

Update on Influenza and SARS-CoV-2 in South Africa

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**NATIONAL INSTITUTE FOR
COMMUNICABLE DISEASES**

Division of the National Health Laboratory Service

Overview of surveillance programmes

Overview of respiratory disease surveillance programmes

Viral Watch

- 1984
- 8 provinces (EC, FS, KZ, GP, LP, MP, NC, NW, WC)
- Outpatients
- General practitioners
- Respiratory specimens tested for influenza, RSV, pertussis, SARS-CoV-2

Influenza-like illness (ILI)

- 2012
- 4 provinces (KZ, NW, WC, MP)
- Outpatients
- Primary healthcare clinics
- Respiratory specimens tested for influenza, RSV, pertussis, SARS-CoV-2

Pneumonia Surveillance

- 2009
- 6 provinces (GP, KZ, MP, NW, WC, EC)
- Inpatients
- Public hospitals
- Respiratory specimens tested for influenza, RSV, pertussis, SARS-CoV-2

ILI and Pneumonia surveillance sites, South Africa

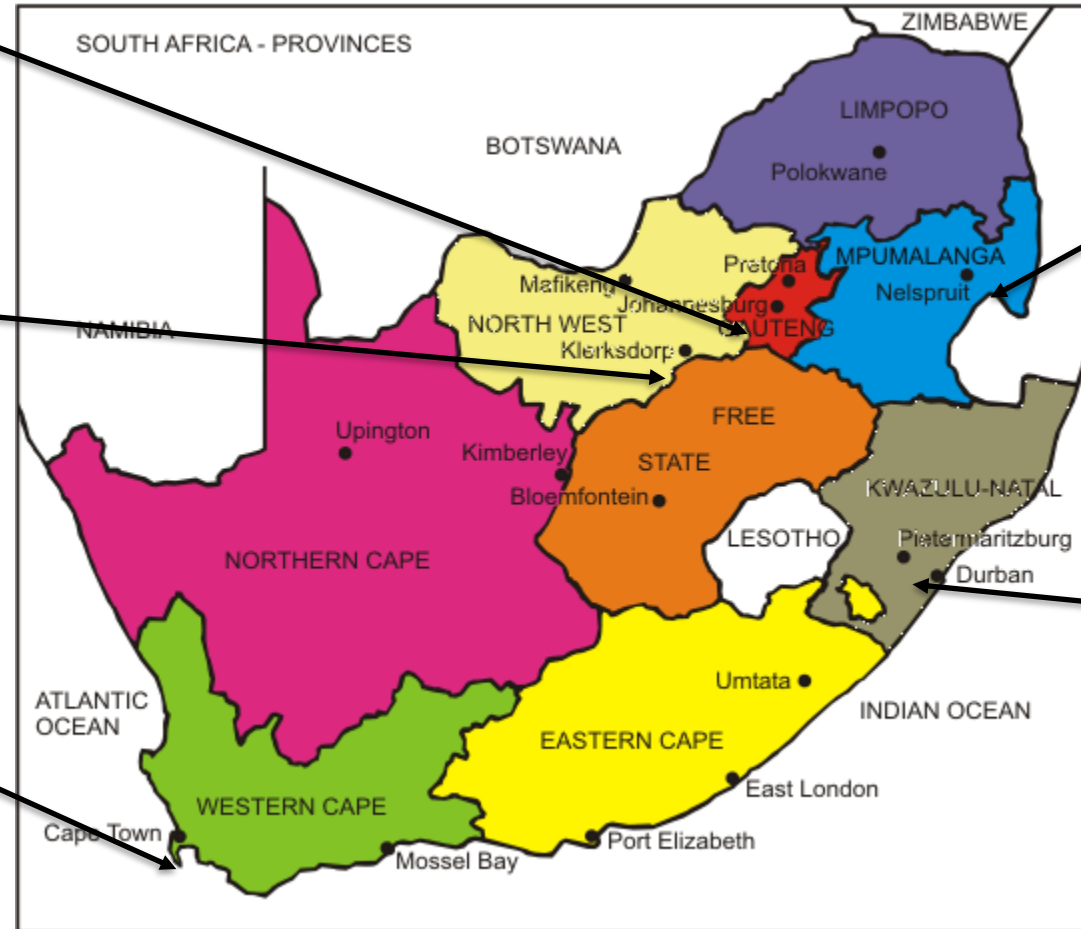
Rahima Moosa Mother and Child Hospital (2014)

Klerksdorp-Tshepong Hospital Complex (2010)

Jouberton Clinic (2012)

Red Cross Memorial Childrens' Hospital and Mitchell's Plain Hospital (2016)

Eastridge Clinic (2019) and Mitchell's Plain Clinic (2019)



Mapulaneng and Matikwana Hospitals (2009)
Tintswalo Hospital 2020

Agincourt Clinic (2016)

Edendale Hospital (2009)

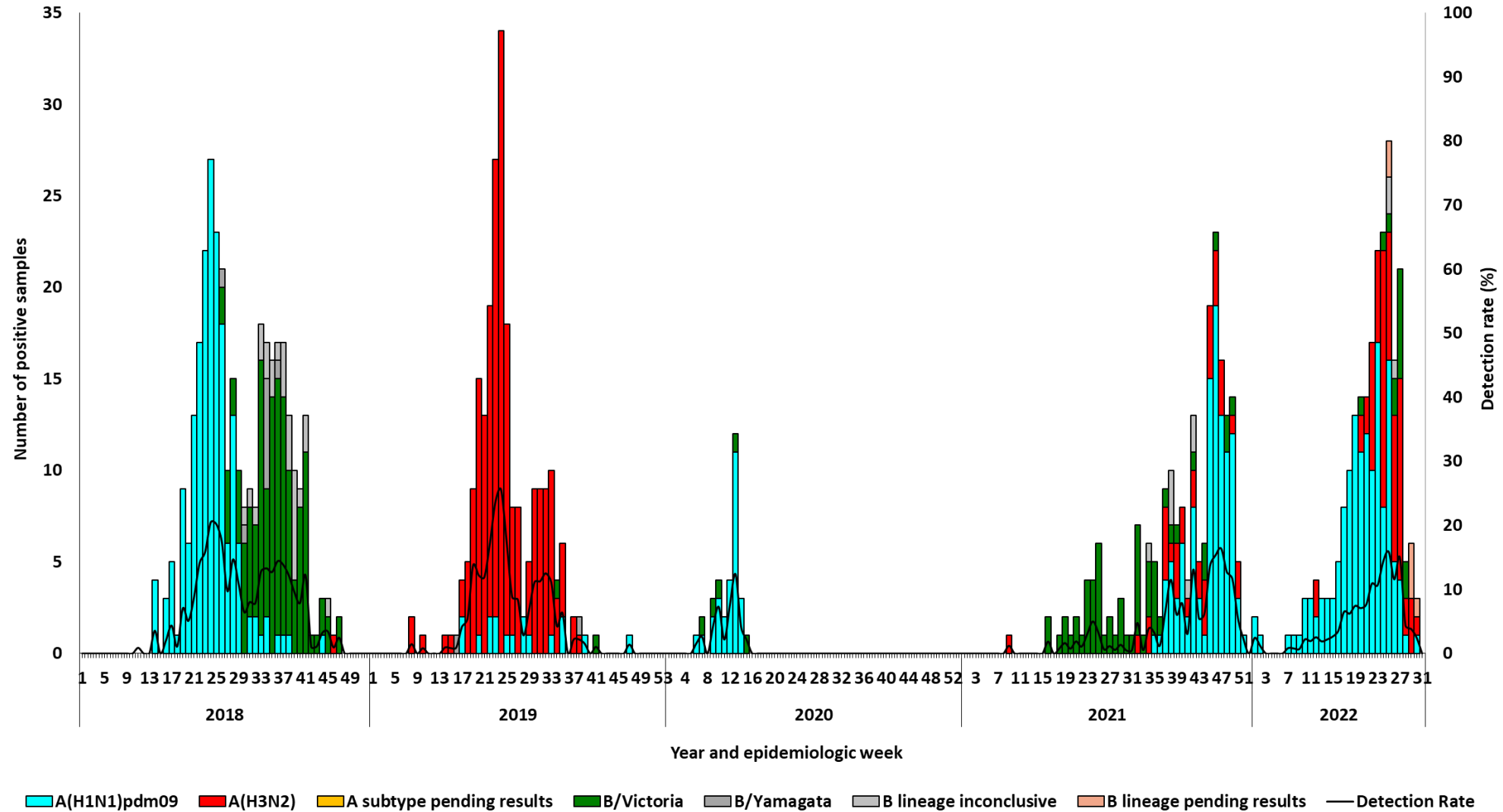
Edendale Gateway Clinic (2012)

