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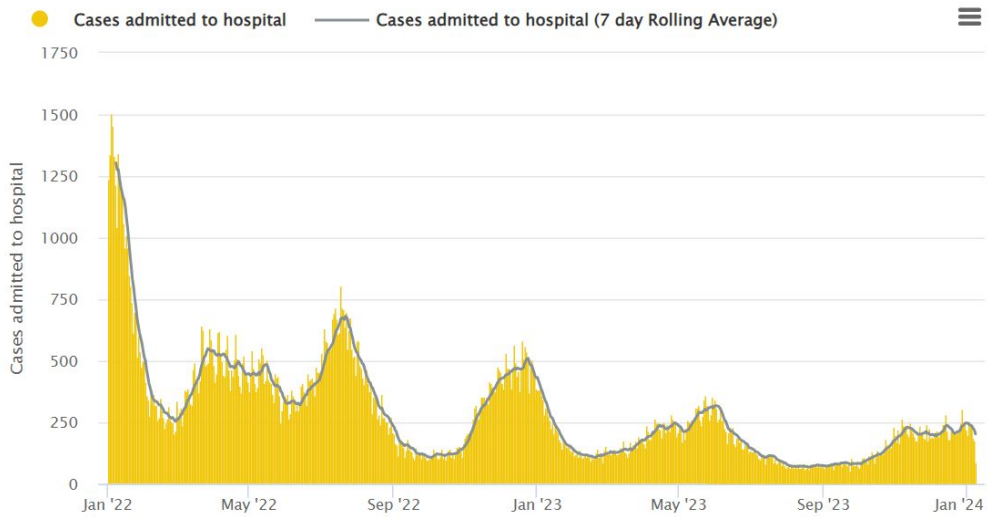
IMMUNISATION COALITION

COVID-19 vaccine effectiveness

3:20 pm

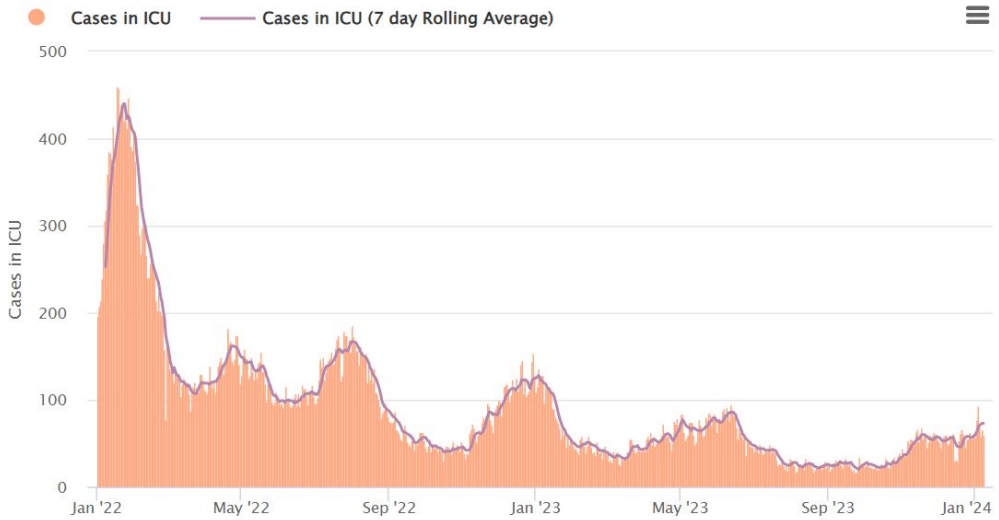
COVID-19 burden in Australia - pandemic year 5

COVID-19 cases admitted to hospital, by date of diagnosis, Australia, 01 Jan 2022 to 08 Jan 2024



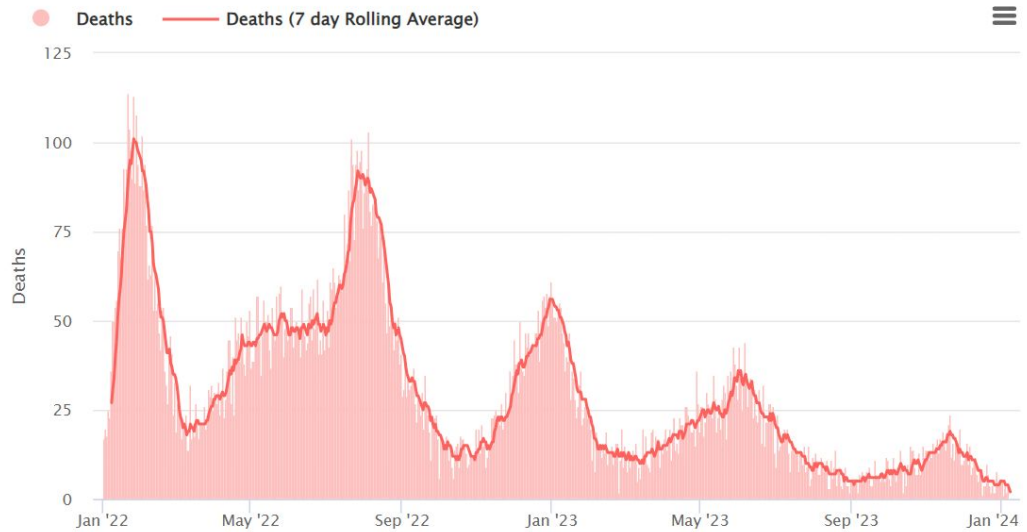
Source: National Notifiable Diseases Surveillance System, as at 08 Jan 2024

