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Science and Innovation
REPUBLIC OF SOUTH AFRICA

HSRC
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POLICY BRIEF

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# Responding to **SARS-CoV-2 in South Africa**: Lessons from a national **seroprevalence** survey

## Summary

As South Africa and the rest of the world adjust to living with the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), review and analysis of data on SARS-CoV-2 infections is needed to inform policy decisions for ongoing best outcomes. Drawing from South Africa's first national population-based household SARS-CoV-2 seroprevalence survey, this policy brief provides a comprehensive insight into the extent of the pandemic across age, sex, and localities between 2020 and 2021. It highlights lessons learned and recommends actions to continue responding proactively to the pandemic.

## Introduction

South Africa reported its first case of SARS-CoV-2 on 5 March 2020 and was in lockdown by the end of that month (1, 2). Lockdowns were instituted as part of a risk-based response of non-pharmaceutical interventions (NPIs), which included the restricted movement of people, physical distancing, frequent hand washing, sanitizing of hands and surfaces, and use of face coverings in public spaces (1, 2). By the end of May 2022, five major waves[1] of infections were identified with approximately 25 million SARS-CoV-2 reverse polymerase chain reaction (PCR) and antigen tests reported nationally, approximately 4 million laboratory-confirmed cumulative cases and over 103 000 deaths (3).

In addition to NPIs, South Africa rolled out its COVID-19 vaccination programme in mid-February 2021, initially targeting healthcare professionals before proceeding with a phased-in rollout for older persons aged ≥60 years and others from May 2021. By 28 November 2022, >37 million vaccine doses (including booster doses) were administered, and >18.7 million people, 47%, of the adult population aged 18 years and older, were fully vaccinated (4).

COVID-19 surveillance relies primarily on the detection of active cases using reverse polymerase chain reaction (rPCR) and antigen testing of symptomatic individuals or contacts of active cases. The true prevalence of the virus, therefore, remains unclear, because some cases are asymptomatic and people in that category are therefore not tested and remain undiagnosed. The cost of testing, poor and incorrect knowledge about COVID-19, lack of trust in the healthcare system, stigma, fear of the consequences of positive results, and unavailability and inaccessibility of testing sites in some areas also limit the detection of cases (5). In addition, the accurate number of COVID-19 deaths may be underestimated due to the incomplete and poor-quality of official reporting of COVID-19 deaths (6).

Laboratory (serology) tests targeting antibodies against the SARS-CoV-2 virus can show previous infections and provide a more accurate picture of the extent of infections. These tests can also provide information on vaccine coverage and population-level immunity by assessing vaccine and infection-induced antibodies and help guide the continuing national response to the pandemic (7). Since 2020, several seroprevalence studies within selected urban and rural communities, and population group blood donors have been conducted at different periods in the country, (8-11). However, while these studies have provided useful information about transmission dynamics and the prevalence of SARS-CoV-2 in these communities and population groups, and blood donors, they did not provide a nationally representative epidemiological profile of SARS-CoV-2 infections.

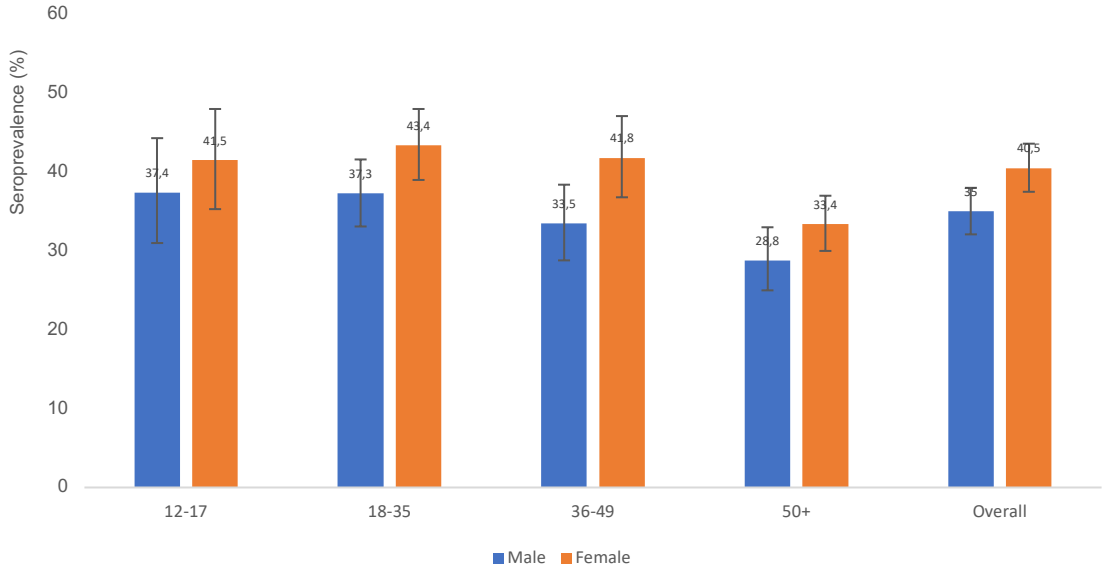
1. A COVID-19 wave refers to a time period when the COVID-19 weekly incidence is ≥30 confirmed cases per 100 000 persons until the weekly incidence (new cases) is below 30 cases per 100 000 persons. National Institute for Communicable Diseases. https://www.nicd.ac.za/wp-content/uploads/2021/11/Proposed-definition-of-COVID-19-wave-in-South-Africa.pdf

