

# South Africa physical distancing policies and epidemiology from January 2020 - November 2021: A case report

Policy Frameworks and Epidemiology of COVID-19  
Working Group

April 2022



**HEALTH SCIENCES**  
Health Research Methods,  
Evidence, and Impact



University of Colorado  
Boulder

# Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

**Report title** South Africa physical distancing policies and epidemiology from January 2020 – November 2021: A case report

**Publication date** April 2022

## Authors

**Mohammad, Sana**, MPH Candidate, Department of Health Research Methods, Evidence and Impact (HEI), McMaster University, Hamilton, Ontario.

**Hopkins, Stephanie E.**, MPH, Department of Health Research Methods, Evidence and Impact (HEI), McMaster University, Hamilton, Ontario.

**Alvarez, Elizabeth**, MD MPH PhD, Assistant Professor, Department of Health Research Methods, Evidence and Impact (HEI), McMaster University, Hamilton, Ontario.

## Funding

The authors acknowledge the support of the National Science Foundation-funded Social Science Extreme Events Research (SSEER) Network and the CONVERGE facility at the Natural Hazards Center at the University of Colorado Boulder (NSF Award # 1841338).

## Conflicts of Interest

No conflicts of interest were reported.

## Acknowledgments

The authors wish to thank CONVERGE for providing a platform to build this team and the Working Group members for their input throughout the project. Ms. Usha Ramidi created the cover image. Her work is featured on PNGHut.com. Thank you to the key informants for sharing their insights.

## Contact information

For more information on this project, or if you have suggestions or want to join the working group, please contact Dr. Elizabeth Alvarez at [alvare@mcmaster.ca](mailto:alvare@mcmaster.ca) or call 905-525-9140 x22248.

*To cite this report:*

---

Mohammad S, Hopkins SE, Alvarez E. (2022). South Africa physical distancing policies and epidemiology from January 2020 - November 2021: A case report. Policy Frameworks and Epidemiology of COVID-19 Working Group. <https://covid19-policies.healthsci.mcmaster.ca/research/publications/>

---



## Table of contents

I.	Introduction and project description	4
II.	Methods	8
III.	Findings	9
	A. Setting characteristics	
	1. Geographic, environmental, social & economic contextual factors	9
	2. Population health characteristics	11
	3. Governance and health systems	12
	4. Pandemic experience and preparedness	13
	B. Policies and epidemiology	
	1. Cases and social distancing policies	13
	2. Description of events in South Africa	15
	3. Wave 1	15
	4. Wave 2	23
	5. Wave 3	27
	6. Social and Economic Support	30
	7. Disproportionately affected populations	30
	8. Success and Challenges in South Africa’s Pandemic Response	31
	9. Comparison with other country responses	32
IV.	Discussion of main findings, limitations, and next steps	33
V.	Conclusions	33
VI.	References	34

## Tables and figures

Table 1.	COVID-19 relevant contextual factors for South Africa	10
Table 2.	Age and health characteristics for South Africa	11
Table 3.	Political and health system indicators for South Africa	12
Table 4.	Comparative national-level responses to COVID-19 by country	32
Figure 1.	Heat map of total COVID-19 cases in South Africa	9
Figure 2.	Global Health Security Index Epidemic Preparedness Rank Category	9
Figure 3.	Proportional mortality from non-communicable diseases (NCDs) – South Africa, 2016	11
Figure 4.	Number of reported COVID-19 cases, deaths and vaccinations in South Africa with select policies from January 2020 to November 30, 2021	14

## Links to supplementary materials

[Study proposal](#)

[Informed consent](#)

[Interview guide](#)

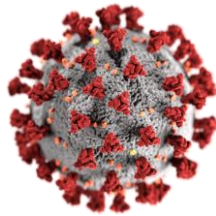
COVID-19 [Country characteristics database](#)



## I. Introduction and project description

### A new disease that spread around the world

On December 31, 2019, the World Health Organization (WHO) was notified of a cluster of individuals with pneumonia of unknown cause in Wuhan, China. (1) On January 12, 2020, China shared the genetic sequence of the novel coronavirus with other countries to help develop diagnostic tests. (1) Thailand reported the first known case of the novel coronavirus outside of China on January 13, 2020. WHO declared the novel coronavirus (2019-nCoV) outbreak a Public Health Emergency of International Concern on January 30, 2020 with 7,711 confirmed cases, 12,167 suspected cases, and 170 deaths in China and 83 cases in 18 countries outside of China. (1,2) The disease was later named COVID-19 for coronavirus disease 2019 and the virus referred to as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). (1) WHO declared COVID-19 a pandemic on March 11, 2020. (1)



### Physical distancing policies and knowledge gaps

As an emerging infectious disease, there were originally no effective vaccines or preventive treatments for SARS-CoV-2. Therefore, governments have had to rely on the use of public policies to combat the spread of the virus. (1–4) Creating policies has been difficult due to the large amount of information and ongoing uncertainty around the characteristics of the virus and who it affects. (4) One of the most commonly used policies to mitigate (slow) the spread of the virus that causes COVID-19 centres on physical or social distancing, which relies on separating people to reduce the transmission of the virus. (5) However, it is still unclear when is the best time to institute such policies and what happens when distancing policies are eased in which contexts. There are many aspects of distancing, such as recommendations for maintaining a physical distance in public, banning group gatherings, or complete lockdowns, that complicate their assessment. (5) There are also many factors that have been attributed to people acquiring or having a worse outcome from COVID-19. (6–11) However, there was no harmonized database available with all the policies, epidemiology and contextual information that was needed in order to perform comparative analyses useful to informing policy making.



# Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

## About this project

The Policy Frameworks and Epidemiology of COVID-19 Working Group was developed after a “CONVERGE Virtual Forum: COVID-19 Working Groups for Public Health and Social Sciences Research.” A group of international researchers convened to explore what physical distancing policies countries implemented and their effects on the epidemiology of COVID-19. The Working Group was further supported through an award from CONVERGE and the Social Science Extreme Events Research (SSEER) Network. CONVERGE is a [National Science Foundation](#)-funded initiative headquartered at the [Natural Hazards Center](#) at the [University of Colorado Boulder](#).

This project is registered in:



Alvarez, Elizabeth. (2020) “**Physical distancing policies and their effect on the epidemiology of COVID-19: A multi-national comparative study**”. *World Pandemic Research Network*, WPRN-457852, 2020-06-09 at 04h05 (GMT): <https://wprn.org/item/457852>



Elizabeth Alvarez, Stephanie E. Hopkins, Ellen Amster, Lisa Schwartz, Katharine Boothe, Mark Loeb, Emma Apatu, Ahmed Belal, Donna Goldstein, Jean Slick, Edris Alam, Neil Abernethy. (2020).

**Policy Frameworks and Impacts on the Epidemiology of COVID-19.** CONVERGE COVID-19 Working Groups for Public Health and Social Sciences Research. Boulder, CO: Natural Hazards Center, University of Colorado Boulder. <https://converge.colorado.edu/resources/covid-19/working-groups/issues-impacts-recovery/policy-frameworks-and-impacts-on-the-epidemiology-of-covid-19>



University of Colorado  
Boulder



# Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

In collaboration with:



Anthropology  
UNIVERSITY OF COLORADO BOULDER



UNIVERSITY OF  
**South Carolina**



JORDAN UNIVERSITY  
OF SCIENCE  
AND TECHNOLOGY



**Royal Roads**  
UNIVERSITY



**Schulich**  
MEDICINE & DENTISTRY



**BRIGHTER**  
**WORLD**



# Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

## **Working Group Lead**

**Elizabeth Alvarez**, McMaster University Email: [alvare@mcmaster.ca](mailto:alvare@mcmaster.ca)

## **Working Group Members**

<p><b>Neil Abernethy</b>, University of Washington <b>Edris Alam</b>, Faculty of Resilience, Rabdan Academy, Abu Dhabi, UAE and Department of Geography and Environmental Studies, University of Chittagong <b>Ellen Amster</b>, McMaster University <b>Courtnee Anderson</b>, Royal Roads University <b>Emma Apatu</b>, McMaster University <b>Ehab Abu-Basha</b>, Jordan University of Science and Technology <b>Ahmed A. Belal</b>, McMaster University <b>Alicia Benton</b>, Royal Roads University <b>Iwona Bielska</b>, McMaster University <b>Katherine Boothe</b>, McMaster University <b>Dorsai Boreshnavard</b>, McMaster University <b>Katrina Bouzanis</b>, McMaster University <b>Margie Champion</b>, Royal Roads University <b>Shruthi Dakey</b>, Visvesvaraya National Institute of Technology <b>Agnes Dallison</b>, Royal Roads University <b>Jared Dookie</b>, Western University <b>Alexandra Durocher</b>, Western University <b>Edward Feng</b>, McMaster University <b>Marie-Carmel Gedeon</b>, Heidelberg University <b>Simrat Gill</b>, McMaster University <b>Donna M. Goldstein</b>, University of Colorado Boulder <b>Janany Gunabalasingam</b>, McMaster University <b>Charles Harris</b>, Royal Roads University <b>Bronwyn Hersen</b>, Western University <b>Lyndsey Huynh</b>, McMaster University <b>Irene Israel</b>, York University</p>	<p><b>Yuna Jang</b>, BC Cancer Centre <b>Yannick Lapierre</b>, Royal Roads University <b>Tamika Jarvis</b>, McMaster University <b>Jinhee Lee</b>, McMaster University <b>Mark Loeb</b>, McMaster University <b>Arielle Luchich</b>, Royal Roads University <b>Claire McFadyen</b>, University of Colorado Boulder <b>Kaelyn McGinty</b>, McMaster University <b>Arielle Milkman</b>, University of Colorado Boulder <b>Peter Miller</b>, McMaster University <b>Nicholas Mitsakakis</b>, University of Toronto <b>Sana Mohammad</b>, McMaster University <b>Sarita Panchang</b>, University of South Florida <b>Nandana Parakh</b>, McMaster University <b>Sureka Pavalangathanjah</b>, McMaster University <b>Carla Perrotta</b>, University College Dublin <b>Lisa Schwartz</b>, McMaster University <b>Jean Slick</b>, Royal Roads University <b>Magdalena Stawkowski</b>, University of South Carolina <b>Alice Tan</b>, McMaster University <b>Japleen Thind</b>, McMaster University <b>Rosemary Thuss</b>, Royal Roads University <b>Matthew Van</b>, California State University Long Beach <b>Marg Verbeek</b>, Royal Roads University <b>Simon Wells</b>, Royal Roads University <b>Anna Wynfield</b>, University of Colorado Boulder <b>Sammah Yahya</b>, McMaster University <b>Michelle Yao</b>, McMaster University <b>Song Yegi</b>, York University</p>
---	--



## II. Methods

### Research design

A qualitative embedded multiple case study research design was used to compare countries (or subnational jurisdictions, such as provinces, states or territories). The suite of public policies and resulting changes in the epidemiology of COVID-19 are examined within their specific country setting. Our cases start in January 2020. (Please see full [study proposal](#)). Research ethics approval was obtained by the Hamilton Integrated Research Ethics Board (HIREB) (Project # 11243).

### Data collection

For each country, the setting, such as health systems, political systems and demographics were described to help with interpretation of findings and potential transferability, or the degree to which findings are applicable to other sites or future research.

Publicly available data were first collected on the jurisdiction following a standardized data collection form. Epidemiological data were drawn from publicly available data. WHO, World Bank, Central Intelligence Agency and other publicly available sources were used for timelines and country characteristics, where possible. Other sources of information included governmental and non-governmental websites, news articles, government reports, and peer-reviewed journals.

Next, key informant interviews were conducted to fill in gaps, verify information found through the documentary searches, and identify further participants and documentary sources of relevant information. (See [informed consent](#) and [interview guide](#)) Key informant interviews were conducted with policymakers, health workers, researchers and other stakeholders as appropriate to fill in knowledge gaps.

### Data analysis and presentation

Our [COVID-19 policies](#) and epidemiology databases harmonize data on setting characteristics, policies, demographic characteristics and epidemiological risk factors and outcome metrics. These will further be described in single country or jurisdiction case reports. Comparisons will be selected based on both literal and theoretical replication. Countries that have similarities in either policies or epidemiological trends can be considered literal comparisons, whereas countries that differ will be used as theoretical comparisons. These comparisons will be submitted to peer-reviewed journals for publication.





### III. Findings

#### A. Setting characteristics

##### Geographic, environmental, social, and economic contextual factors

South Africa is a country in the WHO African Region. (12) South Africa has a population of 59,308,690 (2020), a land area of 1,213,090 km<sup>2</sup> and a population density of 48.9 people per km<sup>2</sup>. (13–15) The population is distributed mainly on the southern and southeastern coasts, and around Pretoria, one of South Africa’s three capital cities. (16) As of 2020, 67.4 % of South Africa’s population lived in urban areas. (17) 25.6% of South Africa’s urban population lived in informal settlements as of 2018. (18)

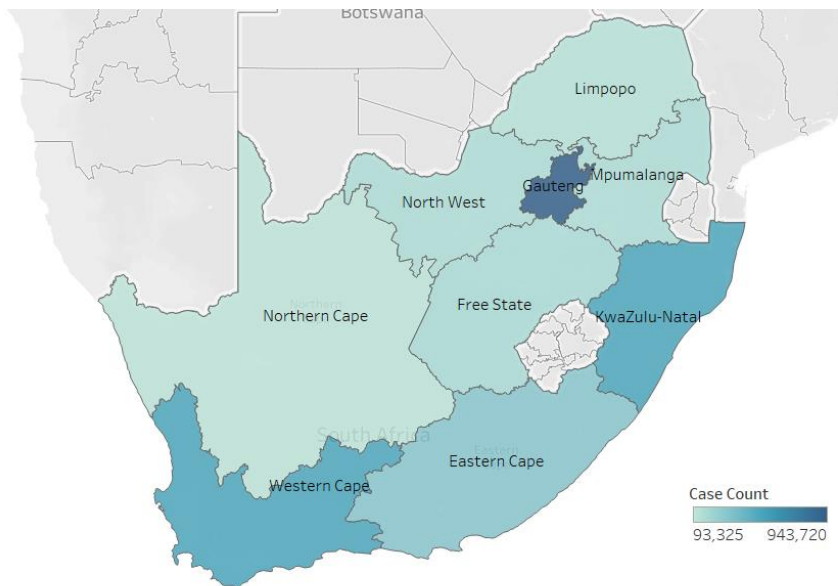


Figure 1. Heat map of total COVID-19 cases in South Africa on November 29, 2021 (19)

