



## Consequences of barriers to primary health care for children in Aotearoa New Zealand

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### ABSTRACT

Inequities in the provision of accessible primary health care contribute to poor health outcomes and health inequity. This study evaluated inequities in the prevalence and consequences of barriers that children face in seeing a general practitioner (GP) in Aotearoa New Zealand. We analysed data on 5,947 children from the *Growing Up in New Zealand* longitudinal study cohort on barriers to seeing a GP in the previous year, reported by mothers when their children were aged 24 months and 54 months (in 2011/12 and 2013/14 respectively); and maternal-reported hospitalisations in the year prior to age 54 months. We used logistic regression to estimate odds ratios (OR) and 95% confidence intervals (CIs) for consequences of these barriers.

Overall, 4.7% (n = 279) of children experienced barriers to seeing a GP in the year to 24 months and 5.5% (n = 325) in the year to 54 months. At each age, and for each specific barrier studied, barriers were more prevalent among Māori (the indigenous people of Aotearoa New Zealand), and among Pacific, compared to New Zealand European, children. Children facing barriers in the year to age 24 months were twice as likely to be hospitalised in the year to 54 months (OR 2.18, 95%CI: 1.38 to 3.44). When this relationship was analysed by ethnicity, the association was strongest for Māori (OR: 2.92, 95%CI: 1.60 to 5.30), less strong for Pacific (OR 2.01, 95%CI: 0.92 to 4.37) and not present for New Zealand European (OR 1.27, 95%CI 0.39 to 4.12) families.

Barriers that children face to seeing a GP have social and cost implications for families and the health system. Changes to the health system, and future health policy, must align with the New Zealand government's obligations under *Te Tiriti o [The Treaty of] Waitangi*, to ensure that health equity becomes a reality for Māori.

### 1. Introduction

There are significant cost barriers to accessing primary health care in Aotearoa New Zealand, arising from the fact that government funding does not fully fund such care, with general practitioners (GPs), who deliver primary health care services, able to charge a fee for their services. New government funding was provided during the 2000s to reduce these charges; however, the charges have continued to rise over time and continue to constitute a major barrier to access, in particular for key population groups, including Māori, the indigenous people of Aotearoa New Zealand.

Māori comprise 16.5% of the total population (~5 million) with the

other major ethnic groups being NZ European (70.2%), Pacific peoples (8.1%) and Asian peoples (15.1%), (1.2%) (Statistics New Zealand and 2, 2020). Māori have a median age of 25 years, and Pacific peoples 23 years, compared to 41 years of the European ethnic group (Statistics New Zealand and 2, 2020). Te Tiriti o [The Treaty of] Waitangi was negotiated between Māori leaders and the British Crown in 1840. Te Tiriti affirmed Māori sovereignty and includes, amongst other provisions, the right to protection of health (Durie, 1989; Robson and Harris, 2007).

Previous research on access to primary health care has found cost to be a persistent barrier to care, with Māori more likely to face barriers and have lower access to primary health care than people of New

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Zealand European ethnicity (Corcadden et al., 2018; Cram, 2014; Crampton et al., 2007; Jatrana & Crampton, 2009). The persistence of these inequities directly challenges the guarantee of equity for Māori, as established under Te Tiriti o Waitangi. A recent report (Tribunal, 2019) found the New Zealand government (as the Crown representative) to be in breach of Te Tiriti o Waitangi, given the failure of legislative and policy frameworks to deliver equitable health outcomes for Māori (Came et al., 2020).

Measures to improve access to primary health care for children began in 1997 with the introduction of a zero-fees policy for children under six years (Dovey, 2002). As a result of the Primary Health Care Strategy (2001) new funding was made available to improve access to primary health care (King, 2001), including extending the zero-fees policy for children to after-hours care since 2012, and increasing the age band to which the policy applies, to those aged under 13 in 2015, and those aged under 14 in 2018 (Health Central, 2018; Ryall, 2011, 2014). Over this same time frame, cost as a reported barrier to primary health care for children, as documented in the New Zealand Health Survey (NZHS), has reduced in recent years (Ministry of Health. New Z, 2018).

Although changes to policy, in terms of reducing or eliminating user charges, are important in removing a key barrier to access to care, the removal of such charges has not removed all financial barriers that service users face in seeing a GP. The “cost” of seeing the GP is not only the user charge made to the practice, but also, for example, the cost of travel or childcare and for care for other dependents, and the cost of any time off work (which could involve leave without pay or taking annual or sick leave or having to make time up at a later date) (Barker et al., 2016; Jansen et al., 2008). These barriers are not affected by a zero-fees policy. Such costs affect different families differently, typically impacting those with the fewest resources hardest.

There is little evidence surrounding inequities in access to primary health care for children. The prevalence among children under 15 who face any barrier to accessing GP care was reported in the NZHS of 2018/19 as 19.9%, equating to 189,000 children (Ministry of Health. New Z, 2018). The prevalence was higher for Māori (24.7%, n = 58,000) and Pacific (25.6%, n = 33,000) children. Analysis of data from the B4School Checks (a free, nationwide programme of health and development checks for 4-years olds) show that children most in need are least likely to be able to access these checks (Gibb et al., 2019), which parallel known inequities in access to primary health care (Corcadden et al., 2018; Cram, 2014; Crampton et al., 2007; Jatrana & Crampton, 2009) that adults experience. Family involvement is particularly important when considering access to care for Māori children (Cram, 2014).

An additional barrier that disproportionately affects Māori families is racism. Evidence points to various forms of racism, including structural, systemic and interpersonal racism, as being important drivers of inequities in access to care (Came et al., 2019; Chin et al., 2018). An analysis of the NZHS found that the children of mothers who reported an experience of racism were twice as likely to face barriers to primary health care (Paine et al., 2018).

