

**Hot Issue QTB****IMPACT OF COVID-19 VACCINES****Key points**

- Vaccination remains one of the best protective measures against COVID-19.
- While no vaccine is 100 per cent effective at preventing infection in vaccinated people, COVID-19 vaccines help protect people who are vaccinated from getting severely ill from COVID-19 if they do get infected, including significantly reducing the risk of hospitalisation and death.

**Severity of illness by vaccination status:**

- Reliable data on the vaccination status of PCR confirmed COVID-19 cases are currently only available for New South Wales, Queensland and South Australia.
  - Where known, the majority of PCR confirmed cases among those aged 12 years and over have occurred in vaccinated individuals.
    - As vaccination coverage increases, it is expected that the total number of COVID-19 infections among fully vaccinated people, including those that experience severe illness (i.e. hospitalisation, ICU admission or death), will rise. This does not mean the vaccines are not working.
    - As seen globally and in Australia, people who are fully vaccinated are less likely to be infected if exposed, and, more importantly, far less likely to develop severe disease than those who are vaccinated.
  - During both the Delta and Omicron waves, the proportion of unvaccinated and partially vaccinated cases that experienced severe illness was higher than the proportion amongst fully vaccinated cases.
    - From 16 June to 14 December 2021 (reflecting the Delta wave), 1.4 per cent of cases that were fully vaccinated experienced severe illness (defined as those who were admitted to ICU or died), compared with 3 per cent of cases that were either partially vaccinated or unvaccinated.
    - From the 15 December 2021 to 1 March 2022 (reflecting the Omicron wave), 0.3 per cent of fully vaccinated cases experienced severe illness, compared to 1.1 per cent of cases that were not fully vaccinated.
  - The importance of vaccination in preventing severe illness increases with age, with a much higher proportion of unvaccinated cases aged 70 years and over experiencing severe illness, compared to unvaccinated cases amongst younger age groups (Tables 1 and 2).
    - During the Omicron wave, 17.8 percent of unvaccinated cases aged 70 or over experienced severe illness, compared to 0.4 per cent of cases aged 12 to 69 years.
- The risk of a case developing severe illness is influenced by a range of factors including vaccination status, age, underlying illnesses and timeliness of seeking health care.



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Information on the extent to which COVID-19 contributed to death and the underlying illnesses of the individual case are not available.

- Estimating the impact of a vaccination program is challenging as there is no completely unaffected control group. Furthermore, the effects of the vaccination program need to be differentiated from that of other interventions (for example, lockdowns or outbreak control measures), changes in behaviour and any seasonal variation in COVID-19 activity.
- On 8 February 2022, a COVID-19 Mortality Data Taskforce was established within the Department of Health. The Taskforce is working with key stakeholders including states and territories to enable more timely, detailed data relating to COVID-19 deaths (including information relating to vaccine uptake and health status) to be provided to the Commonwealth for analysis. This data will provide additional insights regarding the impact of vaccination with respect to mortality.

### Facts and Figures

#### Australian data for severity of illness by vaccination status:

Table 1: PCR confirmed COVID-19 cases by age group, vaccination status and highest level of illness severity, New South Wales, Queensland and South Australia, 16 June to 14 December 2021 (Delta wave)

