

BMJ Open Health workers' Perceptions and Responses in implementing COVID-19 Immunisation StratEgy in South Western Sydney (PRECISE): an observational study

Josephine Sau Fan Chow ¹, Annamarie D'Souza,¹ Brian Lane,¹ Joseph Descallar,² Megan Ford,² Sonia Marshall,¹ Susan Pennings¹

To cite: Chow JSF, D'Souza A, Lane B, *et al.* Health workers' Perceptions and REsponses in implementing COVID-19 Immunisation StratEgy in South Western Sydney (PRECISE): an observational study. *BMJ Open* 2022;**12**:e055034. doi:10.1136/bmjopen-2021-055034

► Prepublication history for this paper is available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2021-055034>).

Received 03 July 2021
Accepted 25 March 2022



© Author(s) (or their employer(s)) 2022. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

¹Clinical Innovation & Business Unit, South Western Sydney Local Health District, Liverpool, New South Wales, Australia

²Clinical Trial Support Unit, Ingham Institute, Liverpool, New South Wales, Australia

Correspondence to

Josephine Sau Fan Chow;
josephine.chow@health.nsw.gov.au

ABSTRACT

Objectives To understand the views and motivations of healthcare workers at a vaccination hub who received a COVID-19 vaccination in March–May 2021.

Study design This is an observational study via an anonymous electronic survey of seven questions focus on where survey recipients received information about the vaccine roll-out, their motivations for receiving the vaccine and their level of comfort in receiving the vaccine.

Setting The Liverpool Vaccination Hub is located in South Western Sydney.

Participants Participants were healthcare workers who received the first dose of a COVID-19 vaccine in the Australian Government's Phase 1a and 1b priority categories. The majority of survey respondents (70%) were female (median aged between 35 and 44 years). The majority of survey respondents were clinical workers, such as nurse, paramedics and doctors.

Outcome measures χ^2 analysis was used for analysis of survey responses in univariate analysis. Logistic regression was used to analyse survey responses, adjusting for week, type of health worker and age.

Results 4746 healthcare workers responded to the survey after receiving their first vaccine dose, a response rate of 23%. Over 90% of respondents said that COVID-19 vaccination information from their organisation was easily available. Most of them reported that they were comfortable receiving a COVID-19 vaccine. The majority of respondents were motivated to receive the vaccine due to concern about contracting COVID-19 themselves (75%), or concerns about transmitting it to other people such as patients (52%), family members (65%) or other community members (54%). Younger respondents were more likely to have preferred more information on vaccine safety ($p<0.0001$) and the effectiveness of the vaccine ($p<0.0001$).

Conclusion The majority of healthcare workers who received a COVID-19 vaccine reported that it was easy to find useful information about the vaccination roll-out and they had a positive experience being vaccinated.

Strengths and limitations of this study

- This is one of the first studies investigating healthcare workers' experiences, motivations and information sources about receiving a COVID-19 vaccination in Australia.
- Most healthcare workers reported that they were comfortable receiving a COVID-19 vaccine, and received a vaccine in order to protect themselves and others, rather than due to externally imposed incentives or mandates.
- Methodological strengths include a large sample size of over 4000 healthcare workers in a diverse metropolitan area.
- A methodological limitation is that this study only surveys healthcare workers who had just received a COVID-19 vaccine. It therefore does not provide information about healthcare workers who are strongly hesitant or suspicious of vaccines.

BACKGROUND

As of December 2021, it is estimated that over 5 million people worldwide have died from the viral respiratory disease SARS-CoV-2 (COVID-19). In Australia, nearly 2000 people have died from COVID-19. While Australia has had relative success in containing the COVID-19 pandemic so far, this containment is threatened by the existence of new and more easily transmissible variants.¹ It is likely that a long-term strategy for ending the pandemic will depend on a majority of people choosing to be vaccinated against COVID-19. Three COVID-19 vaccines are currently approved for use and available in Australia: a vaccine developed by Pfizer and BioNTech, a vaccine developed by Moderna, as well as a vaccine from Oxford University and AstraZeneca.² Australia began its COVID-19 vaccination roll-out in

February 2021. Between February and May 2021, the groups targeted for vaccination were healthcare, aged care and emergency services workers, adults aged over 70 and those with medical conditions.

