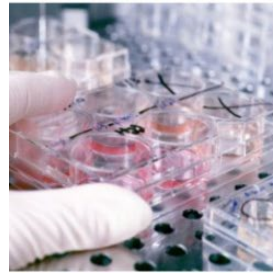




**NATIONAL HEALTH  
LABORATORY SERVICE**



# **The NHLS and the National Emergency Response to COVID-19 pandemic**

**Koleka Mlisana**

**NIOH COVID-19 Centenary Webinar**

**21 April 2022**

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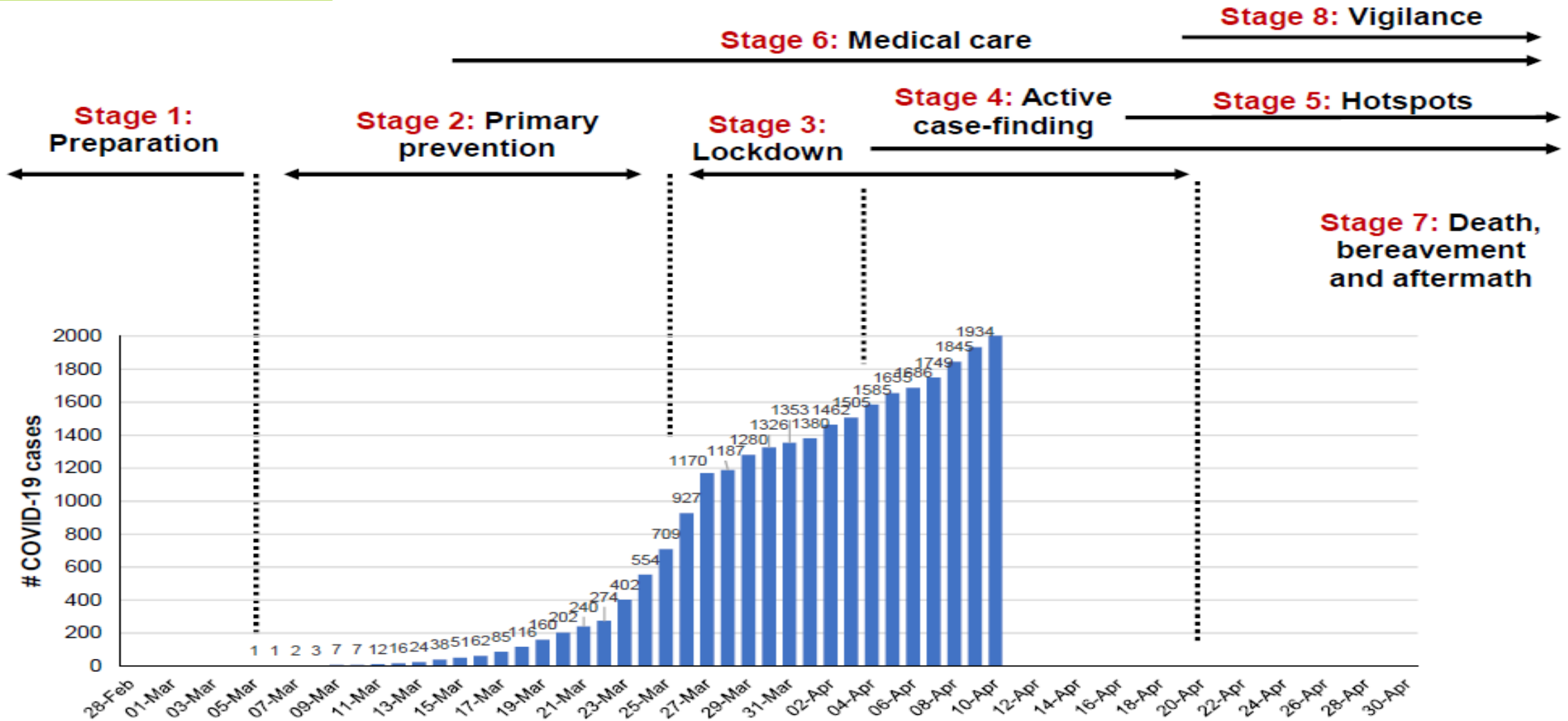
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# Objective of the South African COVID-19 Response Strategy

