CAPRISA

CENTRE FOR THE AIDS PROGRAMME OF RESEARCH IN SOUTH AFRICA

Covid-19 update

10 March 2022

science & innovation Department: Science and Innovation REPUBLIC OF SOUTH AFRICA
CAPRISA hosts a DST-NRF Centre of Excellence in HIV Prevention
NRF National Research Foundation
UNAIDS
saMRC
CAPRISA hosts a MRC HIV-TB Pathogenesis and Treatment Research Unit
CAPRISA hosts a DoH-MRC Special Initiative for HIV Prevention Technology
health Department: Health REPUBLIC OF SOUTH AFRICA
COLUMBIA UNIVERSITY
MAILMAN SCHOOL of PUBLIC HEALTH
UNIVERSITY OF KWAZULU-NATAL INYUVESI YAKWAZULU-NATALI
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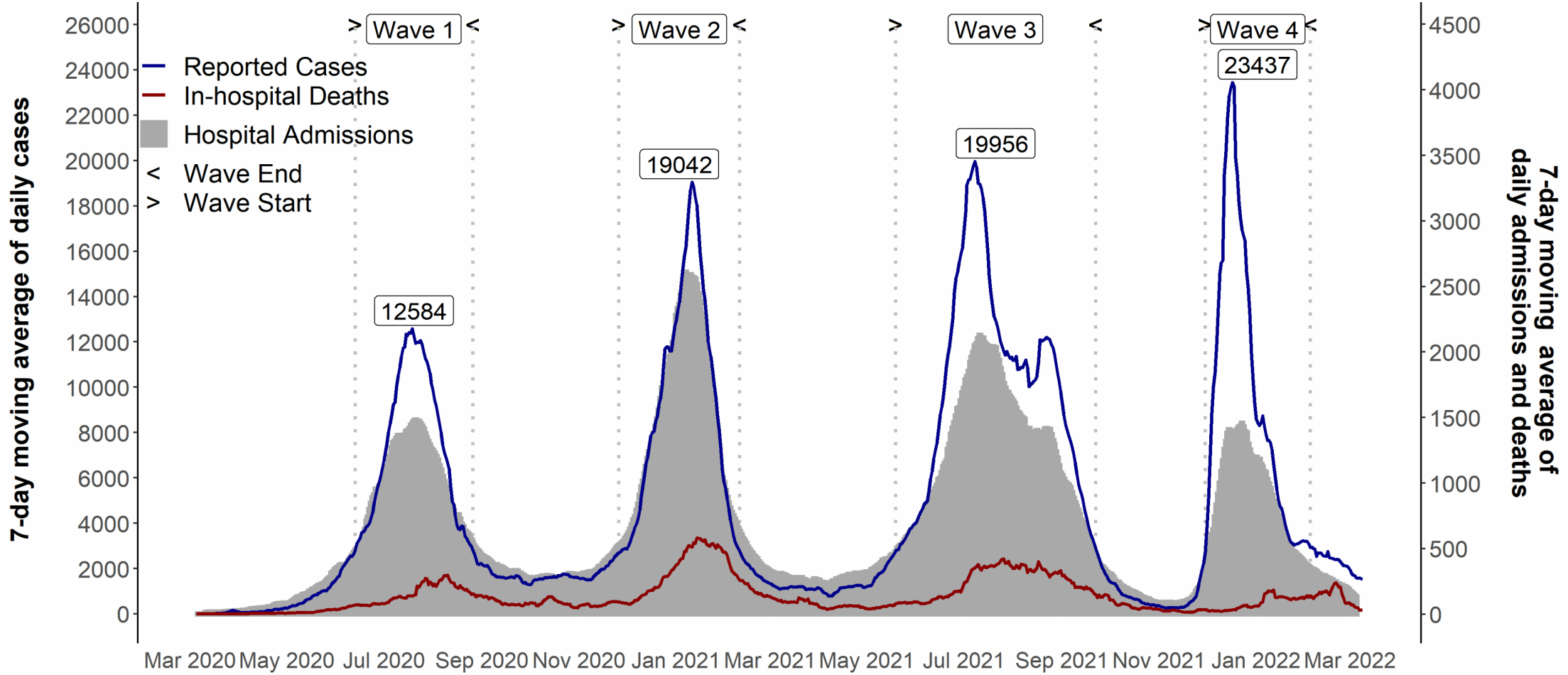
Covid-19 in South Africa

up to – 9 March 2022



Source of hospital admissions data: Lucille Blumberg, Richard Welch and Waasila Jassat – DATCOV, NICD

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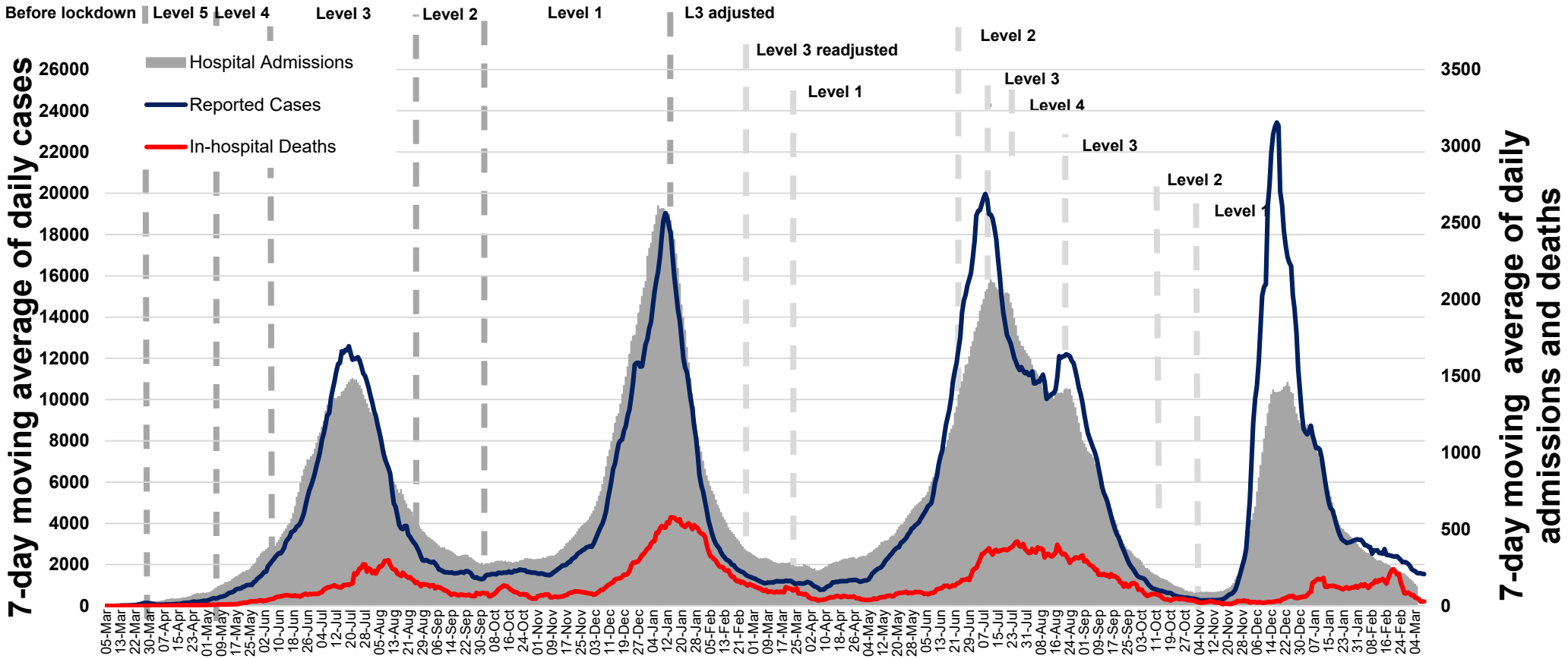
Covid-19 in South Africa

7-day moving average of new cases, hospital admissions and in-hospital Covid-19 deaths up to - 9 March 2022



Source of hospital admissions data: Lucille Blumberg, Richard Welch and Waasila Jassat – DATCOV, NICD

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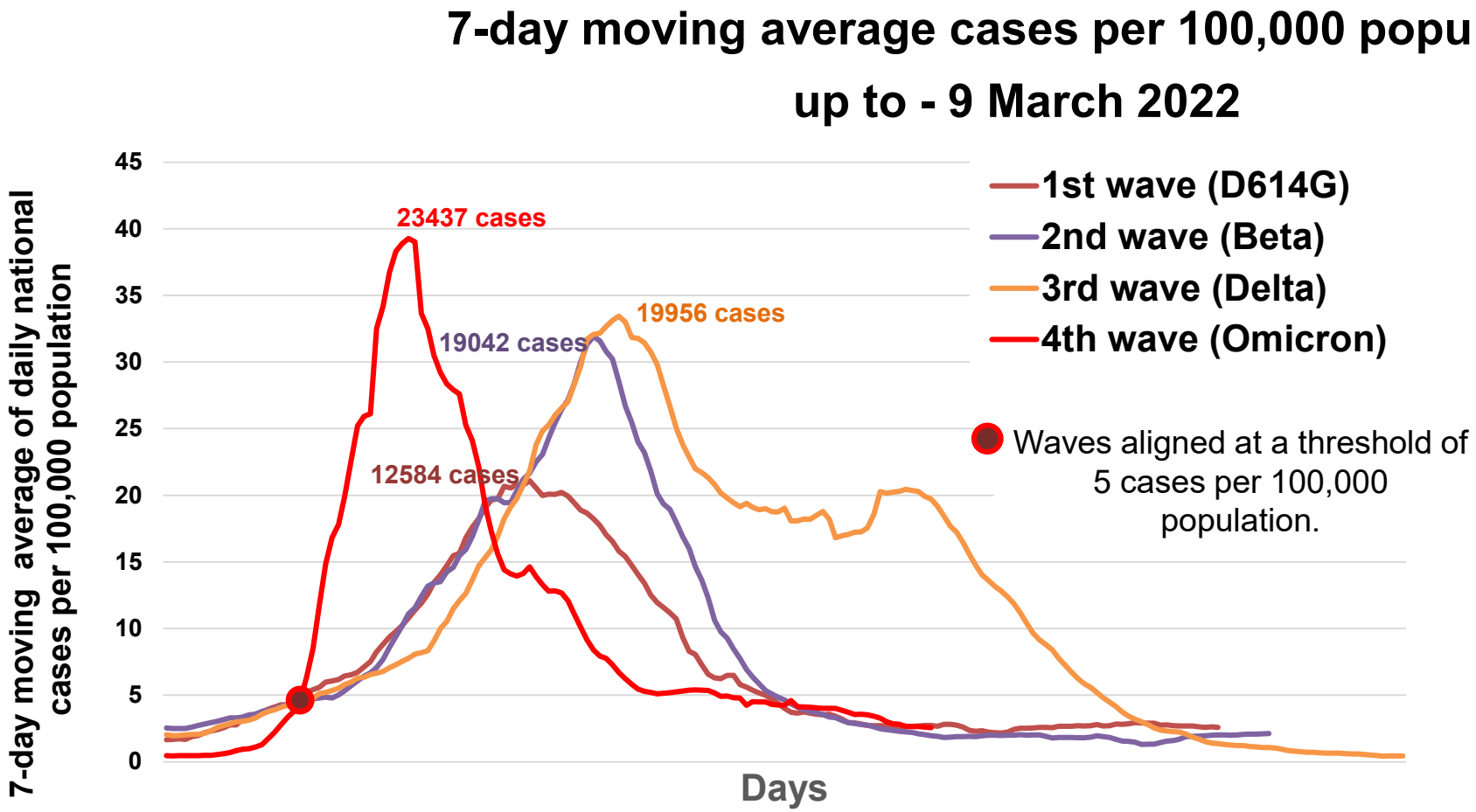
SARS-Cov-2 cases in 1st, 2nd & 3rd and 4th waves: South Africa



