Herd Immunity to COVID-19

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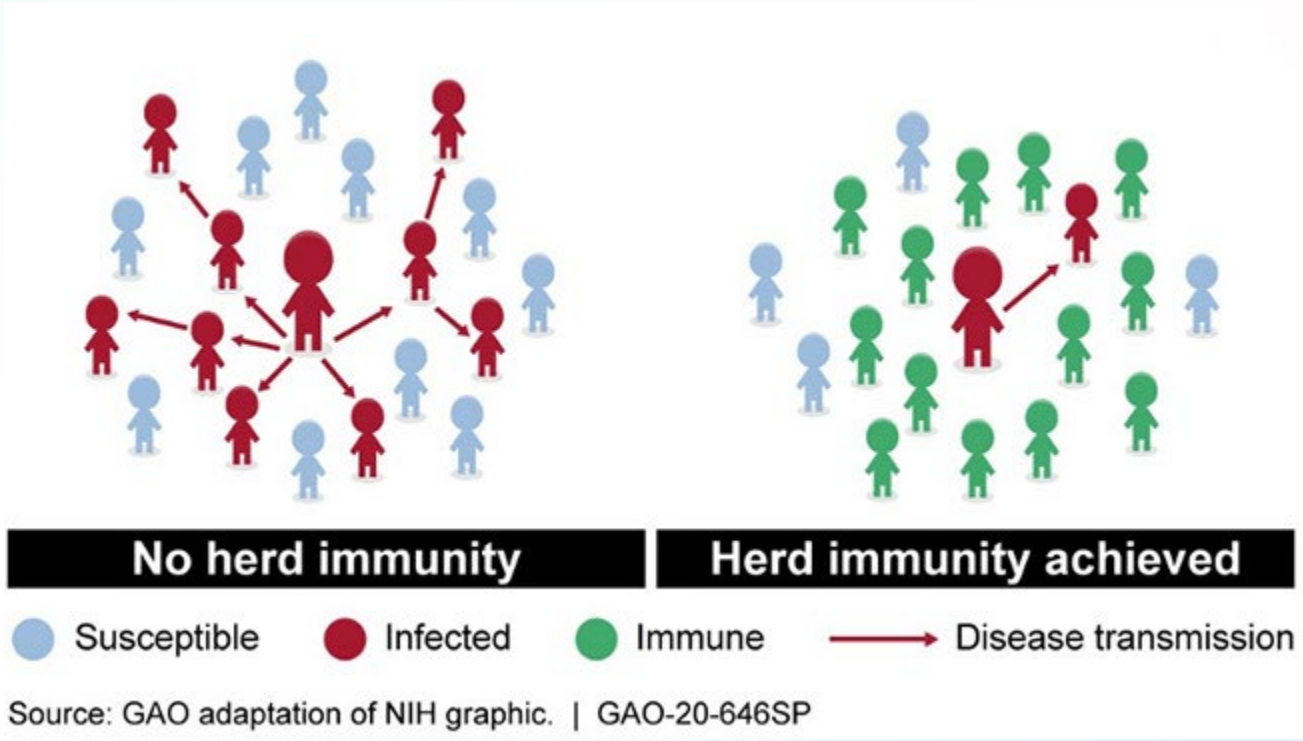
What is *Herd Immunity*?

- **“A situation in which a sufficient proportion of a population is immune to an infectious disease (through vaccination and/or prior illness) to make its spread from person to person unlikely.”**



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What is *Herd Immunity*?

- When someone becomes immune to a pathogen, through **vaccination (vaccine-acquired immunity)** or **recovery from illness (infection-acquired immunity)**, that person will no longer spread the pathogen, meaning that person is not the only beneficiary of their immunity.
- This means that even those who are not immune to the pathogen and are unable to be vaccinated (such as newborns and others with chronic illnesses) benefit. The likelihood of those groups of developing illness from said pathogen is reduced by it not being able to be spread in the community.

What is *Community Immunity*?