ILI: influenza-like illness
SRI: severe respiratory illness

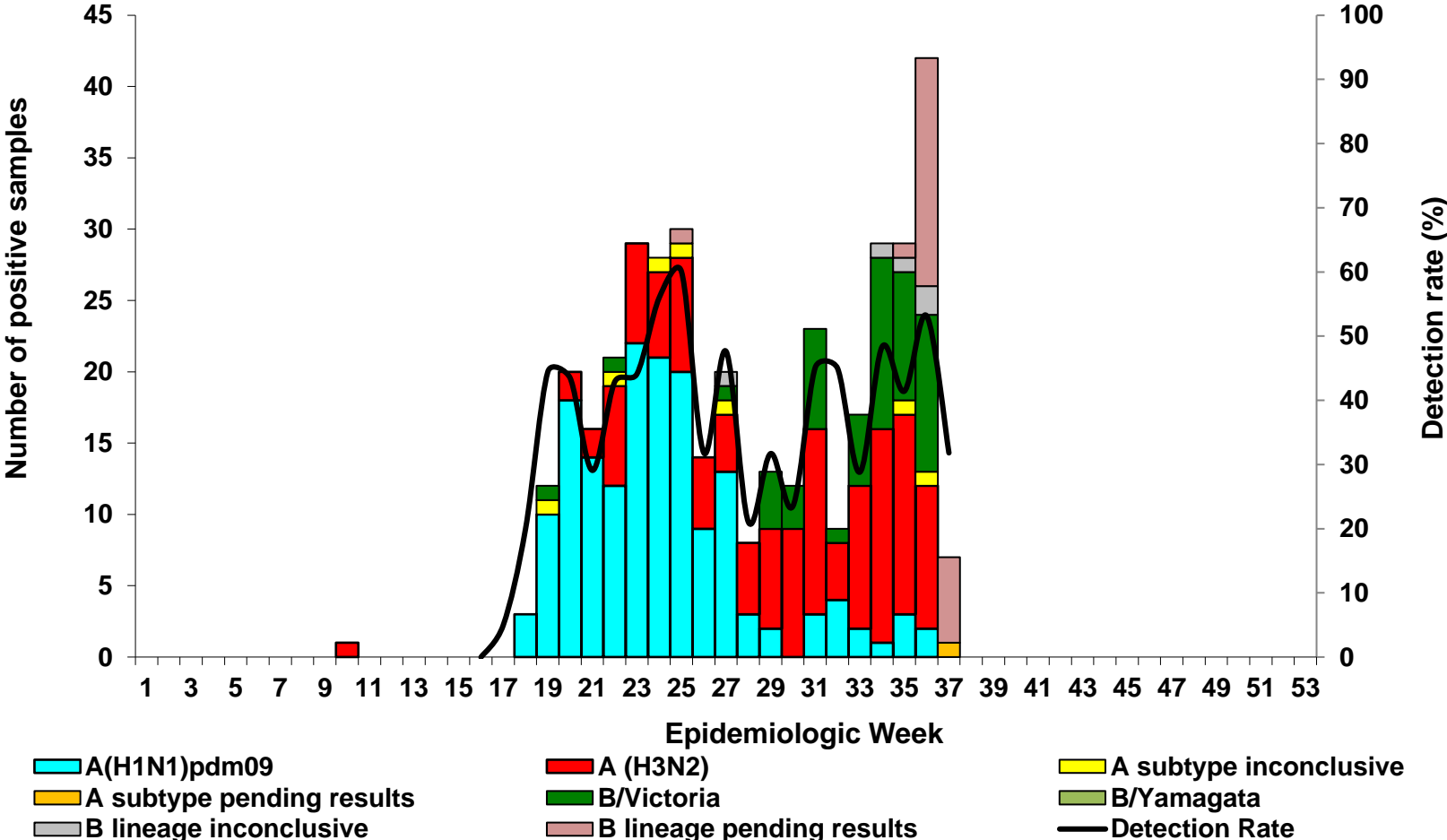
Influenza

Number of influenza infections and detection rate, 2018-2022

Pneumonia surveillance programme



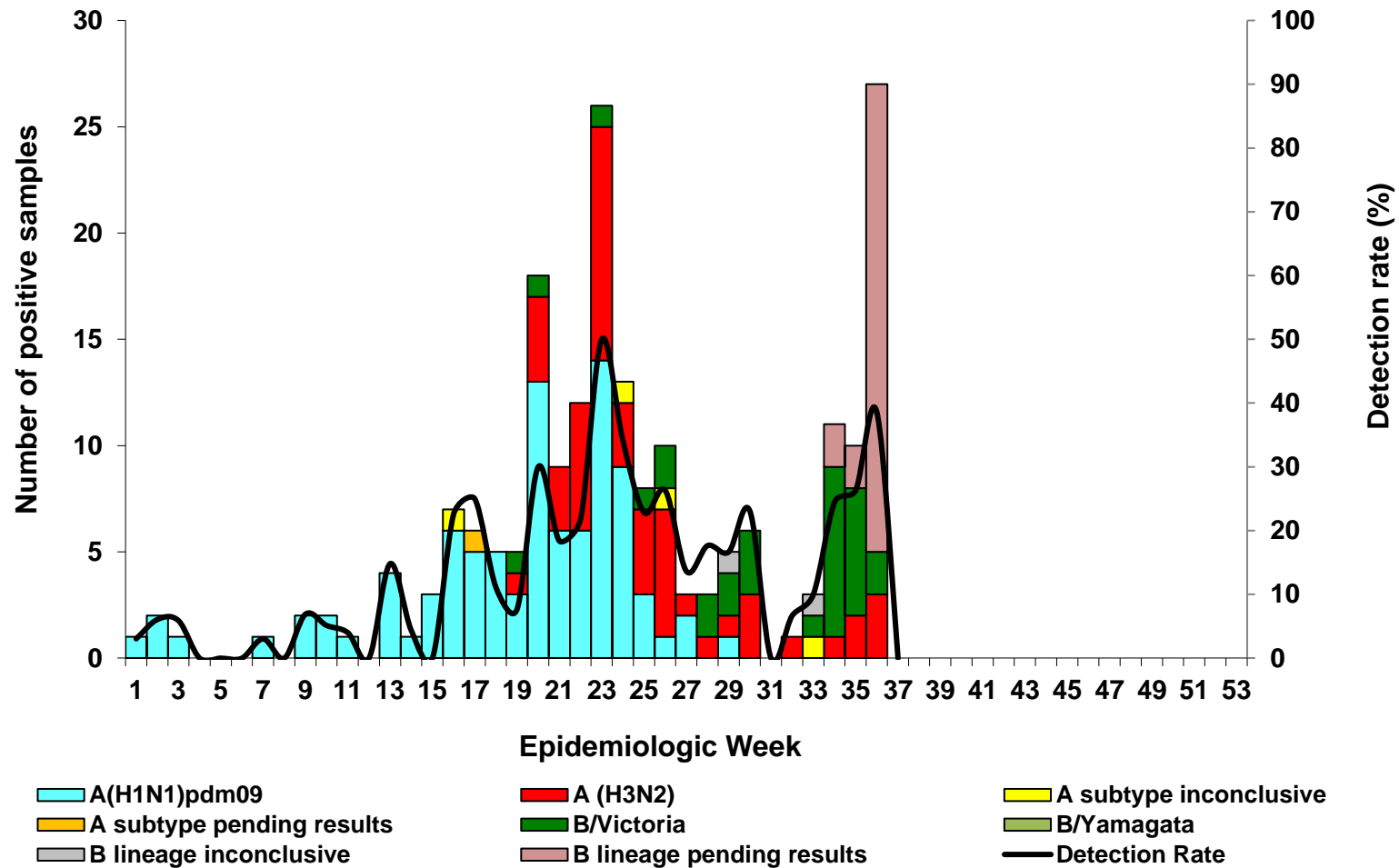
Number of influenza infections and detection rate by epidemiologic week, Viral Watch programme, South Africa, Weeks 1 to 37, 2022 (N=385)



Detection rate: 37% (385/1030)

Inconclusive: insufficient viral load in sample and unable to characterise further

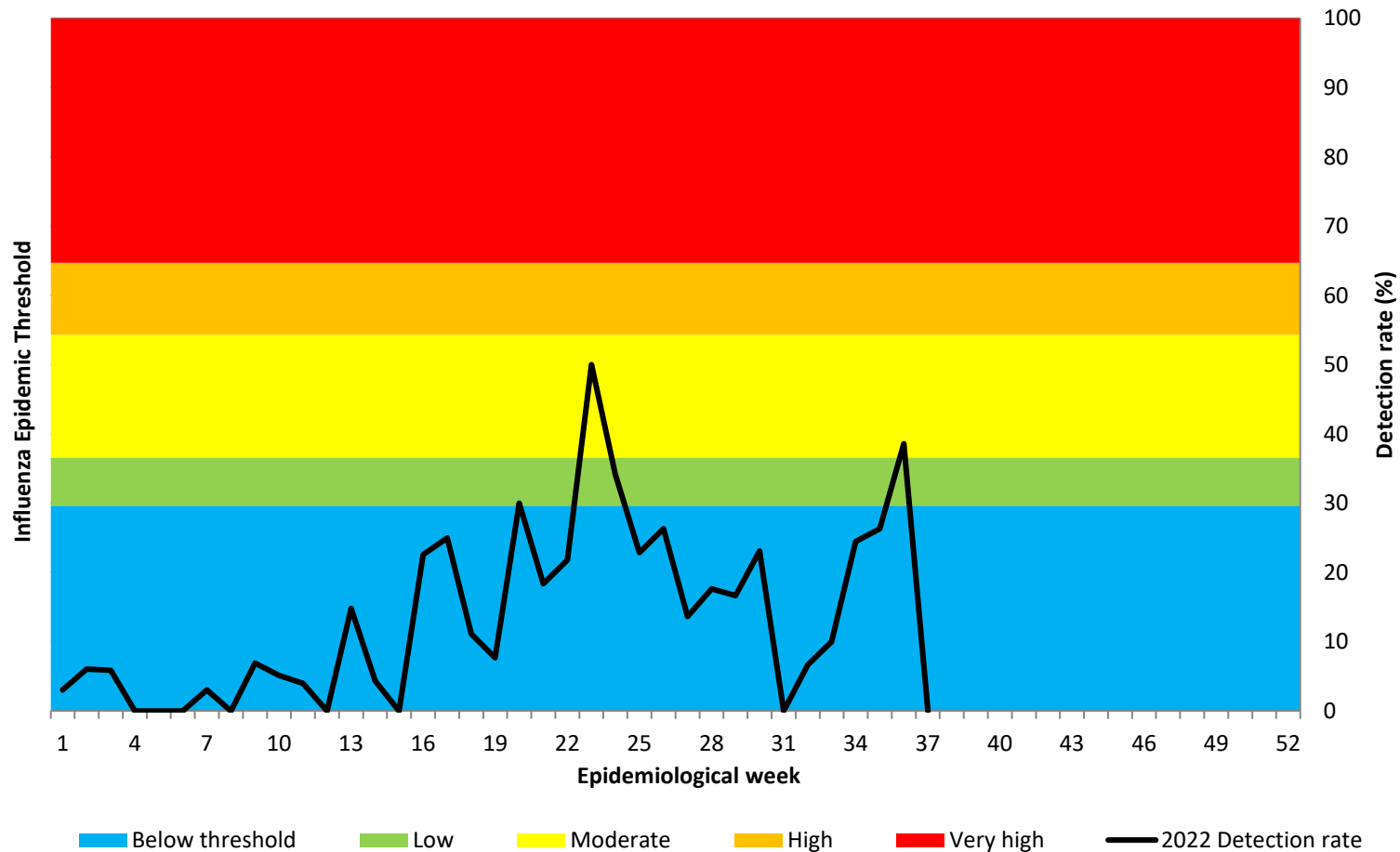
Number of influenza infections and detection rate by epidemiologic week, Influenza-like illness (ILI) programme at primary health care clinics, South Africa, Weeks 1 to 37, 2022 (N=207)



