

Supplementary materials

These supplementary materials have been provided by the authors to give readers additional information about their work

Supplement to: Serious Underlying Medical Conditions and COVID-19 Vaccine Hesitancy: A Large Cross-sectional Analysis From Australia.

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List of CANVACCS, DIABVACCS, and MSVACCS investigators

Study Site, Australian State	Investigator(s)
Monash Health, Victoria	
CANVACCS	Veronica Lopez Aedo
	Elizabeth Ahern
	Muhammad Alamgeer
	Nathan Bain
	Amy Body
	Peter Briggs
	Daphne Day
	Sophia Frentzas
	Lisa Grech
	Marion Harris
	Gwo-Yaw Ho
	Caroline Lum
	Vi Luong
	Amelia McCartney
	Cameron McLaren
	Mike Nguyen
	Stephen Opat
	David Pook
	Eva Segelov
	Andrew Strickland
	Avraham Travers
	Kate Webber
	Michelle White
	Walid Zwieky
DIABVACCS	Barbora de Courten
	Jennifer Wong
MSVACCS	Michelle Allan
	Ernest Butler
Bendigo Health, Victoria	
CANVACCS	Sam Harris
DIABVACCS	Frank Gao
	Amy Harding
	Mark Savage
Latrobe Regional Hospital, Victoria	
CANVACCS	Hieu Chau
Sunshine Coast Hospital and Health Service, Queensland	
CANVACCS	Bryan Chan
DIABVACCS	Brett Sillars
MSVACCS	Joshua Barton
	Antony Winkel
Icon Cancer Centre Hobart, Tasmania	
CANVACCS	Louise Nott
Central Coast Haematology, New South Wales	
CANVACCS	Richard Blennerhassett
	Cecily Forsyth
	Jacqueline Jagger
St Vincent's Hospital Sydney, New South Wales	
CANVACCS	Nada Hamad
Campbelltown Hospital, New South Wales	
CANVACCS	Annette Tognela
Dr David Hoffman, New South Wales	
DIABVACCS	David Hoffman
Border Medical Oncology, New South Wales	
CANVACCS	Craig Underhill

Abbreviations: CANVACCS, CANcer patients' perspectives on coronavirus VACCination Survey; DIABVACCS, DIABetes patients' perspectives on coronavirus VACCination Survey; MSVACCS, Multiple Sclerosis patients' perspectives on coronavirus VACCination Survey.

Table S1. Chronic disease COVID-19 Vaccine Survey Items.