COVID-19 cases in ICU, Australia, 01 Jan 2022 to 08 Jan 2024



Source: Critical Health Resources Information System (CHRIS), as at 08 Jan 2024

COVID-19 associated deaths, Australia, 15 Dec 2021 to 10 Jan 2024



Source: National Notifiable Diseases Surveillance System, as at 08 Jan 2024

https://www.health.gov.au/topics/covid-19/reporting

Rationale for continued monitoring COVID-19 vaccine effectiveness

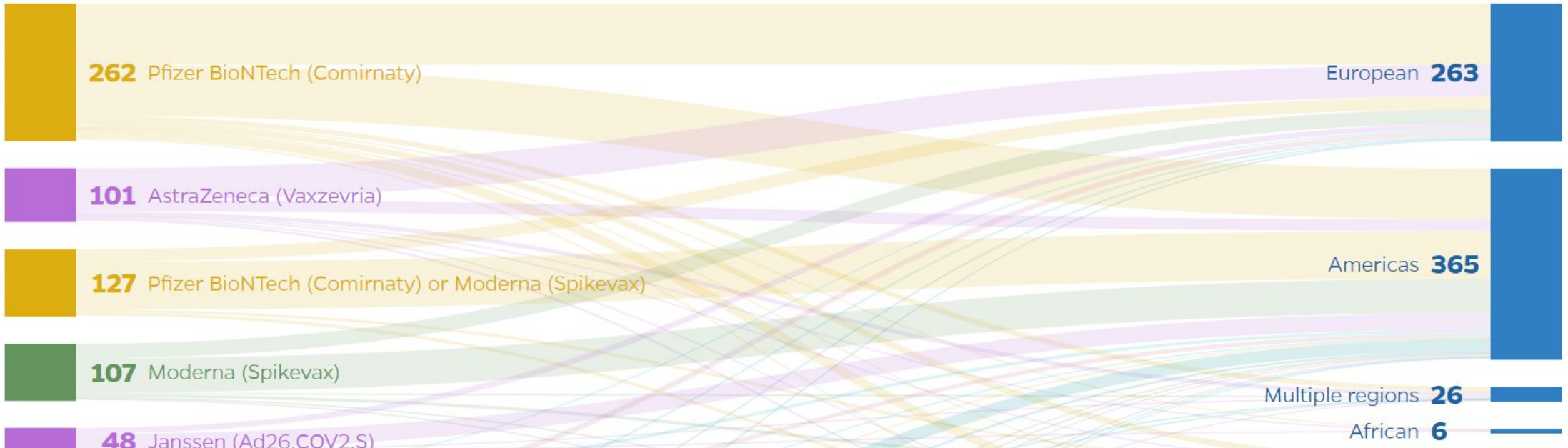
- Clinical trials of vaccine efficacy often lack information on:
  - less common outcomes (hospitalisation/death)
  - duration of protection
  - changes in efficacy with new circulating variants
  - vaccine changes
  - comparative efficacy
  - vaccine impact to guide programmatic decision-making

This section contains information on vaccine effectiveness studies that have been reported in preprint and published literature and reports.

There are currently **551** Studies in **51** Countries

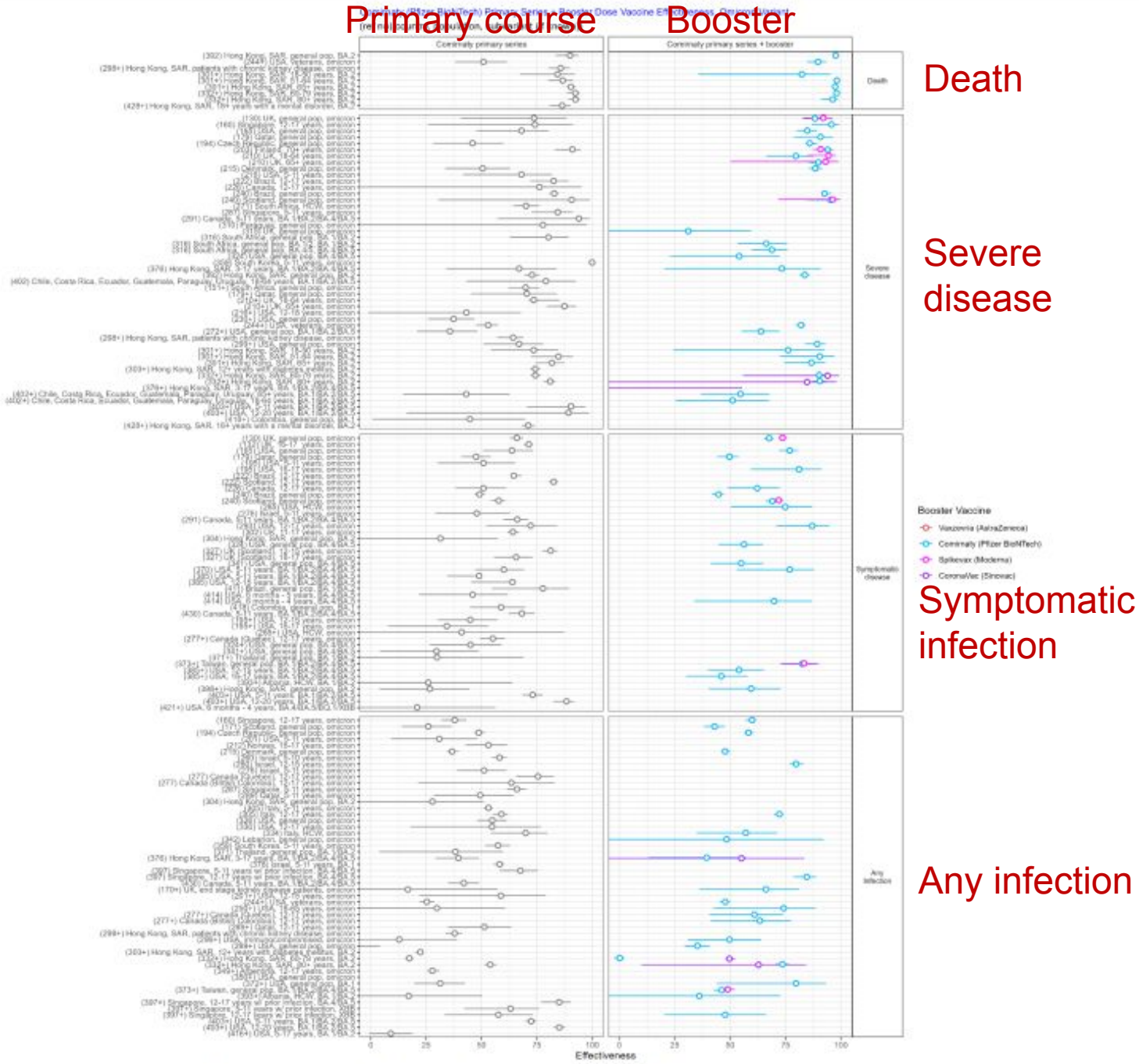
Which primary series vaccines are being studied?

Where are they being studied?



