

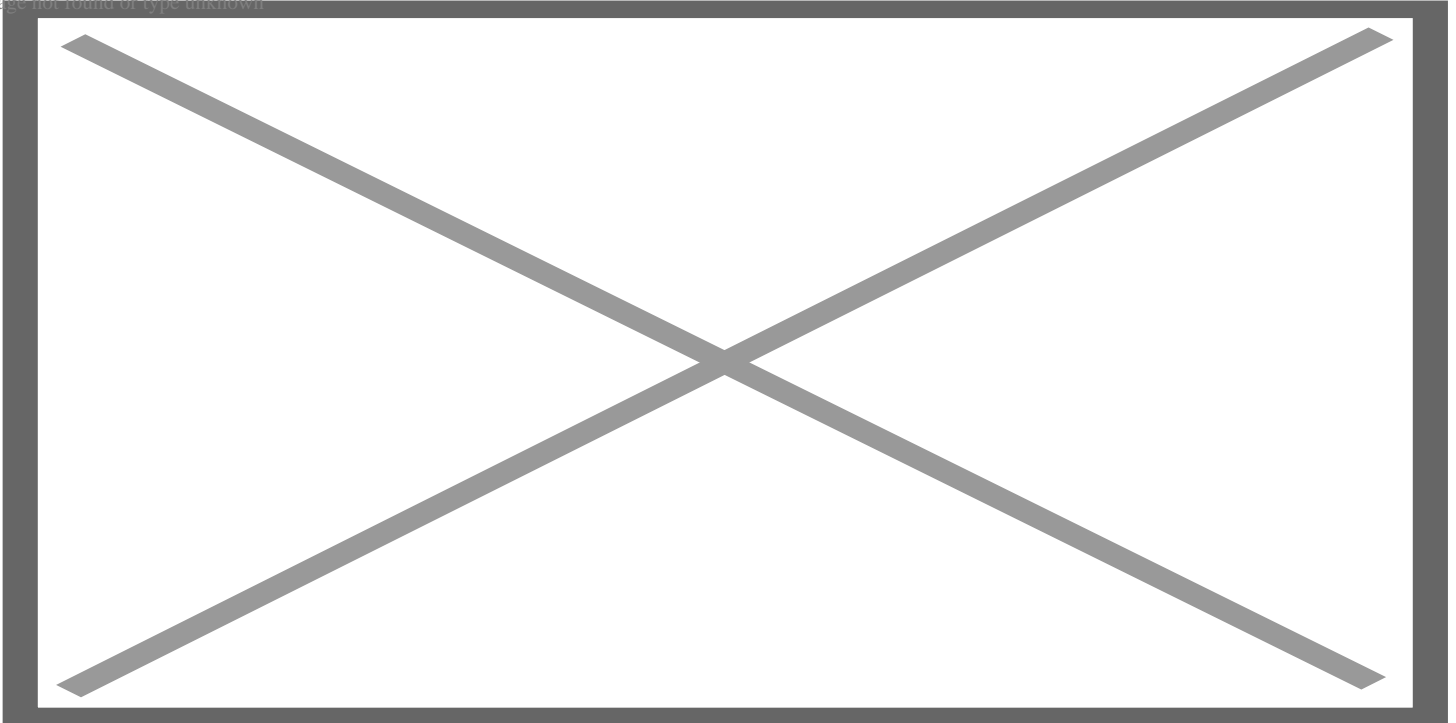
Which offers more protection: Vaccination or natural immunity?



According to Sen. Rand Paul – an ophthalmologist, not an infectious disease specialist – natural immunity is better. While not being an infectious disease expert myself, I at least know enough to fact-check before speaking. So the answer, as is frequently the case, is: it depends.

Let's start by demonstrating the pandemic's continuing politicization with the Tweets of the Senator from Kentucky.

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Perhaps a more interesting question is whether there are advantages or disadvantages to natural versus artificial, i.e., vaccinated immunity?

