COVID-19 Antiviral Prescribing In Urgent Care By Patient Ethnicity

Urgent Message: This study confirms variable prescription rates among different ethnicities in Aotearoa, New Zealand, for COVID-19 antiviral medication despite efforts to reduce health inequities.

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Abstract

Introduction: In Aotearoa, New Zealand, COVID-19 disproportionately increased mortality and morbidity outcomes in Māori and Pacific patients. In an effort to counteract these health inequities, the government aimed to increase access to COVID-19 antiviral medication for Māori and Pacific patients with COVID-19 by changing the age threshold among ethnicities for those who would otherwise not be eligible based on medical comorbidity or vaccination status (age ≥50 years old for Māori and Pacific patients compared to ≥65 years old for other ethnicities). This study looked at whether prescribing for COVID-19 antivirals in an urgent care setting had any prescribing differences among patient ethnicities.

Methods: A retrospective review was performed for all consultations for patients with confirmed or probable COVID-19 with a first presentation to White Cross Urgent Care Clinics in Auckland, New Zealand, between September 14, 2022, and March 6, 2023. Demographic data was collected along with eligibility status for COVID-19 antiviral medication and whether a COVID-19 prescription was provided. Statistical analysis was performed using Fisher's exact test.

Results: A total of 571 patient records were reviewed; 175 patients were excluded, leaving a final sample of 396 patients. Only 37.5% of eligible Māori patients with COVID-19 received a COVID-19 antiviral prescription in this study, and this was statistically significantly lower than all other ethnicities (p=0.017). Other ethnicity patients had the next lowest prescription receipt rate (61.5%), followed by Pacific (61.9%), New Zealand (NZ) European (71.0%), and Asian (100.0%) ethnicities.

Discussion: This study confirms variable prescription rates among different ethnicities for COVID-19 antiviral medication despite efforts to reduce health inequities for these groups. Further studies are needed to understand the underlying causes of these differential prescribing practices.

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Introduction and Aims

During the COVID-19 pandemic outbreak in Aotearoa, New Zealand (Ao/NZ), beginning February 2020, Māori and Pacific people were shown to have a higher risk of clinically severe outcomes from COVID-19, including risks of hospitalization and death.[1,2,3] Hospitalizations early in the pandemic demonstrated that Europeans and those with higher socioeconomic status were mainly affected (likely due to the majority of cases being associated with overseas travellers rather than community transmission at this stage). However, Māori and Pacific patients that were hospitalized tended to be younger and with longer lengths of hospital stay, despite making up under 40% of the cases.[4,5] During the Omicron wave in 2022, cases were highest per capita and occurred earliest in age among Māori and Pacific people.[3] At that time, Māori people also had the highest risk of hospitalization.[3] This is similar to historical inequitable health outcomes for Māori during the 1918 influenza and 2009 H1N1 outbreaks.[1,6,7,8,9,10,11,12,13,14,15,16] Ao/NZ data reflected similar patterns to other countries, with multiple countries showing that either indigeneity or ethnic minority were both individual risk factors for more severe disease in COVID-19.[1,6-16]

As well as disparities in mortality and morbidity outcomes, studies have also shown that Māori and Pacific patients tend to receive lower prescription rates than other ethnicities for a wide range of diseases.[17,18,19,20] While no studies in Ao/NZ have looked at COVID-19 antiviral prescribing by ethnicity, studies overseas have shown that there have been ethnic disparities for medications given for COVID-19.[21] In the Unites States, Black, Asian and Hispanic ethnicities were less likely to receive outpatient medication for COVID-19 than White patients.[22] Potential reasons given were limited access to care, lack of a primary care provider, potential biases in prescribing practices, and lack of communication to certain communities regarding the COVID-19 antivirals.[22]

