



ACTUARIAL SOCIETY
S O U T H A F R I C A

The Role of Actuaries in a Pandemic: Overview of the ASSA COVID-19 Task Team Work

The Actuarial Convention, 11 October 2023

*Presented by Claiton Manikai, Adam Lowe, Siebert Benade, Karsten Roux and
Prof. Roseanne Harris*



What we want to talk about

- Why was the Task Team created?
 - What have we done?
 - Life/Mortality workstream
 - Health workstream
 - Market conduct workstream
 - Thought leadership and the future
 - International perspective
 - Key conclusions and recommendations
-



Terms of Reference approved by ASSA Council (summary)

The Task Team is established to create a **forum for ASSA members** to learn, model, educate, inform, research, debate and influence COVID-19 developments in a **positive and constructive way** which support and enhance our **profession's commitment to societal and public interest**.

The Task Team will

1. conduct **retrospective and prospective analysis of the COVID-19 pandemic**
2. identify **market conduct issues**
3. collaborate with other experts and develop a body of knowledge for dealing **with future pandemics** and prepare public policy recommendations

Objectives

- Help actuaries **in thinking and responding** to COVID-19
 - **Forum** for ASSA members
 - Promote the **formal publication** of research and analysis (for science)
 - Promote **professional and ethical** conduct by members
 - Societal and **public interest**.
 - Support development of **thought leadership** of actuarial practice
 - **Strategic direction** of the Society
 - **Support** other bodies and **influence** legislation
-



Structure

- The following adapted structure was adopted
 - Life/Mortality
 - Health
 - Market Conduct
- Made sense given working areas and experience of teams
- Each of the teams above created reports

Chair: **Claiton Manikai**

Deputy Chair: **Louis Rossouw**

Life/Mortality lead: **Karsten Roux**

Health Stream lead: **Adam Lowe**

Market Conduct lead: **Siebert Benade**

Secretariat: **Phumla Tsemetse, Zandile Gobe, Thandanani Mbhele**

with

Council reps.: **Niel Fourie, Christoff Raath**

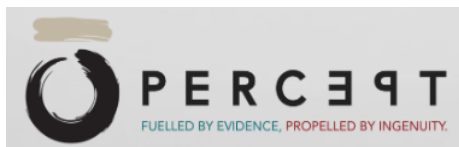
Public Interest GC: **Lusani Mulaudzi**

By invitation: **ASSA President and President-Elect**

C19TT membership representations – call for volunteers



- Invites sent by ASSA to all Actuaries, all practice areas, via ASSA comms. channels, workshop held in Q1 2022
- Members contribute to the C19TT in their personal professional capacities
- Team membership is cross a wide range of companies, practice areas and sectors
- This gave C19TT access to very diverse inputs and experience, and access to a varied range of data sources.





Key findings of the ASSA Covid-19 Task Team to date

1. COVID-19 was a **deadly pandemic** killing many South Africans (high relative mortality rate globally)
 2. COVID-19 **deaths were under-reported** and without **excess deaths** derived from vital registrations we would not have been able to ascertain the extent of the impact (which is likely still understated)
 3. **Society and governments responded** to mitigate the impact with some unintended consequences
 4. The **effect of interventions are difficult to measure** but these generally show positive contribution in SA and elsewhere
 5. **Economic impacts are difficult to disentangle** (need to balance risks of interventions vs. COVID-19 without intervention)
 6. **Vaccines saved lives** and access to vaccines sooner would have saved more lives, with **the benefits of vaccines outweighing any risks.**
 7. COVID-19 and related effects are likely to **impact mortality and morbidity for a number of years**
 8. **Actuaries have a public interest and prudential role to play** to understand and mitigate the risks we face due to pandemics in the future
-