Data source: Department of Health; Analysis: Marothi LETSOALO; Ande MCHUNU

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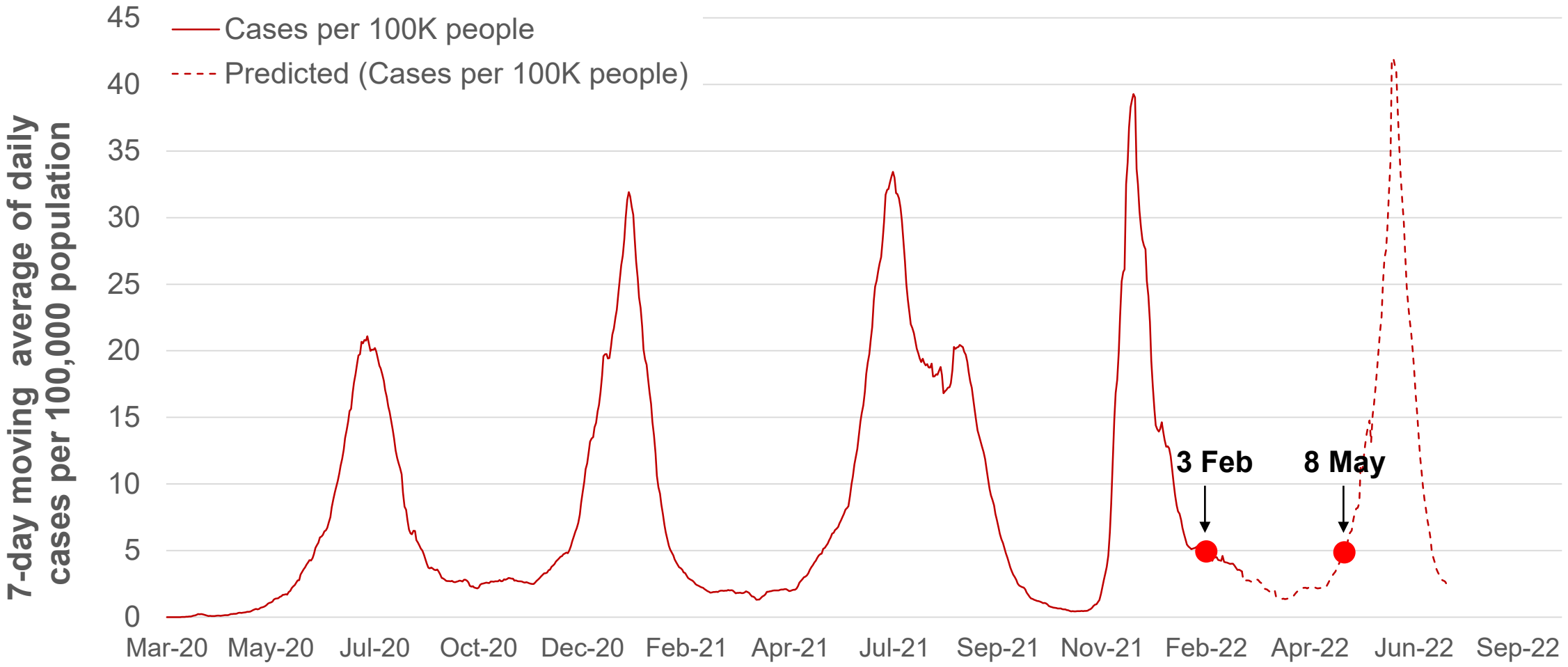
Will there be a 5th wave in South Africa?



Note: New variant and other factors may change epidemic trajectory. These estimations are based on several assumptions and not on mathematical modelling

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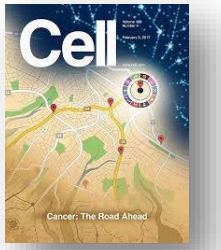
Predicting the impact of (& preparing for) future immune escape variants on the pandemic



Population impact of SARS-CoV-2 variants with enhanced transmissibility and/or partial immune

Mary Bushman[1]*, Rebecca Kahn[1]†, Bradford P. Taylor[1]†, Marc Lipsitch[1], William P. Hanage[1]

Moderate immune escape poses a low risk unless there is ↑ transmissibility

nature

HOW TO REDESIGN COVID VACCINES SO THEY PROTECT AGAINST VARIANTS

Lineages that can evade immunity are spurring vaccine makers to explore ways to redesign their shots.

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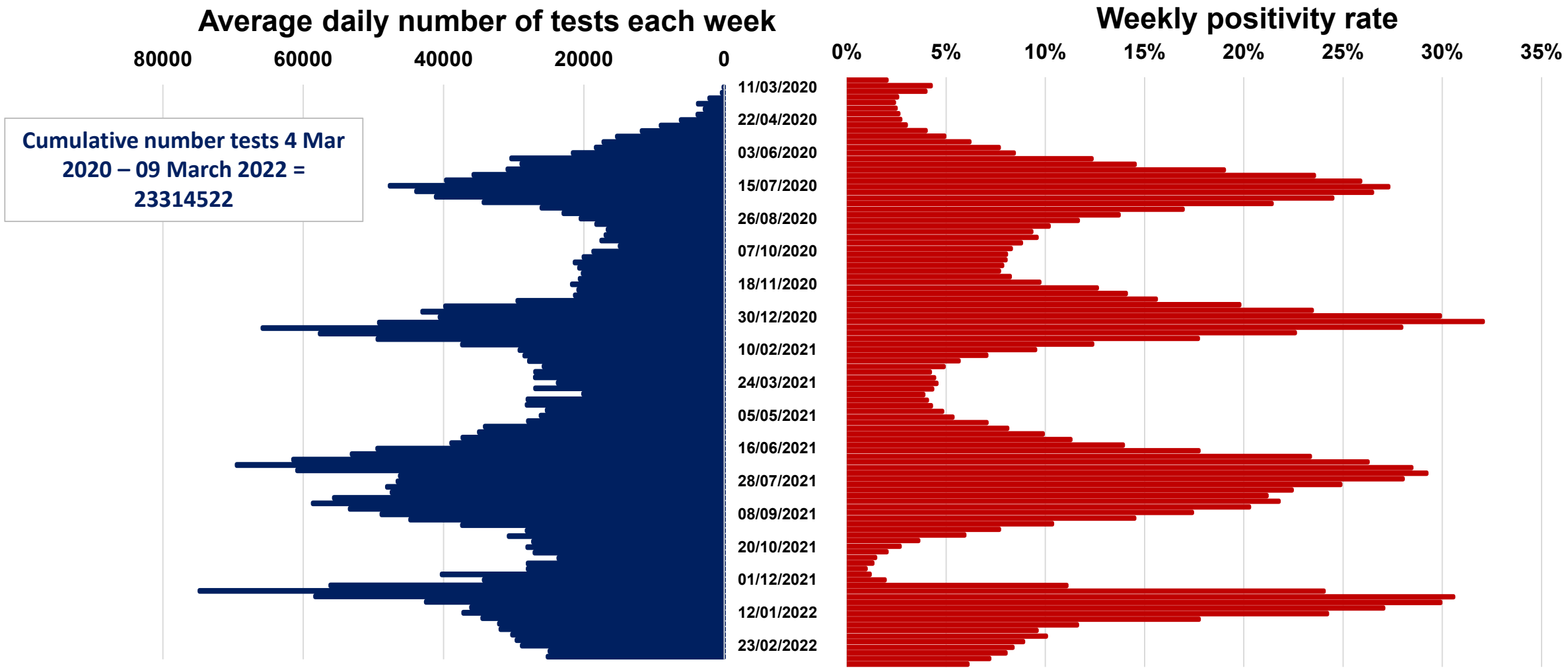
Average daily tests and proportion of positive tests

up to - 9 March 2022



Cumulative number tests 4 Mar 2020 – 09 March 2022 = 23314522

Data source: Department of Health

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Estimated effective reproduction rate (R) of Covid-19 in South Africa

up to - 4 March 2022

Source: *Our World in Data; data explorer; Johns Hopkins University [COVID-19 Dashboard]*

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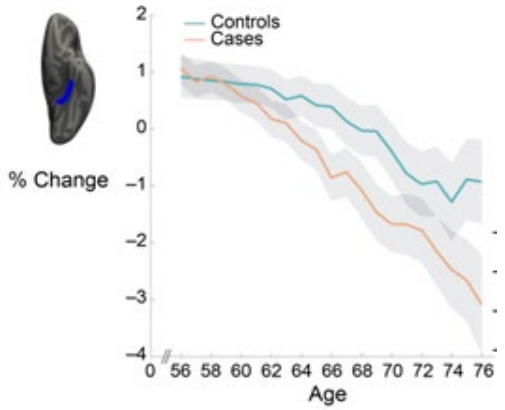
nature

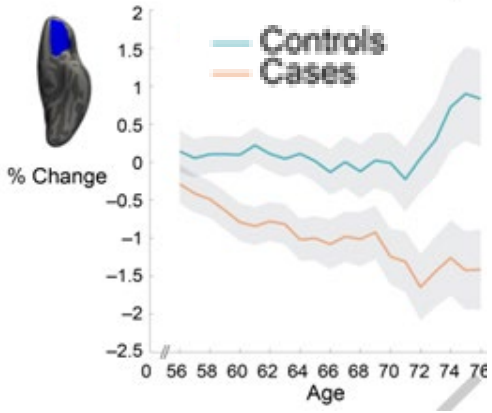
SARS-CoV-2 is associated with changes in brain structure in UK Biobank

Gwenaëlle Douaud, Soojin Lee, Fidel Alfaro-Almagro, Christoph Arthofer, Chaoyue Wang, Paul McCarthy, Frederik Lange, Jesper L. R. Andersson, Ludovica Griffanti, Eugene Duff, Saad Jbabdi, Bernd Taschler, Peter Keating, Anderson M. Winkler, Rory Collins, Paul M. Matthews, Naomi Allen, Karla L. Miller

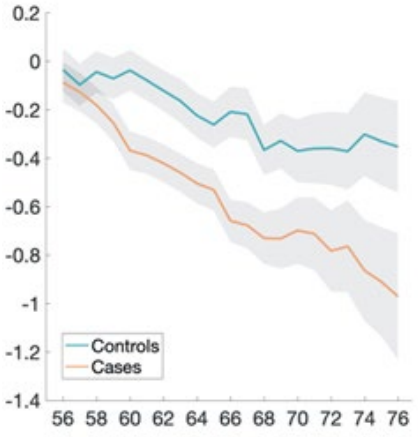
Left parahippocampal gyrus (contrast)



Left orbitofrontal cortex (thickness)



Ratio brain / total intracranial volume



- **785 UK Biobank participants imaged twice 141 days apart (401 Covid+ between two scans)**
- **Covid+ participants → larger cognitive decline between two timepoints**
- **Effects of SARS-CoV-2 infection:**

- **Smaller brain size**
- **↓ in grey matter thickness**
- **Effect marked in olfactory region**

