COVID-19 vaccination coverage and hesitancy among groups prioritised in Australia’s vaccine rollout

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Abstract
Objectives: This paper examines differences in vaccination coverage and hesitancy for people in vaccine priority groups.

Design, setting, participants: Using data from 2,400 Australians who participated in two waves of the Taking the Pulse of the Nation survey in April and May 2021, we describe vaccination coverage and hesitancy among vaccine priority groups including people with disability, people living with a severe mental health condition, a severe long-term health condition, those requiring frequent assistance with everyday activities, and people who provide paid or unpaid care.

Main outcome measures: The proportion of the sample who were vaccinated and who were vaccine hesitant, for the whole sample and for vaccine priority groups, disaggregated by age group and gender.

Results: COVID-19 vaccine coverage was estimated to be 8.2% overall, higher for people with severe long term health conditions (13.4%) and lower for people with severe mental health conditions (4.3%). Vaccine hesitancy was high overall (35.6%) and was found to be lower for people with disability (30.3%), with severe long term health conditions (27.7%), with frequent

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need for assistance (24.2%) and carers (30.7%), but similar for those with severe mental health conditions (36.1%).

Conclusions: Low vaccination coverage and high hesitancy for people in the priority groups leaves many people at significant risk of serious disease or death if infected with COVID-19. These findings demonstrate the urgent need for governments to enable easy access to vaccination for people in priority groups and to develop communication strategies to promote vaccination uptake, co-designed with the priority groups.

**Introduction**

COVID-19 vaccination is the cornerstone of managing the COVID-19 pandemic. Across the world, countries have developed strategies for the prioritisation of COVID-19 vaccination. The World Health Organization (WHO) developed guidelines for the prioritisation of vaccination among groups according to their risk of acquisition and transmission of COVID-19 (e.g., health care workers providing direct care) and risk of serious disease or death if infected by COVID-19 (e.g., older people, organ transplant recipients) (1). WHO also recommended that the levels of community transmission in a country should also guide vaccine distribution (1).

In Australia, the Commonwealth government has been responsible for the procurement and distribution of COVID-19 vaccines and the policy settings, although there have been some variations between States and Territories in the rollout to different groups. In January 2021, the Commonwealth government prioritised a range of groups in Phase 1a and 1b of vaccine the rollout which began in late February 2021. These groups included workers providing support in aged-care or to people with disability, as well as informal carers who provide unpaid support to people who need assistance with activities of daily living. People with chronic health conditions including serious mental illness and intellectual disability and people who required assistance with activities of daily living were also prioritised (2, 3). Government and media reports have shown that there have been significant, and ongoing, delays in the rollout of the vaccine among many people in these priority groups including among residents of aged-care and disability residences and the workers who support them (4-7).

Australia lags most of the world in COVID-19 vaccination coverage (8), ranked 78th globally according to the Johns Hopkins Coronavirus Resource Centre Vaccine Tracker (9). At the start of August 2021, 20% of the Australian population aged 16 years and above had been fully
vaccinated and 41% had received at least one dose (10). Despite the prioritisation of people with disability and disability workers, the data suggest that just under 35% of National Disability Insurance Scheme participants living in disability residential settings were fully vaccinated and only 27% of disability support workers (10).

Australia’s low COVID-19 vaccination coverage is in part due to lack of supply – a problem that intensified after the Commonwealth government recommended that Pfizer was used for people under 50 years on 8th April 2021 and then under 60 years on 16th June 2021 because of the risk of Thrombosis with Thrombocytopenia Syndrome (TTS) in younger age-groups (11-13). Another obstacle to achieving high levels of vaccination in priority groups is vaccine hesitancy – the delay in the acceptance or refusal of vaccines (14, 15).

Australian research has demonstrated relatively high levels of vaccine hesitancy compared to similar countries (16). An Australian survey conducted in January 2021, found that 13% of Australians would definitely not get vaccinated, 8% would probably not get vaccinated, 35% would probably get vaccinated, and 44% would definitely get vaccinated (17). Among priority groups, relatively high levels of vaccine hesitancy have been reported among disability support workers, with an Australian study suggesting 50% of disability support workers were hesitant to receive the COVID-19 vaccine (18), and internationally there are reports of high prevalence of vaccine hesitancy among health and social care workers (19). Understanding patterns of vaccine hesitancy is important for tailoring vaccination programs and evidence-informed and community-engaged responses to vaccine hesitancy to different subgroups (20, 21).

