

CDC COCA Moderator: Good afternoon. I am Captain Ibad Khan, and I'm representing the Clinician Outreach and Communication Activity, COCA with the Office of Emergency Risk Communication at the Centers for Disease Control and Prevention. I'd like to welcome you to today's COCA Call "Clinician Update on Measles Cases and Outbreaks in the United States."

All participants joining us today are in listen-only mode. Free Continuing education is offered for this webinar, and instructions on how to earn continuing education will be provided at the end of the call. In compliance with continuing education requirements. All planners and presenters, moderators, must disclose all financial relationships and any amount with ineligible companies over the previous 24 months. As well as any use of unlabeled product, or products under investigational use.

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I would now like to welcome our presenters for today's COCA call. We are pleased to have with us Captain David Sugarman. the Acting Branch Chief for the Vaccine Preventable Diseases Branch in the Division of Viral Disease at CDC's National Center for Immunization and Respiratory Diseases. Next, we have Ms. Adria Mathis who's an epidemiologist in the Division of Viral Diseases in CDC's National Center for Immunization and Respiratory Diseases. And we have Dr. Dan Filardo, who's a medical officer in the Division of Viral

Diseases at CDC's National Center for Immunization and Respiratory Diseases. It's my pleasure now to turn it over to Captain Sugarman. Captain Sugarman, please proceed.

CAPT David Sugarman, MD, MPH, FACEP, USPHS: Thank you very much. I'll start our presentation with a quick history of measles in the United States and where we are today. Next slide. In the decade before the vaccine became available in 1963, nearly all children got measles by the time they were 15 years old. It is estimated that 3 to 4 million people in the United States were infected each year.

In 1963, the first measles vaccine was licensed in the United States, leading to massive declines in annual cases. Then, in 1989, measles outbreaks among vaccinated school-aged children prompted the adoption of the recommendation of a second dose of MMR vaccine for all children. Thanks to the highly effective vaccination program in the United States, as well as better measles control in the Americas region, measles was declared eliminated from the United States in 2000. This means... this meant the absence of the continuous spread of disease was greater than 12 months.

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Since elimination, we've had 13 large outbreaks of more than 50 cases, of which 11, 85%, were in 4 close-knit communities with low vaccination rates. Including the West Texas outbreak that started earlier this year and grew to more than 800 cases, along with an additional outbreak in Kansas and Oklahoma with 89 cases. 10 of these outbreaks occurred in the last 10 years. Next slide. When more than 95% of people in a community are vaccinated, most people are protected through community immunity.

Given the highly infectious nature of measles, this 95% coverage is the coverage level that is required to prevent measles outbreaks. As shown by this map of two-dose MMR coverage at school entry during the 2024-25 school year, coverage is also heterogeneous across states, with 13 states reporting coverage less than 90%, shown in dark orange. Next slide. From measles elimination till the COVID-19 pandemic, MMR coverage remained above the 95% threshold. However, vaccination coverage among U. S. kindergartners fell during the pandemic and continue to slip downward. From 95. 2% during the 2019-2020 school year to 92. 5% in the 2024-2025 school year, leaving over 285,000 children unprotected this year.

Next slide.

Coverage is also quite heterogeneous at the county level, potentially obscuring true outbreak risk. This is a map of estimated county-level coverage from the National Immunization Survey Child, using the 2012-2016 birth cohort county-level estimate of percentage with greater than or equal to one dose of MMR vaccine at 24 months of age.

Lighter color shows lower coverage rates, with the lightest colored county shown here, with coverage rates of less than 80%. Counties with this level of coverage are at highest risk of measles outbreaks. By example, several of the light-colored counties had measles cases during the 2025 measles outbreak in Texas.

Next slide.

Furthermore, as seen in these county-level coverage maps before and after the COVID-19 pandemic, published by Johns Hopkins University, the declines in MMR immunization coverage also reveal significant heterogeneity. Next slide. In summary, currently the U. S. is maintaining measles elimination, despite the record number of cases and outbreaks that have been reported this year. This year marks the largest number of cases reported since 1992. The risk for widespread measles to the general population remains low because of high population-level immunity. Globally, measles activity remains high. Large outbreaks in Canada and Mexico, though slowing, have led to a record number of imported cases into the United States from the Americas region. And communities with low MMR vaccine coverage continue to be at increased risk of outbreaks. I'll now hand it over to my colleague, Adria Mathis, to review measles surveillance data.

Adria Mathis, MSPH: Thank you, David.

Next slide, please.

As of September 9th, 1,454 confirmed measles cases have been reported in the United States in 2025. Among these, 1,433, or 99%, occurred among U. S. residents and were reported by 42 jurisdictions. 23 jurisdictions have reported 1 to 9 cases, 16 have reported 10 to 49 cases, and the highest number of cases have been reported from Kansas with 90 cases, New Mexico with 100 cases, and Texas with 803 cases.

Next slide.

During 2001 to 2024, a median of 79 measles cases were reported annually, ranging from a low of 13 cases in 2020 to a high of 1,274 cases in 2019. The 1,454 cases reported this year represent an 18-fold increase over this annual median. It marks the second time post-elimination that over 1,000 measles cases have been reported in the U. S.

