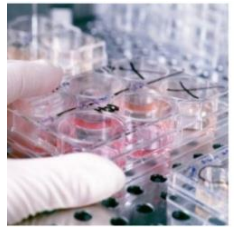
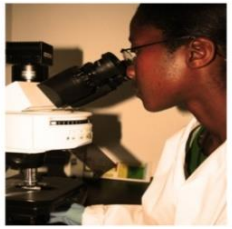
NATIONAL HEALTH LABORATORY SERVICE





Reflections on COVID-19 Interventions

Prof Koleka Mlisana

26th NEDLAC Annual National Summit

07 December 2021

History of deadly plagues, epidemics and global pandemics

Major outbreaks

● 1 million or more deaths* ● Less than 1 million

Before 1300

Plague of Athens
430 BC
Estimated deaths:
100,000

Antonine plague
165 - 180
3.5 - 7 million

Japanese smallpox
735 - 737
1 million

Plague of Justinian
541 - 542
25 - 100 million

After 1300

Black death
(Bubonic plague)
1347 - 51
25 - 50 million

Great plague
of London
1665 - 66
100,000

Spanish flu
1918 - 19
50 - 100 million

HIV
1981-
34 million+

Covid-19
2020-
5 million+
as of Nov 1, 2021

Smallpox
(in Mexico)
1520
8 million

Cocoliztli
(possibly typhoid, Mexico)
1545 - 48
15 million

Cocoliztli
1578
2 million

Great plague of Marseille
1720 - 23
40,000

Russian plague
1770 - 72
100,000

Russian flu
1889-90
1 million

Asian flu
1957-58
1.1 million

Hong Kong flu
1968 - 70
1 million

Ebola
2014-16
11,300

MERS
2012 -
850

Swine flu
2009 - 10
151,700-575,400

SARS
2002 - 03
770

*Toll estimates vary according to different sources

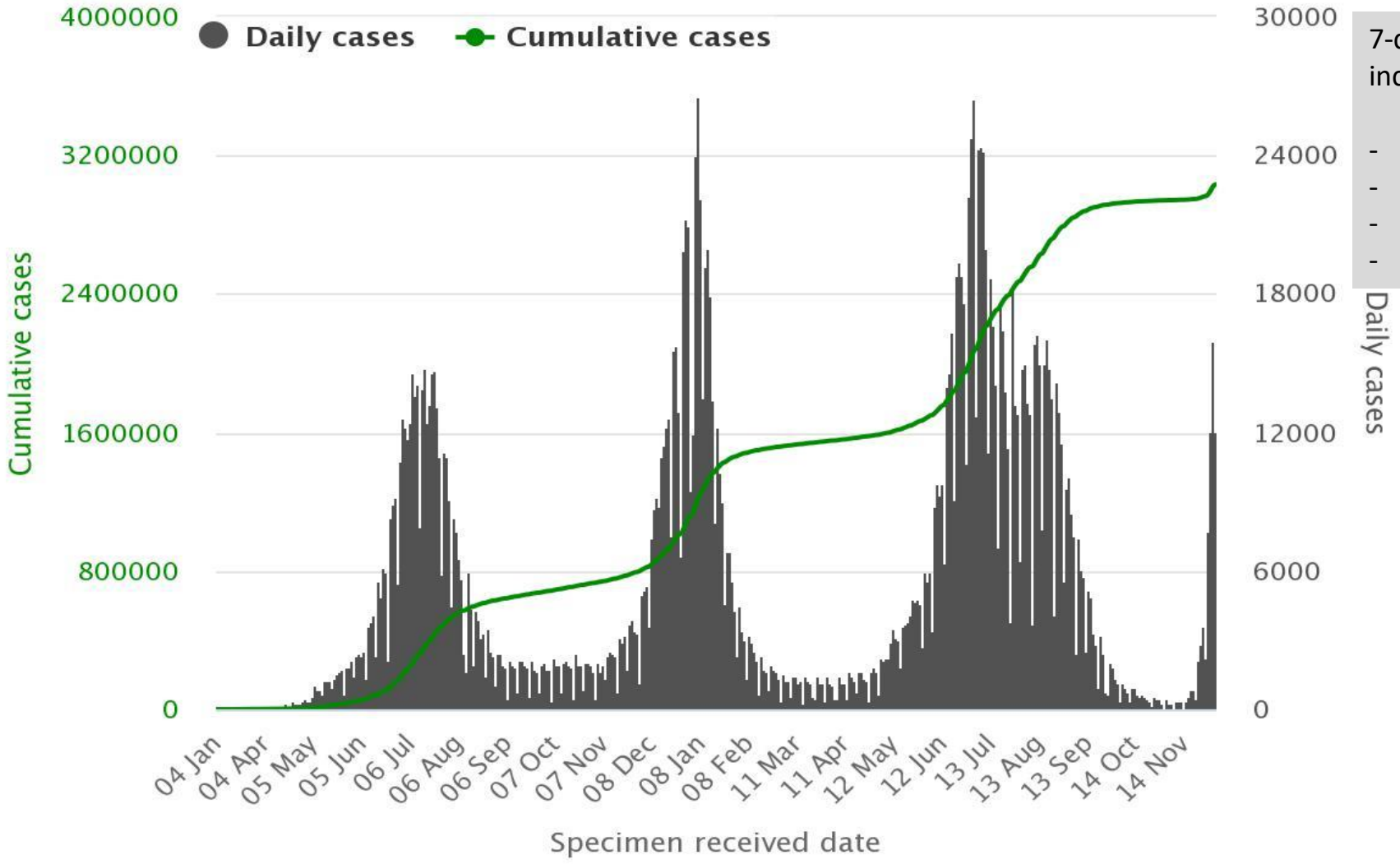
AFP

Source: livescience.com/cdc.gov/Ijidonline.com/britannica.com/ph.ucla.edu/history.com/ncbi.nlm.nih

NATIONAL HEALTH LABORATORY SERVICE

Laboratory-confirmed COVID-19 cases

Total = **3 031 694**



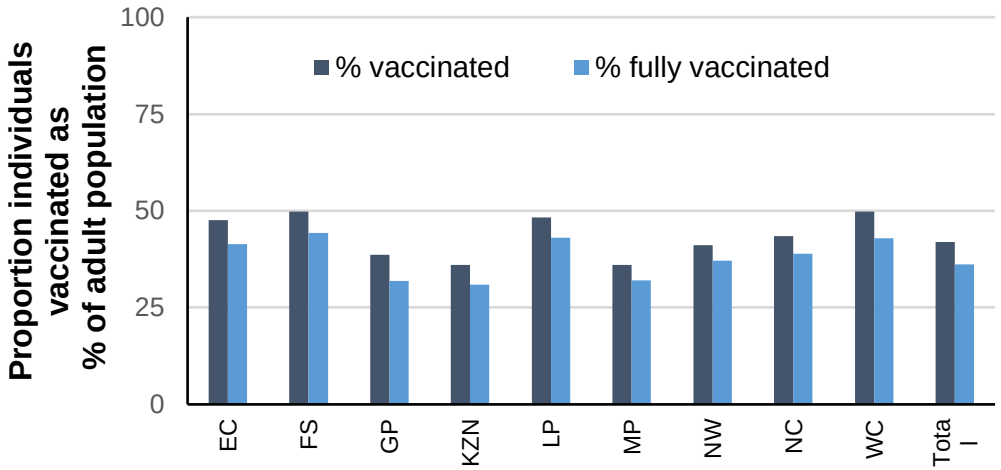
7-day moving average increasing rapidly

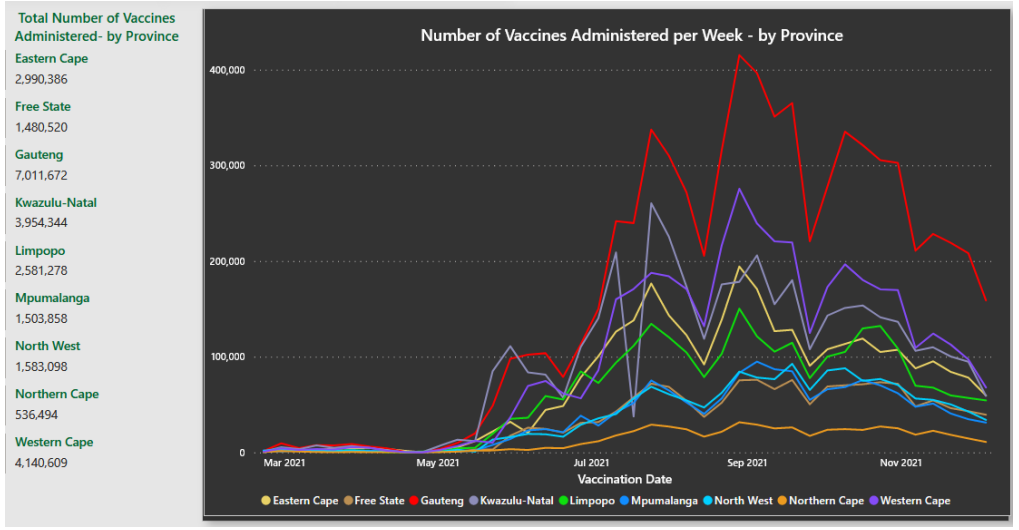
- 16 Nov 2021 = 332
- 23 Nov 2021 = 1 011
- 30 Nov 2021 = 4 811
- 04 Dec 2021 = 9 710

