Final report summary

COVID-19 and National Immunisation
Programme research

Submitted by
Victoria University of Wellington

Project title
PROP-053 COVID-19 Vaccine Evaluation (COVE)
in Aotearoa New Zealand

Section 1: Contact information

1.1 Point of Contact for this report

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Section 2: Reporting

2.1   Overview

Since the confirmation of the first COVID-19 case in Aotearoa New Zealand, the government has adjusted its approach to match the evolving virus, transitioning from elimination to minimisation and ultimately prioritising protection.

Estimated Residential Population (ERP) and Health Service User (HSU) populations produced different estimates for vaccination rates for Māori at a population level. Across all age groups, Māori vaccination rates using ERP were much lower in comparison to Māori vaccination rates using the HSU population.

We estimated an observed 77,485 fewer Māori fully vaccinated and an additional 72,884 unvaccinated than expected if the fully vaccinated/unvaccinated rates in each age band were the same as for the non-Māori population. Among Māori, greater residential mobility, disability, household crowding, poorer housing quality, the presence of a child aged under five in the household, and three or more generation family types were associated with being unvaccinated. Women, primary health organisation enrolees, and those who earn ≥$100,000 per year (household income) were more likely to be vaccinated.

During the follow-up period, 9.5% of individuals aged 15 and above, totalling 413,310, remained unvaccinated, and 19.3% (755,103) received their second booster dose.

COVID-19 vaccine effectiveness against hospitalisation and mortality was highest in the first-month post-vaccination period, gradually waning. For example, against COVID-19 hospitalisation, the second booster dose vaccine effectiveness was 81.8% (95% CI: 73.6–87.5) in the first month, decreased to 72.2% (95% CI: 58.5–81.4) in the fourth month, and then further decreased to 49.0% (95% CI: 7.9–71.8) in the sixth month. Against COVID-19 infection, there was a rapid decline in vaccine effectiveness. For example, against infection confirmed with PCR, the first booster dose vaccine effectiveness was 54.0% (95% CI: 38.8–65.4) in the first month and dramatically decreased to 20.0% (95% CI: -88.1–66.0) in the third month.

There was little difference between groups of the Aotearoa New Zealand population studied. The second booster dose vaccine effectiveness against COVID-19 hospitalisation for the Māori population was 81.1% (95% CI: 46.0–93.4) in the first month, decreased to 51.9% (95% CI: 7.6–74.9) in the second to third month, and then further decreased to 36.6% (95% CI: -16.8–63.4) in the fourth to sixth month. The second booster dose vaccine effectiveness against COVID-19 hospitalisation for the Pacific peoples was 92.2% (95% CI: 36.6–98.9) in the first month, decreased to 56.7% (95% CI: -0.7–81.3) in the fourth to sixth month.

An ethics approval (Number: 30627) was obtained from the Human Ethics Committee of Te Herenga Waka—Victoria University of Wellington, New Zealand.

2.2   What is the problem or issue that your research investigated?

In response to the COVID-19 pandemic in Aotearoa New Zealand, where over 2,470,435 cases, 31,119 hospitalisations, 878 ICU admissions, and 4,849 deaths have occurred as of October 2023, severe outcomes

have been linked to various factors like age, ethnicity, multimorbidity, and socioeconomic status. Despite the government's evolving strategies to combat the virus, including a comprehensive vaccination campaign starting in February 2021, there were challenges with vaccine uptake, particularly among the Māori and younger age groups. Our a priori analysis revealed differences in vaccine uptake between groups of the Aotearoa New Zealand population and observed waning vaccine effectiveness by 25 weeks post-second dose. Further investigation into vaccine uptake, determinants, and effectiveness post-boosters is needed to address these issues. This research aims to provide data which can be used to help optimise vaccination strategies, specifically for vulnerable populations like the Māori, Pacific peoples, and socioeconomically disadvantaged groups, to mitigate severe COVID-19 outcomes.

2.3   What are the practical solutions and implementation options that you recommend?

Estimated vaccination rates were lower for Māori compared to non-Māori population. Recent primary health organisation enrolment status, disability, residential mobility, and poor quality housing were associated with vaccine uptake. Further understanding of the role of these variables and vaccine uptake is required.

Vaccine effectiveness decreased gradually as a function of time post-vaccination, especially against SARS-CoV-2 infection, and only 19.3% of people 15 years and older received the second booster dose. Given the waning effectiveness of these vaccines, further surveillance should be undertaken to monitor vaccine uptake amongst groups and vaccine effectiveness of booster doses (including for bivalent vaccines) or combination vaccines.

2.4   What considerations need to be taken into account when implementing the solutions?

Residential mobility relies on individuals providing accurate information to government agencies, but frequent movers may not consistently update their details, leading to potential gaps in data used for these analyses. Underreporting of these factors in the existing data means our results are likely to undersestimate their impact on vaccine uptake.

Some COVID-19 cases, especially from self-tests and communities with limited access to testing sites, might remain unreported. This may have underestimated infection rates in some communities.

Data on housing quality, household crowding, composition, income, and children under five may have changed since the 2018 census, leading to increased uncertainty in the effect estimates for these variables.

These results are based on the use of historic time frames (i.e. up to 28/02/2023). This may lead to discrepancies when compared to alternative analyses or official data (e.g. that encompass the most up-to-date COVID-19 data).

The combination of vaccine waning, low booster rates, emergence of new variants needs to proactively address the social factors that have been demonstrated to impact vaccine uptake.