

# Effectiveness of Homologous and Heterologous AZD1222, CoronaVac, and BNT162b2 Booster Vaccine Against SARS-CoV-2 Infection, and Severe COVID-19

## Comparing the Delta- and Omicron-Dominant Periods in Malaysia

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### Context and Methodology

**Test-Negative Design** (infection) and **Retrospective Cohort** (severe) using **nationally-comprehensive** data on outcomes, vaccination, and automated contact tracing in Malaysia, which has a **diverse vaccine portfolio**, covering those primary vaccinated in 1 Jul to 30 Sep 2021, and boosted in 27 Oct 2021 to 4 Feb 2022.

Marginal VEs from logistic regressions, adjusting for age, sex, ethnicity, comorbidities, number of times traced, and number of times tested pre-observation.

### GitHub Repo: Replication

<https://github.com/suahjl/mysboosters-omicrondelta1q-expansion>



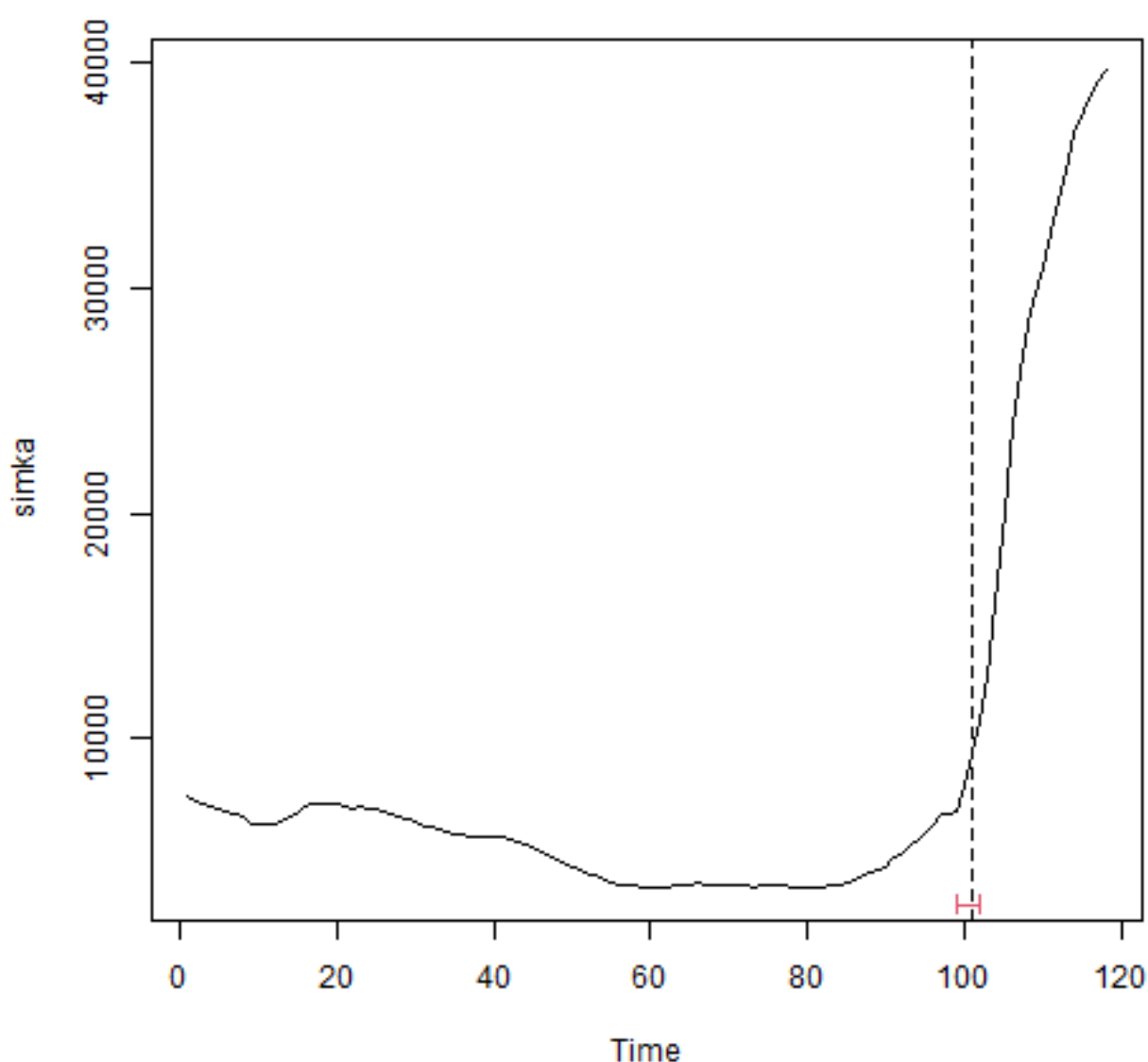
### TL;DR

- First-generation COVID-19 vaccines are less effective against Omicron than Delta SARS-CoV-2 infection
- Going into endemicity, policymakers must ensure low mortality risk
- Boosters demonstrated exceptional protection against severe COVID-19
- Close surveillance is warranted to ensure adequate protection amongst comorbid individuals