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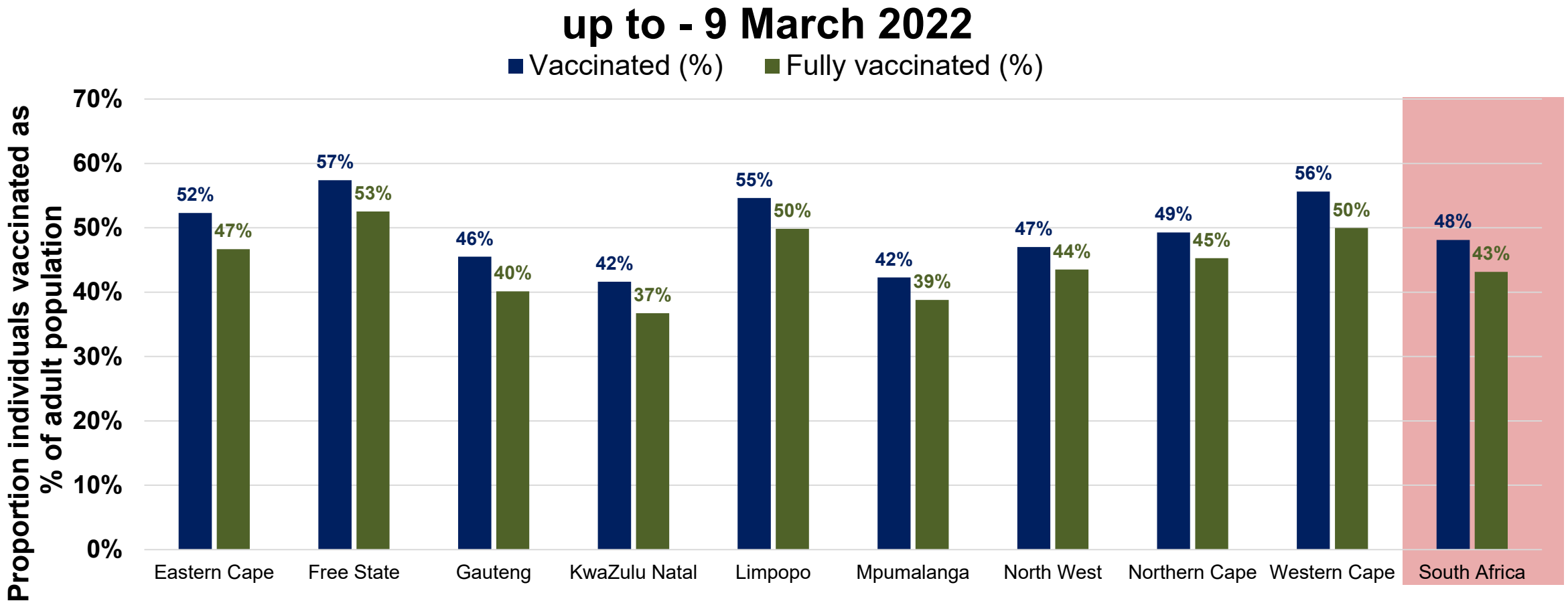
Proportion of individuals vaccinated as % of adult population



Source: *Department of Health. https://sacoronavirus.co.za/latest-vaccine-statistics/*

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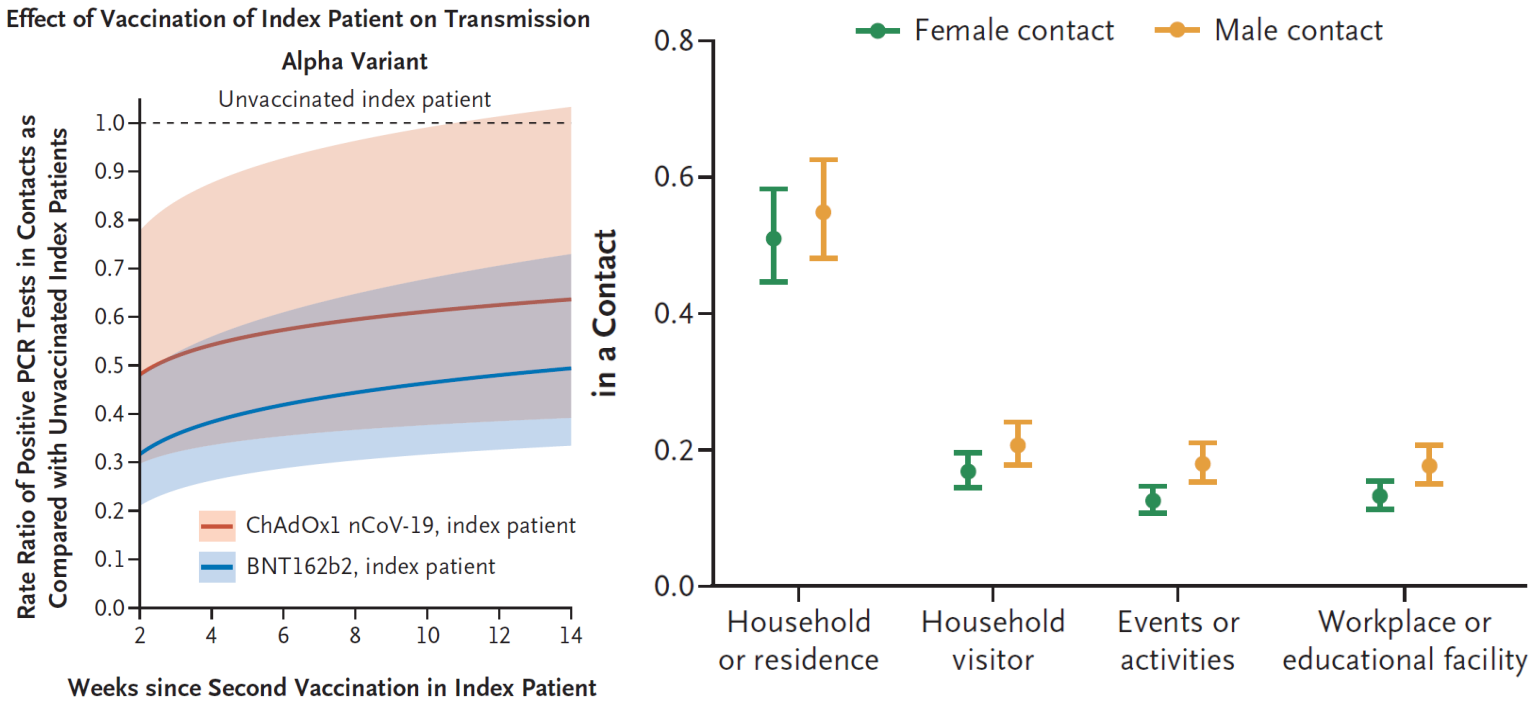
Vaccination reduced transmission SARS-CoV-2 to contacts (in two variants)

The NEW ENGLAND JOURNAL of MEDICINE

Effect of Covid-19 Vaccination on Transmission of Alpha and Delta Variants

David W. Eyre, B.M., B.Ch., D.Phil., Donald Taylor, M.Math., Mark Purver, Ph.D., David Chapman, Ph.D., Tom Fowler, Ph.D., Koen B. Pouwels, Ph.D.



- **146,243 contacts of 108,498 index patients tested (37% +)**
- **Pfizer (X2) or AstraZeneca (X2) → reduced infection by 68% and 52% in contacts when compared to infections in contacts of unvaccinated**
- **Vaccine → lower viral load – ↓ infectiousness**
- **Residence contacts – high risk**

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Science

Indirect protection of children from SARS-CoV-2 infection through parental vaccination

Samah Hayek[1], Galit Shaham[1], Yatir Ben-Shlomo[1], Eldad Kepten[1], Noa Dagan[1,2,3,4], Daniel Nevo[5], Marc Lipsitch[6], Ben Y. Reis[3,4,7], Ran D. Balicer[1,8], Noam Barda[2,1,3,4]*

Direct Effect
Protection of parents from having been vaccinated

94.4%
(93.2%-95.4%)

Household Infectiousness Effect
Reduction in Risk of transmission from infected parent to unvaccinated child

72.1%
(36.6%-89.3%)

Indirect Effect
Protection of child afforded by parental vaccination

26.0%
(14.0%-36.2%)
One Vaccinated Parent

71.7%
(68.6%-74.6%)
Two Vaccinated Parents

- **Two-parent homes with at least one vaccine-ineligible child**
- **Children with two parents vaccinated - 72% lower risk of getting infected**

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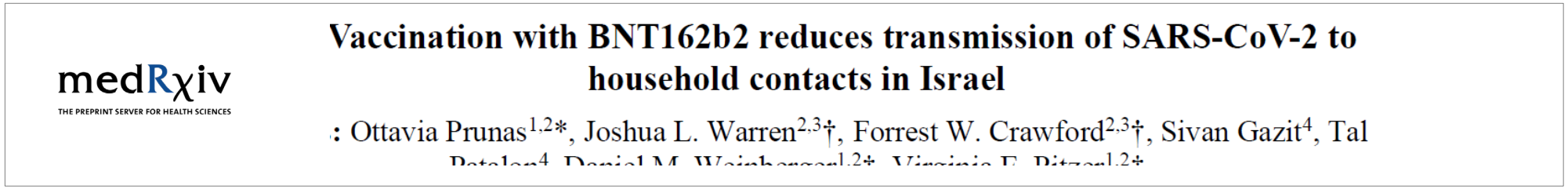
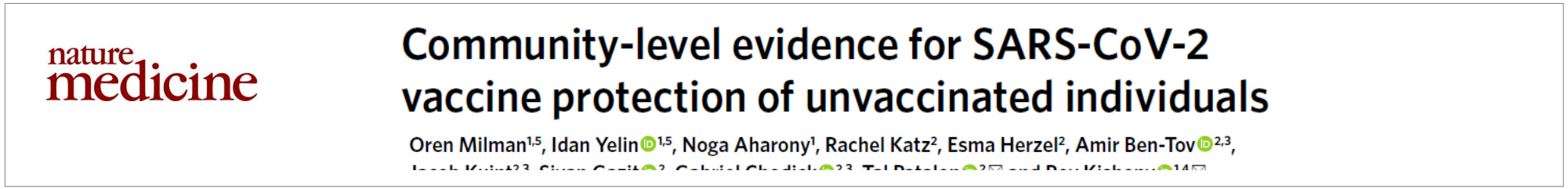
↓ infections in unvaccinated in communities with high mRNA vaccination coverage


medRxiv
THE PREPRINT SERVER FOR HEALTH SCIENCES

Vaccination with BNT162b2 reduces transmission of SARS-CoV-2 to household contacts in Israel

: Ottavia Prunas[1,2]*, Joshua L. Warren[2,3]†, Forrest W. Crawford[2,3]†, Sivan Gazit[4], Tal

Transmission in 253,564 individuals in 65,624 households in Israel – in unvaccinated: 79% ↓ infection in those exposed to vaccinated vs unvaccinated infected household contacts


nature medicine

Community-level evidence for SARS-CoV-2 vaccine protection of unvaccinated individuals

Oren Milman[1,5], Idan Yelin[1,5], Noga Aharony[1], Rachel Katz[2], Esma Herzel[2], Amir Ben-Tov[2,3],

Each **20%** ↑ in vaccination → positive tests ↓ **~50%** in unvaccinated people

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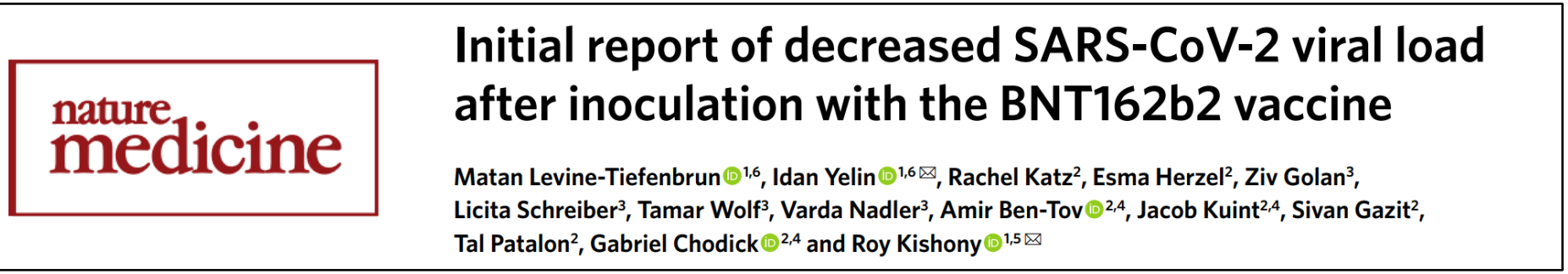
Covid-19 vaccines reduce infectiousness by ↓ virus levels which ↓spread of the virus



Reducing infectiousness:

- Pfizer: Significant drop in viral load from about 2-4 weeks after 1st dose
- AstraZeneca: lower viral load in vaccinated compared to unvaccinated

Sources: Mallapaty S. Can COVID vaccines stop transmission? Scientists race to find answers. *Nature*. 2021 Feb 19;10;
Levine-Tiefenbrun, M., Yelin, I., Katz, R. et al. Initial report of decreased SARS-CoV-2 viral load after inoculation with the BNT162b2 vaccine. Nat Med 27, 790–792 (2021).