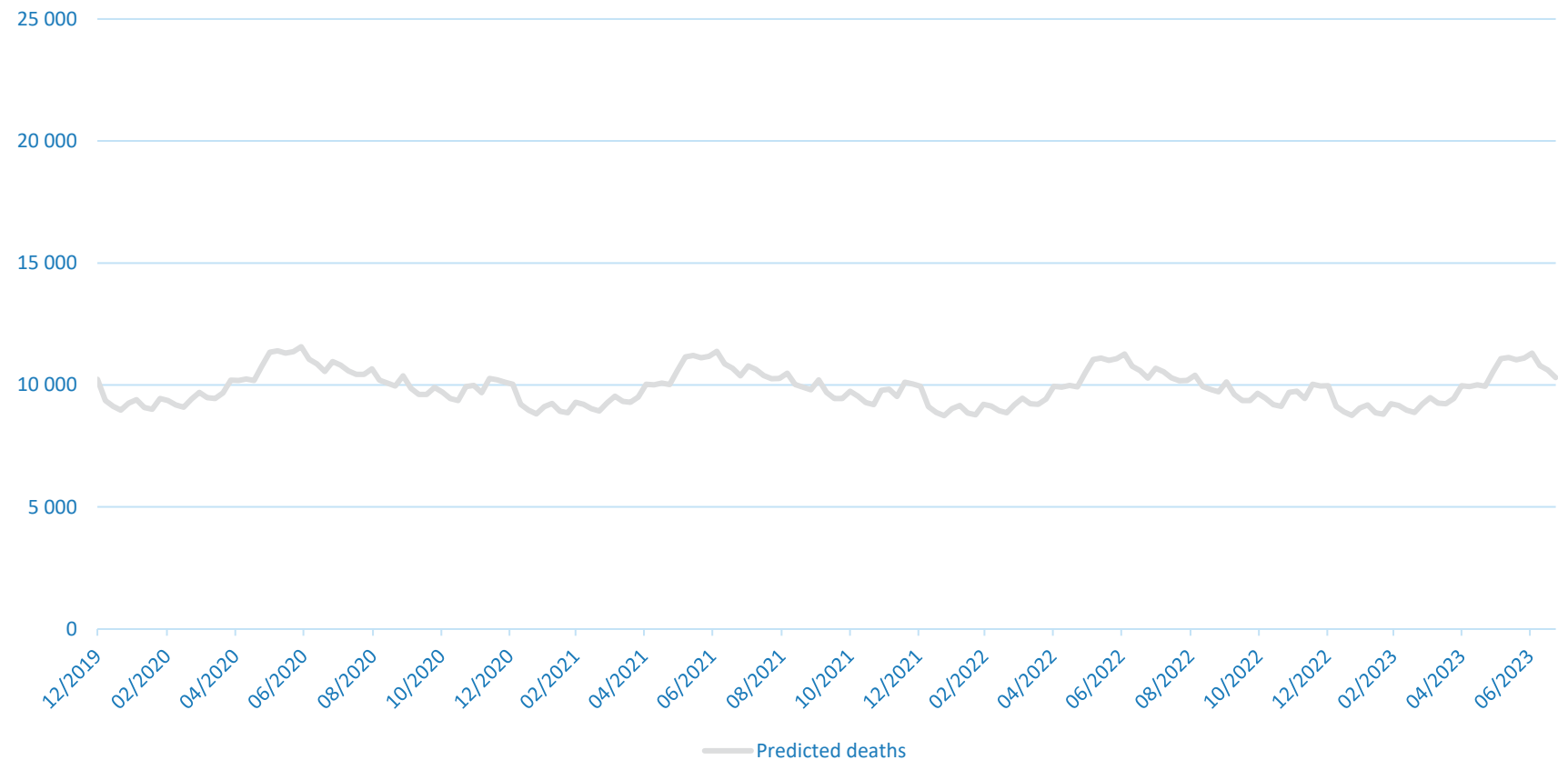
ACTUARIAL SOCIETY
SOUTH AFRICA

Life Insurance and Mortality Workstream



“Normal” Deaths Expected

Predicted deaths 1 033 000





“Normal” Deaths Expected

Predicted deaths 1 033 000

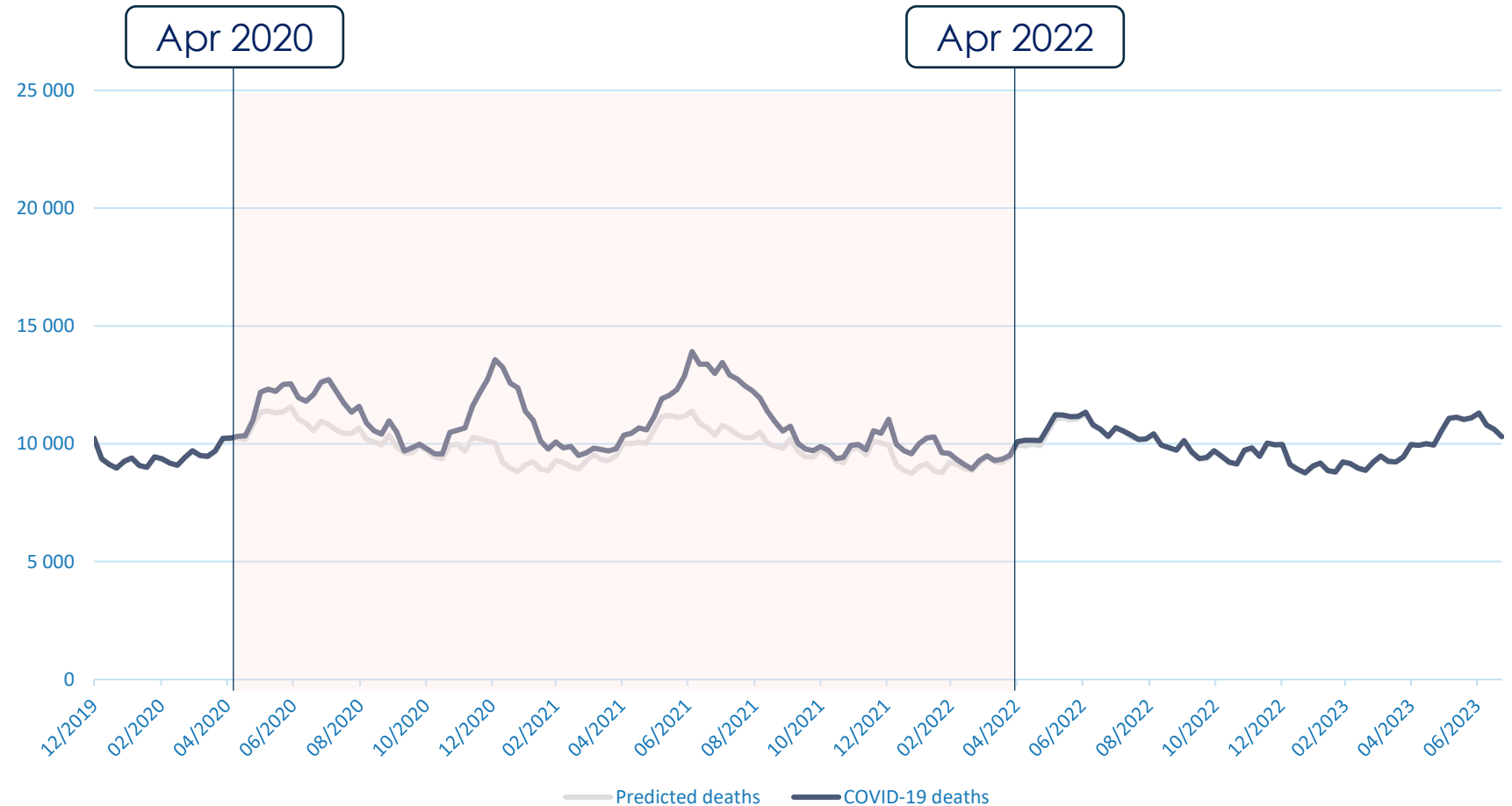




COVID-19 Reported Deaths

Predicted deaths 1 033 000

COVID-19 deaths 100 000



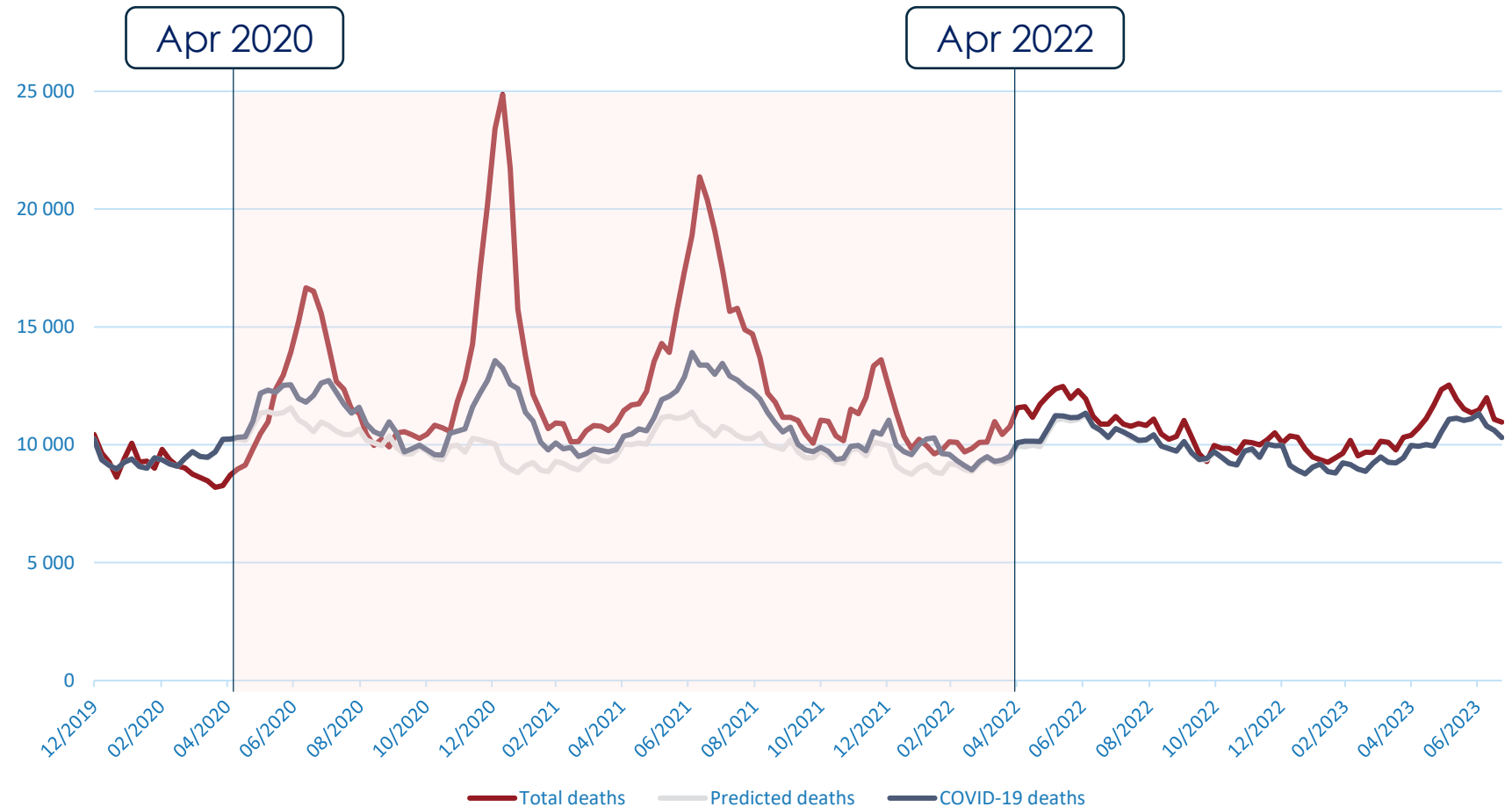


Excess Deaths

Predicted deaths 1 033 000

COVID-19 deaths 100 000

Excess deaths 264 000



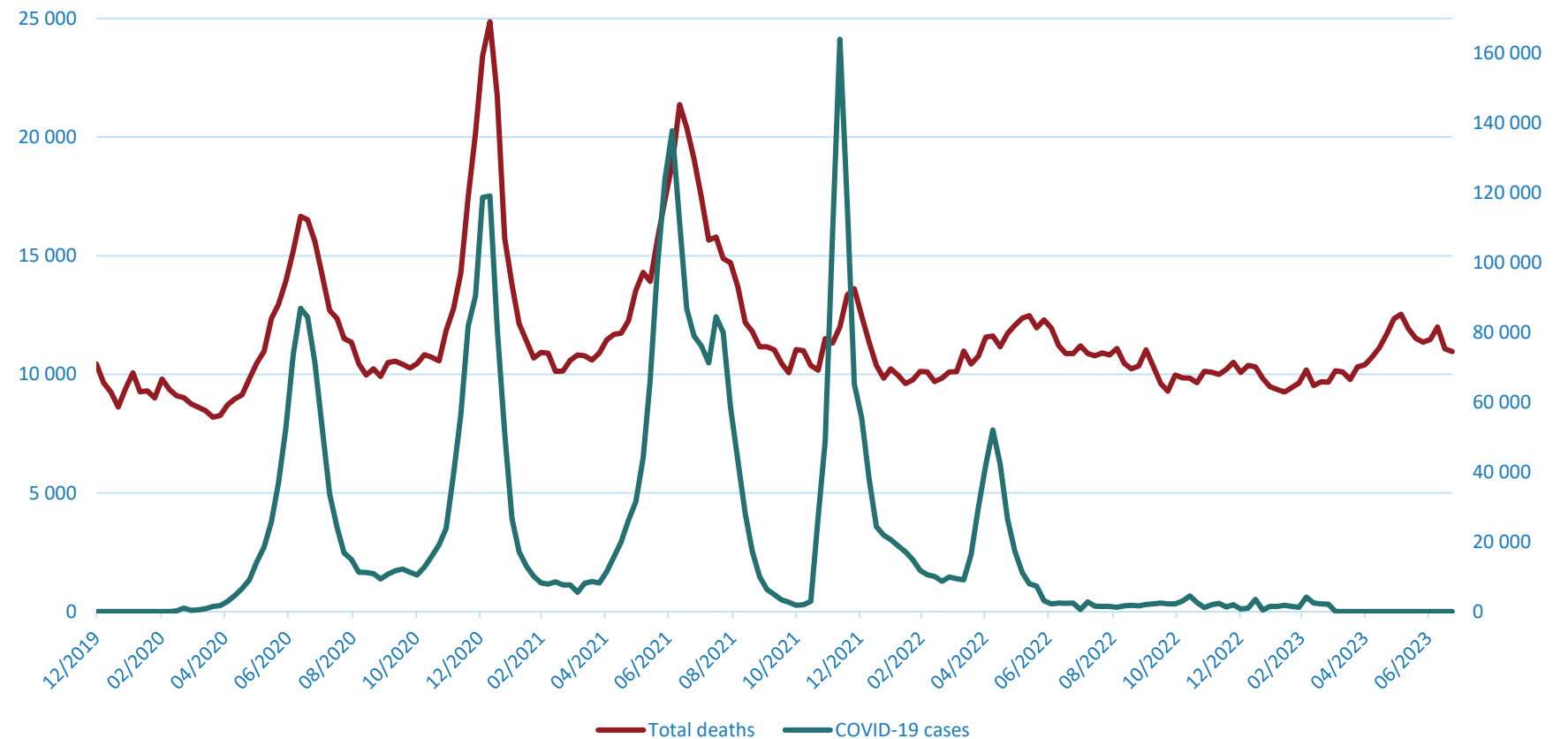


Are Excess Deaths Caused by COVID-19?



Are Excess Deaths Caused by COVID-19?

Highly correlated with incidence

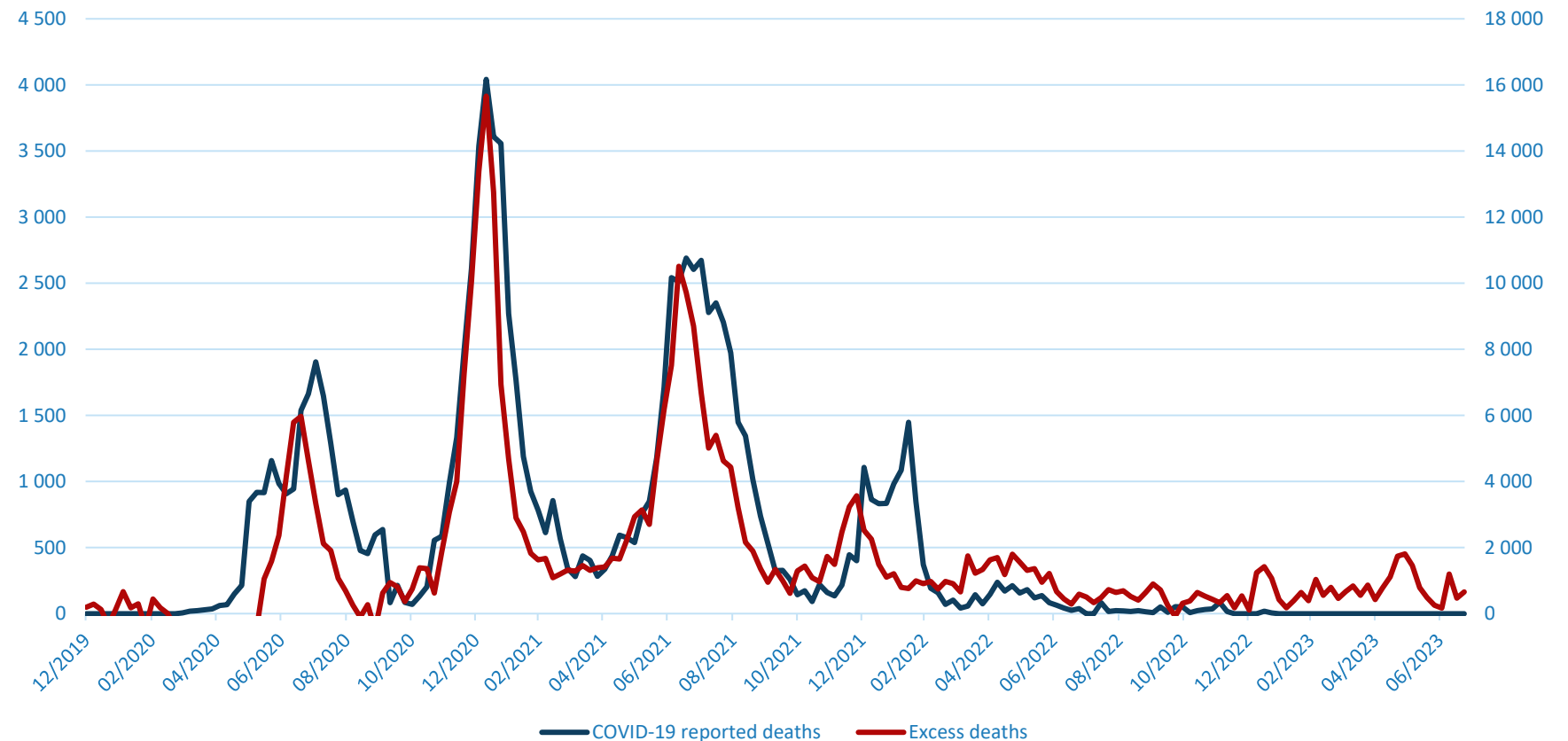




Are Excess Deaths Caused by COVID-19?

