

***Immunisation Coverage
(Primary Series)
and Children's Interactions
with the Health System***

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Double vowels are used rather than macrons where appropriate in Te Reo Maaori words in keeping with the Tainui convention, as mana whenua of the Counties Manukau district.

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Immunisation coverage (primary series) and children's interactions with the health system

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Summary and recommendations

Childhood vaccination coverage in Counties Manukau is currently well below the target of 95% for all ethnic groups. The purpose of this report is to explore data currently available to help understand the opportunities for action to increase childhood vaccination coverage in CM Health.

Coverage

Counties Manukau (CM) Maaori and Pacific children's immunisation coverage fell significantly over the 12-month period to March 2021 across all age milestones. For the 12-month period to March 2021, 936 children had not met their 8-month immunisation milestone, 718 of them Maaori and Pacific (76%).¹ CM Maaori and Pacific children's immunisation coverage at the 8-month milestone fell from 85% and 92% in April 2020 to 66% and 83% respectively in March 2021 (Figure 1). Consistent with the fall in coverage across a number of primary series immunisation milestones for children, there had also been a fall of 20% in the number of vaccines administered to children under 5 in 2020 compared to 2019 (Figure 4). However, there was modest increase of 7% in the number of vaccines administered the first 3 months of 2021 compared the corresponding period in 2020.

Vaccine timeliness

A high proportion of the immunisation coverage gap is related to delays in getting timely vaccination as per the immunisation schedule as opposed to outright refusal. For example, 21% more Maaori children were up-to-date at the 8 month milestone as compared to the 6 month milestone (Table 21). Given that there are no more vaccines on the schedule from 5 to 11 months, this 21% is straight catch-up. The delays in vaccination result in lower uptake of time sensitive vaccines such as rotavirus vaccines where the second dose needs to be given before the age of 25 weeks.

Health service contacts

The vast majority of children who did not meet the 8-month immunisation milestones had some contact with the publicly funded health system. Out of a retrospective cohort of children born between 1st July 2019 and 31st July 2020 (13 month period), who were domiciled in CM in 2020 and did not meet the 8-month immunisation milestone n=1,241: 83% were enrolled in a PHO (n=1,032), 72% had received a community pharmaceutical dispensing (n=896), 59% had a general medical subsidy (GMS) claim (n=729), and 15% had attended a hospital ED service (n=188) (Table 11).

Recommendation

- Given the high level of health service coverage, health professionals should take the opportunity to reinforce the vaccination messages at every service encounter.
- The latest phone and address details from the last health service contact should be accessible to support a recall or an outreach service as required.

¹ Immunisation coverage report 12-month sourced from MOH "tier_1_stats_12_month_april-mar_202021"
<https://www.health.govt.nz/our-work/preventative-health-wellness/immunisation/immunisation-coverage/national-and-dhb-immunisation-data>

- Every Well Child or health service contact should be used to optimise PHO enrolment and reinforce the immunisation message in a customised way. For example, using recent publicly-funded health service contacts could provide a much more targeted approach in optimising PHO enrolment coverage for the whole of population (including women of reproductive age). Messages and processes to support PHO enrolment and immunisation can be further reinforced during the antenatal period.
- Consistent messages regarding immunisation should be delivered by lead maternity carers and Well Child providers particularly for births that occur outside the publicly-funded hospital
- A look-up system to check and update eligibility of publicly funded health service that is accessible at point of care, without needing a person to prove eligibility on multiple occasions and in different settings would improve people's experience with publicly funded service.

PHO enrolment

PHO enrolment is strongly associated with immunisation coverage (Table 16). In particular, early PHO enrolment before 7 weeks (Table 30) and PHO enrolment with no subsequent enrolment gaps are strongly associated with better immunisation coverage (Table 28). Only 18% of CM children enrolled in a PHO in the first week of life (Table 30). However, about 10% of children who enrolled in a PHO before 7 weeks were subsequently disenrolled. Maaori (16%) and Pacific (13%) children had higher subsequent disenrollment rates (Table 33). This finding is mostly likely because the requisite forms had not been completed by the 12-week point. These PHO enrolment gaps are strongly associated with poorer immunisation coverage (Table 31). Other factors identified with higher immunisation coverage include being born in a publicly-funded hospital², or having a prior hospitalisation event (Table 15). Not being born in a publicly-funded hospital in New Zealand is associated with poorer PHO enrolment rates (Table 18). This group may include children who were born overseas, and/or born at home, or a privately funded facility in New Zealand.

Of the 1,241 children who did not meet the 8-month immunisation milestone, 209 (17%) were not enrolled in a PHO. However, 90% of these children not enrolled in a PHO had other health service activities as recorded by the MOH datasets (Table 12) suggesting there was one or more potential immunisation opportunities. Of note, Maaori and Pacific children had a higher activity rate at 98%, and 93% respectively.

Recommendation

- The automatic PHO enrolment system at birth should be implemented and supported by lead maternity carers.
- Establish IT systems to support PHO enrolment at various points of care from a range of health service providers to further optimise PHO enrolment coverage.
- The processes of PHO enrolment at birth need to be timely and good quality to limit subsequent PHO enrolment gaps. Business rules in relation in the temporary PHO enrolment of the new-born children in New Zealand should be fine-tuned to support this.
- The grace period of the preliminary PHO enrolment for the new-born could be lengthened, with automatic validation of eligibility.
- Automatic alerts to be set up so that if a non-PHO enrolled person is required to pay a higher co-payment fee then a targeted approach to enrolment occurs. Business rules could be more person-centric e.g. consider if a child is not yet enrolled, attended a GP clinic more than two times, a business rule mandates compulsory enrolment?

² As recorded in the NMDS, effectively excluding home births, new arrivals from overseas, or births in privately funded hospital not reporting to the MOH hospital records.

- Specific barriers to access primary health care in the context of Covid-19 era should be addressed, e.g. children being excluded from attending vaccination appointment if a child has respiratory symptoms. In addition, work should be undertaken with primary care to address some of the specific concerns raised from prior qualitative interviews and published reports, e.g. some clinics do not make people feel welcome in attending.

Outreach Immunisation service

The number of vaccines administered by the Outreach Immunisation Service, (OIS, Plunket) fell by 39% from 6,245 in 2019 to 3,903 in 2020 (Figure 5). For children who were referred to the OIS services, primary care delivered more vaccines to those children than the OIS service (Table 7). Overall, OIS administered about 3.7% of total number of vaccines for CM children under 5 in 2020, and accounted for about 12.9% of vaccinations for Maaori and 4.4% for Pacific children (Table 4). Kidz First hospital provided about 1.0% of total vaccinations volumes for CMDHB children under 5, and accounted for about 2.1% of Maaori and 1.4% of Pacific child vaccinations in 2020.

Recommendation

1. Given the high PHO enrolment and high level of primary health care contacts in the first year of life, optimising vaccination delivery by primary health care is likely to be the most sustainable option in providing a comprehensive set of health services required by a child (including immunisation).
2. Interventions that aim to improve immunisation coverage should be child and whaanau centric and consider the wider health needs of a child and family.
3. Active use of whole of system data, including the use of the most recently updated phone and address details of a child may improve the reach and efficiency of an outreach service.

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Introduction

Counties Manukau District Health Board (CMDHB) is recognised as having a young, socioeconomically deprived and ethnically diverse population. Counties Manukau has a large birth cohort with approximately 8,000 births/year. The estimated resident population released by Stats NZ indicates the 0-4 year old population in CM Health is made up of 23% Maori, 28% Pacific, 30% Asian, and 19% NZ European/Other, with a high proportion of children living in decile 9 and 10. It is estimated that 57,400 children aged 0-14 years in CM Health live in decile 9 and 10 areas.

The current immunisation schedule is reasonably complex. In 2020, an additional vaccination event at 12 months was added to the schedule so that now vaccination events, for under 5 year olds are scheduled to occur at 6 weeks, 3 months, 5 months, 12 months, 15 months and 4 years.

Table 1: New Zealand Immunisation Schedule from 1 October 2020

Age	Diseases covered and vaccines
6 weeks	Rotavirus (start first dose before 15 weeks) Diphtheria/Tetanus/Pertussis/Polio/Hepatitis B/Haemophilus influenzae type b Pneumococcal
3 months	Rotavirus (second dose must be given before 25 weeks) Diphtheria/Tetanus/Pertussis/Polio/Hepatitis B/Haemophilus influenzae type b
5 months	Diphtheria/Tetanus/Pertussis/Polio/Hepatitis B/Haemophilus influenzae type b Pneumococcal
12 months	Measles/Mumps/Rubella Pneumococcal
15 months	Haemophilus influenzae type b Measles/Mumps/Rubella Varicella (Chickenpox)
4 years	Diphtheria/Tetanus/Pertussis/Polio

Childhood vaccination coverage in Counties Manukau is currently well below the target of 95% for all ethnic groups. There is particular concern regarding Maaori coverage with a large equity gap across all milestone ages. The reasons for the decreasing vaccination coverage are multifactorial with systemic issues such as socioeconomic factors, access issues, practice level factors, attitudes held about vaccination by both health practitioners and caregivers, health literacy and now COVID-19, all playing a role.

