SA’s Covid-19 epidemic: Trends & Next steps

Prepared for Minister of Health Zweli Mkhize

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Outline

**Part 1: The Coronavirus epidemic**
- The Coronavirus epidemic in South Africa
- Why is South Africa not on the expected Covid epidemic trajectory?
- How much community transmission in SA?
- Some future epidemic scenarios

**Part 2: South Africa’s Covid-19 response**
- Stages of the SA Covid-19 response
- Next steps: Stopping small flames to reduce the risk of raging fires
- Conclusion
The first million cases of Covid-19

Wuhan seafood market

Data correct as of 3 April 2020

Source: Nature 2020

Confirmed cases (thousands)

- 500,000 cases
- World Health Organization calls pandemic
- 100,000 cases
- Lockdowns start in Europe
- First genetic sequence available
- China lockdowns start
- Lockdowns start lifting in China

Source: Nature 2020
Country level epidemic trajectories
SA’s SARS-CoV-2 epidemic - 1

Cumulative number of cases

# COVID-19 cases


0 500 1000 1500 2000 2500

SA’s SARS-CoV-2 epidemic - 2
Trends in cumulative cases

# COVID-19 cases

0 500 1000 1500 2000 2500 3000 3500 4000

19-Feb 29-Feb 10-Mar 20-Mar 30-Mar 09-Apr

# COVID-19 cases

19-Feb 29-Feb 10-Mar 20-Mar 30-Mar 09-Apr
SA’s SARS-CoV-2 epidemic - 3

Trends in new cases
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Covid-19 cases - SA vs UK
SA’s expected vs actual trajectory

Source: Tulio de Oliveira & UKZN CoV Big Data Consortium
SA’s epidemic trajectory is unique…

Why is SA different - new cases declining to a plateau:
- Are we missing cases due to low or declining testing coverage?
- Are there missing cases in poor communities due to skewed higher private lab testing?
- Is the reduction genuine and due to the interventions in SA’s Covid-19 response?

Diagram source: Tulio De’ Oliviera & KZN CoV Big Data Consortium
Trends in cumulative private & NHLS Covid-19 tests show steady increase

Covid-19 cases have declined in the last 2 weeks while NHLS test numbers increased ie. while testing in people and communities without medical aid increased

Note: Overall testing is still below the target of 10-15,000 / day
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The 3 waves of the SA epidemic

Expected situation

Actual situation

- Travelers
- Contacts and nosocomial transmissions
- Community transmission
Why did SA not follow the expected epidemic curve?

• First & second waves did not bridge spread effectively into the general community
  • No exponential increase in cases
  • If $R_o > 1$ daily average cases each fortnight/week would go up
  • Infectiousness is ~2 weeks - fortnight average of 65 cases/day before and 72 cases/day after lockdown suggests $R_o \sim 1$ around lockdown (Note: all cases are infections before lockdown)
  • No evident national increases in acute respiratory distress (may have some pockets)

• If community transmission is low, cases decline

• If community transmission is increasing then cases will increase and exponential curve will start again
Where is the highest risk of community transmissions in SA?
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So what’s next?

Unlikely scenario

Likely scenario
Delayed exponential curve

Predicted lockdown impact in India and Wuhan

India

Wuhan
A difficult truth…

Can SA escape the worst of this epidemic? Is exponential spread avoidable?

• No! Not unless SA has a special protective factor (mojo) not present anywhere else in the world

• Our population will be at high risk again after the lockdown
  • Infectiousness period includes 4-7 days before symptoms ie. people can spread it without knowing
  • The virus spreads too fast normally

• Government interventions have slowed viral spread, the curve has been impacted and we have gained some time
Why the delay is important?

• Time to flatten the curve even more
• South Africa has a unique component to its response, ie. active case finding
• Only South Africa has >28,000 community health care workers going house-to-house in vulnerable community for screening & testing to find cases
• New quicker and simpler diagnostics becoming available
• New treatments become available
• Time to prepare for the medical care needs
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Current stages of SA’s response

Stage 1: Preparation
• Community education
• Establishing lab capacity
• Surveillance

Stage 2: Primary prevention
• Social distancing & hand-washing
• Closing schools and reduced gathering
• Close the borders to international travel

Stage 3: Lockdown
• Intensifying curtailment of human interaction

Stage 4: Surveillance & active case-finding
• The Community response: door-to-door screening, testing, isolation and contact tracing
Stages of SA’s COVID-19 response

Stage 1: Preparation
Stage 2: Primary prevention
Stage 3: Lockdown
Stage 4: Active case-finding
Stage 5: What’s next