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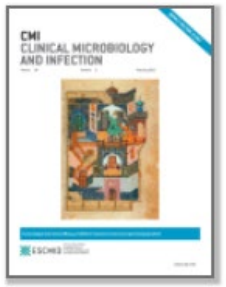
Vaccines – Community benefit by more rapidly declining viral load in vaccinated vs unvaccinated

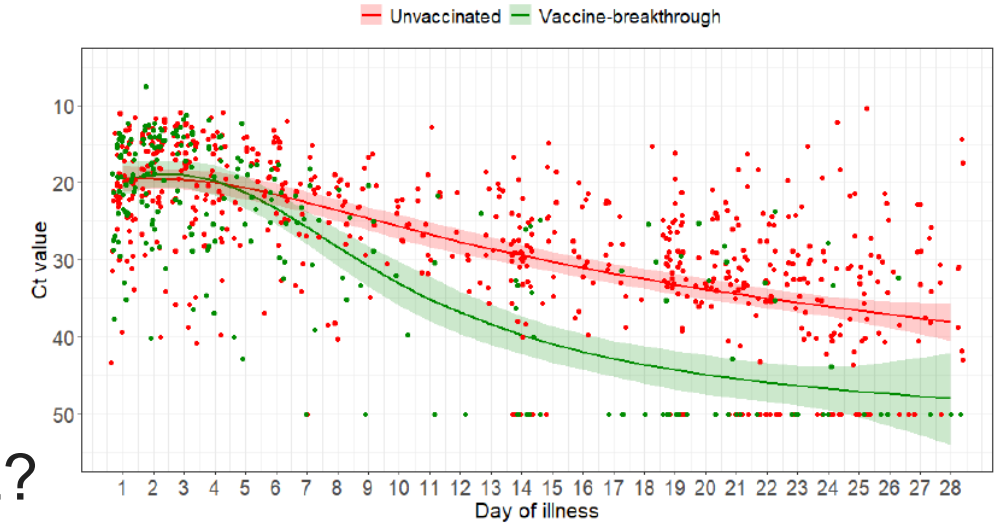


Clinical Microbiology and Infection

Virological and serological kinetics of SARS-CoV-2 Delta variant vaccine breakthrough infections: a multicentre cohort study

Chia PY, Ong SW, Chiew CJ, Ang LW, Chavatte JM, Mak TM, Cui L, Kalimuddin S, Chia WN, Tan CW, Chai LY.

- 218 individuals in Singapore:
  (88 vaccinated, 130 unvaccinated)
- Delta - viral loads ↓ faster in vaccinated
- Omicron has a higher viral load than Delta (↓ Ct) – do vaccines Omicron ↓ VL?



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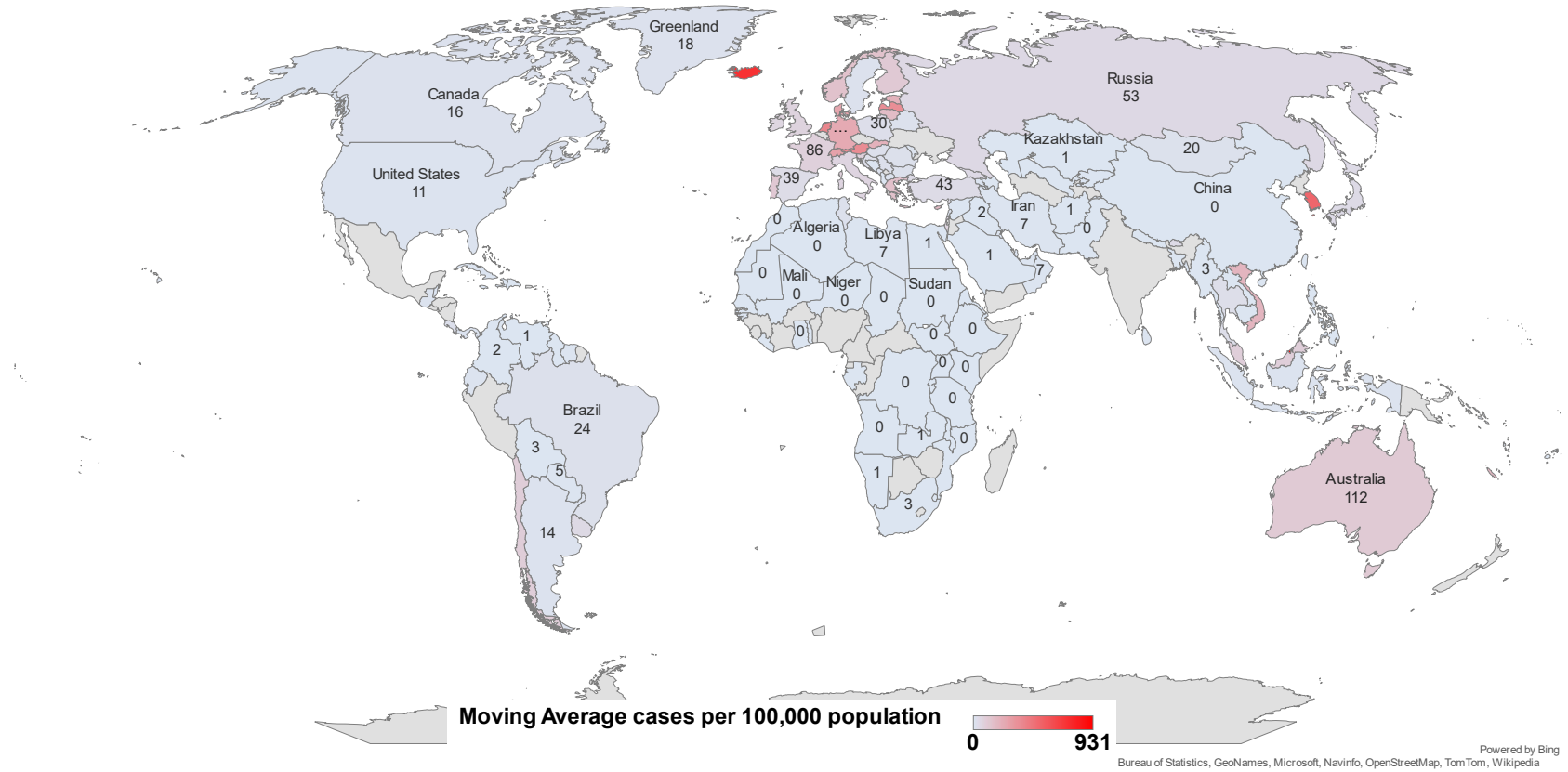
Global Covid-19 epidemic

7-day moving average cases per 100,000 population

up to - 9 March 2022



Source: *Our World in Data*

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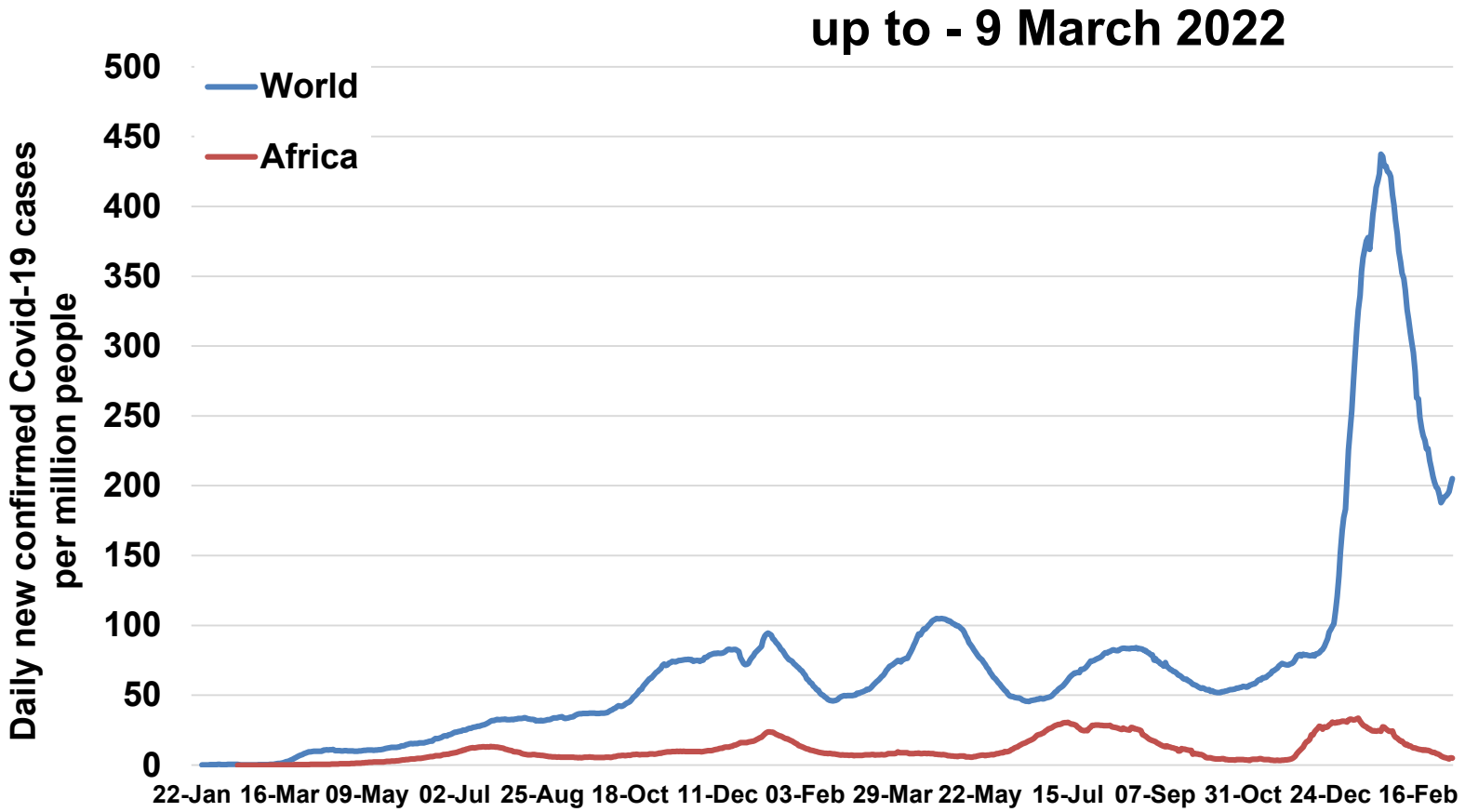
Covid-19 in Africa
Omicron variant drives 4th wave



WORLD

* 450 million cumulative global case and 6 million deaths

AFRICA

* 11.4 million cumulative cases (2.5 % of global cases - 22 January 2020 up to 09 March 2022
* 250539 deaths (CFR: 2.2%; ~4.2% of global deaths in 15% of world's population)

