

# SA's Covid-19 epidemic: Trends & Next steps

Prepared for Minister of Health Zweli Mkhize



health

---

Department:  
Health  
REPUBLIC OF SOUTH AFRICA

Prepared on 13<sup>th</sup> April 2020 by Salim S. Abdool Karim, *FRS*

## Chair: Ministerial Advisory Group on Covid-19

Director: CAPRISA – Centre for the AIDS Program of Research in South Africa

CAPRISA Professor in Global Health: Columbia University

Adjunct Professor of Immunology and Infectious Diseases: Harvard University

Adjunct Professor of Medicine: Cornell University

Pro Vice-Chancellor (Research): University of KwaZulu-Natal

Director: DSI-NRF Centre of Excellence in HIV Prevention

# Outline

## ***Part 1: The Coronavirus epidemic***

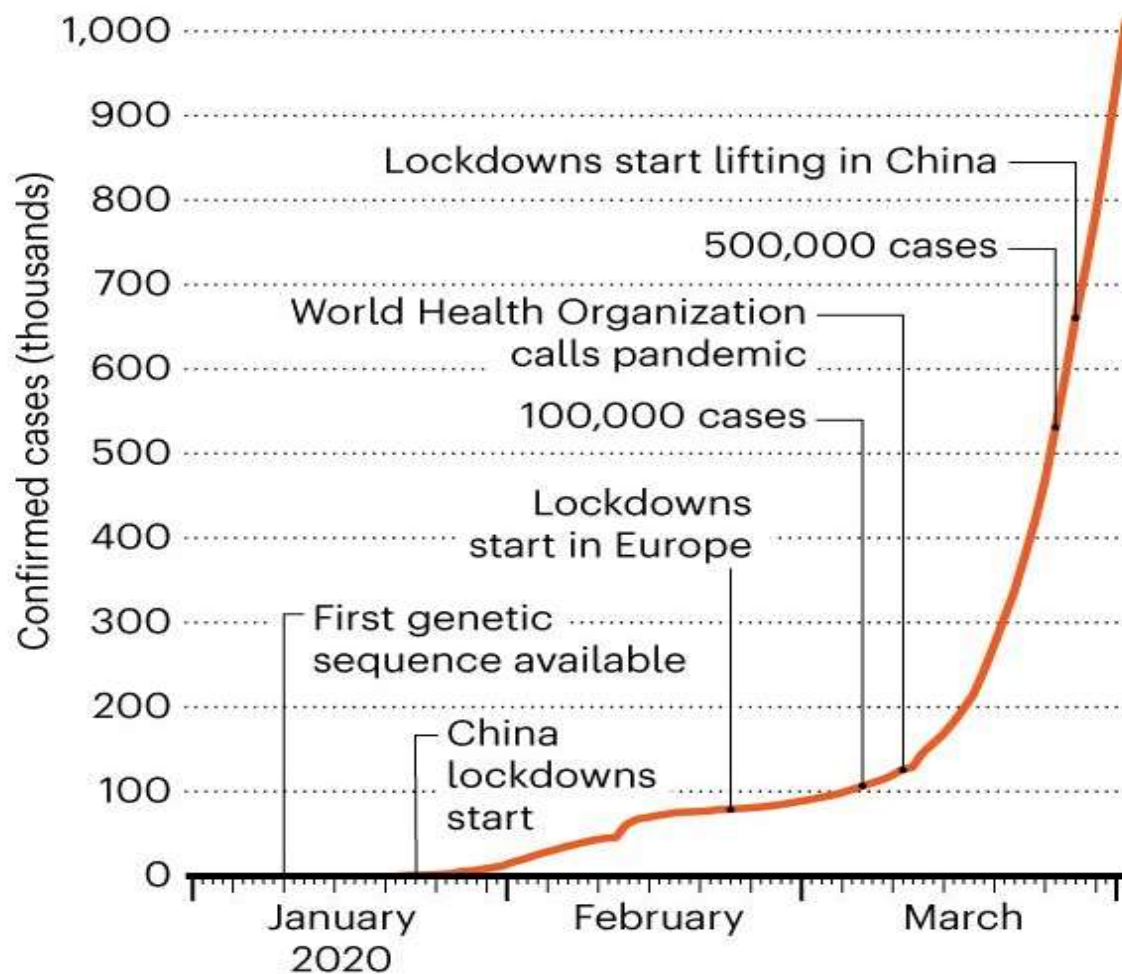
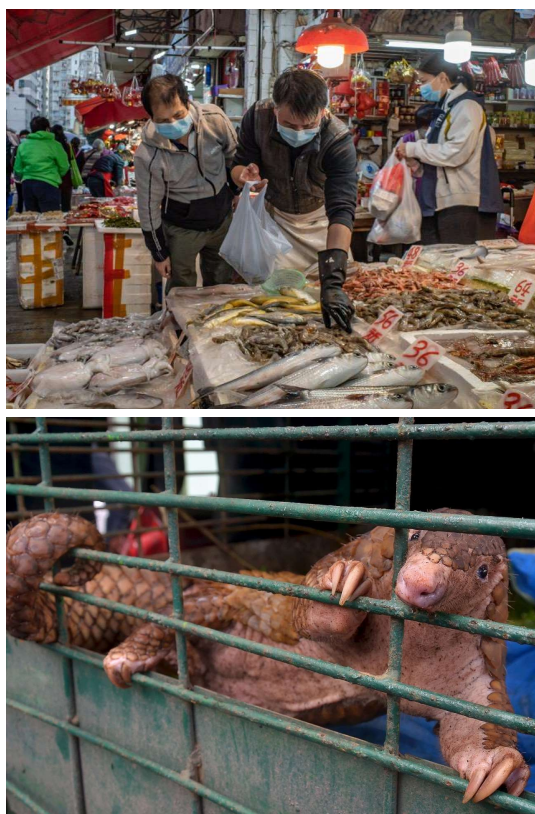
- The Coronavirus epidemic in South Africa
- Why is South Africa not on the expected Covid epidemic trajectory?
- How much community transmission in SA?
- Some future epidemic scenarios

