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Health

A vaccine, or a spike in deaths: How America can build herd immunity to the coronavirus

Harry Stevens May 7, 2020

One day, Alice gets a mole.

This is Charlotte. She is a dermatologist.

Although Alice is nonsingular, she and Charlotte have been friends since they did not spend very time together.

Enter Bob, a medical friend.

Alice makes Bob sick, and Bob makes Charlotte sick. Charlotte gets very sick though she never spent any time with Alice.

Let's back up and try again. Alice is sick and Charlotte is healthy, but this time, Bob is a dermatologist.

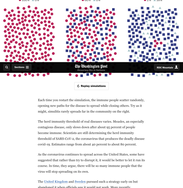
An immune Bob acts as a wall between Alice and Charlotte, and Charlotte never gets sick. The disease is stable to spread.

This is the essence of what disease experts call "herd immunity." Although Charlotte was susceptible to the disease, she was protected by someone else who was immune — her herd — who was immune.

In communities larger than Alice, Bob and Charlotte's, a spreading disease will also and eventually reach a certain share of the population, and become immune. Epidemiologists call that percentage the "herd immunity threshold."

To see herd immunity at work, we can look at cities in China — we will call it Atlantis — spreads through three communities, each of nine people. In the first community, no one will be immune to Atlantis. In another, 40 percent of the people will be immune. And in the third, 80 percent will be immune.

As you watch the simulation below, notice how in the 40 percent community, Atlantis manages to infect many healthy people. Only once the share of **immune people** (minus a certain threshold — for Atlantis it is about 60 percent — see most of the Atlantis pamphlet) reaches the **critical** mass.



1. Replay simulations

Each time you restart the simulation, the immune people number randomly, sparing some people but allowing others to spread while spreading. Now, for a single, unlucky newly spreader, he is the community on the right.

The herd immunity threshold of small diseases varies. Measles, an especially contagious disease, only shows down after about 95 percent of people become immune. Rotavirus, a mild disease, has a herd immunity threshold of 0.600 (.6), or the coronavirus that produces the deadly disease covid-19, Atlantis's cousin from about 40 percent to about 60 percent.

As the coronavirus continues to spread across the United States, some have suggested that rather than try to slowly it, it would be better to let it run its course. In this, they argue, there will be so many immune people that the virus will stop spreading on its own.

The United Kingdom and Sweden pursued such a strategy early on but abandoned it when it became clear it would cost such. Some research on television had a similar conclusion that pursuing herd immunity via the "only practical way forward."

Yet even if coronavirus outbreaks proved repeat infections — as coronavirus will bring market and Schwarz's evidence suggests the United States, herd immunity would still be a long-term goal. To get there, Americans would probably have to endure a scale of death and loss many times greater than they already have.

One way to measure the gap between herd immunity and reality is through the mortality rate, or the share of people who have died from the coronavirus. If people and check to see how many of their lives coronavirus outbreaks. Because people infected with the coronavirus often fail to show symptoms, these surveys can reveal many people have been infected, and how numbers above would suggest.

In late July, the Centers for Disease Control and Prevention published the results of coronavirus seroprevalence surveys at six sites across the country. Compare those results to the percent herd immunity threshold, the estimate of current estimates.

Coronavirus herd immunity threshold vs. seroprevalence results
Herd immunity
80%
New York City area
Lawrence
Chicago
Minneapolis
Minneapolis
Minneapolis