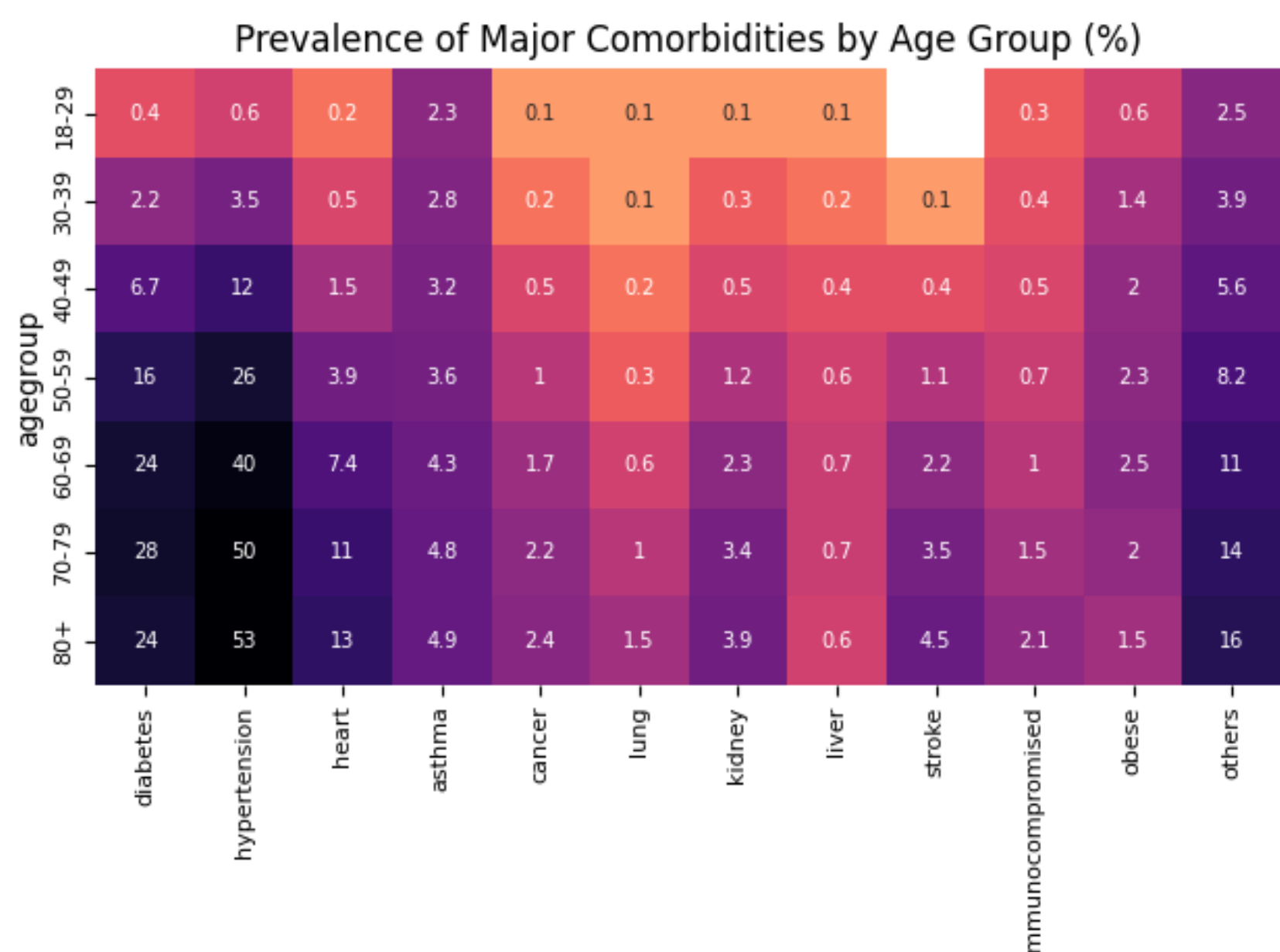