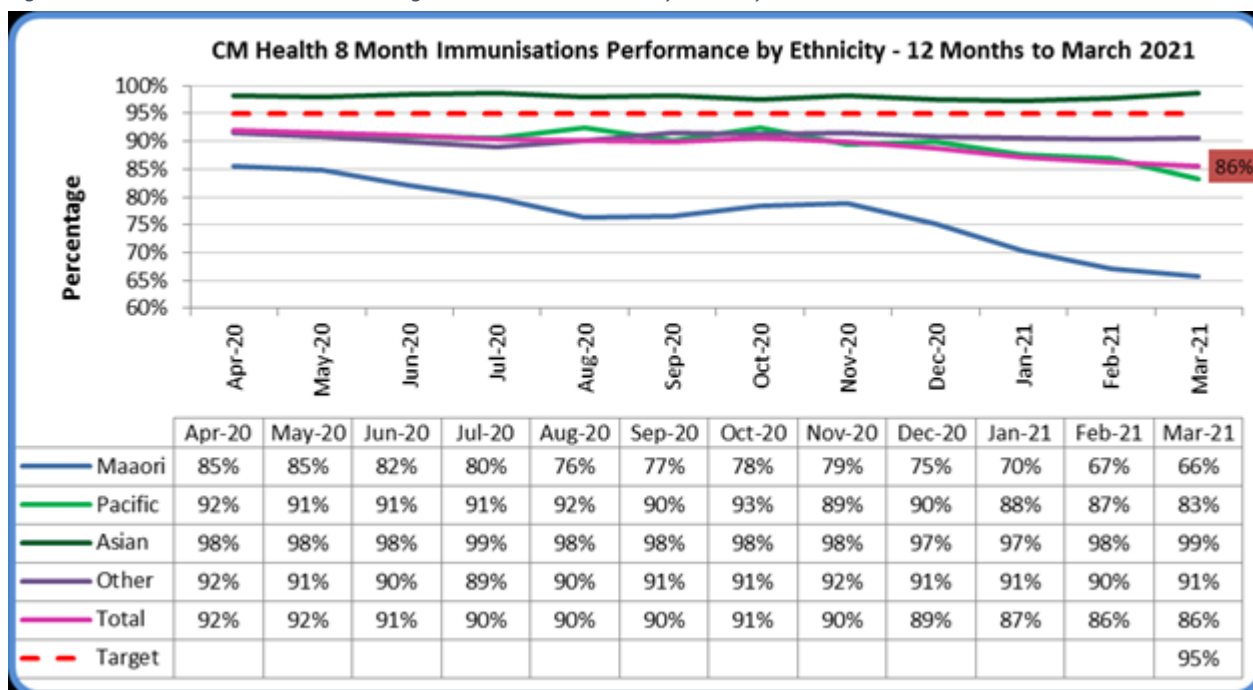
The purpose of this report is to explore data currently available to help understand the opportunities for action to increase childhood vaccination coverage in CM Health.

Vaccination Coverage in CMDHB

For the 12-month period to March 2021, 936 children had not met their 8 month immunisation milestone, 718 of them Maaori and Pacific (76%). CM Maaori and Pacific children’s immunisation coverage significantly fell over the 12-months to March 2021 across all three of the commonly reported primary series immunisation milestones. Over the same period, by comparison, Asian immunisation coverage in CM remained consistently high.

CM Maaori and Pacific children’s immunisation coverage at 8 months of age fell from 85% and 92% in April 2020, to 66% and 83% in March 2021 respectively (Figure 1). Over the same time period, there was a modest fall of 1% in the New Zealand European and Other group, while Asian immunisation coverage remained consistently high at 99%. Overall immunisation coverage for CM children at the 8 month milestone fell from 92% in April 2020 to 86% in March 2021.

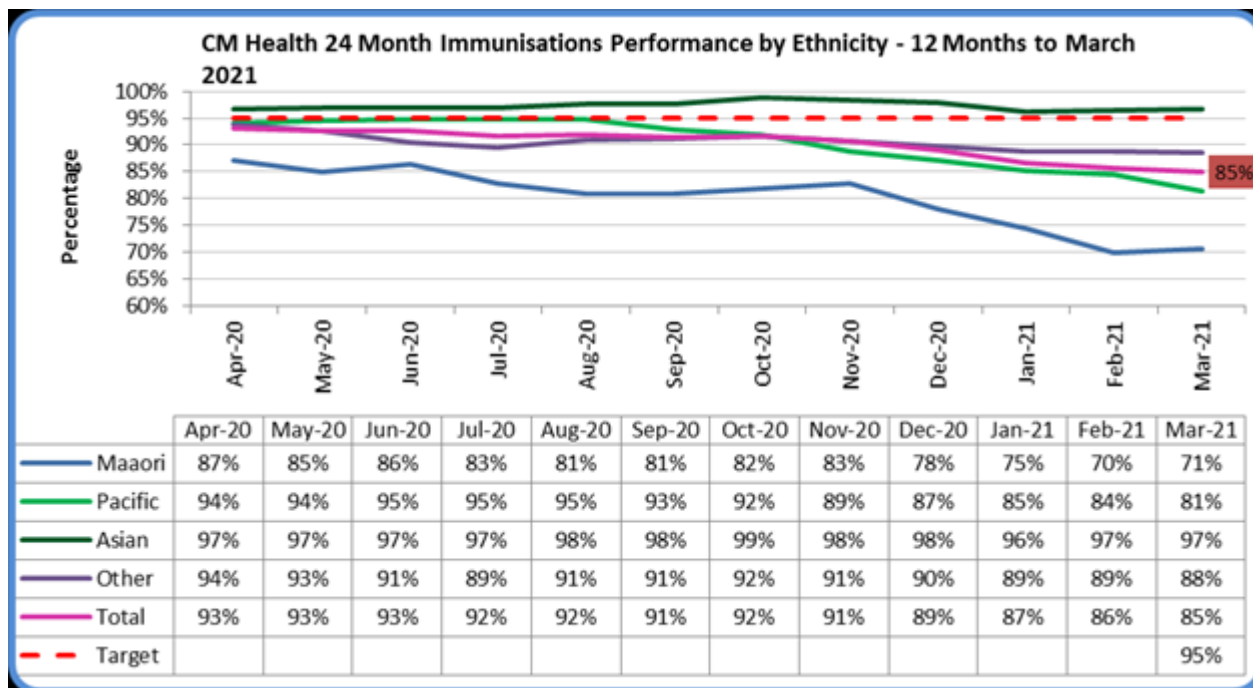
Figure 1: CM Health immunisation coverage at 8 month milestone by ethnicity – 12 months to March 2021



Data source: NIR, by Bede Oulaghan

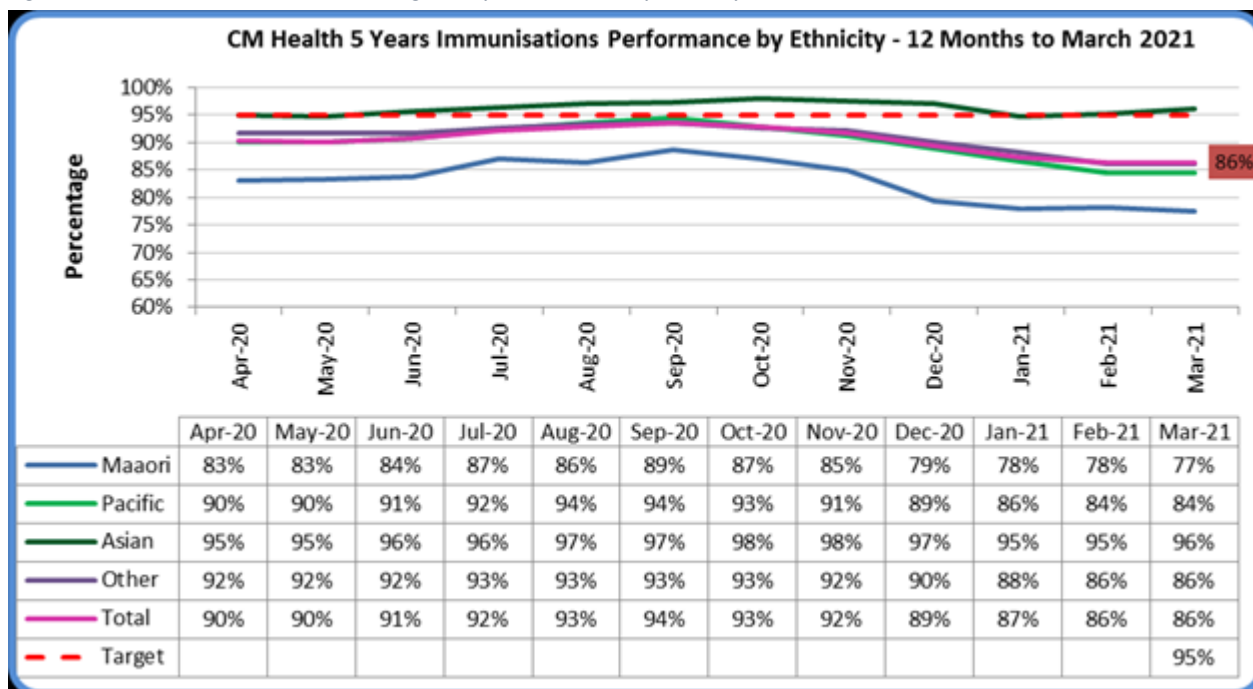
At the 24 month milestone, CM Maaori immunisation coverage fell from 87% in April 2020 to 71% in March 2021 (Figure 2). Pacific children fell from 94% to 81%. The New Zealand European and Other groups fell from 94% to 89%. Asian immunisation coverage remained consistently high over the period of a year at 97%.

