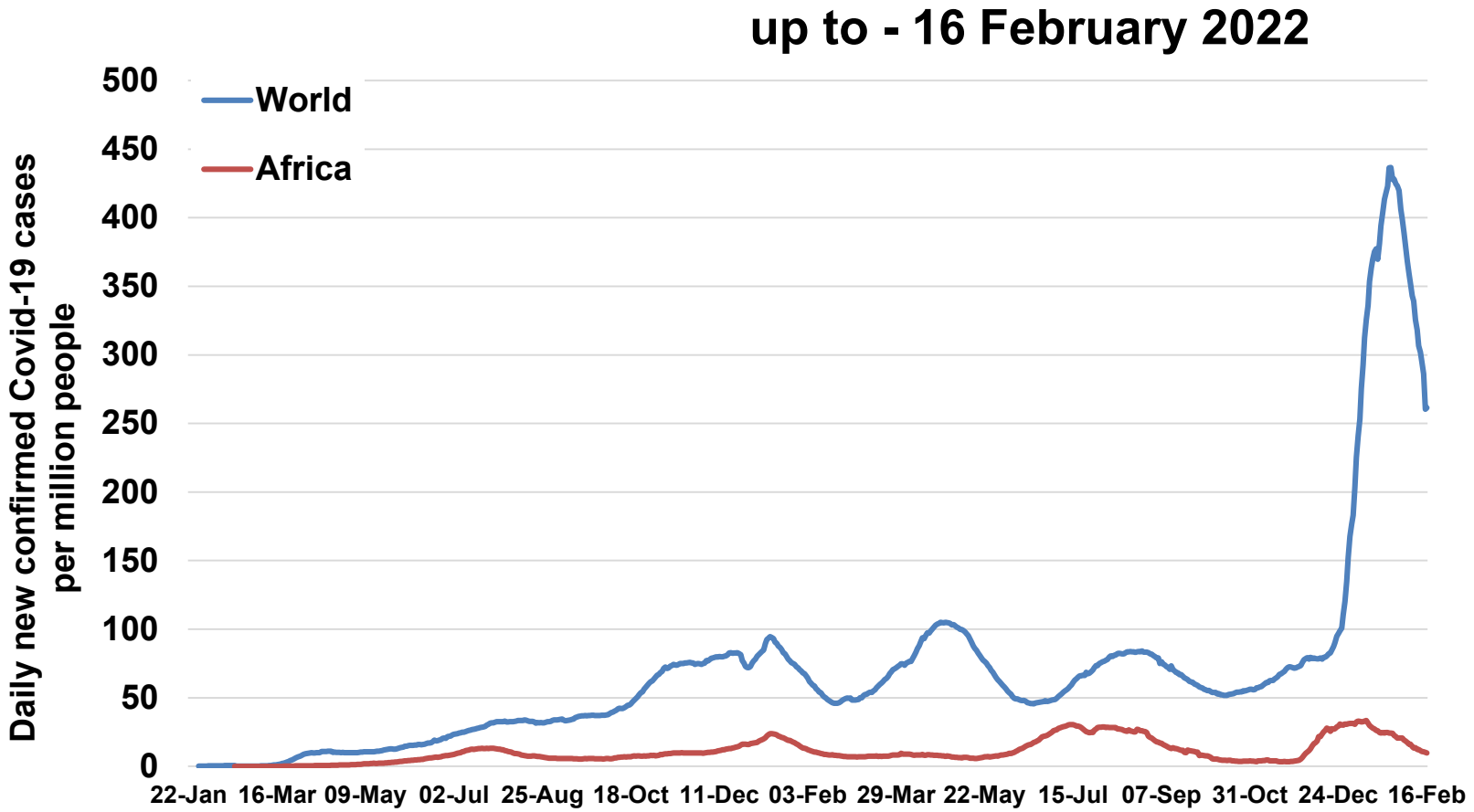
Covid-19 in Africa and the world
Omicron variant drives 4th wave



WORLD

* 403 million cumulative global case and 5.8 million deaths

AFRICA

* 11 million cumulative cases (2.7 % of global cases - 22 January 2020 up to 09 February 2022

* 242712 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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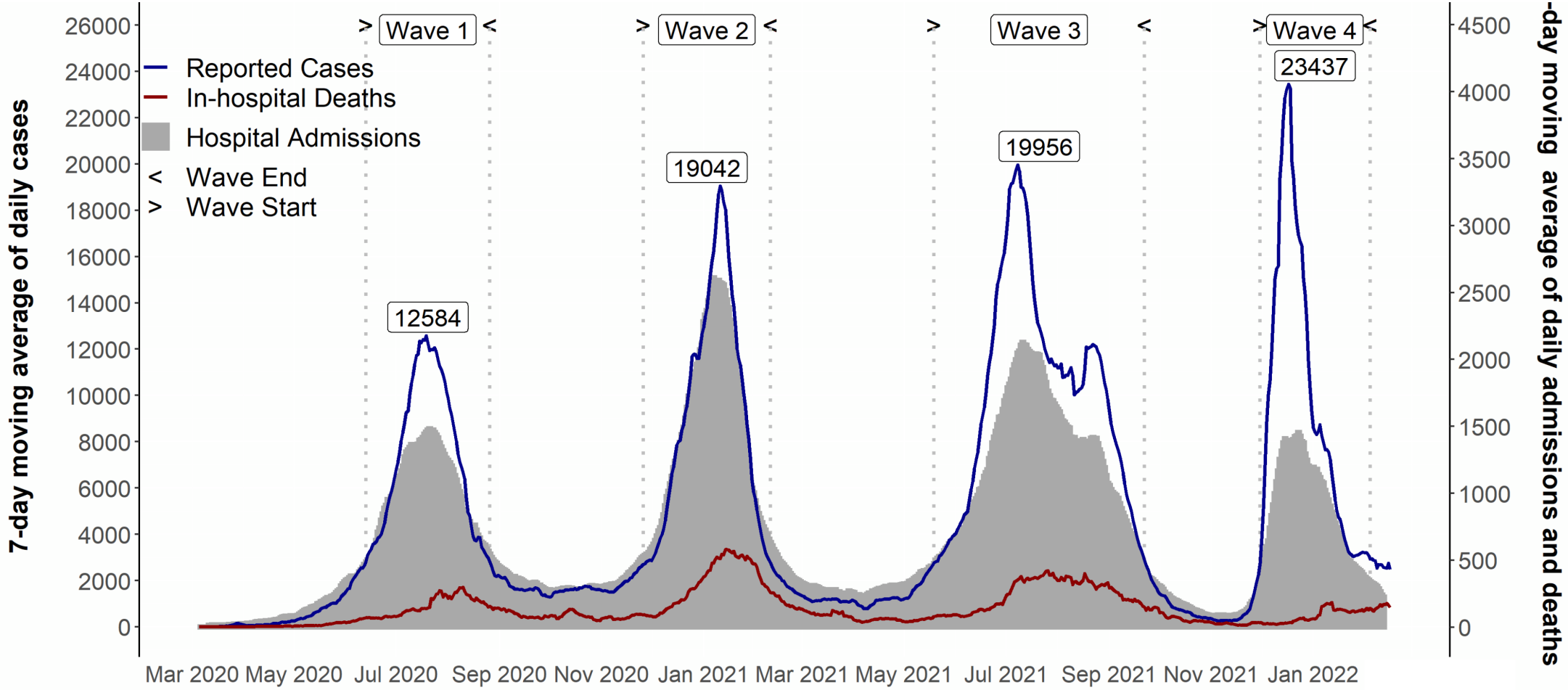
Covid-19 in South Africa

up to - 16 February 2022



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

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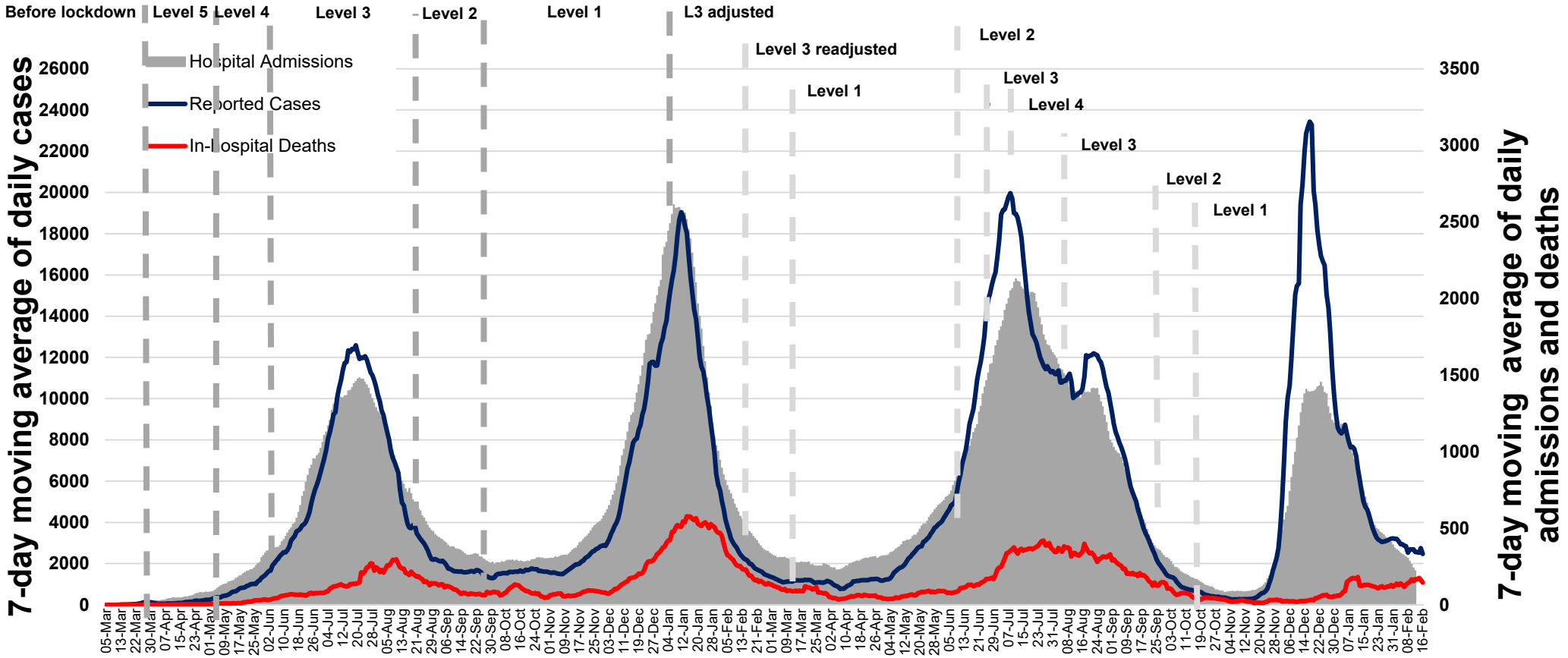
Covid-19 in South Africa