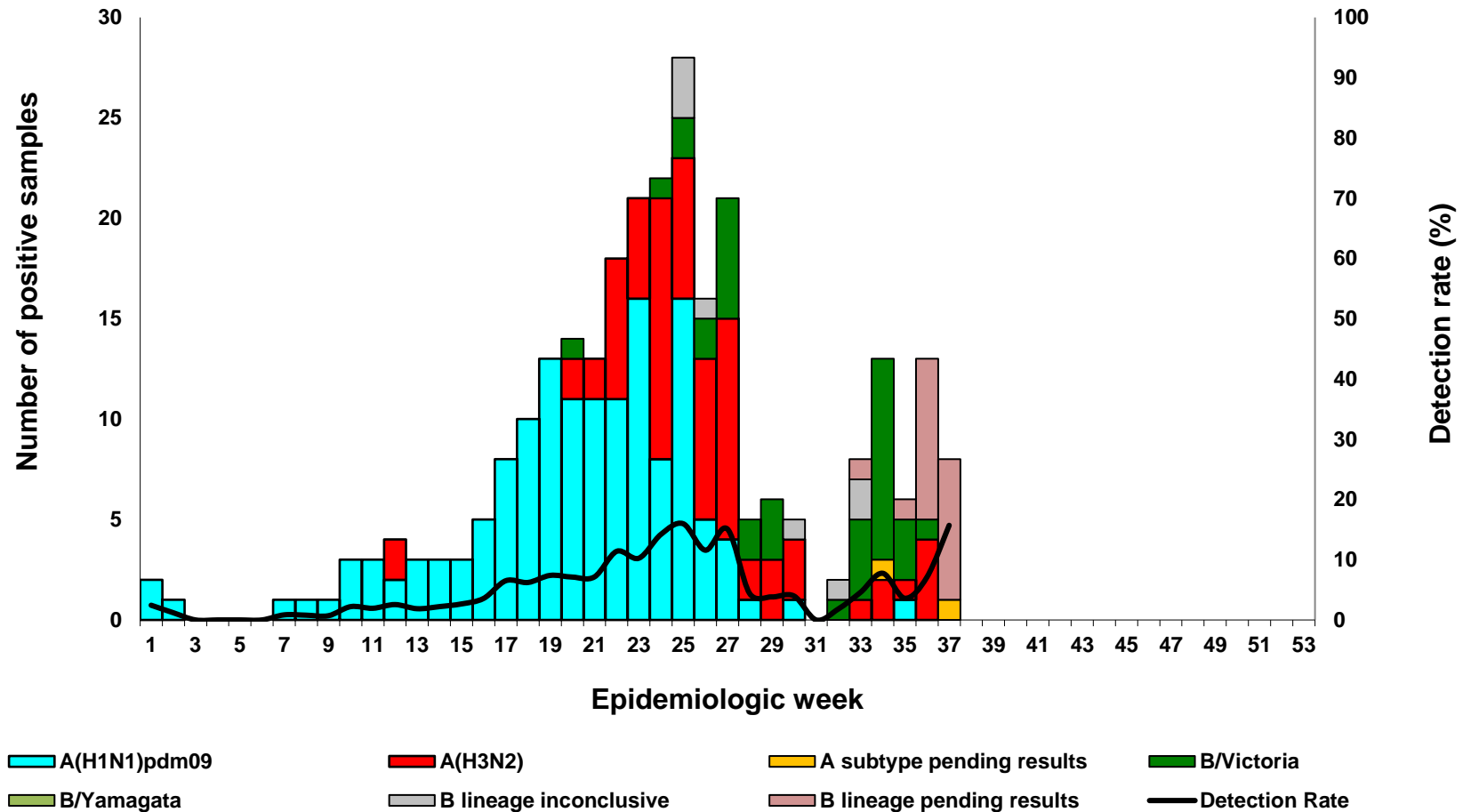
Detection rate: 17% (207/1236)

Inconclusive: insufficient viral load in sample and unable to characterise further

Influenza detection rate and epidemic thresholds, Influenza-like illness (ILI) surveillance at primary health care clinics, South Africa, Weeks 1-37, 2022



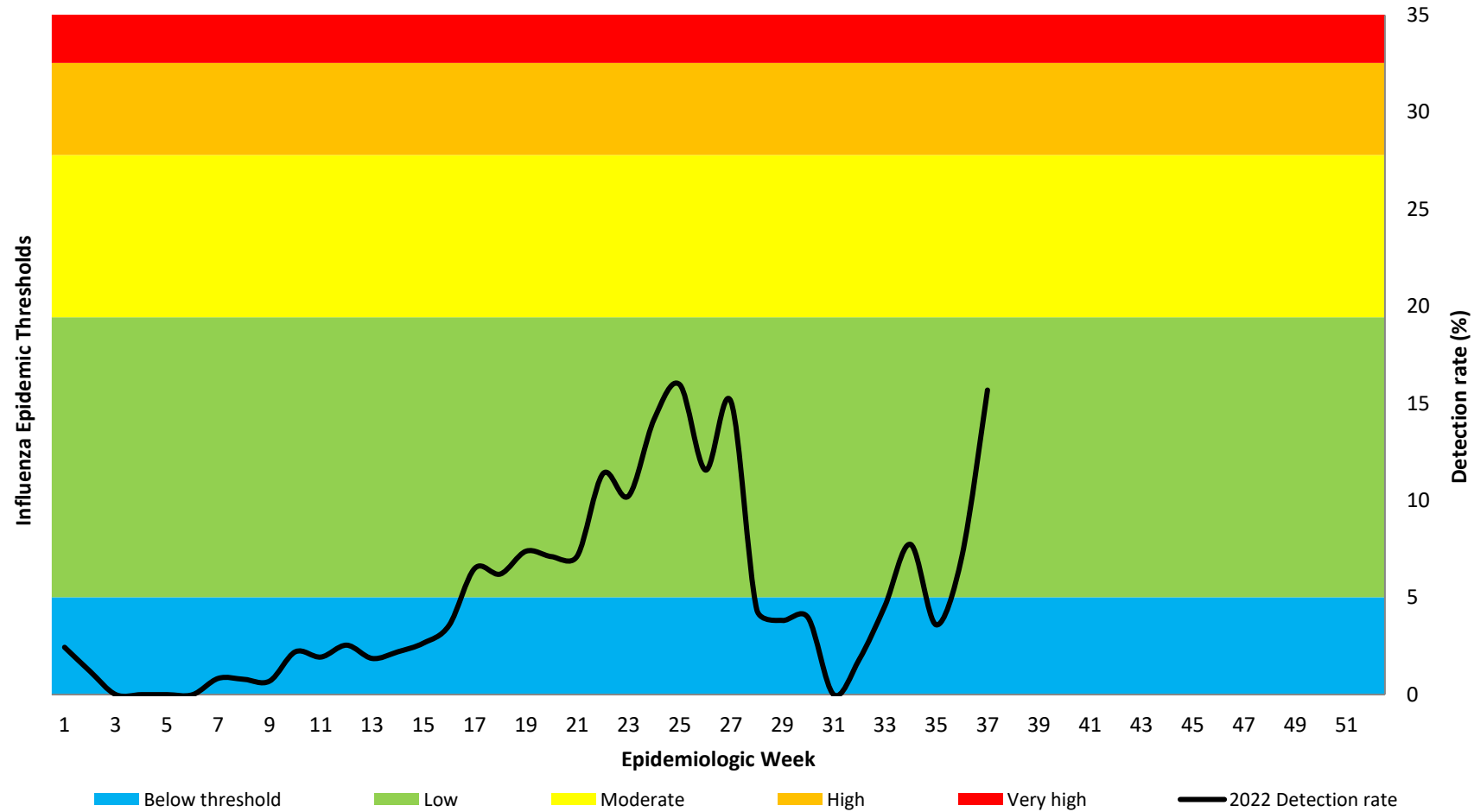
Number of influenza infections and detection rate by epidemiologic week, Pneumonia surveillance programme, South Africa, Weeks 1 to 37, 2022 (N=289)



Detection rate: 6% (289/5153)

Inconclusive: insufficient viral load in sample and unable to characterise further

Influenza detection rate and epidemic thresholds, Pneumonia surveillance programme at public hospitals, South Africa, Weeks 1-37, 2022



Summary of haemagglutination inhibition (HAI) assay results, South Africa, 3 January – 14 August 2022 (Weeks 1-32)

Programme	Number of cultures with HAI titres	A(H1N1)pdm09		A(H3N2)		B/Victoria	
		A/Indiana/02/2020		A/Tasmania/503/2020		B/Washington/02/2019	
		Normal reactors	Low reactors	Normal reactors	Low reactors	Normal reactors	Low reactors
Viral Watch	11	0	9	1	0	1	0
Influenza-like illness	34	10	8	11	0	5	0
Pneumonia surveillance	49	19	17	10	0	3	0
Total n/N (% per virus)	94	29/63 (46)	34/63 (54)	22/22 (100)	0/22 (0)	9/9 (100)	0/9 (0)

Maximum likelihood phylogenetic tree of HA of A(H1N1)pdm09

- 2021 (n=50) and 2022 (n=80) viruses belong to clade 6B
 - Two major genetic subgroups 6B.1A.5a.1 and 6B.1A.5a.2
 - 88% of 2021 viruses - 6B.1A.5a.1
 - 74% of 2022 viruses - 6B.1A.5a.2 clade, clustered with 2022 vaccine strain (A/Victoria/2570/2019)

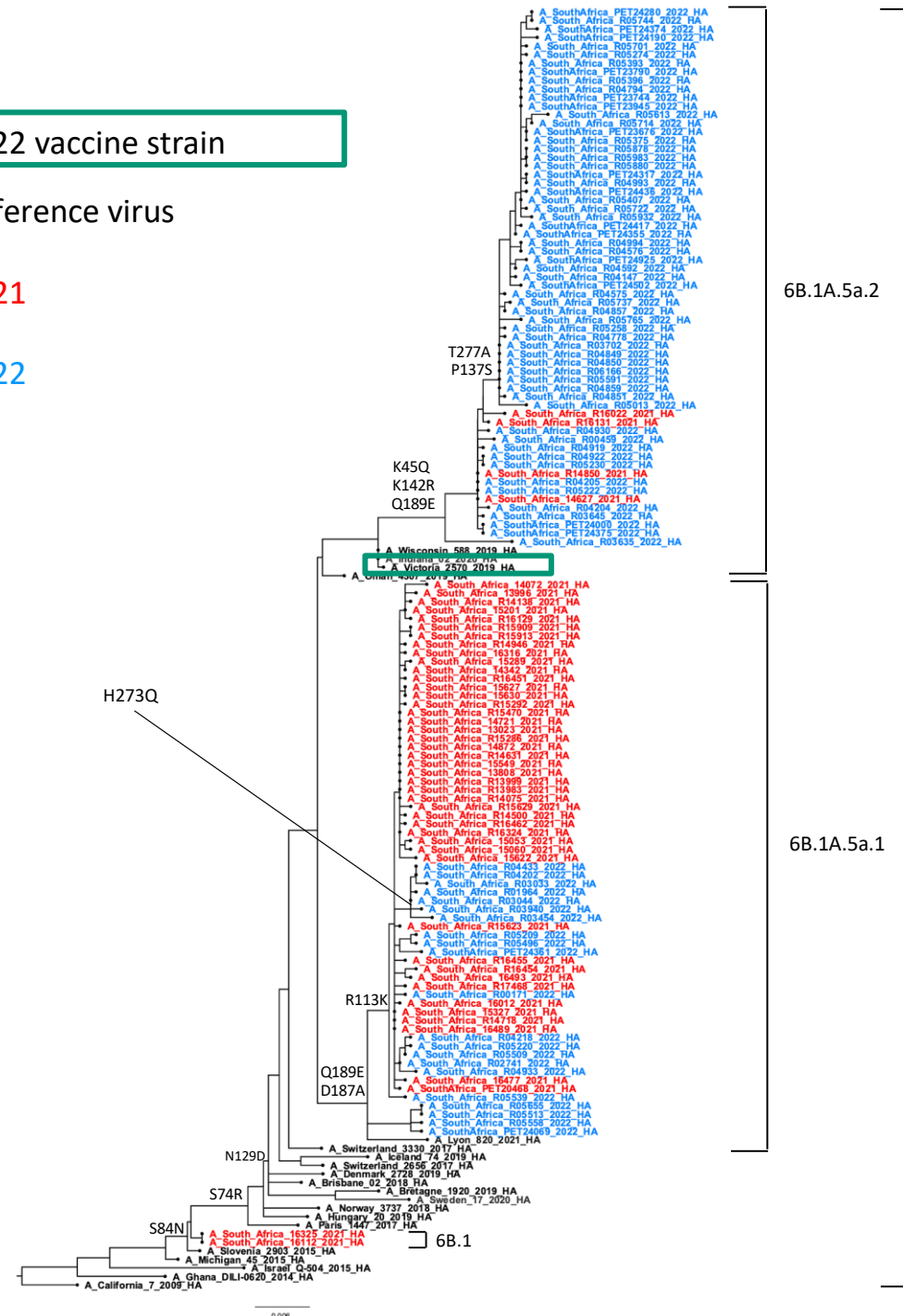
- Sequences obtained from GISAID on 25 August 2022 sequenced by WHO-CCs, WITS-VIDA and NICD
- Phylogenetic analysis using IQTREE v1.6.12, Groups identified using NextClade