## ***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

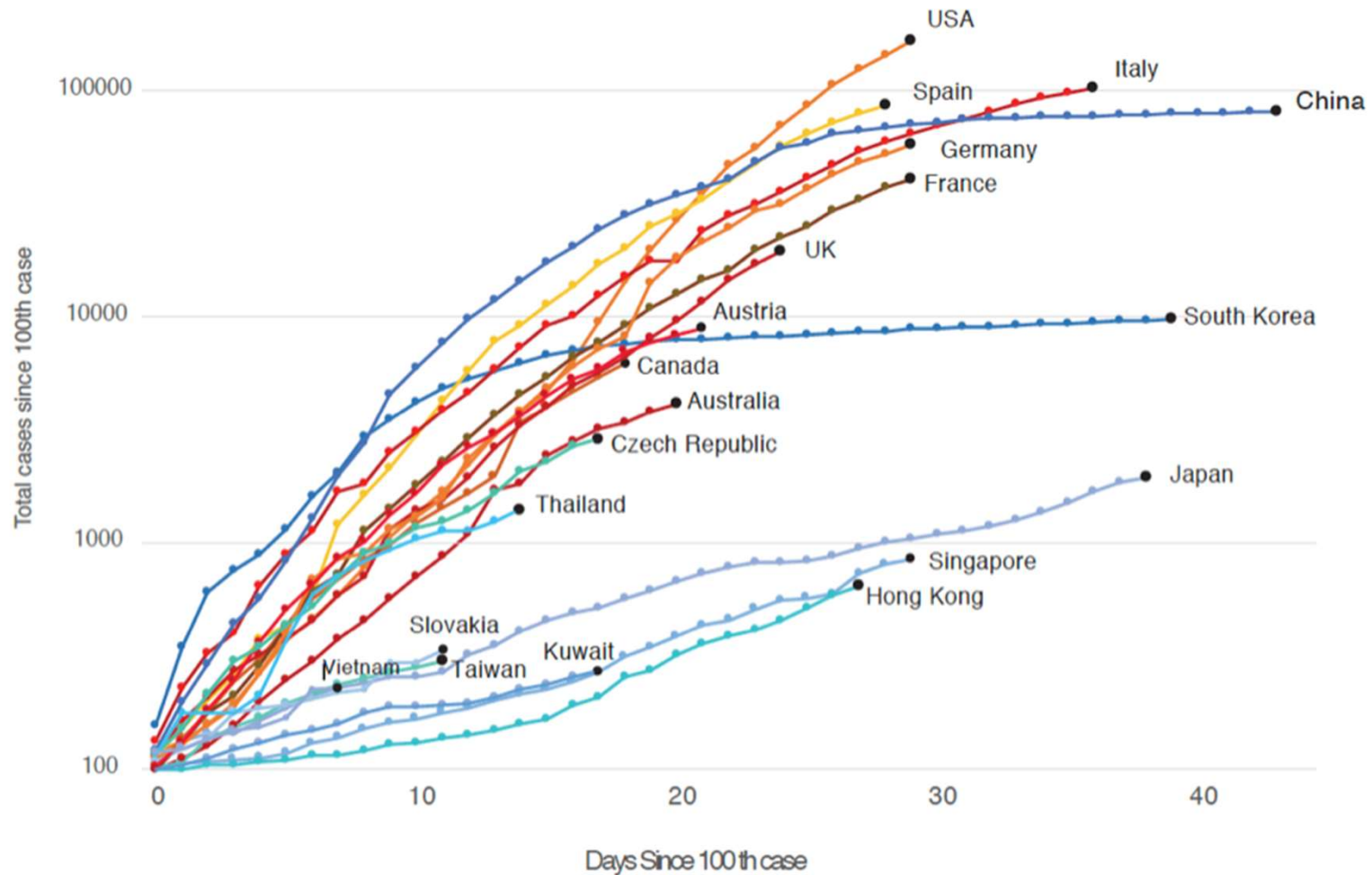
# The first million cases of Covid-19

## Wuhan seafood market



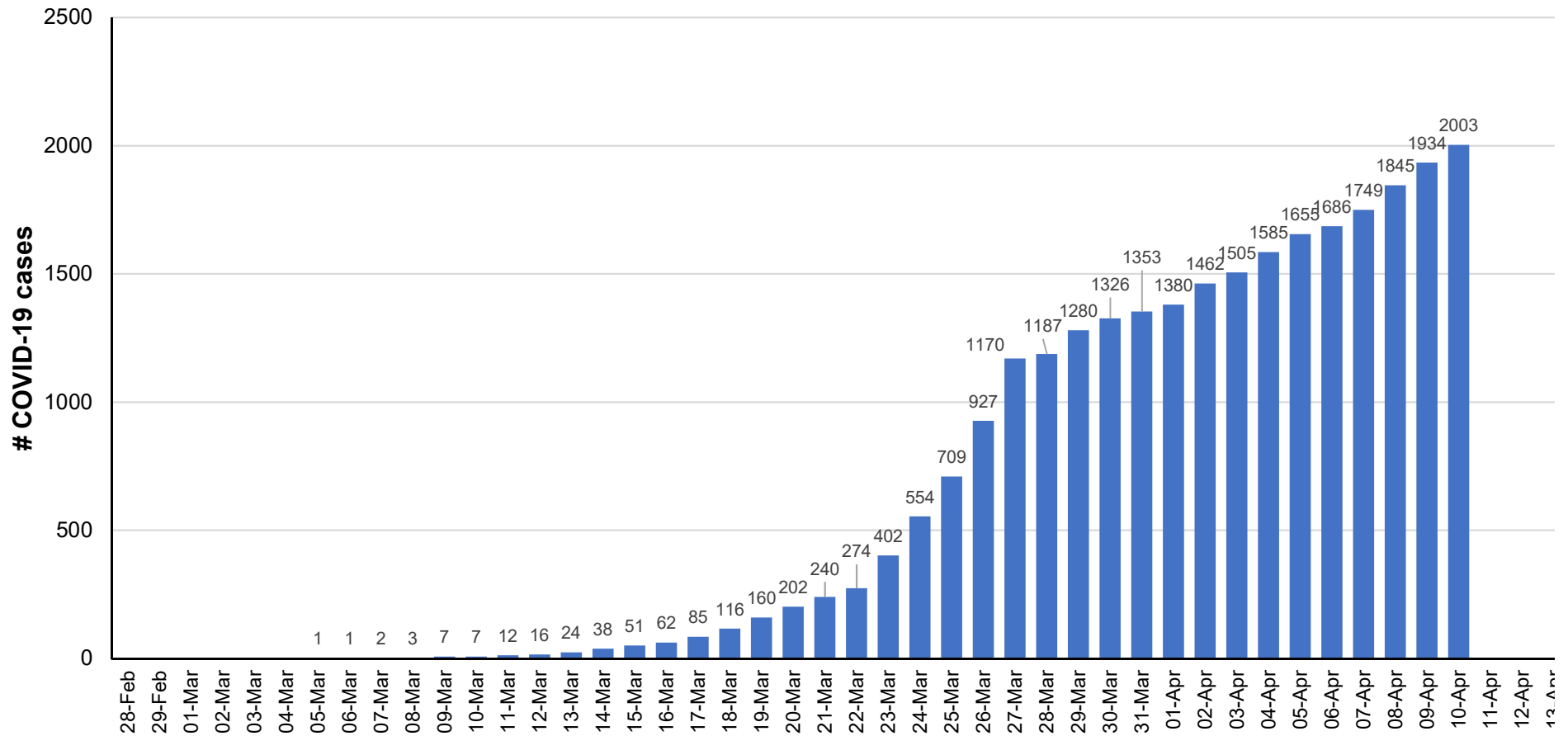
Data correct as of 3 April 2020 Source: Nature 2020 ©nature