There have been considerable levels of hesitation about receiving a COVID-19 vaccine in Australia. The results of a representative online survey in 2020 suggested that only 59% of Australian adults would definitely receive a COVID-19 vaccine when it became available to them.³ It appears that concern about potential vaccine side effects has played a significant role in vaccine hesitancy. Of the Australian adults who were not already vaccinated in April 2021, the overwhelming majority (80%) reported at least some concerns about side effects. Of the Australians who expressed hesitancy about receiving a COVID-19 vaccine, over half cited the widely reported link between the Oxford/AstraZeneca vaccine and blood clots as a reason for their concern.⁴

The experiences and perceptions of healthcare workers about COVID-19 vaccinations may have an important influence on vaccination rates in the community. Survey data from the USA suggest that the most trusted source of information about a COVID-19 vaccine in the community is a person's own doctor or healthcare provider.⁵ The vast majority of respondents in a US survey (85%) reported that they had 'a great deal' or 'a fair amount' of trust in their healthcare provider to provide reliable information about a COVID-19 vaccine, much higher than their trust in state government officials (58%) or pharmaceutical companies (53%) to provide this information.⁶ Healthcare workers may have an influential role on community attitudes towards COVID-19 vaccination. For example, if healthcare workers have inaccurate or limited information, negative experiences or concerns about COVID-19 vaccinations, they may convey these to their patients and other community members, either directly or indirectly. It is therefore important to identify where healthcare workers receive information about COVID-19 vaccines and understand their experiences and perceptions about receiving the vaccine. Vaccine misinformation or concerns among healthcare workers may influence overall vaccine uptake rates.

While studies have been conducted in the USA⁶ and in Turkey,⁷ there is little information about Australian healthcare workers' perceptions and motivations in regard to COVID-19 vaccines. Data from other countries may not always straightforwardly generalise to an Australian context due to cultural, social and political differences, as well as differences in the experience of the pandemic internationally.

METHODS

Study aim

This study investigated healthcare workers' views, experiences and information sources about COVID-19 vaccines in South Western Sydney.

Study design

This was an observational study via survey. Participants were recruited through the Liverpool Vaccination Hub, one of the three initial vaccination hubs in New South Wales, Australia. The Liverpool Vaccination Hub is located at Liverpool Hospital in South Western Sydney. The Hub administered its first COVID-19 vaccinations on 22 February 2021.

Participants completed an anonymous online survey consisting of seven short questions. It consisted of a mixture of opened and closed end questions focused on where survey recipients received information about the vaccine roll-out, their motivations for receiving the vaccine and their level of comfort in receiving the vaccine. The open-ended feedback captured any experiences or impact which do not fit into the predefined domains. Participants were also asked a number of demographic questions about their age range, gender, ethnic background and occupation. No individually identifiable information was collected.

The survey was developed by the investigators with information and domains identified from previous research studies relating to vaccine roll outs.

Participants

All study participants were healthcare workers and this study focused on their experiences and perceptions. All healthcare workers who received their first vaccine dose at the Liverpool Vaccine Hub between 23 March 2021 and 13 May 2021 were eligible and invited to participate in this study.

All participants in this study received the Pfizer/BioNTech COVID-19 vaccine. The Pfizer/BioNTech vaccine requires two doses, which were administered 3 weeks apart. All healthcare workers, as well as other staff affiliated with the South Western Sydney Local Health District (SWSLHD), were eligible to receive a vaccine dose during this timeframe. The Australian Government made COVID-19 vaccinations available in stages. Initially, during Phase 1a, only frontline healthcare workers, aged care workers and residents, and border and quarantine staff were eligible to receive the vaccine. During Phase 1b, eligibility was widened to include other healthcare workers, critical workers such as emergency services and police, adults aged over 70 and people with underlying medical conditions.⁸

Patient and public involvement

Patients or the public were not involved in the design, conduct, reporting or dissemination plans of this research. A number of healthcare worker representatives were involved in the development of the research question and the research methodology. No identifying details or contact information of participants were collected, which prevents the direct dissemination of results to study participants. Preliminary study results were presented to key healthcare workers, including nurses at the Liverpool Vaccination Hub. It is also anticipated that some of the

results of this study will be communicated to participants through emails to all SWSLHD staff.

