

## COMMENTARY

## With COVID Vaccinations Comes a Potential Nightmare Scenario

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February 10, 2021

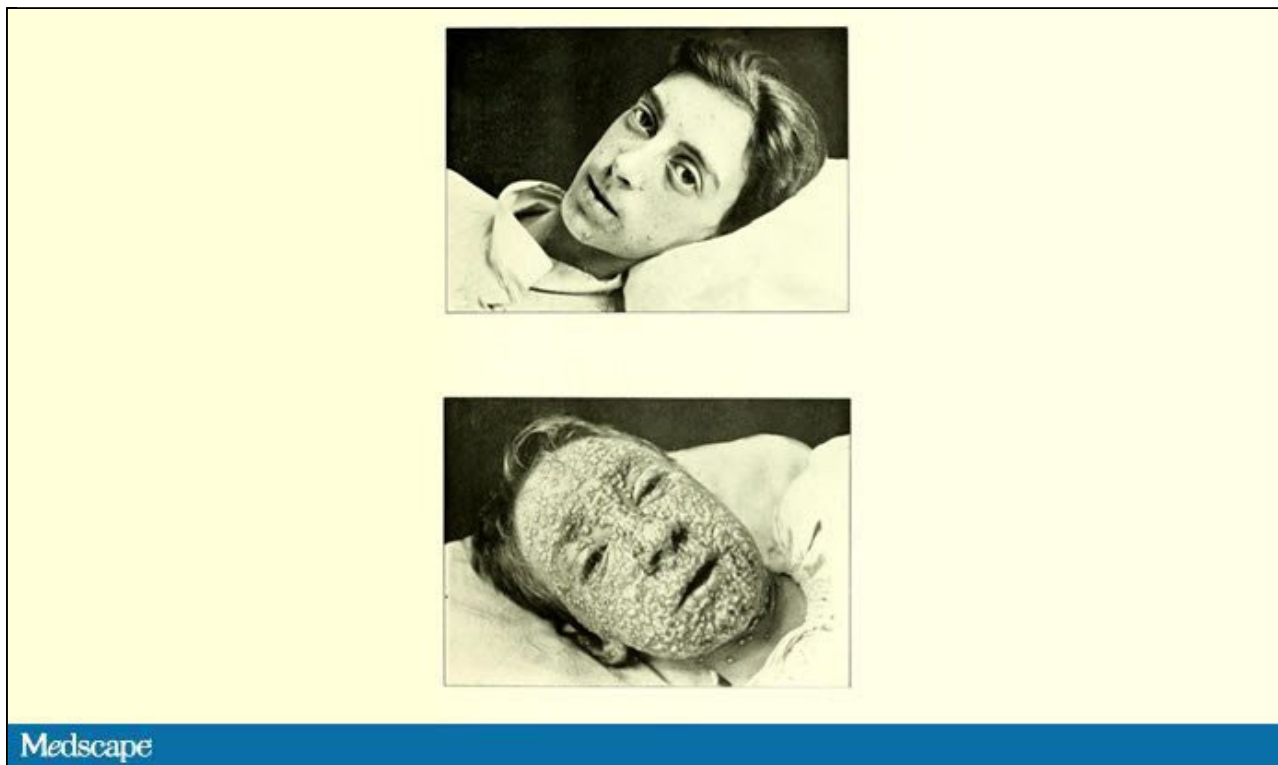
*This transcript has been edited for clarity.*

Welcome to *Impact Factor*, your weekly dose of commentary on a new medical study. I'm Dr F. Perry Wilson of the Yale School of Medicine.

No one talked about it much, but public health professionals were all aware of a potential nightmare scenario when COVID vaccinations started up in bulk. No, not a slew of severe adverse events; the clinical trials made it clear that these were fairly safe interventions. The nightmare scenario, discussed in small groups online and on campus, was this: What if the vaccines reduce the severity of COVID-19 but not the transmissibility? In other words, what if the vaccine takes someone who would have been sick with COVID-19, isolating at home, and converts them into an asymptomatic carrier, out in the world and spreading virus like millions of Typhoid Marys?

It's not a crazy proposition. Remember that the vaccine trials were designed to see if the vaccine prevented symptomatic COVID-19, not total infections. And I need to point out that this is fine — reducing symptoms is hugely important.

This picture was published in 1901.