Vaccine effectiveness studies of Comirnaty mRNA against Omicron

Primary course and booster



Death

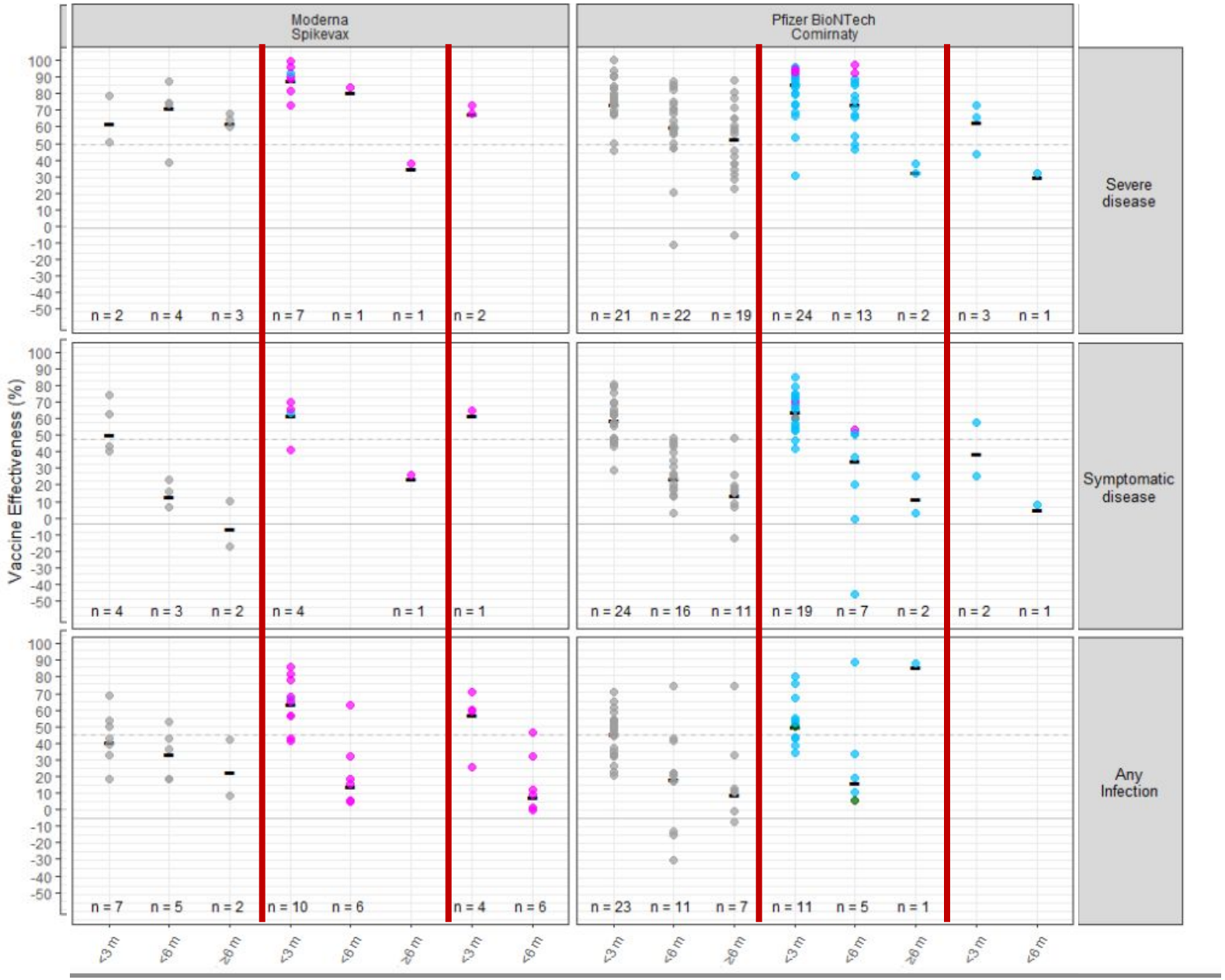
Severe disease

Symptomatic infection

Any infection

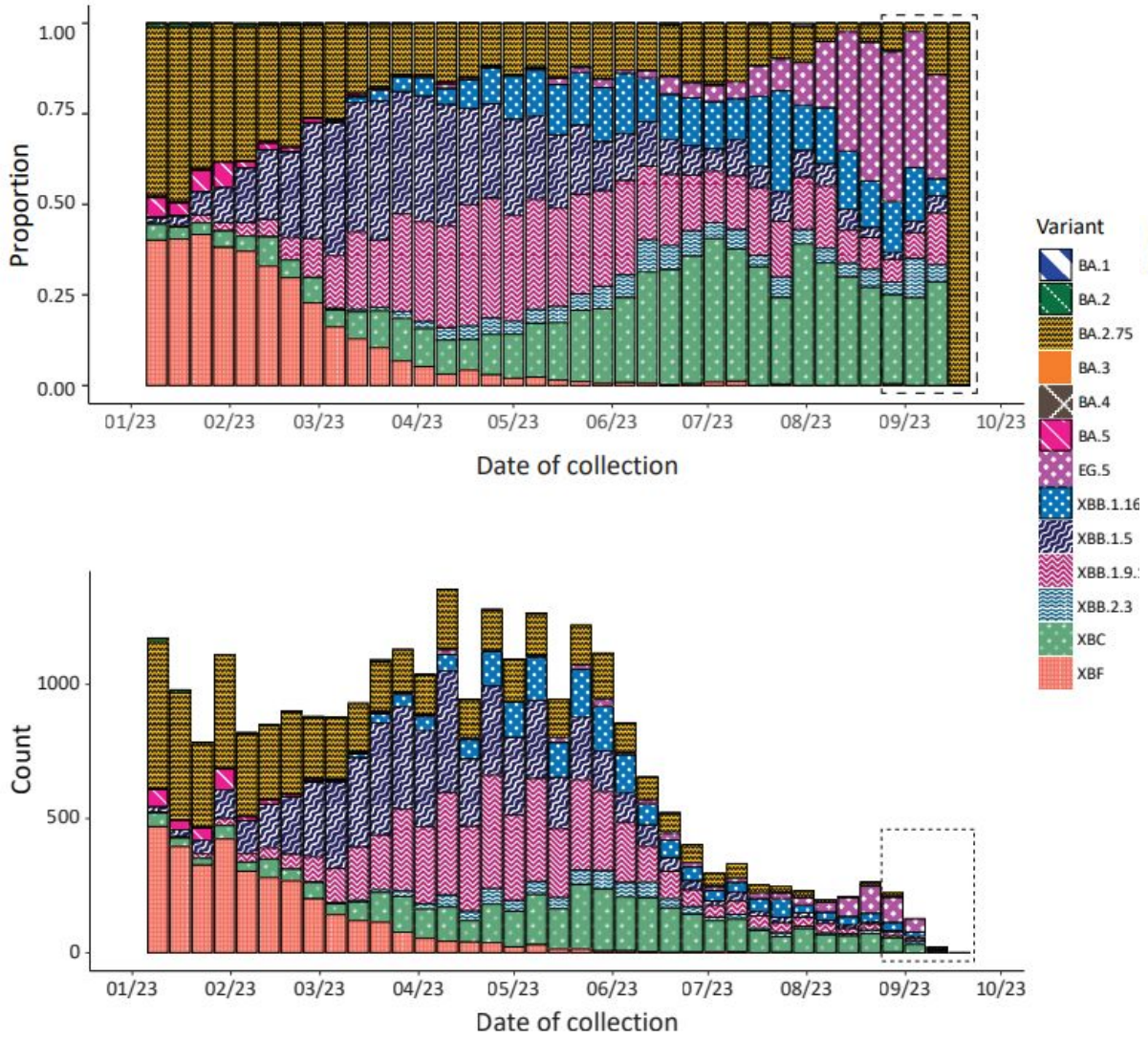
+ Indicates estimates that that include a follow-up time extending beyond 4 months post final dose.