There has been little research into the consequences of barriers to primary health care, although it is likely that an inaccessible primary health system will contribute to higher hospital usage. An Australian study found that inadequate community care services predicted higher levels of emergency room visits for individuals with physical conditions (Vecchio et al., 2018). Reductions in inequities in ambulatory-sensitive hospitalisation (ASH) i.e. for causes that should be treatable in primary care (Health QualitySafety Commission), suggest that an improvement in access to primary health care can have an important impact on health equity in Aotearoa New Zealand (Matheson et al., 2015). An early analysis from the *Growing Up in New Zealand* (GUINZ) study found that maternal experience of racism from health-care providers was associated with a two-fold higher rate of hospitalisation from infectious diseases among Pacific children in the first year of life (Hobbs et al., 2017).

Although there has been previous research into the barriers to access

for primary health care in Aotearoa New Zealand, this has largely been based on qualitative interviews or quantitative analyses of cross-sectional data (Cram, 2014; Gibb et al., 2019; Jansen et al., 2008; Jatrana & Crampton, 2009; Pledger et al., 2011). From these cross-sectional data we cannot determine the consequences of these barriers. The aim of this study was to analyse the determinants and consequences of barriers to seeing a GP in a contemporaneous cohort of children in Aotearoa New Zealand. We focus on access to seeing a GP, which is a key component of primary health care.

## 2. Methods

The study was based on an analysis of repeated waves of data collected from the mothers of children enrolled in GUINZ, a contemporary child longitudinal cohort study in Aotearoa New Zealand. Details of the cohort’s design and methods have been reported elsewhere (Morton et al., 2013). Briefly, pregnant women residing in three adjacent District Health Board (DHB) regions, Auckland, Counties Manukau and Waikato, with an expected delivery date between April 25, 2009 and March 25, 2010 were eligible for inclusion. Recruitment methods included informing women of the study through their lead maternity carer, as well as community actions to increase awareness and participation (Morton et al., 2014).

A total of 6,846 babies were included in the cohort, representing 35% of all live births in the three DHBs. Data collection waves relevant to the analysis conducted here were computer-assisted face-to-face-interviews with the mother when the child was 9 months (in 2010), 24 months (in 2011/12) and 54 months old (in 2013/14). At the time of each of these data collection waves, children in the study were eligible for zero-fees GP visits.

### 2.1. Variables used

The key outcome variables used were: i) facing a barrier to seeing a GP; and ii) having had a hospital admission for a range of non-injury related conditions. ‘Facing a barrier to seeing a GP’ was defined as a positive response to the question “In the last 12 months, has there been any time when [child] needed to see a GP or family doctor about his/her health, but didn’t get to see any doctor at all?”. The same question was asked at 24 and 54 months.

Having been admitted to hospital in the previous year was reported at 54 months. The relevant questions for hospital admissions excluded injuries, and related to the following specific health conditions: non-food allergies; hay-fever; ear infections; asthma; whooping cough (pertussis); other respiratory disorders including chest infections, bronchiolitis, bronchitis, pneumonia; cough lasting more than four weeks; wheezing in the chest; gastroenteritis (three or more watery or looser-than-normal bowel movements or diarrhoea within a 24 h period); eczema or dermatitis; throat infection or tonsillitis; skin infections. ASH-related conditions were defined as a hospital admission in the previous 12 months of one or more of the following: ear infection, asthma/wheeze, whooping cough, gastroenteritis, eczema/dermatitis, skin infections or throat infection/tonsillitis. These were chosen as being the categories that were most closely related to the conditions used to define childhood ASH (Health QualitySafety Commission).

The sex of the child was reported by the mother at age 9 months. Maternal age was self-reported when the child was age 54 months. At that time, maternal age ranged from 20 to 50 years and was analysed in five-year age bands. At that same timepoint, the child’s ethnicity was reported by the mother on behalf of the child.

In this study, we report ethnicity as Māori, Pacific People, and NZ European/Other. People who reported their ethnicity as “New Zealander” were included in the ‘Other’ group, unless they also identified as Māori or Pacific, as the majority of people who report their ethnicity as New Zealander are New Zealand Europeans (Cormack & Robson, 2010). For analysis, the total Māori population was compared with non-Māori

population and the total Pacific population compared with non-Pacific population. The New Zealand European group was defined as people who identified as New Zealand European, but did not identify as Māori or Pacific ethnicity. This group does not include “Other” ethnicities.

Relevant primary health care measures used were i) having a regular GP or practice; ii) whether the mother reported that the child’s visit to the GP usually incurred fees; and iii) number of GP visits in the previous 12 months. Health was measured using maternal-reported child health at 24- and 54-months, in five categories (excellent, very good, good, fair, poor).

Various measures of social determinants of health were used. These included an area-based measure of material deprivation (Salmond & Crampton, 2012), based on place of domicile using measures from the 2006 (at age 24 months) and 2013 (at age 54 months) censuses, known as NZDep2006 and NZDep2013; maternal employment at age 24 months; self-reported standard of living at age 24 months in five categories (low, fairly low, medium, fairly high, high); self-reported income and sufficiency of income at age 24 months in four categories (not enough, just enough, enough, more than enough); and overcrowding, defined as more than one person per room, measured at 9 months.

We included maternal experience of racism in the health service, reported when the child was 24 months old as an additional potential confounder or mediator of the relationship between barriers to primary care and later hospitalisations. This measure was defined as a mother answering that they had been treated unfairly in/by the health service because of their ethnicity.

## 2.2. Statistical analysis

The prevalence of barriers to seeing a GP were tabulated, and chi-squared tests used to test for differences between ethnic groups. The determinants of barriers to care were analysed using logistic regression, with the output reported as odds ratios (ORs) and associated 95% confidence intervals (CIs).

Possible mediators of the relationship between barriers to seeing a GP and subsequent hospitalisations were addressed through statistical adjustment using multivariable logistic regression models. A crude logistic regression model of the effect of facing a barrier to primary care and the risk of subsequent hospitalisation was run, followed by sequential adjustment for possible mediators. Broadly, these included measures of social determinants of health, a measure of maternal-reported child health and measures of experience of racism in the health service.

Analyses were conducted for the total population, the total Māori population (i.e. Māori with or without another ethnicity) compared to non-Māori, and the total Pacific population (i.e. Pacific with or without another ethnicity) compared to non-Pacific. Someone with Māori and Pacific ethnicity would be included in both analyses. In some instances, comparisons were made between Māori (or Pacific) and the New Zealand European population.