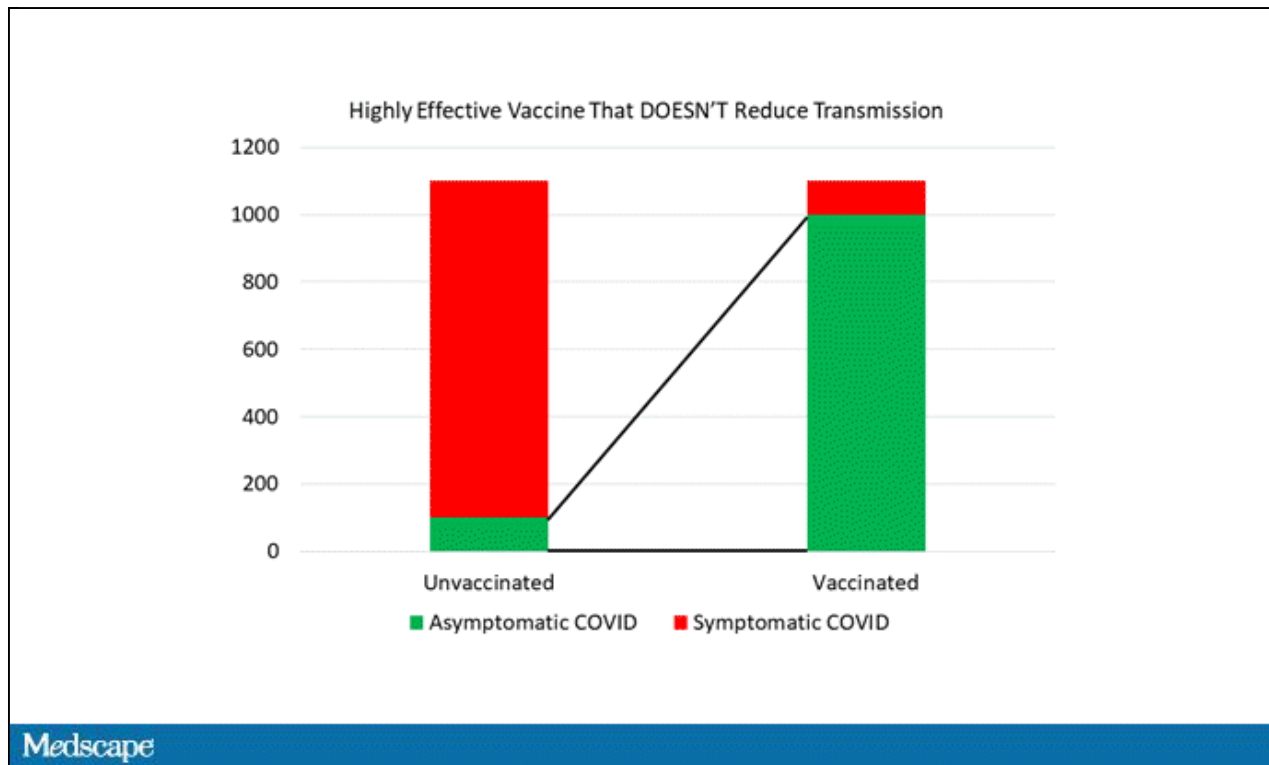


Two sisters were both exposed to smallpox from the same source. The woman on top, aged 21, was vaccinated as an infant. The girl on the bottom, 15 years old, was not. You can see that the vaccine did not eradicate the disease; the woman on top has a couple of lesions. But it's clear you'd rather be her than her sister.

On an individual level, reducing the severity of disease is critical. From a public health perspective, we *also* want to reduce transmission.

Public health officials have been cautious about this, generally pointing out that we don't yet know if vaccines reduce transmission, and encouraging the vaccinated to keep distancing, wearing masks, and whatnot. That's reasonable. But let's be honest: It would be really strange to have a vaccine that is 95% effective at eliminating symptomatic COVID-19 but didn't have any effect on overall infections.

The one good argument I've heard for this is that the vaccines generate blood-borne immunoglobulins like IgM but not mucosal ones like IgA, and so maybe the vaccines protect against big systemic infections but the virus can still set up shop in the nasal passages.



What this purely hypothetical vaccine does is show dramatic efficacy at reducing symptoms of COVID-19, but it doesn't reduce infections at all. It basically takes people who would be sick and turns them into asymptomatic carriers, spreading to the unvaccinated masses.