Next slide.

In 2025, most measles cases have occurred among school-aged children, with 38% of all cases among those aged 5 to 19 years. This is similar to what we've seen in prior years. Fewer cases are seen among older adults, demonstrating lower risk of exposure than for children, and durable protection for immunized adults. 92% of cases were either unvaccinated or of unknown vaccination status 4% previously received 1 MMR dose, and

another 4% previously received 2 MMR doses. 12% of patients were hospitalized, which is a little lower than the typical 20% we've seen in prior years. Among those hospitalized, 95% were unvaccinated or of unknown vaccination status, 4% previously received 1 MMR dose, and 1% previously received 2 MMR doses. Sadly, 3 deaths have been reported. Two confirmed in Texas among unvaccinated school-aged children without any past medical history, and one confirmed in New Mexico in an unvaccinated adult. Of note, from 2001 to 2024, only 3 deaths were reported, 2 in 2003, and 1 in 2015. Two of these occurred among immunocompromised patients.

Next slide, please.

There have been 142... oh, back one slide, please. There have been 142 internationally imported cases reported in 2025. More importations have been reported to date than in any other year post-elimination. Important cases have been associated with travel to and from countries in all six World Health Organization regions. Half are associated with travel to and from countries in the region of the Americas, and 47% of all importations are associated with travel to and from Canada and Mexico. For comparison, during 2001 to 2024, the top source regions for imported cases were the European and Western Pacific regions, and only 3% of imported cases were from the region of the Americas.

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This increase in importations from the Americas is due to large ongoing outbreaks in Canada and Mexico. Both countries have reported over 4,000 cases to date, and over 11,000 measles cases have been reported in the region of the Americas this year. This represents a 33-fold increase in cases in the Americas compared to the same time period in 2024. Additionally, a total of 22 deaths have been reported in the region. All deaths have occurred among unvaccinated patients.

Next slide.

In the US, measles cases are primarily imported by unvaccinated U. S. residents who traveled abroad. During 2001 to 2025, a total of 1,034 importations have occurred in the U.S. A median of 26 importations were reported each year during 2001 to 2024, ranging from a low of 7 importations during 2020 to a high of 92 importations in 2019. Overall, 702, or 68%, of all importations since 2000 have occurred among U. S. residents, and 332, or 32%, occurred among international visitors to the U. S. Specifically in 2025, 89% of imported cases have occurred among U. S. residents. Of these, 65% were unvaccinated, 25% were of unknown vaccination status, and 10% were previously vaccinated.

Next slide.

A total of 37 outbreaks, defined as 3 or more linked cases, have been reported this year. More outbreaks have been reported to date than in any other year post-elimination. For comparison, only 16 outbreaks were reported during 2024. Most of these outbreaks have been small and within households 81% of outbreaks have involved 10 or fewer cases. An outbreak in West Texas, which began on January 20th, peaked during the week of March 22nd, and had the last case reported on July 1st, accounted for 52% of all reported cases this year. This was the largest measles outbreak reported in the U. S. since 1992.

Next slide.

Cases of measles have been reported among pregnant women in 2025. Measles can result in pregnancy complications, including preterm labor and miscarriage or fetal demise. Measles can transmit vertically to the fetus and can result in congenital measles, which is characterized by a febrile, rash illness within 10 days of birth. Congenital measles can result in severe complications, including encephalitis, and is associated with a higher risk for subacute sclerosing panencephalitis, or SSPE, which is a fatal degenerative disease of the central nervous system. CDC has added additional information regarding measles complications in pregnancy to our Clinical Overview of Measles webpage.

Next slide.

Here's our first knowledge check. Most imported measles cases have been among under-vaccinated international visitors to the U. S, true or false?

Next slide.

This statement is false, as we reviewed today. Most imported cases occur among unvaccinated U. S. residents who travel internationally and get infected in other countries.

Next slide.

Now, I will turn it over to Dr. Dan Filardo to discuss some common measles clinical scenarios.

Thanks, Adria.

Dr. Dan Filardo: It's good to be with you today. So now we'll review some clinical scenarios, and hopefully cover many frequently asked questions about measles and measles vaccination that we get from clinicians across the country.

Next slide.

So for our first case presentation, you're seeing a 62-year-old man for a routine appointment. He says that he has been hearing about measles outbreaks in the United

States and wants to know if he needs any additional measles vaccines. He received one dose of a live attenuated measles vaccine as a child, per his vaccine records. He has hypertension and prediabetes but doesn't have any other medical problems. What other questions do you want to ask to determine whether a dose of MMR is recommended for him?

Next slide.

So let's start by reviewing MMR vaccination recommendations for adults. Adults born before 1957 have presumptive immunity to measles. And one dose of MMR vaccine, or other presumptive evidence of immunity, is sufficient for most adults living in the United States. Some adults, in specific cases, are recommended to have two doses of MMR, and we'll cover that today. However, there is no broad recommendation for a catch-up program among adults for a second dose of MMR.

Next slide.