7-day moving average of new cases, hospital admissions and in-hospital Covid-19 deaths

up to - 16 February 2022



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

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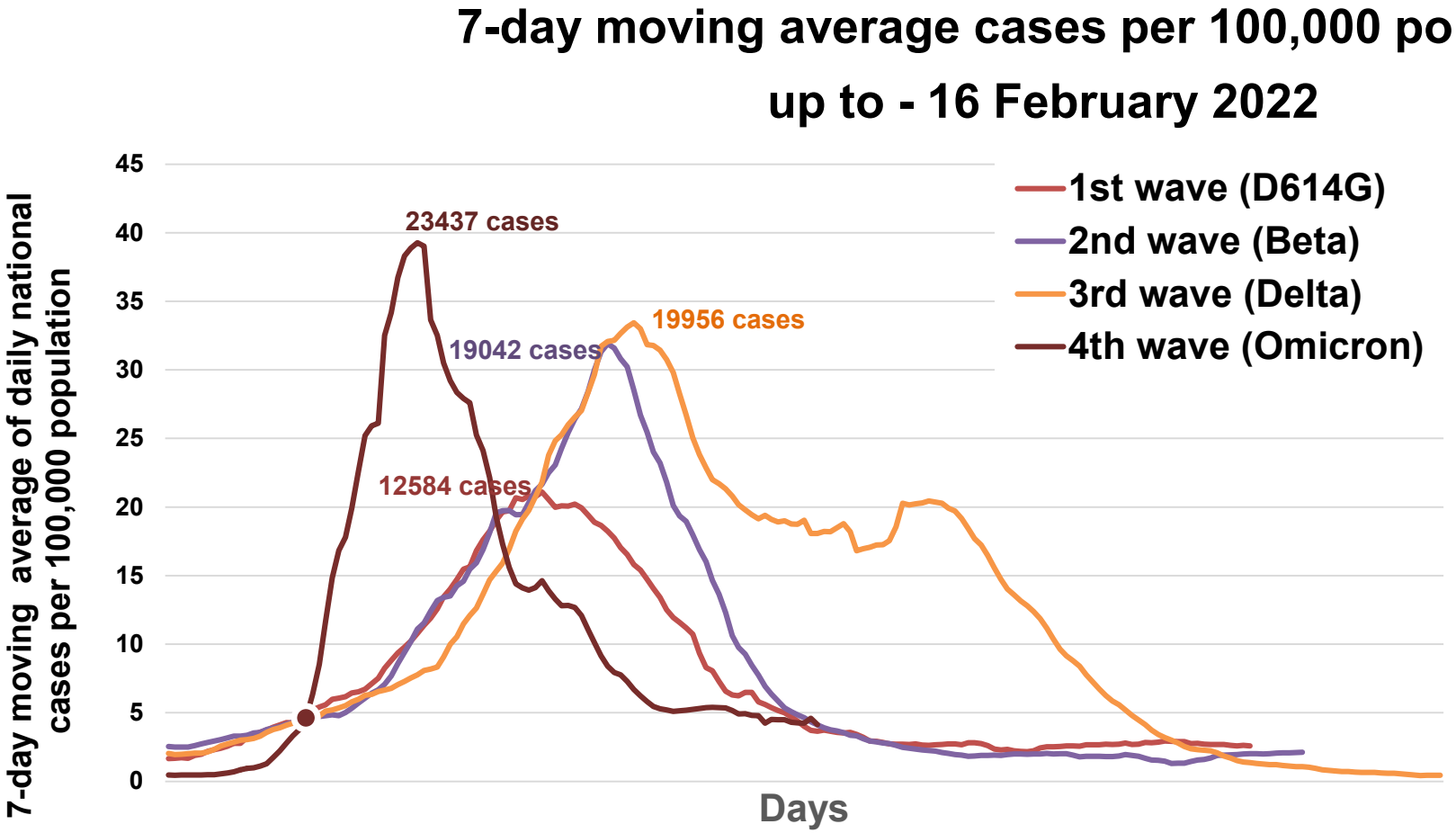
SARS-Cov-2 cases in 1st, 2nd & 3rd and 4th waves: South Africa



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

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Why vaccinate?

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The 8 benefits of Covid-19 vaccines

- **Individual benefits:**
  1. ↓ asymptomatic infections
  2. ↓ clinically apparent infections
  3. ↓ severe infections / hospitalisations
  4. ↓ deaths from Covid-19
  5. ↓ progression to long Covid
- **Community benefits:**
  6. ↓ infectious if infected when vaccinated
  7. ↓ period of infectiousness when vaccinated
  8. ↓ secondary attack rate to close contacts exposed to a vaccinee

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1. Covid-19 vaccines reduce asymptomatic infections

Preventing asymptomatic SARS-CoV-2 infections:

- Moderna: 66% reduction in number of asymptomatic infections
- AstraZeneca: 49.3% reduction in asymptomatic infections

Source: Mallapaty S. Can COVID vaccines stop transmission? Scientists race to find answers. *Nature*. 2021 Feb 19;10.

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2a. Do vaccines prevent clinically apparent SARS-CoV-2 infections with pre-existing variants?

Yes, quite well

	Efficacy	Endpoints (vaccine vs placebo)	Sample size
Johnson & Johnson*	66%*	n/a	43,783
Pfizer	95%	8 vs 162	34,922
moderna	94%	11 vs 185	28,207
THE GAMALEYA NATIONAL CENTER OF EPIDEMIOLOGY AND MICROBIOLOGY	92%	16 vs 62	19,866
NOVAVAX^	89%	6 vs 56	15,000
AstraZeneca	67%	84 vs 248	17,177
sinovac#	51%	n/a	12,396

* Single dose

Brazilian trial
^UK trial

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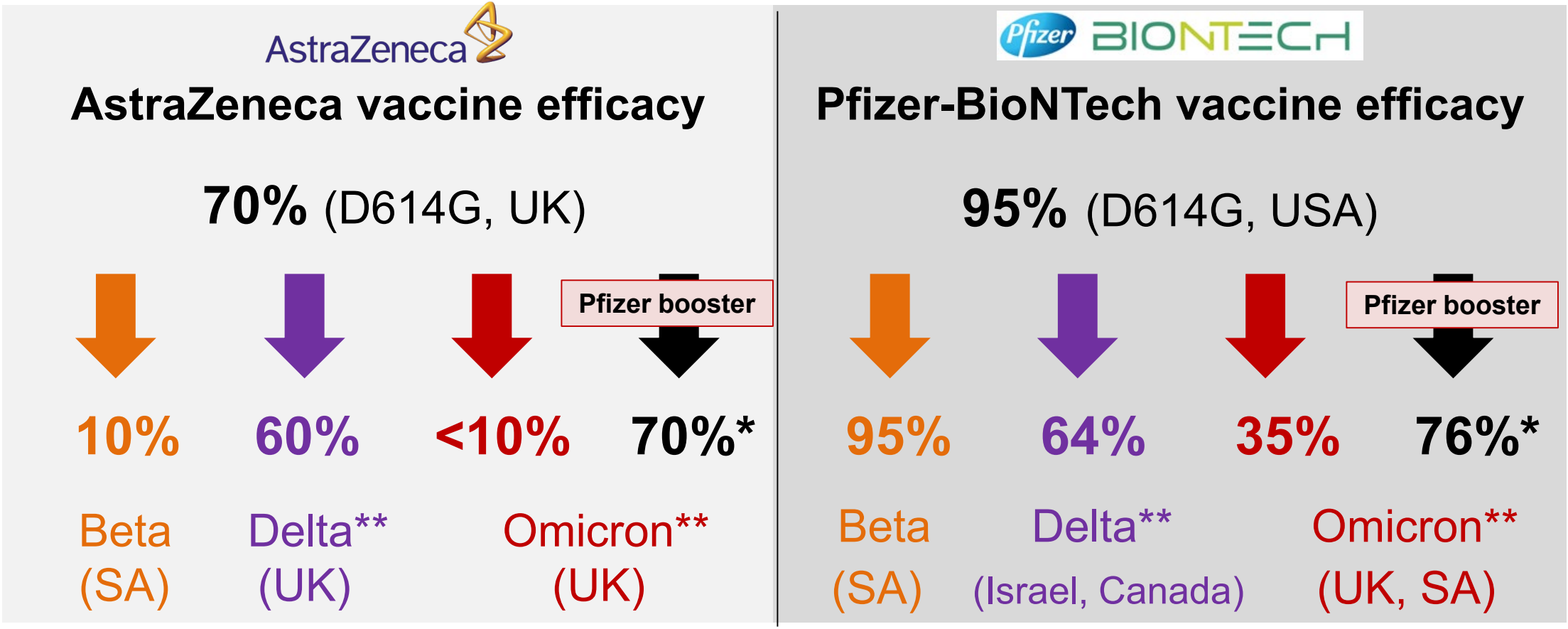
2b. But efficacy in preventing clinical illness may vary with vaccine type & immune escape by variants



*Booster benefit duration not known – likely to be short-lived

**Vaccine efficacy assessed at ~6 months in observational studies

Sources: *Abdool Karim SS, et al. NEJM; 2021:10.1056/NEJMc2100362; Sheikh et al. The Lancet, 2021. 10.1016/S0140-6736(21)01358-1. Lopez Bernal et al. NEJM; 2021. 10.1056/NEJMoa2108891; Stowe et al. PHE preprint; Nasreen et al. medRxiv preprint; Andrews N, et al. medRxiv preprint*

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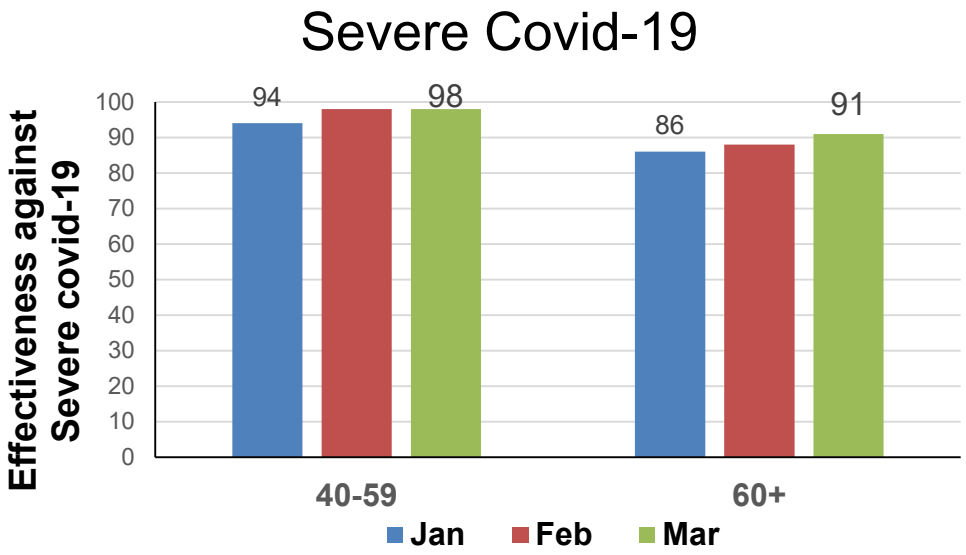
3. Vaccines remain effective over time for all past variants for severe Covid-19 / hospitalization

- **While may see more mild infections from Omicron due to Ab escape, there is likely to be less impact on severe disease as it depends more on T-cells**
- **Test -ve, case–control study by Discovery Health:**
  - VE for **Omicron** for severe : **70%** (2 dose Pfizer)
- **Kaiser Permanente (n=3,436,957 – Alpha & Delta)**
  - VE for hospital admissions (delta): **93%** (up to 6 mths)
- **New York State (n=8,834,604)** ≥ 65 years, VE ↓ over 4 mths
  - Pfizer-BioNTech: **95%** to **89%**
  - Moderna: **97%** to **94%**
  - J&J: **86%** to **83%** **(Alpha & Delta)**



Earlier vaccinees (Jan-Feb) in Israel at similar risk of severe disease within their age groups

Sources: *Thomas SJ et al. NEJM 2021; DOI: 10.1056/NEJMoa2110345; Chemaitelly, H, et al. NEJM. 2021: DOI: 10.1056/NEJMoa2114114; Goldberg Y, et al. medRxiv. Preprint: 2021:2021.08.24.21262423; Tartof SY et al. Lancet 2021; https://doi.org/10.1016/S0140-6736(21)02183-8; Rosenberg ES et al medRxiv preprint doi: https://doi.org/10.1101/2021.10.08.21264595.*

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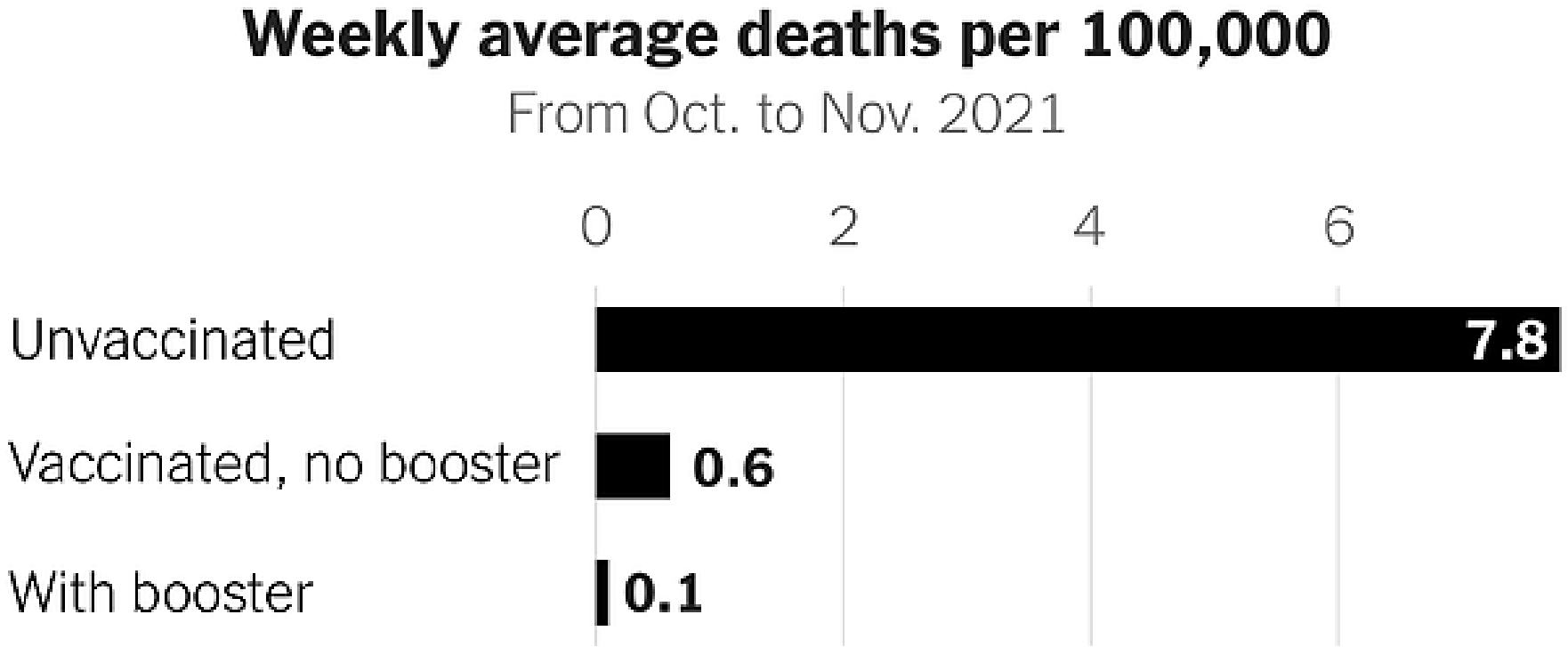
4. CDC report: Vaccines & boosters impact individual risk on risk of death



