



The impact of the COVID-19 pandemic on routine childhood immunisation coverage in Aotearoa New Zealand

Leon Iusitini, Thomas Schober, Gail Pacheco

leon.iusitini@aut.ac.nz



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Disclaimer: These results are not official statistics. They have been created for research purposes from the Integrated Data Infrastructure (IDI) and Longitudinal Business Database (LBD) which is carefully managed by Stats NZ. For more information about the IDI and LBD please visit https://www.stats.govt.nz/integrated-data/.

The results are based in part on tax data supplied by Inland Revenue to Stats NZ under the Tax Administration Act 1994 for statistical purposes. Any discussion of data limitations or weaknesses is in the context of using the IDI for statistical purposes, and is not related to the data's ability to support Inland Revenue's core operational requirements.



- Pandemic disrupted delivery of immunisation programmes and uptake of vaccines:
 - Fear of COVID-19 exposure
 - Lockdowns and travel restrictions
 - Redeployment of healthcare workers to pandemic response
 - (Mis)information about vaccines and changes in parental perceptions
- Official guidance from MoH: 'keep calm and keep vaccinating!'
- What was the initial impact of the COVID-19 pandemic on immunisation events from 6 weeks to 4 years, and who missed out?
- Did those who missed vaccines at the start of the pandemic catch-up over time?

Data source – Integrated Data Infrastructure (IDI)





- Population-wide research database managed by Stats NZ
- Links microdata across government agencies and surveys
 - Vaccine type and date from National Immunisation Register (NIR)
 - Births registered with DIA to construct population of interest (and determine birth order)
 - Child sex, ethnicity, region, and area deprivation from IDI central tables
 - Parents' income, education, and benefit receipt from Inland Revenue tax data and 2018 Census
- We focus on children born in NZ, exclude those who died or moved overseas, and look only at whether vaccination occurred by given date or not (don't distinguish reasons)

Descriptive trends in timely immunisation uptake





Figure: Share of children fully immunised within 1 month of becoming eligible for different immunisation events over time



- To estimate effect of pandemic, we conduct a retrospective cohort study focused on children who became eligible for immunisation at the start of the pandemic
- We compare vaccine uptake of affected and unaffected children at the same age
 - Affected: became eligible in March, April, May 2020
 - Unaffected: became eligible in March, April, May 2019 (= born one year earlier)
- We use a linear probability regression model to quantify vaccine uptake at each event as a function of affected status and control variables
- We quantify uptake at 1 month after becoming eligible, 2 months after, 9 months after, e.g., for the 4-year event, at age 49 months, 50 months, 57 months
- Identifying assumption: affected children would have behaved similarly to the earlierborn cohort in the absence of the COVID-19 pandemic
- Affected and unaffected children are socio-demographically similar



• Sample sizes:

Immunisation event	Sample size
6 week event	27,504
3 month event	27,039
5 month event	27,567
15 month event	26,478
4 year event	26,139

Illustration of empirical strategy





Figure: Share of children fully immunised at 4-year immunisation event, comparing affected and unaffected cohorts

Results: Average effects





Figure: Effect of the COVID-19 pandemic on childhood vaccine uptake at different immunisation events

Results: Heterogeneous effects on 4-year event by ethnicity





Figure: Effect of the COVID-19 pandemic on childhood vaccine uptake at the 4-year immunisation event by ethnicity

Results: Heterogeneous effects on 4-year event by birth order





Figure: Effect of the COVID-19 pandemic on childhood vaccine uptake at the 4-year immunisation event by birth order

Results: Heterogeneous effects on 4-year event by parents' benefit receipt



Figure: Effect of the COVID-19 pandemic on childhood vaccine uptake at the 4-year immunisation event by parents' benefit receipt

Results: Heterogeneous effects on 4-year event by area deprivation





Figure: Effect of the COVID-19 pandemic on childhood vaccine uptake at the 4-year immunisation event by area socioeconomic deprivation



- The COVID-19 pandemic had small or nil effects on uptake of the infancy events (6 weeks, 3 months, 5 months, 15 months)
- But a large negative effect on uptake of 4-year event (-15 pp at 1 month after eligibility, -6 pp after 9 months)
- The pandemic had differential impacts on 4-year uptake:
 - Less catch-up among Māori, Pacific, and low-SES families
 - Widening of pre-existing inequalities in immunisation coverage