So what if my adult patient thinks they were vaccinated as a child, but they have no records or documentation?

Next slide.

If they were born before 1957, no vaccination is recommended because they already have presumptive evidence of immunity. If they were born in 1957 or after, there are two options. You can provide a dose of MMR and consider if they are an adult who is recommended to get two doses, which we'll cover on the next slide. Or, you can check for evidence of immunity through IgG testing.

Next slide.

So some adults are recommended to have two doses of MMR vaccine separated by at least 28 days, including adults at higher risk of transmission, and a few other specific groups. These adults include students at post-high school educational institutions, healthcare personnel, international travelers. It also includes people who public health authorities determine are at increased risk for getting measles during a measles outbreak in the place where they live. And additionally, there are two other groups of adults that we don't talk about quite as frequently, but who are also recommended to have documentation of two doses. These include adults who are household contacts or close contacts with people who are immunocompromised, and adults living with HIV who are not severely immunocompromised, that is, who can receive the MMR vaccine.

Next slide.

Public health authorities determine who is at increased risk for getting measles during a local measles outbreak, and state and local health departments may issue MMR vaccination recommendations that are specific to an outbreak within their jurisdiction. Local residents may be recommended to have two doses. So if your patient, from this scenario, is living in a region where the local health department has recommended that residents have two doses, an MMR dose would be indicated. In the setting of a local outbreak, health authorities may also recommend an early second dose for children under 4 years of age, or an early dose for infants 6 to 11 months of age, depending on the situation. Travelers to regions with these recommendations should follow the same guidance regarding vaccination as people who live in the areas affected by the measles outbreak. I'll highlight here that on our measles cases and outbreak webpage, we do link to jurisdiction-specific guidance on outbreak vaccine recommendations whenever possible.

Next slide.

So another question we get often is, what about the inactivated measles vaccine? So during a brief period of time, from 1963 to 1967, an inactivated measles vaccine was available in the United States. Less than a million people received this vaccine, so that accounts for less than 5% of all measles vaccine recipients during these years. Later research found that this vaccine was less effective than the live attenuated vaccine that we use, subsequently, and it was removed from the market. And all measles vaccines provided in the United States since 1968 have been live attenuated measles vaccines that are highly effective.

Next slide.

So my patient received a dose of measles vaccine in 1965. Does it count as a valid dose?

Next slide.

If the vaccine is clearly marked as live attenuated, it is a valid dose. And also, just to reiterate, all doses received in 1968 or later are considered valid, since only the live attenuated vaccine was available. So any documented vaccine in or after 1968 would count. If the vaccine is marked as the quote-unquote killed or inactivated vaccine, it is not a valid dose. And if the type of vaccine administered is not clear, it should not be considered a valid dose during these years of 1963 to 1967. And if the dose is determined not to be valid, additional vaccination should be considered, if indicated.

Next slide.

So what about IgG testing for people with two doses? So most people who receive two doses of MMR are considered presumptively immune to measles, regardless of the results

of serologic testing. And of note, for these two doses to meet the CDC recommendations for what counts in this instance, MMR doses must be separated by at least 28 days, and MMR doses must be received at age 12 months of age or older.

Next slide.

So my patient received 2 MMR doses, one at 12 months of age and one at 4 years of age. Should I check for immunity with an IgG test if they are traveling abroad?

Next slide.

Serologic testing is not recommended to confirm immunity for a person with two appropriately timed MMR doses. That is, both doses are after 12 months of age, and they're separated by at least 28 days. And even if the IgG test is negative or equivocal, MMR vaccination is not recommended by ACIP, because this person still has presumptive evidence of immunity. So documented age-appropriate vaccination supersedes the results of serologic testing. There is one special circumstance worth mentioning here when it comes, not to measles, but to rubella specifically. If a woman of reproductive age has two MMR doses, but tests negative for rubella immunity, so a negative or equivocal rubella IgG test, an additional MMR dose can be provided. But no further serologic testing is recommended after this dose to confirm measles or rubella immunity.

Next slide.

So I'd like to highlight a new tool available on the CDC webpage, which is an adult MMR vaccination decision tree. This decision tree summarizes measles vaccine recommendations for adults, much of what we've just discussed in the last scenario, and we hope it's helpful for providers when considering these scenarios and when considering MMR vaccine questions for their adult patients.

Next slide.

So let's move on to Case 2 in a travel health clinic. A mom brings her 10-month-old in for a travel health visit. They'll be leaving for Spain next month, and she wants to know what she needs to do for herself and her baby. Mom received one dose of MMR as a child, and it is recorded in her immunization records. Her daughter is up-to-date with all of her recommended vaccines, and has not received a measles vaccine before. So what do you recommend regarding MMR prior to travel?

Next slide.