Duration of Vaccine Effectiveness Against Omicron: Primary Series, First Booster Dose, and Second Booster Dose (where data available)



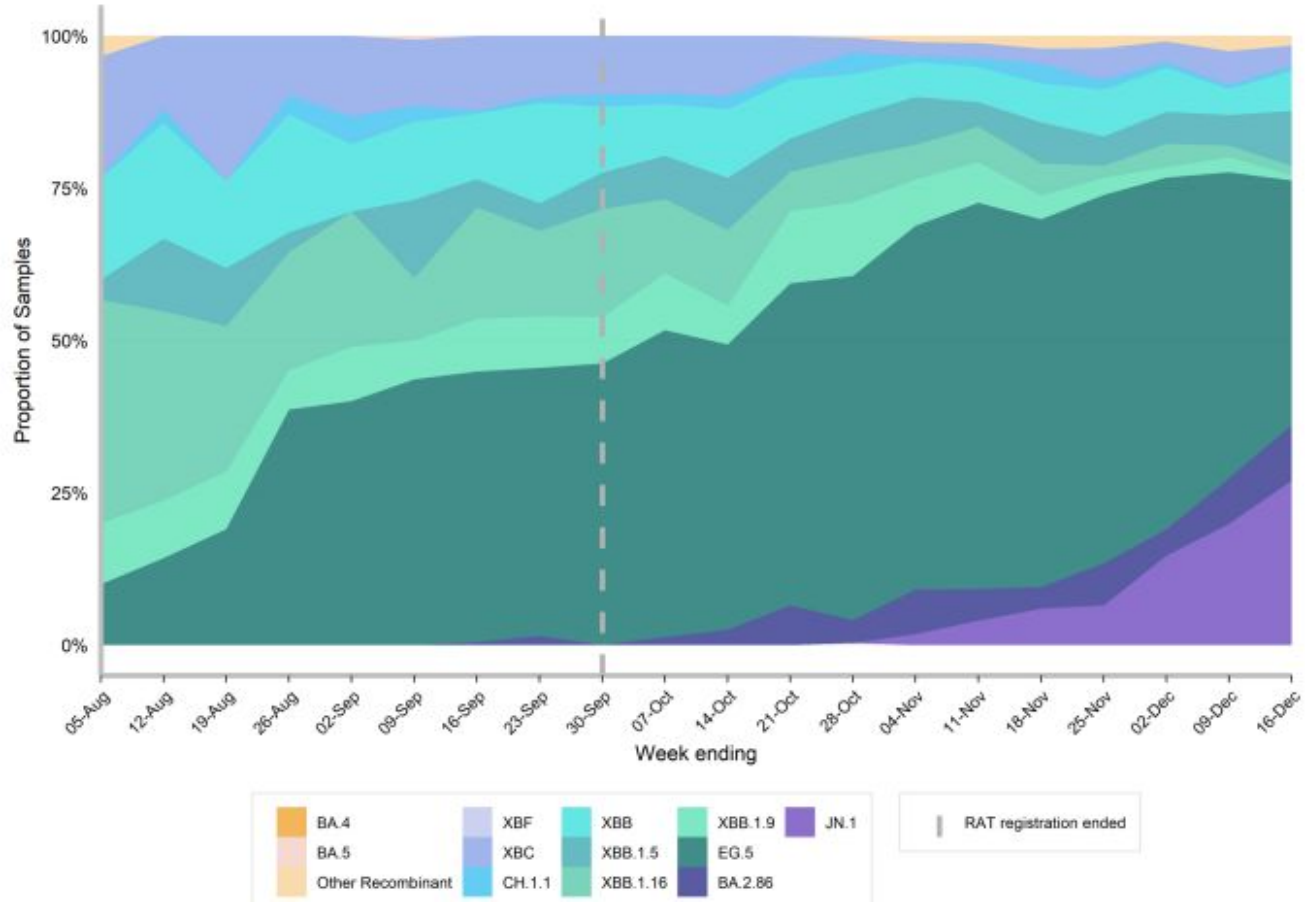
Data supports waning of COVID-19 vaccine effectiveness and need for continual boosting

Figure 8: Omicron sub-lineage in Australia since 1 January 2023 by sample collection date, showing (A) proportions and (B) count per week[a,b,c]