Data collection

Healthcare workers were required to remain in the Vaccination Hub under observation for at least 15 min after receiving a vaccine dose, to monitor for possible adverse reactions. In this 15-minute period, nurses at the Liverpool Vaccination Hub explained the purpose of this study and invited healthcare workers to participate in the study.

If they agreed to participate, they were directed to a QR code to access the Participant Information Sheet and the survey via their personal mobile device. iPads were available on request for healthcare workers who were not able to scan the QR code on their personal device. The survey was constructed using the platform SurveyMonkey.

Analysis

Frequencies and percentages of responses and bar charts were used to display survey responses. χ^2 analysis was used for analysis of survey responses in univariate analysis. The responses to the questions 'Where did you get the information regarding the COVID-19 vaccine roll out?' and 'What additional information would you have preferred?', as listed in table 1, were analysed using multi-variable logistic regression models. As multiple response options could apply for each question, separate models were used for each response. Analysis was limited to the responses 'SWSLHD' and 'From my manager' for the first question (where information was obtained), whereas the response option 'I did not prefer to receive more information' from the second question (additional information) was omitted from analysis. The independent predictors of interest were age groups, week of survey (from 1 to 8), and occupational category as listed in table 2. $P < 0.05$ was considered statistically significant. SAS Enterprise guide V.8.2 was used for statistical analysis.

RESULTS

Between 23 March and 13 May 2021, 20 664 vaccine doses were administered at the Liverpool Vaccination Hub. A total of 5373 healthcare workers scanned the QR code on their phone or electronic device during this period. A total of 4746 healthcare workers (23% of all the healthcare workers who had received a vaccine dose) responded to the survey targeted to those who had received the first vaccine dose.

The number of vaccine doses declined over this period, from an average of 752 vaccinations per day in the first week of the survey, to an average of 372 vaccinations per day in the eighth week of the survey (table 3).

The majority of respondents (70%) were female. This is similar to the overall workforce demographics of SWSLHD, which is 72% female.⁹ The median respondent was aged between 35 and 44 years. The majority of respondents were clinical workers, such as nurse, paramedics and doctors (table 1).

Table 1 Demographic data of the respondents and survey responses

	Number	Percentage*
Age group (years)		
Under 25	640	14%
25–34	1196	25%
35–44	1108	24%
45–54	905	19%
55–64	695	15%
65 and over	158	3%
Gender		
Female	3287	70%
Male	1413	30%
Occupational category		
Allied health (eg, physiotherapists, psychologists)	370	8%
Clinical staff (eg, doctors, nurses, paramedics)	3422	73%
Corporate staff (eg, finance, information technology)	910	19%
Where did you get the information regarding the COVID-19 vaccine roll-out?†		
SWSLHD information (intranet, staff emails, posters)	2784	59%
Manager	1635	35%
Newspapers	155	3%
TV news	414	9%
Social media (eg, Facebook, Twitter, Instagram)	269	6%
Friend	135	3%
Coworker	487	10%
Information availability		
Easily available or very easily available	3879	91%
Available with some effort	330	8%
Not easily available	48	1%
Helpfulness of SWSLHD information in making a decision to receive the vaccine		
Helpful or very helpful	3525	83%
Neither helpful nor unhelpful	708	17%
Unhelpful	25	1%
Views about vaccination		
Getting vaccinated is my choice	1430	34%
Getting vaccinated is my responsibility	1095	26%
Both	1574	37%
Neither	44	1%
Don't know	50	1%
What additional information would you have preferred?‡		
When or where the vaccine was available	770	18%
How to register for the vaccine	650	16%

Continued

Table 1 Continued

	Number	Percentage*
Eligibility to receive vaccine at this time	445	11%
Vaccine safety	1168	28%
Vaccine effectiveness	1087	26%
Did not prefer more information	1621	39%
Vaccine motivations†		
I wanted to protect myself from COVID-19	3514	75%
I wanted to protect family members from COVID-19	3062	65%
I wanted to protect my patients from COVID-19	2453	52%
I wanted to protect other community members from COVID-19	2552	54%
I need to receive the vaccine in order to travel interstate/overseas in the future	1363	29%
I am required to receive the vaccine by my employer	665	14%
A friend or family member convinced me to receive the vaccine	196	4%
Vaccine experiences		
'Comfortable' or 'Very comfortable' receiving the first dose of the vaccine	3630	85%
Neither comfortable nor uncomfortable	468	11%
Uncomfortable	157	4%

*Percentages may add up to more than 100% due to rounding.