Week number	Week beginning	Percentage testing positive (%)
14	04-Apr-21	4.0
15	11-Apr-21	4.8
16	18-Apr-21	5.1
17	25-Apr-21	5.7
18	02-May-21	6.9
19	09-May-21	8.3
20	16-May-21	9.7
21	23-May-21	11.3
22	30-May-21	13.4
23	06-Jun-21	17.6
24	13-Jun-21	23.7
25	20-Jun-21	27.4
26	27-Jun-21	29.9
27	04-Jul-21	31.9
28	11-Jul-21	31.5
29	18-Jul-21	28.2
30	25-Jul-21	25.2
31	01-Aug-21	23.7
32	08-Aug-21	23.3
33	15-Aug-21	22.7
34	22-Aug-21	20.0
35	29-Aug-21	16.0
36	05-Sep-21	13.0
37	12-Sep-21	9.3
38	19-Sep-21	6.8
39	26-Sep-21	4.6
40	03-Oct-21	3.3
41	10-Oct-21	2.7
42	17-Oct-21	1.8
43	24-Oct-21	1.5
44	31-Oct-21	1.1
45	07-Nov-21	1.2
46	14-Nov-21	2.4
47	21-Nov-21	8.3

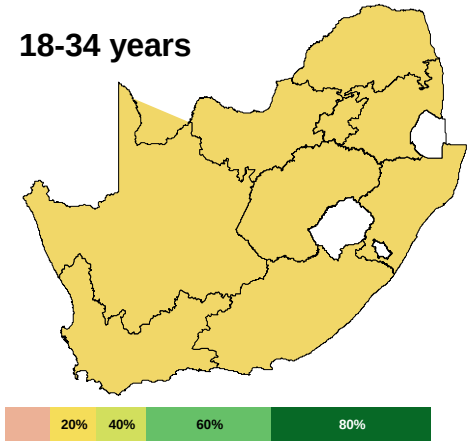
30 Nov 2021 = 10.2% 01 Dec 2021 = 16.5% 02 Dec 2021 = 22.4% 05 Dec 2021 = 23.8%

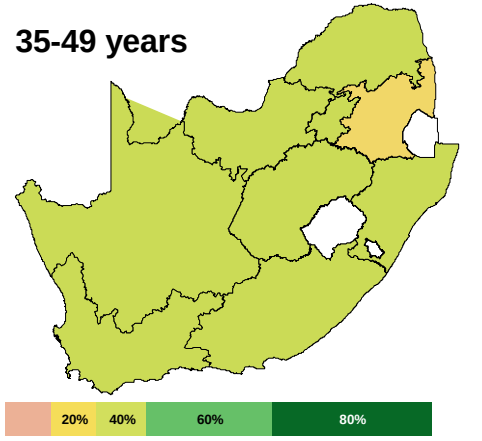
Proportion of Individuals Vaccinated

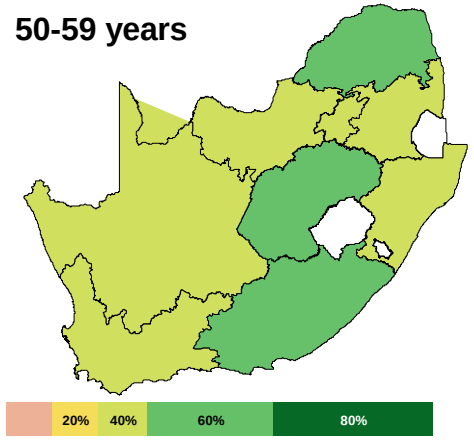


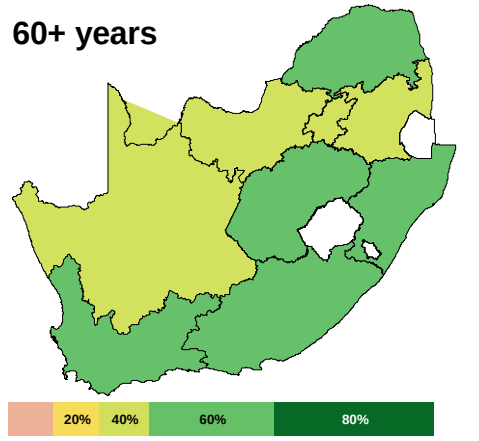


Age groups vaccinated as % of population









Credit: *Cheryl Baxter, Caprisa*

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Lessons Learned from Past Pandemics and COVID-19

Lesson 1: Increased global health cooperation

Lesson 2: Multi-sectoral cooperation works

Lesson 3: The poor suffer the most

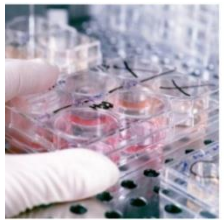
Lesson 4: Names matter

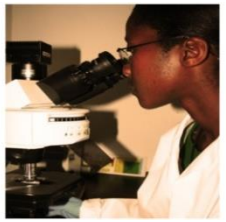
Lesson 5: There is not silver bullet

Lesson 6: Vaccines when administered, work effectively

Lesson 7: Expect the unexpected

NATIONAL HEALTH LABORATORY SERVICE





Lesson 1

Increased global health cooperation

NATIONAL HEALTH LABORATORY SERVICE

Global Influenza Surveillance and Response System (GISRS)

- Established in 1952 amid concern of an influenza outbreak in Europe
- Monitors the spread of influenza with the aim to provide the World Health Organization with influenza control information
- Global mechanism for surveillance, preparedness and response
- Laboratories collect specimens in their countries, perform primary virus isolation and preliminary antigenic characterisation and share with WHO collaborating centres
- Collaborating centres make recommendations on the composition of seasonal influenza vaccines
- Global platform for open-access to genomic sequences of influenza viruses
- Main source of data for GISRS in influenza vaccine decision-making

Global Initiative on Sharing All SARS-CoV-2 sequence Data

The genomic data presented here are based on South African SARS-CoV-2 sequence data downloaded from GISAID (www.gisaid.org) on 3 December at 08h30

GISAID

Data license: https://www.gisaid.org/registration/terms-of-use/

Elbe, S., and Buckland-Merrett, G. (2017) Data, disease and diplomacy: GISAID's innovative contribution to global health. Global Challenges, 1:33-46 DOI: 10.1002/gch2.1018 PMCID: 31565258

Shu, Y., McCauley, J. (2017) GISAID: Global initiative on sharing all influenza data – from vision to reality. EuroSurveillance, 22(13) DOI: 10.2807/1560-7917.ES.2017.22.13.30494 PMCID: PMC5388101

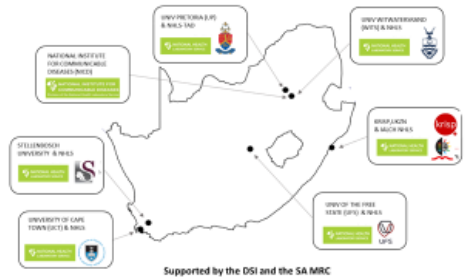
Case data is based on specimen collection date. Cases from https://www.nicd.ac.za/diseases-a-z-index/disease-index-covid-19/surveillance-reports/weekly-epidemiological-brief/ Test data from https://www.nicd.ac.za/diseases-a-z-index/disease-index-covid-19/surveillance-reports/weekly-testing-summary/

- **First SARS-CoV-2 whole-genome sequence published on GISAID on 10 January 2020**
  - Enabled development of the first vaccines and diagnostic tests to detect SARS-CoV-2
- Key to current SARS-CoV-2 genomic surveillance efforts
  - **5 739 364** sequences have been shared via GISAID since 10 January 2020, including over **24 000** from South Africa

NGS-SA Network for Genomic Surveillance in South Africa

Network for Genomic Surveillance South Africa (NGS-SA)

SARS-CoV-2 Sequencing Update



Supported by the DSI and the SA MRC

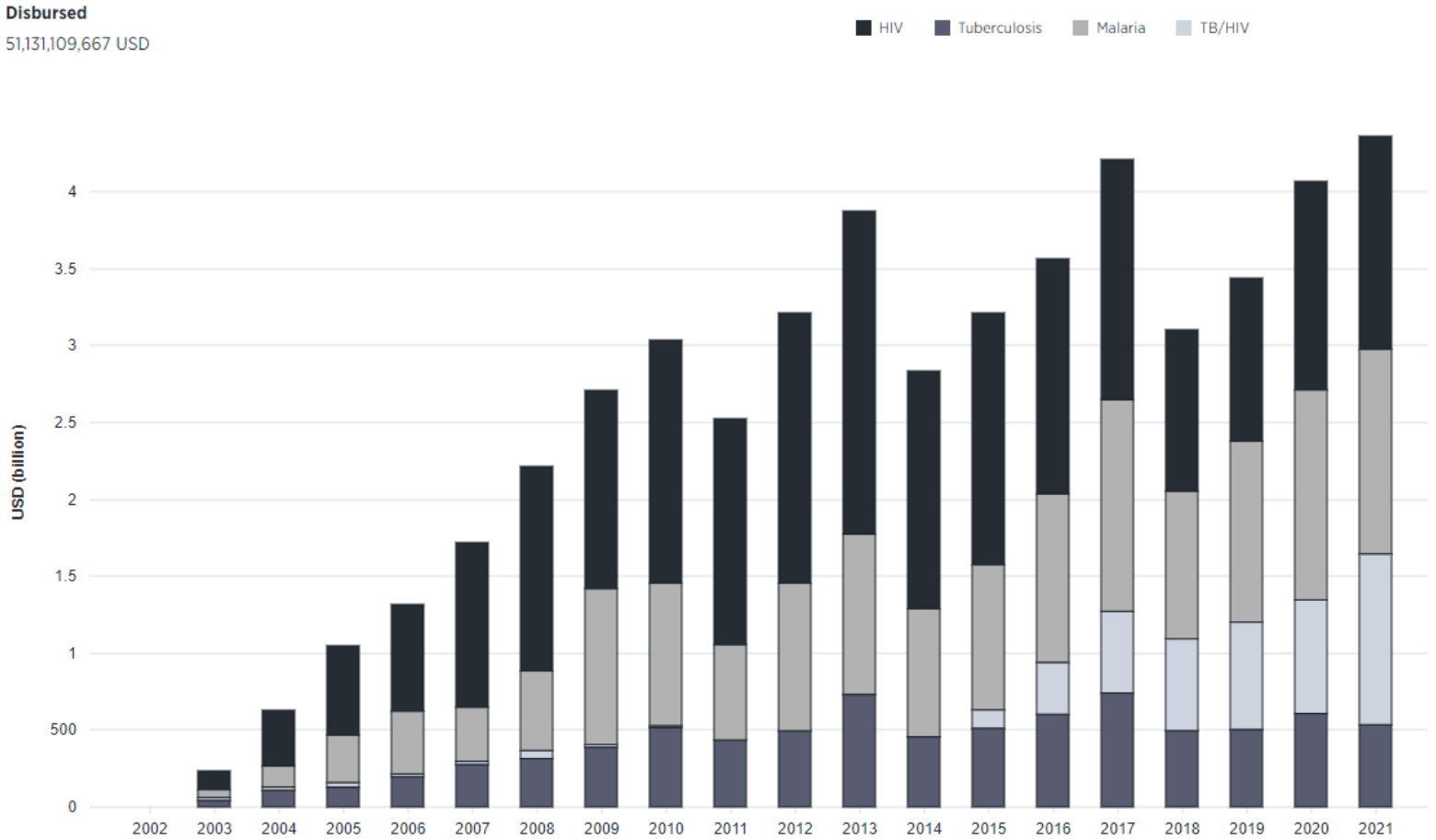
Msomi N, Mlisana K, et al. Lancet Microbe 2020