Given the face-to-face nature of the data collection, there were only minimal levels of missing data. For those people who refused to answer questions or replied that they did not know, this was detailed in the descriptive analyses. In the analysis of the determinants of barriers to primary health care, missing data for each question was analysed in the baseline (i.e. non-exposed) group. In the multivariable analyses, we excluded people with missing data for any of the variables used, to ensure that the models were comparable, i.e. based on the same people.

## 3. Results

The cohort included 6,847 children whose mother completed the questionnaire at 9 months, of whom 6,404 (93.5%) had child and maternal data recorded at age 24 months, and, of these, 5,947 (92.9%) had child and maternal records at age 54 months. Thus, the final sample for analysis was based on 5,947 children, which is 86.9% of the original

cohort at 9 months. Included in this sample were 73 sets of twins, i.e. 146 individuals.

### 3.1. Description of cohort

Details of the cohort used for analysis are shown in Table 1. There were slightly more male babies included than female, but this did not differ by ethnicity. In the total cohort, 50% of mothers were over the age of 36 years; Māori and Pacific mothers were significantly younger. Across the total cohort, mothers and babies were almost equally likely to be living in the three DHB districts of recruitment (Auckland, Counties Manukau and Waikato). This varied by ethnicity, with fewer Māori in Auckland DHB and over half of Pacific families in Counties Manukau DHB.

The distribution of area-based deprivation for the total cohort reflects the population of Aotearoa New Zealand, with about one fifth of the cohort in each quintile. Māori and Pacific people were significantly more likely to live in more deprived areas. Other socio-economic determinants of health were also unequally distributed by ethnicity: Māori and Pacific mothers were less likely to be in paid employment when their child was aged 24 months, less likely to report a high or fairly high standard of living, less likely to report that their income was enough or more than enough to live on, and more likely to live in overcrowded houses.

Most mothers rated their children’s health at 24 months as excellent, but the health of Māori was more likely to be reported as good, fair or poor than non-Māori. Over 10% of the cohort saw a GP 12 or more times when aged 1 to 2, and this was higher for Māori and Pacific children. The overall pattern of GP visits was lower in the 12 months to age 54 months, but higher consultation rates remained evident for Māori and Pacific children, compared to non-Māori and non-Pacific children, respectively.

Despite the zero-fees policy, when children were aged 24 months, over 16% of mothers reported being charged for “standard doctor visits” for their child; this was lower for Māori (11%) and Pacific (7%) children. Māori children were equally likely as non-Māori to be enrolled at a practice (as measured based on reported usually seeing the same GP, or a GP at the same practice), whereas Pacific children had lower enrolment rates, and were more likely to go to more than one practice, or use the hospital, than non-Pacific children. The overall prevalence of having experienced racism in the health sector was 1.2%; this was reported more frequently by mothers of Māori (2.4%) and Pacific (2.2%) children.

Overall, at 54 months, 4% of the cohort had had a hospital stay for one of the specific conditions asked about; this was higher for Māori (5.3%) and Pacific (5.4%) children.

### 3.2. Description of barriers to seeing a GP at age 24 months and 54 months

A total of 279 children (4.7%) faced a barrier to seeing a GP in the previous 12 months at age 24 months. This was more common in Māori compared to non-Māori (8.3% vs. 3.5%) and in Pacific compared to non-Pacific (7.0% vs. 4.1%) children. Among New Zealand European children, 77 (2.8%) reported having faced a barrier to seeing a GP. Most mothers who reported a barrier ( $n = 157$ , 56.3%) reported that this had happened only once in the last 12 months; but 63 (22.6%) reported this happening twice, 45 (16.0%) three to five times; and 12 (4.3%) more than five times. Two mothers were not sure how many times they had faced a barrier to access in the last 12 months. Māori mothers were more likely to report having faced a barrier more often than non-Māori, e.g. 26 (1.8%) reported facing a barrier three or more times, compared to 32 (0.7%) non-Māori,  $P < 0.001$ . Likewise, Pacific mothers reported more frequent barriers than non-Pacific mothers: 21 (1.7%) Pacific mothers reported facing a barrier three or more times, compared to 37 (0.8%) of non-Pacific mothers,  $P < 0.001$ .

Mothers were given several options to describe the reason for not

**Table 1**  
Description of cohort of 5,947 children who remained part of the Growing Up in New Zealand study.

	Age at which variable measured	Māori (n = 1,461)		Pacific (n = 1,193)		Total Cohort (n = 5,947)	
		n	%	n	%	n	%
Sex	9 months						
Male		757	51.8	614	51.5	3,059	51.4
Female		704	48.2	579	48.5	2,888	48.6
P-value			0.74		0.98		
Maternal Age	54 months						
25 or under		204	14.0	173	14.5	408	6.9
26 to 30		337	23.1	286	24.0	931	15.6
31 to 35		377	25.8	331	27.8	1,602	26.9
36 to 40		329	22.5	251	21.0	1,920	32.3
41 or over		209	14.3	151	12.7	1,081	18.2
P-value			<0.001		<0.001		
DHB of domicile	24 months						
Auckland		266	18.2	305	25.6	1,755	29.5
Counties Manukau		494	33.8	634	53.1	1,924	32.4
Waikato		534	36.6	121	10.1	1,577	26.5
Waitemata		37	2.5	36	3.0	214	3.6
Other/missing		130	8.9	97	8.1	477	8.0
P-value			<0.001		<0.001		
NZDep2006	24 months						
1 (least deprived)		171	11.7	48	4.0	1,090	18.3
2		197	13.5	94	7.9	1,097	18.5
3		239	16.4	121	10.1	1,031	17.3
4		324	22.2	247	20.7	1,164	19.6
5 (most deprived)		478	32.7	615	51.6	1,349	22.7
Missing		52	3.6	68	5.7	216	3.6
P-value			<0.001		<0.001		
Overcrowding	9 months						
Yes		679	46.5	823	69.0	2,200	37.0
No		780	53.4	370	31.0	3,745	63.0
P-value			<0.001		<0.001		
Maternal paid employment	24 months						
Yes		702	48.1	500	41.9	3,135	52.7
No		726	49.7	641	53.7	2,690	45.2
Missing		33	2.3	52	4.4	122	2.1
P-value			<0.001		<0.001		
Household income	24 months						
Up to \$50k		458	31.4	464	38.9	1,429	24.0
\$50,001 to \$70k		252	17.3	194	16.3	944	15.9
\$70,001 to \$100k		264	18.1	188	15.8	1,117	18.8
More than \$100k		324	22.2	177	14.8	1,887	31.7
Missing		163	11.2	170	14.3	570	9.6
P-value			<0.001		<0.001		
Income sufficiency	24 months						
Not enough		188	12.9	186	15.6	579	9.7
Just enough		489	33.5	456	38.2	1,885	31.7
Enough		505	34.6	374	31.4	2,154	36.2
More than enough		246	16.8	124	10.4	1,204	20.3
Missing		33	2.3	53	4.4	125	2.1
P-value			<0.001		<0.001		

