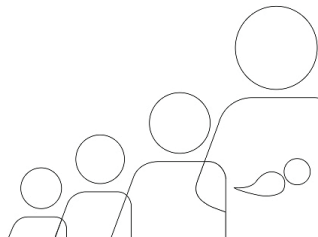




Health and wellbeing of under-15 year olds in Hutt Valley, Capital & Coast and Wairarapa 2018

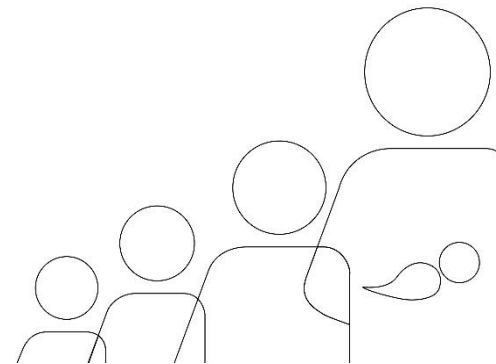




New Zealand Child and Youth
Epidemiology Service

Health and wellbeing of under-15 year olds in Hutt Valley, Capital & Coast and Wairarapa 2018

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This report has been prepared for the Hutt Valley, Capital & Coast and Wairarapa District Health Boards.

While every endeavour has been made to use accurate data in this report, there are currently variations in the way data are collected from DHB and other agencies that may result in errors, omissions or inaccuracies in the information in this report. The NZCYES does not accept liability for any inaccuracies arising from the use of these data in the production of these reports, or for any losses arising as a consequence thereof.

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1. Introduction

This report is released at a time of renewed focus on the health and wellbeing of children and young people in Aotearoa. In April 2019 StatsNZ released the first round of child poverty statistics using a revised and more robust methodology.¹ The same week saw the release of the first summary report on the national engagement undertaken in preparation of New Zealand's first Child Youth and Wellbeing Strategy.² There is a sense of careful hope in the child health and wellbeing sector that we may see steps toward the transformative change that is required for all children to enjoy the same opportunities to fulfil their potential.³

In this report the New Zealand Child and Youth Epidemiology Service (NZCYES) provides data and information to contribute to the effective planning and funding of services to improve, promote and protect the health and wellbeing of New Zealand children. The indicators of child health and wellbeing in this report cover the under-15 age group, with a focus on the school years. Indicators reported on in 2017 had a focus on the first five years of life. The 2019 report will extend further along the life course, to age 24 years.

Indicator data for this report were extracted in 2018 from a range of routinely collected national datasets. For each indicator the report provides an analysis of the most recent data available at the time of writing, followed by evidence for good practice derived from current policies, guidelines and the evidence-based literature. Where possible, the evidence for good practice includes discussion of equity issues relevant to each indicator, to inform service planning and delivery.

The 2018 report begins with a population snapshot comparing the population profile by age and gender in each district health board (DHB) with the national demographic profile. This helps to provide a context for the data presented in the report for specific indicators. Data should be interpreted in light of the differing patterns in age structure, ethnic composition, social and material deprivation in different regions and in Aotearoa overall.

Equity is a key concern in child health. The Ministry of Health has a clear mandate to take a bold approach to addressing health inequities.⁴ The first review topic, *Health equity*, summarises recent publications from the Ministry of Health, organisations of health professionals, and scholarly literature with a focus on health equity between Māori and other children and young people in Aotearoa.

Selected nutritional and physical activity indicators from the New Zealand Health Survey are presented in the healthy behaviours section of the report. These indicators are important for overall wellbeing, growth, and long-term health of children and young people.

The second review topic, *Children's views on healthcare*, reviews research on what children think about health services and how they are provided. This will help health service planners and providers to incorporate children's views to make services more user-friendly and thereby more effective.

The next two sections present data on oral health and immunisation, using a combination of community-based and hospitalisation data. An overview of all-cause hospitalisation follows, with detailed analysis of the more common causes of hospitalisation in this age group. Mental health analysis in this report presents data from the New Zealand Health Survey, and hospitalisation data for under-15 year olds with a mental health diagnosis.

The opportunity to “grow up in a family environment of happiness, love and understanding”⁵ is a fundamental right of every child. The final section of this report includes indicators related to nurture and protection of children and young people. Data from the New Zealand Health Survey on physical punishment of children, and data from the National Collections on deaths and hospitalisations due to assault, neglect or maltreatment are included.

The report appendices provide detail that may be helpful when interpreting information presented in the report. They include detailed descriptions of the methods used to develop evidence for good practice, and the statistical methods used in the data analyses, descriptions of the data sources used for the various indicators reported, explanation about classification of ethnicity and social and material deprivation in the report, and a list of the clinical codes relevant to each indicator.

In summary, the 2018 report on health and wellbeing of under-15-year-olds presents data and interpretation on a set of relevant indicators extracted from national health datasets. The data used were the most recent available at the time of writing, and provide a snapshot of achievements and challenges in these areas. This report cannot address questions that require outpatient data, as these are not yet available at a national level. Developing systems that can provide a fuller picture of outpatient and primary health care data is important to inform child health service planning at national and DHB level.

The following figures present an overview of the health and wellbeing of under-15 year olds indicators for Hutt Valley (Figure 1-1), Capital & Coast (Figure 1-2) and Wairarapa (Figure 1-3) DHBs. Each figure also presents the national rate and the range of values observed across all DHBs.

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Indicator	Period	Hutt Valley number	Hutt Valley rate	NZ rate	Lowest DHB rate	Indicator range	Highest DHB rate
1 Proportion of population aged 0–14 years	2017	29,083	20.29	20.06	17.85		24.4
2 Active transport	2014–2017	..	34.00	43.80	27.10		58.5
3 Breakfast eaten at home every day	2014–2017	..	87.00	85.50	68.50		91.0
4 Fast food 3+ times in past week	2014–2017	..	7.20	7.10	2.20		13.3
5 Fizzy drink 3+ times per week	2014–2017	..	18.50	17.40	8.80		25.7
6 Vegetable and fruit intake	2014–2017	..	58.30	51.00	33.60		70.7
7 Television watching	2014–2017	..	49.70	42.50	35.90		53.1
8 Teeth removed due to decay in past 12 months	2014–2017	..	4.40	3.70	2.00		6.2
9 Teeth removed due to decay in lifetime	2014–2017	..	13.50	10.60	7.30		18.4
10 Hospitalisations of 1–14 year olds for dental caries	2012–2016	1,521	10.95	7.59	4.43		13.9
11 Fully immunised at 8 months	Quarter ending June 2018	485	93.09	91.24	82.12		95.0
12 Fully immunised at 24 months	Quarter ending June 2018	477	91.20	91.91	84.50		98.0
13 Fully immunised at 5 years	Quarter ending June 2018	472	91.47	88.00	78.38		94.3
14 Deaths of 1–14 year olds	2011–2015	18	12.86	14.25	7.08		30.6
15 Hospitalisations of 28 days to 14 years	2013–2017	22,643	153.35	133.66	102.80		153.3
16 Hospitalisations of 0–14 year olds for unintentional injuries	2013–2017	1,666	1128.29	1087.45	854.55		1471.0
17 Asthma (medicated)	2014–2017	..	20.50	15.40	10.30		24.4
18 Hospitalisations of 0–14 year olds for asthma and wheeze	2013–2017	1,278	8.66	6.89	3.40		11.4
19 Hospitalisations of 0–14 year olds for gastroenteritis	2013–2017	805	5.45	4.46	2.50		5.7
20 Hospitalisations of 0–14 year olds for serious skin infections	2013–2017	599	4.06	3.36	0.64		5.3
21 ADHD	2014–2017	..	2.10	2.00	0.60		6.4
22 Anxiety disorder	2014–2017	..	5.00	2.80	1.30		6.8
23 Autism spectrum disorder	2014–2017	..	0.60	1.60	0.60		3.8
24 Depression	2014–2017	..	1.80	0.60	0.10		1.8
25 Emotional and/or behavioural problems	2014–2017	..	5.90	4.40	2.00		11.1
26 Hospitalisations of 0–14 year olds for mental health	2013–2017	178	120.55	79.75	54.95		128.9
27 Physical punishment	2014–2017	..	4.80	5.70	1.70		16.6
28 Death of 0–14 year olds due to assault	2000–2015	5	1.00	0.85	0.00		3.7
29 Hospitalisations of 0–14 year olds due to assault	2013–2017	26	17.61	14.80	6.27		29.0
30 Care and protection notifications requiring further action for 0–17 year olds	2017	776	16.94	24.52	0.28		34.4

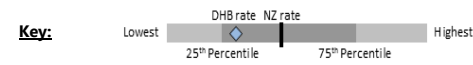


Figure 1-1. Summary indicator graph, Hutt Valley DHB vs New Zealand

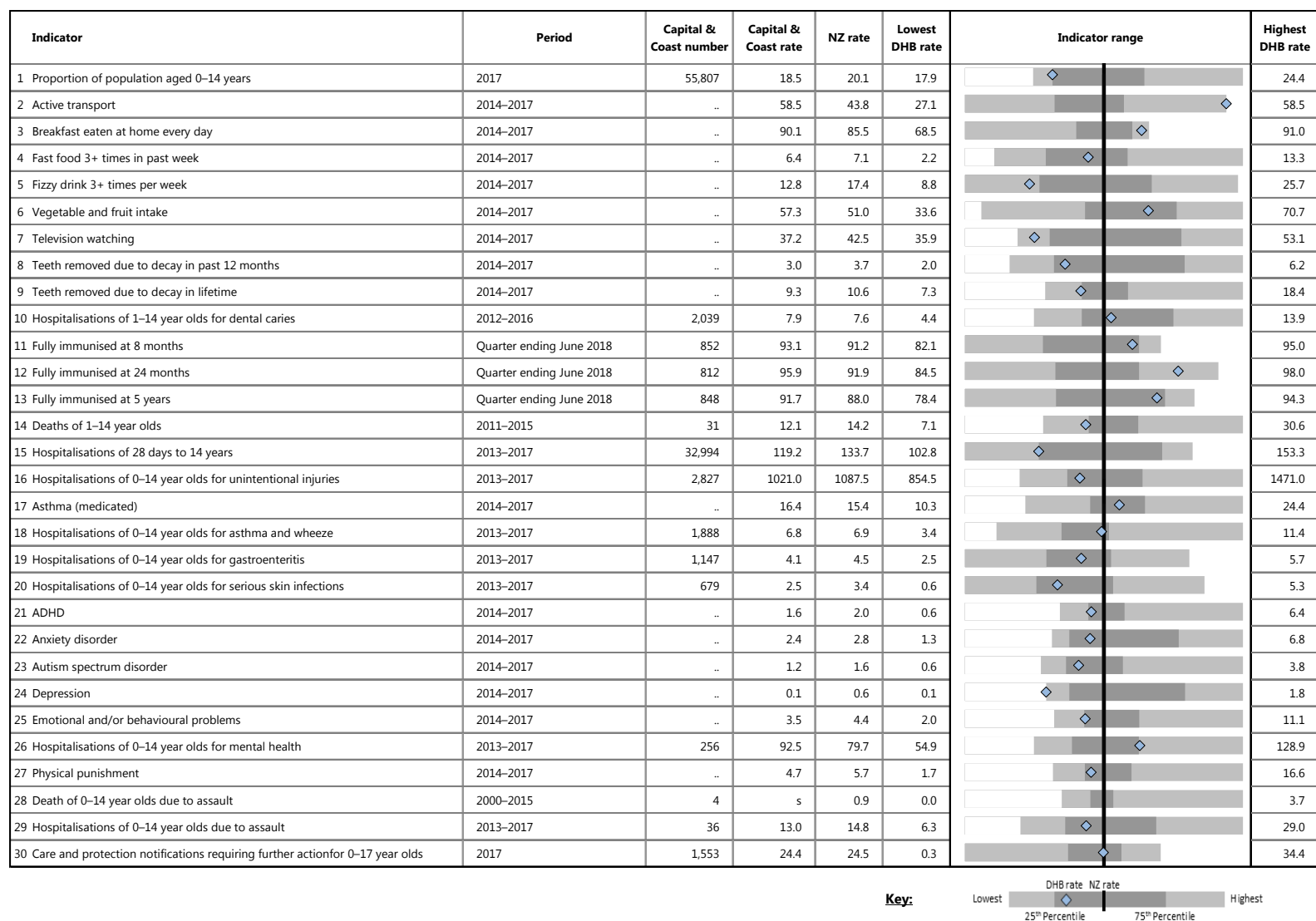


Figure 1-2. Summary indicator graph, Capital & Coast DHB vs New Zealand

Indicator	Period	Wairarapa number	Wairarapa rate	NZ rate	Lowest DHB rate	Indicator range	Highest DHB rate
1 Proportion of population aged 0–14 years	2017	8,483	19.29	20.06	17.85		24.4
2 Active transport	2014–2017	..	30.20	43.80	27.10		58.5
3 Breakfast eaten at home every day	2014–2017	..	85.70	85.50	68.50		91.0
4 Fast food 3+ times in past week	2014–2017	..	4.20	7.10	2.20		13.3
5 Fizzy drink 3+ times per week	2014–2017	..	16.40	17.40	8.80		25.7
6 Vegetable and fruit intake	2014–2017	..	57.40	51.00	33.60		70.7
7 Television watching	2014–2017	..	49.50	42.50	35.90		53.1
8 Teeth removed due to decay in past 12 months	2014–2017	..	3.70	3.70	2.00		6.2
9 Teeth removed due to decay in lifetime	2014–2017	..	12.00	10.60	7.30		18.4
10 Hospitalisations of 1–14 year olds for dental caries	2012–2016	396	9.97	7.59	4.43		13.9
11 Fully immunised at 8 months	Quarter ending June 2018	127	93.38	91.24	82.12		95.0
12 Fully immunised at 24 months	Quarter ending June 2018	117	93.60	91.91	84.50		98.0
13 Fully immunised at 5 years	Quarter ending June 2018	115	94.26	88.00	78.38		94.3
14 Deaths of 1–14 year olds	2011–2015	7	17.69	14.25	7.08		30.6
15 Hospitalisations of 28 days to 14 years	2013–2017	5,396	127.69	133.66	102.80		153.3
16 Hospitalisations of 0–14 year olds for unintentional injuries	2013–2017	586	1386.75	1087.45	854.55		1471.0
17 Asthma (medicated)	2014–2017	..	15.20	15.40	10.30		24.4
18 Hospitalisations of 0–14 year olds for asthma and wheeze	2013–2017	233	5.51	6.89	3.40		11.4
19 Hospitalisations of 0–14 year olds for gastroenteritis	2013–2017	187	4.43	4.46	2.50		5.7
20 Hospitalisations of 0–14 year olds for serious skin infections	2013–2017	103	2.44	3.36	0.64		5.3
21 ADHD	2014–2017	..	6.40	2.00	0.60		6.4
22 Anxiety disorder	2014–2017	..	6.80	2.80	1.30		6.8
23 Autism spectrum disorder	2014–2017	..	3.80	1.60	0.60		3.8
24 Depression	2014–2017	..	1.30	0.60	0.10		1.8
25 Emotional and/or behavioural problems	2014–2017	..	11.10	4.40	2.00		11.1
26 Hospitalisations of 0–14 year olds for mental health	2013–2017	54	127.79	79.75	54.95		128.9
27 Physical punishment	2014–2017	..	6.80	5.70	1.70		16.6
28 Death of 0–14 year olds due to assault	2000–2015	5	3.66	0.85	0.00		3.7
29 Hospitalisations of 0–14 year olds due to assault	2013–2017	8	18.93	14.80	6.27		29.0
30 Care and protection notifications requiring further action for 0–17 year olds	2017	459	27.77	24.52	0.28		34.4

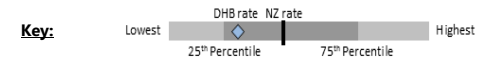


Figure 1-3. Summary indicator graph, Wairarapa DHB vs New Zealand

2. Population snapshot

Knowledge of regional demography is important to appropriately interpret crude rates presented in NZCYES reports. When rates within a district health board differ from New Zealand rates, this finding should be interpreted in the light of how age structure and ethnic composition of the local population, and patterns of social and material deprivation in the area, differ from the New Zealand demographic profile.

The regional demographic profile may affect the data presented for each indicator at district health board level. The DHB-level data are best considered alongside the New Zealand rate ratio tables and graphs. Progress toward health equity, although not able to be measured precisely, can be considered when the observed rates in a DHB differ from the rates that might be expected based on the demographic profile.

The following provides a snapshot of the demographic characteristics of the population for Hutt Valley, Capital & Coast and Wairarapa DHBs. It presents information as at June 2017, using intercensal extrapolation with StatsNZ Census 2013 Estimated Resident Population (ERP) as the base.

Data source and methods

Data sources

Extrapolated estimated resident population as at 30 June 2017, using intercensal extrapolation (base: StatsNZ Census 2013 estimated resident population)

Additional information

New Zealand's national health datasets have traditionally continued to use the previous censuses' domicile codes for ≈ 2 years after any new census. In addition, NZDep is assigned on the basis of domicile code / Census Area Unit ($\approx 1-2,000$ people), so in regions where there appear to be no births in e.g. decile 10 areas, there still may be babies born into, for example, decile 10 meshblocks (smaller areas of ≈ 100 people). When these smaller meshblocks are aggregated into larger census area units, they collectively fail to achieve an overall decile 10 score.

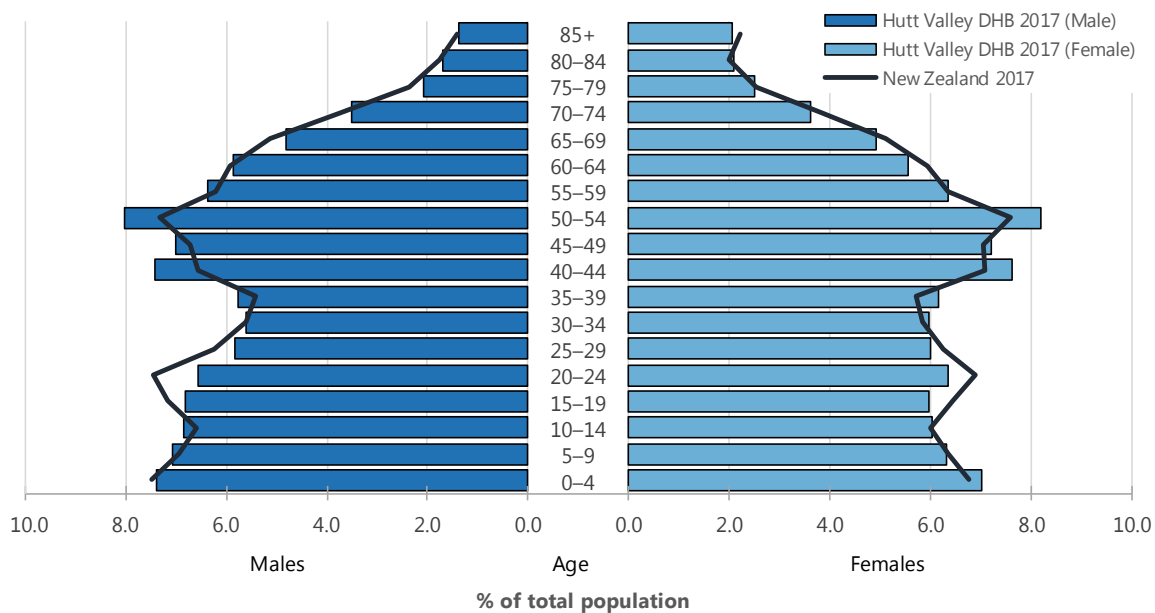
Prioritised ethnicity has been used throughout, with the ethnicity of those reporting multiple affiliations being prioritised in the following order: Māori, Pacific, Asian/Indian, Other, European (those identifying as "New Zealander's" in the 2013 Census have been allocated to the European group).

Tests of statistical significance have not been applied to the data in this section, so any associations described do not imply statistical significance or non-significance.

Figure 2-1 to Figure 2-3 present the (estimated) population structure for Hutt Valley, Capital & Coast and Wairarapa DHBs in comparison to the age structure of the New Zealand estimated population for 2017.

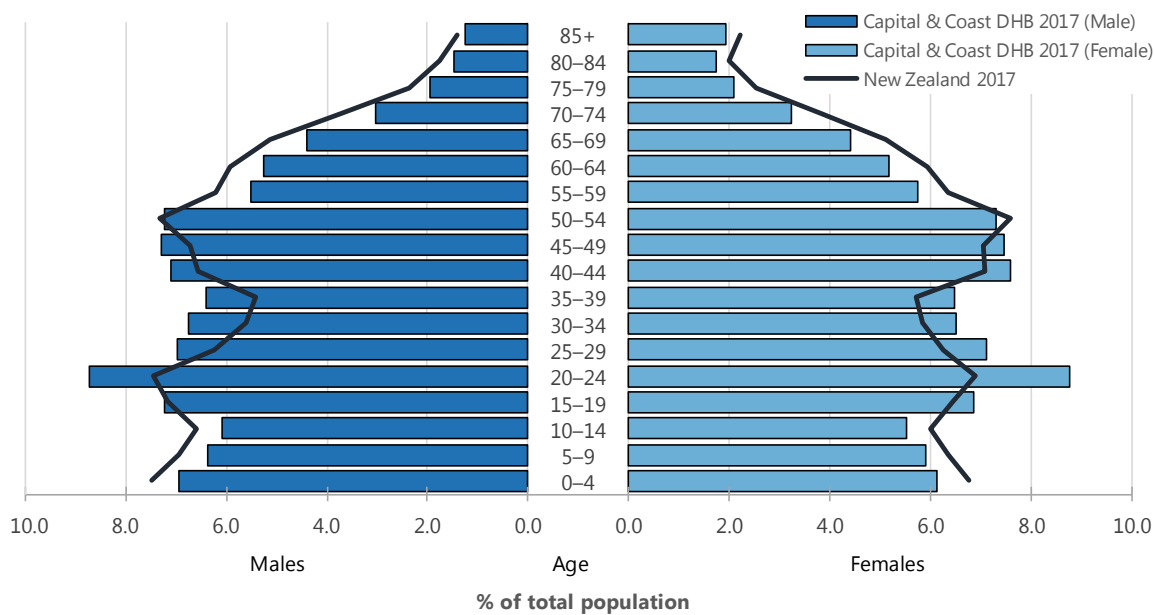
The proportion of the population aged under-15 years within New Zealand was almost 20%. For each of the DHBs the proportion of under-15 year olds within their population was similar to New Zealand as a whole, with 20% in Hutt Valley, 18% in Capital & Coast and 19% in Wairarapa DHBs (Figure 2-1 to Figure 2-3).

Figure 2-1. Population distribution by age group and sex, Hutt Valley DHB



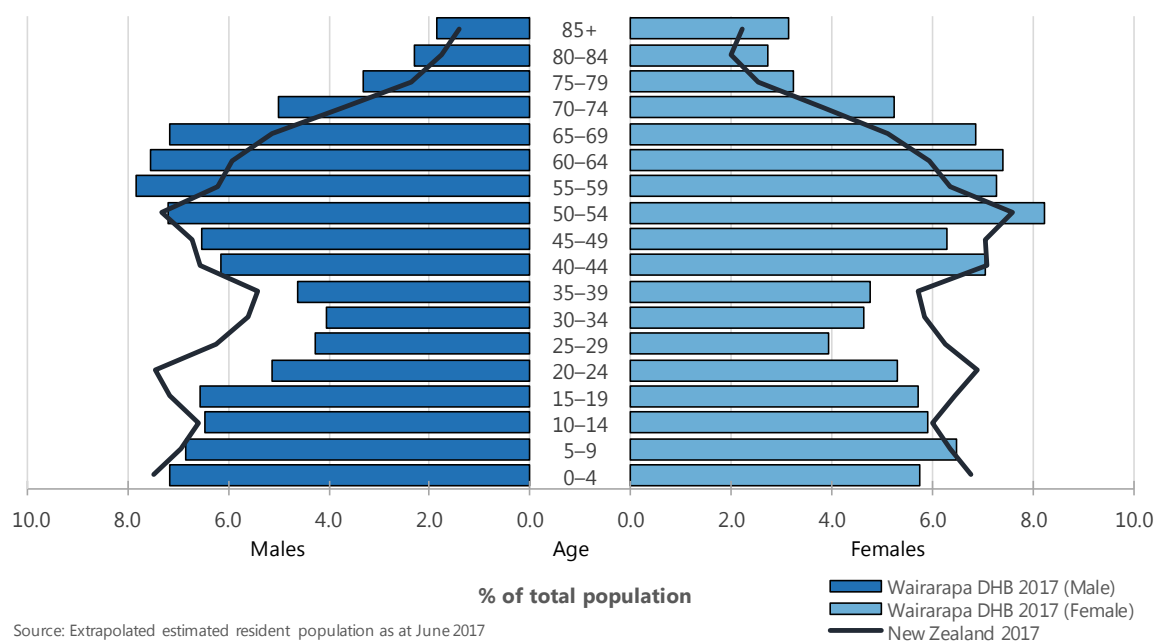
Source: Extrapolated estimated resident population as at June 2017

Figure 2-2. Population distribution by age group and sex, Capital & Coast DHB



Source: Extrapolated estimated resident population as at June 2017

Figure 2-3. Population distribution by age group and sex, Wairarapa DHB



The demographic distribution of the under-15 year old population within New Zealand and each district health board are presented by the residential deprivation score (NZDep2013 index of deprivation score), (prioritised) ethnicity, and gender in Figure 2-4

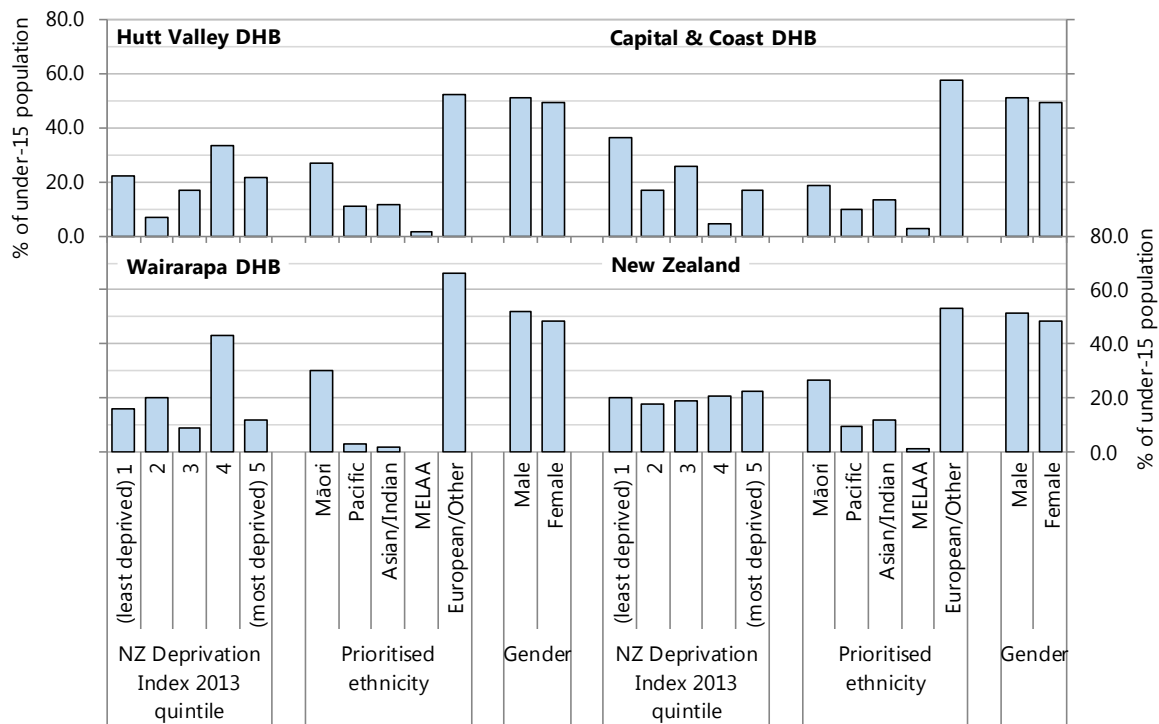
The proportion of under-15 year olds in New Zealand residing in areas with high neighbourhood deprivation (NZDep2013) scores (considered most deprived) was around 22% compared with 20% in areas with low neighbourhood deprivation scores. Over 50% of New Zealand under-15 year olds were of European/Other ethnicity, over 25% were Māori, 12% Asian/Indian and nearly 10% identified with Pacific ethnicities. There were marginally more males aged under 15 years than females (Figure 2-4).

The demographic distribution within Hutt Valley, Capital & Coast and Wairarapa DHBs differs from the national demographic distribution for neighbourhood deprivation and ethnicity (Figure 2-4).

The proportions of the under-15 year old population in each DHB that resided in areas of low deprivation scores ranged from 16% in Wairarapa and 22% in Hutt Valley, to 36% in Capital & Coast. The highest proportion of under-15 year olds in Hutt Valley and Wairarapa DHBs resided in moderately high deprivation score areas (quintile 4).

Over half of the under-15 year old population in the three DHBs was of European/Other ethnicity (52% in Hutt Valley, 58% in Capital & Coast, and 66% in Wairarapa). Around 30–40% of the under-15 populations in Hutt Valley and Wairarapa were Māori (37% and 30% respectively). Under-15 year olds of Pacific ethnicity comprised 11% of the population in Hutt Valley and 10% in Capital & Coast; 11% and 14% of this population in Hutt Valley and in Capital & Coast were Asian/Indian.

Figure 2-4. Demographic distribution of under-15 year olds in Hutt Valley, Capital & Coast and Wairarapa DHBs, by demographic factor, as extrapolated at June 2017



Source: Extrapolated estimated resident population as at June 2017

3. Health equity: Achieving equitable health outcomes for Māori children and young people

Dr Mavis Duncanson

“All children, no matter where they live or who they are, should have the same opportunity to fulfil their potential”

Inequities in child health position statement (2018): Royal Australasian College of Physicians.¹

Introduction

Achieving equity in child health outcomes is an important and urgent issue in Aotearoa.² To give children the best start to life and optimise their health, development and well-being we must reduce and ultimately eliminate health inequities across their life trajectory.¹ The New Zealand Government has mandated the Ministry of Health to take a bold approach to addressing health inequities.³

This rapid review summarises recent publications from the Ministry of Health, organisations of health professionals, and scholarly literature. The focus of this review is on health equity between Māori and other children and young people in Aotearoa. The nature of the information sources means that some findings are for broader population groups, and draw on research beyond New Zealand.

The New Zealand Ministry of Health defines equity in health outcomes in this way: “In Aotearoa New Zealand, people have differences in health that are not only avoidable but unfair and unjust. Equity recognises different people with different levels of advantage may require different approaches and resources to get equitable outcomes”.^{3 (p5)}

The New Zealand Medical Association defines health equity as an ethical principle concerned with the absence of systematic disparities in health, or in the major social determinants of health, between population groups with different levels of underlying social advantage/disadvantage.⁴ This definition preferences the use of the term equity over the term equality, because the former recognises that people differ in their capacity for health and their ability to attain or maintain health. Equitable outcomes in health may require different (i.e. unequal) inputs to achieve the same result.⁴

For a full discussion of the evolving concept of equity, and underlying principles and ethics, see the Ministry of Health publication ‘Achieving equity in health outcomes: Highlights of important national and international papers’ (Ministry of Health, 2018).³

Health inequities

Health inequities occur when inequality between population groups infringes on standards of fairness and human rights.⁵ “Child health inequities are differential outcomes in children’s health, development and well-being that are unjust, unnecessary, systematic and preventable.”^{1 (p1)}

There are compelling health inequities between Māori and non-Māori New Zealanders.^{6,7} These inequities are large, pervasive, and persist across the lifespan and over time.^{3,6} Health inequities are compounded by inequities in exposure to risks, in access to resources, and opportunities to lead healthy lives.⁴ Inequities are observed in determinants of health, including in education, employment,

income, housing, income support, dealings with the criminal justice system, health literacy, deprivation, and access to health care.⁶ Such inequities are well-documented,⁶ including in New Zealand Child and Youth Epidemiology Service (NZCYES) reports on child health and wellbeing.⁸

Indigenous peoples face great social disadvantages and poor health compared with the general population in countries all around the world.⁹ Even in well-resourced countries such as Australia, Canada, and New Zealand, Indigenous peoples experience substantial gaps in life expectancy compared with non-indigenous people.⁹ In New Zealand in 2012–14 there was a gap of more than seven years between Māori and non-Māori life expectancy at birth.¹⁰ Anderson et al. (2016) showed that Indigenous populations from 23 countries experienced inequities compared with benchmark populations for several variables including life expectancy at birth, maternal and infant mortality, frequency of low birthweight and high birthweight infants, measures related to nutrition (e.g. child malnutrition and childhood obesity), and in key social indicators including educational attainment and economic status.¹¹ There is evidence from other studies of major inequities between Indigenous and non-indigenous peoples in mental health, burden of chronic disease, and disability.⁹

Health inequities are costly. Economic analysis of health inequalities in the United Kingdom (UK) considered the nearly 700,000 children who were to be born in 2010. If health inequalities were eradicated, each child could expect to live two years longer.³ In the UK approximately 1.3 million total years of life are currently lost to health inequalities. Eliminating health inequalities would also lead to gains through reduced rates of illness and disability, with addition of 2.8 million years of disability-free life.³ The societal costs of health inequity between Māori and non-Māori children in New Zealand are very high, with estimates ranging from over NZ\$62 million to over NZ\$200 million per annum, depending on the costing measure used.¹² ‘Excess’ deaths of 67 Māori children per year contributed to this societal cost estimate.¹² These 67 deaths represent 5,210 life years lost each year due to premature mortality, which is NZ\$224 million in years of life lost.³

In an apparent paradox, health inequities between Māori and non-Māori children are estimated to save the New Zealand health sector around 24 million dollars per annum.¹² The cost of 3,075 ‘excess’ Māori avoidable hospitalisations per year from 2003–2007 is more than offset by lower use of other health services. When it costs the health sector less to admit acutely sick Māori children, than to prevent severe illness through ensuring equitable primary care access or effective population based interventions, a focus only on constraining health expenditure leaves no incentive to reduce inequities in primary care access.¹² Within Aotearoa, child health sector expenditure appears skewed towards non-Māori children. If Māori children utilised health services at the same rate as non-Māori, each year there would have been:¹²

- 23,373 more outpatient consultations (2006–2008)
- 5,740 more mental health consultations (2006–2008)
- 26,442 more Accident Compensation Corporation (ACC) accident and injury claims (2003–2007)
- 40,041 more general practice (GP) consultations (2007–2008)
- 198,108 more pharmaceutical claims (2007–2008)
- 101,922 more claims for laboratory test claims (2007–2008).

Barriers to health equity

There is robust and growing evidence that demonstrates the impact of social determinants of health, including colonisation and racism, on the health status of indigenous peoples.⁷ Like the clinical journey of an individual and their whānau to good health,¹³ the journey toward health equity is affected by ngā hau e whā (the four winds) of colonisation, racism, migration and marginalisation.

Colonisation

Colonisation, both historical and contemporary, is a driver of poor health for indigenous peoples worldwide, including Māori in New Zealand.⁶ Colonisation led to the creation of the nation states that profoundly reshaped the conditions of Indigenous peoples' lives and communities.⁹ Enduring legacies of colonisation include detrimental social structures and political arrangements, which in turn lead to persistent social disadvantage.⁹ Historical colonisation resulted in the loss of lives through invasion and war, and redistribution of resources and power away from indigenous to the incoming migrant populations.⁶ The trauma resulting from colonisation has produced anxiety, resentment, sadness and grief which is often intergenerational, and felt as a collective, producing a traumatised society.¹⁴ Ongoing power imbalances underpin contemporary colonisation and result in continued privilege for the colonising populations.⁶

Racism

Racism is recognised as both a tool of and driver for historical and contemporary colonisation.⁶ Māori in Aotearoa experience significantly higher rates of exposure to perceived racism than all other ethnic groups; such racism in turn, limits the ability to actively participate in society.¹⁴ Institutional racism is a determinant of health for Māori and Pacific communities and a barrier to quality health delivery and to health equity.⁷ On a socio-political level, racism produces inequity in necessary resources for health and access to good, effective healthcare, while on a personal level racism causes psycho-social stress and internalisation of negativity toward one's culture.¹⁴ Institutional racism is a pattern of differential access to material resources and power which advantages and privileges one sector of the population while disadvantaging and marginalising another.⁶ Institutionalised or structural racism can be more simply defined as inaction in the face of need.⁶ Mono-cultural practice seems wide-spread within the administration and service delivery of the health sector. Inequities in practice can be invisible to those managing the system.⁷

Marginalisation

Marginalisation of Indigenous peoples is a key component of contemporary colonisation.⁶ One common experience of all colonised Indigenous people is that they become enclosed in a national state where identity and priorities are defined in ways that ignore, marginalise, denigrate, or actively suppress Indigenous identities.⁹ Processes of acculturation produce a society which fears or avoids anything that is foreign or different from the dominant culture.¹⁴ Socio-political processes in such a society lead to disregard for ethnic and cultural minorities, members of which are made to feel insignificant and excluded from society.¹⁴ Although social inclusion is regarded as a human right and a social determinant of health, Indigenous peoples have been, and continue to be, marginalised within the countries which they have occupied for thousands of years.¹⁴ Understanding the consequences of this history and the current dynamics of marginalisation is essential for the development of effective social policy and public health interventions.⁹

Urbanisation

Indigenous peoples have traditionally held strong relationships with land, forests, waterways, oceans and air in specific locations.¹⁵ Migration away from traditional rural areas to towns and cities means that day-to-day lives become largely shaped by metropolitan environments.¹⁵ Urbanisation is often associated with complex patterns of migration for Indigenous peoples.⁹ Complex migratory patterns and demographic shifts of Indigenous populations, including those associated with urbanisation, contribute to the ways in which the social and cultural construct of Indigenous identity changes over time.⁹ Urbanisation of Māori within Aotearoa was one of the most rapid internal migrations seen internationally.¹⁶ In 1926, 84% of Māori lived in rural areas whereas by 2006 the proportion of Māori living in urban settings had risen to almost 85%.¹⁶ Negative effects of urbanisation included atrophy of traditional Māori social structures and degradation of cultural, social and physical living environments. Māori living in cities experience poorer health outcomes compared to other New Zealanders, they disproportionately bear the negative effects of economic recession, receive poor education, and are less able to access quality housing.¹⁶ More recent Treaty settlements, and recognition that traditional indigenous knowledge is a part of a city's real history and an asset in

preparing for its future, have created opportunities for greater involvement of Māori in the development of healthy cities for the future.¹⁶ A major driver for full Māori participation in urban planning and development is achieving equity across the social, economic, and political spectrums.¹⁶ Durie (2007) also notes that although the diaspora, whether urban or transnational, has been associated with weakening of indigenous identity and potential, there have also been positive effects.¹⁵ “While those who leave home do not necessarily retain the same idiom or the same values as those who remain behind, a commitment to their own people may be no less and re-connections will be valued. The capacity to contribute to indigenous resilience may be increased by new skills, expanded networks, different organisational arrangements, and fresh visions acquired in distant environments”.¹⁵ (p20)

Te Tiriti o Waitangi

Deep engagement with Te Tiriti o Waitangi, the Treaty of Waitangi (Te Tiriti) is central to addressing health equity in New Zealand^{3,17} and is essential for any credible effort to achieve equity between Māori and non-Māori.⁷ The work practices of Crown ministers and officials need to align with Te Tiriti to prevent further treaty breaches and Waitangi Tribunal proceedings.⁷ The New Zealand College of Public Health Medicine upholds Te Tiriti o Waitangi as the basis for partnership with Māori.⁶ The New Zealand College of Public Health Medicine recognises that Te Tiriti o Waitangi establishes a special relationship between iwi Māori and the Crown, in which Māori have the right to self-determination and to monitor and evaluate the Crown.⁶ In this context the Crown includes policies and activities of the New Zealand Government including the Ministry of Health. Persistence of health inequities between Māori and other New Zealanders is a serious breach of Te Tiriti.⁷ Meaningful Treaty partnerships that acknowledge Māori views about historically sourced contemporary harms, collective responsibility and accountability around health, could strengthen indigenous engagement and outcomes.⁷ Came et al (2016) notes that although Treaty principles are embedded within health legislation and within the Māori Health Strategy—He Korowai Oranga, the New Zealand Health Strategy does not address Te Tiriti obligations explicitly.⁷

Navigating toward health equity

The Meihana model is used at the University of Otago, Christchurch as part of the Indigenous Health Framework.¹³ The model uses the image of a double-hulled canoe (te waka hourua) to represent the patient and whānau. Both must be considered in assessment of health status. The two hulls are bound together by the crossbeams of tinana (physical health and functioning), hinengaro (psychological and emotional wellbeing), wairua (beliefs regarding connectedness and spirituality), taiao (the physical environment including home and work environment of the patient and also the nature and suitability of the clinical environment), and iwi katoa (access to services and systems that can improve health and wellbeing).¹³ The Meihana model builds on foundations of the well-documented Māori health model, te whare tapa whā (the four-sided house), described by Dr Mason Durie as a view of health that fitted with contemporary Māori thinking.¹⁸

The image of te waka hourua is particularly relevant in child health where the whānau and the patient must be considered together. The journey is aided by ngā roma moana (the ocean currents). Pitama identifies these currents as ahua (indicators of Te Ao Māori, or Māori world view, that are important to the individual and whānau) tikanga (Māori cultural practices), whānau (relationships, roles and responsibilities of the patient within Te Ao Māori including whānau, hapū, iwi and other organisations), and whenua (the specific genealogical or spiritual connection between the individual or whānau and land).¹³ The process of navigation requires understanding an holistic model of health, which incorporates the spiritual dimension.¹⁸ Practical demonstration of navigational skill will include use of te reo Māori, and correct pronunciation of Māori names, organisational guidelines and processes to enable specific tikanga practices on request, and explicit exploration and recognition of the nature and importance of relationships, roles and responsibilities within the whānau and whenua.¹³

The Ministry of Health approach to achieving equity proposes a repeating cycle based around deepening the understanding of equity gaps, shifting thinking about where priorities for investment of time and resources should lie, followed by increasing direct action to address inequalities.³ Solutions

to the ill-health of Indigenous populations need to take account of exposure to historical violence, continuing deprivation due to unfair distribution of resources, and include recognition of social, cultural, and political identity.⁹ Research into health equity suggests that fragmented approaches will fail. Equity must be addressed from a planned, systems viewpoint, with sustained, systematic, multi-level efforts.⁷ Political empowerment, cultural recognition, and economic advancement are required to address issues associated with colonisation and its legacies.⁹ In all of these efforts, indigenous peoples should be engaged in their own health research, governance, and service delivery, so that solutions are generated that strengthen community resilience and self-determination.⁹

Effective leadership

The Royal Australasian College of Physicians recommends strong leadership at national and local government levels to improve child health equity. This will include setting equity-based key performance indicators that promote the health, development and well-being of all children, and making Directors-General and chief executives of all relevant Government departments accountable for their achievement.¹ Legislation and related government regulation and policy should set the standard for addressing child health inequities.¹

Government should conduct health equity impact assessments on policies and significant legislation with a focus on children's health, and establish accountability mechanisms that evaluate and lead to the modification or removal of existing policy and legislation that perpetuate child health inequities.¹ The New Zealand Medical Association believes that policies addressing education, employment, poverty, housing, taxation and social security should be assessed for their health impact.⁴

The New Zealand Health Strategy has retained Māori representation on district health boards (DHBs) to enable Treaty partners' input into health decision making. Structurally strengthening Māori and Pacific input into health policy and decision-making through representation on all health advisory and reference groups might strengthen outcomes.⁷

Health provider performance is routinely monitored by government, but it is less transparent how health funders and policy makers ensure quality within their own practice.⁷ Investment in strengthening political and cultural competencies within the health sector is important in navigating toward health equity and improving capacity and ability to achieve this outcome.⁷ Core cultural competencies are applicable to people engaged at all levels of the health system including decision makers and policy makers.⁷ Organisations need to purposely design cultures that enact health equity. Such design will require reorientation and rethinking of attitudes throughout organisational practices, policies and systems.⁷ There is evidence that DHBs perform better in including consideration of equity into strategic focus than in building this commitment into service delivery.¹⁹

Intersectoral action

Most of the social determinants of health lie beyond the direct mandate of the health sector.⁴ The Royal Australasian College of Physicians recommends improvement in service capacity by providing strong and truly universal child health and education services that deliver the right care to children for their health, development and well-being regardless of their family circumstances, socioeconomic status, ethnicity, geography or other social determinants.¹ Action across sectors including local government, health, education, employment, housing, transport, early childhood, justice and finance is required to address the social determinants of health.^{1,4} The health sector has a role in advocating for and actively encouraging intersectoral approaches to addressing the social determinants of health, in which the whole of society needs to be involved along with the whole of government.⁴ The goal of such action is to ensure that all children have the best possible start in life and enjoy equitable outcomes no matter who they are born to or where they live.¹

Self-determination

Effective and sustainable interventions to address health inequities must include changes in economic or social relationships, law reform, and other systemic changes that restore power to the group experiencing inequity.⁵ Māori health development can only occur when Māori can define their own priorities for health.³ Māori and Pacific communities have their own ideas about how to improve their

respective health status.⁷ Māori need to be structurally and consistently engaged in decision-making about health policy and investment decisions, through representation on all health advisory and reference groups.⁷ Māori health development is an approach in which Māori have control over the strategies used, take a preventive and integrated approach to managing and delivering their own services and work in partnership with the State.¹⁸

The Declaration on the Rights of Indigenous Peoples (the Declaration) was adopted by the United Nations General Assembly in 2007. At that time New Zealand was one of four countries that voted against the Declaration. In 2010 Dr Pita Sharples, Minister of Māori Affairs, appeared before the UN Permanent Forum on Indigenous Issues to say that New Zealand had changed its position and to announce New Zealand's support for the Declaration.²⁰ The Declaration is consistent with Te Tiriti o Waitangi on responsible government, tino rangatiratanga (self-determination) and equal rights for all, including for health.⁶ The New Zealand College of Public Health Medicine recognises the Declaration, which states that the human rights of indigenous peoples are equal to the human rights of everybody else, including the right to self-determination (article 3); the right to be free from discrimination (article 2); the right to be respected as distinct peoples (article 5); and collective, as well as individual rights (article 1).⁶

Inclusive decision making

Poor representation of the Indigenous people within the service delivery decision making processes results in disempowerment and the development of culturally inappropriate and ineffective services.¹⁴ The following questions adapted from TUHA-NZ (Treaty Understanding of Hauora in New Zealand) provide guidance for incorporating Treaty principles into health service development to address inequity:^{3,7}

- Article 1: How will hapū/Māori be involved in decision making throughout the health sector?
- Article 2: How well are hapū/Māori aspirations reflected within the strategy or plan?
- Article 3: What specific actions will be undertaken to ensure health equity outcomes? How will they be monitored?
- Article 4: How well are Māori world views and values, including wairuatanga, reflected in the strategy or plan?⁷

With a specific focus on equity in child health it is important that the views and perspectives of children are also taken into account in decision making. Children and young people's voices are often left out of the policy making process. The advantage of including children in the policy making process is that they can provide a unique perspective which is often not heard in the traditional consultation process.¹

Address racism

Eliminating institutional racism should be central to efforts to achieve health equity in Aotearoa.⁶ Even the most consciously egalitarian individuals may hold unconscious negative racial or ethnic stereotypes.²¹ There is a significant body of work which suggests self-determining, tailored approaches, that encompass decolonisation initiatives and efforts to counter institutional racism, work best for Māori.⁷ The previously described Meihana model was developed at the University of Otago to assist health practitioners to improve health service delivery for Māori patients/whānau.¹³ A strength of the Meihana model is the inter-relatedness of the components which cannot be considered in isolation. The Meihana model could contribute toward decreasing institutional racism by improving health professionals' understandings of Māori health, health inequities and health determinants. This can lead to a focus on Māori health needs and rights in the way that services are organised, and to less support for health initiatives which result in poor outcomes for Māori or increase inequities.²²

Workforce development

There is a need to develop and retain the indigenous health workforce, in order to improve access to healthcare for Māori.¹⁴ The Royal Australasian College of Physicians supports the development of a

culturally diverse paediatric workforce that more closely mirrors the population.¹ A workforce that is culturally diverse and culturally competent is essential to deliver services responsive to Māori.²³

On equity grounds, indigenous participation in the professional health workforce should match community demographic profiles. Indigenous health workers are often employed as cultural or community aids bringing first-hand knowledge of the community and a capacity to engage reluctant patients. However, they should also be well enough versed in health issues to make informed decisions about patients' referral and management. Otherwise there is potential for professional and cultural interventions to diverge.²⁴ Marked improvements are seen in indigenous participation and subsequent health outcomes when services are based in and informed by the community, and have indigenous workers involved in delivery of services.¹⁴

The cultural competence of the New Zealand health workforce requires examination and strengthening.²⁵ Health practitioners' who demonstrate cultural competence have the capacity to improve hauora (holistic health and wellbeing) of a person and their whānau by integrating cultural needs into clinical practice.²⁵ Understanding equity principles is a key component of health professional education and is a priority for ongoing professional development for those already in practice.¹ All health professionals should be supported and encouraged to act, advise and advocate for action on social determinants of health throughout the population.⁴

Improved access to primary care, better housing, lowering child poverty rates and the provision of quality early childhood education and childcare have been shown to impact positively on both child health and longer-term health outcomes.¹² Within primary care practices, improved organisation can lead to equitable health outcomes across population groups.²⁶

Data and monitoring

Mātauranga Māori understandings of what protects and threatens health need to be incorporated in actions to achieve equitable health and social outcomes.²⁷ Much of the evidence for good practice is generated far from Aotearoa in studies that include no indigenous theorising or analysis. There is a need to commission local research so we can ensure that interventions actually decrease health inequities in our context.⁷

Data about health disparities in a population are important to measure progress toward achieving health equity, as evidenced by a reduction in health disparities, in absolute and relative terms.²⁸ The New Zealand Medical Association believes that health inequities should be routinely monitored and reported upon in the health system, and that there is a need for more health inequities research that applies what is understood from observational studies to deliver meaningful knowledge to policy makers, based on real-life interventions.⁴ Quantitative research can help to procure the recognition and resources needed to protect and promote indigenous health.²⁹ Accurate recording of ethnicity, using self-identification through Ministry of Health protocols, is the most effective way to allow Māori patients the right to identify themselves as Māori.¹³ Māori have the right to monitor inequities in health determinants and outcomes as an essential component of assessing how well, or poorly, Māori health and lives are valued in Aotearoa.⁶ High quality ethnicity data (i.e. data that are comprehensive across the health and disability sector, complete, current and accurate with consistently gathered numerator and denominator data) is necessary to fulfil Māori rights to be counted and to measure progress toward achieving health equity.⁶ The Royal Australasian College of Physicians recommends enhancing the reporting and measurement of key performance indicators through better integrated data and reporting systems as part of leadership and accountability.¹

There is a need for better information about the extent to which health and education systems are available for children and delivered according to need.¹ Establishing and maintaining a research alliance between universities, non-governmental organisations and health services would be one way to achieve this.¹ Ideally there would be routinely collected data across all health care service providers (primary, secondary and tertiary including quality, utilisation and diagnostic information).

Health services need to build in the capacity to evaluate their progress towards the elimination of inequity in local service delivery through data collection and monitoring. This includes the collection of patient reported experience and impact measures as a measure of the quality of care; and monitoring their own practice data to examine whether they are addressing inequity in the services

they provide.¹ Disaggregated data about the prevalence of child health conditions and relevant clinical outcomes by locality, ethnicity and socioeconomic status would enable service providers to monitor the consistency, utilisation and quality of services. Such data could be used to plan allocation of education and health services in geographic locations where need and potential to benefit is likely greatest and could ensure that quality was highest where needed most.¹

Conclusion

In a nutshell, the Ministry of Health succinctly summarises the current state of play in relation to health equity:³

- There is a long history of defining and explaining the concept and ethics of health equity
- Despite efforts to address them, inequitable health outcomes remain pervasive
- Social determinants of health are a key driver of inequity
- The economic cost of not addressing health equity is high and far-reaching
- Te Tiriti o Waitangi guarantees equity by recognising health as a taonga
- Aotearoa has many of the necessary conditions to achieve health equitable health outcomes
- The health sector should not hesitate to draw on its collective resources to resolve differences in health equity. Government has given the mandate for a pro-equity agenda.

Navigating toward health equity will require recognition of the multiple forces that affect the journey. Institutional examination of the current situation, specific action to address racism and to ensure self-determination, workforce development and monitoring of progress are all important components of achieving equity for Māori children and young people. At an individual and local levels it is important that child health equity is explicitly considered in all policy and service delivery decisions and documents.¹ If we do not consider equity in every decision, we will never achieve it.

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4. Health Behaviours

Healthy behaviours, including adequate nutritional intake and physical activity, are critical to the overall wellbeing, growth, and long-term health of children and young people.^{1,2}

Adequate nutrition and daily healthy breakfasts are considered protective factors to excess weight gain in under-15 year olds,³ while energy-dense, nutrient-poor foods are identified as contributing factors to obesity and other health problems.¹ The Ministry of Health considers “eating well” to involve consuming a combination of carbohydrates, proteins, fats, and vitamins and minerals, of which vegetables and fruits are a good source.¹ It is recommended by the Ministry of Health that under 15 year olds eat at least three servings of vegetables (two servings of vegetables for children aged 2–4) and two servings of fruit every day.¹ Eating a good breakfast every day is also a critical component of healthy eating habits.^{1,4} In combination with an increased intake of nutrient-rich foods, the intake of energy-dense, nutrient-poor foods that are high in fat, sugar, or salt should be decreased to less than once a week as a component of making healthier food choices.^{1,3,5}

The *Sit Less, Move More, Sleep Well* guidelines for children and young people recommend limiting sedentary behaviours, including screen time.^{6,7} Children and young people are recommended to partake in moderate or vigorous physical activity for at least one hour a day, including active transport, to maintain a healthy body weight and support adequate sleep.⁸

This section on Health Behaviours provides data on children between 2–14 years of age, as answered by their parents or primary caregivers in the New Zealand Health Survey (NZHS). The section reports on health behaviours for this age range regarding nutritional indicators, including intake of fruit and vegetables, fast food, and fizzy drink, and physical activity or sedentary indicators, including television and screen watching, and active transport.

Data sources and methods

Indicator(s)

Adequate fruit and vegetable intake in 2–14 year olds (%)

Numerator: Number of 2–14 year olds who met Ministry of Health guidelines for daily vegetable and fruit intake

Denominator: Total number of 2–14 year olds

Breakfast at home in 2–14 year olds (%)

Numerator: Number of 2–14 year olds who ate breakfast at home in the past week

Denominator: Total number of 2–14 year olds

Breakfast at home can be classified into:

Every day in the past week

Less than five days in the past week

Fizzy drink intake in 2–14 year olds (%)

Numerator: Number of 2–14 year olds who had a fizzy drink in the past week

Denominator: Total number of 2–14 year olds

Fizzy drink intake can be classified into:

Had a fizzy drink more than one time in the past week

Had a fizzy drink more than three times in the past week

Fast food intake in 2–14 year olds (%)

Numerator: Number of 2–14 year olds who had fast food in the past week

Denominator: Total number of 2–14 year olds

Fast food intake can be classified into:

Had fast food more than one time in the past week

Had fast food more than three times in the past week

Active transport use in 2–14 year olds (%)

Numerator: Number of 2–14 year olds who met NZHS criteria for using active transport

Denominator: Total number of 2–14 year olds

Television watching in 2–14 year olds (%)

Numerator: Number of 2–14 year olds who met NZHS criteria for television watching

Denominator: Total number of 2–14 year olds

Screen watching in 2–14 year olds (%)

Numerator: Number of 2–14 year olds who met NZHS criteria for screen watching

Denominator: Total number of 2–14 year olds

Data source

New Zealand Health Survey, as published by the Ministry of Health

- National data (2006/07–2016/17),⁹ refer to data source appendix
- Regional data (Pooled year: 2014–2017).¹⁰

Definitions

The NZHS's criteria for adequate vegetable and fruit intake is when a child, on average: eats at least two servings of vegetables and two servings of fruit each day (2–4 year olds); eats at least three servings of vegetables and two servings of fruit each day (5–14 year olds).