Highly correlated with incidence

Highly correlated with reported
COVID-19 deaths





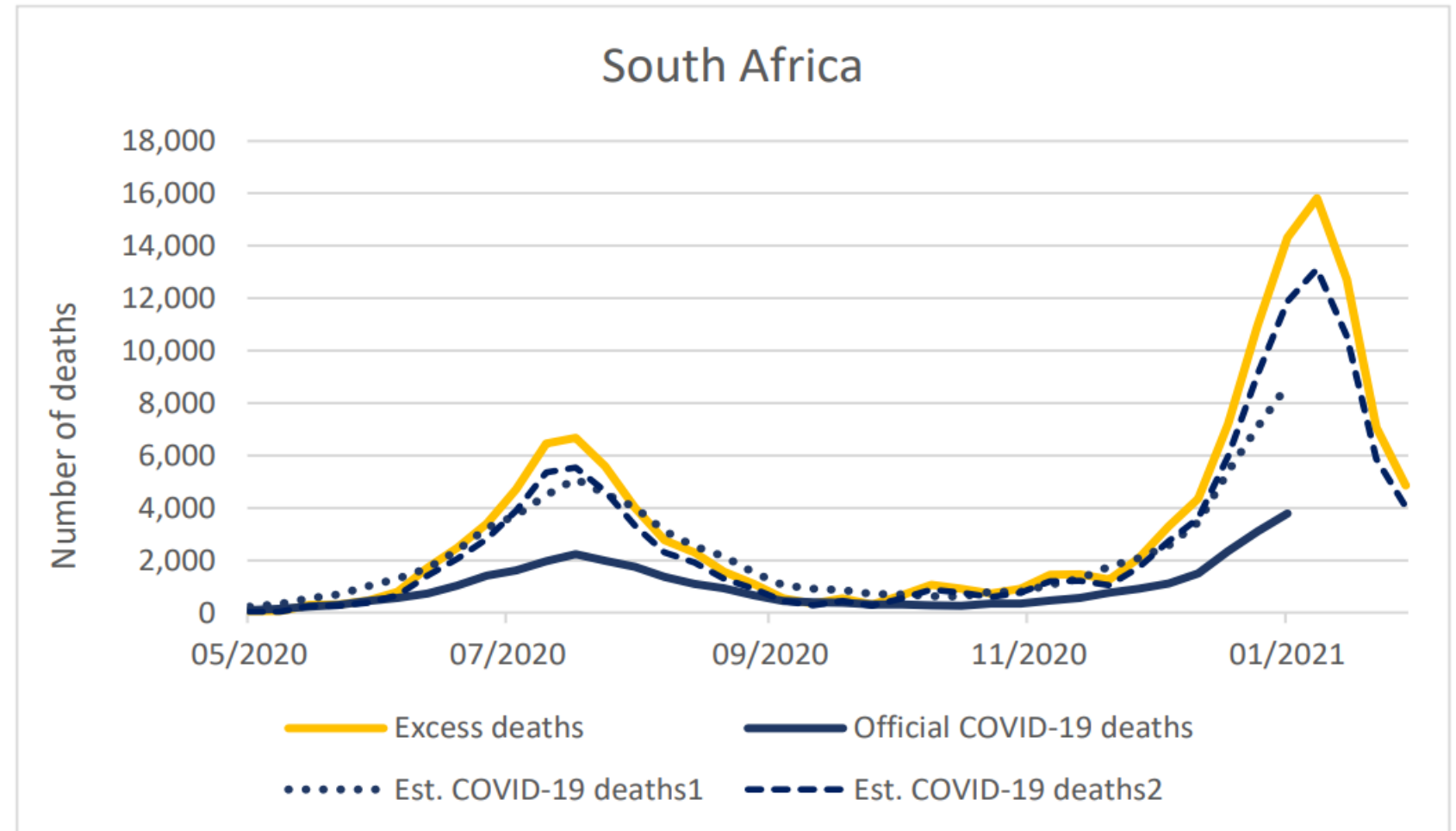
Are Excess Deaths Caused by COVID-19?

Highly correlated with incidence

Highly correlated with reported
COVID-19 deaths

85-95% of excess deaths

<https://www.samrc.ac.za/sites/default/files/bood/weeklyreports/CorrelationExcessDeaths.pdf>



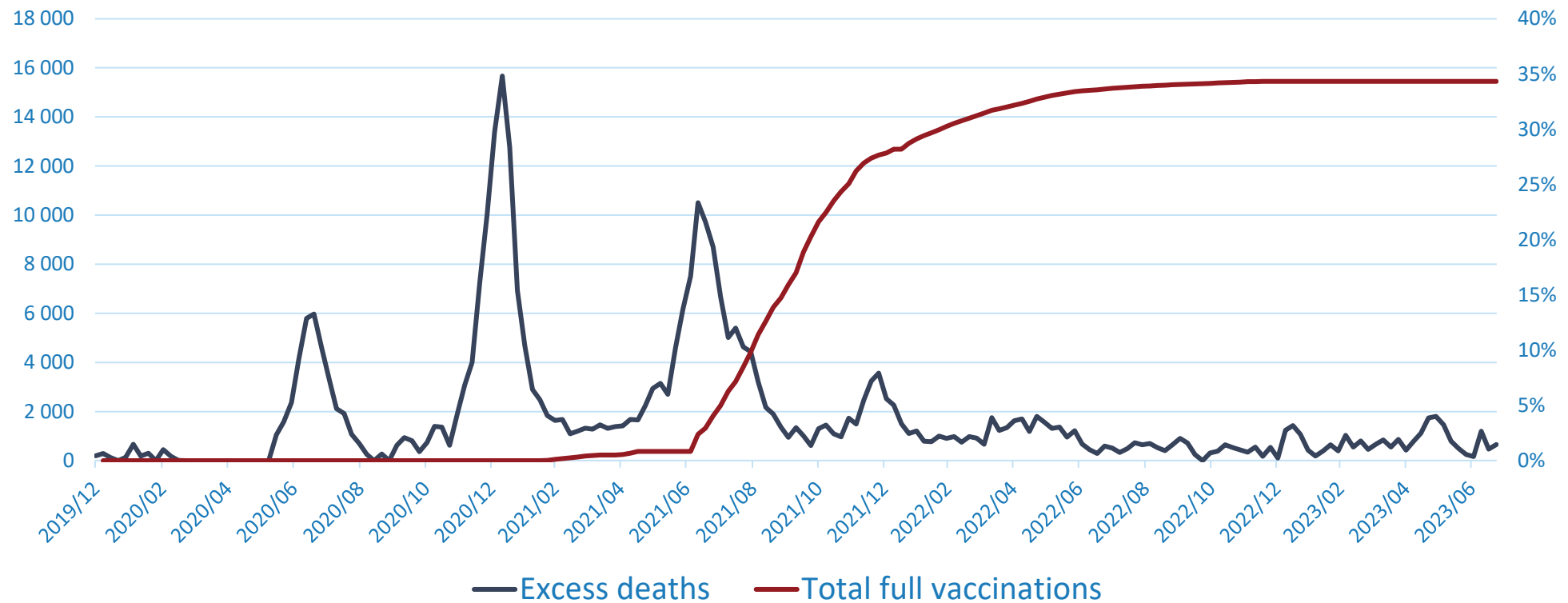


Societal Response

- Social distancing, reduced size gatherings, masks, curfews and alcohol restrictions
 - Reduced mobility → reduced sickness and mortality
 - Scramble for vaccines
 - Much lower mortality in Omicron wave for other countries
 - Economic consequences are hard to study
 - Was it justified?
 - What if we did more? More isolation? Earlier vaccines?
-



Vaccination Rate vs Excess Deaths





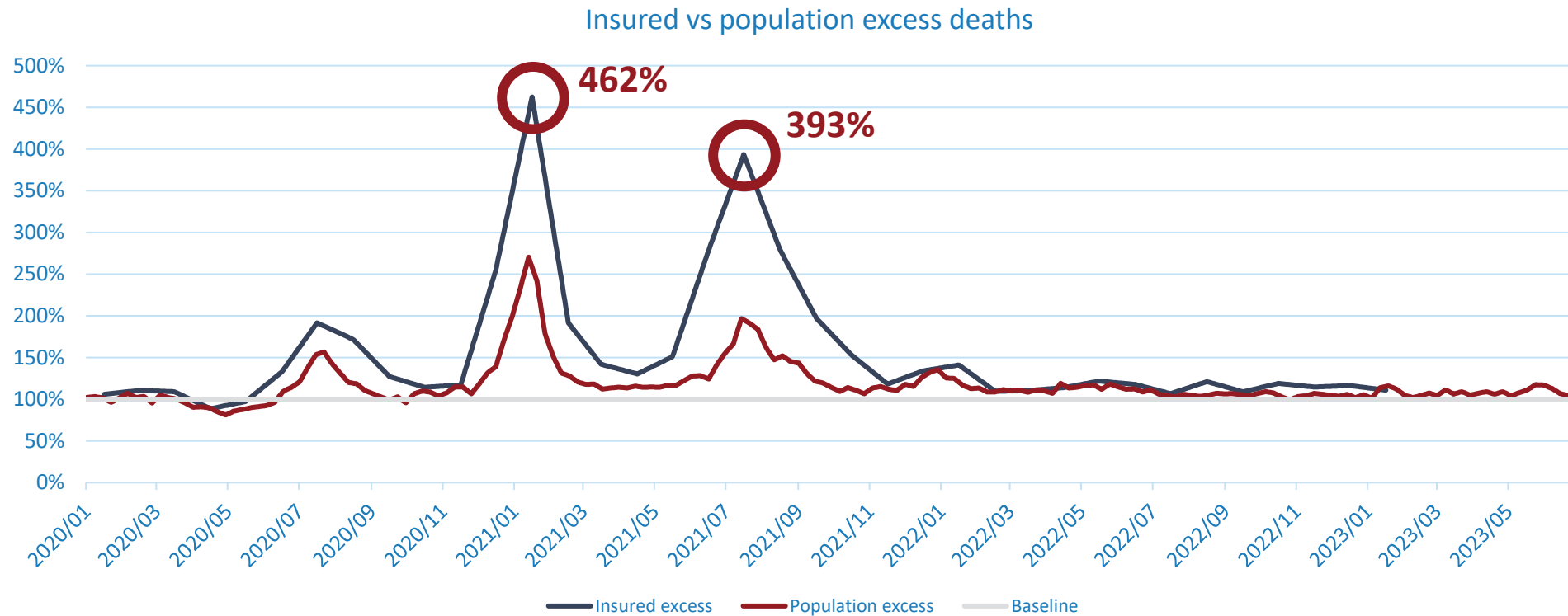
Actuarial Response

- IFOA COVID-19 Action Taskforce (ICAT) and COVID-19 Actuaries Response Group
 - ASSA COVID-19 Task team
 - ASSA COVID-19 models
 - ASSA CSI Covid dashboard
 - Information bulletins
 - Papers by various insurers and reinsurers
 - Review of
 - Industry response
 - SAM performance
-



Insurers' Role

- Paid significant amounts of claims





Insurers' Role

- Paid significant amounts of claims
 - Premium holidays
 - Pricing updates
 - Changed claims definitions and processes
 - Changed underwriting practices
 - Changed risk assessment processes and scenarios
-



Other Lines of Business

- Disability income
 - Significant increase in short waiting period claims
 - Higher claim termination rates due to deaths
 - Future increase?
 - Disability lump sum
 - Slight reduction to date
 - Future increase?
 - Critical illness
 - Slight reduction to date
 - Expected increased incidence
-