Prepared by the National Institute for Communicable Diseases (NICD) of the National Health Laboratory (NHLS) on behalf of the Network for Genomics Surveillance in South Africa (NGS-SA)

NATIONAL HEALTH LABORATORY SERVICE

The Global Fund

- Global partnership to support HIV, TB, and Malaria programmes mainly through the provision of grants to support activities



Lesson 2

Multi-sectoral cooperation

Civil Society Involvement in AIDS Policy

- Tremendous rise in HIV/AIDS cases in the late 1990's led to the formation of civil society organisations such as Treatment Action Campaign
- Criticised government's ineffective HIV/AIDS strategy
- Argued for the scale-up of effective interventions to combat the disease
- AIDS 2000 conference in Durban as a landmark for ART access in SSA
- Challenged government's stance on provision of Antiretroviral drugs
- Intensive campaigns that attracted international attention led to wide-ranging changes in health policy in SA

NATIONAL HEALTH LABORATORY SERVICE

Other Ministers

Minister of Cooperative Governance and Traditional Affairs

Minister of Health

National Command Council

NEDLAC

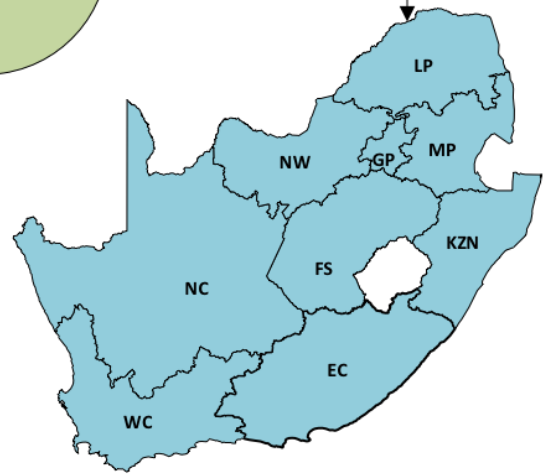
National Joint Operations Committee (NATJOC)

(COVID) Project Management Office of NDoH

Incident Management Team (Operational)

- Epi Surveillance & Response
- Communications & Health Promotion
- Personal Protective Equipment
- Case Management
- Contact Tracing
- Infection Prevention & Control
- Environmental Health
- Data Management
- Human Resources

National Health Council



- Clinical sub-committee
- Public health sub-committee
- Modelling sub-committee
- Laboratory sub-committee

COVID-19 Ministerial Advisory Committee

Socio-Behavioural Ministerial Advisory Committee

Vaccine Ministerial Advisory Committee

Lesson 3

The most vulnerable suffer the most

NATIONAL HEALTH LABORATORY SERVICE

Differential Impact of HIV on Girls and Women

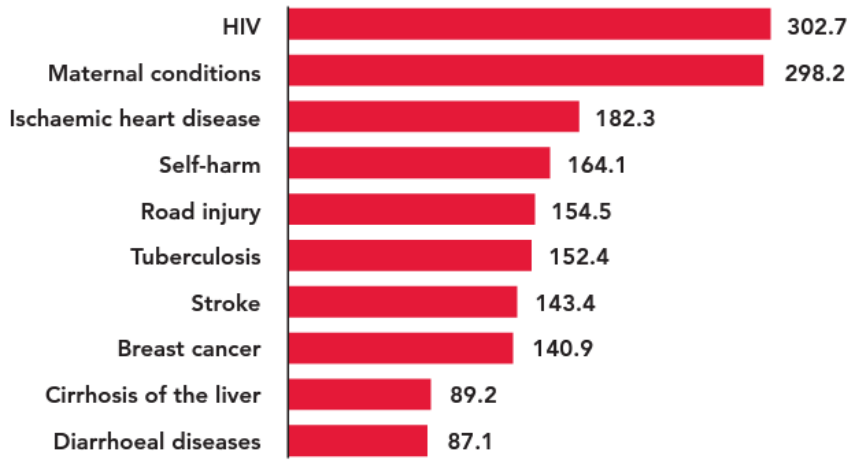
Every minute, a young woman is newly infected with HIV.

As a result of their lower economic, socio-cultural status in many countries, women and girls are disadvantaged when it comes to negotiating safe sex, accessing HIV prevention information and services.

In sub-Saharan Africa, three in five new HIV infections among 15–19-year-olds are among girls.

Source: UNAIDS 2018 estimates.

AIDS-related illnesses are the leading cause of death among 15–49-year-old females globally (hundred thousands)



Source: Global health estimates 2016: deaths by cause, age, sex, by country and by region, 2000–2016. Geneva, World Health Organization; 2018.

10X

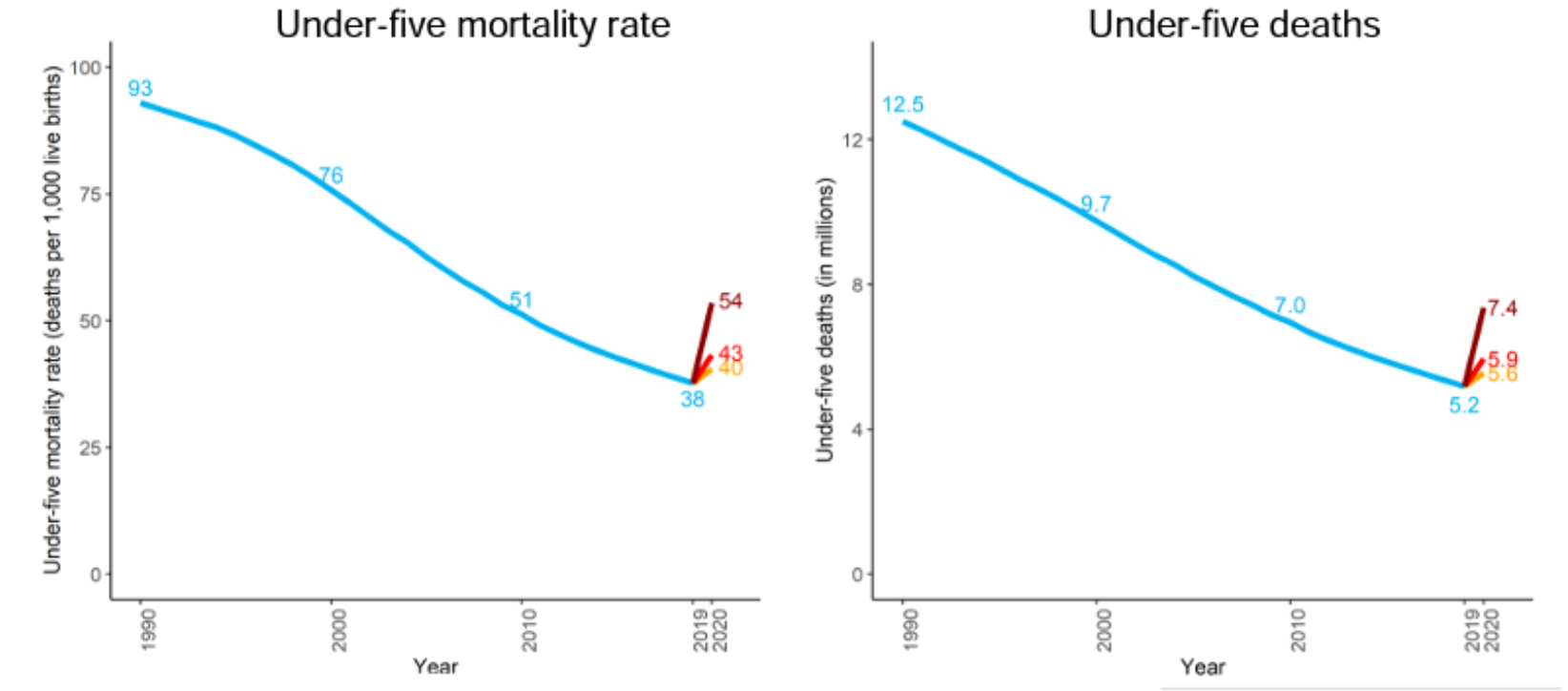
HIV INCIDENCE IS 10 TIMES HIGHER AMONG FEMALE SEX WORKERS THAN AMONG THE GENERAL POPULATION

Source: UNAIDS, 2018.

