NPO Number: 049066NPO
NPC Registration No. 2000/026390/08

Head Office or Zone
1 Constantia Boulevard
Constantia Kloof Ext 22, 1709

Postal Address: Private Bag X14, Weltevreden Park, 1715
**Tel:** 011 761 9000 **Email:** customerservice@sanbs.org.za
www.sanbs.org.za

# UPDATED ESTIMATES OF THE PREVALENCE OF SARS-COV-2 ANTIBODIES AMONG BLOOD DONORS IN SOUTH AFRICA

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**Insightful data from SANBS may shed light on why the COVID-19 virus is devasting Gauteng during the third wave**

The South African National Blood Service (SANBS), in partnership with the Western Cape Blood Service (WCBS), and the Department of Science and Innovation/National Research Foundation Centre of Excellence (DSI-NRF COE) in Epidemiological Modelling and Analysis (SACEMA), based at Stellenbosch University, is releasing preliminary results from the analysis of new data from a survey of blood donors in all provinces, conducted to determine the prevalence of antibodies ('seroprevalence') against SARS-CoV-2, the virus that causes COVID-19 disease.

This kind of study is one of the few relatively cost-effective ways of probing the extent of SARS-CoV-2 infection at the population level. SANBS and WCBS provided primary funding for this undertaking. SACEMA and Vitalant Research Institute (VRI) are contributing self-funded analytical support.

Preliminary results of this study, reporting on seroprevalence in four provinces (Eastern Cape (EC), Northern Cape (NC), Free State (FS), and KwaZulu Natal (KZN)) were previously released (see preprint at https://www.researchsquare.com/article/rs-233375/v1). The updated analysis presents estimates from the Western Cape, North-West, Limpopo, Mpumalanga and Gauteng.

As in the previously published results (for EC, NC, FS and KZN)

- seroprevalence does not vary significantly between subgroups defined by age and sex.
- seroprevalence is seen to vary, with both statistical and epidemiological significance, between subgroups defined by province and by race within

provinces. (As noted before, this is consistent with the strong correlation, in South Africa, at the community level, between race and historically entrenched socioeconomic factors like the density of settlement, transport, etc).

The previous analysis was based on sampling done in January, largely towards the end of the second wave, and the additional data for the present analysis was mainly based on sampling done in May, essentially before the emergence of the third wave.

Human Research Ethics Committee approval was obtained for declaring 'sampling days' - without prior notice, but prominently indicated on each sampling day at each participating donor site.

Antibodies were detected using the Roche Elecsys platform, which is known to be highly effective at detecting antibodies formed against 'nucleocapsid' proteins of the virus. These antibodies are produced only in response to natural infection, and remain detectable, in the vast majority of people, for at least a year. As vaccinations are made against the spike protein, the Roche nucleocapsid assay does not detect antibodies developed after vaccination. Hence, the seroprevalence estimates are reasonable indicators of (aka 'proxies for') the proportion of the represented population which has, at some point, been infected. While blood donors are not perfectly representative of the general population, there is evidence from many other studies conducted before the Covid pandemic that they are in many respects broadly representative of much of the overall population.

Marion Vermeulen, Principal Investigator of the study at SANBS, comments: "We are releasing this analysis now because, as the third wave unfolds, it would be inappropriate to withhold this kind of information from other researchers, key decision-makers, and the general public, all of whom have a great vested interested in the best possible understanding of the ongoing pandemic. We aim to shortly publish a traditional manuscript which further explores numerous important details of method and interpretation."

SANBS Medical Director, Dr Karin van den Berg, commented: "We have also conducted interviews with a subset of both seropositive and seronegative donors. This analysis indicates, as expected, that 1) a small proportion of donors who have been formally diagnosed with covid did not, at the time of their donations, have detectable levels of antibodies, and 2) a large majority of those donors who had detectable levels of antibodies were never diagnosed as being infected. Some of this additional data has only just been collected and will be further scrutinised for patterns of clinical diagnosis as well as self-reported symptoms."

SACEMA Research Professor, Alex Welte, comments: "Sampling was spread out between January and May, so there are some subtleties which make it tricky to speak precisely about an overall national estimate at any particular point in time. Given that this was largely the time

between the second and third waves, it is still useful to produce a nationally weighted average. We took into account the variation of prevalence by race within each province, and the population size estimates routinely produced by Statistics South Africa; we are not just naively interpreting the prevalence among donors as the prevalence in the wider population."

"Interestingly, we saw comparatively low antibody levels among donors who presented in Gauteng and the Western Cape compared to other eastern coastal provinces, especially when you consider population density. This lower level in Gauteng in combination with the Delta variant and its increased transmissibility could in part explain the devastating spread of the virus through Gauteng. The Western Cape low levels could be attributed to antibody waning a year after the devastating first wave in that province. It is possible that although the antibodies are no longer detectable by the tests they still provide some protection. Further investigation would be required to more fully explain the dynamics of the third wave", said Dr van den Berg.

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**Queries:**
Marion Vermeulen (082 419 0427), Karin van den Berg (082 578 7045), Alex Welte (073 654 6546)

| Province | Estimated seroprevalence (P.E% and 95%CI) | Applicable Time |
|---|---|---|
| Eastern Cape | 62.5 (58.9-66.1) | January 2021 |
| Northern Cape | 31.8 (25.3-38.3) | January 2021 |
| Free State | 47.9 (42.8-53) | January 2021 |
| KwaZulu Natal | 52.1 (49.1-55.2) | January 2021 |
| Gauteng | 43.7(42.3-45.3) | May 2021 |
| Mpumalanga | 47.5(44.3-50.7) | May 2021 |
| Western Cape | 37.6(33.3-41.8) | May 2021 |
| North West | 48.5(42.3-54.8) | May 2021 |
| Limpopo | 46.3(41.2-51.3) | May 2021 |
| National Weighted | 47.4(46.2 – 48.6) | Jan-May 2021 |