A child (aged 5–14 years) used active transport if they usually travelled to and from school by walking, cycling, skating or using other non-motorised modes, as defined by the NZHS.

Television watching is when a child (2–14 years old) watched television for two or more hours per day (averaged over a week), as defined by the NZHS.

Usually watched screens is when a child (2–14 years old) watched screens (including TV) for two or more hours per day (averaged over a week), as defined by the NZHS. This does not include time spent at school or on homework.

Additional information

For more information on the NZ Health Survey please refer either to the Ministry of Health website

(<https://www.health.govt.nz>) or to data source appendix in this report

Overview

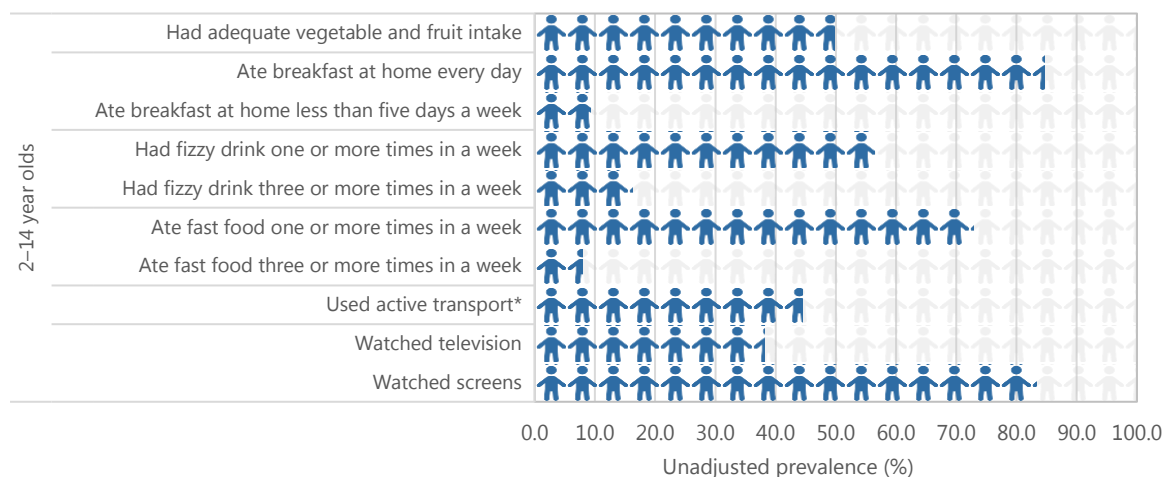
Figure 4-1 presents an overview for the prevalence of health behaviours in 2–14 year olds by indicator for the most recent NZHS. Table 4-1 presents the prevalence of health behaviours in New Zealand for each under-15 age group: 2–4 year olds, 5–9 year olds, and 10–14 year olds. National data is presented while small numbers at the DHB level do not allow more meaningful comparison.

This survey shows that half (49.8%) of 2–14 year olds met the standards for adequate vegetable and fruit intake (Figure 4-1). Close to 85% of 2–14 year olds ate breakfast at home every day, the highest prevalence rate seen of all indicators. The prevalence rate was significantly higher for 2–4 year olds when compared their older peers (Table 4-1).

Most children are consuming fast food and fizzy drink above the recommended threshold of less than once a week (Figure 4-1). Around three quarters of children ate fast food one or more times a week, and over half had fizzy drink one or more times a week (Figure 4-1). Children aged 10–14 years consumed fizzy drink around twice as much as 2–4 year olds (Table 4-1).

The majority of children, 83.4%, watched screens for an average of at least two hours per day, of which nearly 40% watched television (Figure 4-1). Screen time of two or more hours per day was observed to be higher in older age groups (Table 4-1). Nearly half of 5–14 year olds were physically active in travelling to school (Figure 4-1).

Figure 4-1. Health behaviours in 2–14 year olds, by indicator, New Zealand, 2016/17 NZHS



Source: NZ Health Survey 2016/17; Percent of children (of 2–14 year olds; unadjusted prevalence, 95% CI).

*Data on active transport is only collected for 5–14 year olds

Table 4-1. Health behaviours in 2–14 year olds, by age group and by indicator, New Zealand, NZHS 2016/17

DHB	Unadjusted prevalence (%)	95% CI
Health behaviours in 2–14 year olds		
2–4 year olds		
Had adequate vegetable and fruit intake	57.0	52.7–61.2
Ate breakfast at home every day	89.2	85.6–92.0
Ate breakfast at home less than five days a week	6.1	4.5–8.3
Used active transport*	...	
Ate fast food one or more times in a week	68.0	63.8–71.9
Ate fast food three or more times in a week	5.8	4.3–8.0
Had fizzy drink one or more times in a week	39.2	35.3–43.2
Had fizzy drink three or more times in a week	10.9	8.5–13.9
Watched television	42.9	38.3–47.7
Watched screens	67.2	62.4–71.6
5–9 year olds		
Had adequate vegetable and fruit intake	44.6	40.9–48.4
Ate breakfast at home every day	87.0	84.2–89.4
Ate breakfast at home less than five days a week	7.1	5.5–9.1
Used active transport	40.5	36.8–44.3
Ate fast food one or more times in a week	75.0	71.9–77.9
Ate fast food three or more times in a week	8.5	6.6–10.9
Had fizzy drink one or more times in a week	56.5	53.1–59.9
Had fizzy drink three or more times in a week	13.6	11.5–15.9
Watched television	38.3	34.8–41.8
Watched screens	84.3	81.3–87.0
10–14 year olds		
Had adequate vegetable and fruit intake	51.3	47.8–54.9
Ate breakfast at home every day	79.3	76.9–81.6
Ate breakfast at home less than five days a week	13.5	11.5–15.7
Used active transport	48.8	44.9–52.7
Ate fast food one or more times in a week	73.3	70.2–76.2
Ate fast food three or more times in a week	8.4	6.6–10.6
Had fizzy drink one or more times in a week	66.0	62.6–69.2
Had fizzy drink three or more times in a week	22.5	19.8–25.4
Watched television	35.0	32.0–38.2
Watched screens	91.5	89.3–93.3

Source: NZHS 2016/17; Percent of children (of 2–14 year olds; unadjusted prevalence, 95% CI). *Data on active transport is only collected for 5–14 year olds

Nutritional indicators

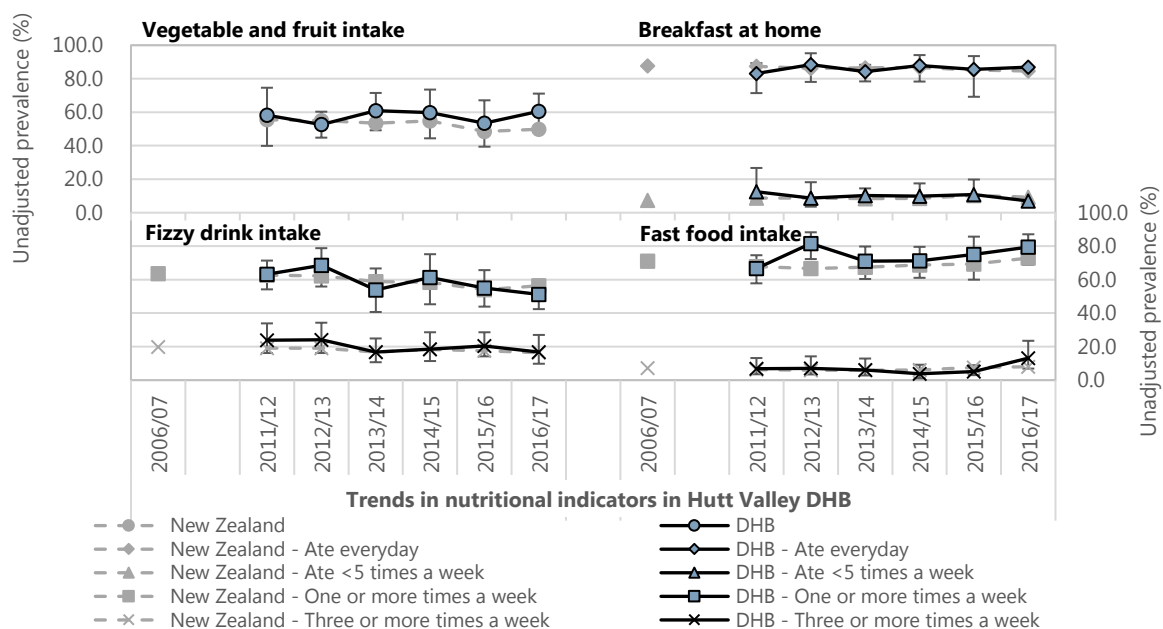
This section examines indicators of the NZHS pertaining to nutrition and eating behaviours for children in the Hutt Valley, Capital & Coast, and Wairarapa DHBs and New Zealand, including: vegetable and fruit intake, breakfast at home, and fizzy drink and fast food consumption. Figure 4-2 to Figure 4-4 present these nutritional indicators in 2–14 year olds for each DHB from data reported since NZHS 2006/07.

Each nutritional indicator is mostly been stable overall in the Hutt Valley, Capital & Coast, and Wairarapa DHBs with some year-to-year variation. The proportion of children who had adequate vegetable and fruit intake was marginally higher than the national rate for the most recent survey years in the Hutt Valley and Capital & Coast DHBs.

The rate of 2–14 year olds who consumed fast food one or more times a week has increased overall since 2011/12 for all DHBs in the greater Wellington region. The proportion of children who consumed fizzy drink one or more times a week has been decreasing overall since 2011/12 for Hutt Valley and Capital & Coast.

More children are eating breakfast at home every day of the week in Capital & Coast DHB, which has increased over time, when compared to the national rate. Other indicators were stable overall.

Figure 4-2. Nutritional indicators in 2–14 year olds, by survey year, Hutt Valley, NZHS years 2006/07–2016/17



Source: NZ Health Surveys 2006/07–2016/17. DHB data is not available for 2006/07 NZHS. Percent of children (of 2–14 year olds; unadjusted prevalence, 95% CI).

Figure 4-3. Nutritional indicators in 2–14 year olds, by survey year, Capital & Coast, NZHS years 2006/07–2016/17

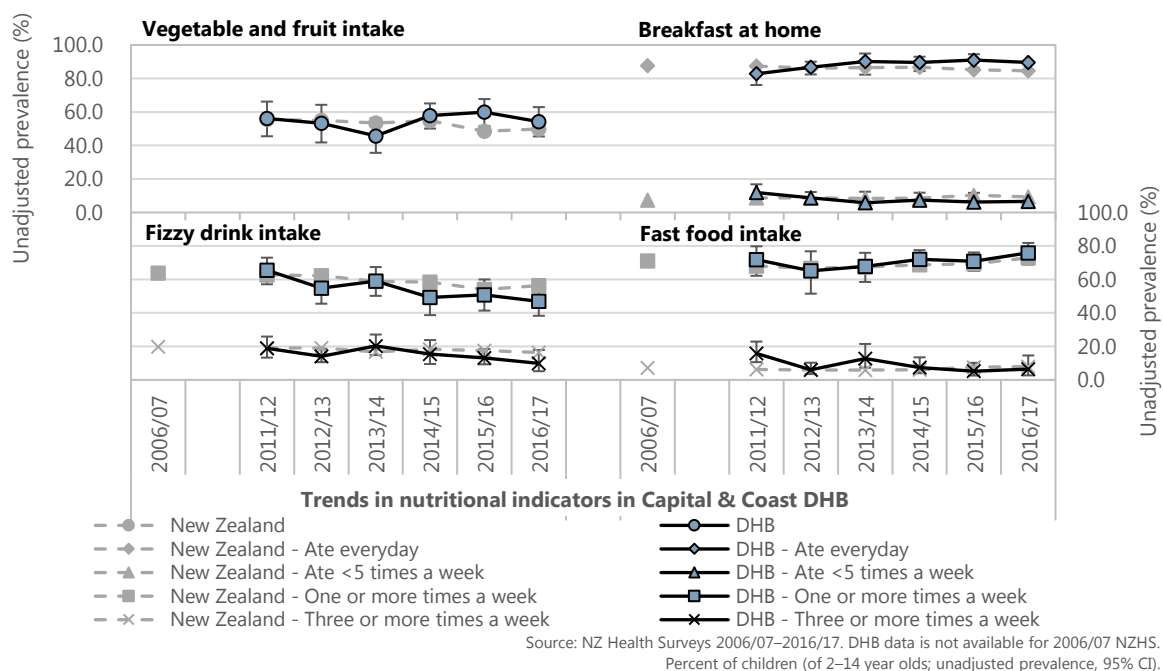
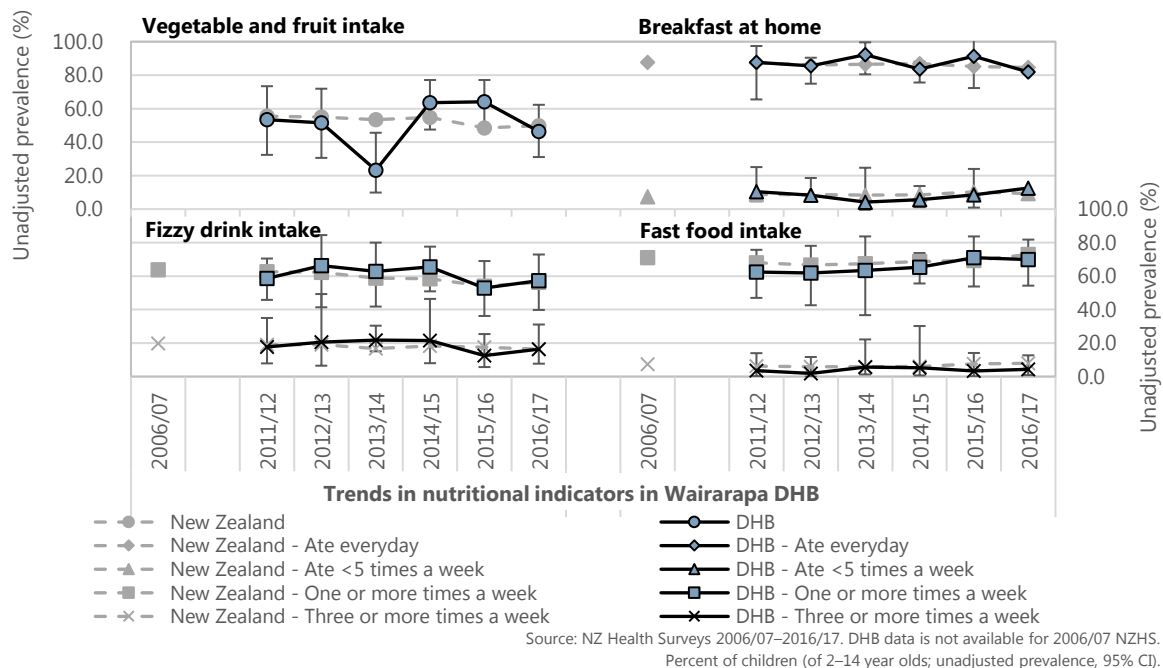


Figure 4-4. Nutritional indicators in 2–14 year olds, by survey year, Wairarapa, NZHS years 2006/07–2016/17



Vegetable and fruit intake

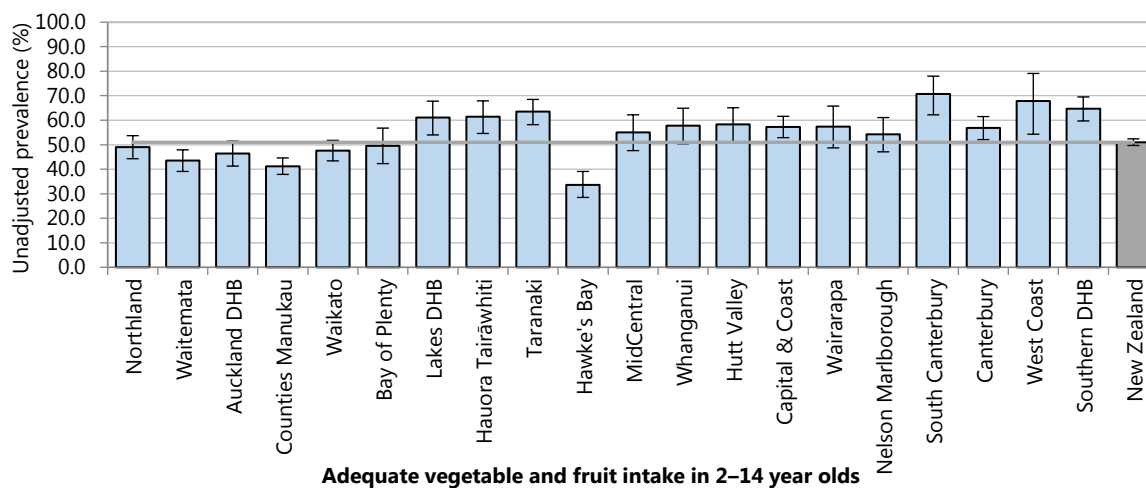
Question C3.06: On average, how many servings of fruit does [child's name] eat per day? Please include all fresh, frozen, canned and stewed fruit. Do not include fruit juice or dried fruit. A 'serving' = 1 medium piece or 2 small pieces of fruit or ½ cup of stewed fruit. For example, 1 apple and 2 small apricots = 2 servings.

Question C3.07: On average, how many servings of vegetables does [child's name] eat per day? Please include all fresh, frozen and canned vegetables. Do not include vegetable juices. A 'serving' = 1 medium potato/kumara or ½ cup cooked vegetables or 1 cup of salad vegetables. For example, 2 medium potatoes + ½ cup of peas = 3 servings.

Source: New Zealand Health Survey Annual Data Explorer 2016/17⁹

A child’s vegetable and fruit intake is classified as “adequate” by the NZHS when a child: eats at least two servings of vegetables (three servings for 5–14 year olds) and two servings of fruit each day. The proportion of children aged 2–14 who had adequate vegetable and fruit intake is shown for each District Health Board (DHB) and New Zealand in Figure 4-5 for the years 2014–2017.

Figure 4-5. Proportion of 2–14 year olds who had adequate vegetable and fruit intake, by district health board, NZHS 2014–17



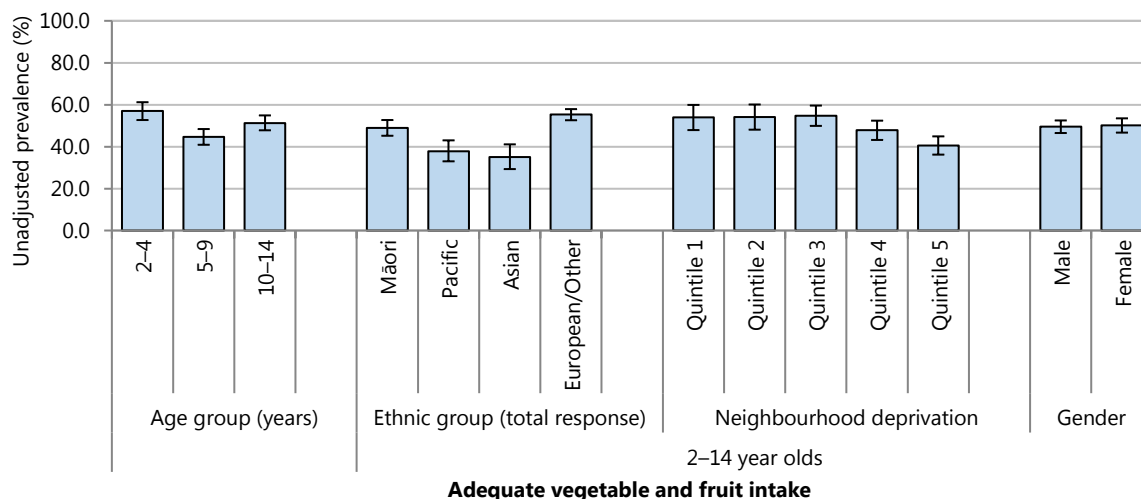
Source: NZ Health Survey 2014-17; Percent of children (of 2–14 year olds; unadjusted prevalence, 95% CI)

Nationally, around 50% of children met standards for adequate vegetable in fruit intake. Within Hutt Valley, Capital & Coast, and Wairarapa DHBs, all had higher proportions of children consuming adequate levels of vegetables and fruits at nearly 60%, when compared to New Zealand.

Figure 4-6 and Figure 4-7 present the unadjusted and adjusted rates for adequate fruit and vegetable intake in 2–14 year olds by demographic factor, including deprivation score, ethnic group, and sex, for the 2016/17 NZHS. The adjusted rate ratio presents the gap, if any, between the groups and the reference group. The following associations were observed, bearing in mind that this univariate analysis does not quantify the independent effect of each demographic factor:

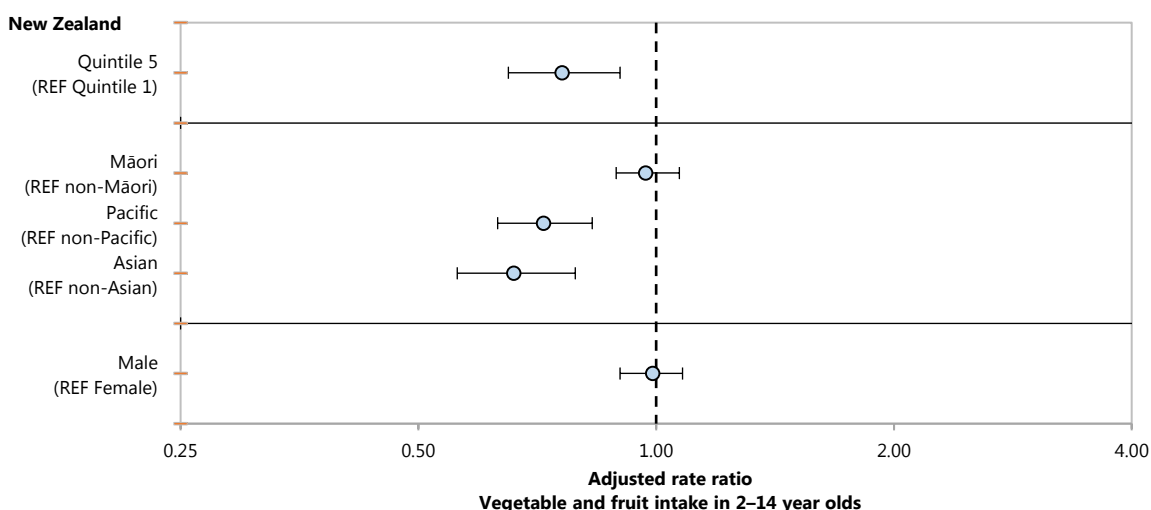
- The rate ratio was significantly lower for children with a higher deprivation (NZDep2013) score of quintile 5 compared to children in the lowest deprivation score (Quintile 1) (Figure 4-6, Figure 4-7).
- European/Other children had a significantly higher prevalence of children who met the guidelines for vegetable and fruit intake (Figure 4-6). The rate for Pacific children with adequate intake was significantly lower than non-Pacific children and the same was observed for Asian children compared to non-Asian children (Figure 4-7).

Figure 4-6. Adequate vegetable and fruit intake in 2–14 year olds, by demographic factor, New Zealand, 2016/17 NZHS



Source: NZ Health Survey 2016/17; Percent of children (of 2–14 year olds; unadjusted prevalence, 95% CI).

Figure 4-7. Adequate vegetable and fruit intake in 2–14 year olds, by demographic factor, New Zealand, 2016/17 NZHS



Source: 2016/17 NZ Health Survey. Adjusted rate ratios, 95% confidence intervals. Ethnicity is total response; Quintile is NZDep2013

Breakfast

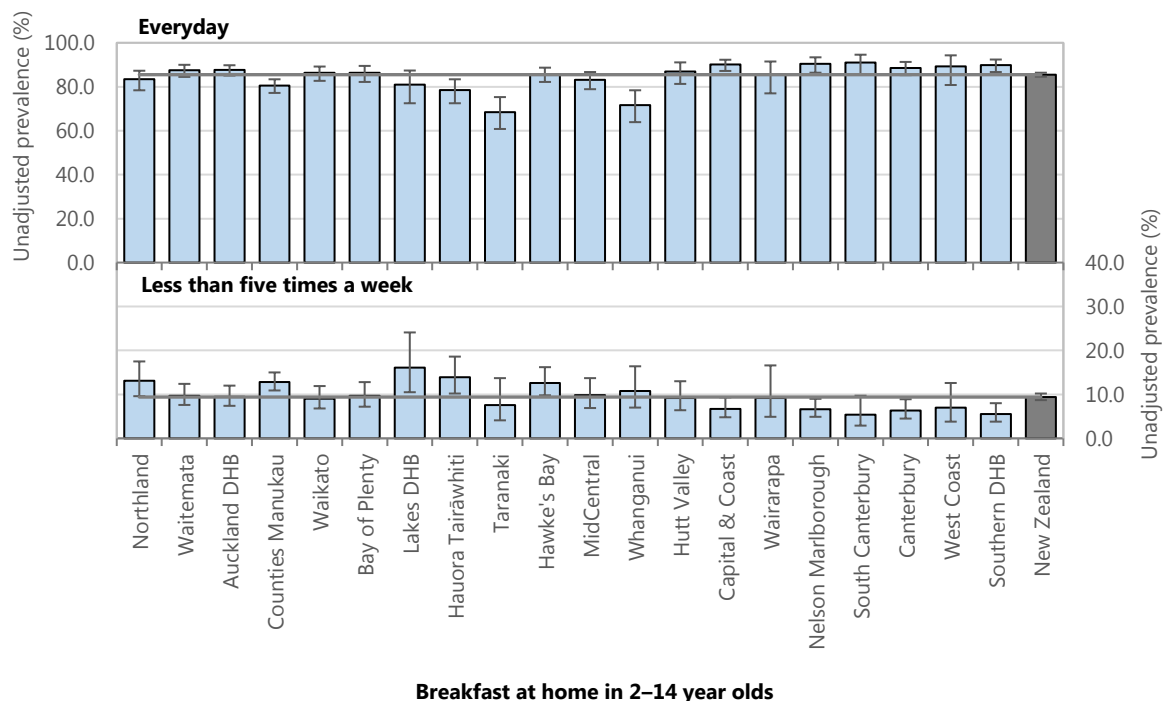
Question C3.08: Thinking back over the past 7 days, on how many days did [child's name] have breakfast at home? [If child was not at home in past week, ask caregiver to recall last 7 days child was at home.]

Source: New Zealand Health Survey Annual Data Explorer 2016/17⁹

Figure 4-8 shows the proportion of children who either ate breakfast at home every day of the week or less than five times a week by DHB and nationally for the survey years 2014–17.

In New Zealand, 85.5% of children had breakfast at home every day, while less than 10% of children had breakfast at home less than five times a week (Figure 4-8). A significantly higher proportion of children in Capital & Coast DHB ate breakfast at home every day compared with the New Zealand rate. Compared with the national rate, Hutt Valley and Wairarapa DHBs proportions of children were similar to the New Zealand proportions on both indicators (Figure 4-8).

Figure 4-8. Proportion of 2–14 year olds who ate breakfast at home every day or less than five times a week, by district health board, NZHS 2014–17

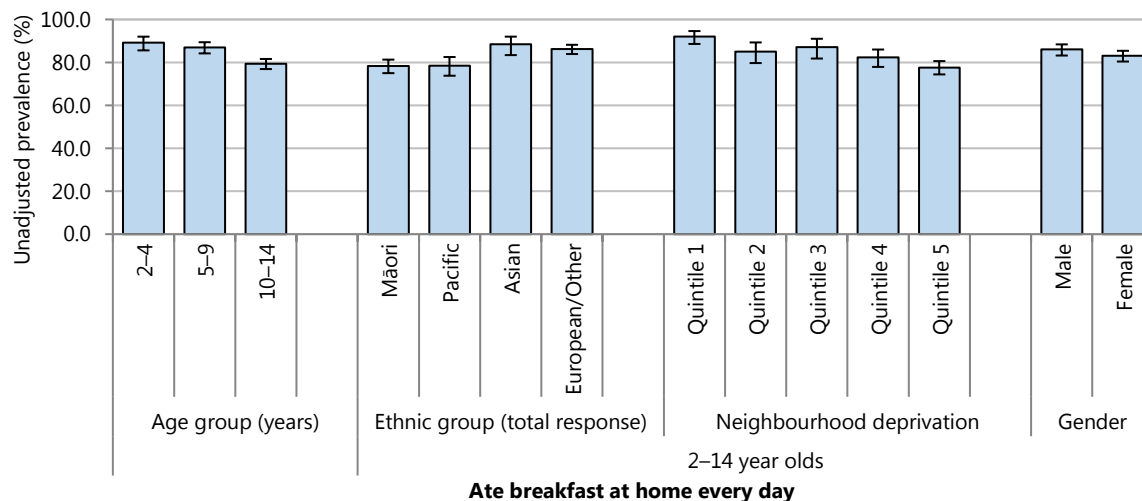


Source: NZ Health Survey 2014-17; Percent of children (of 2–14 year olds; unadjusted prevalence, 95% CI)

The unadjusted and adjusted rates for children who ate breakfast at home every day are presented in Figure 4-9 and Figure 4-10 by demographic factor, including deprivation score, ethnic group, and sex, for the 2016/17 NZHS. The adjusted rate ratio presents the gap, if any, between the groups and the reference group. The following associations were observed, bearing in mind that this univariate analysis does not quantify the independent effect of each demographic factor:

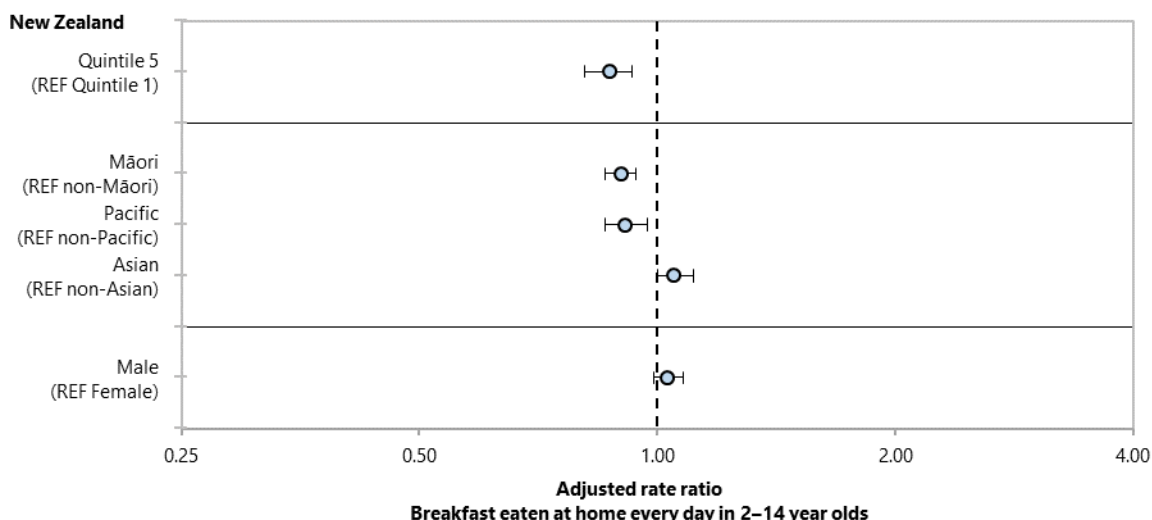
- Compared with children in the lowest level of deprivation (NZDep2013), children in quintile 5 had a lower rate of eating breakfast at home every day (Figure 4-9, Figure 4-10).
- Māori children and Pacific children had lower rates of eating breakfast at home every day compared to non-Māori and non-Pacific children (Figure 4-10) and Asian or European/Other children (Figure 4-9).
- Older age groups ate breakfast at home every day less than their younger peers (Figure 4-9).

Figure 4-9. Breakfast eaten at home every day in 2–14 year olds, by demographic factor, New Zealand, 2016/17 NZHS



Source: NZ Health Survey 2016/17; Percent of children (of 2–14 year olds; unadjusted prevalence, 95% CI).

Figure 4-10. Breakfast eaten at home every day in 2–14 year olds, by demographic factor, New Zealand, 2016/17 NZHS



Source: 2016/17 NZ Health Survey.
Adjusted rate ratios, 95% confidence intervals. Ethnicity is total response; Quintile is NZDep2013

Fizzy drink

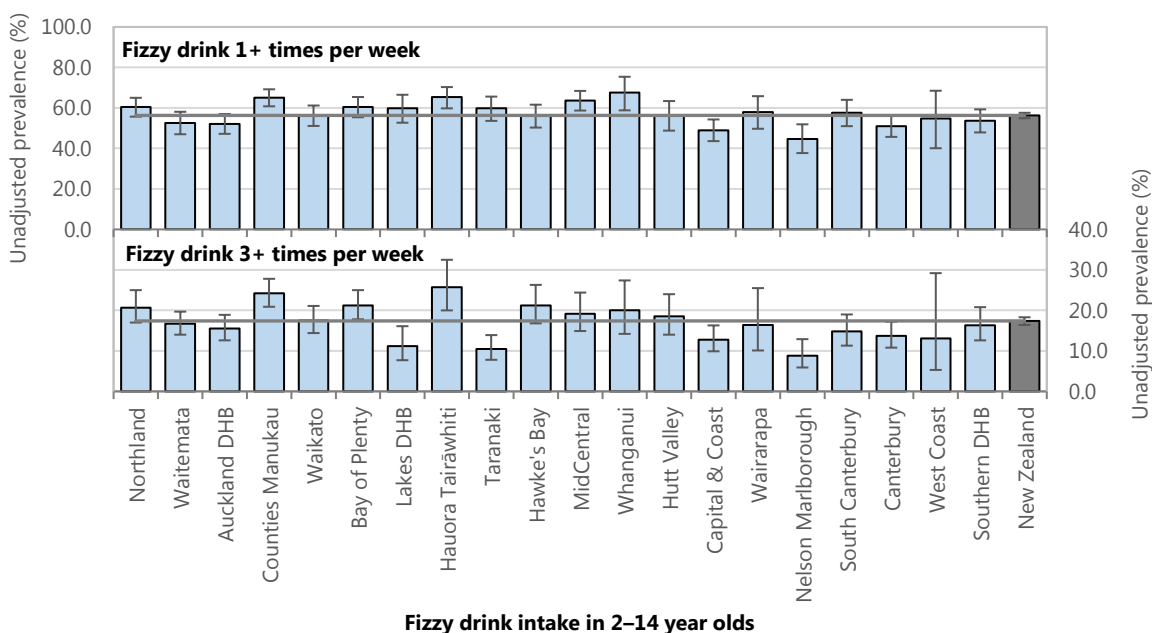
Question C3.09: In the past 7 days, how many times did [child’s name] have a fizzy drink, such as cola or lemonade? [This includes diet (artificially sweetened) and energy drinks such as ‘Powerade’ or ‘V’ but does not include powdered drinks made up with water such as cordial or ‘Raro’, or fruit juice such as ‘Just Juice’.]

Source: New Zealand Health Survey Annual Data Explorer 2016/17⁹

The proportion of children who consumed fizzy drink either one or more times per week or three or more times per week is shown in Figure 4-11.

While 56% of 2–14 year olds consumed fizzy drink one or more times per week, a minority of children consumed fizzy drink three times or more (17%). Consumption of fizzy drinks was significantly lower than the New Zealand rate on both indicators in Capital & Coast DHB. Frequency of consumption of fizzy drinks for 2–14 year olds in Hutt Valley and Wairarapa DHBs was similar to New Zealand consumption on both measures of frequency.

Figure 4-11. Proportion of 2–14 year olds who had fizzy drink one or more or three or more times a week, by district health board, NZHS 2014–17

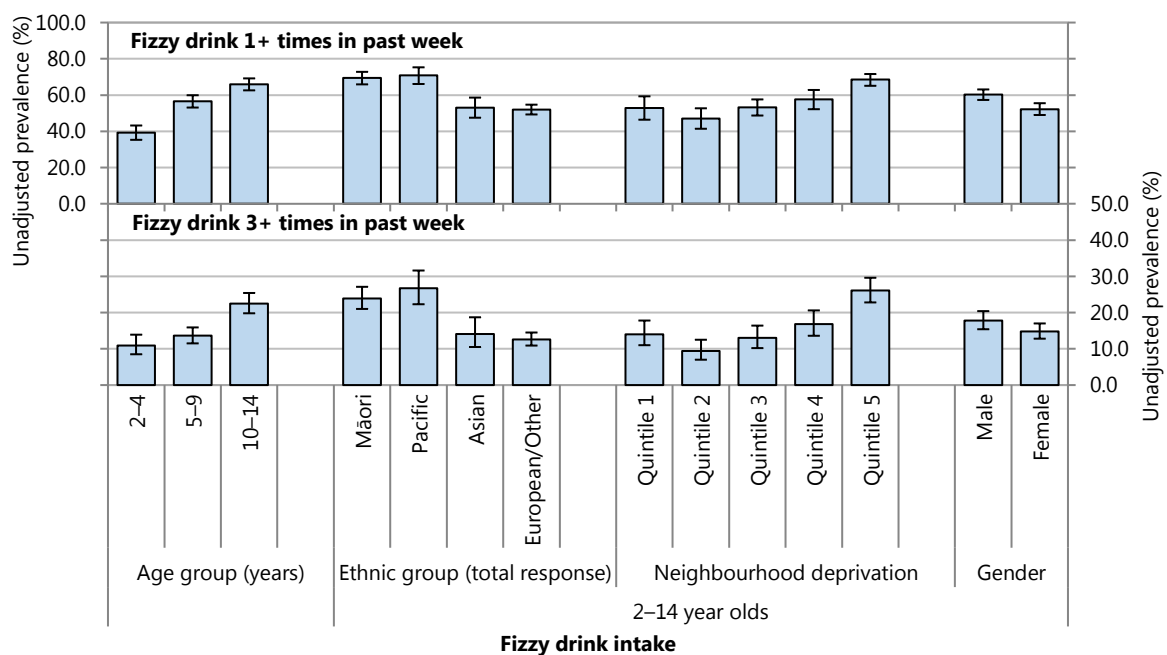


Source: NZ Health Survey 2014-17; Percent of children (of 2–14 year olds; unadjusted prevalence, 95% CI)

Figure 4-12 and Figure 4-13 present the unadjusted and adjusted rates for fizzy drink intake in 2–14 year olds by demographic factor, including deprivation score, ethnic group, and sex, for the 2016/17 NZHS. The adjusted rate ratio presents the gap, if any, between the groups and the reference group. The following associations were observed, bearing in mind that this univariate analysis does not quantify the independent effect of each demographic factor:

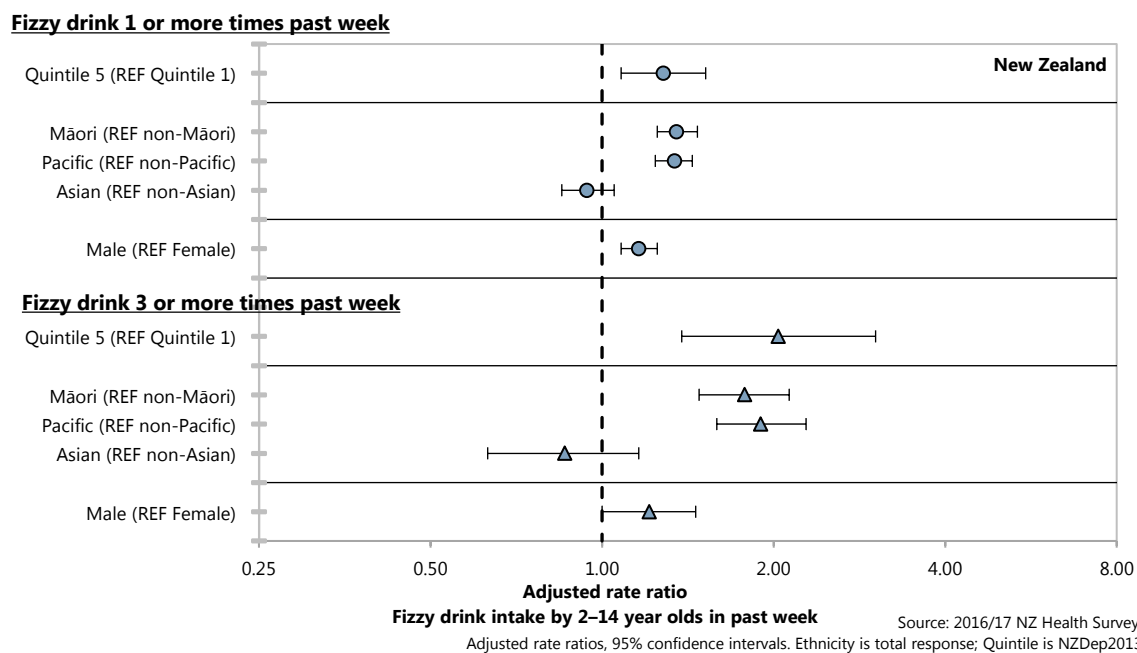
- The prevalence rates of children who consumed a higher number of fizzy drinks (three or more) were higher with higher deprivation scores (NZDep2013) (Figure 4-12; Figure 4-13).
- The prevalence of children who consumed one or more or three or more fizzy drinks a week was higher for Māori children and Pacific children compared with non-Māori and non-Pacific (Figure 4-13) or Asian and European/Other (Figure 4-12).
- Male children had a significantly higher rate for consuming fizzy one or more times a week compared to their female peers (Figure 4-12, Figure 4-13).
- Prevalence rates of fizzy drink consumption were higher by older age grouping (Figure 4-12).

Figure 4-12. Fizzy drink intake by 2–14 year olds in past week, by demographic factor, New Zealand, 2016/17 NZHS



Source: NZ Health Survey 2016/17; Percent of children (of 2–14 year olds; unadjusted prevalence, 95% CI).

Figure 4-13. Fizzy drink intake by 2–14 year olds in past week, by demographic factor, New Zealand, 2016/17 NZHS



Fast food

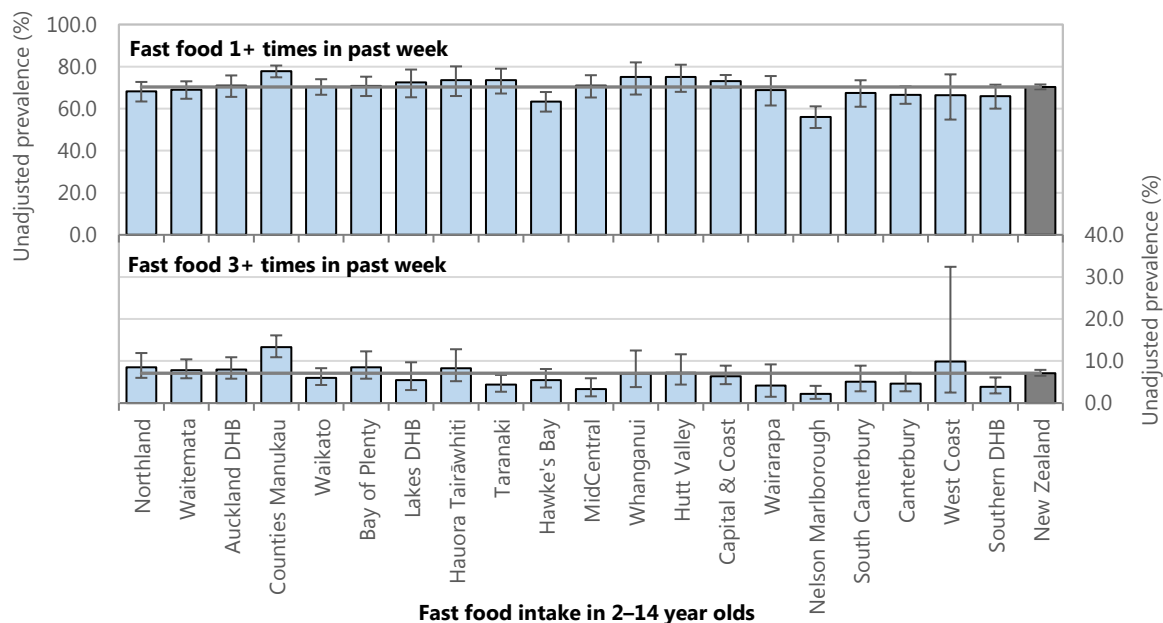
Question C3.10: In the past 7 days, how many times did [child’s name] eat any food purchased from a fast food place or takeaway shop, such as fish and chips, burgers, fried chicken or pizza? This includes snacks as well as mealtimes.

Source: New Zealand Health Survey Annual Data Explorer 2016/17⁹

Figure 4-14 shows the proportion of children aged 2–14 who consumed fast food either one or more times per week or three or more times per week.

According to the Ministry of Health, foods that are energy-dense, nutrient-poor and high in fat, sugar, or salt (such as fast food) should be decreased to less than once a week.^{1,3} In 2014–17, the majority of children in Hutt Valley, Capital & Coast, and Wairarapa consumed fast food one or more times a week, close to the national rate. The prevalence rate of children who consumed fast food at a higher frequency of three or more times a week was also similar to the New Zealand rate (although lower in Wairarapa DHB the difference was not statistically significant).

Figure 4-14. Proportion of 2–14 year olds who ate fast food one or more or three or more times a week, by district health board, NZHS 2014–17

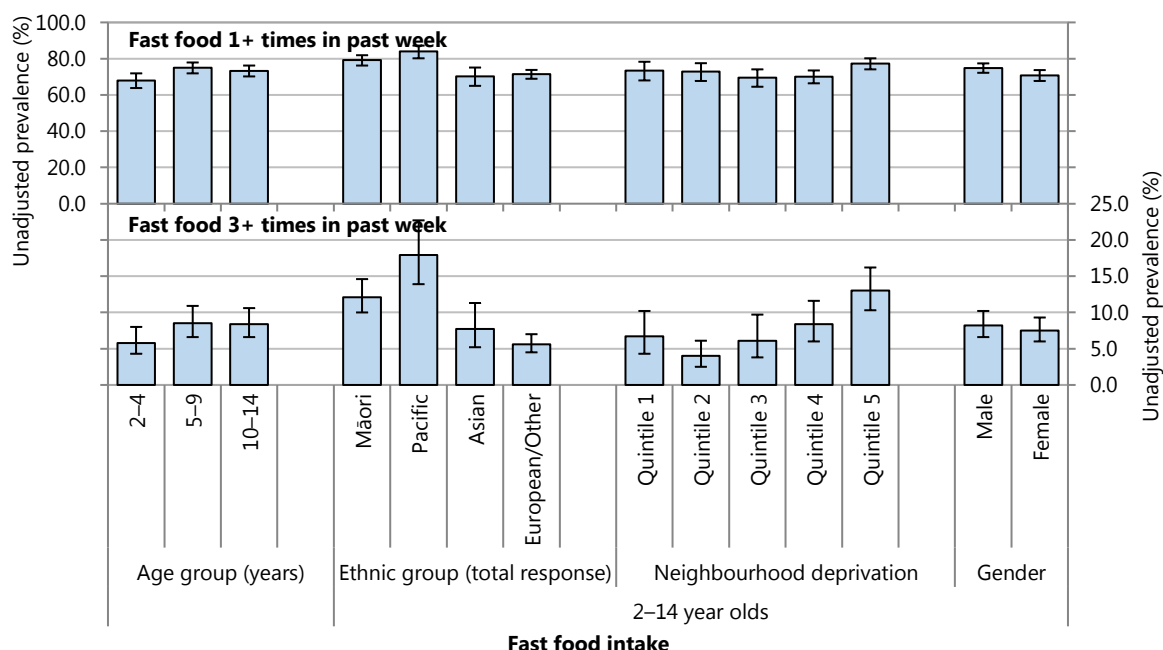


Source: NZ Health Survey 2014-17; Percent of children (of 2–14 year olds; unadjusted prevalence, 95% CI)

Figure 4-15 and Figure 4-16 present the unadjusted and adjusted rates for fast food intake in 2–14 year olds by demographic factor, including deprivation score, ethnic group, and sex, for the 2016/17 NZHS. The adjusted rate ratio presents the gap, if any, between the groups and the reference group. The following associations were observed, bearing in mind that this univariate analysis does not quantify the independent effect of each demographic factor:

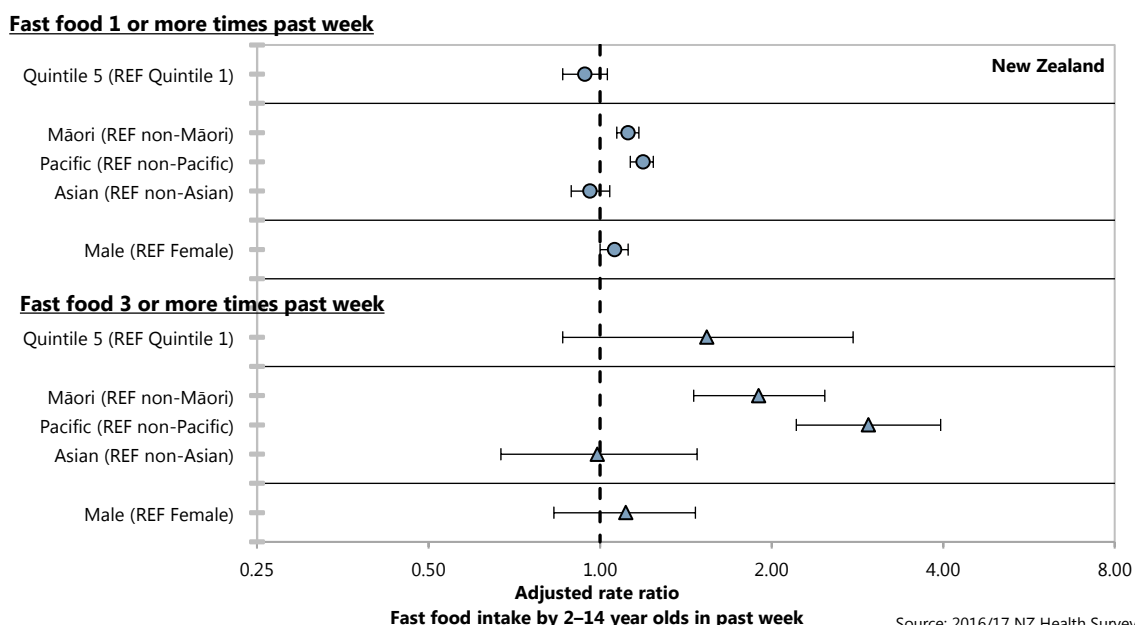
- Children in more deprived areas (NZDep2013) consumed fast food at a higher frequency of three or more times per week compared to children in the least deprived areas (Figure 4-15, Figure 4-16)
- There were significant differences by ethnic group, with more Māori and Pacific children consuming fast food one or more or three or more times per week compared to non-Māori and non-Pacific children (Figure 4-16) or Asian and European/Other children (Figure 4-15).

Figure 4-15. Fast food intake by 2–14 year olds in past week, by demographic factor, New Zealand, 2016/17 NZHS



Source: NZ Health Survey 2016/17; Percent of children (of 2–14 year olds; unadjusted prevalence, 95% CI).

Figure 4-16. Fast food intake by 2–14 year olds in past week, by demographic factor, New Zealand, 2016/17 NZHS



Source: 2016/17 NZ Health Survey. Adjusted rate ratios, 95% confidence intervals. Ethnicity is total response; Quintile is NZDep2013

Physical activity indicators

This section examines health behaviour indicators of the NZHS pertaining to physical activity, those being: active transport to or from school, and the extent to which children watched television or screens during the week. Figure 4-17 to Figure 4-19 present these physical activity indicators in 2–14 year olds in the Hutt Valley, Capital & Coast, and Wairarapa DHBs from data reported since NZHS 2006/07. Data on active transport use to and from school is only available for children at school age, the age of five and over.

The NZHS shows that the proportion of children watching television has fluctuated since 2011/12. Screen watching data was collected in the most recent survey year (which includes television watching). Around twice as many 2–14 year olds usually watched screens than those who only

watched television. The prevalence rates for watching screens for two or more hours a day was similar to the New Zealand rate in all three Greater Wellington Region DHBs.

Active transport use in 5–14 year olds has increased in recent years in Capital & Coast and Wairarapa DHBs.