Screening items	
1. Are you 18 years or older?	<input type="radio"/> Yes <input type="radio"/> No (Terminate if No)
2. Have you got [chronic disease]?	<input type="radio"/> Yes <input type="radio"/> No (Terminate if No)
3. Are you a [participating site] patient?	<input type="radio"/> Yes <input type="radio"/> No (Terminate if No)
Vaccination status	
4. Have you already received a COVID-19 vaccine?	<input type="radio"/> Yes, 1 dose only <input type="radio"/> Yes, 2 doses <input type="radio"/> No
Oxford COVID-19 Vaccine Hesitancy Scale	
Instructions: We would like to know your feelings and thoughts about the COVID-19 vaccine. Note: If you have already been vaccinated against COVID-19, please complete these questions in relation to a future COVID-19 vaccine dose/booster.	
5. Would you take a COVID-19 vaccine if offered?	<input type="radio"/> Definitely/have taken <input type="radio"/> Probably <input type="radio"/> I may or may not <input type="radio"/> Probably not <input type="radio"/> Definitely not <input type="radio"/> Don't know
6. When a COVID-19 vaccine is available:	<input type="radio"/> I will want to get it as soon as possible <input type="radio"/> I will take it when offered <input type="radio"/> I'm not sure what I will do <input type="radio"/> I will put off (delay) getting it <input type="radio"/> I will refuse to get it <input type="radio"/> Don't know
7. I would describe my attitude towards receiving a COVID-19 vaccine as:	<input type="radio"/> Very keen <input type="radio"/> Pretty positive <input type="radio"/> Neutral <input type="radio"/> Quite uneasy <input type="radio"/> Against it <input type="radio"/> Don't know
8. If a COVID-19 vaccine was available in my local area, I would:	<input type="radio"/> Get it as soon as possible <input type="radio"/> Get it when I have time <input type="radio"/> Delay getting it <input type="radio"/> Avoid getting it for as long as possible <input type="radio"/> Never get it <input type="radio"/> Don't know
9. If my family or friends were thinking of getting a COVID-19 vaccination, I would:	<input type="radio"/> Strongly encourage them <input type="radio"/> Encourage them <input type="radio"/> Not say anything to them about it <input type="radio"/> Ask them to delay getting the vaccination <input type="radio"/> Suggest that they do not get the vaccination <input type="radio"/> Don't know
10. I would describe myself as:	<input type="radio"/> Eager to get a COVID-19 vaccine <input type="radio"/> Willing to get the COVID-19 vaccine <input type="radio"/> Not bothered about getting the COVID-19 vaccine <input type="radio"/> Unwilling to get the COVID-19 vaccine <input type="radio"/> Anti-vaccination for COVID-19 <input type="radio"/> Don't know
11. Taking a COVID-19 vaccination is:	<input type="radio"/> Really important <input type="radio"/> Important <input type="radio"/> Neither important nor unimportant <input type="radio"/> Unimportant <input type="radio"/> Really unimportant <input type="radio"/> Don't know
Oxford COVID-19 Vaccine Confidence and Complacency Scale	
12. Do you think you will be infected with COVID-19 over the next 12 months?	<input type="radio"/> Definitely <input type="radio"/> Probably <input type="radio"/> Possibly <input type="radio"/> Probably not

	<input type="radio"/> Definitely not <input type="radio"/> Don't know
13. I think the COVID-19 vaccine is likely to:	<input type="radio"/> Work for almost everyone <input type="radio"/> Work for most people <input type="radio"/> I am unsure how many people it will work for <input type="radio"/> Not work for most people <input type="radio"/> Not work for anyone <input type="radio"/> Don't know
14. I think the COVID-19 vaccine is likely to:	<input type="radio"/> Definitely work for me <input type="radio"/> Probably work for me <input type="radio"/> May or may not work for me <input type="radio"/> Probably not work for me <input type="radio"/> Definitely not work for me <input type="radio"/> Don't know
15. I think if I get the COVID-19 vaccine it will be:	<input type="radio"/> Really helpful for the community around me <input type="radio"/> Helpful for the community around me <input type="radio"/> Neither helpful nor unhelpful for the community around me <input type="radio"/> Unhelpful for the community around me <input type="radio"/> Really unhelpful for the community around me <input type="radio"/> Don't know
16. I think if individuals like me get the COVID-19 vaccine it will:	<input type="radio"/> Save a large number of lives <input type="radio"/> Save some lives <input type="radio"/> Have no impact <input type="radio"/> Lead to more deaths <input type="radio"/> Lead to a large number of deaths <input type="radio"/> Don't know
17. I think the speed of developing and testing the vaccine means it will be:	<input type="radio"/> Really good <input type="radio"/> Good <input type="radio"/> Will not affect how good or bad it is <input type="radio"/> Bad <input type="radio"/> Really bad <input type="radio"/> Don't know
18. I think the speed of developing and testing the vaccine means it will be:	<input type="radio"/> Really safe <input type="radio"/> Safe <input type="radio"/> It will not affect how safe it is <input type="radio"/> Unsafe <input type="radio"/> Really unsafe <input type="radio"/> Don't know
19. I think if many people do not get the vaccine this:	<input type="radio"/> Will be dangerous <input type="radio"/> May be dangerous <input type="radio"/> Will have no consequences at all <input type="radio"/> May be good <input type="radio"/> Will be good <input type="radio"/> Don't know
20. I expect that receiving the vaccine will be:	<input type="radio"/> Hardly noticeable <input type="radio"/> A little unpleasant <input type="radio"/> Moderately unpleasant <input type="radio"/> Painful <input type="radio"/> Extremely painful <input type="radio"/> Don't know
21. I think the side-effects for people of getting the COVID-19 vaccine will be:	<input type="radio"/> None <input type="radio"/> Mild <input type="radio"/> Moderate <input type="radio"/> Significant <input type="radio"/> Life-threatening <input type="radio"/> Don't know
22. I think the COVID-19 vaccine will:	<input type="radio"/> Greatly strengthen my immune system <input type="radio"/> Strengthen my immune system <input type="radio"/> It will neither strengthen nor weaken my immune system <input type="radio"/> Weaken my immune system <input type="radio"/> Greatly weaken my immune system <input type="radio"/> Don't know
23. I think taking the COVID-19 vaccine:	<input type="radio"/> Will give me complete freedom to get on with life just as before <input type="radio"/> Will give me greater freedom