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Table 1 (continued)

	Age at which variable measured	Māori (n = 1,461)		Pacific (n = 1,193)		Total Cohort (n = 5,947)	
		n	%	n	%	n	%
Standard of living	24 months						
High		102	7.0	51	4.3	564	9.5
Fairly high		341	23.3	197	16.5	1,702	28.6
Medium		819	56.1	733	61.4	3,066	51.6
Fairly low		143	9.8	136	11.4	410	6.9
Low		19	1.3	20	1.7	67	1.1
Missing		37	2.5	56	4.7	138	2.3
P-value			<0.001		<0.001		
Experience of racism in health sector	24 months						
Yes		35	2.4	26	2.2	70	1.2
No		1,426	97.6	1,167	97.8	5,877	98.8
P-value			<0.001		<0.001		
Child's health	24 months						
Excellent		708	48.5	627	52.6	3,036	51.1
Very good		478	32.7	374	31.4	1,960	33.0
Good		160	11.0	103	8.6	612	10.3
Fair		71	4.9	35	2.9	191	3.2
Poor		12	0.8	<10		28	0.5
Missing		32	2.2	51	4.3	120	2.0
P-value			<0.001		0.13		
Child's health	54 months						
Excellent		705	48.3	593	49.7	3,036	51.1
Very good		519	35.5	419	35.1	2,050	34.5
Good		194	13.3	153	12.8	709	11.9
Fair		37	2.5	26	2.2	132	2.2
Poor		<10		<10		16	0.3
Missing		0		0		<10	
P-value			0.064		0.68		
GP visits in last 12 months	24 months						
0		28	1.9	13	1.1	119	2.0
1-2		266	18.2	212	17.8	1225	20.6
3-5		588	40.3	459	38.5	2427	40.8
6-11		356	24.4	311	26.1	1418	23.8
12+		182	12.5	134	11.2	603	10.1
Missing		41	2.8	64	5.4	155	2.6
P-value			0.003		0.001		
GP visits in last 12 months	54 months						
0		0		0		0	
1-2		441	30.2	345	28.9	1908	32.1
3-5		572	39.2	496	41.6	2365	39.8
6-11		244	16.7	207	17.4	981	16.5
12+		121	8.3	78	6.5	330	5.6
Missing		83	5.7	67	5.6	363	6.1
P-value			<0.001		0.028		
Hospital stay in last 12 months	54 months						
Yes		77	5.3	64	5.4	236	4.0
No		1,384	94.7	1,129	94.6	5,711	96.0
P-value			0.003		0.006		
See a regular GP							
Yes, one practice		1,349	92.3	1,073	89.9	5,553	93.4
Yes, more than one practice		33	2.3	43	3.6	131	2.2
No, use hospital		<10		<10		17	0.3
No, use after hours		20	1.4	12	1.0	61	1.0
Missing		52	3.6	58	4.9	185	3.1
P-value			0.17		<0.001		
Usually pay to see GP							
Yes		157	10.8	82	6.9	975	16.4

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**Table 1** (continued)

	Age at which variable measured		Māori (n = 1,461)		Pacific (n = 1,193)		Total Cohort (n = 5,947)	
	n	%	n	%	n	%	n	%
No	1,256	86.0	1,053	88.3	4,786	80.5		
Missing	48	3.3	58	4.9	186	3.1		
P-value				<0.001				<0.001

**Notes.**

P values relate to chi-squared tests comparing Māori with non-Māori and Pacific people with non-Pacific, excluding people with missing data.

Exact numbers and percentages for cells with fewer than 10 people are not shown.

\*Based on child’s ethnicity, as reported by the mother at age 54 months. The Māori and Pacific groups are total Māori and total Pacific, and therefore some people are in both columns. The total cohort comprises Māori, Pacific and non-Māori, non-Pacific people.

having seen a GP on the last occasion that this happened. The most common reason was not being able to get an appointment (n = 142, 2.4%), followed by being after hours (n = 62, 1.0%), not having transport (n = 45, 0.8%), not being able to spare the time (n = 18, 0.3%), cost (n = 14, 0.2%), not being able to get in touch with the GP (n = 7, 0.1%), and not having childcare (n = 3, 0.1%). There were 67 people (1.1%) who reported another (unspecified) reason for their child not having seen a GP when needed at age 24 months. For each specified reason, the frequency was higher in Māori than non-Māori, and Pacific than non-Pacific families. The most marked differences between ethnic groups in barriers were not being able to get an appointment for Māori children and not having transport for Pacific families.

A total of 325 children (5.5%) faced a barrier to seeing a GP at 54 months. This was more common in Māori compared to non-Māori (9.0% vs. 4.3%) and in Pacific compared to non-Pacific (9.1% vs. 4.6%) children. Among New Zealand European children, 87 (3.2%) had faced a barrier to seeing a GP. Most mothers of children who reported this barrier (n = 160, 51.7%) stated that this had happened only once in the last 12 months, but 97 (29.9%) reported this happening twice, 47 (14.5%) three to five times, and 12 (3.7%) more than five times. For one child the response was “don’t know”.