2022 vaccine strain

Reference virus

2021

2022



Maximum likelihood phylogenetic tree of HA of A(H3N2)

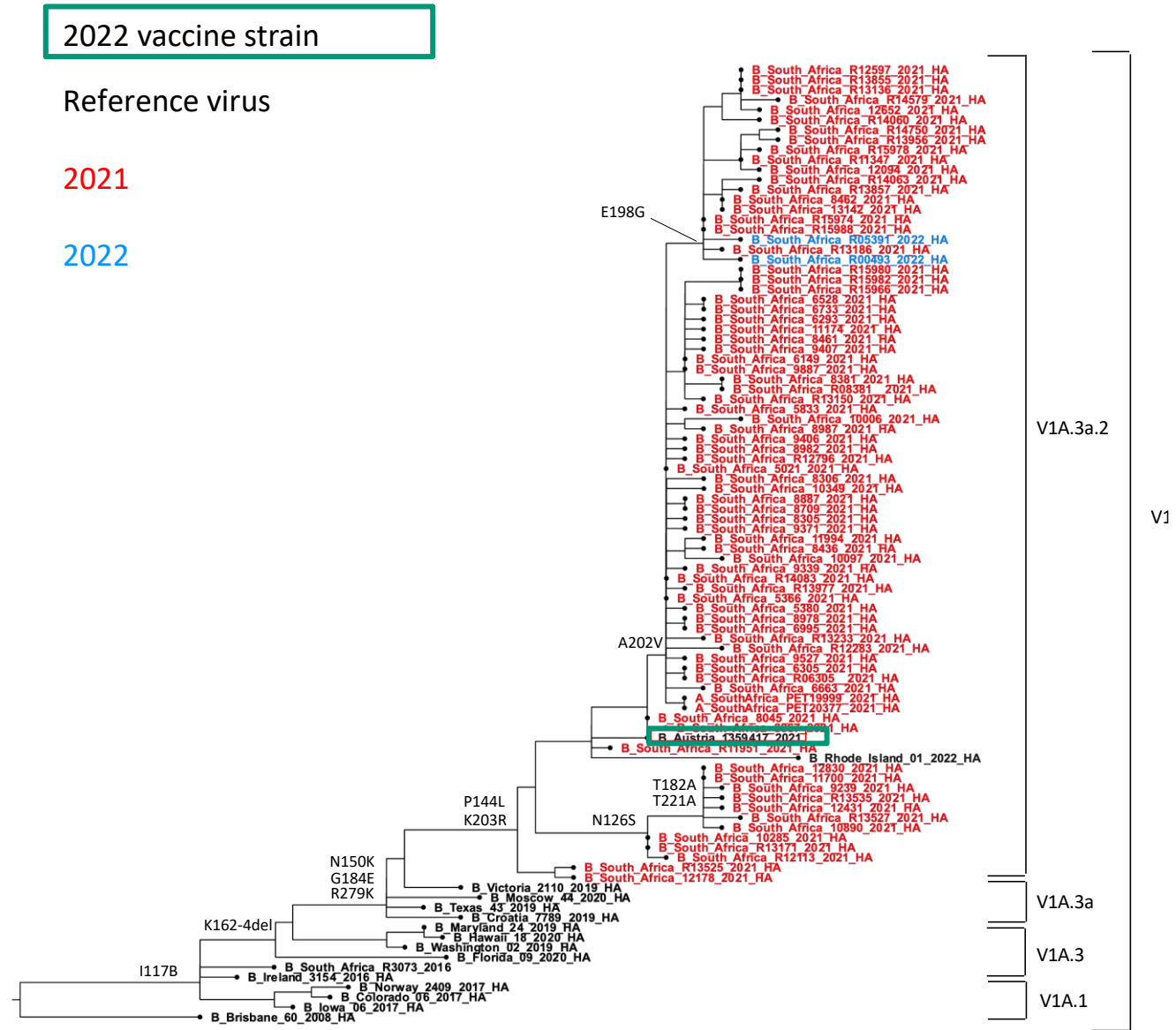
- 2021 (n=22) and 2022 (n=9) viruses belong to 3C.2a clade
- 2021 strains belonged to three subgroups:
 - 3C.2a1b.1b, 3C.2a1b.1a and 3C.2a1b.2a.2
- 2022 strains - 3C.2a1b.2a.2 clade together with 2022 vaccine strain (A/Darwin/9/2021).



- Sequences obtained from GISAID on 25 August 2022 sequenced by WHO-CCs, WITS-VIDA and NICD
- Phylogenetic analysis using IQTREE v1.6.12, Groups identified using NextClade

Maximum likelihood phylogenetic tree of HA of B/Victoria

- 2021 (n=94) and 2022 (n=2) viruses belonged to clade V1A
- V1A.3a.2 subclade
- Together with 2022 vaccine strain (B/Austria/1359417/2021)



• Sequences obtained from GISAID on 25 August 2022 sequenced by WHO-CCs, WITS-VIDA and NICD
 • Phylogenetic analysis using IQTREE v1.6.12, Groups identified using NextClade

Vaccine coverage and vaccine effectiveness (VE), adjusted by age and seasonality, 2022

	Vaccine coverage			Adjusted VE % (95% confidence interval)
	Cases n/N (%)	Controls n/N (%)	Total n/N(%)	
Any influenza	12/207 (5.8)	49/314 (15.6)	61/521 (11.7)	64.5 (29.9-82.0)
Influenza A(H1N1)pdm09	9/122 (7.4)	49/314 (15.6)	122/436 (28.0)	45.8 (-20.0,75.5)
Influenza A (H3N2)	1/58 (1.7)	49/331 (14.8)	58/389 (14.9)	90.8 (31.4,98.8)

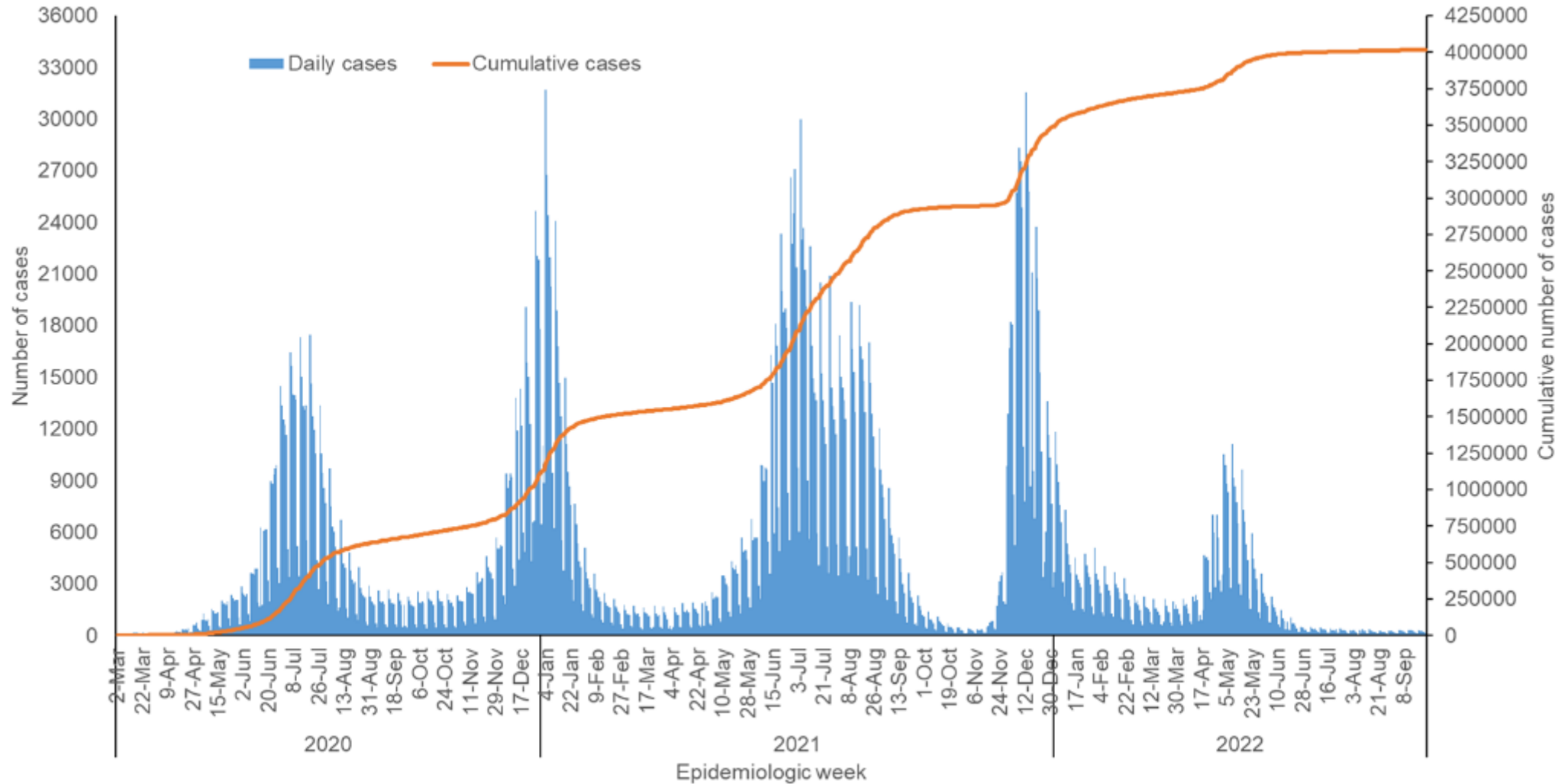
- VE was assessed using a test-negative case control study design
- Viral Watch outpatient influenza sentinel surveillance programme
- Not determined for B/Victoria due to small numbers