Figure 4-17. Watched television or screens and used active transport in 2–14 year olds, by survey year, Hutt Valley, NZHS years 2006/07–2016/17

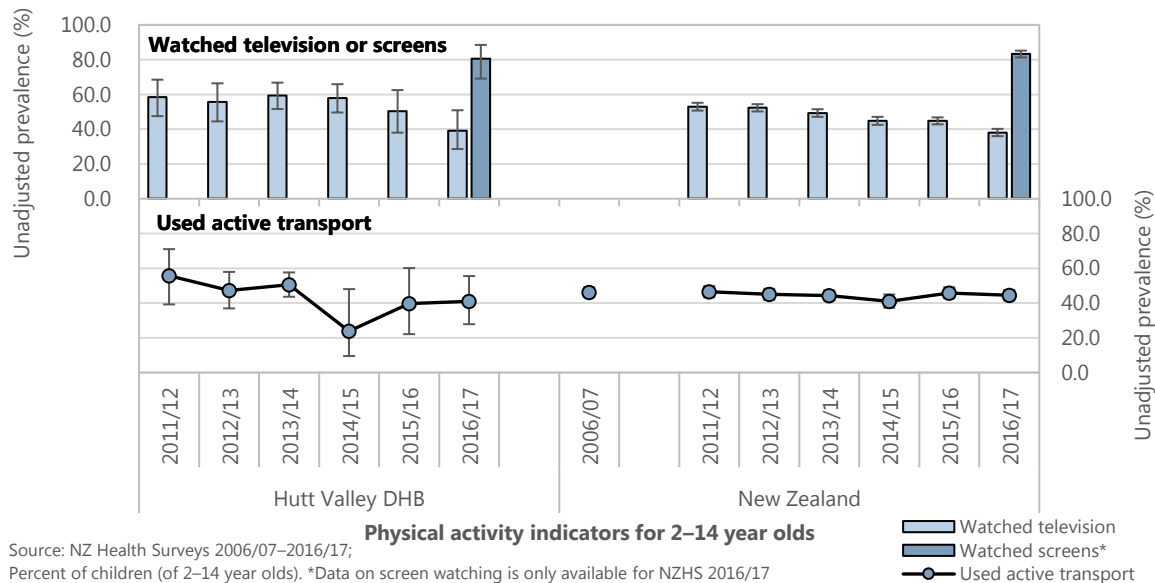


Figure 4-18. Watched television or screens and used active transport in 2–14 year olds, by survey year, Capital & Coast, NZHS years 2006/07–2016/17

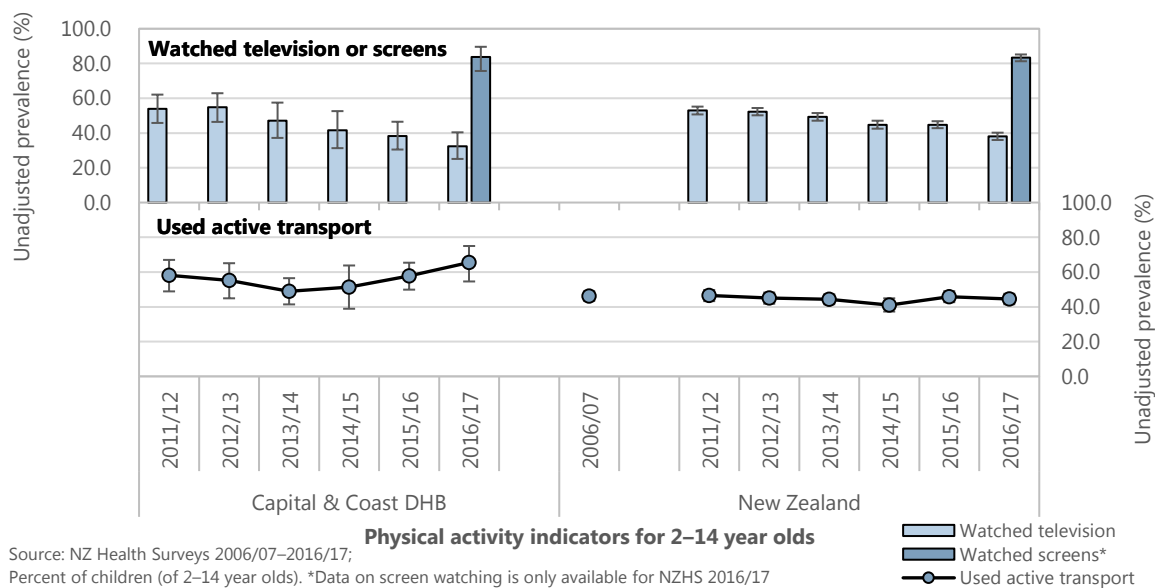
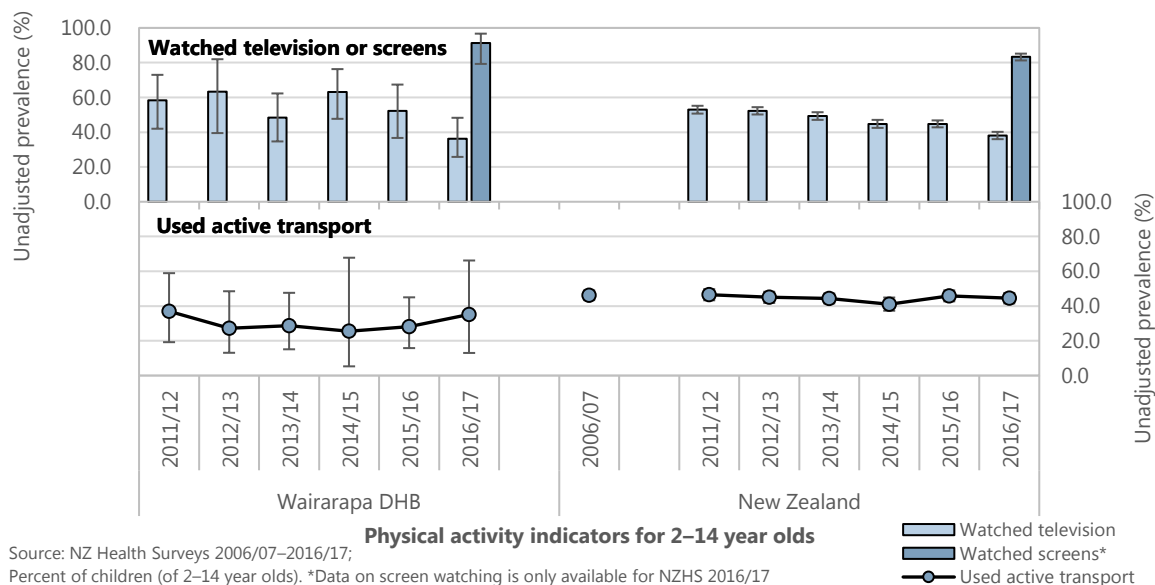


Figure 4-19. Watched television or screens and used active transport in 2–14 year olds, by survey year, Wairarapa, NZHS years 2006/07–2016/17



Active transport use

Question C3.11: How does [child’s name] usually get to and from school? [Multiple responses possible]

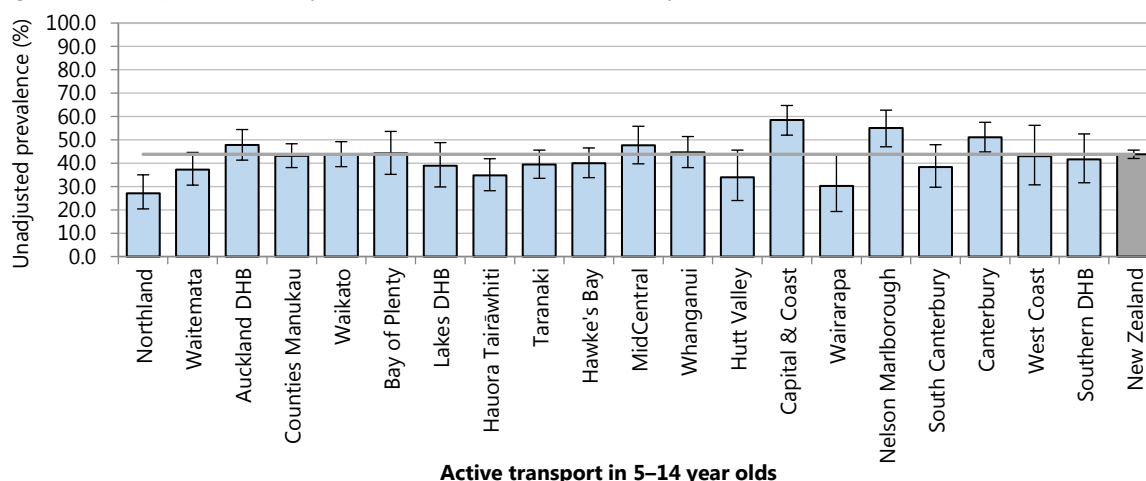
1. Walk
2. Bike
3. Skate or other physical activity
4. Car
5. School bus
6. Public transport
7. Other
8. Not applicable, for example, is home schooled

Source: New Zealand Health Survey Annual Data Explorer 2016/17⁹

The proportions of 5–14 year olds who usually used active transport (non-motorised modes of getting to and from school such as walking, biking, or skating) are presented in Figure 4-20 for the survey years 2014–17.

Nearly half of 5–14 year olds travelled to school through non-motorised modes. Although there was variation between the proportions for children who used active transport in Capital & Coast, Hutt Valley and Wairarapa DHBs, these were not statistically different from the New Zealand rate.

Figure 4-20. Proportion of 5–14 year olds who used active transport, by district health board, NZHS 2014–17

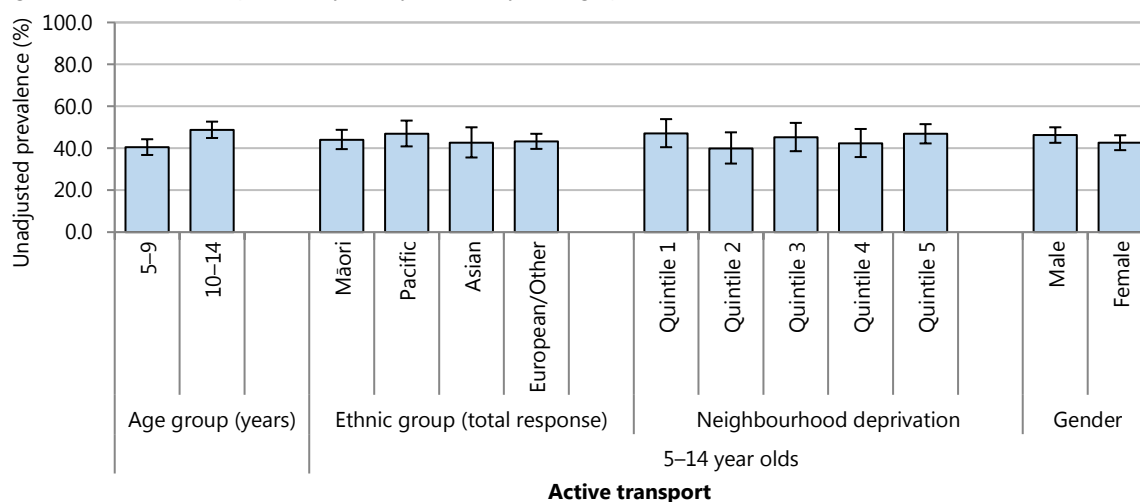


Source: NZ Health Survey 2014-17; Percent of children (of 5–14 year olds; unadjusted prevalence, 95% CI).
 *Data on active transport is only collected for 5–14 year olds

Figure 4-21 and Figure 4-22 present the unadjusted and adjusted rates for 5–14 year olds who usually used active transport by demographic factor, including deprivation score, ethnic group, and sex, for the 2016/17 NZHS. The adjusted rate ratio presents the gap, if any, between the groups and the reference group. The following associations were observed, bearing in mind that this univariate analysis does not quantify the independent effect of each demographic factor:

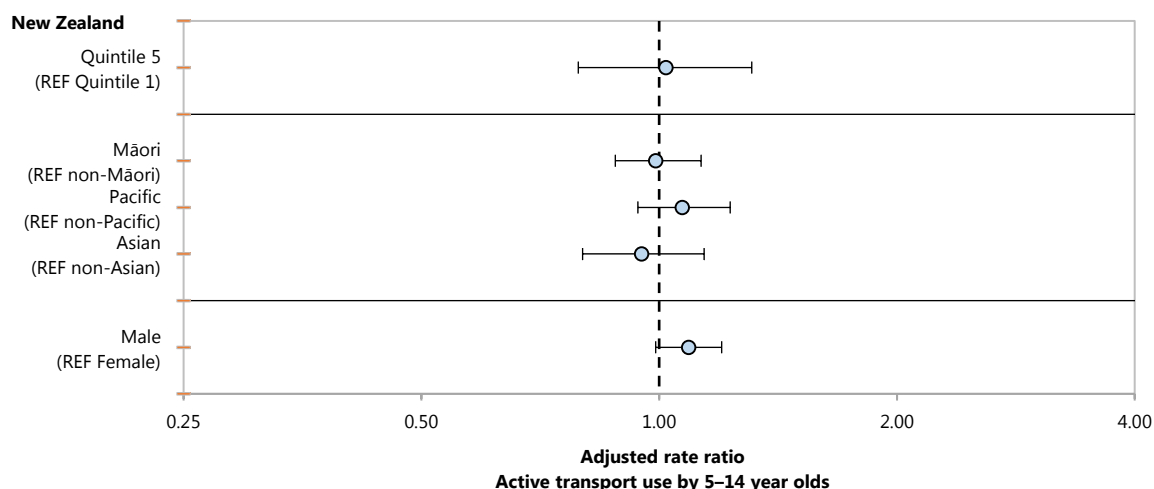
- There was little difference by demographic factor but active transport rates were marginally higher for males when compared to females (Figure 4-21, Figure 4-22).
- The prevalence rates for active transport were significantly higher for 10–14 year olds when compared to their younger peers (Figure 4-21).

Figure 4-21. Active transport use by 5–14 year olds, by demographic factor, New Zealand, 2016/17 NZHS



Source: NZ Health Survey 2016/17; Percent of children (of 2–14 year olds; unadjusted prevalence, 95% CI).

Figure 4-22. Active transport use by 5–14 year olds, by demographic factor, New Zealand, 2016/17 NZHS



Source: 2016/17 NZ Health Survey.

*Data on active transport is only collected for 5–14 year olds;

Adjusted rate ratios, 95% confidence intervals. Ethnicity is total response; Quintile is NZDep2013

Television or screen watching

Question C3.12: What is the average amount of time [child's name] spends watching TV each week day? This could be anywhere, not just in your home, and includes DVDs/videos but does not include games.
 ____ hours

Question C3.12a: What is the average amount of time [Name] spends each weekday looking at a screen for activities other than watching TV or videos? For example, playing video games or browsing the internet. This does not include time spent at school or on homework.
 ____ hours

Question C3.13: What is the average amount of time [child's name] spends watching in the weekend? Again, this could be anywhere, not just in your home and includes DVDs/videos but does not include games.
 ____ hours

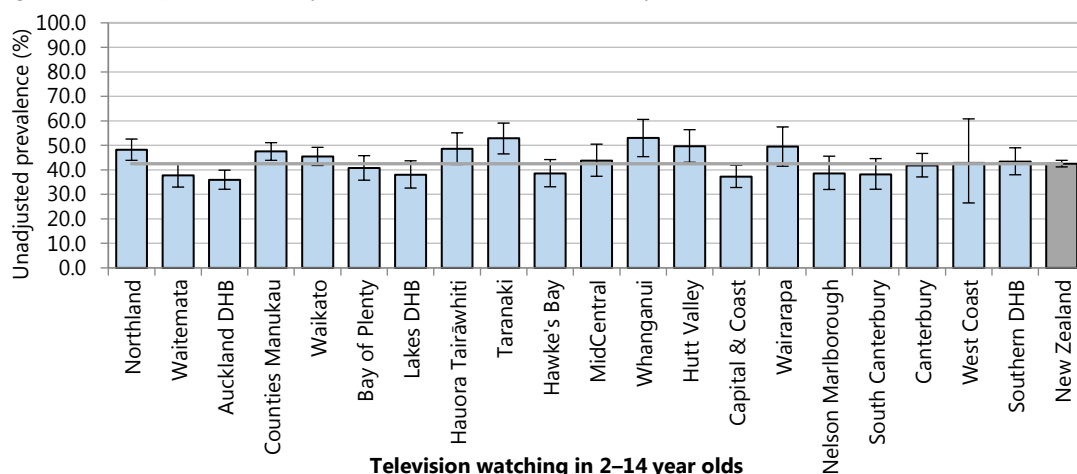
Question C3.13a: What is the average amount of time [Name] spends in the weekend looking at a screen for activities other than watching TV or videos? For example, playing video games or browsing the Internet. This does not include time spent at school or on homework.
 ____ hours

Source: New Zealand Health Survey Annual Data Explorer 2016/17⁹

Figure 4-23 presents the proportion of 2–14 year olds who watched television for two or more hours per day (on average per week) for NZHS 2014–17 while Figure 4-24 presents the proportion of those who watched screens (including TV) for two or more hours per day (on average per week) for the most recent NZHS.

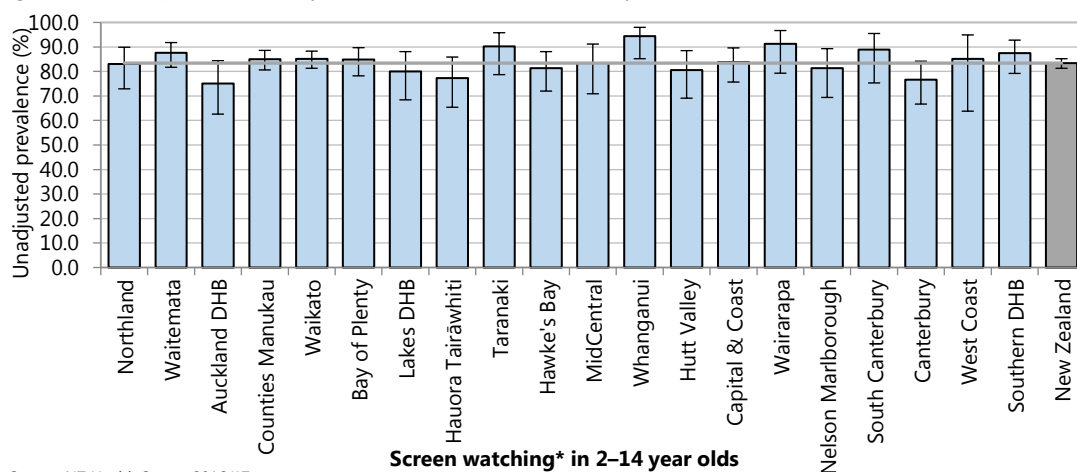
The national rate for screen watching was almost double the rate for television watching (Figure 4-23, Figure 4-24). The proportions of children who usually watched television or screens in Hutt Valley, Capital & Coast and Wairarapa DHBs were not significantly different from the New Zealand proportions (Figure 4-23, Figure 4-24).

Figure 4-23. Proportion of 2–14 year olds who watched television, by district health board, NZHS 2014–17



Source: NZ Health Survey 2014-17; Percent of children (of 2–14 year olds; unadjusted prevalence, 95% CI)

Figure 4-24. Proportion of 2–14 year olds who watched screens, by DHB, 2016/17 NZHS

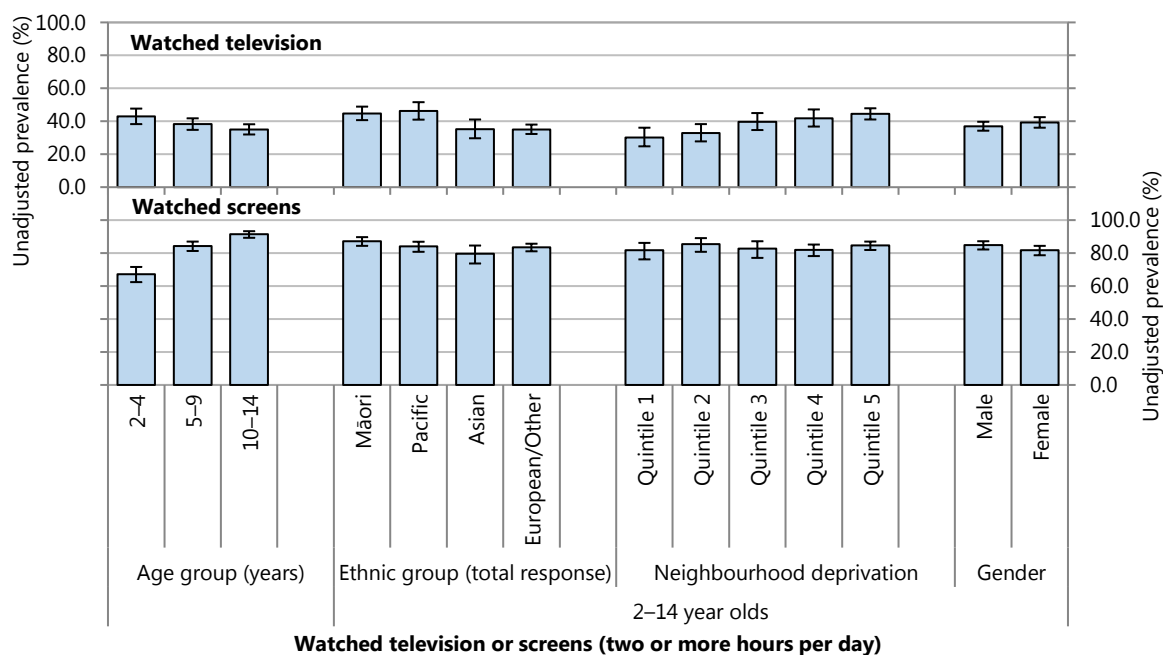


Source: NZ Health Survey 2016/17; Percent of children (of 2–14 year olds; unadjusted prevalence, 95% CI). *Screen watching includes television watching

Figure 4-25 and Figure 4-26 present the unadjusted and adjusted rates for 2–14 year olds who usually watched screens or television by demographic factor, including deprivation score, ethnic group, and sex, for the 2016/17 NZHS. The adjusted rate ratio presents the gap, if any, between the groups and the reference group. The following associations were observed, bearing in mind that this univariate analysis does not quantify the independent effect of each demographic factor:

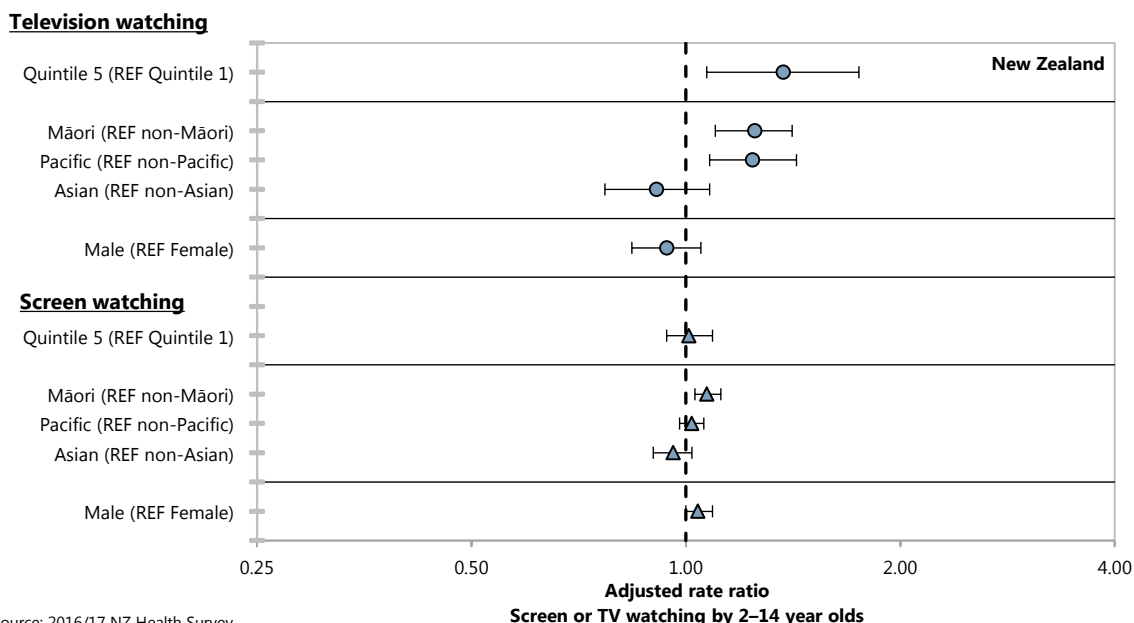
- The rate for television watching was higher for children with a higher deprivation (NZDep2013) score of quintile 5 compared to children in the lowest deprivation score (quintile 1); however, there was no significant difference for screen watching by deprivation (Figure 4-25, Figure 4-26).
- Higher rates of television watching were seen in Māori children compared to non-Māori, and similar was observed of Pacific and non-Pacific children (Figure 4-25, Figure 4-26).
- There was no significant difference observed in screen watching by demographic factor with the exception of age group, where prevalence rates for screen watching were significantly higher for older age groups (Figure 4-25).

Figure 4-25. Screen or TV watching by 2–14 year olds, by demographic factor, New Zealand, 2016/17 NZHS



Source: NZ Health Survey 2016/17; Percent of children (of 2–14 year olds; unadjusted prevalence, 95% CI).

Figure 4-26. Screen or TV watching by 2–14 year olds, by demographic factor, New Zealand, 2016/17 NZHS



Source: 2016/17 NZ Health Survey. Adjusted rate ratios, 95% confidence intervals. Ethnicity is total response; Quintile is NZDep2013

Evidence for good practice

Effective protection for children’s health through strategic investment in their nutrition, relationships, and environment is critical to their trajectory towards adult health and, more broadly, population health.¹¹

Physical activity and nutrition are also inextricably linked to the Sustainable Development Agenda 2030, which includes goals for good health and wellbeing, increased gender equality and reduced inequalities, achieving food security and ending malnutrition, sustainable cities and communities and agriculture, and climate action.^{12,13}

Benefits associated with regular healthy nutritional and physical activity behaviours include, but are not limited to: better oral health;⁶ increased enjoyment from social activities;^{6,14} improved mental

wellbeing;^{6,14,15} reduced risk of disease;¹⁴ and improved ability to learn.⁶ To gain greater benefit from physical activity, it is recommended that children and adolescents regularly participate in two different types of activity: resistance exercise for muscular and bone benefits and aerobic exercise for cardiovascular and metabolic benefits.^{12,16}

Promotion of health behaviours

Facilitating motivation for healthier behaviours

Psychosocial theories identify three key self-determined forms of motivation that can impact on cognitive processes and engagement in healthy behaviours.^{17,18} These are: intrinsic motivation, where engaging in an activity is perceived as satisfying in and of itself (e.g. fun while dancing); integrated regulation, where engaging in an activity is perceived as being aligned with a person's identity and broader self (e.g. "I am a runner"); identified motivation, where engaging in an activity is perceived as a means to achieve desirable outcomes (e.g. physical activity leads to health and social benefits).^{17,18} Individuals should be supported to feel positive about engaging in health behaviours and making change incrementally.¹⁹ A more holistic perspective on encouraging physical activity in children and young people emphasises the importance of gaining not only physical skills to play sport, but also a sense of competence in physical activity that leads to confidence and motivation to partake in it.⁶ While more evidence is needed to assess causality, food literacy and nutrition knowledge may play a role in the health behaviours of children and young people in addition to attitudinal factors (e.g. preferences for vegetables and fruits) and their underpinning motivations.²⁰ Caution should be exercised so efforts to prevent and manage childhood obesity do not contribute to weight stigmatisation and disordered eating.²¹

The role of primary health care

Multi-sectoral efforts are needed to support more active living and healthier food and drink consumption in children, thus preventing and addressing related health issues.^{22,23} Primary health care plays a pivotal role in encouraging healthy behaviours in their patients, advocating for their access to recreational and nutritional facilities and services, and directing them to information and health promotion.^{22,24,25} Health professionals have a role in identifying any barriers children experience to physical activity, such as safety concerns or financial constraints.²⁵ Health professionals should utilise routine contact with children and families/whānau to help establish target behaviours through eating plans, identifying healthy snacks, and plans for limiting screen time.^{25,26} National Institute for Health and Care Excellence (NICE) and the World Health Organization (WHO) also emphasise the importance of primary health care and health professionals promoting healthy behaviours in community settings and schools.^{15,27} Health professionals need to have correct information that can be communicated to the public in ways that are easy to understand and culturally-appropriate, as do lay community health workers.²⁴ Health professionals should participate in continuing education to improve their ability to support children and families/whānau.²⁸ Improved coordination and cooperation in the health sector can reduce risk of duplication of effort and help to ensure more consistent messages about healthy behaviours are conveyed to parents, whānau, and children.²⁴

Information provision

Nutrition guidelines should feature in public services (such as hospitals) as well as schools,²² which have a significant influence on the lives of children.²⁶ Nutritional information (for example nutritional guidelines, food labelling, and calorie indicators) can assist personal decision-making about food and drink consumption.²² It is important that health promotion messages to children and young people are easy for them to understand.²⁴ Menu boards and shelves in food outlets and supermarkets can convey nutrition information.²⁴ Simple labelling systems for food and nutrition are recommended for their greater understandability to consumers, such as the Health Star rating system,²⁴ which consumers are increasingly using to help them choose foods and decide between products.²⁹ A "traffic light" system of conveying nutritional information is also recommended for being easier to understand than more information-dense labelling in smaller typeface (such as nutrition information panels).²² Such systems of conveying nutritional information have been shown to influence food and beverage reformulation by manufacturers and promote development of new healthier options.²⁴

Making environments and support networks empowering

The importance of the environmental influences on childhood health behaviours is also well-recognised,^{6,12,23,30} and thus it is important that interventions directed at health behaviours recognise the social, cultural, environmental, and economic contexts factors that impact on self-determined motivational forms.^{12,18,31} In New Zealand there is increasing accessibility of cheap, energy-dense, nutrient-poor foods and pervasive marketing of such foods.²² Consequentially, healthy eating habits have become comparatively more expensive and more difficult to pursue.²²

NICE guidance describes the context in which people make decisions as "choice architecture", which can be used to influence how people act.³¹ Sites at which children gather (such as schools and child sports facilities) should be healthy food environments where healthy choices are accessible and convenient.³² Healthy food environments (which includes social norms) create settings in which it is easier for individuals to make a healthier choice and they also reduce reliance on individuals making conscious efforts to choose healthier options.²⁴ Efforts should be made to reduce the extent to which children and young people are exposed to fast food outlets and marketing of unhealthy foods and drinks, and children should have convenient access to fresh and nutritional produce and convenient opportunities to use non-motorised means of transport.^{31,32} District health boards can work with shopping areas and retailers to promote healthier food and beverages and make these more convenient and more affordable.²⁴ Community events and festivals can be used to showcase healthier food options.²⁴ NICE recognises the importance of health promoters keeping up with current lifestyle trends (e.g. "coffee culture", and "sports" drinks) and the contexts in which individuals are making decisions.¹⁴

Modifying environments and providing resources and sites for activities can facilitate children's active play.⁶ Guidelines state that environments should be stimulating, fun, and safe for children.¹⁶ Urban and public building planning can encourage children and young people to incorporate physical activity into the structure of their daily lives, and recommendations include, but are not limited to: safe and good cycling and pedestrian infrastructure, access to and convenience of public transport, good staircase options and bike storage in buildings, good green and recreational space or facilities, and compact urban design to help make facilities and destinations more accessible.^{23 24}

Approaches should be directed towards empowering children and their families and whānau through capacity-building.³² It is recommended that the public sector have a key role in developing the capacities of family, whānau, and caregivers for encouraging and financially supporting healthy behaviours in children.¹¹ A nurturing and supportive parenting style has been identified as a factor that supports children in maintaining a healthy diet and body size.³³ Thus, people in the support networks of children (caregivers, family and whānau) should be facilitated in their ability to provide children with resilient and nurturing relationships.¹⁹ Parents and whānau should be involved as critical stakeholders in intervention and service delivery planning in ways that should focus on co-production and reciprocity.^{19,24,31,34-36} Parents, whānau and school staff set examples to children through their health behaviours and attitudes, which is identified as key to facilitating the implementation of school interventions.^{24,37} With appropriate support from health professionals and the public sector, social networks are critical avenues to conveying information to children that is correct, understandable, and culturally-appropriate.²⁴ Community engagement in community-based interventions and infrastructure is essential; communities should be strongly involved at all stages of community-based interventions and interventions should be integrated with other initiatives already pre-established.²⁴

WHO emphasises the importance of creating societies where social norms and attitudes serve to enhance understanding and appreciation for regular engagement with health behaviours.¹² Community life and social networks have a major influence on individual health. People in contact with children should encourage and support children to incorporate physical activity into the structure of their daily lives by facilitating these behaviours in routine and habit^{15,32} and showing children how to enjoy them.¹⁶ Children and young people should be encouraged to strive daily for a balance in physical activity, low-energy expenditure activities, and sleep.⁷ Incorporating activity and breaks throughout the day can be supported in peer, social and community culture.²³ Effort should be made to help children replace sedentary time with light activity²³ and engage in sporadic sessions of activity among rest time.¹⁶ Children should also be granted opportunities to engage in playful physical activity where they can use creativity and exploration with less adult regulation.⁶

Interventions for health behaviours

WHO and NICE propose that the public sector undertake comprehensive, multicomponent (nutritional, physical, and psychosocial support), multi-sectoral efforts that take into consideration environment and family and whānau.^{32,38}

The following list of evidence notes interventions for health behaviours and their components:

- Health promotion activities that focus on physical activity and healthy eating and their benefits are more effective than promotion focused on body size.²⁴ Interventions should avoid inadvertently increasing weight stigmatisation and disordered eating.²¹
- Motivational interviewing (also known as "talking therapy") is an effective intervention for improving healthy behaviours in children and young people when individuals have motivation, parental involvement, have access to dietician services, and involvement in the intervention over a long period of time.³⁹ Lifestyle counselling (involving education, collaborative behaviour identification and goal-setting, and support provision) is a recommended intervention that should engage both the individual and family.⁴⁰
- The use of self-determination-supportive motivational styles in school-based interventions are associated with improved satisfaction and overall motivation for physical activity, in contrast to approaches that rely on guilt-avoidance and punishment-avoidance in students.¹⁸
- Combined physical activity and nutrition interventions can be more effective at preventing weight gain in children when implemented in multiple settings compared to single-component community-based interventions.⁴¹ There is moderate evidence for the effectiveness of weight change in primary-school-aged children.⁴²
- Interventions applied to school food and drink prices are effective to improve the nutrition of school children.³⁰
- Environmental interventions only based on playground markings and/or game equipment are not sufficient to significantly impact physical activity in children, while interventions based on introducing physical structures plus playground markings seem to have a short to medium term impact.⁴³
- Several studies on school practices or policies for physical activity promotion reported significant improvement to physical activity in children on at least some measures.⁴⁴ Two cost-effective options (when assessing reach and cost per student) for school-based interventions for increasing physical activity in children include time extension to mandatory physical education classes or regular short active intervals throughout the day.⁴⁵ Current cumulative evidence suggests that school-based interventions extending the duration of physical activity are effective for encouraging behavioural changes in pre-secondary school children.³⁴ Sutherland et al⁴⁶ and Naylor et al⁴⁷ implemented interventions in elementary schools involving: committees or "action teams", longer⁴⁷ or quality physical education classes,⁴⁶ and "snacking" on physical activities in the classroom/sporadic sessions of activity⁴⁷ or incentives for student directed lunchtime activity.⁴⁶
- Multicomponent school-based interventions can improve vegetable and fruit intake when they involve a combination of increasing the availability of vegetables and fruits, nutrition education, and caregiver and whānau support.⁴⁸
- Modelling healthy eating by teachers or older peers is one of the most effective innovative strategies to impacting children's diet and health in the school setting, along with rewards and using cartoon characters for food promotion.⁴⁹ In the home setting, modelling and demonstrating target behaviours is also effective for obesity prevention in children through diet change and physical activity.⁵⁰
- Key features of effective school- and home-based interventions include providing information about the link between health and behaviour, prompting the practice of target behaviours (repeating them), and creating a plan for social support regarding how peers, family, and whānau could participate in target behaviours.⁵⁰

- Children should be encouraged to eat without TV and screens, which increase food intake by diminishing satiation.³³
- Parents and caregivers placing covert limits on the portion size of energy-dense, nutrient-poor foods and drinks are effective for facilitating healthier eating habits in children and adolescents.³³
- Video games are increasingly popular in children and games that also incorporate physical activity (e.g. Wii Fit and Dance Dance Revolution) provide a less sedentary option compared to other games.⁵¹ The current evidence-base examining the effectiveness of video game technology interventions requires further development.
- Mobile and digital technologies have potential to support health promotion, enhance health service accessibility and quality, and reach international health-related goals but more evidence is needed on their effectiveness on behaviour change in children.^{14,52}

Evidence specific to overweight and obese children includes:

- To identify children at risk of obesity in a timely manner, children's nutrition, physical activity, and growth should be assessed at regular intervals, as should their family environment.^{24,28} The US Preventive Services Task Force found no evidence regarding appropriate intervals for screening children and young people at risk of obesity or already obese;⁵³ however, the *Clinical guidelines for weight management in New Zealand children and young people*⁵⁴ suggest that height and weight measurements be taken ideally every 12 months.
- Multicomponent interventions are preferred by NICE, the Academy of Nutrition and Dietetics, and others to address overweight and obesity in children.^{36,55-57} Multicomponent interventions involve targeting nutrition, physical activity and sedentary time, and behaviour.³⁶ Current research strongly indicates that multicomponent interventions are effective for reducing child BMI (Body Mass Index) in the short- and long-term⁵⁶ and increasing some aspects of their health-related quality of life.⁵⁵
- Multicomponent interventions are identified as effective when they involve dietitian nutritionists, psychologists/mental health providers, or family and whānau participation.⁵⁶
- Comprehensive, intensive behavioural interventions are identified by the US Preventive Services Task Force as being effective for weight loss in children with obesity.⁵⁶ These interventions involved 26 to 52 contact hours over 2 to 12 months engaging with parents and children via sessions and education (on healthy foods, safe transport, and food labels).⁵⁶ Interventions encouraged stimulus control (e.g. limiting access to tempting foods), goal setting and self-monitoring, and contingent rewards.⁵⁶ Behavioural interventions are also to be delivered with an appropriately trained professional.⁵⁷
- Interventions for childhood obesity should be coordinated around the needs and preferences of family and whānau.⁵⁷ Many intervention approaches use some combination of individual and family therapy.²⁵ A Cochrane review⁵⁸ concluded that current cumulative evidence shows parent-only and parent-child interventions for overweight or obese children aged 5 to 11 years to have similar effects on BMI, behavioural changes, and health-related quality of life. NICE guidance³⁶ states that there is strong evidence in support of the effectiveness of parent-child or family-child interventions on child BMI z score.
- Motivational interviewing is an encouraged intervention for managing obesity in children and adolescents.²⁵
- Dietary interventions should not be provided in isolation.⁵⁷
- Some evidence suggests that school-based nutrition education is effective in reducing the BMI of children and adolescents and also in increasing their vegetable and fruit consumption.^{59,60}
- A systematic review exploring the effectiveness of behaviour-change techniques incorporated into mobile apps for modifying nutrition and physical activity in children and adolescents

found that self-monitoring goal attainment features in apps seem to be more effective for individuals with overweight or obesity when compared with healthy-weight peers.⁶¹ However, the mobile health (mHealth) intervention marketplace is yet to be aligned with evidence-based practice.⁶¹

Other evidence and recommendations worth consideration:

Where a goal is to help children maintain a healthy weight, programmes should also seek to support and improve children's quality of sleep,¹⁵ because low-quality sleep is associated with excess weight gain.⁴⁰ Furthermore, eating a healthy breakfast is linked to improved overall quality of diet.³³

Current referral pathways could be further improved (for example, the B4 School Check) and other health and wellness checks could be implemented for other age groups, for which developing referral pathways would be useful.²⁴ Improved referral and access to dieticians and community programmes that incorporate several health professionals (dieticians, counsellors and physiologists) could be explored.²⁴

While caregiver and whānau involvement can contribute to the success of interventions involving multiple components, a review of the current cumulative evidence is required to determine what interventions with caregiver involvement are more effective.⁶² It is also noted that most mobile health apps focus on the individual and thus there is opportunity to explore how mHealth can utilise individuals' caregiver and whānau relationships for greater intervention effectiveness.⁶¹

It is recommended that children be provided with opportunities to learn skills pertaining to growing and preparing food alongside a sound theoretical understanding of the long-term impacts of food and drink on health and the environment.^{32,63} School gardens and other places of participatory food production can be utilised as sites for facilitating healthy eating habits such as decreasing children's reluctance to try new foods, increasing their servings of vegetables and fruits, and improving their nutrition knowledge.^{20,24} More cumulative evidence on these initiatives is needed to confidently determine their effectiveness for health behaviours.²⁰

Equity

WHO,¹² NICE,¹⁹ and others⁵¹ emphasise the importance of the socio-environmental context of interventions and how social, financial and environmental factors can lead to inequity in people's opportunities to make positive changes in their lives.

The accessibility, affordability, and convenience of healthy nutrition options and opportunities for physical activity need particular attention when supporting healthy behaviours in disadvantaged groups.³² The Ministry of Health has recommended that Māori, Pacific, and low-income groups be prioritised for physical activity initiatives and promotion.²³

The literature recognises a correlation between obesity and higher deprivation,^{22,51} with children in more deprived areas experiencing higher rates of obesity after adjusting for age, sex, and ethnicity.^{22,51} Individuals in higher socioeconomic deprivation also experience a lack of access to healthier lifestyle options and understandable health information.⁵¹ Increasing evidence indicates that information-focused interventions risk increasing health inequities because they are less likely to be effective for lower socio-economic groups.⁶⁴

WHO emphasises that health information needs to be understandable and accessible to all groups in society and disseminated and tailored to specific groups (with consideration of age, socioeconomic, and ethnic groups).^{15,32}

The public sector needs to address child, family and whānau access to effective health behaviour programmes.¹¹ Out-of-pocket cost is a barrier to accessing nutrition and physical activity programmes.⁶⁵ Free access to these programmes has been identified as an effective facilitator for children of all socio-economic positions.⁶⁴ Barriers to school-based programmes include a lack of space or time, harsh or cold weather, of teacher enthusiasm or training.^{37,45} Improving access to recreational facilities and sport opportunities should be considered to support children in low-socioeconomic groups.²⁴

Current cumulative evidence is largely inconclusive about the effects of interventions for nutrition-related health behaviours in children from low socio-economic backgrounds or minority ethnic groups.⁴⁸ School-based nutrition interventions involving education and environment modification and community empowerment initiatives (where support networks generate solutions to childhood obesity) seem to be effective for reducing obesity-related outcomes for low socio-economic children.³⁹ Such community-based strategies or policies seem to be more effective for children in lower socioeconomic positions when they are of wide reach and long duration.⁶⁴ Taxes and subsidies in combination may improve healthy eating behaviours for people in lower socio-economic positions.⁶⁶

To achieve more equitable outcomes for Pacific and Māori, more holistic approaches to encouraging healthy behaviours in children should be pursued, such as involving the wider family and whānau and the environment as facilitators, in accordance with Pacific and Māori worldviews.⁶ Traditional Māori forms of physical activity and less-sedentary activity should be supported, including play, traditional games, and cultural practices (such as visiting the marae and participating in kapa haka).⁶

Inequities have been noted between girls and boys, with young and adolescent girls experiencing a decline in moderate to vigorous physical activity with age.¹⁸ Self-perceived competence and embarrassment relating to sport and physical activity can be compromised in girls and has been identified as a key factor in the decline in their physical activity.¹⁸ Interventions can find it challenging to reach and have an impact on the physical activity health behaviours of girls; however, interventions that are both multicomponent and specifically developed for girls seem to have more impact on their health behaviours.¹⁸ Interventions directed towards improving the perceived joy in physical activity (intrinsic motivation) can have a positive impact on the self-rated health of girls and some dance interventions have been associated with improved self-esteem.¹⁸

Access is important for achieving equitable health-behaviour-related outcomes for people with disabilities.^{36,38,67} People with disabilities may experience more restriction on their options for physical activity and non-motorised transport compared to peers without disability.^{38,67} People with disabilities may experience more difficulty managing their body weight.³⁶ The needs of people with disabilities, access to adapted equipment, and accommodations in the physical environment should be taken into consideration.⁶⁷

Guidelines, evidence-based reviews, New Zealand publications, and other relevant publications and websites

New Zealand publications and guidelines

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5. Children's views on healthcare

Judith Adams

Introduction

Over recent decades, healthcare services have evolved to give patients/consumers more input into their treatment decisions and service planning and development.¹ Throughout the world, it is recognised that health services should adopt a patient- and family-centred approach to providing healthcare and that it is no longer acceptable for health services to be run with a paternalistic “doctor knows best” approach.

Patient-centred care (also known as people-centred care and person-centred care) is care that is respectful of, and responsive to, the preferences, needs and values of patients and consumers.^{2,3} It is promoted by the World Health Organization (WHO) and governments in many countries including New Zealand,⁴ Australia³ and the UK.⁵

Paying attention to patient experience (how people think and feel about what happens when they use health services) is one of the core facets of patient-centred care.⁶ Enhancing patient experience is widely regarded as one of the key ways to improve the quality and safety of healthcare.^{3,7}

This article reviews research on what children think about health services and how they are provided, with the aim of helping health service planners and providers to consider how incorporating children's preferences into child health services could make them more user-friendly and thereby more effective.

Background: Healthcare and the United Nations Convention on the Rights of the Child

New Zealand ratified the United Nations Convention on the Rights of the Child (UNCROC)⁸ in 1993.⁹ The convention gives children the right to the highest attainable state of health and access to healthcare services (Article 24). It also gives the child who is capable of forming his or her own views the right to express those views freely in all matters affecting him or her, the views of the child being given due weight in accordance with the age and maturity of the child (Article 12). The right to freedom of expression includes the right to freedom to seek, receive, and impart information and ideas of all kinds, regardless of frontiers, either orally, in writing or in print, in the form of art, or through any other media of the child's choice (Article 13).

Taken together, Articles 24, 12 and 13 strongly imply not only that health services provided to children should be of the highest possible standard but also that the adults organizing and providing healthcare should give children opportunities to express their views on healthcare and take notice of what they have to say.

In response to UNCROC, in 2010 Children's Hospitals Australasia initiated a project on children's rights in healthcare services. This project resulted in the publication of the *Charter of Tamariki/Children's and Rangatahi/Young People's Rights in Healthcare Services in Aotearoa New Zealand*.¹⁰ The charter lists eleven rights, including the right to “Express their views, and to be heard and taken seriously”.¹⁰

In the run-up to the 2017 general election the Office of the Children's Commissioner engaged with children using two on-line surveys: primary and intermediate (129 students aged 8–13 years) and secondary (677 students aged 13–18 years).¹¹ The surveys included questions asking participants what were the most important issues for New Zealand and what they would change if they were Prime Minister. Health was one of the most important issues: children and young people thought that everyone should have access to good free healthcare, when and where they need it, and good healthy

and affordable food. Mental health and bullying were considered especially important and young people said they wanted quicker and more accessible support for mental health.

How can we find out about children's views on healthcare?

The short answer is: we ask them. The long answer is that there are a number of different ways you can ask them and there are advantages and disadvantages to each. Readers who would like to know more about this topic might like to read the 2013 publication from The Health Foundation in the UK *Measuring patient experience*,¹² which, although not focussed on children, does provide a comprehensive evidence scan of 328 studies of approaches to measuring patient and carer experiences of healthcare.

Commonly used approaches include surveys, interviews and patient stories.¹² Researchers have to choose a position on the continuum from collecting purely descriptive (qualitative) information to collecting purely numerical (quantitative) information.¹² Collecting detailed descriptive information, for example by conducting in-depth interviews, means that you can only collect information from a small number of patients, which limits the generalisability of your findings.¹² Collecting information from a large number of people, for example via a survey, gives you information that is more generalisable, and suitable for statistical analysis, but inevitably not very detailed or descriptive.¹² Patients responding to a survey can usually only express their views on aspects of care that are covered in the survey (although some surveys offer patients a chance to provide brief comments as well as just ticking the boxes).

The following section provides a brief overview of the kinds of research that have been done on children's views and experiences of healthcare. It is followed by sections discussing how surveys and interviews have been used to gain insight into children's views and experiences of healthcare.

Some general observations on research into children's views on healthcare

A large number of research studies have explored children's views, perceptions and experiences of health care. These have taken a variety of approaches, and a brief outline of some of the more commonly used ones is provided here to give readers some idea of the kinds of research that have been done in this area.

Qualitative research taking the child's perspective is a relatively new field of research in paediatrics. Scott et al.¹³ reviewed the use of qualitative research in paediatrics and they reported on how the number of publications reporting child participants had increased over time from five in 1993–1996 to twelve in 2009–2012. They identified 51 articles published from 1993 to 2012. Another finding from this review was that these articles were predominantly published in nursing journals.

Many studies have taken a condition-based approach: they seek to examine both children's overall experience and their healthcare-related experience of having a particular condition. The more commonly studied conditions include diabetes,¹⁴⁻¹⁶ asthma,¹⁵ juvenile arthritis,¹⁷ renal disease,¹⁸ cystic fibrosis,¹⁹ congenital heart disease,²⁰ epilepsy,^{21,22} cancer^{23,24} and cerebral palsy.²⁵

Some studies have focussed on experiences of specific aspects of children's healthcare such as renal dialysis,²⁶ needle-related pain,²⁷ lumbar puncture,²⁸ hematopoietic stem cell transplantation,²⁹ dental restorations,³⁰ the use of intra-oral cameras to detect dental caries,³¹ post-operative pain relief,^{32,33} involvement in clinical decision-making,³⁴⁻³⁶ medicines³⁷ and mental health services.³⁸

Other studies have examined the healthcare perceptions and experiences of particular groups of children, such as children with disabilities³⁹⁻⁴³ or children with chronic conditions.^{44,45}

The vast majority of studies of children's views on healthcare relate to hospitalisation. There have been well over one hundred studies published on this topic. There appear to have been almost none on general practice or other kinds of primary care or on children's views on what healthcare actually is or what it is for.

Surveys of children's perceptions of healthcare

Although patient surveys are used in many countries,⁴⁶ including Australia³ and New Zealand,⁴⁷ as part of quality and safety improvement measures for health services, these are rarely used to collect information from children about their perceptions of their own healthcare.^{12,46} New Zealand's adult inpatient and primary care patient experience surveys include only patients aged 15 years or more.⁴⁸⁻⁵⁰

Surveys in other countries that enquire about children's healthcare, for example the 2006 Catalan Health Interview Survey⁵¹ and the US Consumer Assessment of Healthcare Providers and Systems (CAHPS®) Child Hospital Survey⁵², typically ask parents about their child's care.^{53,54} Children's perceptions of their healthcare experience may not be the same as those of their parents. A study that developed a child-focussed survey for inpatients and outpatients and compared the responses of children and their parents found that, although parents' and children's scores were significantly correlated ($r=0.29$, $p<.001$), a large percentage of parents chose significantly more positive scale responses than their children did.⁵³

The 2011 Council of Europe survey

In 2011, the Council of Europe commissioned a survey inviting children and young people across its 47 member states to share their views and experiences about healthcare.^{55,56} As part of this project, the Ombudsman for Children in Ireland undertook five focus group discussions with 125 children and young people aged between nine and 12 years from a variety of rural, city and disadvantaged backgrounds. Discussions focussed on the healthcare setting and how it could be made more child-friendly, the attitudes and behaviours of health care professionals, and issues affecting communication and children's use of health care services. The children also attended an arts-based workshop and made posters to illustrate their views and ideas.

A series of survey questions asked about children's last visit to see a health professional. Most children didn't wait for too long to be seen but 13.6% said they had to wait a long time. Most (80%) were happy with the waiting area. While they were waiting, their strongest emotions were being bored (37%), relaxed (28%), anxious (20%) and in pain (8%). Experiences at the appointment were generally positive with 81% being given the information they wanted, 82% saying they understood this information, 82% saying that they were given the opportunity to ask questions, 81% saying they felt respected and 85% saying that the health professional spoke directly to them. Only 38% said they understood all of the health professional said to them, although 48% understood most of it, 12% some of it and only 2% none of it.

The children consulted by the Ombudsman expressed their views about the importance of the physical environment in hospitals and paediatric units. They said they should:

- be bright and colourful
- have places to relax
- not be too cramped and include individual rooms
- have rooms with windows
- have comfortable and clean beds
- have television with lots of channels, DVDs, computer and other games, a games room and internet access
- enable parents/families to stay with their children
- provide good food
- have outside spaces if possible
- smell better
- provide storage space for children to put their possessions.

A study that used data from this survey⁵⁶ (from a total of 2023 respondents from eight countries) compared how children (≤ 12 years), early adolescents (13–15 years) and late adolescents (16–18 years) rated the importance of nine healthcare factors on a scale of 1 (not important at all) to 10 (very important). The most important item for all age groups was being listened to and the least were knowing the names of professionals and not feeling rushed. Children rated the presence of parents and pain control as more important than either understanding the doctor or being able to ask questions.

Adolescents rated understanding the doctor higher than being with parents. For early adolescents, there were no significant differences between the importance of pain control, understanding the doctor and asking questions, and for older adolescents pain control was less important than understanding doctors and equally as important as asking questions.

Around a third of the children in the survey had been in hospital and answered questions about their hospital experiences. Around half (47%) shared a room with another child. Most children (61%) reported that their room was “a friendly place to be” although almost a quarter (23%) said it was not. Most (59%) found their bed comfortable. Almost two-thirds (64%) did not have a parent stay with them overnight, but only half of these children would have liked this. Children were divided about whether they would have liked a parent present during treatment. The authors of the survey report suggested that having a parent present is more important for younger children. In the survey, 73% of children said they were able to have their own things around them. A majority (63%) were able to go outside, 48% could go to a quiet room and 39% could go wherever they wished.

All the children in the survey answered questions about children’s views on partnership working in the healthcare system. Half (50%) said that after their healthcare appointment no one asked about follow-up or their experiences, 34% said they had received follow-up and 16% said they did not know. Responses to being asked to rate how well (on a scale of 1 to 10) different health professionals worked together were mixed.

Children were asked to select from a list things they would like to change about the health system and significant numbers of them chose the following:

- children should be given information about what is going to happen to them (81%)
- health professionals should listen to children more (68%)
- health professionals should talk to children more (60%)
- health professionals should be more friendly (55%).

The children could also add to the list and they had a wide range of other suggestions, mostly focussed on health professionals and healthcare settings being more child-friendly, taking children seriously, and providing them with the information they need. They also mentioned length of waiting lists, delays in communication and treatment cost.

Some survey questions asked about involvement in healthcare policy-making. A large proportion (47%) of respondents said they would like to be involved although 28% said they would not and 30% said they didn’t know, possibly because they didn’t understand the question. When asked about how they would like to participate in healthcare policy making, the most popular response was speaking to someone face to face, although other ways, including with others in school and through the internet were also popular.

The final survey questions asked children to indicate whether a series of statements were true or false. Statements believed to be true by high proportions of children were:

- hospitals and health centres should always be child-friendly (91%)
- children have the right to information about their healthcare and what will happen to them (87%)
- children should be asked their views by their health professionals (75%)
- those running hospitals and health centres should ask children what they think about them (54%)

The survey report’s author noted that the survey’s findings are largely consistent with previous research and show how important it is to children that healthcare is child-friendly and how acutely children are aware of their treatment by health professionals. She stated that, arguably, the most important finding was how rarely children are asked for their perspectives on their healthcare and the development and delivery of healthcare services, and that the most important lesson to take from this is that:

“children have a right to be heard, to be supported to participate in matters that affect them, not just to make decisions about their clinical

care and medical treatment but on the broader issues affecting health care policy and the health care system.”⁵⁵

The children and young people's inpatient and day case survey for NHS England

The Care Quality Commission conducted England's first national survey of more than 19,000 children and young people who received inpatient or day care in 137 NHS acute trusts during August 2014 (a response rate of 27%).⁵⁷ Children aged 8 to 15 years received a questionnaire to answer themselves with a supplementary section for parents or carers to complete. Where children were less than eight years old, a questionnaire was sent to their parents only. The survey focussed on indicators of quality of care.

The survey found that, overall, children and their parents or carers reported good experiences of care, with 87% of children (8–15 years) and 88% of parents or carers scoring their overall experience at least seven out of ten. Other findings indicating good quality of care were:

- 91% of 8–15 year olds said that staff told them what to expect when they were having an operation or procedure
- 89% of 8–15 year olds said that they felt safe on the ward all the time
- 82% of 8–15 year olds said that hospital staff talked to them about how they were going to care for them in a way that they could understand
- 80% of 8–15 year olds said that when they experienced pain, staff did everything they could to help control it.

There were also some findings indicating areas where care could be improved. Forty-one percent of parents felt that staff were not always aware of their child's medical history before treating them, 35% that they were not definitely encouraged to be involved in decisions regarding their child's care and treatment, and 32% that staff were not always available when their child needed attention. Some parents and children were not given adequate guidance on discharge about their child's condition and treatment and who to call or what to do if they had concerns. Hospital staff were not consistently involving older children in their decisions about their care: 43% of 12–15 year olds said they were not fully involved in decisions about their care, and 38% said that staff did not “completely” tell them what would happen after they left hospital.

Compared to children without these issues, children with physical disabilities, mental health conditions, and learning disabilities reported poorer patient experience overall. They were less likely to receive care that met their specific needs; the wards they stayed in were less likely to have the appropriate equipment; and staff were less likely to be definitely aware of the child's medical history, and to know how to care for the child's individual or special needs.

There was variation between NHS trusts with some getting better overall scores than others. The Care Quality Commission suggested that the worse rated trusts could learn from the experience of better-rated ones.

A study that compared the responses of children (8–15 years) and their parents in this survey⁵⁸ found that agreement between children's and young people's responses and those of their parents was reasonably good for overall experience and pain relief but much lower for questions relating to professionals' communication. In the regression models, children and young people were significantly less likely than their parents to report feeling safe, involvement in decisions, or adequate privacy.

A large multi-centre cross sectional study of children's perceptions of the quality of nursing care in Italy

A study conducted on a convenience sample of 692 child patients aged 4–14 years in eight Italian hospitals (representing a response rate 97.2%)⁵⁹ used the Italian version of the previously validated Child Care Quality at Hospital (CCQH) instrument⁶⁰ to assess children's perceptions of the quality of nursing care. This questionnaire had 49 items (each scored on a 5-point Likert scale) divided into three main quality areas: nurses' characteristics (5 items, including humanity, sense of humour, competence and trustworthiness); nursing activities (25 items, including caring and communication,

supporting initiative, education, physical care and treatment, and entertainment); and nursing environment (19 items assessing the physical, social and emotional environments).