**“To stop the chain of transmission, thus  
reducing the morbidity and mortality due to  
COVID-19”**



# Stages of South Africa's COVID-19 Response



**Stage 1 (Preparation):** Upscaling healthcare and testing capacity

**Stage 2 (Primary Prevention):** Declaration of National State of Disaster

**Stage 3 (Strict Lockdown):** Restriction in Movement and social interaction

**Stage 4 (Active Case Finding):** Large-Scale Community Screening and Testing Programme

**Stage 5 (Hotspot Identification):** Identification and control of localised outbreaks

**Stage 6 (Medical Care):** Provision of medical care to infected individuals

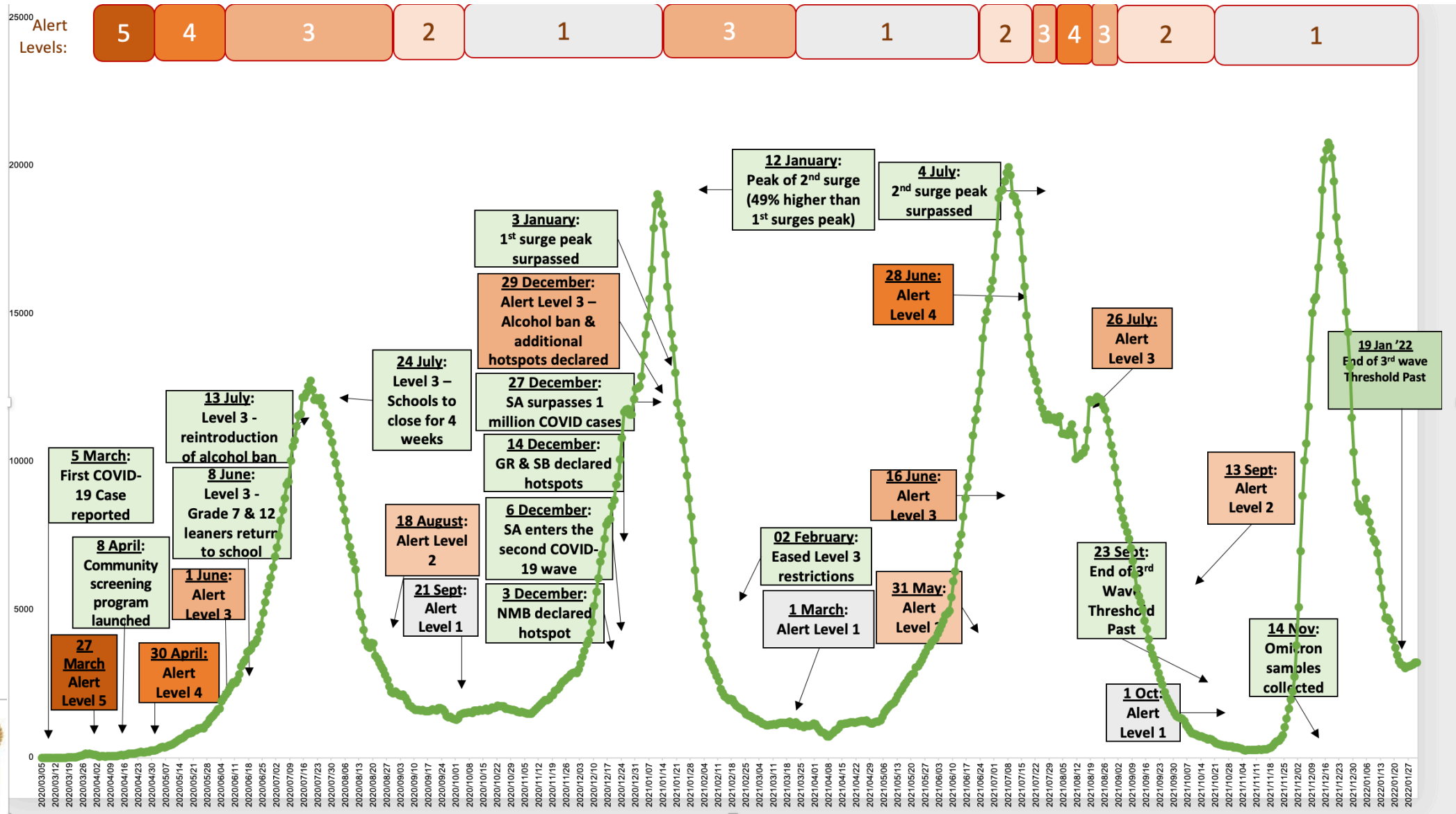
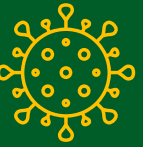
**Stage 7 (Death and Bereavement):** Preparation for deaths and burials

**Stage 8 (Vigilance):** Case finding, genomic surveillance and monitoring population immunity

**Stage 9 (Vaccination):** Roll-out of the national vaccination programme


**Stage 10 (Integration):** Integration of COVID-19 into routine healthcare programmes

# COVID-19 in South Africa: Overview of Case Trend with Events



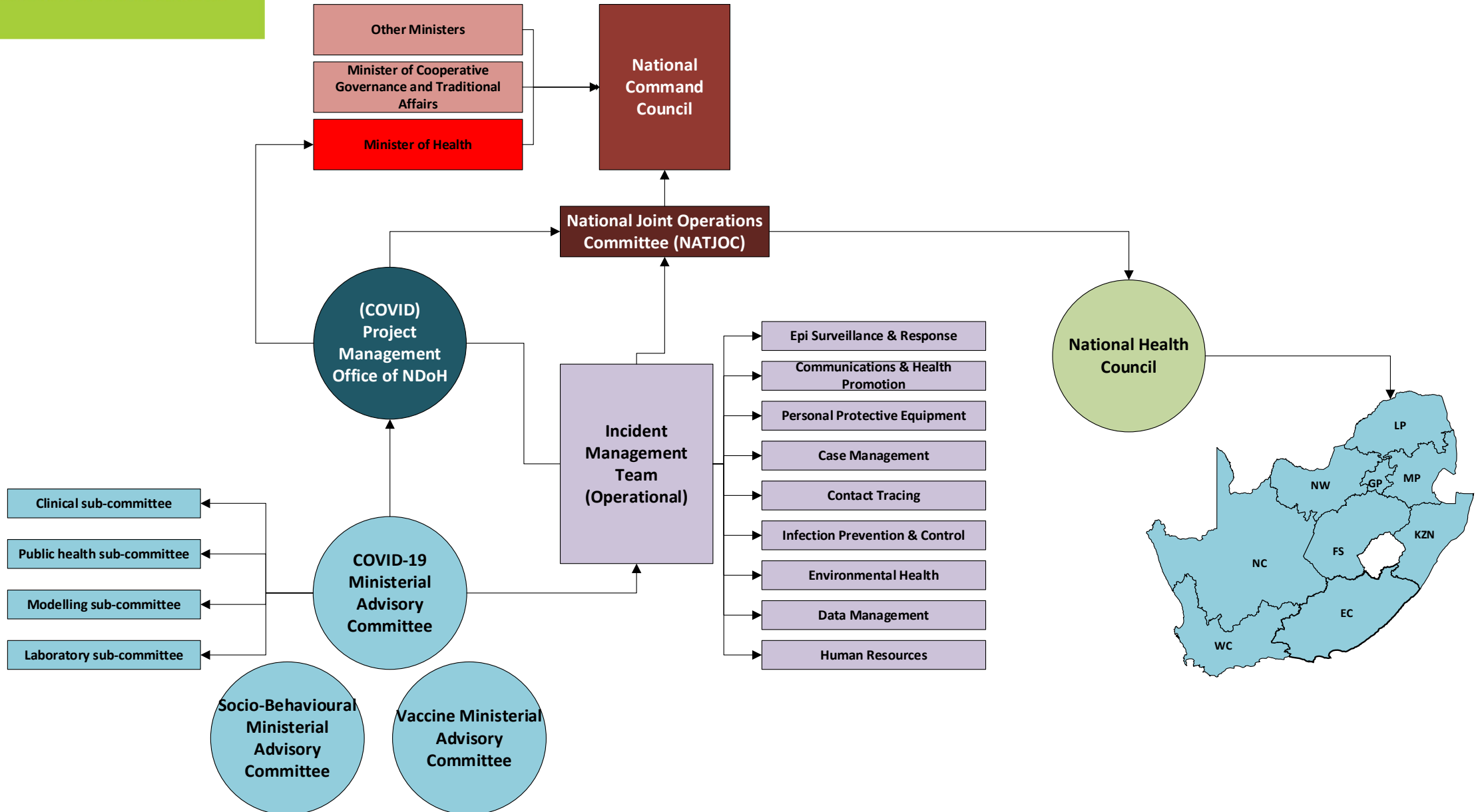


# Risk-Adjusted Strategy

<b>ALERT LEVEL 5</b>	<b>ALERT LEVEL 4</b>	<b>ALERT LEVEL 3</b>	<b>ALERT LEVEL 2</b>	<b>ALERT LEVEL 1</b>
 <b>OBJECTIVE</b>				
<b>Drastic measures to contain the spread of the virus and save lives.</b>	<b>Extreme precautions to limit community transmission and outbreaks, while allowing some activity to resume.</b>	<b>Restrictions on many activities, including at workplaces and socially, to address a high risk of transmission.</b>	<b>Physical distancing and restrictions on leisure and social activities to prevent a resurgence of the virus.</b>	<b>Most normal activity can resume, with precautions and health guidelines followed at all times.  Population prepared for an increase in alert levels if necessary.</b>