So let's review some measles vaccination recommendations for travelers. Clinicians should recommend vaccination against measles for anyone aged 6 months or older

traveling internationally who does not have written documentation of vaccination or other evidence of measles immunity. Acceptable evidence of immunity against measles includes at least one of the following. Written documentation of adequate vaccination, which is different for international travelers, as we'll cover. laboratory... or laboratory evidence of immunity, that is a positive IgG test, or laboratory confirmation of prior measles infection. So that means a lab-confirmed acute measles infection and confirmed by IgM testing or PCR testing. Or, finally, birth before 1957. A side note, CDC recommends after international travel, travelers should watch for signs and symptoms of measles for 3 weeks after returning to the United States. And the same goes for travelers domestically to areas with ongoing measles outbreaks.

Next slide.

So to review our recommendations for travelers, infants 6 months of age or older should receive MMR vaccine prior to international travel... international travel. And it's important to note that MMR is not licensed for children under 6 months of age, so this applies only to infants 6 to 11 months of age. Infants who receive an early dose of MMR vaccine between 6 to 11 months of age, and this is sometimes called a quote-unquote infant dose, or a zero dose. They should get 2 more doses after their first birthday, and subsequent doses should follow CDC's recommended childhood schedule, with a dose at 12 through 15 months of age, and another dose at 4 through 6 years of age. All children 12 months of age or older, teenagers and adults are recommended to have two total doses prior to international travel, separated by at least 28 days. If previously unvaccinated, a traveler could receive their first dose of MMR immediately, and can get a second dose 28 days after that first dose.

Next slide.

So returning to our case, the mother should receive one dose of MMR prior to travel. She will now have two documented MMR doses. The infant should also receive a dose of MMR, and these should be followed by two more doses after their first birthday, or the routine childhood schedule. And vaccination, ideally, would take place at least 2 weeks before travel to provide optimal protection. But vaccination can also happen closer to travel if this is not possible.

Next slide.

So we'll now walk through just a few quick scenarios for travelers to assess recommendations for vaccination. First, we have a 2-year-old patient who's going to Cancun. With one dose of MMR at 15 months. What should we do?

Next slide.

Here, we should give an MMR dose, ideally 2 weeks before travel. And it's important... it's good to note here that no further MMR doses are required, as these two doses meet the two-dose school entry requirement and CDC recommendations for two lifetime doses for measles, mumps, and rubella protection.

Next slide.

Next, we have an 8-month-old going to Toronto to visit family who's not ever received a prior MMR dose. Next slide. In this case, we should give an MMR dose, and we'll educate the family that two more MMR doses will be recommended per the routine childhood schedule, starting at 12 months of age.

Next slide.

And finally, we have a 14-year-old with unknown vaccination history who's planning to study abroad. Next slide. Here, we recommend 2 doses of MMR, separated by at least 28 days, with the 2 doses ideally completed at least 2 weeks prior to travel.

Next slide.

Another question we commonly get is, what about vaccination after a measles infection? As we noted, patients with a previously documented laboratory-confirmed measles infection are considered to have lifelong immunity for measles. So they don't need MMR vaccination for measles protection. However, it is still recommended that they be up-to-date with MMR vaccination recommendations to provide protection against mumps and rubella.

Next slide.

So let's do another knowledge check. A patient that is 65 years old, who was born in 1960, reported having measles as a child, and has not received an MMR vaccine previously. Should they get an MMR vaccine?

Next slide.

So the answer is yes. The patient should receive at least one dose. Unless their prior measles infection was confirmed by laboratory testing, it does not count as presumptive evidence of immunity. They should have at least one dose of MMR, and their provider can consider if two doses might be indicated based on what we discussed previously.

Next slide.

Our next question is. A patient who is 50 years old has had 2 doses of MMR as a child at ages 1 and 6. They had a titer to test for immunity to measles, and it was negative. Should they receive another dose of MMR?

Next slide.

And the answer is no. Two doses received after 12 months of age and separated by at least 28 days are considered presumptive evidence of immunity, regardless of the results of IgG testing.

Next slide.

And our last question for now.

A patient's immunization records show that they received a vaccine listed as Pfizer-Vax measles K, reflecting the inactivated measles vaccine in 1964 at 3 years of age. They were born in 1961. They had no other immunizations for measles on their immunization record. Should they receive a live attenuated MMR vaccine now?

Next slide.

And the answer is yes. They should be revaccinated. The prior inactivated vaccine is not considered a valid dose, and they should receive MMR, with some further questions to assess whether or not one or two doses are indicated.

Next slide.

Next, we'll move on to our third case. A 15-month-old, otherwise healthy infant presents to their primary pediatrician. At an urgent care visit two days ago, family reported that the child had two days of low-grade fever, fussiness, and a faint macular papapular rash. A viral exanthan panel, designed to detect a broad array of viruses, was Obtained in urgent care, and it detected measles virus. The fever has since resolved since the urgent care visit, and the rash is already beginning to fade. And the infant received their first MMR dose 12 days prior. What should be your next steps?

Next slide.

So first, let's review some background. MMR vaccine can cause a short-lived febrile rash syndrome that is not contagious to others. Fever can be seen in up to 15% of vaccinees, especially after the first dose, and rash can be seen in up to 5% of vaccinees. Most of the time, the rash is mild, and does not mimic measles. However, the rash that results from a vaccine reaction can rarely mimic measles, in that it starts on the face and then spreads down to affect the full body. The image shown on the right is an example of a measles-mimicking rash that was confirmed to be a reaction to the MMR vaccine. These vaccine

reactions are generally mild and self-limited, and symptoms usually occur within 7 to 18 days after vaccination.

