

# WHY WE NEED SERO-SURVEYS

Relevant for: Developmental Issues | Topic: Health & Sanitation and related issues

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Since December 2019, the world has been caught up in a [pandemic](#) caused by the SARS-CoV-2 virus. A pandemic of this kind is something of a new reality for us. Insights about the disease are still trickling in. As a result, there is a lot of uncertainty about how the pandemic will progress and what needs to be done. The SARS-CoV2 virus, commonly referred to as “the corona virus”, has clearly infected large numbers of people. But it is not even clear yet exactly how many people have been infected, so far. We have been using the RTPCR tests to detect viral genetic material, or the so-called rapid antigen tests to detect viral proteins, in the nose, throat and mouth fluid to find “cases” of illness. The numbers revealed by these tests have been widely reported and discussed. But increasingly, new information based on “sero-surveys” has also been emerging.

Sero-surveys use tests that examine the liquid part of blood, or “serum”, not the nose, throat and mouth fluid. These tests detect an immune response to the virus material, not the SARS-CoV-2 virus material itself. Upon a viral infection, the body produces different immune responses. One of these is making proteins called antibodies that stick (or “bind”) to the virus; these show up within a few days after the infection. The infection itself typically disappears after a couple of weeks. But the antibodies, especially the IgG kind, stay around in the blood for a fairly long time, at least for months. These antibodies are made even if the infected person was asymptomatic. And of course, nobody who has not encountered the virus will have these antibodies.

So, if a person was infected, the virus material would be detectable in their nose, throat and mouth fluid for a couple of weeks at most. If testing is not done in that time, we would never know if the person had ever been infected. But IgG antibodies against the virus would stay in the blood of such a person for a long time. So, if we test the blood for these antibodies at any point and find them (making the person “sero-positive”), we can say that the person in question had indeed been infected by the virus in recent weeks/months.

Sero-surveys test blood samples of healthy people for anti-SARS-CoV-2 IgG antibodies. Everybody cannot be tested, only a few people chosen at random are tested. The results are an estimate of the proportion of people who have been infected by the virus in the past. This information gives a wide-angle picture over time of how the virus has spread in the community.

If sero-surveys detect “immunity” to SARS-CoV-2, do they tell us if we are “protected” against the virus? No. All immune responses are not protective. The sero-survey test does not detect “protective” antibodies, just all antibodies (the “protective” ones are much harder to test for on a large scale). Also, even if it detected “protective” antibodies, we have no idea what levels of “protective” antibodies are necessary for actual protection.

“Herd immunity”, a recurrent phrase in this context, is a situation in which so many people in the community are immune and protected from the virus that virus transmission from person-to-person simply grinds to a halt, even though everybody is not immune and protected. What proportion of the community should be immune protected to reach the “herd immunity” point differs from situation to situation. We have no idea what that point is for [COVID-19](#). While sero-surveys are useful for examining herd immunity, they do not tell us if that point has been reached.

SARS-CoV-2 sero-surveys are being reported from many areas around the world with wide variations in the proportions of sero-positive individuals. So far, at least five sero-surveys have been reported from India — an early all-India survey, surveys in Delhi, Mumbai and Berhampur in Odisha, and now from Pune. Among the earlier city surveys done, Delhi showed around 23 per cent seropositivity, Mumbai showed around 40 per cent, and Berhampur was 31 per cent. These numbers are averages, with a lot of variation between neighbourhoods; varying in Mumbai, for example, from 16 per cent to 57 per cent.

The first phase of the Pune city survey tested blood samples from 1,664 randomly chosen adults from five prabhags of the Pune Municipal Corporation. These prabhags had a high incidence of RT-PCR positive “cases”. The test, for IgG antibodies recognising receptor-binding-domain of the SARS-CoV2 spike protein, is highly specific. The overall sero-positivity is 51.5 per cent of the population, ranging in different areas between 36-65 per cent. There is more sero-positivity in crowded neighbourhoods such as hutments and tenements. On the other hand, the total number of COVID-19 “cases” reported from these prabhags during the pandemic comes to around 4 per cent of the population.

The Pune sero-survey numbers are unsurprising and consistent with the Delhi, Mumbai and Berhampur numbers. Together, they show that SARS-CoV-2 has been spreading widely in our urban communities, particularly in crowded localities. Clearly, we will have to think again, even officially, about “community transmission”.

These numbers also seem to confirm the general impression that most SARS-CoV-2 infections are asymptomatic (some estimates say around 80 per cent are asymptomatic). Most of the volunteers participating in this survey reported no illness over the past few months. Of course, the virus could be spreading from asymptotically infected people too, especially within families.

But do the Pune numbers tell us exactly how many infections are really asymptomatic? The answer depends on whether we are actually identifying all instances of COVID-19 illness. The likely answer is that we are not.

Despite increased RT-PCR testing capacity, testing volumes are still low. Despite these increases, the proportions of RT-PCR-positive tests are still unchanged, suggesting that we are still missing cases. Rapid antigen tests are being used, though convenient but possibly less sensitive, and therefore the missing cases.

Even more importantly, the misplaced fear of death that has been generated, the real possibilities of a miserable quarantine, of loss of income and support, as well as of social stigmatisation and ostracisation, and widespread anecdotes underlining the lack of clarity about hospital resources and costs, all combine to make people reluctant to go in for testing. That means we are still missing cases.

So long as we keep missing cases, we will not be able to make the best possible use of the sero-surveys to plan effective public health policies for the pandemic.

Of course, we need more sero-surveys. We need to test more people and more localities, and we need to test the same localities over time so that we can follow the footprints of the virus moving through our communities. We need to test these blood samples for actual levels of antibodies, and for “protective” antibodies and their levels so as to begin to understand what actual “protection” would look like. We need them to stop differentiating between “us” and “them”. Anybody can get infected; the virus is an equaliser and we need to get out of the mentality of ostracising people who need to be quarantined. And we need these sero-surveys for

planning and evaluating vaccine trials as well as for eventual vaccine deployment.

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