# COVID-19 cases
What should we do this week?
Follow the lockdown rules and monitor community transmission by average daily cases & community positivity/screened

Average daily Covid-19 cases last week = 67 (95% Confidence interval: 45-89)

State of Disaster
Lockdown

Next week?
Community transmission levels to guide next steps & the lockdown

• By 18\textsuperscript{th} April, will know if community transmission interpretation accurate (~67 cases/day; CI: 45 - 89)

• Epidemiological ($R_o$) criterion for lockdown - if average daily cases (- active screening) from 10 – 16 April is:
  • 90+, then continue lockdown
  • 45 - 89 AND CHW rate is >0.1% then continue lockdown
  • 45 - 89 AND CHW rate is ≤0.1% then ease lockdown
  • ≤ 44, then ease lockdown

• Expect large daily variations & some increases in +ve tests due to active case-finding (passive vs active cases)

• Abrupt return may increase spread – plan the systematic easing of the lockdown over several days:
  • Stepwise approach to reduce risk of rapid transmission taking economic imperatives & social disruption into consideration
Next stages of South Africa’s response

Stage 5: Hotspots
- Surveillance to identify & intervene in hotspots
- Spatial monitoring of new cases
- Outbreak investigation & intervention teams

Stage 6: Medical Care (for the peak)
- Surveillance on case load & capacity
- Managing staff exposures and infections
- Building field hospitals for triage
- Expand ICU bed and ventilator numbers

Stage 7: Bereavement & the Aftermath
- Expanding burial capacity
- Regulations on funerals
- Managing psychological and social impact

Stage 8: Ongoing Vigilance
- Monitoring Ab levels
- Administer vaccines, if available
- Ongoing surveillance for new cases
Stages of SA’s COVID-19 response

- **Stage 1:** Preparation
- **Stage 2:** Primary prevention
- **Stage 3:** Lockdown
- **Stage 4:** Active case-finding
- **Stage 5:** Hotspots
- **Stage 6:** Medical care
- **Stage 7:** Death, bereavement and aftermath
- **Stage 8:** Vigilance

# COVID-19 cases

- 0
- 200
- 400
- 600
- 800
- 1000
- 1200
- 1400
- 1600
- 1800
- 2000

- 26-Feb
- 01-Mar
- 03-Mar
- 05-Mar
- 07-Mar
- 09-Mar
- 11-Mar
- 13-Mar
- 15-Mar
- 17-Mar
- 19-Mar
- 21-Mar
- 23-Mar
- 25-Mar
- 27-Mar
- 29-Mar
- 31-Mar
- 02-Apr
- 04-Apr
- 06-Apr
- 08-Apr
- 10-Apr
- 12-Apr
- 14-Apr
- 16-Apr
- 18-Apr
- 20-Apr
- 22-Apr
- 24-Apr
- 26-Apr
- 28-Apr
- 30-Apr

(Bar chart showing the timeline of COVID-19 cases from February to April with key dates and numbers indicated on the x-axis.)
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Stage 8: Vigilance / surveillance

• Need to stay one step ahead of viral spread and not wait for patients to arrive in hospitals to act

• 3 components to surveillance:
  • Ongoing CHW house-to-house screening and testing especially in vulnerable communities
  • One day each month – health worker surveillance
  • One day each month - National surveillance day for schools, mines, prisons & big companies
  • For now self-taken swabs (later change to fingerprick) from a small sample of people in each setting
Major concerns for stage 6 –
The medical care response

- Poor health care access = ↑ deaths (NY)
- Need an effective ambulance system
- HIV+ (not on ART) & TB patients may ↑ severity
- Both Covid & Flu epidemics intermingled
- Need a voluntary partial lockdown until end September just for old people (>70 or >60) and those with co-morbidities to reduce exposure
- Field hospitals for triage, mainly in big cities
- Getting staff ready for the exponential curve, hospitals with makeshift ICUs, more ventilators & PPE
Conclusions

• SA has a unique epidemic trajectory

• Current trajectory due to curtailed community transmission from effective early interventions

• The exponential curve is almost inevitable

• Lockdown bought SA some time (about 4 to 6 weeks) and will likely reduce peak case load (flattened curve)

• Systematic approach to keeping infection rates low while easing lockdown in stages

• Focus shifts to Stage 5 of hotspot identification and intervention (fighting flames before they become fires), to Stage 6 – preparing for peak medical care response & Stage 8 – Vigilance & national surveillance
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• The Ministerial Advisory Committee for Covid-19

• The National Covid Command Council

• All the hard-working people tackling the Coronavirus epidemic, especially health care workers on the frontline