Data Source: *Our World in Data; NICD*

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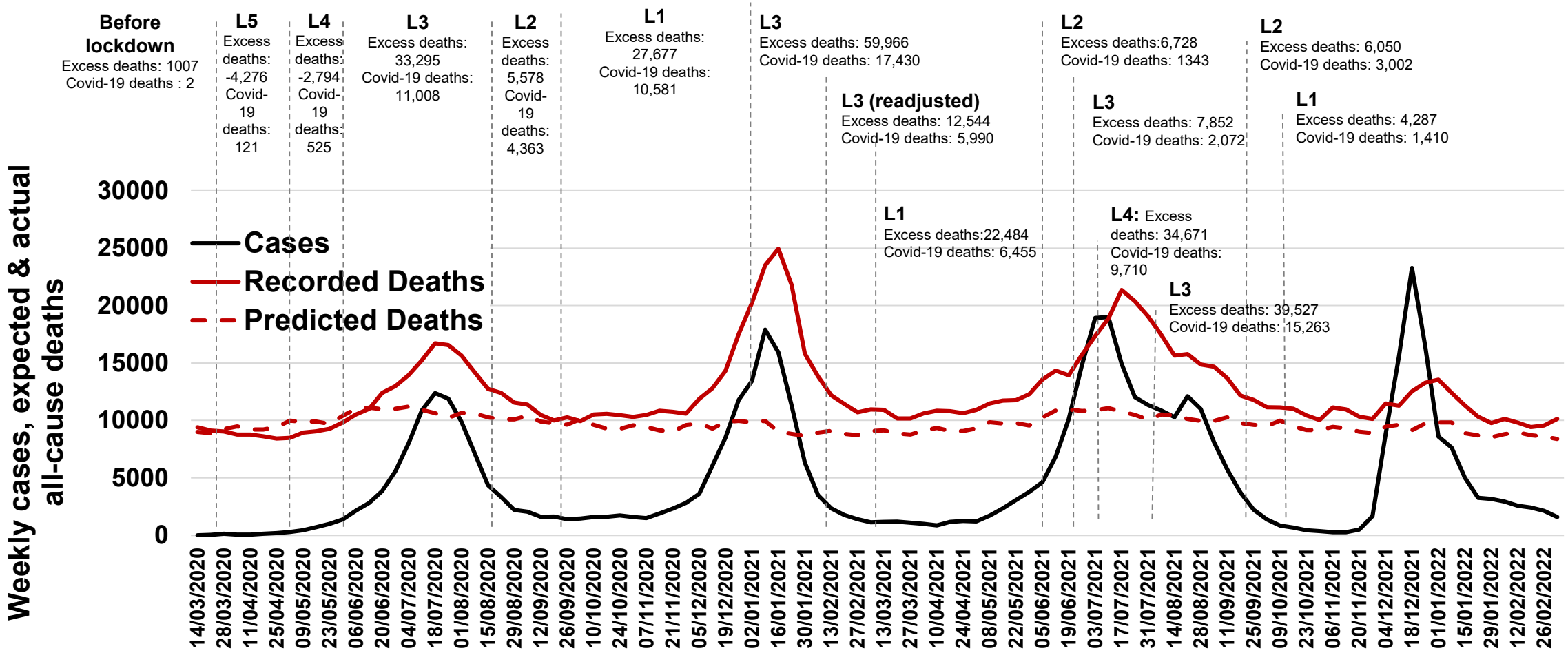
Expected & actual all-cause deaths during Covid-19

up to – 5 March 2022



Source: Bradshaw D, et al

saMRC advancinglife

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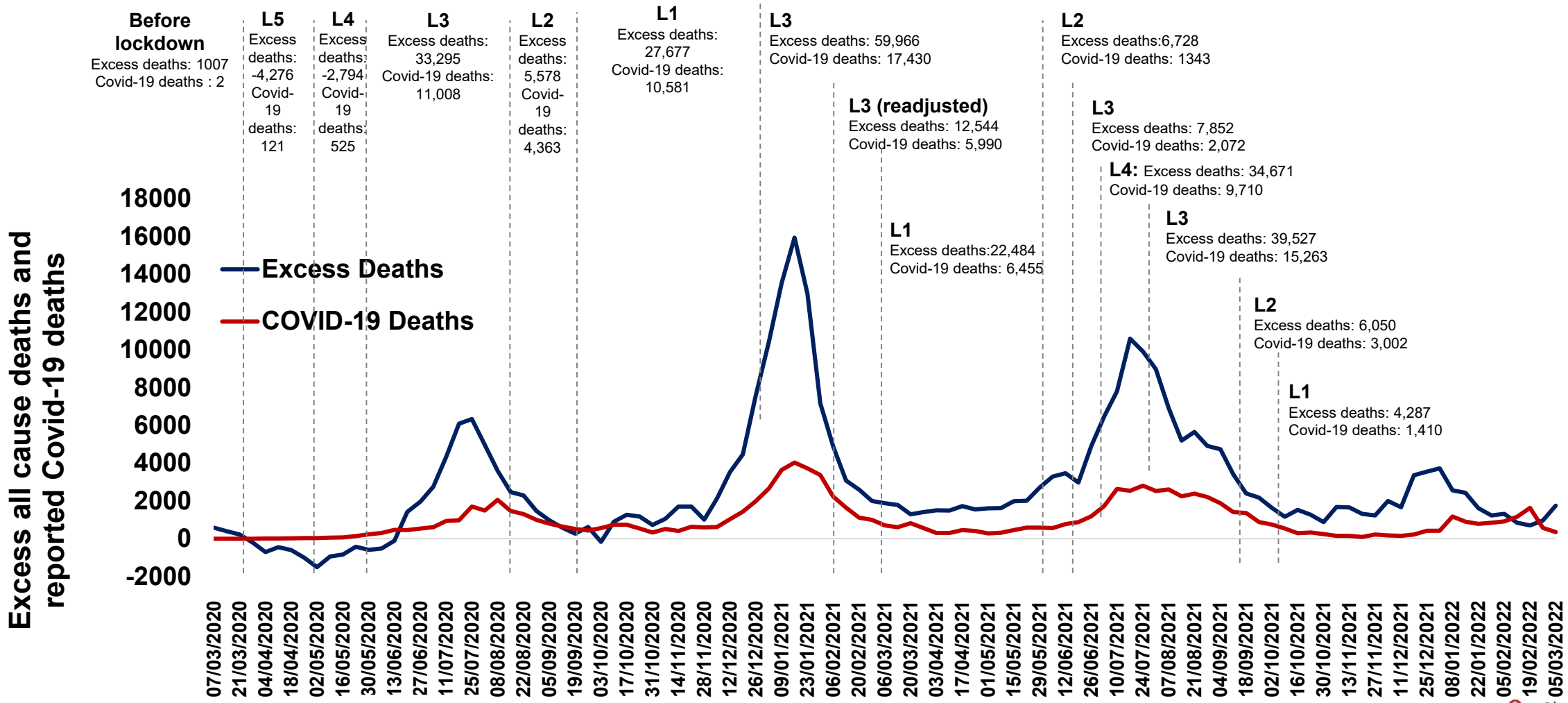
Weekly excess all cause deaths & reported Covid-19 deaths

up to – 5 March 2022



Source: Bradshaw D, et al

Provincial SARS-CoV-2 cases in the 4 waves

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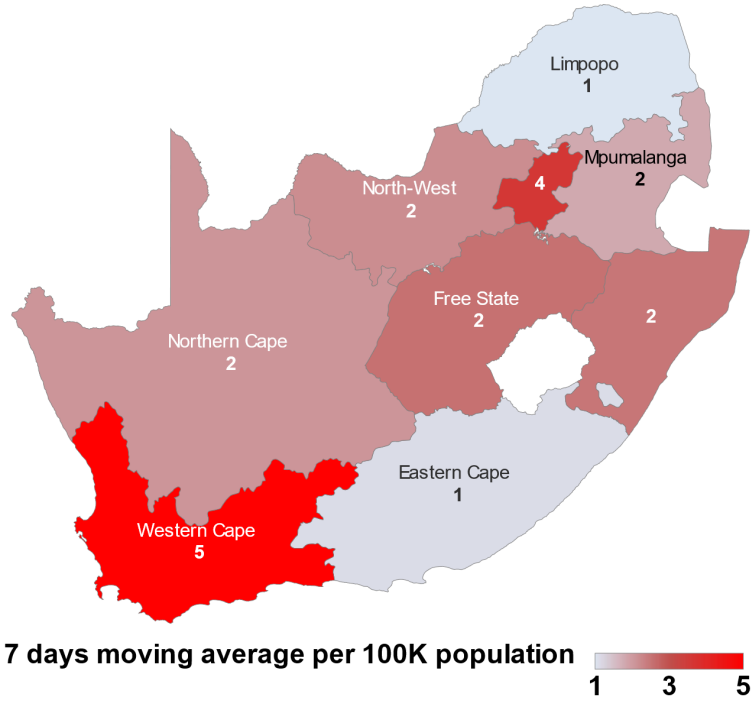
Daily new cases over last 7 days/100,000

up to - 9 March 2022

Province	Population per 100,000	7 Days Moving Average: at 7 days back	Per 100K at 7 days back	at a day back	100K at a day back	Increase / Decrease
Eastern Cape	67	61	1	62	1	1%
Free State	29	87	3	71	2	-18%
Gauteng	155	635	4	546	4	-14%
KwaZulu Natal	115	298	3	272	2	-9%
Limpopo	59	44	1	46	1	6%
Mpumalanga	47	111	2	77	2	-31%
North West	41	88	2	83	2	-6%
Northern Cape	13	29	2	25	2	-14%
Western Cape	71	358	5	352	5	-2%
South Africa	597	1711	3	1534	3	-10%
Africa	13410	8186	1	6922	1	-15%
World	77952	1496359	19	1615886	21	8%



Data source: Department of Health

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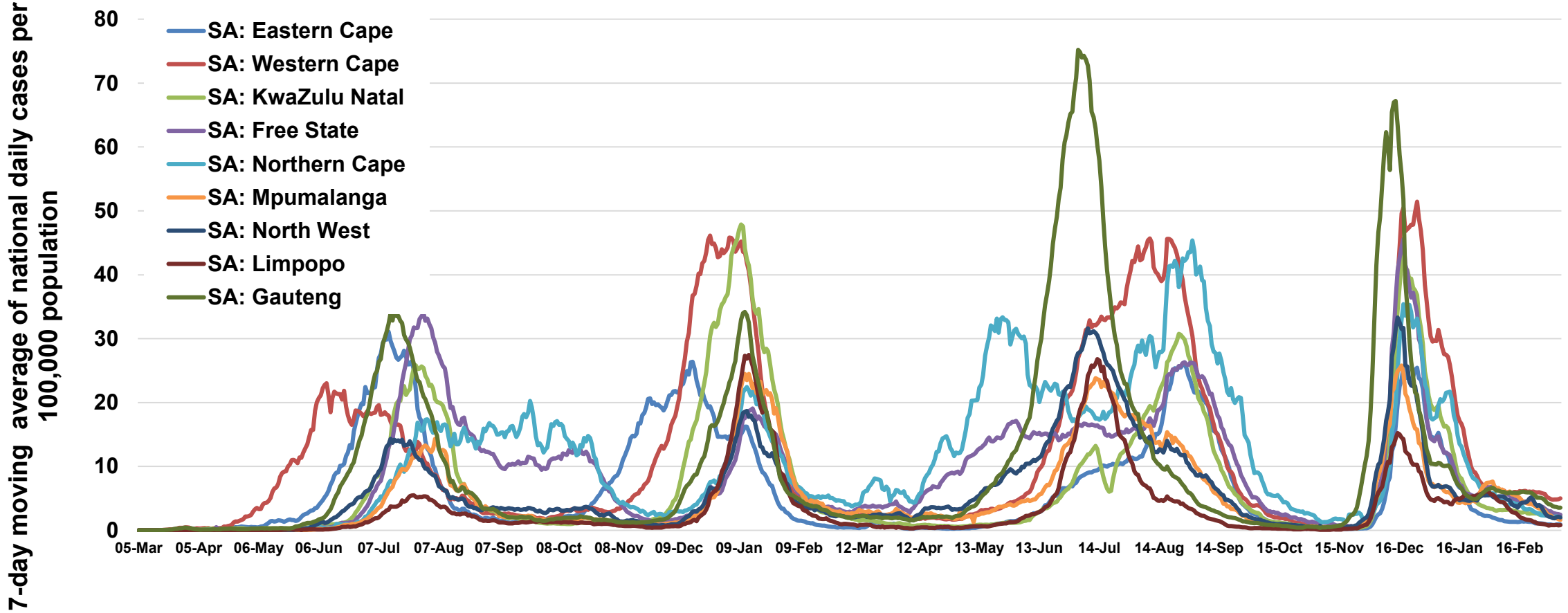
Confirmed SARS-Cov-2 cases by province