Figure 2: CM Health immunisation coverage at 24 month milestone by ethnicity – 12 months to March 2021



At the 5 year milestone, CM Maaori immunisation coverage fell from 83% in April 2020 to 77% in March 2021 (Figure 3). Pacific children coverage fell from 90% to 84%. New Zealand European and Other groups fell from 92% to 86%. Asian immunisation coverage remained consistently high over the period of a year at 96%.

Figure 3: CM Health immunisation coverage at 5 year milestone by ethnicity – 12 months to March 2021

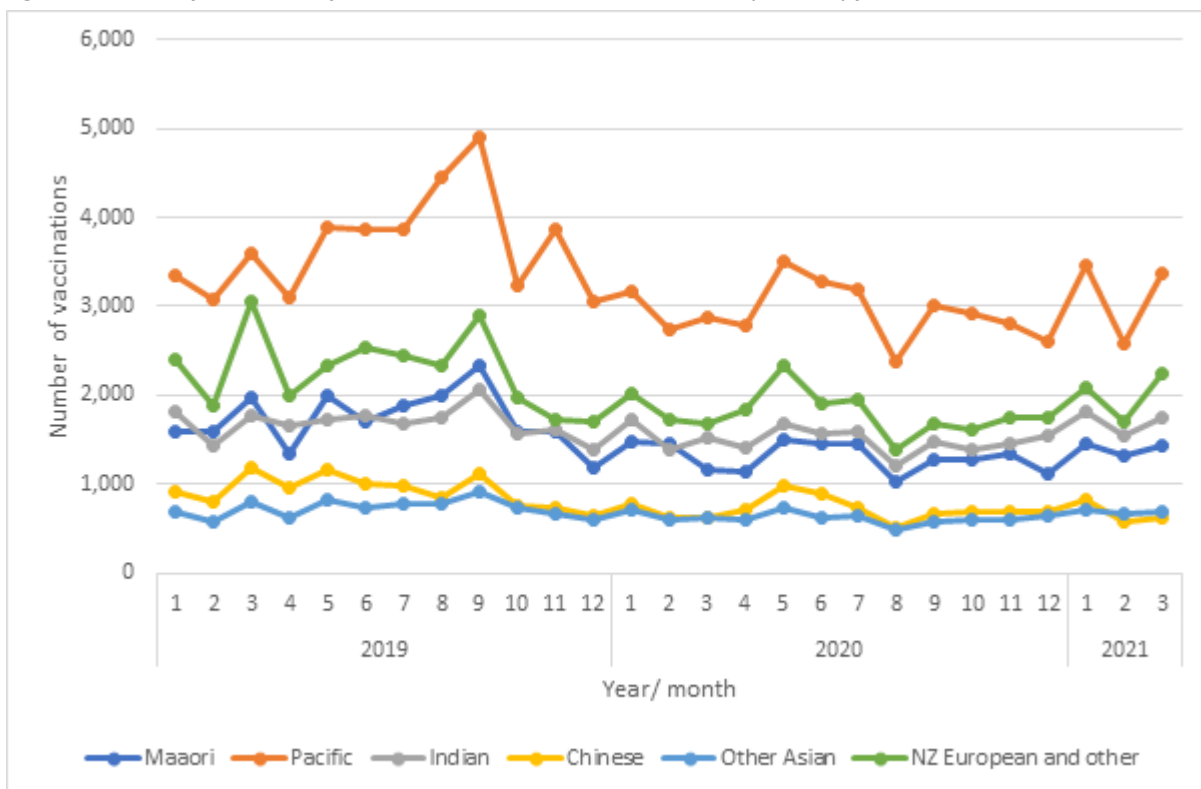


Vaccination activities: number of vaccines administered

Milestone indicators are relatively late indicators of vaccination activities as all the children have to reach the milestone age of interest in order to be reported by the indicator. A direct count of all vaccinations may provide more insights into recent trends.

Overall, there was about a 20% fall in the number of vaccinations administered in 2020 compared to 2019 for children aged under 5 (Figure 4). In particular, there was a fall in vaccination activities in August 2020 associated with the level 3 lock down in the Auckland region. In the first 3 months of 2021, there was an increase of 7% in the number of vaccines administered compared to the corresponding 3-month period in 2020. However, there was only a 3% increase in number of vaccines administered for Maori (and 7% increase for Pacific children). The more recent increase in vaccination numbers is not yet fully reflected in the milestone tables as those (who had received the more recent vaccinations) would not have reached the milestone age cut off points.

Figure 4: Number of vaccinations for children under 5 in Counties Manukau by ethnicity from 2019 to 2020



The impact of immunisation schedule changes on the number of vaccines and the number of discrete immunisation episodes required before 5 years of age

In 2020, there were two changes made in the NZ immunisation schedule. The pneumococcal vaccine is no longer required at 3 months. For each child, the total doses of pneumococcal vaccines required has reduced from four to three. However, the number of discrete immunisation episodes before age 5 has increased from five to six, because both pneumococcal vaccine and MMR are now expected to be administered at 12 months (a new time slot). At 15 months, Haemophilus influenzae type b; varicella vaccine and MMR vaccines are on the schedule and at 4 years the combo vaccine of diphtheria, tetanus, acellular pertussis, polio is still expected to be given. In summary, immunisation is expected to occur at 6 weeks, 3 months, 5 months, 12 months, 15 months and 4 years.

Despite the expected increase of unique vaccination encounters required for each child in 2020, because of the changes in the immunisation schedule, there was a fall in the number of unique vaccination encounters in 2020 compared to 2019 by 16% (based on unique dates of vaccination for each child)³ (Table 2). Maaori had one of the highest drops (20%) in the number of unique vaccination encounters.

Table 2: Number of unique vaccination encounters (dates) for CM children aged between 0 and 4 from 2019 to 2020 (full year)

Year	Maaori	Pacific	Indian	Chinese	Other Asian	NZ Euro and others	Overall
2019	8,199	17,352	8,696	5,599	3,878	11,740	55,464
2020	6,540	14,972	7,888	4,369	3,435	9,548	46,752
% change	-20%	-14%	-9%	-22%	-11%	-19%	-16%

However, more recent data for the first 3 months of 2021 suggested there had been an increase in the number of unique vaccination encounters with Maaori and Pacific children in the first 3 months of 2021 (Table 3).

Table 3: Number of unique vaccination encounters (dates) for CM children aged between 0 and 4 in the first 3 month of the year (Jan to March 2019 to 2021)

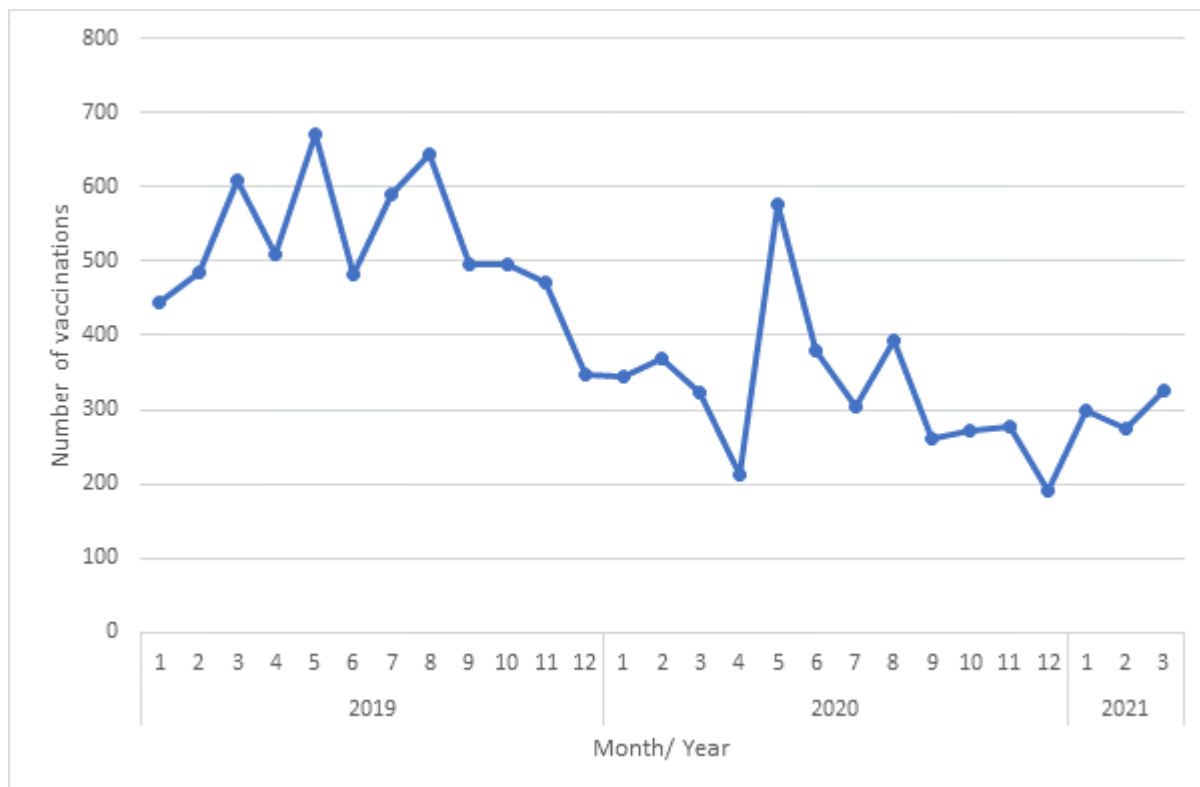
Year	Maaori	Pacific	Indian	Chinese	Other Asian	NZ Euro and others	Overall
2019	1,951	3,746	2,033	1,376	877	3,019	13,002
2020	1,575	3,493	1,914	936	820	2,242	10,980
2021	2,033	4,578	2,563	1,122	1,073	3,065	14,434
change in the first 3 months between 2020 and 2021	29%	31%	34%	20%	31%	37%	31%

³ As per the immunisation schedule, often there is a set of vaccines that are needed to be given at the same time, e.g. at 6 weeks, "Rotavirus", "Diphtheria/Tetanus/Pertussis/Polio/Hepatitis B/Haemophilus influenzae type b" and "Pneumococcal" are often given at the same time, (as the same vaccination encounter).

