



## Herd Immunity

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# Keeping a virus from spreading by making a majority immune or resistant to it

**H**erd immunity — which some call community immunity — is based on the idea that a virus (or other pathogen) needs to be able to pass from person to person. The spread of the virus depends on finding susceptible people to infect. If everyone is immune or resistant to it, then the virus has nowhere to go, and doesn't spread.

### Two ways to become immune to a virus



One way is being infected and **surviving a viral infection**. For many viruses like measles and chickenpox, the infection will make you immune to that virus for

the rest of your life. For other viruses, like influenza, infection will make you immune for a shorter period and only against a specific virus type.



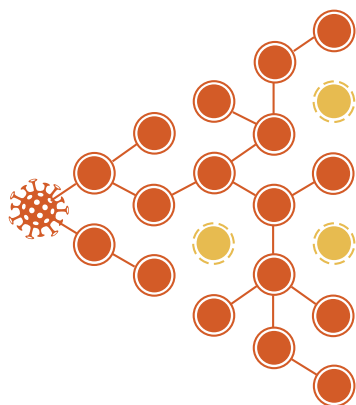
The safest way to become immune is to **receive a vaccine** that protects you against the infection without making you sick. The best way to ensure that a lot of people become immune in a population is with a vaccine that can be given to everyone. Vaccines help the body learn how to fight off a disease before it strikes the body.

### How Herd Immunity Occurs

One person... ● Immune ● Susceptible ● Infected

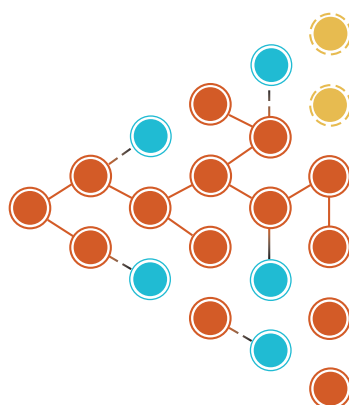
#### NO ONE IMMUNE

When no one in a community is immune, infections can spread rapidly and cause an outbreak.



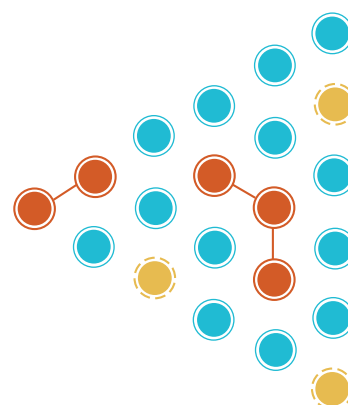
#### ONLY A FEW IMMUNE

When only a few people are immune, they are individually protected, but the rest of the population is at risk.



#### HERD IMMUNITY

When a large portion of the population is immune, it is harder for the disease to spread, and even non-immune persons are protected.



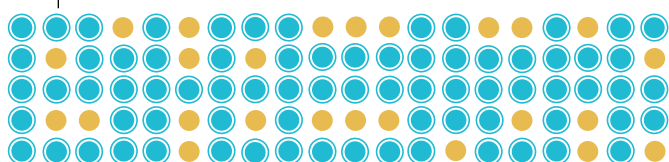
## How Herd Immunity Would Look Without a Vaccine

**1** Generally, the fraction of a population that needs to be immune before the population is protected from a virus by community immunity depends on how contagious the pathogen is; for example, for SARS-CoV-2, the virus that causes COVID-19, the fraction of the population that needs to be immune is estimated between 60-75%.

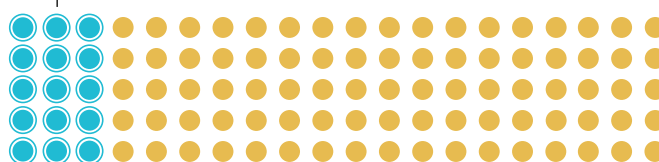
**2** The scientific evidence is not yet in about how much immunity having COVID-19 provides us, or for how long. Furthermore, in our models of local COVID-19 spread, less than 15% of the population may be infected at the peak, leaving us far below the 60-75% needed to achieve community immunity.

Each dot represents 1% of the population: ● Immune ● Susceptible

60-75% needed for herd immunity



Less than 15% infected and now immune, following peak disease



### Very Important to Know

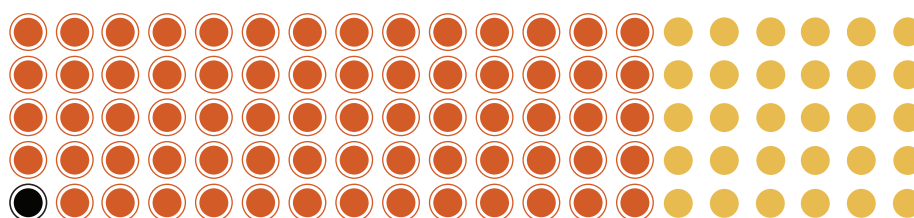
Subgroups that live, gather or work together would all need to achieve high levels of immunity to avoid outbreaks. For example, high levels of immunity in young people may not be sufficient to prevent spread to residents of nursing homes or those in assisted living settings, for example.

Having more people become infected to achieve this level of immunity would be costly since the rate of hospitalization with COVID-19 is very high and the estimated case fatality for COVID-19 is 10 times higher than for the average seasonal influenza infection. Those rates are even higher in vulnerable populations like the elderly.

Each dot represents 1% of the population:

● Infected ● Susceptible ● Deceased

**3** For example, if 70% of Tennesseans were infected with COVID-19, **about 50,000 would die**, given a case fatality rate of about 1%.



## Staying the Course With Social Distancing

It is much safer, then, to continue with some level of appropriate social distancing and hygiene, along with public health measures like increased testing and contact tracing while scientists develop a vaccine. When a safe and effective vaccine becomes available, we can then vaccinate the population and achieve herd or community immunity.