The mean score for children's overall experience of hospitalisation was 3.96 (out of 5). Of the three main quality areas, the nurse characteristics area had the highest mean score (3.79) and was positively correlated with the overall satisfaction score in all three age bands: 4–6 years, 7–11 years and 12–14 years. The researchers found that nurse characteristics was the only significant factor contributing to children's satisfaction across all three age bands and they concluded that, from a child's point of view, a nurse's ability to connect with them is more important than his or her ability to perform particular nursing tasks.

Findings from studies that have interviewed children about their views and experiences regarding healthcare

There have been a large number of these studies and there is not space to discuss individually more than a few of the more general ones here.

The views and experiences of children and young people regarding health services in England

A 2012 rapid review for the Children and Young People's Health Outcomes Forum in England⁶¹ aimed to collect and synthesise the most up-to-date evidence on children and young people's experiences and views of health service provision, and how health services can be improved to better meet their needs. It included evidence from England from the previous five years (2007–11), consisting of 66 research studies and 46 consultations. The evidence related to hospitals, primary health, mental health, public health, and shaping national policy and local services.

Consistent themes relating to primary health and hospital care were:

- staff tended to talk to parents and speak in a way that children and young people couldn't really understand
- some staff were unfriendly and didn't treat them with respect (but some were nice, helpful, kind, comforting and caring)
- failure to consistently involve children and young people in decisions about their care
- being cared for in unsuitable and unwelcoming environments (this was particularly reported by young people transitioning to adult services)
- staff not knowing how to communicate with children and young people with speech, language and communication difficulties
- getting "lost" in the transition to adult services (for those with long term conditions like diabetes and asthma)
- children in care lacked information and advice on health issues and accessing health services.

Many of the issues in mental health services were similar to those in other health services. Contact with mental health services was characterised by:

- inadequate communication
- a lack of respect
- not being involved in decisions affecting their lives
- not being treated with dignity
- inadequate placement in, and transition to, adult services
- inappropriate placement in, and transition to, adult services.

Issues specific to mental health services were:

- the stigma attached to mental health issues, which makes it hard to ask for and access support
- mental health services being seen as an add-on rather than a mainstream service.

The evidence showed that mental health difficulties were amplified for vulnerable children and young people such as those who were in care or in the youth justice system, and asylum seekers. It was especially important for these groups to have access to information about mental health services and support in accessing these services.

In regard to public health services, the review found that children and young people acknowledged the importance of being healthy but did not always feel that they had access to the information and advice that would enable them to make healthier lifestyle choices. They realised that advertising campaigns and peer pressure made it difficult for some people to make healthy choices, more so for people from deprived areas. They thought public health campaigns were too obviously designed by and for adults and that they failed to answer children and young people's questions about sensitive issues like sexuality. The review highlighted the need to respond to the information needs of vulnerable groups and to recognise the fact that young people are a diverse group who need information delivered in a variety of ways.

Young people had been consulted about a wide range of public health issues affecting them, such as early sexual activity and underage drinking but it was unclear whether their recommendations for action that fell outside the health sector, for example for more youth activities in the local area and better public transport, had been acted on.

The consultations clearly showed that children and young people wanted to be involved in:

- discussions about public health
- design, development and evaluation of child-friendly campaigns and information
- design, development and evaluation of children and young people's local health services.

The review identified some examples of local and national consultations with children and young people on health issues. These clearly indicated that children and young people thought they should have a say in decisions about their health, and be allowed to take the lead if they were capable. Children and young people valued the support of their parents and carers but had their own opinions and wanted to make their own choices. They especially wanted to:

- be listened to
- have their recommendations acted on
- be told what happens as a result of their recommendations
- meet with decision-makers who could explain why recommendations may not have been acted on.

The review concluded with some key lessons for the NHS on how it could better meet the needs of its younger users:

- staff should speak directly to children (as well as their parents), give them child-friendly information, and explain to them what health services are available and how they can access them
- staff communication should be based on respect and recognition of children and young people's right to be involved in decisions about their health and care
- staff relationships with children and young people should be based on trust and mutual respect. This is especially important for those receiving long term care and mental health services
- children and young people want services to be provided in child-friendly environments, and, like other NHS users, want them to be effective, flexible and personalised
- transition to adult services needs to be better managed and planned in collaboration with young people and their families
- responsibility for informing and supporting children and young people with health issues needs to extend beyond health professionals, particularly for children and young people who lack parental support, such as those in care.

Children's and young people's perspectives on hospital care in the Netherlands

A study conducted in both inpatient and outpatient paediatric departments in eight Dutch hospitals⁶² investigated perspectives on the quality of hospital care and how it could be improved. Sixty-three children and adolescents with either acute or chronic disorders, aged 6–18 years, participated. The study used several different participatory methods of collecting qualitative data including photovoice (children took photographs of things and places they did and didn't like and wrote and talked about them) and a letter to the chief executive (through a link on the hospital website). With older children (13–18 years), online and face-to-face semi-structured interviews were also used. The letter to the chief executive had four sentences for the children to complete, similar to the following:

- Dear chief executive, what I very much like about this hospital is
- If I were the boss, I would immediately change/improve....
- This is my idea for change/improvement...
- I would just like to tell you or ask.....

The researchers identified five themes in their analysis of children's positive and negative experiences: attitudes of healthcare professionals; communication with staff; contacts with peers and family; treatment procedures, and hospital environment and facilities.

Children stressed that doctors, nurses and other hospital staff needed to have enough time to pay attention to patients and should be willing to answer questions. They liked staff to be sociable, kind and friendly and did not like it when staff were hurried or brusque when dealing with them.

Children regarded effective communication as being very important. They valued being listened to, being well informed, staff speaking directly to them (rather than their parents), and staff consulting with each other. They frequently stressed the importance of being told about treatment, planning and procedures and they also wanted information about details that adults may consider too complex or not interesting, such as the type of medication they were getting. Children who did not know what was going to happen during treatments or procedures became anxious. Most children wanted their parents present during consultation with healthcare staff, even if staff were not speaking to them (i.e. the parents), because parents could remember and recall important information, introduce things that children had forgotten to say, and ask questions that children were too afraid to ask.

Children reported some problems with communication between staff, including having to tell their story repeatedly to different staff, and receiving conflicting advice from different staff members.

Children wanted to be listened to and to have a say about both their treatment and their stay in hospital. This was especially true for chronically ill children who had extensive knowledge and experience about their condition and its treatment.

Keeping in contact with family and friends was very important to the children in hospital. They liked having familiar people with them, having visitors and being able to keep in touch via the internet and mobile phones. The children also said they enjoyed the company of the other patients in playrooms and sitting rooms. Most didn't mind sharing a room and many preferred it, especially if their roommate was close to their own age and someone they could talk to. None said that they minded if a roommate had a parent staying overnight.

Children often talked about medical interventions, most often about invasive procedures that they found unpleasant, frightening and painful, such as blood sampling, having a drip inserted, getting injections and having a stomach tube inserted. Many didn't like to wait long for an intrusive procedure as it made them even more anxious. They highlighted the importance of guidance and distraction during invasive procedures, and said that rewards afterwards were nice.

Children had plenty to say about the hospital environment and facilities. They appreciated entertainment activities provided by the hospital, such as playing computer games, watching television, playing with the hospital play specialists, and spending time in the playroom or the teenager's room. They were frustrated by poorly working computers, slow internet connections and having to pay for internet and television use, which was particularly upsetting for children whose parents couldn't afford to pay these fees. Adolescents who had to spend longer periods in hospital

worried about falling behind in their school work, and being able to make use of the electronic learning environment offered by many schools via the internet was important to them.

The children had few good things to say about the hospital food. They liked the paediatric departments having colourful decor, but thought there was scope for improvement with suggestions including message boards and space to display their mail. They wanted private toilets and showers, because they didn't want to have to move far if they were feeling weak or were attached to a drip. In one new hospital, glass in the room doors was a problem, as it let in too much light from the corridor at night, and in another, windows didn't open.

Some children had concerns about privacy. One girl said the shower and toilet facilities weren't private enough and one boy said he would like a place where he could be alone, other than the toilet. Another girl said the windows had no blinds and people in a neighbouring building could look in.

In discussing their findings, the study authors pointed out that, although good food and sleep are basic human needs, and important for healing, they were not always met in children's hospitals. They also highlighted the importance of children's relationships with family, friends and peers and the importance of electronic communication for children and young people's social and educational lives.

They stated that many of their findings replicated those from previous studies, such as children's preferences for warm and colourful decor, more privacy, better food, adequate preparation and support for stressful procedures, and the importance of good relationships and communication with hospital staff.

They noted that many of the areas for improvement identified during this study had been acted on by the hospitals, for example by providing blinds for windows and doors and developing child-friendly menus that had been tasted and assessed by a specially established team. The researchers were of the opinion that, although participatory methods such as those used in this study have not been commonly used in hospital settings, they are more likely to bring about change than traditional social research methods.

Children's and young people's opinions about hospital care in Ireland

Coyne and Conlon⁶³ conducted in-depth qualitative interviews with 17 children, aged 7–16 years, at three hospitals in Ireland. The interview transcripts were analysed with the aid of qualitative analysis software. The children expressed a range of fears and these were collated into two themes: fears related to the ward environment and hospital staff and fears related to investigations and treatments.

Children found the ward environment scary and several mentioned not feeling safe there. Children of all ages spoke of being worried about the unknown in relation to what would happen to them. From what they said, it appeared that a general lack of information or explanation from ward staff exacerbated their fears. Even children with previous hospital admissions reported fears. One said she didn't like being around other sick people because it made her aware of what could happen to her.

Children reported that the professionals they saw were always different and that being dealt with by so many strangers was intimidating. Some children found it hard to sleep with the noise and bright lights on the ward, and the constant traffic of people moving about. While some children were happy with the games and play facilities, others reported being bored and lonely, whether their parents were there or not. Lack of privacy was upsetting for some older children.

Children expressed many concerns about investigations, including potential discomfort, pain, and uncertainty about the procedures and outcome. The children awaiting surgery were anxious about how it would affect their bodies and had misconceptions about it. For example, one girl imagined they were going to cut her open with a big knife.

Most of the children disliked needles and their accounts of their experiences suggested that they only sometimes received numbing cream and explanations about the procedure beforehand. Parents' presence, making friends with other children, and getting to know the nurses and doctors were key factors in reducing children's fears and helping children cope with the unpleasant aspects of hospitalisation.

The study authors stated health professionals should be aware of the things that make children feel threatened and fearful in hospital and that it is important for children to be prepared for what will happen to them, for example by pre-admission visits (only feasible for elective admissions) and explanations before procedures. They also stated that nurses should promote a safe and supportive environment and involve parents in delivering information so they can help relieve children's anxieties.

The hospital-related fears of four- to six-year-old children in Finland

In one of the few studies to have interviewed young children, Samela et al.⁶⁴ interviewed 90 4–6 year old children in a metropolitan area in Finland during 2004–2006 to find out about their hospital-related fears. Twenty-seven of the children were interviewed as patients in a paediatric surgical ward and the other 63 were interviewed at a kindergarten (these children based their ideas about hospitals largely on their prior experiences with other healthcare services, such as well-child visits, vaccinations and health inspections). The researchers used semi-structured interviews, supported by pictures that showed a fairy tale figure in a hospital environment. The interview covered what possible fears the children had in reaction to being a patient, interacting with hospital staff, nursing practices, and the hospital environment.

This study found that the essential hospital-related fears of pre-school children related to nursing interventions and pain, separation from parents and being left alone, lack of information, and instruments and equipment. When describing their fears children's emotions ranged from nervousness to sadness to anger. The researchers ascribed meanings to children's fears in four main clusters: insecurity, injury, helplessness and rejection.

Insecurity was associated with the unfamiliar things in hospital that the children didn't fully understand the purpose of, diseases and injury, nursing procedures, the physical surroundings of the hospital, unfamiliar people and being separated from parents. Children's experiences of threatening adult behaviour made them distrustful that adults would be helpful which led them to reject the help of adults and express how they tried to rely on themselves. When adults were untruthful, such as when they downplayed the possibility of pain, this increased children's feelings of insecurity.

Children did not understand the necessity of pain-inducing procedures and felt that they had been hurt if doctors or nurses carried out frightening procedures on them against their will. Such procedures, and being made to undress, made them feel that their bodily integrity had been violated. If they felt threatened by injury, children reported resisting through words or actions, and hiding, escaping or shutting their eyes. Children felt helpless when adults didn't respect their wishes, or they were unable to meet adults' expectations and some described acting like a baby.

The children often expressed their fears in a contradictory manner or denied them, for example saying "it wasn't scary at all... but it's a bit scary.if it hurts". Sometimes they denied being afraid, even though they described having cried and resisting the nursing procedure. It was also common for children to deny being afraid themselves but describe another child as being afraid, or to change the topic of conversation or exhibit playful behaviour.

The study authors suggested that the experiences of insecurity, being injured and helplessness related to fears can be prevented or reduced by giving parents information on hospital-related fears and preparing the child before hospital admission.

Research done in New Zealand

One small study, by Rasmussen et al.⁶⁵, conducted nine family interviews to learn about children's experience of hospitals and hospitalisation. Five of these included the hospitalised child. The small number of participants makes it hard to generalise about children's experiences other than to say that children and parents often had different experiences, told different stories, and were distressed about different things.

Foster and Whitehead⁶⁶ interviewed 26 children (aged 5–15 years) admitted to a paediatric high-dependency unit in New Zealand. The researchers asked each child seven open-ended questions formulated from the literature. Thematic analysis of the interviews generated two themes: relationships and support.

The relationships theme contained four categories: nurses, doctors, parents and family. Nurses' actions were most often described positively (by 15 children) as making them feel "supported", "safe" and "listened to". Their characteristics included being "kind", "caring", "helpful", "happy", "smiley", and "cool". Five children reported that nurses' actions made them feel "excluded, isolated and forgotten", "scared" or "growled at". Doctors' actions were described positively by seven children as making them feel "safe", "respected", "listened to" and "included in conversations" about their care, but two children, who had long and complicated hospital stays, described their relationships with doctors as "frustrating". Six children said their doctors were "funny", "happy", "caring", "nice" or "super cool".

Children valued having their parents with them in hospital: they said their parents were helpful and made them feel safe. Within the context of family, 18 children reported forming deeper relationships and experiencing personal growth in "resiliency", "independence", and "confidence and strength".

The support theme contained three categories relating to the various ways children remembered being supported: physically, psychologically and emotionally. Twelve children remembered their treatment experiences negatively as "freaky", "horrible", "upsetting" and "painful" although eight of the children also said they were "necessary" and "important" because they "helped them get better". Eleven children described physical symptoms as "shivering", "spewing", "scary" and "annoying" but four older children with chronic illness said their symptoms were "ok" because "it was just part of it".

Eight children described psychological support in the form of visitors and coping strategies including "sleeping", "eating", "watching movies", "singing", "crying", "screaming", "cuddling soft toys", and "playing with the many gifts" they had received. Fifteen children described enjoying hospital entertainment activities, such as bubble blowing, crafts, movies, hospital clowns, Radio Lollipop and re-enactment of clinical procedures with other children, and a further nine children described being upset that they could not participate in these activities due to illness severity or isolation precautions. All children expressed a desire to resume normal childhood activities.

The study authors stated that their findings indicate that there is synergy between the frameworks of child-centred care (in which the child is the co-creator of their own healthcare experience) and family-centred care (wanting family presence, consent and involvement). They stated that further research is needed to explore how the degree to which children need (and wish for) participation versus protection, and to be regarded as unique or part of a family, competent or dependent, powerless or empowered, is relational and situational.

Using insights from research on patients' views to improve health services

There is no point in asking children about their healthcare experiences and what they think about healthcare if the information gained is not used to improve children's health services, and ultimately children's health. This section discusses the research on incorporating patient preferences into health services. Most of this relates to teenagers or adults, as there has been little research on involving children in health service planning.

What is the evidence that involving patients in service design leads to positive patient outcomes?

The systematic review by Crawford et al.⁶⁷ identified 42 papers in the published or grey literature, written in English between January 1966 and October 2000 that described the effects of 40 initiatives involving patients in the planning and development of healthcare. Thirty-one (74%) were case studies, five were the results of surveys, three examined reports of meetings and three reported on the findings of action research. It was not stated that any of the involved patients were children. Reports often described patient involvement leading to changes in services, such as improving accessibility and producing information leaflets for patients, organisations changing their attitudes to involving patients, and the patients welcoming the opportunity to become involved and gaining self-esteem through the process of contributing. The review authors were unable to identify any reports that

investigated the effects of involving patients on the health, quality of life, or satisfaction of those using services.

A 2012 systematic review by Mockford et al.⁶⁸ aimed to identify the impact of patient and public involvement (PPI) on the UK National Health Service (NHS) and the economic cost of PPI. It also examined how user involvement is defined, conceptualised and theorised, and how the impact of PPI is measured or captured. The review identified 28 studies from 1997 to 2009, 20 of which were case reports. The studies were undertaken in a variety of health services including primary care trusts, cancer services and mental health services. No studies involved services specifically for children.

The review found that PPI takes many forms in the NHS ranging from lay membership of managerial boards to patient involvement in condition-specific groups with a single aim such as leaflet design or awareness campaigns. The impacts of PPI were in the areas of service planning and development, information development and dissemination, and attitudes of service users and providers.

Fifteen studies reported that user involvement led to the development of new or improved services, including better access, transport and car parking, a new sexual health and contraception advice service for teenagers, evening services, an improved appointment booking service, an interactive health promotion website co-designed by service users which enabled users to talk to professionals, a peer support group for stroke patients and enhanced services for carers.

Ten studies described impacts related to information development and dissemination, including producing public and patient information, raising awareness of chronic conditions, and developing or contributing to training sessions for both service users and professionals. Many studies noted that health professionals' attitudes, values and beliefs about the value of service user involvement changed after working with service users. Difficulties encountered included service users having their own agendas for being involved, and health professionals lacking the time, resources or experience for working with service users.

Few studies had any conceptual or theoretical basis: most relied on current policy initiatives as their primary framework. No studies mentioned using a validated measurement instrument to capture the impact of PPI. Data was collected through questionnaire surveys, semi-structured and structured interviews, focus groups, documentary analysis and observation of meetings. This data was mostly description of activities and opinions about the difference user involvement had made. No studies reported full costs of PPI although some gave an indication of the costs of some activities that were part of PPI.

Overall, the review found that there were many and varied PPI activities in the UK NHS but no robust evidence of their impact and almost no evidence of their cost. The review authors stated that absence of evidence does not indicate an absence of impact but rather inadequate reporting and a lack of reliable tools to capture the impact of PPI. They stated that there is a need for significant development of the PPI evidence base, particularly guidance for the reporting of user activity and impact.

The impact of patient advisors on healthcare outcomes

One promising way of engaging patients in initiatives to improve healthcare services is to have patients serving on patient advisory councils, becoming members of quality improvement committees, or being involved in training staff.⁶⁹ Patient advisory councils for children's health services often consist of parents and other family members but some hospitals, including the Alberta Children's Hospital⁷⁰, Children's Minnesota⁷¹, and the Royal Children's Hospital Melbourne⁷², have councils of teenagers and young people, as does the Canterbury District Health Board⁷³, the Hawke's Bay District Health Board⁷⁴, and NHS England.⁷⁵

A 2017 review by Sharma et al.⁶⁹ aimed to determine whether patient engagement in patient advisory councils is associated with improvements in clinical quality, patient safety, or patient satisfaction. They identified 32 relevant studies published between November 2002 and August 2015, 16 of which were case studies. Two of the studies in the review by Sharma et al. described advisory councils for paediatric services, although only one clearly described involving young people in a patient advisory council. None of the studies reported results from a prospective, randomized controlled trial of the impact of patient advisors on clinical care, patient safety or patient satisfaction.

Four papers from one research group in Colorado described quasi-experimental public health interventions in which a community advisory council participated in a regional campaign to publicize colon cancer screening, asthma, and blood pressure control by helping to “translate” public health messages so they would be understandable to the lay community. This approach was associated with statistically significant increases in intention to engage in colorectal cancer screening, increased use of asthma inhalers as well as asthma action plans, and improved rates of blood pressure control. In this study the control group included people who had no exposure to the health promotion message at all rather than those who had received a health promotion message developed without patient input so the positive results could not definitely be attributed to the patient engagement component.

Six papers reported anecdotal or case-based findings that patient advisory councils improved appointment access for patients, which is a domain of healthcare quality. One report included several case studies describing how patient advisory councils had been associated with reductions in patient falls and medical errors. Four papers described how patient advisory councils had been associated with improved patient satisfaction.

The review authors observed that research on organizational-level patient engagement appeared to have made little progress since the 2002 Crawford systematic review⁶⁷ and that it was still the case that the most-commonly cited examples of patient advisors having an impact were on improvements to patient educational materials, clinical physical space, and staff “culture” or awareness. They concluded that future work needs to rigorously evaluate patient advisory council programmes to demonstrate the value of the investments needed to implement patient-centred care.

Ponte et al.⁷⁶ describe a paediatric advisory council for cancer services at the Children’s Hospital of Boston. From the description of the work of the council it appears that members were probably adults rather than children although this was not explicitly stated. The council initiated a project looking at the experiences of children brought to the emergency department. The project resulted in a recommendation that paediatric oncology patients should be triaged directly into treatment rooms so they did not have to spend a long time in the waiting room potentially risking exposure to infection. Emergency department staff worked with the council to design and implement a new “ED Fast Track” system that eliminated waiting time and increased satisfaction among oncology patients and their families.

Rich et al.⁷⁷ discuss the lessons learned from the Teen Advisory Committee (TAC) at Boston Children’s Hospital by TAC teens and facilitators, and by hospital staff who have sought advice and guidance from TAC. At the time of writing the 18 TAC members ranged in age from 14 to 21 years and included 14 patients with chronic illness, two healthy siblings, and two peer leaders from the hospital’s Youth Advisory Programme. The TAC meets 11 times a year for two hours, and the first half hour is devoted to dinner and socializing. This means that short-term projects work best.

Projects that the TAC has collaborated with hospital staff on included the social networking policy, and providing feedback to help improve the patient experience (e.g. the inpatient room decor). To investigate the issue of inclusion in care, committee members designed a survey with both qualitative questions and questions answered using a Likert scale and conducted it in outpatient clinics. They presented their findings to hospital administrators, physicians, nurses, social workers, and child life specialists, telling them that data from the survey showed that providers at Boston Children’s Hospital include adolescents in health care discussions and decision-making, but cautioning staff about assuming that they know what a teen may want.

The NHS Youth Forum and its effect on health services

The NHS Youth Forum started up in 2013.⁷⁸ It is made up of young people from across England and in 2018 it involved 25 young people aged 13–25 years.⁷⁹ It has a partnership arrangement with Public Health England and the Department of Health to enable it to take a system approach and have a direct impact on the health services that young people use. Its core aims are to:

- ensure that young people’s voices are present in the national programmes of work in NHS England
- be a “critical friend”, exploring aspects of health that do or don’t work well for young people and suggesting improvements to health services for young people

- encourage other young people to get actively involved in their own healthcare.⁷⁸

Youth forum members choose priority areas each year and deliver project work relating to these. They also work with health service policy leaders and commissioners to inform key areas of strategic healthcare policies and national programmes. They are often asked to work on other projects with partners. Youth Forum members have three residential meetings each year and attend a wide range of meetings and events as Youth Forum representatives. They keep in touch with each other through weekly email updates and an online forum.⁷⁸

Some of the achievements of the NHS Youth Forum have been

- changing the NHS complaints policy to make it clear that young people can complain in their own right and be taken seriously
- developing a series of posters about young people's rights in healthcare
- developing resources for commissioners to help them involve young people in their strategic decision making
- running a social media campaign called "Dear NHS" to enable young people to say what they feel about healthcare services
- advocating for better mental health services and participating in the Youth Select Committee inquiry into mental health services for young people
- developing resources to support GP and primary care practitioners to involve young people in improving healthcare services
- leading a campaign to encourage young people to think about their own wellbeing: #yourhealthinyourhands.

NHS England commissioned a study undertaken by nursing academics at the University of Hertfordshire between July 2015 and September 2016 that examined the activities of the NHS Youth Forum and the strategies used to influence health service provision for children and young people.⁷⁹ The study used activity logs (completed by nine of the 25 forum members), a questionnaire and semi-structured interviews (with eight members, one of whom also completed an activity log) to gather information. Analysis of the activity logs indicated that the youth forum members were undertaking a wide range of activities across the country. Analysis of the interviews yielded seven themes relating to:

- the young people (keen to make an impact, enjoying participating, and valuing the confidence and skills they gained)
- motivation (often personal experience of health issues)
- commitment
- community (collaborating with a range of like-minded people: other forum members as well as health and community leaders and health professionals)
- knowledge experts (NHS employees who provided forum members with much-needed insight into the structure, organisations and policies of the NHS)
- youth workers (from the British Youth Council, who provided guidance, advice and support to forum members)
- funding (forum members got all their expenses paid but were not paid for their time and did not wish to be).

The study authors concluded that the NHS Youth forum had developed rapidly and successfully and was enabling the voice of young people to be heard.

Co-design of healthcare services

There is increasing recognition of the value of moving beyond merely taking patients views and preferences into account when planning and delivering health services to co-designing services with patients.⁸⁰

Bate and Robert⁸⁰ suggest that experience-based co-design is at the far end of the continuum of patient influence, which begins with complaining, and moves through information giving, to listening and responding, to consulting and advising, to experience-based co-design.

Bate and Robert⁸⁰ stress the value of experience-based design and they state that the components of good design in healthcare services are the same as those of good design in any field:

- performance (how well it does the job or is fit for purpose: functionality)
- engineering (how safe, well-engineered and reliable it is: safety)
- the aesthetics of experience (how interaction with the service or product feels or is experienced: usability).

They state that while healthcare has always been concerned with performance (in terms of evidence-based practice, pathways and process design) and engineering (in terms of clinical governance and safety standards) it has neglected the human experience. Patient experience is a subjective phenomenon: it cannot be directly observed, but only glimpsed through the language patients use to describe it.

“Stories and storytelling are the basis of experience design. As the repository of experience, they contain almost everything that is required for a deep appreciative understanding of the strengths and weaknesses of a present service and of what needs to be redesigned for the future.”⁸⁰

The goal of experience-based design is a positive patient experience with the patient experience being just as important in the service design process as process and clinical goals.⁸⁰ The following sections discuss some examples of involving children and young people in the design of health services.

A youth council for an acute NHS hospital trust in England

A 2008 paper by Coad et al.⁸¹ was written as a collaboration between adults and the young people on the youth council of an acute NHS hospital trust in England. Its aim was to reflect on how the Trust involved the youth council (consisting of 17 young people aged 11–18 years) to improve children’s service delivery. It reports on an evaluation workshop at which the young people discussed the following three specific topics:

- evidence that the youth council’s involvement had improved trust services
- barriers to young people’s voices being heard in service delivery
- what could promote young people’s involvement in healthcare services.

Since its inception 18 months earlier, the council had advised on a wide range of issues by:

- designing a questionnaire and using it to undertake a satisfaction survey of children and young people on wards
- considering menus for the adolescent unit
- working towards the content of a Bedside Booklet for the Adolescent Unit which is available as a hard copy beside each bed and on the hospital website
- reviewing various Trust websites, and selecting some to be links on the Trust’s internet site
- advising on *FamilyTalk* (a research project into how genetic conditions are communicated across families including children and young people)
- giving advice on participant information sheets and consent forms to a researcher applying for ethics approval
- designing a poster to attract teenagers to participate in a research project about weight issues, and advising on the information sheet about the project.

Many council members (14 out of 15 attendees) thought they had been fully briefed and were helping staff to make decisions, and contributing to healthcare for young people in the trust. Some said they had not expected their involvement to be as practical as it turned out to be. Council members were asked whether there was any particular task or project that was memorable or had made an impression. Most cited *FamilyTalk* and reported that the research project team had responded to everything they had suggested.

The young people thought that their views were largely taken into consideration by the Trust but several said that, in society at large, they were not taken seriously. They thought this was because of their chronological age. Council members were frustrated when their views were over-ruled as when their suggestions about the design of the new children's ward were not acted on due to budget constraints. They did, however, appreciate the Director of Children's Services and the Chief Executive of the Trust coming to explain this to them.

To promote young people's involvement in healthcare services, the youth council thought that, when a user group is set up, members need to be clear from the start about what is expected of them. The council agreed to have definite end times for meetings to fit in with transport arrangements, to appoint one member as chairman, to determine an agenda at each meeting for the next one, and to have an adult gatekeeper to provide support for the group, voice their opinions to the Trust, and ensure their responsibilities were not too onerous.

Involving children and young people with chronic conditions or physical disability in local health service development in NHS trusts in England

Lightfoot and Sloper⁸² report on a study that aimed to investigate the involvement of children and young people with a chronic illness or physical disability in local health services development in health authorities and NHS trusts in England. As a first stage, the researchers undertook a national survey to identify current initiatives involving this group of patients. They identified twenty-seven and chose six for further investigation to learn about the views of young patients and staff who had taken part in NHS service development projects. The six were selected because the researchers sought to include a range of methods of involvement and to prioritise initiatives that seemed (from the survey returns) to have the greatest involvement of young people.

All six initiatives were based in hospitals. In brief, details of the six initiatives were:

- A senior nurse in a children's ward commissioned a local organisation to facilitate small group work with a group of young patients and identify ideas for change. The group designed and carried out a structured interview with young family members and friends. They analysed the data, added their own views, and made a presentation to the Chair of the Trust and hospital staff. The facilitator wrote a report of the findings for the Trust.
- A children's ward sister obtained a half-time secondment for six months to find out young patients' ideas for change in the outpatients clinic. She set up a group of five young outpatients (two later left) whose meetings involved both work and social activities. The group sent out an anonymous postal questionnaire to other young patients to find out their views. On learning that some new clinic patients were nervous about what to expect, the group made a short video for new patients, including an interview with the consultant.
- After talking with patients and identifying a need for improved recreational facilities, the hospital youth worker (a fulltime employee of the Trust) recruited a group of seven young people who raised money for, and planned, a recreation area on the renal ward and an on-site weekly evening youth club for local young people with chronic illness.
- Following initial consultation with patients when a new cystic fibrosis unit was established, patient views continued to be collected formally via questionnaires, and informally by the unit director (a consultant physician) "keeping an ear to the ground".
- Teenage inpatients had previously been asked by staff nurse to write a letter about what it was like to be on the children's ward. They were keen to have a separate facility and had consistent preferences regarding it. When funding for an adolescent unit became available, the staff nurse approached inpatients (in person) for their ideas on decor and recreation facilities. Once the unit was operational, the nurse periodically asked inpatients for their views, both informally "in passing" and formally through questionnaires.

- An adolescent nurse specialist was appointed to lead the establishment of a separate adolescent unit within the hospital. Teenagers were consulted both one-to-one informally on the ward, and, for a short time, in small groups consisting of inpatients and staff. Once the unit was open, staff and patients reported that consultation was largely informal and routine as part of the unit's listening culture, although there were also a weekly ward-based confidential "chat group" and a discharge questionnaire for long-term patients.

The researchers used semi-structured interviews to ask young patients who had taken part in these initiatives about how they decided to take part; the experience of taking part; outcomes; reflections on the experience; and advice for health staff seeking to involve young patients. They also interviewed two types of staff in each site: someone directly involved in the project under investigation, and someone responsible for patient and public involvement in the Trust.

In all the Trusts, staff respondents said that the youth initiatives being studied had developed separately from the Trust's general strategy and, in fact, most knew little about them. Project staff noted that Trusts' broader service user involvement strategies favoured large-scale quantitative methods (e.g. surveys) for finding out about patients' views, and they felt these were inappropriate for working with young people.

Analysis of the young people's and staff views yielded seven broad themes: the benefits of involving young patients; motivation; approaching young patients; topics; methods; feedback; and staffing. Young people's views on involvement were mixed, but those who reported a positive experience (all those at four of the sites) cited benefits of being involved such as making a difference; personal development; gaining confidence and learning to take responsibility, feeling valued and respected, having something useful to put in their CV to show potential employers, and, for those involved in groups, the chance to have fun and meet new people.

Staff cited benefits including discovering that young people have many worthwhile things to say, and that adults can't assume they know what's important to young people, and they said that this would change their professional practice. Staff were motivated to participate by a belief that it was important to find out what mattered to young patients. The young people were motivated primarily by altruism: to make things better for future patients, and to help staff who had cared for them. To decide to participate, they needed to feel confident that they would be listened to and that their opinions were valued.

Both patients and staff said it was important not to assume all young patients would feel lucky to be asked to participate, since not everyone would do. Young people thought it best for consultation to occur in hospital when ideas about what needs to change were fresh in their minds. They wanted clear information on what was expected of them and assurances about arrangements for anonymity and confidentiality.

Staff thought young people should choose the topics about which they were consulted, as did young people, although they said a "starter list", ideally including young people's ideas from elsewhere, was helpful. Topics young people wanted to be consulted on were (in order of popularity):

- staff communication with patients (especially patronising attitudes and withholding information)
- entertainments and recreation facilities
- food quality
- hospital tuition
- flexibility of rules regarding bedtime, visiting and going out
- privacy
- decor
- timing of treatment.

Young people said there was no one right method of involving young patients: different methods suited different people and different purposes. Although they recognised the advantages of questionnaires, they thought one-to-one discussion was the best way to learn a person's own views, and that it was best if the interviewer was not someone who worked in the service so that patients

didn't avoid saying what they thought for fear of causing offence to someone they knew, or getting them into trouble.

Young people were keen for hospitals to develop a listening culture (as were some staff) so they could raise issues at any time not just when they were being formally consulted. Young people wanted feedback to know that they had been heard and that their suggested changes had been implemented, or, if that was not possible, to know why not.

Staff cited various issues relating to staffing. If the staff person was independent then young people felt able to speak freely, but the staff person could get frustrated by not knowing if the Trust was following up on young people's suggestions. Hospital staff who had other roles in addition to patient involvement could struggle to balance the demands of their multiple roles. Three staff mentioned feeling isolated and said they would welcome some kind of peer network with people doing similar work in other Trusts.

In their conclusions, the study authors said that some local initiatives were clearly more meaningful for young participants than others. They stated that, despite it being impossible to generalise from the small numbers in their study, there were four features consistently present only in the four sites where all young participants reported having a positive experience:

- an adult had a formal role to facilitate young people's involvement
- involvement took place over time with repeated contact
- young people had a say over which topics were chosen for consultation
- young people received feedback about what was happening regarding their ideas for change.

Co-design in healthcare services in New Zealand

As part of the Partners in Care programme, the Health Quality and Safety Commission (HQSC) funded a co-design programme which has been delivered by Ko Awhatea to healthcare organisations around the country since 2014.^{83,84} The core principles of the programme are:

- to achieve a partnership between patients, staff and carers
- an emphasis on experience rather than attitude or opinion
- a narrative and storytelling approach to identify "touchpoints"
- an emphasis on the co-design of services
- a systematic evaluation of improvements and benefits.

Participants in the programme are encouraged to undertake co-design projects that engage consumers in a co-design approach to improving healthcare systems. Co-design projects have been undertaken in a wide variety of patient groups (almost all adults) including older people who have fallen in the community and need help to get up, orthopaedic theatre patients, and patients using a district nursing service, an outpatient hysteroscopy service, and a breast service.^{85,86}

A co-design project undertaken in Nelson Marlborough DHB during 2014–15 aimed to help people providing paediatric services to adopt strategies that would enable them to receive feedback from children themselves.⁸⁷ The project initially gathered information in child development services and paediatric outpatients. The tools used for this included:

- child written surveys
- a patient experience questionnaire
- narrative excerpts that had been collated from both families and clinicians as part of the Maternal and Child Health Integration Project (funded by the Ministry of Health).

The paper surveys were designed specifically to appeal to children, and children were asked to complete them and then post them in a letterbox for collection and collation. Different services could adapt the survey to address specific parts of their service. The surveys offered children the chance to give feedback in a number of ways. Depending on their age, they could:

- draw a picture to describe the experience
- write a word

- write a story.

Charge nurse managers were willing to help with more in-depth interviews with children attending outpatient departments and make the child surveys available on the wards but it was challenging for them to find time for co-design project activities on top of their usual work, particularly because the project was undertaken during the Christmas and summer period when staffing levels were lower.

The project group compiled feedback from their three key sources according to three key “touchpoints” in the care pathway: the first point of contact/primary care; the waiting room and reception experience; and the appointment with the doctor or nurse they had been referred to. The group did not present the feedback specifically from children separately but made wordles to identify the most frequently occurring words in all of the text feedback they received. A wordle is a visual representation of key words in a word cloud in which the size of the font used to display a word reflects the frequency with which that word appeared in the original text (so frequently used words appear larger).

The project group found that people were interested in getting feedback in this form as it presented both positive and negative messages together in a balanced way. One of the most important lessons from the project was the importance of focussing on the emotional experience of children and families when thinking about how services are provided. The project group intended to present their work at a paediatrics service meeting and were committed to working to improve the current situation and involving consumers in this work.

The evaluation of the 2014–15 co-design programme⁸³, which was delivered to nine healthcare organisations, found that, as in previous programme evaluations, project team members felt that they did not get enough support from sponsors or senior leaders to get the most out of their participation in the programme. Project team members needed to get better at maintaining communication with consumers, assuring them that their contributions were valued and advising them of how their input has led to change for future consumers. The sponsors who supported project teams found it challenging to find enough time to dedicate to projects due to their other commitments. Project teams needed buy in and engagement from senior leaders to get release time to work on their project, validate the experience-based-design approach, overcome barriers to change and implement recommended solutions.

Conclusions

It is only in relatively recent years that policy makers have begun to pay attention to children’s views on their own healthcare and even more recently that they have begun to consider how they could incorporate children’s preferences into the way healthcare is designed and delivered, and how they could develop health care quality indicators that take account of what is important to children.

The research to date on children’s views of healthcare has largely been undertaken from a nursing perspective and involved children who are hospital inpatients. The findings on children’s likes and dislikes in hospital have generally been unsurprising. Children don’t like needles; being away from home, family and friends; unfamiliar and/or unfriendly people; not being listened to; not being consulted about their care; having to tell their story repeatedly to different people; hospital staff who don’t communicate with each other and who give conflicting advice; not being told about what’s going to happen; lack of privacy; noisy environments and bright lights (especially when they are trying to sleep) and unappetizing food.

Children in hospital do like staff to be friendly, kind, and helpful, to spend time with them, and to make them feel safe, supported, respected and listened to. They like having their parents with them and being able to keep in touch with families, friends and school through social media, email, Skype, mobile phones and other electronic methods. They like the decor to be bright and cheerful. They like to be entertained, including via the internet. Younger children like to have a playroom with toys and teenagers like a recreation room with videogames and computers.

Most of this research has not yet been translated into measureable improvements in the quality of children’s health services. Research has yielded little insight into the best ways to incorporate children’s preferences into healthcare services and thereby improve children’s health outcomes.

Research on children's views is still largely conducted by adults and new insights could be gained if children were more involved in carrying out research, for example by designing surveys or interviewing their peers.⁸⁸ There is a need to broaden the scope of research on children's views on healthcare to include primary care of all kinds, and public health. There is also a need to involve children in health service planning and to evaluate the effects of doing this on patient satisfaction, other indicators of quality of care, and patient health outcomes.

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6. Oral Health

Oral health is an important component of overall health and wellbeing,^{1,2} and dental decay is identified as a major threat to natural teeth.² As children see their permanent teeth start to appear from six years of age, children can be supported to adopt protective factors against oral disease and to regularly access professional oral health services.

National campaigns, including Baby Teeth Matter³ and National Oral Health Day,⁴ aim to spread awareness about the importance of the modifiable lifestyle factors, including dental hygiene habits and diet, critical to setting children up with good oral health for life. The Ministry of Health recommends fluoride in the water supply should be maintained at between 0.7 ppm and 1.0 ppm to mitigate carious lesions on deciduous and permanent teeth.⁵

This section on Oral Health reports on access to fluoridated water, caries-free permanent teeth, and decayed, missing or filled permanent teeth (DMFT). Good oral health is indicated by a higher prevalence of being caries-free and by a lower mean number of decayed, filled, or missing teeth. Hospitalisation rates for dental services is an indicator of the need for and access to treatment for severe cases of dental caries. The hospitalisation rates of children for dental conditions serves to indicate the need for services and treatment in more severe cases of dental caries.

The section provides data on children in Year 8 of school (around 12 years of age) from the Community Oral Health Service (COHS) and children between 1–14 years from the National Minimum Dataset (NMDS). Not all children in Year 8 will be captured by the COHS dataset.

For more detail about the oral health status of children under 5 years old, refer to the NZCYES report series for 2017 on *Health and wellbeing of under-five year olds*.⁶

Data sources and methods

Indicators

1. Oral Health status of children in Year 8
2. Hospitalisations for dental caries in 1–14 year olds

Oral Health status of children in Year 8

Data source: Community Oral Health Service (COHS) published by the Ministry of Health

Proportion of Year 8 children who were with or without access to fluoridated water

Numerator: Number of Year 8 children who attended a school area with or without fluoridated water

Denominator: Total number of Year 8 children examined in the year

Proportion of Year 8 children who were caries-free

Numerator: Number of Year 8 children whose teeth were caries-free on completion of treatment with an oral health service

Denominator: Total number of Year 8 children examined in the year

Mean number of decayed, missing or filled teeth (DMFT) at Year 8

Numerator: Number of Year 8 children with permanent teeth that are decayed, missing (due to caries) or filled on completion of treatment

Denominator: Total number of Year 8 children examined in the year

Mean number of decayed, missing or filled teeth (DMFT) for children with caries at Year 8

Numerator: Number of Year 8 children with permanent teeth that are decayed, missing (due to caries) or filled on completion of treatment

Denominator: Number of Year 8 children examined in the year as having caries

Hospitalisations for dental caries in 1–14 year olds

Numerator: Hospitalisations of 1–14 year olds with a primary diagnosis of dental caries
Numerator source: National Minimum Dataset (NMDS)
Denominator: NZCYES Estimated Resident Population (with intercensal extrapolation)

Additional information

The Ministry of Health requires that COHS collect ethnicity information in three categories (Māori, Pacific and Other) in the seven 'official' Pacific DHBs (those with the highest numbers of Pacific Peoples: Counties Manukau, Auckland, Waitemata, Capital & Coast, Canterbury, Hutt Valley, Waikato) and in two categories (Māori and Other) in the other DHBs.⁷

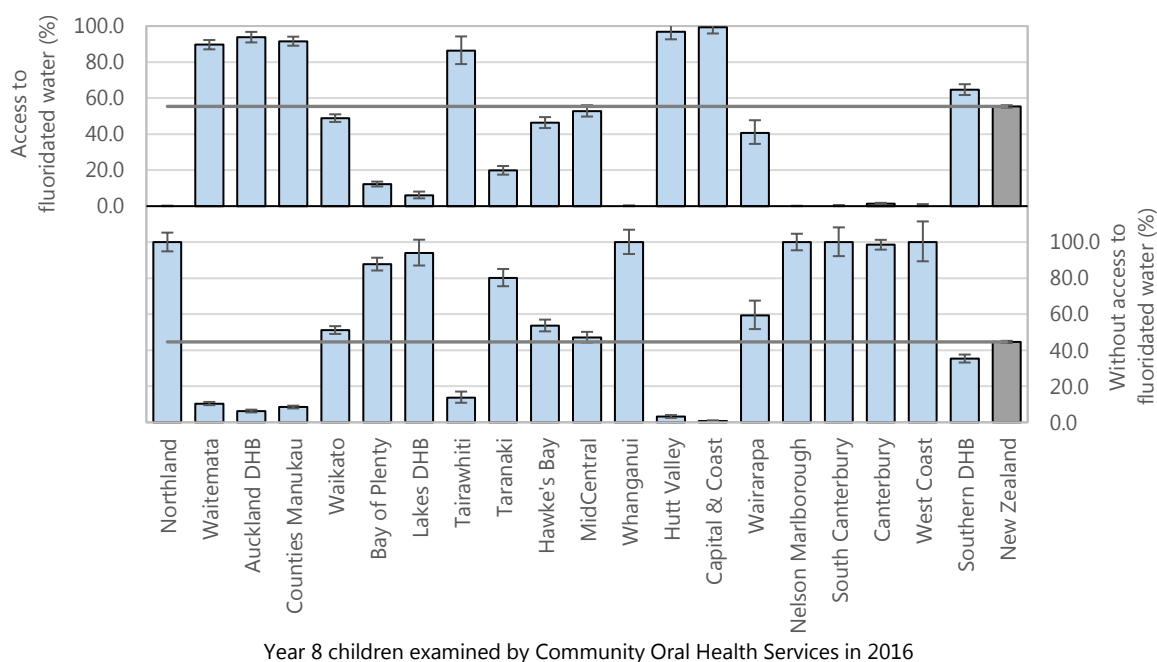
Fluoridation status for primary and intermediate school children is based on the water fluoridation status of the school the child attends, or in the case of home schooling the child's residential address.⁸

Access to fluoridated water

The Ministry of Health recommends fluoridated water as a means to preventing carious lesions, for which fluoride levels should be maintained at between 0.7 ppm and 1.0 ppm.⁵ This section reviews fluoridated water access for Year 8 children using information from the COHS.

Figure 6-1 and Table 6-1 present the proportion of Year 8s with or without access to fluoridated water in 2016 by District Health Board (DHB). In Hutt Valley and Capital & Coast DHBs, 97% and 99% (respectively) of examined Year 8 children had access to fluoridated water, while 40.7% of children in Wairarapa had access.

Figure 6-1. Proportion of Year 8 children with or without access to fluoridated water, by DHB, 2016



Source: COHS

Table 6-1. Proportion of Year 8 children examined with or without access to fluoridated water, Hutt Valley, Capital & Coast and Wairarapa DHBs vs New Zealand, 2016

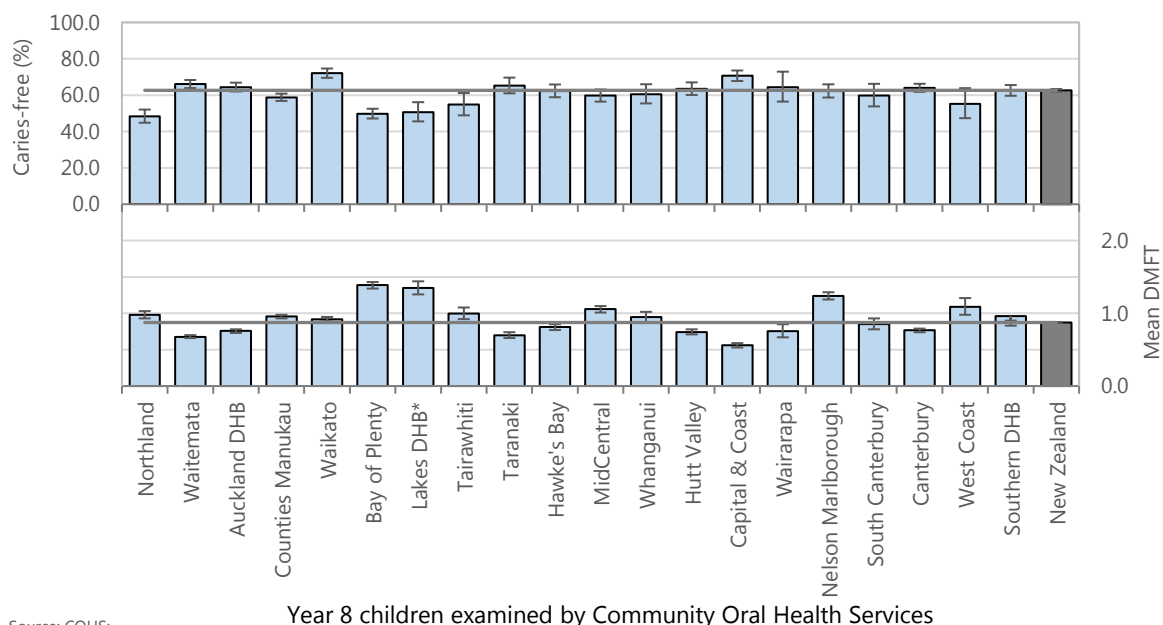
DHB	Access to fluoridated water (%)	Without access to fluoridated water (%)
Year 8 children examined by Community Oral Health Services in 2016		
Hutt Valley	96.84	3.16
Capital & Coast	99.27	0.73
Wairarapa	40.74	59.26
New Zealand	55.37	44.63

Source: COHS

Oral health status

Figure 6-2 and Table 6-2 present the proportion caries-free or mean DMFT (mean number of decayed, missing, or filled permanent teeth) among Year 8 students examined in 2016 for each DHB and New Zealand. The percentage of children caries-free was significantly higher than the national in Capital & Coast DHB (70.6%), while Hutt Valley and Wairarapa had percentages similar to the national. All three DHBs had a significantly lower mean number of DMFT compared to children nationally, with Capital & Coast seeing the lowest mean DMFT of all DHBs.

Figure 6-2. Proportion caries-free or mean DMFT among Year 8 children, by DHB 2016



Source: COHS;
DMFT = Decayed, missing or filled teeth,
*Excludes those children for whom fluoridation status was not recorded.

Table 6-2. Proportion caries-free or mean DMFT among Year 8 children, Hutt Valley, Capital & Coast and Wairarapa DHBs 2016

DHB	Year 8 children examined (n)	Caries-free		Mean DMFT
		n	%	
Year 8 children examined by Community Oral Health Services in 2016				
Hutt Valley	2,059	1,307	63.5	0.74
Capital & Coast	3,266	2,306	70.6	0.56
Wairarapa	378	243	64.3	0.76
New Zealand	47,327	29,642	62.6	0.87

Source: COHS; DMFT = decayed, missing or filled teeth

Figure 6-3 presents the mean DMFT in the permanent teeth of Year 8s and mean dmft in the deciduous teeth of children aged 5 years. Overall, the mean DMFT of Year 8s has declined marginally since 2003 in all three DHBs, while the mean dmft of 5-year-olds has seen more fluctuation and has declined since 2003 and remained relatively stable in recent years. There was an apparent increase in the mean DMFT of age groups between 2007–2008 in Wairarapa DHB.

A smaller gap exists between the mean DMFT/dmfts of these age groups nationally for recent years in all three DHBs when compared to 2003–2004. Year 8s consistently saw a lower mean DMFT compared to their younger peers.

Figure 6-3. Trends in mean DMFT/dmft of Year 8 or 5-year-old children, by age, Hutt Valley, Capital & Coast and Wairarapa DHBs and New Zealand 2003–2016

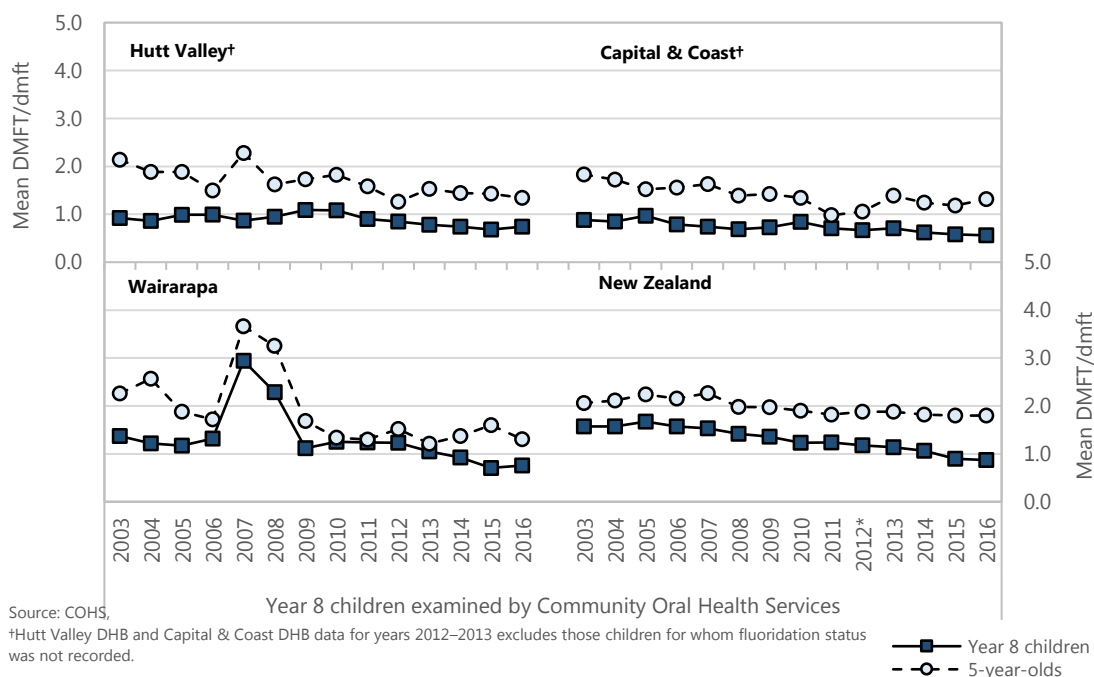
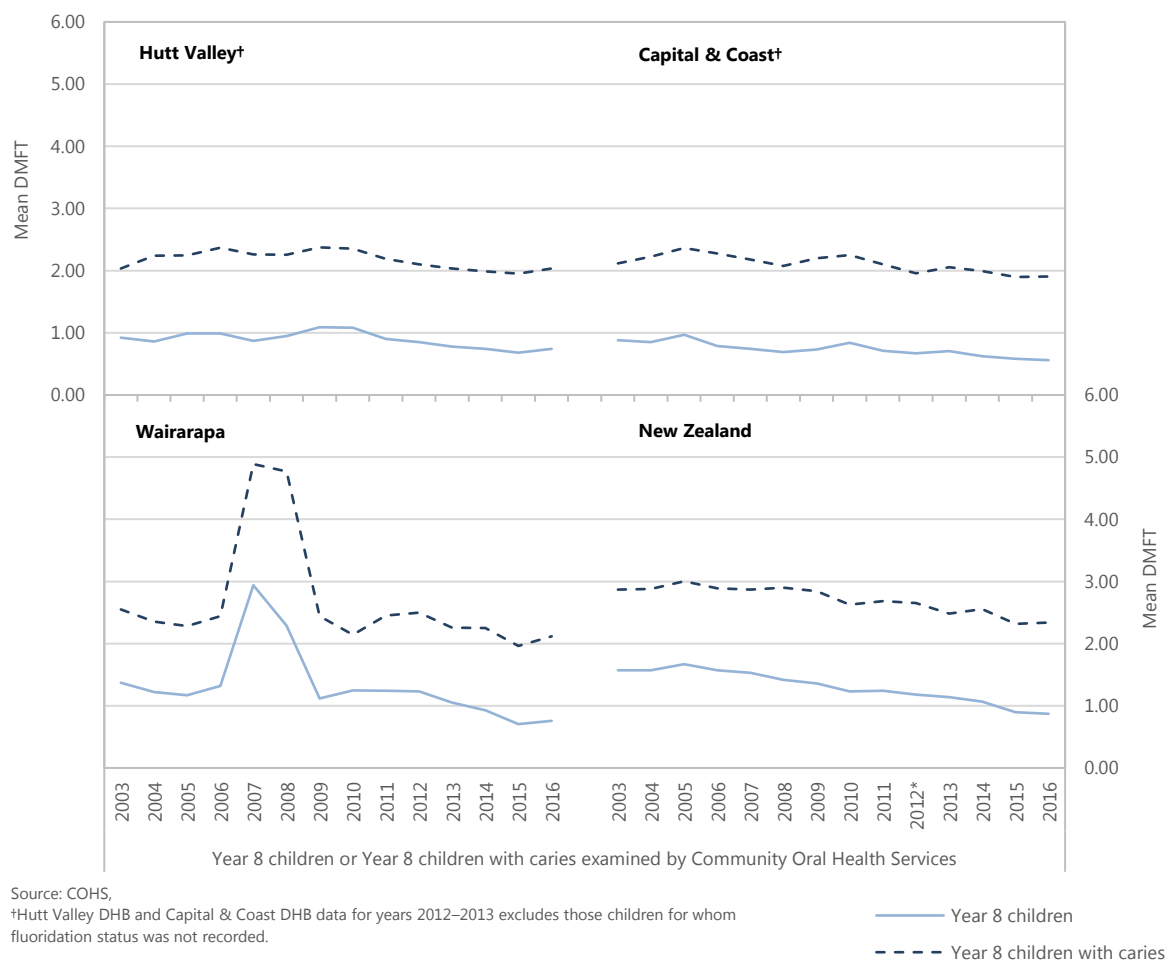


Figure 6-4 presents the mean DMFT of all Year 8 children and the mean DMFT Year 8 children with caries since 2003 for the Hutt Valley, Capital & Coast, and Wairarapa DHBs and New Zealand. Mean DMFT in children with caries serves to indicate the severity of dental caries in this population.