Non-primary care providers of vaccinations: Outreach Immunisation Service (OIS)

Plunket is the largest provider of Outreach Immunisation Service (OIS) for CM. Papakura Marae, Southseas and Raukura Hauora all have small OIS contracts but deliver very few vaccinations. There has been a drop in vaccines administered by Plunket since late 2019, in particular noting a fall in vaccines given in April 2020, associated with level 4 lock down in Auckland and staffing issues related to outreach services.

Figure 5: Number of vaccinations for CM children under 5 administered by CMDHB Plunket OIS service



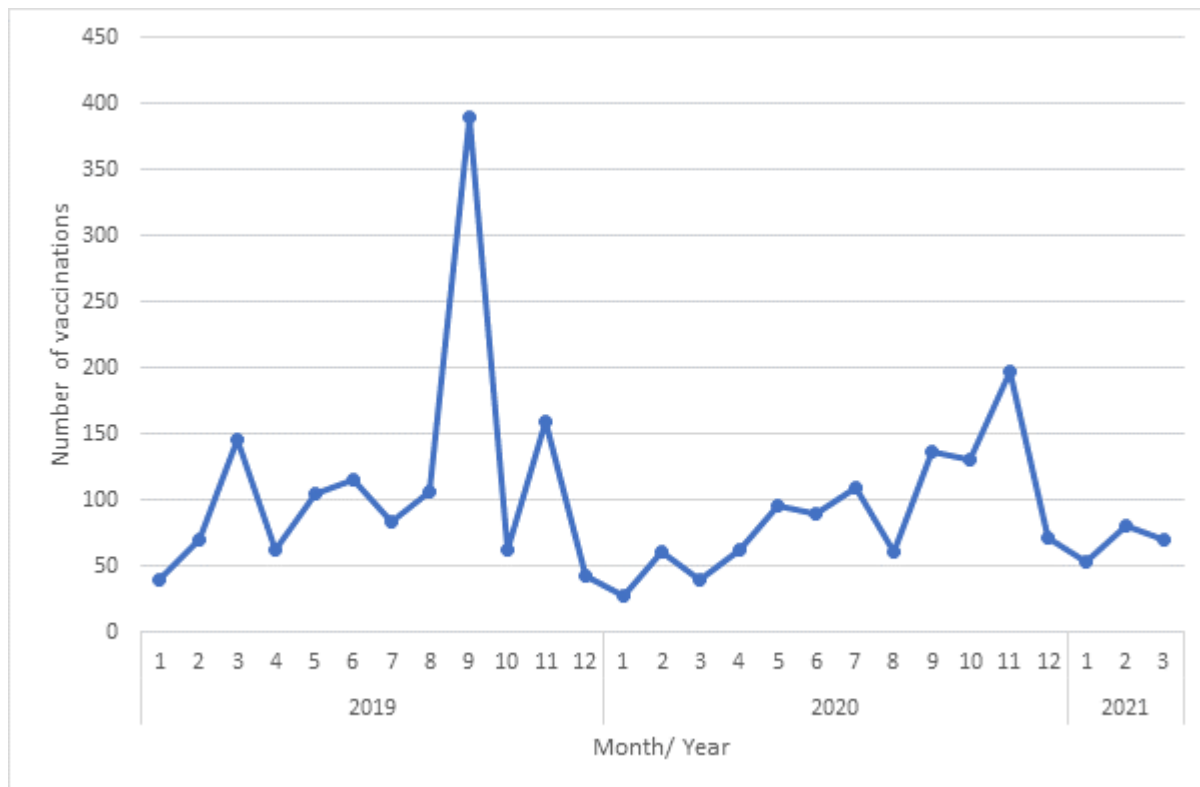
The OIS provided by Plunket administered about 3.1% of all vaccinations for CM children under 5 in the first 3 months of 2021. This compares to 4.7% in whole year of 2019 and 3.7% in 2020. Overall, there was a 39% fall in vaccination volumes from 6,245 in 2019 to 3,903 in 2020. The outreach service administered 10.1% of Maaori vaccinations in the first 3 months of 2021 and 4.1% of vaccinations for Pacific children.

Table 4: Percentage of vaccinations for CM children under 5 delivered by Plunket by ethnicity

Year	Maaori	Pacific	Indian	Chinese	Other Asian	NZ European and other	Overall
2019	15.4%	5.8%	0.4%	0.2%	0.4%	1.2%	4.7%
2020	12.9%	4.4%	0.3%	0.1%	0.3%	1.0%	3.7%
2021	10.1%	4.1%	0.6%	0.1%	0.6%	0.7%	3.1%

Kidz First also provides vaccinations opportunistically, for young children while they are in hospital. In addition to the primary series Kidz First also offered influenza vaccination in 2020 (but not in 2019 and not yet in the first 3 months in 2021), which is included in these numbers. Their volumes are generally lower in the summer months where hospitalisation rates are lower.⁴ Overall, Kidz First provides about 1.0% of the total vaccinations volumes for CMDHB children under 5, and accounts for about 2.1% of Maaori and 1.4% of Pacific children’s vaccination volumes in 2020.

Figure 6: number of vaccinations for CM children under 5 administered by Kidz first



⁴ In addition, 2020 saw a low rate of paediatric admissions due to a reduction of infectious disease. This has reversed in 2021.

Linking OIS referral data to NIR data

The following analyses were undertaken by Bede Oulaghan (from the Health Intelligence & Informatics team) matching OIS data with the NIR data and PHO enrolment data.⁵

For the 8 month cohort, there were 2,045 referrals made to OIS in 2020 for 1,981 unique individuals (NHIs) as recorded as at 23rd March 2021. Referrals are predominately for Maaori and Pacific children accounting for 92% of all referrals (Table 5).

Table 5: Number of referrals to OIS by ethnicity (as recorded by OIS service on a spreadsheet)

Ethnicity	Number of referrals	% of referrals
Maaori	1,008	49%
Pacific	682	33%
Asian	142	7%
Other	213	10%
Total Referrals	2,045	

Out of the 2,045 referrals made to the OIS service, 38% were recorded as immunised as at 23rd March 2021. About 16% were either recorded as being not contactable or having moved out of Counties Manukau health area. About 32% of referrals made in 2020 were still under the service of OIS as at 23rd March 2021. Of note, even in this selected cohort only 6% outright declined immunisation.

Table 6: Outcomes of referrals to OIS in 2020 as recorded by OIS.

Outcome as recorded by OIS	Number of referrals	% of referrals
Immunised	786	38%
Unable to Contact/Non Responder	168	8%
Moved Out of CMH	154	8%
Declined Immunisations	130	6%
Declined OIS	148	7%
Deceased	3	0%
Still with OIS	656	32%
Total Referrals	2,045	

⁵ Note: there are a number of challenges with the linkage process and the quality of the OIS data submitted in a spreadsheet. There may be value in setting up a more systematic and standardised way in better capturing the relevant data to support service improvement and service delivery. The Health Intelligence team only has access to the following 5 PHOs, Alliance Health Plus, East Health, National Hauora Coalition, ProCare and Total Healthcare. People who are enrolled outside of these 5 PHOs will not be mapped.

The outcome of being “immunised” as recorded by OIS service, does not necessarily mean that all immunisations were delivered by the OIS service. The actual immunisation may be administered by primary health care practice or by OIS. With linkage to the NIR based on a data extract on 20th April 2021, Table 7 demonstrated for children who had been referred to the OIS service, majority of the vaccinations were delivered by primary health care. This may or may not have been due to the efforts made by the OIS service.

Table 7: Immunisation status and location of vaccinations for (“8 month”) children who were referred to the CM OIS service in 2020

Immunisation status and location of immunisation	6 weeks: DTaP-IPV-HepB/Hib		3 Months: DTaP-IPV-HepB/Hib		5 months: DTaP-IPV-HepB/Hib	
	Number	%	Number	%	Number	%
Immunised	1,408	71%	1,256	63%	1,121	57%
By GP practice	1,150	58% (82% of imms total)	875	44% (70% of imms total)	553	28% (49% of imms total)
By OIS (Plunket)	215	11% (15% of imms total)	362	18% (29% of imms total)	559	28% (50% of imms total)
By Kidz First/CM Health	43	2% (3% of imms total)	19	1% (1% of imms total)	9	1% (1% of imms total)
Declined	136	7%	162	8%	183	9%
Rescheduled	0	0%	7	0%	9	0%
No NIR record	437	22%	556	28%	668	34%
Total Unique NHIs	1,981 ⁶		1,981		1,981	

⁶ For the 8 month cohort, there were 2,045 referrals made to OIS in 2020 for 1,981 unique individuals.