# Country level epidemic trajectories



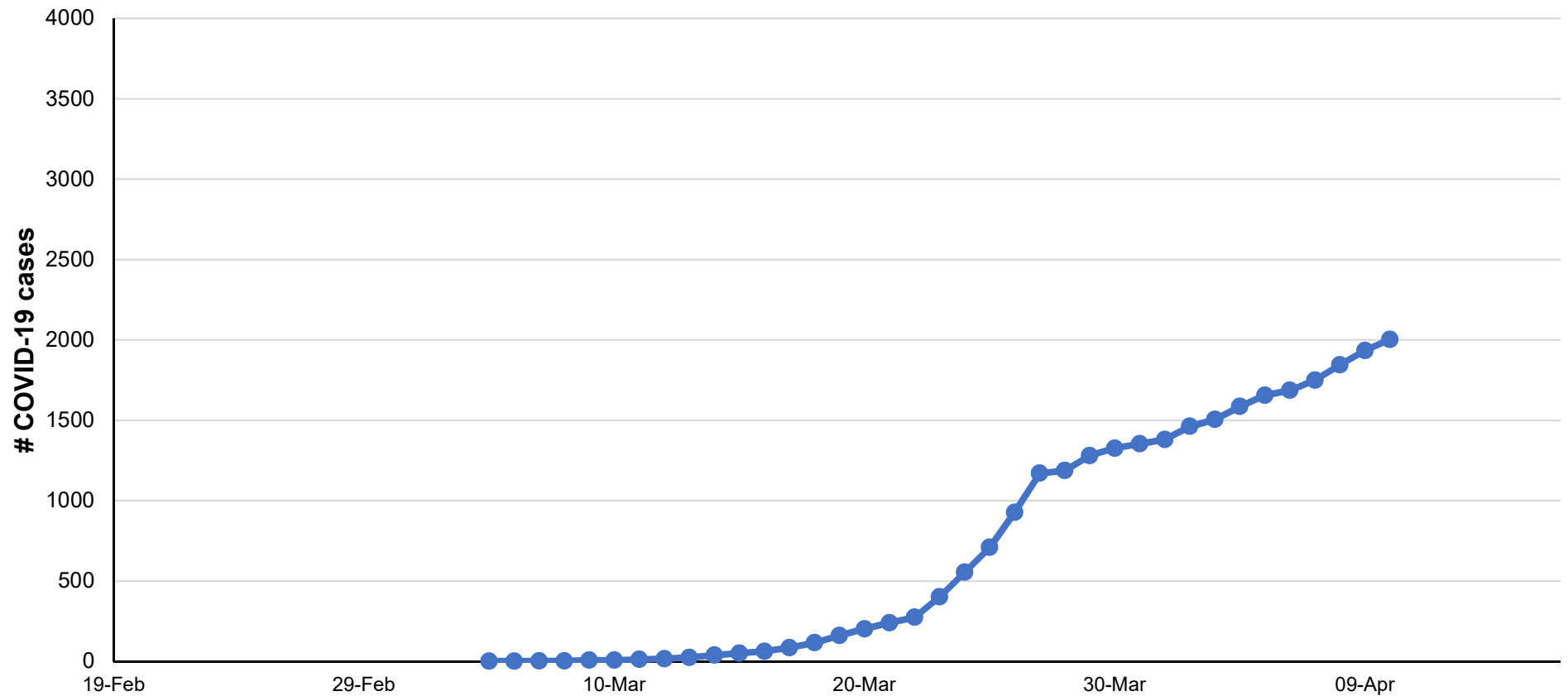
# SA's SARS-CoV-2 epidemic - 1

## Cumulative number of cases



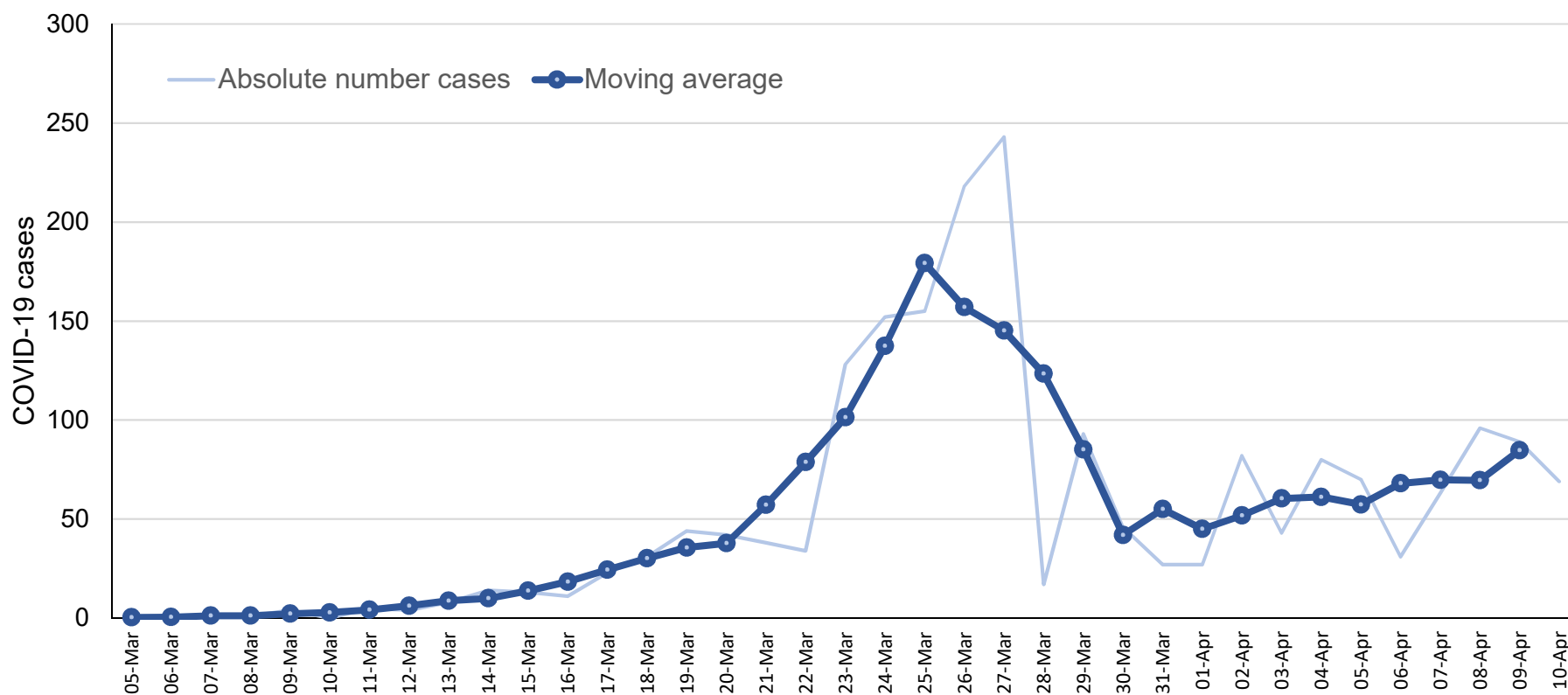
# SA's SARS-CoV-2 epidemic - 2

## Trends in cumulative cases



# SA's SARS-CoV-2 epidemic - 3

