

# **Another vaccine crisis: Rise in missed doses may portend return of measles**

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M-M-RVAXPRO® powder and solvent for suspension for injection in pre-filled syringe Measles, mumps, and rubella vaccine (live). Credit: Whispyhistory/Wikimedia Commons, CC BY-SA 4.0

More than 22 million children worldwide missed their first dose of the measles vaccine in 2020, according to the World Health Organization (WHO) and the U.S. Centers for Disease Control and Prevention (CDC). That is 3 million more than the number of children who missed recommended doses in 2019, representing the largest increase in 20 years.

Measles is a highly [contagious disease](#) and high rates of vaccination are required to prevent outbreaks. Approximately 95% of a population needs to be vaccinated against [measles](#) in order to achieve herd immunity. So this increase in missed vaccinations and lower rates of outbreak surveillance, which also decreased in 2020, put regional measles elimination at risk, public health leaders say.

In a recent conversation, Sten Vermund, dean of the Yale School of Public Health, and Saad Omer, director of the Yale Institute for Global Health and recent member of the WHO Strategic Advisory Group of Experts' working group on measles and [rubella vaccines](#), spoke to Yale News about the dangerous implications of this trend and what can be done to reverse it.

This interview has been condensed and edited.

**How concerning is it that such a growing number of children are missing their first dose of the measles**

## **vaccine?**

Saad Omer: It's concerning because we know from experience that these missed doses are not uniformly distributed. They're often in the most under-resourced, most underprivileged, and most vulnerable communities. So, this is concerning, and we need to catch up.

Sten Vermund: Measles, among respiratory viruses, is more serious than most. It has a higher death rate and complication rate, and for those reasons alone, we are alarmed. But the second element that is concerning is that it's more infectious than the other respiratory viruses, including coronavirus. It's simply easier to catch. When you have a diminution of the number of kids who are protected, you can pretty much count on there being outbreaks because the transmission is more robust and, therefore, the protection is more fragile, and we need a very high proportion of children to be vaccinated to achieve the so-called herd immunity.

## **What steps need to be taken to get these children vaccinated?**

Omer: It's ultimately the country programs that are responsible, but they need a lot of help and support. In certain cases, the WHO, Gavi [the Global Alliance for Vaccines and Immunizations], and UNICEF can provide support. It's important to have international attention and investment so countries can mount these catch-up campaigns, especially as COVID-19 restrictions begin to open up.

We also should be mindful that controlling the measles virus globally is in the U.S. interest. We know that there are pockets of vulnerability in this country. There have been increasing outbreaks here. Because of social distancing [due to the COVID-19 crisis], we pushed back the

impact of those outbreaks a little bit. But now, as children go back to schools and communities come together again, even this country is at risk of measles outbreaks.

**The report listed the 10 countries with the highest number of children with missed first doses, and these countries were fairly spread out, geographically. What does that mean for outbreak risk and what are the implications of that for solving the problem?**

Vermund: We have to vaccinate against measles, all the kids all the time, and that includes high-income countries. Whenever we have some rumor that autism is caused by the measles, mumps, and rubella vaccine, and parents in high-income countries stop vaccinating, you start to see measles cases. It's extremely easy to reintroduce measles through travel and to spread measles. It is remarkably transmissible.

And we do have strong national programs—national programs for vaccines are stronger than national programs for just about any other condition. And so I do think we have the infrastructure to make rapid progress again. It may require a surge of funding, and Gavi, as Saad mentioned, is well positioned to help countries that have vaccine shortages. But I think there is a sense of urgency not only for these 10 priority countries, but for many others.

Omer: The breadth of the problem highlights the need for a coordinated regional and global response. We are as strong as the weakest link in the chain of protection against this virus. Research has also shown that the ability to mount immune memory against other pathogens goes down when you are hit with measles. And that effect lasts for a few years. So, we don't want these communities to be hit with a one-two punch of measles and then subsequent infections.