When asked what the reason was for the barrier to seeing a GP at 54 months, the most common reason was not being able to get an appointment (n = 174, 2.9%), followed by being after hours (n = 75, 1.3%), not having transport (n = 17, 0.3%), not being able to spare the time (n = 15, 0.3%), and not being able to get in touch with the GP (n = 7, 0.1%). At this age, no parents reported that cost or childcare were barriers to seeing a GP. There were 37 (0.6%) people who reported another (unspecified) reason for their child not having seen a GP when needed at age 54 months. For each reason, the proportion was higher in Māori than non-Māori, and Pacific than non-Pacific families. The most marked differences between ethnicities were: not being able to get an appointment for Māori and being after hours for Pacific families.

**3.3. Determinants of barriers at age 24 months**

Factors that were associated with barriers at age 24 months are shown in Table 2. Barriers were more often reported by younger mothers and were more common in the Counties Manukau and Waikato DHB areas compared to Auckland DHB. Most measures of social determinants of health, including household overcrowding, area-level deprivation,

**Table 2**

Number and proportion of mothers who reported their child having faced a barrier to see a GP in the year to 24 and in the year to 54 months.

	Age 24 months				Age 54 months			
	Total Cohort	Māori	Pacific	NZ European	Total Cohort	Māori	Pacific	NZ European
Cost	14 (0.2%)	<10	<10	<10	0	-	-	-
Unable to get an appointment	142 (2.4%)	64 (4.4%)	35 (2.9%)	44 (1.6%)	174 (2.9%)	74 (5.1%)	43 (3.6%)	53 (1.9%)
Being after hours	62 (1.0%)	21 (1.4%)	23 (1.9%)	21 (0.8%)	75 (1.3%)	25 (1.7%)	32 (2.7%)	19 (0.7%)
No transport	45 (0.8%)	22 (1.5%)	30 (2.5%)	<10	17 (0.3%)	<10	11 (0.9%)	<10
Unable to spare the time	18 (0.3%)	<10	11 (0.9%)	<10	15 (0.3%)	<10	<10	<10
Unable to get in touch with the GP	<10	<10	<10	<10	<10	<10	<10	<10

Note: Exact numbers and percentages for cells with fewer than 10 people are not shown.

household income and sufficiency of income, were related to facing a barrier. Maternal unemployment was associated with higher levels of barriers for Pacific mothers, but self-reported standard of living was not. Children with poorer health and those who saw a GP more frequently were more likely to report facing a barrier. Maternal experience of racism in the health sector was not related to reporting a barrier to seeing a GP.

In univariable analysis, Māori were over two and a half times more likely to report facing a barrier to seeing a GP than non-Māori (OR 2.58, 95%CI 1.99 to 3.35). Having adjusted for all the health and socio-demographic variables shown in Table 3, there remained an excess risk of 86% for reporting barriers for Māori compared to non-Māori, (OR 1.86, 95%CI 1.41 to 2.47).

Pacific children were 87% more likely to report facing a barrier to seeing a GP than non-Pacific children (OR 1.87, 95%CI 1.41 to 2.49). About half of this excess risk is accounted for by the health and socio-demographic variables shown in Table 3. In the fully adjusted model, there remained an excess risk of 45% for reporting barriers for Pacific compared to non-Pacific, (OR 1.45, 95%CI 1.03 to 2.04).

**3.4. Association between barriers to care at age 24 months and hospitalisations at 54 months**

Based on reports at age 54 months, 236 (4%) of children had been admitted to hospital in the previous 12 months for one of the range of conditions that was asked about. Hospitalisations were more common in Māori (5.3%) and Pacific (5.4%) than non-Māori (3.5%) and non-Pacific (3.6%) children respectively. Similar patterns were seen when the range of hospital admissions was restricted to those as close as possible to the definition of ASH; the overall prevalence was 3.1%, but this was more common in Māori (4.0%) compared to non-Māori (2.9%, P = 0.033), and in Pacific (4.7%) compared to non-Pacific children (2.7%, P = 0.001).

Children whose mothers reported having had a barrier to seeing a GP at age 24 months were over twice as likely to have had a hospitalisation in the 12 months to age 54 months, OR 2.18 (95%CI: 1.38 to 3.44). There was no clear pattern of increasing hospitalisation rate with increasing missed opportunities to see a GP. This association differed by ethnicity. The increased risk of hospitalisation associated with having faced a barrier to seeing a GP at age 24 months was most marked for Māori (OR 2.92, 95%CI: 1.60 to 5.30) and less marked but still strong for

**Table 3**  
Determinants of having faced a barrier to primary health care in the year to 24 months.

	Māori		Pacific		Total Cohort	
	OR	95%CI	OR	95%CI	OR	95%CI
Child's sex						
Male	1*		1*		1*	
Female	0.69	0.47 to 1.00	0.99	0.63 to 1.54	0.82	0.64 to 1.04
Maternal age						
25 or under	1*		1*		1*	
26 to 30	0.80	0.47 to 1.35	0.64	0.34 to 1.21	0.60	0.40 to 0.91
31 to 35	0.45	0.25 to 0.70	0.52	0.28 to 0.99	0.41	0.28 to 0.61
36 to 40	0.39	0.21 to 0.71	0.52	0.26 to 1.04	0.34	0.23 to 0.51
41 or over	0.35	0.17 to 0.72	0.21	0.07 to 0.62	0.27	0.17 to 0.43
DHB of domicile						
Auckland	1*		1*		1*	
Counties Manukau	1.40	0.78 to 2.50	1.34	0.76 to 2.33	1.38	0.99 to 1.92
Waikato	1.55	0.87 to 2.73	1.28	0.56 to 2.94	1.86	1.34 to 2.58
Waitemata	1.78	0.56 to 5.60	1.99	0.64 to 6.25	1.36	0.69 to 2.70
Other	1.22	0.46 to 3.21	1.18	0.26 to 5.36	1.68	0.94 to 3.00
NZDep2006						
1 (least deprived)	1*		1*		1*	
2	0.54	0.20 to 1.41	1.55	0.16 to 15.31	1.10	0.66 to 1.85
3	1.26	0.58 to 2.71	3.78	0.47 to 30.67	2.06	1.29 to 3.28
4	1.11	0.53 to 2.34	4.37	0.57 to 33.27	2.13	1.36 to 3.36
5 (most deprived)	2.13	1.09 to 4.15	3.98	0.54 to 29.47	3.10	2.03 to 4.75
Overcrowding						
Yes	1.23	0.85 to 1.78	1.35	0.81 to 2.26	1.40	1.10 to 1.79
No	1*		1*		1*	
Maternal employment						
Yes	1*		1*		1*	
No	1.13	0.78 to 1.65	1.58	0.99 to 2.53	1.06	0.84 to 1.35
Household income						
Up to \$50k	1*		1*		1*	
\$50,001 to \$70k	0.90	0.53 to 1.52	0.51	0.25 to 1.03	0.66	0.46 to 0.96
\$70,001 to \$100k	0.69	0.40 to 1.21	0.69	0.36 to 1.31	0.65	0.46 to 0.92
More than \$100k	0.56	0.32 to 0.97	0.33	0.14 to 0.78	0.38	0.27 to 0.54
Standard of living sufficiency						