7-day moving average cases per 100,000 population

up to - 9 March 2022



Data source: Department of Health; Analysis

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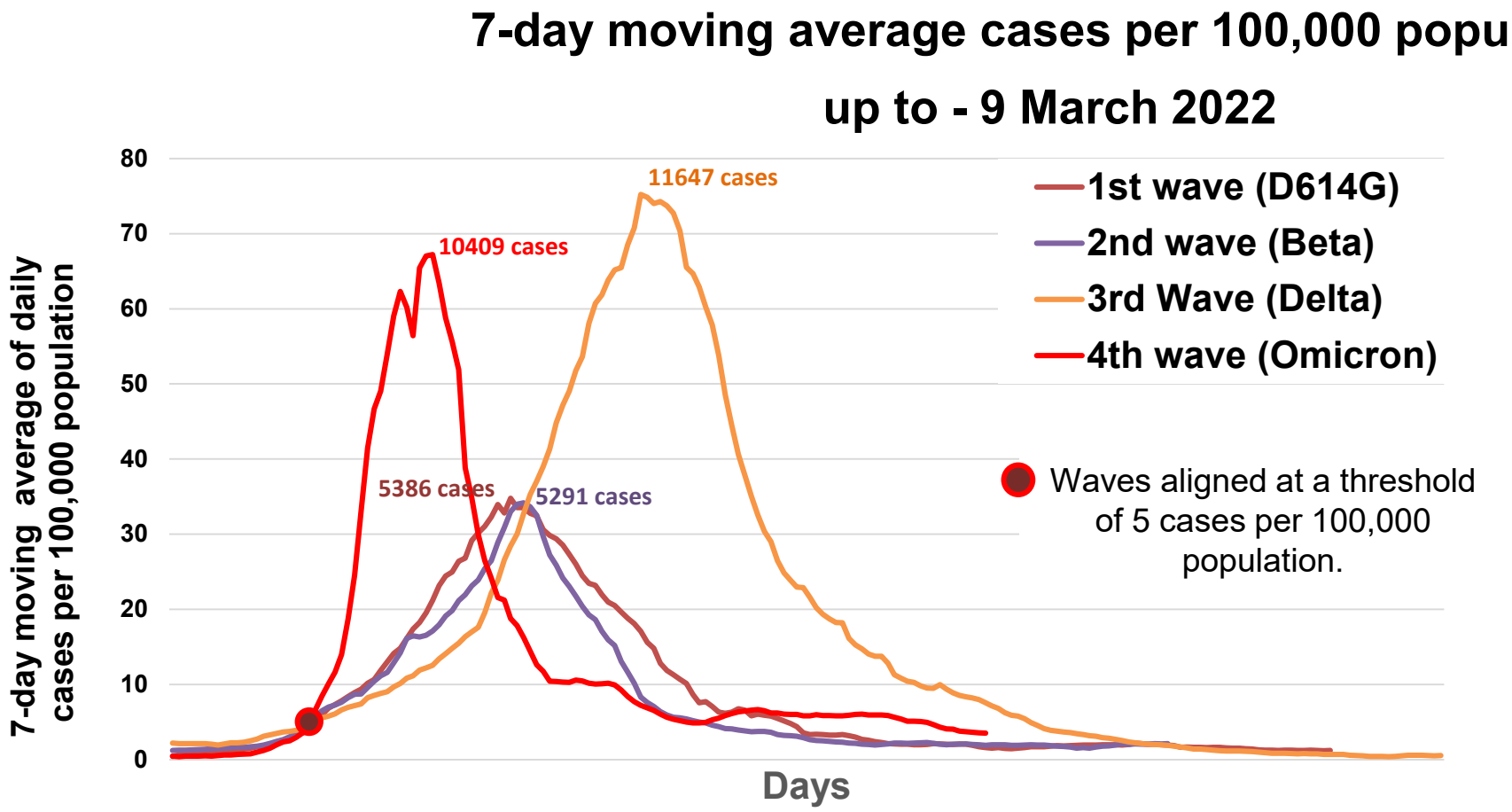
SARS-Cov-2 cases in 1st, 2nd & 3rd and 4th waves: Gauteng



Data source: Department of Health; Analysis: Marothi Letsoalo; Ande Mchunu

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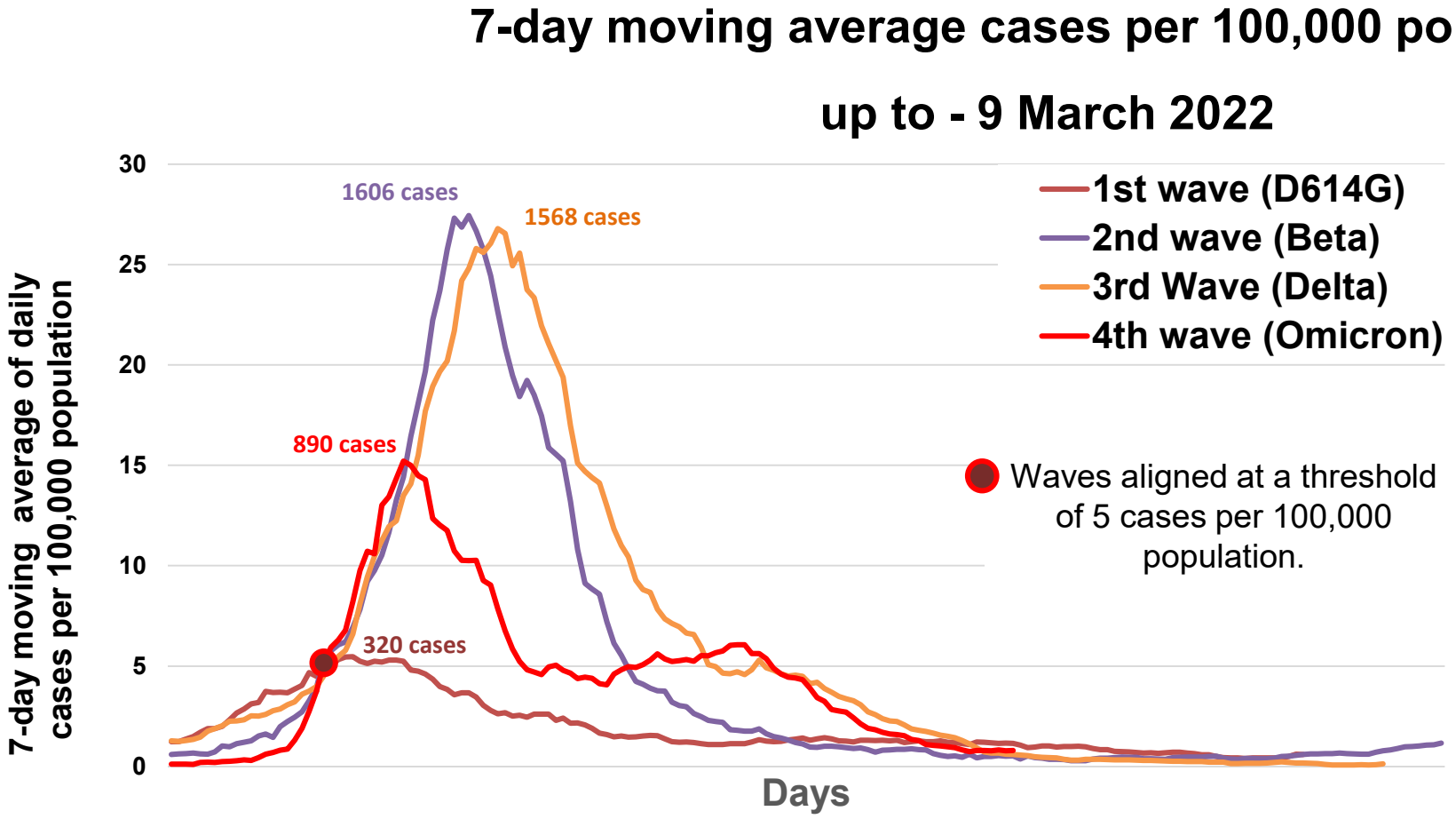
SARS-Cov-2 cases in 1st, 2nd & 3rd and 4th waves: Limpopo



Data source: Department of Health; Analysis: Marothi Letsoalo; Ande Mchunu

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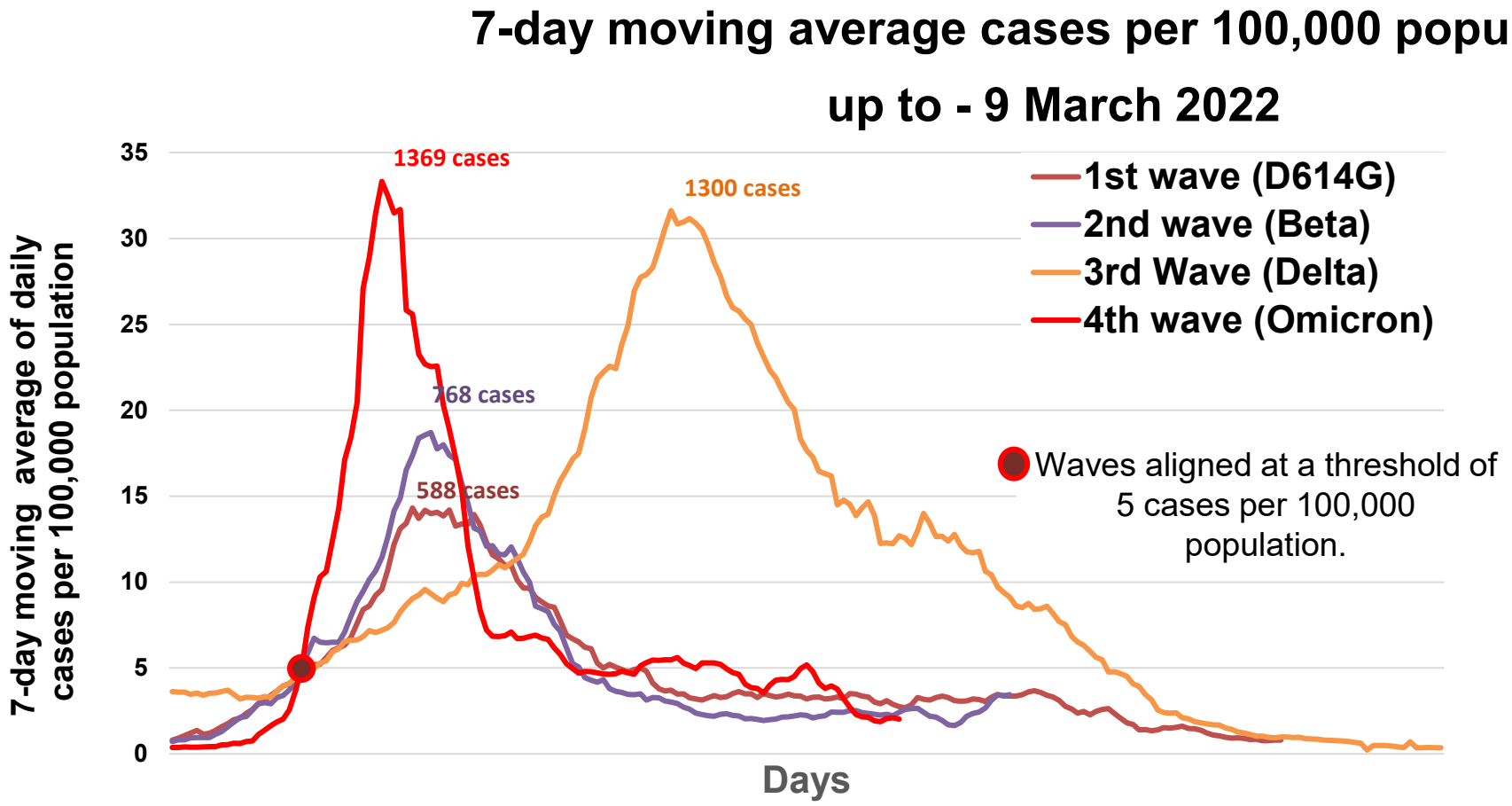
SARS-Cov-2 cases in 1st, 2nd & 3rd and 4th waves: North West



