

Queensland Vaccine Safety and Efficacy Program (QoVAX) Statewide Study

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Background:

There are limited community, population-based studies on the effectiveness of COVID-19 vaccines. Most people in Queensland, Australia, received two COVID-19 vaccine doses before appreciable spread of SARS-CoV-2. The objectives of the QoVAX Statewide study were to investigate health outcomes of COVID-19 vaccines and identify intrinsic and extrinsic factors associated with immune responses, vaccine safety and protection from severe COVID-19 in Queensland.

Methods:

QoVAX Statewide (ACTRN12622000020785) is a community cohort study of Queensland residents aged 18 years and older who had received their last dose of a COVID-19 vaccine within the preceding 12-months. Participants completed an online questionnaire and had the option for a pathology request slip to be sent to enable collection of a blood sample for antibody testing, biobanking and DNA extraction. Induced concentration of serum IgG to SARS-CoV-2 spike protein was used to measure immune response. Participant history of previous or current COVID-19 was collected in the questionnaire. Differences between multiple groups were analysed by Kruskal-Wallis test with a Dunn's multiple comparison test.

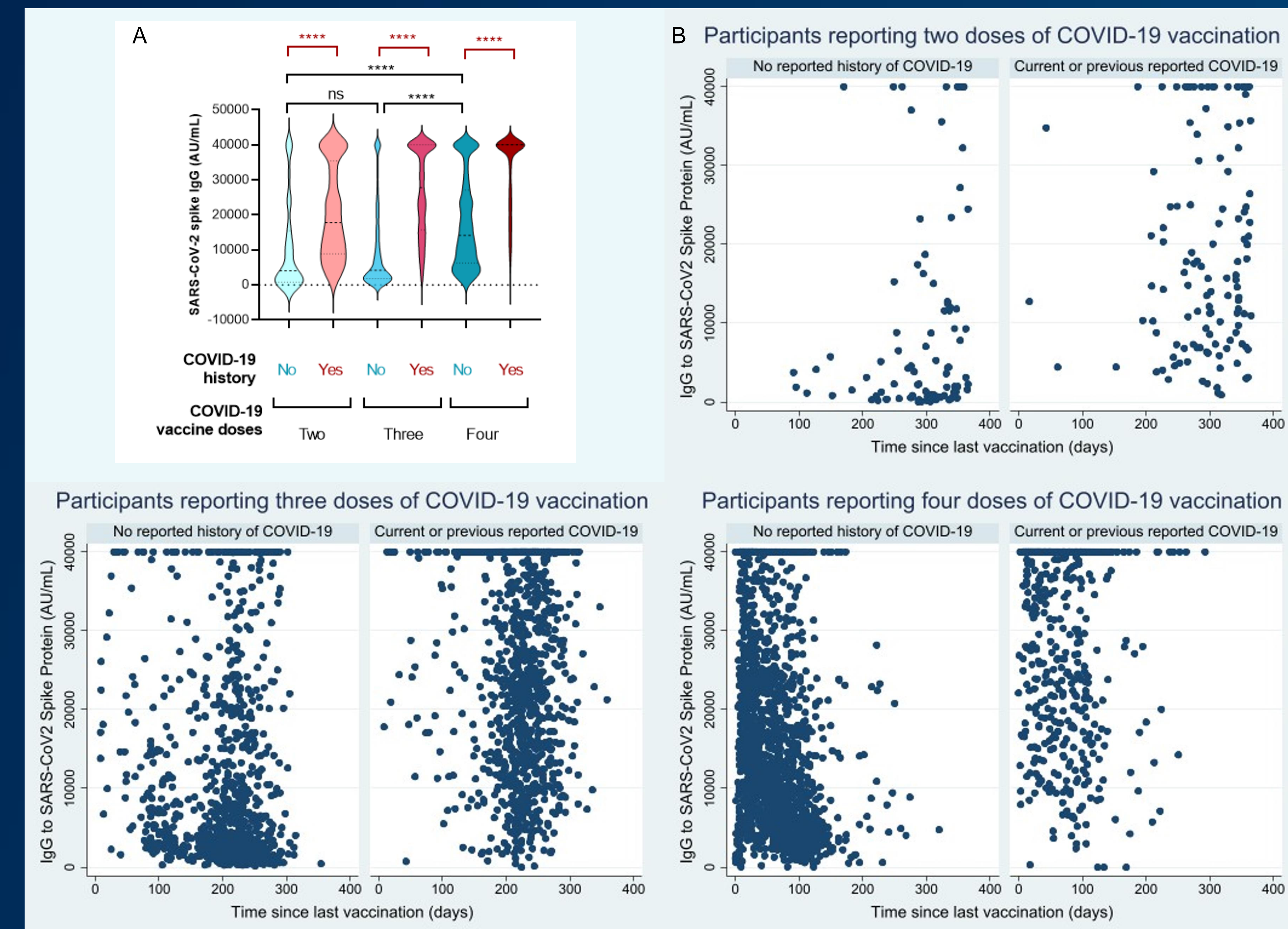


Figure 2. IgG to SARS-CoV-2 spike protein by vaccination status and reported COVID-19 history

Results:

Between April – September 2022, 7,399 people consented; 68.2% were female, the mean age was 53.15 (SD 14.55) years, and 86% of Queensland postcodes were represented (Figure 1, Table 1). Three or more doses of COVID-19 vaccination were reported by 92.9% of participants; 24 (0.33%) participants received only one dose, and nine (0.12%) were unvaccinated. A SARS-CoV-2 positive test (current or previous) was reported by 3,211 (45.2%) participants, and blood samples were provided by 4,966 (67.1%). Considering only participants who reported no history of COVID-19, there was an increase in SARS-CoV-2 spike IgG concentrations between those who had four doses of a COVID-19 vaccine and compared those who had either two or three doses (Figure 2A). Spike IgG concentrations were higher for those with current or previous natural SARS-CoV-2 infection than participants with no reported COVID-19 history. An apparent decline in spike IgG concentrations with time since last dose in those who had three or four COVID-19 vaccine doses warrants analysis (Figure 2B).

Factors such as age, gender, general health, comorbidities and genomics, as well as other factors such as time since the border opened, time since last vaccine dose, and exposure to SARS-CoV-2 variants of concern, that may be associated with COVID-19 vaccine response, safety and protection from SARS-CoV-2, are being further examined.

Conclusion:

The concentrations of SARS-CoV-2 IgG post COVID-19 vaccination, in people with and without a history of COVID-19, are likely to be influenced by multiple complex interacting factors. Dynamic linkage with key health service datasets will facilitate ongoing assessment of short to long term health impacts, including long COVID for participants in the QoVAX Statewide study.

Affiliations:

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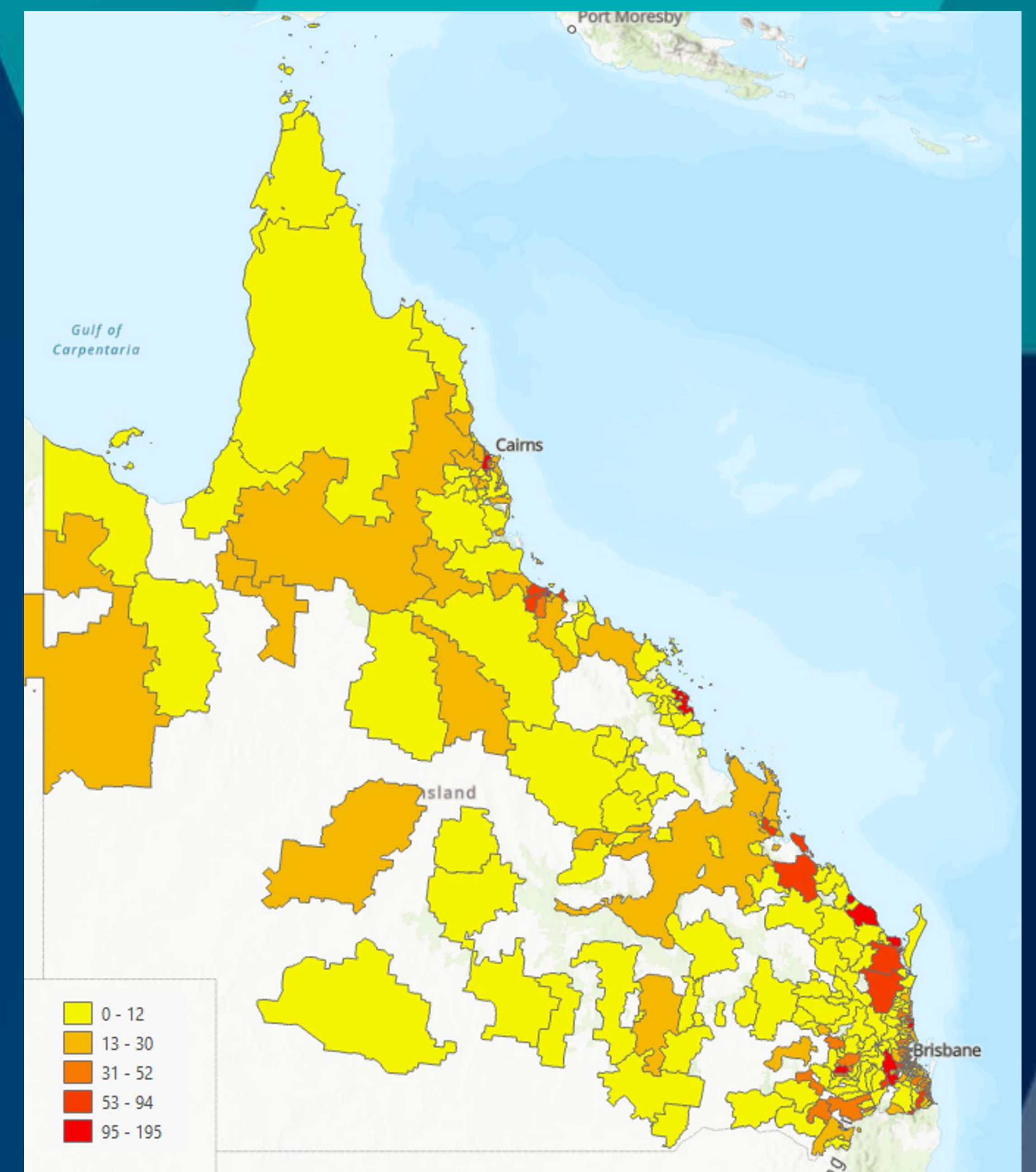


Figure 1. Distribution of QoVAX Statewide participants across Queensland, by postcode

Table 1. Characteristics of QoVAX participants

Characteristic	All participants		Gave sample	
	No.	%	No.	%
Overall (n, %)	7,399		4,966	
Age				
Mean (SD)	53.15 (14.55)		56.15 (13.73)	
Median	54.25		57.78	
BMI				
Mean (SD)	27.95 (6.13)		27.88 (6.01)	
Median	26.8		26.8	
Biological sex (n, %)				
Female	4,907	68.36%	3,349	67.49%
Male	2,263	31.53%	1,610	32.45%
X (inc non-binary)	3	0.04%	-	-
Prefer not to say	5	0.07%	3	0.06%
COVID-19 Vaccinations (n, %)				
None	9	0.12%	6	0.12%
1 dose	24	0.33%	5	0.10%
2 doses	484	6.66%	213	4.29%
3 doses	3,513	48.38%	2,183	43.99%
4 doses	3,232	44.51%	2,555	51.49%
COVID-19 Infection				
None	3,885	54.75%	2,881	58.06%
Previously positive	2,939	41.42%	1,896	38.21%
Currently positive	272	3.83%	185	3.73%
Chronic Health Condition (n, %)				
Yes	2,908	41.32%	2,150	43.33%
No	4,065	57.77%	2,772	55.86%
Prefer not to say	64	0.91%	40	0.81%
Immunocompromise				
Autoimmunity	266	3.60%	187	3.77%
Chronic inflammation	311	4.20%	246	4.96%
Immunosuppressed	81	1.09%	64	1.29%
Immunodeficiency	24	0.32%	17	0.34%
Allergic disease	801	10.83%	561	11.30%
Immunosuppression medication	210	3.17%	167	3.56%



Queensland Government

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<https://www.health.qld.gov.au/research-reports/research-projects/qovax-set-covid-19-vaccine-research-program>