDC recommending N95 or routine surgical mask for any suspected source?

Christopher Prestel, MD, FAAP: I may be missing some of the questions here. For healthcare personnel, they should use Airborne Precautions when caring for someone with known or suspected measles which would be respiratory protection using respiratory protection.

HCP should use respiratory protection (i.e., a respirator) that is at least as protective as a fit tested, NIOSH-certified disposable N95 filtering facepiece respirator, regardless of presumptive evidence of immunity, upon entry to the room or care area of a patient with known or suspected measles.

More info ins in the interim recommendations:

<https://www.cdc.gov/infectioncontrol/pdf/guidelines/Measles-Interim-IC-Recs-H.pdf>

16. If a HCW has had two documented MMR vaccines but has a negative measles IgG (presumably has waned), do they need to be revaccinated?

Christopher Prestel, MD, FAAP: CDC considers individuals protected from measles if they have written documentation showing two doses of MMR/measles-containing vaccine (infants ages 6-11 months of age would only need documentation for one dose). Titers are not required to evaluate immunity, and additional doses are not required if titers are low.

Updates as of 4/30/2024:

17. Can you share the APIC reference about considering someone with 2 MMR's and a -IgG to be considered to have presumptive immunity?

Tina Tan, MD, FIDSA, FPIDS, FAAP: Presumptive evidence of measles immunity is discussed in the Prevention of Measles, Rubella, Congenital Rubella Syndrome, and Mumps, 2013: Summary Recommendations of the Advisory Committee on Immunization Practices (ACIP) report which can be accessed at:

<https://www.cdc.gov/mmwr/preview/mmwrhtml/rr6204a1.htm>

18. Are RT-PCR swabs of conjunctival cul-de-sacs useful in diagnosis?

Tina Tan, MD, FIDSA, FPIDS, FAAP: This is not a specimen that probably will have much yield; the recommended specimens are respiratory specimens (NP/OP swabs) and urine. Additional information about testing for measles can be found here:

<https://www.cdc.gov/chickenpox/downloads/MMRV-Testing-for-Clinicians.pdf>.

19. Are there any recommendations for treatment (not post-exposure prophylaxis) and the role of oral ribavirin?

Tina Tan, MD, FIDSA, FPIDS, FAAP: There are currently no recommendations for using oral ribavirin for therapy.

20. Can you comment on the number of cases occurring in vaccinated individuals?

Thomas (Dan) Filardo, MD: As detailed in a recent MMWR publication, during January 1, 2020–March 28, 2024, 5% of cases occurred among people with 1 documented MMR dose, and 4% of cases occurred among people with 2 documented MMR doses.

<https://www.cdc.gov/mmwr/volumes/73/wr/mm7314a1.htm>

21. Can someone point me to the original studies that determined contagiousness of measles and can someone point me to articles or reports of documented transmission of measles in open air venues.

Thomas (Dan) Filardo, MD: Plotkin’s Vaccines, 8th Edition, lists some articles for reference of the high degree of contagiousness in the Measles chapter, specifically:

Ehresmann KR, et al. J Infect Dis. 1995;171:679-683.

Top FH. Am J Public Health. 1938(28):935-943.

Hope-Simpson RE. Lancet. 1952;2:549-554.

22. Given the threat of a measles outbreak in a prison, do you have any specific recommendations for how serology or vaccination (pre-exposure) can be used to increase the level of protection (in the event of an outbreak)? Do you have any recommendations for employee health programs in corrections? Although MMR is recommended prior to going to college/university due to high risk for transmission because of “large concentrations of persons”, it is not recommended for congregate carceral settings. Why is that? Thanks!

Thomas (Dan) Filardo, MD: Apart from healthcare facilities and educational institutions, ACIP and CDC do not have setting-specific recommendations for measles, including for congregate settings such as correctional facilities.

Employee health programs can work to ensure that their employees have documentation of presumptive evidence of measles immunity, as appropriate to the individual’s age and job duties, per ACIP recommendations for adults. by performing IgG testing would not substantially delay vaccination, then it could be performed to determine who is susceptible or immune. Otherwise, if serology cannot be performed quickly, then the public health response should include vaccination of susceptible or unknown immunity contacts, ideally within 72 hours of exposure, as post-exposure prophylaxis; or after 72 hours to prevent measles from future exposures.