**Table 3 (continued)**

	Māori		Pacific		Total Cohort	
	OR	95%CI	OR	95%CI	OR	95%CI
Not enough	1*		1*		1*	
Just enough	0.78	0.46 to 1.32	0.66	0.38 to 1.15	0.61	0.43 to 0.89
Enough	0.53	0.31 to 0.93	0.29	0.14 to 0.58	0.51	0.35 to 0.74
More than enough	0.47	0.24 to 0.92	0.65	0.30 to 1.43	0.46	0.30 to 0.70
Standard of living						
High	1*		1*		1*	
Fairly high	0.85	0.35 to 2.06	1.04	0.33 to 3.25	0.96	0.59 to 1.56
Medium	1.51	0.68 to 3.36	0.81	0.28 to 2.33	1.29	0.82 to 2.01
Fairly low	1.13	0.42 to 3.02	1.35	0.42 to 4.31	1.53	0.85 to 2.73
Low	0.75	0.09 to 6.51	0.62	0.06 to 5.90	1.10	0.32 to 3.77
Maternal-reported child health						
Excellent	1*		1*		1*	
Very good	1.61	1.03 to 2.52	1.58	0.69 to 2.60	1.60	1.21 to 2.11
Good	2.95	1.72 to 5.05	2.44	1.25 to 4.79	2.67	1.89 to 3.78
Fair	4.10	2.11 to 7.98	1.59	0.46 to 5.43	3.36	2.03 to 5.57
Poor	1.51	0.19 to 12.05	-		2.21	0.52 to 9.45
GP visits in last 12 mths						
0	0.62	0.08 to 4.88	2.86	0.32 to 25.71	0.96	0.29 to 3.20
1-2	1*		1*		1*	
3-5	1.25	0.68 to 2.31	2.83	1.17 to 6.85	1.79	1.20 to 2.66
6-11	1.77	0.94 to 3.32	2.74	1.10 to 6.85	2.11	1.39 to 3.21
12+	3.04	1.57 to 5.88	4.66	1.77 to 12.22	3.67	2.34 to 5.74
Maternal experience of racism						
Yes	1.04	0.31 to 3.44	2.50	0.84 to 7.44	1.92	0.83 to 4.48
No	1*		1*		1*	

Pacific children (OR 2.01, 95%CI: 0.92 to 4.37). There was no evidence of a relationship between barriers to seeing a GP at 24 months and hospitalisation in the 12 months prior to age 54 months for New Zealand European children (OR 1.27, 95%CI 0.39 to 4.12).

To address possible confounding by indication, since only children who need to see a GP can face a barrier, we repeated the analyses, restricting it to children who reported having seen a GP at least once at the age of 24 months. This made no material difference to the results for Māori (OR 2.90, 95%CI: 1.59 to 5.27); Pacific (OR 2.15, 95%CI: 0.98 to 4.69); or New Zealand European (OR 1.29, 95%CI 0.40 to 4.18) children.

Regarding ASH-related conditions, the effect showed a similar pattern to that of all hospitalisations, and the magnitude of the association was strengthened. Children who had faced a barrier two years earlier had a two and a half times higher risk of having a hospitalisation for an ASH-related condition in the 12 months prior to age 54 months, (OR 2.56, 95%CI 1.58 to 4.14). When the results were stratified by ethnicity, the effect was largest and the evidence strongest for Māori (OR 3.46, 95%CI 1.81 to 6.62); it was also strong for Pacific children (OR

2.36, 95%CI 1.08 to 5.17), but it was not present for New Zealand European children, 1.78 (95%CI: 0.55 to 5.82).

Possible mediators of the relationship between barriers to seeing a GP and risk of hospitalisation were investigated. The observed associations were not explained by demographic factors, social determinants of health, or maternal experience of racism in the health sector. A child's health explained part but not all of the association, see Table 4. Overall, and for Māori and Pacific children, there remained a 60% higher risk of hospitalisation among those who had faced a barrier to seeing a GP.

In summary, having faced a barrier to seeing a GP in early childhood is related to an elevated risk of having been hospitalised in the 12 months prior to age 54 months. Socio-demographic variables or maternal experience of racism do not appear to explain this association, and the results appear to be only partly mediated through measures of

**Table 4**

Association between barrier to primary health care in the year to 24 months and risk of hospitalisations in the year to 54 months.