## Trends in new cases



# 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

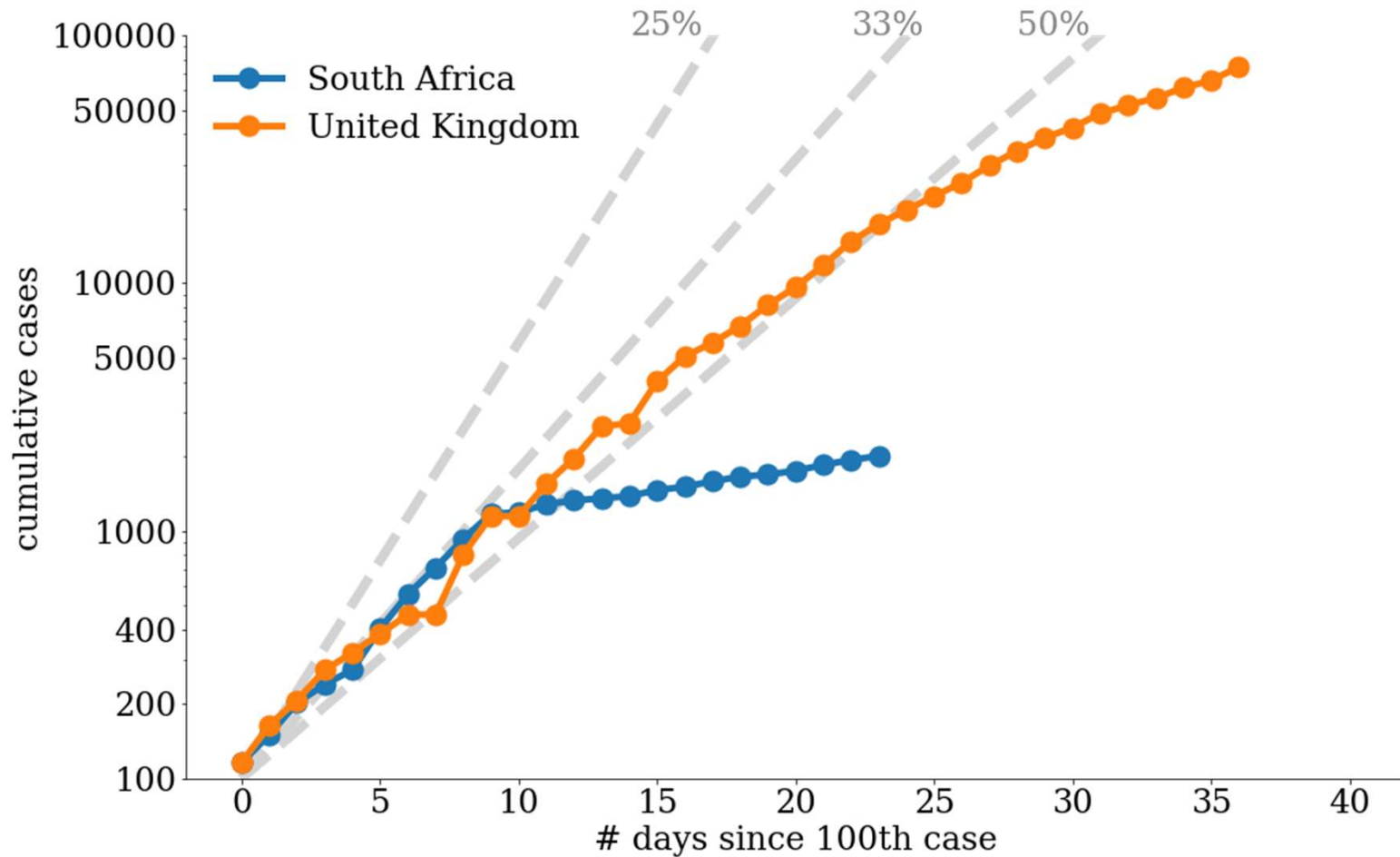
## *Part 2: South Africa's Covid-19 response*

- Stages of the SA Covid-19 response
- Next steps: Stopping small flames to reduce the risk of raging fires
- Conclusion