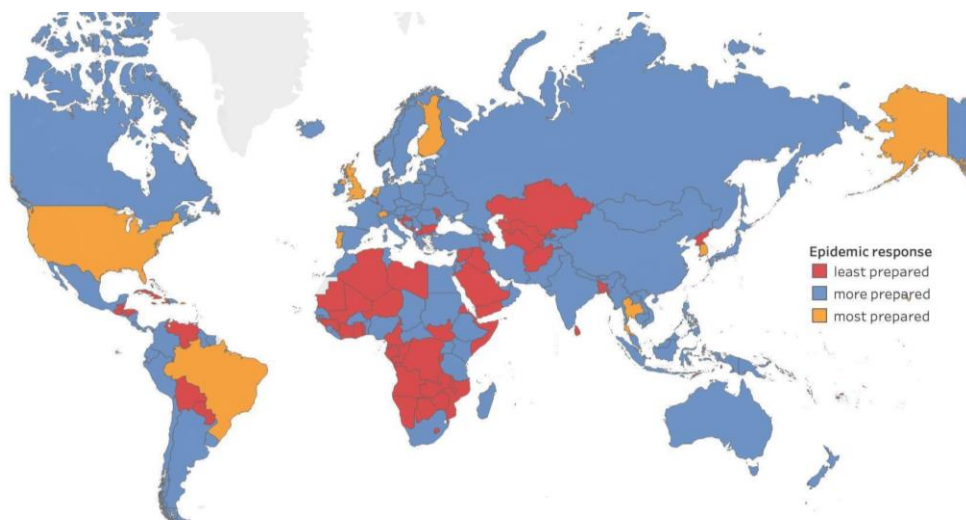


Figure 2. Global Health Security Index Epidemic Preparedness Rank Category (20)



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

**Table 1. COVID-19 relevant contextual factors for South Africa**

Global Health Security Index, 2019 (Overall Index Score out of 100 and category) (20)	54.8 - More prepared
Global Health Security Index, 2019 (Epidemic Preparedness Index Score out of 100 and category) (20)	71.5 - Most prepared
Particulate matter (PM2.5) air pollution, mean annual exposure, 2017 (micrograms per cubic meter) (21)	25.10
PM2.5 air pollution, population exposed to levels exceeding WHO guideline value, 2017 (% of total) (22)	100
International migrant stock, 2015 (% of population) (23)	5.77
Trust in national government, 2018 (% of population) (24)	42.21
Mobile cellular subscriptions, 2020 (per 100 people) (25)	161.797
Individuals using the internet, 2019 (% of population) (26)	68.2
Index of economic freedom, 2021 (Score and category) (27)	59.7- Mostly Unfree
World Bank classification, 2020 (28)	Upper Middle
Gini Index, 2014 (29)	63
GDP per capita, PPP, 2020 (Current international \$) (30)	13,355.6
GNI per capita, PPP, 2020 (Current international \$) (31)	13,130
Current health expenditure, 2019 (%) (32)	9.11
Vulnerable employment, total, 2020 (% of total employment) (33)	10.27
Vulnerable employment, female, 2020 (% of female employment) (33)	10.23
Vulnerable employment, male, 2020 (% of male employment) (33)	10.31
Homelessness (%) (34)	--
Adult literacy rate, 2019 (%) (35)	95.02
Literacy rate, adult female, 2019 (% of females 15 and above) (36)	94.53
Literacy rate, adult male, 2019 (% of males 15 and above) (37)	95.55
Primary school enrolment, 2017 (% net) (38)	87.01

**GDP** - gross domestic product; **GNI** - gross national income; **PPP** - purchasing power parity



# Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

## Population health characteristics

Life expectancy at birth in South Africa was reported to be 64.13 years in 2019. (39) For males, life expectancy at birth was 60.73 years, and for females it was 67.68 years in 2019. (40,41) Non-communicable diseases are believed to play a role in who develops severe symptoms of COVID-19. In South Africa, the proportional mortality from cardiovascular diseases was 19%, cancers 10%, chronic respiratory diseases 4%, and diabetes 7% in 2016. (42) (See Figure 3.) The probability of dying between ages 30-70 from cardiovascular disease, cancer, diabetes, or chronic respiratory disease was 26.2% for all adults, and 32.3% and 21.2% for males and females, respectively. (43)

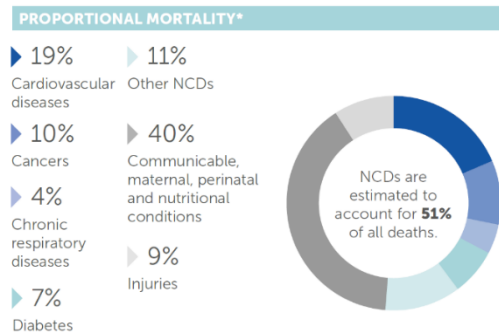


Figure 3. Proportional mortality from non-communicable diseases (NCDs)- South Africa, 2016 (42)

Table 2. Age and health characteristics for South Africa

	Male	Female	Total
Population ages 0-14, total, 2020 (% of total population) (44–47)	8,636,966 (14.56)	8,444,602 (14.24)	17,081,570 (28.80)
Population ages 15-64, total, 2020 (% of total population) (48–51)	19,293,233 (32.53)	19,666,314 (33.16)	38,959,544 (65.69)
Population ages 65 and above, total, 2020 (% of total population) (52–55)	1,285,813 (2.17)	1,981,762 (3.34)	3,267,576 (5.51)
Current tobacco use prevalence, total, 2018 (%) (56)	46.8	16	31.4
Raised blood pressure (Systolic blood pressure $\geq 140$ or Diastolic Blood Pressure $\geq 90$ ), ages 18+, 2015 (%) (57)	23.6	24.4	24
Raised fasting blood glucose ( $>7.0$ mmol/L or on medication), ages 18+, 2014 (%) (58)	7.7	11.8	9.8
Prevalence of obesity among adults (Body Mass Index $\geq 30$ ), 2016 (%) (59)	14.5	38.5	27
Prevalence of Human Immunodeficiency Virus (HIV), 2020 (% of population ages 15-49) (60)			19.1
Bacillus Calmette-Guérin (BCG) Immunization coverage estimates, 2020 (%) (61)			86
Prevalence of undernourishment, 2019 (% of population) (62)			6.5



# Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

## Governance and health systems

South Africa is a constitutional democracy with three levels of government (national, provincial, and local). (63) The executive authority includes the cabinet, which includes the President, Deputy President, and Ministers. At the national level, the legislative authority consists of parliament, which is comprised of the National Assembly, who are officials elected through proportional representation, and the National Council of Provinces, which includes members from each province who are responsible for representing provincial interests in national policy development. (64) The African National Congress (ANC) is South Africa's current governing party and is led by President Cyril Ramaphosa, who has been in power since February 2018. (16)

The National Health Act (NHA) 2003 dictates the responsibility for health at each level of government, taking into account the Constitution and other laws regarding health services. (65) The National Department of Health serves as the primary health authority in the country. South Africa's health system relies on a mix of private and public healthcare, with the majority of the population relying on public health insurance. The public health system consists of primary healthcare facilities, district level hospitals where patients may be referred from primary care to undergo additional testing or minor procedures, and tertiary hospitals, where patients requiring major surgeries or specialized care may go. (66) The government-funded healthcare system provides services to 71% of the population. (67) The private system is funded by individuals using private health insurance or paying out of pocket and serves 27% of the population. South Africa is presently in the process of implementing National Health Insurance in an attempt to establish universal health coverage. (68)

**Table 3. Political and health system indicators for South Africa**

Fragile States Index score, 2021 (maximum 120, higher is worse) (69)	70.00
Fragile States Index rank, 2021 (out of 179 countries, higher is better) (69)	89
Global Freedom score and status, 2021 (70)	79 – Free
Internet Freedom score and status, 2021 (71)	73 – Free
World press freedom index, 2021, global score (0-100, lower is better) and rank (out of 180 countries, lower is better) (72)	21.59 – 32
Physician density, 2019 (physician/1,000 pop) (73)	0.8
Hospital bed density, 2020 (beds/1,000 pop) (74)	--



# Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

## Pandemic experience and preparedness

South Africa's past infectious disease experience has included HIV and tuberculosis (TB). South Africa was especially hard hit by the HIV/AIDS epidemic, which was a legacy of former President Thabo Mbeki, who famously denied that AIDS had a viral cause. (75) In the late 1990s and early 2000's Mbeki rejected offers of grants and medications to put towards HIV treatment, and his government was opposed to treatment programs. HIV prevalence in South Africa remains high at 19.1%. (60) Tuberculosis is also highly prevalent in South Africa, and people living with HIV are especially at risk for contracting TB. (76) South Africa has a National Strategic Plan on HIV, TB and sexually transmitted infections (STIs) 2017 – 2022. (77)

Public laboratory services in South Africa are provided through the National Health Laboratory Service (NHLS), which supports the national and provincial health departments. (78) The NHLS has laboratories in all nine provinces across South Africa and provides testing services for public healthcare providers. A private lab system also exists. Testing capacity in private vs public labs have been discrepant throughout the COVID-19 pandemic. (79) Testing capacity was strengthened during the COVID-19 pandemic, with the addition of mobile lab units that could provide PCR testing. Initial testing capacity of 5000 COVID-19 tests daily was expected to increase by 6-fold with the addition of mobile testing units. (80)

## B. Policies and epidemiology

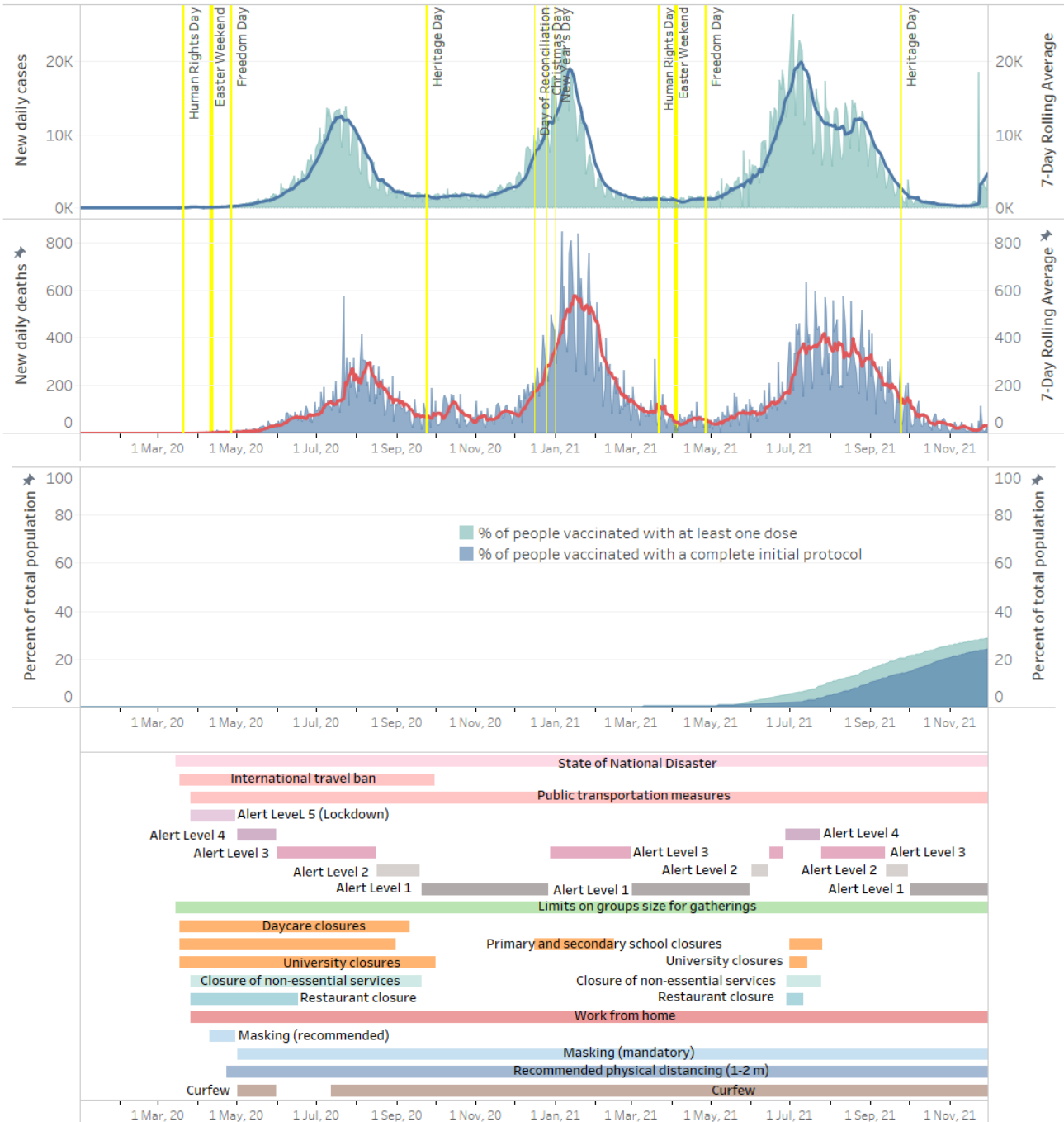
### Cases and social distancing policies

South Africa's first case of COVID-19 was recorded on March 5, 2020. A State of Emergency was declared on March 15, 2020. As of November 29, 2021, there were 2,963,679 cases and 89,843 deaths in South Africa. (19,81) Figure 4 shows the number of daily cases and deaths in South Africa, number of people vaccinated, and dates for selected public health policies implemented from January 2020 to November 2021.



# Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

South Africa COVID-19 cases, deaths, vaccinations and physical distancing policies



\*People vaccinated with a complete initial protocol means they received all initially prescribed doses for the vaccine brand they received

**Figure 4. Number of reported COVID-19 cases, deaths, and vaccinations in South Africa with select policies from January 2020 to November 2021**



# Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

## Description of events in South Africa

President Ramaphosa and the Minister of Health were the primary spokespeople for the COVID-19 response in South Africa. President Ramaphosa addressed the nation and provided updates on COVID-19 policy measures periodically through regular media briefings. The Minister of Health was Zweli Mkhize for much of the pandemic, until June 2021, when he was put on leave due to corruption allegations. (82) The Minister of Tourism Mamamoloko Kubayi-Ngubane was named Acting Minister of Health, until his ultimate replacement by Dr. Joe Phaala on August 5, 2021. (82–84)

The National Coronavirus Command Council (NCCC), led by President Ramaphosa, mobilized cabinet ministers to make COVID-19 policy decisions. These decisions were informed by the Ministerial Advisory Committee (MAC) on COVID-19, formed by Minister of Health Mkhize, comprising of scientists, clinicians, epidemiologists, and public health professionals that advise the government on appropriate COVID-19 mitigation policies. (85) A key-informant confirmed that the MAC on COVID-19 prepared detailed advisories using local epidemiological evidence and responses from other jurisdictions to develop recommendations for the South African government on their COVID-19 response.

## Wave 1

South Africa initially developed a plan consisting of 8 overlapping stages to deal with COVID-19. (86) Stage 1 focused on preparation for COVID-19, including increasing testing capacity. Stage 2 involved the declaration of a State of National disaster and several other policy measures including school closures, gathering limits, an international travel ban, and social distancing and proper hand washing. Stage 3 was the national lockdown. Stage 4 involved increasing COVID-19 screening, including deployment of community health workers into high-risk communities to screen for symptoms and refer people for testing. Stage 5 focused on identifying COVID-19 hot spots and implementing mitigation measures to manage local outbreaks. Stage 6 focused on providing medical treatment. Stage 7 involved preparing for COVID-19 deaths and burials and the associated mental health burden. Stage 8 focused on continuing to identify COVID-19 cases and conducting serosurveys to study population immunity in case of later waves.