	<input type="radio"/> Will have no effect on my freedom <input type="radio"/> Will restrict my freedom <input type="radio"/> Will completely restrict my freedom to get on with life <input type="radio"/> Don't know
24. I think getting the vaccine is a sign of:	<input type="radio"/> Great personal strength <input type="radio"/> Personal strength <input type="radio"/> Not a sign of personal strength or weakness <input type="radio"/> Personal weakness <input type="radio"/> Great personal weakness <input type="radio"/> Don't know
25. Taking a new COVID-19 vaccine will make me feel like a guinea pig:	<input type="radio"/> Do not agree <input type="radio"/> Agree a little <input type="radio"/> Agree moderately <input type="radio"/> Agree a lot <input type="radio"/> Completely agree <input type="radio"/> Don't know
Disease Influenced Visual Acceptance Scale-Six Instructions: We would like to know about how your [chronic disease] may be related to your feelings and thoughts about the COVID-19 vaccine. For each of the following statements, please tap/click the one choice that best represents how strongly you agree or disagree with it. There are 6 choices to choose from for each statement.	
26. My history of [chronic disease] makes me more worried about being infected with COVID-19:	<input type="radio"/> Strongly agree <input type="radio"/> Somewhat agree <input type="radio"/> Neither disagree nor agree <input type="radio"/> Somewhat disagree <input type="radio"/> Strongly disagree <input type="radio"/> Don't know
27. My history of [chronic disease] means having the vaccine is more important to me:	<input type="radio"/> Strongly agree <input type="radio"/> Somewhat agree <input type="radio"/> Neither disagree nor agree <input type="radio"/> Somewhat disagree <input type="radio"/> Strongly disagree <input type="radio"/> Don't know
28. My doctor's recommendation regarding the vaccine is important to me:	<input type="radio"/> Strongly agree <input type="radio"/> Somewhat agree <input type="radio"/> Neither disagree nor agree <input type="radio"/> Somewhat disagree <input type="radio"/> Strongly disagree <input type="radio"/> Don't know
29. My history of [chronic disease] makes me worried about how well the vaccine will work for me:	<input type="radio"/> Strongly disagree <input type="radio"/> Somewhat disagree <input type="radio"/> Neither disagree nor agree <input type="radio"/> Somewhat agree <input type="radio"/> Strongly agree <input type="radio"/> Don't know
30. My history of [chronic disease] makes me worried about how the vaccine will affect me:	<input type="radio"/> Strongly disagree <input type="radio"/> Somewhat disagree <input type="radio"/> Neither disagree nor agree <input type="radio"/> Somewhat agree <input type="radio"/> Strongly agree <input type="radio"/> Don't know
31. I am worried about how the vaccine will affect my [chronic disease] treatment:	<input type="radio"/> Strongly disagree <input type="radio"/> Somewhat disagree <input type="radio"/> Neither disagree nor agree <input type="radio"/> Somewhat agree <input type="radio"/> Strongly agree <input type="radio"/> Don't know
Demographics	
32. What is your gender?	<input type="radio"/> Male <input type="radio"/> Female <input type="radio"/> Non-binary / third gender <input type="radio"/> Prefer not to say
33. What is your age?	_____