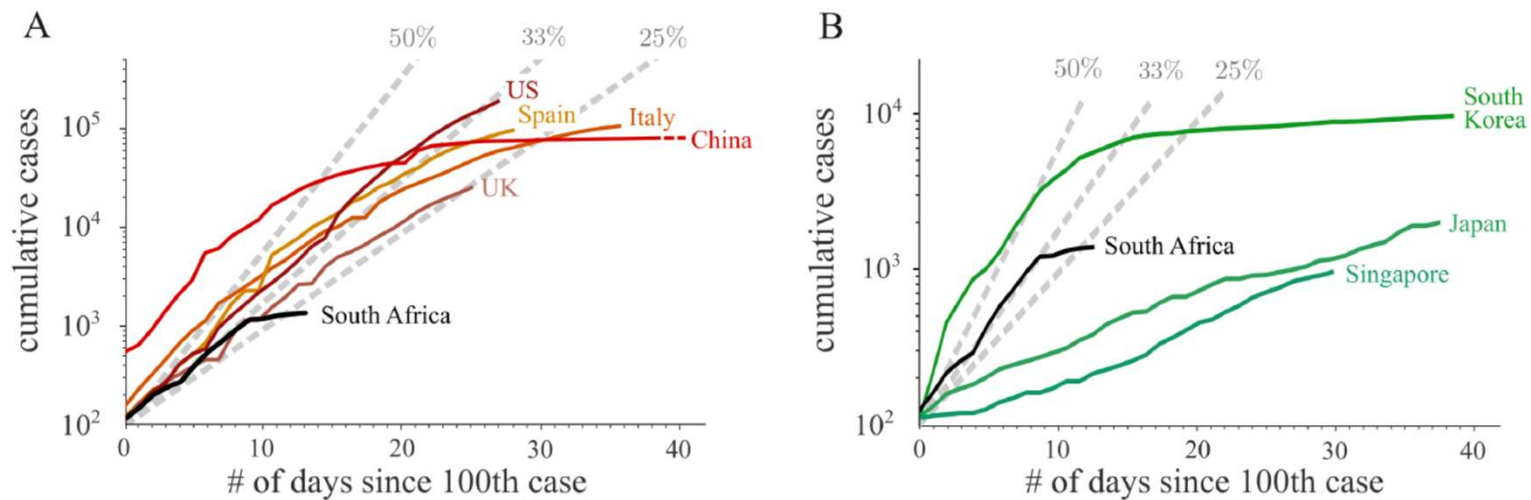


# Covid-19 cases - SA vs UK

## SA's expected vs actual trajectory



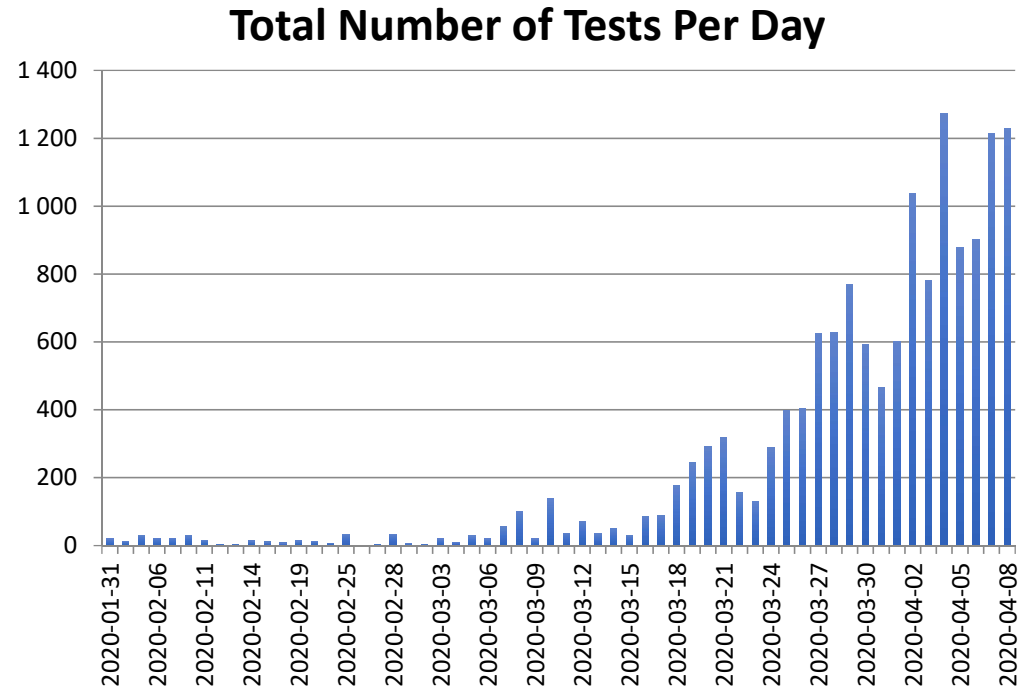
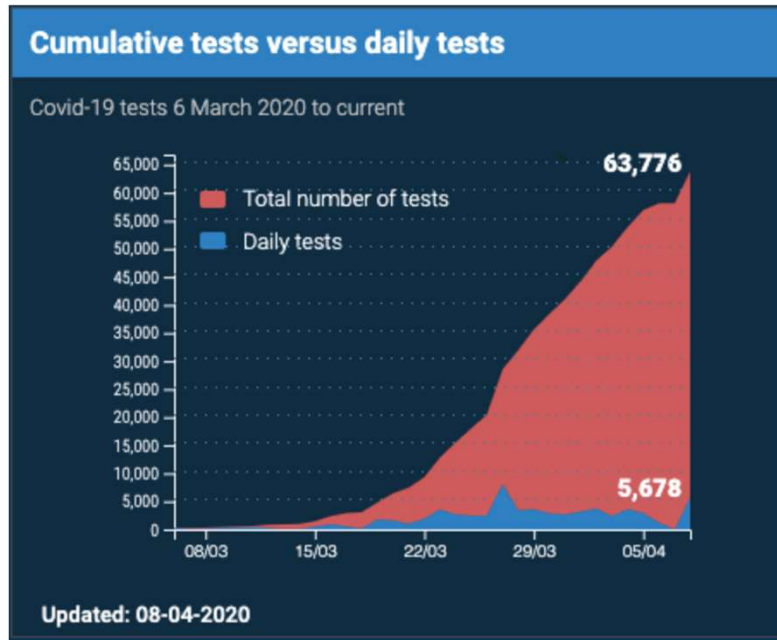
# SA's epidemic trajectory is unique...



## ***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?**

# 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**

# Outline

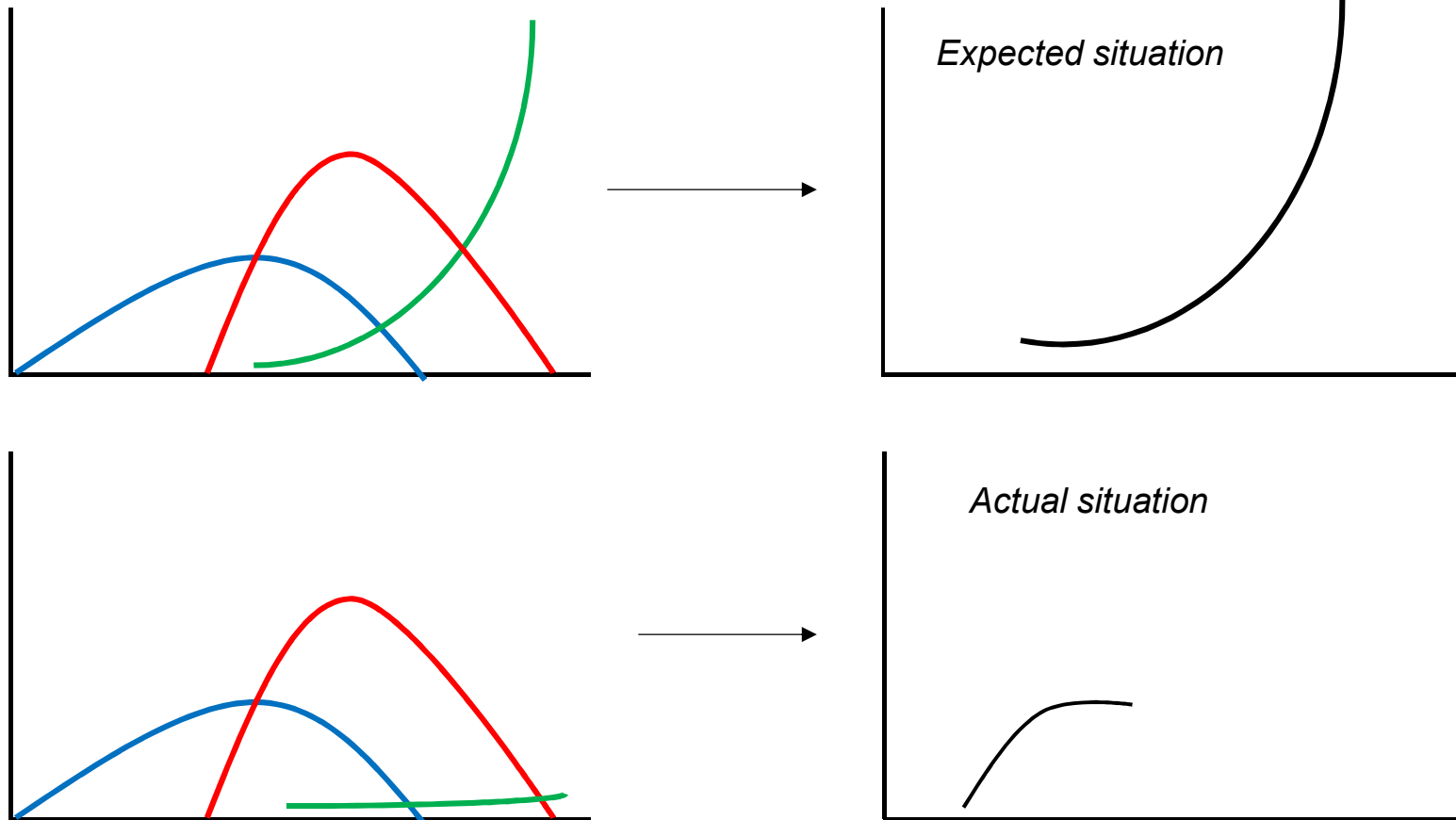
## *Part 1: The Coronavirus epidemic*

- The Coronavirus epidemic in South Africa
- Why is SA not on the expected 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 3 waves of the SA epidemic