# Key Structures in the COVID-19 Response

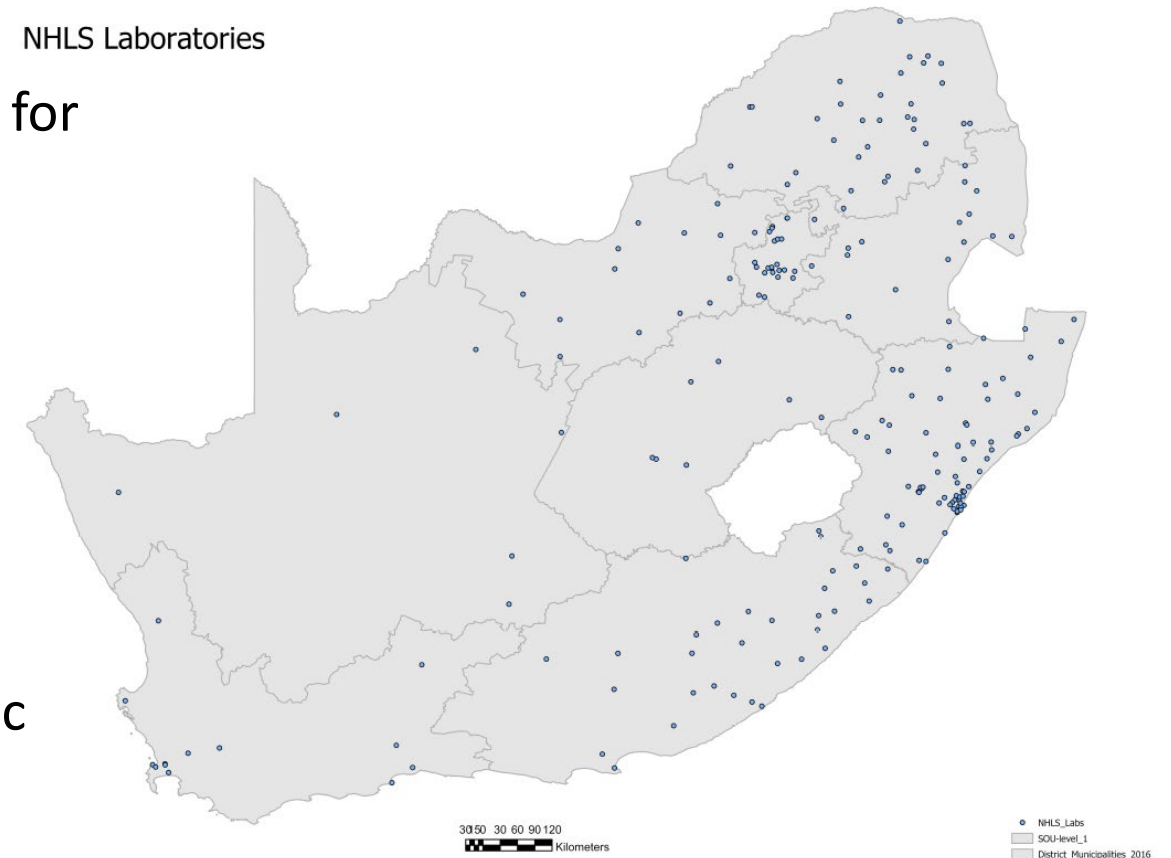




# COVID-19 Testing Roll-Out in the NHLS

- Initial testing was performed in the National Institute for Communicable Disease (NICD)
  - Mainly for surveillance and initial containment steps
- NHLS service laboratories started testing on 9 March 2020 in 16 laboratories across South Africa's nine provinces:
  - Nine virology laboratories
  - Seven other laboratories
- Variety of conventional and automated PCR diagnostic platforms
- Roll-out of COVID-19 testing was preceded by training and assay verifications
- Currently 130 NHLS laboratories (**including mobile**) conduct COVID-19 testing

NHLS Laboratories







# Objectives of the Testing Strategy

- **Prevent** the spread of COVID-19
- **Identify** hotspot areas for targeted intervention based on COVID-19 burden
- **Screen** the population in identified hotspot areas for COVID-19
- **Test** those individuals who screen positive as per the person under investigation criteria, prioritising vulnerable groups
- **Trace** all confirmed COVID-19 cases and their contacts. Isolate or Quarantine positive cases either at home or in identified isolation facilities, when home circumstances do not allow for self-isolation/quarantine
- **Strengthen** effective information and surveillance systems in COVID-19 high burden areas
- **Communication** of risk to reduce the spread and its impact



# Key Considerations in Planning

- Diagnostic capacity needed to address increasing and unforeseen demands
- Immediate resource expansion, usage optimisation and sharing was required. This includes:
  - Human Resources;
  - Equipment – HIV Viral load and TB diagnostic platforms
  - Reagents and Kits
  - Personal Protective Equipment
  - Transportation and sample transfer capacity
- Adaptable communication strategies and information accessibility
- Maximising capacity and upscaling services by identifying additional resources and crafting a seamless capacity integration plan



# Key Challenges to scaling up testing

- Inadequate in-country capacity (testing platforms and human resources)
- Local and global supply-demand constraints on reagents and test kits (RNA extraction kits in particular)
- Large-scale community screening programme overwhelmed laboratories
- Restrictive testing criteria in public-sector clinics and hospitals