34. What is your highest educational level (completed)?	<input type="radio"/> No formal education <input type="radio"/> Primary education <input type="radio"/> Secondary education <input type="radio"/> Vocational/trade qualification <input type="radio"/> University education or higher degree <input type="radio"/> Other (please specify): _____
35. What is your annual household income (including everyone who lives in your home)?	<input type="radio"/> Less than \$50,000 <input type="radio"/> \$50,001 to \$100,000 <input type="radio"/> \$100,001 to \$150,000 <input type="radio"/> More than \$150,000 <input type="radio"/> Prefer not to say
36. Do you identify as Aboriginal and/or Torres Strait Islander?	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Prefer not to say
37. Is English your first language?	<input type="radio"/> Yes <input type="radio"/> No
38. Please include any comments about your feelings and thoughts about your [chronic disease] and COVID-19 vaccination that you would like to share. If you have no comments to include, please type 'Nil'.	[Text entry]: _____
Disease-specific clinical questions (Cancer only)	
39. What type of cancer do you have? (i.e. where your cancer started and not where it has spread to).	<input type="radio"/> Breast <input type="radio"/> Lung (including mesothelioma) <input type="radio"/> Genitourinary (i.e. prostate, kidney, testicular or bladder) <input type="radio"/> Skin (including melanoma) <input type="radio"/> Gastrointestinal (i.e. stomach, oesophagus, bile duct, gallbladder, pancreas, colon, rectum, or anus) <input type="radio"/> Gynaecological (i.e. ovarian, cervical, uterine or vulvar/vaginal) <input type="radio"/> Head and neck (i.e. mouth, throat, sinus or nose) <input type="radio"/> Brain <input type="radio"/> Blood (i.e. leukemia, myeloma and lymphoma) <input type="radio"/> Other (please specify): _____
40. When was your cancer diagnosed?	<input type="radio"/> Less than 6 months ago <input type="radio"/> 6 to 24 months ago <input type="radio"/> 2 to 5 years ago <input type="radio"/> More than 5 years ago
41. As you understand it, is your cancer in just the one area where it started (localised) or has it spread to other places in the body (metastatic)?	<input type="radio"/> Localised <input type="radio"/> Metastatic <input type="radio"/> Don't know <input type="radio"/> Other (please type any comments): _____
42. Are you currently on cancer treatment?	<input type="radio"/> Yes <input type="radio"/> No
43. How long ago was your last treatment? (e.g. chemotherapy, immunotherapy, hormonal treatment, targeted therapy, radiotherapy and/or clinical trial).	<input type="radio"/> Currently on treatment <input type="radio"/> Less than 1 year ago <input type="radio"/> 1 to 5 years ago <input type="radio"/> More than 5 years ago
Disease-specific clinical questions (Diabetes only)	
39. What type of diabetes do you have?	<input type="radio"/> Type 1 <input type="radio"/> Type 2 <input type="radio"/> Other (please specify): _____ <input type="radio"/> Don't know
40. How long have you had diabetes?	<input type="radio"/> Less than 1 year <input type="radio"/> 1 to 5 years <input type="radio"/> 5.1 to 10 years <input type="radio"/> More than 10 years
41. My most recent HbA1c (within the past year) was:	<input type="radio"/> Less than 7% <input type="radio"/> 7% to 8.5% <input type="radio"/> 8.6% to 10% <input type="radio"/> More than 10% <input type="radio"/> Don't know