Ao/NZ's response to COVID-19 always prioritized the aim of equitable outcomes, unfortunately, the burden of COVID-19 continued to disproportionately affect Māori and Pacific people.[23] One strategy involved how COVID-19 antiviral medication was distributed after its initial introduction to the country in 2022. In Ao/NZ, patients have access to medications that are chosen by Te Pātaka Whaioranga (Pharmac), a government agency that decides which medicines and therapeutic products are government-funded so patients can access them at no (or heavily subsidized) cost.[24] In March 2022, protection against the risk of severe outcomes from COVID-19 was expanded from purely a vaccination and elimination strategy, to include therapeutic medication with nirmatrelvir/ritonavir.[25] Initial eligibility criteria for patients with COVID-19 included an immunocompromised status, or having a minimum of at least 5 risk factors for poor outcomes (risk factors included a high risk ethnicity such as Māori or Pacific, age thresholds determined by COVID-19 vaccination status, or comorbidities as defined by the Ministry of Health).[24]

In light of growing concerns about the emerging disproportionate burden of COVID-19 on Māori and Pacific people, particularly given historical inequities across other diseases affecting Māori particularly, Pharmac made the decision to amend their access criteria to COVID-19 antivirals in September 2022.[26] The key change made was lowering the age threshold for Māori and Pacific patients (regardless of vaccination status or comorbidities) to those aged 50 years or above, as compared to other ethnicities that still required a minimum age of 65 years.[26] Access to COVID-19 antivirals at the time required a prescription from a relevant healthcare practitioner or select pharmacists, though pharmacist-only prescriptions accounted for only 5% of antivirals dispensed.[26,27] As most COVID-19 cases in Ao/NZ were not hospitalized, medical physicians were a major source of COVID-19 antiviral prescriptions.[28,29,30]

During the COVID-19 pandemic in Ao/NZ, urgent care (UC) played a key role in both the assessment and management of COVID-19 patients, particularly as general practitioners (GPs) moved to telehealth early in the pandemic.[31,32] Many UC clinics continued face-to-face patient consultations, including initial assessment and management of COVID-19 patients, with some clinics completely converted into community testing centers for COVID-19 polymerase chain reaction (PCR) testing, prior to the availability of COVID-19 rapid antigen tests (RATs).[33,34]

As key providers for COVID-19 patients, particularly those requiring in-person assessment, it is imperative that UC does not perpetuate the health inequities that have and continue to affect the Māori and Pacific people.[1,3] Ideally, UC should be a driver for reducing these inequities, particularly considering that Māori and Pacific people have the lowest enrollment in primary care.[35] This means that UC may see higher levels of Māori and Pacific patients, as unenrolled patients make up a significant proportion of the UC patient base.[35] Furthermore, equitable health outcomes for Māori are a commitment under the obligations of Te Tiriti o Waitangi (the Treaty of Waitangi)—the foundational legal document which protects the rights of Māori as tangata whenua (indigenous people) of Ao/NZ. [36] This is a responsibility for all

Table 1. Demographic Characteristics and Method of Diagnosis	
Median Age (Years, IQR)	35 (38)
Gender - n (%)	
Male	190 (48.0%)
Female	206 (52.0%)
Ethnicity - n (%)	
NZ European	70 (17.7%)
NZ Māori	28 (7.1%)
Pacific	83 (21.0%)
Asian	144 (36.4%)
Other	57 (14.4%)
Not Stated	14 (3.5%)
Case Diagnosis - n (%)	
Confirmed	389 (98.2%)
Probable	7 (1.8%)
Abbreviations: IQR – interquartile range; NZ – New Zealand	

healthcare providers in Ao/NZ.[29]

White Cross is a network of urgent care clinics (UCCs) that treat acute illnesses and injuries in the community. There are a total of 8 White Cross clinics spread across Auckland – Ao/NZ's largest city—comprising a mix of either dedicated UCCs or hybrid clinics with a mix of urgent care and general practice.[37,38] The geographic spread of this network serves an ethnically and age diverse population of patients.[38]

The primary aim of this study was to examine rates of COVID-19 antiviral prescribing to eligible patients in an urgent care setting. A secondary aim was to identify any differences in COVID-19 antiviral prescription rates for Māori and Pacific patients in an urgent care setting.

Methods

A Health and Disability Ethics Committee screening application was submitted for this project, and it was considered out of scope and therefore, not requiring ethics approval. White Cross organizational approval was also obtained prior to any data collection.