Influenza Summary

- 2022 Influenza season started in week 17 (starting 25 April 2022)
 - No season in 2020, increase in transmission “out of season” in 2021
 - 2022 season ongoing (biphasic season), timing similar to pre COVID-19
- Influenza A(H1N1)pdm09 predominating in 2022
 - Viral Watch: 47% (164/349)
 - ILI: 53% (93/175)
 - Pneumonia surveillance: 57% (144/255)
 - Recent increase in influenza B/Victoria
- Low vaccine coverage (12%) in Viral Watch programme
 - Adjusted VE vaccine effectiveness: A(H1N1)pdm09 45.8% (-20.0,75.5), A(H3N2) 90.8% (31.4,98.8)

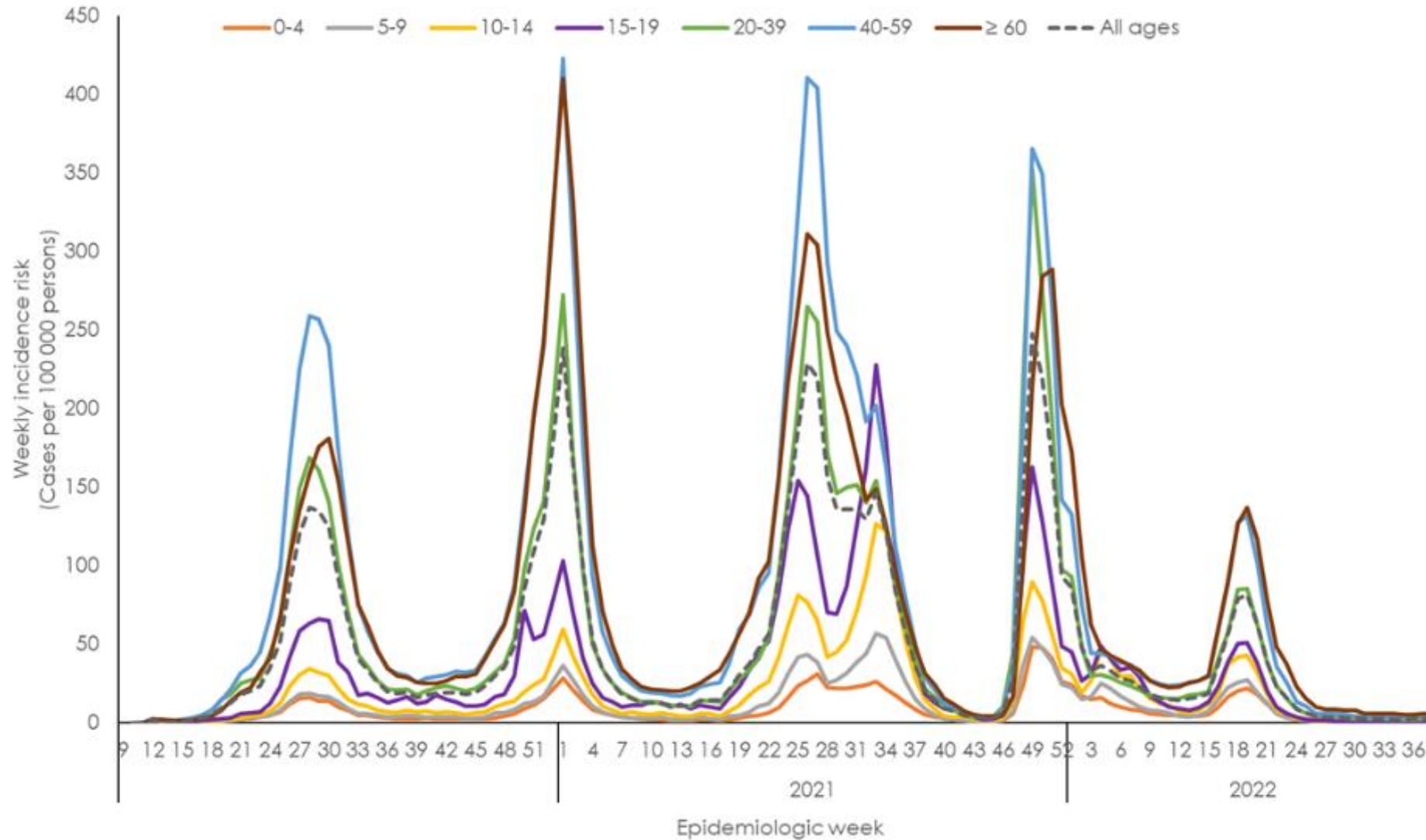
SARS-CoV-2

South Africa: lab-confirmed cases – 4 017 700 (24 September 2022)



There was a 6.2% decrease in the number of new cases detected in week 38 of 2022 (1 532) compared to the number of new cases detected in week 37 of 2022 (1 634)

Weekly incidence of laboratory-confirmed cases by age

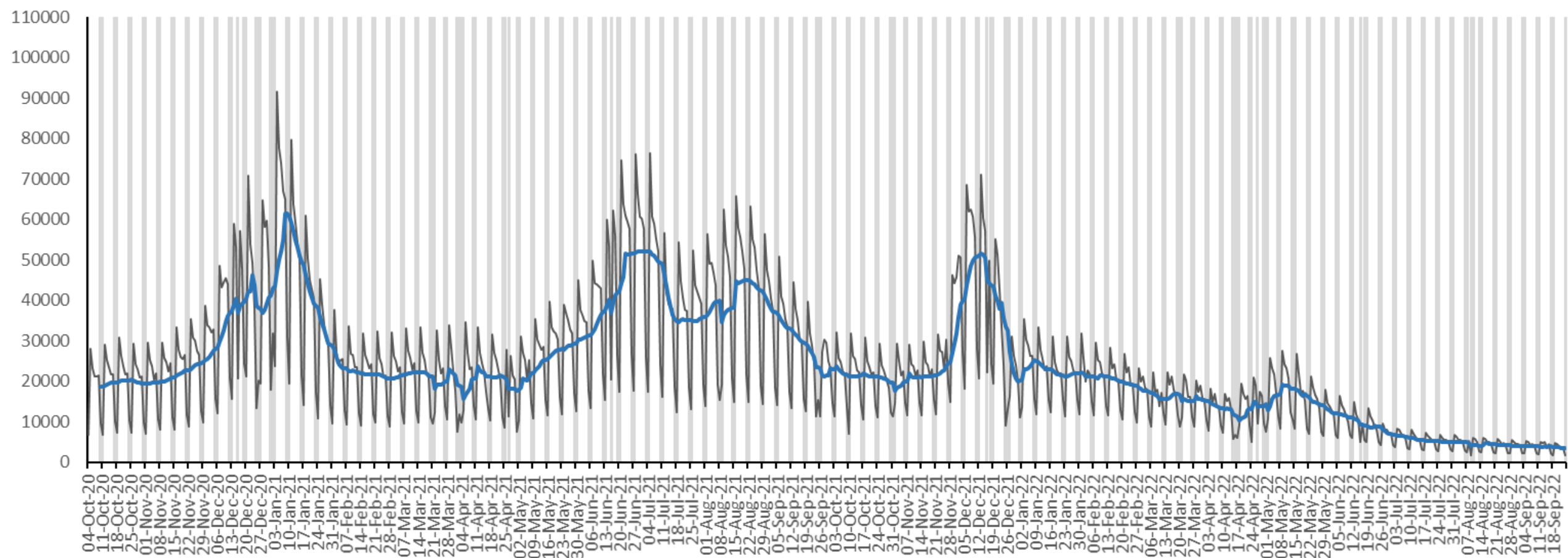


The highest weekly incidence risk among cases detected in week 38 of 2022 was reported in the ≥ 80 -year age group (11.6 cases per 100 000 persons), and the lowest weekly incidence risk was in the 5-9-year age group (0.4 cases per 100 000 persons).

Number of SARS-CoV-2 PCR tests reported by date of specimen collection

Blue line shows the 7-day moving average of the number of PCR tests reported.

Grey bars highlight weekend days and public holidays.



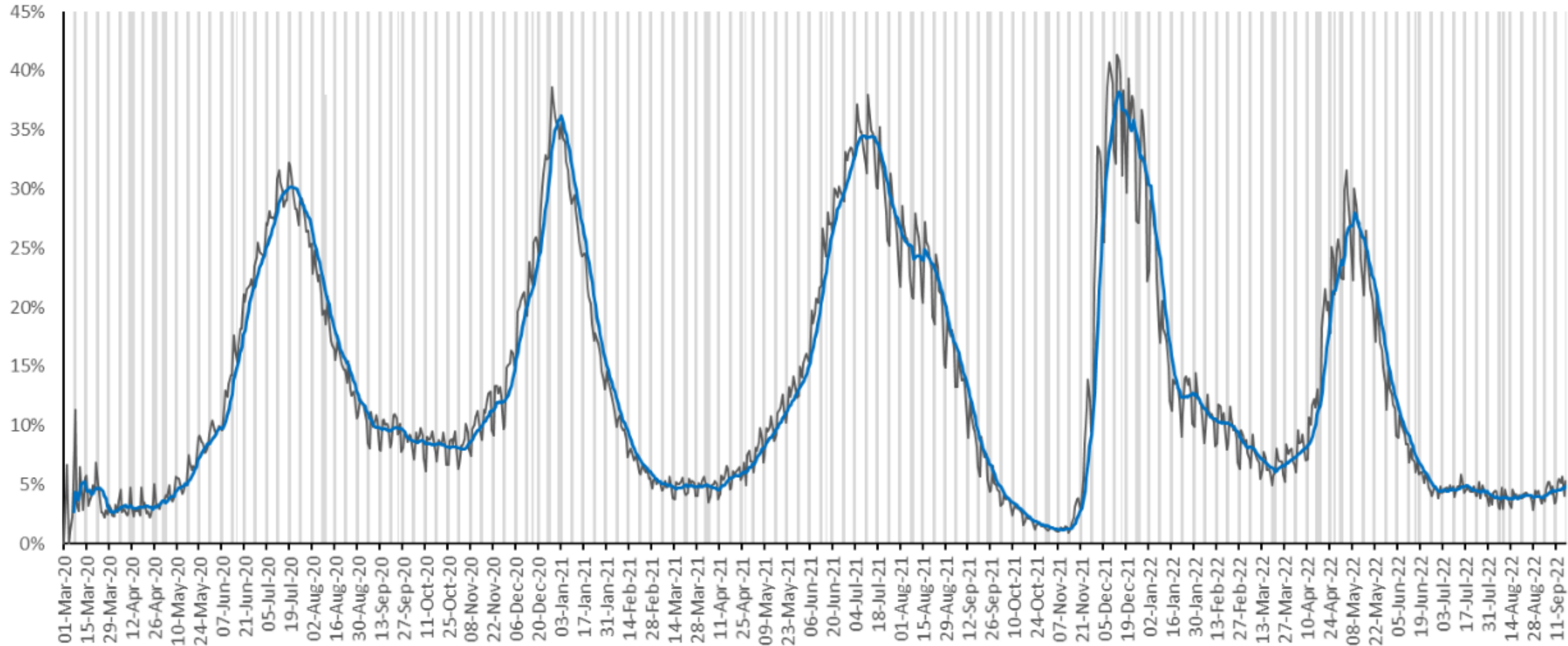
In the period 1 March 2020 through 24 September 2022, 21,172,787 PCR tests for SARS-CoV-2 have been reported nationally. The number of PCR tests reported in week 38 of 2022 ($n=23,372$) was 13.4% lower than the number of PCR tests reported in the previous week ($n=26,996$ in week 37)