COVID-19 Incidence and Death Rates Among Unvaccinated and Fully Vaccinated Adults with and Without Booster Doses During Periods of Delta and Omicron Variant Emergence — 25 U.S. Jurisdictions, April 4–December 25, 2021

Weekly / January 28, 2022 / 71(4);132–138

CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

Morbidity and Mortality Weekly Report (*MMWR*)

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5. Two doses of Pfizer vaccine reduces long Covid

medRxiv
THE PREPRINT SERVER FOR HEALTH SCIENCES

Association between vaccination status and reported incidence of post-acute COVID-19 symptoms in Israel: a cross-sectional study of patients tested between March 2020 and November 2021

Paul Kuodi[1], Yanay Gorelik[1], Hiba Zayyad[1,3], Ofir Wertheim[3], Karine Beiruti Wiegler[2], Kamal Abu Jabal[1,2], Amiel A. Dror[1,4], Saleh Nazzal[3], Daniel Glikman[1,3], Michael Edelstein[1,2]

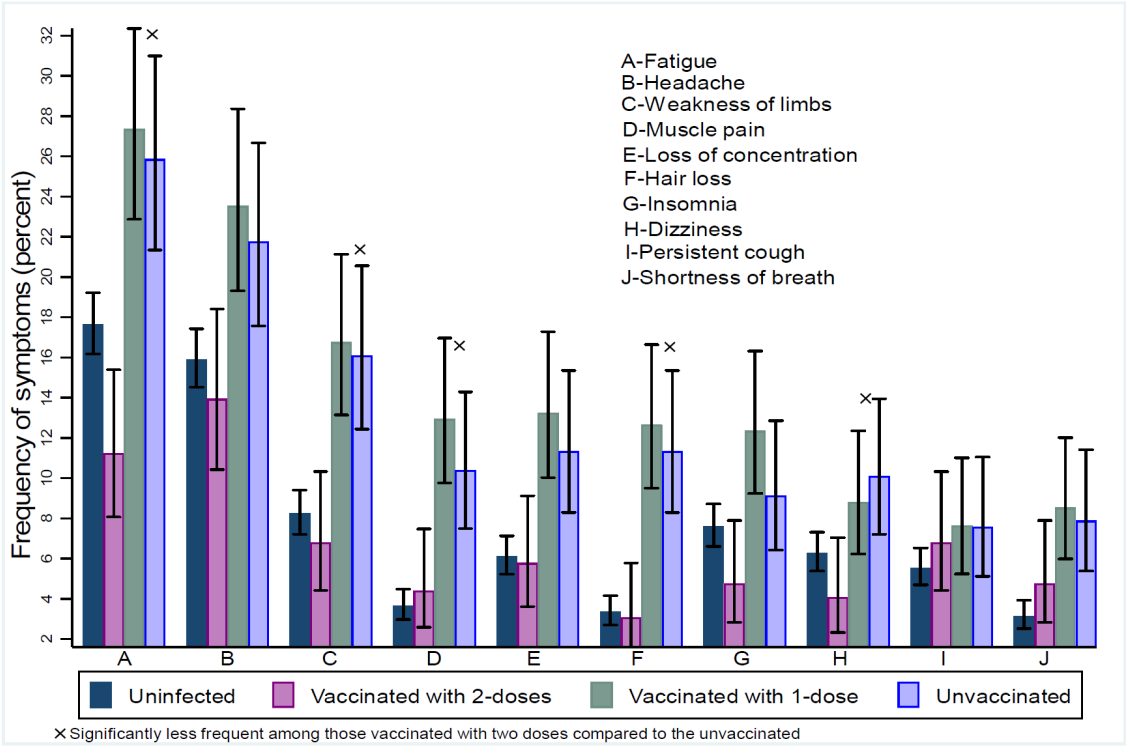

Figure 1. Frequency of most reported symptoms among the uninfected, the vaccinated and the unvaccinated

54% to 64% reduction in the 4 most common persistent long Covid symptoms:

- Fatigue
- Headache
- Weakness
- Muscle pain

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

Initial report of decreased SARS-CoV-2 viral load after inoculation with the BNT162b2 vaccine

Matan Levine-Tiefenbrun[1,6], Idan Yelin[1,6] ✉, Rachel Katz[2], Esma Herzel[2], Ziv Golan[3], Licita Schreiber[3], Tamar Wolf[3], Varda Nadler[3], Amir Ben-Tov[2,4], Jacob Kuint[2,4], Sivan Gazit[2], Tal Patalon[2], Gabriel Chodick[2,4] and Roy Kishony[1,5] ✉

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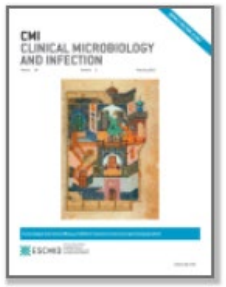
7. Vaccines – Community benefit by more rapidly declining viral load in vaccinated vs unvaccinated

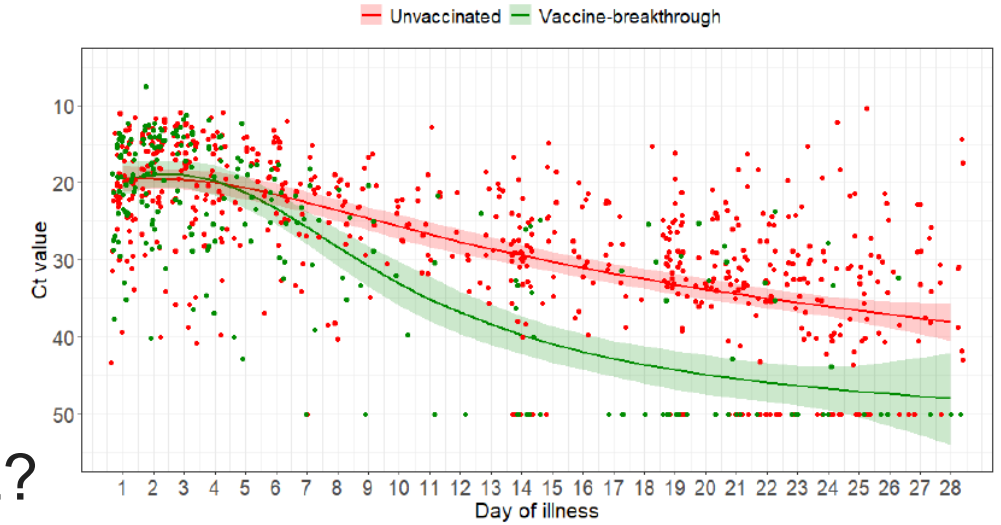


Clinical Microbiology and Infection

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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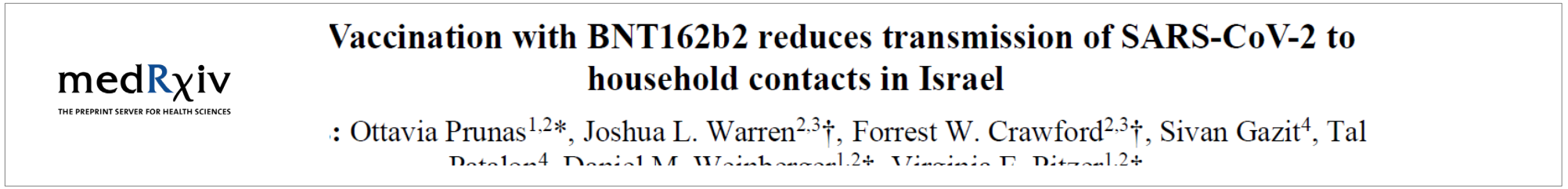
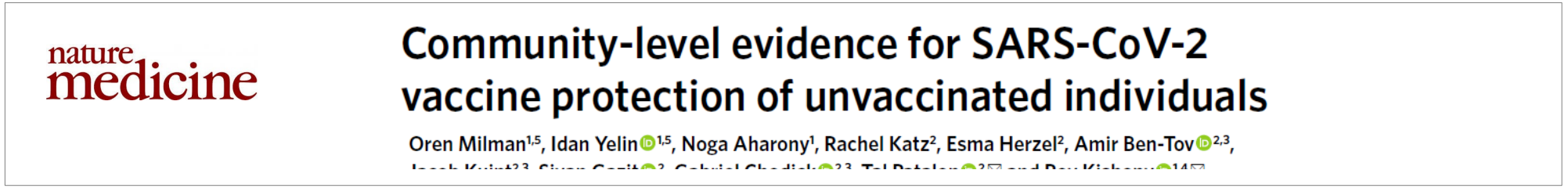
8. ↓ infections in unvaccinated in communities with high mRNA vaccination coverage



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



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

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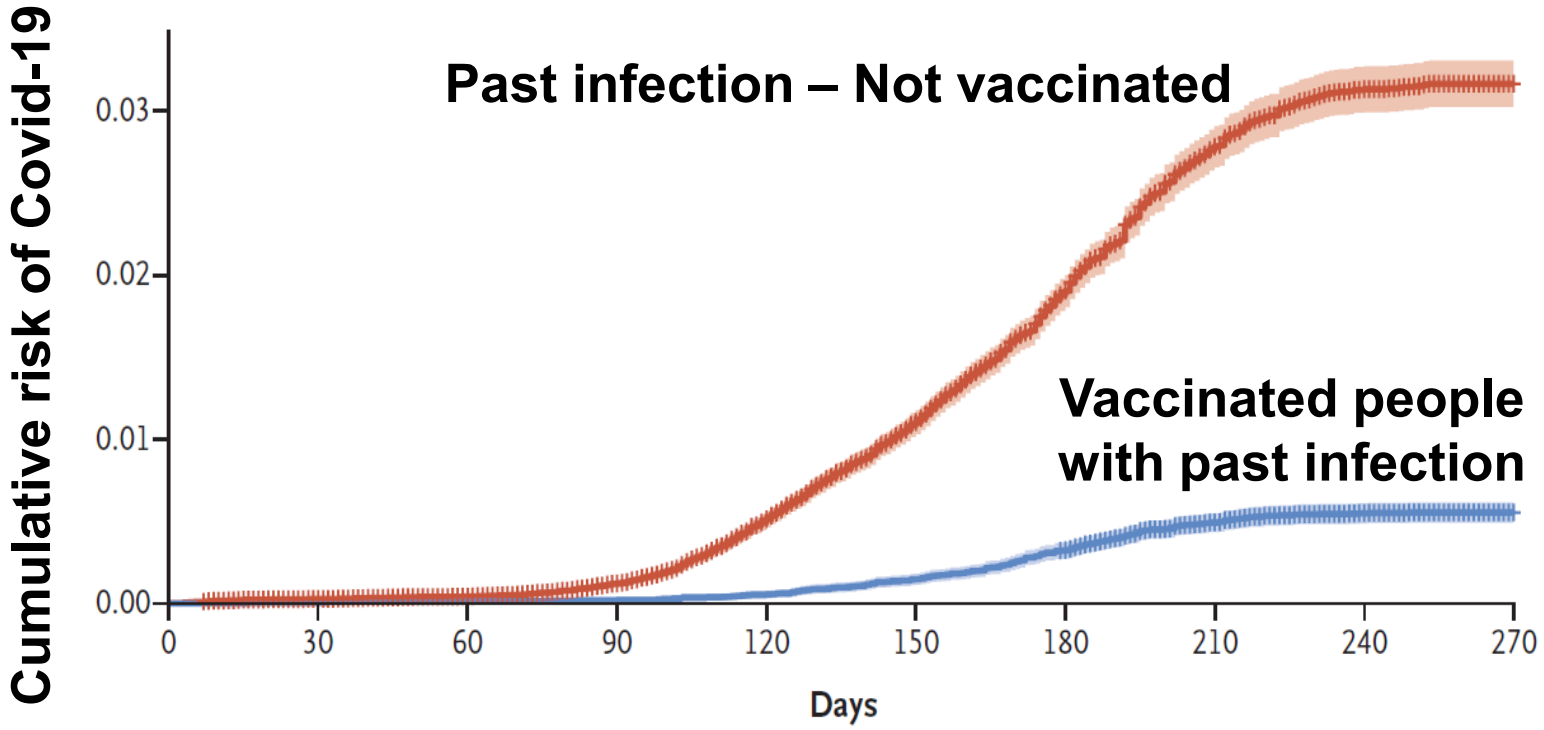
Vaccination reduced reinfection by 82% compared to unvaccinated in those with past infection