Table 8 and Table 9 describe the vaccinations received by 24 month and 4 year cohorts of children referred to the OIS service in 2020. Noticeably, more vaccinations were delivered by primary health care than by the OIS (Plunket) service for children who were referred to OIS. Therefore, the role of outreach may include a co-ordination/ engagement role of immunisation services with or without actually delivering the vaccination. The increased percentage of vaccinations undertaken by Kidz First at 4 years of age is likely to represent the vaccinations done when the children attend a clinic for their B4S check, rather than this occurring through the hospital.

Table 8: Immunisation status and location of vaccinations for (“24 month”) children who were referred to the CM OIS service in 2020

Immunisation status and location of immunisation	15 Month MMR / Hib	
	Number	%
Immunised	520	37%
By GP practice	327	23% (63% of imms total)
By OIS (Plunket)	175	12% (34% of imms total)
By Kidz First/CM Health	18	2% (3% of imms total)
Declined	68	5%
Rescheduled	36	3%
No NIR record	787	56%
Total Unique NHIs	1,411	

Table 9: immunisation status and location of vaccinations for (“4 year”) children who were referred to the CM OIS service in 2020

Immunisation status and location of immunisation	4 year DTaP-IPV		4 year MMR	
	Number	%	Number	%
Immunised	472	46%	415	40%
By GP practice	244	24% (52% of imms total)	258	25% (62% of imms total)
By OIS (Plunket)	75	7% (16% of imms total)	59	5% (14% of imms total)
By Kidz First/CM Health	153	15% (32% of imms total)	98	10% (24% of imms total)
Declined	48	5%	38	4%
Rescheduled	6	0%	5	0%
No NIR record	503	49%	571	56%
Total Unique NHIs	1,029		1,029	

Given that vast majority of children who did not meet immunisation milestones often have multiple other health service contacts (Table 11), and based on the linkage work between OIS referral and NIR records of vaccination suggest that significant proportions of children referred to OIS are often hard to track, there may be a role to use the last contact details recorded from administrative records to enable better tracking of children referred to the OIS.

Factors associated with meeting vaccination milestones

A retrospective cohort of children born between 1st July 2019 and 31st July 2020 (13-month period) was selected to determine what factors are associated with higher vaccination coverage (at the 8 month milestone mark). Children who had a date of birth between 1st July 2019 and 31st July 2020 as recorded in one of the MOH datasets are included.⁷ This method aims to capture the children born outside of a publicly funded hospital setting including children born overseas and subsequently had health service utilisation. Consistent with the MOH immunisation reports, Maaori and Pacific children have lower immunisation coverage compared to other ethnicities.

Table 10: % of CM children born between 1st July 2019 and 31st July 2020 with complete immunisation at 8 month milestone by ethnicity (deaths excluded)

Immunisation milestones	Maaori	Pacific	Indian	Chinese	Other Asian	European/ Other	Overall
Incomplete at 8 months	498	407	60	24	31	221	1,241
Completed vaccinations at 8 months	1,384	2,451	1,413	560	581	1,762	8,151
% Complete at 8 months	74%	86%	96%	96%	95%	89%	87%
Total	1,882	2,858	1,473	584	612	1,983	9,392

⁷ NMDS up to 28 Feb 2021, NNPAC up to 30 Sep 2020, PHO enrolment up to 28 Feb 2021, Pharms up to 31 Dec 2020, NIR 31st March 2021, GMS 31 Dec 2020, lab 23 Dec 2020

Out of the 1,241 children who did not meet the 8 month immunisation milestone, 83% of them had contact with a PHO, and 72% had received a pharmaceutical dispensing (Table 8). Furthermore, the relatively high percentage of children who had GMS claims (59%) suggested that either there were PHO enrolment gaps post-birth or children were commonly receiving primary care services outside the enrolled practice, for example urgent care practices. Given the concerning proportion of children not meeting immunisation milestones, but receiving other health services, suggests an opportunity for action. This could range from directly checking immunisation status then and there, or at least making better use the latest personal contact details from the more recent administrative health records. It does highlight the potential value of reinforcing the core immunisation messages from a range of health service providers. For the 12 month period to March 2021, 1,241 children within the selected cohort had not met their 8 month immunisation milestone, 905 of them Maaori and Pacific (79%). There were 209 children who did not meet the 8-month immunisation milestone, and also were not enrolled in a PHO.

Table 11: Health service activities of CM children who did not meet the 8 month immunisation milestone (deaths excluded)

Health service activities	Maaori	Pacific	Indian	Chinese	Other Asian	European/ Other	Overall
Number of children with Incomplete vaccinations at 8 months	498	407	60	24	31	221	1,241
Contact with PHO	409	337	54	22	22	188	1,032
% Contact with PHO	82%	83%	90%	92%	71%	85%	83%
Had Pharms dispensing	364	309	47	18	17	141	896
% had pharms dispensing	73%	76%	78%	75%	55%	64%	72%
Had GMS claims	292	246	31	15	12	133	729
% had GMS claims	59%	60%	52%	63%	39%	60%	59%
Contact with Hospital ED services	73	87	3	3	1	21	188
% had Hospital ED events	15%	21%	5%	13%	3%	10%	15%
Contact with secondary outpatient services	64	60	5	1	0	34	164
% with secondary outpatient services	13%	15%	8%	4%	0%	15%	13%

Out of the 209 children who did not meet the 8 month milestone, and not enrolled in a PHO, 90% had other health service activities as recorded by the MOH datasets⁸ (Table 12). Of note, Maaori and Pacific children had a higher coverage at 98%, and 93% respectively. Systems to look up PHO enrolment status and support PHO enrolment would be of value at the point of care of each health service to further optimise PHO enrolment coverage. Overall, there were 21 children with no footprint in MoH databases which suggested these children might have moved overseas.

Table 12: Number of types of health service received by CM children who did not meet 8 month milestone, and not enrolled in a PHO

Number of health service types received	Maaori	Pacific	Indian	Chinese	Other Asian	European/ Other	Overall
0	2	5	1	1	3	9	21
1	42	35	3	1	1	7	89
2	15	14	2		4	11	46
3	24	12			1	4	41
4	6	2				1	9
5		2				1	3
% had at least one health service activity recorded in MOH datasets	98%	93%	83%	50%	67%	73%	90%
Total	89	70	6	2	9	33	209

⁸ Health service activities include: GMS claims, hospital based ED events, outpatient events as recorded by NNPAC, pharmaceutical dispensing, and inpatient events.

The majority of children (70%) who did not meet the 8-month immunisation milestone, and were not enrolled in a PHO, had a birth event in hospital (Table 13). This supports the potential value of automatic PHO enrolment at birth if the system was to work well. Just under half of the children (42%) had received at least one pharmaceutical dispensing and 40% generated GMS claims (i.e. attendance at a general practice). The non-PHO enrolment status would often be noted in these settings since these health service events are generally charged at a higher rate of patients' co-payment. Given the high percentage of children in this subgroup had a range of health service use, there may be value in using the latest contact details from the prior record to enable better reach of the outreach service.

Table 13: Type of other health services received by children who did not meet the 8 month immunisation milestone, and were not enrolled in a PHO.

Type of health service received	Maaori	Pacific	Indian	Chinese	Other Asian	European/ Other	Overall
Had pharms dispensing	42	28	2		3	12	87
% had pharms dispensing	47%	40%	33%	0%	33%	36%	42%
Inpatient events (not related to birth)	12	9				6	27
% had inpatient events	13%	13%	0%	0%	0%	18%	13%
Hospital birth events	76	50	3		6	11	146
% had birth in hospital	85%	71%	50%	0%	67%	33%	70%
GMS claims	34	27	2	1	3	16	83
% had GMS claims	38%	39%	33%	50%	33%	48%	40%
ED	5	9				3	17
% had ED admission	6%	13%	0%	0%	0%	9%	8%
Outpatients (NNPAC non-ED events)	6	2				5	13
% had outpatient events	7%	3%	0%	0%	0%	15%	6%
Total	89	70	6	2	9	33	209

Birth locations and prior hospitalisation

There were 9,448 children with a date of birth between 1st July 2019 and 31st July 2020 domiciled in Counties Manukau (based on last health service contact).⁹ 7% of the children were not born in a hospital as recorded in the NMDS. The 7% out of hospital births may include home births, people who were born overseas, or born in privately funded facilities not (yet) submitting data to the NMDS¹⁰.

Table 14: Number of children with a date of birth between 1st July 2019 and 31st July 2020 by DHB, and by birth location, and by prior hospital event¹¹

DHB of domicile	No prior NMDS event	Had a NMDS event	Total births in the 13-month period	% with no prior hospital event	% of births not at a hospital
011 Northland	243	2,458	2,701	9%	13%
021 Waitemata	602	7,889	8,491	7%	9%
022 Auckland	485	5,459	5,944	8%	10%
023 Counties Manukau	462	8,986	9,448	5%	7%
031 Waikato	802	5,446	6,248	13%	18%
042 Lakes	111	1,588	1,699	7%	9%
047 Bay of Plenty	370	3,229	3,599	10%	14%
051 Tairāwhiti	44	717	761	6%	7%
061 Taranaki	120	1,503	1,623	7%	11%
071 Hawkes Bay	179	2,137	2,316	8%	12%
081 MidCentral	203	2,259	2,462	8%	11%
082 Whanganui	62	892	954	6%	9%
091 Capital & Coast	222	3,285	3,507	6%	8%
092 Hutt	139	2,095	2,234	6%	9%
093 Wairarapa	59	569	628	9%	13%
101 Nelson Marlborough	110	1,559	1,669	7%	15%
111 West Coast	43	329	372	12%	19%
120 Canterbury	470	6,631	7,101	7%	12%
123 South Canterbury	42	631	673	6%	7%
160 Southern	287	3,525	3,812	8%	12%
New Zealand overall	5,055	61,187	66,242	8%	11%

⁹ 56 children had died by the end of the 2020. The 9,448 would also include the children who were born overseas (during the 13 month period of interest).