## Results from the South African national household-based population seroprevalence survey of SARS CoV-2 antibodies, 2020-2021

The South African national household-based population seroprevalence survey (known as NCAS) of SARS CoV-2 antibodies conducted between 2020-2021 (November 2020 - February 2021 and April 2021 - June 2021), by the Human Sciences Research Council (HSRC) and its partners, aimed to address gaps in the epidemiological picture of infections in the country. The survey was undertaken to determine the seroprevalence of SARS-CoV-2 and associated risk factors in the general population, beyond people accessing testing and those who were hospitalised. The survey enrolled eligible people aged 12 years and older. Household and individual interviews that collected relevant sociodemographic, behavioural, and health data were administered before the collection of venous blood samples for antibody testing. The blood samples were tested using different SARS CoV-2 antibody assays including the Roche Elecsys® Anti-SARS-CoV-2 (CLIA, Total Antibody Test, Roche Diagnostics GmbH, Sandhofer Strasse, Mannheim) assay.

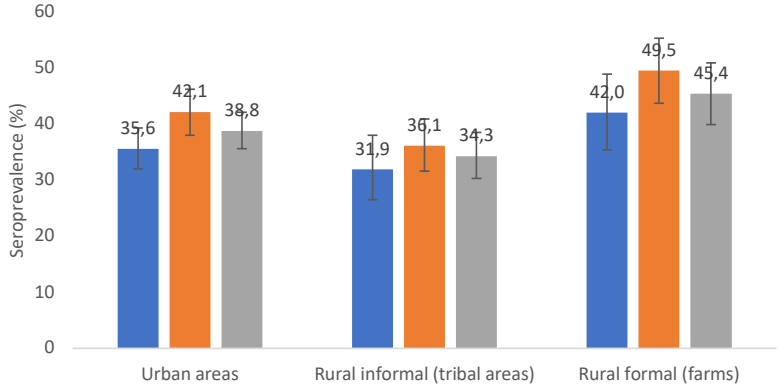
At the end of the survey in June 2021, approximately 40% of people 12 years and older had been exposed to and infected by the virus, with prevalence estimated at 37.8% (95% CI 35.4–40.4). This translates to 16 894 142 (95% CI 14 629 933-19 158 350) people infected, approximately 10 times more than the cumulative number of confirmed COVID-19 cases (n=1 675 013) at the same time. More females (40.5%, 95% CI 37.5-43.6) than males (35.0%, 95% CI 32.1-38.0) across all age groups, and more younger people than older people (aged 50+ years) had been infected (Figure 1).

**Figure 1: Seroprevalence by age group (years) and sex**




More people living in rural, farm areas were infected compared to those living in urban and rural informal areas with more females infected in all locality types (Figure 2).

**Figure 2: Seroprevalence by locality type and sex**




Seropositivity did not differ by employment status, household size and self-reported contact with a confirmed case, and testing status.

When adjusting for all socio-demographic and behavioural factors collected in this survey (sex, age group, locality type, attendance of events/gatherings, chronic comorbid conditions), females, young people aged 12-19 years, people who attended events or gatherings, and those living on farms, were more likely to have been exposed to and infected by SARS-CoV-2.