Data source: Department of Health; Analysis: Marothi Letsoalo; Ande Mchunu

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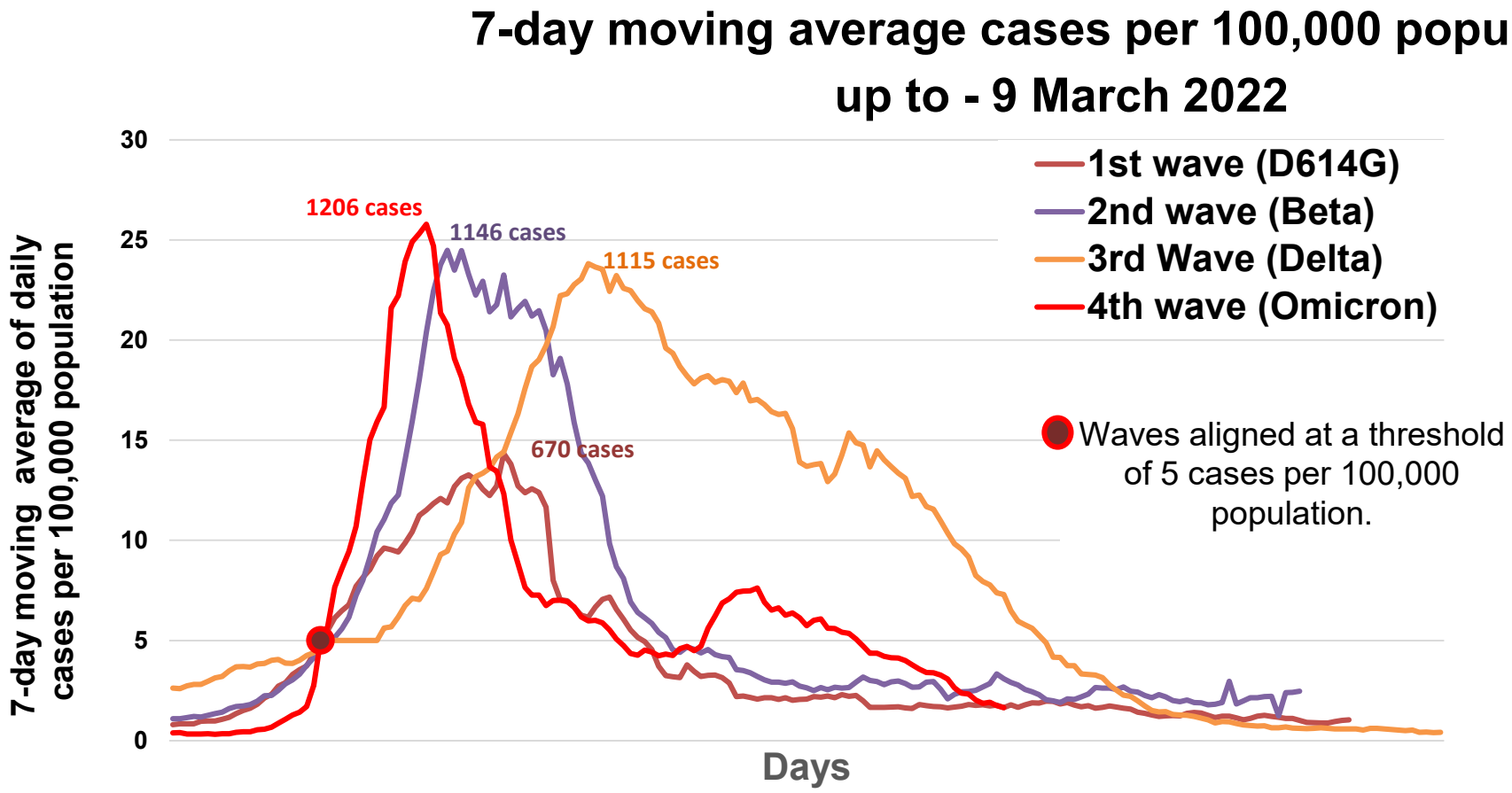
SARS-Cov-2 cases in 1st, 2nd & 3rd and 4th waves: Mpumalanga



Data source: Department of Health; Analysis: Marothi Letsoalo; Ande Mchunu

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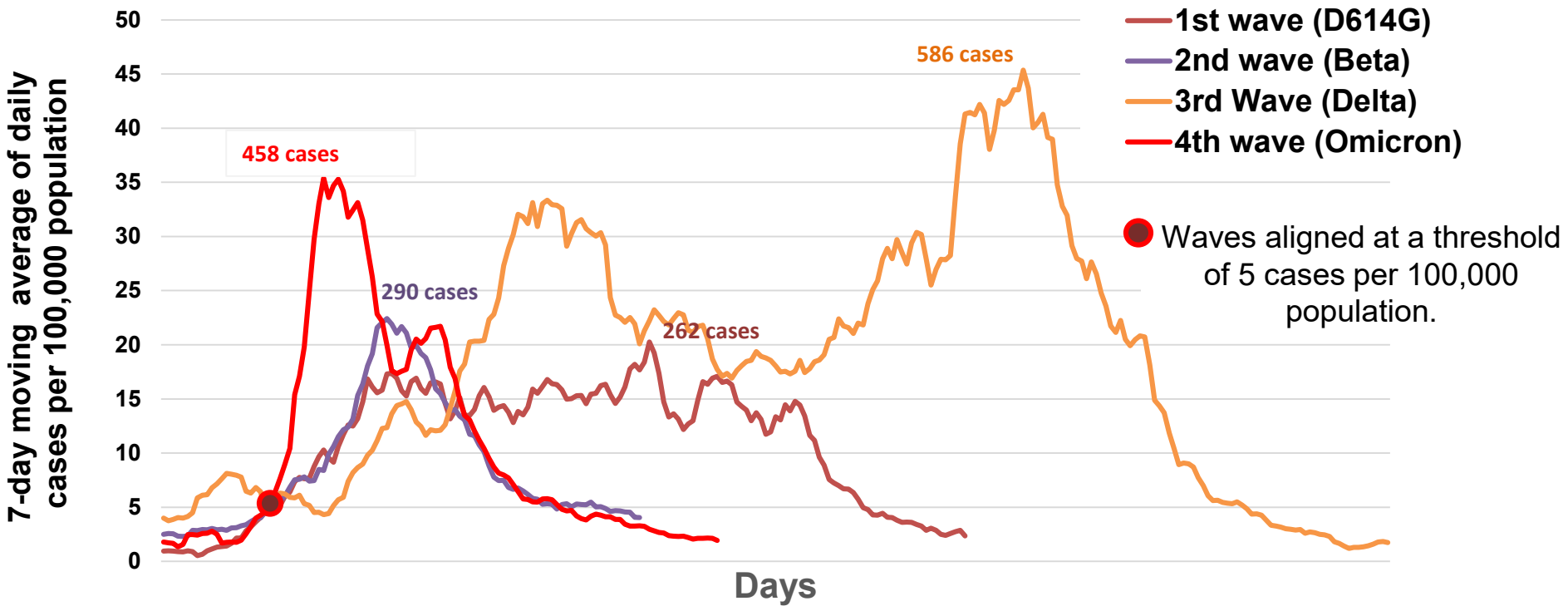
SARS-Cov-2 cases in 1st, 2nd & 3rd and 4th waves: Northern Cape

7-day moving average cases per 100,000 population
up to - 9 March 2022



Data source: Department of Health; Analysis: Marothi Letsoalo; Ande Mchunu

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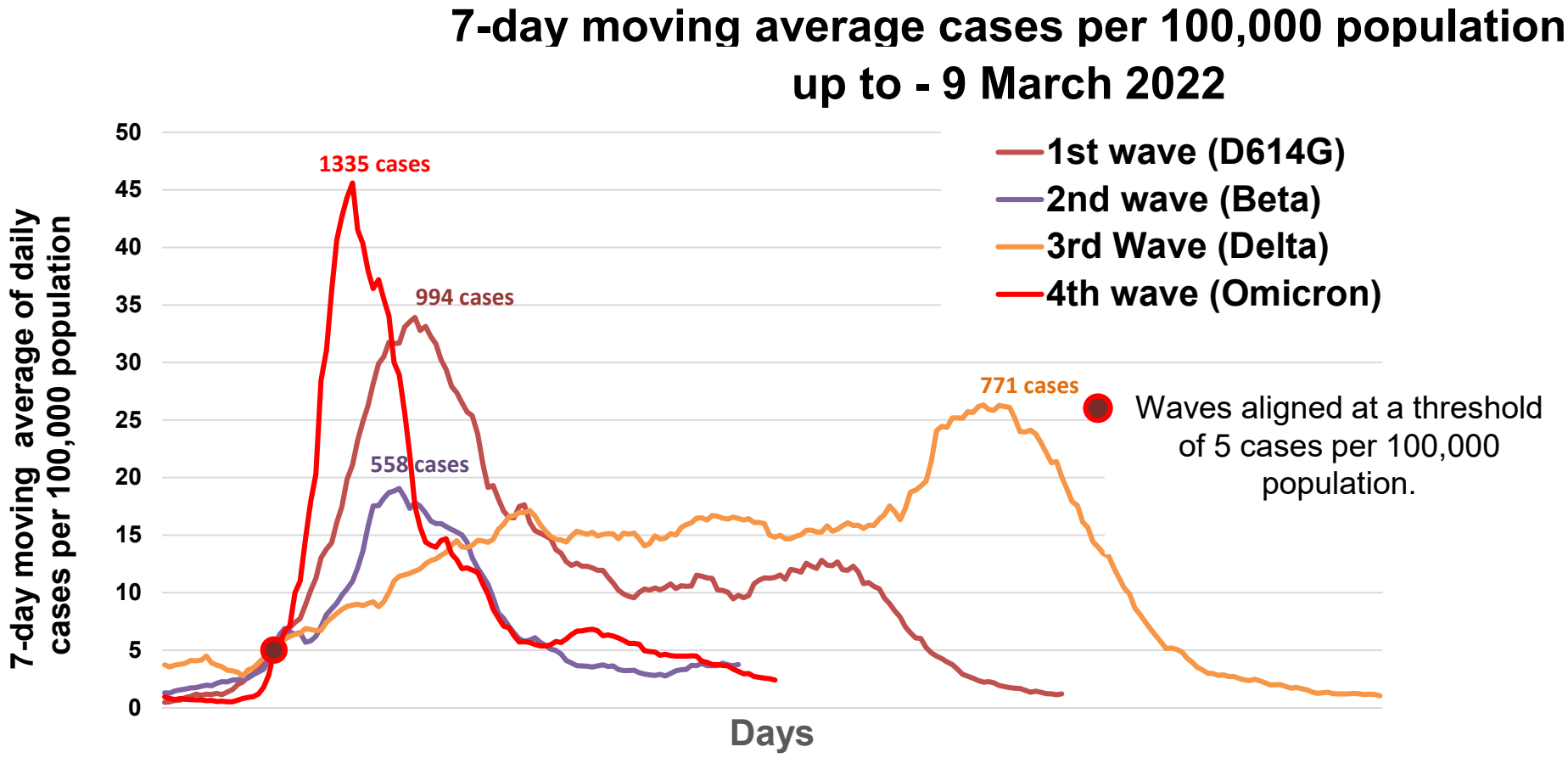
SARS-Cov-2 cases in 1st, 2nd & 3rd and 4th waves: Free State