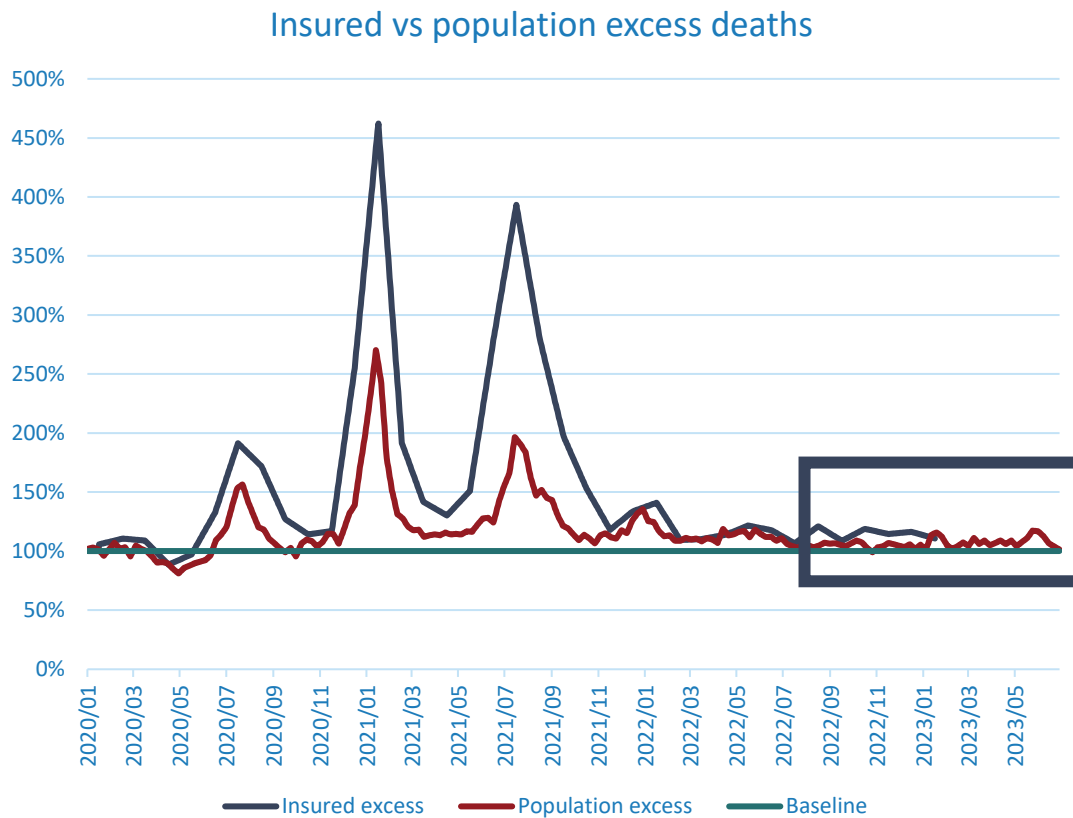


Future Mortality & Morbidity Impacts



Future Mortality & Morbidity Impacts

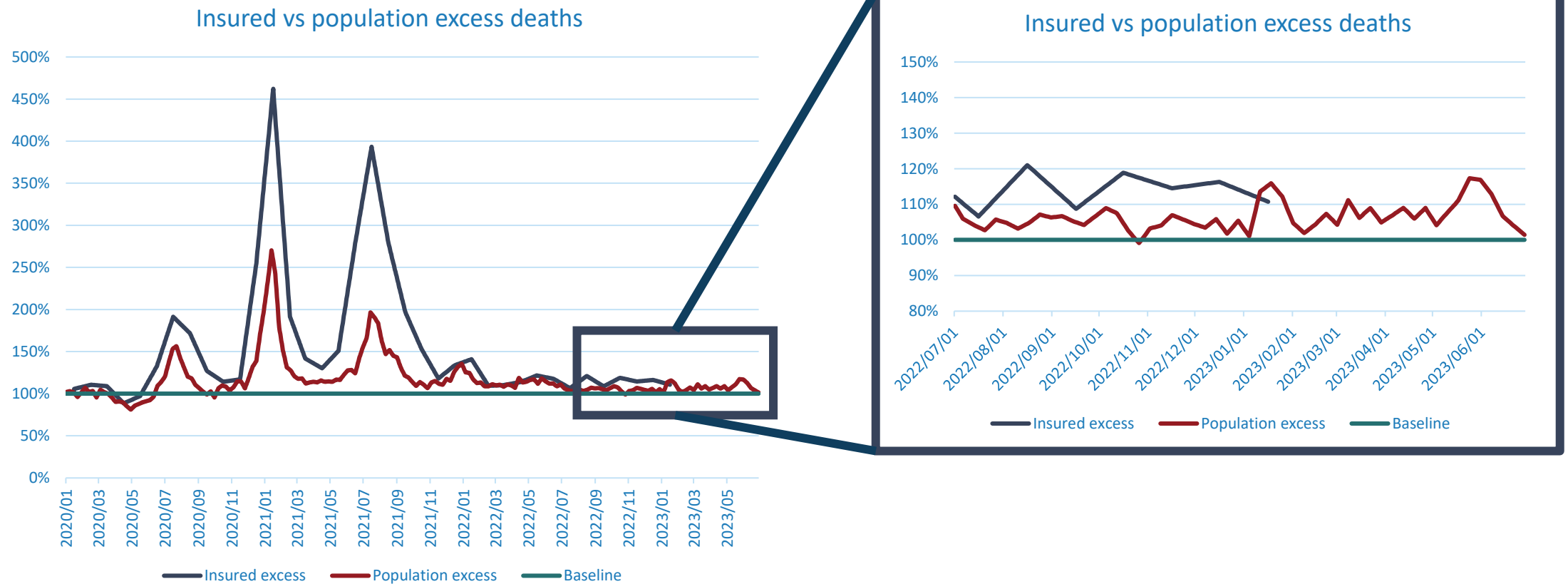
- Still some excess deaths





Future Mortality & Morbidity Impacts

- Still some excess deaths





Future Mortality & Morbidity Impacts

- Still some excess deaths
 - Delayed diagnosis and treatment
 - Economic impacts
 - Accelerated deaths in impaired population
 - Medical technology advances
-



Mortality & Life Insurance – Future Focus

- “Encourage” StatsSA to release cause-based data
 - Ongoing population-based data monitoring (global pandemic readiness)
 - Assumptions about future pandemics
 - Planning at a societal level for future pandemics
 - Dependence on global supply chain problematic
 - Could have saved lives and restart economy sooner with vaccines
 - Recalibrate life insurers’ capital regimes
 - Ongoing research and studies
 - Long-COVID
 - Modelling guidance
 - Excess living benefit claims
-



ACTUARIAL SOCIETY
SOUTH AFRICA

Healthcare Workstream



Healthcare Workstream to Date: Progress of the Pandemic

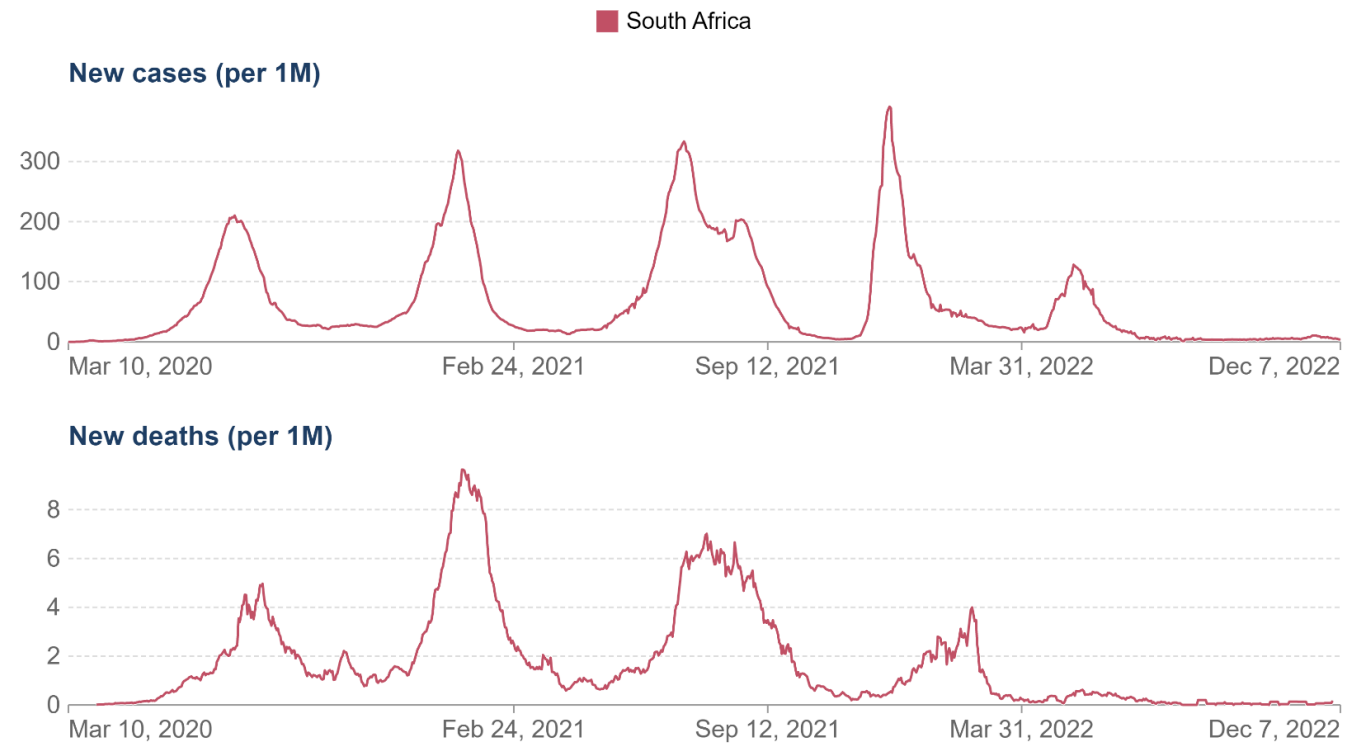
The Task Team and its predecessor Working Group tracked infections and deaths through the 'waves' over time – this has been linked to the variants of the virus to support the emerging picture of the SA pandemic. For SA:

- Wave 1 was the original virus form and a relatively mild wave;
- Wave 2 was driven by the Beta variant (high peak of deaths);
- Wave 3 was driven by the Delta variant (large, sustained peak of cases and deaths); and
- Waves 4 and beyond were driven by the Omicron variant (milder in terms of deaths).

Daily new confirmed COVID-19 cases & deaths per million people

7-day rolling average. Limited testing and challenges in the attribution of cause of death means the cases and deaths counts may not be accurate.