The NEW ENGLAND JOURNAL of MEDICINE

Effectiveness of the BNT162b2 Vaccine after Recovery from Covid-19

Ariel Hammerman, Ruslan Sergienko, Michael Friger, Tanya Beckenstein, Alon Peretz, Doron Netzer, Shlomit Yaron, Ronen Arbel



- 149,032 patients with past infection - 56% vaccinated
- Reinfection rates: 2.5 vs 10.2 cases per 100.000
- Vaccine effectiveness = 82% (16 to 64 years)
- 1 Pfizer dose = 2 doses

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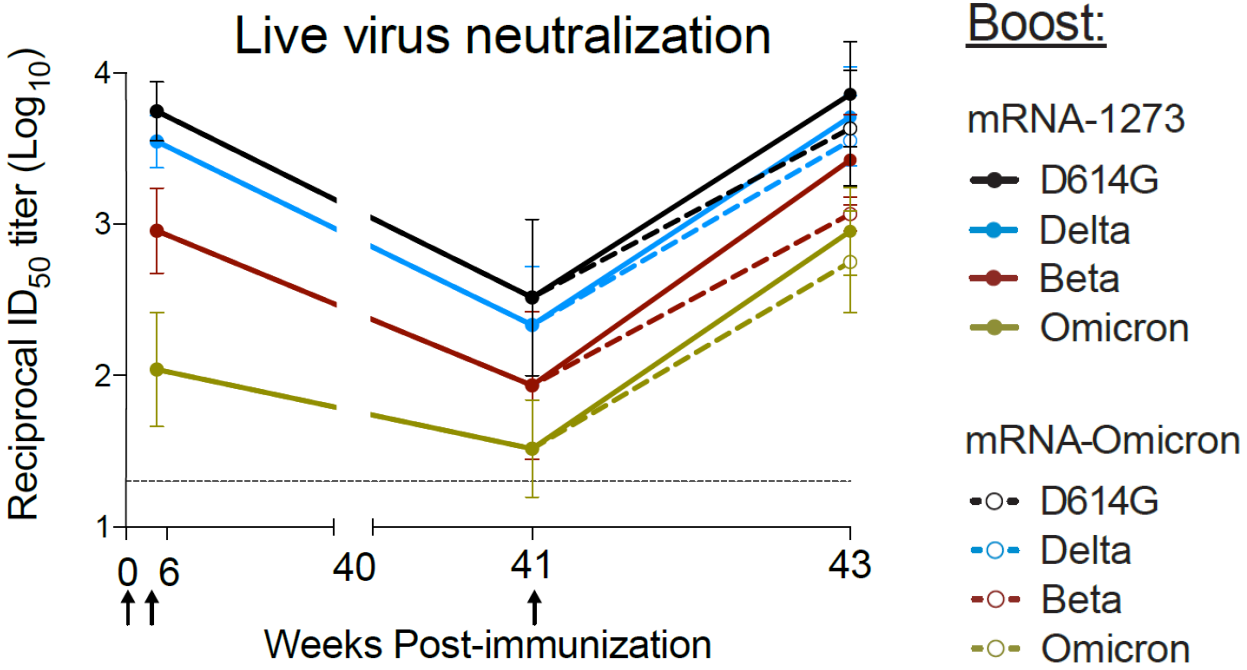
Omicron specific vaccine boost not any better

bioRχiv

mRNA-1273 or mRNA-Omicron boost in vaccinated macaques elicits comparable B cell expansion, neutralizing antibodies and protection against Omicron

Matthew Gagne, Juan I. Moliva, Kathryn E. Foulds, Shayne F. Andrew, Barbara J. Flynn, Anne P. Werner, Danielle A. Wagner, I-Ting Teng, Bob C. Lin, Christopher Moore, Nazaire Jean-Baptiste, Robin Carroll



Nine months after 2 Moderna doses, both the standard Moderna booster and the Omicron-specific Moderna booster provided equal complete protection in the lungs and limited partial protection in the upper airways following an Omicron challenge

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Continuing slides on Covid-19 in South Africa

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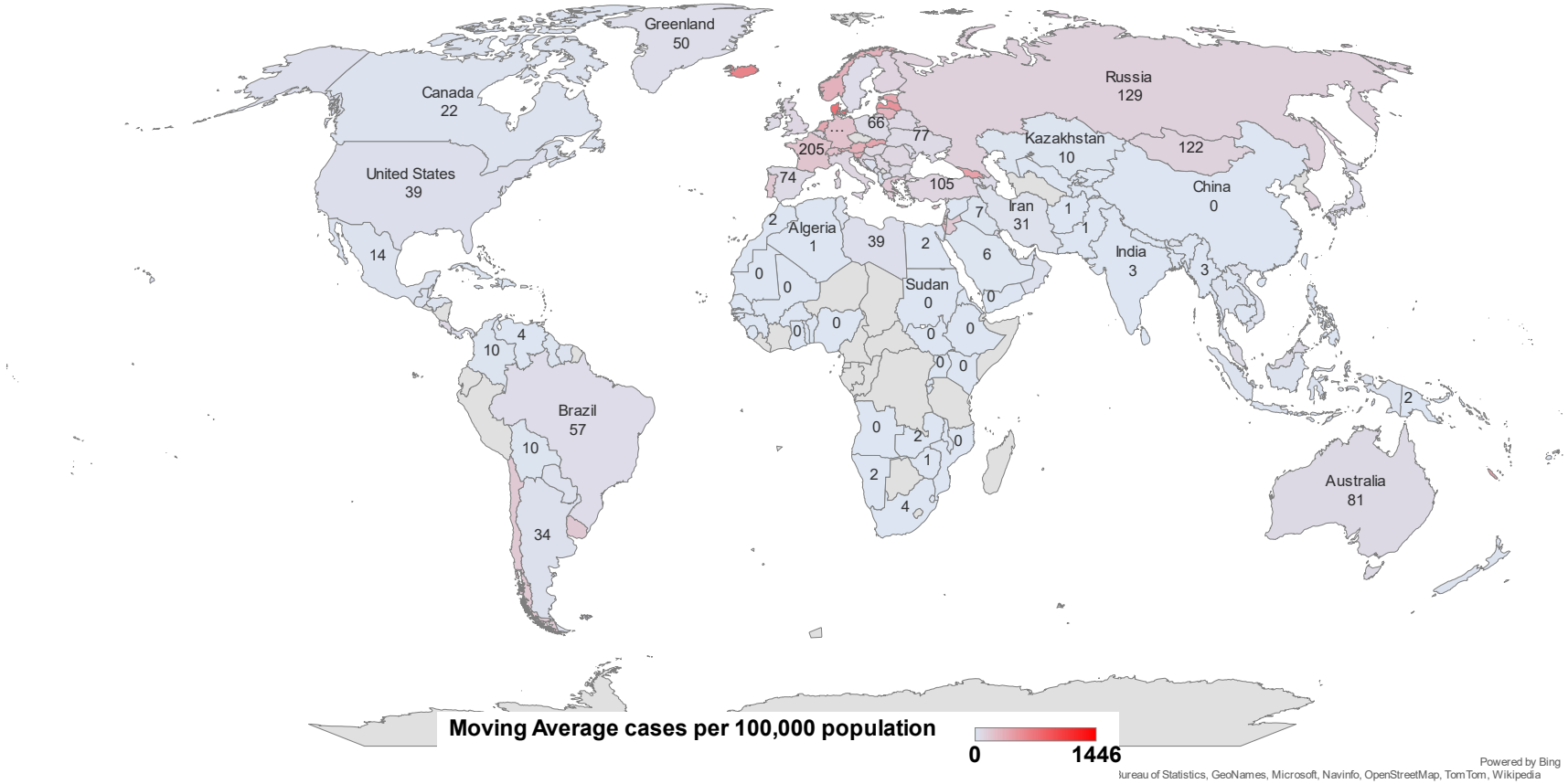
Global Covid-19 epidemic

7-day moving average cases per 100,000 population

up to - 16 February 2022



Source: *Our World in Data*

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

up to - 16 February 2022

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

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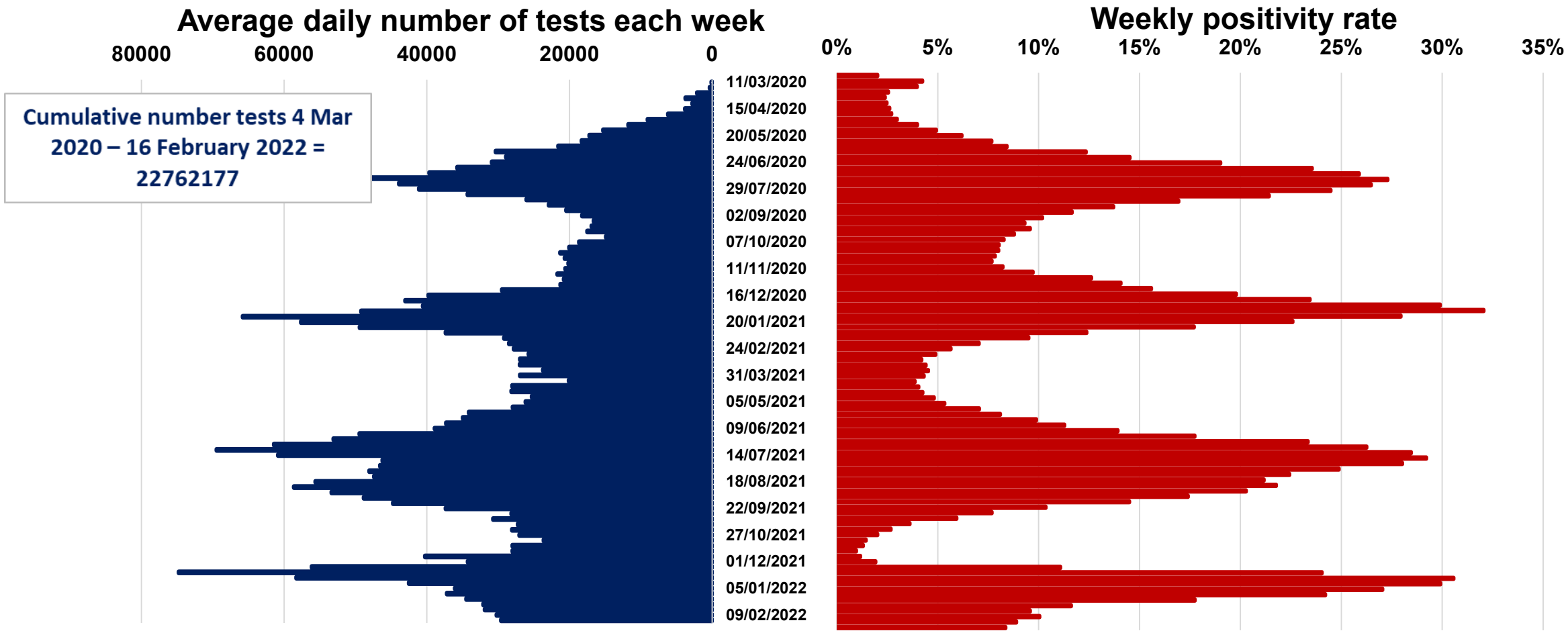
Average daily tests and proportion of positive tests