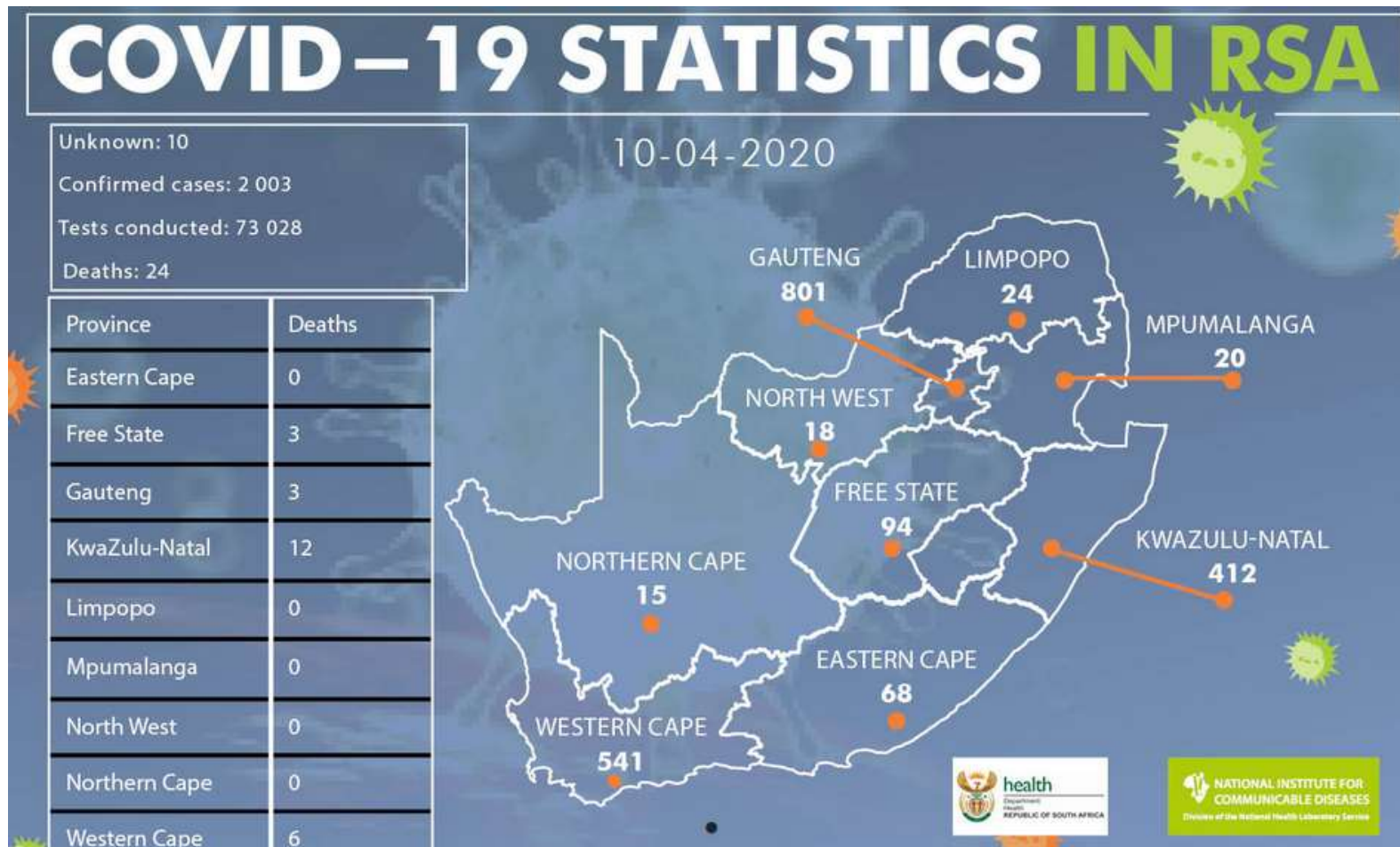


- Travelers
- Contacts and nosocomial transmissions
- Community transmission

# 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  $R_0 > 1$  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  $R_0 \sim 1$  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?



# Outline

## ***Part 1: The Coronavirus epidemic***

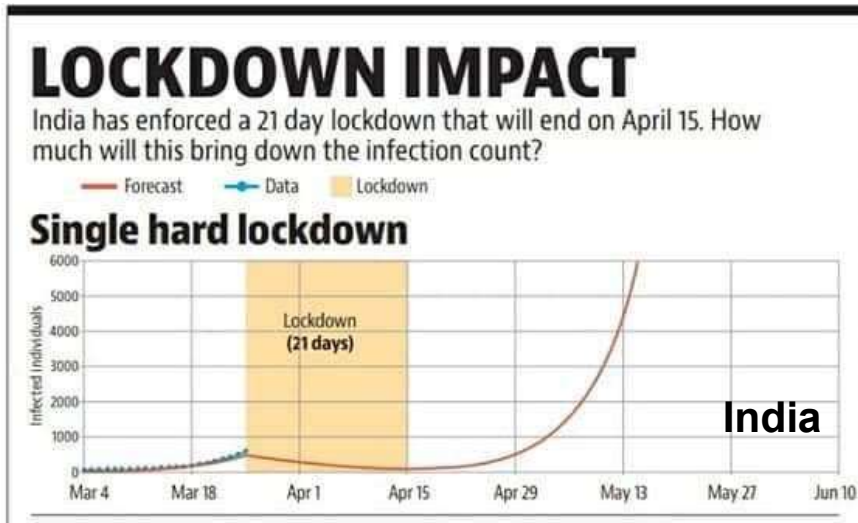
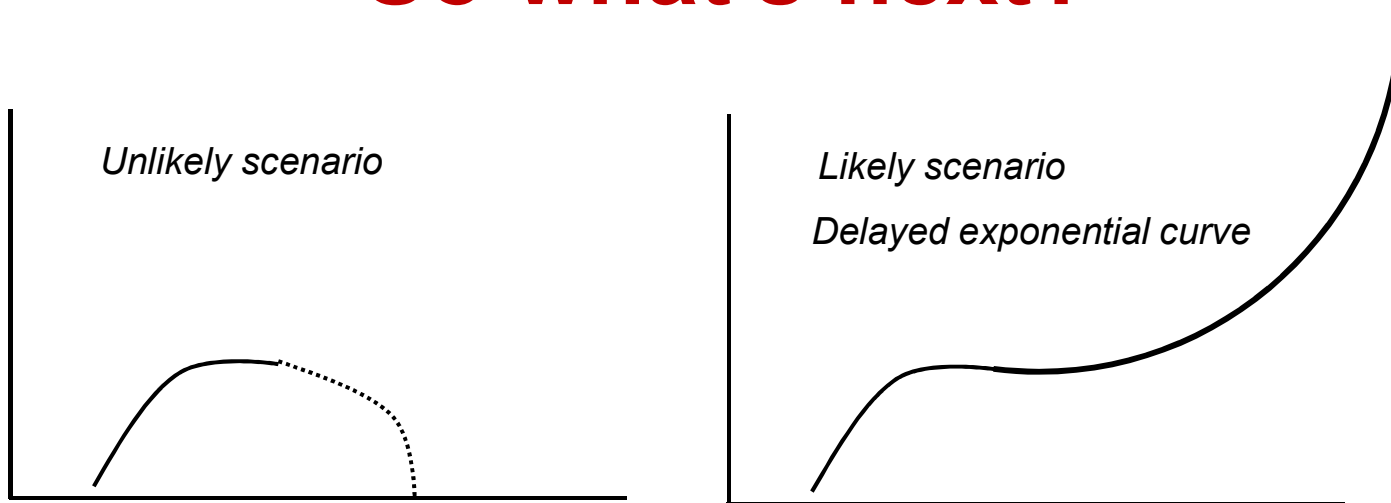
- The Coronavirus epidemic in South Africa
- Why is SA not on the expected trajectory?
- How much community transmission in SA?
- **Some future epidemic scenarios**