Next slide.

It's also important to understand that measles vaccine strain virus can be detected after receipt of any live attenuated measles vaccine. That includes MMR or MMRV, even if a vaccine reaction does not occur. Vaccine strain virus is usually detectable during the 28 days after vaccination, but prolonged detection, that is, 28 or more days after vaccination, has been reported rarely in the literature. A standard measles PCR alone cannot differentiate detection of vaccine strain virus versus a wild-type measles virus. MIVA is a specialized PCR test that can determine vaccine strain versus wild-type measles virus detection. Genotyping of the measles virus also provides this information, but with a longer turnaround time than the MIVA test. MIVA and genotyping are available through CDC and through reference centers that are run by the Association of Public Health Laboratories, or APHL. It's important to note that testing through CDC and the public health reference laboratories is generally done through a referral from state or local public health agencies. So contacting your state or local public health authorities to arrange testing is needed if this testing is required at these laboratories.

Next slide.

So what are the next steps for our case that we reviewed? The main action item here is to evaluate for epidemiologic risk of measles infection, which includes assessing if there's been a known exposure to measles, any travel internationally or to a location with a known measles outbreak in the 21 days before the rash started. Or a known local measles outbreak where the patient lives. If there is an epidemiologic risk factor for measles, we would recommend contacting state or local public health authorities. And arranging for appropriate testing, which may include MIVA testing, as we've discussed. If there's no identifiable epidemiologic risk for measles, and you can confirm that the patient you're seeing was recently vaccinated, especially in that 7-18 day window before the rash started, like we discussed, we generally recommend managing symptoms and overall providing reassurance. As we discussed, the vaccine reaction is generally mild and self-limited, and does not result in an illness that is contagious to others. However, if there is still concern for acute measles. Because the symptoms are more severe than might be expected for a vaccine reaction, for example, or another reason. Contacting public health authorities is still a good idea to discuss the case and to discuss if there's any need for further testing or further follow-up.

Next slide.

So here, we wanted to highlight another available resource from CDC regarding measles diagnostic testing in settings without a local measles outbreak. Which includes assessment of recent MMR vaccination. Of note, this algorithm is intended to be used in settings where measles is rare, outside of specific epidemiologic risks. In outbreak settings, the threshold for measles testing will likely be different, with a higher baseline probability of measles for people coming in with febrile rashes. And this algorithm can be downloaded from the CDC webpage.

Next slide.

So another question we get on this topic is covered here. Is MMR vaccine safe for people who live with people who are immunocompromised? So, as we reviewed, measles vaccine strain RNA can be detected by PCR up to 28 or even more days after receipt of MMR. But we know that vaccine strain measles virus is weakened, or attenuated, and after vaccination, the scientific evidence shows that people cannot spread measles vaccine strain virus to others. So people who live with or have close contact with people who themselves can't receive MMR, such as young infants, pregnant women, and immunocompromised people, they can be vaccinated without any precautions. We also know that vaccination of the people around those who cannot directly receive vaccination offers indirect protection by preventing measles exposures. So, in fact, as we reviewed, household members of immunocompromised people are recommended to have two doses of MMR to provide the best protection to their loved ones.

Next slide.

Is MMR vaccine safe for women who are breastfeeding? While MMR is contraindicated during pregnancy, it is safe for breastfeeding women to receive MMR vaccination without any precautions. Breastfeeding does not interfere with the response to MMR vaccine, and the baby will not be affected by the vaccine through breast milk. Next slide. So for another knowledge check question. A patient received their first dose of MMR two weeks prior, and now presents with a measles-like rash. A throat swab RT-PCR is positive for measles, and MIVA testing indicates that measles vaccine strain virus was detected. Does the health department need to track their contacts and provide post-exposure prophylaxis?

Next slide.

The answer is no. With confirmation that the symptoms in this case are due to a vaccine reaction, and measles vaccine strain virus was detected, which is not transmissible person to person, no further action like contact tracing or post-exposure prophylaxis is required.

Next slide.

So on to our last case to discuss today. A 25-year-old woman presents to her primary care provider. A week ago, she experienced 2 days of low-grade fever, followed by a maculopapular rash that began on her chest and spread down to her abdomen and arms. The rash started 5 days ago and has begun to fade, and she's had no other symptoms. She received 2 doses of MMR at ages 1 and 6, and she has no underlying medical conditions. She tells you that she recently traveled to Vietnam to visit family and returned 10 days ago. A family member in Vietnam she was staying with was just diagnosed with measles. You think that this person might have measles. But it doesn't match all the symptoms. How should you proceed?

Next slide.