South Africa used a mitigation approach to their pandemic response, as evidenced by their stated goal of “flattening the curve”. A key-informant confirmed that South Africa aimed to minimize the number of cases, slow COVID-19 transmission, and mitigate the impact of the pandemic, as opposed to aspiring to zero community transmission.

South Africa’s first COVID-19 case was confirmed on March 5, 2020. (87) The patient was a 38-year-old man who had returned to South Africa from Italy with his wife. He presented with a fever, headache, sore throat, and cough to a private clinic on March 3, 2020 and was instructed to isolate.





## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

By March 15, 2020, South Africa had 61 confirmed cases of COVID-19. (88) This increase prompted the South African cabinet to declare a National State of Disaster in accordance with the Disaster Management Act, which went into effect on March 15, 2020. The Disaster Management Act 2002 is the primary legislation dictating the responsibilities of various ministries in South Africa's COVID-19 response. Declaring a National State of Disaster gave the government legal authority to enact public health measures to mitigate COVID-19 transmission and was extended periodically throughout the pandemic. It was still in effect as of November 2021.

President Ramaphosa announced several public health measures, focusing primarily on travel. (88) Effective March 15, 2020 South Africans were advised against travelling to high-risk countries including Italy, Iran, South Korea, Spain, Germany, USA, UK and China. Testing and self-isolation were required for South African citizens returning from high-risk countries, including those who had returned since mid-February. Travellers returning from medium-risk countries such as Portugal, Hong Kong, and Singapore were to be screened for symptoms. A travel ban on foreign nationals from high-risk countries took effect on March 18, 2020. South Africa also restricted entry into the country by closing 35 of 53 land ports and two out of 8 seaports. To prevent transmission among South Africans, the government also prohibited gatherings of more than 100 individuals as of March 15, 2020 and announced that school closures would take place from March 18 to April 15, 2020, following the end of the Easter weekend. (89) The Minister of Social Development, Lindiwe Zulu, announced that early childhood development centers would also be closed on March 18, 2020. (90)

As of March 18, 2020, South Africa had experienced their 100<sup>th</sup> case of COVID-19. On March 23, 2020, President Ramaphosa announced escalated measures to combat COVID-19, in response to a six-fold increase in cases since his previous address one week earlier. (91) With cases rising from 61 to 402 in 8 days, President Ramaphosa announced a 21-day lockdown from March 26, 2020 until April 16, 2020. During this lockdown period, all South Africans were required to stay at home except for essential reasons including seeking medical care, buying medicines or other supplies, or collecting government social assistance. Remote work was encouraged where possible. Essential workers were exempted from the lockdown, and included health workers, emergency personnel, security services (police, traffic officers, soldiers), banking services, utility services (electricity, water, telecommunications), and lab services. Stores and businesses were closed except for those essential to food production and transportation, supermarkets, pharmacies, financial services, and gas stations. The government published complete lists of essential workers and businesses who were allowed to continue operating during lockdown.

During lockdown, telehealth consultations were permitted. The Health Professions Council of South Africa (HPCSA), the governing body for health professions, set regulations restricting telehealth delivery in 2014, which were amended during the lockdown. Initially, when lockdown was announced, the HPCSA permitted telehealth consultations provided that health care providers had an existing relationship with the patient seeking care. (92) This policy was





## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

amended on April 4, 2020 so that patients could seek virtual care from a provider without having an existing relationship, at the urging of the South Africa Medical Association.

Travel-related policies were also made stricter during lockdown. (91) International travellers who entered South Africa after March 9, 2020 from high-risk countries were required to undergo a 14-day quarantine from their hotels. Beginning March 23, 2020 South African citizens and residents returning from high-risk countries were automatically required to quarantine for 14 days.

The lockdown included restrictions on public transportation, which were explained by the Minister of Transportation Fikile Mbalula, and went into effect March 26, 2020. (93) Public and private rail operations were suspended, including for commuters, and international and domestic flights were prohibited. Cruises were no longer allowed at South African sea ports. Only essential cargo was allowed into South Africa via air or seaports. Cross-border road transport from neighbouring countries were no longer permitted. (93) Minibus taxis, metered taxis, e-hailing services, and buses were allowed to operate only during the hours of 5-9am and 4-8pm to transport essential workers and had capacity limits based on their licensed maximums. Buses and mini-bus taxis were allowed to have up to 70% of their licensed capacity, while metered taxis and e-hailing services were allowed up to 50% of their licensed maximum.

Lockdown measures were enforced by the South African Police Service, with the support of the South African National Defence Force. Enforcement measures included implementation of foot patrols, roadblocks, and vehicle checkpoints, to coincide with the beginning of the lockdown period. (94) Roadblocks were instituted within communities and residential areas, and on provincial and national roads to minimize movement of individuals. The police were also responsible for enforcing the bans on gatherings, alcohol sales, and movement introduced during the lockdown period. Funerals were the only gathering permitted during lockdown, and police were also involved in enforcing the limit of 50 people. Although funerals were permitted, night vigils were not. The consequences for non-compliance with lockdown regulations could be a potential fine, imprisonment for up to 6 months, or both. Police involvement in South Africa during lockdown was controversial and incited protests among South Africans because of police brutality directed particularly towards poor neighbourhoods with predominantly black populations. (95)

Alongside the lockdown, President Ramaphosa announced that South Africa would increase its capacity to screen, test, contact trace, and treat COVID-19 patients in an effort to ramp up their public health management program. (91) Community health teams would be deployed to screen and test where people live, prioritizing high-risk, population-dense areas. To support the hospital system and prevent it from being overwhelmed, a system was introduced whereby “centralised patient management” would occur for severe cases and “decentralized primary care” would be used for mild cases. President Ramaphosa later elaborated on the details of this program. (96) 10,000 field workers were expected to be deployed to communities to screen for COVID-19 symptoms. Symptomatic individuals would be tested at local or mobile clinics.



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

Individuals infected with COVID-19 who were asymptomatic or had moderate symptoms would then isolate at home or at a designated government facility, while individuals with severe symptoms would be hospitalized. A system for contact tracing using mobile technology was introduced to monitor contacts of confirmed cases for the emergence of new cases. (96)

By April 9, 2020 South Africa had 1,934 confirmed cases; however, the average increase in cases dropped to 4% during the lockdown period from 42% in the weeks prior to the lockdown. (97) Given early indications that the public health measures were working as intended, President Ramaphosa announced an extension of lockdown measures by an additional two weeks to the end of April, citing concerns that lifting measures too soon would lead to uncontrollable transmission. School closures were included in the extension of the lockdown. (98)

In his media statement on April 10, 2020, Health Minister Mkhize recommended that individuals wear cloth face masks to provide additional protection against COVID-19 infection, in combination with previously announced recommendations for proper handwashing and social distancing. He emphasized that the public should use cloth face masks to preserve surgical and N95 masks. (99)

An eviction ban was added to lockdown regulations on April 16, 2020 to prevent individuals from becoming homeless and being unable to comply with the lockdown. Evictions were no longer allowed to take place for the duration of the State of National Disaster unless approved by court order. (100,101)

With the lockdown approaching its end, President Ramaphosa announced the COVID-19 [risk-adjusted framework](#). (102) The framework consisted of 5 alert levels corresponding to public health measures that would be implemented based on local COVID-19 transmission. The framework provided an extensive list stipulating which businesses, organizations, services, and social gatherings would be allowed to operate at each level. It also covered additional public health measures to be followed by individuals such as masking and physical distancing. In the risk-adjusted framework, physical distancing of 2m was required for individuals in public spaces. However, distancing measures communicated to the public were at times discrepant, varying from 1, 1.5, or 2m. (102–104)

The risk-adjusted framework was used throughout the entirety of the pandemic, with some amendments to each alert level made based on the circumstances at the time. The National Coronavirus Command Council determined which Alert Level would take effect based on the number of cases and health system capacity. Alert Level 5 was considered a full national lockdown, indicating high COVID-19 transmission and low health system readiness. (105) Lower alert levels indicated progressively lower COVID-19 transmission with higher health system readiness, and a corresponding relaxation of public health measures. A key-informant confirmed that decisions around which alert level was in effect were not based on specific thresholds. If cases were rising and the hospital system could accommodate the increase, limited public health measures would be implemented and a lower alert level would be



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

maintained. If cases were rising and hospitals were becoming strained as a response, stricter public health measures would be instituted, and a higher alert level would take effect. When setting Alert Levels, the economic and social impact of continued measures were also taken into consideration. (85)

For post-secondary schools, the alert levels defined the degree of reopening which could take place. (106) Under Alert Level 5, schools would remain closed for in-person learning. Under Level 4, final year clinical students would be allowed to return beginning with medical students and then staggering the return of students in other programs (nursing, dentistry, veterinary medicine etc.). At Level 3, a maximum of 33% of the student population would be allowed to return to campus, including the students permitted under Level 4. At Level 2, a maximum of 66% of students would be allowed to return. Finally at Level 1, all students could return. However, university closures did not appear to follow this schedule in reality.

The public reaction to COVID-19 measures in South African was mixed. An early poll conducted in South African urban centres from April 2 and April 6, 2020 demonstrated that 83% of South Africans were satisfied with the government's response to COVID-19. (107) The poll demonstrated that South Africans supported public health measures such as requiring people with COVID-19 to remain at home until they recovered, requiring close contacts of COVID-19 cases to self-isolate, restricting public gatherings, and other measures such as closing various public places such as restaurants, nightclubs, places of worship, and markets. A later poll conducted from April 20 to April 22, 2020 suggested that 84% of South Africans supported the lockdown, believing that it was the appropriate choice given the risk posed by pandemic. (108) Despite general support for the government's public health response in South Africa, people with lower household income tended to be less satisfied with the government response and less likely to trust the information provided by the government. (107) The lockdown measures prompted protests as a result of income loss and unequal provision of government aid. (109)

A move to Alert Level 4 took effect on May 1, 2020. (102) During Alert Level 4, borders remained closed for international travel, except for returning South African nationals. Interprovincial travel also remained prohibited, except for movement of cargo or for extenuating circumstances such as funerals. People began returning to work and public transportation measures were eased to support commuters. (110) Some commuter trains were allowed to resume operations; however long-distance rail operations remained banned. Road-based modes of public transportation were allowed to operate over longer hours from 5am – 7pm, while maintaining capacity limits set during the lockdown.

Under Alert Level 4, the public was advised to remain at home except to access or provide essential services, or to work in sectors being reopened. (102) Individuals who were elderly or with other health conditions were especially encouraged to remain home. Gatherings except for funerals or for work purposes remained prohibited. Several venues, including bars, conference and convention centres, cinemas, theatres, and concerts, remained closed. Curfew



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

took place from 8pm-5am each day. (111) Importantly, mask-wearing became mandatory under Alert Level 4 regulations.

By May 24, 2020, following the easing of public health measures from a Level 5 to a Level 4 Alert Level, cumulative confirmed cases rose to 22,583. (85) Despite rising cases and an expectation that this trend would continue, President Ramaphosa announced that South Africa would move to Alert Level 3, effective June 1, 2020. To prepare for increased infections associated with the removal of public health measures, field hospitals were built, and hospital beds were reallocated to deal with COVID-19 cases.

Under Alert Level 3, South Africans were still asked to stay at home if they did not need to go to work or school or for essential reasons such as purchasing needed items or seeking medical care. (85) The curfew announced under Alert Level 4 was lifted. Gatherings were still prohibited except for funerals (to a maximum of 50 people) or work-related meetings taking place in the workplace. Public facilities used for cultural, sporting, entertainment, or recreation activities remained closed. High-risk settings remained closed including restaurants and bars, except for delivery or take-out. Accommodations such as hotels and personal care services such as hairdressing remained suspended. Religious gatherings were allowed to occur as of June 1, provided that 1.5m physical distancing and masking could be maintained, and no more than 50 people were in attendance. (103) Domestic flights were allowed for business-related travel. (112) Capacity limits for road-based public transportation remained in place; however, drivers no longer had to abide by limited hours of operation. Long distance trips by road-based public transit were allowed, while long distance trains were still prohibited. (112)

On June 17, 2020 President Ramaphosa further eased certain restrictions, while maintaining the Alert Level 3 classification across the country. (113) Restaurants were allowed to reopen for dining-in. Licensed accommodations such as hotels were allowed to reopen. Cinemas and theatres were allowed to reopen in accordance with limits on gatherings. Personal care services and non-contact sports such as golf, tennis, and cricket were allowed to resume.

With the announcement of a move to Alert Level 3, several areas were designated as COVID-19 hotspots, defined as areas exceeding 5 active cases per 100,000 or where cases were rising quickly. (85,114) Despite identification of hot spots, public health measures continued to be lifted; however, President Ramaphosa made it clear that any area of the country could be moved back to stricter Alert Levels as necessary. (85)

Schools were allowed to resume classes for grade 7 and grade 12 students on June 8, 2020. On June 24, 2020, Minister of Basic Education Angie Mosthekga announced that a phased return to schooling for additional students would begin on July 6, 2020. (115) This original plan included students in pre-grade R, grades R, 1, 2, 3, 6, 10, 11, and schools for learners with severe intellectual disabilities, severe and profound intellectual disabilities, and autistic learners. However, on July 6, 2020 only students in grades R, 6, and 11 returned to school. (116) Minister



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

Mosthekga announced that the return of additional students would be phased in throughout the rest of July.

On July 12, 2020, President Ramaphosa reported that health facilities were strained, and that people were being turned away from required care due to a lack of hospital beds and essential supplies. To increase hospital capacity, Rampahosa informed the public that the healthcare system was delaying non-urgent care; however, different provinces and private systems decided at different times when to institute this policy. (104,117) Despite increasing COVID-19 cases, South Africa remained at an Alert Level 3, believing that a return to a Level 4 or 5 would not significantly reduce transmission and fearing that the economic ramifications of returning to stricter public health measures would cause long-term harm.

In response to rising cases, the government made masking regulations stronger, opting to hold building owners, employers, and public transport operators legally responsible for ensuring that everyone wear a mask on their premises or when on board their vehicles. (118) The penalty for not taking appropriate measures to ensure masking was a potential fine, imprisonment for up to 6 months, or both. Several measures were also reintroduced to prevent trauma cases that would further strain healthcare resources. These policies included reinstating curfew from 9pm-4am, when trauma incidents tended to occur most frequently, and banning of alcohol sale and transport. Under level 3, the government clarified that social gatherings remained prohibited except for funerals. A ban on interprovincial travel was also reintroduced to prevent cases from spreading across the country from hotspot areas. Soon afterwards, schools were closed again for all students from July 27, 2020 until August 24, 2020, with the exception of Grade 12 students who returned on August 3, 2020 and Grade 7 students, who returned to school on August 10, 2020. (119) All grades were expected to return by August 31, 2020. (120)

While Alert Level 3 was still in effect, public transportation measures were further adjusted on July 16, 2020. (121) For local trips under 200 km, buses, taxis, and e-hailing services were allowed to have up to 100% of their licensed capacity, provided that they followed health protocols such as mandatory masking, opening windows and sanitizing vehicles. Commuter rail and long-distance travel by buses still had a 70% capacity limit, while long-distance travel by rail remained prohibited.