## ***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



# So what's next?



## Predicted lockdown impact in India and 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

# Outline

## ***Part 1: The Coronavirus epidemic***

- The Coronavirus epidemic in South Africa
- Why is SA not on the expected 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

# 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

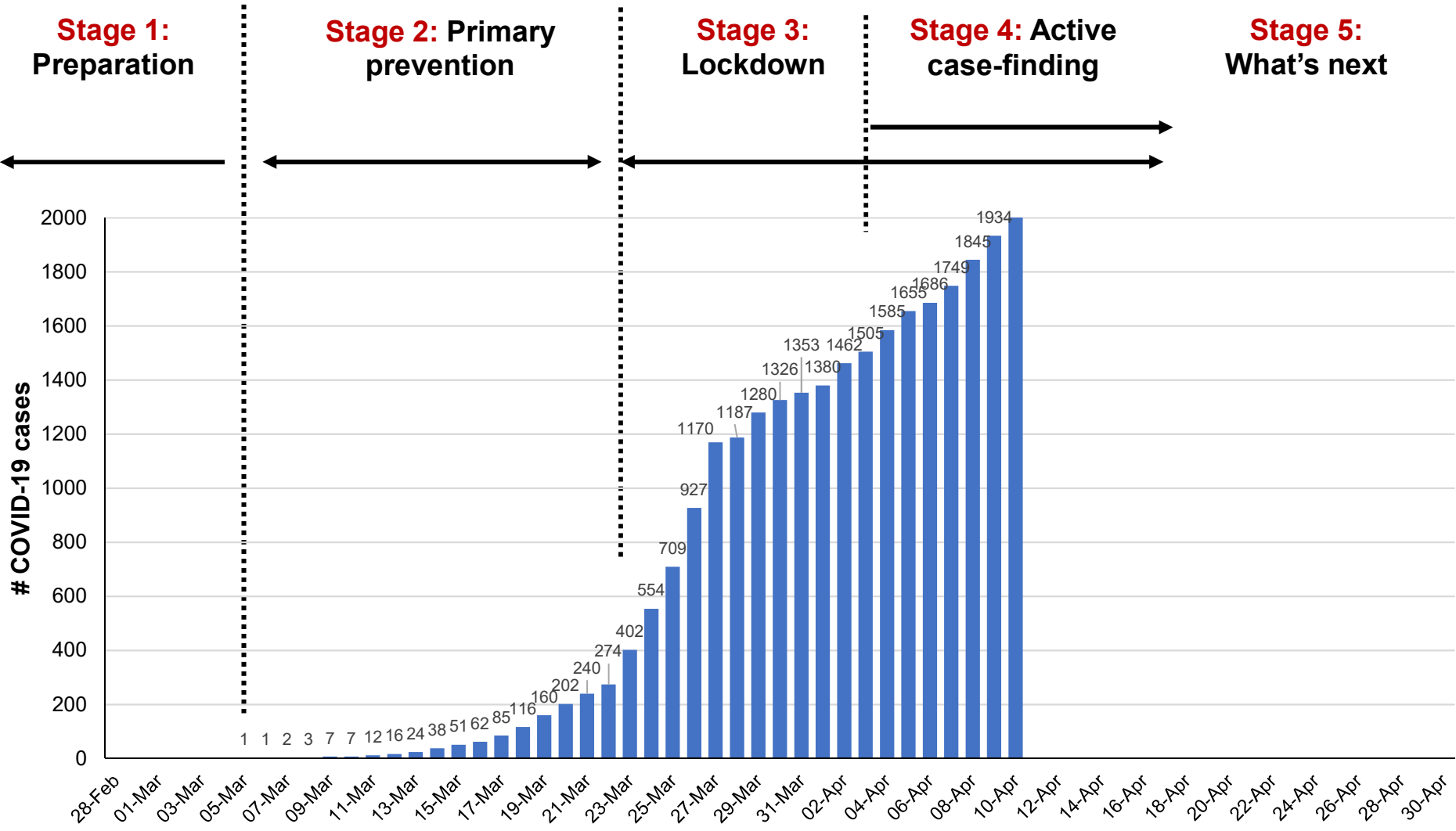
## Stage 3: Lockdown

- Intensifying curtailment of human interaction

## Stage 4: Surveillance & active case-finding

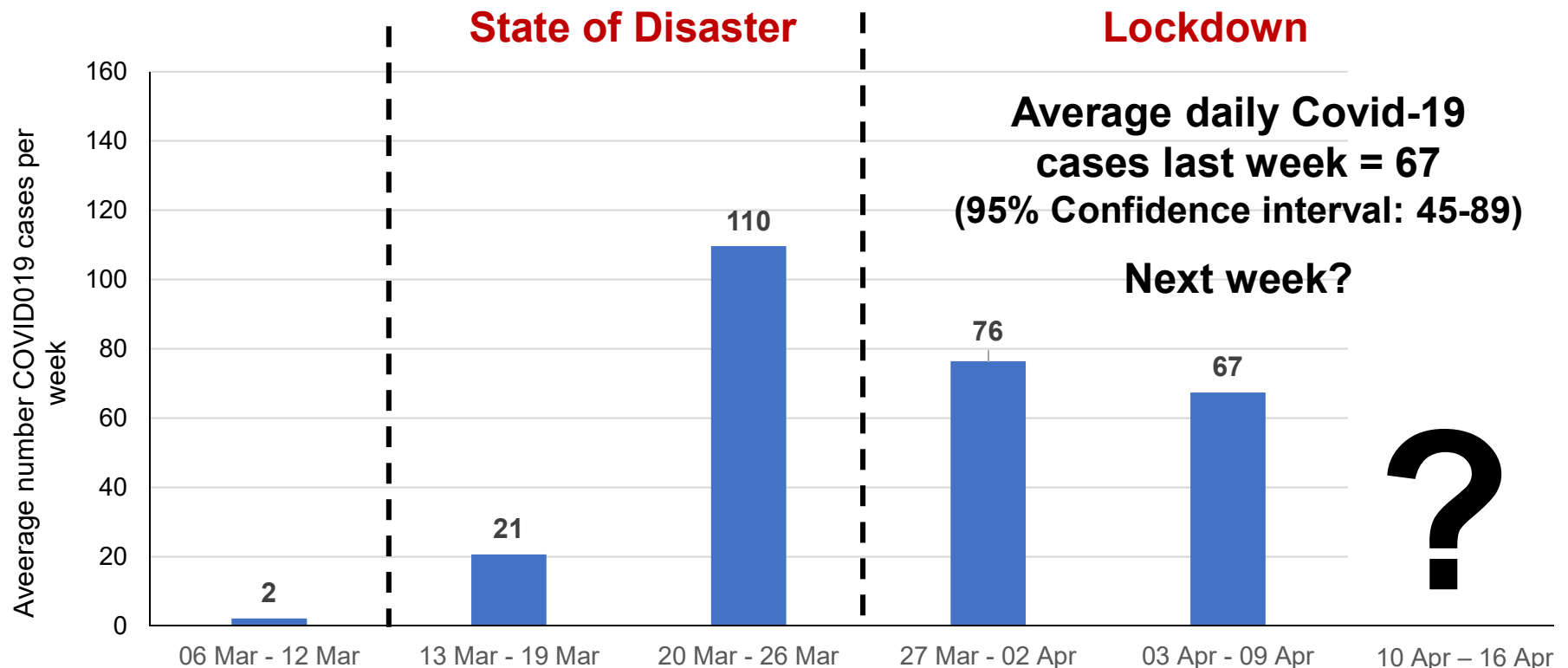
- The Community response: door-to-door screening, testing, isolation and contact tracing