Age	Vaccination Status	Not severe (no hospital or death)	Hospitalised (no ICU or death)	ICU (no death)	COVID-19 related death	Total cases
12-17	Fully Vaccinated	261 (97.4%)	7 (2.6%)	0 (0.0%)	0 (0.0%)	268
	Partially Vaccinated	228 (94.2%)	14 (5.8%)	0 (0.0%)	0 (0.0%)	242
	No effective vaccination	5,707 (95.0%)	286 (4.8%)	17 (0.3%)	0 (0.0%)	6,010
	Unknown	1,192 (94.5%)	65 (5.2%)	4 (0.3%)	0 (0.0%)	1,261
	<b>Total</b>	<b>7,388 (94.9%)</b>	<b>372 (4.8%)</b>	<b>21 (0.3%)</b>	<b>0 (0.0%)</b>	<b>7,781</b>
18-49	Fully Vaccinated	8,760 (95.4%)	403 (4.4%)	17 (0.2%)	0 (0.0%)	9,180
	Partially Vaccinated	4,320 (92.6%)	320 (6.9%)	23 (0.5%)	3 (0.1%)	4,666
	No effective vaccination	23,567 (85.8%)	3,466 (12.6%)	392 (1.4%)	47 (0.2%)	27,472
	Unknown	4,790 (84.9%)	747 (13.2%)	105 (1.9%)	0 (0.0%)	5,642
	<b>Total</b>	<b>41,437 (88.2%)</b>	<b>4,936 (10.5%)</b>	<b>537 (1.1%)</b>	<b>50 (0.1%)</b>	<b>46,960</b>
50-69	Fully Vaccinated	2,570 (89.3%)	262 (9.1%)	35 (1.2%)	10 (0.3%)	2,877
	Partially Vaccinated	1,446 (83.1%)	240 (13.8%)	33 (1.9%)	21 (1.2%)	1,740
	No effective vaccination	3,964 (68.1%)	1,355 (23.3%)	356 (6.1%)	145 (2.5%)	5,820
	Unknown	889 (67.8%)	312 (23.8%)	110 (8.4%)	1 (0.1%)	1,312
	<b>Total</b>	<b>8,869 (75.5%)</b>	<b>2,169 (18.5%)</b>	<b>534 (4.5%)</b>	<b>177 (1.5%)</b>	<b>11,749</b>
70+	Fully Vaccinated	769 (63.0%)	328 (26.9%)	28 (2.3%)	96 (7.9%)	1,221
	Partially Vaccinated	326 (55.9%)	183 (31.4%)	21 (3.6%)	53 (9.1%)	583



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No effective vaccination	439 (36.3%)	447 (36.9%)	95 (7.8%)	230 (19.0%)	1,211
Unknown	160 (41.6%)	183 (47.5%)	36 (9.4%)	6 (1.6%)	385
<b>Total</b>	<b>1,694 (49.8%)</b>	<b>1,141 (33.6%)</b>	<b>180 (5.3%)</b>	<b>385 (11.3%)</b>	<b>3,400</b>

<sup>^</sup>Data extracted from the National Interoperable Notifiable Diseases Surveillance System (NINDSS) on 16 March 2022.

<sup>\*</sup>Excluding cases with mixed vaccination regime or vaccinated outside of Australia. <sup>\*\*</sup> In order to accommodate the time required for vaccination to become effective, 'No effective vaccination' includes cases with an illness onset within 21 days after receiving a first dose. Source: NINDSS extracted 16 March 2022

Table 2: PCR confirmed COVID-19 cases by age group, vaccination status and highest level of illness severity, New South Wales, Queensland and South Australia, 15 December 2021 to 1 March 2022 (Omicron wave)