The mean DMFT among all Year 8s and also those with caries has declined marginally overall in the Capital & Coast and Wairarapa DHBs. Year 8 children with caries in Hutt Valley, Capital & Coast, and Wairarapa DHBs saw a mean DMFT that was consistently lower than the national mean DMFT for children with caries.

The difference between the mean DMFT of children and the mean DMFT of children with caries has remained consistent in the three DHBs and nationally. There was an apparent spike in mean DMFT for children in Wairarapa DHB for 2007 and 2008.

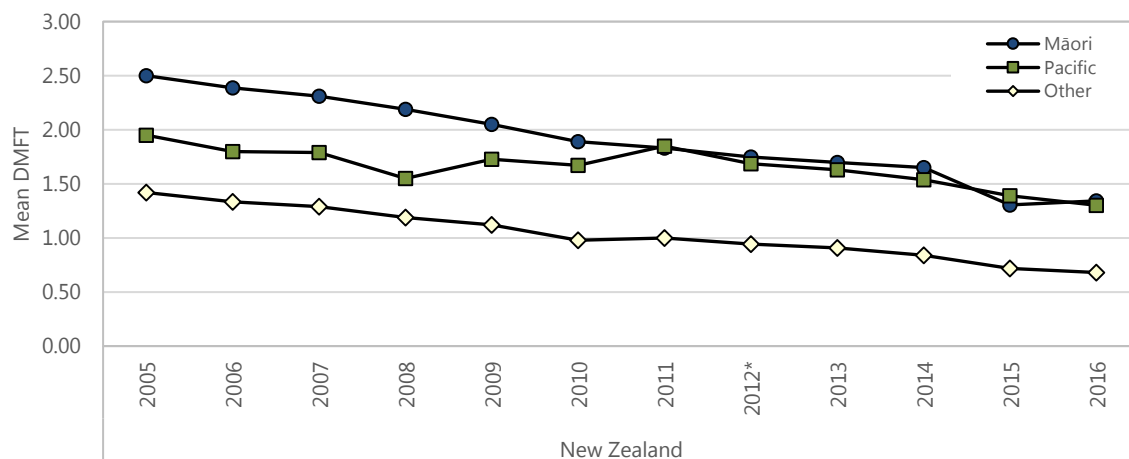
Figure 6-4. Trends in mean DMFT of all Year 8 children or Year 8 children with caries, Hutt Valley, Capital & Coast and Wairarapa DHBs and New Zealand 2003–2016



The New Zealand mean DMFT for all Year 8 children is presented by ethnicity and by year in Figure 6-5, while Figure 6-6 and Table 6-3 present the mean DMFT specifically for Year 8s with dental caries by ethnicity. The mean has generally decreased over time for Māori and Other ethnic groups, while the mean has fluctuated for Pacific Year 8 children (Figure 6-5).

For 2016, Māori and Pacific Year 8s have a similar mean DMFT (Figure 6-5); however, Māori Year 8s with caries had a higher mean DMFT than their Pacific and Other peers. While Year 8s in the Other ethnic group had a mean DMFT of nearly half that of Māori and Pacific, the Other Year 8s with caries had a mean close to that of Māori and Pacific Year 8s with caries (mean of 2.08 compared to 2.80 and 2.61 respectively).

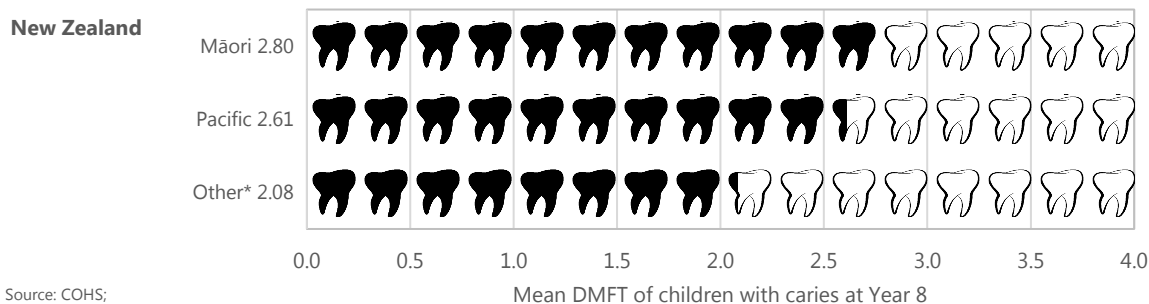
Figure 6-5. Trends in mean DMFT of Year 8 children, by ethnicity, New Zealand 2005–2016



Source: COHS;

*Southern DHB data were not reported for 1 Jan-20 Feb 2012.

Figure 6-6. Mean DMFT of Year 8 children with caries, by ethnicity, New Zealand 2016



Source: COHS;

Ethnicity is prioritised ethnicity.

*Other (includes Pacific children in the other DHBs that are not the seven 'official' Pacific DHBs)

Table 6-3. Mean DMFT of Year 8 children with caries, by ethnicity, New Zealand 2016

DHB	Year 8 children examined (n)	With caries		Mean DMFT
		n	%	
Year 8 children examined by Community Oral Health Services in 2016				
New Zealand				
Māori	9,817	4,705	47.93	2.80
Pacific	4,250	2,121	49.91	2.61
Other*	33,260	10,859	32.65	2.08

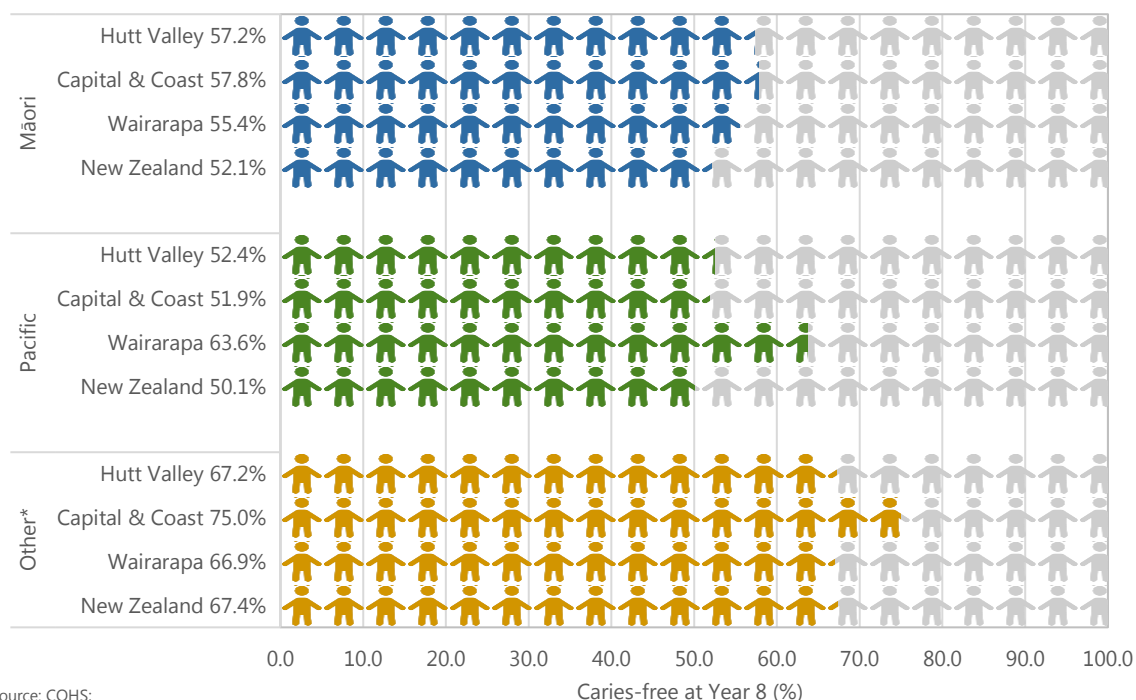
Source: COHS; Ethnicity is prioritised ethnicity, *Other (includes Pacific children in the other DHBs that are not the seven 'official' Pacific DHBs)

The proportion of Year 8s identified as being caries-free is presented for 2016 by DHB and by ethnicity in Figure 6-7 and Table 6-4. In the three DHBs, the Other group had a higher proportion of Year 8s who were caries-free compared to Māori and Pacific (Figure 6-7, Table 6-4). A higher proportion of Other children in Capital & Coast were caries-free compared to children nationally.

A higher proportion of Māori and Pacific children in the three DHBs were caries-free compared to New Zealand. In Wairarapa DHB seven of the 11 Pacific children were caries-free (64%).

Māori children in Hutt Valley, Capital & Coast, and Wairarapa DHBs had a mean DMFT lower than for Māori children nationally. The mean DMFT of children in the Other group in Capital & Coast DHB was much lower than the mean in the other DHBs and New Zealand (Table 6-4).

Figure 6-7. Proportion of Year 8 children caries-free by ethnicity for Hutt Valley, Capital & Coast and Wairarapa DHBs vs New Zealand 2016



Source: COHS; Ethnicity is prioritised ethnicity, * Other (includes Pacific children in the other DHBs that are not the seven 'official' Pacific DHBs)

Table 6-4. Proportion of Year 8 children caries-free by ethnicity for the Hutt Valley, Capital & Coast and Wairarapa DHBs vs New Zealand 2016

DHB	Year 8 children examined (n)	Caries-free		Mean DMFT
		n	%	
Year 8 children examined by Community Oral Health Services in 2016				
Māori				
Hutt Valley	484	277	57.2	0.96
Capital & Coast	403	233	57.8	0.80
Wairarapa	83	46	55.4	1.11
New Zealand	9,817	5,112	52.1	1.34
Pacific				
Hutt Valley	187	98	52.4	1.22
Capital & Coast	318	165	51.9	1.07
Wairarapa	11	7	63.6	0.73
New Zealand	4,250	2,129	50.1	1.30
Other*				
Hutt Valley	1,388	932	67.2	0.60
Capital & Coast	2,545	1,908	75.0	0.46
Wairarapa	284	190	66.9	0.65
New Zealand	33,260	22,401	67.4	0.68

Source: COHS; Ethnicity is prioritised ethnicity, * Other (includes Pacific children in the other DHBs that are not the seven 'official' Pacific DHBs)

Dental hospitalisations

The New Zealand Health Survey 2016/2017 found that 4.2% (95% CI: 3.4–5.2) of 1–14 year olds had teeth removed due to decay, an abscess, infection or gum disease in the preceding 12 months.⁹ This proportion was higher than the preceding health survey. This section reviews hospitalisation rates for dental conditions for children aged between 1–14 years using information from the NMDS.

Table 6-5 and Table 6-6 present the hospitalisation rate of 1–14 year olds in 2012–2016 where the primary diagnosis was a dental condition. Nationally and for the three DHBs, dental caries was the leading reason for oral-health-related hospitalisations of 1–14 year olds.

Table 6-5. Hospitalisations of 1–14 year olds for dental conditions, by primary diagnosis, Hutt Valley, Capital & Coast, and Wairarapa DHBs 2012–2016

Primary diagnosis	Number	Annual average	Rate	%
Hospitalisations for dental conditions in 1–14 year olds				
Hutt Valley				
Dental caries	1,521	304.2	10.95	85.8
Dentofacial anomalies/malocclusion	14	2.8	0.10	0.8
Diseases of the pulp/periapical tissue	40	8.0	0.29	2.3
Disorders of tooth development/eruption	86	17.2	0.62	4.9
Embedded/ impacted teeth	35	7.0	0.25	2.0
Gingivitis/periodontal diseases	<5	s	s	s
Other diseases of the teeth hard tissue	8	1.6	0.06	0.5
Other disorders of the gingiva/edentulous alveolar ridge	<5	s	s	s
Other disorders of the teeth or supporting structures	19	3.8	0.14	1.1
Non-dental primary diagnosis	42	8.4	0.30	2.4
Total	1,772	354.4	12.76	100.0
Capital & Coast				
Dental caries	2,039	407.8	7.91	67.3
Dentofacial anomalies/malocclusion	24	4.8	0.09	0.8
Diseases of the pulp/periapical tissue	603	120.6	2.34	19.9
Disorders of tooth development/eruption	197	39.4	0.76	6.5
Embedded/ impacted teeth	36	7.2	0.14	1.2
Gingivitis/periodontal diseases	<5	s	s	s
Other diseases of the teeth hard tissue	19	3.8	0.07	0.6
Other disorders of the gingiva/edentulous alveolar ridge	<5	s	s	s
Other disorders of the teeth or supporting structures	16	3.2	0.06	0.5
Non-dental primary diagnosis	91	18.2	0.35	3.0
Total	3,029	605.8	11.76	100.0
Wairarapa				
Dental caries	396	79.2	9.97	94.3
Dentofacial anomalies/malocclusion	<5	s	s	s
Diseases of the pulp/periapical tissue	<5	s	s	s
Disorders of tooth development/eruption	6	1.2	0.15	1.4
Embedded/ impacted teeth	<5	s	s	s
Other diseases of the teeth hard tissue	<5	s	s	s
Other disorders of the teeth or supporting structures	<5	s	s	s
Non-dental primary diagnosis	8	1.6	0.20	1.9
Total	420	84.0	10.58	100.0

Numerator: NMDS admissions with dental conditions in their first fifteen diagnoses, Denominator: NZCYES Estimated resident population; Rate per 1,000 1–14 year olds, Suppressed applied for small numbers

Table 6-6. Hospitalisations of 1–14 year olds for dental conditions, by primary diagnosis, New Zealand 2012–2016

Primary diagnosis	Number	Annual average	Rate	%
Hospitalisations for dental conditions in 1–14 year olds during 2012–2016				
New Zealand				
Dental caries	32,316	6,463.2	7.59	80.1
Dentofacial anomalies/malocclusion	427	85.4	0.10	1.1
Diseases of the pulp/periapical tissue	3,914	782.8	0.92	9.7
Disorders of tooth development/eruption	1,956	391.2	0.46	4.9
Embedded/ impacted teeth	856	171.2	0.20	2.1
Gingivitis/periodontal diseases	127	25.4	0.03	0.3
Other diseases of the teeth hard tissue	243	48.6	0.06	0.6
Other disorders of the gingiva/edentulous alveolar ridge	44	8.8	0.01	0.1
Other disorders of the teeth or supporting structures	437	87.4	0.10	1.1
Total	40,320	8,064.0	9.47	100.0

Numerator: NMDS admissions with dental conditions as their primary diagnosis, Denominator: NZCYES Estimated resident population; Rate per 1,000 1–14 year olds,

Table 6-7 presents the primary procedures involved in the hospitalisations of 1–14 year olds where dental caries was the primary diagnosis. The most common procedures were non-surgical removal of tooth and restorative dental service.

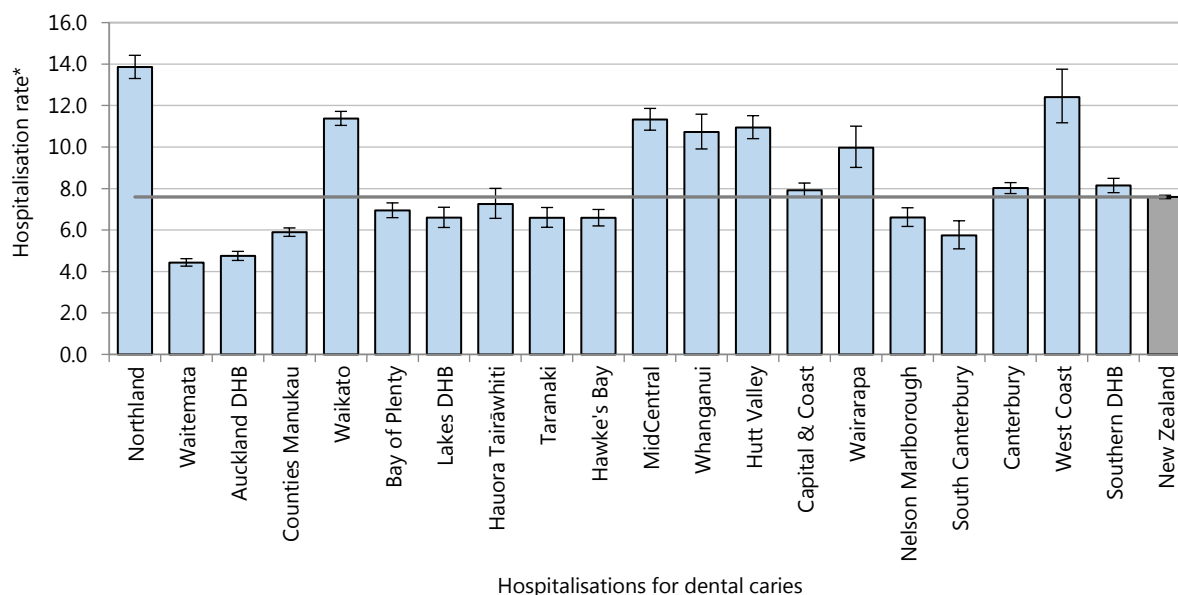
Table 6-7. Hospitalisations of 1–14 year olds for dental caries, by primary procedure, New Zealand 2012–2016

Primary procedure	Number	Annual average	Rate	%
Hospitalisations of 1–14 year olds for dental caries during 2012–2016				
New Zealand				
Non-surgical removal of tooth	18,008	3,601.6	4.23	55.7
Restorative dental service	10,368	2,073.6	2.44	32.1
Preventative dental service	1,977	395.4	0.46	6.1
No Procedure Listed	1,014	202.8	0.24	3.1
Surgical removal of tooth	574	114.8	0.13	1.8
Other Dental Procedures	335	67.0	0.08	1.0
Other Procedures	40	8.0	0.01	0.1
Total	32,316	6,463.2	7.59	100.0

Numerator: NMDS, Denominator: NZCYES Estimated resident population; Rate per 1,000 1–14 year olds, Hospitalisations with dental caries as their primary diagnosis

Rates of hospitalisations for dental caries among 1–14 year olds were significantly lower in Capital & Coast compared to New Zealand, while significantly higher in Hutt Valley and Wairarapa (Figure 6-8, Table 6-8).

Figure 6-8. Rates of hospitalisation of 1–14 year olds for dental caries by district health board, New Zealand 2012–2016



Numerator: NMDS,
Denominator: NZCYES Estimated resident population
Period: 2012–2016, *Hospitalisations per 1,000 1–14 year olds

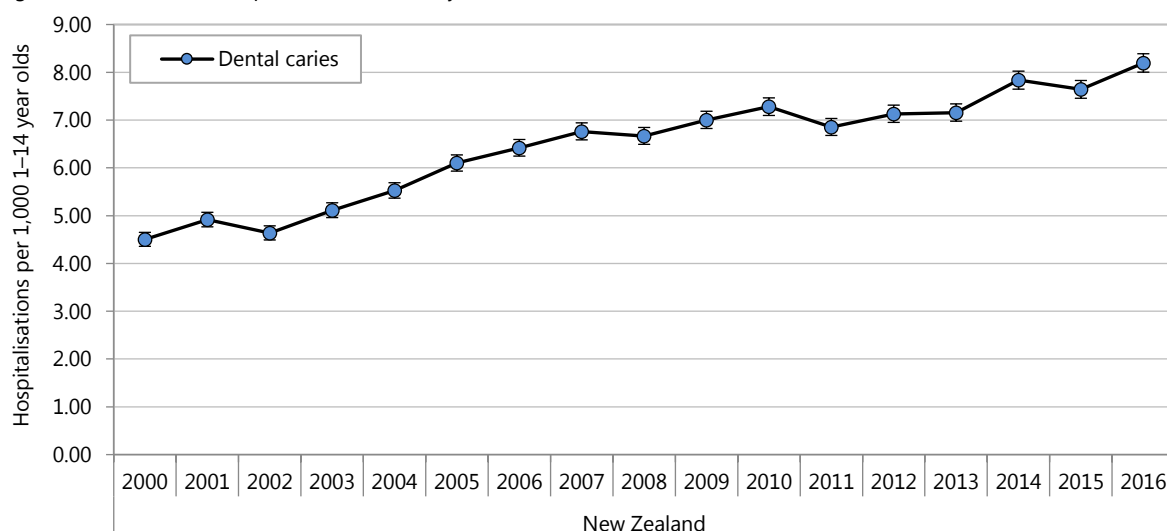
Table 6-8. Hospitalisations of 1–14 year olds for dental caries, Hutt Valley, Capital & Coast, and Wairarapa DHBs vs New Zealand 2012–2016

DHB	Number	Annual average	Rate per 1,000 1–14 year olds	Rate ratio	95% CI
Hospitalisations of 1–14 year olds for dental caries in 2012–2016					
Hutt Valley	1,521	304	10.95	1.44	1.37–1.52
Capital & Coast	2,039	408	7.91	1.04	1.00–1.09
Wairarapa	396	79	9.97	1.31	1.19–1.45
New Zealand	32,316	6,463	7.59	1.00	

Numerator: NMDS, Denominator: NZCYES Estimated resident population

Figure 6-9 presents the hospitalisations of 1–14 year olds for dental caries in New Zealand for 2000–2016. The hospitalisation rate for dental caries has increased significantly overall and nearly doubled since 2000.

Figure 6-9. Trends in hospitalisations of 1–14 year olds for dental caries, New Zealand 2000–2016

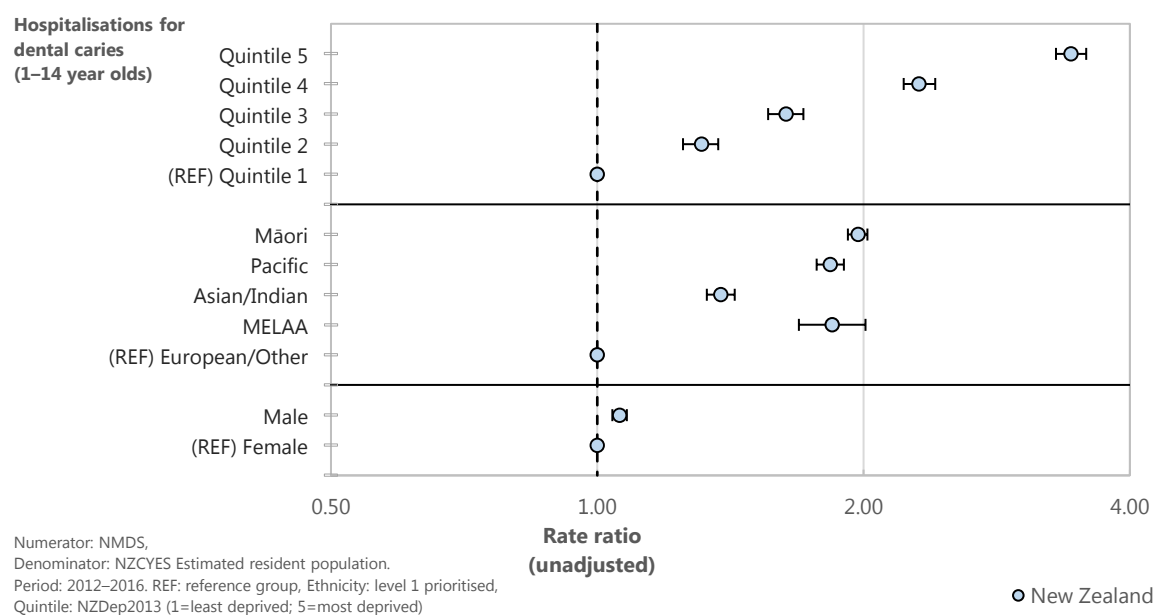


Numerator: NMDS, Denominator: NZCYES Estimated resident population

Figure 6-10 presents the hospitalisation rate of 1–14 year olds for dental caries by the residential deprivation score (NZDep2013 index of deprivation score), ethnicity, and sex. The unadjusted rate ratio presents the gap, if any, between the groups and the reference group. The following associations were observed bearing in mind that this univariate analysis does not quantify the independent effect of each demographic factor:

- The hospitalisation rate for dental caries was significantly higher for those residing in areas with higher (quintiles 2–5; deciles 9–10) NZDep2013 scores compared with quintile 1.
- While European/Other children had significantly lower rates of hospitalisation for dental caries than the other ethnic groups, the hospitalisation rates for Māori and Pacific children were nearly two times higher.
- The rate for boys hospitalised for dental caries was significantly higher, although marginal, when compared to the hospitalisation rate for girls.

Figure 6-10. Hospitalisations of 1–14 year olds for dental caries, by demographic factor, New Zealand 2012–2016



Evidence for good practice

Dental caries is identified as being one of the most important oral health burdens in the global context.¹⁰ Dental caries is the most widespread noncommunicable disease worldwide.¹¹ Children and adolescents are most at risk for developing dental caries, which has a cumulative effect on the occurrence of caries later in life.¹² An individual's oral health impacts on their appearance and self-esteem,^{13,14} which is particularly important for children and young people.¹⁴ Symptomatic dental caries in children can affect performance at school, and is associated with pain and tooth loss.¹³ Promoting oral health early is critical both for quality of life experienced at an individual level and the overall health of a population.¹²

Conceptualising oral health

The lens through which we perceive oral health informs our understandings of oral diseases and their underlying mechanisms, as well as our focus on appropriate treatments and goals.^{15,16} While the lens for understanding oral health has almost entirely been biomedical,¹⁵ there is increasing awareness about the concept of oral-health related quality of life and the importance of the social determinants of oral health.^{15,17-19} A biomedical and behavioural approach to oral health is not sufficient to achieving sustainable improvement in oral health or oral health equity in the population.¹⁷

New definitions of oral health are in recognition of the relationship a person has with their dental and dentofacial profile, how they perceive themselves, their overall well-being (resilience and satisfaction in life and realisation of potential), and how they live daily and engage in their social life.^{15,18} The

concept of oral-health related quality of life embraces a multidimensional biopsychosocial approach that focuses on the social, emotional and physical experience of oral health, which is inextricably linked with sense of self.¹⁶ It also recognises the contextual factors that impact on oral health and oral-health related quality of life.¹⁶

The Ministry of Health recognises that oral health begins with a healthy environment; that is an environment that supports oral health.¹⁸ Because the choices of individuals are significantly influenced by the social, political and environmental conditions in which they are situated, the social determinants of health require addressing in order for interventions to more effectively influence behavioural patterns and health inequity.^{17,19,20} The Ministry of Health recognises how environmental factors can undermine access to healthy options, and thus emphasises the importance of population-level initiatives that facilitate healthy choices for oral health.¹⁸

In their report on addressing health equity and the social determinants of health, WHO emphasises the importance of striving to improve the daily lives of people and the inequitable conditions in which they live every day and the social, political and economic factors underpinning them.²¹ Benefit from oral health initiatives are more likely to be optimised through utilising a determinants of health approach^{19,22} or a lifecourse approach,^{18,23} both of which recognise how social, economic, cultural and environmental factors impact on health and accumulate.^{18,23}

A holistic understanding of oral health is also apparent in Oranga Waha,²⁴ where oral health is recognised as integral to people enjoying daily life, hongi, kiss, and laugh without discomfort or embarrassment.

Tools have been developed to assess the impacts of treatment and satisfaction with care on the oral-health quality of life of children, such as the Child Oral Health Impact Profile (COHIP).¹⁶

Identifying oral-health related protective and risk factors in children

The US Preventive Services Task Force recognises that there are no validated multivariate screening tools to determine higher risk of caries in children but individual, maternal, and family factors that elevate risk should instead be considered.¹³

Interacting factors that elevate risk for dental caries in children and adolescents include but are not limited to:

- Genetics and developmental defects of teeth¹¹
- Reduced salivary flow or low buffering capacity of saliva to neutralise plaque acids (may be due to medication or disease)^{25,26}
- The history of caries and caries status of the child and their family/whānau^{11,13,25-27}
- Low fluoride exposure^{11,26-28}
- History of caries and current caries status of the child and their and family/whānau,^{11,13,25-27} especially bacterial transmission from the mother¹¹
- Frequent free sugar exposure and a cariogenic diet (such as one high in refined carbohydrates),^{11-13,25,26,29,30} including formula milk containing free sugars,¹¹ and the timing of food consumption in relation to low salivary protection (such as cariogenic foods before bedtime)¹¹
- Oral hygiene^{11,13} and any impaired ability to practice oral hygiene (including motor skills)²⁵
- A disadvantaged social context experienced by the child and family and whānau,¹¹ including low socioeconomic status or low income,^{11-13,25-27} or higher deprivation.^{30,31}

A checklist for caries risk factors needs to be undertaken when a child's first tooth erupts as a fully-integrated component of their healthcare package and recorded in the child's medical records.¹¹ For example, primary health care professionals should conduct a risk assessment (such as oral screening), after which referral for dental care should be considered.³² In New Zealand children can enrol with a community oral health service from birth; all health care providers who have contact with children can check if this has happened and facilitate enrolment where necessary.

Facilitating oral health

The literature emphasises the importance of addressing the contexts in which children and their families and whānau are situated and their impact on general and oral health. The Community Oral Health Service (previously New Zealand's School Dental Service), have had a positive impact on the oral health of children and adolescents through focusing on intermediary determinants of health, including early intervention, increased enrolment and access to care, and increased preventive care.³³ But it is argued that more efforts are required in addressing the social determinants of health.^{19,33}

Campaigns for general health often promote many of the same outcomes that will facilitate an environment that supports oral health.¹⁸ District Health Boards (DHBs) can lead policy change on sugar-related tax, dental treatment for those with low-incomes, and water source fluoridation.³³

Primary health care services and general practices are the first contact for individuals, families and communities in the New Zealand health system.^{18,34} A more collaborative approach between primary health care and oral health services has more potential to improve oral health outcomes and address inequity.^{18,19} Initiatives to address oral health require a coordinated approach across sectors to avoid service fragmentation, duplication, and the provision of inconsistent or contradictory information (which is particularly important for family and whānau who may be less confident).¹⁷

DHBs and primary health organisations (PHOs) can help equip primary health professionals with the skills, knowledge, and resources so they can help identify needs or risk in children and initiate timely referral.¹⁸ Health professionals can promote oral health,³⁵ provide information to family and whānau,²⁹ support healthy oral-health-related behaviours,³⁶ encourage adherence to dietary and nutrition guidelines (particularly for sugar intake),¹¹ prescribe sugar-free medicines,³⁷ encourage parental/caregiver uptake of dental appointments,²⁹ identify caries risk,³⁷ and utilise referral pathways.¹¹ The National Institute for Health and Care Excellence (NICE) also emphasises that patients should not be judged or blamed for their oral health status or oral-health related behaviours.³⁸ Early contact with children is critical to timeliness in identifying need and implementing preventive and treatment measures.^{20,39} Oral health check-ups should be better integrated into the delivery of primary health care, especially with those services which are routine^{11,18} and already accessed.^{17,22} Professionals can record a child's oral health status and counsel parents/caregivers about diet, oral hygiene and feeding practice at periodic visits, such as general health examinations and immunisation appointments.^{11,18}

A caries risk assessment should be conducted by health professionals before a child reaches 12 months of age as part of the child's overall health assessment.²⁶ Oral health services or information provision can be better integrated with Well Child/Tamariki Ora services.²² Health professionals should be encouraged to "Lift the Lip", a technique for screening young children's teeth.¹⁸ Primary health care professionals can be opportunistic about asking about oral health and documenting the enrolment status of children and examining a patient's throat and mouth (i.e. "Lift the Lip").³⁴ Well Child providers and B4 School Check providers can also opportunistically "Lift the Lip".³⁴ Check-ups can be conducted by Well Child providers, practice nurses, Plunket, and Māori or Pacific providers.¹⁸ The World Health Organization (WHO) provides guidance that caries prevention should begin with modifying sociobehavioural factors.¹¹

It is also important that primary health professionals are aware of the options for services and have written information available on funding and resources.³⁴ Children should be monitored for whether they are accessing oral health services in a timely manner, especially for those children with higher need or access barriers.²⁰ Primary health care can facilitate early contact with oral health services and assist in the ongoing assessment of children's oral health service utilisation. Due to the rate at which dental caries progresses in children and adolescents (more rapid than patients aged over 18 years), the longest interval between oral health reviews for patients under 18 years old should be 12 months.⁴⁰

When developing care plans for individuals receiving health and social services, health professionals should include oral health as a critical component of care plans.³⁰

Co-ordinators of primary health care (such as DHBs and PHOs) should facilitate relationship-building, links, and partnership between the non-oral-health primary health workforce and oral health workforce.¹⁸

Oral-health-related behaviours

Children, parents and caregivers should be provided dietary advice so as to support their making healthier choices for oral wellbeing,^{30,41} for example reducing the number of times per day that foods and drinks containing free sugar are consumed.^{12,36,39,42} Adolescents should also receive diet analysis and subsequent professionally-determined recommendations for behaviour modification aimed towards general and oral health.⁴³ Healthy sugar consumption is described as: no added sugar until two years of age, and limited sugar consumption for children two years of age and older.¹¹ WHO recommends that the free sugars intake of children be limited to less than 10% of total energy intake and ideally less than 5%.¹² Children and young people should also be discouraged from developing tobacco habits.⁴¹ Oral health self-care practices and skills and healthy lifestyles should be promoted in public spaces, such as schools.⁴¹

While information provision is widely recommended, a Cochrane review concluded there was insufficient cumulative evidence to determine whether interventions involving information provision or instruction about toothbrushing and cariogenic dietary components (such as sugar snacking) were effective in preventing and reducing dental plaque in children.⁴⁴ Therefore, it is noted that increased knowledge does not necessarily lead to sustained behaviour change.⁴⁴

Many factors that can improve or maintain oral health (frequent tooth brushing, fluoride exposure, dental service utilisation, avoiding saliva-sharing activities, etc.) are contingent on patients' actions.^{18,45} Factors that can make it difficult to establish healthy oral-health-related behaviours are: complex child-care arrangements, education attainment, oral health literacy, deprivation, personal priorities, and other health issues of caregivers and family members.^{29,36}

Consideration of promoting healthier behaviours for oral health also need to consider providing environments in which healthier behaviours are easier.¹⁸ Particularly, environmental initiatives can encourage healthier oral-health behaviours and address barriers to healthy choices.¹⁷ For example, public spaces such as schools and hospitals can create an environment where oral health guidelines and labelling are provided and healthy, less cariogenic food and drink options are available, displayed prominently, and affordable.^{17,30} Other initiatives can, for example, reduce the out-of-pocket cost of toothbrushes and toothpaste^{11,17,41} and facilitate the availability and affordability of sugar-free options (such as paediatric medicines).¹⁷ Facilitative factors identified by the Ministry of Health are fluoridated water, a healthy diet and smoke-free surroundings.¹⁸ Policy-makers and health professionals should play an advocacy role in encouraging food manufacturers to minimise free sugars in products.¹¹

Schools should be health-promoting environments for children.^{41,46} Interventions in which children receive daily toothbrushing supervision can be delivered in nurseries and preschools.³⁷ Scotland's Childsmile national nursery toothbrushing programme which also supplies free dental packs (containing fluoride toothpaste) is identified as effective at seeing a reduction in dental caries in 5-year-olds.⁴⁷ A tooth-brushing programme in Northland schools showed improved oral-health-related quality of life for children in the intervention group.⁴⁸

Motivation is another factor critical to implementing and maintaining behaviour change. Recognised health behaviour theory and models should be utilised, including motivational interviewing.^{26,49}

Children and parents/whānau should be supported to understand the benefits that are associated with healthier behaviours and to create an action plan and review their progress.³⁶ For example, children's higher oral quality of life (including dental symptoms, perception of wellbeing, and social and physical oral functioning) is associated with more frequent brushing and flossing.⁵⁰ Behaviours for oral health should also be promoted through community health workers and utilising platforms such as social media and mobile devices.¹¹

Health professionals may also need to provide behaviour-change support for non-nutritive influences on oral health, including bruxism or digit and pacifier sucking.³⁹ Adolescents should be monitored by health professionals for their alcohol and drug use, oral piercings, tobacco use, and eating disorders because of the effect of these factors on oral health.⁴³

Campaigns for general health often promote many of the same outcomes that will facilitate an environment that supports oral health.¹⁸ The Common Risk/Health Factor Approach (CRHFA) is a

strategy that aims to reduce risk factors and facilitate health factors so as to ultimately support population health (and disease reduction).⁵¹ WHO recommends a common risk factor approach for oral health compared to a disease-focused approach and calls for better integration of general health and oral health initiatives.¹² Chronic diseases (such as oral diseases) often share risk factors (for example, smoking, nutrition and diet, and hygiene) and addressing one risk factor can also impact on other risk factors (for example, decreased accessibility to dietary free sugars can impact on childhood dental caries and obesity).^{12,51} In this approach, dental caries can be addressed through initiatives that aim to improve the nutrition-related health behaviours of children and aim to improve child safety-related behaviours (including safety to mitigate likelihood of orofacial injuries).⁵¹ For more information about promoting health behaviours in children and adolescents, see the section in this report about evidence for good practice guidelines for Health Behaviours.

Role of family and whānau

It is important to keep parents and whānau involved in behavioural change processes in children, especially for children under the age of 7 who will require more support.³⁶ If a whānau member has oral health issues, it is likely that other members will have similar issues.³⁴ Behaviours good for oral health in children need to be encouraged in the whole whānau.³⁴

Parents and caregivers should be advised that their modelling of oral-health related behaviours play an important role in the child's development of oral-health related behaviours.¹¹ An interventional approach that involves all family members is required, to facilitate the role of parents and caregivers and provide them with guidance on maintaining the oral health of a child (frequency and technique of tooth brushing, fluoride use, age for tooth brushing start, parental supervision, sugar consumption and diet counselling).^{11,39}

Supervising children for toothbrushing or for mouthrinsing is a factor associated with effective caries prevention or reducing caries increment in permanent teeth.^{26,52} For children at standard risk of dental caries, it is strongly recommended by the literature^{26,37,39} and by the Ministry of Health⁵³ that parents or caregivers and whānau brush their children's teeth, or help and supervise them, with fluoride toothpaste twice daily.

Maternal oral health is recognised as having a critical role in infant risk for early childhood caries (ECC), for which disease onset and progression is contingent on certain oral microbes that are primarily transmitted from mother to child.⁵⁴ Oral health promotion can focus on prevention strategies pertaining to encouraging maternal oral health (and subsequently suppress the mutans streptococci reservoir and preventing bacterial transmission) and discouraging saliva-sharing activities (sharing toothbrushes or utensils, placing pacifiers in parent's mouth, etc).^{11,14,39} Interventions during pregnancy and post-delivery pertaining to establishing ECC awareness as well as good oral hygiene and good infant feeding behaviours are identified as effective in reducing the mother-child transmission of mutans streptococci and subsequent ECC.⁵⁴

It is also recognised in the evaluation of Community Oral Health Services that parents and whānau could be supported better to have more understanding of the Community Oral Health Services and what is available.⁵⁵

NICE recognises that it is important for health professionals involved in oral health promotion to establish positive relationships with patients as a means of facilitating their oral health service utilisation, especially for those who do not attend oral health services regularly.³⁸

Clinical interventions

The first choices for prevention and control of dental caries include: fluoride toothpaste and other topical fluoride modalities, fluoridated water supplies, fissure sealants, and dietary improvement.⁴²

High-quality literature is in favour of:

- The application of fluoride varnish at least twice a year in all children^{13,29,49} from the age of primary tooth eruption¹³ and
- The use of fluoride toothpaste by children when toothbrushing (at least twice daily)^{13,26-29,35,39,49} especially for children in areas without sufficiently fluoridated water, who should be

started on fluoride toothpaste from 6 months old,¹³ and for children who are between the ages of 10 and 16 and are at increased risk of developing dental caries, whose toothpaste should have higher parts per million fluoride (ppmF)^{29,49}

- The use of dental/fissure sealants.^{27,35,56}

Fluoride interventions seemed to be more effective in groups of children who have higher baseline levels of decayed, missing or filled teeth.^{56,57}

Fluoride toothpastes are identified as being preventive against dental caries⁵⁸ and associated in a clear reduction in caries increment.⁵⁷ The preventive effect of fluoride toothpastes on dental caries increases with higher ppmF fluoride concentrations and is of statistically significant difference in concentrations of 1,000-1,250 ppmF and above.⁵⁸ Thus children at higher risk of dental caries should be advised to use toothpaste at a concentration of over 2,000 ppmF twice daily.²⁶ However, it is also noted that the age of children should be considered and that, where risk of fluorosis is a concern, children under 6 years should be limited to toothpaste concentrations of 1,000 ppmF or lower.^{58,59} To address risk of fluorosis, health professionals should keep in-mind that children are usually exposed to multiple sources of fluoride while their teeth are developing.⁶⁰ For more detailed guidelines on the application of topical fluoride interventions in New Zealand, please see Guidelines for the Use of Fluorides by the Ministry of Health.⁵³

Primary health care professionals can support parental and whānau decision-making about the use of fluoride toothpaste by advising of the issues associated with reduced fluoride use (and dental caries protective effects) compared with the risk of fluorosis.⁵³ Health professionals should have an understanding about age-appropriate fluoride toothpaste use so as to subsequently advise parents and whānau.⁶⁰

The US Preventive Services Task Force recommends sufficient fluoridation of community water sources on the basis of their strong evidence of effectiveness.¹³ A Cochrane review also concluded that water fluoridation is effective for the prevention of dental caries in deciduous and permanent teeth while also noting that oral health behaviours of the population (e.g. use of fluoride toothpaste) need to be taken into consideration when implementing a water fluoridation programme.⁶¹ Community water fluoridation is cost-effective when compared to the cost of restorative dental treatment.^{14,43} For children residing in areas that do not contain sufficient fluoride levels in the water source, fluoride mouthrinsing at least fortnightly is suggested by the Irish Oral Health Services Guideline Initiative (weekly is recommended for more effectiveness).³⁷

Planning for preventive interventions should consider combining fluoride and fissure sealant interventions.³⁷ Dental/fissure sealants are clinically effective in preventing pit and fissure caries in children and adolescents (for as long as the sealant remains in place), especially for teeth considered to be vulnerable (mainly molars),^{27,35} and thus is a complementary strategy to fluoride, which prevents caries on all types of surfaces.³⁵ The application of fissure sealants to vulnerable permanent teeth is strongly recommended for all children,²⁶ and particularly for those assessed as being at high risk of dental caries.³⁷

There is not enough cumulative evidence to formally recommend the routine use of xylitol for dental caries prevention.¹³

There is not sufficient evidence to recommend the use of lasers for caries removal on deciduous and permanent teeth when compared to the use of drills; however, it is noted that use of anaesthesia is significantly lower in groups who use lasers.⁶²

Conclusions in the literature differ on the effectiveness of casein derivatives on managing or preventing dental caries. A systematic review found the evidence on casein derivatives, specifically CPP-ACP, insufficient to determine their effectiveness for preventing caries in vivo.⁶³ A meta-analysis found casein phosphopeptide-amorphous calcium phosphate (CPP-ACP) to be effective for significantly remineralising carious lesions when compared to controls and for a significant caries-preventive effect.⁶⁴ When comparing interventions delivering CPP-ACP via sugar-free chewing gum, lozenges, 200ml glasses of milk, or mouth-rinses, it was determined that chewing gum was more effective in the short-term and the long-term (<24 months).⁶⁴

Oral health and oral trauma

Health professionals should provide preventive age-appropriate counselling regarding orofacial injuries in infants (from play objects, pacifiers, or car seats, etc.)³⁹ or develop a plan with children and adolescents to reduce the likelihood of traumatic orofacial injuries from sport or leisure activities (such as supporting the adolescent to use a sport-specific and properly-fitted mouthguard).⁴³

Non-accidental injuries commonly feature oro-facial injuries, and thus can be a sign of child abuse.^{34,65} Primary care can have a role in observing and reporting cases of non-accidental orofacial injury so as to enhance protection of children.^{34,65} Therefore, primary health care professionals should be trained in identifying dental aspects of abuse or neglect.³⁴ All children suspected of experiencing child abuse or neglect should receive an examination for any oral trauma (burns or lacerations on the lips or tongue, discoloured teeth, etc.).⁶⁵ Examination and further testing could be conducted for sexually-transmitted infections within a child's oral cavity and may indicate possible child abuse.⁶⁵ Severe early childhood caries may indicate wilful failure to seek care in parents or caregivers, which may also need identification and attention from a primary health care professional.⁶⁵

Further information on non-accidental injuries is detailed in the evidence for good practice guideline in this report on Nurture & Protection.

Equity and facilitating oral health

WHO¹² and The Public Health Advisory Committee (PHAC)²³ particularly emphasise that socioeconomic determinants have the most significant impact on child oral health and oral health inequity. The US Preventive Services Task Force¹³ and other literature⁵⁴ note that risk for dental caries is higher among minority and economically disadvantaged children. In New Zealand, adverse effects pertaining to oral health problems and dental decay disproportionately impact on children in lower socioeconomic groups,^{11,12,14} in rural and regional areas,¹⁴ and of Māori and Pacific groups.¹⁴ Tooth loss, untreated coronal and root decay, lower oral-health-related quality-of-life, periodontal disease, and higher unmet need for dental care and are associated with higher deprivation.²⁴ Access to care is critical to the delivery of oral health services to children of all ethnic groups and socioeconomic backgrounds and children in rural areas or children with disability.²³

Furthermore, inequities in oral health experienced by children and adolescents widen in adult years.³³ Inequities existing for groups pertaining to oral health are indicative of material, structural, and access inequities experienced over the life course.⁶⁶ A Cochrane review concluded that there was not enough cumulative evidence to formally conclude whether water fluoridation was effective for reducing disparities for dental caries across socio-economic groups.⁶¹

School-based or school-linked approaches for delivering fissure sealant programmes can reach groups who are otherwise unlikely to receive them.³⁵ Limited knowledge in the general public and health professionals about oral health promotion can act as a barrier to school-related approaches.³⁵

People in higher socio-economic positions tend to have behaviours better for oral health compared to peers in lower socio-economic positions, which subsequently is one of the contributing factors in their better oral health outcomes.⁵⁰ Providing emotional and informational support for behavioural change may be relevant to people in lower socio-economic positions in combination with other initiatives that make healthier choices more accessible to this group.

In New Zealand's largely unsubsidised and fee-for-service context, the oral health of Māori adults with low incomes or in unemployment, the increasing population of older Māori/kaumātua, and Māori with disabilities, special needs, and chronic health conditions are of particular concern.²⁴ Māori and Māori with disabilities are over-represented in populations experiencing higher deprivation, unemployment, and material disadvantage.²⁴ Risk factors emphasised for Māori individuals pertain to free sugars consumed in diets,²⁴ the resources (time, money, available transport) required to access facilities (and extra resources are required to restore good oral health),^{24,66} the lower levels of ownership of toothbrushes and fluoride toothpaste,²⁴ undermined health literacy,²⁴ geographic barriers,⁶⁶ and the presence of other conditions experienced that are associated with periodontal disease.²⁴ Issues identified by Māori themselves pertaining to the dental care of children and adolescents are gaps in adolescent oral health education and lack of routine assessment and tailored

education for the oral health of children with disability.²⁴ Providers of the Māori Oral Health Providers Project noted the high level of oral health care need in Māori children and adolescents who presented to their services, and thus that funding based on "typical" oral health needs was inadequate compensation for the amount of work and higher level of treatment frequently required to provide services to this group.⁶⁷

Therefore, in order to be beneficial, oral health initiatives need to be culturally appropriate and acceptable to New Zealand communities.²² Service acceptability to Māori is central to Māori uptake of oral health services and improved oral health awareness and status.^{66,68} Sometimes Western health models are not perceived by indigenous peoples as adequate.⁶⁶ Oral health strategies, promotion and initiatives need to be developed in ways that are relevant to Māori cultural concepts.^{18,33} The acceptability of health care can be impacted by Māori beliefs and practices (for example, tapu and noa), and thus cultural competence is important in the oral health workforce and service provision.²³

It was recognised in the evaluation of Community Oral Health Services that there is room for improvement in DHB initiatives for proactive and robust engagement with Māori with the aim of making services more culturally responsive and appropriate.⁵⁵

Parents and whānau may be whakamā about the oral health of a child, which could result in avoidance of oral health services that could be utilised for the child, and oral health services and messages should not convey "blame".²³

The Māori dental therapy and oral health workforce are critical to providing services acceptable and relevant to Māori children.^{18,68} Effort should be made to develop the Māori oral health workforce and capacities of Māori providers to subsequently improve the oral health of Māori children and young people and lessen disparities experienced by this group.^{18,24,68} It is recommended that DHBs make workplaces more attractive to Māori dental therapists through making it supportive of Māori, encouraging culturally responsive practice, and providing attractive remuneration.⁶⁸ Māori involvement in decisions affecting the determinants of oral health should also be facilitated.^{19,24} The active participation of target populations and community empowerment are important to designing ways to address the social determinants of oral health in appropriate, opportune, and responsive ways.¹⁹

Support for Māori oral health services, the Māori oral health workforce, and the cooperation between Māori services and mainstream services are factors that impact on the oral health inequity of Māori.^{23,69} In an evaluation of the Māori Oral Health Providers Project, it was identified that there is good evidence that providers have an increased capacity to deliver oral health services effectively for Māori and the wider community as a result of the project.⁶⁷ Services that adopt whānau ora as kaupapa reduce oral health service-related barriers experienced by Māori and thus address oral health inequities.⁶⁹ Mobile services offered by Māori providers have been shown to improve the enrolment of pre-school tamariki and rangatahi.⁶⁹ Improved coordination between Māori oral health providers and school dental services and dentists so as to provide mobile services can facilitate service provision for Māori in regional and rural communities.⁶⁹

The capacity of Māori oral health service providers should be supported through receiving adequate funding for their services in recognition that these services are provided to a group with high oral health needs, including adequate support for maintenance of equipment and staff retention.⁶⁹

A New Zealand study found that children of Pacific mothers with Pacific cultural orientation had a higher rate of untreated decayed teeth and less teeth treated with restorative care or extractions (i.e. had a higher mean treatment needs index (TNI)) when compared to children of Pacific mothers with a New Zealand cultural orientation.⁷⁰ The study indicates that those more aligned to their Pacific culture have a higher unmet oral health burden.⁷⁰ In combination with reducing access-related barriers to dental care, strategic investment is needed to empower Pacific individuals to pursue good oral health in ways that are culturally appropriate to them.⁷⁰

Guidelines, evidence-based reviews, New Zealand publications, and other relevant publications and websites

New Zealand guidelines

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7. Immunisation

High immunisation coverage is integral to the United Nations Sustainable Development Goals as both a cost-effective preventative intervention that supports public health security and equitable health outcomes while also being a means to facilitate progress towards national economic and educational goals that would be otherwise compromised by the impacts of infectious disease.¹⁻³

New Zealand currently offers protection against several vaccine-preventable diseases to children and adolescents through the National Immunisation Schedule.⁴ There have been some recent changes to the vaccines made available through the Immunisation Schedule. As of 2014, babies have been eligible to receive a vaccine for rotavirus,⁵ while a change to the Schedule in 2017 involved the expansion of publicly funded access to the human papillomavirus (HPV) vaccine to include both males and females aged 9 through 26.⁶ Varicella immunisation was added to the schedule in July 2017.⁶

Timely immunisation coverage has been a key national health focus and performance measure. The Ministry of Health has set a target of 95% for children aged eight months who should have completed their primary course of immunisation on-time. District health board performance measures set the goal that 95% of children at five years of age should be fully vaccinated.⁷

The section reports on immunisation coverage in under-5 year olds and under-15 year olds and hospitalisations for vaccine-targeted diseases.

Data sources and methods

Proportion of children fully immunised at each milestone age

Number of children who had completed their age appropriate immunisations by the time they turned that milestone age during the reporting period

Rates of hospitalisation for vaccine-targeted diseases

Number of under-15 year olds discharged from hospital with a primary diagnosis of select vaccine-targeted diseases (1,000 0–14 year olds)

Proportion of children with HPV vaccination courses by immunisation status

Completed course: Number of 9–14 year olds who completed all their age-appropriate primary course for HPV immunisation on-time with completing their first dose at milestone age

Incomplete course: Number of 9–14 year olds who completed some, but not all, of their all their age-appropriate primary course for HPV immunisation (two-doses) or did not complete their course on-time (six months between doses) with completing their first dose at milestone age

Declined course: Number of 9–14 year olds who were offered their age-appropriate primary course for HPV immunisation (two-doses) and had not completed any doses due to decline(s) at age of first offer

Data sources

Proportion of children fully immunised at each milestone age

Data source: National Immunisation Register (NIR)

Rates of hospitalisation for vaccine-targeted diseases

Numerator: National Minimum Dataset (NMDS)

Denominator: NZCYES Estimated Resident Population (with intercensal extrapolation)

Proportion of children with HPV vaccination courses by immunisation status

Numerator: National Immunisation Register (NIR)

Denominator: NZCYES Estimated Resident Population (with intercensal extrapolation)

Additional information

Milestone ages for vaccination are: 6 months, 8 months, 12 months (1 year), 18 months, 24 months (2 years), and 5 years. Fully immunised NIR values were suppressed where less than 10 children were in the group. Parents are able to 'opt off' having their child's immunisation information stored in the NIR. Children are fully immunised where they have completed their primary course of immunisation (and the respective immunisation events) on-time.

Children aged five and under are fully immunised where they have completed their primary course of immunisation (and the respective immunisation events) on-time.

Immunisation against HPV: The immunisation status against HPV is based on an extract provided from the National Immunisation Register (NIR). As per the immunisation schedule at time of analysis, individuals aged 14 years and under are to receive two doses of HPV vaccine at an interval of at least 6 months and individuals aged 15 and over are to receive three doses of HPV vaccine over a six month period to be considered 'fully protected'.^{8,9}

When the section on HPV vaccination refers to "declines", it refers to children who have been offered HPV vaccination but declined by the child or parent/guardian or declined due to permanent contraindications.

Demographic information was available within the NIR extract provided to NZCYES by the Ministry of Health for around 13% of the children offered HPV vaccination in 2017. Therefore analyses by demographic variable, including gender, District Health Board, ethnicity, or deprivation score (NZDep2013), are not presented.