Data was collected using a retrospective review. Records were only included in the final sample if they met all the following inclusion criteria:

- Patients presenting to any White Cross clinic in Auckland between September 14, 2022, and March 6, 2023
- Presentation was for a current COVID-19 illness
- Presentation was the first consultation with a doctor for this episode of COVID-19
- The consultation was a face-to-face consultation with an urgent care doctor

Diagnosis of COVID-19 was based on Medtech Evolution READ codes of "Probable" or "Confirmed" COVID-19 disease, and the consultation notes were manually cross-checked to ensure diagnosis was met based on the following definitions at the time of patient presentation:

Confirmed case

- A patient with symptoms consistent with COVID-19 as per the NZ Ministry of Health symptom criteria (at least 1 of: new or worsening cough, sneezing and runny nose, fever, anosmia/altered sense of taste, sore throat, shortness of breath, fatigue)[34]
- AND a positive PCR test OR a positive supervised or unsupervised COVID-19 RAT

Probable case

- Symptoms in keeping with COVID-19 case criteria as for confirmed case
- Patient reported a household contact that was positive for COVID-19 in the last 2 weeks

Patient level data collected included age, ethnicity, method of diagnosis, eligibility status for COVID-19 antivirals during the study period, whether an antiviral was prescribed during the urgent care consultation, and if so, which antiviral was prescribed. In cases where patients were eligible, but antivirals were not prescribed, the reason for not prescribing was also collected if documented in the clinical notes.

Statistical significance was checked with a Fisher's exact test using SPSS Statistics software.

Results

A total of 571 patient records were reviewed with 175 patients excluded, leaving a final sample of 396 patients.

Table 2. Demographic Characteristics By Ethnicity						
	NZ European	NZ Māori	Pacific	Asian	Other	Not Stated
Total - n	70	28	83	144	57	14
Median Age (years, IQR)	58 (44)	41.5 (24)	28 (49)	33 (32.5)	41 (39.5)	22 (56)
Male - n (%)	27 (38.6%)	14 (50.0%)	35 (42.2%)	75 (52.1%)	31 (54.4%)	8 (57.1%)
Abbreviations: IQR – interquartile range; NZ – New Zealand						

Table 3. COVID-19 Antiviral Prescribing By Ethnicity

	NZ European	Māori	Pacific	Asian	Other	Not Stated
Total (n)	70	28	83	144	57	14
Median age (years, IQR)	58 (44)	41.5 (24)	28 (49)	33 (32.5)	41 (39.5)	22 (56)
Eligible for COVID-19 antivirals	31	8	21	14	13	2
Median age of eligible patients (years, IQR)	75 (9)	58 (11)	60 (13)	63 (17)	73.5 (8)	73 (N/A)
Prescribed COVID-19 antivirals (n)	23	4	13	17	9	2
Proportion of eligible patients who received an antiviral prescription (n,%)	22 (71.0%)	3 (37.5%)	13 (61.9%)	14 (100.0%)	8 (61.5%)	1 (50.0%)
Total antiviral prescriptions (n) and proportion relative to number of eligible patients (%)	23 (74.2%)	4 (50.0%)	13 (61.9%)	17 (121.4%)	9 (69.2%)	2 (100.0%)
Eligible patients that meet at least one other access criteria for COVID-19 antivirals*	9	0	7	8	3	0

Abbreviations: IQR – interquartile range; NZ – New Zealand
*Additional criteria include a variety of conditions relating to comorbidities, mental health, COVID-19 vaccine status and risk factors for severe COVID-19 disease as defined by the Pharmac website.[50] In this sample, 7 patients met additional access criteria based on having at least 3 pre-existing high-risk factors for severe illness from COVID-19 and 1 patient met criteria based on having a health condition expected to impair an adequate immune response to COVID-19.

Reasons for exclusion were: incorrect READ code diagnoses; duplicate records; negative RAT; phone consultations; and asymptomatic patients (for example, private screening for fitness to fly). A summary of the final sample including demographic characteristics are shown in **Tables 1-2**. Fourteen patients did not have ethnicity documented. For this study, these patients were counted in the "Other" ethnicity sample and were considered ineligible for COVID-19 antiviral medication.