Our World
in Data



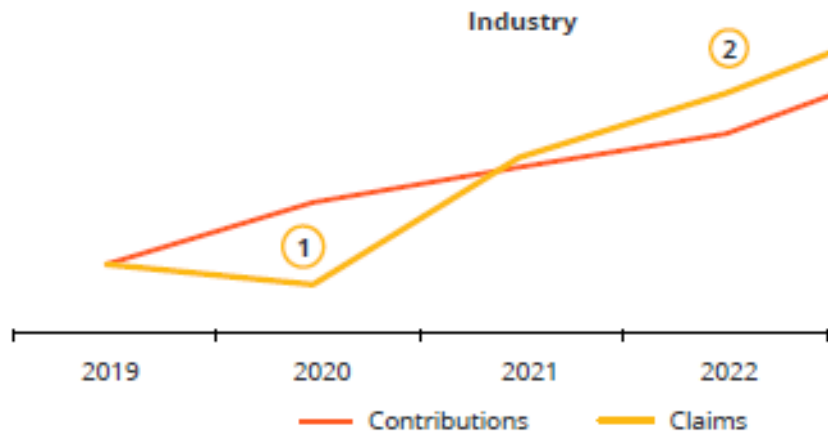
Source: Johns Hopkins University CSSE COVID-19 Data

CC BY

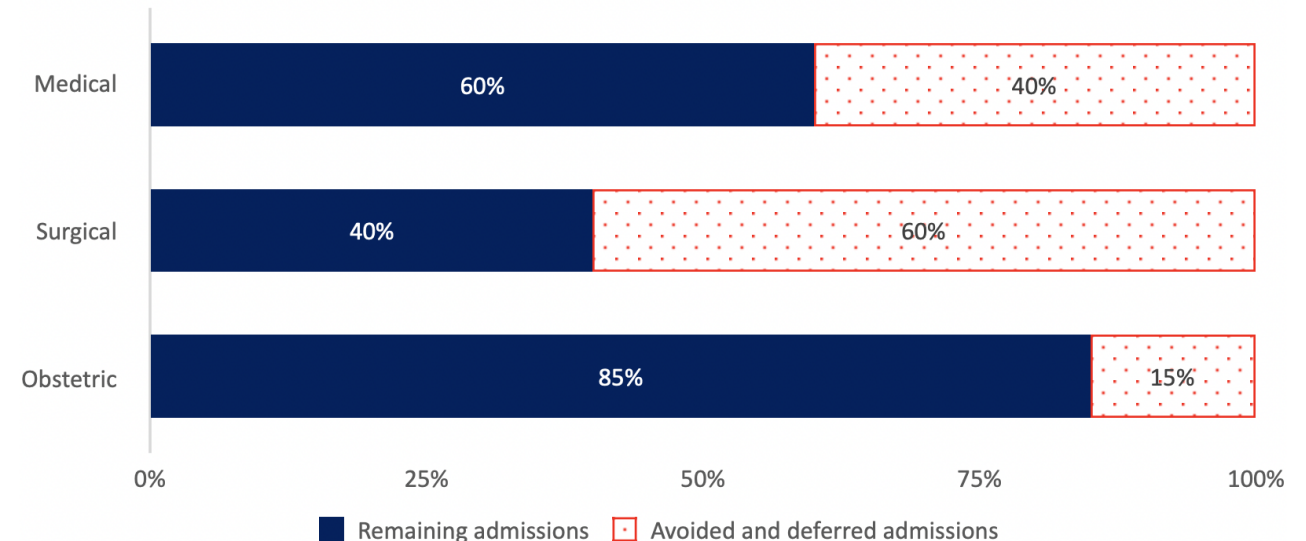


Healthcare Workstream to Date: Medical Scheme Claims

Research (and data from the CMS) suggests that most medical schemes experienced surpluses through the pandemic as a result of deferred or cancelled treatments (notably hospital admissions).



Source: Discovery Health



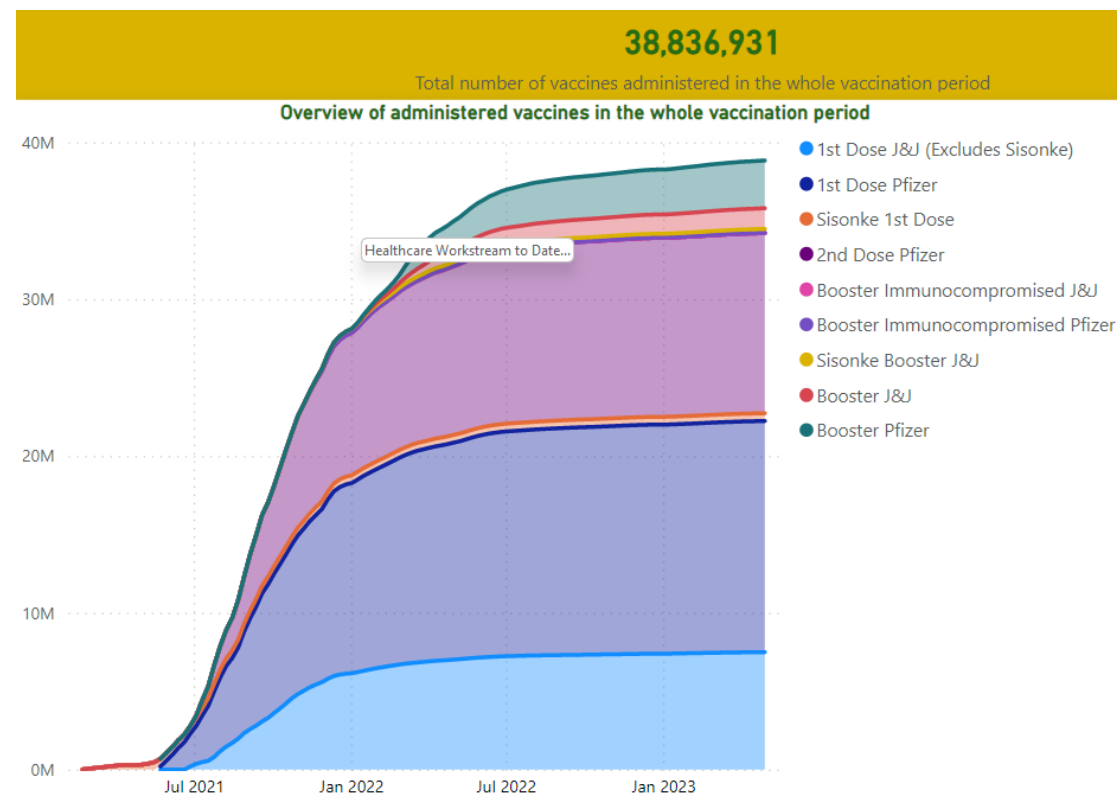
Source: Insight Actuaries and Consultants



Healthcare Workstream to Date: Vaccine Rollout

Research and publications tracked the vaccine rollout in South Africa. It was characterized into:

- Act 1 (Medical Emergency): the scramble for vaccines which led to the Sisonke trial;
- Act 2 (Groundwork): getting vaccines into the country (starting with Pfizer) and administering them to the elderly group;
- Act 3 (Building Pace): J&J vaccines arrive, large quantities come in and the age-based rollout continues; and
- Act 4 (Race to the Finish): bringing the country to population immunity to allow the release of restrictions.



Source: National Department of Health



Healthcare Workstream to Date: Vaccine Safety and Efficacy

Efficacy

Significant evidence of positive effects on severe disease and death

Mixed to no effect on transmission and less severe infections

Duration

Duration of immunity still uncertain, but shown to wane in months after vaccination

Booster vaccines used as part of many rollouts, especially in higher-risk populations

Side Effects

Some side-effects are reported, but at population level benefits outweigh these

A specific risk in respect of myocarditis was identified in younger males

Natural Immunity

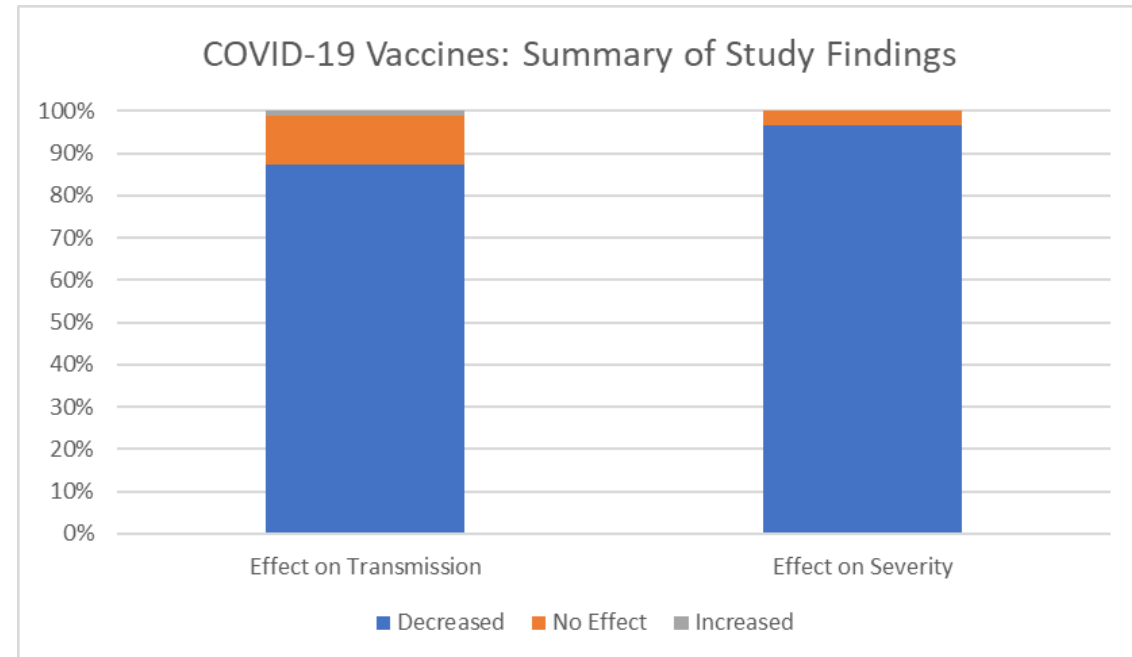
Immune responses to infection vary more than those to vaccines, but natural immunity is still strong protection

Research appears to suggest hybrid immunity (past infection plus vaccination) could be the strongest protection



Healthcare Workstream to Date: Vaccine Studies Summary

- 95% and more of published studies we could find (over 110) show a positive effect of vaccination on severity of infection; but
- A lower proportion (85%) of a smaller set of studies (95) show the same positive effect on transmission and one study even finds the opposite.





Healthcare Workstream to Date: Other Research

Other research by actuaries/medical schemes included:

- Analysis of age and disease-related mortality and morbidity in COVID patients, confirming the rationality of the age-based rollout;
 - Cost-benefit analyses into the proposal to vaccinate the entire adult population (as opposed to only high-risk groups);
 - Reductions in mortality resulting from the provision of pulse oximeters to COVID-positive patients;
 - The enhancement to vaccine protection provided by physical activity; and
 - Other discussions around vaccine hesitancy and the possibility of COVID becoming endemic in the population.
-



Healthcare Workstream: Further Proposed Research

The Healthcare Workstream has requested data from medical schemes and is in the process of collecting that data. The research questions proposed include:

- Does medical scheme data correlate to the 'official' statistics in terms of the infection waves?
 - Can hospitalisation statistics provide a proxy for infection severity and allow us to comment on severity of infection?
 - Does the data on vaccinated lives support the research showing a positive impact on death and severe infection but limited to no impact on transmission?
 - What is the duration of vaccine-induced and natural immunity and what if any are the implications for population immunity?
 - Can we find any (early) evidence of vaccine side-effects or long-COVID syndrome in the medical schemes data?
-



ACTUARIAL SOCIETY
SOUTH AFRICA

Market Conduct Workstream



Market Conduct Workstream

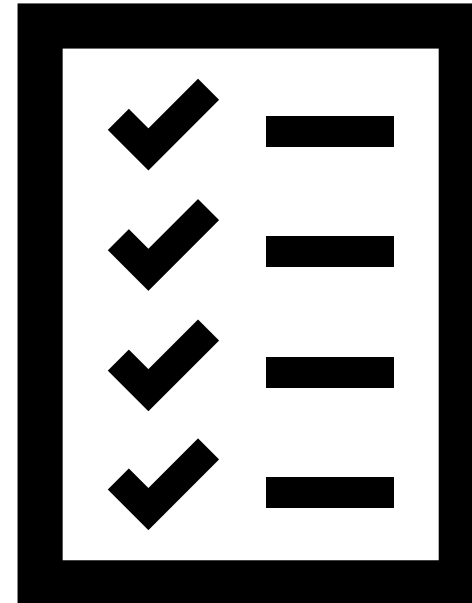
- Identify market conduct issues that may:
 - Negatively affect policyholders
 - Bring the Profession into disrepute
- Market conduct risk rating
- Develop recommendations





Actuarial Involvement During COVID-19

- Pandemic modelling
- Capital and liquidity
- Premium affordability
- Product innovation
- Contribution increases and excess reserves
- Operational processes





Key Areas of Market Conduct Risk

- Underwriting practices
- Client communication
- Public perception





Underwriting Practices



Vaccination status



Past infection

- Mixed reactions from the public
- Insurance Act, PPRs and TCF
- Ethical frameworks
- Any distinction to be actuarially justified
 - Point of sale
 - Ongoing



Medium risk



Client Communication



**Business Interruption
Cover**



Credit Life

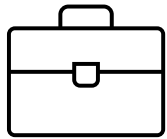
- Policy wording and exclusions
- Client expectations vs. reality
- Opportunity to improve product design
- Claims repudiation highly publicised
- Update guidance e.g. APN904?
- Learnings from different industries?



