Are you vaccinated? COVID-19 vaccination rates and the effect of a vaccination program in a metropolitan mental health inpatient population in Australia

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Abstract
Objective: To assess the COVID-19 vaccination rates of a severe mental illness (SMI) population in Western Australia (WA) in January to March 2022, and to evaluate an inpatient COVID-19 vaccination program available to this group.
Method: A retrospective audit of the COVID-19 vaccination status of inpatients at the Mental Health Unit (MHU) at a tertiary hospital in WA was conducted and compared with the state average. Additionally, the medical records were interrogated to determine whether eligible inpatients were offered and received COVID-19 vaccination via the inpatient vaccination program.
Results: Vaccination rates for the MHU population were substantially lower than those for the WA population, particularly earlier in 2022. During January, just 49.0% of admitted patients had received two doses of the vaccine, compared to 92.8% of WA. Over the three months, 67 (47.2%) of all admissions were eligible for vaccination during their admission and 19 of the eligible patients (28.4%) were successfully vaccinated.
Conclusion: This audit has demonstrated a slow uptake of COVID-19 vaccinations in the SMI population, despite the wide availability for 12 months prior to this period. This indicates a significant potential for targeted, assertive programs to improve vaccination rates in this population group.

Keywords: COVID-19, mental health, psychiatry, vaccination, severe mental illness

The COVID-19 pandemic has prompted a worldwide vaccination effort to diminish the spread of the virus and decrease the severity. People with mental illnesses have been identified as an at-risk group for excess morbidity and mortality from COVID-19, and there have been numerous calls for a focus on vaccination in this group, given that they have historically had lower vaccine uptake than the general population.1-3

As COVID-19 vaccinations have been rolled out globally, a gap in vaccination rates has been identified between the general population and the mental health patient population.4 Factors contributing to this gap may include a decreased ability to understand or engage with public health measures, decreased access to vaccination services, transiency, cost, and mistrust of vaccines or government authorities.5

In Western Australia (WA), there has been an unusually extended period of preparation prior to any widespread community transmission of COVID-19.6 This allowed the state to achieve high levels of COVID-19 vaccination prior to community exposure to the virus, but there is limited data regarding the success of this in the mental health cohort.

A metropolitan health service in WA started a service wide inpatient vaccination program, providing COVID vaccinations to vulnerable inpatient groups, including mental

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health inpatients. To evaluate the uptake of this service, an audit of vaccination rates, vaccine uptake, and vaccine delivery was conducted in the short-stay inpatient mental health unit (MHU) in January to March of 2022. The MHU is an eight-bed adult short-stay unit at a major tertiary hospital. Patients are generally admitted from emergency departments in metropolitan areas but can be admitted from across WA. The recommended stay on the ward is 72-h, with patients discharged or transferred to long-stay wards as required. The vaccination program identified, consented, and vaccinated eligible patients during their stay.

This audit was conducted to assess the following:

1. The vaccination rate of the MHU patient group compared with the WA population in the months of January-March 2022.
2. The success of the COVID-19 vaccination program in providing vaccinations to the MHU patient group over this period.

**Method**

Average vaccination rates of WA were obtained through government resources available online and monthly average values were calculated assuming a linear progression between the first and last data available during that month. State resources did not specify the population vaccination rate once >95% vaccination was reached, so a generous estimate of 5% non-vaccination rate for the state population was applied in comparison.

The vaccination records of all patients who were admitted through the MHU during the months of January, February, and March 2022 were obtained. Records were sourced through inpatient medical admission notes and/or online national health databases, including My Health Record (MHR) and the Australian Immunisation Network (AIN). Vaccine eligibility at the time of inpatient admission was established using the contemporaneous eligibility requirements published by the WA State Government’s Roll Up for WA Web site. It was noted that the required interval between the second and third vaccine doses was reduced, from 4 months to 3 months, on January 31st, 2022 in WA.

If a patient was determined to be eligible for a COVID-19 vaccination during their admission, the medical notes were interrogated for evidence that each patient:

1. Was offered a vaccination via the inpatient vaccination program.
2. Received the vaccination prior to their discharge.

If the same patient was admitted on more than one occasion within 1 month, they were included only once when calculating the vaccination rates of the MHU population for that month. However, when assessing the implementation and effectiveness of the inpatient vaccination program, each admission was considered as an individual opportunity for the program to vaccinate eligible patients.

**Results**

A total of 142 admissions to the MHU occurred in the months of January–March 2022. The demographic data of the MHU patient population is summarized in Table 1. The primary psychiatric diagnoses for the patient sample can be found in Table 2. The most common psychiatric diagnosis was schizophrenia, including schizoaffective disorder and other acute psychosis. The average patient stay was 4.5 days over the 3 months.

**COVID-19 Vaccination in the MHU population**

Vaccination rates for the MHU population were significantly lower than the WA average, as seen in Table 3, Table 4, Table 5, and Figure 1. Over 30% of the patients admitted in January 2022 had received no COVID-19 vaccines, compared to 5.1% of WA (RR=6) (Table 3). This decreased to 8.51% by March, with the relative risk of being unvaccinated dropping to 1.7-fold.

