

Measles Outbreak: How Do We Contain It?



PODCAST 41

00:12

Dr. Jane Caldwell

Hi, this is Jane Caldwell. Welcome to the *On Medical Grounds* podcast, your source for engaging, relevant, evidence-based medical information. Today *On Medical Grounds*, we will be speaking with Dr. Jon Temte about the alarming rise in measles infections in the United States. Dr. Temte is Professor of Family Medicine at the University of Wisconsin School of Medicine and Public Health. Back in 2000, he was part of an expert panel that concluded that measles were eliminated in the United States. That same expert panel recertified measles elimination in 2011. Dr. Temte also chaired the advisory committee on immunization practices, which issued a report in 2013 for the prevention of measles, rubella, congenital rubella syndrome, and mumps. Hello, Dr. Temte. Thank you for joining us at the *On Medical Grounds* podcast.

Dr. Jonathan Temte

Well, thank you very much for the invitation to speak on something that I feel strongly about.

01:16

Dr. Jane Caldwell

The Centers for Disease Control and Prevention first issued an emergency warning on January 25th of this year, stating that 23 measles cases were confirmed in several states beginning on December 1st of 2023. Early in 2024, we saw measles infections in a South Florida school. Multiple new reports of measles infections are now rolling in. In Chicago, a migrant shelter reported that almost 2,000 individuals were exposed to measles, including 95 toddlers. At last count, there are now up to 41 confirmed cases in over 16 states. Can you put in perspective how contagious measles is compared to other infections?

Dr. Jonathan Temte

We tend to think that measles is one of the most contagious respiratory viruses out there. Some of the variants of COVID-19 or SARS-CoV-2 have come fairly close. But because of the tendency for measles to spread very, very easily, both through respiratory droplets and through aerosols, we take any case of measles very, very seriously.

02:35

Dr. Jane Caldwell

It's been so long since measles were seen in the United States that many physicians and nurses have only seen photos and textbooks. What does measles actually look like?

Dr. Jonathan Temte

You're absolutely correct here. I think we're now facing two generations of physicians and other clinicians

out there who have never seen a case. And I think it's really important to understand a little bit of the basics of measles that this is a virus that has a two-phase replication within individuals. First, with exposure and inhalation, there's an initial infection and then there's a dispersal with virus ending up in regional lymph nodes and a secondary replication. And then eventually making it out to the skin. From exposure to the first prodrome, it's about 11 to 12 days. And from that prodrome, which might last anywhere from two to four days, we see the rash occurring typically about two days after that prodrome.

So let's get under the hood a little bit here. That prodrome phase is a period of time when people will tend to have what we call a stair step in fever. So fever is gradually increasing over two or three days. And the characteristic findings during that prodrome are what we call the three C's. Cough, conjunctivitis and coryza, or runny nose. And so, the stepwise fever with this and possible exposure should clue somebody in on the possibility of measles. But the characteristic finding is that measles rash. The rash comes on again two to four days after that prodrome starts. And it's a rash that typically begins in the hairline, spreads down over the face, spreads down over the trunk, and then moves out peripherally thereafter. It's a red rash. It's called a macular papular rash. Sometimes it can be confluent, but the challenge is seeing the rash on different skin colors and different skin types. We have to think of this all in a big package. And then finally, that rash will tend to start receding in the same order that it came on. And the total rash will last five or six days. The other thing that's really important to consider is that people are contagious from about four days before that rash starts until about four days after the rash starts. And those are periods of time that it's really important to keep people in quarantine. Again, because this is so very contagious.

05:38

Dr. Jane Caldwell

Does the rash, can it damage your skin, say, the way chicken pox can?

Dr. Jonathan Temte

We tend not to see a whole lot of long-term problems with the skin rash. So it's not considered scarring like smallpox or chickenpox.

05:57

Dr. Jane Caldwell

Have you seen it now in your state?