NATIONAL HEALTH LABORATORY SERVICE

Impact of COVID-19 on Global Under-Five Mortality

Global under-five mortality rates and deaths, 1990–2019, and scenario-based projections using the LiST model for 2020



Though the real impact is still not clear without available data, it is estimated that in just one year under a severe scenario (39.3–51.9% disruptions in health services and 50% increase in wasting), there could be **more than 2 million additional deaths (45% increase)** of children under five – **moving us back on the curve by a decade**

Source: United Nations Inter-agency Group for Child Mortality Estimation (UN IGME) 2020 and Roberton Timothy et al., "Early estimates of the indirect effects of the COVID-19 pandemic on maternal and child mortality in low-income and middle-income countries: a modelling study", *The Lancet Global Health*, vol. 8, no. 7, 1 July 2020, published 12 May 2020.

Impact of COVID-19 on Healthcare Services in South Africa

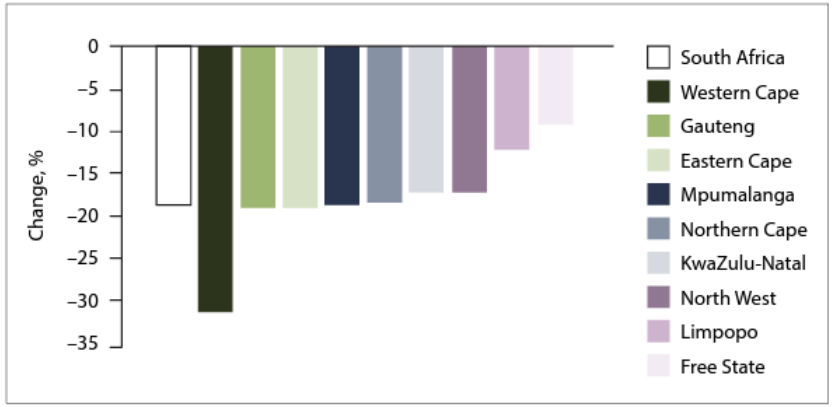


Fig. 2. Changes in numbers of patient visits between March and December 2019 and 2020.

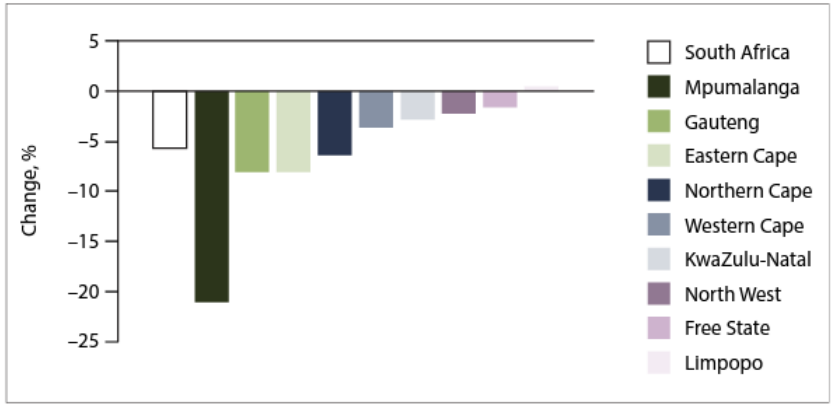


Fig. 3. Changes in contraceptive methods prescribed between March and December 2019 and 2020.

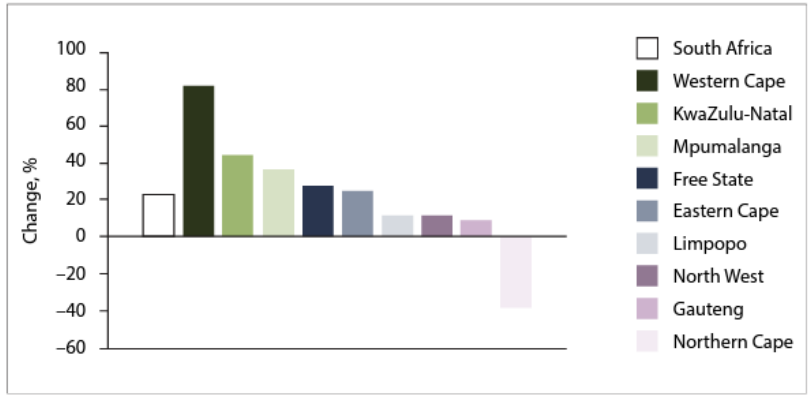


Fig. 6. Changes in maternal deaths in public health facilities between March and December 2019 and 2020.

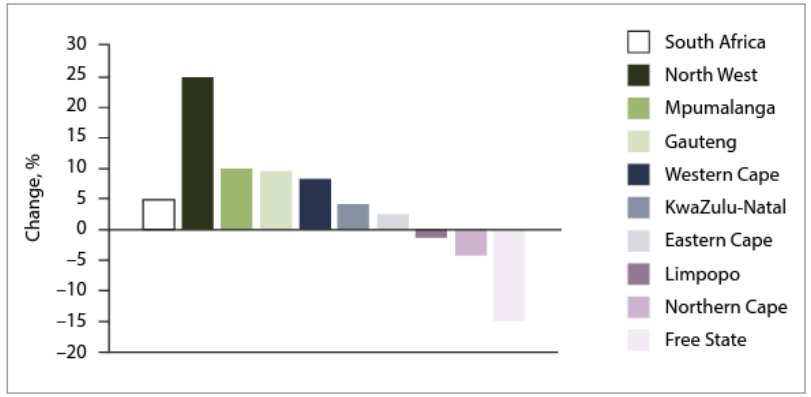


Fig. 7. Changes in institutional neonatal deaths in public health facilities between March and December 2019 and 2020.

SAMJ IN PRACTICE

HEALTHCARE DELIVERY

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

Y Pillay,[1] PhD; **S Pienaar,**[1] PhD; **P Barron,**[2] FFCH (SA); **T Zondi,**[3] MPH

[1] *Clinton Health Access Initiative, Pretoria, South Africa*
[2] *School of Public Health, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa*
[3] *National Department of Health, Pretoria, South Africa*

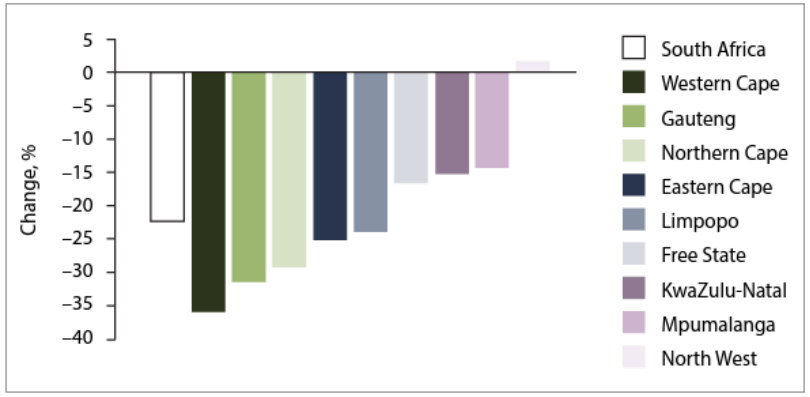


Fig. 9. Changes in HIV tests done in public health facilities between March and December 2019 and 2020.

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Impact of COVID-19 on Women and Girls

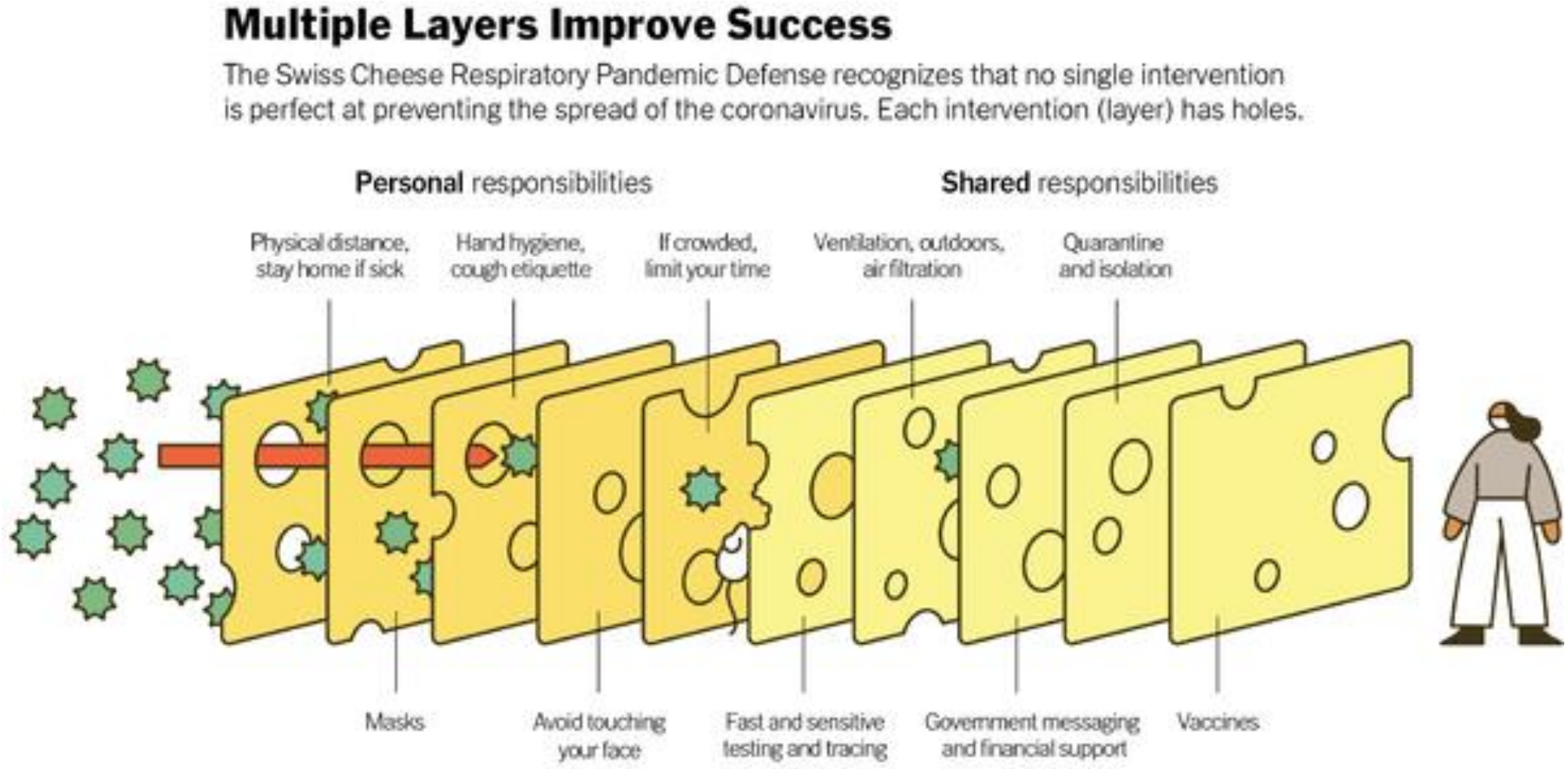
- Disruption of healthcare access for women and girls
- Countries failed to keep sexual and reproductive health services available, resulting in neglect and an increase in risks to women's health
- Lockdowns and restrictions increased gender-based violence
- Some estimates suggest 5% of all employed women lost their jobs globally, compared with 3.9% of employed men