This paper fills a gap in our knowledge about vaccination levels and hesitancy among priority groups in Australia with the aim of identifying groups who require better targeting to improve vaccination coverage. Given these are high risk groups, we would anticipate that the findings indicate higher vaccine coverage and lower vaccine hesitancy in these groups compared to the overall population. Using data from 2,400 Australians who participated in Taking the Pulse of the Nation survey, we describe vaccination coverage and hesitancy among vaccine priority groups including people with disability, people who reported living with a severe mental health condition, a severe long-term health condition, and those requiring frequent assistance with everyday activities. We also report vaccination coverage and hesitancy for people who provide paid or unpaid care to someone in one of the priority groups.
Methods

We used data from Taking the Pulse of the Nation (TTPN), a survey which has been conducted every two weeks since April 2020 by the Melbourne Institute: Applied Economic & Social Research at the University of Melbourne (22). The survey is conducted as a phone or online interview, collecting data from 1200 people at each wave to track Australians’ expectations and attitudes towards the COVID-19 pandemic. This analysis used data from two waves of the survey, conducted in April and May 2021, in which questions about disability and caring responsibilities were included. At this stage of the pandemic, people over the age of 50 years and people in high priority groups (and their carers) were eligible to receive the vaccine.

In these two waves of the survey, a question was included about whether people had a disability, defined as “a long-term health condition, impairment or disability that restricts you in your everyday activities and has lasted (or is likely to last) for 6 months or more”. Additional questions were included to identify whether people were eligible to receive the vaccine according to the definition of vaccine priority groups, which included living with a severe mental health condition, a severe long-term health condition, and requiring frequent assistance with everyday activities (e.g., eating, dressing, mobility). A question was also included to identify people who provided care, help or assistance, either paid or unpaid, to people in the high priority groups. Responses “don’t know” were recoded to missing.

Information on vaccination and vaccine hesitancy was recorded in the survey. Participants were asked if they were “willing to have the COVID-19 vaccine” with possible responses listed as “I have had it already”, “yes”, “no”, and “don’t know”. People were identified as being vaccinated if they responded that they had had the vaccine. Therefore, vaccination coverage represents people who have had at least one dose of the vaccine. People were identified as being vaccine hesitant if they responded “no” or “don’t know” and not vaccine hesitant if they responded “yes” or were already vaccinated.

Population subgroups of interest included age groups (18-64 years; 65 years and above) and gender (men; women).

We estimated the proportion of the sample who were vaccinated and who were vaccine hesitant, for the whole sample and for exposure groups of interest (people with disability, severe mental health conditions, severe long-term health conditions, people requiring frequent
assistance with everyday activities, and people who were carers). We also disaggregated the results by age group and gender. The analyses used survey weights, constructed using the most recent Australian Bureau of Statistics estimated resident population projections based on the 2016 Census, stratified by gender, age and location to be representative of the Australian population. Analyses were conducted in Stata/SE 14.2 using the survey commands to account for the survey design characteristics.

**Results**

The two waves of the survey included 2,400 participants, of which 8.2% were vaccinated and 35.6% were vaccine hesitant (Table 1), of which 19.1% were unwilling to get the vaccine and 16.5% did not know (data not shown).

In the sample, 27.5% of participants had a disability, 10.8% had a severe mental health condition, 19.9% had a severe long term health condition, 5.6% had frequent need for assistance, and 26.4% were paid or unpaid carers. In terms of demographics, 20.2% of the sample were aged 65 years and older, and 51% were women.

Table 1. Characteristics of the sample (n=2,400)

| Characteristic                        | n   | %    |
|---------------------------------------|-----|------|
| Vaccinated                            |     |      |
| Yes                                   | 177 | 8.2  |
| No                                    | 2,223 | 91.8 |
| Vaccine hesitancy                     |     |      |
| Yes                                   | 854 | 35.6 |
| No                                    | 1,546 | 64.4 |
| Disability                            |     |      |
| No                                    | 1,623 | 69.9 |
| Yes                                   | 709 | 27.5 |
| Missing                               | 68  | 2.6  |
| Severe mental health condition        |     |      |
| No                                    | 2,118 | 89.2 |
| Yes                                   | 282 | 10.8 |
| Missing                               | 0   | 0    |
| Severe long term health condition     |     |      |
| No                                    | 1,913 | 80.1 |
| Yes                                   | 487 | 19.9 |
| Missing                               | 0   | 0    |
| Frequent need for assistance          |     |      |
| No                                    | 2,258 | 94.4 |
| Yes                                   | 142 | 5.6  |
| Missing                               | 0   | 0    |
| Carer                                 |     |      |
| No                                    | 1,700 | 71.5 |
| Yes                                   | 655 | 26.4 |
| Missing                               | 45  | 2.1  |
| Age group                             |     |      |

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Vaccination coverage

Compared to the sample overall, the proportion of people who had been vaccinated was higher for people with severe long term health conditions (13.4%), similar for those with disability (8.9%), people in need of frequent assistance with everyday activities (7.1%), and carers (8.9%), and lower for people with severe mental health conditions (4.3%, Table 2). These patterns were broadly consistent when the sample was disaggregated by age and gender.