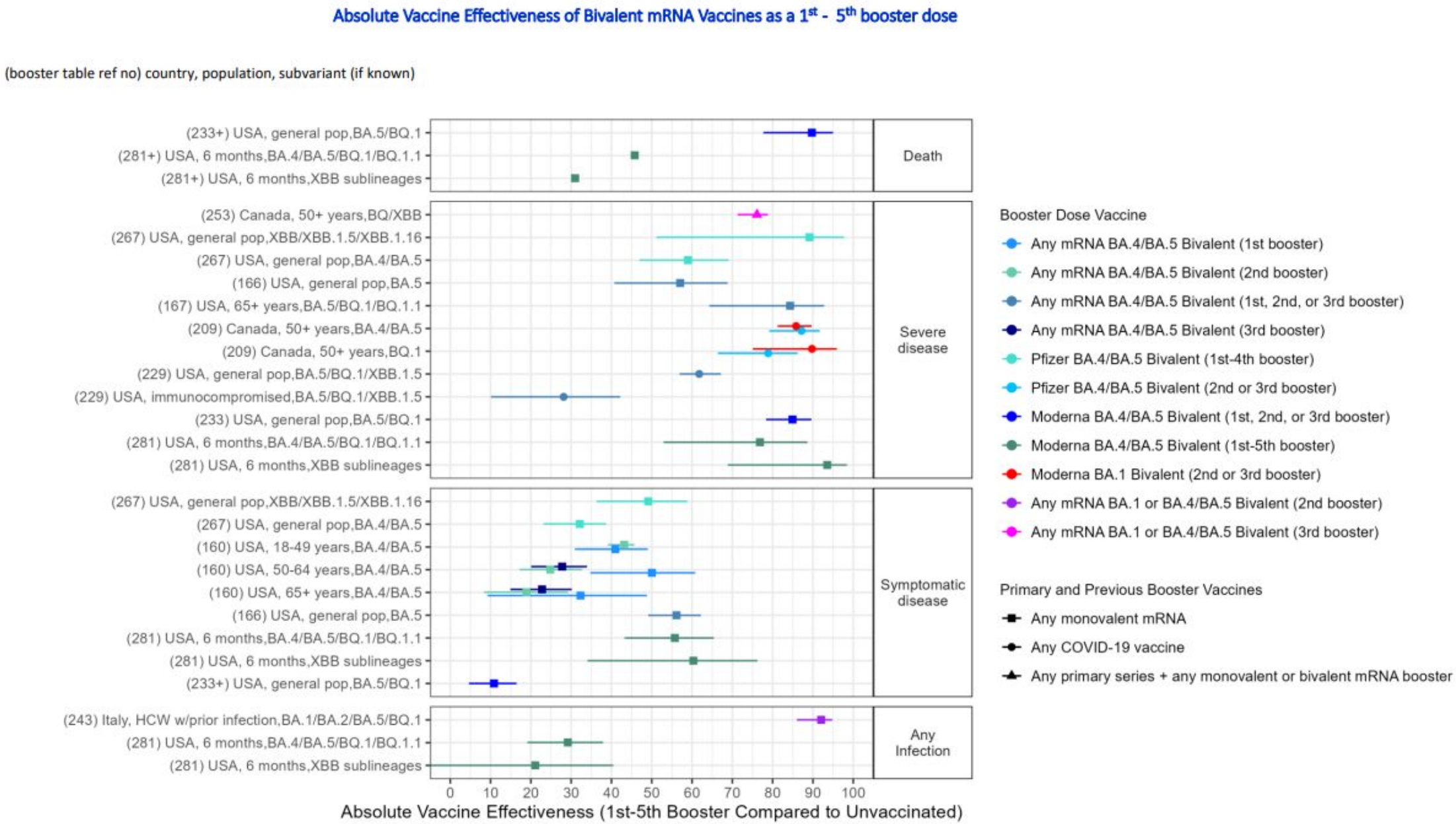
Comm Dis Intell Epub 14 Nov 2023

Figure 9. Estimated distribution of COVID-19 sub-lineages in the community, 05 August 2023 to 16 December 2023.



NSW Health epidemiology report fortnight ending 6 January 2024

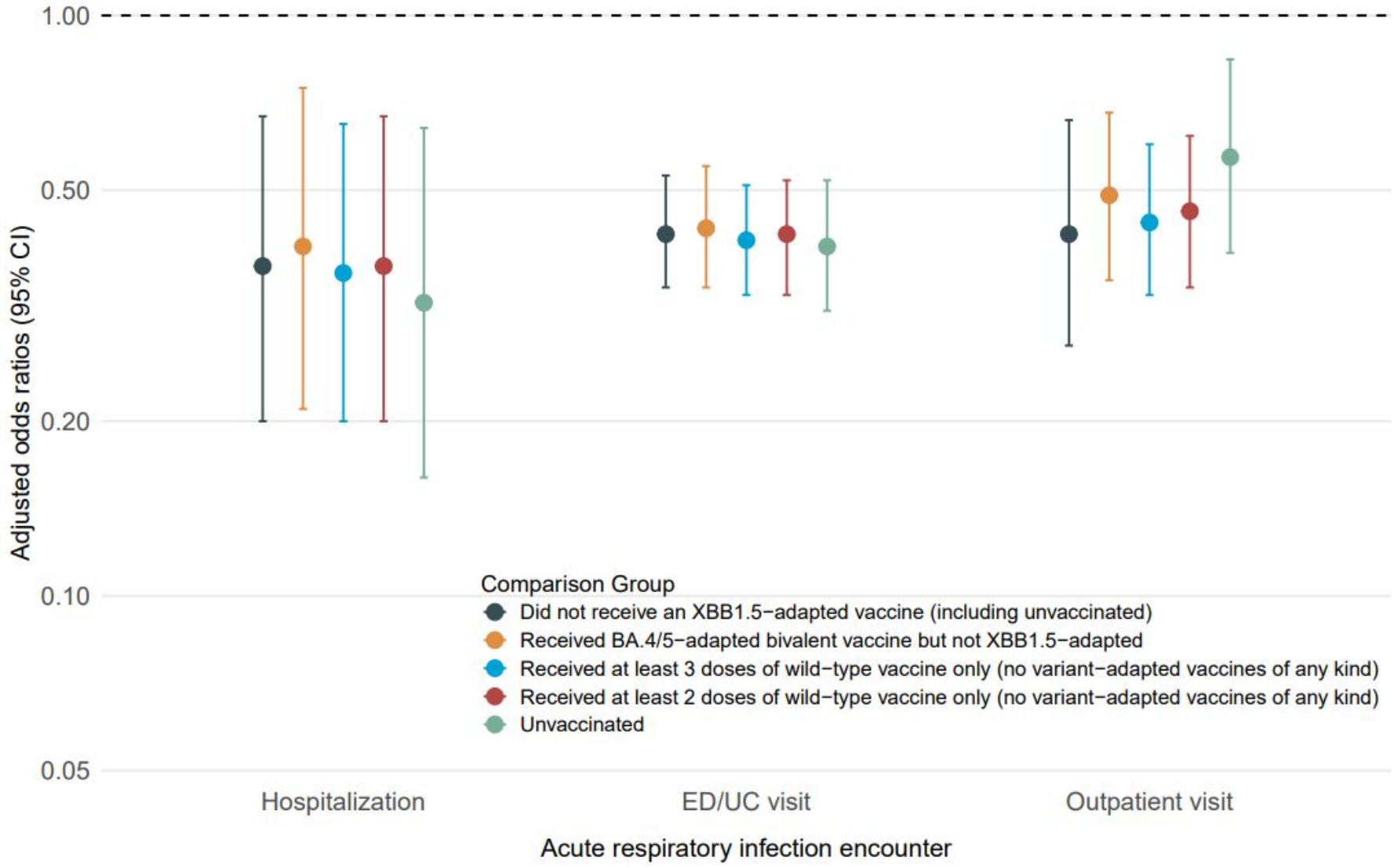
BIVALENT VACCINE ABSOLUTE VACCINE EFFECTIVENESS AGAINST OMICRON



BNT162b2 XBB1.5-adapted Vaccine and COVID-19 Hospital Admissions and Ambulatory Visits in US Adults