Lesson 6

There is no silver bullet

NATIONAL HEALTH LABORATORY SERVICE

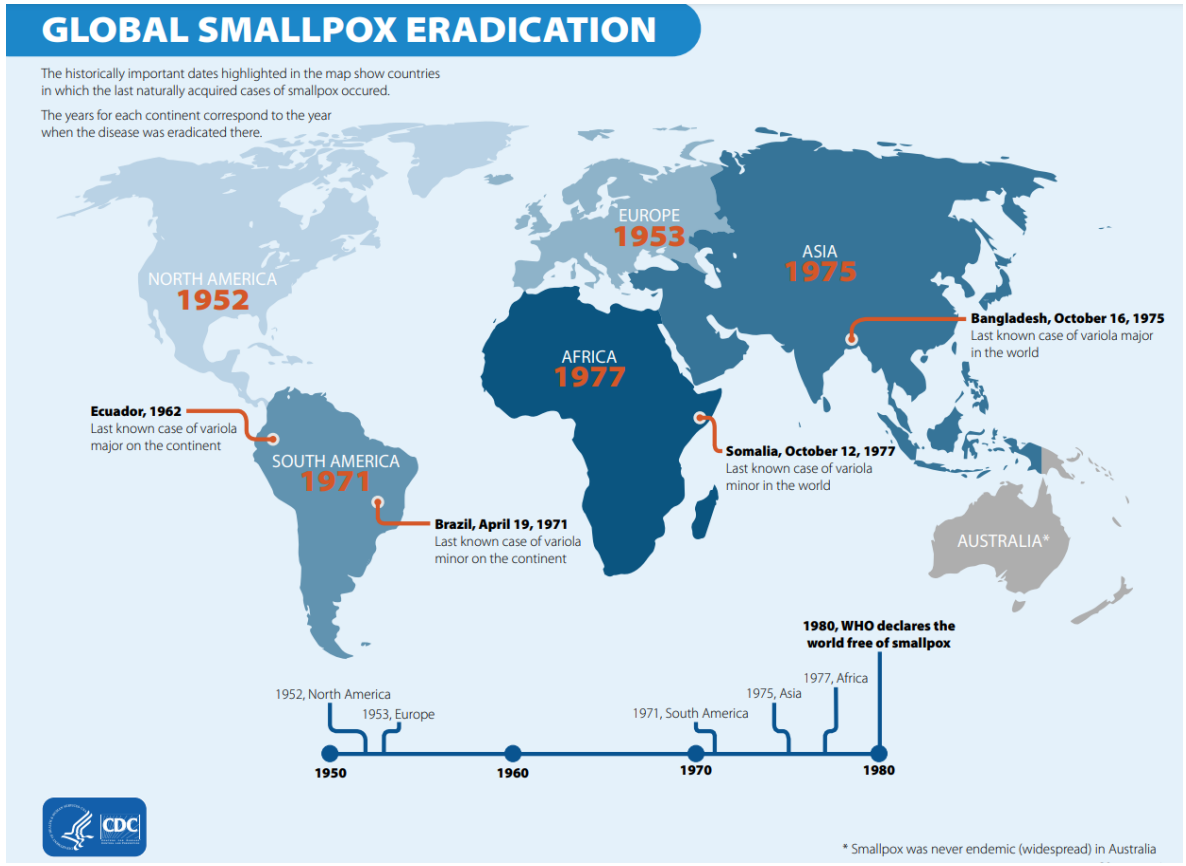
The Swiss Cheese Model



Lesson 7

Vaccines Work

Global Smallpox Eradication

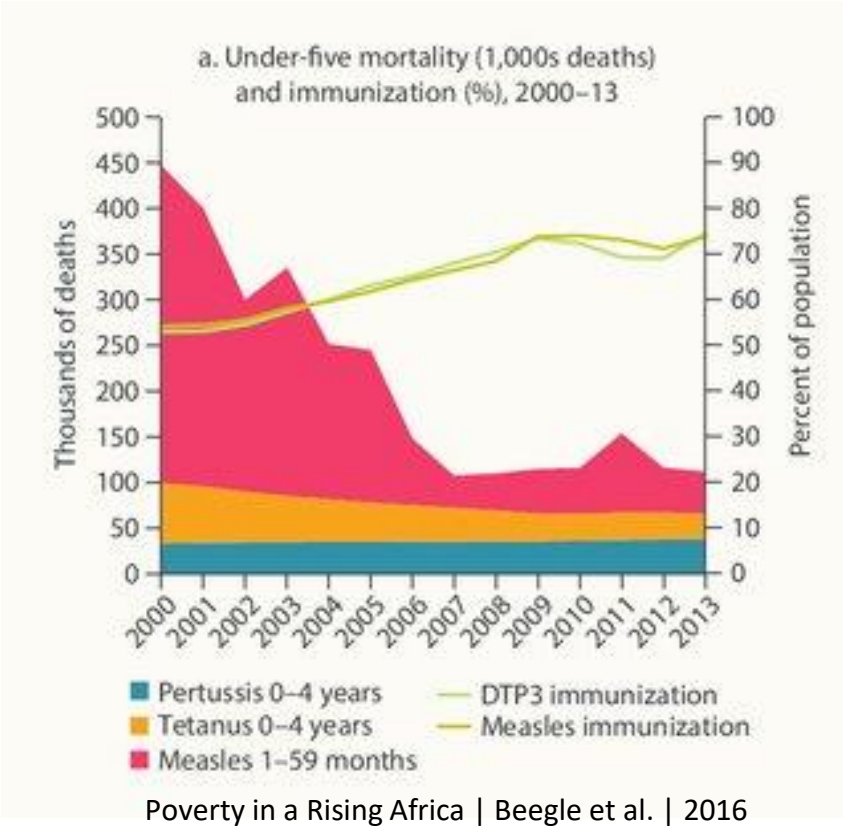


Eradicated in 1977 through a 10-year WHO-led campaign

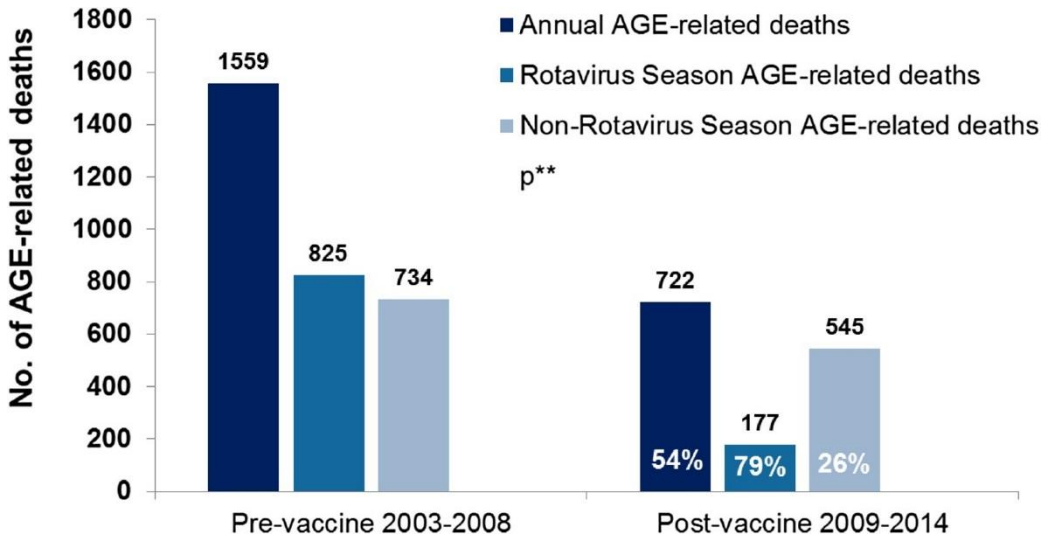
- Emerged around 1520 in India
- CFR = 30%
- Threatened 60% of world's population before eradication
- Early control efforts included "*Variolation*" – Smallpox-naïve individuals exposed to material from smallpox sores
- Led to the development of the first-ever vaccine against a communicable disease