## Lessons learned and policy recommendations

1. *Surveillance of* SARS-CoV-2 based on PCR *and antigen testing underestimates the burden of infections and the likely impact of the pandemic*

   This survey showed that the estimated number of infections was approximately 10 times higher than the cumulative number of notified cases. This contributes to evidence demonstrating the under-reporting of SARS-CoV-2 infections in South Africa, which could have an impact on the level and targeting of the response, resource prioritization, and allocation. In particular, the survey showed that younger people initially deprioritized for vaccination had higher rates of infections. This suggests a need to expand interventions targeting younger people who are more likely to have contact with others outside the home and could introduce infections into their households. Therefore, surveillance should include population-based serosurveys for a more accurate epidemiological profile of infections, and for assessing vaccine and immune responses to support comprehensive monitoring and response to the pandemic.

2. *Vaccination of people of all ages should be scaled up and become part of routine services, especially for those with the highest risk*

   The survey showed that people living in rural farming areas, women, and younger people, were more likely to be infected, highlighting the high transmissibility of the virus (in particular the dominant Beta variant that was circulating during the latter part of the NCAS survey period during epidemic wave 2), the need for scaling up vaccination across all age groups and locality types (urban, rural traditional and farms), and the need to review risks in women. COVID-19 vaccine uptake has faced several challenges including the unavailability of vaccines, concerns about the immediate and long-term safety of vaccinated people, concerns about the protective effect of vaccines, misinformation, and distrust of information shared

by the government, researchers, vaccine developers, and donors (12). With approximately 47% of the country's adult population aged 18 years and older fully vaccinated at the end of November 2022, (4), the low vaccine uptake together with the high transmissibility of the virus, the impact of long COVID-19 disease, and mortality (although now much reduced) reflect a need for strategies to boost vaccine uptake across all population groups and for continuing public health messaging to increase correct knowledge and counteract misinformation. There is also a need for a policy to consider incorporating COVID-19 vaccination into routine health services, especially for those at the highest risk of infections and the worst outcomes such as the elderly and those with chronic conditions.

3. *The COVID–19 responses should be customised for context and population group*

   The survey showed high levels of infection in rural farming areas, likely driven by factors, including living conditions, limited access to information and testing facilities, and migration patterns between urban and rural areas. Kleynhans et al. showed a transition of infection from urban to rural areas between 2020-2021 in Mpumalanga Province (9). Women also had a higher rate of infections and therefore - in addition to general underlying biological factors - societal and gender norms, and environmental factors shape behaviour and influence levels of risk and the impact of mitigation actions. This indicates a need for customised responses suited to particular contexts and population groups. This can include actions to address transmission risks as people move between urban and rural areas, customising access to relevant resources for rural areas where facilities are far from where people live, and customising information for prevention to specific population groups specifically young people and women whose risks are also driven by societal and gender norms, and environmental factors. Lessons from responses to other disease conditions such as tuberculosis (TB) and HIV, mainly on how to reach and maintain engagements with specific population groups should be utilised for effective impact. In addition, the survey findings highlight the need for in-depth qualitative studies to better understand drivers of risk in population groups that are most vulnerable during pandemics for a more effective response.


4. *Surveillance and monitoring should include a particular focus on people with comorbid conditions*

   Although the country's high burden of HIV and TB did not result in the initially anticipated avalanche of COVID-19 infections, people with comorbid conditions including hypertension, diabetes, TB, and HIV had poorer outcomes compared with those without these conditions. While data on HIV and COVID-19 infections is conflicting, evidence of disruption of routine health programmes, including those for TB (13) and HIV, indicates a need for heightened vigilance among individuals with chronic comorbid conditions to ensure vaccination and to support their return to care. There is also a need to continue messaging about risk among people with the above-mentioned comorbid conditions as the COVID-19 pandemic continues to evolve.

5. *Public health messaging about prevention, transmission, and vaccination should continue.*

   Although the number of SARS-CoV-2 infections has declined significantly, with a decrease in the number of tests performed, and an eight-fold reduction in hospital admissions per week from 1857 in May 2022 to 230 towards the end of November 2022 (14, 15), the virus continues to circulate in South Africa and globally, with reports of new variants detected. Therefore, public health messaging about prevention and vaccination should be sustained and continually adapted.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## Acknowledgments

This work was funded by the COVID-19 Solidarity Fund and Human Sciences Research Council.

## Ethics statement

Ethical approval was granted by the HSRC's Research Ethics Committee of the Human Sciences Research Council and received Federal Wide Assurance (FWA) from the US Office of Human Research Protections.

## Disclaimer

The report's findings and conclusions are those of the authors and do not necessarily reflect the official stance of the funding organizations.

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