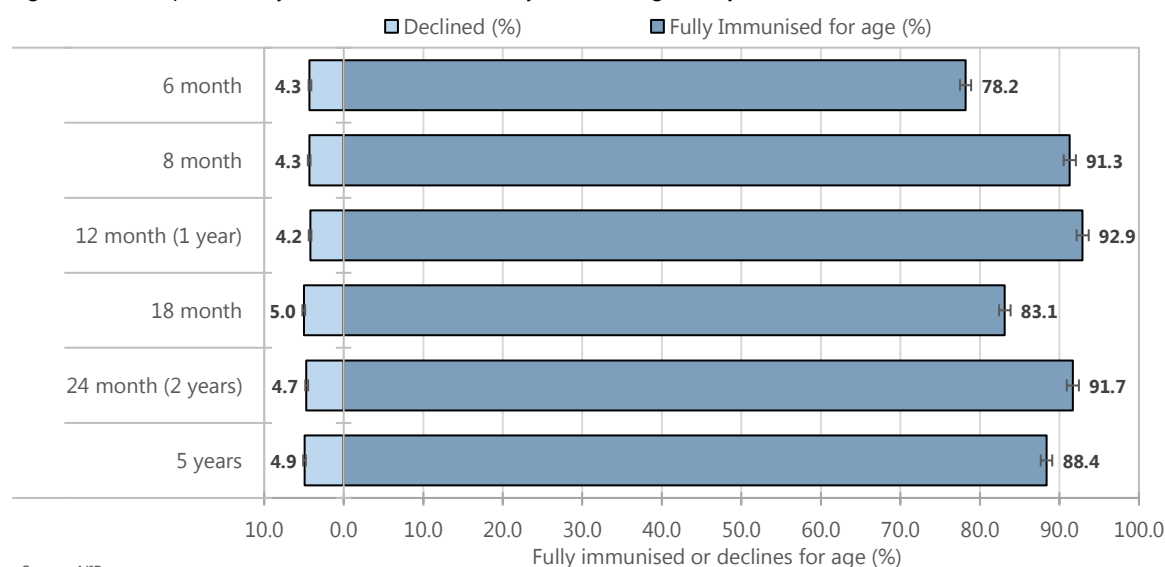
Vaccine-preventable (targeted) diseases, based on the immunisation schedule at time of analysis, comprises: Diphtheria, *Haemophilus influenzae* type B (Hib), Hepatitis B, Measles, Mumps, Pertussis (whooping cough), Polio (poliomyelitis), Rotavirus, Rubella, Pneumococcal disease, Tetanus. Additional vaccine-targeted diseases for high-risk groups (or available through purchase) include Hepatitis A, infective strains of meningococcal disease, Varicella (chickenpox), Influenza, and Tuberculosis (TB). For the codes used to identify these listed diseases, refer to the Appendices.

For information on the NIR see the Ministry of Health website (<http://www.health.govt.nz/our-work/preventative-health-wellness/immunisation/national-immunisation-register/questions-and-answers-national-immunisation-register>) or to the data source appendix in this report.

Immunisation coverage for children aged 5 years and under

Nationally, the majority of infants and children were fully immunised at each milestone age, although the targets of 95% coverage at age eight months and five years were not met (Figure 7-1, Table 7-1). At each milestone age, less than one percent of parents chose to opt-off having their child's immunisation information documented in the National Immunisation Register (NIR) and between four and five percent declined any of the scheduled vaccinations. Note that children of parents who opted off inclusion of information in the NIR may or may not have been immunised. The immunisation status of these children is unknown.

Figure 7-1. Proportion fully immunised or declined by milestone age, 1 July 2017–30 June 2018



Source: NIR;

Period: 1 July 2017–30 June 2018. 'Declines' is where any of the scheduled vaccinations have been declined

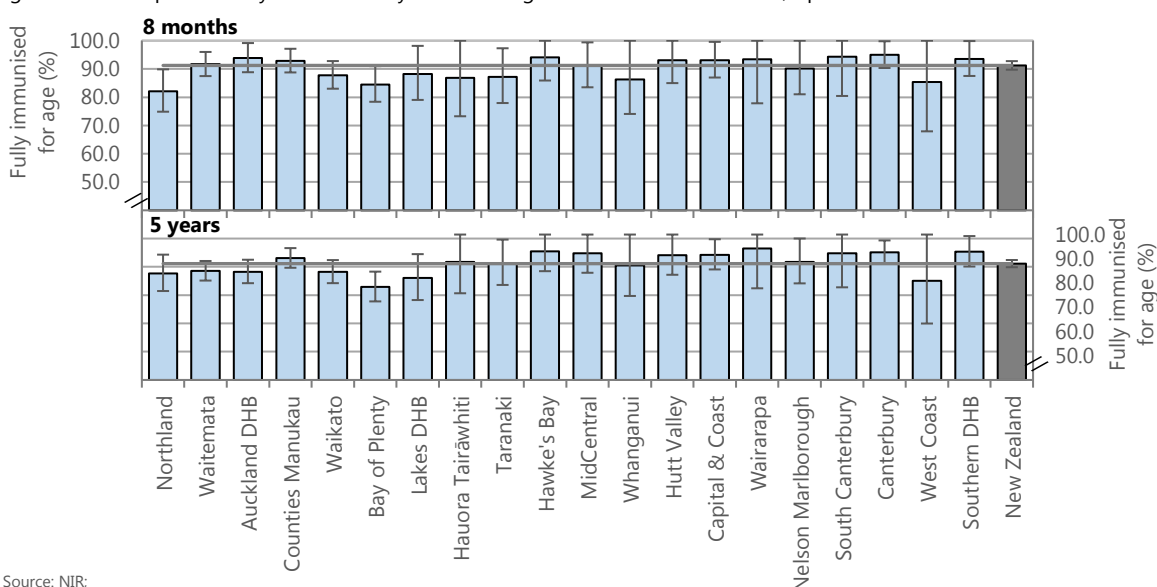
Table 7-1. National immunisation coverage, year ending June 2017

Milestone age	Eligible (n)	Fully Immunised for age		Opt-Offs		Declined	
		n	%	n	%	n	%
1 July 2017–30 June 2018							
6 month	59,927	46,859	78.2	363	0.6	2,604	4.3
8 month	60,294	55,052	91.3	385	0.6	2,563	4.3
12 month (1 year)	60,718	56,422	92.9	422	0.7	2,529	4.2
18 month	61,020	50,731	83.1	385	0.6	3,035	5.0
24 month (2 years)	60,769	55,718	91.7	386	0.6	2,882	4.7
5 years	64,779	57,246	88.4	436	0.7	3,155	4.9

Source: Ministry of Health

Figure 7-2 and Table 7-2 present the proportion of infants fully immunised at 8 months and at 5 years for each district health board during April to June 2018. The proportion of fully immunised 8-month-olds was marginally higher than the national rate for all three DHBs (Hutt Valley, Capital & Coast, and Wairarapa), as was the proportion of 5-year-old children fully immunised.

Figure 7-2. Proportion fully immunised by milestone age and district health board, Apr–Jun 2017



Source: NIR;
Period: Apr–Jun 2018

Table 7-2. Proportion fully immunised, by milestone age, Hutt Valley, Capital & Coast, and Wairarapa, Apr–Jun 2018

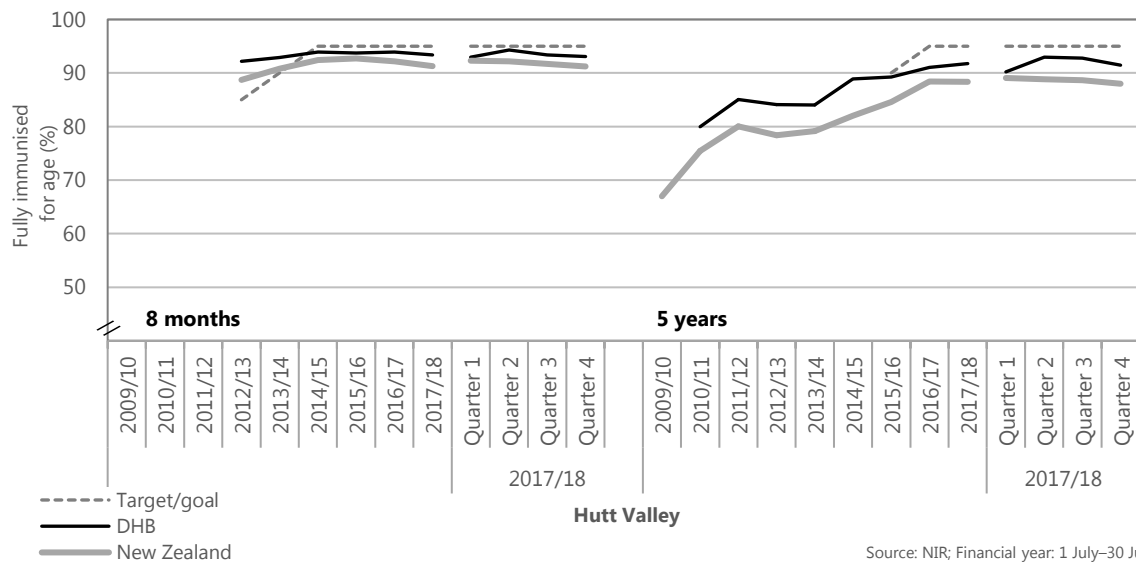
DHB	Eligible (n)	Fully immunised	
		n	%
Fully immunised at milestone age during Apr–Jun 2018			
8 months			
Hutt Valley	521	485	93.1
Capital & Coast	915	852	93.1
Wairarapa	136	127	93.4
New Zealand	15,303	13,963	91.2
5 years			
Hutt Valley	516	472	91.5
Capital & Coast	925	848	91.7
Wairarapa	122	115	94.3
New Zealand	15,330	13,490	88.0

Source: NIR

Figure 4-5 to Figure 7-5 present the immunisation trends for the Hutt Valley, Capital & Coast, and Wairarapa DHBs. Immunisation coverage has remained relatively steady for 8-month-olds in the three DHBs since 2012/13, while it has significantly increased for 5-year-olds since 2009. All three DHBs

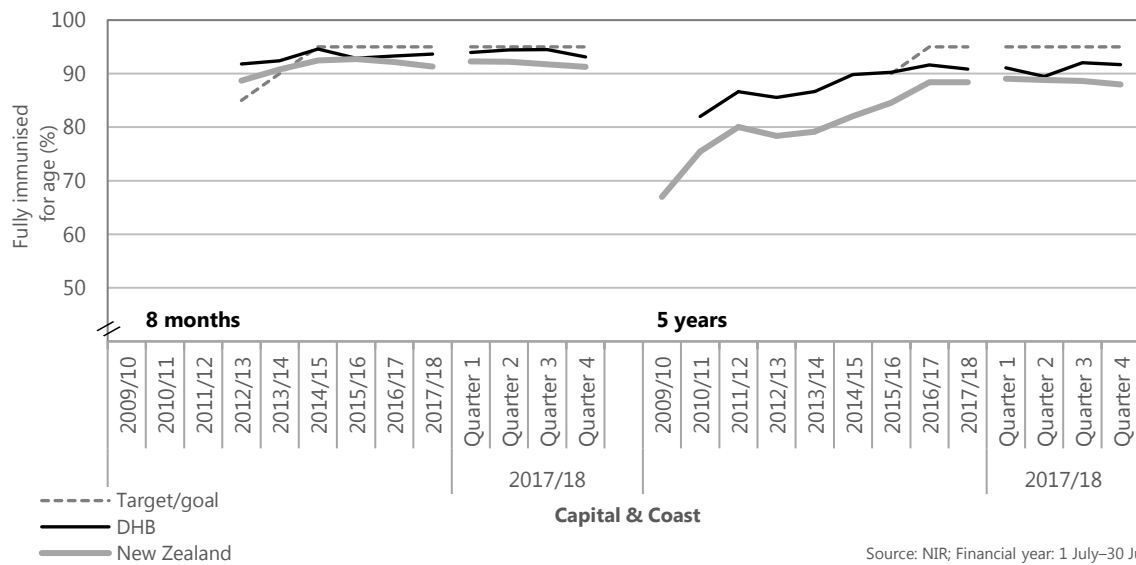
saw rates consistently higher than children nationally. Very recently, rates have generally stabilised for 5-year-olds.

Figure 7-3. Immunisation coverage by milestone age, Hutt Valley, years ended 30 June 2009–2018



Source: NIR; Financial year: 1 July–30 June

Figure 7-4. Immunisation coverage by milestone age, Capital & Coast, years ended 30 June 2009–2018



Source: NIR; Financial year: 1 July–30 June

Figure 7-5. Immunisation coverage by milestone age, Wairarapa, years ended 30 June 2009–2018

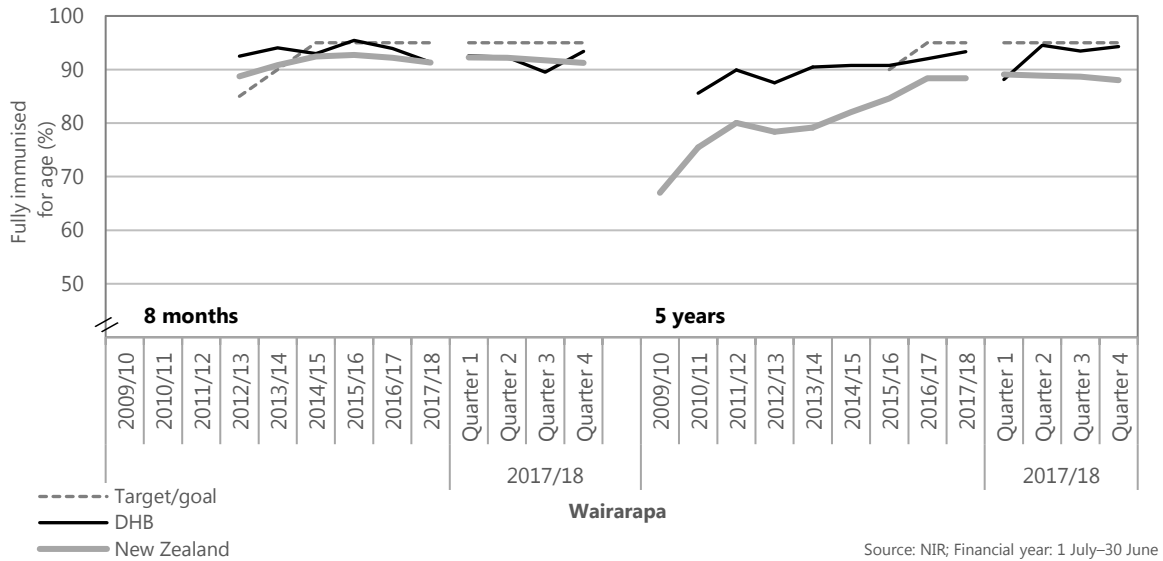


Figure 4-6 presents the proportion of fully immunised 5-year-olds by ethnicity for the Hutt Valley, Capital & Coast, and Wairarapa DHBs, while Figure 7-7 presents the proportion of fully immunised 5-year-olds by deprivation scores (NZDep2013).

The immunisation rates for 5-year-olds have gradually increased for all ethnic groups since 2013/14 in the Hutt Valley, Capital & Coast, and Wairarapa DHBs. The proportion of Māori 5-year-olds in Capital & Coast fully immunised was often lower compared to other ethnic groups. The apparent fluctuations seen in Wairarapa should be interpreted with caution as they are based on small numbers.

While the immunisation rates for 5-year-olds have gradually increased across all deprivation scores in the Hutt Valley, Capital & Coast, and Wairarapa DHBs, children in areas with the highest deprivation score (quintile 5) often had lower immunisation coverage compared to their peers in quintile 1. The gap between the immunisation coverage in 5-year-olds residing in areas of lower deprivation (quintile 1) compared to those residing in areas with higher deprivation (quintile 5) has decreased recently in Hutt Valley and widened recently in Capital & Coast.

Figure 7-6. Immunisation coverage at 5 years of age, by ethnicity, Hutt Valley, Capital & Coast and Wairarapa, years ended 30 June 2014–2018

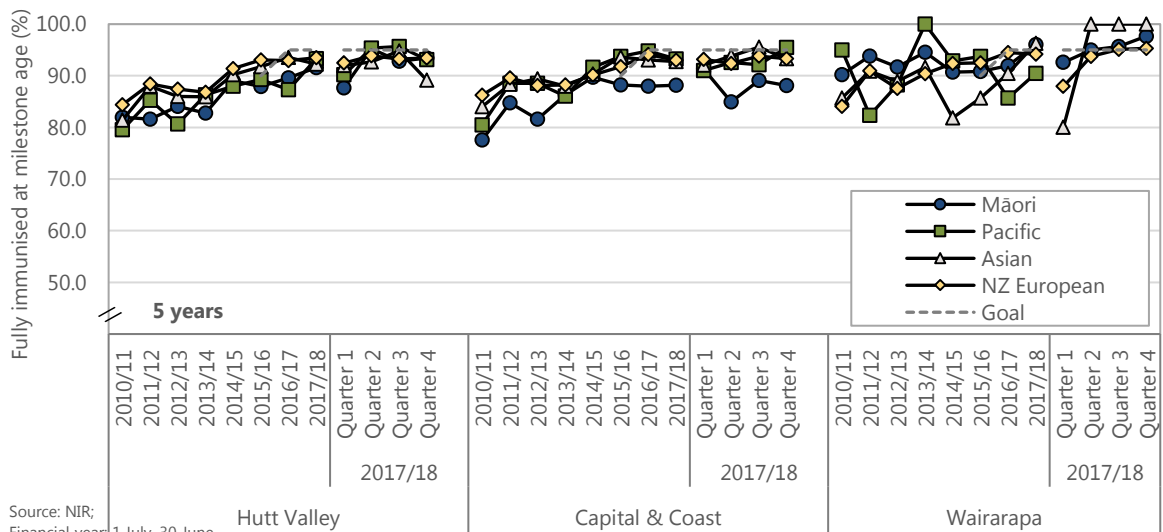
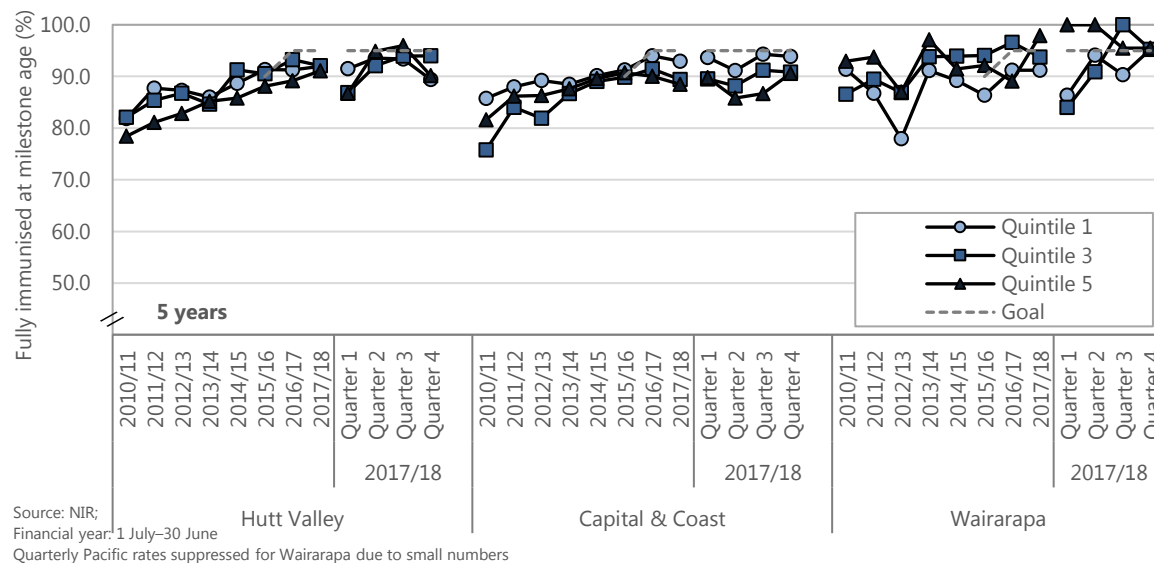


Figure 7-7. Immunisation coverage at 5 years of age, by NZ Deprivation Index quintile, Hutt Valley, Capital & Coast and Wairarapa, years ended 30 June 2014–2018



Immunisation coverage against HPV in under-15 year olds

Since 1st January 2017, both boys and girls aged nine to 26 have had publicly funded access to a vaccine targeting the human papillomavirus (HPV) vaccine.^{10,11} Previously, from late 2008, the HPV vaccine was only funded in New Zealand for girls and young women up to their 20th birthday.¹⁰ The course of HPV immunisation for those aged under 15 years is two doses (with a 6 month gap between them).⁸ HPV vaccination is free to all eligible children and, where vaccine supply is available, offered at participating schools to children in Year 8 (around 12 years old) and accessible via primary care providers and approved Family Planning clinics.^{9,11}

This section presents the HPV immunisation status of children between nine and 14 years old, as described in the National Immunisation Register (NIR), as having been offered an HPV vaccine. Approximately 16% of 9–14 year olds were offered the HPV in 2017, of which around 74% accepted the offer and completed the vaccination course (Table 7-3, see also the Data sources and methods box).

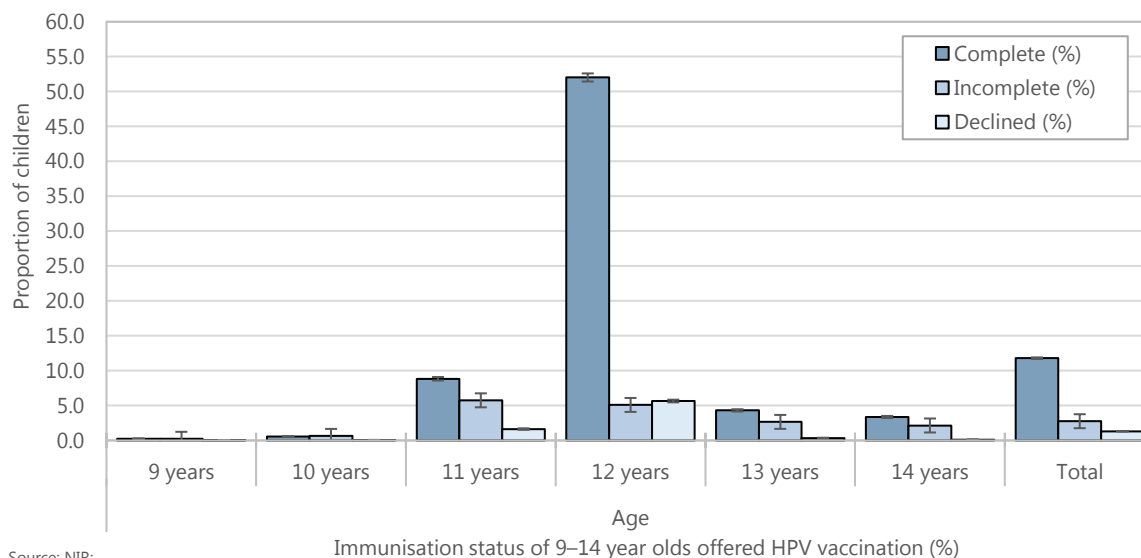
Figure 7-8 and Table 7-3 present the HPV immunisation status of 9–14 year olds in 2017, by age at first vaccination offer, compared to the estimated population of children in each age group.

Over 50% of eligible children who were first offered HPV vaccination at 12 years old had completed their full vaccination course in 2017 and nearly 9% of those children aged 11 years at first offer. A small proportion of older children also completed full HPV vaccination courses in 2017.

Of the children aged 9–14 years old offered HPV vaccinations, 4,583 unique children declined the vaccination offer. A child may have more than one decline for the period shown.

There were 9,576 children aged 9–14 identified with an incomplete HPV vaccination course, some of which were due to declining the second dose.

Figure 7-8. HPV immunisation status of 9–14 year olds, by age, New Zealand 2017



Source: NIR;
Period: 2017. Denominator: NZCYES estimated resident population

Table 7-3. HPV immunisation status of 9–14 year olds, by age, New Zealand 2017

Age at 1 st offer	Eligible (n)	Offered HPV vaccination (n)	Complete		Incomplete		Declined	
			n	% of eligible	n	% of eligible	n	% of eligible
HPV immunisation status of 9–14 year olds during 2017								
New Zealand								
9 years	58,040	293	145	0.25	139	0.24	9	0.02
10 years	55,447	704	307	0.55	365	0.66	32	0.06
11 years	55,223	8,957	4,880	8.84	3,176	5.75	901	1.63
12 years	59,619	37,412	31,009	52.01	3,035	5.09	3,368	5.65
13 years	60,887	4,452	2,623	4.31	1,620	2.66	209	0.34
14 years	57,820	3,250	1,945	3.36	1,241	2.15	64	0.11
Total	347,036	55,068	40,909	11.79	9,576	2.76	4,583	1.32

Source: NIR. Denominator: NZCYES estimated resident population.

The child's parent or guardian predominantly declined HPV vaccination (Table 7-4). Figure 7-9 presents the immunisation status of 9–14 year olds as a proportion of all children in the age group over time since 2009, soon after the HPV vaccine was made available in New Zealand. The rate of children who completed an HPV vaccination course was higher in 2009 (around 8% of children) before being relatively stable at around 4–5% until doubling in 2017 (when HPV vaccination was made available to both boys and girls).

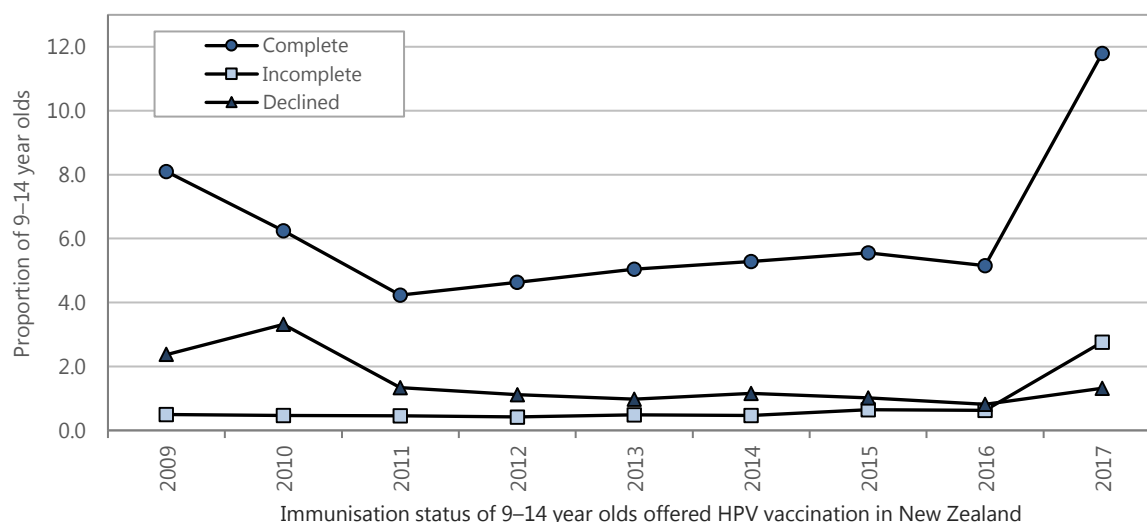
The proportion of 9–14 year olds who declined HPV vaccination was higher in 2009 and 2010 before stabilising around 1%. The proportion of children with incomplete HPV vaccination courses was stable until 2017.

Table 7-4. Children (9–14 years old) with incomplete or declined HPV immunisation courses and reasons for responses involving decline for dose, New Zealand 2017

Response involving decline for dose	n	% of responses involving decline for dose
9–14 year olds with incomplete or declined HPV immunisation courses during 2017		
New Zealand		
Decline for dose by individual	64	1.4
Decline for dose by parent/guardian	4,546	98.6
Permanent Contraindications	<5	s
Total responses	4,612	100.00

Source: NIR. *A child may have more than one response for the period shown.

Figure 7-9. Immunisation status of 9–14 year olds, New Zealand, 2009–2017



Source: NIR. Denominator: NZCYES estimated resident population

Hospitalisations for vaccine-preventable diseases

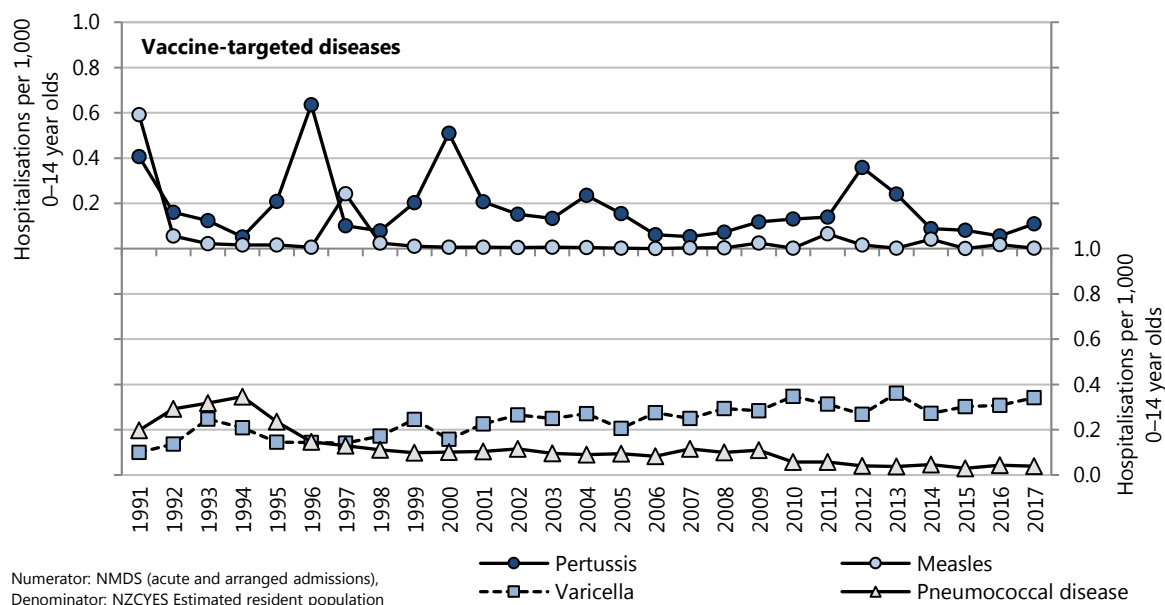
Table 7-5 presents the rates of under-15 year olds hospitalised with select vaccine-targeted diseases between 2012 and 2016. Hospitalisation rates were highest for gastroenteritis, varicella (chickenpox) and meningitis. The hospitalisation rate of under 15-year-olds for varicella gradually increased since 2000 (Figure 7-10), however, it is important to note that while the vaccine against varicella is on the immunisation schedule it is not free to all children.

Table 7-5. Hospitalisations for vaccine-targeted diseases in 0–4 year olds, by primary diagnosis, New Zealand 2013–2017

Primary diagnosis	Number	Rate per 1,000 0–14 year olds	95% CI
Hospitalisations of 0–14 year olds for vaccine-targeted diseases during 2013–2017			
New Zealand			
Diphtheria	<5	s	s
Tetanus	<5	s	s
Pertussis	525	0.11	0.11–0.13
Polio (poliomyelitis)	0	..	..
(Acute) Hepatitis B	<5	s	s
<i>Haemophilus influenzae</i>	0	..	..
Pneumococcal disease	179	0.04	0.03–0.05
Measles	59	0.01	0.01–0.02
Mumps	36	0.01	0.01–0.01
Rubella	0	..	..
Gastroenteritis: Rotaviral	1,660	0.36	0.35–0.38
Gastroenteritis: other viral	7,111	1.55	1.52–1.59
Gastroenteritis: non-viral	1,019	0.22	0.21–0.24
Gastroenteritis: Other or NOS infective	10,411	2.28	2.23–2.32
Meningitis: bacterial	279	0.06	0.05–0.07
Meningitis: viral, other, NOS	939	0.21	0.19–0.22
Meningococcal disease	213	0.05	0.04–0.05
Tuberculosis	29	0.01	0.00–0.01
Varicella	1,448	0.32	0.30–0.33

Numerator: NMDS, Denominator: NZCYES Estimated Resident

Figure 7-10. Trends in hospitalisations for vaccine-targeted diseases in 0–14 year olds, by primary diagnosis, New Zealand 1991–2017



Evidence for good practice

Prevention

The prevention of vaccine-preventable diseases necessarily involves acquired immunity at both an individual-level and a community (herd) level in order to both reduce the prevalence of the diseases and mitigate their spread to those who are vulnerable.¹² It is well-recognised that high immunisation coverage for vaccine-preventable diseases is driven by parental demand and thus parental confidence in vaccines.¹³ The World Health Organization's Vaccination and Trust publication,¹⁴ which is purposed to supply evidence-based and technical support regarding vaccination confidence and hesitancy, and a recent publication endorsed by the World Health Organization (WHO)¹⁵ identify key components of parents' decision-making that can facilitate or undermine their demand for vaccines, including:

- Information and judgements (such as memory of recent news articles and social media posts or shares, and heuristics or judgement bias in understanding vaccines) Also pertains to the perception and understanding of risk (including side effects, feelings, and severity of reactions)
- Attitudes (such as general perception of the government and authorities, and moral, religious, and philosophical views)
- Social, cultural, and group norms and values (a sense of what peers do and trust, and a sense of what they ought to do and trust)
- Habits and routine vaccine or health-related behaviours
- Structural barriers and incentives.

WHO^{14,16} and the Center for Disease Control and Prevention (CDC)¹⁷ recognise that parents are obtaining unbalanced, misleading, and non-credible information on vaccines from the internet and various news and social media sources, which can compromise their confidence in vaccines and erode trust. Studies on examining this relationship that are specific to New Zealand are emerging.¹⁸ A 2017 Cochrane review¹⁹ found that parents often felt inadequately informed regarding vaccines and wanted to be supported in their decision-making, to be assisted in obtaining information, and to receive specific, tailored (e.g. to their values), clear, and balanced information on vaccines from a variety of credible locations prior to their child's vaccination appointment. A New Zealand study²⁰ found that parents expressed feelings of uncertainty and fear (especially with regard to vaccine safety) and a

desire to receive more information and information that was balanced, engaging, and accessible. In response to the prevalence of uncertainty and hesitancy towards vaccines in combination with the prevalence and accessibility of non-credible information, WHO established an online hub, The Vaccine Safety Net, that aggregates verified, evidence-based information sources for general public and health professional use.²¹ For over 20 years, the Immunisation Advisory Centre (IMAC) has provided independent information and resources to the New Zealand general public on immunisation, vaccines and vaccine-targeted diseases.^{22,23} One of the key functions of IMAC is to help communities better understand immunisation and its benefits and risks.²³ IMAC is the only New Zealand-based website currently endorsed by WHO as being a reliable source of information on vaccine safety, and is thus a member of WHO's Vaccine Safety Net.²¹

Government entities, vaccine providers, and health professionals should support parental demand for vaccination by means of ongoing engagement and dialogue,^{13-15,24} through which they may: disseminate information in ways that are understandable, delivered in a variety of appropriate ways, and responsive to parental considerations in decision-making; listen to the informational needs of parents and children and hear concerns that may be compromising vaccine confidence (for example, risk perception and vaccine myths); and gain opportunities to promptly respond to any underlying causes of vaccine hesitancy and uncertainty.^{13-15,25} Two reviews emphasise that information and dialogue should be parent-centred and tailored to the rationale and context of hesitancy^{24,26} and several studies found an improvement in parent's intentions to vaccinate their children when information was parent-centred.²⁶ Cumulative evidence also shows that face-to-face interventions of 10 to 15 minutes or longer also may be effective for improving parents' intention to vaccinate.²⁷

Vaccine providers should develop internal communication plans to respond to public safety concerns^{14,17} and be more responsive to the public's needs in cases where adverse events are reported.²⁸ Relevant health professionals should be provided ongoing vaccine-related guidance,^{28,29} training, and supervision to support their ability to respond to consumer hesitancy and information needs.^{13,17}

In the inquiry into improving the completion rates of childhood immunisation presented to the House of Representatives,²⁸ the Health Committee recommended that select clinical leaders should be asked to take on champion roles in their communities and social media be utilised to convey positive messages about immunisation.

Health professionals should be trained and supported to create a welcoming, warm, and empathic environment in which parents and youth have the opportunity to ask questions and raise concerns.^{14,17,29} Available New Zealand literature suggests that manaakitanga (the practice of creating a welcoming, warm environment) is significant to improving the immunisation coverage of Māori children.³⁰

Some reviews have concluded that there is insufficient evidence to determine the effectiveness of: patient-doctor trust interventions,¹⁹ the effectiveness of educational interventions,³¹ or the effectiveness of many new media technologies on vaccine demand and rates.³² However, Murray et al.'s New Zealand study²⁰ found that face-to-face dialogue with a health professional improved parents' confidence in vaccine information received. When utilised in combination, the study found visual and verbal means of providing information effective at improving parents' memory of vaccine information.²⁰

Equity

Immunisation coverage has not occurred equitably across ethnic groups. Vaccination rates are consistently marginally lower for Māori children aged from eight months through to five years when compared to their Asian, Pacific, and New Zealand European peers of the same age.³³

Structural barriers and convenience issues can compromise immunisation coverage, even where parents have confidence in vaccinations.^{14,15} International guidelines and reviewers recommend that services be designed in ways that are without out-of-pocket cost (or are low-cost), provided in a language the consumer understands, scheduled conveniently for the consumer, accessible and convenient in location, and available within reasonable time.^{13,14,34} Parent- or family-focused incentive

programmes (monetary or non-monetary) should, as appropriate, be used to facilitate vaccine demand, especially for hard-to-reach or marginalised groups.^{13,15,28,35-38}

Home visits are a good means to educate parents or provide vaccination, especially for hard-to-reach groups and groups facing greater access difficulties.^{29,36,39} A New Zealand report³⁰ recommends enhanced, patient-centred text message recalls for communicating with Māori parents, and a US study⁴⁰ found text message more effective for increasing vaccination rates in children with low-income parents.

Collaboration and ongoing partnership should be undertaken with hard-to-reach groups to both design tailored immunisation strategies and co-construct their meaning.¹³ Immunisation strategies tailored to Māori should incorporate indigenous worldviews.³⁰

Positive, clear, and understandable communication are important to facilitating the confidence of Māori parents and information for Māori parents should be designed to incorporate tikanga Māori and centre parent's values.³⁰ A New Zealand report recommends pre-established, ongoing, positive, and empathetic relationships with both Māori parents and whānau so as to facilitate immunisation coverage in tamariki Māori.³⁰ Further research examining the effectiveness of culturally competent interventions is needed. Perceived credibility and trust are considered to be especially important to facilitating vaccine demand in hard-to-reach groups, as these communities may have lower trust in the government and health authorities.^{13,14} Training professionals to utilise and pronounce te Reo Māori correctly is important to improve respect perceived by Māori parents and thus improve relationships.³⁰

Good health practice

Appropriate consumer reminder and recall interventions are effective for increasing vaccine participation rates.^{36,40-43} Text messages and phone calls are recommended in the literature,^{32,40,41} however, the means of recall should be tailored to the population and to the resources available to providers and practices.⁴³ A New Zealand study found that text message means of reminder were overwhelmingly preferred by their participants.²⁰

The vaccination status of children should be monitored at regular stages so as to support providers to quickly identify cases in which appropriate vaccinations have been missed and require follow-up.^{34,41} Immunisation information systems, confidential computerised databases that record the vaccination status of consumers, are recommended tools to assist in identifying opportunities for intervention and follow-ups for missed vaccinations.⁴⁴

A New Zealand study recommends customised action plans comprised strategies per practice, and available additional support, provided to low performing general practices as effective at improving immunisation coverage.⁴⁵

Guidelines, evidence-based reviews, New Zealand publications, and other relevant publications and websites

New Zealand guidelines

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International guidelines

- World Health Organization. 2015. **WHO's Vision and Mission in Immunization and Vaccines 2015-2030**. http://www.who.int/immunization/documents/general/WHO_Mission_Vision_Immunization_Vaccines_2015_2030.pdf?ua=1%22
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- The Community Guide. **What Works Fact Sheet: Increasing Appropriate Vaccination**. Centers for Disease Control and Prevention. <https://www.thecommunityguide.org/resources/what-works-increasing-appropriate-vaccination>
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Evidence-based reviews

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8. Causes of death and hospitalisation

This section provides a brief overview of the causes of death and hospitalisation for under-15 year olds residing in New Zealand for the last five years to provide context for the subsequent sections of this report where the descriptions are of specific conditions. Infant mortality was presented in an earlier report on the health and wellbeing of under-five year olds (otago.ac.nz/nzcyes) and is not repeated here.

The following sections presents information on deaths and hospitalisations of under-15 year olds as documented in the National Mortality Collection and the National Minimum Dataset.

Data sources and methods

Deaths of under-15 year olds

Deaths of 1–14 year olds with a documented cause of death (per 100,000 age-specific population)

Hospitalisations of under-15 year olds

Hospitalisations of 0–14 year olds excluding neonates (per 100,000 age-specific population).

Data sources

Numerators: Deaths: National Mortality Collection (MORT)

Hospitalisations: National Minimum Dataset (NMDS)

Denominator: NZCYES Estimated Resident Collection (with intercensal extrapolation)

Additional information

Hospitalisations during the neonatal period were heavily influenced by perinatal factors and/or result from preterm infants transitioning through different levels of neonatal care (e.g. from neonatal intensive care, to Level 1–3 special care baby units). Therefore neonatal hospitalisations have been excluded from this analysis. Similarly, for infant mortality and thus this section is restricted to an analysis of mortality aged 1–14 years.

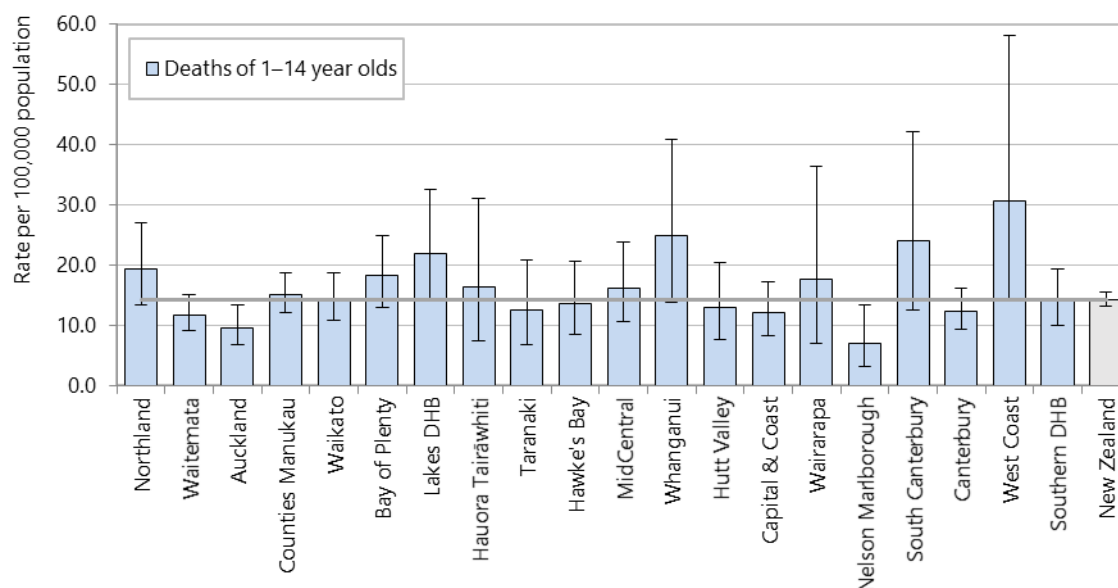
An acute hospitalisation is an unplanned hospitalisation occurring on the day of presentation, while an arranged hospitalisation (referred to elsewhere in this report as a semi-acute hospitalisation) is a non-acute hospitalisation with an admission date less than seven days after the date the decision was made that the hospitalisation was necessary. A waiting list admission is a planned hospitalisation, where the admission date is seven or more days after the date the decision was made that the hospitalisation was necessary.

An overview of these datasets, and outline of their data limitations, are provided in the appendices for review before interpreting any patterns.

Deaths

There were 604 deaths of children aged 1–14 years between 2011 and 2015, an average of 121 deaths per year. Figure 8-1 shows the rates of deaths for district health boards per 100,000 age-specific population. The most common underlying causes of death were unintentional injury, cancers (neoplasms), and congenital anomalies (Table 8-1).

Figure 8-1. Deaths of 1–14 year olds, by district health board, 2011–2015



Numerator: MORT (excludes infants), Denominator: NZCYES Estimated resident population.
Deaths per 100,000 age-specific population; Rates are unadjusted

Table 8-1. Deaths in 1–14 year olds, by main underlying cause, New Zealand 2011–2015

Main underlying cause of death	Number	Annual average (n)	Rate per 100,000 1–14 year olds	95% CI	%
Deaths of 1–14 year olds during 2011–2015					
New Zealand					
Unintentional injury	177	35	4.17	3.58–4.84	29.3
Neoplasms	100	20	2.36	1.92–2.87	16.6
Congenital anomalies	51	10	1.20	0.90–1.58	8.4
Intentional self-harm	35	7	0.83	0.57–1.15	5.8
Metabolic disorders	27	5	0.64	0.42–0.93	4.5
Assault	21	4	0.50	0.31–0.76	3.5
Cerebral palsy	21	4	0.50	0.31–0.76	3.5
Pneumonia	21	4	0.50	0.31–0.76	3.5
Epilepsy or status epilepticus	19	4	0.45	0.27–0.70	3.1
SUDI	19	4	0.45	0.27–0.70	3.1
Other causes	113	23	2.67	2.20–3.20	18.7
New Zealand total	604	121	14.25	13.13–15.43	100.0

Numerator: MORT (excludes infants), Denominator: NZCYES Estimated Resident Population

Between 2011 and 2015 there were 18 deaths of 1–14 year olds residing in Hutt Valley DHB, 31 in Capital & Coast DHB and seven in Wairarapa DHB (Table 8-2). Around 25% of 1–14 year olds residing in Capital & Coast DHB between 2011 and 2015 had cancer (neoplasms) as the underlying cause of death. The number of deaths were too small when grouped by specific cause of death to present for Hutt Valley and Wairarapa DHBs (Table 8-3).

Table 8-2. Deaths in 1–14 year olds, Hutt Valley, Capital & Coast and Wairarapa DHBs vs New Zealand 2011–2015

DHB	n	Annual average (n)	Rate per 100,000 population	Rate ratio	95% CI
Registered deaths during 2011–2015					
1–14 year olds					
Hutt Valley	18	4	12.86	0.90	0.56–1.44
Capital & Coast	31	6	12.10	0.85	0.59–1.22
Wairarapa	7	1	17.69	1.24	0.59–2.62
New Zealand	604	121	14.25	1.00	

Numerator: MORT (excludes infants), Denominator: NZCYES Estimated resident population. Deaths per 100,000 1–14 year olds; Rates and ratios are unadjusted

Table 8-3. Deaths in 1–14 year olds, by main underlying cause of death, Hutt Valley, Capital & Coast and Wairarapa DHBs 2011–2015

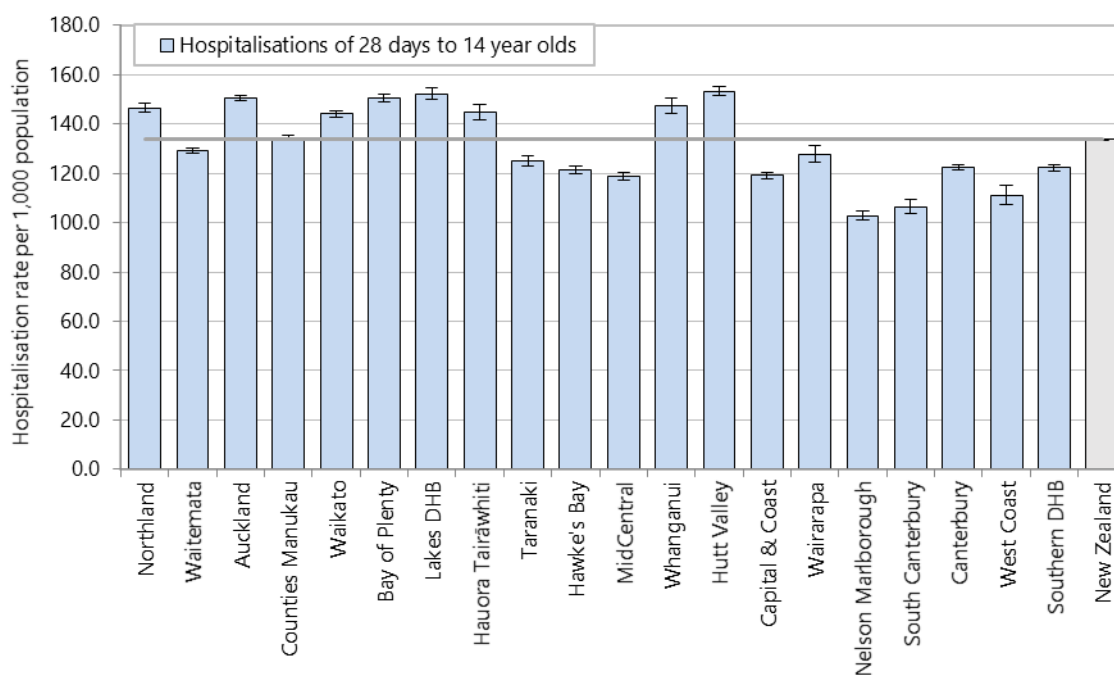
Main underlying cause of death	Number	Annual average (n)	Rate per 100,000 1–14 year olds	95% CI	%
Deaths of 1–14 year olds during 2011–2015					
Hutt Valley DHB					
All causes	18	4	12.86	7.62–20.32	100.0
Total	18	4	12.86	7.62–20.32	100.0
Capital & Coast DHB					
Neoplasms	8	2	3.12	1.34–6.15	25.8
Unintentional injury	5	1	1.95	0.63–4.55	16.1
Other causes	18	4	7.03	4.16–11.10	58.1
Total	31	6	12.10	8.22–17.17	100.0
Wairarapa DHB					
All causes	7	1	17.69	7.09–36.45	100.0
Total	7	1	17.69	7.09–36.45	100.0

Numerator: MORT (excludes infants), Denominator: NZCYES Estimated Resident Population

Hospitalisations

In New Zealand there were 611,217 hospitalisations of under-15 year olds between 2013 and 2017. The hospitalisation rates for each DHB and New Zealand as a whole, for individuals aged between 28 days and 14 years, are shown in Figure 8-2. Of these hospitalisations, over 60% were acute admissions and a quarter of the hospitalisations were waiting list admissions. The most common reasons for an acute admission were injury or poisoning, and respiratory conditions, while cancer or cancer treatment (neoplasm, chemotherapy or radiotherapy), injury or poisoning and congenital anomalies were the most common reasons for an arranged admission. Of the waiting list admissions, admissions were frequently for dental procedures, grommets, or for a tonsillectomy with or without adenoidectomy. In this time period there were also 350 hospitalisations of under-15 year olds for reproductive health reasons (Table 8-4).

Figure 8-2. Hospitalisations of 28-day–14-year olds, by district health board, 2013–2017



Numerator: NMDS (excludes neonates), Denominator: NZCYES Estimated resident population.

Table 8-4. Causes of hospitalisations in 0–14 year olds, by admission type, New Zealand 2013–2017

	n	Annual average (n)	Rate per 1,000 0–14 year olds	95% CI	%
Hospitalisations of 0–14 year olds in New Zealand during 2013–2017					
Acute admissions by primary diagnosis					
Injury or poisoning	50,262	10,052	10.99	10.89–11.09	12.8
Asthma and wheeze	31,100	6,220	6.80	6.73–6.88	7.9
Acute upper respiratory tract infection (URTI)	30,956	6,191	6.77	6.69–6.85	7.9
Acute bronchiolitis	29,197	5,839	6.38	6.31–6.46	7.5
Viral infection NOS	21,803	4,361	4.77	4.70–4.83	5.6
Gastroenteritis	19,902	3,980	4.35	4.29–4.41	5.1
Pneumonia	15,262	3,052	3.34	3.28–3.39	3.9
Serious skin infections	14,390	2,878	3.15	3.10–3.20	3.7
Abdominal and pelvic pain	10,842	2,168	2.37	2.33–2.42	2.8
Unspecified acute lower respiratory infection	8,493	1,699	1.86	1.82–1.90	2.2
Other diagnoses	159,588	31,918	34.90	34.73–35.07	40.7
Acute total	391,795	78,359	85.67	85.41–85.94	100.0
Arranged admissions by primary diagnosis					
Neoplasm, chemotherapy, or radiotherapy	12,615	2,523	2.76	2.71–2.81	19.4
Injury or poisoning	6,034	1,207	1.32	1.29–1.35	9.3
Congenital anomalies	3,457	691	0.76	0.73–0.78	5.3
Perinatal-related conditions	3,356	671	0.73	0.71–0.76	5.2
Observation for suspected toxic effect from ingested substance	2,595	519	0.57	0.55–0.59	4.0
Haemolytic anaemias	1,098	220	0.24	0.23–0.25	1.7
Metabolic disorders	1,056	211	0.23	0.22–0.25	1.6
Mental health	942	188	0.21	0.19–0.22	1.5
Constipation	905	181	0.20	0.19–0.21	1.4
Removal of internal fixation device	903	181	0.20	0.18–0.21	1.4
Other diagnoses	31,940	6,388	6.98	6.91–7.06	49.2
Arranged total	64,901	12,980	14.19	14.08–14.30	100.0
Reproductive hospitalisations* by primary diagnosis					
Pregnancy, delivery, or postnatal-related conditions	185	37	0.08	0.07–0.10	52.9
Termination of pregnancy: therapeutic, other, or unspecified	143	29	0.06	0.05–0.08	40.9
Spontaneous or other early pregnancy loss	22	4	0.01	0.01–0.01	6.3
Reproductive total	350	70	0.16	0.14–0.17	100.0
Waiting list admissions by primary procedure					
Dental procedures	38,834	7,767	8.49	8.41–8.58	25.2
Grommets	20,857	4,171	4.56	4.50–4.62	13.5
Tonsillectomy +/- adenoidectomy	16,723	3,345	3.66	3.60–3.71	10.8
Musculoskeletal procedures	13,508	2,702	2.95	2.90–3.00	8.8
Gastrointestinal procedures	11,399	2,280	2.49	2.45–2.54	7.4
Procedures on skin or subcutaneous tissue	4,824	965	1.05	1.03–1.09	3.1
Adenoidectomy without tonsillectomy	3,130	626	0.68	0.66–0.71	2.0
Other procedures	37,497	7,499	8.20	8.12–8.28	24.3
No procedure listed	7,399	1,480	1.62	1.58–1.66	4.8
Waiting list total	154,171	30,834	33.71	33.54–33.88	100.0
New Zealand total	611,217	122,243	133.66	133.32–133.99	

Numerator: NMDS (excludes neonates), Denominator: NZCYES Estimated Resident Population. NOS = not otherwise specified, * Reproductive rates are per 1,000 females thus overall rate not provided due to use of gender-specific denominator for reproductive hospitalisations

The number of hospitalisations of under-15 year olds residing in Hutt Valley, Capital & Coast and Wairarapa DHBs between 2013 and 2017 are shown in Table 8-5. Under-15 year olds residing in Hutt Valley, Capital & Coast, and Wairarapa DHBs were frequently admitted to hospital acutely for injury or poisoning, or for respiratory infections. The common reasons for arranged admissions in Hutt Valley and Capital & Coast were cancer and oncology treatment (neoplasm, chemotherapy or radiotherapy), and injury or poisoning for Wairarapa. Admissions to hospital from the waiting list were frequently for dental procedures, insertion of grommets or for tonsillectomy +/- adenoidectomy, and also musculoskeletal procedures for Wairarapa. The order of these diagnoses within each admission type varied between the three DHBs (Table 8-6–Table 8-8).