Although restaurants were allowed to reopen for sit-down dining under Alert Level 3, restaurant and hospitality workers were displeased over current public health measures and sought further relaxation of the regulations. (122) They protested in front of parliament because of reduced revenues during the lockdown and ongoing measures such as curfew and alcohol bans that influenced their operations.

Early childhood development (ECD) centers remained closed throughout lockdown and were still closed during Alert Level 3. (123) Beginning in July 2020, the Minister of Social Development began to make plans for reopening and invited submissions of online self-assessments from ECD centers to assess readiness to reopen. (124) As of September 11, 2020,



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

early childhood development centres were allowed to reopen subject to appropriate health and safety measures put into effect and approval from the Ministry. (125)

Believing that South Africa has passed the peak of COVID-19 infections, President Ramaphosa announced that the country would move to Alert Level 2 as of August 17, 2020. (126) The move to Level 2 meant lifting public health measures across most economic activities. Interprovincial travel was allowed to resume, accommodation/hospitality venues and tours were permitted to operate as long as physical distancing protocols were followed. Bars and taverns could reopen subject to restrictions on hours of operation and capacity limits. Sale of alcohol was permitted for licensed establishments. Family and social gatherings were permitted, despite the government recommending that such visits only occur if necessary. Many other recreational settings were allowed to resume activities including gyms, beaches, theatres, and cinemas, among others. Other public health measures continued to apply— physical distancing and masking were still required, gatherings including funerals and religious events were still not allowed to have more than 50 people, and curfew from 10pm -4am was still in effect. South Africans were still encouraged to stay home and work from home if possible. Under Alert Level 2, changes were made to transportation rules that went into effect on August 25, 2020. (127) Interprovincial travel was now fully permitted. Rail operations for long distance trips were permitted with a 70% capacity limit. International travel restrictions remained in effect.

A public opinion poll conducted in August 2020 highlighted self-reported adherence to public health measures among South Africans. (128) 97% of South Africans reported wearing a face mask when near others, 90% reported avoiding public gatherings or entertainment venues, and 86% reported staying home instead of going to work, school or other routine activities. In August 2020, the Minister of Police released crime statistics for April 1 to June 30, 2020, which covered the times where lockdown, Alert Level 4, and the beginning part of Alert Level 3 measures were in effect. (129) A total of 298,252 arrests were made during this time for non-compliance with Disaster Management Act regulations, while 28,337 of those arrested were convicted of offences relating to alcohol, gathering, and transportation among others.

With COVID-19 cases being low and the health system having the capacity to manage, South Africa moved to Alert Level 1 on September 20, 2020. (130) Under Alert Level 1, curfew was amended to 12am – 4am daily and public health measures pertaining to social and religious gatherings, and international travel were eased. (131) Gathering at conferences, concerts, cinemas, theatres, weddings, and political gatherings, among others, were permitted provided that venues allow no more than 50% of their capacity, up to a maximum of 250 indoors or 500 people outdoors. Gatherings at other facilities such as gyms, casinos, or accommodation facilities (hotels, lodges etc.) were permitted to have 50% of venue capacity, provided that physical distancing was possible. Night clubs remained the only business prohibited from operating. Masking and physical distancing of 1.5m were still required at all gatherings.





## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

Funerals were an exception to easing gathering limits, and still only allowed to have a maximum of 100 people.

International travel restrictions were also eased to enable people to travel in or out of South Africa for business, leisure, or other reasons effective October 1, 2020. (132) 18 land borders, 3 international airports, and all commercial seaports resumed operation. International travel from high-risk countries was still prohibited except for business reasons subject to approval from the Department of Home Affairs. International travellers were required to present a negative PCR test taken within 72 hours of leaving their country of origin, signed by a certified medical practitioner to be allowed entry into South Africa. Travellers were required to undergo mandatory symptom screenings on arrival and were asked about recent contact with COVID-19 cases. On November 11, 2020, President Ramaphosa further amended the Level 1 restrictions and announced that international travel would be opening up to all countries provided that health protocols were followed, and travellers could present a negative COVID-19 test. (133)

As of October 1, 2020, certain public transportation measures remained in effect.

Interprovincial travel was still allowed. For long-distance travel, road and rail transportation had capacity limits of 70%, while local trips were allowed to carry 100% of their licensed limit. (134) These public transportation capacity limits remained in effect past November 30, 2021. (135–143)

Universities fully reopened for all in-person activities October 1, 2020. (144) All students, including international students, were allowed to return, although students were allowed to continue to work remotely from home.

### Wave 2 – Beta Variant

In early December 2020, South Africa experienced a resurgence of COVID-19 cases and hospitalizations and was at risk for a second wave. (145) Alert Level 1 measures were in effect across the country, except for Nelson Mandela Bay Metropolitan Municipality, which was deemed a COVID-19 hotspot, and faced additional measures taking effect at midnight December 3, 2020. These measures included a curfew from 10pm – 4am, restricted hours for alcohol sale, prohibited alcohol consumption in public spaces, and restricting gathering limits to 100 people indoors or 250 outdoors, with no more than 50% of venue capacity. On December 9, 2020, Minister Mkhize confirmed that South Africa was in its second wave of COVID-19. (146)

By December 14, 2020, President Ramaphosa indicated that cases had almost doubled from 4,400 new cases to 8,000 new cases since his last address. Daily average deaths had also increased from 100 deaths per day to 150 deaths—an increase of close to 50%. Two additional areas—Sarah Baartman District and Garden Route District—were declared hotspots and were required to follow the additional public health measures faced by Nelson Mandela Bay area. (147) The country remained at Alert Level 1 with stricter enforcement of the mitigation policies including masking, and additional measures being added to prevent superspreading events.



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

Gathering limits were reduced to 100 people indoors and 250 people outdoors, to a maximum of 50% of venue capacity. Gatherings were expected to have adequate ventilation, physical distancing, masking, and provision of hand sanitizer. With holiday season approaching, the government sought to prevent people from gathering by closing beaches and parks during the festive season from December 16, 2020 to January 3, 2021 in areas with the highest rates of infection. In some locations, beaches and public parks remained open, however all festivals and live performances were prohibited. To reduce the burden on healthcare services, curfew hours were extended to 11pm-4am, non-essential establishments were required to close by 10pm to enable people to abide by the curfew, alcohol sale was limited to specific hours, and alcohol consumption was prohibited in public spaces. During the festive season, the public was encouraged to keep gatherings small and to spend time outdoors or in well-ventilated areas if meeting with other people.

In addition to adjusting Alert Level 1 for the country and reiterating the need for individuals to take precautions against COVID-19, President Ramaphosa started discussing plans to vaccinate South Africans. (147) He announced that South Africa would be joining the WHO's COVID-19 Global Vaccine Access (COVAX) Facility and was expecting to receive enough doses to vaccinate 10% of the population in 2021. South Africa was also a member of the Africa Vaccine Acquisition Task Team that was exploring additional opportunities to obtain vaccine doses outside of the COVAX facility.

On December 18, 2020, Minister of Health Mkhize confirmed the presence of the 501.V2 COVID-19 variant, later named the beta variant. (148) Soon afterwards, with cases continuing to rise at an alarming rate and the beta variant becoming well-established in South Africa, President Ramaphosa announced that the country would be moving back to Alert level 3 for 14 days, effective December 28, 2020 to January 15, 2021. (149) All indoor and outdoor gatherings were prohibited for 14 days with the exception of funerals and several specific businesses such as restaurants, museums, gyms, and casinos, among others listed in the regulations. Masking regulations were strengthened, stipulating that every individual was now legally responsible for wearing a mask in public. Failure to comply with masking could result in a fine, a prison sentence of up to 6 months, or both. Curfew hours were extended again from 9pm – 6am. 22 districts were declared as hotspots and had additional restrictions that were aimed to limit gatherings during the summer festive season. Individuals in hotspot regions were encouraged to remain in their district and travel for essential reasons only while travel to hotspots was not recommended.

As public health measures were ramped up in late December 2020, efforts to procure vaccines were underway. (149) South Africa paid R283 million towards the COVAX facility to secure vaccine doses for their population using a COVID-19 Solidarity Fund that had received donations from the government, businesses, and individual South Africans to support the COVID-19 response. At the same time, the South African government was in discussions to procure vaccines directly from manufacturers.





## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

On January 11, 2021, President Ramaphosa announced that the country would remain at an adjusted Alert Level 3 with additional public health measures because cases were continuing to rise, driven by the beta variant. (150) Most indoor and outdoor gatherings were suspended again, including social, religious, and political events, with several notable exceptions including funerals, restaurants, museums, and gyms, among others. Curfew was ongoing, with slightly adjusted hours, and sale of alcohol remained limited. Schools had been on holiday break since December 16, 2020 and were supposed to reopen on January 26, 2021 according to the academic calendar; however, the break was extended until February 15, 2021 in order to keep students safe. (151,152) The extended school closure was met with a mixed response from the public. Some individuals were nervous about the ability of schools to implement health and safety protocols and the possibility of increasing infections among teachers and students. This concern was particularly true for parents of low socioeconomic status residing in townships and informal settlements, in comparison to wealthier parents from South African suburbs.

### *Vaccination Strategy*

President Ramaphosa announced the vaccination strategy in South Africa would comprise a 3-part strategy to procure vaccines, administer vaccines to priority populations, and distribute vaccines to the community at large. (150) The strategy was designed around achieving herd immunity, which was estimated to require vaccination of 67% of the population or 40 million South Africans. Vaccine procurement would occur through the WHO's COVAX facility, the African Union Vaccine Initiative, which was a pool established specifically for African countries to obtain vaccines, and through direct negotiation with vaccine manufacturers.

Part 2 of the strategy was focused on vaccine rollout and was divided into three phases. (150) Phase 1 was to focus on healthcare workers. Phase 2 expanded eligibility to essential workers including teachers, police, and other frontline workers; people living in congregate settings such as old age homes, shelters, and prisons; people over the age of 60; and adults with comorbidities. Phase 3 would then allow the remaining adult population to be vaccinated.

Part 3 of the strategy involved providing vaccines to locations throughout the country where they could be administered including hospitals, clinics, outreach services and mobile clinics and private settings including doctors' offices, pharmacies, and workplaces. (150)

As of February 1, 2021, South Africa had received its first shipment of AstraZeneca vaccines from Serum Institute of India and vaccination of healthcare workers was set to begin, pending verification that the vaccines had retained their quality during transportation. (153) At the same time, South Africa awaited shipments of vaccines from the COVAX facility, Johnson & Johnson, and Pfizer.

In response to a study showing decreased effectiveness of the AstraZeneca vaccine against the beta variant, South Africa decided to delay the rollout of vaccinations to health care and frontline workers, opting to wait on the arrival of incoming Johnson & Johnson and Pfizer vaccines instead. (154) Vaccinations still began mid-February and by late February, over 67,000



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

health workers had been vaccinated. With arrivals of additional doses of the Johnson & Johnson vaccine, the vaccination campaign was ramped up. (155)

As of February 1, 2021, South Africa recorded their lowest increase in daily COVID-19 cases since December 2020, indicating that South Africa had passed the peak of their second wave. (153) In response, President Ramaphosa announced that some public health measures would be relaxed under Alert Level 3. Curfew hours were adjusted to 11pm-4am. Religious gatherings were allowed to resume with a maximum of 50 people indoors or 100 people outdoors, up to a maximum of 50% of the venue capacity if the venue was too small to enable social distancing. Beaches, parks, public swimming pools, and other public places were allowed to reopen. Regulations on alcohol sales were relaxed. Several other public health measures stayed in effect. Gatherings, other than religious gatherings, funerals, and certain other establishments such as restaurants and gyms, were still not permitted. Masking and distancing continued to be required in public spaces. President Ramaphosa emphasized that with widespread presence of the beta variant, it was important to continue public health measures, even with vaccinations underway.

With South Africa emerging from its second wave, President Ramaphosa announced that the country would again move to Alert Level 1 on March 1, 2021. (155) Many public health measures were relaxed, and most economic activities were allowed to resume. Curfew hours were reduced, gatherings were permitted to occur with a maximum of 100 people indoors or 250 people outdoors with appropriate social distancing, and alcohol sales were allowed to resume as normal. Masking and distancing were still required, with failure to wear a mask remaining a criminal offence.

With daily new case numbers stabilizing at approximately 1,200 and declining hospitalizations and deaths, President Ramaphosa announced on March 30, 2021 that South Africa would remain at Alert Level 1, with some adjustments to the public health measures. (156) Gathering limits were increased to allow 250 people in indoor venues or 500 people outdoors, as long as distancing could be maintained. Even with relaxed gathering limits, the government still urged people to avoid congregating in large groups, particularly for vulnerable populations including seniors and those with other health conditions. (157) Most other Level 1 measures such as curfew remained unchanged, however restrictions concerning alcohol sales and consumption were to be in effect for Easter weekend.

Vaccination of health workers was underway and was expected to take 3 months. (156) President Ramaphosa also announced that vaccination of priority populations was expected to begin in Mid-May 2021 and that registration would begin in April 2021.

In February 2021, a public opinion poll looked at self-reported adherence to public health measures. (158) While most respondents still supported and adhered to public health measures, there was a slight decline since the poll done in August 2020. 95% of respondents



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

reported masking in public, 87% reported avoiding public gatherings, and 78% reported staying home.

### Wave 3- Delta Variant

On May 3, 2021, Minister Mkhize discussed concerns regarding the B.1.617 variant circulating in India, which was later named the delta variant. (159) The delta variant had not been detected in South Africa. Minister Mkhize reassured the public that there were no direct flights to South Africa from India and that all entry points into South Africa were following screening protocols for individuals.

After a period of maintaining lower case numbers following the end of the second wave, cases began to rise again and concerns over a third wave became apparent. (160) President Ramaphosa announced that South Africa would move to Alert Level 2 on June 1, 2021. Curfew hours were extended again and gathering limits were reduced to a maximum of 100 people indoors and 250 people outdoors. South Africans were still encouraged to reduce contacts, spend time outdoors in well-ventilated areas if meeting with someone, and to avoid public spaces or non-essential travel. Even with these additional measures, the daily number of cases had doubled, and hospitalizations and deaths had increased. (161) Several South African provinces were officially experiencing a third wave with others trending towards it. As a result, President Ramaphosa announced that the country would move back to Alert Level 3 on June 15, 2021. Curfew was again extended, and gatherings were limited to 50 people indoors and 100 people outdoors.