Analysis by ethnicity demonstrated that patients of Māori ethnicity were prescribed COVID-19 antivirals at a lower rate compared to all non-Māori ethnicities, including Pacific **(Table 3)**. Analysis using Fisher's exact test confirmed this difference was statistically significant (p=0.017, 2-tailed).

Of the 396 patients seen with their first presentation of COVID-19, 89 patients met eligibility criteria for COVID-19 antiviral medication. If eligibility was uncertain based on lack of documented co-morbidities or ethnicity, these patients were considered "Not eligible" (n=1). Of the 89 patients who were eligible for COVID-19 antivirals, 61 (68.5%) received prescriptions, which were mostly nirmatrelvir/ritonavir **(Table 4).** Reasons for a lack of prescription are shown in **Table 4 and Figure 1.**

Reasons for not prescribing COVID-19 antivirals varied, but in most cases, were not documented **(Figure 1)**. However, this was only seen in non-NZ European patients as all eligible NZ European patients who did not have a COVID-19 antiviral prescribed had reasons documented.

Of note, 7 patients who did not meet Pharmac eligibility criteria had antivirals prescribed. Three of these patients requested the prescription to self-fund, while 4 patients had no reason documented. Of note, those did have some medical co-morbidities including cardiac disease and diabetes; however, their co-morbidities did not meet the threshold for antiviral eligibility. The ethnicity breakdown of patients who received an antiviral prescription without meeting eligibility were: Māori; NZ European; Asian; Other; and Not Stated.

Discussion

This study demonstrated that in Ao/NZ, Māori patients had the lowest rates of COVID-19 antiviral prescriptions given. This finding provides valuable insight into prescribing patterns in urgent care. It shows inequitable prescribing practices in Ao/NZ are potentially present which may result in inequitable COVID-19 antiviral access in a population which is already vulnerable to severe outcomes from COVID-19.[1-3]

Another study based in the United States showed

that Black, Asian and Hispanic ethnicities were less likely to receive outpatient medication (monoclonal antibodies such as bamlanivimab) for COVID-19 compared to White patients.[22] In this same study, potential reasons given were limited access to care, lack of a primary care provider, potential biases in prescribing practices, and lack of communication to certain communities regarding the COVID-19 antivirals.[22] My study only looked at patients who presented to an urgent care clinician, suggesting that access to care is likely not a contributing factor. Instead, this suggests that potential biases in prescribing practices may be a more significant contributing factor.

My study suggests that lower COVID-19 antiviral prescribing rates may be contributing to Māori patients' inequitable health outcomes for COVID-19. Factors impacting the prescribing behavior of physicians may be a potential target to improve prescribing rates. In the treatment of other respiratory infectious diseases, 1 study showed that physician attitude was the dominant factor in the decision to prescribe antibiotics, specifically fear of disease complications, patient reactions, and patient expectations for antibiotics.[39] In order to change prescribing behavior, education for physicians and tools which reflect a physician's own practice have been proposed as potential solutions.[39,40] These may be potential targets to influence COVID-19 antiviral prescribing practices for urgent care physicians to ensure equitable care.