High risk



Public Perception



The Profession

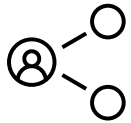
- Responsibility to act in the public interest
- Role that ASSA plays in public debates
- Intentional and informed communication
- Questions:
 - Where can actuaries add value?
 - Content and frequency of messaging?
 - Better organised?
 - Formal ASSA stance/guidance?



Medium risk



Public Perception



Information Sharing in the Industry

- C19 Task Team sharing analysis and developments
- Collaboration through CSI studies
- More professional guidance needed around sensitive information?
- Competition Commission considerations



Medium risk



Market Conduct Risk Overview



Underwriting Practices



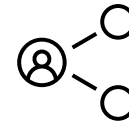
Medium risk



Client Communication



High risk



Public Perception



Medium risk



ACTUARIAL SOCIETY
S O U T H A F R I C A

**An international perspective and contributions
to global research**



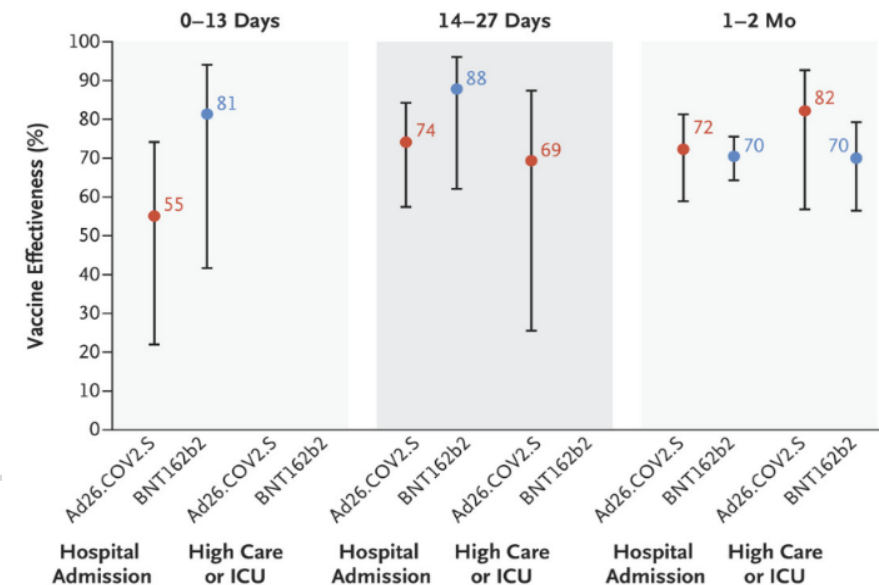
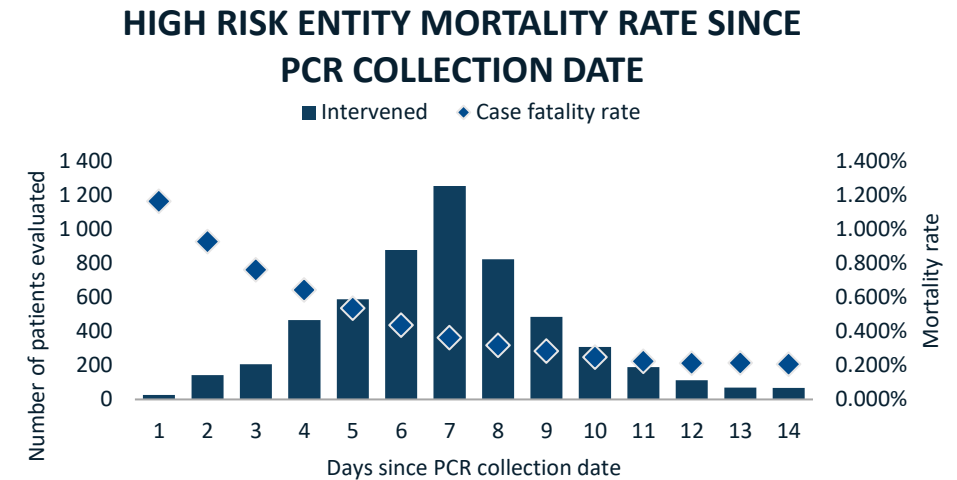
Applications of actuarial analysis during the pandemic

- Rapid development of SA-specific Covid-19 resilience index saved lives through oximeter distribution

Nematswerani, N., Collie, S., Chen, T., Cohen, M., Champion, J., Feldman, C., & Richards, G. A. (2021). The impact of routine pulse oximetry use on outcomes in COVID-19-infected patients at increased risk of severe disease: a retrospective cohort analysis. *South African Medical Journal*, 111(10), 950-956.

- Vaccine effectiveness against BA1/BA2 infection and severe disease equivalent between 2 dose J&J and 2 dose Pfizer 1-2 months post vaccination

- Two-dose J&J (Ad26.COV2.5)
- Two-dose Pfizer (BNT162b2)





After either 2 or 3 doses of BNT162B2 vaccine, rapid waning of vaccine effectiveness evident against Omicron sublineages in South Africa

Figure S1: Genomic sequences by variant type in South Africa by calendar date (Source: Network for Genomic Surveillance in South Africa- SARS COV2 Genomic Surveillance update (24 June 2022))

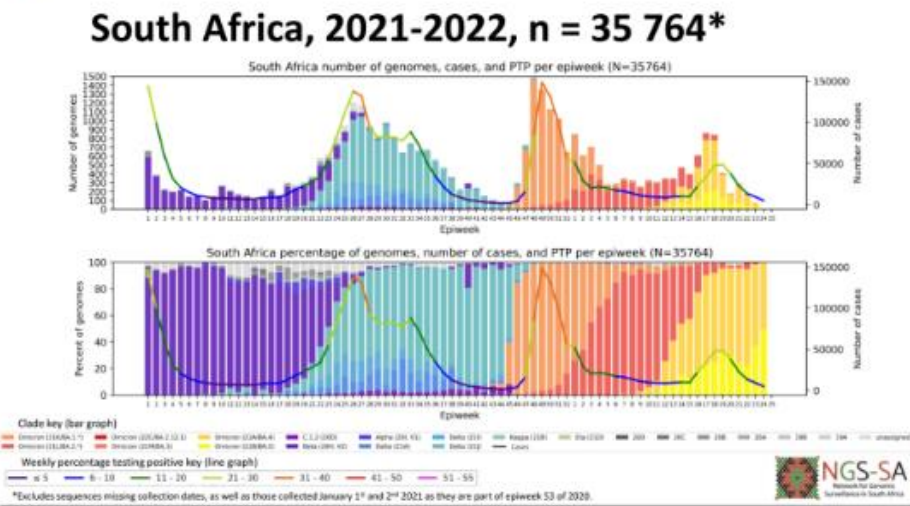


Table 1. BNT162b2 Vaccine Effectiveness against Hospitalization for Covid-19 in South Africa, According to the Dominant Omicron Sublineage.*

Time since Most Recent Vaccine Dose	VE of Dose 2		VE of Dose 3	
	BA.1–BA.2 Omicron Wave	BA.4–BA.5 Omicron Wave	BA.1–BA.2 Omicron Wave	BA.4–BA.5 Omicron Wave
	percent (95% CI)			
0–13 days	66.7 (38.3–82.0)	—	—	—
14–27 days	80.3 (62.8–89.5)	—	81.6 (68.1–89.4)	—
1–2 mo	61.3 (54.7–66.9)	—	66.4 (53.7–75.6)	68.8 (59.5–76.0)
3–4 mo	56.3 (51.6–60.5)	47.4 (19.9–65.5)	50.0 (4.4–73.9)	46.8 (35.3–56.2)
5–6 mo	45.6 (39.3–51.3)	26.3 (7.1–41.6)	—	—
7–8 mo	38.4 (16.9–54.4)	23.6 (11.1–34.3)	—	—
≥9 mo	—	19.3 (6.3–30.5)	—	—

* In South Africa, the BA.1 and BA.2 sublineages of the omicron variant were dominant from November 15, 2021, to February 28, 2022; the BA.4 and BA.5 sublineages were dominant from April 15 to June 24, 2022. Estimates of vaccine effectiveness (VE) are provided only if the P value was less than 0.05 for the between-group difference in the calculation of the odds ratio from the test-negative case-control design, if the number of polymerase-chain-reaction assays on admission was available, and if more than 10 admissions were observed for the estimate. Estimates of vaccine effectiveness have not been adjusted for multiplicity. CI denotes confidence interval.

Complications post vaccination are extremely rare and outweighed by risk caused by Covid-19 infection (reported cases)



Though extremely rare,
3 conditions were found to have a statistically significant **risk of occurrence following COVID-19 vaccination**