Dr. Jonathan Temte

Well, we have not had any cases in Wisconsin. The last case we had was actually last fall in October. However, I have to mention that in October of 2021, we had a small outbreak here of 22 cases, and this occurred on a military base that had received over 10,000 Afghani refugees, and this was a population that was not immunized. Fortunately, public health got in very quickly and had a widespread immunization program with the support of the elders and the leaders of this immigrant community. And it brought it under control fairly quickly.

06:42

Dr. Jane Caldwell

The CDC says that one in five unvaccinated people who get measles will be hospitalized. Can you talk about both the short-term and the long-term problems that are associated with measles?

Dr. Jonathan Temte

Absolutely. When we look historically, the figure was about 30% or one in three people had a complication. And it could be as simple as diarrhea, otitis media, but also things like pneumonia were fairly common. Less common, but enough to be notable, was encephalitis. And one of the long-term attributes of measles is this condition called subacute sclerosing panencephalitis. Fortunately, this only affected about one out of every 10,000 people who encountered measles, but this is a progressive, non-treatable CNS infection or effect that comes on anywhere from eight to 11 years after that initial case of measles and is fatal.

And so this is one of those big concerns out there. More recently, there have been some very interesting studies looking at how measles infection, particularly in a young person, basically resets the immune system. It wipes out a lot of the immune memory that we acquire either through infection or through vaccination. And so children who have come down with measles are susceptible to other common child infections and there have been fatalities reported from this.

08:27**Dr. Jane Caldwell**

That's fascinating. Well, that sort of leads into my next question, but you may have already answered it. Are any of these problems more frequent in unvaccinated children as opposed to unvaccinated adults?

Dr. Jonathan Temte

Well, in general, we tend to see more of these in young children. However, these can occur across the age range.

08:51**Dr. Jane Caldwell**

The CDC has now issued an emergency warning. How many people have to be confirmed as infected before it's considered a measles outbreak?

Dr. Jonathan Temte

Well, I think one has to consider that even a single case in a jurisdiction is considered a public health emergency. And in fact, just yesterday, our state of Wisconsin issued a public health alert to clinicians because of the cases across the border in Illinois. So fairly close to us in the Chicago area. And so I would say it's hard to put a number as to what we would consider an outbreak. But what we consider emergent and serious is even a single case, because that case can multiply very, very quickly. You know, 90% of people who are unimmunized, who have contact with a case of measles, will come down themselves with measles.

09:49**Dr. Jane Caldwell**

You were on a committee that said measles were eliminated in the US in 2000 and also re-verified in 2011. What happened that caused us to lose that status?

Dr. Jonathan Temte

Well, the good news is we have not lost the status. Measles is still eliminated in the United States. In about

2015, the entire Western hemisphere, both North and South America, were certified as having measles eliminated. However, that status has been lost because of cases in Venezuela and Brazil. And this is one of the interesting things with measles that we have the ability to control. But oftentimes, political instability is a factor that leads to the loss of elimination status.

10:42

Dr. Jane Caldwell

The World Health Organization considers only one infection in the world that is eradicated, and that is smallpox. What is the difference between being eliminated and being eradicated?

Dr. Jonathan Temte

Excellent question. Well first let's understand that to eliminate, or I'm sorry, let's start out with eradicate. To eradicate a virus, one has to have control over reservoirs of that virus. Smallpox only occurred in humans. Likewise, polio is only found in humans and measles is only found in humans. That opens the door to eradication, which means the entire removal of virus from the entire global population. So we have achieved that with smallpox. We're getting very close with polio, and we have shown that things like rubella and measles can be removed from large geographic areas without full eradication.

Now when something's eliminated, we will use the lack of transmission within a geopolitical boundary over an entire year. So you can't have a chain of transmission that keeps on burning through the population for 12 months. Unfortunately, the United States came very, very close in 2019. We had more cases that year, almost 1,300, than we have seen since 1992. Fortunately, since that time we have been lower than that, but there's always a risk if we allow our vaccination rates to drop.