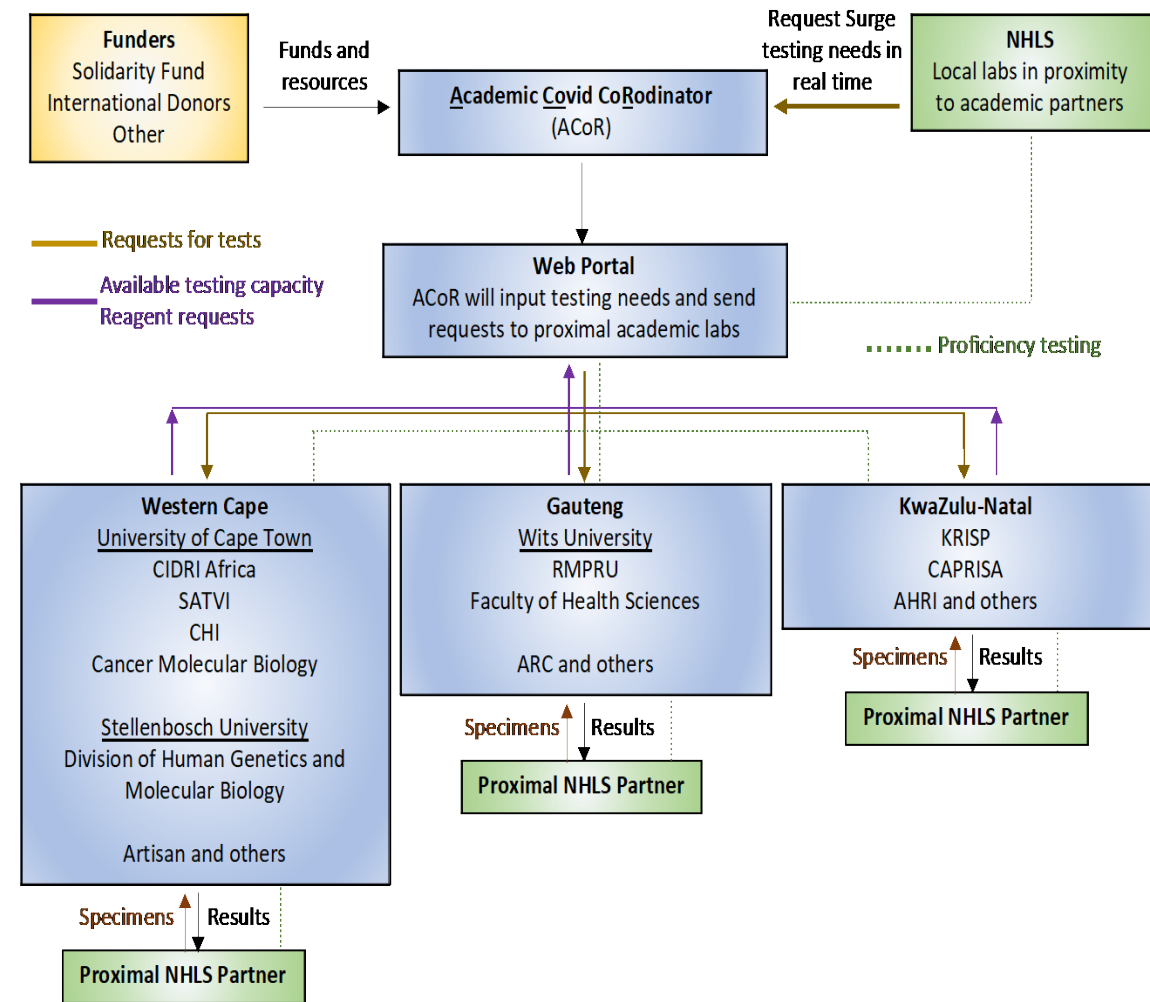


# Dealing with supply constraints

- Procurement of automated high throughput extraction platforms and extraction kits/consumables
- Introduction of multiple testing platforms
- Continuous engagement of suppliers to negotiate increased test kits allocation
- Activation of surge plan to include academic and research labs as referrals for NHLS tests
- Referrals of tests to private labs to reduce backlogs
- Priority clearance of COVID goods at ports of entry – customs & port health
- Review of testing protocol and prioritizing of samples to be tested
- Introduction of rapid antigen tests

# Mobilising Additional Laboratory Capacity

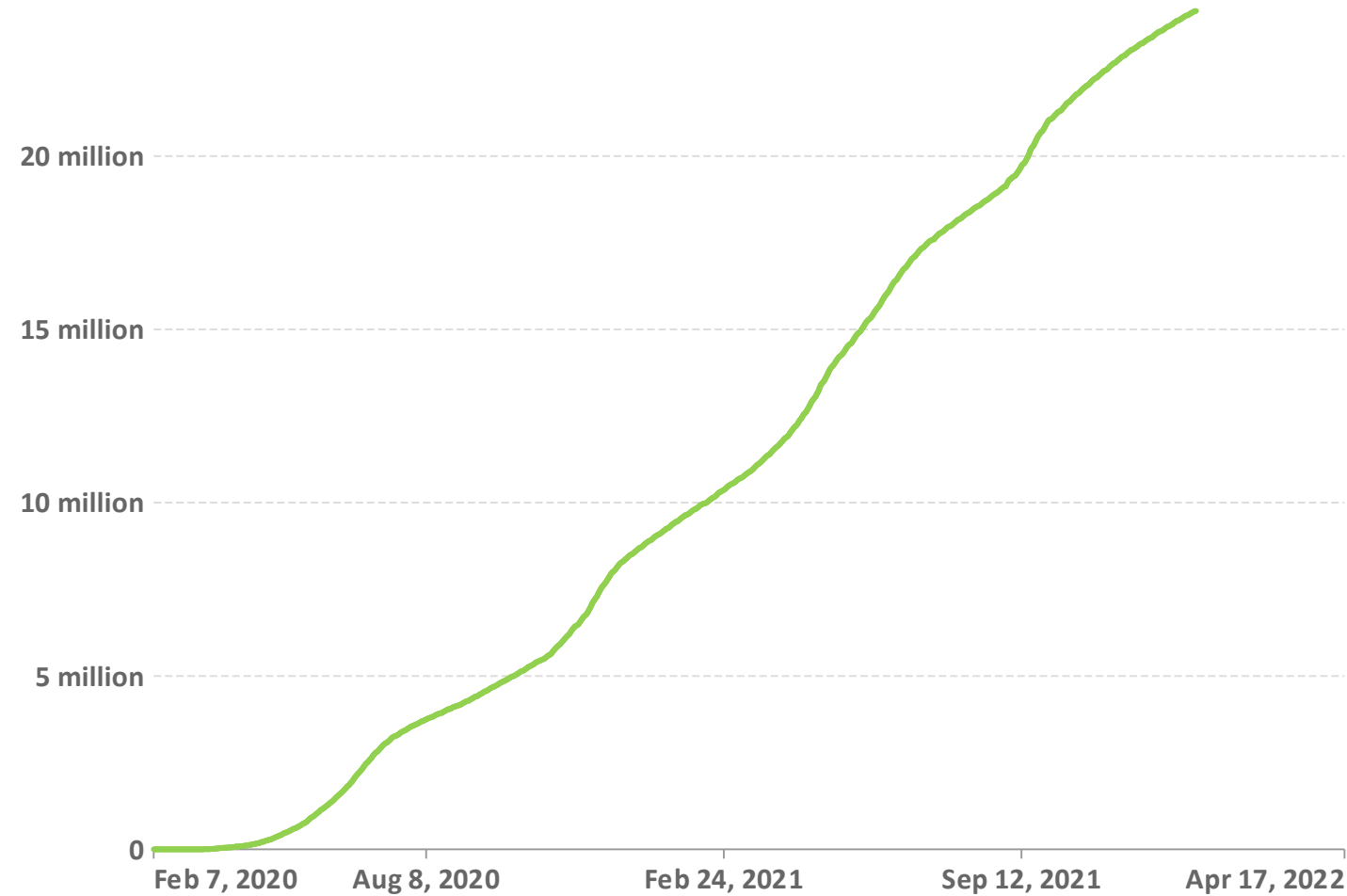
- NHLS approached academic and research laboratories, and other private-sector laboratories with the capability or potential to be up-scaled for SARS-CoV-2 testing
- Assessed and prepared them as standby for use when demand for testing exceeds available NHLS testing capacity
- Laboratories underwent a series of preparatory steps, including:
  - a rapid capacity assessment,
  - quality assurance assessment,
  - design of customised standard operating procedures
  - Assay validation