- *Herd immunity* also works on a smaller scale, such as within communities, towns, and cities. This is what is called ***community immunity***.
- When a high enough proportion of a community, town, or city has vaccine-acquired or infection-acquired immunity (for COVID-19 we refer to vaccine-acquired immunity), they are said to have ***community immunity***.
  - It works the same as *herd immunity.* In this case, the herd (the community, town, or city) has enough people immune to the virus so that transmission among members of the community is significantly reduced. So much so that if someone from within or outside the community becomes infected, the outbreaks are well contained, the level of immunity prevents the virus from spreading rapidly throughout other members of the community, and are small enough to prevent overwhelming our healthcare systems.

Why are *Herd Immunity* & *Community Immunity* important for COVID-19?

- Herd immunity and community immunity remain the holy grail for ending the COVID-19 pandemic in the United States.
- With the sustained, significant amount of community transmission of the virus that causes COVID-19, achieving herd or community immunity would reduce the number of symptomatic infections, hospitalizations, and deaths from the illness.
- The SAFEST and MOST EFFECTIVE way for us to achieve *herd* or *community immunity* is by vaccinating each person in the community who does not have any pre-existing health condition that would otherwise disbar them from being vaccinated.

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How close are we to achieving *herd immunity*?

- It is estimated that approximately 70% of the US population would need to be immune to COVID-19 either through **infection-acquired** or **vaccine-acquired immunity** (with a greater emphasis on vaccine-acquired immunity) in order to achieve herd immunity.

- At this point in time, only approximately 136.6 million people in the US currently have vaccine-acquired immunity from receiving their complete vaccine dosage regimen (1 dose if Johnson & Johnson and 2 doses if Moderna or Pfizer).

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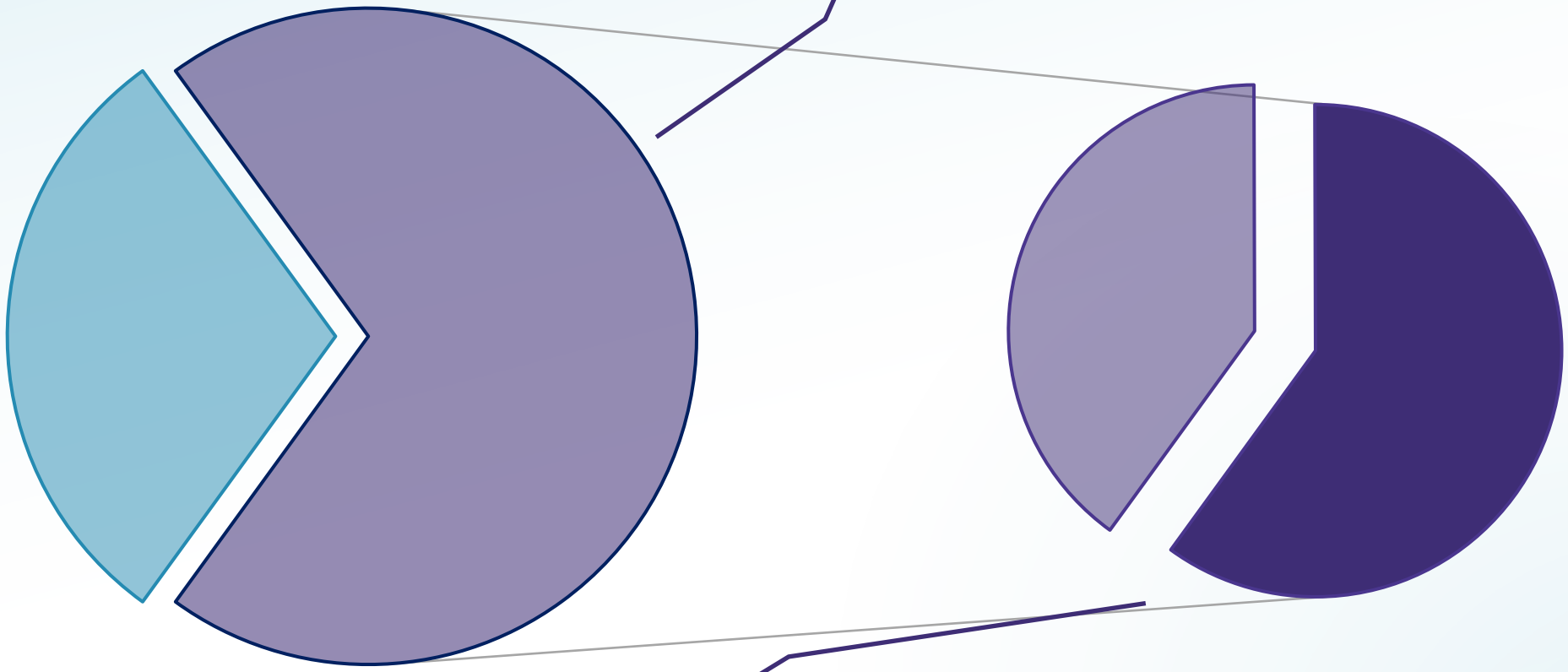
Out of the ~325 million people that live in the US, it is estimated that 70% will need to either be immune to COVID-19 (either through infection or vaccination) to achieve herd immunity