12:32

Dr. Jane Caldwell

The measles vaccine is one of our most, if not the most, effective vaccine that we have. What can you tell us about the vaccine itself and can you recommend a dosage schedule?

Dr. Jonathan Temte

Absolutely. The current measles vaccine is packaged along with mumps and with rubella. So it is a triple vaccine. All three of these are live virus vaccines, but they're live and attenuated, meaning that they provide immunity, but they don't typically provide much in the way of any symptoms.

The current dosing schedule is typically started at age 12 to 15 months for the first dose, and then a second dose provided at age four to six years. With a single dose, we tend to look at measles as being about 95% effective in preventing cases of measles if exposed. With a second dose, that brings it up to about 99%. So it's a very, very effective vaccine. It also is a very safe vaccine in that we see side effects at very low levels. But things that listeners should be aware of is the possibility of a post-vaccination rash, which occurs at low levels. And about one in 5,000 children will have a febrile seizure following a measles-containing vaccine. Febrile seizures, in and of themselves, are benign, but they're very, very frightening for parents to see. But just so we're in the open, there are some known side effects with the measles vaccine. But again, they tend to be self-limited and tend to be reasonably benign.

14:38

Dr. Jane Caldwell

The standard view is that the U.S. needs to have a 95% vaccination rate to keep measles at bay. Now we're currently at 93%. Is there a point where we're going to lose what we call our herd immunity?

Dr. Jonathan Temte

I think one of the most important concepts with herd immunity isn't so much what the entire population has for a coverage rate, but what smaller populations within that larger population have. So, in our country, a lot of us tend to live with like-minded people, and because of this, we'll see pockets of really high vaccination, and we'll see pockets of low vaccination.

For example, in my state, there is one county that has a coverage rate for two-year-olds, you know, basically the first dose, that is down in the low 60s in terms of percent. And if you look across the country, there will be neighborhoods, there will be counties, there will be villages, cities, and so on, that have extraordinarily low rates of coverage. And those are where we do not want a case of measles to drop into because this again can be an explosive type situation. More recently, and for example, in Chicago, where the case being found in a homeless shelter, we've seen a rapid magnification because of the lack of immunity within that population. So I think we have to think beyond that level of vaccination coverage and herd immunity and think more on a local level. Now, the other thing I'll mention is the more contagious or more transmissible of viruses, the higher overall vaccine coverage rate we need. And because measles has a really high basic reproduction number, it means that we have to immunize a great number of people to prevent the taking off of measles in a population. And the best estimate is that's around 93 to 95% for measles.

17:17

Dr. Jane Caldwell

So likewise, not many younger parents remember the measles as being around as a serious childhood illness. Do you think we have made a false sense of security because the vaccine works so well?

Dr. Jonathan Temte

The vaccine works very well and our population has very little remaining knowledge of measles cases. If you look at a physician like myself, I grew up and in the 1960s was immunized for measles. And since the mid-1960s, we have had fewer and fewer cases. And even during a bad year like 2019, when there were almost 1300 cases across the country, most physicians did not see that. Most parents did not have a child who had measles. And so by the fact that we're very, very good at prevention, we have no knowledge and we have virtually no fear of this particular virus. And I think that can be a dangerous situation to be in.

18:23

Dr. Jane Caldwell

Vaccine misinformation seems to be more common now since COVID-19, but it also existed in relation to the measles vaccine even before the pandemic. How much did the retracted article about autism hurt measles vaccination rates?

Dr. Jonathan Temte

When this article was published in 1998, there was a fairly rapid decline, particularly in the United Kingdom and across Europe in vaccination because of people who were concerned about autism being related

to the vaccine. The entire study and all subsequent work along this line has been thoroughly debunked. However, even today in 2024, patients will be concerned about the possibility of autism, particularly with the MMR vaccine. And this is a connection that was made, which is a false connection, but it has been incredibly hard to shake. So I think the bottom line is its very unfortunate that this claim was made, but it has had a long, long and very negative tail.