up to – 16 February 2022



Data source: Department of Health

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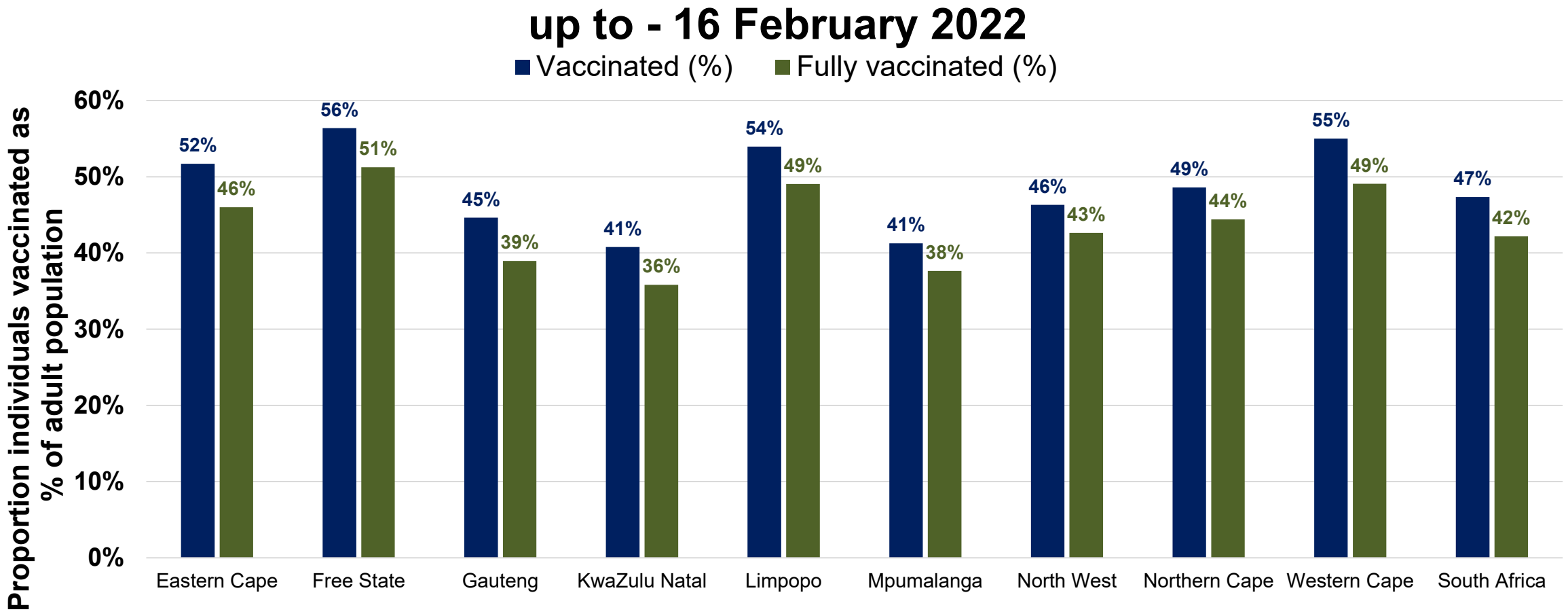
Proportion of individuals vaccinated as % of adult population



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

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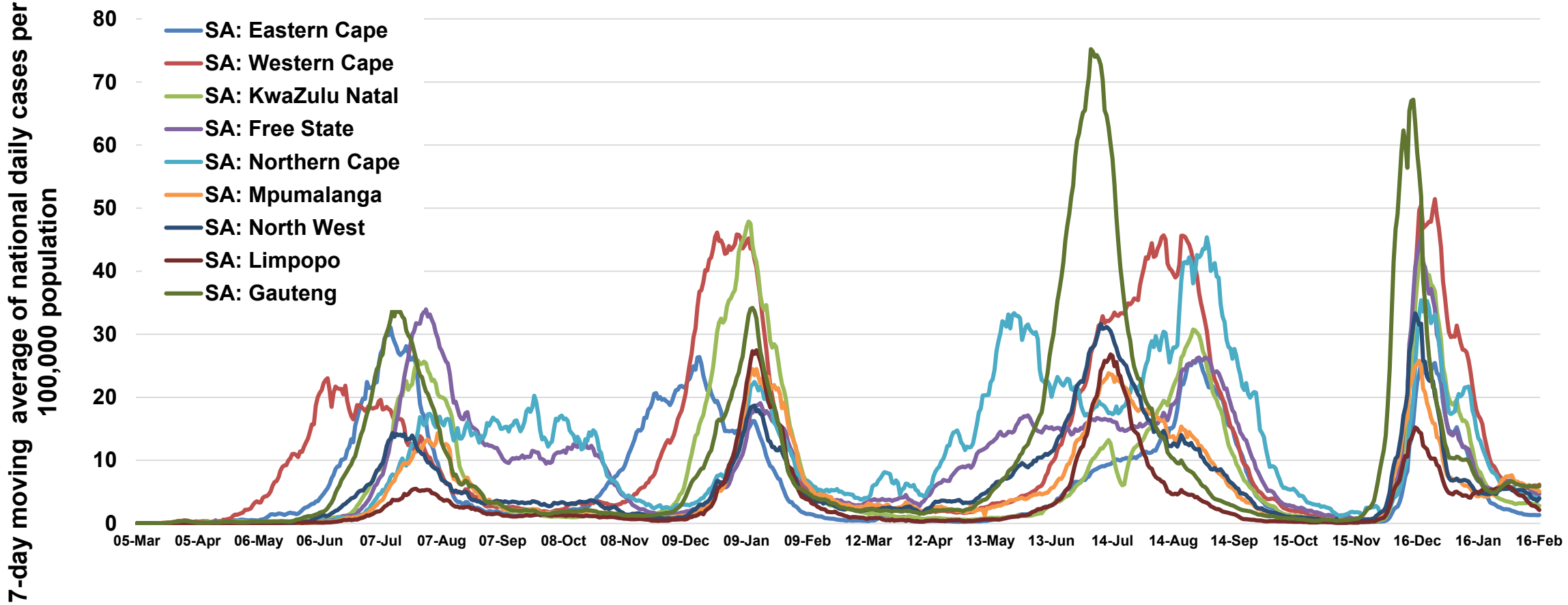
Confirmed SARS-Cov-2 cases by province

7-day moving average cases per 100,000 population

up to - 16 February 2022



Data source: Department of Health; Analysis

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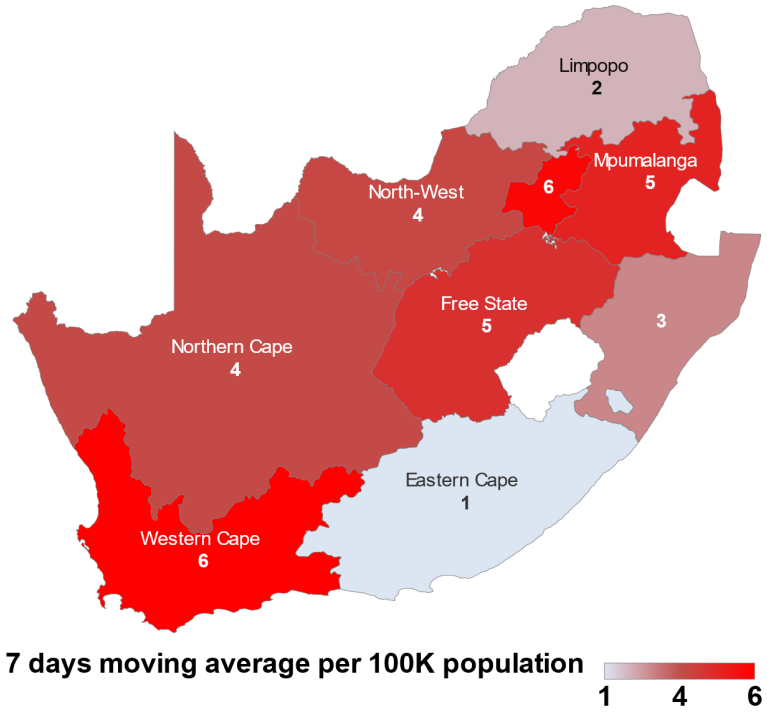
Daily new cases over last 7 days/100,000

up to - 16 February 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	92	1	89	1	-3%
Free State	29	164	6	137	5	-17%
Gauteng	155	900	6	915	6	2%
KwaZulu Natal	115	375	3	326	3	-13%
Limpopo	59	201	3	125	2	-38%
Mpumalanga	47	281	6	237	5	-16%
North West	41	195	5	163	4	-16%
Northern Cape	13	49	4	50	4	1%
Western Cape	71	420	6	433	6	3%
South Africa	597	2677	4	2475	4	-8%
Africa	13410	16874	1	13286	1	-21%



Data source: Department of Health

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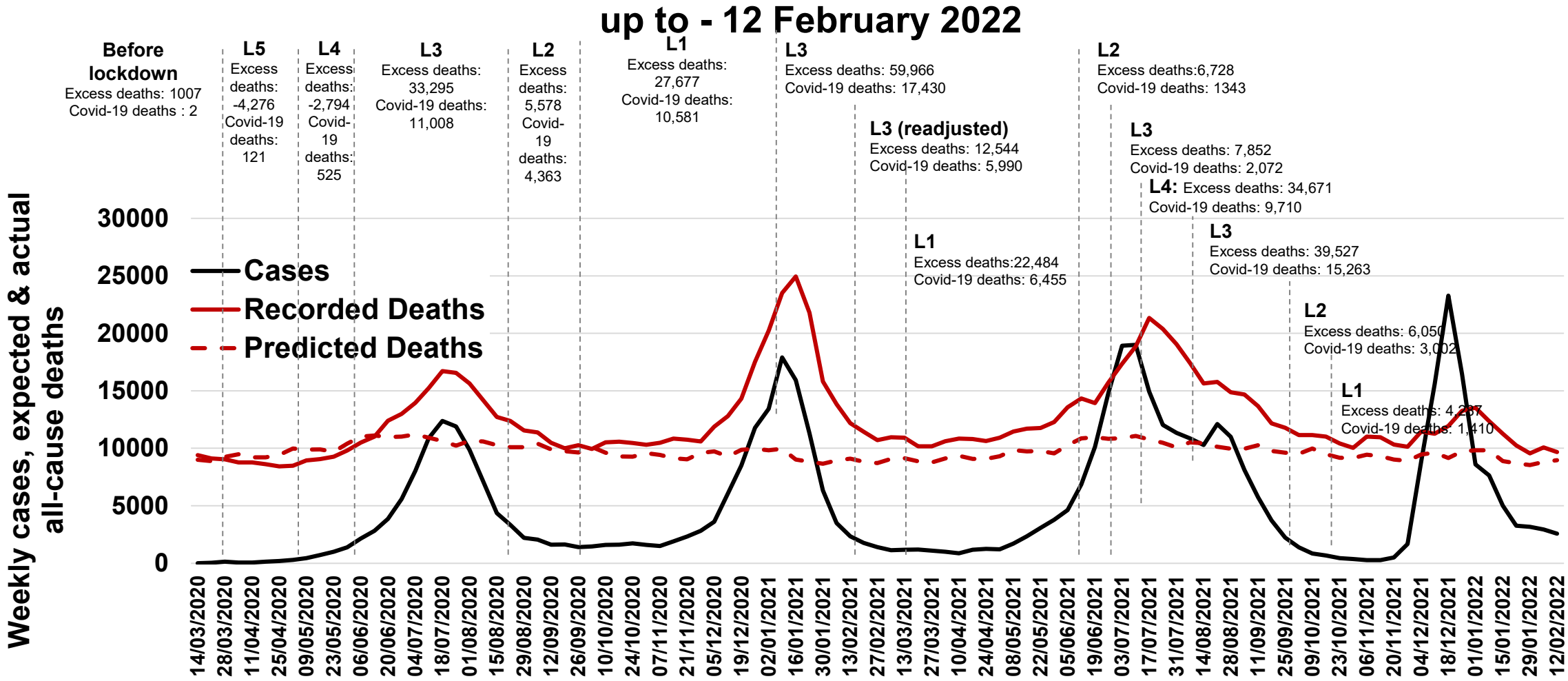
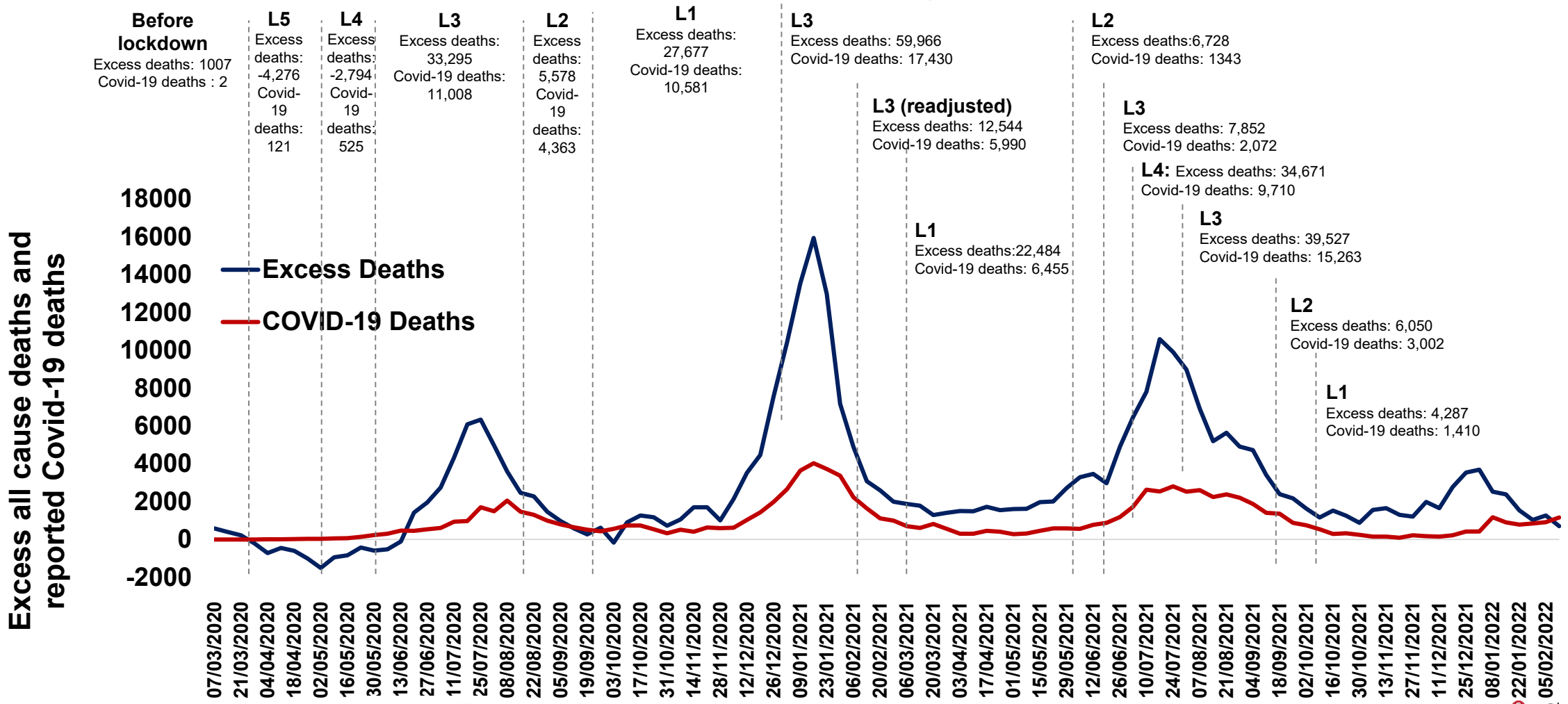
Expected & actual all-cause deaths during Covid-19