¹⁰ Some facilities seem to take a year or more to submit data to the NMDS

¹¹ Deaths not excluded.

Either prior hospitalisation, or birth in a hospital are associated with better immunisation coverage at 8 months. Out of the children who were born in hospital, 88% had completed set of vaccination as per the 8-month milestone. Children who were not born in hospital and did not have prior hospitalisation had a much lower vaccination completion at 54% (Table 15).

Table 15: vaccination completion rates at 8 month milestone of CM children born between 1st July 2019 and 31st July 2020 by prior hospitalisation status

Prior hospitalisation status	Incomplete at 8 months	Completed vaccinations at 8 months	Number of children
Not born in hospital and not had prior hospitalisation	46%	54%	462
Not born in hospital but had prior hospital event	27%	73%	206
Born in Hospital	12%	88%	8,780
Overall	14%	86%	9,448

PHO enrolment status

Children who are not enrolled in a PHO are much less likely to have vaccination completed at 8 months compared to children who are enrolled. However, only relatively small number of children 389 out of 9,448 (4%) were not enrolled in a PHO.

Table 16: vaccination completion rates at 8 month milestone of CM children born between 1st July 2019 and 31st July 2020 by PHO enrolment status

PHO enrolment	Incomplete at 8 months	Completed vaccinations at 8 months	Number of children
No	64% (n=249)	36% (n=140)	389
Yes	12%	88%	9,059
Overall	14%	86%	9,448

Over 99% of children enrolled in a PHO are also enrolled on the NIR. However, non-PHO enrolment is associated with lower NIR enrolment coverage.

Table 17: Association between PHO enrolment and NIR enrolment (CM children born between 1st July 2019 and 31st July 2020)

PHO enrolment	Not enrolled in NIR	Enrolled in NIR	Number of children
No	17% (n=66)	83% (n=323)	389
Yes	0.7%	99.3%	9,059
Overall	1.4%	98.6%	9,448

Children who are not born in hospital, as recorded in the NMDS, were also less likely to be enrolled in a PHO. This group may include children who were born overseas, and/or did not have a validated immunisation record, or children born at home or in a privately-funded facility.

Table 18: Association between PHO enrolment status and location of birth (CM children born between 1st July 2019 and 31st July 2020)

Born in Hospital	PHO enrolled	Not PHO enrolled	Number of children
No	88%	12%	668
Yes	97%	3%	8,780
Overall	96%	4%	9,448

Answering some key policy questions

Is poor immunisation coverage related to delays or outright refusal?

Out of the retrospective cohort of children born between 1st July 2019 and 31st July 2020 in New Zealand (13-month period), 76% overall met the 6 month immunisation milestone (Table 19). However, Maaori had considerably lower immunisation coverage at the 6 month milestone at 58% nationally, and only at 52% for Maaori children in CM.

Table 19: % of children born between 1st July 2019 and 31st July 2020 in New Zealand meeting the 6 month immunisation milestone by ethnicity and by DHB

DHB of domicile	Maaori	Pacific	Indian	Chinese	Other Asian	NZ Euro and others	Overall
011 Northland	52%	66%	86%	92%	79%	69%	60%
021 Waitemata	59%	73%	91%	91%	89%	77%	79%
022 Auckland	63%	70%	91%	87%	89%	80%	79%
023 Counties Manukau	52%	71%	92%	91%	90%	78%	74%
031 Waikato	51%	67%	90%	90%	88%	75%	69%
042 Lakes	51%	73%	78%	94%	91%	78%	65%
047 Bay of Plenty	52%	70%	90%	85%	87%	75%	68%
051 Tairāwhiti	53%	76%	94%	100%	89%	77%	63%
061 Taranaki	57%	68%	89%	86%	92%	77%	72%
071 Hawkes Bay	56%	75%	91%	100%	87%	80%	70%
081 MidCentral	59%	75%	88%	85%	89%	80%	74%
082 Whanganui	55%	77%	80%	86%	94%	82%	70%
091 Capital & Coast	69%	77%	87%	94%	89%	86%	83%
092 Hutt	70%	80%	89%	89%	89%	88%	82%
093 Wairarapa	72%	71%	100%	100%	100%	84%	81%
101 Nelson Marlborough	70%	73%	94%	90%	92%	82%	80%
111 West Coast	74%	88%	100%	100%	75%	72%	73%
120 Canterbury	73%	82%	91%	92%	91%	85%	84%
123 South Canterbury	73%	68%	86%	89%	79%	87%	84%
160 Southern	72%	84%	87%	82%	92%	86%	84%
New Zealand overall	58%	73%	90%	90%	89%	80%	76%

There is no additional vaccination required between 6 and 8 months of age as per New Zealand immunisation schedule. Therefore, any improvement of coverage at the 8-month milestone mark is related to children catching up with vaccinations prior to 6 months. While CM Maaori children's immunisation coverage remained relatively low at 73% (Table 20), there had been an improvement of 21% within the 2-month period (Table 21) suggesting that delay in getting vaccination in the timely manner is one of the major factors of Maaori children not meeting the 6 month immunisation milestone. The relatively low outright refusal to immunisation is also supported by the low New Zealand immunisation decline rates at around 5%. Within the selected group CM children referred to outreach services (Plunket), the decline rates ranged from 5 to 9%.

Table 20: % of children born between 1st July 2019 and 31st July 2020 in New Zealand meeting the 8 month immunisation milestone by ethnicity and by DHB

DHB of domicile	Maaori	Pacific	Indian	Chinese	Other Asian	NZ Euro and others	Overall
011 Northland	78%	79%	96%	92%	90%	83%	81%
021 Waitemata	79%	88%	96%	96%	96%	87%	89%
022 Auckland	79%	85%	96%	93%	93%	87%	88%
023 Counties Manukau	73%	85%	95%	96%	95%	88%	86%
031 Waikato	75%	85%	95%	95%	94%	88%	85%
042 Lakes	69%	89%	83%	100%	94%	86%	78%
047 Bay of Plenty	74%	87%	96%	97%	91%	85%	82%
051 Tairāwhiti	76%	86%	94%	100%	89%	85%	80%
061 Taranaki	74%	82%	95%	93%	94%	85%	83%
071 Hawkes Bay	84%	96%	97%	100%	96%	90%	89%
081 MidCentral	75%	85%	96%	89%	95%	88%	84%
082 Whanganui	73%	88%	80%	86%	94%	90%	82%
091 Capital & Coast	82%	88%	91%	97%	96%	92%	90%
092 Hutt	83%	87%	93%	96%	93%	94%	90%
093 Wairarapa	88%	79%	100%	100%	100%	89%	89%
101 Nelson Marlborough	85%	86%	96%	90%	93%	90%	89%
111 West Coast	82%	100%	100%	100%	92%	78%	80%
120 Canterbury	88%	93%	96%	94%	94%	92%	92%
123 South Canterbury	85%	76%	93%	100%	88%	94%	92%
160 Southern	86%	93%	94%	90%	97%	93%	92%
New Zealand overall	78%	87%	95%	95%	95%	89%	87%

Table 21: Absolute % improvement of immunisation between 6- and 8-months immunisation milestones of children born between 1st July 2019 and 31st July 2020 (13 month period) in New Zealand

DHB of domicile	Maaori	Pacific	Indian	Chinese	Other Asian	NZ Euro and others	Overall
011 Northland	26%	13%	10%	0%	10%	14%	20%
021 Waitemata	20%	15%	6%	4%	6%	10%	10%
022 Auckland	17%	15%	5%	6%	5%	7%	9%
023 Counties Manukau	21%	14%	4%	5%	5%	10%	12%
031 Waikato	24%	18%	5%	5%	6%	13%	16%
042 Lakes	18%	16%	5%	6%	3%	8%	13%
047 Bay of Plenty	22%	17%	6%	12%	4%	11%	15%
051 Tairāwhiti	24%	10%	0%	0%	0%	8%	17%
061 Taranaki	17%	13%	7%	7%	2%	8%	11%
071 Hawkes Bay	28%	21%	5%	0%	10%	11%	18%
081 MidCentral	16%	10%	8%	4%	5%	8%	10%
082 Whanganui	18%	12%	0%	0%	0%	8%	12%
091 Capital & Coast	13%	11%	4%	3%	7%	6%	7%
092 Hutt	12%	8%	4%	8%	3%	6%	8%
093 Wairarapa	16%	7%	0%	0%	0%	5%	8%
101 Nelson Marlborough	15%	14%	2%	0%	1%	8%	9%
111 West Coast	9%	13%	0%	0%	17%	6%	7%
120 Canterbury	15%	12%	5%	1%	4%	7%	8%
123 South Canterbury	13%	8%	7%	11%	9%	7%	8%
160 Southern	13%	9%	6%	8%	5%	7%	8%
New Zealand overall	20%	14%	5%	5%	5%	9%	11%

Given the latest immunisation data is only up to 31st March 2021, in order to compare 6, 8 and 12 months immunisation milestones, an older subgroup of children was selected, namely children born during the 9-month period between 1 July 2019 and 31 Mar 2020. Given the fall in vaccination numbers in 2020 compared to 2019, this older cohort had experienced a period of higher immunisation activities in the past compared to the children born more recently. The subgroup of children born during the 9-month period between 1 July 2019 and 31 Mar 2020, had also seen an improvement in immunisation coverage between the 6 month and 8 month milestones, particularly ethnic groups with low immunisation coverage at 6 months (Table 22). For example, there was a 23% improvement in immunisation coverage for CM Maori between the 6 and 8 month milestones. However, the improvement of immunisation coverage is more modest between 8 and 12 month milestones at only 3% for CM Maori (Table 23).