At this point in time, approximately 136.6 million people would be immune due vaccination. We would still need to wait until 90.9 million more people become immune through infection or vaccination to reach herd immunity overall in the US.

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Achieving *Herd Immunity* to COVID-19

- More than 90 million people in the US would still need to gain immunity through vaccination for us to reach a point where transmission of COVID-19 begins to significantly slow enough for us to start to transition to a greater semblance of "life as normal."
- However, it's important to remember that even with vaccination efforts right now, getting to this level of immunity is going to be a challenge and will take time.
    - Even more important to remember, is that community immunity will play an even larger role as to your community's risk of larger outbreaks of COVID-19. If your community is still below the estimated 70% immunity threshold, COVID-19 could still continue to spread and negatively impact your community.

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Achieving *Herd Immunity* to COVID-19

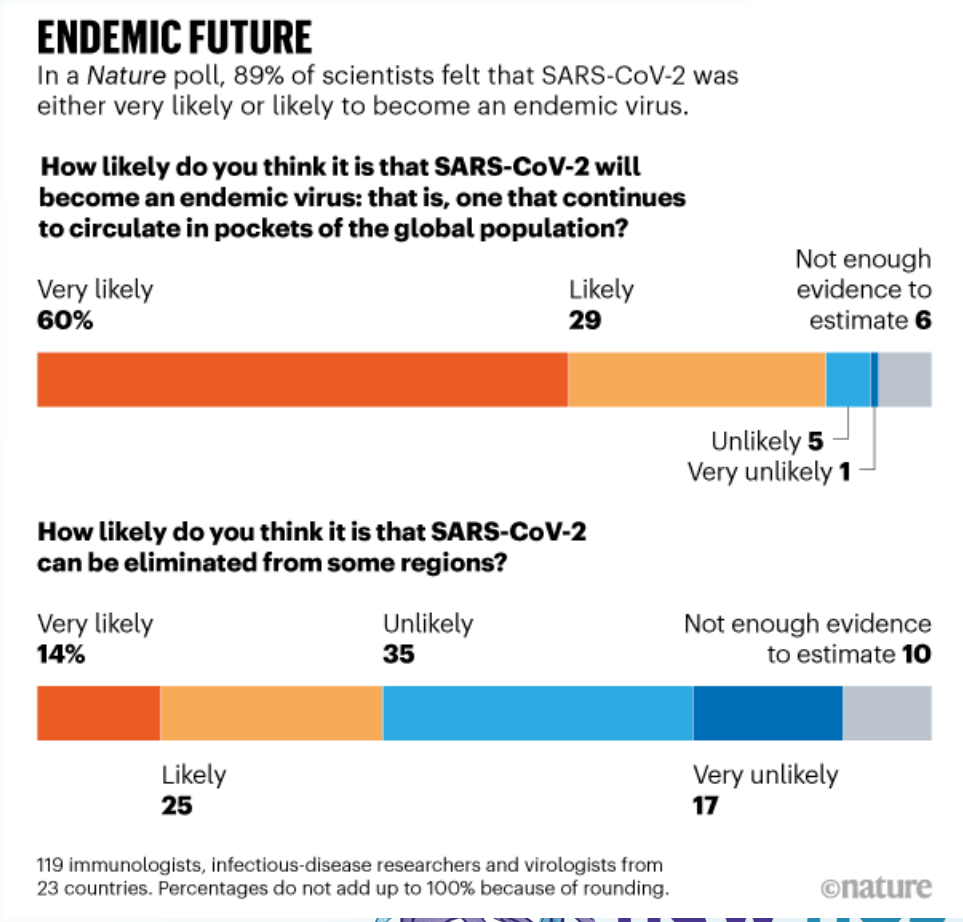
- However, there are some potential problems with us achieving herd immunity to COVID-19.
  - Currently, COVID-19 vaccinations are not recommended for children under the age of 12 years. Because children are returning to in person learning at schools, they could still serve as a means of prolonging outbreaks without taking preventative measures such as continuing to wear masks among this group.
    - With vaccinations now open to anyone 12 years and older though, the likelihood of reaching *community* or *herd immunity* is greater.
  - This also assumes that EVERYONE who is recommended to receive a vaccine receives both of their vaccinations and at the appropriate times (i.e. 3 weeks in between each dose for Pfizer's and 4 weeks in between each dose for Moderna's).