Table 2 Proportion vaccinated (%)

|                     | Overall     | Disability  | Severe mental health condition | Severe long-term health condition | Frequent need for assistance | Carer        |
|---------------------|-------------|-------------|---------------------------------|-----------------------------------|-----------------------------|--------------|
| Whole sample        | 8.2 (6.6, 9.8) | 8.9 (6.8, 11.6) | 4.3 (2.5, 7.5) | 13.4 (9.9, 17.8) | 7.1 (3.6, 13.4) | 8.9 (6.4, 12.2) |
| Age                 |             |             |                                 |                                   |                             |              |
| 18-64               | 2.6 (1.8, 3.6) | 3.3 (2.0, 5.5) | 2.3 (1.2, 4.5) | 4.2 (2.4, 7.4) | 1.2 (0.4, 3.8) | 4.0 (2.2, 7.1) |
| 65+                 | 30.5 (24.9, 36.8) | 27.5 (20.1, 36.4) | 42.6 (19.1, 70.0) | 32.7 (23.5, 43.4) | 26.4 (12.1, 48.2) | 26.2 (18.0, 36.5) |
| Gender              |             |             |                                 |                                   |                             |              |
| Men                 | 9.0 (6.9, 11.8) | 10.7 (7.5, 15.0) | 3.0 (1.2, 7.1) | 14.0 (9.9, 19.5) | 7.8 (3.2, 17.8) | 8.4 (5.6, 12.4) |
| Women               | 7.4 (5.6, 9.7) | 7.3 (4.8, 11.0) | 5.9 (2.8, 11.7) | 12.8 (7.9, 20.2) | 6.1 (2.2, 16.0) | 9.3 (5.8, 14.5) |

Vaccine hesitancy

Overall vaccine hesitancy was high, with 35.6% of the sample estimated to be hesitant to receive the vaccine (Table 3). Compared to the sample overall, vaccine hesitancy was lower for people with disability (30.3%), people with severe long term health conditions (27.7%), people with frequent need for assistance (24.2%) and people who were carers (30.7%), but similar for those with severe mental health conditions (36.1%).

For people aged 18 to 64 years, vaccine hesitancy was high overall (39.7%) and was similarly high across the priority groups, ranging from 27.5% for people with frequent need for assistance to 37.4% for people with severe mental health conditions. For older people, vaccine hesitancy was lower overall (19.3%), similar for carers (18%), people with disability (15.7%) and people with severe long-term health conditions (16.7%), and there was some indication that it was lower for people with severe mental health conditions (12.3%) and people with frequent need for assistance (13.4%).
Vaccine hesitancy was higher for women than men (39.9% versus 31.1%), but lower for women with frequent need for assistance (22.5%), severe long-term health conditions (28.2%), and disability (32.3%) compared to women in the overall sample, and lower for men who were carers (22.8%) compared to men in the overall sample.

Table 3 Vaccine hesitancy (%)

|               | Overall   | Disability | Severe mental health condition | Severe long-term health condition | Frequent need for assistance | Carer      |
|---------------|-----------|------------|---------------------------------|-----------------------------------|-----------------------------|------------|
| Whole sample  | 35.6 (33.2, 38.0) | 30.3 (26.3, 34.7) | 36.1 (29.4, 43.5) | 27.7 (23.0, 33.0) | 24.2 (16.6, 33.8) | 30.7 (26.5, 35.2) |
| Age           |           |            |                                 |                                   |                             |            |
| 18-64         | 39.7 (37.0, 42.4) | 34.7 (30.0, 39.8) | 37.4 (30.4, 45.0) | 32.9 (26.9, 39.6) | 27.5 (18.5, 38.9) | 34.3 (29.4, 39.6) |
| 65+           | 19.3 (15.3, 24.1) | 15.7 (10.6, 22.8) | 12.3 (2.9, 39.1) | 16.7 (11.0, 24.6) | 13.4 (5.0, 31.2) | 18.0 (11.8, 26.4) |
| Gender        |           |            |                                 |                                   |                             |            |
| Men           | 31.1 (27.9, 34.5) | 28.1 (22.6, 34.4) | 30.3 (21.3, 41.0) | 27.1 (20.4, 35.0) | 25.6 (14.9, 40.3) | 22.8 (17.5, 29.1) |
| Women         | 39.9 (36.5, 43.4) | 32.3 (26.7, 38.6) | 42.8 (33.1, 53.1) | 28.2 (21.8, 35.6) | 22.5 (13.6, 34.9) | 36.3 (30.3, 42.8) |