At the same time, the vaccination program was underway and gaining momentum. 480,000 health workers had been vaccinated with the J&J vaccine as part of Phase 1 of the vaccination strategy. (161) South Africa experienced some issues with their vaccine supply. The J&J supply coming from the USA had been under investigation for contamination, which forced the vaccine program to rely on Pfizer vaccines. Despite the challenges with the J&J vaccine, Phase 2 of the vaccination strategy continued, and an additional 1.5 million health workers and people over the age of 60 received their first dose of the Pfizer vaccine. With the promise of the arrival of additional J&J and Pfizer doses, South Africa estimated that they would be able to vaccinate 150,000 people per day and were expecting to ramp up to 250,000 per day. As vaccinations ramped up, the national vaccination program introduced streams. (162) The first stream focused on the general population and eligibility went according to age group. The second stream focused on vaccinating workers in the basic education sector while the third stream targeted police officers. A fourth stream was focused on vaccination in important economic sectors including the mining, manufacturing, and taxi industries.

The Delta variant was detected in several South African provinces including the Eastern Cape, Free State, Gauteng, KwaZulu-Natal, and Western Cape and was replacing the beta variant, which had been the dominant variant in South Africa since the second wave. (162) Even with the reinstatement of public health measures in early June, the delta variant was worsening the



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

situation. As a result, President Ramaphosa announced that the country would move to Alert Level 4 for 14 days, from June 28, 2021 until July 11, 2021. All gatherings were prohibited. Curfew hours were extended to 9pm -4am. Sale of alcohol was prohibited. Public spaces such as beaches and parks were permitted to stay open but could not be used for gatherings. Other non-essential services such as restaurants, gyms, fitness centres, night clubs, casinos were required to close for the duration of this time. (163) Visits to institutions including old age homes and other congregant settings were limited. (162) Restaurants were only allowed to open for take-out or delivery because individuals could not remain masked while eating or drinking. School closures for the holidays were moved earlier and began June 30, 2021. (162) Universities closed for in-person learning for 2 weeks, while virtual learning could continue. (164) Gauteng province was experiencing a higher load of COVID-19 cases, therefore travel into and out of the province was restricted to essential reasons including work, business, or transport of goods. (162) In Gauteng, elective surgeries were also postponed.

With COVID-19 cases remaining high, the Delta variant spreading rapidly, and the healthcare system being under pressure, the third wave in South Africa was having a more severe effect than the first two waves. Thus, President Ramaphosa announced the extension of the Alert Level 4 for an additional 14 days until July 25, 2021. (165) Most measures remained in place, however restaurants and eateries were able to reopen as of July 11, 2021 to have a maximum of 50 people at a time. Other settings including gyms and fitness centres were also allowed to reopen. The vaccination program continued to expand eligibility, allowing people aged 35+ to register for an appointment as of July 15, 2021, with the goal of beginning to vaccinate this age group starting on August 1, 2021. (165)

With COVID-19 cases declining steadily since Alert Level 4 was instituted, South Africa was able to move past the peak of wave 3. (166) However, this decline was not felt equally across all provinces. While cases in Gauteng province were declining, infections in Western Cape, Eastern Cape, and KwaZulu Natal were rising. Despite this disparity, President Ramaphosa announced that South Africa would move back to Alert Level 3 as of July 25, 2021. Interprovincial travel for non-essential reasons was allowed to resume. Non-essential establishments including restaurants, bars, and fitness centers were allowed to reopen, with the exception of night clubs. (167) Gatherings were permitted with a limit of 50 people indoors or 100 people outdoors. Alcohol sales were allowed to resume. Schools were reopened July 26, 2021. (168)

Adults aged 18-34 were allowed to begin getting vaccinated as of September 1, 2021, in addition to adults over the age of 35. Vaccination capacity and supply had also been expanded so that individuals could get their doses without booking an appointment in advance. (166) The vaccination campaign continued to progress, and South Africa was vaccinating their population at a pace of 1 million doses every 4 to 5 days. Despite the entire adult population over age 18 being eligible for vaccination, South Africa focused resources on individuals over the age of 60 or presenting with comorbidities. (169) By September, South Africa was no longer concerned about their vaccine supply, believing that they had enough to vaccinate the entire adult population.



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

As cases began declining again in all provinces, President Ramaphosa announced that South Africa was moving to Alert Level 2 on September 13, 2021. Curfew hours were reduced, gathering limits were increased to a maximum of 250 people indoors and 500 people outdoors, and alcohol sales were permitted again. (169)

By September 30, 2021, President Ramaphosa confirmed that South Africa had exited their third wave driven by the delta variant and announced that South Africa would move to Alert Level 1 on October 1, 2021. (153) Gathering limits were raised, allowing 750 people indoors and 2000 people outdoors. Funerals were an exception to this rule and only a maximum of 100 people were permitted to attend.

In September 2021, there was a follow-up public opinion poll to the ones completed in August 2020 and February 2021. (170) While self-reported adherence to masking in public remained high among respondents at 94%, avoidance of public gatherings dropped to 78% and staying home dropped to 65% since February 2021.

In an effort to increase vaccination uptake in the population, the government launched the “Vooma Vaccination Weekends” campaign, which opened up vaccination sites on weekends to enable people to get vaccinated who may have had constraints on their weekday schedule. (171) The campaign took place across the country and mobilized political, religious, business, and other community leaders to encourage vaccination among the population. President Ramaphosa also announced that the National Department of Health would be rolling out vaccine certificates that would be used to allow individuals to provide valid proof of vaccination for activities such as travel that required it. (171) Health Minister Joe Phaala announced the launch of the vaccine certificate on October 8, 2021. (172)

Minister of Health Joe Phaala announced that South Africa would be opening up vaccination for children aged 12-17 starting October 20, 2021. (173) Children in this age group were eligible to receive one dose, pending further study of the risk of myocarditis following 2 doses. Minister Phaala also clarified that AstraZeneca, Moderna, Sputnik, and Sinovac vaccines were not in use in South Africa at the time, and that vaccine certificates could not be issued for these vaccines.

Minister Phaala announced an interesting initiative to support vaccination in the population. With the upcoming municipal elections, pop-up vaccination sites would be located at voting stations, particularly where vaccine uptake was disproportionately low. (174) He also introduced a pilot vaccination incentive scheme called the Vooma Voucher, which would provide R100 grocery vouchers to people over 60 who received their first vaccine dose in November 2021.

By the end of November 2021, South Africa was still in a State of Disaster and remained at an Alert Level 1. (175) President Ramaphosa emphasized the need for the population to come forward for vaccination to prevent hospitalization and death. Gathering limits and masking were the main public health measures still in effect.



# Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

## Social and Economic Support

The South African government introduced economic and social relief measures to support the population during the pandemic, which were at times stopped and reinstated. The Unemployment Insurance Fund (UIF) was used to set up a COVID-19 Temporary Employee Relief Scheme (COVID-19 TERS). This fund was first announced on March 27, 2020 and was introduced to support businesses and employees during the lockdown period. (176) The COVID-19 TERS benefit was meant to support employers with paying employees their regular salary while they were at home during lockdown and was extended periodically throughout the pandemic.

The government also provided support by enhancing existing social grants. (177) The government provided a child support top-up, where South Africans received an extra R300 in May 2020 and an extra R500 per month from June to October 2020. All other social grants were also increased by R250 per month from May to October 2020. A temporary COVID-19 Social Relief of Distress grant was also introduced and provided R350 per month to people who were unemployed or not receiving other social grants or unemployment payments. (177) This grant was initially meant to be available from May-October 2020, but it was extended periodically throughout the pandemic until April 2021, where the government stopped the program citing they could not longer afford to provide the grant. (178) It was reinstated from August 2021.

In response to food insecurity during the pandemic, a food distribution program was also introduced by the national Ministry of Social Development, in coordination with their provincial level counterparts. (179) Emergency food parcels valued at R700 per household were delivered to registered people through existing Community Nutrition Development Centers (CNDCs). People eligible for food parcels included people currently served by CNDCs and other food programs that were closed during the lockdown, and households needing food who were not already supported by the Social Relief of Distress grant or other food insecurity programs.

## Disproportionately affected populations

There have been several populations especially at risk for COVID-19 in South Africa. With the declaration of a State of National Disaster and subsequent lockdown, people living in informal settlements were affected significantly. Informal settlements are densely populated, impoverished areas where people have built homes, oftentimes illegally, on municipal land. These areas tend not to have adequate water infrastructure or sanitation. (180) In the context of COVID-19, people living in these areas did not have adequate space to isolate at home and were at high risk of an outbreak. The South African government announced efforts to deliver water to these areas to support proper hand hygiene and to resettle people elsewhere to make these areas less population dense. (181) Despite a national eviction ban, there was difficulty in enforcing the ban at the municipal level and municipal law enforcement was used to evict people in informal settlements from their homes. (182)

Along similar lines, people who were homeless and living in shelters were also at a high risk of contracting COVID-19. (179) In shelters, the government attempted to support this population





## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

by providing resources such as personal protective equipment and hand sanitizer. The government also set up housing for people who were homeless in sports stadiums, schools, and other closed public spaces. (183)

Incarcerated people were also at a disproportionate risk of becoming infected. (184) The Department of Correctional Services (DCS) activated their Disaster Management Response strategy and worked on testing incarcerated people and isolating anyone who tested positive. The DCS worked with Department of Health and provincial governments to determine appropriate healthcare facilities where incarcerated people could be transferred if treatment was required.

The lockdown also had implications for gender-based violence (GBV). During the first week of lockdown alone, South African police noted that 2,320 cases of GBV had been reported. (185) GBV was so significant that President Ramaphosa described it as a second epidemic that South Africa was facing alongside COVID-19. (113) South Africa's national Gender-based violence command centre had received three times the number of calls they normally did. (186) With the rise in GBV incidents, the South African government tried to improve the capacity of their GBV command centre by increasing the number of social workers available to work on gender-based and family violence cases. (179) They also tried improving referral pathways between the GBV command center and relevant authorities to improve service provision for survivors of GBV and help them access support faster.

### Successes and Challenges in South Africa's Pandemic Response

Key informants identified several successes and challenges in South Africa's COVID-19 response. The initial lockdown worked to "flatten the curve" and gave South Africa time to develop additional healthcare capacity. Building field hospitals during lockdown and ensuring adequate oxygen supply contributed to this success—one key informant said that no one had died due to a lack of oxygen. Key-informants also mentioned that the screening, testing, contact tracing and isolation policies and public education programs worked well. There was strong risk communication and community engagement through social media and regular press conferences from the Minister of Health and the President. Ultimately, one key informant described South Africa's response as a "qualified success". While there were many deaths, they felt that South Africa had mitigated the effects of the pandemic, and that it could have been worse.

Some key informants felt that the government response was slow and not keeping up with the virus, with one suggesting that decision-making could have been streamlined to reduce bureaucracy when decisions needed to be made quickly. South Africa could also have mobilized other sectors more in sharing the responsibility and messaging around COVID-19.



# Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

## Comparison with other country responses

There are many concerns in trying to compare countries' responses to COVID-19. These concerns are shaped by limitations of the data itself and differences in contextual factors. A separate paper by this working group describes limitations of COVID-19 data. (Submitted) Table 4 presents a list of select African countries and their use of different social distancing policies.

Government	State of Emergency	■		■	■	
Case Management	Separation of cases or suspected cases within institutions	■	■			
	Recommended self-isolation for symptoms					
	Recommended self-isolation for contacts					
	Recommended self-isolation for cases				■	
	Recommended self-isolation after travel					
Closure	Suspended elective medical/dental procedures	■	■	■		
	Restaurant closure	■	■	■		
	Non-essential service closure	■	■	■	■	
Detection	Surveillance systems	■	■	■	■	
	Mass fever screening in public transportation	■	■			
	Drive through testing centres	■				
	Contact tracing	■	■	■	■	
	Assessment centres	■	■	■	■	
Economics	Housing economic relief	■	■	■	■	
	Economic relief policies for individuals/families	■	■	■	■	
	Economic relief policies for businesses	■	■	■	■	
	Anti-price gouging	■		■	■	
	Anti-hording	■		■	■	
Education	University closure	■	■	■	■	
	School closure- high school	■	■	■	■	
	School closure- elementary school	■	■	■	■	
	School closure- daycare	■	■	■	■	
Health Workforce	LTC Health workers allowed to only work at one site					
	Health workers allowed to only work at one site					
Healthcare Resources	Telehealth access to prescription medication	■				
	Audio/video telehealth	■	■			
Physical Distancing	Work from home/remote work	■	■			
	Required use of masks/PPE for public	■	■	■	■	
	Recommended use of masks/PPE for public	■		■		
	Quarantine orders for contacts	■	■	■	■	
	Quarantine orders for cases	■	■	■	■	
	Quarantine orders after travel	■	■	■	■	
	Quarantine for "at risk" or priority neighbourhoods	■	■	■	■	
	Physical distancing recommendation	■	■	■	■	
	Lockdown	■	■	■	■	
	Isolation for vulnerable populations	■	■	■	■	
	Ban on group size	■	■	■	■	
	Public Decontamination	Public decontamination transit	■	■		
		Public decontamination streets				
Travel bans	Screening at airports/borders	■	■	■	■	
	International bans for non-essential travel	■	■	■	■	
	Closing public transportation	■	■			
		South Africa	Uganda	Sierra Leone	Liberia	

**Table 4. Comparative national-level responses to COVID-19 by country (filled in means policy was implemented)**





### IV. Discussion of main findings, limitations, and next steps

South Africa has an estimated population of 59,308,690, with 2,963,679 cases and 89,843 deaths from COVID-19 as of November 29, 2021. During the study period, South Africa took a mitigation approach throughout their COVID-19 response, aiming primarily to “flatten the curve”.

South Africa created its policies in consultation with epidemiologists, scientists, and public health professionals. They employed a variety of policies such as lockdown, school closures, international travel bans, masking, and gathering limits. South Africa implemented a strict initial national lockdown and used that time to build healthcare capacity to accommodate future COVID-19 surges and to increase their testing capacity. Following their lockdown, they situated their approach as a risk-adjusted framework that designated alert levels based on COVID-19 transmission and healthcare capacity to respond. This framework ultimately aimed to prevent the healthcare system from being overwhelmed while balancing the social and economic effects of mitigation policies.

South Africa’s strategy shifted away from non-pharmaceutical interventions to emphasize vaccination later on in the pandemic. Early on, their vaccine rollout faced issues due to supply. South Africa’s vaccination strategy was based around attaining herd immunity in the population and occurred in phases beginning with health workers, frontline workers, adults over the age of 60, and adults living with comorbidities, before expanding eligibility to the population based on age.

Limitations to this report may exist because findings rely on availability of accurate, up-to-date documentation of policy responses by the media and government sources. In cases where policies were not implemented according to plan, there may be some discrepancies with the information reported here.

#### Conclusions

South Africa has used a variety of policies in their COVID-19 response; however, South Africa still experienced a large burden of COVID-19 cases and deaths, even with the public health measures they implemented. It will be important for South Africa to ensure they take action swiftly in response to future changes in the pandemic and to pay attention to long term effects of COVID-19.