†Participants could select multiple responses. Totals do not add up to 100%.

SWSLHD, South Western Sydney Local Health District.

Information sources

The majority (59%) of respondents reported that they received information about the vaccine roll-out from SWSLHD, from sources such as staff emails, the staff intranet and posters (table 1). Just over a third of respondents (35%) indicated that they received information about the vaccine roll-out from their manager. Relatively few received information from sources outside the workplace, such as social media (6%), newspapers (3%) or TV news (9%).

Older respondents were somewhat less likely to say that they had received information about the vaccination roll-out from their manager ($p<0.0001$) (table 4). For example, 42% of those aged 25–34 received information about the vaccination roll-out from their manager, compared with 30% of those aged over 65.

The proportion of respondents who received information from their manager also appeared to decline steadily throughout the survey period ($p<0.0001$). In the first week of the survey, 42% of respondents received information about the vaccine roll-out from their manager, compared with 20% in the seventh week.

The information sources reported by respondents also varied by occupational category ($p<0.0001$). Of allied

health workers (such as physiotherapists and psychologists), just under half (45%) reported that they received information from their manager. This is higher than the proportion of clinical workers (such as doctors, nurses and paramedics) and corporate workers (such as finance and information technology staff) who received information from their manager. The proportion of respondents who received information from SWSLHD did not appear to differ between these groups ($p=0.5734$).

The vast majority (91%) of respondents said that information about the COVID-19 vaccination roll-out was 'easily available' or 'very easily available'. A small minority (8%) said that this information was 'available with some effort' and 1% said that information was 'not easily available'.

Some respondents indicated that they would have preferred to receive more information before they received their first vaccine dose. A minority of respondents would have preferred to receive more information about the logistics of the vaccine roll-out, such as where and when the vaccine was available (18%), how to register to receive the vaccine (16%) and whether they were eligible to receive the vaccine at this stage of the roll-out (11%). Even people who had voluntarily received the vaccine appear to have had unaddressed concerns, with 28% of respondents saying that they would have preferred to receive more information about vaccine safety and 26% saying that they would have preferred to receive more information about vaccine effectiveness. Younger respondents were more likely to have preferred more information on availability ($p<0.0001$), how to register ($p<0.0001$), whether they were eligible to receive the vaccine ($p<0.0001$), vaccine safety ($p<0.0001$) and the effectiveness of the vaccine ($p<0.0001$) (table 5). Thirty-nine per cent of respondents reported that they did not prefer to receive more information about the vaccine roll-out.

Vaccine motivations

The majority of respondents were motivated to receive the vaccine due to concern about contracting COVID-19 themselves (75%) or concerns about transmitting it to other people such as patients (52%), family members (65%) or other community members (54%).

Other external motivations were also reported such as being required by their employer to receive the vaccine (14%), convinced by a family member or friend (4%), or needing the vaccine in order to travel (29%).

Just over a third of respondents (34%) reported that getting vaccinated was their choice, while 26% said that getting vaccinated was their responsibility, and 37% said that it was both their responsibility and their choice (table 1).

Vaccine experiences

Most respondents appear to have had positive experiences receiving the vaccine, with the vast majority (85%) saying that they were 'comfortable' or 'very comfortable'

Table 2 Multivariable logistic regression for the response to the question ‘Where did you get information regarding the COVID-19 vaccine roll-out?’