Discussion

The findings of this study suggest that vaccination coverage was similar between people in the overall sample and the majority of the priority groups, including people with disability, people with frequent need for assistance and people who were carers. The vaccination coverage was slightly higher for people with severe long-term health conditions and very low for people with severe mental health conditions, and strikingly low for younger people in all priority groups. Given that people in these priority groups were eligible to receive the vaccine at the time of the survey, the lack of difference in vaccination coverage between these groups and the overall sample is surprising and of concern.

Despite people with disability being a priority group for vaccination, the Royal Commission hearing in May 2021 highlighted the low rates of vaccination for people with disability (23). Given the difference in vaccine eligibility, we would have expected the results to indicate much higher vaccine coverage among people in the priority groups. However, we found little evidence of a difference in vaccine coverage for between in the priority groups compared to the overall sample.

There were high levels of vaccine hesitancy overall with more than one in three people in the sample reporting that they were hesitant to receive a COVID-19 vaccine. We found high levels of vaccine hesitancy for people in the priority groups, particularly for young people and women
with severe mental health conditions and women who were carers, despite their elevated risk of serious illness or death if they contracted COVID-19.

It is important to note that that data for the first of the two waves of the survey were collected just after the change in the Commonwealth government recommendation that people under 50 years were to receive the Pfizer vaccine rather than the AstraZeneca vaccine because of the risk of TTS. This announcement may account, in part, for the elevated vaccine hesitancy reported in this study, particularly for young people. Indeed, vaccine hesitancy in our first wave was estimated to be 39% overall, notably higher than previous and subsequent waves where vaccine hesitancy was 32% on average, ranging from 29% to 35%.

Our study had a number of strengths. This is the first study to examine vaccination coverage and hesitancy aligning as closely as possible with many of the vaccine priority groups in Australia. The sample was large enough to identify people in all the priority groups, including once disaggregated by age group and gender. There were also limitations. We did not examine all vaccine priority groups. There was insufficient data to examine occupational vaccine priority groups such as healthcare workers, though it would be valuable to gain insights into vaccination coverage and hesitancy in these groups who were also eligible to receive the vaccine. We only examined two broad age groups because there were too few younger people in the priority groups to disaggregate the age groups further. Given the notable difference in vaccine hesitancy between older and younger people in the priority groups in this analysis, further research is needed to understand trends in vaccine hesitancy across a greater number of age groups. Further, we did not examine differences by ethnicity, Aboriginal and Torres Strait Islander peoples, or cultural and linguistic diversity because the survey did not collect data on these characteristics. Given the evidence about differences in vaccine hesitancy by ethnicity in the United Kingdom and the Unites States (24), it is important to examine differences in vaccine hesitancy by these characteristics for people in priority groups in future research. The survey is unlikely to be representative of the Australian population, though the sample weights make the results more representative of the population. The vaccine coverage was estimated to be 8.2% overall, which is broadly consistent, though perhaps slightly lower, than population estimates of vaccination coverage at similar time points, estimated to be 7.5% on 25th April 2021 and 12.1% on 16th May 2021 (25).

Conclusions
Low vaccination coverage for subgroups of people in the priority groups leaves many people at significant risk of serious disease or death if infected with COVID-19. These findings demonstrate the urgent need for governments to enable easy access to vaccination for people in priority groups through accessible vaccination hubs and in-reach into workplaces and homes. Further research is needed to understand the reasons underlying vaccine hesitancy in Australia, including among different subgroups of the population. Communication strategies to improve vaccination uptake need to be co-designed with the priority groups.

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Ethics approval
The Taking the Pulse of the Nation Survey was approved by the Faculty of Business and Economics & Melbourne Business School Human Ethics Advisory Group (Ethics ID 2056754.1).

Data sharing statement
Researchers can access the Taking the Pulse of the Nation Survey for research and replication purposes. To gain access, please contact Dr. Nicolás Salamanca at melb-inst@unimelb.edu.au.

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