19:48

Dr. Jane Caldwell

With social media and the politicization of vaccine hesitancy, what can we do to fix that?

Dr. Jonathan Temte

Well, I think first and foremost, it's really important for physicians, for physician assistants, nurse practitioners, and other vaccinators to really make sure that parents and others know that we're all on the same team. We're all on the same side. The best approaches in my mind are consistency, honesty and persistence. Being somebody who is there for your patients, who cares about your patients, and who kind of walks the walk. So if you're promoting vaccination, making sure that you and your staff are vaccinated, those all go a long way. Will this solve it for everybody? Absolutely not. But I think again that consistency and that relationship you have with patients goes a long way. We know time after time that when clinicians advocate for their patients and provide up-to-date good information over time and strongly recommend a vaccine, those are things that are associated with much higher rates of vaccine coverage.

21:21

Dr. Jane Caldwell

Well, we must be about the same age because I also received my MMR and my MMR booster in the mid-1960s. But you know, I checked with the CDC at their aptly named website, The Pink Book, and I found out that I might not have immunity due to an ineffective killed vaccine that was available at that time. So I contacted my doctor, and she had my measles antibody titer taken, and I was shocked to learn that I had no immunity to measles. So since then I've had a new more effective MMR shot and I'm going to get the MMR booster a little bit later on. So how do we get this word out to our special older population that is at risk for measles now?

Dr. Jonathan Temte

Well, I think it's more of a challenge than that because many of us are on electronic health records now, and many of our states will have electronic immunization records, but virtually none of the records go back far enough in time to have any clue what we have. And so I think the challenge right now is considering who should be vaccinated, and who can take a pass on that, especially in our adult population. And particularly for individuals who think that they were vaccinated sometime between 1964 and let's say 1968, those are people who, if they are considering international travel, if they're on college campuses, if they're healthcare workers, should consider either getting a titer or just redoing the vaccine. One of the problems I see, however, is in our electronic health record, we have been prompting a lot of people to get vaccinated that probably don't need it because of either their age, being born at the time that they were likely to have measles, or actually having received a vaccine for which we don't have a record for. The good news is even if you've been fully vaccinated, as a child, getting another vaccine as an adult is not going to have any significant negative effect on you. But I think it's really important that for those adults out there who don't have record, have some concern, receiving a single dose of MMR vaccine will provide really good

coverage. For people who are, for example, healthcare workers, students who are going and spending time on campus and people who are looking at international travel, particularly to the eastern hemisphere, these are individuals who should consider getting a vaccine dose.

24:19

Dr. Jane Caldwell

Well, it's interesting. My husband was also immunized back in the mid-60s and his titer was fine. So I think having your titer checked is a good way to see if you need it. So I'm going to close by asking what is your biggest worry concerning measles and other reemergent diseases?

Dr. Jonathan Temte

Well, I have to go back. When I was part of this measles elimination meeting back in 2000, I will confess I was naive in terms of vaccination, of immunization science, and fairly naive in terms of measles. But I take you back to that time at which there were about a million children each year across the world dying of measles. I worry that we get back to a time when that can happen. And I also look at some recent information out there that just during the pandemic period, going from 2021 to 2023, we saw a five-fold increase in reported measles cases across the world. And one area where it really grew very quickly was in Europe. And so the combination of misinformation, of vaccine hesitancy, can really lead toward a world in which people are less safe, that children are more prone to significant illness, disease, and death. And all this is controllable through an inexpensive, highly effective and safe vaccine.

Dr. Jane Caldwell

Dr. Temte, thank you so much for taking time to speak with us and sharing your knowledge of measles vaccines.

Dr. Jonathan Temte

And thank you very much for the invitation. Take care now.

Dr. Jane Caldwell

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