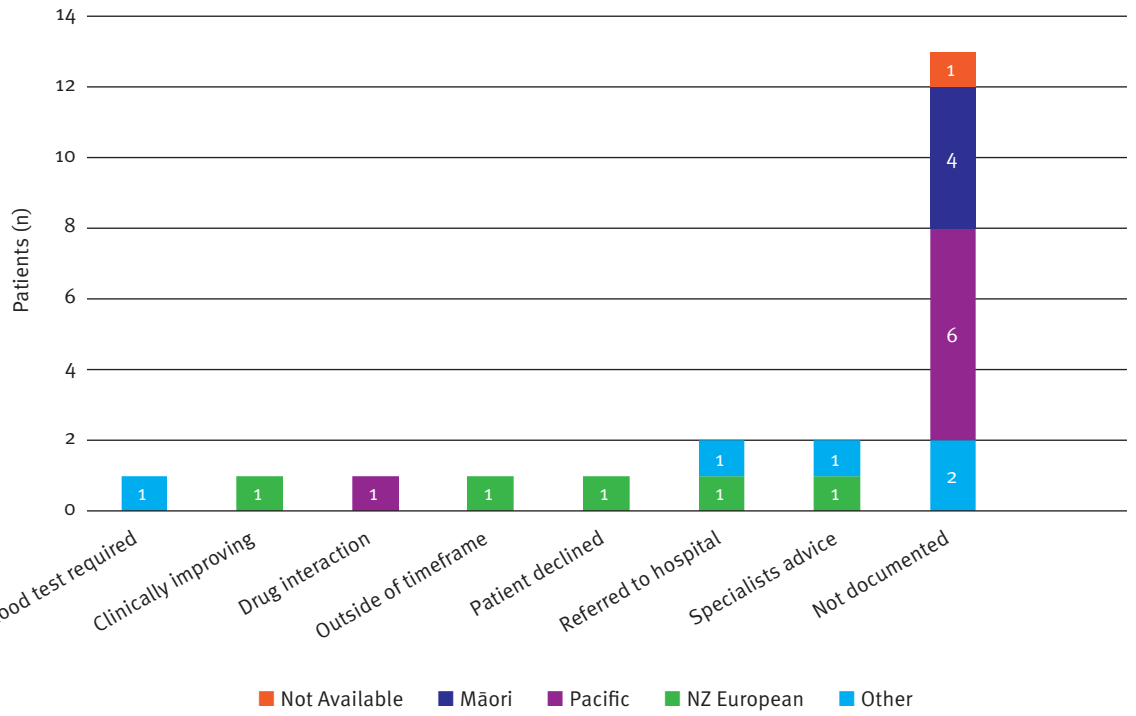
Other potential contributing factors for disparities in ethnic health outcomes across a range of infectious disease pandemics in the literature also include financial barriers to medications and patient health literacy.[12] However, financial barriers to medications are unlikely to be contributing as Ao/NZ has a publicly funded healthcare system, and COVID-19 antiviral medication was free for eligible patients at the time.[24] Patient health literacy may play a role, as perhaps patients who received prescriptions in this study requested them from the clinician, which

Table 4. Patients Eligible for COVID-19 Antivirals, Antivirals Prescribed, Reasons For Not Prescribing

Eligible for COVID-19 Antivirals (n)	89
Prescribed COVID-19 Antivirals (n, %)	61 (68.5%)
Antiviral Prescribed (n)	
nirmatrelvir/ritonavir	45
molnupiravir	16
Reason Documented For Not Prescribing (n)	
Patient declined	1
Clinically improving	1
Referred acutely to hospital	2
Recommended by hospital specialist*	2
Uncertain symptom onset/time frame	1
Drug interaction	1
Blood test required	1
No documented reason	13

*Documentation showed phone consultation from acute hospital specialist who advised COVID-19 antivirals were not recommended based on patient and/or clinical case factors (eg, drug interactions, patient co-morbidities)

Figure 1. Reasons Documented for Not Prescribing COVID-19 Antivirals in Eligible Patients by Ethnicity



could increase the likelihood of a COVID-19 antiviral being prescribed for eligible patients. However, which patients requested a prescription was not included in the data collected in this study. Regardless, clinicians still have the responsibility of being aware of the eligibility criteria and correctly applying it rather than relying on patients requesting these medications.

Given the findings in the literature, there are additional areas which may need to be addressed to correct the identified gaps in prescribing. Lack of clinician knowledge regarding eligibility criteria for community access to COVID-19 antivirals may be a potential contributing factor. During the pandemic, particularly the early waves, Ao/NZ was a country with very frequent communication updates from the central health agency.[22,34] Given the sheer volume of information, in combination with rapidly evolving guidelines, it may have been difficult for clinicians to be aware of the most current recommendations.[34] Another area to address particularly when looking at the lower prescribing rates of Māori to non-Māori patients, may be clinician implicit bias as has been theorized in other studies.[17,18,19,20,39,40,41,42]

While health and prescribing disparities affecting Māori are seen in the literature, there are a few conditions where Māori patients have received higher prescription rates than non-Māori patients.[42,43] This includes prescriptions for antipsychotics and antibiotics for pharyngitis.[42,43] For antibiotics for pharyngitis, a driving factor may be that acute rheumatic fever affects a disproportionate number of Māori and Pacific people in Ao/NZ and guidelines for pharyngitis management reflect this increased risk based on ethnicity.[44] Consequently, antibiotics are more likely to be commenced in these at-risk groups based on Ao/NZ's pharyngitis guidelines.[43,44] It is surprising therefore, that this study did not show similarly higher rates of COVID-19 antiviral prescriptions compared to other ethnicities, given the role of ethnicity in the Pharmac eligibility criteria. As such, physician prescribing behavior may contribute more to this disparity.