## References

1. Rolling updates on coronavirus disease (COVID-19) [Internet]. World Health Organization. 2020 [cited 2020 Oct 15]. Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen>
2. Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV) [Internet]. World Health Organization. 2020 [cited 2020 Oct 15]. Available from: [https://www.who.int/news/item/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-\(2005\)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-\(2019-ncov\)](https://www.who.int/news/item/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov))
3. Report of the WHO-China Joint Mission on COVID-19 Final Report [Internet]. World Health Organization. 2020 [cited 2020 Oct 15]. Available from: <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>
4. Weible CM, Nohrstedt D, Cairney P, Carter DP, Crow DA, Durnová AP, et al. COVID-19 and the policy sciences: initial reactions and perspectives. *Policy Sci.* 2020 Jun 1;53(2):225–41.
5. Ferguson N, Laydon D, Nedjati Gilani G, Imai N, Ainslie K, Baguelin M, et al. Report 9: Impact of non-pharmaceutical interventions (NPIs) to reduce COVID19 mortality and healthcare demand [Internet]. Imperial College London; 2020 Mar [cited 2020 Oct 15]. Available from: <https://www.imperial.ac.uk/mrc-global-infectious-disease-analysis/covid-19/report-9-impact-of-npis-on-covid-19/>
6. Ho S. Breaking down the COVID-19 numbers: Should we be comparing countries? CTV News [Internet]. 2020 Mar 31 [cited 2020 Oct 15]; Available from: <https://www.ctvnews.ca/health/coronavirus/breaking-down-the-covid-19-numbers-should-we-be-comparing-countries-1.4874552>
7. D’Adamo H, Yoshikawa T, Ouslander JG. Coronavirus Disease 2019 in Geriatrics and Long-Term Care: The ABCDs of COVID-19. *J Am Geriatr Soc.* 2020;68(5):912–7.
8. Kluge HHP. Older people are at highest risk from COVID-19, but all must act to prevent community spread [Internet]. World Health Organization. 2020 [cited 2020 Oct 15]. Available from: <https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/statements/statement-older-people-are-at-highest-risk-from-covid-19,-but-all-must-act-to-prevent-community-spread>
9. Jin JM, Bai P, He W, Wu F, Liu XF, Han DM, et al. Gender Differences in Patients With COVID-19: Focus on Severity and Mortality. *Front Public Health* [Internet]. 2020 [cited 2020 Oct 15];8. Available from: <https://www.frontiersin.org/article/10.3389/fpubh.2020.00152>



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

10. Canadian Institutes of Health Research. Why sex and gender need to be considered in COVID-19 research - CIHR [Internet]. CIHR. 2020 [cited 2020 Oct 15]. Available from: <https://cihr-irsc.gc.ca/e/51939.html>
11. Vocke M. Trust between Canadians and government improving during COVID-19 outbreak: survey. Global News [Internet]. [cited 2022 Apr 23]; Available from: <https://globalnews.ca/news/6791574/coronavirus-trust-canadians-government-survey/>
12. WHO Regional offices [Internet]. World Health Organization. 2020 [cited 2020 Oct 19]. Available from: <https://www.who.int/about/who-we-are/regional-offices>
13. United Nations Population Division. Population, total | Data [Internet]. The World Bank. 2020 [cited 2022 Jan 20]. Available from: [https://data.worldbank.org/indicator/SP.POP.TOTL?most\\_recent\\_value\\_desc=true](https://data.worldbank.org/indicator/SP.POP.TOTL?most_recent_value_desc=true)
14. Food and Agriculture Organization. Land area (sq. km) [Internet]. The World Bank. 2020 [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/AG.LND.TOTL.K2>
15. World Development Indicators. Population density [Internet]. The World Bank. 2020 [cited 2022 Jan 20]. Available from: [https://databank.worldbank.org/embed/COVID-19-Database-\(population-density\)/id/9dd8868f](https://databank.worldbank.org/embed/COVID-19-Database-(population-density)/id/9dd8868f)
16. Central Intelligence Agency. South Africa. In: The World Factbook [Internet]. Central Intelligence Agency; 2022 [cited 2022 Apr 23]. Available from: <https://www.cia.gov/the-world-factbook/countries/south-africa/>
17. COVID-19 Database (urban population) [Internet]. [cited 2021 Oct 10]. Available from: [https://databank.worldbank.org/embed/COVID-19-Database-\(urban-population\)/id/f26f04a6](https://databank.worldbank.org/embed/COVID-19-Database-(urban-population)/id/f26f04a6)
18. United Nations Human Settlements Programme (UN-HABITAT). Population living in slums (% of urban population) - South Africa [Internet]. The World Bank. [cited 2022 Apr 27]. Available from: <https://data.worldbank.org/indicator/EN.POP.SLUM.UR.ZS?locations=ZA>
19. National Institute for Communicable Diseases. Latest confirmed cases of COVID-19 in South Africa (30 November 2021) [Internet]. NICD. 2021 [cited 2022 Mar 17]. Available from: <https://www.nicd.ac.za/latest-confirmed-cases-of-covid-19-in-south-africa-30-november-2021/>
20. The Global Health Security Index [Internet]. 2019 GHS Index. [cited 2020 Oct 16]. Available from: <https://www.ghsindex.org/>
21. Brauer M. PM2.5 air pollution, mean annual exposure (micrograms per cubic meter) [Internet]. The World Bank. 2017 [cited 2020 Oct 16]. Available from: <https://data.worldbank.org/indicator/EN.ATM.PM25.MC.M3?view=chart>



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

22. Brauer M. PM2.5 air pollution, population exposed to levels exceeding WHO guideline value (% of total) [Internet]. The World Bank. 2017 [cited 2020 Oct 16]. Available from: <https://data.worldbank.org/indicator/EN.ATM.PM25.MC.ZS?view=chart>
23. United Nations Population Division. International migrant stock (% of population) [Internet]. The World Bank. 2015 [cited 2020 Oct 16]. Available from: <https://data.worldbank.org/indicator/SM.POP.TOTL.ZS>
24. Wellcome Trust Global Monitor. Share of people who trust their national government [Internet]. Our World in Data. 2019 [cited 2020 Oct 17]. Available from: <https://ourworldindata.org/grapher/share-who-trust-government>
25. International Telecommunication Union (ITU) World Telecommunication/ICT Indicators Database. Mobile cellular subscriptions (per 100 people) [Internet]. The World Bank. 2020 [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/IT.CEL.SETS.P2>
26. International Telecommunication Union (ITU) World Telecommunication/ICT Indicators Database. Individuals using the Internet (% of population) [Internet]. The World Bank. 2019 [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/IT.NET.USER.ZS>
27. Country Rankings: World & Global Economy Rankings on Economic Freedom [Internet]. The Heritage Foundation. 2021 [cited 2022 Jan 20]. Available from: [//www.heritage.org/index/ranking](http://www.heritage.org/index/ranking)
28. World Development Indicators. The World by Income and Region [Internet]. The World Bank. [cited 2020 Oct 21]. Available from: <https://datatopics.worldbank.org/world-development-indicators/the-world-by-income-and-region.html>
29. World Bank, Poverty and Inequality Platform. Gini Index [Internet]. The World Bank. [cited 2020 Oct 21]. Available from: <https://data.worldbank.org/indicator/SI.POV.GINI/>
30. International Comparison Program, World Bank. GDP per capita, PPP (current international \$) [Internet]. The World Bank. [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD>
31. International Comparison Program, World Bank. GNI per capita, PPP (current international \$) [Internet]. The World Bank. [cited 2020 Jan 20]. Available from: <https://data.worldbank.org/indicator/NY.GNP.PCAP.PP.CD>
32. Global Health Observatory Data Repository. Current health expenditure (CHE) as percentage of gross domestic product (GDP) (%) - Data by country [Internet]. World Health Organization. World Health Organization; 2020 [cited 2022 Jan 20]. Available from: <https://apps.who.int/gho/data/view.main.GHEDCHEGDP SHA2011v>



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

33. International Labour Organization, ILOSTAT database. Vulnerable employment [Internet]. The World Bank. 2020 [cited 2022 Jan 20]. Available from: [https://databank.worldbank.org/embed/COVID-19-Database-\(Vulnerable-employment\)/id/19517473](https://databank.worldbank.org/embed/COVID-19-Database-(Vulnerable-employment)/id/19517473)
34. OECD Affordable Housing Database. HC3.1 Homeless population [Internet]. OECD Social Policy Division; 2020 [cited 2020 Oct 17]. Available from: <http://www.oecd.org/els/family/HC3-1-Homeless-population.pdf>
35. UNESCO Institute for Statistics. Literacy rate, adult total (% of people ages 15 and above) [Internet]. The World Bank. 2020 [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/SE.ADT.LITR.ZS>
36. Countries Compared by Education > Literacy > Female [Internet]. NationMaster. [cited 2022 Jan 20]. Available from: <https://www.nationmaster.com/country-info/stats/Education/Literacy/Female>
37. Countries Compared by Education > Literacy > Male [Internet]. NationMaster. [cited 2022 Jan 20]. Available from: <https://www.nationmaster.com/country-info/stats/Education/Literacy/Male>
38. UNESCO Institute for Statistics. School enrollment, primary (% net) [Internet]. The World Bank. [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/SE.PRM.NENR>
39. United Nations Population Division. Life expectancy at birth, total (years) [Internet]. The World Bank. [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/SP.DYN.LE00.IN>
40. United Nations Population Division. Life expectancy at birth, male (years) [Internet]. The World Bank. [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/SP.DYN.LE00.MA.IN>
41. United Nations Population Division. Life expectancy at birth, female (years) [Internet]. The World Bank. [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/SP.DYN.LE00.FE.IN>
42. Noncommunicable diseases country profiles 2018 [Internet]. World Health Organization. [cited 2022 Jan 20]. Available from: <https://www.who.int/publications-detail-redirect/9789241514620>
43. Global Health Observatory Data Repository. Mortality between age 30 and exact age 70 from cardiovascular diseases, cancer, diabetes or chronic respiratory diseases [Internet]. World Health Organization. World Health Organization; 2018 [cited 2022 Oct 21]. Available from: <https://apps.who.int/gho/data/view.main.GSWCAH21v>



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

44. United Nations Population Division's World Population Prospects. Population ages 0-14, male [Internet]. The World Bank. [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/SP.POP.0014.MA.IN>
45. United Nations Population Division's World Population Prospects. Population ages 0-14, female [Internet]. The World Bank. [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/SP.POP.0014.FE.IN>
46. United Nations Population Division's World Population Prospects. Population ages 0-14, total [Internet]. The World Bank. [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/SP.POP.0014.TO>
47. United Nations Population Division's World Population Prospects. Population ages 0-14 (% of total population) [Internet]. The World Bank. [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/SP.POP.0014.TO.ZS>
48. United Nations Population Division's World Population Prospects. Population ages 15-64, male [Internet]. The World Bank. [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/SP.POP.1564.MA.IN>
49. United Nations Population Division's World Population Prospects. Population ages 15-64, female [Internet]. The World Bank. [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/SP.POP.1564.FE.IN>
50. United Nations Population Division's World Population Prospects. Population ages 15-64, total [Internet]. The World Bank. [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/SP.POP.1564.TO>
51. United Nations Population Division's World Population Prospects. Population ages 15-64 (% of total population) [Internet]. The World Bank. [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/SP.POP.1564.TO.ZS>
52. United Nations Population Division's World Population Prospects. Population ages 65 and above, male [Internet]. The World Bank. [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/SP.POP.65UP.MA.IN>
53. United Nations Population Division's World Population Prospects. Population ages 65 and above, female [Internet]. The World Bank. [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/SP.POP.65UP.FE.IN>
54. United Nations Population Division's World Population Prospects. Population ages 65 and above, total [Internet]. The World Bank. [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/SP.POP.65UP.TO>



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

55. United Nations Population Division's World Population Prospects. Population ages 65 and above (% of total population) [Internet]. The World Bank. [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/SP.POP.65UP.TO.ZS>
56. Global Health Observatory Data Repository. Age-standardized estimates of current tobacco use, tobacco smoking and cigarette smoking - Data by country [Internet]. World Health Organization. World Health Organization; 2020 [cited 2020 Oct 21]. Available from: <https://apps.who.int/gho/data/view.main.TOBAGESTDCURRv>
57. Global Health Observatory Data Repository. Raised blood pressure (SBP  $\geq$  140 OR DBP  $\geq$  90), crude (%) - Estimates by country [Internet]. World Health Organization. 2017 [cited 2020 Oct 21]. Available from: <https://apps.who.int/gho/data/view.main.2464EST>
58. Global Health Observatory Data Repository. Raised fasting blood glucose ( $\geq$  7.0 mmol/L or on medication) (crude estimate) - Estimates by country [Internet]. World Health Organization. 2017 [cited 2020 Oct 21]. Available from: <https://apps.who.int/gho/data/view.main.2469>
59. Global Health Observatory Data Repository. Prevalence of obesity among adults, BMI  $\geq$  30, crude - Estimates by country [Internet]. World Health Organization. 2017 [cited 2020 Oct 21]. Available from: <https://apps.who.int/gho/data/view.main.BMI30Cv>
60. UNAIDS. Prevalence of HIV, total (% of population ages 15-49) [Internet]. The World Bank. [cited 2020 Oct 21]. Available from: <https://data.worldbank.org/indicator/SH.DYN.AIDS.ZS>
61. Global Health Observatory. BCG immunization coverage among 1-year-olds (%) [Internet]. World Health Organization. [cited 2020 Oct 21]. Available from: [https://www.who.int/data/gho/data/indicators/indicator-details/GHO/bcg-immunization-coverage-among-1-year-olds\(-\)](https://www.who.int/data/gho/data/indicators/indicator-details/GHO/bcg-immunization-coverage-among-1-year-olds(-))
62. Food and Agriculture Organization. Prevalence of undernourishment (% of population) [Internet]. The World Bank. [cited 2020 Oct 22]. Available from: <https://data.worldbank.org/indicator/SN.ITK.DEFC.ZS>
63. Structure and functions of the South African Government [Internet]. South African Government. [cited 2022 Apr 23]. Available from: <https://www.gov.za/about-government/government-system/structure-and-functions-south-african-government>
64. The Structure Of Government [Internet]. Parliamentary Monitoring Group. [cited 2022 Apr 23]. Available from: [https://pmg.org.za/page/structure-of-government#The\\_Executive](https://pmg.org.za/page/structure-of-government#The_Executive)
65. National Health Act [Internet]. South African Government. [cited 2022 Apr 23]. Available from: <https://www.gov.za/documents/national-health-act>





## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

66. Bertha Centre Country Profile: South Africa [Internet]. The Center for Health Market Innovations. 2015 [cited 2022 Apr 23]. Available from: <https://healthmarketinnovations.org/document/bertha-centre-country-profile-south-africa>
67. Rensburg R. Healthcare in South Africa: how inequity is contributing to inefficiency [Internet]. The Conversation. 2021 [cited 2022 Apr 23]. Available from: <http://theconversation.com/healthcare-in-south-africa-how-inequity-is-contributing-to-inefficiency-163753>
68. Health [Internet]. South African Government. [cited 2022 Apr 23]. Available from: <https://www.gov.za/about-sa/health>
69. Fragile States Index [Internet]. Global Data. The Fund for Peace. 2021 [cited 2022 Jan 20]. Available from: <https://fragilestatesindex.org/global-data/>
70. Countries and Territories- Global Freedom Scores [Internet]. Freedom House. [cited 2022 Jan 20]. Available from: <https://freedomhouse.org/countries/freedom-world/scores>
71. Countries- Internet Freedom Scores [Internet]. Freedom House. [cited 2022 Jan 20]. Available from: <https://freedomhouse.org/countries/freedom-net/scores>
72. 2021 World Press Freedom Index [Internet]. Reporters without Borders. [cited 2022 Jan 20]. Available from: [https://rsf.org/en/ranking\\_table?sort=asc&order=Countries%20%26%20regions](https://rsf.org/en/ranking_table?sort=asc&order=Countries%20%26%20regions)
73. WHO Global Health Workforce Statistics. Physicians (per 1,000 people) [Internet]. The World Bank. [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/SH.MED.PHYS.ZS>
74. World Health Organization. Hospital beds (per 1,000 people) [Internet]. The World Bank. [cited 2022 Jan 20]. Available from: <https://data.worldbank.org/indicator/SH.MED.BEDS.ZS>
75. Boseley S, editor health. Mbeki Aids denial “caused 300,000 deaths.” The Guardian [Internet]. 2008 Nov 26 [cited 2022 Apr 23]; Available from: <https://www.theguardian.com/world/2008/nov/26/aids-south-africa>
76. Kanabus A. TB Statistics of South Africa [Internet]. TB Facts. 2021 [cited 2022 Apr 23]. Available from: <https://tbfacts.org/tb-south-africa/>
77. National Strategic Plan on HIV, TB and STIs 2017 - 2022 [Internet]. Department of Health Knowledge Hub. 2016 [cited 2022 Apr 23]. Available from: <https://www.knowledgehub.org.za/elibrary/national-strategic-plan-hiv-tb-and-stis-2017-2022>
78. About Us [Internet]. National Health Laboratory Service. [cited 2022 Apr 23]. Available from: <https://www.nhls.ac.za/about-us/>





## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

79. Green A. COVID-19: Stark differences between public and private sector testing [Internet]. Spotlight. 2020 [cited 2022 Apr 23]. Available from: <https://www.spotlightnsp.co.za/2020/06/24/covid-19-stark-differences-between-public-and-private-sector-testing/>
80. Minister Zweli Mkhize launches mobile laboratories to boost Covid-19 Coronavirus testing capacity [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/south-africa%E2%80%99s-covid-19-testing-capacity-increased-60-new-mobile-lab-units-launched-1-apr>
81. Ritchie H, Mathieu E, Rodés-Guirao L, Appel C, Giattino C, Ortiz-Ospina E, et al. COVID-19 Deaths [Internet]. Our World in Data. 2020 [cited 2022 Apr 23]. Available from: <https://ourworldindata.org/covid-deaths>
82. SA minister Zweli Mkhize put on leave over corruption allegations. Al Jazeera [Internet]. 2021 Jun 8 [cited 2022 Apr 23]; Available from: <https://www.aljazeera.com/news/2021/6/8/south-africa-health-minister-put-on-leave-over-corruption-allegations>
83. The pandemic hot seat: Dr Joe Phaahla promoted to South Africa’s Minister of Health. Daily Maverick [Internet]. 2021 Aug 6 [cited 2022 Apr 23]; Available from: <https://www.dailymaverick.co.za/article/2021-08-06-the-pandemic-hot-seat-dr-joe-phaahla-promoted-to-south-africas-minister-of-health/>
84. President Cyril Ramaphosa: Changes to the national executive [Internet]. South African Government. 2021. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-changes-national-executive-5-aug-2021-0000>
85. President Cyril Ramaphosa: Developments in South Africa’s risk-adjusted strategy to manage the spread of coronavirus COVID-19 [Internet]. South African Government. 2020. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-developments-south-africa%E2%80%99s-risk-adjusted-strategy-manage-spread>
86. Abdool Karim SS. The South African Response to the Pandemic. N Engl J Med. 2020 Jun 11;382(24):e95.
87. First Case of COVID-19 coronavirus reported in SA [Internet]. National Institute for Communicable Diseases. 2020 [cited 2022 Apr 23]. Available from: <https://www.nicd.ac.za/first-case-of-covid-19-coronavirus-reported-in-sa/>
88. President Cyril Ramaphosa: Measures to combat Coronavirus COVID-19 epidemic [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/statement-president-cyril-ramaphosa-measures-combat-covid-19-epidemic-15-mar-2020-0000>



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

89. Minister Nkosazana Dlamini Zuma: Gazetted Regulations as part of government's intervention measures on Covid-19 Coronavirus [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/minister-nkosazana-dlamini-zuma-gazetted-regulations-part-government%E2%80%99s-intervention>
90. Minister Lindiwe Zulu calls on Social Development and public entities to implement measures to minimise spread of Coronavirus COVID-19 [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/minister-zulu-calls-social-delopment-and-its-publivec-entities-implement-measures-minimise>
91. President Cyril Ramaphosa: Escalation of measures to combat Coronavirus COVID-19 pandemic [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-escalation-measures-combat-coronavirus-covid-19-pandemic-23-mar>
92. Ferreira A. COVID-19 South Africa: Pandemic and Telemedicine [Internet]. 2020. Available from: <https://www.clydeco.com/en/insights/2020/04/covid-19-south-africa-pandemic-and-telemedicine>
93. Statement of the Minister of Transport, Fikile Mbalula on the occasion of unpacking lockdown implications for Transport [Internet]. South African Government; 2020. Available from: [https://www.transport.gov.za/documents/11623/138323/UNPACKINGLOCKDOWN\\_25March2020.pdf/b224d127-41a7-49b0-94c0-c215b3560a0b](https://www.transport.gov.za/documents/11623/138323/UNPACKINGLOCKDOWN_25March2020.pdf/b224d127-41a7-49b0-94c0-c215b3560a0b)
94. Minister Bheki Cele unpacks measures by the police to enforce the Coronavirus COVID-19 lockdown [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/minister-bheki-cele-unpacks-measures-police-enforce-coronavirus-covid-19-lockdown-25-mar>
95. Harrisberg K. South Africans protest police brutality against poor under lockdown. Reuters [Internet]. 2020 Jun 9 [cited 2022 Apr 23]; Available from: <https://www.reuters.com/article/us-safrica-protests-police-trfn-idUSKBN23G2QQ>
96. President Cyril Ramaphosa: Update on Coronavirus COVID-19 lockdown [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-update-coronavirus-covid-19-lockdown-30-mar-2020-0000>
97. President Cyril Ramaphosa: Extension of Coronavirus COVID-19 lockdown to the end of April | South African Government [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-extension-coronavirus-covid-19-lockdown-end-april-9-apr-2020-0000>



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

98. Basic Education postpones May/June exam rewrites due to Coronavirus COVID-19 [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/basic-education-postpones-mayjune-exam-rewrites-due-coronavirus-covid-19-18-apr-2020-0000>
99. Minister Zweli Mkhize confirms 24 deaths and total of 2003 cases of Coronavirus COVID-19 [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/minister-zweli-mkhize-confirms-24-deaths-and-total-2003-cases-coronavirus-covid-19-10-apr>
100. Minister Nkosazana Dlamini Zuma on Coronavirus COVID-19 amended regulations [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/minister-nkosazana-dlamini-zuma-coronavirus-covid-19-amended-regulations-16-apr-2020-0000>
101. Coronavirus COVID-19 Alert level 1 [Internet]. South African Government. [cited 2022 Apr 23]. Available from: <https://www.gov.za/covid-19/about/coronavirus-covid-19-alert-level-1#evictions>
102. President Cyril Ramaphosa: South Africa's response to Coronavirus COVID-19 pandemic [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-south-africas-response-coronavirus-covid-19-pandemic-23-apr-2020>
103. Minister Nkosazana Dlamini Zuma: Coronavirus Covid-19 Level 3 Lockdown Regulations [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/minister-nkosazana-dlamini-zuma-coronavirus-covid-19-level-3-lockdown-regulations-28-may>
104. President Cyril Ramaphosa: Progress in national effort to contain the Coronavirus COVID-19 pandemic [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-progress-national-effort-contain-coronavirus-covid-19-pandemic-12>
105. About alert system [Internet]. South African Government. [cited 2022 Apr 23]. Available from: <https://www.gov.za/covid-19/about/about-alert-system>
106. Minister Blade Nzimande: Implementation of measures by the post school education sector in response to Coronavirus Covid-19 pandemic [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/minister-blade-nzimande-implementation-measures-post-school-education-sector-response>
107. Responding to COVID-19 in Africa: Key findings from surveys in 20 countries (Part 1) [Internet]. Ipsos. [cited 2022 Apr 23]. Available from:



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

<https://www.ipsos.com/en/responding-covid-19-africa-key-findings-from-surveys-in-20-countries>

108. As we head into level 4, South Africans strongly support lockdown [Internet]. Ipsos. 2020 [cited 2022 Apr 23]. Available from: <https://www.ipsos.com/en-za/we-head-level-4-south-africans-strongly-support-lockdown>
109. Davids D. Demonstrations under lockdown: The threat of increased violent protests in South Africa [Internet]. S-RM. 2020 [cited 2022 Apr 23]. Available from: <https://insights.s-rminform.com/lockdown-protests-in-south-africa>
110. Speaking notes for the Minister of Transport, Fikile Mbalula on the occasion of the media briefing on COVID-19 Transport Level 4 Directions [Internet]. 2020. Available from: [https://www.transport.gov.za/documents/11623/143476/statementFINAL\\_COVID\\_01May2020.pdf/38872217-9a90-46bc-94cd-4fcce2df1caf](https://www.transport.gov.za/documents/11623/143476/statementFINAL_COVID_01May2020.pdf/38872217-9a90-46bc-94cd-4fcce2df1caf)
111. Read South Africa’s full level 4 lockdown restrictions here [Internet]. Business Tech. 2020 [cited 2022 Apr 23]. Available from: <https://businesstech.co.za/news/government/392831/read-south-africas-full-level-4-lockdown-restrictions-here/>
112. Minister Fikile Mbalula: Coronavirus COVID-19 level 3 lockdown transport measures [Internet]. 2020. Available from: [https://www.transport.gov.za/documents/11623/143476/level3\\_lockdown\\_30May2020.pdf/df4436c6-b03c-4098-b9e9-2053fac855ff](https://www.transport.gov.za/documents/11623/143476/level3_lockdown_30May2020.pdf/df4436c6-b03c-4098-b9e9-2053fac855ff)
113. President Cyril Ramaphosa: South Africa’s response to the COVID-19 Coronavirus Pandemic [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-south-africa%E2%80%99s-response-covid-19-coronavirus-pandemic-17-jun-2020>
114. South Africa will now have 3 different coronavirus ‘hotspot levels’ – here’s how it works. Business Tech [Internet]. 2020 May 26 [cited 2022 Apr 24]; Available from: <https://businesstech.co.za/news/government/401893/south-africa-will-now-have-3-different-coronavirus-hotspot-levels-heres-how-it-works/>
115. Minister Angie Motshekga on Coronavirus COVID-19 safety measures Gazetted for Basic Education Sector [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/minister-basic-education-emphasizes-safety-new-directions-gazetted-basic-education-sector>
116. Basic Education on amendments to grades returning to school [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/basic-education-amendments-grade-returning-school%C2%A0-2-jul-2020-0000>



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

117. Jeranji T. COVID-19: How provinces are catching up on elective procedures [Internet]. Spotlight. 2020 [cited 2022 Apr 23]. Available from: <https://www.spotlightnsp.co.za/2020/10/06/covid-19-how-provinces-are-catching-up-on-elective-procedures/>
118. Minister Nkosazana Dlamini Zuma: Amendment of Level 3 Coronavirus COVID-19 Regulations [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/minister-nkosazana-dlamini-zuma-amendment-level-3-coronavirus-covid-19-regulations-13-jul>
119. Minister Angie Motshekga welcomes the announcement by President Cyril Ramaphosa regarding Cabinet decision on the school break during Coronavirus COVID-19 pandemic [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/minister-angie-motshekga-welcomes-announcement-president-cyril-ramaphosa-regarding-cabinet>
120. School reopening: Break over for most grades on 24 August, all grades back by 31 August. News24 [Internet]. 2020 Aug 3 [cited 2022 Apr 24]; Available from: <https://www.news24.com/news24/southafrica/news/school-reopening-break-over-for-most-grades-on-24-august-all-grades-back-by-31-august-20200803>
121. Updated Public Transport Directions on Alert Level 3 [Internet]. 2020. Available from: [https://www.transport.gov.za/documents/11623/160598/UPDATEDPUBLICTRANSPORT\\_16July2020.pdf/6cd5c2e0-7162-4957-8cae-fdb24799f7cb](https://www.transport.gov.za/documents/11623/160598/UPDATEDPUBLICTRANSPORT_16July2020.pdf/6cd5c2e0-7162-4957-8cae-fdb24799f7cb)
122. South African police disperse protesters over lockdown pain. The Washington Post [Internet]. 2020 Jul 24 [cited 2022 Apr 23]; Available from: [https://www.washingtonpost.com/world/africa/south-african-police-disperse-protesters-over-lockdown-pain/2020/07/24/7b17a6e4-cdc8-11ea-99b0-8426e26d203b\\_story.html](https://www.washingtonpost.com/world/africa/south-african-police-disperse-protesters-over-lockdown-pain/2020/07/24/7b17a6e4-cdc8-11ea-99b0-8426e26d203b_story.html)
123. Social Development sets up workstreams to conduct risk assessment and state of readiness for the early childhood development centres under Coronavirus Covid-19 lockdown [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/social-development-sets-workstreams-conduct-risk-assessment-and-state-readiness-early-0>
124. Minister Lindiwe Zulu reminds ECD centres and partial care facilities across the country to complete the online self-assessment exercise to re-open under Coronavirus COVID-19 Alert Level 3 [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/minister-lindiwe-zulu-reminds-ecd-centres-and-partial-care-facilities-across-country>
125. Department of Social Development: Directions to Prevent and Combat the Spread of COVID-19 [Internet]. African Legal Information Institute. [cited 2022 Apr 23]. Available from: <https://africanlii.org/akn/za/act/gn/2020/993>