These conditions are fortunately easily treatable

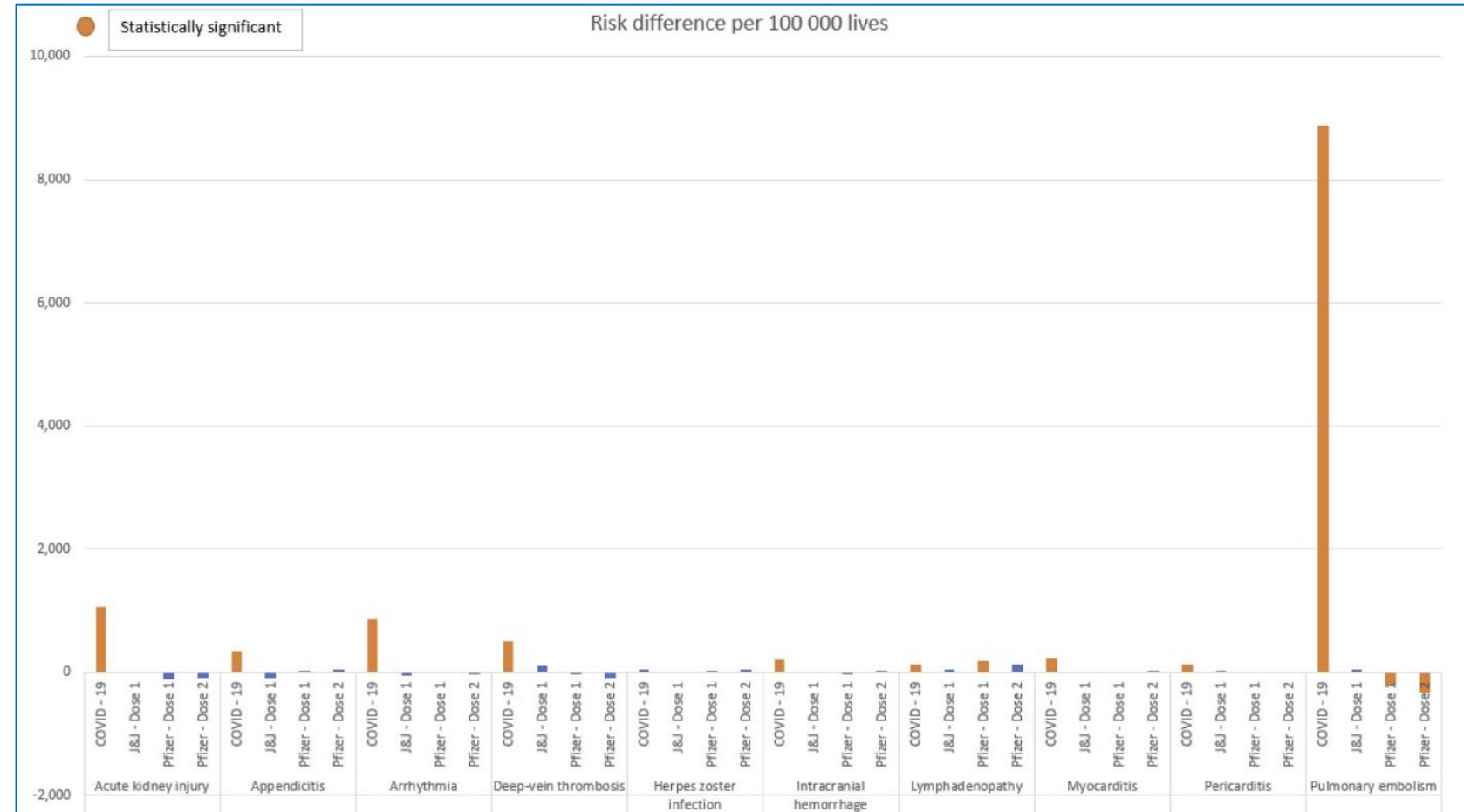
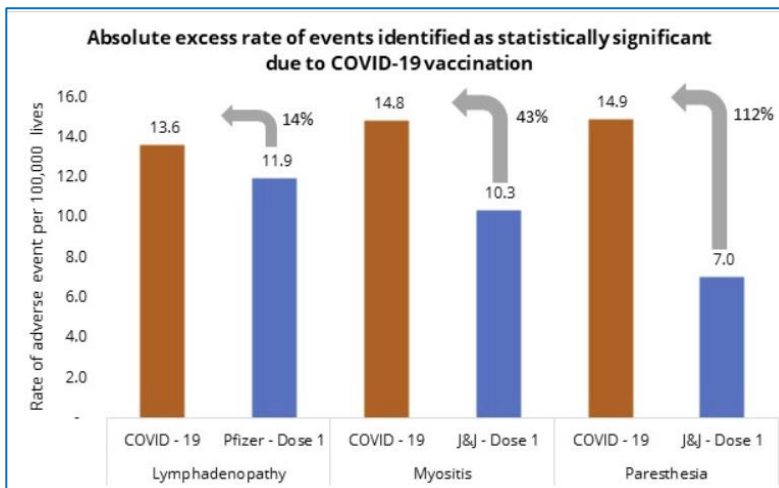
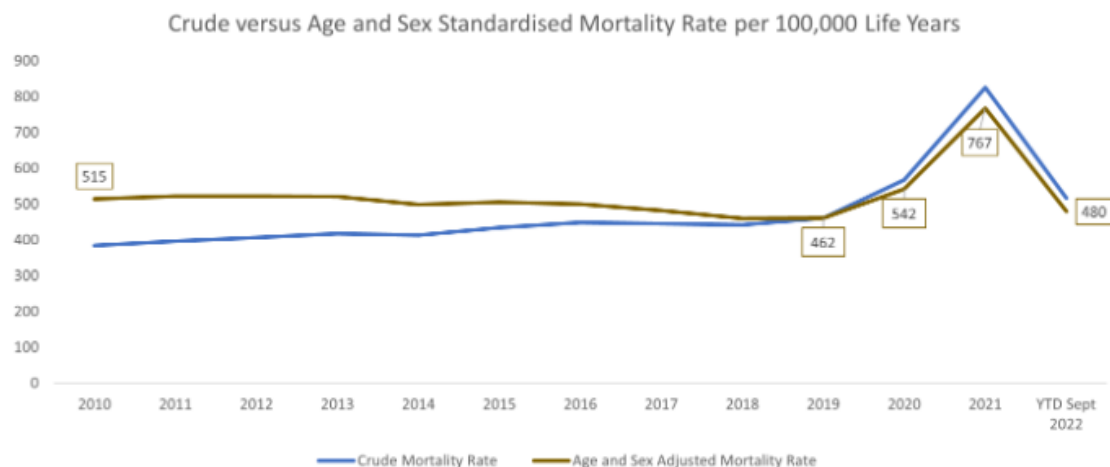


Figure 4: Absolute excess risk of statistically significant adverse events in the case of COVID-19 illness, or COVID-19 vaccination (J&J or Pfizer vaccines)

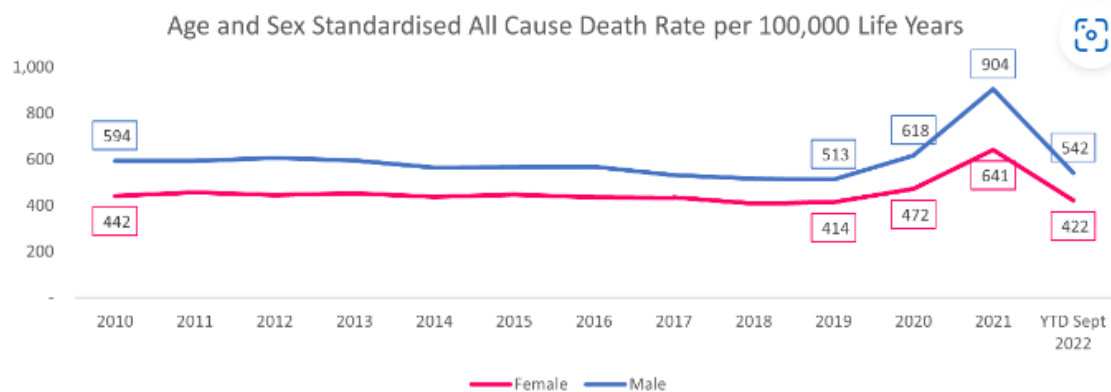


Mortality trends at highest level in pandemic and reverting to pre-pandemic levels

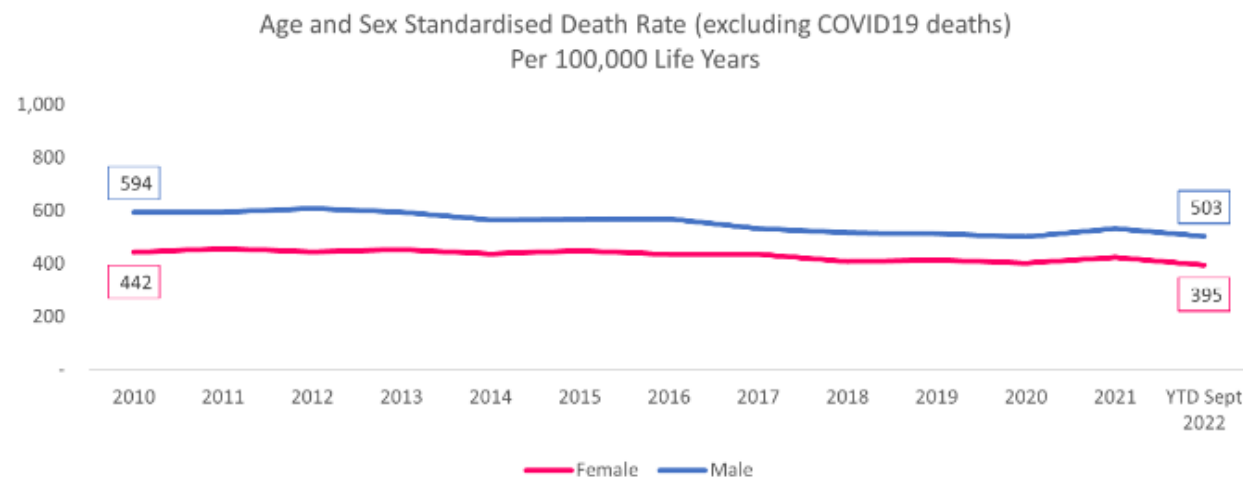


- Medical scheme population is ageing over time – hence the need for age/sex adjustment
- Both crude and standardized mortality reached historic levels during the first 2 yrs of Covid-19 pandemic
- Death rates have reverted to near pre-pandemic levels By Sept 2022