So let's discuss measles infections after vaccination. Despite high vaccine effectiveness, people with prior vaccination against measles can develop measles through two main pathways. The first is what we call primary vaccine failure. Which refers to a failure to respond to a prior MMR dose, and therefore not to have any pre-existing immunity to measles prior to the exposure. This is more common if a person has received only one prior dose of MMR. The other is what we call secondary vaccine failure, which is defined as a measles infection despite pre-existing immunity. Because almost all people respond to the vaccine after two doses, this is more common if a person has received two prior doses. Secondary vaccine failure is also more common when there is a high intensity of exposure, such as in a household. Or other large outbreak where a person might be exposed repeatedly to measles. Secondary vaccine failure cases are rare. But when they do occur, there are still benefits to vaccination. People with secondary vaccine failure are less likely to be severely ill, that is, to be hospitalized or to develop complications like pneumonia. And they are less likely to transmit measles to others based on the available evidence. For people with pre-existing measles vaccination, clinicians should be aware that measles infection may be modified. The respiratory symptoms, like cough or conjunctivitis, may be absent or mild, and the measles rash may be atypical, starting, for example, not on the face, like in this case here, and the rash may be more limited in scope than it is in unvaccinated people.

Next slide.

So let's also talk a little bit about testing for measles. Diagnostic evaluation for measles should include both molecular testing. That is a real-time reverse transcriptase polymerase chain reaction, or RRT-PCR. And serologic testing, which include, which is IgM. Molecular testing is most commonly done on nasopharyngeal or oropharyngeal, that is, NP or OP

swabs, but can also be performed on urine specimens. And of course, along with testing, consideration of the clinical and epidemiologic context is important when considering measles, including travel history, vaccination status, or known exposures.

Next slide.

So in this case, with the rash having occurred more than 5 days ago, it's worth considering getting an NP or OP swab and a urine specimen for RT-PCR to improve the sensitivity of testing. We know that the further out we get from the rash onset, the less likely it is that we'll detect measles virus by PCR, so having a respiratory and urine specimen together can help improve sensitivity. And we also recommend consulting public health authorities early when measles is suspected, which can help ensure that the right tests are done, and that the specimens are routed appropriately for testing.

Next slide.

So how does a measles infection in someone with prior immunity from vaccination differ from a measles infection in someone without prior immunity? A, the measles rash may be atypical. B, the person is less likely to have complications. C, the person is less likely to transmit measles to others, or D, all of the above. Next slide. And the answer is D, all of the above.

Next slide.

The next few slides highlight additional resources CDC has developed to help healthcare providers in healthcare settings prepare for and respond to measles.

Next slide.

So first, I'll just highlight quickly that the interim infection prevention and control recommendations for measles in healthcare settings have been updated in July with some clarifications, and they can be found at the link on this slide.

Next slide.

We also have new customizable resources to help support measles infection prevention and control in healthcare settings that are included here. And the QR code on this slide leads directly to the landing page for all of these resources.

Next slide.

CDC's Be Ready for Measles Toolkit delivers preparedness and outbreak response tools and communications materials to support jurisdictions in communicating with the public, clinicians, and partners before and during a measles outbreak.

Next slide. The toolkit includes resources for healthcare providers, including fact sheets, outbreak response tools, and social media graphics.

Next slide.

And we also have a quick reference measles checklist for healthcare workers. Next slide. And if you need additional materials, please reach out. Communication materials for the public are available in additional languages and in editable or printer-friendly versions upon request. And the email linked here, measles resources at [cdc.gov](https://www.cdc.gov), is the best way to contact us to request those resources.

Next slide.

We just have here a few additional resources for clinicians, including our Clinical Overview of Measles page, the IPC page that I mentioned previously, and the sublink within our toolkit that specifically has resources for healthcare providers.

Next slide.

So I'd like to thank you for your participation, and I'll hand it back over to our moderator.

CDC COCA Moderator: Thank you very much, presenters. I want to thank you for sharing this timely information. We'll now go into our Q&A session. Audience, please remember to ask a question. Simply click in the Q&A button at the bottom of your screen, then type your question. So let's start by answering what I'm seeing as a common theme in the Q&A.

CDC COCA Moderator: What do you think is driving the record number of cases this year?

Adria Mathis, MSPH: Hi, this is Adrienne Mathis, I can take that question. A combination of factors has really contributed to the increased number of cases that we've seen this year. Again, I think it's important to note that the risk for widespread measles transmission in the U. S. remains low, because we do have high population immunity from high measles vaccination coverage. However, recent increases in global measles, including large outbreaks in Mexico and Canada, coupled with declines in MMR vaccination coverage in many U. S. jurisdictions, have increased the risk of cases and outbreaks in the U. S. Larger measles outbreaks typically follow importations into communities with low vaccination coverage. For example, the outbreak that started in Texas earlier this year predominantly affected members of an unvaccinated... an under-vaccinated community, and cases from West Texas alone accounted for about 52% of the year's cases. Luckily, Texas did declare this outbreak to be over last month. We also went over the record number of imported measles cases, and record number of outbreaks that have occurred this year. And again, most of these imported cases continue to occur in U. S. residents who are unvaccinated

and become infected while traveling abroad, and most outbreaks this year have been small, with 10 or fewer cases. Thank you.

CDC COCA Moderator: Thank you very much for that. Our, next question asks, can you, Share any adverse outcomes that have been observed as a result of contracting measles during pregnancies?