Data source: Department of Health; Analysis: Marothi Letsoalo; Ande Mchunu

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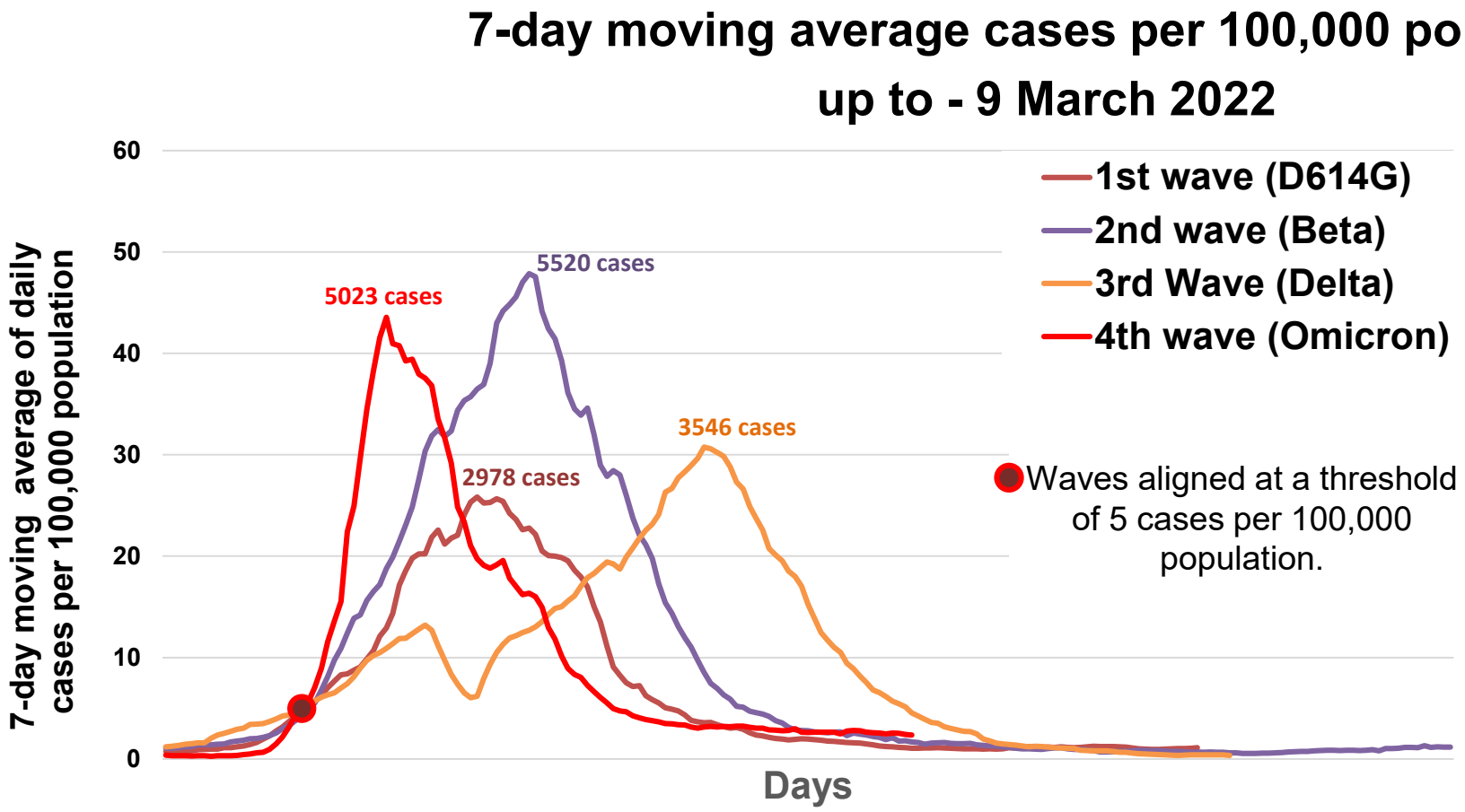
SARS-Cov-2 cases in 1st, 2nd & 3rd and 4th waves: KwaZulu Natal



Data source: Department of Health; Analysis: Marothi Letsoalo; Ande Mchunu

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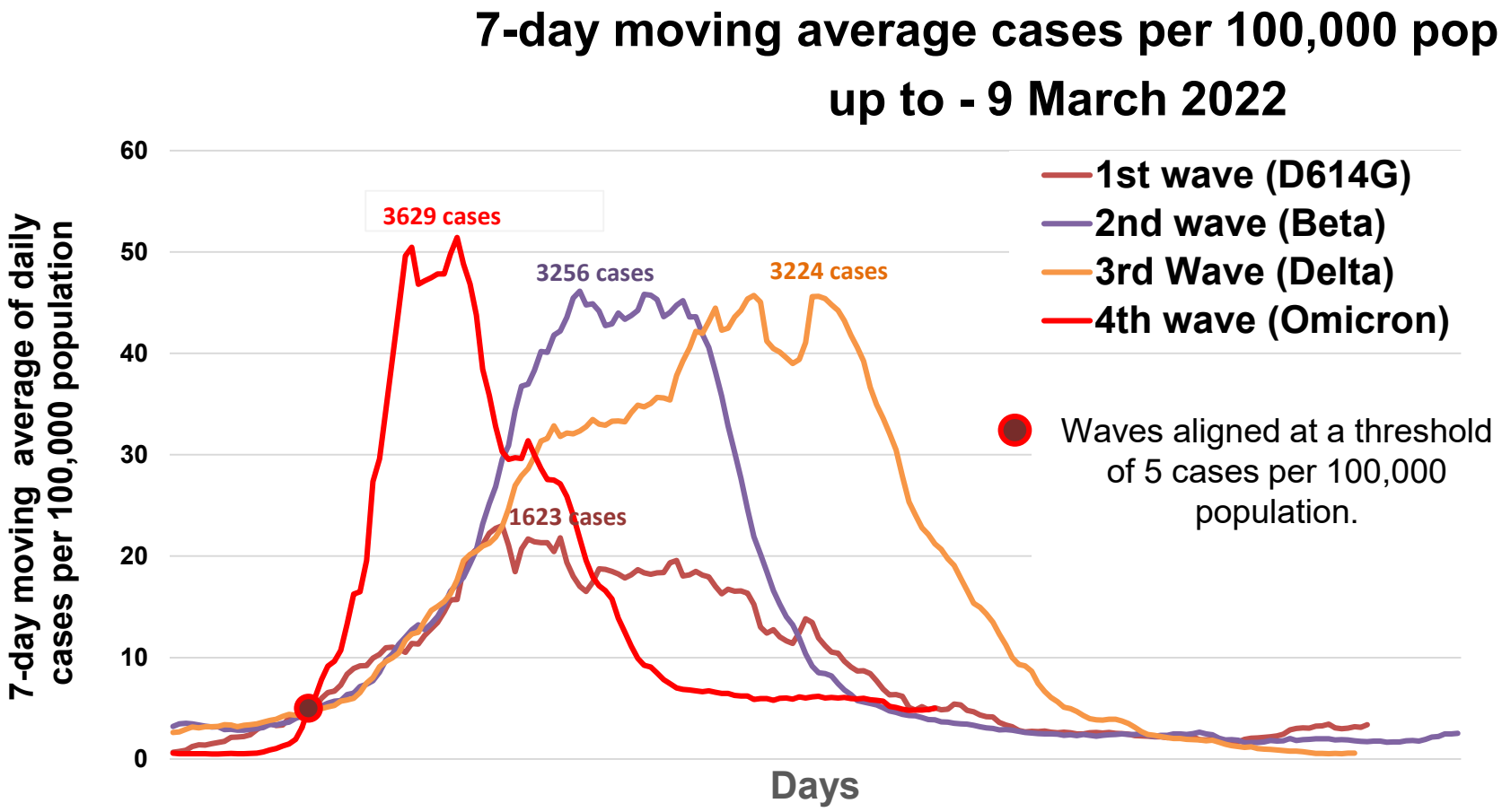
SARS-Cov-2 cases in 1st, 2nd & 3rd and 4th waves: Western Cape



Data source: Department of Health; Analysis: Marothi Letsoalo; Ande Mchunu

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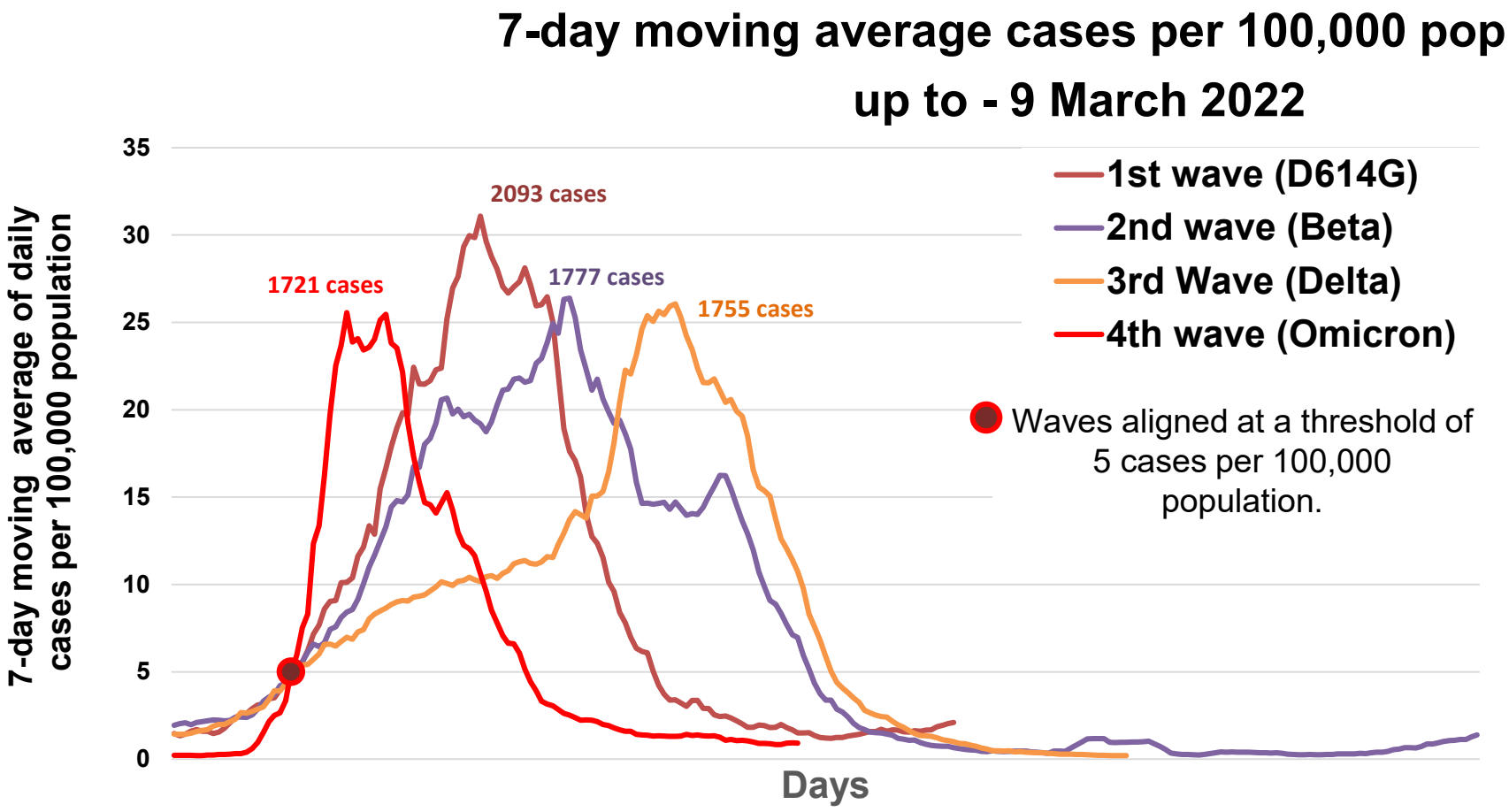
CENTRE FOR THE AIDS PROGRAMME OF RESEARCH IN SOUTH AFRICA

SARS-Cov-2 cases in 1st, 2nd & 3rd and 4th waves: Eastern Cape



Data source: Department of Health; Analysis: Marothi Letsoalo; Ande Mchunu

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