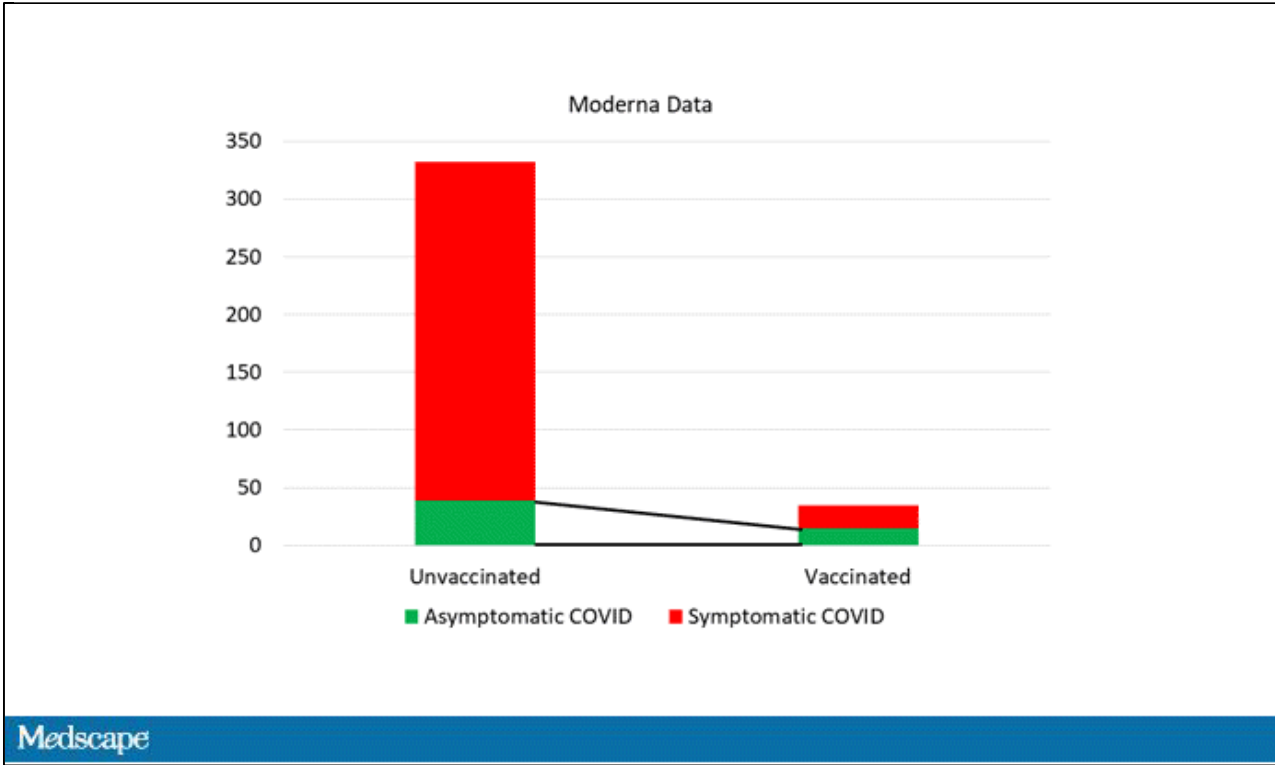
Fortunately, it doesn't look like this scenario will come to pass.

First, let's look at the AstraZeneca data. Their protocol for UK trial participants included weekly at-home nasal swabs, regardless of symptoms. That gives us good data on the number of asymptomatic infections in the vaccine and control groups. You can see from this graph a significant reduction in *any* infection as well as a smaller reduction in asymptomatic infections.



This is great news. Even having the same number of asymptomatic infections but fewer infections overall is good for public health. The nightmare scenario only occurs if a vaccine *increases* the number of asymptomatic infections.

Moderna has a bit of data too, though not as systematically collected. They swabbed everyone in the trial before they got the second dose of vaccine. So — caveat here — these people were not fully protected. Nevertheless, we can see a similar result: dramatic reductions in overall infections and a reasonable reduction in asymptomatic infections.



As of this recording, I don't have data regarding asymptomatic infections in the Pfizer trial, though I understand that they are coming.

So, can the vaccinated take their masks off? Not yet. There clearly is an asymptomatic infection rate even after vaccination; it is just thankfully smaller than among the nonvaccinated. Of course, there are two ways to make this issue

moot. One is to have a ubiquitous testing system catching all of those asymptomatic cases. We still don't have that in the US. Two is to vaccinate everyone all at once; this is basically what happens each flu season. If everyone is vaccinated, or at least all the high-risk people are, the impact of asymptomatic spread is seriously mitigated.

The next set of data to look for is from postvaccination antibody tests. The mRNA and protein vaccines all focus on the spike protein, meaning vaccinated people have anti-spike antibodies. If they *also* have antibodies to other parts of SARS-CoV-2, that is a sign that they were infected with wild-type virus. In the absence of daily nasal swabs, that will be the best way we have to truly understand the risk for asymptomatic spread from vaccinated individuals. But for now, at least, we can sleep easier. There will be no nightmares tonight.

*F. Perry Wilson, MD, MSCE, is an associate professor of medicine and director of Yale's Clinical and Translational Research Accelerator. His science communication work can be found in the Huffington Post, on NPR, and here on Medscape. He tweets @fperrywilson and hosts a repository of his communication work at [www.methodsman.com](http://www.methodsman.com).*

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