	Manager			SWSLHD		
	OR	95% CI	P value	OR	95% CI	P value
Age (years)			<0.0001			0.127
Under 25	Reference			Reference		
25–34	1.32	1.07 to 1.62	0.0094	0.92	0.75 to 1.12	0.386
35–44	1.08	0.87 to 1.33	0.4762	0.95	0.78 to 1.17	0.6465
45–54	0.85	0.68 to 1.06	0.1504	0.92	0.74 to 1.13	0.4084
55–64	0.72	0.58 to 1.26	0.0074	0.82	0.66 to 1.03	0.0865
65+	0.86	0.58 to 1.26	0.4258	0.63	0.45 to 0.9	0.0116
Week			<0.0001			<0.0001
1	2.1	1.5 to 2.92	<0.0001	1.24	0.92 to 1.67	0.1626
2	1.9	1.27 to 2.8	0.0016	0.95	0.66 to 1.37	0.7807
3	1.61	1.18 to 2.2	0.003	1.36	1.03 to 1.79	0.0321
4	1.66	1.19 to 2.3	0.0027	1.68	1.25 to 2.26	0.0007
5	1.46	1.06 to 2.02	0.0218	1.45	1.08 to 1.93	0.0129
6	1.57	1.14 to 2.17	0.0058	1.01	0.76 to 1.34	0.9641
7	0.78	0.52 to 1.15	0.2027	1.14	0.88 to 1.47	0.4491
8	Reference			Reference		
Health worker			0.0013			0.5734
Allied	1.29	1 to 1.66	0.048	1.14	0.88 to 1.47	0.3142
Clinical	0.88	0.75 to 1.03	0.0997	1.06	0.91 to 1.24	0.4448
Corporate	Reference					

receiving the first dose of the vaccine and only 4% reporting feeling ‘uncomfortable’.

DISCUSSION

This study surveys the perceptions and motivations of healthcare workers in South Western Sydney for receiving a COVID-19 vaccine. A major finding of the study is the overall success of official vaccine communications to

this cohort of healthcare workers. The fact that a large majority of respondents considered that official information from SWSLHD helped them make the decision to receive the vaccine is an important achievement. Factors that may have contributed to this success include the easy availability of information about the vaccine roll-out and the widespread dissemination of official information, with a majority of respondents receiving information from sources such as staff emails and the intranet. This availability of official information may also explain why few respondents reported receiving information about the vaccine roll-out from non-official (and possibly less reliable) sources, such as social media, newspapers and TV news.

This study has both similarities to and differences from previous studies about healthcare workers’ motivations to receive vaccinations against influenza or other illnesses. Consistent with other studies, the most common reason for being vaccinated was for self-protection against infection. However, the motivation to protect family members and patients appeared to be stronger in the case of COVID-19 than influenza. For example, Tuckerman *et al*¹⁰ reported that 47% of healthcare workers received the influenza vaccine to protect their patients and 19% to protect their family, compared with 52% and 65%, respectively, in this study. This difference is likely to be due to the much higher mortality rate from COVID-19

Table 3 Number of COVID-19 vaccine doses administered

Week of survey	Average vaccinations per day*	Response rate to survey (%)
Week 1	752	20
Week 2	866	6
Week 3	713	38
Week 4	583	22
Week 5	466	28
Week 6	441	37
Week 7	480	14
Week 8	372	17

*These numbers have been presented as a daily average as the vaccination hub was closed for a number of public holidays during this time. A simple weekly total would be misleading as some weeks were longer than others.

Table 4 Multivariable logistic regression for the response to the question ‘What additional information would you have preferred?’