NATIONAL HEALTH LABORATORY SERVICE

Effect of Vaccines of Childhood Mortality



Poverty in a Rising Africa | Beegle et al. | 2016



International Journal of Infectious Diseases | Vol 61 | August 2017

Increase in childhood vaccination is correlated with decline in childhood mortality

Lesson 8

Expect the Unexpected

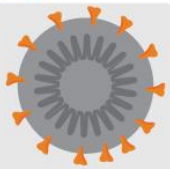
Coronavirus variants

Mutations are natural and to be expected in any virus. Several variants of SARS-CoV-2 have been detected

WHO variants of concern

B.1.1.7 Alpha

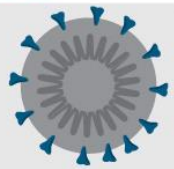
First record: September 2020



Country of first detection: **United Kingdom**

B.1.351 Beta

First record: October 2020



Country of first detection: **South Africa**

P.1 Gamma

First record: December 2020

Country of first detection: **Brazil**

B.1.617 Delta

First record: October 2020

Country of first detection: **India**

B.1.1.529 Omicron

First record: **November 2021**

Announced in: **South Africa**

Main concerns

Transmissibility

Any change on the spike can ***potentially affect how easily a virus can infect a cell***

The **alpha** and **beta** variants appeared to spread more easily and quickly than earlier variants

The **delta** variant has been found to be 43% to 90% more transmissible than previous COVID-19 variants, according to different experts

Severity of illness

Studies on **alpha** submitted to the UK's NERVTAG* in January suggested there ***could be a link to increased risk of death***

A study published August 27 confirmed that a person infected with **delta** is 50% more likely to be hospitalised than someone with **alpha**

*New and Emerging Respiratory Virus Threats Advisory Group

Vaccine efficacy

Some studies suggested **beta** and **gamma** may have mutations that prevent antibodies working as well, ***though more research is needed***

Other lab studies have shown ***that vaccines retain effectiveness*** against **beta** and **alpha**

Studies on **delta** suggest that the variant is moderately resistant to vaccination

Omicron

Detection of the variant ***coincides with a sharp rise in cases*** in South Africa

A preliminary study has suggested the variant is three times more likely to cause reinfections compared to the Delta or Beta strains

WHO says it could take weeks to ascertain effects on transmissibility, severity and vaccine effectiveness

The variant harbours ***32 mutations in the spike protein***, including ***in regions that antibodies recognise***, potentially dampening their potency

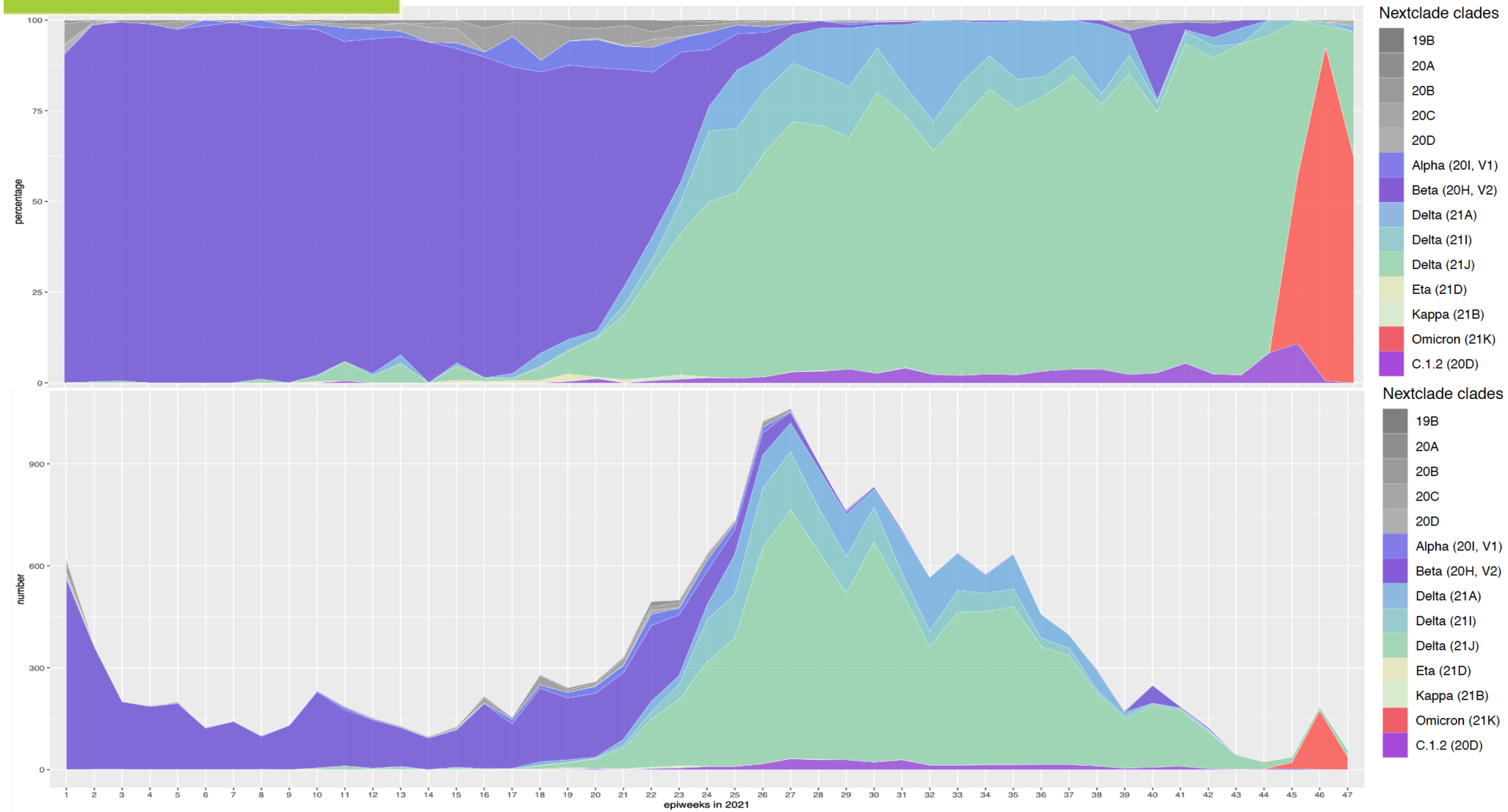
Source: cdc.gov/sciencemediacentre.org/cidrap.umn.edu/WHO.int/sciencenews.org/Birmingham Uni Turnkey lab/NERVTAG/ Imperial College London/astrazeneca.com/New Scientist/Lancet/Moderna

AFP

NATIONAL HEALTH LABORATORY SERVICE

Distribution of SARS-CoV-2 variants in South Africa:

Proportion and number of clades by epiweek in South Africa, 2021 (N= 17 813)



Sequencing data ending epi week 47 (ending 27 November 2021)

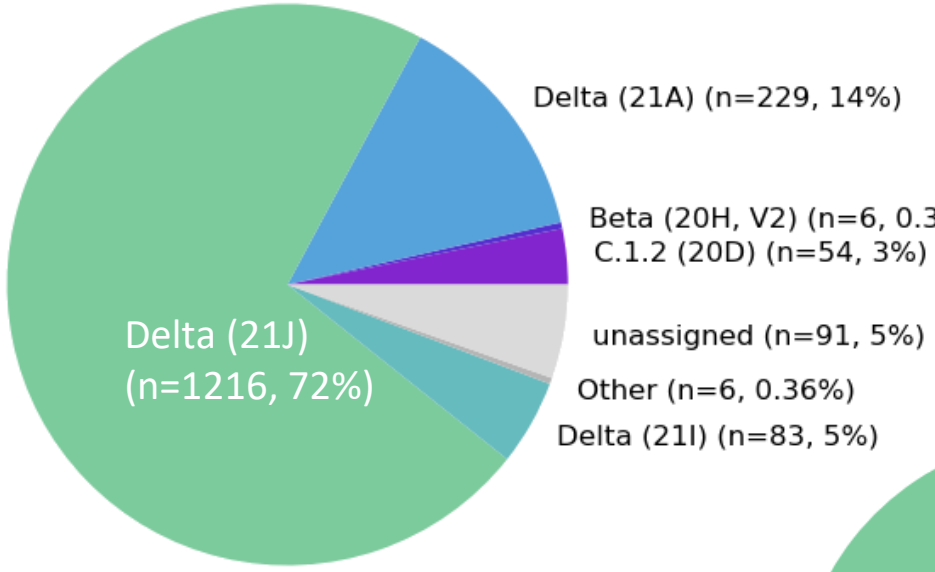
Currently in epi week 48 (ending 4 December 2021)

Delta dominated South Africa's third wave with >80% frequency in October, with C.1.2 detection remaining <4%. Omicron appears to dominate November sequencing data but sequencing is ongoing to determine its true prevalence.