Table 22: Absolute % improvement of immunisation between 6- and 8-months immunisation milestones of children born between 1 July 2019 and 31 Mar 2020 (9 month period) in New Zealand

DHB of domicile	Maaori	Pacific	Indian	Chinese	Other Asian	NZ Euro and others	Overall
011 Northland	25%	12%	11%	0%	12%	13%	19%
021 Waitemata	21%	15%	7%	5%	7%	10%	11%
022 Auckland	17%	16%	5%	7%	6%	7%	9%
023 Counties Manukau	23%	15%	4%	6%	6%	10%	13%
031 Waikato	25%	17%	5%	7%	6%	13%	16%
042 Lakes	17%	13%	7%	7%	4%	8%	13%
047 Bay of Plenty	23%	16%	8%	12%	3%	11%	15%
051 Tairāwhiti	24%	13%	0%	0%	0%	8%	17%
061 Taranaki	20%	10%	10%	0%	3%	8%	11%
071 Hawkes Bay	27%	19%	6%	0%	12%	11%	18%
081 MidCentral	18%	12%	11%	5%	6%	9%	12%
082 Whanganui	19%	17%	0%	0%	0%	8%	13%
091 Capital & Coast	15%	11%	5%	4%	8%	6%	8%
092 Hutt	13%	7%	6%	10%	3%	7%	8%
093 Wairarapa	15%	0%	0%	0%	0%	6%	9%
101 Nelson Marlborough	16%	14%	3%	0%	2%	9%	10%
111 West Coast	10%	13%	0%	-	25%	6%	8%
120 Canterbury	15%	12%	5%	1%	4%	8%	8%
123 South Canterbury	12%	0%	9%	0%	12%	8%	8%
160 Southern	13%	7%	7%	7%	6%	8%	9%
New Zealand overall	21%	14%	6%	5%	6%	9%	12%

Table 23: Absolute % improvement of immunisation between 8- and 12-months immunisation milestones of children born between 1 July 2019 and 31 Mar 2020 (9 month period) in New Zealand

DHB of domicile	Maaori	Pacific	Indian	Chinese	Other Asian	NZ Euro and others	Overall
011 Northland	2%	3%	0%	0%	2%	2%	2%
021 Waitemata	5%	3%	1%	1%	1%	2%	2%
022 Auckland	6%	2%	1%	1%	1%	2%	2%
023 Counties Manukau	3%	3%	1%	1%	0%	2%	2%
031 Waikato	5%	2%	1%	2%	1%	2%	3%
042 Lakes	8%	6%	0%	0%	4%	1%	5%
047 Bay of Plenty	5%	2%	0%	0%	0%	2%	3%
051 Tairāwhiti	5%	7%	0%	0%	0%	1%	4%
061 Taranaki	5%	0%	7%	17%	3%	2%	3%
071 Hawkes Bay	3%	1%	0%	0%	2%	1%	2%
081 MidCentral	9%	2%	0%	0%	2%	2%	4%
082 Whanganui	6%	0%	0%	0%	0%	2%	4%
091 Capital & Coast	5%	4%	4%	1%	1%	1%	2%
092 Hutt	5%	1%	2%	0%	0%	0%	2%
093 Wairarapa	4%	11%	0%	0%	0%	1%	2%
101 Nelson Marlborough	4%	0%	0%	0%	3%	1%	2%
111 West Coast	8%	0%	0%	-	0%	1%	2%
120 Canterbury	2%	0%	0%	1%	1%	1%	1%
123 South Canterbury	0%	23%	0%	0%	0%	0%	1%
160 Southern	3%	3%	2%	2%	1%	1%	1%
New Zealand overall	5%	3%	1%	1%	1%	1%	2%

Maori children at 12 months continued to have the lowest immunisation coverage, with 84% of Maori children in New Zealand and 80% of CM Maori children meeting their 12 milestone.

Table 24: % of children born between 1 July 2019 and 31 Mar 2020 in New Zealand meeting the 12 month immunisation milestone by ethnicity and by DHB

DHB of domicile	Maaori	Pacific	Indian	Chinese	Other Asian	NZ Euro and others	Overall
011 Northland	81%	81%	93%	89%	90%	84%	83%
021 Waitemata	86%	91%	97%	97%	96%	90%	92%
022 Auckland	84%	89%	95%	94%	94%	89%	90%
023 Counties Manukau	80%	89%	95%	96%	94%	90%	89%
031 Waikato	81%	89%	95%	95%	96%	91%	88%
042 Lakes	78%	94%	77%	100%	98%	88%	83%
047 Bay of Plenty	82%	93%	96%	96%	89%	88%	86%
051 Tairāwhiti	80%	87%	92%	100%	86%	84%	82%
061 Taranaki	81%	77%	100%	100%	97%	87%	86%
071 Hawkes Bay	87%	97%	95%	100%	96%	91%	90%
081 MidCentral	83%	90%	97%	89%	97%	91%	89%
082 Whanganui	82%	86%	77%	78%	92%	93%	87%
091 Capital & Coast	90%	94%	95%	97%	95%	94%	94%
092 Hutt	90%	89%	94%	96%	96%	95%	93%
093 Wairarapa	92%	89%	100%	100%	100%	91%	91%
101 Nelson Marlborough	91%	89%	94%	88%	95%	91%	91%
111 West Coast	92%	100%	100%	-	100%	79%	83%
120 Canterbury	90%	94%	95%	94%	96%	93%	93%
123 South Canterbury	88%	85%	91%	100%	85%	94%	92%
160 Southern	89%	96%	93%	91%	99%	94%	93%
New Zealand overall	84%	90%	95%	95%	95%	91%	90%

Delayed immunisation may lead to missing out on time-sensitive vaccines?

Rotavirus is a time-sensitive vaccine. The first dose must be given before 15 weeks, and the second dose must be given before 25 weeks. There is increased clinical risk of complication if rotavirus vaccine is given beyond 25 weeks. Rotavirus vaccines are not included as part of the standard immunisation milestone coverage calculations. Out of the children born between 1st July 2019 and 31st July 2020 in CM, 356 (4%) had a “complete” 8 month immunisation milestone, but they did not complete the 2 doses of rotavirus vaccine (Table 25).

Table 25: number of children born between 1st July 2019 and 31st July 2020 in CM by the number of doses of rotavirus vaccine received and by the 8-month immunisation milestone status (deaths excluded)

Number of Rotavirus vaccine	Incomplete at 8-month milestone	"Completed" vaccinations at 8-month milestone
0	686	135
1	307	221
2	245	7,744
3	2	51
4	1	
Total	1,241	8,151

Only 72% of CM Maaori children had the 2 doses of rotavirus vaccines, the poor uptake of rotavirus vaccines is certainly at least partly related to the timeliness of vaccinations.

Table 26: number of rotavirus vaccines received by CM children born between 1st July 2019 and 31st July 2020 by ethnicity

Number of Rotavirus vaccine	Maaori	Pacific	Indian	Chinese	Other Asian	NZ Euro and others	Overall
None	312	240	22	19	24	204	821
One	219	164	47	9	11	78	528
Two or more	1,351	2,454	1,404	556	577	1,701	8,043
% had 1 rotavirus vaccine	12%	6%	3%	2%	2%	4%	6%
% had 2 or more rotavirus vaccines	72%	86%	95%	95%	94%	86%	86%
Total	1,882	2,858	1,473	584	612	1,983	9,392

Are there people in the NIR that may not be trackable?

Young children particularly new born babies often have a high need for health service use. A complete lack of a health service footprint may suggest a child is no longer in New Zealand. Matching children enrolled in the NIR against health service activities as recorded by the Ministry of Health datasets may provide an estimate of the proportion of children in the NIR who may no longer be in New Zealand and who are falsely inflating the incomplete vaccination percentages. About 161 (1.7%) of the CM children born between 1st July 2019 and 31st July 2020 had no evidence of any health service activity¹² (excluding the initial birth event) and were non-enrolled in a PHO in March 2021. On the other hand, there were 75 children (0.8%) who had health service activity that suggested they live in the CM area, but were not yet enrolled in the NIR or enrolled in a PHO as at March 2021. Therefore, there is scope to have a targeted approach by using contact details from the administrative data to inform outreach services.

Table 27: NIR enrolment status of CM children born between 1st July 2019 and 31st July 2020 by HSU activity

HSU activity	Not NIR enrolled	NIR enrolled	Total
No HSU activity	32	161	193
HSU activity	75	9,124	9,199
Total	107	9,285	9,392

¹² Health service activity includes inpatient events (other than the index birth event), outpatient events, ED attendance, community lab claims, community pharmaceutical dispensing, GMS claims.