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

126. President Cyril Ramaphosa: South Africa's risk-adjusted strategy to manage spread of Coronavirus COVID-19 [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-south-africa%E2%80%99s-risk-adjusted-strategy-manage-spread-coronavirus>
127. Alert Level 2 Transport Directions [Internet]. South African Government; 2020. Available from: [https://www.transport.gov.za/documents/11623/173494/LEVEL2\\_TRANSPORT\\_DIRECTION\\_S\\_25Aug2020.pdf/c728c4bf-95c6-4eec-a860-e60d97a2af1b](https://www.transport.gov.za/documents/11623/173494/LEVEL2_TRANSPORT_DIRECTION_S_25Aug2020.pdf/c728c4bf-95c6-4eec-a860-e60d97a2af1b)
128. Responding to COVID-19 in African countries (Part 2) [Internet]. Ipsos. 2020 [cited 2022 Apr 23]. Available from: <https://www.ipsos.com/en/responding-covid-19-african-countries-wave-2>
129. Minister Bheki Cele: Release of crime statistics for first quarter of 2020/21 [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/minister-bheki-cele-release-crime-statistics-first-quarter-202021-14-aug-2020-0000>
130. President Cyril Ramaphosa: Progress in South Africa's effort to contain the Coronavirus Covid-19 pandemic [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-progress-south-africa-s-effort-contain-coronavirus-covid-19>
131. Minister Nkosazana Dlamini Zuma: Coronavirus COVID-19 level 1 lockdown regulations [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/minister-nkosazana-dlamini-zuma-coronavirus-covid-19-level-1-lockdown-regulations-18-sep>
132. Minister Naledi Pandor: Re-opening of borders and ports of entry for international travellers during Coronavirus Covid-19 epidemic lockdown level 1 [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/minister-naledi-pandor-re-opening-borders-and-ports-entry-international-travellers-during>
133. President Cyril Ramaphosa: Progress in the national effort to contain the Coronavirus Covid-19 pandemic [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-progress-national-effort-contain-coronavirus-covid-19-pandemic-11>
134. Statement by Minister Mbalula regarding alert Level 1 Regional and International travel [Internet]. 2020. Available from: [https://www.transport.gov.za/documents/11623/202739/ALERT\\_LEVEL1\\_October2020.pdf/90bc2c07-7a3f-4704-8a1a-24dd1b7bbdb2](https://www.transport.gov.za/documents/11623/202739/ALERT_LEVEL1_October2020.pdf/90bc2c07-7a3f-4704-8a1a-24dd1b7bbdb2)





## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

135. Summary Of Level 3 Regulations (as Of 29 December 2020) [Internet]. SA Corona Virus Online Portal. 2020 [cited 2022 Apr 26]. Available from: <https://sacoronavirus.co.za/2020/12/29/summary-of-level-3-regulations-as-of-29-december-2020/>
136. Summary Of Level 3 Regulations (as Of 01st February 2021) [Internet]. SA Corona Virus Online Portal. 2021 [cited 2022 Apr 26]. Available from: <https://sacoronavirus.co.za/2021/02/02/summary-of-level-3-regulations-as-of-01st-february-2021/>
137. Summary Of Level 3 Regulations (as Of 13th February 2021) [Internet]. SA Corona Virus Online Portal. 2021 [cited 2022 Apr 26]. Available from: <https://sacoronavirus.co.za/2021/02/13/summary-of-level-3-regulations-as-of-13th-february-2021/>
138. Summary Of Level 1 Regulations (as Of 01st March 2021) [Internet]. SA Corona Virus Online Portal. 2021 [cited 2022 Apr 26]. Available from: <https://sacoronavirus.co.za/2021/03/01/summary-of-level-1-regulations-as-of-01st-march-2021/>
139. Disaster Management Act: Regulations: Alert Level 3 During Coronavirus COVID-19 Lockdown (as Of 15th June 2021) [Internet]. SA Corona Virus Online Portal. 2021 [cited 2022 Apr 26]. Available from: <https://sacoronavirus.co.za/2021/06/15/disaster-management-act-regulations-alert-level-3-during-coronavirus-covid-19-lockdown/>
140. Disaster Management Act: Regulations: Alert Level 4 During Coronavirus COVID-19 Lockdown (as Of 28th June 2021) [Internet]. SA Corona Virus Online Portal. 2021 [cited 2022 Apr 26]. Available from: <https://sacoronavirus.co.za/2021/06/29/disaster-management-act-regulations-alert-level-4-during-coronavirus-covid-19-lockdown-as-of-28th-june-2021/>
141. Summary Of Level 2 Regulations (as Of 13th September 2021) [Internet]. SA Corona Virus Online Portal. 2021 [cited 2022 Apr 26]. Available from: <https://sacoronavirus.co.za/2021/09/12/summary-of-level-2-regulations-as-of-13th-september-2021/>
142. Summary Of Level 1 Regulations (as Of 01 October 2021) [Internet]. SA Corona Virus Online Portal. 2021 [cited 2022 Apr 26]. Available from: <https://sacoronavirus.co.za/2021/09/30/summary-of-level-1-regulations-as-of-01-october-2021/>
143. Summary Of Level 1 Regulations (as Of 30 December 2021) [Internet]. SA Corona Virus Online Portal. 2021 [cited 2022 Apr 26]. Available from: <https://sacoronavirus.co.za/2021/12/31/summary-of-level-1-regulations-as-of-30-december-2021/>





## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

144. Minister Blade Nzimande: Higher Education and Training response to Coronavirus Covid-19 epidemic lockdown level 1 [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/education-sector-response-covid-19-epidemic-lockdown-30-sep-2020-0000>
145. President Cyril Ramaphosa: Developments in Coronavirus Covid-19 response [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-developments-coronavirus-covid-19-response-3-dec-2020-0000>
146. Minister Zweli Mkhize confirms second wave with 6 709 more cases of Coronavirus COVID-19 [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/minister-zweli-mkhize-confirms-second-wave-6-709-more-cases-coronavirus-covid-19-9-dec-2020>
147. President Cyril Ramaphosa: Progress in national effort to contain Coronavirus Covid-19 pandemic [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-progress-national-effort-contain-coronavirus-covid-19-pandemic-0>
148. Minister Zweli Mkhize confirms 8 725 more cases of Coronavirus COVID-19 [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/minister-zweli-mkhize-confirms-8-725-more-cases-coronavirus-covid-19-18-dec-2020-0000>
149. President Cyril Ramaphosa: South Africa's progress in national effort to contain Coronavirus COVID-19 pandemic [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-south-africas-response-coronavirus-covid-19-pandemic-28-dec-2020>
150. President Cyril Ramaphosa: South Africa's progress in national effort to contain Coronavirus COVID-19 pandemic [Internet]. South African Government. 2021 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-south-africas-progress-national-effort-contain-coronavirus-covid>
151. South Africa School Holidays 2020 [Internet]. PublicHolidays.co.za. [cited 2022 Apr 24]. Available from: <https://publicholidays.co.za/school-holidays/2020-dates/>
152. Mafolo K. DM168 Feature: Relief and dismay at delayed school reopening [Internet]. Daily Maverick. 2021 [cited 2022 Apr 23]. Available from: <https://www.dailymaverick.co.za/article/2021-01-17-relief-and-dismay-at-delayed-school-reopening/>
153. President Cyril Ramaphosa: Developments in response to Coronavirus COVID-19 [Internet]. South African Government. 2021 [cited 2022 Apr 23]. Available from:



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

<https://www.gov.za/speeches/president-cyril-ramaphosa-developments-response-coronavirus-covid-19-1-feb-2021-0000>

154. President Cyril Ramaphosa: 2021 State of the Nation Address [Internet]. South African Government. 2021 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-2021-state-nation-address-11-feb-2021-0000>
155. President Cyril Ramaphosa: South Africa’s progress in national effort to contain COVID-19 pandemic [Internet]. South African Government. 2021 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-south-africas-progress-national-effort-contain-coronavirus-0>
156. President Cyril Ramaphosa: Developments in the country’s response to the Coronavirus COVID-19 pandemic [Internet]. South African Government. 2021 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-developments-country%E2%80%99s-response-coronavirus-covid-19-pandemic-30>
157. Minister Nkosazana Dlamini Zuma: Coronavirus Covid-19 alert level 1 amended regulations [Internet]. South African Government. 2021 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/covid-19-alert-level-1-amended-regulations-31-mar-2021-0000>
158. Responding to COVID-19 in Africa: Using data to find a balance (Part 3) [Internet]. Ipsos. 2021 [cited 2022 Apr 23]. Available from: <https://www.ipsos.com/en/responding-covid-19-africa-using-data-find-balance-part-3>
159. Minister Zweli Mkhize confirms total of 1 584 961 cases of Coronavirus COVID-19 [Internet]. South African Government. 2021 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/minister-zweli-mkhize-confirms-total-1-584-961-cases-coronavirus-covid-19-3-may-2021-0000>
160. President Cyril Ramaphosa: National effort to contain Coronavirus COVID-19 pandemic [Internet]. South African Government. 2021 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-national-effort-contain-coronavirus-covid-19-pandemic-30-may-2021>
161. President Cyril Ramaphosa: South Africa’s response to Coronavirus COVID-19 pandemic [Internet]. South African Government. 2021 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-south-africas-response-coronavirus-covid-19-pandemic-15-jun-2021>
162. President Cyril Ramaphosa: South Africa’s response to Coronavirus COVID-19 pandemic [Internet]. South African Government. 2021 [cited 2022 Apr 23]. Available from:



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

<https://www.gov.za/speeches/president-cyril-ramaphosa-south-africas-response-coronavirus-covid-19-pandemic-27-jun-2021>

163. Disaster Management Act: Regulations: Alert level 4 during Coronavirus COVID-19 lockdown [Internet]. South African Government. 2021 [cited 2022 Apr 23]. Available from: <https://www.gov.za/covid-19/about/coronavirus-covid-19-alert-level-4#closed>
164. Minister Blade Nzimande on plans for the post school education and training institutions on the Coronavirus COVID-19 adjusted level 4 lockdown with effect from monday 28 June 2021 [Internet]. South African Government. 2021 [cited 2022 Apr 24]. Available from: <https://www.gov.za/speeches/minister-blade-nzimande-plans-post-school-education-and-training-institutions-coronavirus>
165. President Cyril Ramaphosa: Progress in national effort to contain the Coronavirus COVID-19 pandemic [Internet]. South African Government. 2021 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-progress-national-effort-contain-coronavirus-covid-19-pandemic-1>
166. President Cyril Ramaphosa: South Africa’s response to Coronavirus COVID-19 pandemic [Internet]. South African Government. 2021 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-south-africas-response-coronavirus-covid-19-pandemic-25-jul-2021>
167. Disaster Management Act: Regulations: Alert level 3 during Coronavirus COVID-19 lockdown [Internet]. South African Government. [cited 2022 Apr 23]. Available from: <https://www.gov.za/covid-19/alert-level-3-coronavirus-covid-19-lockdown#closed>
168. Here are the updated return dates and plans for schools in South Africa. Business Tech [Internet]. 2021 Jul 16 [cited 2022 Apr 23]; Available from: <https://businesstech.co.za/news/government/506468/here-are-the-updated-return-dates-and-plans-for-schools-in-south-africa/>
169. President Cyril Ramaphosa: South Africa’s response to Coronavirus COVID-19 pandemic [Internet]. South African Government. 2021 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-south-africas-response-coronavirus-covid-19-pandemic-12-sep-2021>
170. Responding to Covid-19 in Africa: Finding the balance (Part 4) [Internet]. Ipsos. 2022 [cited 2022 Apr 23]. Available from: <https://www.ipsos.com/en/responding-covid-19-african-countries-wave-4>
171. President Cyril Ramaphosa: South Africa’s response to Coronavirus COVID-19 pandemic [Internet]. South African Government. 2021 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-south-africas-response-coronavirus-covid-19-pandemic-30-sep-2021>



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

172. Minister Joe Phaahla: South Africa's response to Coronavirus Covid-19 pandemic [Internet]. South African Government. 2021 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/minister-joe-phaahla-south-africas-response-covid-19-pandemic-8-oct-2021-0000>
173. Minister Joe Phaahla: Coronavirus COVID-19 Vaccination roll-out programme media briefing [Internet]. South African Government. 2021 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/minister-joe-phaahla-covid-19-vaccination-roll-out-programme-media-briefing-15-oct-2021>
174. Minister Joe Phaahla: COVID-19 vaccination roll-out programme media briefing | South African Government [Internet]. [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/remarks-dr-m-j-phaahla-minister-health-during-covid-19-vaccination-roll-out-programme-media>
175. President Cyril Ramaphosa: Address on South Africa's response to Coronavirus COVID-19 pandemic- 28 Nov [Internet]. South African Government. 2021 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-address-south-africas-response-coronavirus-covid-19-pandemic-28>
176. Labour on Temporary Employer-Employee Relief Scheme during Coronavirus COVID-19 lockdown [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/labour-temporary-employer-employee-relief-scheme-during-coronavirus-covid-19-27-mar-2020>
177. President Cyril Ramaphosa: Additional Coronavirus COVID-19 economic and social relief measures [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/president-cyril-ramaphosa-additional-coronavirus-covid-19-economic-and-social-relief>
178. Myeni T. 'Still looking for answers': South Africa reels from deadly riots. Al Jazeera [Internet]. 2021 Jul 19 [cited 2022 Apr 23]; Available from: <https://www.aljazeera.com/news/2021/7/19/still-looking-for-answers-south-africa-reels-from-deadly-riots>
179. Minister Lindiwe Zulu: Coronavirus COVID-19 economic and social measures [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/minister-lindiwe-zulu-coronavirus-covid-19-economic-and-social-measures-29-apr-2020-0000>
180. Informal Settlements in South Africa: Langrug Community [Internet]. Cape Town Project Centre. [cited 2022 Apr 23]. Available from: <https://wp.wpi.edu/capetown/projects/p2014/wash-up-business/background-research/informal-settlements-in-south-africa/>



## Policy Frameworks and Epidemiology of COVID-19 – South Africa Case Report

181. Minister Lindiwe Sisulu on interventions to curb the spread of Coronavirus COVID-19 [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/minister-lindiwe-sisulu-interventions-curb-spread-coronavirus-covid-19-25-mar-2020-0000>
182. Serebrin J. In South Africa's cities, evictions are happening despite a national ban. City Monitor [Internet]. 2020 Aug 7 [cited 2022 Apr 23]; Available from: <https://citymonitor.ai/environment/south-africas-cities-evictions-are-happening-despite-national-ban-5226>
183. Cocks T, Roelf W. Mixed blessing for some, as South Africa shelters homeless in schools, stadiums. Reuters [Internet]. 2020 Apr 16 [cited 2022 Apr 23]; Available from: <https://www.reuters.com/article/us-health-coronavirus-safrica-homeless-idUSKCN21Y1UC>
184. Correctional Services activates containment and treatment as Coronavirus COVID-19 cases increase [Internet]. South African Government. 2020 [cited 2022 Apr 23]. Available from: <https://www.gov.za/speeches/correctional-services-activates-containment-and-treatment-coronavirus-covid-19-cases>
185. Masuabi Q. Bheki Cele: 'I wish alcohol ban could be extended beyond lockdown' | Citypress. City Press [Internet]. 2020 Apr 5 [cited 2022 Apr 27]; Available from: <https://www.news24.com/citypress/News/bheki-cele-i-wish-alcohol-ban-could-be-extended-beyond-lockdown-20200405?isapp=true>
186. Newham G, du Plessis A. How might the Covid-19 lockdown affect public safety in SA? [Internet]. Daily Maverick. 2020 [cited 2022 Apr 27]. Available from: <https://www.dailymaverick.co.za/article/2020-04-06-how-might-the-covid-19-lockdown-affect-public-safety-in-sa/>