Table 8-5. Hospitalisations of 0–14 year olds (excluding neonates), Hutt Valley, Capital & Coast and Wairarapa DHBs vs New Zealand 2013–2017

DHB	n	Annual average (n)	Rate per 1,000 population	Rate ratio	95% CI
Hospitalisations during 2013–2017					
28 days to 14 year olds					
Hutt Valley	22,643	4,529	153.35	1.15	1.13–1.16
Capital & Coast	32,994	6,599	119.16	0.89	0.88–0.90
Wairarapa	5,396	1,079	127.69	0.96	0.93–0.98
New Zealand	611,217	122,243	133.66	1.00	

Numerator: NMDS (excludes neonates), Denominator: NZCYES Estimated resident population. Hospitalisations per 1,000 0–14 year olds; Rates and ratios are unadjusted

Table 8-6. Causes of hospitalisations of 0–14 year olds (excluding neonates), by admission type, Hutt Valley DHB 2013–2017

	n	Annual average (n)	Rate per 1,000 0–14 year olds	95% CI	%
Hospitalisations of 0–14 year olds in Hutt Valley DHB during 2013–2017					
Acute admissions by primary diagnosis					
Injury or poisoning	1,767	353	11.97	11.42–12.54	11.3
Asthma and wheeze	1,277	255	8.65	8.18–9.14	8.2
Acute upper respiratory tract infection (URTI)	1,241	248	8.40	7.94–8.89	8.0
Acute bronchiolitis	1,110	222	7.52	7.08–7.97	7.1
Viral infection NOS	903	181	6.12	5.72–6.53	5.8
Other diagnoses	9,308	1,862	63.04	61.76–64.33	59.6
Acute total	15,606	3,121	105.69	104.04–107.36	100.0
Arranged admissions by primary diagnosis					
Neoplasm, chemotherapy, or radiotherapy	438	88	2.97	2.69–3.26	28.3
Perinatal-related conditions	144	29	0.98	0.82–1.15	9.3
Injury or poisoning	109	22	0.74	0.61–0.89	7.0
Congenital anomalies	70	14	0.47	0.37–0.60	4.5
Removal of internal fixation device	62	12	0.42	0.32–0.54	4.0
Other diagnoses	726	145	4.92	4.57–5.29	46.9
Arranged total	1,549	310	10.49	9.97–11.03	100.0
Waiting list admissions by primary procedure					
Dental procedures	1,623	325	10.99	10.46–11.54	29.6
Grommets	497	99	3.37	3.08–3.68	9.1
Tonsillectomy +/- adenoidectomy	485	97	3.28	3.00–3.59	8.8
Gastrointestinal procedures	442	88	2.99	2.72–3.29	8.1
Other procedures	2,248	450	15.22	14.60–15.87	41.0
No procedure listed	193	39	1.31	1.13–1.51	3.5
Waiting list total	5,488	1,098	37.17	36.19–38.16	100.0
Hutt Valley DHB total	22,643	4,529	153.35	151.36–155.36	

Numerator: NMDS (excludes neonates), Denominator: NZCYES Estimated Resident Population. NOS = not otherwise specified

Table 8-7. Causes of hospitalisations of 0–14 year olds (excluding neonates), by admission type, Capital & Coast DHB 2013–2017

	n	Annual average (n)	Rate per 1,000 0–14 year olds	95% CI	%
Hospitalisations of 0–14 year olds in Capital & Coast DHB during 2013–2017					
Acute admissions by primary diagnosis					
Injury or poisoning	3,008	602	10.86	10.48–11.26	14.4
Acute upper respiratory tract infection (URTI)	1,830	366	6.61	6.31–6.92	8.8
Asthma and wheeze	1,823	365	6.58	6.28–6.89	8.7
Acute bronchiolitis	1,372	274	4.95	4.70–5.22	6.6
Viral infection NOS	1,151	230	4.16	3.92–4.40	5.5
Other diagnoses	11,689	2,338	42.21	41.45–42.99	56.0
Acute total	20,873	4,175	75.38	74.36–76.41	100.0
Arranged admissions by primary diagnosis					
Neoplasm, chemotherapy, or radiotherapy	729	146	2.63	2.45–2.83	21.5
Injury or poisoning	196	39	0.71	0.61–0.81	5.8
Congenital anomalies	160	32	0.58	0.49–0.67	4.7
Acute bronchiolitis	83	17	0.30	0.24–0.37	2.5
Dental conditions	74	15	0.27	0.21–0.34	2.2
Other diagnoses	2,142	428	7.74	7.41–8.07	63.3
Arranged total	3,384	677	12.22	11.81–12.64	100.0
Waiting list admissions by primary procedure					
Dental procedures	2,975	595	10.74	10.36–11.14	34.1
Grommets	1,146	229	4.14	3.90–4.39	13.1
Tonsillectomy +/- adenoidectomy	671	134	2.42	2.24–2.61	7.7
Musculoskeletal procedures	656	131	2.37	2.19–2.56	7.5
Other procedures	3,193	639	11.53	11.13–11.94	36.5
No procedure listed	96	19	0.35	0.28–0.42	1.1
Waiting list total	8,737	1,747	31.55	30.90–32.22	100.0
Capital & Coast DHB total	32,994	6,599	119.16	117.88–120.45	

Numerator: NMDS (excludes neonates), Denominator: NZCYES Estimated Resident Population. NOS = not otherwise specified

Table 8-8. Causes of hospitalisations of 0–14 year olds (excluding neonates), by admission type, Wairarapa DHB 2013–2017

	n	Annual average (n)	Rate per 1,000 0–14 year olds	95% CI	%
Hospitalisations of 0–14 year olds in Wairarapa DHB during 2013–2017					
Acute admissions by primary diagnosis					
Injury or poisoning	499	100	11.81	10.80–12.89	15.0
Acute upper respiratory tract infection (URTI)	338	68	8.00	7.17–8.90	10.1
Acute bronchiolitis	234	47	5.54	4.85–6.29	7.0
Asthma and wheeze	229	46	5.42	4.74–6.17	6.9
Gastroenteritis	183	37	4.33	3.73–5.01	5.5
Other diagnoses	1,848	370	43.73	41.76–45.77	55.5
Acute total	3,331	666	78.83	76.17–81.55	100.0
Arranged admissions by primary diagnosis					
Injury or poisoning	137	27	3.24	2.72–3.83	18.1
Neoplasm, chemotherapy, or radiotherapy	72	14	1.70	1.33–2.15	9.5
Perinatal-related conditions	60	12	1.42	1.08–1.83	7.9
Removal of internal fixation device	47	9	1.11	0.82–1.48	6.2
Congenital anomalies	36	7	0.85	0.60–1.18	4.8
Other diagnoses	404	81	9.56	8.65–10.54	53.4
Arranged total	756	151	17.89	16.64–19.21	100.0
Waiting list admissions by primary procedure					
Dental procedures	388	78	9.18	8.29–10.14	29.6
Musculoskeletal procedures	139	28	3.29	2.77–3.88	10.6
Grommets	137	27	3.24	2.72–3.83	10.5
Tonsillectomy +/- adenoidectomy	136	27	3.22	2.70–3.81	10.4
Other procedures	483	97	11.43	10.43–12.50	36.9
No procedure listed	26	5	0.62	0.40–0.90	2.0
Waiting list total	1,309	262	30.98	29.32–32.70	100.0
Wairarapa DHB total	5,396	1,079	127.69	124.31–131.15	

Numerator: NMDS (excludes neonates), Denominator: NZCYES Estimated Resident Population. NOS = not otherwise specified

9. Unintentional injury

Injury is the leading cause of death in New Zealand among children and young people. Unintentional injury accounts for the majority of injury-related deaths.¹ Non-fatal injury outcomes range from temporary physical incapacity to more severe injury, hospitalisation, and permanent impairment.² At an individual level, children suffer pain associated with the original injury and with possible subsequent treatment, and run the risk of physical damage that may limit their long-term development.³ Some families report increased emotional and financial stress following injury to a child. Severe injuries in children can interfere with their education.³

Head injury, particularly when associated with traumatic brain injury, can result in long term physical, cognitive and behavioural problems.⁴ Falls were the leading cause of hospitalisations for head injury of under-15 year olds in New Zealand in 2000–2009; the highest hospitalisation rate occurred in under-five-year olds.⁴ In most countries falls are the most common medically attended childhood injury and the majority of injuries in pre-school children occur at home.⁵ The most common causes of fall-related injuries in toddlers are falls off furniture, down stairs, or out of windows (in high density housing environments).⁶ For older children and adolescents playground falls and sport-related injuries contribute to hospitalisation rates.⁷⁻¹⁰

Some children are at higher risk of unintentional injury than others. The social and physical environments within which children live contribute to their risk of injury.¹¹ Some children are more inclined towards potentially hazardous activities, whilst others are more risk averse.³ Depending on their educational, behavioural and physical capabilities, children perceive and respond differently to the risk of injury within a given situation.³ Children with attention deficit hyperactivity disorder (ADHD) have a greater risk of poisoning, burns, and broken bones than children without ADHD.¹² Under-18 year olds with disabilities are at increased risk of unintentional injury compared with their peers.¹³

Data sources and methods

Hospitalisations of 0–14 year olds for unintentional injury

Hospitalisation of 0–14 year olds with a primary diagnosis of injury (excluding cases involving intentional injury, complications of drugs/medical/surgical care and late sequelae of injury or where there was an Emergency Medicine Specialty code on discharge).

Data sources

Numerator: National Minimum Dataset (NMDS)

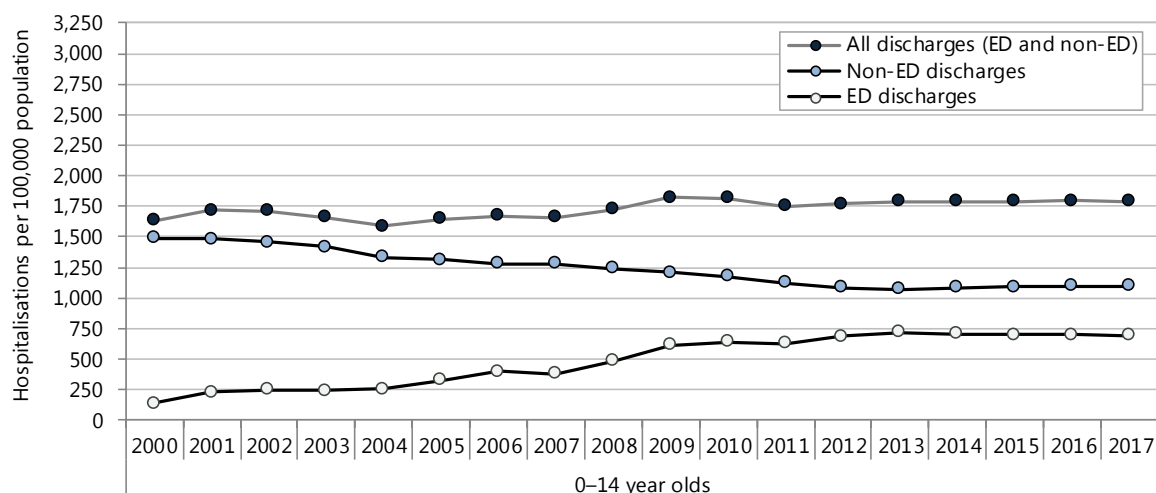
Denominator: NZCYES Estimated Resident Population (with intercensal extrapolation)

Additional information

A description of the National Minimum Dataset and the limitations of the data utilised from this collection are outlined in the appendices, as are the codes used in this section. Please read these before interpreting any trends.

The rate of under-15 year olds hospitalised with an unintentional injury has increased by 10% since 2000. The hospitalisation rate remained relatively stable from 2012–2017 (Figure 9-1).

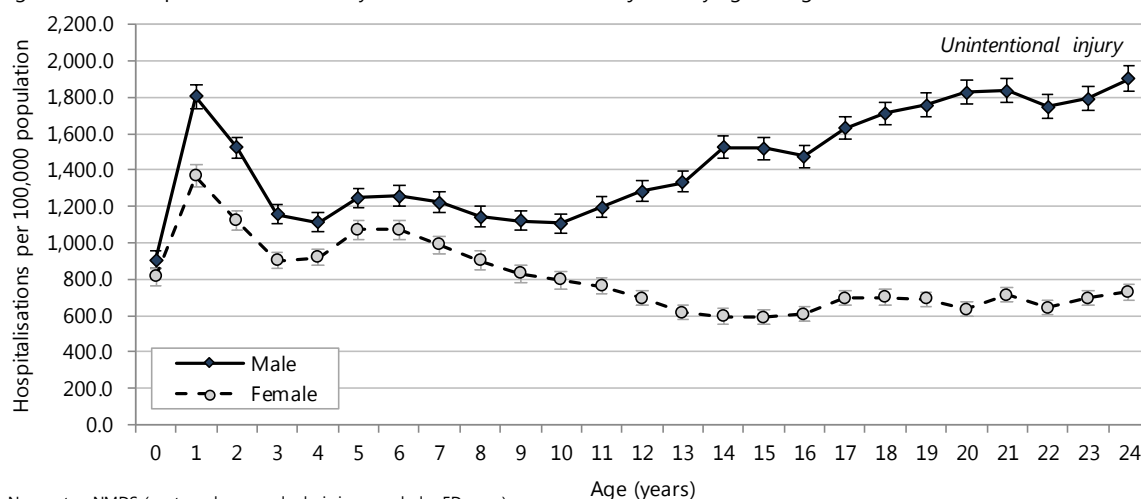
Figure 9-1. Hospitalisations of 0–14 year olds for unintentional injuries, by year of discharge and discharge type, New Zealand, 2000–2017



Numerator: NMDS (acute and arranged admissions), Denominator: NZCYES Estimated Resident Population

In the five years from 2013–2017 there were nearly 50,000 hospitalisations of 0–14 year olds for unintentional injuries. Age-specific hospitalisation rates were highest for both boys and girls between one and two years of age, and for boys the hospitalisation rates increased steadily after age 10 years (Figure 9-2).

Figure 9-2. Hospitalisations of 0–24 year olds for unintentional injuries, by age and gender, New Zealand 2013–2017



Numerator: NMDS (acute and arranged admissions; excludes ED cases), Denominator: NZCYES Estimated Resident Population

For the same period, 44% of unintentional injury hospitalisations among under-15 year olds were from falls and 23% were from inanimate mechanical forces (which includes struck against or by, caught between, contact with sharp items, machinery) (Table 9-1). Hospitalisation data for falls are presented in more detailed later in this section.

Table 9-1. Hospitalisations of 0–14 year olds for unintentional injuries, by external cause of injury, New Zealand 2013–2017

Main external cause of unintentional injury	n	Annual average (n)	Rate per 100,000 population	95% CI	%
Hospitalisations of 0–14 year olds during 2013–2017					
New Zealand					
Falls	21,918	4,384	479.28	472.96–485.67	44.1
Inanimate mechanical forces	11,316	2,263	247.45	242.91–252.05	22.8
Animate mechanical forces	2,942	588	64.33	62.03–66.70	5.9
Non-traffic transport accidents	2,285	457	49.97	47.94–52.06	4.6
Road traffic injuries	2,055	411	44.94	43.01–46.92	4.1
Other or unspecified land transport	645	129	14.10	13.04–15.24	1.3
Other transport	58	12	1.27	0.96–1.64	0.1
Thermal	1,945	389	42.53	40.66–44.46	3.9
Poisoning	1,696	339	37.09	35.34–38.89	3.4
Suffocation	409	82	8.94	8.10–9.85	0.8
Drowning or submersion	160	32	3.50	2.98–4.08	0.3
Other causes	4,048	810	88.52	85.81–91.29	8.1
Undetermined intent	253	51	5.53	4.87–6.26	0.5
Total	49,730	9,946	1,087.45	1077.91–1097.05	100.0

Numerator: NMDS (acute and arranged admissions; excludes ED cases), Denominator: NZCYES Estimated Resident Population

Figure 9-3 presents the unadjusted rate ratios for under-15 year olds hospitalised for unintentional injuries by residential deprivation score (NZDep2013 index), age, ethnicity, and gender. The trends in hospitalisation rates by ethnicity are presented in Figure 9-4. The unadjusted rate ratio presents the gap, if any, between the groups and the reference group. The following associations were observed, bearing in mind that this univariate analysis does not quantify the independent effect of each factor.

There was a marked gap between the hospitalisation rates for children living in areas with the highest NZDep2013 scores (1.7 times higher) compared with children living in areas with the lowest scores. The hospitalisation rates for Māori and for Pacific children were significantly higher than the hospitalisation rates of European/Other children (1.1 and 1.3 times higher respectively; Figure 9-3). Rates for Asian/Indian were significantly lower than for European/Other children, however, more recently hospitalisations have been increasing for this ethnic group while rates have been declining for Māori, Pacific and European/Other children (Figure 9-4).

The hospitalisation rate was significantly higher for male under-15 year olds when compared to female under-15 year olds, and rates were significantly higher for under-10 year olds, with rates for under-five year olds being 1.2 times higher than the rates for 10–14 years.

Figure 9-3. Hospitalisations of 0–14 year olds for unintentional injuries, by demographic factors, New Zealand 2013–2017

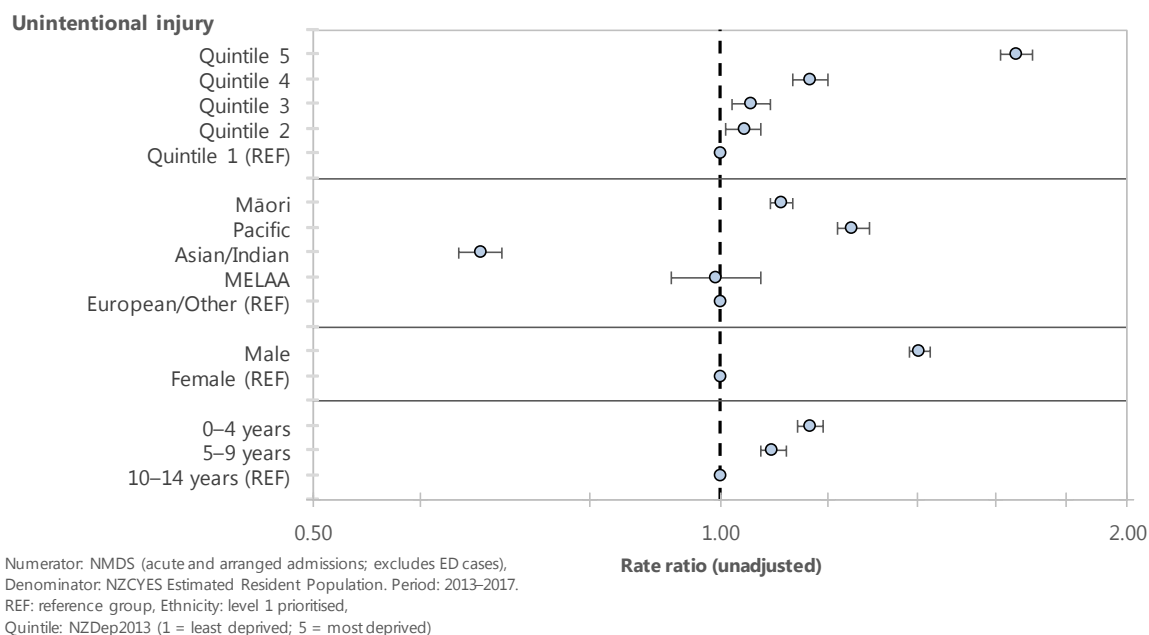
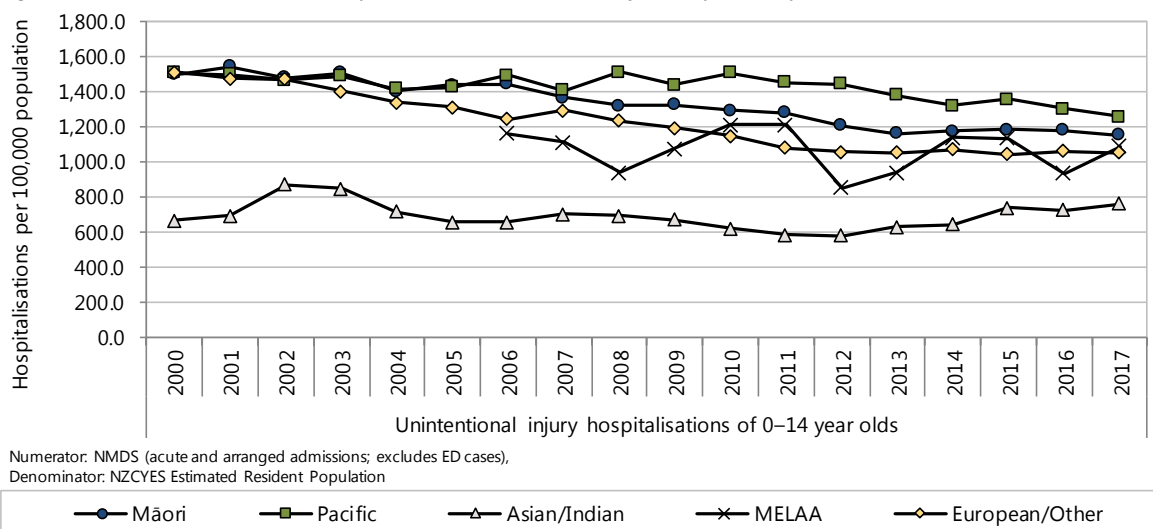
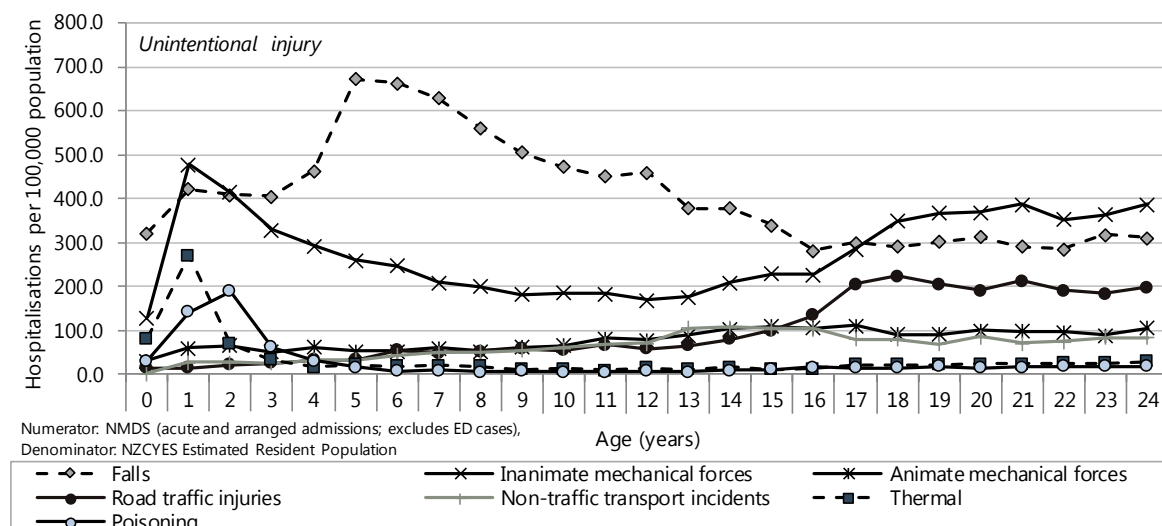


Figure 9-4. Hospitalisations of 0–14 year olds for unintentional injuries, by ethnicity, New Zealand 2000–2017



Certain causes of unintentional injury have noticeable age distributions. Injury hospitalisation rates for inanimate mechanical forces, thermal, and poisoning peak around ages 1 to 2 years, while falls peak around ages five to six years. Inanimate mechanical forces, road traffic crashes, and falls are the most common causes of injury among those older than 15 years. Both non-traffic land transport and animate mechanical forces injury hospitalisation rates gradually increase with increasing age from age four years (Figure 9-5).

Figure 9-5. Hospitalisations of 0–24 year olds for selected unintentional injuries, by age and injury type, New Zealand 2013–2017



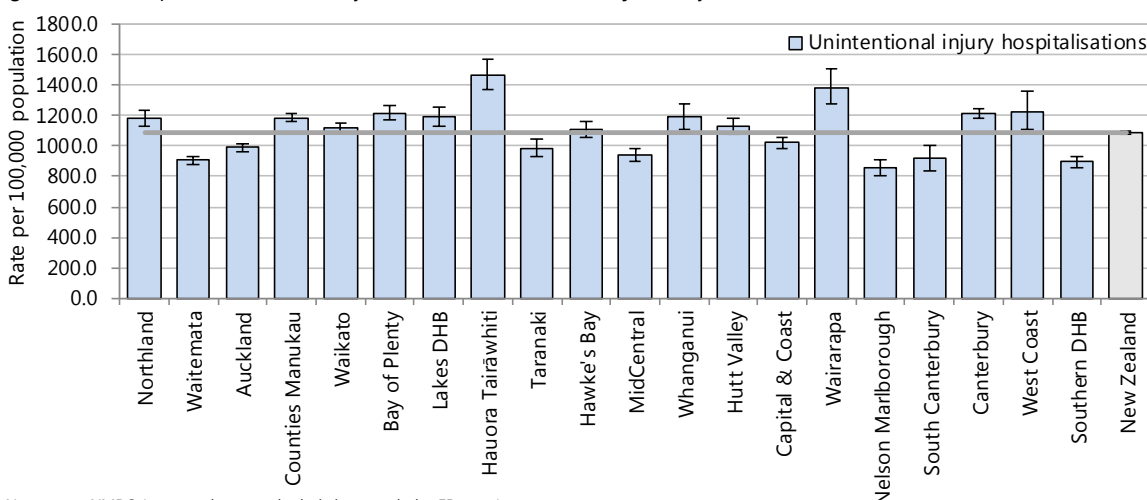
Hospitalisation rates of under-15 year olds for unintentional injury during 2013–2017 were significantly higher than the New Zealand rate for Wairarapa, while rates in Hutt Valley were not significantly different. For Capital & Coast DHB the hospitalisation rate of under-15 year for unintentional injury was significantly lower than the overall national rate (Table 9-2 and Figure 9-6). Capital & Coast DHB had the highest number of unintentional injury hospitalisations for this age group within these three DHBs.

Table 9-2. Hospitalisations of 0–14 year olds for unintentional injuries, Hutt Valley, Capital & Coast, and Wairarapa DHBs vs New Zealand 2013–2017

DHB	Number	Annual average (n)	Rate per 100,000 population	Rate ratio	95% CI
Hospitalisations of 0–14 year olds during 2013–2017					
Unintentional injury					
Hutt Valley	1,666	333	1,128.29	1.04	0.99–1.09
Capital & Coast	2,827	565	1,020.97	0.94	0.90–0.97
Wairarapa	586	117	1,386.75	1.28	1.18–1.38
New Zealand	49,730	9,946	1,087.45	1.00	

Numerator: NMDS (acute and arranged admissions; excludes ED cases), Denominator: NZCYES Estimated Resident Population. Rate ratios are unadjusted

Figure 9-6. Hospitalisations of 0–14 year olds for unintentional injuries, by district health board, New Zealand 2013–2017



Numerator: NMDS (acute and arranged admissions; excludes ED cases), Denominator: NZCYES Estimated Resident Population

Table 9-3 to Table 9-5 present the common reasons for the unintentional injury among hospitalised under-15 year olds during 2013–2017, by district health board. Falls were the most common reason for unintentional injury hospitalisation among under-15 year olds residing in all three DHBs and accounted for between 40–50% of hospitalisations for this age group between 2013 and 2017 (Table 9-3–Table 9-5).

Table 9-3. Hospitalisations of 0–14 year olds for unintentional injuries, by external cause of injury, Hutt Valley DHB 2013–2017

Main external cause of unintentional injury	Number	Annual average (n)	Rate per 100,000 population	95% CI	%
Hospitalisations of 0–14 year olds during 2013–2017					
Hutt Valley					
Falls	689	138	466.62	432.42–502.80	41.4
Inanimate mechanical forces	439	88	297.31	270.15–326.47	26.4
Animate mechanical forces	124	25	83.98	69.85–100.13	7.4
Thermal injury	75	15	50.79	39.95–63.67	4.5
Poisoning	62	12	41.99	32.19–53.83	3.7
Road traffic injuries	45	9	30.48	22.23–40.78	2.7
Non-traffic transport incidents	29	6	19.64	13.15–28.21	1.7
Land Transport: other or unspecified	12	2	8.13	4.19–14.20	0.7
Other transport	1	s	s	s	0.1
Suffocation	9	2	6.10	2.78–11.57	0.5
Drowning or submersion	2	s	s	s	0.1
Other causes	135	27	91.43	76.66–108.22	8.1
Undetermined intent	44	9	29.80	21.65–40.00	2.6
Total	1,666	333	1,128.29	1074.75–1183.80	100.0

Numerator: NMDS (acute and arranged admissions; excludes ED cases), Denominator: NZCYES Estimated Resident Population

Table 9-4. Hospitalisations of 0–14 year olds for unintentional injuries, by external cause of injury, Capital & Coast DHB 2013–2017

Main external cause of unintentional injury	Number	Annual average (n)	Rate per 100,000 population	95% CI	%
Hospitalisations of 0–14 year olds during 2013–2017					
Capital & Coast					
Falls	1,418	284	512.11	485.80–539.48	50.2
Inanimate mechanical forces	604	121	218.13	201.08–236.25	21.4
Animate mechanical forces	146	29	52.73	44.52–62.01	5.2
Thermal injury	104	21	37.56	30.69–45.51	3.7
Poisoning	95	19	34.31	27.76–41.94	3.4
Road traffic injuries	92	18	33.23	26.78–40.75	3.3
Non-traffic transport incidents	56	11	20.22	15.28–26.26	2.0
Land Transport: other or unspecified	24	5	8.67	5.55–12.90	0.8
Other transport	2	s	s	s	0.1
Suffocation	20	4	7.22	4.41–11.16	0.7
Drowning or submersion	5	1	1.81	0.58–4.21	0.2
Other causes	236	47	85.23	74.70–96.83	8.3
Undetermined intent	25	5	9.03	5.84–13.33	0.9
Total	2,827	565	1,020.97	983.68–1059.32	100.0

Numerator: NMDS (acute and arranged admissions; excludes ED cases), Denominator: NZCYES Estimated Resident Population

Table 9-5. Hospitalisations of 0–14 year olds for unintentional injuries, by external cause of injury, Wairarapa DHB 2013–2017

Main external cause of unintentional injury	Number	Annual average (n)	Rate per 100,000 population	95% CI	%
Hospitalisations of 0–14 year olds during 2013–2017					
Wairarapa					
Falls	284	57	672.08	596.17–754.96	48.5
Inanimate mechanical forces	93	19	220.08	177.63–269.62	15.9
Non-traffic transport incidents	50	10	118.32	87.81–156.00	8.5
Road traffic injuries	12	2	28.40	14.66–49.61	2.0
Land Transport: other or unspecified	7	1	16.57	6.64–34.13	1.2
Other transport	1	s	s	s	0.2
Animate mechanical forces	35	7	82.83	57.68–115.19	6.0
Poisoning	34	7	80.46	55.71–112.44	5.8
Thermal injury	15	3	35.50	19.85–58.55	2.6
Drowning or submersion	5	1	11.83	3.81–27.61	0.9
Suffocation	4	s	s	s	0.7
Other causes	42	8	99.39	71.63–134.35	7.2
Undetermined intent	4	s	s	s	0.7
Total	586	117	1,386.75	1276.73–1503.71	100.0

Numerator: NMDS (acute and arranged admissions; excludes ED cases), Denominator: NZCYES Estimated Resident Population

Figure 9-7 to Figure 9-9 present the hospitalisation rates for select causes of unintentional injury over time for each district health board. The rate of fall-related hospitalisations for under-15 year olds has decreased since 2000 in Hutt Valley and in Capital & Coast until 2015. The rate of hospitalisations in Wairarapa have varied annually for the select causes (Figure 9-7–Figure 9-9).

Figure 9-7. Hospitalisations of 0–14 year olds for unintentional injuries, by year of discharge and injury type, Hutt Valley DHB 2000–2017

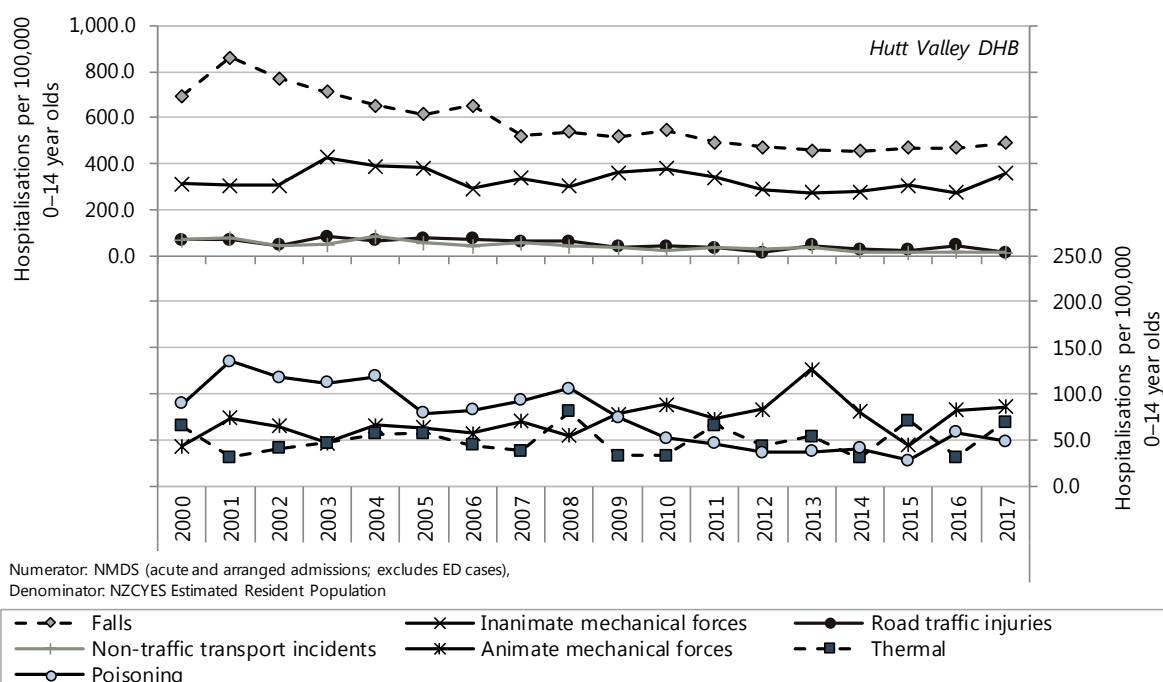


Figure 9-8. Hospitalisations of 0–14 year olds for unintentional injuries, by year of discharge, and injury type, Capital & Coast DHB 2000–2017

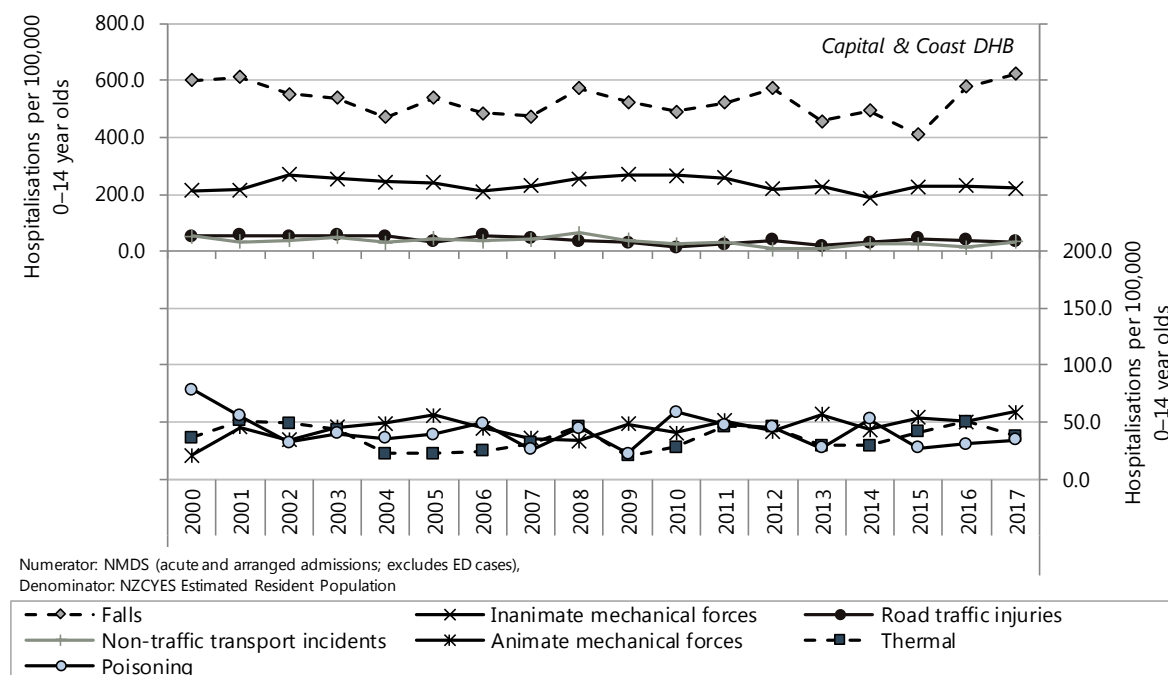
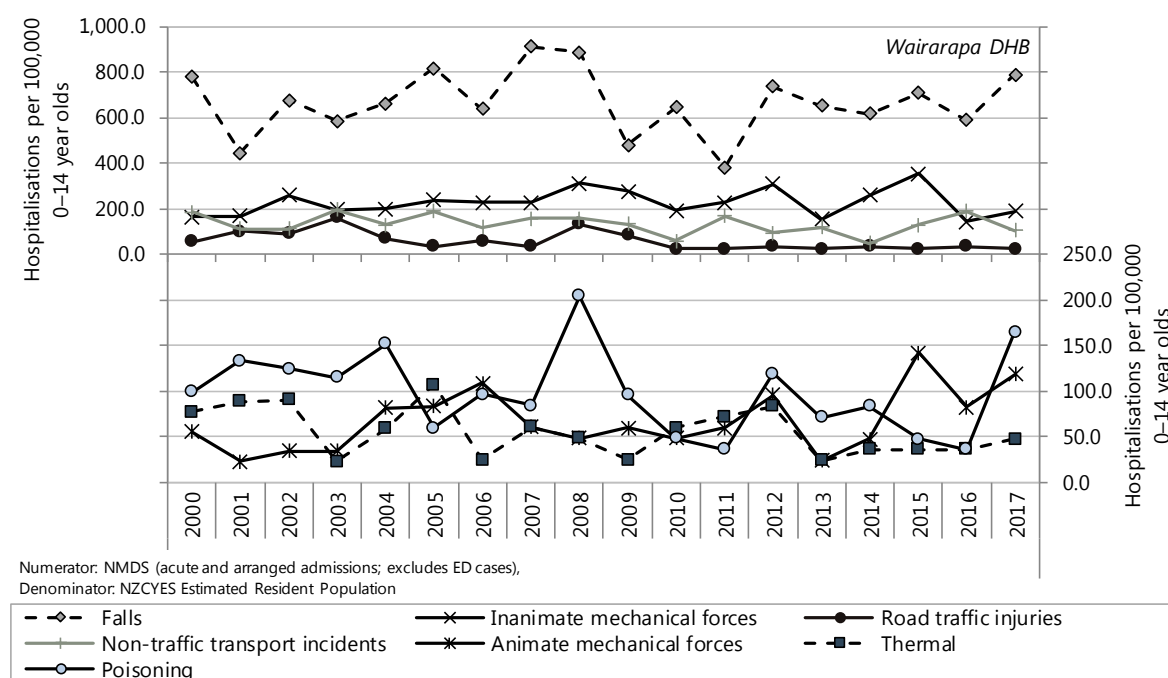


Figure 9-9. Hospitalisations of 0–14 year olds for unintentional injuries, by year of discharge, and injury type, Wairarapa DHB 2000–2017



Falls

Falls were the most common reason for unintentional injury hospitalisation among 0–14 year olds and accounted for 21,918 hospitalisations of 0–14 year olds between 2013 and 2017 (Table 9-3).

The most common types of fall resulting in hospitalisation for 0–14 year olds were falls involving playground equipment and falls on the same level (Table 9-3). Falls from playground equipment occurred most commonly in schools.

Table 9-6. Hospitalisations of 0–14 year olds for unintentional fall-related injuries, by fall type, New Zealand 2013–2017

Cause of injury: falls	Number	Annual average (n)	Rate*	95% CI	%
Hospitalisations of 0–14 year olds for fall-related injuries during 2013–2017					
New Zealand					
Fall involving playground equipment	7,039	1,408	153.92	150.35–157.56	32.1
Fall on same level from slipping, tripping and stumbling	2,452	490	53.62	51.52–55.78	11.2
Fall involving ice-skates, skis, rollerskates or skateboards	1,873	375	40.96	39.12–42.85	8.5
Other fall on same level	1,688	338	36.91	35.17–38.72	7.7
Other fall from one level to another	1,452	290	31.75	30.14–33.43	6.6
Other fall on same level due to collision with, or pushing by, another person	1,265	253	27.66	26.16–29.23	5.8
Fall involving chair	1,036	207	22.65	21.30–24.08	4.7
Fall from, out of or through building or structure	1,035	207	22.63	21.27–24.05	4.7
Fall from tree	886	177	19.37	18.12–20.69	4.0
Fall involving bed	841	168	18.39	17.17–19.68	3.8
Fall on and from stairs and steps	587	117	12.84	11.82–13.92	2.7
Fall while being carried or supported by other persons	447	89	9.77	8.89–10.72	2.0
Fall involving other furniture	303	61	6.63	5.90–7.42	1.4
Diving or jumping into water causing injury other than drowning or submersion	133	27	2.91	2.44–3.45	0.6
Fall on and from ladder	84	17	1.84	1.47–2.27	0.4
Fall from cliff	75	15	1.64	1.29–2.06	0.3
Other specified falls	36	7	0.79	0.55–1.09	0.2
Unspecified fall	686	137	15.00	13.90–16.17	3.1
Total	21,918	4,384	479.28	472.96–485.67	100.0

Numerator: NMDS (acute and arranged admissions; excludes ED cases), Denominator: NZCYES Estimated Resident Population. Rate per 100,000 population. Other specified falls also includes fall involving wheelchair, fall on same level involving ice and snow, and fall on and from scaffolding

Patterns of fall-related hospitalisation rates by age show a very high rate of falls involving playground equipment peaking at age 5–6 years and then falling steeply with increasing age. Rates for falls on same level due to collision with or pushing by another person began to rise from age nine years and remained at relatively high levels through the teenage years. Rates for falls involving skates, skis or skateboards rose until age 12 and then fell with increasing age. Other types of fall had highest rates at age one year and then tended to fall with increasing age until rising again from age 16 years (Figure 9-10).

Fall-related injury hospitalisation rates were highest at age 5–9 years for all ethnic groups, with rates for Pacific generally higher and rates for Asian/Indian consistently lower than rates for European/Other and Māori (Figure 9-11). This peak in rates in 5–9 year olds is mainly due to falls involving playground equipment.

Figure 9-10. Hospitalisations of 0–24 year olds for unintentional fall-related injuries, by age and fall type, New Zealand 2013–2017

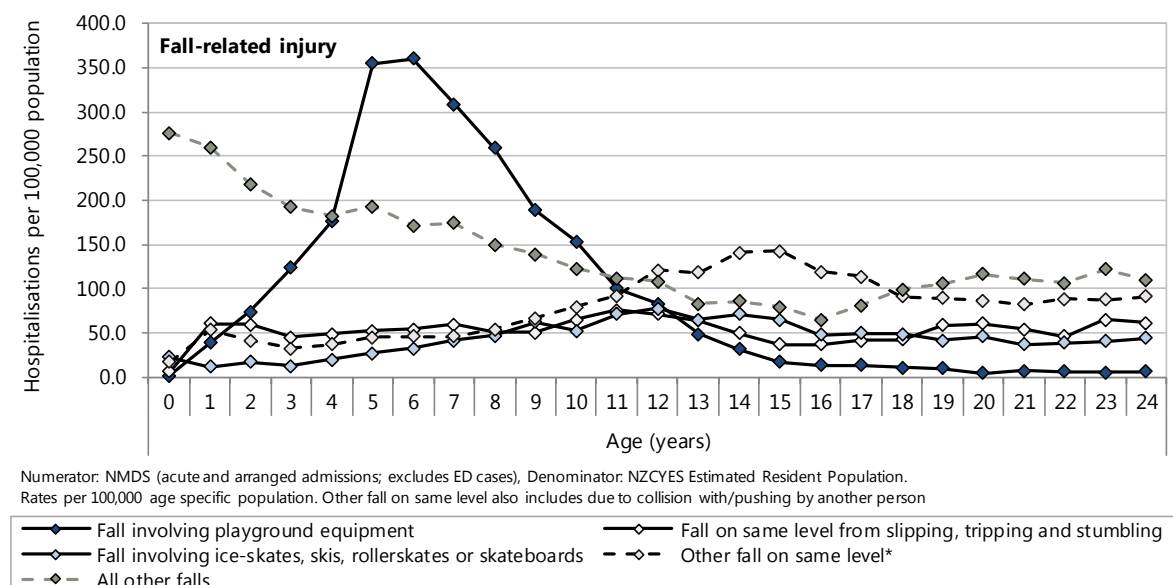
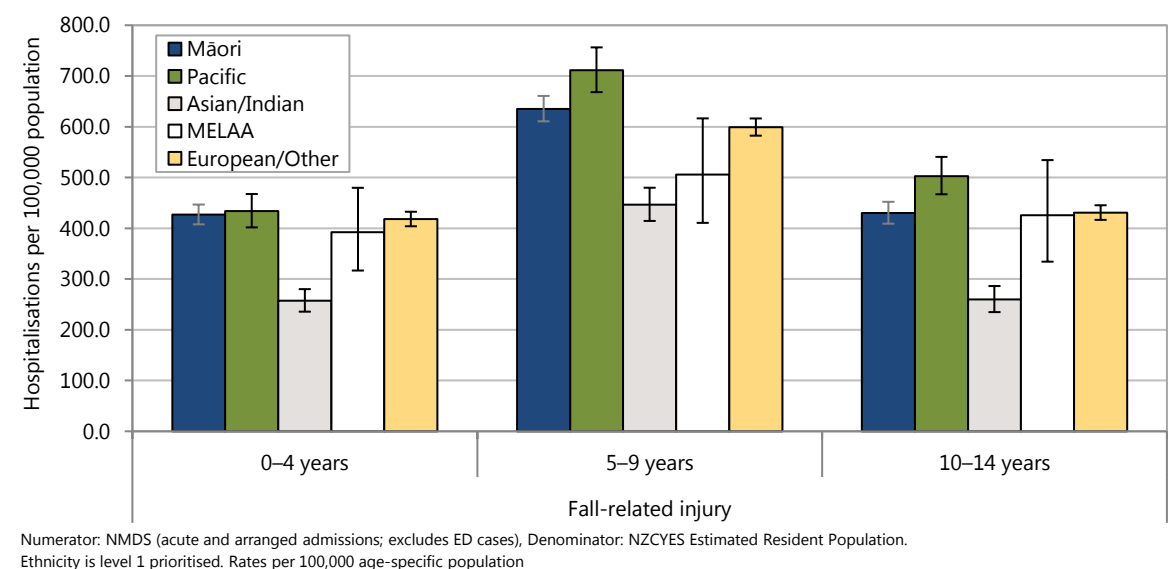
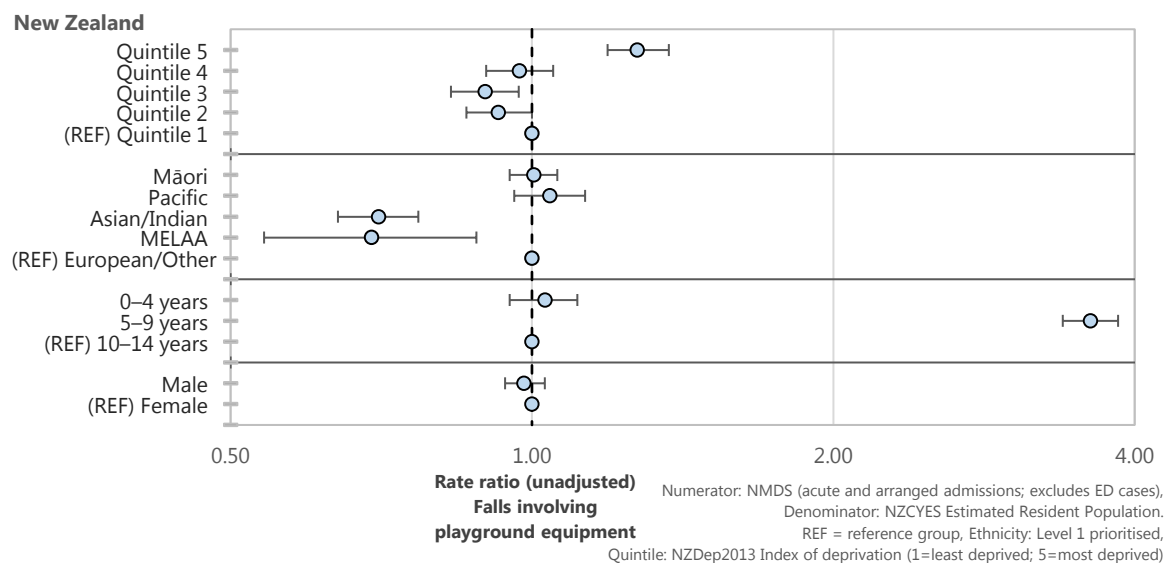


Figure 9-11. Hospitalisations of 0–24 year olds for unintentional fall-related injuries, by age group and ethnicity, New Zealand 2013–2017



Between 2013 and 2017 there was some disparity in hospitalisation rates of under-15 year olds for fall-related injuries involving playground equipment by NZDep2013 index of deprivation score, (prioritised) ethnicity and age. Rates were significantly higher in areas with the highest deprivation scores (NZDep2013 quintile 5) compared with areas with lower deprivation scores (quintiles 1–4). Rates were significantly lower for Asian/Indian and MELAA than rates for European/Other, Māori, and Pacific. There was no significant difference between male and female rates. Hospitalisation rates of 5–9 year olds were around 3.6 times higher than 10–14 year olds and under-five year olds (Figure 9-12).

Figure 9-12. Hospitalisations of 0–14 year olds for playground equipment fall-related injuries, comparison by demographic factors, New Zealand 2013–2017



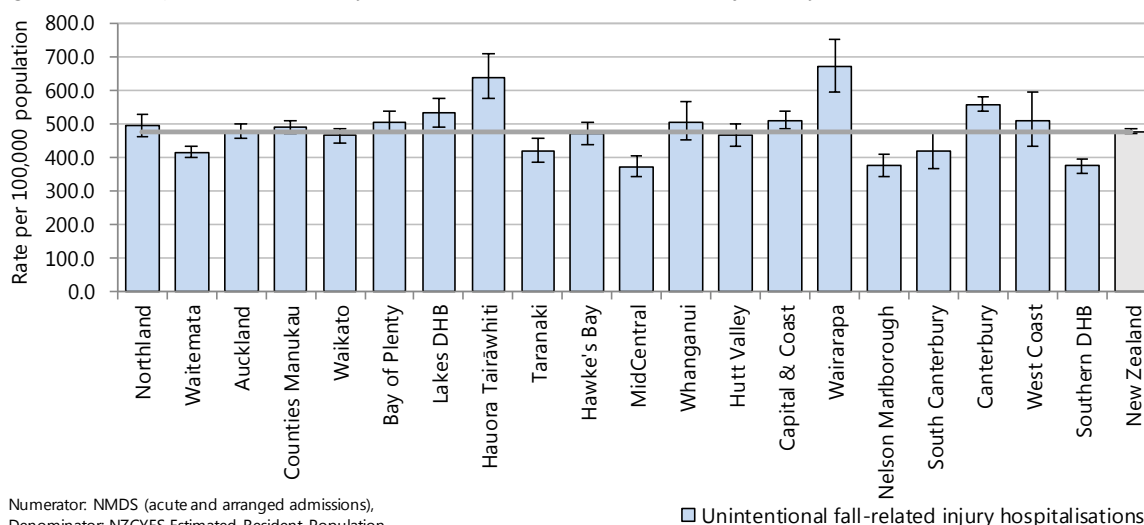
Hospitalisation rates of under-15 year olds for unintentional fall-related injury during 2013–2017 were significantly higher than the New Zealand rate for Wairarapa DHB, and there was no significant difference from the New Zealand hospitalisation rate for falls in Hutt Valley and Capital & Coast DHBs (Table 9-7 and Figure 9-13). Capital & Coast had the highest number of fall-related injury hospitalisations of the three DHBs.

Table 9-7. Hospitalisations of 0–14 year olds for unintentional fall-related injuries, Hutt Valley, Capital & Coast, and Wairarapa DHBs vs New Zealand 2013–2017

DHB	Number	Annual average (n)	Rate per 100,000 population	Rate ratio	95% CI
Hospitalisations of 0–14 year olds during 2013–2017					
Falls					
Hutt Valley	689	138	466.62	0.97	0.90–1.05
Capital & Coast	1,418	284	512.11	1.07	1.01–1.13
Wairarapa	284	57	672.08	1.40	1.25–1.58
New Zealand	21,918	4,384	479.28	1.00	

Numerator: NMDS (acute and arranged admissions), Denominator: NZCYES Estimated Resident Population. Rate ratios are unadjusted

Figure 9-13. Hospitalisations of 0–14 year olds for unintentional fall-related injuries, by district health board, 2013–2017



Numerator: NMDS (acute and arranged admissions), Denominator: NZCYES Estimated Resident Population

Evidence for good practice for the prevention of fall-related injury

Possibilities for prevention

Unintentional injuries are a leading cause of childhood death and serious injury, with under-five-year olds particularly vulnerable.^{14,15} An increasing body of research evidence shows that many of the risks associated with unintentional injury are predictable and amenable to intervention.^{3,14} Effective interventions use educational, environmental and legislative approaches.³ Injury prevention efforts may be impeded by fatalistic attitudes such as the attitude that “accidents will happen”.³ Investment in injury prevention is low worldwide,¹⁶ and in many countries there is a lack of sustained, strategically-planned action to reduce injury.^{17,18} Public and private sectors, civil society, non-government organisations, and all levels of government (from local to international) have a role to play in effective injury prevention.^{16,19}

Strategic intervention at a policy level could significantly reduce child injury deaths and hospitalisations in New Zealand.¹ Sweden, Italy, the United Kingdom and the Netherlands are clear leaders in child injury prevention internationally. In these countries a combination of strategies has led to a reduction in the significant impact of childhood injury. Strategies that have been implemented include public policy changes, injury surveillance and research, improvements in health care systems, communication, and education.²⁰ If childhood mortality rates from injury in New Zealand were reduced to those observed in the Netherlands, there would be approximately 81 fewer child deaths every year.¹ Key components of a strategic approach in New Zealand would include a national injury prevention strategy with specific targets and time lines related to child safety, and a comprehensive national programme of home visits that includes safety education appropriate for the child's development.¹

Parenting programmes are effective in reducing self-reported or medically attended unintentional injury in children, particularly for households with children who may be considered 'at risk' (e.g. children of young or sole parents).²¹ Pooled results from 10 randomised controlled trials, which included a total of 5074 children, found that children from families in which parents had completed parenting programmes sustained fewer injuries than those from families who had not attended the programmes.²¹ Fairly consistent evidence also suggests that parenting programmes improve home safety behaviours.²¹ In addition, making home visiting programmes available to families of young children, as part of injury prevention and wider child and maternal health strategies is likely to have a range of other beneficial effects for maternal and child health.²¹

In most countries falls are the cause of the most common medically attended childhood injuries.^{5,6,22} Falls are associated with a high number of childhood hospitalisations in New Zealand, although hospital stays are not often for prolonged periods.¹ The context of fall injuries changes with child age.²² Falls of pre-schoolers occur frequently in the home setting,^{5,14,22-24} falls from playground equipment are common in the early school years,^{9,24,25} and sporting injuries contribute to fall injury in 10–14 year olds.²⁴

The majority of injuries in pre-school children occur at home.⁵ The most common causes are falls off furniture, down stairs and out windows.^{6,26} Falls down stairs that involve baby walkers are among the most dangerous.^{22,26} Falls from windows are more common in large urban areas and neighbourhoods with low socioeconomic status.²⁶ Falls from furniture vary by age. Infants typically fall from a bed while left unattended and older children mostly fall while climbing on furniture.^{22,26} Playing on a top bunk may result in fall injury; bunk beds are not suitable for under-nine year olds.²⁷ Climbing on furniture is also implicated in window falls.²² Structural factors such as having landings part-way up the stairs, and keeping stairs in good repair, were associated with reduced stair fall injury risk.²³ Household factors like installation of stair gates, not leaving stair gates open, and having carpet on stairs were also associated with reduced risk of fall-related injury.²³ However, if parents do not consider that falls are associated with severe injury, or consider all falls as part of normal development, they may do little to prevent fall-related injury of young children at home.¹⁴

Evidence of the specific effect of home-based fall injury prevention interventions is sparse. Most studies on interventions to prevent childhood falls at home have used safety behaviour as an outcome measure rather than their effect on reducing falls.⁵ Two effective interventions that have demonstrated

a reduction in falls among children are the redesign of baby walkers (engineering) and the mandated use of window guards (enforcement).²² There is some evidence for improved household safety behaviour after interventions to promote use of safety gates and furniture corner covers, and restrict baby walker use.⁵ The evidence is mixed for effects of interventions on the use of window safety devices, non-slip bath mats/decals, and reduction of tripping hazards. There was limited evidence that interventions were effective in improving lighting in corridors, altering furniture layout and restricting access to roofs.⁵ The most effective intervention for different home safety factors varies. The most intensive intervention (including education, low cost/free home safety equipment, home safety inspection and fitting) was the most likely to be the most effective for increasing possession of a fitted stair gate, whereas for reducing possession or use of a baby walker education only was most likely to be most effective.²⁸

The National Institute for Health and Care Excellence recommends interagency identification of households where children may be at increased risk of injury.¹⁵ Practitioners providing support through home visits are well-placed to identify potential hazards such as unprotected stairs.³ Households should be offered a structured home safety assessment, in which unintentional injury risks are identified and tailored advice provided.¹⁵ A New Zealand study looked at the effect of home safety modifications, such as handrails, adequate outside lighting, and slip resistant surfacing for steps and decks, on fall-related injury across all ages.²⁹ The fall-related injury rates for under-10 year olds in the intervention group was 0.032 per person per year, compared with 0.063 fall-related injuries per person per year in the control group.²⁹ The home safety interventions cost on average \$564 per dwelling, and were estimated to reduce fall-related injury costs (to ACC) for children and young people by around 33%.³⁰

Playgrounds provide children with opportunities to explore, be creative and imaginative, and engage in physical activity which results in social and health benefits.^{9,25} Risky play is associated with increased physical activity, independence, cognitive and social development, and reduced mental illness and learning difficulties.³¹ Studies have also shown that risky play helps children learn risk perception and management skills, and avoid injuries.³¹ Brussoni (2015)³¹ differentiate risk (where a child can recognise and evaluate the challenge) with hazards (e.g. unstable equipment that could topple under a child's weight).³¹ In responding to, and being unable to endorse, a position statement on active outdoor play the Canadian Paediatric Society noted the importance of striking an appropriate balance between encouraging children's self-directed outdoor activity and appropriate risk reduction.³² There is perhaps some middle ground between physical activity specialists who often argue that injury is an inevitable side effect of a healthy, active lifestyle, and injury control professionals who typically argue that childhood injuries are inherently bad, irrespective of their origins.³³ Langley (2013) cites well-recognised child injury prevention advocate Frank Rivara as saying that injuries requiring a band-aid and a mother's kiss are a part of growing up. By implication those that result in more serious injury need considered prevention strategies.