In the event of an outbreak of measles in a congregate setting, contacts of a confirmed measles case should be assessed for evidence of immunity, as outlined by ACIP. Documentation of prior receipt of MMR should be assessed if possible; however, many may have unknown immune status due to lack of documentation. If assessing immunity

23. Since maternal measles IgG antibody will be essentially gone or very low by 6 months of age, what is the recommendation for immunoglobulin prophylaxis after measles exposure of infants who are not old enough yet for MMR vaccination?

Tina Tan, MD, FIDSA, FPIDS, FAAP: Information is available in the 2021-2024 American Academy of Pediatrics Redbook. Measles chapter, Table 3.31 on Post-exposure Prophylaxis (PEP) for Measles exposures in those who are not pregnant or immunocompromised – pg 507. For infants < 6 months, if less than 6 days after exposure, then a provider can give a dose of immune globulin (IMIG recommended by Red Book). For infants 6 –11 months, PEP with MMR or IMIG could be considered if <72 hours after exposure; AAP recommends MMR over IMIG during this timeframe. If 4–6 days after exposure, IMIG can be provided for PEP.

24. Is IgG testing (even for HCWs) only recommended once in a lifetime?

Tina Tan, MD, FIDSA, FPIDS, FAAP: It is recommended that all healthcare workers have presumptive evidence of measles immunity which include documentation of vaccination with two doses of live measles virus-containing vaccine, laboratory evidence of immunity, laboratory confirmation of disease, or birth before 1957. Once presumptive evidence of measles immunity is established, it does not need to be repeated at a later time (e.g., as someone ages).

Additional information on presumptive evidence of measles immunity can be located here: <https://www.cdc.gov/mmwr/preview/mmwrhtml/rr6204a1.htm>

25. Would you recommend transferring suspected measles cases from urgent care clinics to the ED?

Tina Tan, MD, FIDSA, FPIDS, FAAP: This depends on what the medical needs of the patient are. If the patient needs medical attention, they should be transported to a healthcare facility that can provide the needed care and institute the appropriate precautions (e.g., Standard and Airborne Precautions).

26. After a patient is seen for suspected measles, how should the exam room be cleaned before the next patient enters the room?

Tina Tan, MD, FIDSA, FPIDS, FAAP: Standard cleaning and disinfection procedures (e.g., using cleaners and water to pre-clean surfaces prior to applying disinfectants to frequently touched surfaces or objects for indicated contact times) are adequate for measles virus environmental control in all healthcare settings. Use an EPA-registered disinfectant for healthcare settings, per manufacturer's instructions. Manage used, disposable PPE and other patient care items for measles patients as regulated medical waste according to federal and local regulations. After the patient leaves the room, it should remain vacant for the appropriate time (up to 2 hours) to allow for 99.9% of airborne-contaminant removal. (See Appendix B, Table B1.: Air changes/hour and time required for airborne-contaminant removal by efficiency)

[<https://www.cdc.gov/infectioncontrol/guidelines/environmental/appendix/air.html#table1>]

Additional information is available in the interim recommendations:

<https://www.cdc.gov/infectioncontrol/pdf/guidelines/Measles-Interim-IC-Recs-H.pdf>

27. Do healthcare providers need eye protection?

Tina Tan, MD, FIDSA, FPIDS, FAAP: Eye protection should be used if healthcare workers anticipate splashes or sprays during patient encounters as part of Standard Precautions. Airborne Precautions do not require use of eye protection.

28. What is the current evidence on waning immunity in immunized or seroconverted and currently immunocompetent adults, particularly health care workers?

Thomas (Dan) Filardo, MD: Some people who receive the MMR vaccine and develop immunity may have negative or equivocal results on subsequent tests for detecting measles IgG. For people with 1 dose of MMR, this could suggest primary vaccine failure, meaning that there was no response to the vaccine. Nearly everybody who receives 2 doses of MMR will respond to the vaccine and develop both antibody-based and cell-based immunity. Tests for cell-based immunity are not routinely available.

Therefore, ACIP considers 2 doses of MMR to confer lifelong protection. People with 2 documented doses of MMR are not recommended to receive serology testing per the [2013 ACIP statement](#) on prevention of measles, mumps, and rubella. Should a healthcare worker receive serology that is equivocal or negative, but they have 2 documented doses of MMR, ACIP does not recommend additional vaccination with MMR for measles prevention.