	More information about when or where the COVID-19 vaccine was available			More information about how to register to receive the COVID-19 vaccine			More information about eligibility to receive the COVID-19 vaccine		
	OR	95% CI	P value	OR	95% CI	P value	OR	95% CI	P value
Age (years)			<0.0001			<0.0001			<0.0001
Under 25	Reference			Reference			Reference		
25–34	0.78	0.62 to 0.99	0.0449	0.87	0.67 to 1.12	0.2784	0.61	0.46 to 0.81	0.0006
35–44	0.57	0.44 to 0.73	<0.0001	0.67	0.51 to 0.87	0.0032	0.56	0.41 to 0.75	0.0001
45–54	0.63	0.49 to 0.82	0.0005	0.57	0.43 to 0.77	0.0002	0.40	0.28 to 0.56	<0.0001
55–64	0.5	0.37 to 0.67	<0.0001	0.52	0.38 to 0.72	<0.0001	0.25	0.16 to 0.38	<0.0001
65+	0.52	0.31 to 0.85	0.0094	0.57	0.33 to 0.98	0.0413	0.30	0.14 to 0.62	0.0013
Week			0.0221			0.0072			0.0069
1	0.69	0.47 to 1.02	0.0645	0.60	0.41 to 0.89	0.0118	1.23	0.73 to 2.06	0.4416
2	0.64	0.39 to 1.07	0.0869	0.90	0.56 to 1.43	0.6447	2.15	1.21 to 3.82	0.0093
3	0.77	0.54 to 1.1	0.1534	0.64	0.45 to 0.92	0.0149	1.07	0.65 to 1.75	0.7939
4	0.81	0.55 to 1.19	0.2764	0.66	0.45 to 0.98	0.0382	1.29	0.77 to 2.15	0.3393
5	0.85	0.59 to 1.23	0.3947	0.52	0.35 to 0.77	0.001	0.93	0.55 to 1.56	0.7805
6	0.96	0.67 to 1.38	0.8148	0.63	0.44 to 0.92	0.0169	1.09	0.66 to 1.8	0.7496
7	1.23	0.82 to 1.84	0.325	0.91	0.6 to 1.38	0.6455	1.64	0.95 to 2.83	0.0772
8	Reference			Reference			Reference		
Health worker			<0.0001			0.0006			0.0128
Allied	0.92	0.62 to 1.35	0.6555	1.33	0.9 to 1.96	0.1526	1.79	1.16 to 2.77	0.0085
Clinical	1.53	1.22 to 1.92	0.0002	1.63	1.26 to 2.1	0.0002	1.53	1.12 to 2.09	0.0073
Corporate	Reference			Reference			Reference		

Table 5 Multivariable logistic regression for the response to the question ‘What additional information would you have preferred?’

	More information about vaccine safety			More information about vaccine effectiveness		
	OR	95% CI	P value	OR	95% CI	P value
Age (years)			<0.0001			<0.0001
Under 25	Reference			Reference		
25–34	1.18	0.94 to 1.47	0.1457	0.95	0.76 to 1.19	0.6584
35–44	1.16	0.93 to 1.46	0.1894	0.80	0.64 to 1	0.0536
45–54	0.81	0.64 to 1.04	0.0958	0.68	0.53 to 0.87	0.0017
55–64	0.63	0.48 to 0.82	0.0007	0.44	0.33 to 0.58	<0.0001
65+	0.48	0.3 to 0.78	0.0032	0.30	0.17 to 0.51	<0.0001
Week			0.0391			0.0727
1	0.77	0.55 to 1.08	0.1328	1.15	0.8 to 1.64	0.4557
2	0.73	0.47 to 1.11	0.1417	1.06	0.68 to 1.64	0.8078
3	0.95	0.69 to 1.29	0.7304	1.21	0.86 to 1.69	0.272
4	1.08	0.78 to 1.5	0.6398	1.41	0.99 to 2.01	0.0542
5	0.84	0.61 to 1.17	0.2999	1.10	0.77 to 1.55	0.6073
6	0.91	0.66 to 1.26	0.565	0.98	0.69 to 1.4	0.9265
7	0.67	0.45 to 0.99	0.0456	0.89	0.59 to 1.35	0.5898
8	Reference			Reference		
Health worker			0.092			0.0105
Allied	1.32	1 to 1.73	0.0507	1.45	1.1 to 1.91	0.0094
Clinical	1.02	0.85 to 1.22	0.8411	1.01	0.84 to 1.22	0.9091
Corporate	Reference			Reference		

than influenza, as well as widespread reporting of the effects of the pandemic overseas. It may also indicate that healthcare workers in South Western Sydney are aware of the potential seriousness of COVID-19 infection, and see the benefits of vaccination to protect themselves and other people.

Potential implications for policy and communications

An important finding from this study is the need for more communication about vaccine safety and effectiveness. Even some healthcare workers who had chosen to be vaccinated against COVID-19 themselves had concerns about vaccine safety and effectiveness. Significant minorities of respondents reported that they would have preferred to receive more information about vaccine safety and effectiveness prior to receiving their first vaccine dose, especially among younger age groups. This may indicate a high level of concern about vaccine side effects in the South Western Sydney community. It may also point to concerns that the vaccine might be ineffective against newer variants of COVID-19.