Dan Filardo, MD: Hi, this is Dan Filardo, I can take that question. I think as we highlighted in the presentation, measles in pregnancy can result in multiple complications. So pregnant women themselves can experience higher rates of measles complications, such as pneumonia, and there can be adverse pregnancy outcomes, like preterm labor, premature delivery, or low birth weight. And measles infection occurring around the time of delivery can also result in congenital measles, where the neonate develops measles at birth, or shortly after birth due to exposure in utero, basically due to exposure related to maternal viremia. So giving immune globulin to an infant at birth can reduce the risk of acute complications for infants born to women with acute measles. But based on the available literature, infants with congenital measles seem to be at higher risk of severe complications, such as encephalitis and SSPE, as we highlighted. And it's a little bit unclear how effectively immune globulin can prevent against these severe complications. Fortunately, overall, these scenarios are rare in the United States, given high overall immunity to measles among adults. Although these scenarios of measles in pregnancy and congenital measles can occur in persistently under-immunized communities that have large numbers of unvaccinated children and adults. I think the other thing I'd like to highlight here that has come up this year is there are some unique patient management and infection control challenges that can come up in healthcare facilities when managing measles infections on the labor and delivery ward and managing congenital measles cases. Hospitals can develop plans now for airborne precautions throughout labor and delivery, including potentially in the operating room, if that is required, and during newborn care. And we'd encourage hospital administrations and clinicians who might consider that they might face these scenarios to review guidance from a few resources, including the American College of Obstetrics and Gynecology the Society for Maternal-Fetal Medicine, and the American Academy of Pediatrics. for considerations about clinical management. And we also encourage clinicians and health systems, if they have concerns, to reach out to their local or state public health department or to CDC for additional infection prevention and control guidance, if needed.

CDC COCA Moderator: Thank you very much. Another question we're seeing in the Q&O box a lot is. Does someone have to be symptomatic to spread measles?

CAPT David Sugerman, MD, MPH, FACEP, USPHS: I can go ahead and take that question. It's one we receive quite often. So, there's no substantial evidence to suggest patients can transmit the virus if they have no symptoms at all. As reviewed, patients with measles are considered contagious 4 days before rash onset, when they'll typically have a fever along with cough, runny nose, and or conjunctivitis.

CDC COCA Moderator: Thank you. Slightly related to that, the next question asks, can someone still get measles if they have been vaccinated?

Dan Filardo, MD: Yeah, hi, this is Dan, I can answer that question. Yes, people who have been vaccinated can get measles, but it is much less likely than for someone who is unvaccinated due to a really highly effective vaccine in the form of MMR. If exposed to measles virus, we think about 3 out of 100 people who have previously received 2 doses of measles vaccine might get measles despite that prior vaccination. But as we reviewed, there's still a strong benefit to the vaccination. People with pre-existing immunity are less likely to get severely ill, and are less likely to spread the virus to others. And as we reviewed, people with pre-existing immunity Can have clinical symptoms that present a little bit differently than people who are unvaccinated, which we call modified measles, including an atypical rash or a relatively mild fever or respiratory symptoms. And I didn't mention this earlier, but this can also occur if a person received post-exposure prophylaxis with MMR or immune globulin after a measles exposure, but develops measles despite receipt of post-exposure prophylaxis. So something for clinicians to be aware of when they're evaluating patients with suspected measles.

CDC COCA Moderator: Thank you. And, we have questions regarding signs and symptoms. This question asks, CDC COCA Moderator: How common is it for a patient to develop a rash after receiving an MMR vaccine?

CAPT David Sugerman, MD, MPH, FACEP, USPHS: This is David Sugerman. I'll go ahead and take that question. So a small percentage of people who get MMR vaccination, especially people getting their first dose, will have a fever and rash. This happens in up to 5% of people who receive the vaccine. Most of the time, this rash is fairly mild, short-lived, and doesn't mimic a true measles rash. And some of the providers on the call may have seen this. In rare instances, the rash can be indistinguishable from measles. Overall, symptoms and rash after receipt of MMR is referred to as a vaccine reaction. This vaccine reaction does not cause complications seen with wild-type measles, such as pneumonia, in people with normal functioning immune systems.

And people who have symptoms related to a vaccine reaction cannot transmit measles vaccine strain virus to others, as is the case with wild-type virus. Generally, testing is not

required when evaluating a patient with a febrile rash. who has recently been vaccinated within the last 1 to 3 weeks, unless there is an epidemiologic risk of measles, such as a known exposure, a local outbreak, or international travel. If there is epidemiologic risk for measles, specialized testing that can identify the vaccine strain may be required, and public health authorities should be contacted for assistance for that type of testing.

CDC COCA Moderator: Thank you very much. Our next question has to do with pediatric vaccination, and it asks, when should early vaccine doses in infants 6 to 11 months be considered? Are there any downsides to giving an MMR dose to infants before 12 months of age?