Specifically, ACIP writes:

“Serologic screening for measles, rubella, or mumps immunity before vaccination is not necessary and not recommended if a person has other acceptable evidence of immunity to these diseases.”

And

“For health-care personnel who have 2 documented doses of measles- and mumps-containing vaccine and 1 documented dose of rubella-containing vaccine or other acceptable evidence of measles, rubella, and mumps immunity, serologic testing for immunity is not recommended. If health-care personnel who have 2 documented doses of measles- or mumps- containing vaccine are tested serologically and have negative or equivocal titer results for measles or mumps, it is not recommended that they receive an additional dose of MMR vaccine. Such persons should be considered to have presumptive evidence of immunity. Documented age-appropriate vaccination supersedes the results of subsequent serologic testing.”

29. If a patient with measles was in a private (non-AIRR) room with the door open, would adjacent rooms and rooms across the hall be considered for exposures?

Tina Tan, MD, FIDSA, FPIDS, FAAP: Yes, if a patient is not in an AIRR room (with the door closed) or masked in a private room with the door closed, people in the same area and shared air space would be considered exposed. More specifically, the interim recommendations state:

“In healthcare settings, persons potentially exposed to measles include patients, visitors, and HCP who are not wearing recommended respiratory protection (regardless of presumptive evidence of measles immunity status) who are:

- In a shared air space with an infectious measles patient at the same time, or
- In a shared air space vacated by an infectious measles patient within the prior 2 hours”

Additional information may be found in the interim recommendations:

<https://www.cdc.gov/infectioncontrol/pdf/guidelines/Measles-Interim-IC-Recs-H.pdf>

30. What about healthcare workers born in 1976? Will testing for immunity titers will suffice or do we need to reboost with an additional dose?

Tina Tan, MD, FIDSA, FPIDS, FAAP: If person has documentation of receipt of 2 appropriately timed doses of vaccine, this is evidence enough that person is immune to measles. Additionally, detection of measles IgG on a blood test is considered presumptive evidence of immunity, and there is no recommendation to repeat a blood draw in the future.

Additional information on presumptive evidence of measles immunity is discussed in the Prevention of Measles, Rubella, Congenital Rubella Syndrome, and Mumps, 2013: Summary Recommendations of the Advisory Committee on Immunization Practices (ACIP) report which can be accessed at:

<https://www.cdc.gov/mmwr/preview/mmwrhtml/rr6204a1.htm>

31. For documented non-responders to MMR, what is recommended should they be exposed in their hospital work environment to measles while wearing appropriate PPE (i.e., N95 and eye protection)? Are they required to isolate or is PPE sufficient? Should they receive IVIG for prevention?

Tina Tan, MD, FIDSA, FPIDS, FAAP: In healthcare settings, persons potentially exposed to measles include patients, visitors, and HCP who are not using recommended respiratory protection (regardless of presumptive evidence of measles immunity status) who are:

- In a shared air space with an infectious measles patient at the same time, or
- In a shared air space vacated by an infectious measles patient within the prior 2 hours

For asymptomatic healthcare personnel without presumptive evidence of immunity to measles who have an exposure to measles:

- Administer postexposure prophylaxis in accordance with CDC and ACIP recommendations (<https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/mmr.html>).

- Exclude from work from the 5th day after their first exposure through the 21st day after their last exposure, regardless of receipt of postexposure prophylaxis.
- Work restrictions are not necessary for healthcare personnel who received the first dose of MMR vaccine prior to exposure: -
 - o They should receive their second dose of MMR vaccine as soon as possible (at least 28 days after their first dose). -
 - o Implement daily monitoring for signs and symptoms of measles from the 5th day after their first exposure through the 21st day after their last exposure.

Additional information may be found in the interim recommendations:

<https://www.cdc.gov/infectioncontrol/pdf/guidelines/Measles-Interim-IC-Recs-H.pdf>

And in the Infection Control in Healthcare Personnel: Epidemiology and Control of Selected Infections Transmitted Among Healthcare Personnel and Patients:

<https://www.cdc.gov/infectioncontrol/pdf/guidelines/IC-Guidelines-HCP-H.pdf>

32. Is there an indication to administer IGIM in acute care settings d/t adverse reactions or can it be given in the clinic?