# COVID-19 Testing in South Africa

- **24 198 159** COVID-19 tests conducted as at 17 April 2022
  - Private Sector: 13 173 306
  - Public Sector: 11 039 688

**4 077 588** positive tests



Source: Official data collated by Our World in Data

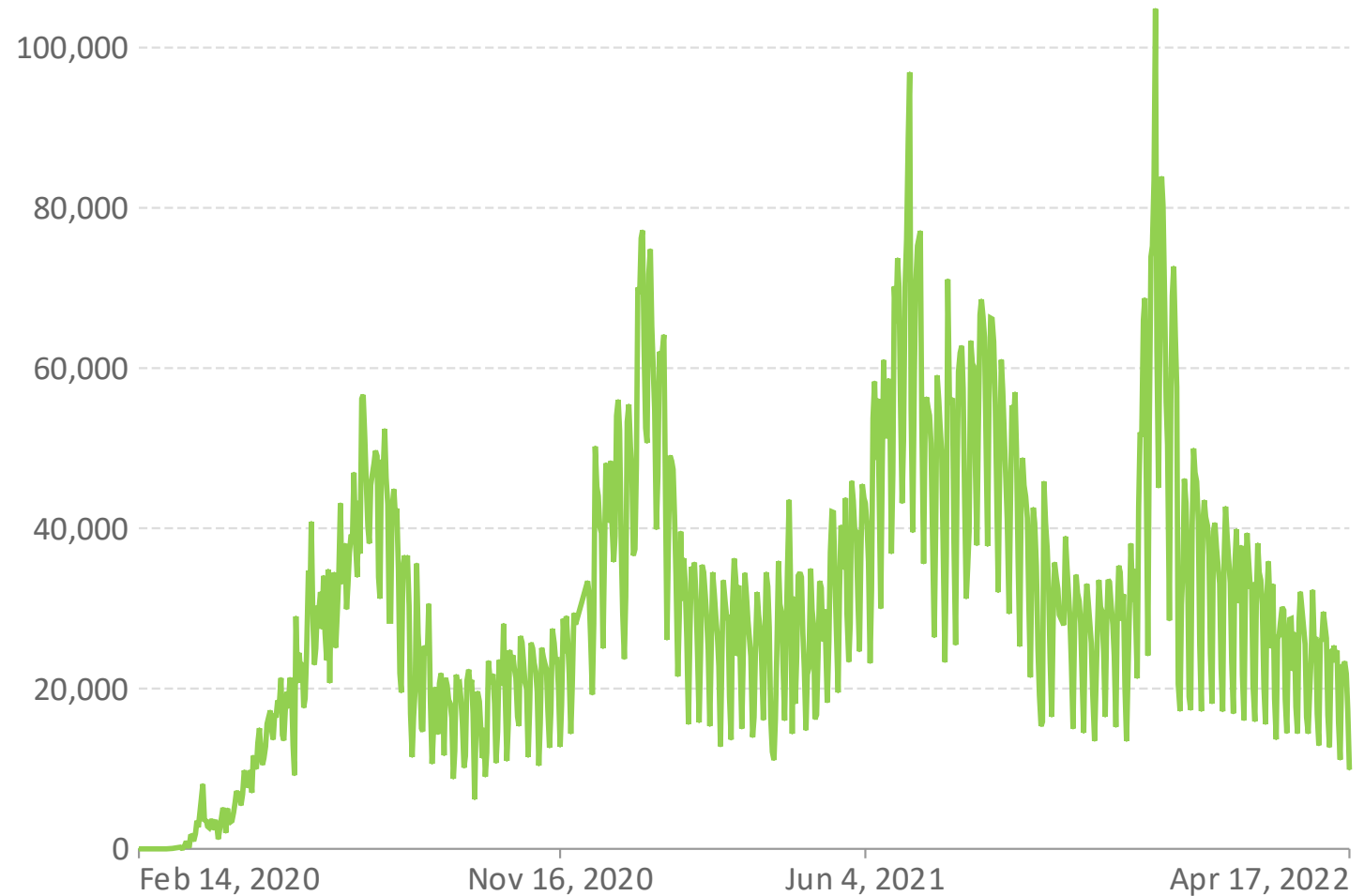


# Daily COVID-19 Test Numbers in the NHLS

Peak testing reached during the fourth wave of infections

Highest number of tests reported on 11 December 2021:

**104 831**

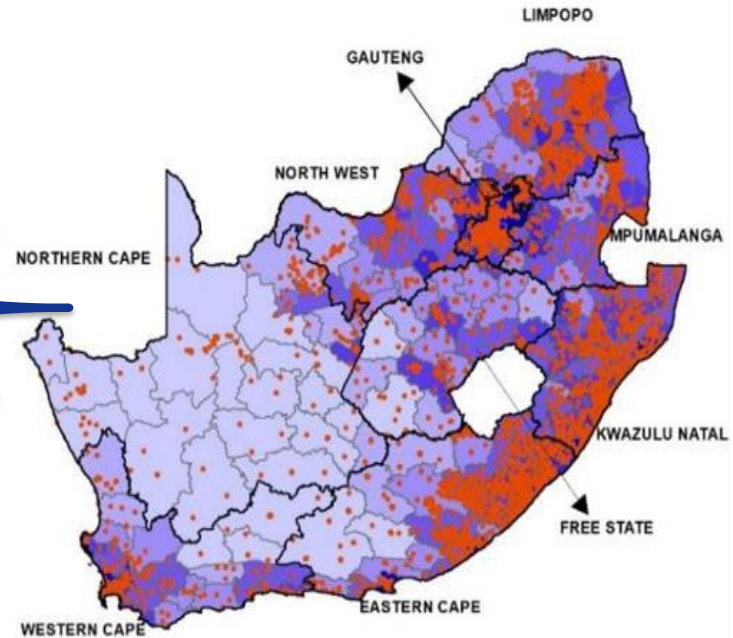


# Leveraging existing molecular footprint and single laboratory information system: *>15 years ongoing monitoring HIV & TB*

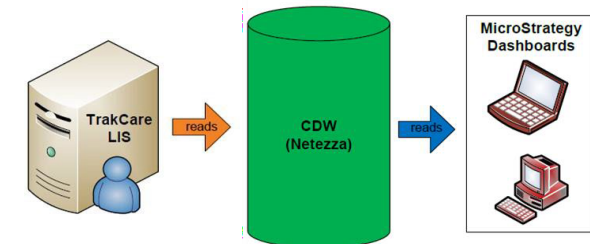
- >6million HIV VL/an
- >600 000 EID/an
- >2.3million molecular Gx/an



LABORATORY TESTING PLATFORMS



1 episode number  
1 laboratory test result  
(multiple test variables)

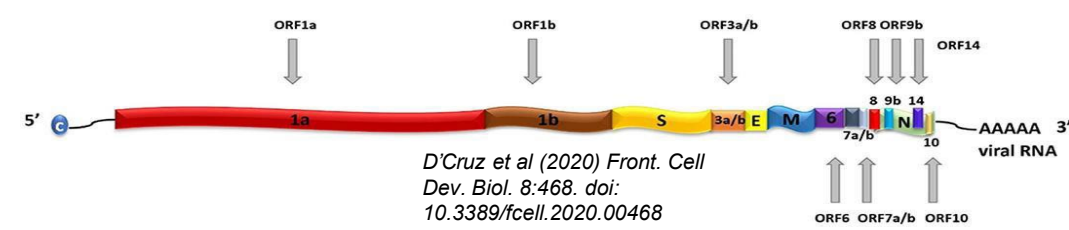


- *Data transformation, mapping and cleaning post test authorization (~2 day lag)*
- *“Big data” takes power and time to analyse*
- *Near-real time data analysis for NPP operations and program management*