Sara Y. Tartof, Jeff M. Slezak, Timothy B. Frankland, Laura Puzniak, Vennis Hong, Bradley K. Ackerson, Julie A Stern, Sarah Simmons, Luis Jodar, John M. McLaughlin

doi: https://doi.org/10.1101/2023.12.24.23300512



XBB.1.5 vaccine received median 30 days earlier;

Other vaccines receipt likely to be much earlier

https://www.medrxiv.org/content/10.1101/2023.12.24.23300512v1.full.pdf

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PDF [70 KB] Save Share Reprints Request

Short-term effectiveness of the XBB.1.5 updated COVID-19 vaccine against hospitalisation in Denmark: a national cohort study

Christian Holm Hansen • Ida Rask Moustsen-Helms • Morten Rasmussen • Bolette Søborg • Henrik Ullum • Palle Valentiner-Branth

Published: January 05, 2024 • DOI: https://doi.org/10.1016/S1473-3099(23)00746-6

Table Event rates among people older than 65 years with and without the XBB.1.5 updated COVID-19 vaccine, from Oct 8 to Oct 26, 2023

	Population	Cumulative follow-up time, years	Average follow-up time, days	Events (rates per 100 person-years)	Adjusted hazard ratio (95% CI)
COVID-19 hospitalisation					
Vaccinated 7 or more days ago	442 247	12 019	9·9	21 (0·175)	0·239 (0·152–0·377)
Not yet vaccinated	867 645	35 023	14·7	243 (0·694)	ref
Negative control outcome: other hospitalisation					
Vaccinated 7 or more days ago*	441 754	11 996	9·9	899 (7·49)	0·848 (0·784–0·918)
Not yet vaccinated	867 645	34 950	14·7	2987 (8·55)	ref

Of those vaccinated, 90·4% (9·6%) received the vaccine by Pfizer-BioNTech (Moderna).

* 493 people were hospitalised during follow-up before vaccination and were therefore removed from the at-risk set.

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Early COVID-19 vaccine effectiveness of XBB.1.5 vaccine against hospitalization and ICU admission, the Netherlands, 9 October - 5 December 2023

C. Henri van Werkhoven, Anne-Wil Valk, Bente Smagge, Hester E. de Melker, Mirjam J. Knol, Susan J.M. Hahné, Susan van den Hof, Brechje de Gier

doi: https://doi.org/10.1101/2023.12.12.23299855

Danish and Dutch studies report rVE for XBB.1.5 boosters of 76% and 71% against COVID-19 hospitalisation

Time since vaccine receipt very short (~10 days)

UK HSA reports rVE ~55% (Sept-Dec 23)

Table 2. Vaccine effectiveness (VE) against hospitalisation amongst those aged 65 years and older in England, stratified by autumn booster manufacturer

Autumn booster [Note 1]	Interval	Controls	Cases	VE (95% C.I.)
No booster	-	7,536	3,469	Baseline
Pfizer BA.4-5	9 to 13 days	211	61	44.9 (25.7 to 59.2)
	2 to 4 weeks	974	227	45.4 (35.3 to 53.9)
	5 to 9 weeks	1,323	195	43.8 (32.5 to 53.1)
	10+ weeks	281	58	34.2 (8.1 to 52.8)
Pfizer XBB	9 to 13 days	220	51	42.3 (20.5 to 58.2)
	2 to 4 weeks	937	127	55.4 (45 to 63.8)
	5 to 9 weeks	752	103	50.9 (37.5 to 61.5)
	10+ weeks	23	1	Insufficient data

Note 1. All individuals had received a bivalent BA.1 booster vaccine as part of the autumn 2022 booster programme, and their last dose was at least 3 months prior to their test. Due to insufficient data, Moderna is not included.

UK HSA COVID vaccine surveillance report 26 Jan 2024

Research and analysis

COVID-19 vaccine quarterly surveillance reports (September 2021 to October 2023)

Data on the real-world effectiveness and impact of the COVID-19 vaccines.

Executive summary

Rigorous clinical trials have been undertaken to understand the immune response, safety profile, and efficacy of all COVID-19 vaccines approved for use in the UK as part of the regulatory process. Ongoing monitoring of the vaccines as they are rolled out in the population is important to continually ensure that clinical and public health guidance on the vaccination programme is built upon the best available evidence.

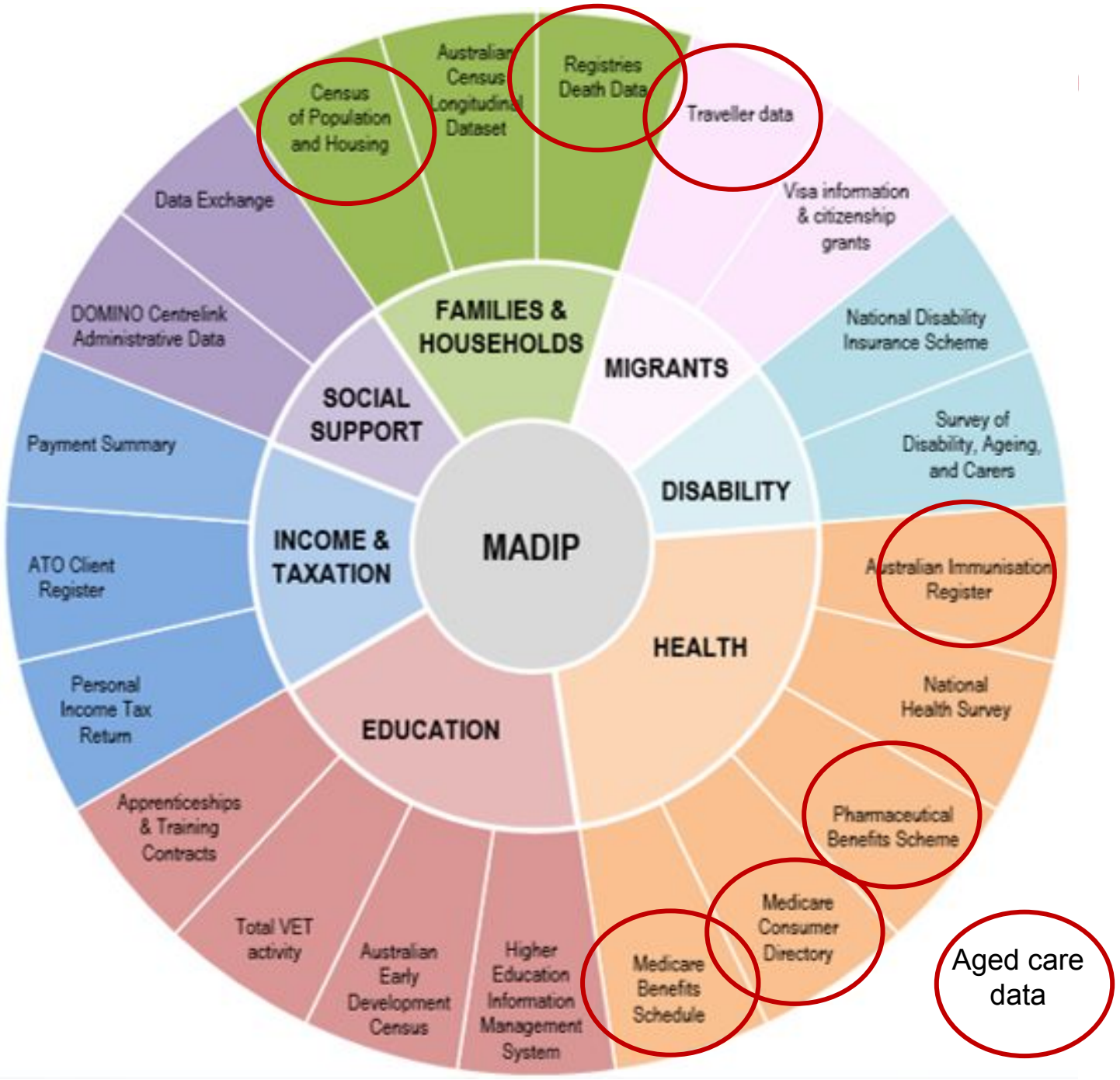
UK Health Security Agency (UKHSA), formerly Public Health England (PHE), works closely with the Medicines and Healthcare Regulatory Agency (MHRA), NHS England, and other government, devolved administration, and academic partners to monitor the COVID-19 vaccination programme. Details of the vaccine surveillance strategy are set on the page COVID-19: vaccine surveillance strategy (1). As with all vaccines, the safety of COVID-19 vaccines is continuously being monitored by the MHRA. They conclude that overall, the benefits of COVID-19 vaccines outweigh any potential risks (2).