Dan Filardo, MD: Yeah, I can take that question. This is Dan Filardo. So, infants infected with measles, we know, are more likely to experience severe disease, and maybe more likely to develop complications, including fatal complications like SSPE. And so therefore, infants 6 months and older who are at higher risk of measles exposure should be vaccinated earlier than the recommended 12 months of age. So infants 6 to 11 months old who are traveling internationally, as we reviewed today, are recommended to get one dose of MMR prior to travel. And during a local measles outbreak, where there is an increased risk of exposure. Jurisdictional health departments, like the state or local health department, who know the local epidemiology best, may also recommend vaccinating infants in this 6-11 month window with one dose of MMR. And just, again, to highlight, as we reviewed, all infants vaccinated before 12 months of age should be given 2 more doses after their first birthday, per the routine schedule. Regarding any downsides to earlier vaccination, there is literature to suggest that this early dose of MMR before 12 months of age may cause antibody levels against measles to be lower later in life, even after 2 more doses on the typical schedule. However, I think it's important to note that antibody levels are only one part of the equation when it comes to measles immunity, and evidence shows that people still develop robust immunity overall to measles, including cell-mediated immunity, if they start receiving... if they receive an MMR dose before that 12 months of age. That's the start of our routine schedule. So while we don't recommend an early dose before 12 months of age for the whole population, given these considerations, we do recommend early doses for people at higher risk of measles exposure, including, as we talked about, infants living in an area with an outbreak. When recommended by the health department, and for infants traveling internationally who are going to be at higher risk for measles exposure.

CDC COCA Moderator: Thank you very much, and we have time for one last question. And the question asks, if someone is given immune globulin after an exposure to

measles, but has not received MMR vaccine before, do they still need to be vaccinated?

CAPT David Sugerman, MD, MPH, FACEP, USPHS: I'll go ahead and take that question. This is David Sugerman. Yes, they will need MMR vaccination. Immune globulin provides only short-term protection, as Dr. Filardo mentioned in his presentation, against measles for about 21 days. Unvaccinated individuals who receive immunoglobulin, or Ig, after a measles exposure should get the MMR vaccine 6 months after administration of intramuscular Ig, or IgI-M or 8 months after administration of intravenous Ig or IgIV, as long as there are no contraindications to the vaccine. Even if the measles exposure results in a measles infection, MMR would still be recommended to prevent rubella and mumps. In the future as well. Exposed infants age 0 to 6 months are also recommended to receive immune globulin post-exposure prophylaxis, or PEP, within 6 days of exposure. In general, PEP is recommended for infants 0-6 months of age. Regardless of maternal immunity to measles, as the amount of antibody transferred in utero may be variable and may diminish over time after birth. Infants who receive immunoglobulin PEP should get the MMR vaccine after their first birthday, as long as at least 6 months have passed since they received intramuscular immunoglobulin, or 8 months have elapsed since receiving intravenous immunoglobulin, or IVIG.

CDC COCA Moderator: Thank you very much. I want to thank everyone for joining us today, with a special thanks to our presenters for sharing their expertise with us today. CDC has fully transitioned from the training and continuing education online TCEO system that provides access to CDC educational activities for continuing education to CDC train? If you do not already have a train account, please create one at www.train.org. All new activities that offer CE from CDC will only be listed in CDC Train. CDC Train is a gateway into the TRAIN Learning Network, the most comprehensive catalog of shared public health training opportunities. This transition will allow you to access non-credit and for-credit educational activities and track your learning, including CE in one place. Many CDC-accredited activities are already listed on CDC Train. The move to one system improves efficiency. It makes it easier for learners, CDC staff, and partners to offer an earned CE in one place. You can access and download CE transcripts and certificates in TCEO through the end of 2025. Instructions will be available on both platforms, and a learner support team will be available to answer any questions. All continuing education for COCA calls is issued online through CDC Train. Those who participate in today's live COCA call and wish to receive continuing education.

[Transcript corrected] Please complete the online evaluation and post-test by **October 13, 2025**, with the course code **WC4520R-091125**. The registration code is **COCA091125**.

Those who will participate in the on-demand activity and wish to receive continuing education should complete the online evaluation between **October 14, 2025**, and **October 14, 2027**, use course code **WD4520R-091125**. And I apologize, I may have said the wrong number. It's actually 091125. Again, the registration code is **COCA091125**.

Today's COCA call will be available on demand. One week, approximately after the live session at [CDC.gov](https://www.cdc.gov) forward slash COCA. A transcript and closed caption video will be available on demand on the COCA Calls webpage approximately one week after this live session. Our next COCA call will be next Thursday, September 18, 2025, from 2 p. m. to 3 p. m. Eastern Time. The topic of the call will be “The Path of Yeast Resistance, Drug-resistant *Candida* on the Rise.” You can learn more details about this upcoming COCA call by visiting COCA’s webpage listed there on your screen. Please continue to visit www.cdc.gov forward slash COCA for more details about this COCA call and other upcoming COCA calls. We invite you to subscribe to receive notifications about upcoming COCA calls and other COCA products by visiting www.cdc.gov forward slash COCA. You will also receive other COCA products to help keep you informed about emerging and existing public health topics. Again, I thank you for joining us for today's COCA call, and have a great day. .