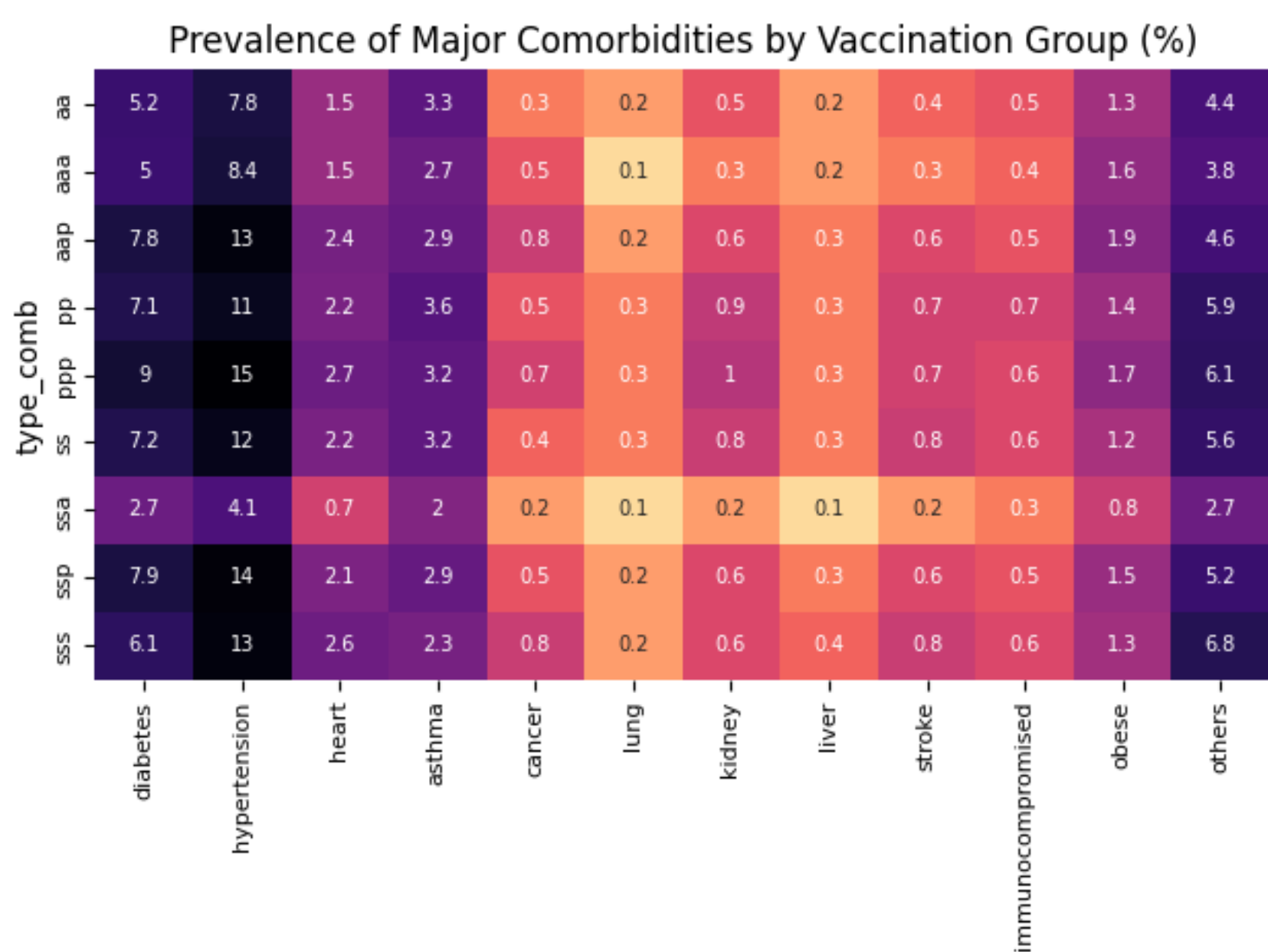
### Delta-Omicron Breakpoint