Is early PHO enrolment associated with better immunisation coverage and is PHO enrolment gap a concern?

Not being enrolled in a PHO is strongly associated with poor immunisation coverage. Early PHO enrolment is associated with better immunisation coverage only if there is no subsequent PHO enrolment gap.

Children who became disenrolled from a PHO after an initial enrolment are more likely to have poor immunisation coverage. The subsequent enrolment gap associated with early enrolment is related to the preliminary enrolment process for newborns. If a completed and signed enrolment form is not submitted by 12 weeks from birth then the preliminary enrolment will lapse and be removed from the National Enrolment System (PHO enrolment). The 3 year grace period of PHO enrolment does not apply the preliminary enrolment of the newborns. For those children who were enrolled with a preliminary status, primary health care is expected to *“pre-calling the newborn at four or five weeks of age for a six week immunisation appointment and a general health and physical assessment; and recalling the newborn if she/he did not attend for their six week immunisation and a general health and physical assessment.”*¹³

Table 28 shows the presence and duration of enrolment gaps after initial enrolment is associated with lower immunisation coverage at the 8-month milestone.

Table 28: Immunisation coverage at 8 month milestone of CM children born between 1st July 2019 and 31st July 2020 by the degree of PHO enrolment gap

PHO enrolment gap (in weeks)	Incomplete at 8 months	Completed vaccinations at 8 months	Number of children	% with completed vaccinations at 8 months
No gap	742	7,434	8,176	91%
1	26	166	192	86%
2	30	162	192	84%
3	20	35	55	64%
4	30	33	63	52%
5	18	28	46	61%
6	22	24	46	52%
7	25	15	40	38%
8	22	16	38	42%
9	15	12	27	44%
10	18	13	31	42%
11	16	18	34	53%
12	12	14	26	54%
13	7	7	14	50%
14	8	11	19	58%
15	8	5	13	38%
16	3	6	9	67%
17	10	13	23	57%
Not enrolled in PHO	209	139	348	40%
Total	1,241	8,151	9,392	87%

¹³ <https://tas.health.nz/assets/Primary-psaap-u14/Enrolment-Requirements-for-Contracted-Providers-and-PHOs-Version-4.1.pdf> Page 11

Out of the 868 children with PHO enrolment gaps, 780 (90%) had other health service activities to suggest that these children exist and had interacted with other part of the health system. About 65% (n=562) had general medical subsidy (GMS) activity, and 84% had community pharmaceutical dispensing.

Table 29: Health service activities of the 868 children with PHO enrolment gaps

Service contacts	HSU activity	GMS activity	Pharms dispensing
No	88	306	139
Yes	780	562	729
Total number of children with PHO enrolment gap	868	868	868

Out of the children who are enrolled in a PHO with no subsequent enrolment gaps, timeliness of PHO enrolment is associated with vaccination completeness at 8 months (Table 30). This is particularly important given the first sets of vaccinations are expected to be delivered at 6 weeks of age. In particular, if PHO enrolment occurred after 7 weeks, a lower immunisation coverage at 8 months is noted. It is worth noting that an additional 20% of children are enrolled at the week after 6 weeks of birth. Therefore, reporting PHO enrolment rate before a child turns 7 weeks may be a more pragmatic way to report PHO enrolment rates for children.¹⁴

However, timeliness of enrolment must be matched with the approaches that limit enrolment gaps. For children enrolment before 7 weeks of birth with subsequent PHO enrolment gaps, is associated with poor immunisation completeness at the 8-month milestone (only 68% of these children at completed vaccination at 8 months).

Table 30: Immunisation coverage at 8 month milestone of CM children born between 1st July 2019 and 31st July 2020 enrolled in a PHO without PHO enrolment gap by the age (in weeks) of first PHO enrolment

Age in weeks of first PHO enrolment	Number with completed vaccinations at 8 months	Number of children enrolled with no subsequent enrolment gaps	% with completed vaccinations at 8 months	Accumulated % of children enrolled by the defined week
0	1,376	1,478	93%	18%
1	1,232	1,336	92%	34%
2	689	747	92%	44%
3	509	552	92%	50%
4	428	452	95%	56%
5	539	565	95%	63%
6	1,595	1,665	96%	83%
7	328	369	89%	88%
8	110	138	80%	89%
9 or more	628	874	72%	100%
Grand Total	7,434	8,176	91%	

¹⁴ MOH reports PHO enrolment at the time of 6 weeks of birth (not at end of 6 weeks).

Does PHO enrolment timelines and PHO enrolment vary by ethnicity?

While overall PHO enrolment (at some point) is reasonably high at 97% for CM children (born between 1st July 2019 and 31st July 2020 and having had some health service activities), the continuity of PHO enrolment varies by ethnicity (Table 31). CM Maaori children have the highest PHO non-enrolment rate at 5%. Furthermore, for those children who were enrolled at some point, CM Maaori (12%) and Pacific (11%) children are more likely to have subsequent gaps in PHO enrolment. This compares to only 5% in NZ European children and 4% in Chinese children.

Table 31: PHO enrolment status and PHO enrolment gaps of CM children born between 1st July 2019 and 31st July 2020 and had some other health service activity

Description	Maaori	Pacific	Indian	Chinese	Other Asian	NZ Euro and others	Overall
Number of children with HSU activity	1,804	2,793	1,463	582	604	1,953	9,199
Enrolment in PHO with no enrolment gap	83%	87%	92%	93%	94%	92%	89%
Enrolled in PHO at some point but with subsequent enrolment gap	12%	11%	7%	4%	4%	5%	8%
Not enrolled in a PHO at any point	5%	2%	1%	3%	2%	2%	3%
Enrolled in PHO in March 2021 (proxy of currently enrolled)	91%	94%	97%	97%	97%	96%	95%

Timeliness of PHO enrolment is important, and ideally this should occur as early as possible after birth to optimise the benefit from subsidised access to primary health care including opportunistic and proactive care. As demonstrated by the analyses enrolment with a PHO before 7 weeks is associated with higher immunisation rate at 8 months of age. Enrolment in both NIR and PHO would allow a proactive follow up or reminders for children to receive their scheduled immunisation. However, timely enrolment should also be of good quality and accuracy to avoid subsequent enrolment gaps.

Early PHO enrolment (before 6 weeks) is associated with subsequent enrolment gaps. A subgroup of children born between 1st July 2019 and 31st July 2020 with evidence of other health service use and being enrolled in a PHO at some point was analysed. While Maaori (20%) and Pacific (24%) new-borns in CM are more likely to be enrolled in PHO in their first week of life compared to other ethnicities, they also mostly likely to have PHO enrolment gaps (Table 32). For example, 5% of Maaori children born between 1st July 2019 and 31st July 2020 enrolled in their first week of life but had a subsequent enrolment gap. 7% of CM children enrolled in a PHO between 1 and 6 weeks had enrolment gaps.

Table 32: Percentages of CM children born between 1st July 2019 and 31st July 2020 by age of PHO enrolment (in weeks), and by ethnicity and subsequent enrolment gaps¹⁵

Age of child of first PHO enrolment	Maaori	Pacific	Indian	Chinese	Other Asian	NZ Euro and others	Overall
0 week	20%	24%	19%	12%	18%	17%	20%
No PHO enrolment gap	15%	19%	17%	11%	17%	15%	17%
With PHO enrolment gap	5%	4%	2%	1%	1%	2%	3%
1 to 6 weeks	55%	61%	70%	76%	72%	69%	65%
No PHO enrolment gap	48%	54%	66%	72%	68%	65%	59%
With PHO enrolment gap	7%	7%	4%	3%	4%	3%	5%
7 weeks	6%	4%	3%	3%	4%	4%	4%
No PHO enrolment gap	6%	4%	3%	3%	4%	4%	4%
With PHO enrolment gap	0%	0%	0%	0%	0%	0%	0%
8 weeks	2%	2%	1%	1%	1%	2%	2%
No PHO enrolment gap	2%	2%	1%	1%	1%	2%	2%
With PHO enrolment gap	0%	0%	0%	0%	0%	0%	0%
9 or more weeks	16%	10%	6%	8%	6%	9%	10%
No PHO enrolment gap	16%	9%	6%	8%	6%	9%	10%
With PHO enrolment gap	0%	0%	0%	0%	0%	0%	0%
Total number of children	1,720	2,725	1,446	566	594	1,905	8,956

¹⁵ Percentages refer to the total number of children by ethnicity. Denominator refers to all children who had been enrolled in a PHO, and had evidence of health service use.

Out of the children who were enrolled in the first 6 weeks of life, Maaori and Pacific children are more likely to have subsequent PHO enrolment gaps at 16% and 13% respectively.

Table 33: % of children¹⁶ who were enrolled in the first 6 weeks of life with subsequent PHO gaps by ethnicity

Age of child of first PHO enrolment	Maaori	Pacific	Indian	Chinese	Other Asian	NZ Euro and others	Overall
No PHO enrolment gap	84%	87%	93%	95%	95%	94%	90%
With PHO enrolment gap	16%	13%	7%	5%	5%	6%	10%

¹⁶ Denominator refers to children who were born between 1st July 2019 and 31st July 2020 who had been enrolled in a PHO before 7 weeks of birth, and had evidence of health service use.