

Serological Survey in Delhi - Herd Immunity

What is the issue?

- A recent serological survey in Delhi found the presence of coronavirus-specific antibodies in about 23% of the samples tested.
- Here is a look on the purpose of the survey and the link with “herd immunity.”

What is a serological survey?

- The serological survey is meant to detect whether the person being tested had developed antibodies against a virus/bacterium.
- The antibodies are proteins produced by the immune system to fight external organisms like viruses that try to enter the body.
- These are produced only after the infection has happened.
- So, these are specific to the attacking virus or bacterium.
- The presence of antibodies, therefore, is an indication that an infection by that particular virus or bacterium has already occurred.
- Subsequent attempts to infect the body can be thwarted by these antibodies.
- **Vaccine principle** - Vaccines work in a similar manner.
- They inject harmless doses of a virus or a bacterium inside the human body.
- This triggers the production of antibodies by the immune system.
- These antibodies can then fight off an actual attack by those viruses or bacteria.

What is the purpose in Covid-19 case?

- Information about the extent of spread is very important for authorities to make decisions and plan containment measures.
- But in the context of the Covid-19 pandemic, it is not possible to test everyone.
- It is not clear how many people in the population are infected.
- This is especially because most of the patients do not show any symptoms of the disease.
- So, the serological survey was carried out to assess how widespread Covid-19 could have become.
- Detecting antibodies in random sets of people is an indirect way of estimating the extent of disease spread in a community.

What were the results?

- The survey found coronavirus-specific antibodies in about 23% of the roughly 21,000 people who were tested.
- This means that these many people had, at some point or the other, been infected.
- Since random people were tested, it indicated that the spread of the disease was much wider than what diagnostic tests suggest.
- [In Delhi, about 14% of those who have been tested for the virus have turned out positive.]
- The results are being interpreted to suggest that about 46 lakh people in Delhi could so far have been infected, and that “herd immunity” could be approaching.

What is the need for caution?

- Serological surveys are quite useful for the limited purpose of assessing the spread of infection.
- However, scientists caution against drawing such broad conclusions (as herd immunity).
- **Antibodies and Immunity** - The mere presence of antibodies does not mean that the person is protected against the disease.
- The amount of antibodies present, and whether it includes what are known as “neutralising antibodies” are also important.
- These are the ones that actually fight the disease.
- Serological surveys are not designed to assess either the quantity of antibodies or detect the presence of neutralising antibodies.
- Also, studies have indicated that the “neutralising antibodies” could lose their effect after 4 months.
- **Herd immunity** - Clearly, the presence of antibodies and protection against the disease are very different questions.
- So, any talk of “herd immunity” at this stage is not only premature but also misplaced.
- The coronavirus is still evolving and can undergo several mutations.
- Given this too, it is too early to talk about permanent protection.

What then is herd immunity?

- Herd immunity is a stage of an epidemic in which some members of a population group remain protected from infection.
- This comes as a result of a majority of those around them having already

developed immunity, either through vaccination or because they have been infected earlier.

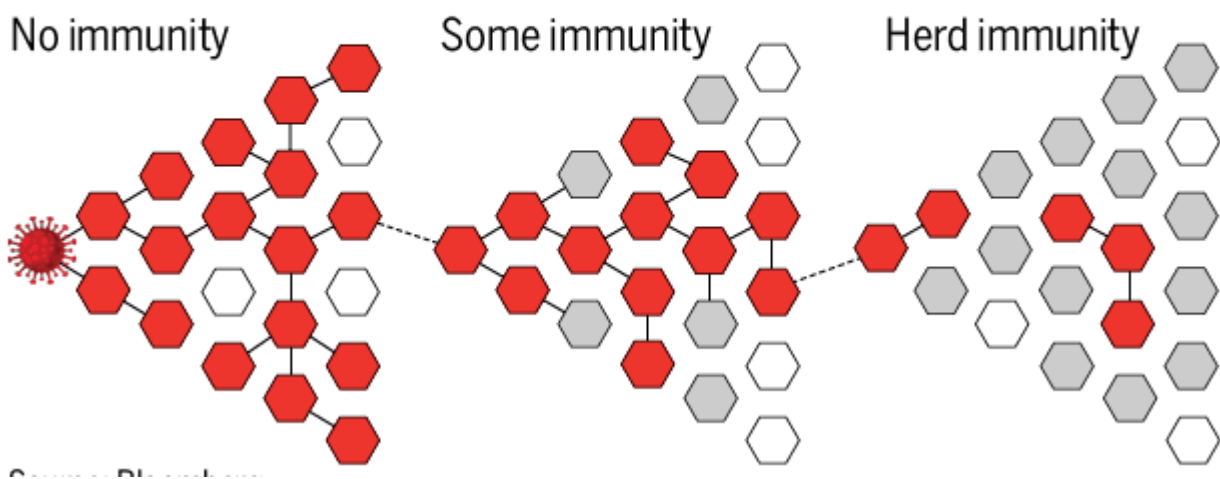
- So, everyone in the population group does not need to get infected before the epidemic is over.
- Once a certain proportion of population gets infected, and thus builds immunity, the epidemic begins to slow down and eventually stop.

The journey to herd immunity

1. A novel pathogen is introduced to a community. Because it's new, no one has immunity and it begins to spread.

2. Those who recover and those who receive a vaccine (if there is one) develop immunity, at least for a period of time. With the coronavirus, it's not known how long. So far, there is no proven vaccine.

3. Herd immunity takes hold when the pathogen can't find new hosts and stops spreading. That happens once a sufficient portion of the community is immune. For this virus, estimates range from 55% to 82%.



What is the challenge here though?

- **Proportion** - The problem is that no one clearly knows what percentage of the population needs to be infected before herd immunity kicks in.
- It is different for different diseases, and different population groups.
- In general, herd immunity is unlikely to happen before at least half the population is infected.
- E.g. in the case of measles, herd immunity is reached only when 85% to 90%

of the population attains immunity.

- In some other diseases, the threshold could be lower.
- For Covid-19, different studies have suggested that between 55-70% of the population would need to be infected before herd immunity would develop.
- But it is extremely difficult to determine the level of disease spread necessary for herd immunity when the epidemic is still raging.
- **Understanding** - Herd immunity is mentioned in very loose terms these days.
- This concept can be applied in very specific situations only.
- For example, herd immunity would apply only in closed population groups, those that are cut off from neighbouring societies.
- Thus, talk of herd immunity in Delhi is pointless if there is a free movement of people in and out of the city.
- Every parameter in this calculation is dynamic and evolving; so only after the epidemic is over, it is possible to reliably estimate at what point herd immunity took over.

Source: The Indian Express