42. My current treatment for my diabetes is/are (select all that apply):	<input type="checkbox"/> Insulin <input type="checkbox"/> Tablets <input type="checkbox"/> Diet only <input type="checkbox"/> Injectables (not insulin) <input type="checkbox"/> Other: _____
43. In the past month, would you say that your management of diabetes was:	<input type="checkbox"/> Excellent <input type="checkbox"/> Very good <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor
44. In the last four weeks, how much did your diabetes affect your daily activities?	<input type="checkbox"/> All the time <input type="checkbox"/> Most of the time <input type="checkbox"/> Some of the time <input type="checkbox"/> Not very often <input type="checkbox"/> Not at all
Disease-specific clinical questions (Multiple Sclerosis only)	
39. What type of MS do you have?	<input type="checkbox"/> Relapsing-remitting MS (RRMS) <input type="checkbox"/> Primary progressive MS (PPMS) <input type="checkbox"/> Secondary progressive MS (SPMS) <input type="checkbox"/> Other (please specify): _____ <input type="checkbox"/> Don't know
40. How long have you had MS?	<input type="checkbox"/> Less than 1 year <input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 5.1 to 10 years <input type="checkbox"/> More than 10 years
41. My current treatment for my MS is/are (select all that apply):	<input type="checkbox"/> Tablets <input type="checkbox"/> Injectables <input type="checkbox"/> Intravenous <input type="checkbox"/> No specific treatment <input type="checkbox"/> Other: _____
42. Over the past 6 months, is your MS well controlled?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know
43. People often have difficulty taking their medications for one reason or another. How many times have you missed taking your disease modifying therapies (DMT) in the past month?	<input type="checkbox"/> All of the time <input type="checkbox"/> Most of the time <input type="checkbox"/> Some of the time <input type="checkbox"/> Occasionally <input type="checkbox"/> Never
44. In the last four weeks, how much did your MS affect your daily activities?	<input type="checkbox"/> All the time <input type="checkbox"/> Most of the time <input type="checkbox"/> Some of the time <input type="checkbox"/> Not very often <input type="checkbox"/> Not at all

Table S2. Participant characteristics, by vaccination status and disease.