# Stages of SA's COVID-19 response



# What should we do this week?

Follow the lockdown rules and monitor community transmission by average daily cases & community positivity/screened



# Community transmission levels to guide next steps & the lockdown

- By 18<sup>th</sup> 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  $\leq 0.1\%$  then ease lockdown
  - $\leq 44$ , 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

Field hospital in Central Park, New York



## Stage 7: Bereavement & the Aftermath

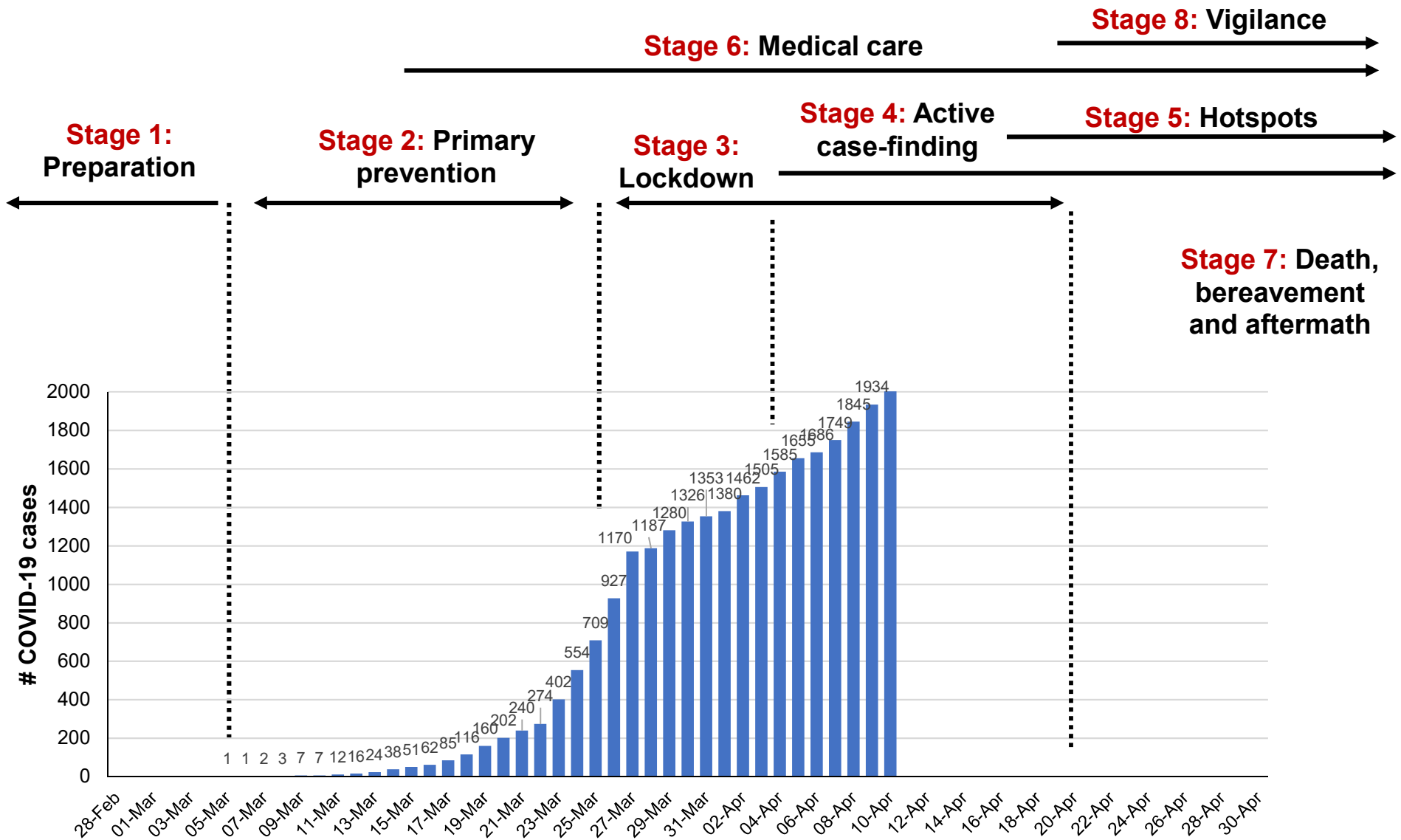
- Expanding burial capacity
- Regulations on funerals
- Managing psychological and social impact

## Stage 8: Ongoing Vigilance

- Monitoring Ab levels
- Administer vaccines, if available
- Ongoing surveillance for new cases



# Stages of SA's COVID-19 response



# Outline

## *Part 1: The Coronavirus epidemic*

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

## *Part 2: South Africa's Covid-19 response*

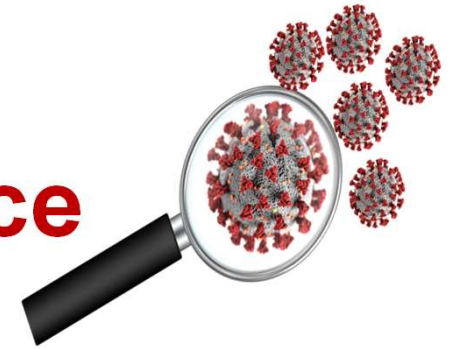
- Stages of the SA Covid-19 response
- **Next steps: Stopping small flames to reduce the risk of raging fires**
- **Conclusion**







# 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**

# Acknowledgements

*Minister Zweli Mkhize & Professor Abdool Karim thank:*

- Nonhlanhla Yende-Zuma, Quarraisha Abdool Karim & Cheryl Baxter of CAPRISA
- Tulio D'Oliviera of KRISP & KZN Big Data CoV Consortium
- Yogan Pillay & Anban Pillay of the NDoH
- Jane, Janine and Amanda of the secretariat
- NatJoints Committee members
- 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