This report contains updates on vaccine effectiveness, vaccination in pregnancy, and vaccine impact on the proportion of the population with antibodies to COVID-19.

Ongoing monitoring of COVID-19 VE in Australia

Aim: to examine how effective COVID-19 vaccines are in preventing COVID-19 deaths

Methods: Use AIR-MADIP (large population-wide linked data collection); now known as AIR-PLIDA

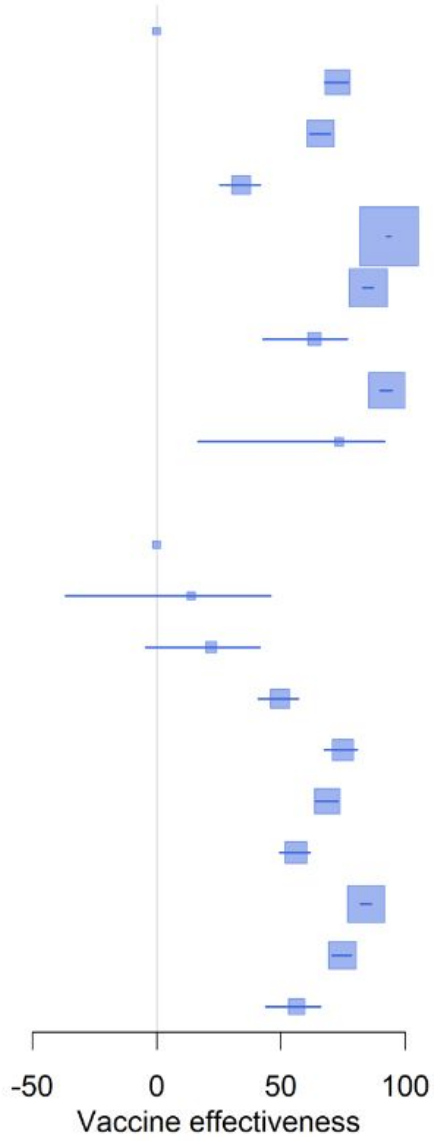


https://www.health.gov.au/our-work/australian-immunisation-register-linked-to-the-multi-agency-data-integration-project