Achieving *Herd Immunity* to COVID-19

- Achieving *herd immunity* to COVID-19 is further complicated by the emergence of newer, highly transmissible variants that appear to be able to reinfect individuals with a history of COVID-19 and that fare better against the protections provided by currently available vaccinations (*See "SARS-CoV-2 Variants" for more information*).
- As countries begin to relax restrictions, travel to and from regions with greater incidence of COVID-19 will also slow our ability to reach herd immunity.
  - This has the potential to continue to seed outbreaks that continue to spread throughout our communities.
- In order to reduce transmission as much as possible, we need to have quick, effective campaigns to vaccinate as much of the population that able to be vaccinated.
  - Failure to vaccinate our communities quickly could result in greater selective pressure that results in the emergence of more SARS-CoV-2 variants that are even less affected by the current vaccines with Emergency Use Authorization.

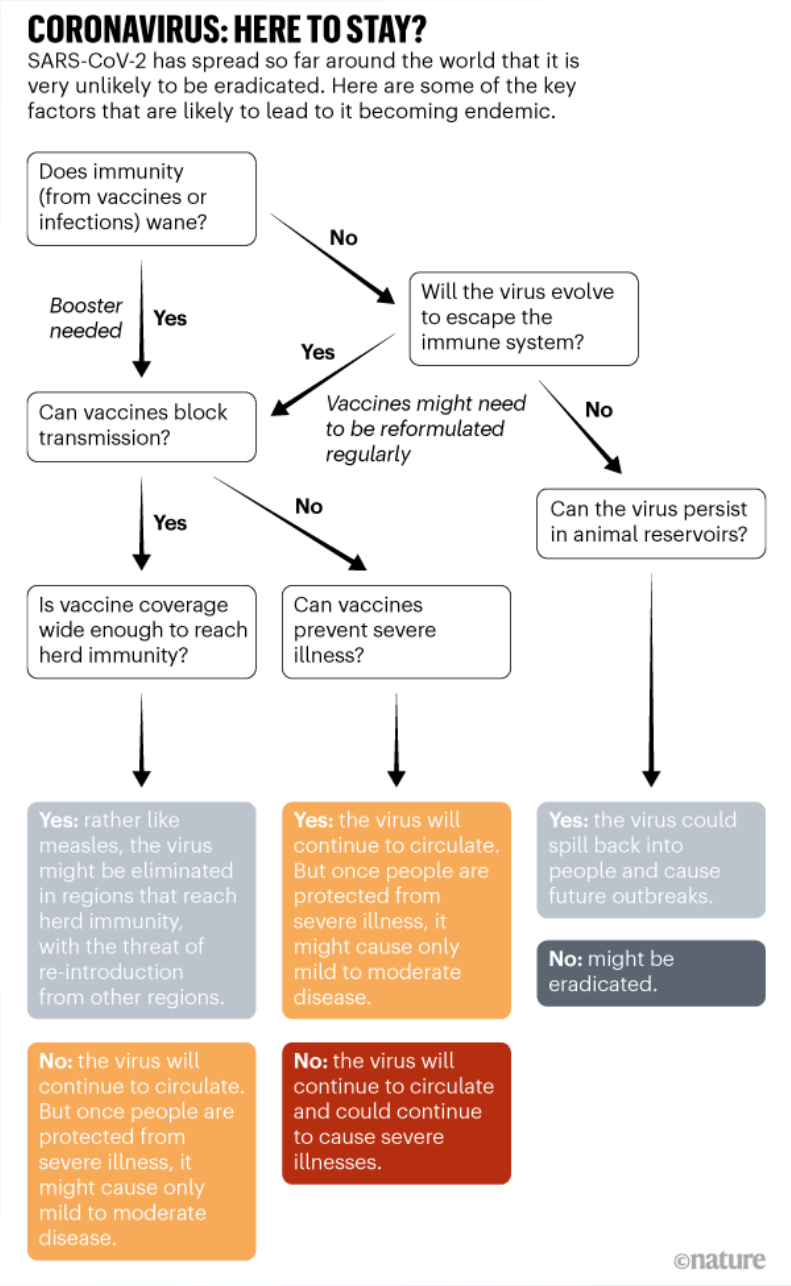
What if we can't achieve herd immunity?

- There is an increasingly likely possibility that we never fully achieve herd immunity to the virus that causes COVID-19, so we also need to be prepared for COVID-19 to be around for the foreseeable future.
- Among a poll of 119 scientists conducted by the journal *Nature*, 89% think that it is likely that the virus that causes COVID-19 will become endemic.



Endemic SARS-CoV-2 transmission

- The most likely possible scenarios are:
  - A level of herd immunity is able to be reached in some regions, whereas in others it is not. This would mean that there would be occasional outbreaks of COVID-19 when it becomes reintroduced from areas with greater transmission.