The short answer is that it makes no difference to our immune system. Whether the antigen is a virus or bacteria, or a snippet of same, made by man, the immune system recognizes it as foreign and “does its thing.” Its thing, of course, is to develop an immune response. That transformation occurs in the bloodstream and lymph nodes irrespective of whether the antigen got in from our nose, mouth, digestive tract, lung, or via a needle.

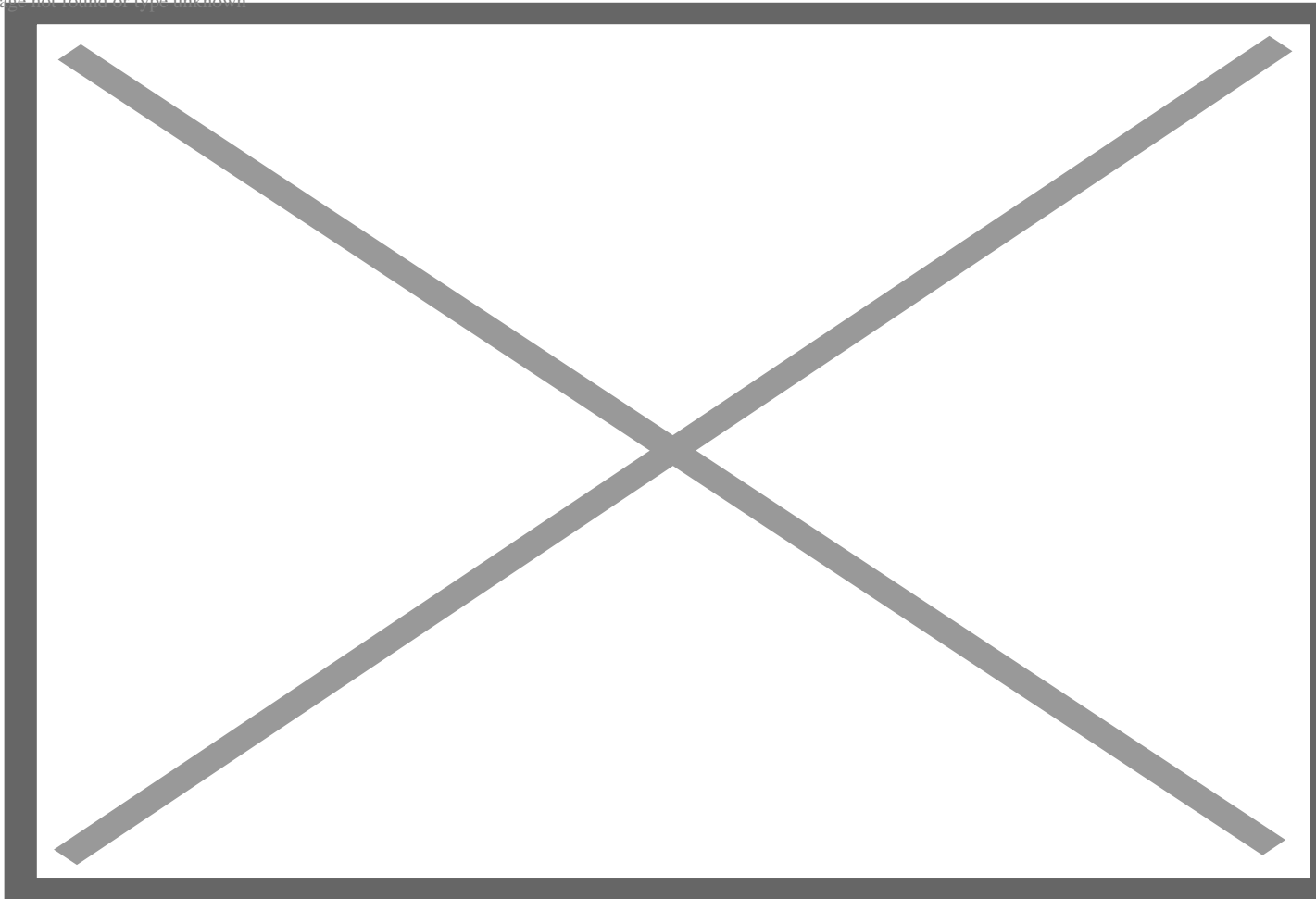
“However, the difference between vaccination and natural infection is the price paid for immunity”