Weekly number of SARS-CoV-2 PCR tests and positive tests reported

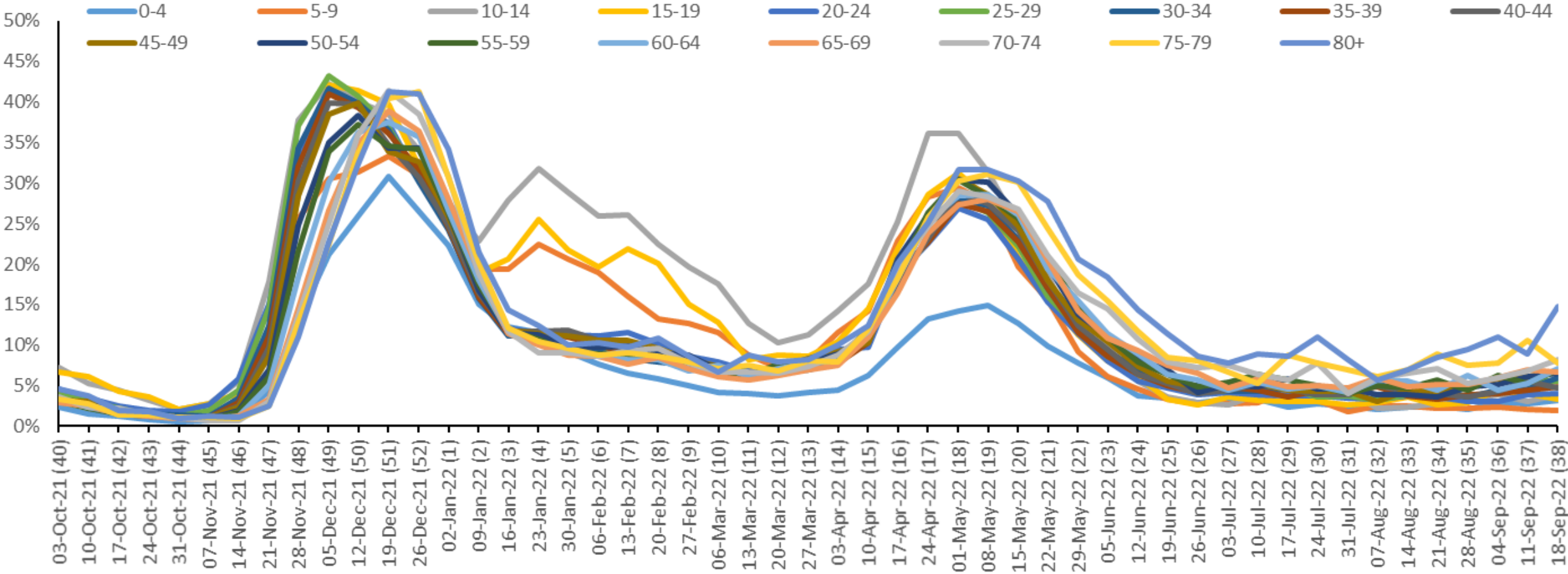
The percentage testing positive was 5.5%, which significantly increased from the previous week (5.0% in week 37, $p=0.01$)

Week number	Week beginning	No. of PCR tests n (%)	No. of positive PCR tests	Percentage testing positive (%)
14	03-Apr-22	93774 (0.4)	7863	8.4
15	10-Apr-22	80638 (0.4)	8849	11.0
16	17-Apr-22	92537 (0.4)	17227	18.6
17	24-Apr-22	97817 (0.5)	23648	24.2
18	01-May-22	116957 (0.6)	32989	28.2
19	08-May-22	126873 (0.6)	34321	27.1
20	15-May-22	115221 (0.5)	26649	23.1
21	22-May-22	99442 (0.5)	17368	17.5
22	29-May-22	84458 (0.4)	10603	12.6
23	05-Jun-22	77894 (0.4)	7497	9.6
24	12-Jun-22	63270 (0.3)	4484	7.1
25	19-Jun-22	61548 (0.3)	3358	5.5
26	26-Jun-22	47976 (0.2)	2164	4.5
27	03-Jul-22	43144 (0.2)	2012	4.7
28	10-Jul-22	38513 (0.2)	1871	4.9
29	17-Jul-22	36440 (0.2)	1658	4.5
30	24-Jul-22	34780 (0.2)	1561	4.5
31	31-Jul-22	34375 (0.2)	1359	4.0
32	07-Aug-22	28640 (0.1)	1170	4.1
33	14-Aug-22	30886 (0.1)	1253	4.1
34	21-Aug-22	28832 (0.1)	1195	4.1
35	28-Aug-22	28124 (0.1)	1144	4.1
36	04-Sep-22	27283 (0.1)	1263	4.6
37	11-Sep-22	26996 (0.1)	1351	5.0
38	12-Sep-22	23372 (0.1)	1286	5.5

Percentage of PCR tests positive for SARS-CoV-2 by date of specimen collection.
Blue line shows the 7-day moving average of the percentage testing positive.
Grey bars highlight weekend days and public holidays.

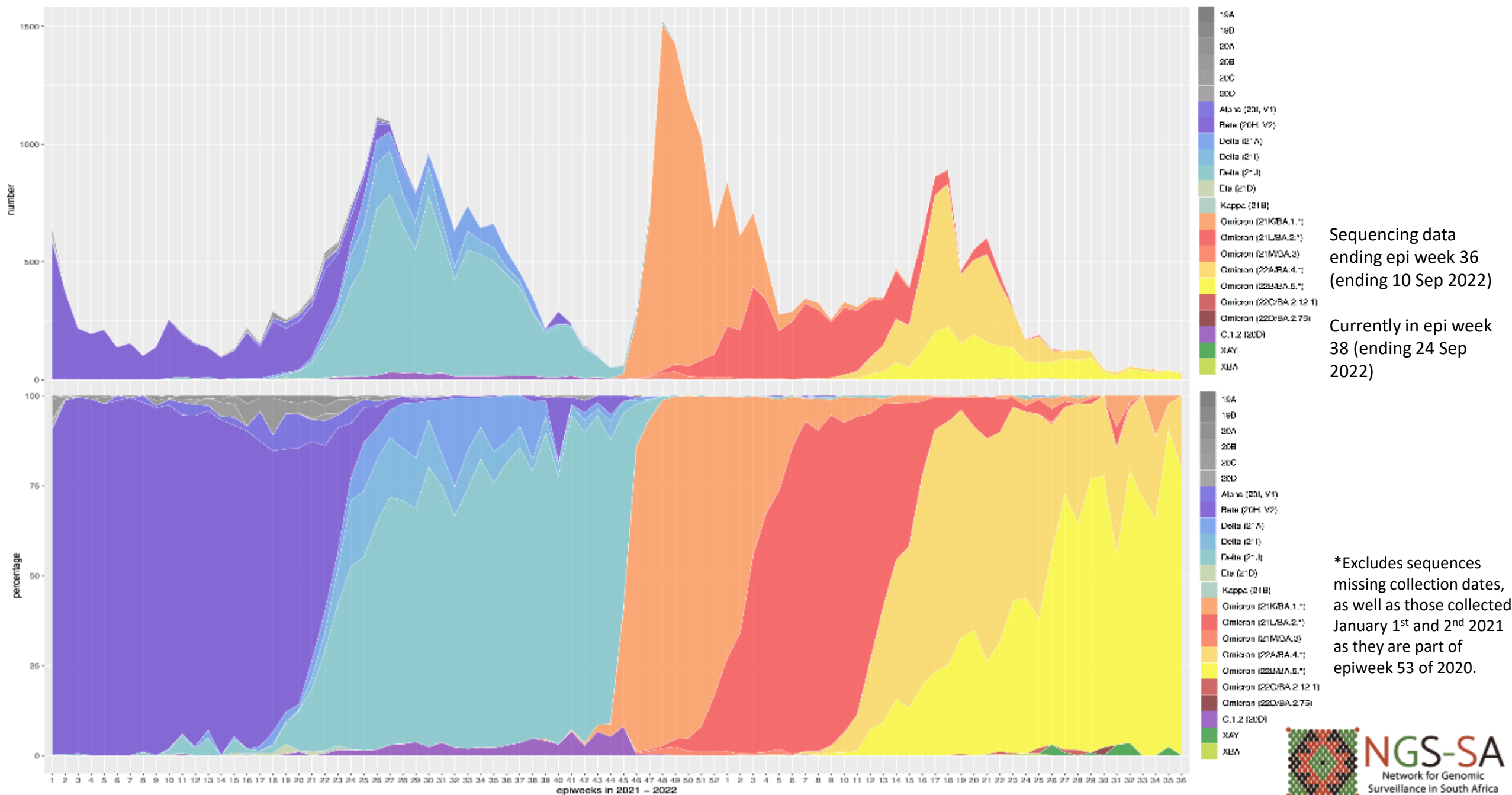


Percentage testing positive (PCR tests only) by age group and week of specimen collection