Tina Tan, MD, FIDSA, FPIDS, FAAP: It can be given in a clinic setting. However, the dosing is 0.5 mL/kg with a maximum of 15 cc (max weight 30 kg) so you can see that the volume may be a limiting factor to administering this in an acute care setting because multiple separate injections may be required.

33. Can IVIG be used as an alternative to IMIG for post-exposure prophylaxis?

Tina Tan, MD, FIDSA, FPIDS, FAAP: Yes, in individuals for whom IVIG would be recommended.

Thomas (Dan) Filardo, MD: For infants, IMIG is generally recommended as the agent of choice. IMIG can be used for postexposure prophylaxis for people weighing <30kg given the maximum dosage of 15mL and dose of 0.5mL/kg. IVIG is recommended for all adults who require postexposure prophylaxis (i.e., immunocompromised people and pregnant people). AAP has also a recommendation for IVIG for all severely immunocompromised children who are >12 months of age (Information is available in the 2021-2024 American Academy of Pediatrics Redbook. Measles chapter, Table 3.32).

34. If someone doesn't recall having MMR vaccine and we can't find any documentation of vaccine, and that person is exposed to measles- how do you manage? do you check IgGs or give MMR vaccine?

Tina Tan, MD, FIDSA, FPIDS, FAAP: Give MMR vaccine.

Thomas (Dan) Filardo, MD: An IgG test could be performed to determine the immune status, as long as it would not delay appropriately-timed MMR for postexposure prophylaxis (MMR PEP is within 72 hours of exposure).

35. Can Priorix be given to immune compromised adult patients in a routine pharmacy vaccination if doctor sends a prescription? How many doses?

Thomas (Dan) Filardo, MD: Priorix is equivalent to MMR vaccine in that it is a live attenuated vaccine so in the immune compromised population, most of the time a MMR vaccine is contraindicated until the immune status is determined to be sufficient to allow for administration of live attenuated vaccination. The determination of an individual patient's immune status is up to their treating providers, but ACIP does have guidance on immunization for people with immunocompromising conditions here:

<https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/immunocompetence.html>

36. Is IVIG a treatment or post-exposure prophylaxis? (Has to be given within 6 days of exposure.) Also, will you address MMR as post-exposure prophylaxis?

Thomas (Dan) Filardo, MD: IVIG is not a treatment for measles. IVIG within 6 days of exposure can be given as post-exposure prophylaxis that can be used in specific high-risk populations (i.e., pregnant people and severely immunocompromised people). MMR postexposure prophylaxis cannot be given to pregnant people or severely immunocompromised people given contraindications to live virus vaccination in these populations.

If there are no contraindications to vaccination, MMR vaccine can be given as post-exposure prophylaxis to people who lack evidence of immunity to measles; MMR must be given within 72 hours of first measles exposure to be considered effective as PEP. Post-exposure prophylaxis after measles exposure may prevent development of measles or may attenuate the severity of disease.

37. In immunosuppressed patients exposed to measles but you can document adequate Ig G level, is IVIG indicated?

Thomas (Dan) Filardo, MD: This depends on the level of immunosuppression, as determined by the patient's clinical providers. If the patient is judged to be "severely immunocompromised", they should receive IVIG as post-exposure prophylaxis regardless of their other evidence of immunity, as they are at risk for severe measles complications.

38. What is the risk and applicability of vaccination in the immunocompromised, including SOT recipients? If they were vaccinated as children, is that sufficient, even if traveling internationally? If not, how can they protect themselves?

Thomas (Dan) Filardo, MD: The Yellow Book has additional information on prevention of measles for immunocompromised travelers:

<https://wwwnc.cdc.gov/travel/yellowbook/2024/additional-considerations/immunocompromised-travelers>

The risk of vaccination in immunocompromised people is that the vaccine, although weakened, can cause severe complications, such as pneumonia. These complications do not occur in immunocompetent people.

39. For immunosuppressed persons who are exposed I assume immunoglobulin administration is indicated if recent exposure. Is there any other way to protect immunosuppressed?

Tina Tan, MD, FIDSA, FPIDS, FAAP: Use of immunoglobulin is the best method to protect the immunosuppressed population. There are no other agents that are recommended.

Thomas (Dan) Filardo, MD: Immunoglobulin (either IMIG or IVIG) must be given within 6 days of first exposure to measles to be considered effective postexposure prophylaxis.