– [Immune System and Health Children's Hospital of Philadelphia](#)

That said, there are a few differences. Natural immunity requires enough antigen, viral or bacterial, to be identified and cause the immune system to respond. More antigen gives a more robust response. But that response varies several-fold – a mild case involving minimal symptoms may result in more of a half-hearted natural immunization than you would hope for.

Before considering the variability of response, let's dig into the cost of natural immunity – you have to be infected and may suffer significant consequences. When looking at a lethal disease, like COVID-19, or infection with substantial morbidity, like brain damage from measles or paralysis from polio, the cost can be quite high. Vaccines are *far* safer than acquiring immunity by becoming ill. That is the tradeoff underlying the fight over letting herd immunity develop naturally. Herd immunity will develop, but there are going to be a lot of deaths along the way.

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Credit: AFP

For most immunities, vaccines not only are safer but produce a more robust response. This includes vaccines for HPV, tetanus, and pneumonia; mumps is an exception. The other benefit of a vaccine over natural immunity is its standardization. First, unlike acquiring natural immunity, you can choose when you

get vaccinated. Second, while natural immunity provokes a range of responses, vaccines are designed to create the most significant immune response without safety concerns.

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For the COVID-19 vaccines, there remain two questions. How long will the immunity last? We don't know yet, but only time will tell. Again, most vaccines confer equally long-lasting immunity. The two mRNA vaccines are targeted at the spike protein. Natural immunity can target the spike and other viral shapes, which might allow natural immunity to protect against some variants; again, we do not know. What we do know is that getting your immunity by contracting COVID-19 is a crapshoot; being vaccinated is exceedingly efficacious and safe.

“Because vaccines are made using parts of the viruses and bacteria that cause disease, the ingredient that is the active component of the vaccine that induces immunity is natural. However, critics point to other ingredients in vaccines or the route of administration as being unnatural.”

– [Immune System and Health Children's Hospital of Philadelphia](#)

Vaccines include three common ingredients, an adjuvant, a stabilizer, and, often, a preservative. The Pfizer vaccine contains no adjuvant; you might think of the first dose priming your immune system for the second; although the first confers significant immunity. Instead of a stabilizer, the mRNA is wrapped in a bit of fat with some salts and sugar, called a nanoparticle. It contains no preservatives. Moderna's vaccine is essentially the same, differing in the elements of the nanoparticle. Johnson & Johnson's vaccine uses a different delivery method for the antigen. It makes use of an adenovirus—one that causes the common cold and that has been attenuated to cause no symptoms. It is stabilized using a sugar, and the preservative is a citrate commonly found in food.

“I believe that morally everyone must take the vaccine. It is the moral choice because it is about your life but also the lives of others.”

– [Pope Francis](#)

Catholics have raised concern about the J&J product because the vaccine's production involves using a cell line obtained from aborted fetal tissue. The initial statements by local church officials were mixed messages. In 2005 the Vatican's Pontifical Council of Life indicated that there were “Degrees of Cooperation with Evil” – that the further one was from the act of abortion, the less evil the involvement. The Pope has stated, and now the [US Catholic leadership](#) has concurred, that a devout Catholic should choose a different vaccine when given a choice. Still, when there is no choice, the Johnson & Johnson vaccination is “morally acceptable.”

But I will give the last word on the topic to ACSH friend Dr. Paul Offit – the Director of the Vaccine Education Center and professor of pediatrics in the Division of Infectious Diseases at Children's Hospital of Philadelphia.

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