Limitations of study

There are a number of limitations of this study. The survey was developed by the investigators with information and domains identified from previous research studies relating to vaccine roll outs. No validity testing has been performed. The most immediately apparent limitation

is that this study only surveys health workers who had just received a COVID-19 vaccine. By definition, this is a group selected not to be the most hesitant or suspicious of vaccines. This study could be compared and contrasted with studies focusing on the most vaccine hesitant health workers in order to draw broader conclusions.

Due to potential response bias, respondents may be unrepresentative even of the cohort of healthcare workers who chose to receive a COVID-19 vaccine. Some health workers scanned the QR code to access the survey, but then did not complete the survey questions. People who had felt uncomfortable or pressured into receiving a COVID-19 vaccine may be less likely to respond to a survey about their perceptions and motivations for receiving the vaccine and thus their views may be under-represented in the results of this study.

CONCLUSIONS

This study surveyed the perceptions and motivations of healthcare workers about receiving a COVID-19 vaccination. Overall, healthcare workers in South Western Sydney felt comfortable receiving their first vaccination dose, and felt that official information was helpful in making the decision to receive a COVID-19 vaccine. Communications may have been improved by disseminating more



information about vaccine safety and effectiveness to address any unresolved concerns among healthcare workers.

Contributors JC developed the idea and methodology of the study, provided governance and oversight and draft manuscript. AD helped conduct the study, provided advice to the Liverpool Vaccination Hub, and reviewed draft survey questionnaires and manuscripts. BL and SM provided support and guidance of staff at the Liverpool Vaccination Hub. JD analysed and interpreted the data. MF provided advice about study planning. SP drafted the protocol, questionnaire and manuscript. All authors approved the final version of this manuscript. JC accepts full responsibility for the work and conduct of the study.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study has approval by the South Western Sydney Local Health District Ethics Committee (the reference number is 2021/ETH00160). Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement All data relevant to the study are included in the article or uploaded as supplemental information. Data are available in a public, open access repository. No additional data are available. All the data collected for this study are anonymous.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

ORCID iD

Josephine Sau Fan Chow <http://orcid.org/0000-0002-8911-6856>

REFERENCES

- Centers for Disease Control and Prevention. SARS-CoV-2 variant classifications and definitions, 2021. Available: <https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/variant-surveillance/variant-info.html>
- Australian Department of Health. COVID-19 vaccines Approved for use in Australia, 2021. Available: <https://www.health.gov.au/initiatives-and-programs/covid-19-vaccines/getting-vaccinated-for-covid-19/which-covid-19-vaccine-will-i-receive#COVID19-vaccines-approved-for-use-in-australia>
- Edwards B, Biddle N, Gray M, *et al*. COVID-19 vaccine hesitancy and resistance: correlates in a nationally representative longitudinal survey of the Australian population. *PLoS One* 2021;16:e0248892.
- et al Biddle N, Edwards B, Gray M. Vaccine willingness and concerns in Australia: August 2020 to April 2021, ANU centre for social research and methods, 2021. Available: https://csrcm.cass.anu.edu.au/sites/default/files/docs/2021/5/Vaccine_willingness_and_concerns_in_Australia_-_August_2020_to_April_2021.pdf
- Seale H. It's crucial we address COVID vaccine hesitancy among health workers. Here's where to start. *The Conversation* 2021 <https://theconversation.com/its-crucial-we-address-covid-vaccine-hesitancy-among-health-workers-heres-where-to-start-152977>
- et al Hamel L, Kirzinger A, Muñana C. KFF COVID-19 vaccine monitor: December 2020, 2020. Available: <https://www.kff.org/coronavirus-covid-19/report/kff-covid-19-vaccine-monitor-december-2020/>
- Kose S, Mandiracioglu A, Sahin S, *et al*. Vaccine hesitancy of the COVID-19 by health care personnel. *Int J Clin Pract* 2021;75:e13917.
- Australian Department of Health. When will I get a COVID-19 vaccine? 2021. Available: <https://www.health.gov.au/initiatives-and-programs/covid-19-vaccines/getting-vaccinated-for-covid-19/when-will-i-get-a-covid-19-vaccine>
- SWSLHD Chief Executive Message: International Women's Day 2021.
- Tuckerman JL, Collins JE, Marshall HS. Factors affecting uptake of recommended immunizations among health care workers in South Australia. *Hum Vaccin Immunother* 2015;11:704-12.