## **The report also mentions that measles surveillance dipped in 2020. What does proper measles surveillance allow you to do?**

Omer: You want to go after outbreaks as soon as possible. You can't have see-no-evil epidemiology with measles; you need to find out if there is a problem and you need to act quickly. Measles is not something you don't find out about. The question is when you find out, and if you find out sooner rather than later, you can have an impact on the trajectory of the outbreak itself.

## **Interestingly, there were also lower rates of reported measles cases last year than in the year before. The WHO proposed a few reasons why that might be—there might actually be fewer cases or maybe cases were underreported. Is there a way to determine the real driver of these numbers?**

Vermund: What we try to do is triangulate multiple data sources. We can survey hospitals and find out how many children have died of measles or how many have been hospitalized with measles. Say you're in a region and you've noticed fewer vaccines being given and there have been lockdowns from coronavirus fears. If your case rates for measles drop, your death rates for measles drop, and your hospitalizations from measles drop, then you can be pretty sure that COVID mitigation reduced the number of measles cases, even if measles risk has gone up. However, if your case numbers drop but your mortality goes up and your hospitalization rates go up, you can be pretty sure that measles cases were underreported. So, there are various surveillance tricks that one can apply to try to tease out whether there's been a true reduction in incidence or whether it's an artifact of poor reporting.

Omer: In addition to surveillance itself, there is the fact that physical distancing going on around the world. But when things go back to "normal" and interactions go up, these artificially depressed rates may increase because there's plenty of tinder that can catch fire.

## **Is there time to correct the problem?**

Omer: It's correctable. We're not helpless bystanders. We know the tools that are out there. We have a really effective vaccine. We have a pretty stable virus. We know how to mount national campaigns even in some of the most resource-deficient settings. We know how to do this. The issue is political commitment, resources, and bandwidth in a public health system that is trying to fight COVID-19. But we can do something about it. We don't have to invent a new vaccine. We don't have a shortage of vaccine. We know how to deliver it. Supply chain capacity is there. We have to work on it but we're not starting from zero.

Vermund: We're at considerable risk now of a global measles expansion. But we can mitigate it and even largely prevent it with action now. Surveillance is not immediate; we always have a lag in knowledge of case rates, and outbreaks can sometimes be masked in the lower income settings. If I were guessing, I would guess that we've got a rise in measles occurring as we speak that we'll learn about in a few months. I think the matter is quite urgent and I think catch-up vaccination is a very high priority.

## **Are there efforts to administer the missed vaccinations?**

Omer: The WHO is paying attention to this, but it's stretched thin. Countries that are vulnerable are mounting campaigns. Pakistan recently launched a national campaign, for example. But it will require sustained

effort. It's not going to automatically solve itself. It will require sustained global, multi-country effort. But there are countries that are taking it seriously and trying to preempt it.

## **Is there anything else to keep in mind going forward?**

Omer: In the next pandemic, we need to make our immunization systems and our overall health systems more resilient. And we need to anticipate these kinds of things. We already saw this with Ebola. Ebola had more childhood deaths due to disruption in measles vaccination in West Africa than from Ebola itself. We need to get out of the cycle of being reactive, we need to expect these kinds of things. And vaccines and public health measures have a huge return on investment. The key is this: zero dollars spent yields zero return on investment. You need to put money in to get that return on investment.

Vermund: Given strong data on the safety and efficacy of the coronavirus vaccine, we are very keen to increase coverage among adolescents and children of that vaccine. And wouldn't it be delightful if revitalized efforts for familiar childhood vaccines, like the measles vaccine, could also add coronavirus vaccine to the list? It may not sound as urgent because coronavirus is not as serious of a disease for children as measles is, but the reality is that the more children who are vaccinated against coronavirus, the fewer cases in kids and the more that vulnerable adults will be protected. And there are children who are vulnerable to coronavirus who will be protected by high vaccine coverage in their classmates and playmates. Vulnerable children include those who are partially immunosuppressed with diseases like diabetes or various cancers. We need to incorporate the coronavirus [vaccine](#) into global childhood vaccination programs now that it is available.

Provided by Yale University



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