Age	Vaccination Status	Not severe (no hospital or death)	Hospitalised (no ICU or death)	ICU (no death)	COVID-19 related death	Total cases
12-17	Fully Vaccinated	56,088 (99.1%)	502 (0.9%)	13 (<0.05%)	0 (0.0%)	56,603
	Partially Vaccinated	2,832 (99.0%)	26 (0.9%)	2 (0.1%)	0 (0.0%)	2,860
	No effective vaccination	5,868 (99.1%)	46 (0.8%)	5 (0.1%)	0 (0.0%)	5,919
	Unknown	22,025 (99.2%)	178 (0.8%)	8 (<0.05%)	0 (0.0%)	22,211
	<b>Total</b>	<b>86,813 (99.1%)</b>	<b>752 (0.9%)</b>	<b>28 (&lt;0.05%)</b>	<b>0 (0.0%)</b>	<b>87,593</b>
18-49	Fully Vaccinated	504,728 (98.7%)	6,438 (1.3%)	192 (<0.05%)	23 (<0.05%)	511,381
	Partially Vaccinated	15,362 (98.3%)	247 (1.6%)	13 (0.1%)	3 (<0.05%)	15,625
	No effective vaccination	20,612 (98.0%)	370 (1.8%)	24 (0.1%)	18 (0.1%)	21,024
	Unknown	148,597 (98.5%)	2,175 (1.4%)	121 (0.1%)	3 (<0.05%)	150,896
	<b>Total</b>	<b>689,299 (98.6%)</b>	<b>9,230 (1.3%)</b>	<b>350 (0.1%)</b>	<b>47 (&lt;0.05%)</b>	<b>698,926</b>
50-69	Fully Vaccinated	150,038 (97.5%)	3,446 (2.2%)	294 (0.2%)	151 (0.1%)	153,929
	Partially Vaccinated	2,426 (95.7%)	83 (3.3%)	15 (0.6%)	12 (0.5%)	2,536
	No effective vaccination	4,467 (95.0%)	138 (2.9%)	22 (0.5%)	77 (1.6%)	4,704
	Unknown	34,313 (97.0%)	904 (2.6%)	156 (0.4%)	5 (<0.05%)	35,378
	<b>Total</b>	<b>191,244 (97.3%)</b>	<b>4,571 (2.3%)</b>	<b>487 (0.2%)</b>	<b>245 (0.1%)</b>	<b>196,547</b>
70+	Fully Vaccinated	40,012 (87.0%)	4,545 (9.9%)	320 (0.7%)	1,115 (2.4%)	45,992
	Partially Vaccinated	838 (81.0%)	117 (11.3%)	11 (1.1%)	69 (6.7%)	1,035
	No effective vaccination	1,389 (71.5%)	208 (10.7%)	23 (1.2%)	323 (16.6%)	1,943
	Unknown	8,278 (87.6%)	1,051 (11.1%)	94 (1.0%)	28 (0.3%)	9,451
	<b>Total</b>	<b>50,517 (86.5%)</b>	<b>5,921 (10.1%)</b>	<b>448 (0.8%)</b>	<b>1,535 (2.6%)</b>	<b>58,421</b>

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receiving a first dose. \*\*\*Data between 02-16 March 2022 is excluded to reflect the lag between symptom onset and the development of severe illness. Source: NINDSS extracted 16 March 2022

International example of vaccine effectiveness

- The UK Health Security Agency (UKHSA, formerly Public Health England) reports that vaccine effectiveness against symptomatic disease with the Omicron variant is substantially lower than against the Delta variant, with rapid waning. However, protection against hospitalisation remains high, particularly after three doses.
- The UKHSA COVID-19 Vaccine Surveillance Report released on 10 March 2022 presents the following summary of evidence on the effectiveness of all vaccines combined against four outcomes: infection, symptomatic disease, hospitalisation and mortality, against both the Omicron (a) and Delta (b) variants.

a)

	Dose 2			Dose 3		
	0 to 3 months	4 to 6 months	Over 6 months	0 to 3 months	4 to 6 months	Over 6 months
Infection	Insufficient data	Insufficient data	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Symptomatic disease	25 to 70%	5 to 30%	0 to 10%	50 to 75%	40 to 50%	Insufficient data
Hospitalisation	65 to 85%	55 to 65%	30 to 35%	80 to 95%	75 to 85%	Insufficient data
Mortality	Insufficient data	Insufficient data	40 to 70%	85 to 99%	Insufficient data	Insufficient data

b)

	Dose 2			Dose 3		
	0 to 3 months	4 to 6 months	Over 6 months	0 to 3 months	4 to 6 months	Over 6 months
Infection	65 to 80%	50 to 65%	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Symptomatic disease	65 to 90%	45 to 65%	40 to 60%	90 to 99%	90 to 95%	Insufficient data
Hospitalisation	95 to 99%	80 to 90%	70 to 85%	95 to 99%	Insufficient data	Insufficient data
Mortality	95 to 99%	90 to 95%	80 to 99%	95 to 99%	Insufficient data	Insufficient data

High Confidence	Evidence from multiple studies which is consistent and comprehensive
Medium Confidence	Evidence is emerging from a limited number of studies or with a moderately level of uncertainty
Low Confidence	Little evidence is available at present and results are inconclusive

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