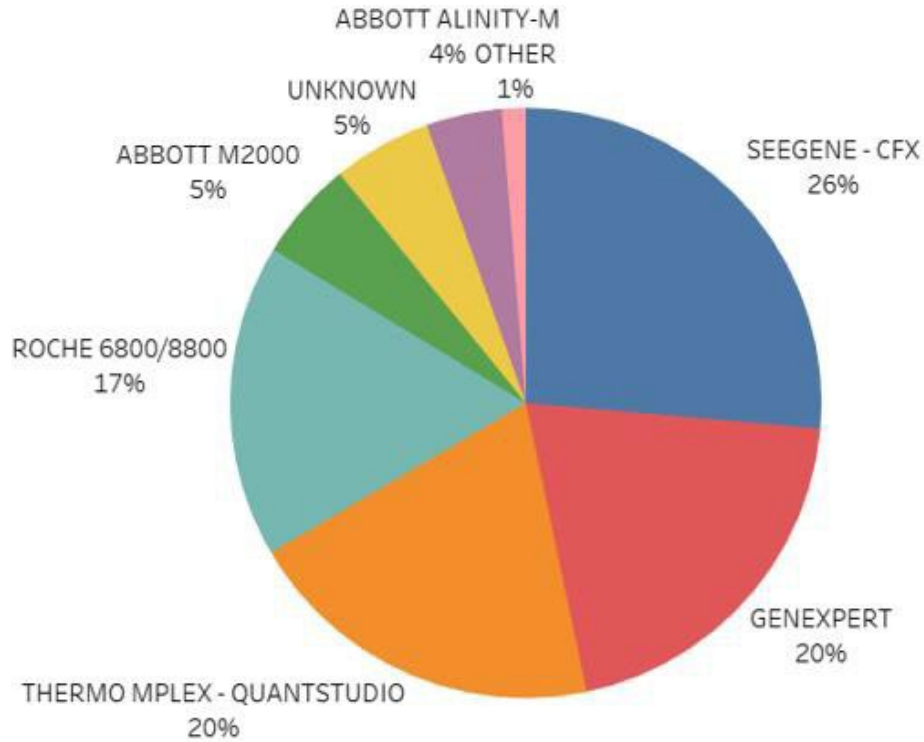
# NHLS SARS-CoV-2 testing platforms

*n=6,820,970 (data extract 30<sup>th</sup> November 2021)*



RdRp, N

Six assays generate **90% test results**.  
Distribution variable by province



RdRp, N



RdRp/S\*, N, E

*\*may include S, data undistinguishable*



N2, E

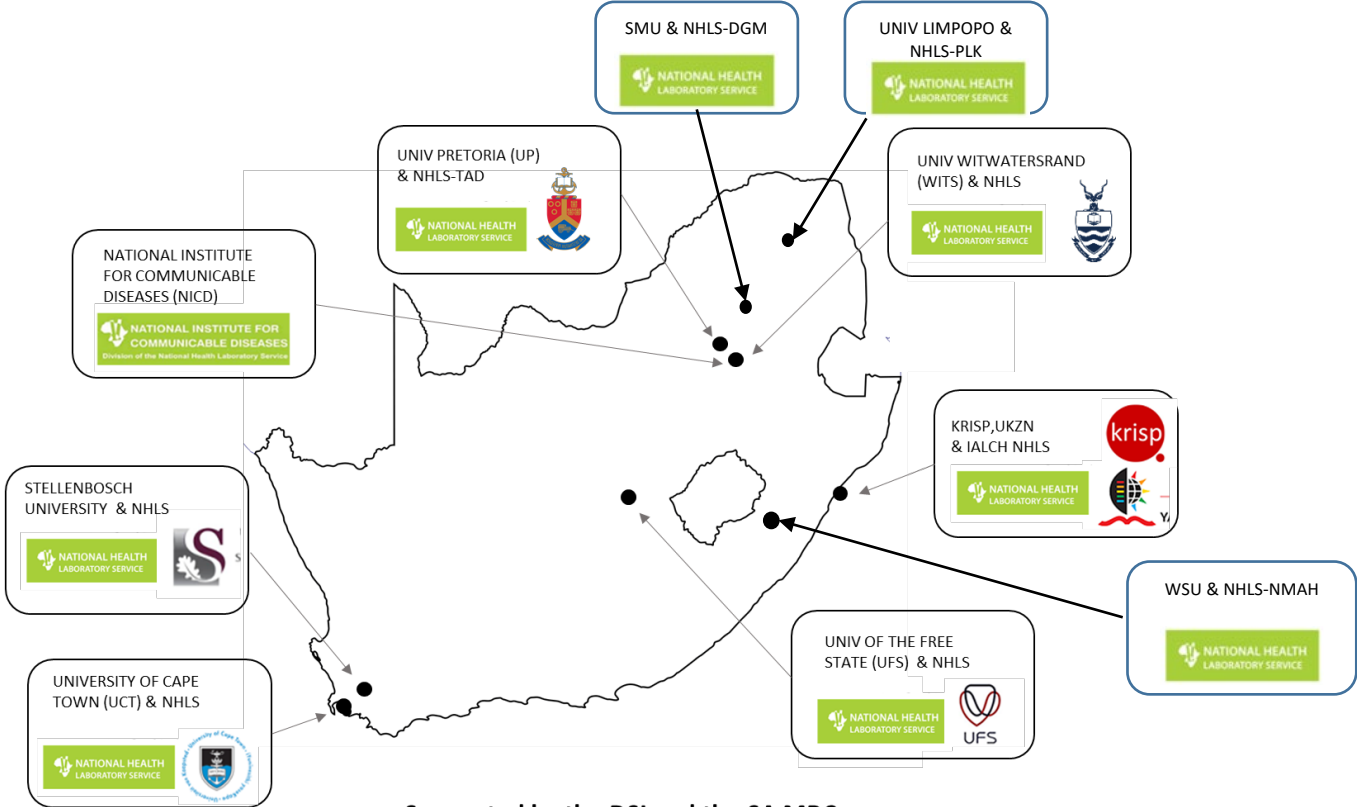


Orf1ab, E

Orf1ab, N, S



# Network for Genomic Surveillance South Africa (NGS-SA)



Supported by the DSI and the SA MRC  
 Msomi N. Mlisana K. et al. Lancet Microbe 2020





# Role of the NICD

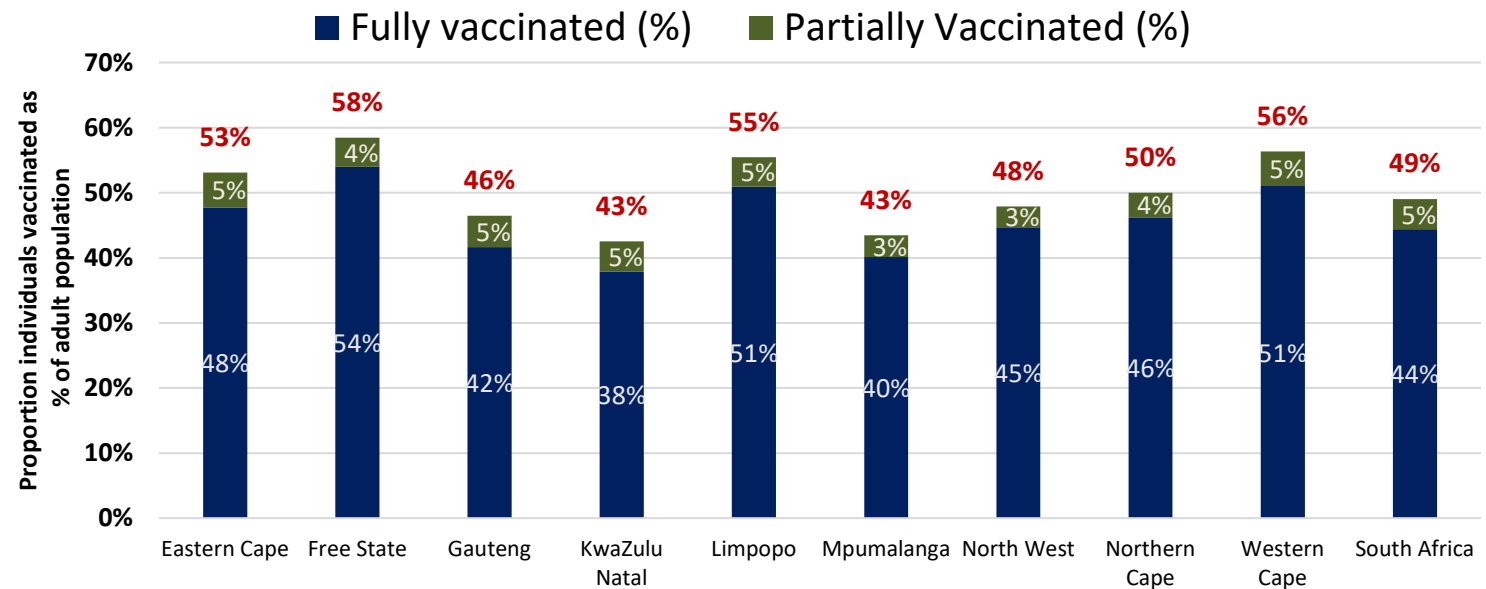
- Pivotal role in the surveillance of and response to the COVID-19 pandemic by:
  - Daily and weekly epidemiological reports
  - Support to the provincial and national departments of health
  - Technical support to districts/sub-districts
- DATCOV Hospital Surveillance System provides daily reports on COVID-19 hospitalizations and deaths
- SOP for the collection and reporting of Laboratory-confirmed COVID-19 deaths
- NICD provincial Epidemiologists providing daily and weekly provincial COVID-19 situational reports



# Vaccination Programme

- Public-Private Partnership to enable equitable access
- Government is the sole purchaser of vaccines and distributes to provinces and private-sector
- Two types currently administered
  - Pfizer-BioNTech
  - Johnson & Johnson
- **34 366 442** doses administered to date and **19 558 347** individuals vaccinated
- Challenge of vaccine hesitancy continues

Proportion of individuals vaccinated as % of adult population as of – 13 April 2022