Source: Bradshaw D, et al

Weekly excess all cause deaths & reported Covid-19 deaths

up to – 12 February 2022



Source: Bradshaw D, et al

saMRC advancinglife

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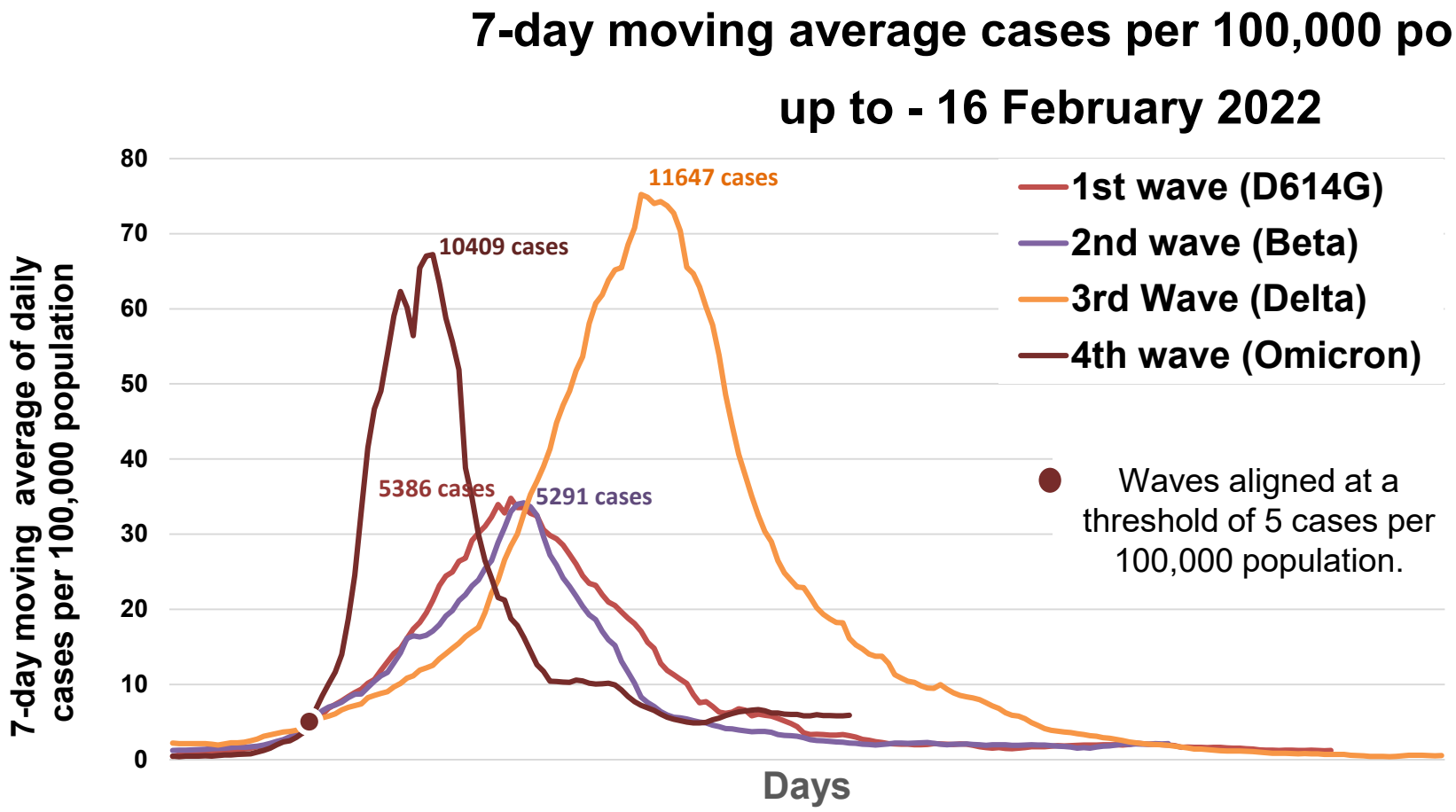
SARS-Cov-2 cases in 1st, 2nd & 3rd and 4th waves: Gauteng



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

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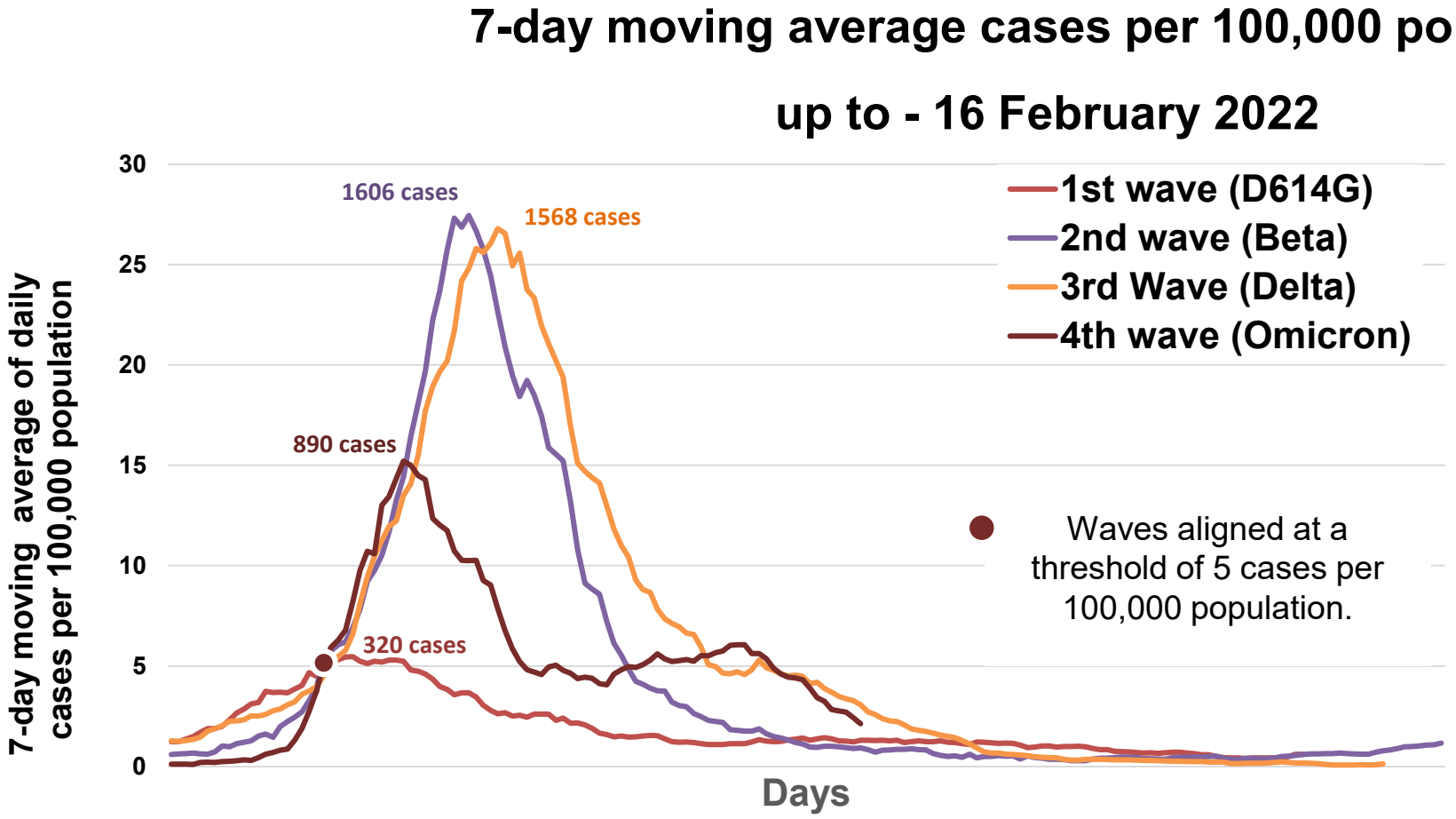
SARS-Cov-2 cases in 1st, 2nd & 3rd and 4th waves: Limpopo



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

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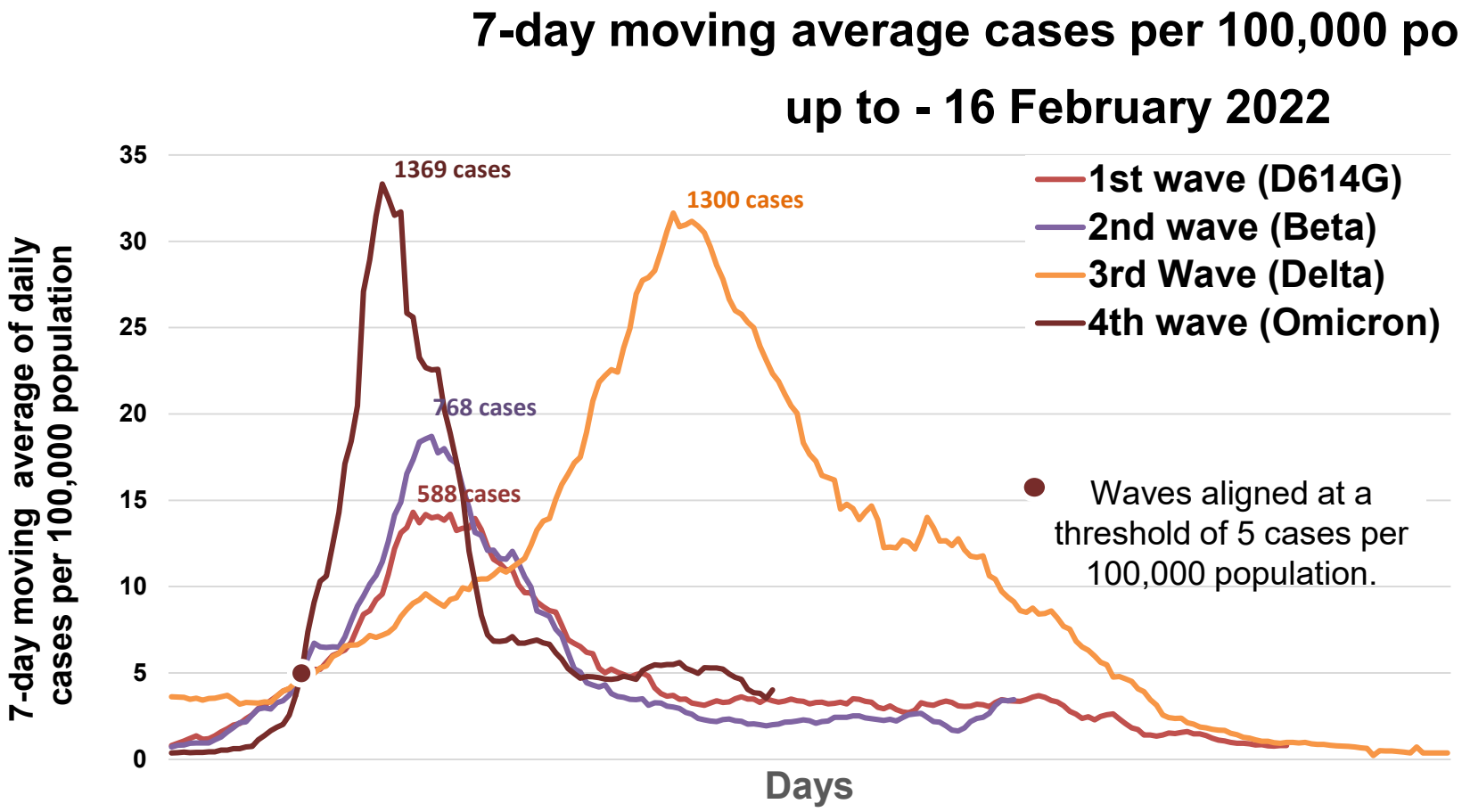
SARS-Cov-2 cases in 1st, 2nd & 3rd and 4th waves: North West