MORTALITY RISK FOR FEMALES BELOW PRE-PANDEMIC LEVELS, WHILE FOR MALES RISK REMAINS ELEVATED

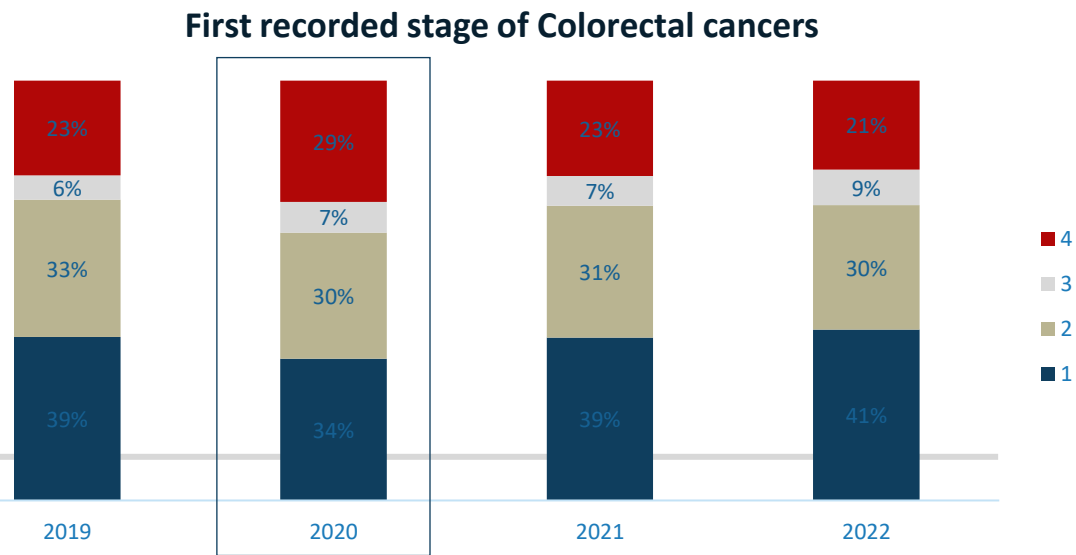
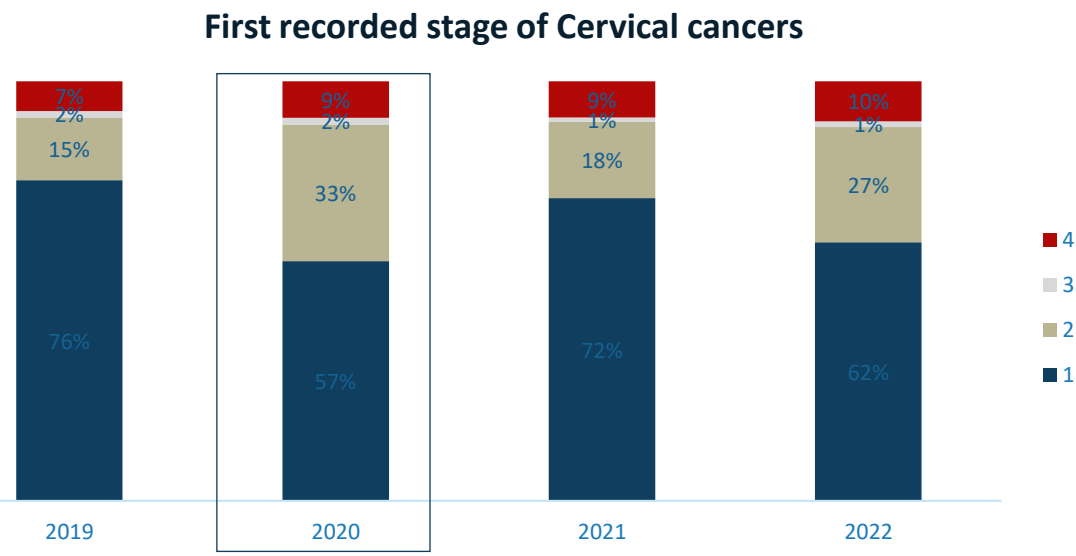
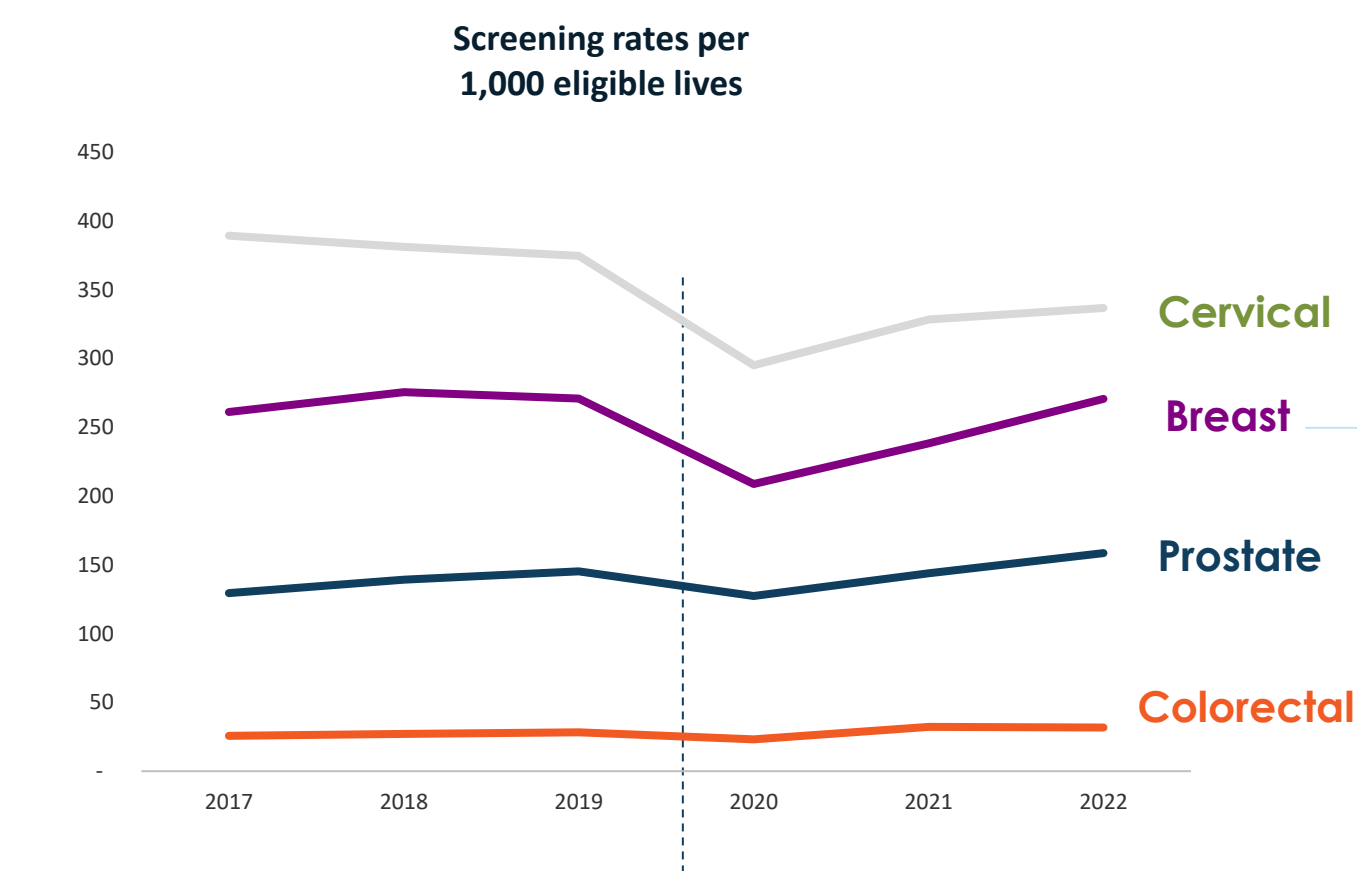


CLASSIFICATION OF COVID19 DEATHS EXPLAINS THE MAJORITY OF EXCESS DEATHS





Screening rates for main cancer types still recovering post Covid and affecting the first recorded stage of cancer



Nematswerani, N., Steenkamp, L., Haneef, S., Naidoo, R. M., & Fonn, S. (2023). Understanding the impact of the COVID-19 pandemic on healthcare services for adults during three waves of COVID-19 infections: A South African private sector experience. *South African Medical Journal*, 113(4), 1156-1164.



International Actuarial Association
Association Actuarielle Internationale



Pandemics Task Force

Lessons Learned

Membership from: Australia, Brazil, Canada,
India, Japan, Lebanon, South Africa, the
Netherlands, UK, US



Lessons Learned from Pandemics: Overview

- **Goal:**
 - Naturally focused on COVID-19, but HIV/AIDS pandemic experience is also considered
 - Leveraging existing work and expertise from actuaries and actuarial organizations around the world
- **Paper Objectives:**
 - Take stock of where we are as the effects of the COVID-19 pandemic begin to wane
 - Provide advice and direction for the actuarial profession for responding to future pandemics
 - Showcase what FMAs and the actuarial profession have done in terms of data analysis, modelling or other commentary
 - Respond to the work of other supranational organizations such as the IAIS or OECD
 - Provide an overview of best and worst practices for collecting and working with reported data

Lessons learned

1



Data

- Working with disparate data
- Discerning reliable and accurate data sources and importance of methods and timeframes
- Inconsistencies in metrics and importance of groupings
- It will always be difficult to measure mortality consistently – value of measures such as excess mortality

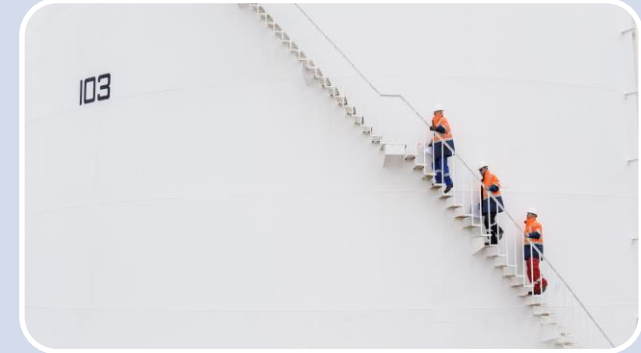
2



Collaboration and Communication

- Actuaries must collaborate with other professionals
- Social media can be a great tool for collaboration, discussion and rapid sharing
- Actuaries can help weed through misinformation and disinformation by becoming experts in the data

3



Professional Practice

- Need to react at a faster pace than normal is not comfortable for many of us
- Dealing with data that is poor and inconsistent
- Past experience is not always reliable for future models and models need to be flexible
- Do our professional standards as currently written enable us to contribute to the response?

Lessons learned

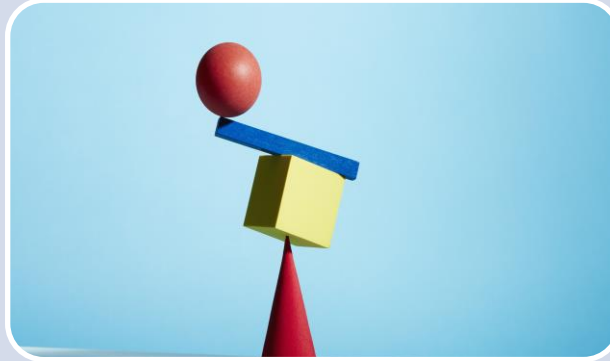
4



The health system

- Efforts to strengthen healthcare infrastructure, improve data systems, and invest in public health interventions will be crucial for the next pandemic
- Risk management and actuarial expertise can assist health care systems including delivery systems and health insurance.

5



Broad risk management

- Interactions between a pandemic and other risk events can lead to feedback loops and tipping points. These need to be carefully watched and modelled
- Anyone who deals with risk should be prepared to deal with threat multipliers -- risks that interact with and make other risks worse.
- Examples: Pandemics, climate change and energy risk



Across all areas of work

- Practice areas
 - Life insurance and mortality
 - Pensions and social security
 - Health care
 - General insurance and property/casualty
 - Enterprise risk management
- Financial sector resilience
- Intersection with other societal and environmental issues



Next steps

Data and modelling paper

- Technical learnings
- Sharing of methodology and approach
- Encourage collaboration

Protection gaps paper

- Key concern for regulators
- Alternative risk sharing mechanisms identified
- Public interest and equity concerns

Other topics

- Preparedness of financial institutions for future pandemic(s)
- The future role of actuaries in this context as risk experts
- Climate risk interaction
- Inequities in infection vulnerability, treatment and coverage gaps



Considerations for a balanced professional approach

Areas for debate

- Lockdown
- Treatment
- Projections
- Vaccination mandates
- Non pharmaceutical interventions
- Identification of vulnerable groups
- Access to data
- Decision making processes

40k +
positions not
2!

Valid analysis results from
having no preconceived
outcome

Confirmation bias:
Does your belief dictate
which data you look at, or
does the data dictate what
you look at?



In any large dataset you will find what you are looking for



ACTUARIAL SOCIETY
SOUTH AFRICA

Thought leadership and Future Focus



Terms of Reference – Future Focus

The Task Team is established to create a forum for ASSA members to learn, model, educate, inform, research, debate and influence COVID-19 developments in a positive and constructive way which support and enhance our profession's commitment to societal and public interest.

The Task Team will

1. conduct **retrospective and prospective analysis of the COVID-19 pandemic**
2. identify **market conduct issues**
3. collaborate with other experts and develop a body of knowledge for dealing **with future pandemics** and prepare public policy recommendations

Objectives

- Help actuaries **in thinking and responding** to COVID-19.
- **Forum** for ASSA members
- Promote the **formal publication** of research and analysis (for science)
- Promote **professional and ethical** conduct by members
- Societal and **public interest**.
- Support development of **thought leadership** of actuarial practice
- **Strategic direction** of the Society
- **Support** other bodies and **influence** legislation



Key findings of the ASSA Covid-19 Task Team to date

1. COVID-19 was a **deadly pandemic** killing many South Africans (high relative mortality rate globally)
 2. COVID-19 **deaths were under-reported** and without **excess deaths** derived from vital registrations we would not have been able to ascertain the extent of the impact (which is likely still understated)
 3. **Society and governments responded** to mitigate the impact with some unintended consequences
 4. The **effect of interventions are difficult to measure** but these generally show positive contribution in SA and elsewhere
 5. **Economic impacts are difficult to disentangle** (need to balance risks of interventions vs. COVID-19 without intervention)
 6. **Vaccines saved lives** and access to vaccines sooner would have saved more lives, with **the benefits of vaccines outweighing any risks.**
 7. COVID-19 and related effects are likely to **impact mortality and morbidity for a number of years**
 8. **Actuaries have a public interest and prudential role to play** to understand and mitigate the risks we face due to pandemics in the future
-