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

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

Data correct as of 3 April 2020

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

Cumulative number of cases

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<tr>
<th>Date</th>
<th>Cases</th>
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<tr>
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SA’s SARS-CoV-2 epidemic - 2

Trends in cumulative cases
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

- Travelers
- Contacts and nosocomial transmissions
- Community transmission

Expected situation

Actual situation
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 $R_0 > 1$ daily average cases each fortnight/week would go up
  - Infectiousness is $\sim$2 weeks - fortnight average of 65 cases/day before and 72 cases/day after lockdown suggests $R_0 \sim 1$ 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

LOCKDOWN IMPACT
India has enforced a 21 day lockdown that will end on April 15. How much will this bring down the infection count?

Single hard lockdown

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

State of Disaster

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

Next week?

<table>
<thead>
<tr>
<th>Week</th>
<th>Average number COVID19 cases per week</th>
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<tbody>
<tr>
<td>06 Mar - 12 Mar</td>
<td>2</td>
</tr>
<tr>
<td>13 Mar - 19 Mar</td>
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<td>20 Mar - 26 Mar</td>
<td>110</td>
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<td>27 Mar - 02 Apr</td>
<td>76</td>
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<tr>
<td>03 Apr - 09 Apr</td>
<td>67</td>
</tr>
<tr>
<td>10 Apr – 16 Apr</td>
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</table>
Community transmission levels to guide next steps & the lockdown

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

• Epidemiological ($R_0$) 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

Field hospital in Central Park, New York
Stages of SA’s COVID-19 response:

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

# COVID-19 cases

0 200 400 600 800 1000 1200 1400 1600 1800 2000

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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
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