NGS-SA Network for Genomic Surveillance in South Africa

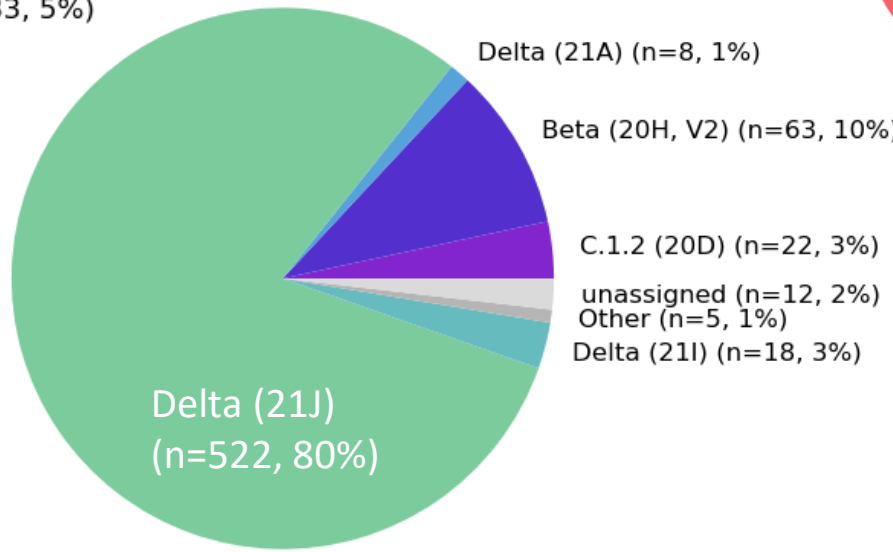
Prevalence of Variants of Concern (VOC) and Variants of Interest (VOI) in September – November 2021

September (N=1685)



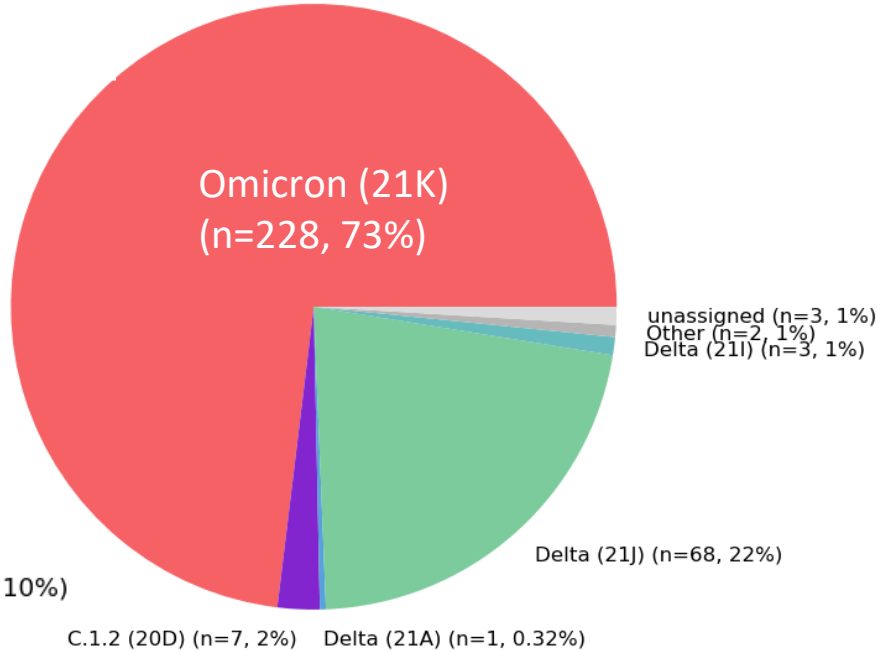
Total Delta in Sep: 1528 (91%)

October (N=650)



Total Delta in Oct: 548 (84.3%)

November (N=312)



Total Delta in Nov: 72 (23%)

The Delta variant dominated in September and October in South Africa.
Omicron was first detected in South Africa in November, comprising 73% (228/312) of sequences.

NGS-SA
Network for Genomic Surveillance in South Africa

Lesson 5

Names Matter

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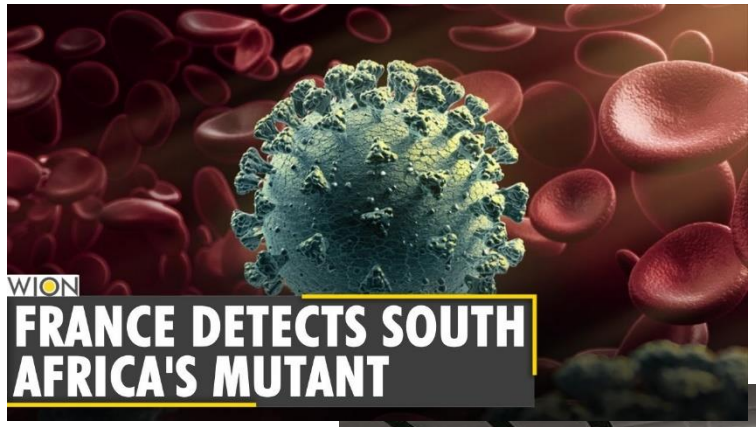
The pandemic of name-calling



SPANISH INFLUENZA BROUGHT TO AMERICA

WASHINGTON, Sept. 11.—Spanish influenza, the strange prostrating malady which recently ravaged the German army and later spread into France and England with

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Consequences of name-calling

- Contrary to popular belief, the flu epidemic of 1918—commonly referred to as the Spanish flu—did not originate in Spain, but likely a military base in Fort Riley, Kansas
  - Designated erroneously, only because Spain put out the first news accounts of it
- Name sent the inaccurate message that it was a distant threat, delaying steps to prevent it in other countries
- Recent COVID-19 labels have led to anti-Asian/African sentiments with severe consequences

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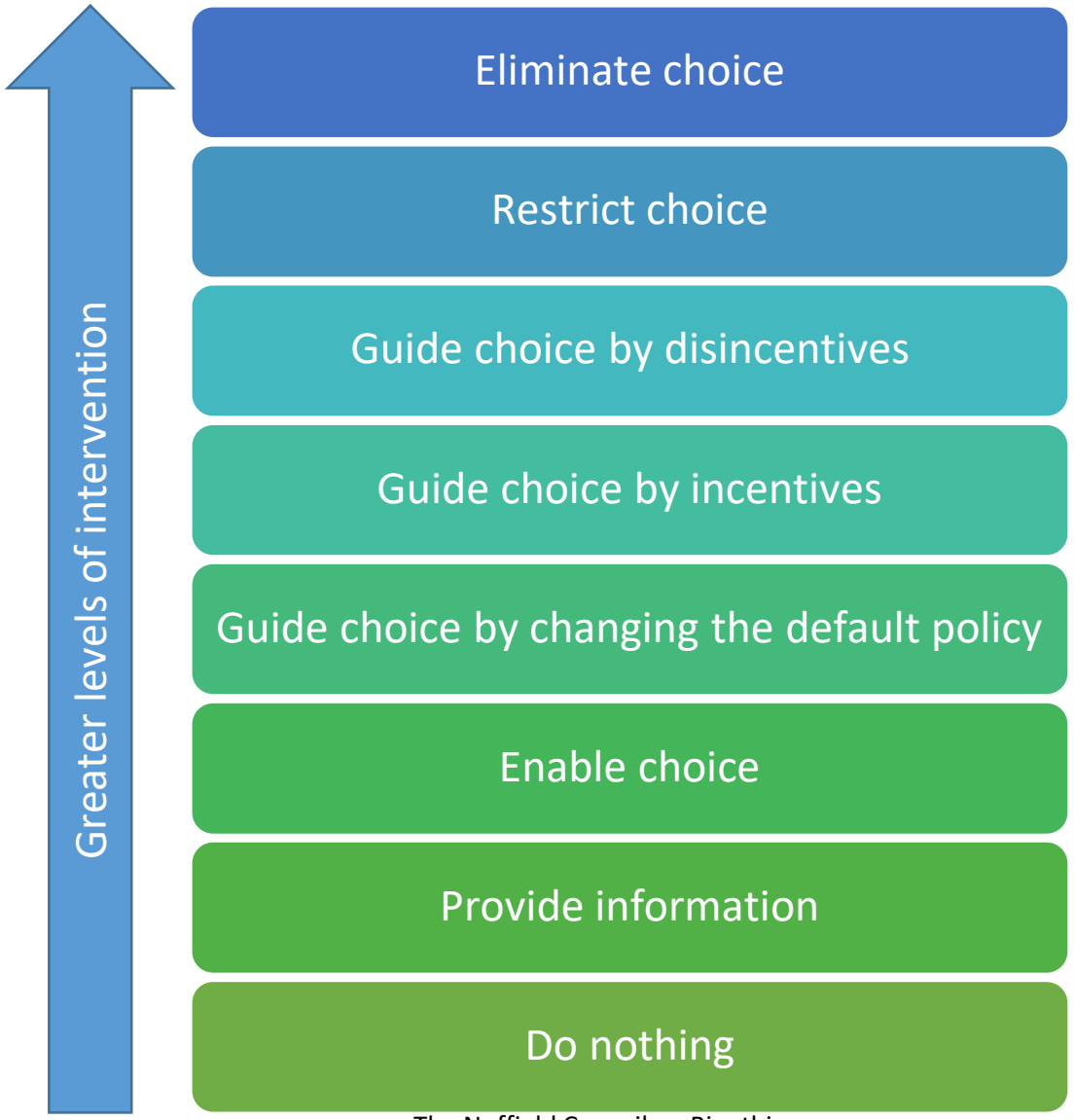
Implementation of Mandates



- Have less-restrictive policy options must be explored and exhausted?
- Will vaccine mandates pass constitutional muster?
- Is the high quality data/evidence to back the need for vaccine mandates?
- Is there adequate supply of vaccines and access to all eligible South Africans?
- Do South Africans have access to credible information?
- Have we done enough to curb misinformation?