An interesting result from this current study was that Pacific patients had higher rates of prescriptions than Māori, which were comparable to other ethnicities such as NZ European. One possible reason may be that Pacific patients had similar eligibility rates based on multiple comorbidities to NZ European and Asian patients. Therefore, prescribing could have been based on medical comorbidities, rather than the different age thresholds based on ethnicity. Ao/NZ also tried to mitigate

the effects of COVID-19 on Pacific people early on in the pandemic with specific strategies to engage with these communities, which were largely Pacific- and community-led.[45] This may have resulted in an increase in health literacy, and consequently a higher likelihood of requesting COVID-19 antivirals by the patients themselves, which could impact physician prescribing behavior as previously discussed.[39]

However, the Māori also took a similar community led strategic approach early in the pandemic.[36] This may suggest that indigenous peoples suffer more from implicit bias even compared with other ethnic minorities. Previous studies have shown that Māori patients experience alienation, micro-aggression, and discriminatory behavior from a wide range of healthcare services.[46] While it is possible that clinicians may have been more aware of the co-morbidities part of the COVID-19 antivirals eligibility, the "Other Ethnicities" group also had the same proportion of patients who met additional COVID-19 therapeutic access criteria compared with Māori, yet COVID-19 antiviral prescribing rates for Māori were still lower. This suggests that co-morbidities may not be the key factor in prescribing decisions. These initial findings show a significant need for further studies on COVID-19 antiviral and other prescribing rates by ethnicity to better understand potential disparities in an effort to develop interventions to minimize inequities.

To date, there have been no published studies in Ao/NZ looking at prescribing patterns for COVID-19 antivirals either in the outpatient or inpatient setting and specifically regarding whether there have been any ethnic disparities. Globally, literature is also limited for research in prescribing patterns based on ethnicity for COVID-19 specifically. This study, though small, provides preliminary insight into potential ethnic inequities in Ao/NZ, particularly involving populations that have already had historical inequities from a range of diseases.[16,36,47] Larger studies across primary healthcare, such as multi-center UCC studies, GP prescribing practices, and direct pharmacist supply to patients of COVID-19 antivirals, would be useful in confirming whether the findings in this study are present more broadly. Next steps should also include what may be potential contributing factors. Future work to address barriers to achieve equitable care for patients, such as addressing clinician implicit bias and physician prescribing behavior, is also needed.

Limitations

The largest limitation of this study is the small sample size. Additionally, this study was limited to UCCs in a single large urban city. However, when comparing both Auckland region and Ao/NZ 2018 census data, the sample in this study is still mostly representative.[37,38,48] Key differences in the sample size include a lower proportion of Māori, and higher proportion of Pacific, Asian and Other ethnicities, compared to Census data.[37,38,48] It should also be noted that ethnicity data in the 2018 Census was counted differently to this study. In the census, multiple ethnicities resulted in a count for every different ethnicity whereas in this study, each patient could only report a single ethnicity.[37,48,49] Census data also grouped European and NZ European in the same category of "European" in contrast to this study which grouped non-NZ European ethnicities under "Other."[37]

Another limitation is ethnicity data was not obtained for all patients, and the ethnicity was self-reported. Lastly, this study did not examine a relationship between COVID-19 antiviral prescribing and COVID-19 illness outcomes.

Conclusion

This study showed that Māori patients a significantly lower proportion of COVID-19 antiviral prescriptions given, compared to all other ethnicities. These results show further work is required to improve prescribing practices in urgent care, and further research needed to identify the causes of variable prescribing practices.■

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