	Māori (n = 1,200)		Pacific (n = 941)		Total Cohort (n = 4,927)	
	OR	95%CI	OR	95%CI	OR	95%CI
Crude association <sup>a</sup>	2.55	1.31 to 4.93	2.27	0.98 to 5.27	2.01	1.21 to 3.31
Adjusted for demographic factors						
+ child's sex	2.40	1.24 to 4.67	2.12	0.94 to 5.15	1.95	1.18 to 3.23
+ maternal age	2.45	1.25 to 4.79	2.10	0.89 to 4.93	1.84	1.11 to 3.05
+ child's ethnicity	n/a		n/a		1.80	1.08 to 2.99
+ DHB of domicile	2.63	1.35 to 5.10	2.37	1.01 to 5.55	1.95	1.18 to 3.32
Adjusted for social determinants of health						
+ NZDep quintiles	2.43	1.24 to 4.73	2.20	0.94 to 5.13	1.88	1.13 to 3.12
+ overcrowding	2.56	1.32 to 4.95	2.26	0.97 to 5.25	1.97	1.19 to 3.26
+ maternal employment	2.52	1.30 to 4.89	2.21	0.95 to 5.17	2.00	1.21 to 3.31
+ household income	2.44	1.26 to 4.75	2.30	0.98 to 5.39	1.86	1.12 to 3.08
+ standard of living sufficiency	2.42	1.23 to 4.75	2.10	0.88 to 5.00	1.85	1.12 to 3.08
+ standard of living rating	2.59	1.33 to 5.06	2.40	1.03 to 5.61	1.96	1.18 to 3.24
Adjusted for measures of health						
+ child health (24M) <sup>b</sup>	1.94	0.98 to 3.84	2.03	0.87 to 4.77	1.72	1.03 to 2.86
+ GP visits in last 12 months (24M) <sup>c</sup>	2.07	1.05 to 4.10	2.00	0.86 to 4.70	1.75	1.05 to 2.91
+ child health (54M)	1.56	0.77 to 3.15	1.64	0.97 to 2.75	1.64	0.97 to 2.75
+ GP visits in last 12 months (54M) <sup>c</sup>	2.02	1.00 to 4.07	2.80	1.14 to 6.88	1.85	1.10 to 3.13
Adjusted for racism in health service						
+ maternal experience of racism	2.55	1.32 to 4.94	2.27	0.98 to 5.28	1.99	1.20 to 3.28

<sup>a</sup> Based on a complete case analysis, excluding missing data for all other variables in the table, which explains the difference between the results in the table and text.

<sup>b</sup> Upper two categories of child health collapsed due to instability in the model of Pacific children.

<sup>c</sup> Lower two categories combined (no visits and one visit in past year) due to small numbers.

child health.

#### 4. Discussion

Our analysis has identified that barriers to seeing a GP are higher for Māori and Pacific children than New Zealand European children. Facing a barrier to seeing a GP at age 12–24 months for Māori and Pacific children is associated with a higher rate of hospitalisation from various illnesses in the year to 54 months, but this is not the case for New Zealand European children. The relationship among Māori and Pacific children is independent of various measures of social determinants of health and maternal experience of racism within the health sector. It is partly mediated through maternal-reported child health. Given the higher rates of experiencing barriers to seeing a GP for Māori and Pacific children, the impact of the barriers for these children will be particularly high.

The strengths of the study include the large cohort of children, with sufficient numbers, particularly of Pacific children, for robust analyses; the high retention rate from antenatal to 54-month follow-up; and the face-to-face data collection with a resulting small amount of missing data. The GUINZ cohort is representative, in terms of Māori ethnicity, of the births in Aotearoa New Zealand. In the 2013 census (Statistics New Zealand.), the proportion of three-year olds (i.e. those closest in age to the cohort members) who were Māori was 24%, compared to 25% Māori in the current analyses. The census reported only 13% of births being Pacific, compared to 20% in the current analysis, probably due to the DHBs recruited for the inclusion criteria, in which a high proportion of the Pacific families in Aotearoa New Zealand live.

We considered limitations of this study. Both the ascertainment of exposure (whether or not a child faced a barrier to seeing a GP) and outcome (hospitalisation) relied on recall, but any misclassification is likely to be non-differential, thus potentially biasing the results towards the null, but unlikely to cause any spurious associations. The mothers answering the survey were asked specifically about seeing a GP. Practice nurses, and increasingly nurse practitioners, play a key role in the provision of primary health care. Although it is likely that the same barriers faced in seeing a GP would apply to the wider primary health care team, we were not able to test this empirically.

The analysis is limited by our lack of detailed understanding of the context in which the children facing barriers are living, including the social and economic circumstances of their parents and/or caregivers. The most common reason for not seeing a GP when in need was not being able to get an appointment. No further information on this is available, but this is clearly an important area that needs further examination. As receptionists act as gate-keepers in access to appointments (Neuwelt et al., 2016), they may demonstrate unconscious bias in interpersonal communications that affect people's access to care. A recent analysis of the Primary Care Patient Experience Survey reported that 91% of respondents agreed that reception and administration staff always treated them with respect (Health Quality and Safety Commission, 2020); however, the results were not reported by ethnicity of the patient and moreover the question does not directly assess unconscious bias. Mothers are often the primary mediators between the children and any primary health care service and the role of the mother as the child's advocate is very important.

Key to understanding the impact of our work is consideration of whether the hospitalisations which have been analysed could have been avoided. One of the system level measures reported at DHB level is ASH; data to March 2020 reported ASH rates of about 7.7% for Māori and 11.7% for Pacific children aged 0–4 years (Ministry of Health, 2020). In comparison, the GUINZ data that was most closely related to ASH show levels of 4.0% for Māori and 4.7% for Pacific children at age 54 months. This may reflect that the GUINZ cohort participants are healthier than the general population, that mothers under-reported hospitalisations in the GUINZ study, or errors or omissions in our imperfect definition of ASH. The proportion of hospitalisations that are avoidable was



particularly high for Pacific children. Furthermore, although we only measured hospitalisations in this study, there is likely to be detrimental social and educational outcomes for children who are hospitalised in infancy, as well as impacts on siblings, parents and the wider family (Evans et al., 2019; Shudy et al., 2006).

We found that barriers to seeing a GP are associated with a higher risk of hospitalisation in the year to 54 months in Māori and Pacific children, but not in New Zealand European children. Why this should be is not clear. New Zealand European children who face barriers are more likely to have done so only once, whereas Māori and Pacific children are more likely to have faced a barrier on more than one occasion. One possible explanation is that New Zealand European children who face a barrier to seeing a GP are more likely to be hospitalised sooner or later, as we do not have a measure of hospitalisation between 24 and 42 months, or after 54 months. Alternatively, it may be that facing barriers multiple times increases the likelihood of hospitalisation.