In January, the MHU population was 7.1 times more likely to be under-vaccinated. This improved markedly by March 2022, with 89.2% of patients being considered...
fully vaccinated (Table 5), and the relative risk of under-vaccination decreasing to 2.2-fold (Table 6). However, rates of third booster dose in the MHU population continued to lag behind the WA rate (44.7% vs 69.5%).

The Inpatient Vaccination Program
During the first 3 months of 2022, 47.2% of all MHU admissions were eligible for a COVID-19 vaccination during their inpatient stay. Of those patients, there was evidence in the medical records that 67.2% were offered vaccination. Of patients who were offered vaccination, 57.8% accepted and were referred. COVID-19 vaccination was provided to 73.1% of patients who accepted it, and to 28.3% of all patients eligible for a vaccination (Table 7).

Discussion
The safety of COVID-19 vaccines has been extensively documented, and vaccination provides the best available protection against the pandemic. Given the vulnerability of mental health patients to adverse effects from the COVID-19 virus, it is a concern that over a quarter of our patients were not vaccinated at all during the first 2 months of 2022, despite individuals with a severe mental illness (SMI) becoming eligible for the COVID-19 vaccination program in February 2021.

The MHU services a population with SMI, as seen in Table 2. People with a SMI in Australia live for approximately 20 years less than the general population, and patients suffer from increased rates of cardiovascular, respiratory, and metabolic disease. These patients would have benefited from early, targeted vaccination efforts to ensure they had adequate protection from COVID-19 prior to widespread community transmission in WA. Unfortunately, this review demonstrated an approximately 7-fold risk of both no vaccination and under-vaccination compared to the general population in January 2022.

More hopefully, COVID-19 vaccination rates in this population had substantially improved by March 2022. This may have been in response to the government vaccination restrictions applied in WA on the 31st of January 2022, where people aged 16 or over required a vaccine passport to enter hospitality venues, bottle shops, and most indoor entertainment complexes. The improvement suggests that any targeted programs existing for SMI patients that were active in 2021 had been ineffective in reaching this group prior to the introduction of these population-level measures. It also indicates that strategies that were effective for the general population (who achieved close to 95% full vaccination by January 2022) were not effective in this group.

While no formal data was collected on the reasons for under-vaccination in the MHU population, 42.2% of patients eligible for COVID-19 vaccination at the time of admission declined to receive it. Reasons for refusal were often documented in the medical notes, and some themes could be identified:

1. Delusional thoughts related to the pandemic or vaccine.
2. Concerns regarding side effects, or lack of long-term safety data.
3. Ambivalence towards the risk to themselves from COVID-19, for example, due to a solitary lifestyle, young age, or other patient factors.

### Table 3. January vaccination rates in MHU versus WA

| Jan - doses | Patients (n) | MHU average (%) | WA average (%) |
|-------------|--------------|-----------------|----------------|
| 3 doses     | 2            | 4.08            | 22.3           |
| 2 doses     | 22           | 44.9            | 92.8           |
| 1 dose      | 10           | 20.4            | 94.9           |
| Not vaccinated | 15          | 30.6            | 5.1            |

### Table 4. February vaccination rates in MHU versus WA

| Feb - doses | Patients (n) | MHU average (%) | WA average (%) |
|-------------|--------------|-----------------|----------------|
| 3 doses     | 5            | 10.9            | 50.3           |
| 2 doses     | 23           | 50.0            | 94.1           |
| 1 dose      | 6            | 13.0            | >95            |
| Not vaccinated | 12         | 26.1            | <5             |

### Table 5. March vaccination rates in MHU versus WA

| Mar - doses | Patients (n) | MHU average (%) | WA average (%) |
|-------------|--------------|-----------------|----------------|
| 3 doses     | 21           | 44.7            | 69.5           |
| 2 doses     | 21           | 44.7            | 94.9           |
| 1 dose      | 1            | 2.1             | >95            |
| Not vaccinated | 4          | 8.5             | <5             |
Other potential contributors include disengagement from formal health services, mistrust of government authorities, and poor health literacy. Western Australia has been relatively spared by the pandemic due to its border controls, which may have also contributed to a reduced urgency for patients to take up the vaccine.6 However, 57.8% of eligible inpatients who accepted a referral to the vaccine program, suggesting that structural barriers to access exist for this population.5 These could include unstable accommodation, diminished access to identification documents or computer services needed to book vaccination, less casual contact with vaccine services through workplaces or educational institutions, perceived financial barriers, transportation, or decreased exposure to health promotion messaging around how to access vaccination.5

The COVID-19 vaccination program successfully vaccinated 19 patients during this audit period, which

![Graphs showing vaccination rates by month and population comparison]
accounted for 73% of those who accepted referral to the program, and 28% of the total number of eligible patients admitted over this time. The primary reason that a referred patient did not go on to receive a vaccine was discharge or transfer prior to vaccination.

Given the high turnover of the MHU, and the brief duration of most admissions, this result indicates a significant potential for targeted programs to improve vaccination rates in the SMI population. This review has also demonstrated a high degree of COVID-19 under-vaccination in the SMI population, despite their early identification as a vulnerable group, and comparative success of population-level vaccination restrictions in improving vaccination rates in this group. We hope this audit provides evidence for the necessity of targeting this under-serviced group, as well as support for the effectiveness of these programs when implemented.

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