Analysis taken from Suah et al (2022; 10.1080/22221751.2022.2072773)

Figure: Supervised SARS-CoV-2 Positive Tests & Bai-Perron Breakpoint Estimate



### Prevalence of Comorbidities



### Delta-Dominant (27 Oct 2021 - 4 Feb 2022)

Figure: mVE against SARS-CoV-2 Infection (Ref: 2x BNT162b2; PP)

	mVE	LB	UB
aa	-136.86	-140.88	-132.91
aaa	76.06	75.21	76.88
aap	83.85	83.18	84.49
ppp	90.28	90.03	90.53
ss	-90.24	-92.02	-88.49
ssa	73.62	72.21	74.95
ssp	85.09	84.86	85.31
sss	80.76	80.13	81.37

Figure: mVE against COVID-19 ICU Admission (Ref: 2x BNT162b2; PP)

	mVE	LB	UB
aa	-123.37		
aaa	93.81		
aap	98.36		
ppp	97.96		
ss	-320.87		
ssa	93.45		
ssp	89.03		
sss	91.55		

Figure: mVE against COVID-19 Death (Ref: 2x BNT162b2; PP)

	mVE	LB	UB
aa	-104.53		
aaa	94.31		
aap	99.2		
ppp	99.43		
ss	-240.62		
ssa	100		
ssp	94.34		
sss	97.51		

### Omicron-Dominant (5 Feb 2022 - 22 Feb 2022)

Figure: mVE against SARS-CoV-2 Infection (Ref: 2x BNT162b2; PP)

	mVE	LB	UB
aa	0.73	-1.78	3.18
aaa	49.29	48.13	50.43
aap	65.28	64.33	66.2
ppp	56.84	56.17	57.49
ss	-1.91	-3.29	-0.55
ssa	61.26	59.58	62.87
ssp	57.71	57.19	58.21
sss	52.45	51.45	53.43

Figure: mVE against COVID-19 ICU Admission (Ref: 2x BNT162b2; PP)

	mVE	LB	UB
aa	-2.65	-70.04	38.03
aaa	79.84	50.37	91.81
aap	92.01	74.81	97.47
ppp	83.98	78.33	88.16
ss	-81.7	-123.79	-47.53
ssa	60.86	-6.22	85.58
ssp	73.61	65.45	79.84
sss	74.02	52.94	85.65

Figure: mVE against COVID-19 Death (Ref: 2x BNT162b2; PP)

	mVE	LB	UB
aa	-8.72	-72	31.28
aaa	100		
aap	93.94	80.92	98.07
ppp	88.76	84.49	91.85
ss	-75.79	-115.49	-43.41
ssa	88.32	16.41	98.37
ssp	73.47	65.42	79.64
sss	77.81	60	87.69

### Ethical Consideration

This is part of The Real-World Evaluation of COVID-19 Vaccines under the Malaysia National COVID-19 Immunization Programme (**RECoVaM**) study registered in the National Medical Research Register (**NMRR-21-1660-60697**). Ethical approval was granted by the Medical Research and Ethics Committee (MREC), Ministry of Health, Malaysia.