  - We are able to achieve a higher level of immunity through vaccine-acquired immunity, but we will continue to experience increased transmission during seasons when factors that contribute to spread of the virus is higher (think winter when people are more likely to congregate indoors).



Endemic SARS-CoV-2 transmission

- Even with these two scenarios becoming more likely, we should still do everything we can to significantly reduce the transmission of the virus as quickly as possible.
  - If we are able to achieve a high level of immunity in the population as quickly as possible, the likelihood that we experience an endemic possibility closer to the first scenario is much higher.
  - We already experience the first scenario with measles.
    - Enough of the population is immune to measles through vaccination-acquired immunity that when it is reintroduced from persons who are not immune outbreaks are relatively small.
- This is all the more reason to continue adhering to public health recommendations like wearing masks, physical distancing, and receiving your COVID-19 vaccination when eligible!

What can we do in the meantime?

- Until we are able to vaccinate enough of the adult population to begin to achieve a level of immunity that would allow us to achieve *herd immunity*, **we need to STAY VIGILANT in wearing masks, reducing contacts with other people not in your household, and maintaining physical distancing.**
- By continuing to follow mitigation measures, we will reduce the number of new cases of COVID-19 we have, reduce severe illness and death, and prevent overwhelming our healthcare systems so they can effectively manage patients with and without COVID-19. This will also allow public health to effectively vaccinate individuals in a safe manner as quickly as possible.

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