	All diseases n, (%)				Cancer n, (%)				Diabetes n, (%)				MS n, (%)			
Characteristics	Vaccinated (n = 3813)	Unvaccinated (n = 868)	p ^a	φ ^b	Vaccinated (n = 2884)	Unvaccinated (n = 674)	p ^a	φ ^b	Vaccinated (n = 696)	Unvaccinated (n=146)	p ^a	φ ^b	Vaccinated (n = 233)	Unvaccinated (n = 48)	p ^a	φ ^b
Gender			0.002	0.05			0.004	0.05			0.37	0.03			0.35	0.07
Male	1758 (83.5)	348 (16.5)			1318 (83.2)	266 (16.8)			383 (83.8)	74 (16.2)			57 (87.7)	8 (12.3)		
Female	2034 (79.8)	514 (20.2)			1553 (79.4)	404 (20.6)			307 (81.2)	71 (18.8)			174 (81.7)	39 (18.3)		
Non-Binary/Other	21 (77.8)	6 (22.2)			13 (76.5)	4 (23.5)			6 (85.7)	1 (14.3)			2 (66.7)	1 (33.3)		
Age			<0.001 ^c	0.03 ^c			<0.001 ^c	0.04 ^c			<0.001 ^c	0.03 ^c			<0.001 ^c	0.06 ^c
Mean (SD)	61.8 (13.0)	55.6 (13.5)			64.1 (11.7)	57.9 (12.3)			56.3 (14.3)	49.8 (14.6)			49.1 (12.6)	40.6 (11.7)		
18 – 29	79 (66.4)	40 (33.6)			13 (52.0)	12 (48.0)			47 (72.3)	18 (27.7)			19 (65.5)	10 (34.5)		
30 – 49	576 (72.6)	217 (27.4)			341 (70.3)	144 (29.7)			141 (75.8)	45 (24.2)			94 (77.0)	28 (23.0)		
50 – 69	1953 (80.1)	486 (19.9)			1458 (78.2)	406 (21.8)			384 (84.4)	71 (15.6)			111 (92.5)	9 (7.5)		
≥70	1202 (90.6)	125 (9.4)			1069 (90.5)	112 (9.5)			124 (91.2)	12 (8.8)			9 (90.0)	1 (10.0)		
Highest level of education			<0.001	0.07 ^d			<0.001	0.07 ^d			0.37	0.06 ^d			0.23	0.12 ^d
No formal/ Primary	96 (73.3)	35 (26.7)			66 (73.3)	24 (26.7)			27 (73.0)	10 (27.0)			3 (75.0)	1 (25.0)		
Secondary	1272 (81.0)	298 (19.0)			931 (79.9)	234 (20.1)			268 (84.0)	51 (16.0)			73 (84.9)	13 (15.1)		
Vocational/Trade	951 (79.1)	251 (20.9)			705 (78.7)	191 (21.3)			189 (81.8)	42 (18.2)			57 (76.0)	18 (24.0)		
University	1487 (84.3)	277 (15.7)			1175 (84.2)	221 (15.8)			212 (83.8)	41 (16.2)			100 (87.0)	15 (13.0)		
Other	7 (50.0)	7 (50.0)			7 (63.6)	4 (36.4)			0 (0.0)	2 (100.0)			0 (0.0)	1 (100.0)		
Annual household income (AUD)			<0.001	0.08 ^d			<0.001	0.09 ^d			0.04	0.11 ^d			0.58	0.10 ^d
<50,000	1260 (81.4)	288 (18.6)			915 (79.4)	238 (20.6)			283 (87.6)	40 (12.4)			62 (86.1)	10 (13.9)		
50,000 - 100,000	946 (82.5)	201 (17.5)			712 (83.4)	142 (16.6)			175 (80.5)	42 (19.4)			59 (77.6)	17 (22.4)		
100,000 - 150,000	466 (78.3)	129 (21.7)			363 (78.6)	99 (21.4)			70 (76.1)	22 (23.9)			33 (80.5)	8 (19.5)		
>150,000	489 (87.9)	67 (12.1)			412 (88.8)	52 (11.2)			42 (80.8)	10 (19.2)			35 (87.5)	5 (12.5)		
Prefer not to say	652 (78.1)	183 (21.9)			482 (77.1)	143 (22.9)			126 (79.7)	32 (20.3)			44 (84.6)	8 (15.4)		
English as primary language			<0.001	0.07			<0.001	0.11			0.24	-0.04			0.43	0.06
Yes	3437 (82.4)	735 (17.6)			2668 (82.4)	570 (17.6)			554 (81.8)	123 (18.2)			215 (83.7)	42 (16.3)		
No	376 (74.0)	132 (26.0)			216 (67.7)	103 (32.3)			142 (86.1)	23 (13.9)			18 (75.0)	6 (25.0)		
Location			<0.001	0.06			<0.001	0.08			0.60	-0.02			0.14	0.10
Metropolitan location	2686 (83.1)	548 (16.9)			1987 (83.1)	403 (16.9)			497 (82.1)	108 (17.9)			202 (84.5)	37 (15.5)		
Regional/Rural location	1127 (77.9)	320 (22.1)			897 (76.8)	271 (23.2)			199 (84.0)	38 (16.0)			31 (73.8)	11 (26.2)		

Abbreviations: AUD, Australian Dollars.

^a Chi-square p-value for differences between vaccination status. Chi-square analyses for gender did not include non-binary/other categories and for highest educational level, it did not include the other category.

^b Phi coefficient.

^c Independent samples t-test p-value and eta squared reported, as they were used to measure differences between vaccination status and effect size for age as a continuous variable, respectively.

^d Cramer's V reported.

Significant differences between vaccinated and not vaccinated for patients who identify as Aboriginal and/or Torres Strait Islander were detected only for: 1) all diseases (p<0.001) and 2) cancer (p=0.003).

Figure S1. Response frequencies for each Disease Influenced Vaccine Acceptance Scale-Six item, by chronic disease type and vaccination status (a-f). 'Don't know' responses have been excluded.