Using a privilege lens, we ask the question: what makes the health system work so much better for NZ European families? One important factor is racism within the health system. Self-reported experience of racism did not explain the observed associations between barriers to care and hospitalisation. However, self-reported racism is likely to be imperfectly measured, as individuals may not be aware of the effect that unconscious bias in a health professional can have on their access to or receipt of care. This could lead to residual confounding. Furthermore, institutional racism is harder to measure, and is acknowledged as present and a cause of inequities in health in Aotearoa New Zealand (Harris et al., 2018). Additionally, racism and unconscious bias are likely to be extended to the child through maternal/caregiver ethnicity, as the mother/caregiver is the usual mediator between an infant and the health service.

Each of the possible reasons for facing a barrier to seeing a GP connects to a greater or lesser degree to social determinants of health and wellbeing. Health services contribute to health improvement (King, 2001), but the social determinants of child health are paramount to improving wellbeing. Although poverty shapes access and experience of the determinants of health, it also intersects with various forms of racism – including the forms we see in the health sector. Families and adults who are better equipped to mitigate racism across the health sector tend to better understand how racism manifests in complex ways and how to ‘respond’. There is evidence to suggest a stronger cultural identity leads to increased self-esteem and personal wellbeing (Houkamau & Sibley, 2011), which is likely to provide a more robust foundation from which to navigate racism in the health sector.

An important question is what factors may mitigate the negative impacts of barriers to seeing a GP at a structural level? Māori health providers offer services which are aligned to Māori models of health and could be expected to ensure better long-term engagement and subsequent health outcomes for Māori. Within the general health system, increasing diversity of the workforce is likely to have a beneficial outcome. Ongoing work has identified Cultural Safety as a key mechanism through which the health sector can act at multiple levels to address health inequity (Curtis et al., 2019; Greenwood, 2019; Health Quality & Safety Commission, 2019). Cultural Safety is a critical education approach which was developed to explicitly articulate the causal links between colonisation, institutional racism, power, and social justice as fundamental to understanding and taking action to address health inequity (Matheson et al., 2018). Cultural Safety has long been a core component of nursing education in Aotearoa New Zealand, but has only recently been adopted by the Medical Council of New Zealand (Curtis et al., 2019). It is imperative that this is not only legislated at the health professional level, but also recognised at health system and inter-sectoral policy levels for greatest impact (Greenwood, 2019), which is of particular relevance given the current reforms of the Health and Disability System (New Zealand Government, 2021).

The disproportionate experience of barriers to seeing a GP amongst Māori and Pacific children is an important example of inequity in the

provision of health care. Such barriers have been shown here to be associated with more or delayed hospitalisation for Māori and Pacific children, but not in New Zealand European children. It could be that the impact of facing a barrier is lower in New Zealand European children, or that these children were hospitalised in the intervening period (i.e. 24–42 months), sooner than Māori and Pacific children. In either case, this has health, social and cost implications for whānau/families, the health system and New Zealand society as a whole.

Health system efforts to remove these barriers have so far emphasised a zero-fees policy for children seeing a GP. We report a range of barriers beyond cost, which may have become more prominent since cost barriers have reduced. For example, ‘inability to get an appointment’ was the most common barrier to seeing a GP, particularly for Māori. Further qualitative work exploring the impact of these barriers is needed, including development of previous work on the role that receptionists and other front-line staff play in facilitating or acting as a potential barrier to appointments (Manhire-Heath et al., 2019). We also identified a high proportion of people, notably Pacific families, reporting that they usually pay to see a GP. This reinforces the need for universal enrolment at a practice, which guarantees free access at the point of care for children, but is known to be lower for Māori and Pacific people (Iruzun Lopez et al., 2021).

## 5. Policy implications

Policy makers should consider how to reduce these barriers to promote enhanced use of primary health care services and to reduce hospital admissions amongst children. Research and policy focused on improving access to GPs for Māori and Pacific people should be prioritised. Although our analyses focus on children, access for children is navigated by parents/caregivers. In this role, challenges that caregivers face in accessing the system compound and shape their ability to advocate for an themselves and their families within the current system. The implications of this work therefore extend beyond children to people of all ages.

To achieve the aspiration of health equity, requires, among other actions, a re-orientation of the primary health care system, in terms of co-design, pro-equity funding levels, elimination of institutional racism and meaningful Māori representation at all levels of the health system. Inequity is ingrained throughout our social systems, with direct impact on the social determinants of health. To fully address social and concomitant health inequity, a transformative, system-change approach is required (Boulton et al., 2020). Given the upcoming reforms of the health and disability system in Aotearoa New Zealand, including the establishment of a Māori Health Authority, the opportunity presents itself to meet these challenges.

In summary, we have reported a high prevalence of barriers to seeing a GP in the year to 24 and in the year to 54 months. For Māori and Pacific children, the barriers in the year to 24 months are associated with a higher chance of hospitalisation in the year to 54 months. Policies to address accessibility of the primary health care system, in particular seeing a GP, for Māori and Pacific children, beyond focusing on cost, are required to address inequities in hospitalisations. The forthcoming health reforms (New Zealand Government, 2021), with their focus on primary and community health, offer an opportunity for these barriers to be addressed. It is imperative that changes within the health system, and future health policy, must align with the New Zealand government’s obligations under *Te Tiriti o Waitangi*, to ensure that health equity becomes a reality for Māori.

## Ethics approval

Ethics approval was obtained for the Growing Up in New Zealand cohort from the Ministry of Health Northern Y Regional Ethics Committee. Approval for the current analysis of anonymised data was given by the Data Access Committee 19\_1004.

## CRedit authorship contribution statement

**Mona Jeffreys:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Software, Supervision, Writing – original draft, Roles/Writing - original draft, Writing – review & editing. **Kirsten Smiler:** Conceptualization, Funding acquisition, Investigation, Methodology, Validation, Writing – review & editing. **Lis Ellison Loschmann:** Investigation, Methodology, Validation, Writing – original draft, Roles/Writing - original draft, Writing – review & editing. **Megan Pledger:** Investigation, Methodology, Validation, Writing – review & editing. **Jonathan Kennedy:** Investigation, Methodology, Validation, Writing – review & editing. **Jacqueline Cumming:** Conceptualization, Funding acquisition, Investigation, Methodology, Validation, Writing – original draft, Roles/Writing - original draft, Writing – review & editing.

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