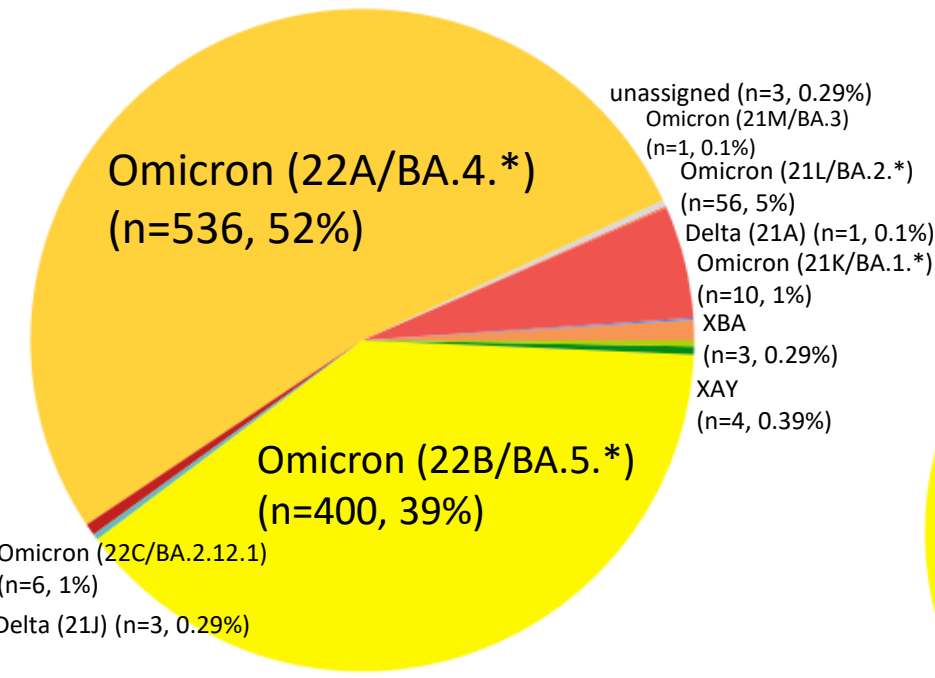
The percentage testing positive in week 38 was highest in the ≥ 80 year's age group (14.7%), followed by 70-74 years (8.2%), and has increased in these age groups in the past few weeks.

Number and percentage of clades by epiweek in South Africa, 2021 – 2022 (38 603*)



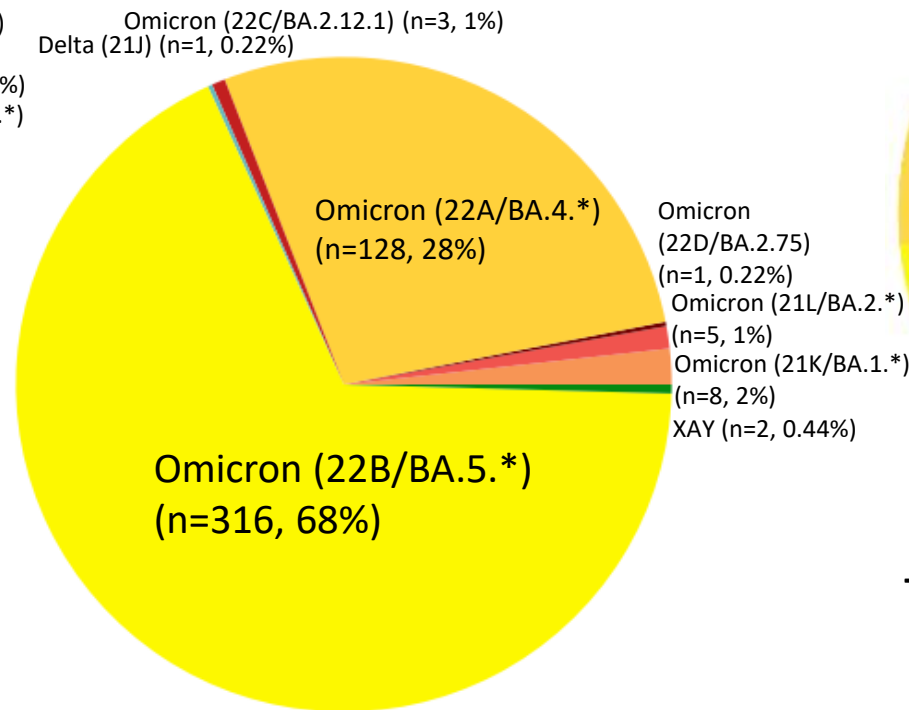
Prevalence of Variants of Concern (VOC) and Variants of Interest (VOI) in June – August 2022

June (N=1023)



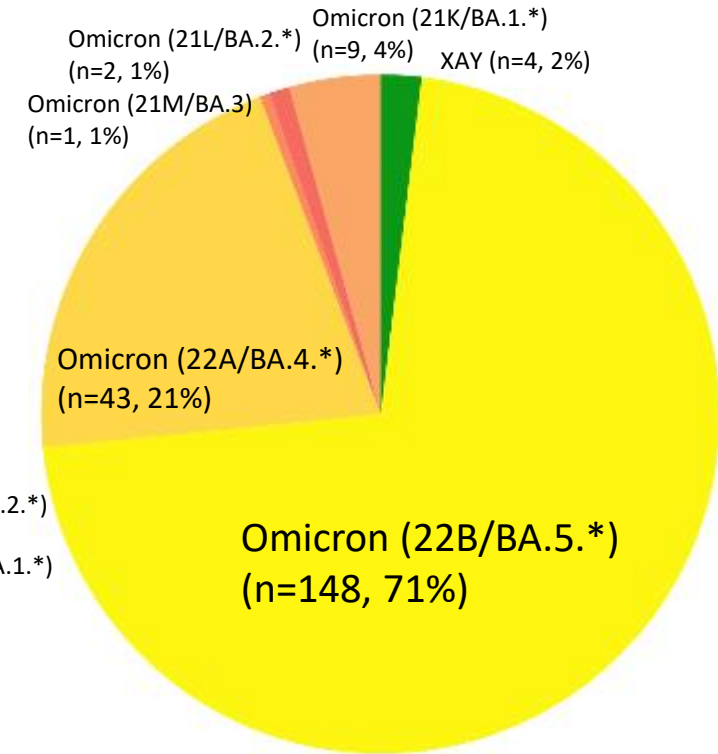
Total Omicron in June: 1009 (98.6%)

July (N=464)

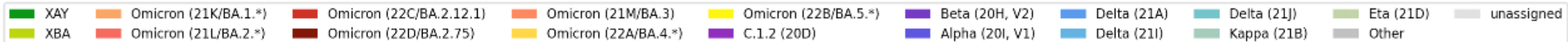


Total Omicron in July: 461 (99.4%)

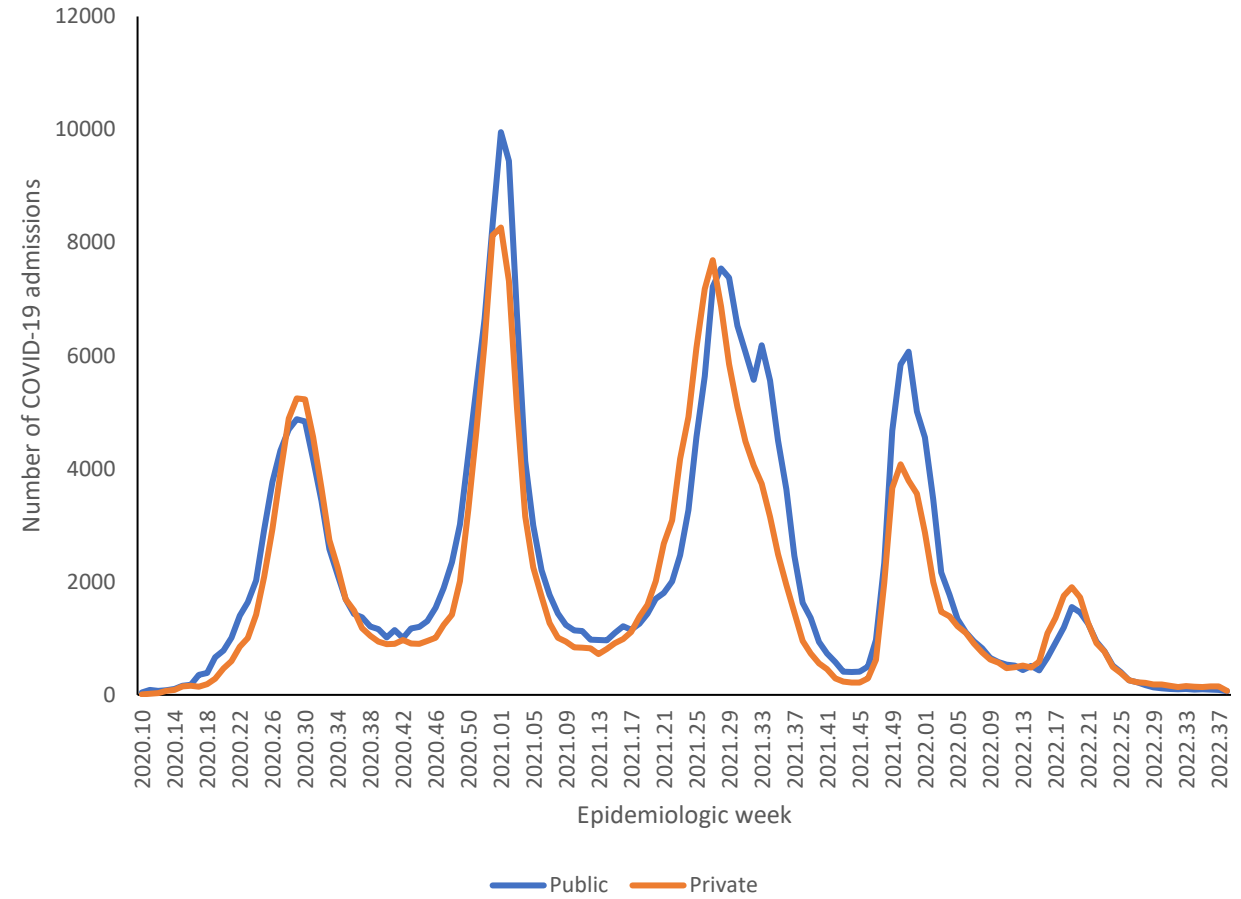
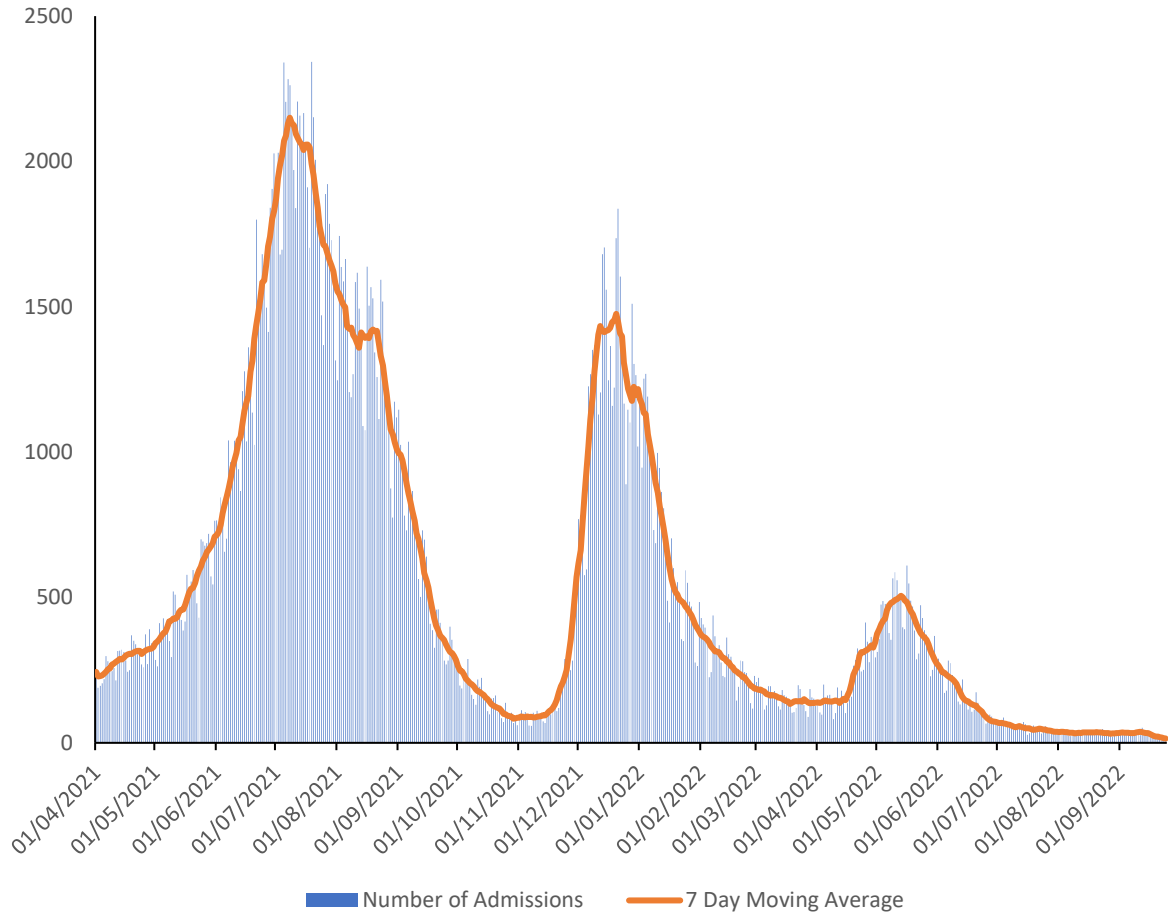
August (N=207)