# Impact of COVID-19 on Healthcare Services in South Africa

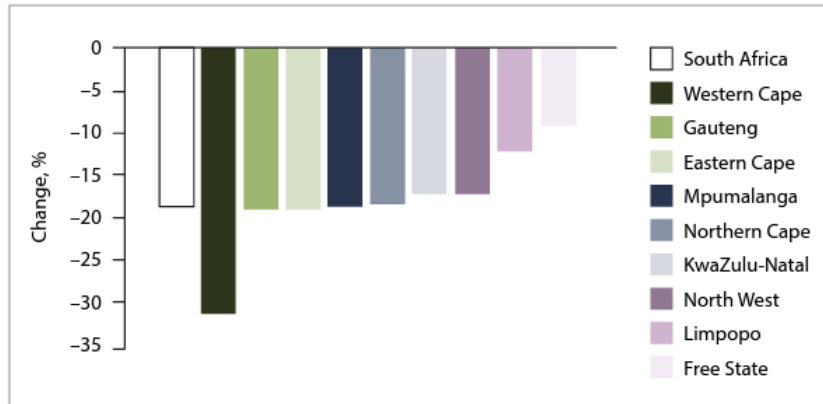


Fig. 2. Changes in numbers of patient visits between March and December 2019 and 2020.

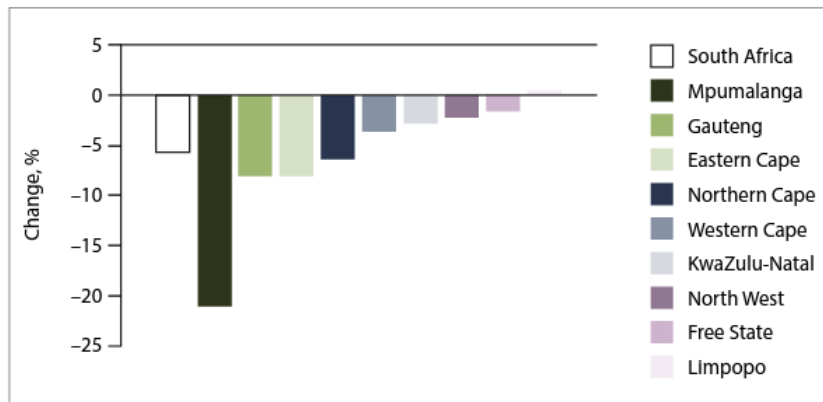


Fig. 3. Changes in contraceptive methods prescribed between March and December 2019 and 2020.

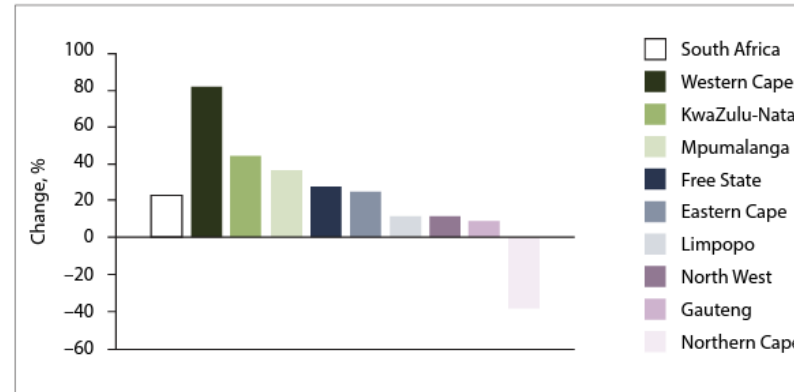


Fig. 6. Changes in maternal deaths in public health facilities between March and December 2019 and 2020.

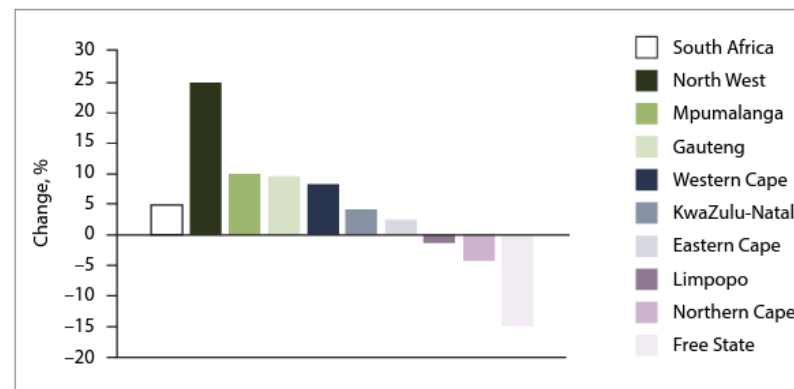


Fig. 7. Changes in institutional neonatal deaths in public health facilities between March and December 2019 and 2020.

## HEALTHCARE DELIVERY

### Impact of COVID-19 on routine primary healthcare services in South Africa

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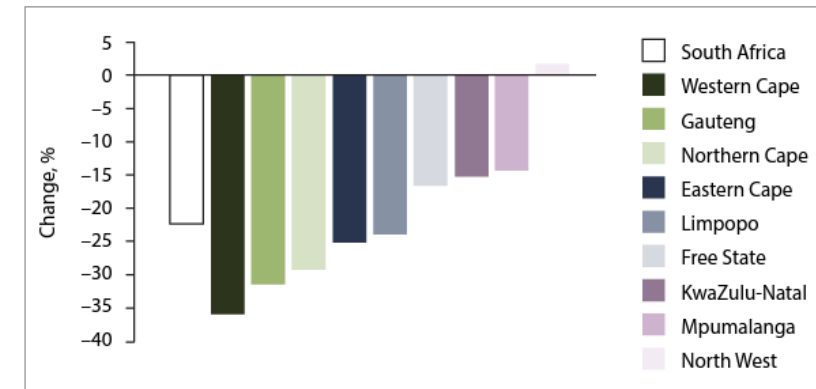


Fig. 9. Changes in HIV tests done in public health facilities between March and December 2019 and 2020.

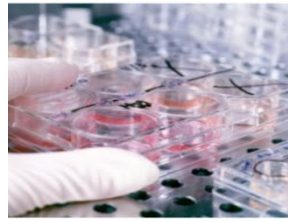


# Lessons Learned

- Importance of working together – share kits and assist with backlog
  - Collaboration of SA researchers – genomic surveillance
- Public-Private Partnerships yield good public health outcomes
- Proximity of scientists to policymakers resulting in informed evidence-based policies
- Early adoption of scientific advice results in better control of emerging health threats
- We must not lose sight of other health problems while responding to emerging health threats – importance of integrating the COVID-19 services into the mainstream health services



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Acknowledgements.....

Maanda Mudau

Thank you!!