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

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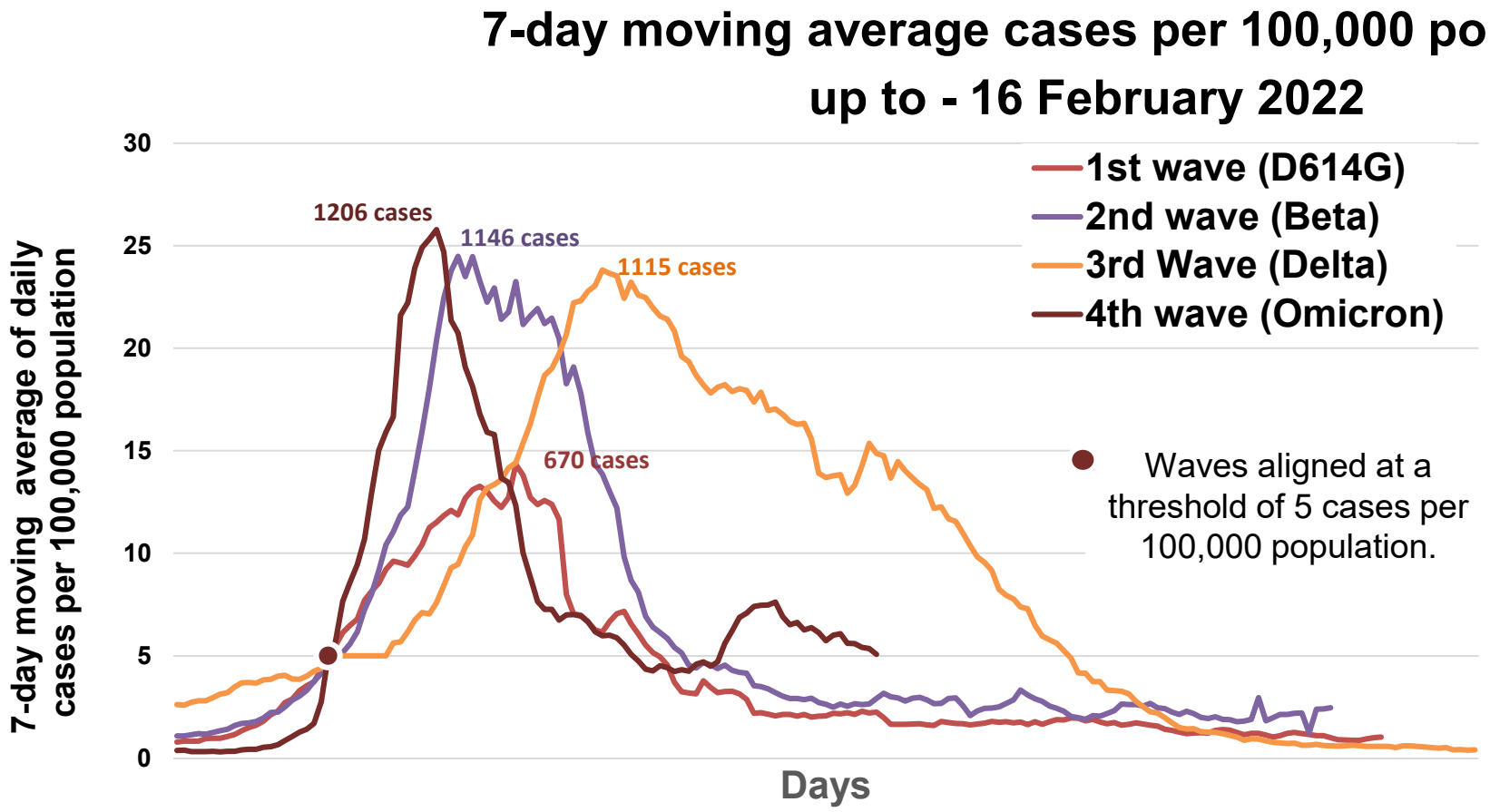
SARS-Cov-2 cases in 1st, 2nd & 3rd and 4th waves: Mpumalanga



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

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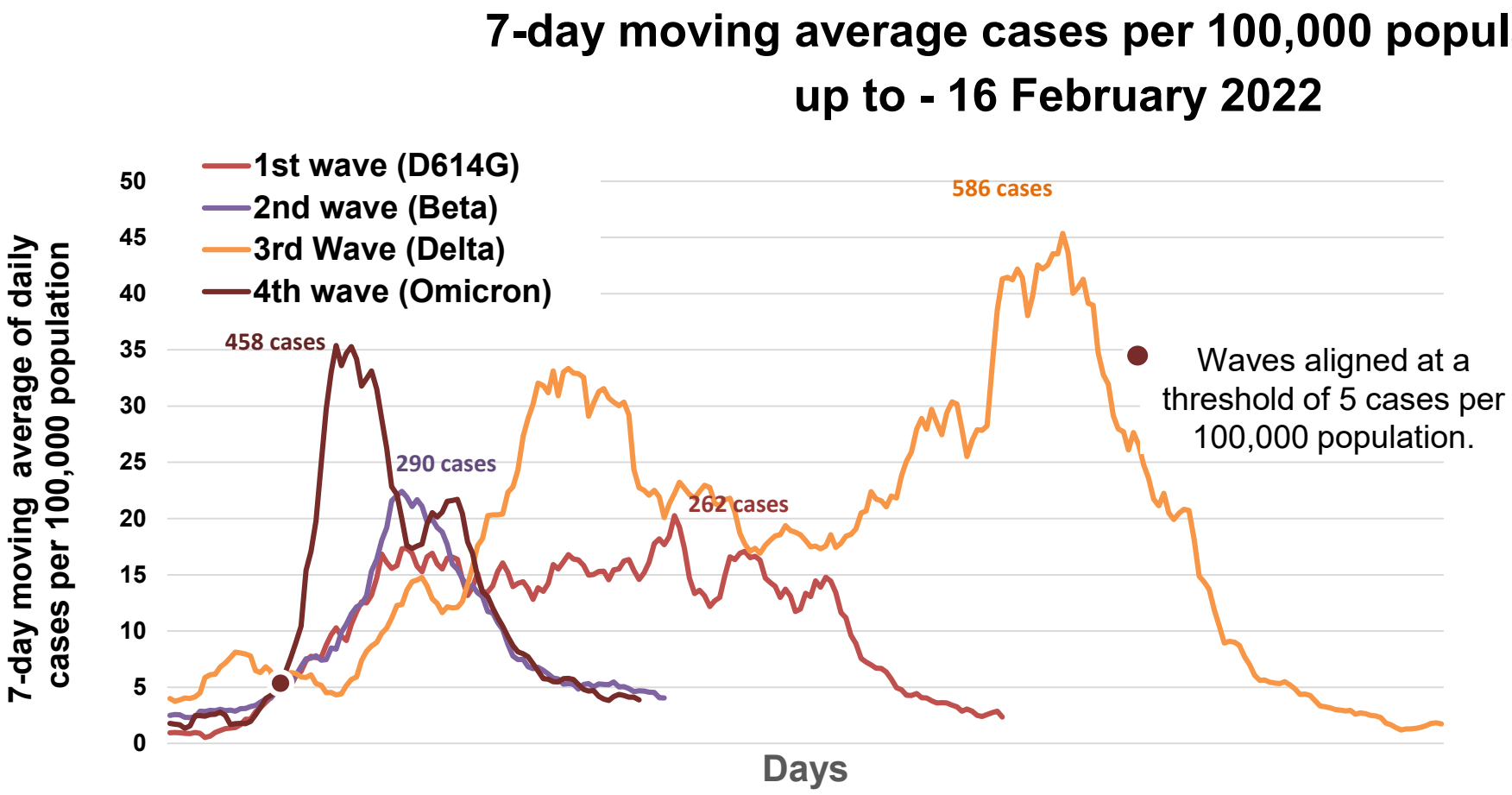
SARS-Cov-2 cases in 1st, 2nd & 3rd and 4th waves: Northern Cape



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

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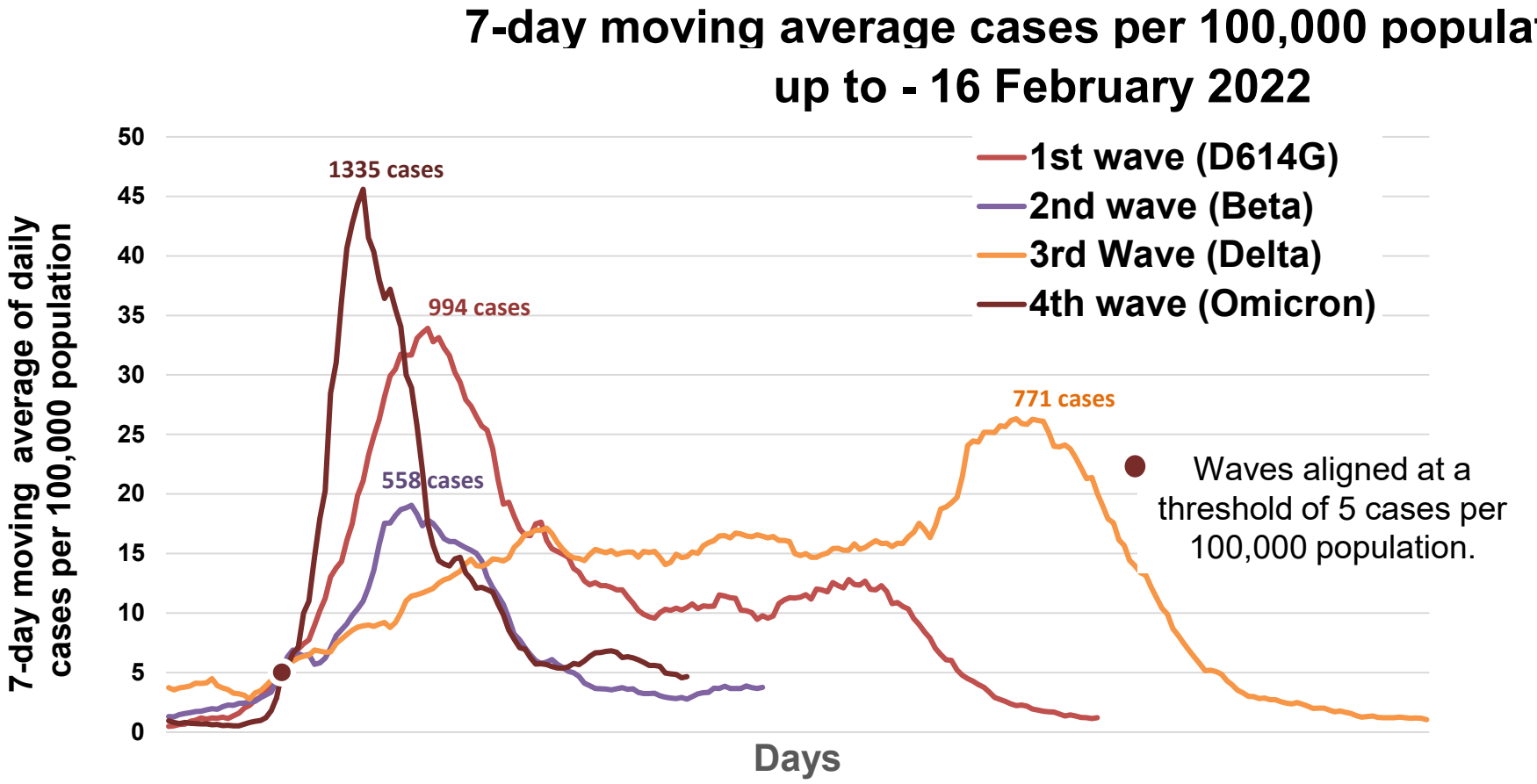
SARS-Cov-2 cases in 1st, 2nd & 3rd and 4th waves: Free State