Total Omicron in August: 203 (98.1%)

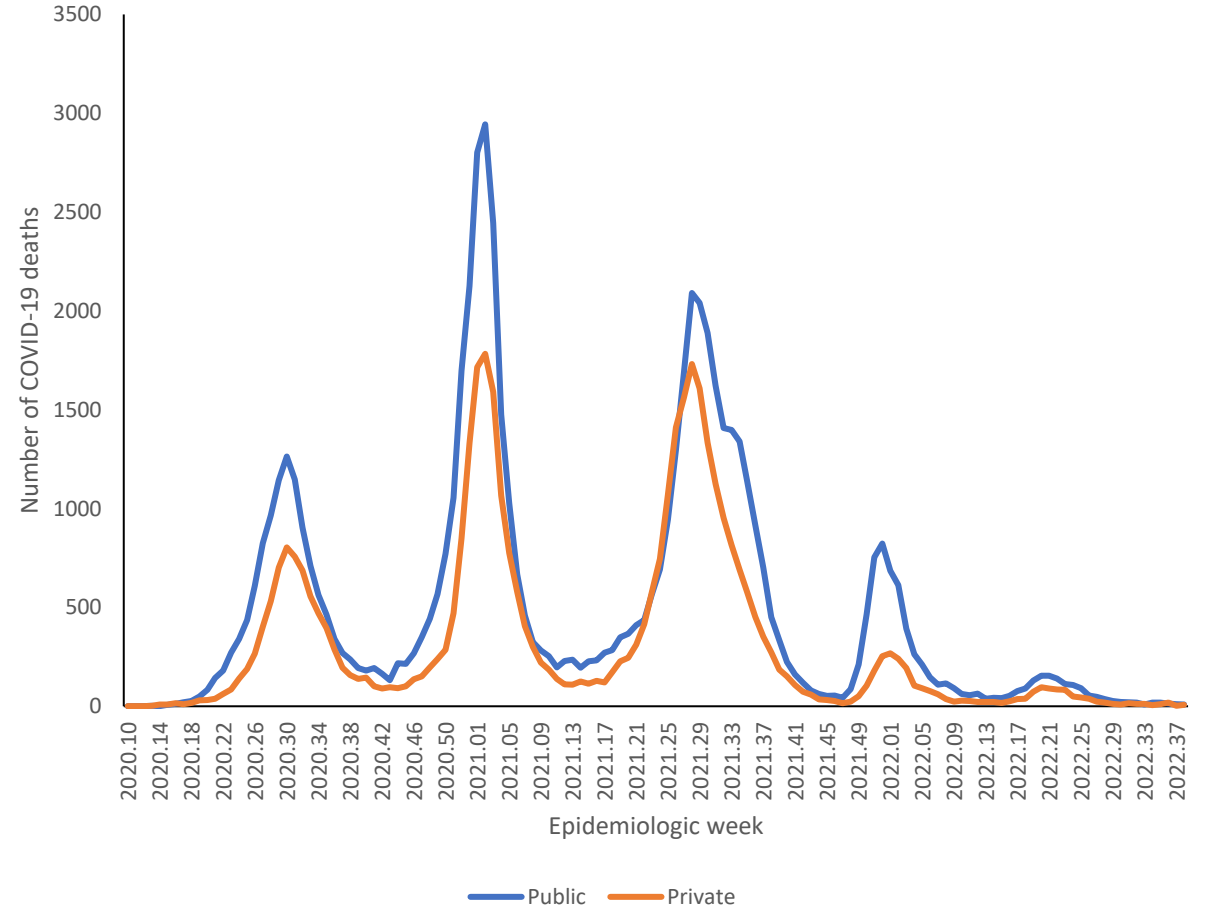
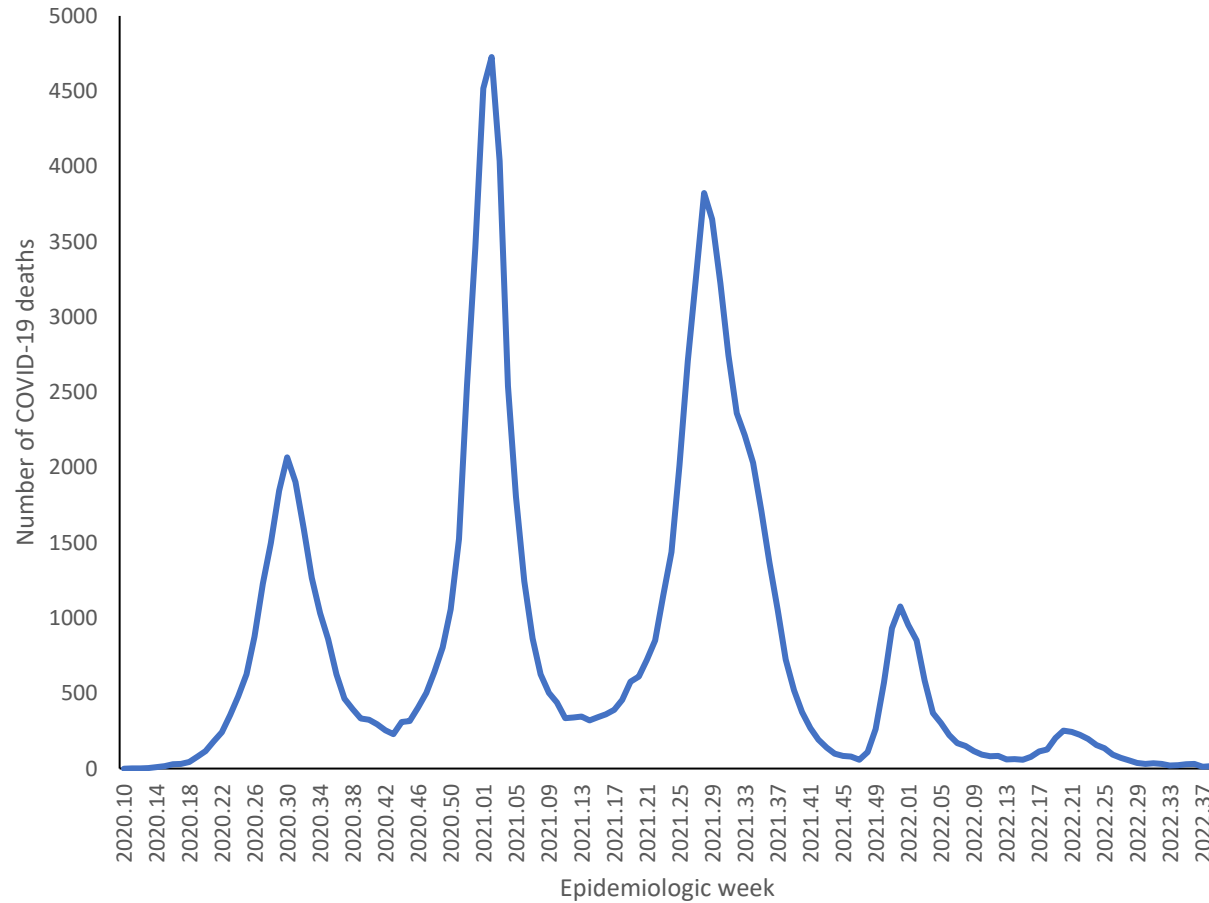


Number of reported COVID-19 admissions, South Africa, 7DMA, 1 April 2021-24 September 2022(left); and by epidemiologic week and health sector, 5 March 2020-24 September 2022(right)



- Decrease in 7 DMA nationally (most recent week data lags)
- Decrease in admissions both sectors

Number of reported COVID-19 deaths, by epidemiologic week and health sector (left) and province (right), South Africa, 5 March 2020-24 September 2022



- Decreased deaths nationally and both sectors
- Low numbers of deaths compared to previous waves

Summary overall

- Number of cases remain low
- Very low levels of testing
- % testing positive increasing slightly
 - Mostly in the elderly
- Hospital admissions and deaths remain low
- No new variants detected
 - Number specimens tested and sequenced are small

Acknowledgements



NHLS (including institutes & subsidiaries)



NICD COVID-19 response team

SA COVID Modeling Consortium



NGA-SA

NDOH IMT epi team

DATCOV team NICD





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