COVID-19 vaccine effectiveness by dose, time since receipt and pandemic wave

Age 65+ years

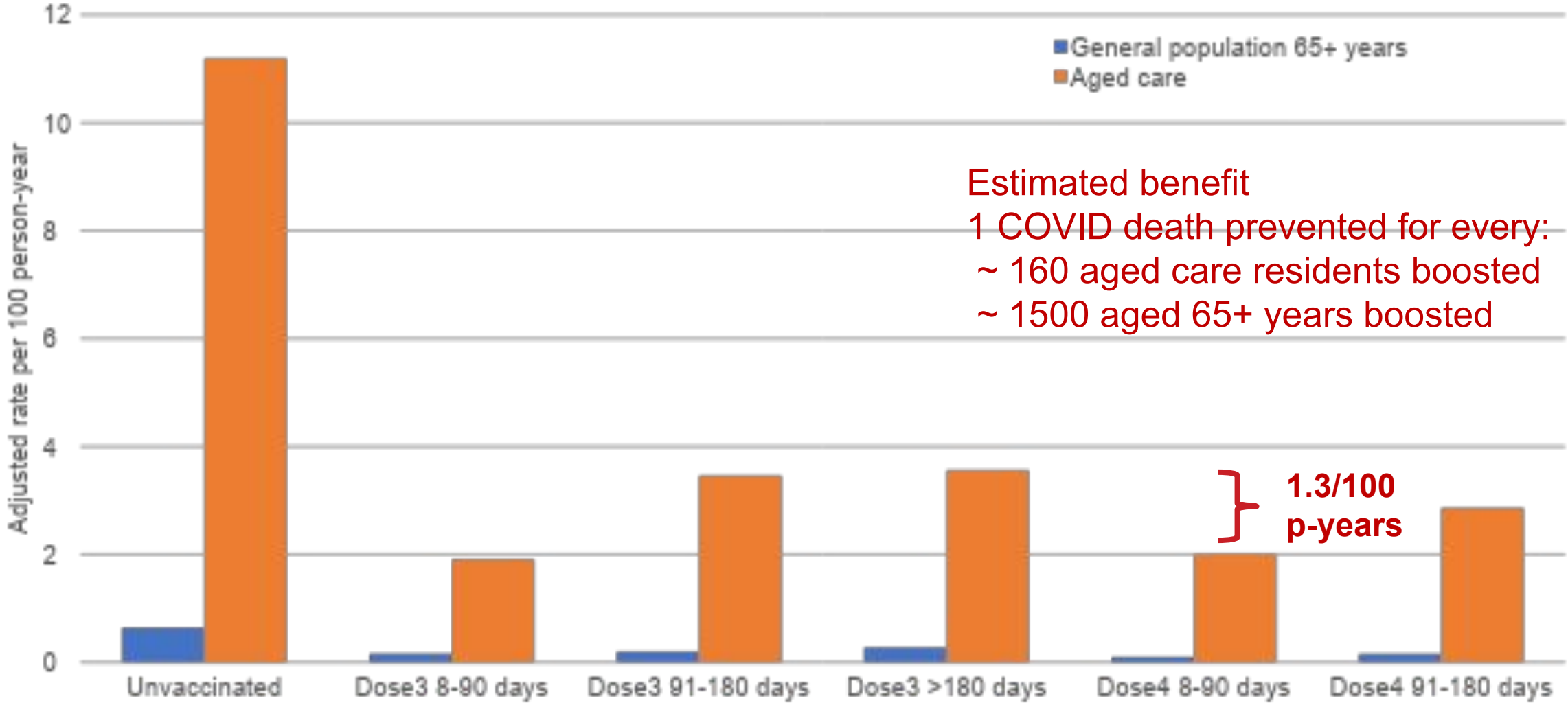
	Rate (per 100-PY) (95% CI)	VE (%) (95%CI)
01JAN22 – 31MAY22		
Unvaccinated	0.929 (0.812; 1.063)	ref
Dose2 8-90 days	0.279 (0.217; 0.359)	72.7 (67.8; 76.9)
Dose2 91-180 days	0.326 (0.285; 0.373)	65.9 (61.7; 69.7)
Dose2 >180 days	0.927 (0.794; 1.082)	34.0 (25.5; 41.6)
Dose3 8-90 days	0.070 (0.060; 0.081)	93.4 (92.6; 94.2)
Dose3 91-180 days	0.164 (0.141; 0.191)	85.1 (82.9; 86.9)
Dose3 >180 days	1.139 (0.536; 2.417)	63.4 (42.9; 76.6)
Dose4 8-90 days	0.094 (0.058; 0.151)	92.6 (90.0; 94.5)
Dose4 >90 days	0.386 (0.053; 2.831)	73.3 (16.8; 91.4)
01JUN22 – 30NOV22		
Unvaccinated	0.490 (0.399; 0.601)	ref
Dose2 8-90 days	1.218 (0.471; 3.149)	13.9 (-36.6; 45.7)
Dose2 91-180 days	0.595 (0.337; 1.051)	21.8 (-4.3; 41.4)
Dose2 >180 days	0.209 (0.162; 0.269)	49.6 (41.0; 56.9)
Dose3 8-90 days	0.232 (0.142; 0.381)	74.9 (67.5; 80.6)
Dose3 91-180 days	0.207 (0.172; 0.248)	68.6 (63.9; 72.7)
Dose3 >180 days	0.205 (0.172; 0.245)	56.0 (49.6; 61.6)
Dose4 8-90 days	0.134 (0.114; 0.156)	84.3 (82.0; 86.2)
Dose4 91-180 days	0.094 (0.078; 0.113)	74.7 (70.7; 78.2)
Dose4 >180 days	0.128 (0.086; 0.189)	56.3 (44.0; 65.9)



Vaccine effectiveness adjusted for age, sex, jurisdiction, household income, co-morbidities, GP visits, 2022 flu vaccine receipt

https://www.thelancet.com/journals/lanwpc/article/PIIS2666-6065(23)00246-8/fulltext

Rate of COVID-19 death, June-Nov 2022 in 65+ yrs



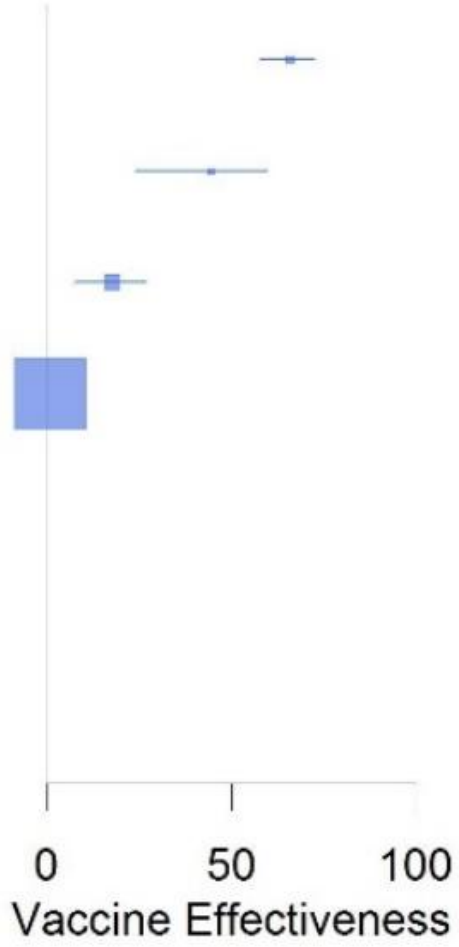
COVID-19 vaccine effectiveness against COVID-19 mortality, 65+ years Australia

01NOV22-31MAY23	Person-time rate (per 100-Person Year)	rVE (%) (95%CI)
Booster, bivalent 8-90 days	0.050 (0.033; 0.075)	66.0 (57.6; 72.7)
Booster, ancestral 8-90 days	0.096 (0.052; 0.175)	44.7 (23.9; 59.7)
Booster, any 91-180 days	0.120 (0.099; 0.145)	17.8 (7.6; 26.8)
Booster, any >180 days	0.126 (0.115; 0.138)	ref.

***Boosters include Dose 3, 4 and 5**

(events=2,880)

(Person-time=2,336,441)



https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2023.28.47.2300603

Summary

- Overall burden of serious disease from SARS-CoV-2 is falling (vaccination and prior infection)
- COVID-19 vaccine effectiveness studies show higher vaccine effectiveness against severe disease (compared to infection only) and waning vaccine effectiveness
- Variant-specific vaccines (mRNA) are effective against infection and severe disease
- For individuals at high risk of severe disease, regardless of vaccine variant-specificity, recency of vaccination is still paramount (ie. vaccination in the last 6 months) – needs better messaging to improve coverage
- Linked data assets such as PLIDA can enable on-going assessment of vaccine effectiveness in Australia although timeliness of data still needs improvement

Acknowledgements

- Ben Smith, Anna Bachlani, Sandrine Stepien, Kristine Macartney (NCIRS)
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- Rosemary Korda, Jennifer Welsh (Australian National University)