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

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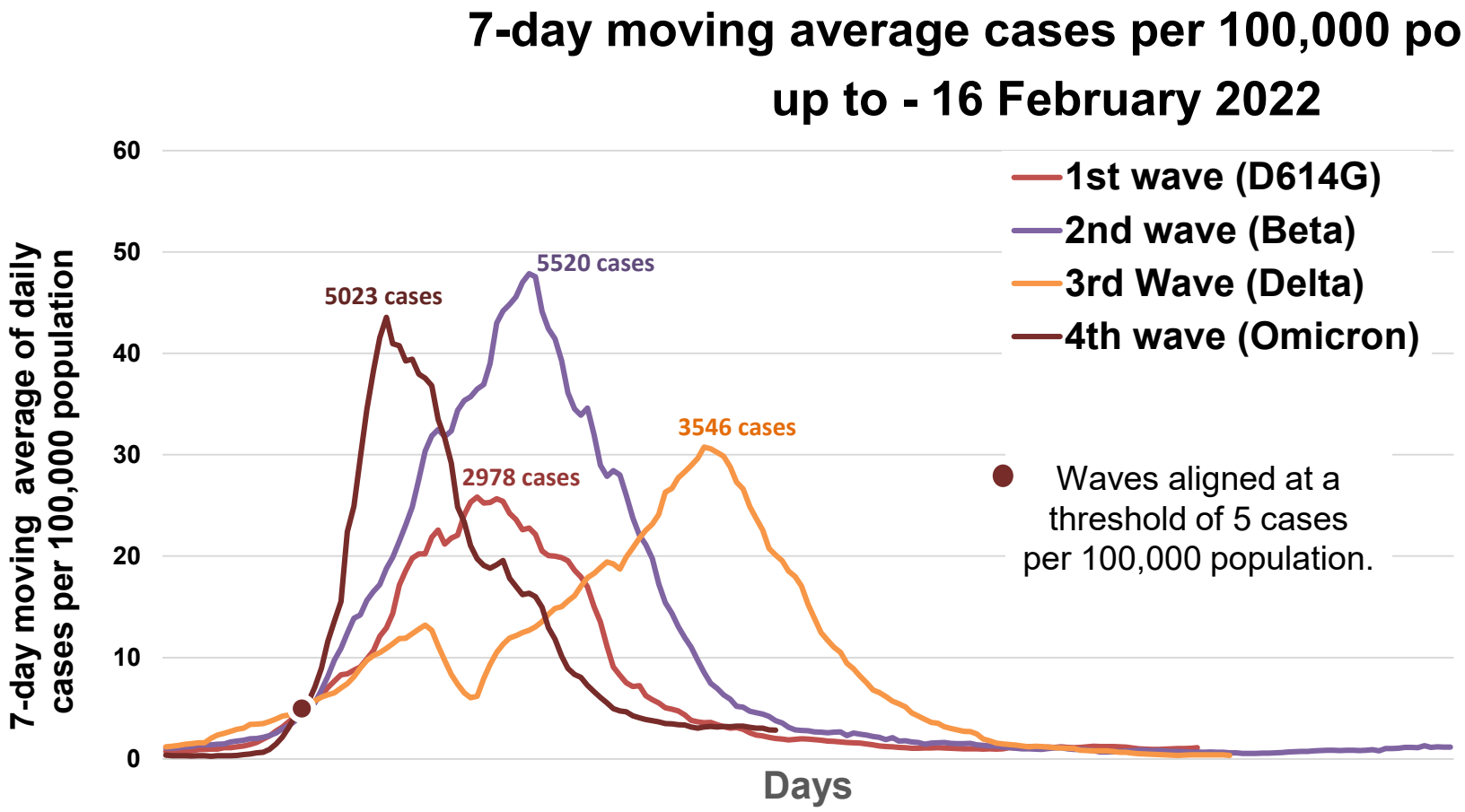
SARS-Cov-2 cases in 1st, 2nd & 3rd and 4th waves: KwaZulu Natal



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

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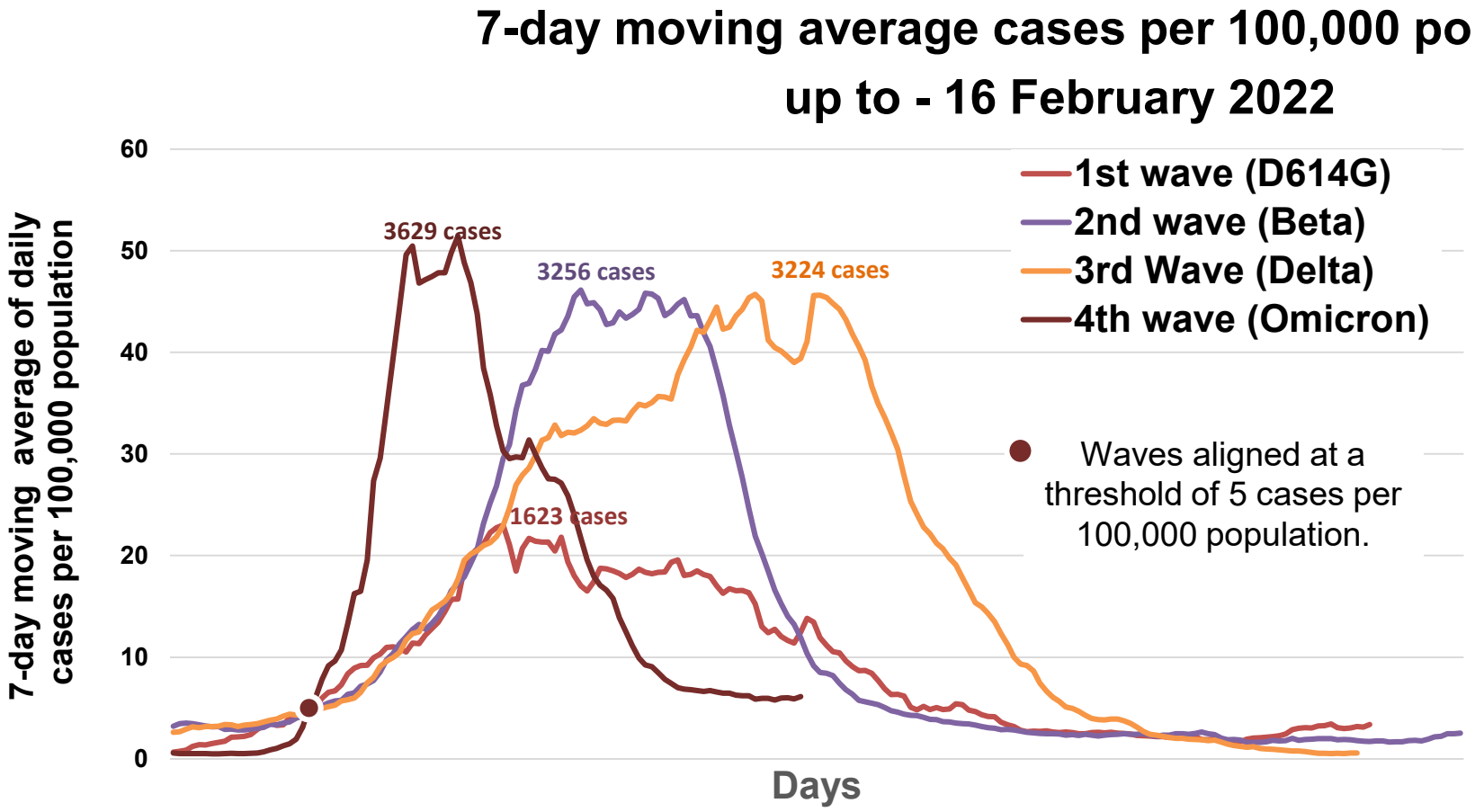
SARS-Cov-2 cases in 1st, 2nd & 3rd and 4th waves: Western Cape



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

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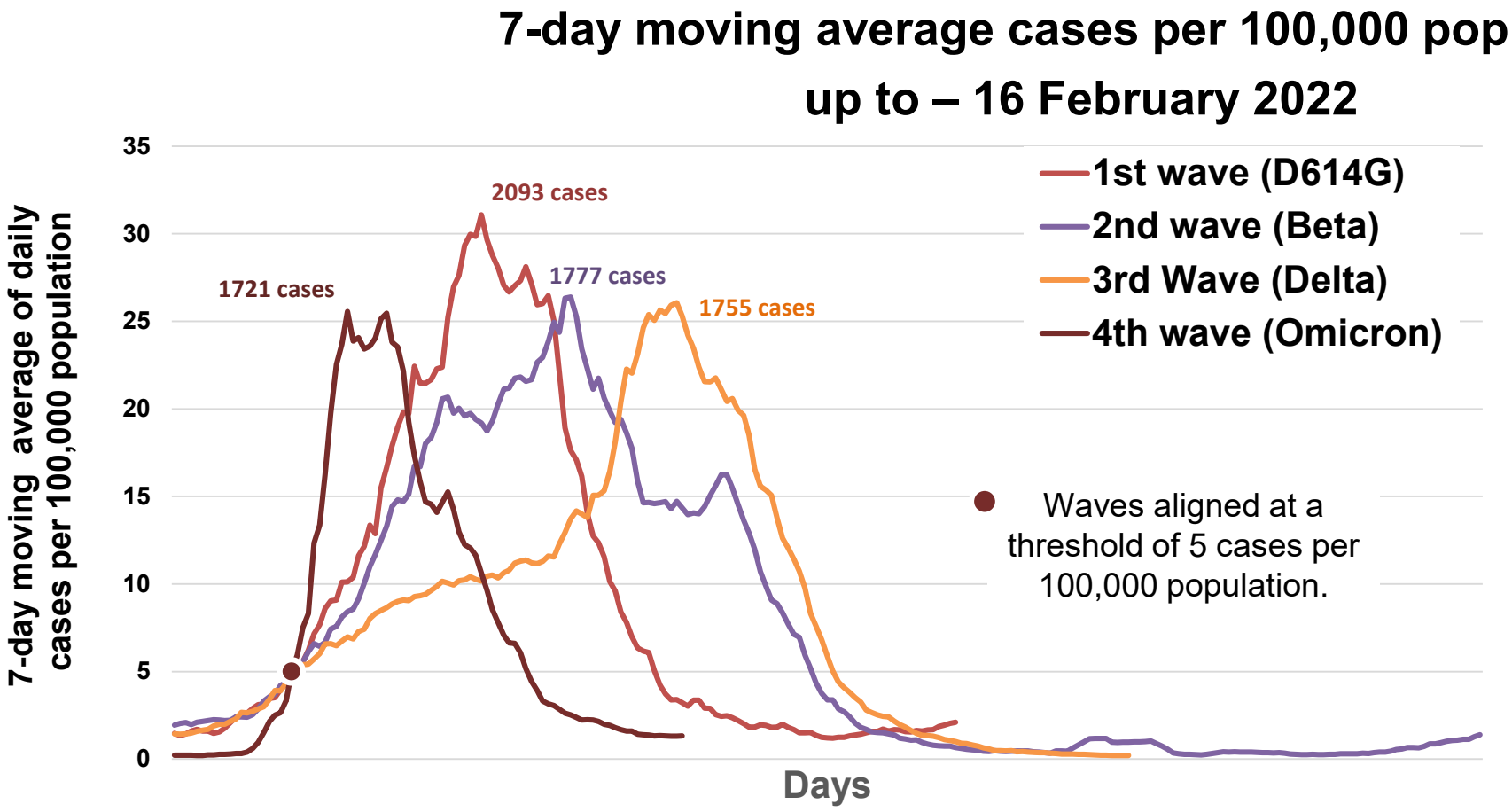
SARS-Cov-2 cases in 1st, 2nd & 3rd and 4th waves: Eastern Cape



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

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