The Nuffield Council on Bioethics

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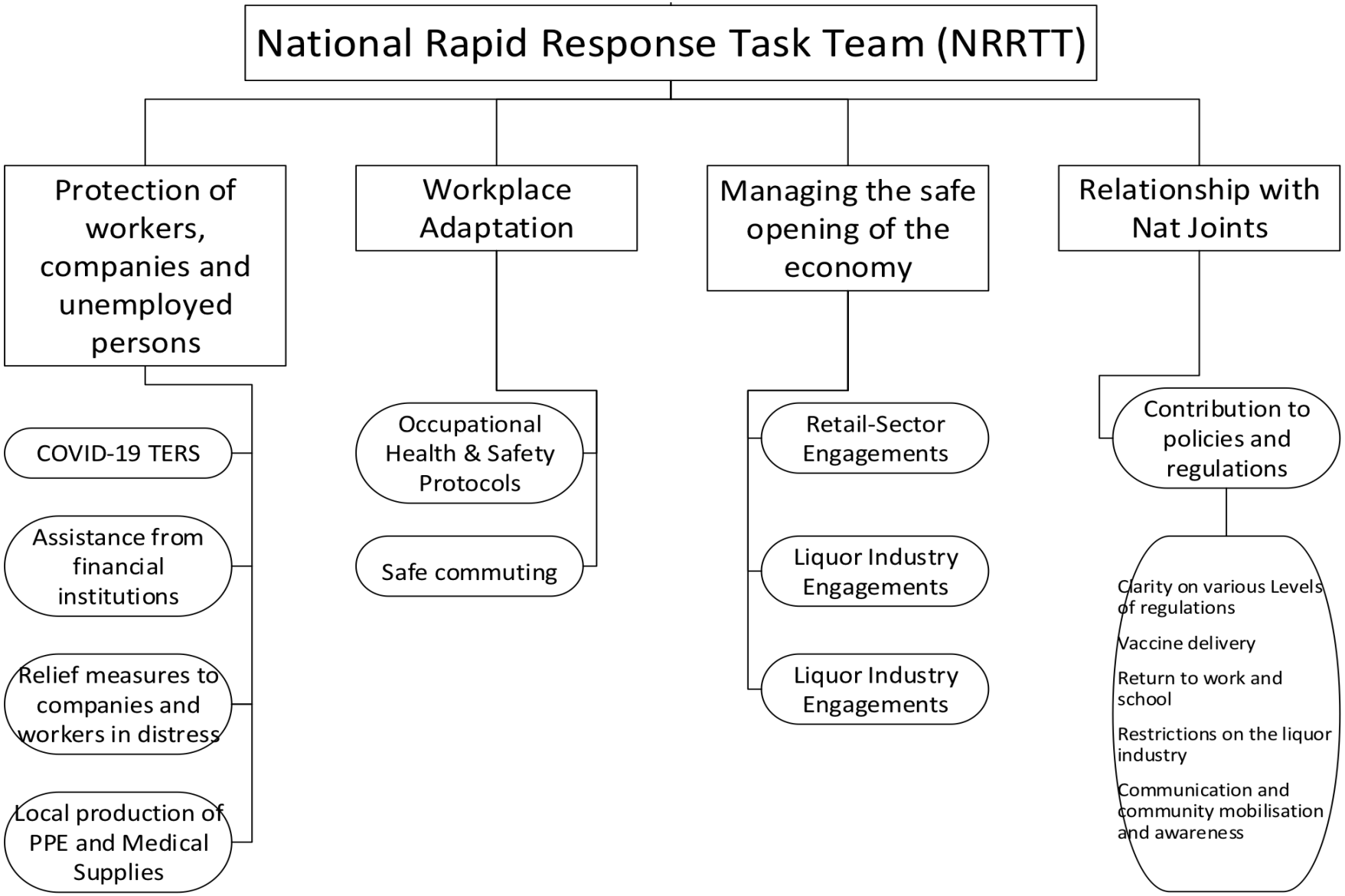
Reflecting on the Work of NEDLAC



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Agency of Civil Society

- Common focus:
  - ➢Despite disparate interests (Apartheid Economies)
- Pervasive common enemy:
  - ➢Exposing behavioural drivers (HIV in patriarchy)
- Fallen heroes – loss of trust:
  - ➢Implosion of leadership (the November vote!)
- Social competency: Positive collective unconscious
  - Where is this agency in the COVID-19 epidemic???

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National Behavioural Competencies

- Social determinants call for a social response
- Pandemic has biologic AND social drivers
  - Science is addressing the biological
- Behavioural modification is key for the social drivers
- Elephant in room: Antisocial drivers of the economy
  - Impact of alcohol [on health systems; family structure; etc]
  - Corruption and accountability [COVID-19 resources]

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Bottom line……

- Vaccinate all; get boosters after 6-8 months prioritising 50+ and immunosuppressed
- Strengthen and **enforce** public health and social measures for prevention
- Omicron variant may have increased transmissibility in addition to substantial evasion of protection conferred by prior infection – increased reinfections and breakthrough infections
- Urgent plan to translate from containment to mitigation…..learning to live with SARS-CoV-2

Acknowledgements

- Maanda Mudau
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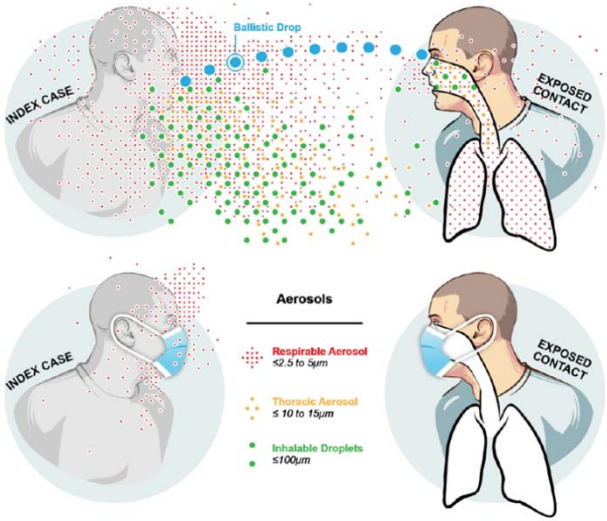
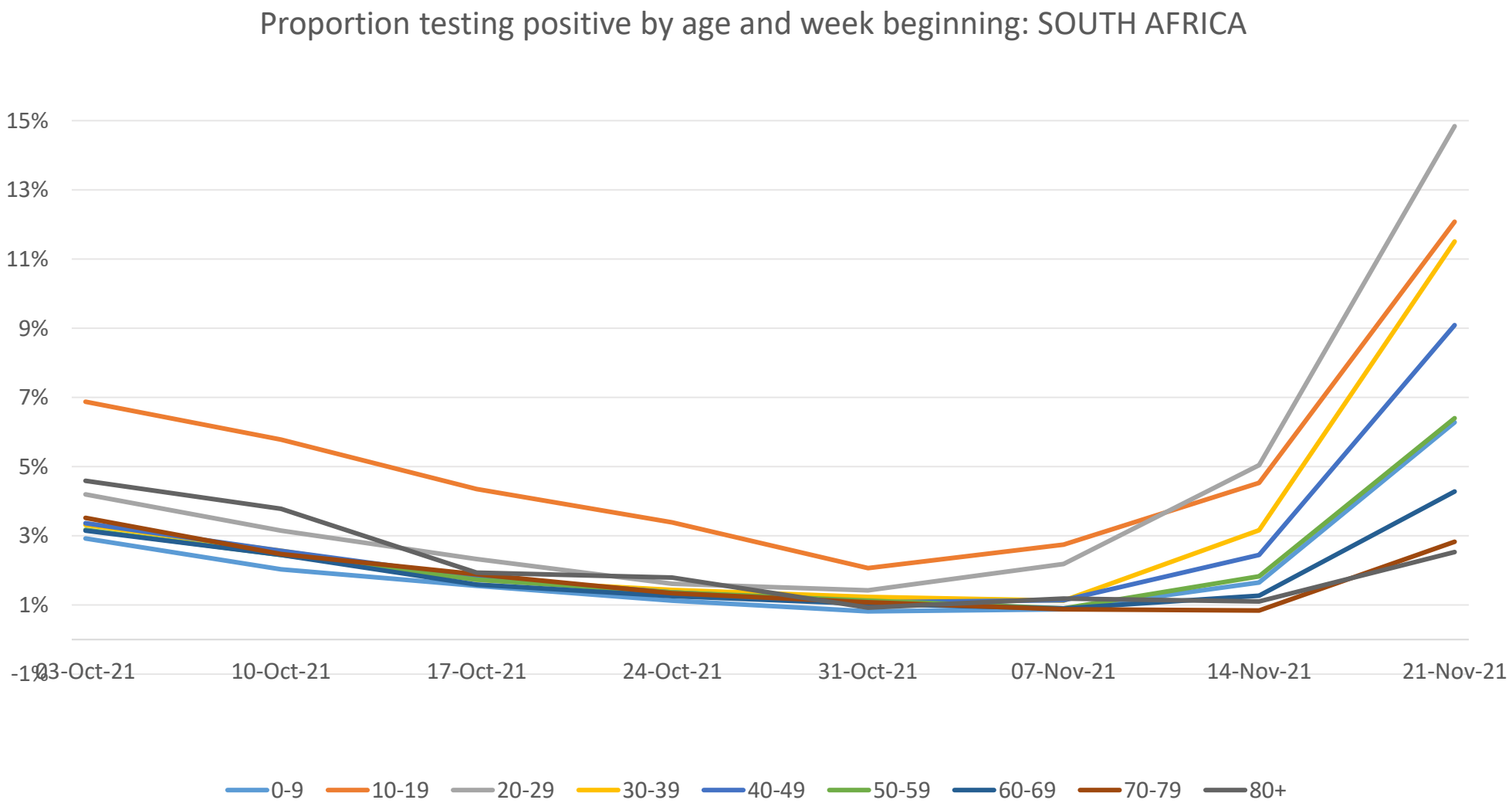
- NGS-SA



Thank You!!!!!

Percent testing positive by age group (PCR only)



Incidence risk of admissions per 100,000 by age group and epidemiologic week, Gauteng