Playground injuries most frequently occur among 5–9 year olds and are most often associated with children falling from heights. The most common injury is an arm fracture.⁹ Comparable injury rates are seen among preschool children in childcare settings, where most reported injuries were caused by falls from or during use of outdoor playground or climbing structures.³⁴ Such falls were also the most common cause of serious injury in childcare settings.³⁴ Equipment- and structure-based playgrounds should adhere to and maintain playground standards in order to reduce the risk of serious injury. Organizations responsible for installing and maintaining playgrounds should consider alternative play spaces that allow children to play outdoors, in a natural environment that supports healthy child development and promotes physical activity.⁷ A systematic review of observational studies identified that absence of handrails and guardrails on playground equipment, non-impact-absorbing surfacing, and critical fall heights were risk factors for playground injury. Effective interventions included modifying playground surfacing and reducing equipment height to less than 1.5 m.⁹ Two studies have shown that State regulation and director training were associated with decreased safety hazards and unintentional injury rates in childcare settings.³⁴ There is currently insufficient evidence to determine whether school-based educational programmes can prevent unintentional injuries. There is some weak, low-quality evidence that such programmes improve safety skills, behaviour/practices and knowledge.³⁵

Participation in sports as a child improves physical and psychological health.⁸ Schools need to promote sport while protecting against injury.⁸ There is an increasing body of rigorous scientific evidence to inform best practice and policy in injury prevention in youth sport, but a lack of injury prevention research in adventure and extreme sport and in children under age 12.⁷ There is evidence for neuromuscular training strategies in the reduction of injury in team sports.⁷ Protective equipment (e.g., helmets, wrist guards) are effective interventions to prevent injury in youth sport.⁷ There is also evidence of suboptimal uptake and maintenance of both these interventions. Research on implementation is critical if there is going to be a shift in knowledge, behaviour change and sustainability of evidence-informed injury prevention practice and policy.⁷ Most intervention studies to reduce sporting injuries focus on changing the behaviour and actions of individual athletes, and the use of protective equipment.¹⁰ There is an even stronger evidence base for strategies such as changes to rules and regulations in sport which have the potential to limit or eliminate dangerous situations in play, and hence prevent sport injury events from occurring.¹⁰ The increasing evidence base on preventing injury in professional sport has had limited uptake in school settings.⁸ School policies tend to focus on injury management rather than prevention. Guidance was often taken directly from evidence relating to adults without specific consideration of the child's age, gender or developmental stage.⁸ Enhanced communication strategies between youth athletes, parents, coaches, sport administrators and clinicians is important to support a greater capacity for effective and sustainable injury prevention efforts.⁷

Good health practice

Health services and health practitioners have important roles to play in injury prevention in clinical settings. Prompt and appropriate treatment of injuries that do occur can minimise the impact on children's wellbeing. A person-centred, integrated approach to providing injury prevention services is fundamental to delivering high-quality care to children and young people.¹⁵

Commissioners, managers and practitioners working in health, social care and education services all have important roles to play in child injury prevention, alongside national and local government and relevant organisations in the voluntary and private sector.¹⁵ Appropriate action includes providing everyone who works with (or cares for and supports) children, young people and their families with access to appropriate education and training in how to prevent unintentional injuries. This is especially important for those who work directly with children, young people and their families. Education and training should take into account the broader context of child health and wellbeing (for example, the promotion of children and young people's development). A key goal is to develop understanding of unintentional injuries and their consequences, the importance of prevention and knowledge of effective strategies available.¹⁵

The clinical setting provides opportunity for individual-level education/ counselling for parents on unintentional childhood injury prevention.¹⁹ Primary care clinicians can play a key role in promoting their patient's safety. Taken collectively, a focused attention on preventing unintentional home injuries by primary care providers can contribute to the reduction of injuries and result in optimal health for all.²² Unintentional home injuries are always costly and often preventable, which provides a strong rationale for addressing unintentional home injuries in clinical settings.²² Paediatricians and child health professionals have knowledge and understanding of child development and behaviour that is valuable in addressing injury prevention. Routine health checks provide an excellent opportunity for health professionals to discuss child safety and to link this with an individual child's developmental milestones.³

Provision of immediate treatment at the scene may reduce the severity of consequences of an injury.³ Falls are an important cause of head injury. Emergency departments see a large number of patients with minor or mild head injuries. Appropriate guidance and use of CT scans can enable early detection and treatment of life-threatening brain injury, where present, but also early discharge of patients with negligible risk of brain injury.³⁶ Access to and use of rehabilitation services can maximise possibilities for children's future activity and quality of life following an injury.³ Early diagnosis and adequate rehabilitation following a sporting injury, and appropriate assessment and clearance before return to sport following injury, can reduce the risk of injury consequences.⁷ Although the main focus in clinical settings for the treatment of injury is on addressing physical and

psychological consequences of injury, these settings may provide a “teachable moment” for advice on future prevention.³

Equity

Unintentional injuries at all severities display a steep social gradient, with children from poorer households being at significantly greater risk of death or injury than those living in more affluent circumstances.^{3,15,26} Underlying factors such as poor quality housing, over-crowding, parental mental health and inadequate supervision may contribute to this inequity.³ Neighbourhood variables most consistently associated with child injury rates relate to poverty, education, employment, and access to services.¹¹ Neighbourhood poverty or advantage has an independent effect on child injury outcome.¹¹ Education, employment, connectedness of parents, and access to services are significant determinants of child injury. Injury rates appear to be lower in areas that score well on summary measures of neighbourhood safety.¹¹ Effective public policy approaches need to effect structural changes to achieve population-level reductions in childhood injury. An increased program of research aimed at quantifying the ecological causation of injury could provide an important supplement to the evidence base to inform public policy solutions.¹¹

Around the world, Indigenous children are found to be at a significantly higher risk of injury compared to non-Indigenous children.^{37,38} The explanation for higher injury rates in Indigenous populations in Canada, Australia and New Zealand is complex. All three countries have similar colonial histories, marked with discrimination and oppression that continue to impact on present generations. The consequent socioeconomic disadvantage experienced by Indigenous populations has resulted in exposure to behavioural and environmental health risks.³⁷ Traditional injury prevention programmes may be too limiting and rigid for implementation in indigenous communities, and may not take local conditions, culture and social structures into account enough.³⁸ Moller (2015: page e150)³⁸ also noted that traditional injury prevention programmes “may not be suitable for indigenous service providers with limited resources”. A systematic review found a limited number of evaluated interventions for the prevention of indigenous childhood injuries.³⁷ The evidence available suggests the following critical success factors across all interventions to reduce injury rates for indigenous children:

- Culturally appropriate content of the intervention underpinned by local traditions and customs with indigenous service providers and community members involved in design and implementation
- Direct involvement of persons of indigenous descent and/or persons knowledgeable of the indigenous culture specific to that area in the delivery of the intervention. This allowed a more trusting relationship to be built with families, enabling successful delivery and improved effectiveness
- An holistic approach that addresses health and well-being in terms of physical, mental, emotional and spiritual aspects of life
- Providing access to subsidized or free safety devices is also reported as a success factor. Some families said that they would not have invested in home safety devices themselves as they were unable to afford them.

Beyond intervention effectiveness, inclusion of indigenous communities in shaping interventions and policies is underpins the principles of Indigenous rights to self-determination and cultural preservation.³⁷ Injury prevention strategies should take a cross-sectoral approach that addresses the underlying wider social and environmental determinant of indigenous ill-health. This includes a focus on early child development, education and skills development, employment and working conditions, minimum income for healthy living, sustainable communities, and a social-determinants approach to prevention.^{38,39}

In a kaupapa Māori injury prevention promotion ‘My home is my Marae’, ACC engaged with local Māori providers of healthcare, education and social services to deliver the home safety intervention.⁴⁰ Kaimahi were trained by ACC’s injury prevention consultants to conduct home safety audits and then worked together with local whānau to conduct the safety audits in their homes, to raise awareness of hazards in the home and to assist them in keeping their whānau safe. After making small commitments to change in their whare, whānau were provided with a safety product to assist them to

further reduce injury risks such as mould/lichen remover, rug grips/non-slip mats/shower mats/bath mats, non-slip paint for outdoor steps, cable grips or cord winders, step ladders, latches for windows and cupboards, smoke alarms or handrails. Evaluation of this programme identified five critical success factors:⁴⁰

- Mana tangata and Manākitanga. It was important to have the right people at ACC and in the community to support and deliver ‘My Home is My Marae’. The injury prevention consultants were deeply respected by staff from provider organisations as a result of the mana tangata, or reputation, respect and credibility, of these individuals in Māori communities. The providers enabled whānau engagement because kaimahi were local Māori, carrying local knowledge, speaking the right language, and were personally connected to whānau through whakapapa and their residence in local communities. They had the passion and integrity to deliver messages to whānau in a way that is mana enhancing; showing whānau that they are valued and cared for.
 - *“This is not just about the project, this is about creating conversations and talking with our people within the home.”*
- Kānohi-ki-te-kānohi. A unique part of the ‘My Home is My Marae’ approach was that it took place in the whare of whānau. This allowed for face-to-face engagement and whakawhanaungatanga with whānau. Kaimahi were grateful for and humbled by this opportunity and recognised the value in connecting with whānau to create opportunities for further work in promoting their health and well-being.
- Capacity building for kaimahi and whānau. Building capacity among kaimahi and whānau was a key strength of the ‘My Home is My Marae’ approach. The capacity of kaimahi themselves was increased through a train-the-trainer or tuakana-teina approach. This in turn empowered whānau to address hazards through changes in their knowledge. The journey for kaimahi was both professional and spiritual. Observing poverty was something that kaimahi carried spiritually as they sought to support and empower whānau with needs that often fell beyond the scope and resources of ‘My Home is My Marae’. The tuakana-teina model built leadership and capacity among whānau and rangatahi through creating a wider awareness and a greater involvement of the dangers within the home.
- ‘Low or no cost’ solutions to hazards in the home. The ability for whānau to reduce hazards in their home with little or no financial cost was a key strength of this approach, particularly when addressing hazards in low-income households. Hazard auditing in Far North whare showed that 76% of the hazards identified and recorded could be resolved through ‘low or no cost’ solutions (368 of 481 hazards). This did leave 23% of the hazards encountered that required a high-cost solution such as plumbing and electrical work (16% or 79 of 481 hazards), other unspecified solutions (6% or 30 of 481 hazards) or had no solution identified (1% or 4 of 481 hazards).

‘My Home is My Marae’ is a multifaceted approach to intervention that addresses behavioural (knowledge and awareness of whānau to reduce or eliminate hazards) and environmental (changes made in whare) dimensions. The Māori leadership and mana tangata of ACC's injury prevention consultants acting as conduits between ACC and provider organisations, and securing provider's engagement, were key strategic factors for success. Programme delivery by local Māori organisations provided the opportunity to integrate injury prevention in other health promotion activities by these organisations; facilitating a holistic rather than isolated response to whānau needs.

‘My Home is My Marae’ reflects a holistic approach to injury prevention which largely aligns with Māori tikanga and Māori models of health and well-being. The approach included the whanau, improved knowledge and awareness of whānau to reduce, eliminate or isolate hazards in their whare, encouraged a safer environment through making changes in the home. Injury prevention or health promotion approaches that seek to engage with whānau and/or Māori communities would benefit from realising critical success factors of ‘My Home is My Marae’.⁴⁰

Guidelines, evidence-based reviews, New Zealand publications, and other relevant publications and websites

New Zealand publications and websites

- The Well Child Tamariki Ora Programme. 2016. **Child safety/injury prevention**. <https://www.wellchild.org.nz/health-info-resources/health-topic/childhood-safetyinjury-prevention> accessed November 2018.
- Safekids <http://www.safekids.nz/> accessed November 2018
- KidsHealth. 2016. **Bunk beds - tips for safe use**. <https://www.kidshealth.org.nz/bunk-beds-tips-safe-use> accessed November 2018.
- KidsHealth. 2018. **Home safety - room by room**. <https://www.kidshealth.org.nz/home-safety-room-room> accessed November 2018.
- ACC **Preventing injury** <https://www.acc.co.nz/preventing-injury/>
- ACC. undated. **Traumatic brain injury**. <https://disability.acc.co.nz/useful-resources/traumatic-brain-injury-tbi/> accessed November 2018. Includes link to child-specific resources
- Otago University: Injury Prevention Research Unit (IPRU). **New Zealand Injury Query System**. <https://psm-dm.otago.ac.nz/niqs/>
- Ministry of Health. **Accidents and injuries** <https://www.health.govt.nz/your-health/conditions-and-treatments/accidents-and-injuries>
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International guidelines

- National Institute for Health and Care Excellence. 2017. **Unintentional injuries among under-15s**. London: National Institute for Health and Care Excellence. <https://pathways.nice.org.uk/pathways/unintentional-injuries-among-under-15s> Includes links to guidance for Unintentional injuries: prevention strategies for under 15s
- National Institute for Health and Care Excellence. 2017. **Head injury: Assessment and early management**. London: National Institute for Health and Care Excellence. <https://www.nice.org.uk/guidance/cg176> National Institute for Health and Care Excellence. 2017. **Unintentional injuries among under-15s**. London: National Institute for Health and Care Excellence. <https://pathways.nice.org.uk/pathways/unintentional-injuries-among-under-15s>
- Peden M, Oyegbite K, Ozanne-Smith J et al (eds). **World report on child injury prevention** World Health Organization and Unicef 2008 http://www.unicef.org/eapro/World_report.pdf
- European Public Health Alliance (EPHA) and TACTICS. (2014) **EPHA Briefing: Mandated responsibility for intentional and unintentional child injury prevention in Europe focusing on road safety, water safety, home safety and intentional injury**. http://epha.org/IMG/pdf/EPHA_Briefing_-_TACTICS-child_safety-Final.pdf

Evidence-based reviews

- Kendrick D, Mulvaney C, Ye, L et al. **Parenting interventions for the prevention of unintentional injuries in childhood**. Cochrane Database of Systematic Reviews. (2013) (6). <http://dx.doi.org/10.1002/14651858.CD006020.pub3>
- Kendrick D, Young B, Masonjones AJ et al **Home safety education and provision of safety equipment for injury prevention**. Cochrane Database of Systematic Reviews. (2014) (10)

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Other relevant publications

- McDonald EM, et al. 2018. **Primary care opportunities to prevent unintentional home injuries: A focus on children and older adults.** *American Journal of Lifestyle Medicine*, 12(2), 96-106. <http://dx.doi.org/10.1177/1559827616629924>

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10. Asthma and wheeze

Asthma is the most common non-communicable disease in children.¹ It is a chronic lower respiratory disease that affects the airways causing symptoms such as difficulty breathing, wheezing, chest tightness and cough.^{1,2} Particular caution in relation to diagnosis is required for pre-school children who present with wheeze after a viral infection, as many of them will not go on to develop asthma.³ There is a high degree of inequality across the socioeconomic spectrum and between ethnic groups in rates of respiratory disease.⁴

The causes of asthma are not well understood.¹ The strongest risk factors for developing asthma are a genetic predisposition (family history of asthma and/or other allergic diseases such as eczema and allergic rhinitis) in combination with environmental exposure to inhaled substances and particles that may provoke allergic reactions or irritate the airways, such as house dust mites, pet dander, pollen, mould, and tobacco smoke.¹ Asthma can also be triggered by cold air, exercise and psychological distress.¹ There are many steps that health professionals and health services can take to improve outcomes and reduce inequities so that all children in New Zealand achieve the best possible asthma outcomes.³

Data sources and methods

Child respondents aged 2–14 years diagnosed by a doctor and currently treated for asthma

Child respondents (aged 2–14 years) are defined as having asthma if the child's parents or caregivers had ever been told by a doctor that the child has asthma and if they now take treatments for asthma (inhalers, medicine, tablets or pills).

Hospitalisations for asthma or wheeze in 0–14 year olds

Acute and arranged hospitalisations of 0–14 year olds with a primary diagnosis of asthma or wheeze (per 1,000 age-specific population).

Data sources

New Zealand Health Survey (NZHS), as published by the Ministry of Health

- National data (2006/07–2016/17)⁵, refer to data source appendix
- Regional data (Pooled year: 2014–2017)⁶

Numerator: National Minimum Dataset (NMDS)

Denominator: NZCYES estimated resident population (with intercensal extrapolation)

Additional information

An acute hospitalisation is an unplanned hospitalisation occurring on the day of presentation, while an arranged hospitalisation (referred to elsewhere in this report as a semi-acute hospitalisation) is a non-acute hospitalisation with an admission date less than seven days after the date the decision was made that the hospitalisation was necessary.

An overview of the National Minimum Dataset, and outline of its data limitations, are provided in the appendices for review before interpreting any patterns. The appendices also contain a list of the codes included.

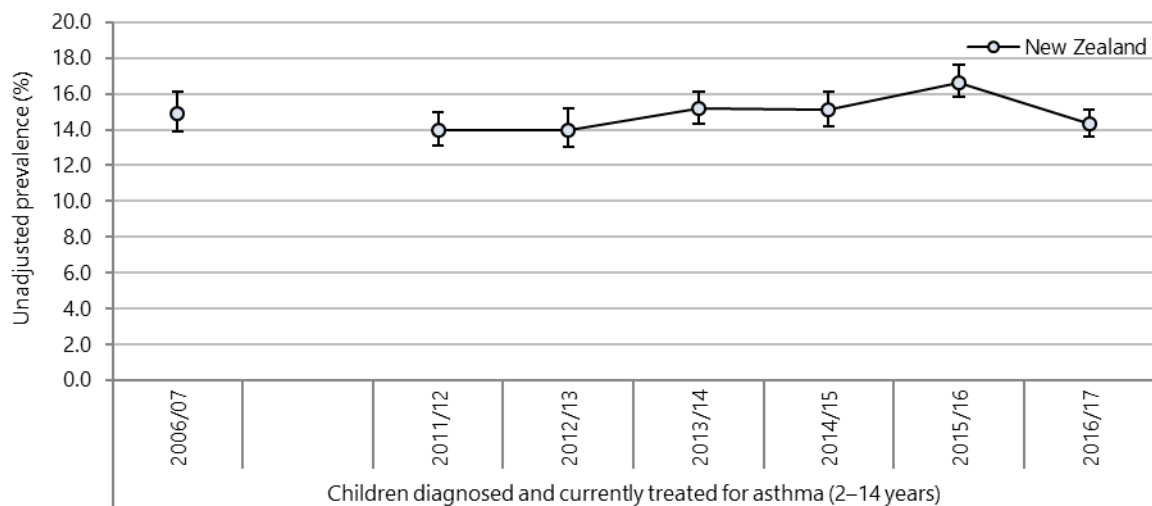
Prevalence of diagnosed asthma

Figure 10-1 presents the percentage of 2–14 year old children who have been diagnosed by a doctor and currently treated for asthma, as reported by parents or primary caregivers in interviews for the New Zealand Health Survey. The percentage has decreased slightly from 14.9% in 2006/07 to 14.3% in 2016/17, with some variation from year to year.

There was no statistical difference in prevalence of asthma by age group (Figure 10-2). The percentage of 2–14 year olds with asthma are presented by demographic factor as unadjusted rates in Figure 10-2 and as adjusted rates in Figure 10-3. Prevalence rates of asthma were significantly higher

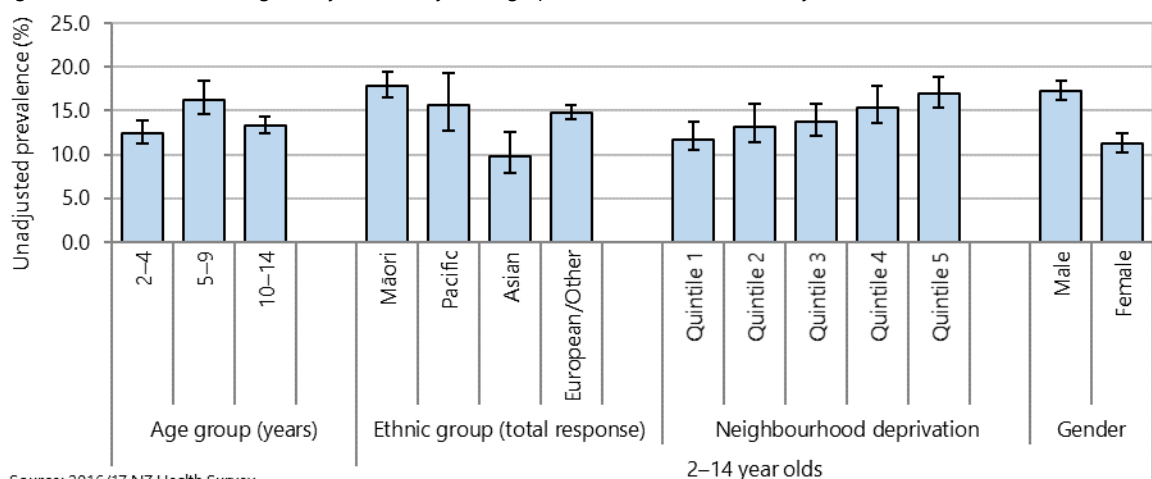
for 2–14 year olds who were Māori (1.4 times higher than non-Māori), and significantly lower for Asian (0.7 times lower than non-Asian). For 2–14 year olds living in areas with high deprivation scores, the rates of asthma were 1.6 times higher than for those living in neighbourhoods with the least deprived scores. Rates among boys were 1.5 times higher than rates of asthma among girls (Figure 10-3).

Figure 10-1. Asthma among 2–14 year olds, by survey year, NZ Health Survey 2006/07–2016/17



Source: NZ Health Survey

Figure 10-2. Asthma among 2–14 year olds, by demographic factor, NZ Health Survey 2016/17

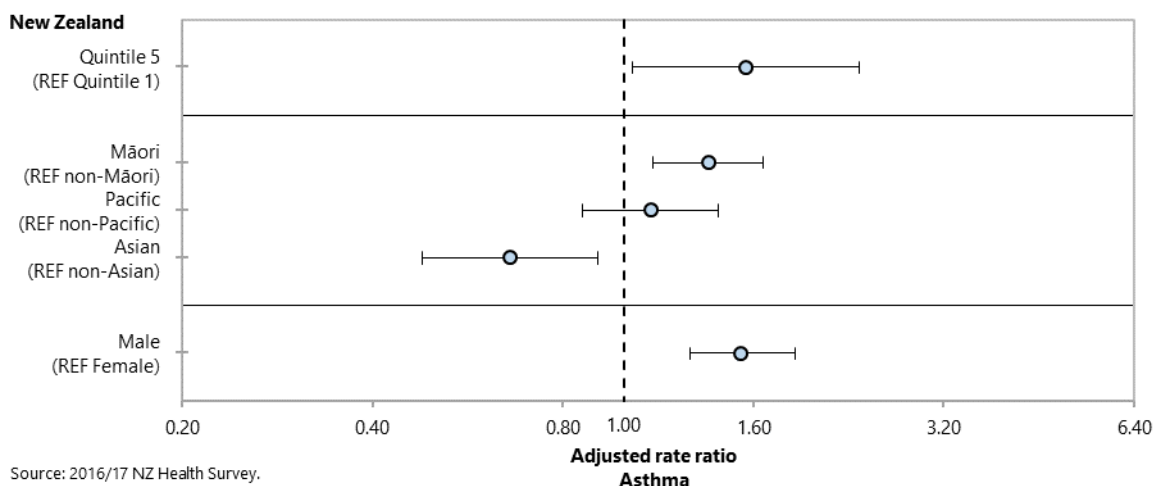


Source: 2016/17 NZ Health Survey.

Children diagnosed and currently treated for asthma (2–14 years);

Quintile is NZDep2013 Index of deprivation (1 = least deprived; 5 = most deprived)

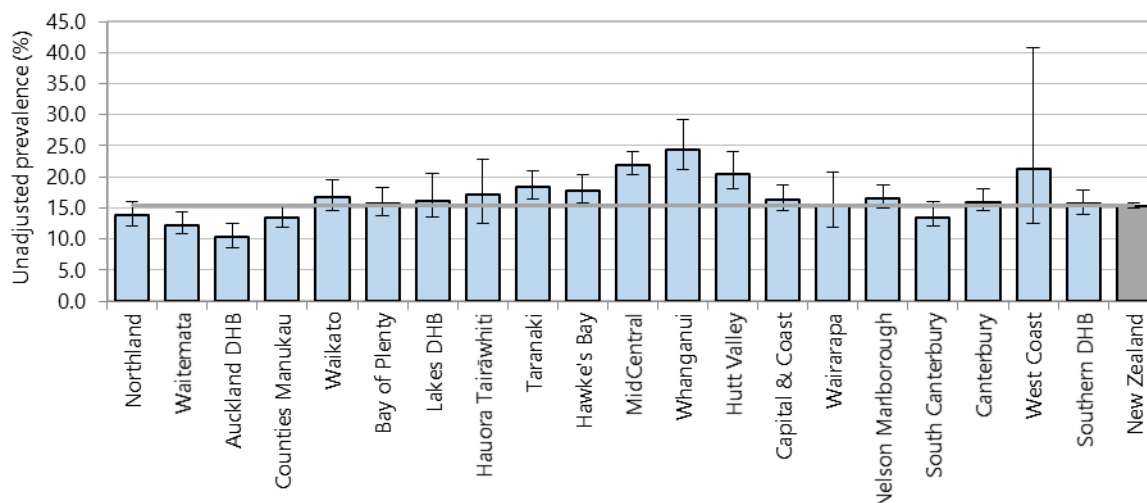
Figure 10-3. Asthma among 2–14 year olds, by demographic factor, NZ Health Survey 2016/17



Source: 2016/17 NZ Health Survey.
 Children diagnosed and currently treated for asthma (2–14 years);
 Ethnicity is total response, Quintile is NZDep2013 Index of deprivation (1 = least deprived; 5 = most deprived)

Figure 10-4 shows the percentage of 2–14 year olds who were diagnosed and currently treated for asthma by district health boards for the pooled 2014/15 to 2016/17 New Zealand Health Surveys. Hutt Valley DHB had a prevalence rate of asthma that was higher than the rate for New Zealand, while Capital & Coast and Wairarapa DHBs had similar rates to New Zealand as a whole.

Figure 10-4. Asthma among 2–14 year olds, by district health board, NZ Health Survey 2014–2017



Source: NZ Health Survey 2014–2017; Children diagnosed and currently treated for asthma (2–14 years)

Hospitalisations

The hospitalisation rates of under-15 year olds for asthma and wheeze have gradually increased since 2000. Since 2009, the hospitalisation rates have remained fairly stable between 6–7 hospitalisations per 1,000 0–14 year olds per year (Figure 10-5).

From 2013–2017 there were 6.9 hospitalisations for asthma and wheeze per 1,000 0–14 year olds. Over half of these hospitalisations had a primary diagnosis of asthma and most of the remainder had a primary diagnosis of wheeze (Table 10-1). Since 2008, there has been a gradual increase in the diagnosis of wheeze amongst hospitalised under-15 year olds, with a corresponding decline in asthma diagnoses (Figure 10-6).

Figure 10-5. Hospitalisations of 0–14 year olds for asthma and wheeze, New Zealand 2000–2017

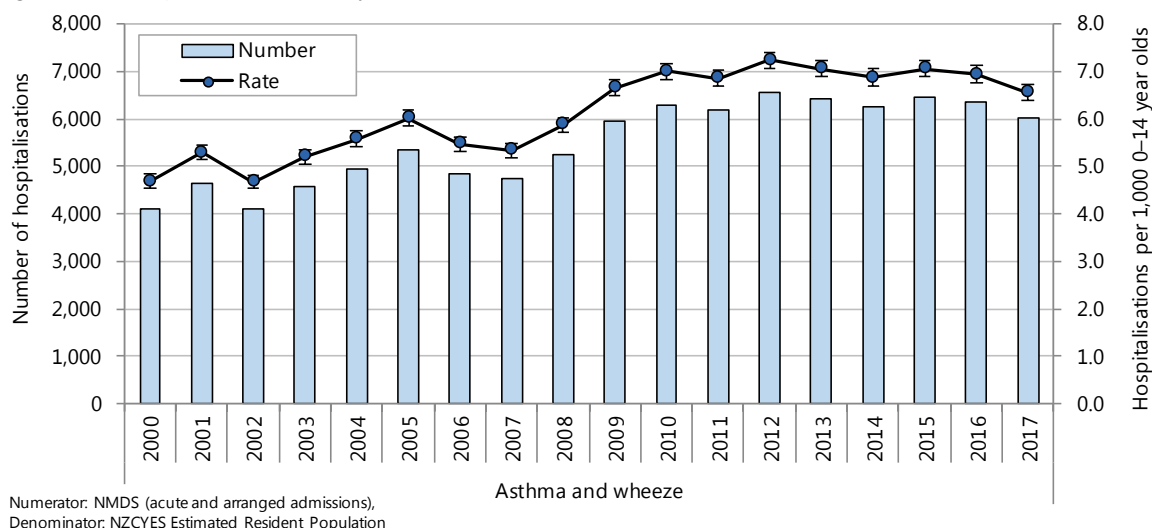
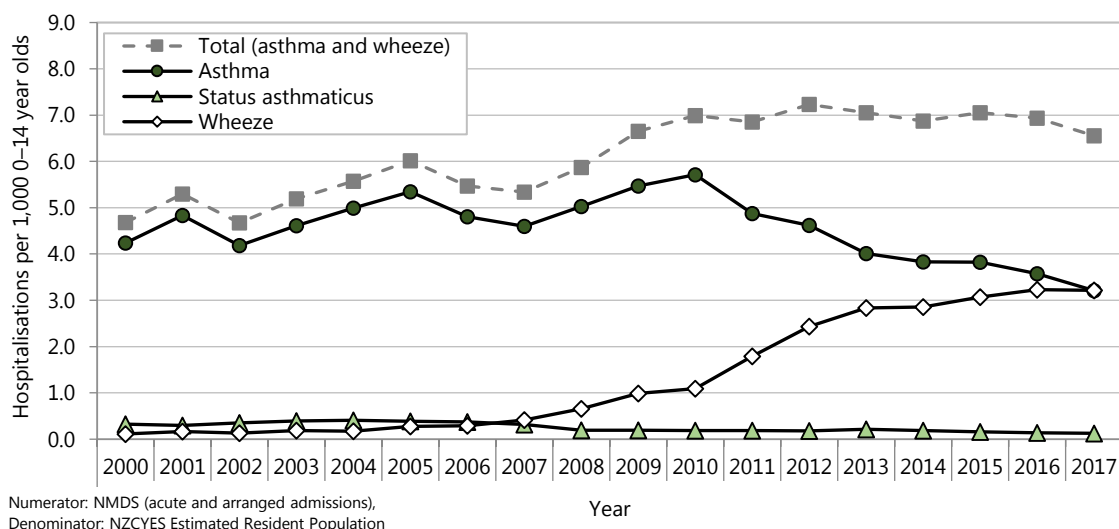


Table 10-1. Hospitalisations of 0–14 year olds for asthma and wheeze, by primary diagnosis, New Zealand 2013–2017

Primary diagnosis	Number	Annual average (n)	Rate per 1,000 0–14 year olds	95% CI	%
Hospitalisations of 0–14 year olds for asthma and wheeze during 2013–2017					
New Zealand					
Asthma	16,862	3,372	3.69	3.63–3.74	53.5
Status asthmaticus	754	151	0.16	0.15–0.18	2.4
Wheeze	13,909	2,782	3.04	2.99–3.09	44.1
Total	31,525	6,305	6.89	6.82–6.97	100.0

Numerator: NMDS (acute and arranged admissions), Denominator: NZCYES Estimated Resident Population

Figure 10-6. Trends in hospitalisations of 0–14 year olds for asthma and wheeze, by primary diagnosis, New Zealand 2000–2017



From 2013–2017 the hospitalisation rate for asthma and wheeze was highest for one year olds, and fell with increasing age. For ages 15 to 24 years the hospitalisation rates were similar and much lower than for younger age groups (Figure 10-7).

Figure 10-7. Hospitalisations for asthma and wheeze in 0–24 year olds, by age, New Zealand 2013–2017

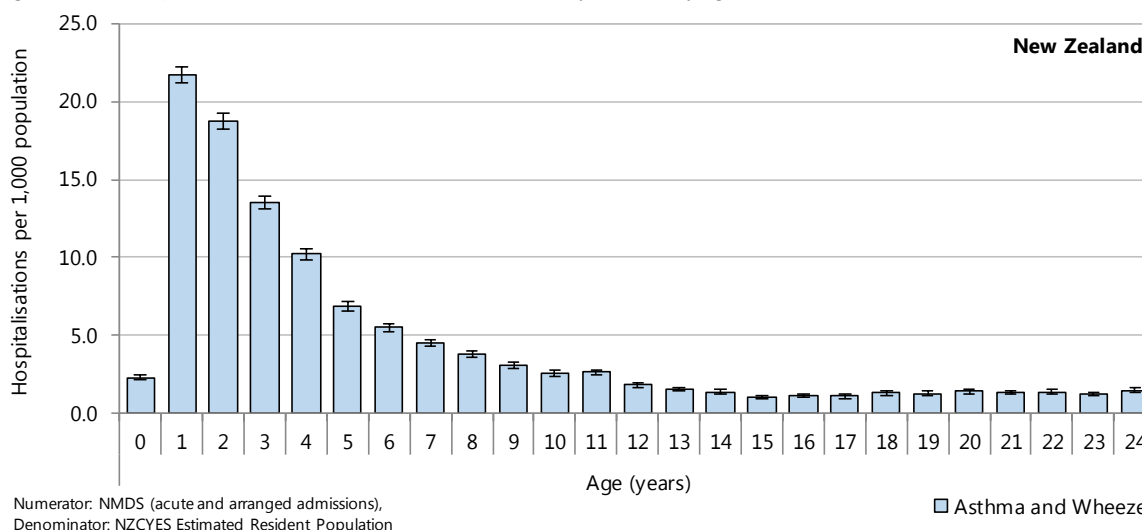


Figure 10-8 presents the unadjusted rate ratios for hospitalisations of under-15 year olds with asthma and wheeze between 2003 and 2017, by residential deprivation score (NZDep2013 index), age, ethnicity, and gender. The unadjusted rate ratio presents the gap, if any, between the groups and the reference group although this univariate analysis does not quantify the independent effect of each factor. The following differences were observed:

- There was a gradient of increasing hospitalisation rates for asthma and wheeze among under-15 year olds with increasing residential NZDep2013 deprivation scores. The hospitalisation rate for under-15 year olds residing in neighbourhoods with the highest deprivation scores (quintile 5) was 2.6 times higher than the rate for those residing in areas with the lowest scores (quintile 1).
- The hospitalisation rates for under-15 year olds of European/Other ethnicity were significantly lower than the other ethnic groups. For under-15 year olds of Pacific ethnicity, the rates were three times higher and for Māori under-15 year olds the rate was twice the asthma and wheeze hospitalisation rate for European/Other under-15 year olds. (Figure 10-8).
- The asthma and wheeze hospitalisation rate was significantly higher for males compared to females aged under-15 year olds, and rates were significantly higher for under-10 year olds, with the rate for under-5 year olds being over six times higher than the rate for 10–14 year olds.

The trends in hospitalisation rates by residential deprivation score and by ethnicity are presented in Figure 10-9 and Figure 10-10. There has been a gradient in hospitalisation rates by neighbourhood deprivation score through this whole time period, however the gap between quintile 5 and the other quintiles widened considerably between 2007 and 2010 and this inequity has persisted through to 2017 (Figure 10-9). The increase in hospitalisation rates for asthma and wheeze over time were observed for all ethnic groups. Rates for Pacific, Māori and MELAA rates were consistently higher than the European/Other and Asian/Indian rates.

Figure 10-8. Hospitalisations of 0–14 year olds for asthma and wheeze, by demographic factors, New Zealand 2013–2017

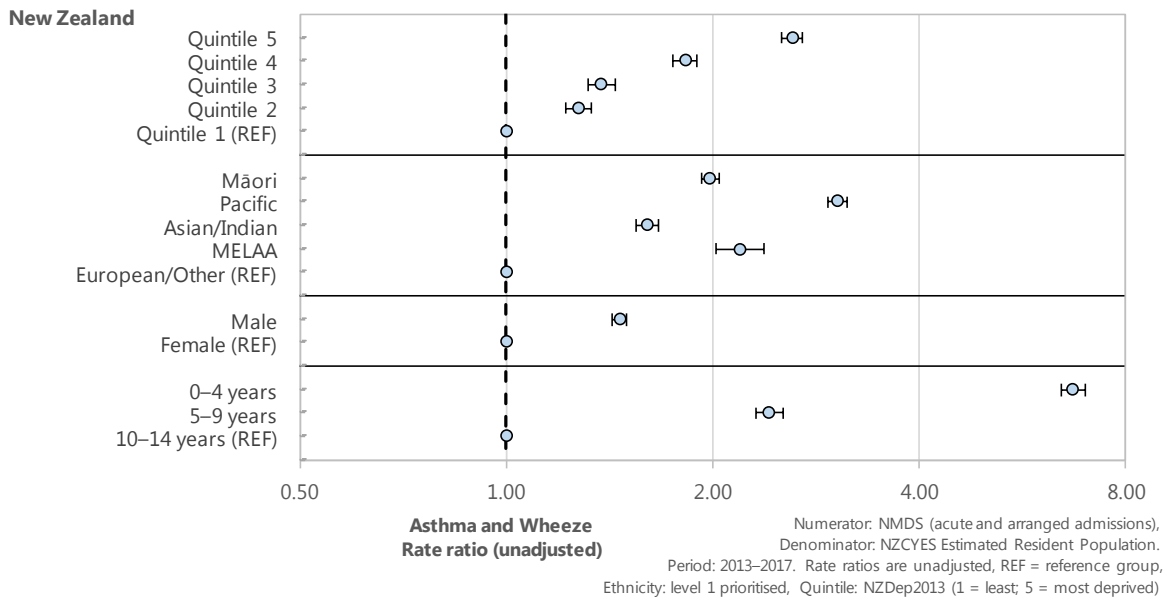


Figure 10-9. Hospitalisations of 0–14 year olds for asthma and wheeze, by NZ Deprivation Index quintile, New Zealand 2000–2017

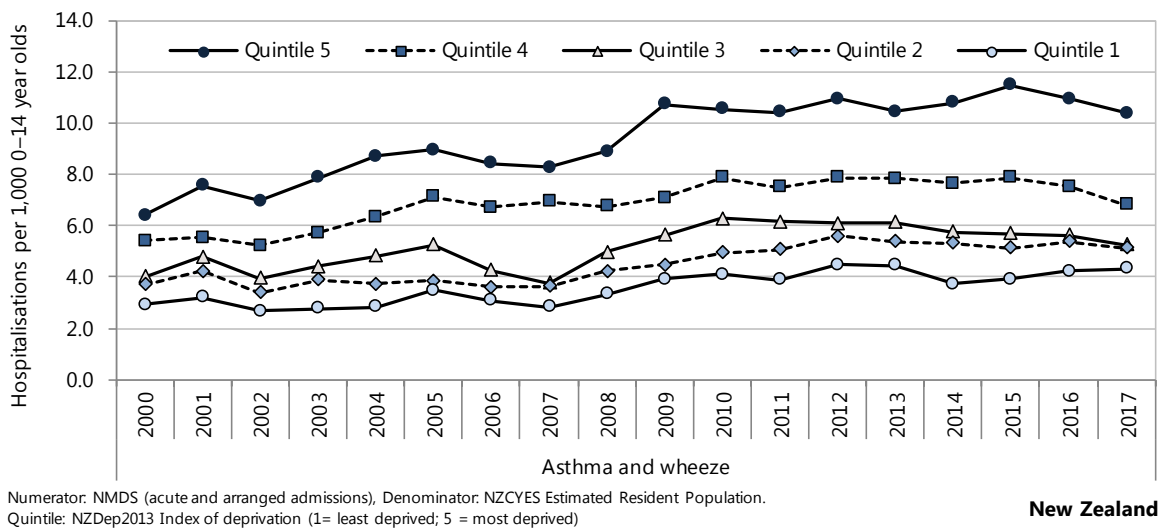
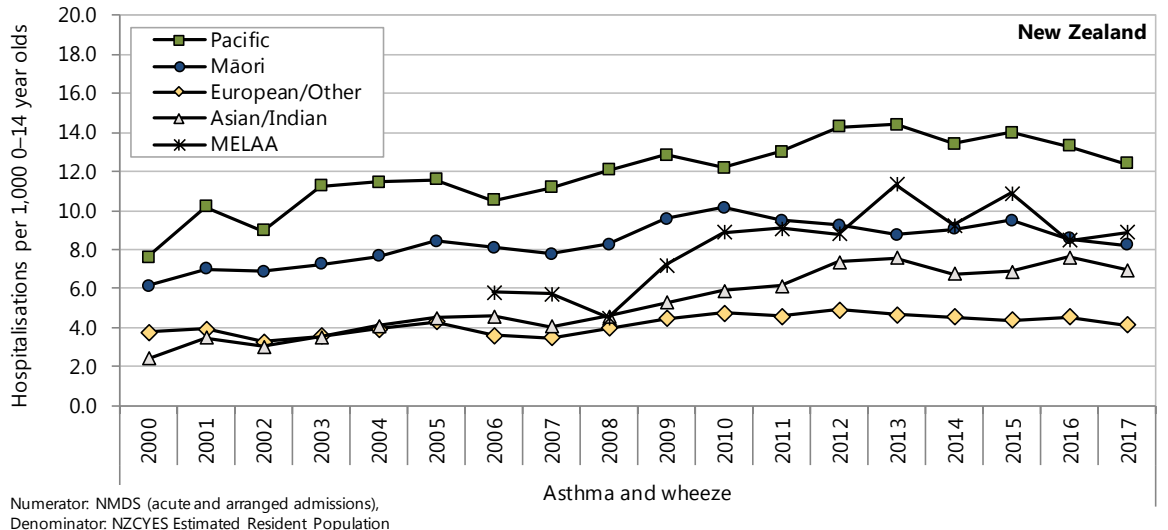


Figure 10-10. Hospitalisations of 0–14 year olds for asthma and wheeze, by ethnicity, New Zealand 2000–2017



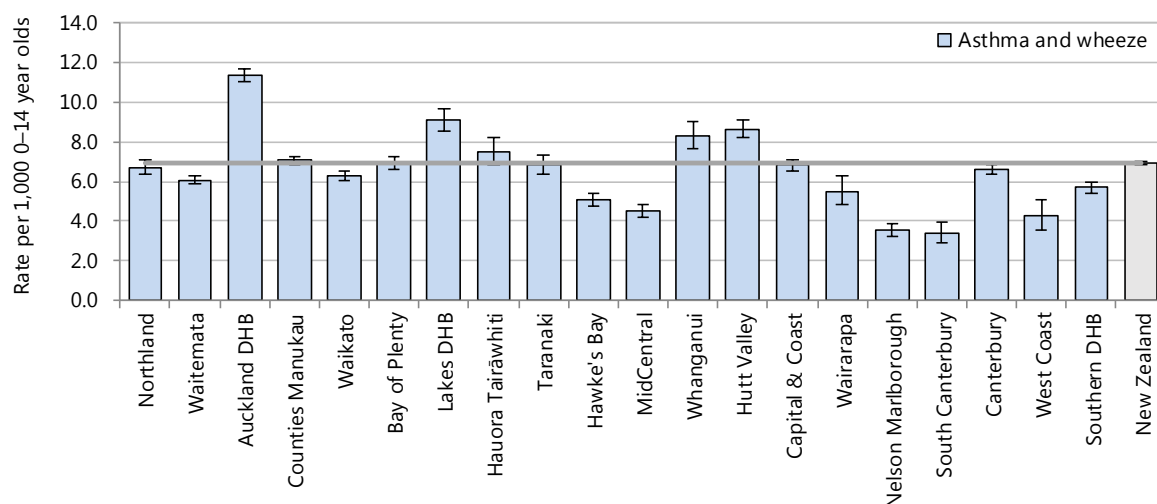
Over the five years between 2013 and 2017 the average number of hospitalisations per individual with asthma and wheeze was 1.5 in Capital & Coast and Wairarapa DHBs, and 1.6 in Hutt Valley. The hospitalisation rate of under-15 year olds with asthma and wheeze was significantly higher in Hutt Valley than the national hospitalisation rate, and significantly lower for Wairarapa (Table 10-2, Figure 10-11). There was no significant difference from the national rate for Capital & Coast DHB. Over half of the hospitalisations in Capital & Coast had a diagnosis of wheeze, and a diagnosis of asthma accounted for over half of the hospitalisations in Hutt Valley and nearly 70% in Wairarapa (Table 10-3).

Table 10-2. Hospitalisations of 0–14 year olds for asthma and wheeze, Hutt Valley, Capital & Coast and Wairarapa DHBs vs New Zealand 2013–2017

DHB	Individuals (n)	Hospitalisations (n)	Annual average (n)	Rate per 1,000 0–14 year olds	Rate ratio	95% CI
Hospitalisations of 0–14 year olds during 2013–2017						
Asthma and wheeze						
Hutt Valley	795	1,278	256	8.66	1.26	1.19–1.33
Capital & Coast	1,259	1,888	378	6.82	0.99	0.94–1.04
Wairarapa	156	233	47	5.51	0.80	0.70–0.91
New Zealand	19,473	31,525	6,305	6.89	1.00	

Numerator: NMDS (acute and arranged admissions), Denominator: NZCYES Estimated Resident Population. Rate ratios are unadjusted

Figure 10-11. Hospitalisations of 0–14 year olds for asthma and wheeze, by district health board, 2013–2017



Numerator: NMDS (acute and arranged admissions), Denominator: NZCYES Estimated Resident Population

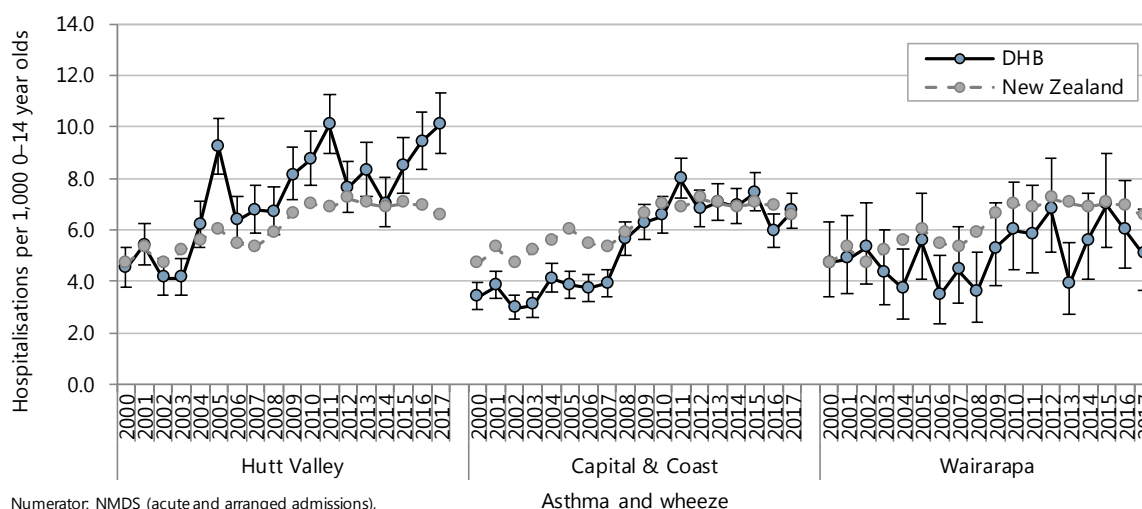
Table 10-3. Hospitalisations of 0–14 year olds for asthma and wheeze, by primary diagnosis, Hutt Valley, Capital & Coast and Wairarapa DHBs 2013–2017

Primary diagnosis	Number	Annual average (n)	Rate per 1,000 0–14 year olds	95% CI	%
Hospitalisations of 0–14 year olds for asthma and wheeze during 2013–2017					
Hutt Valley DHB					
Asthma	691	138	4.68	4.34–5.04	54.1
Status asthmaticus	40	8	0.27	0.19–0.37	3.1
Wheeze	547	109	3.70	3.40–4.03	42.8
Total	1,278	256	8.66	8.19–9.14	100.0
Capital & Coast DHB					
Asthma	780	156	2.82	2.62–3.02	41.3
Status asthmaticus	32	6	0.12	0.08–0.16	1.7
Wheeze	1,076	215	3.89	3.66–4.13	57.0
Total	1,888	378	6.82	6.51–7.13	100.0
Wairarapa DHB					
Asthma	161	32	3.81	3.24–4.45	69.1
Status asthmaticus	8	2	0.19	0.08–0.37	3.4
Wheeze	64	13	1.51	1.17–1.93	27.5
Total	233	47	5.51	4.83–6.27	100.0

Numerator: NMDS (acute and arranged admissions), Denominator: NZCYES Estimated Resident Population

The asthma and wheeze hospitalisation rates for under-15 year olds residing in Hutt Valley and in Capital & Coast DHBs have increased overall since 2000. Since 2004 the hospitalisation rates for Hutt Valley have been consistently higher than the national rate, while rates for the Wairarapa have been consistently lower, and similar to the national rates for Capital & Coast since 2009 (Figure 9-7).

Figure 10-12. Hospitalisations of 0–14 year olds for asthma and wheeze, Hutt Valley, Capital & Coast and Wairarapa DHBs 2000–2017



Numerator: NMDS (acute and arranged admissions), Denominator: NZCYES Estimated Resident Population

Evidence for good practice for the prevention and management of asthma

Possibilities for prevention

Common risk factors for respiratory conditions, including asthma, include poverty, poorly heated homes and household crowding, poor nutrition, frequent or severe lower respiratory infections during childhood, exposure to tobacco smoke and environmental air pollution.^{2,7} Eliminating poverty and improving housing are effective actions to prevent or mitigate severity of asthma and other childhood respiratory conditions.²

Childhood respiratory disease can be prevented or ameliorated by several basic measures including: improving childhood nutrition, promoting breastfeeding, complete timely immunisation, improving living conditions to prevent crowding, avoiding tobacco smoke exposure and reducing indoor air pollution. Influenza infection can be associated with asthma exacerbations.⁸ In New Zealand the annual influenza vaccine is free for anyone (aged over 6 months) who regularly uses an asthma preventer, and for under-four year olds who have been hospitalised or have a history of significant respiratory illness.^{2,9} Avoiding smoking during pregnancy and avoidance of passive smoke exposure after birth can reduce asthma severity in children.^{10,11} The emphasis needs to be on smoking cessation, as exposure to environmental tobacco smoke remains high even when smoking parents maintain smoke-free homes and cars.¹² Legislation and political action on clean air makes a difference and can significantly reduce hospitalisations for respiratory disease.¹⁰

Good health practice

An effective approach to addressing respiratory disease includes ready access to highly skilled health care, early (rather than late) intervention, close links between the various components of the health sector and high levels of health literacy.² Asthma severity and hospitalisation rates can be reduced through better treatment, improved access to primary care and educational interventions for parents, children and healthcare providers.¹³ It is very important that all children who have asthma are promptly and correctly diagnosed, based on a careful clinical history and assessed response to inhaled bronchodilator or corticosteroid treatment.³ For every child with asthma, the severity of their condition, the level of control of symptoms, and their future risk of adverse outcomes, including severe exacerbations must be carefully assessed.³ All children with asthma should be involved in developing their own asthma action plan, which they and their family understand and which is reviewed regularly with a health professional.³

Equity

Across all respiratory health indicators, by the far the most relentless and disturbing pattern was the high degree of inequality, across both the socio-economic spectrum and different ethnic groups.¹⁴ Interventions to effectively address such inequity in respiratory health are essential. They will require change from individuals, health care providers and health policy leaders to create the broad societal change needed to address the wider determinants of health.¹⁵ Addressing social determinants of health and improving health service delivery are both important.¹⁶ Health service providers need appropriate clinical skills to understand patients' beliefs, attitudes, experiences, and behaviours and demonstrate cross-cultural communication and competence in interactions with patients.¹⁵ Observed disparities in the dispensing of preventive asthma treatment to Māori and Pacific children need to be addressed.^{17,18}

Māori with asthma are more likely to be hospitalised or die due to the condition, yet are less likely than non-Māori to be prescribed inhaled corticosteroids, have an asthma action plan or receive adequate asthma management education.^{3,17} Māori whānau have greater exposure to environmental triggers for asthma, such as smoking and poor housing.³ Pacific children experience disparities in health status and unequal access to health care compared with their non-Pacific peers.³ Over 60% of Pacific children live in households experiencing material hardship and half of these children are in households experiencing severe hardship.³ Communication difficulties can be a barrier to healthcare for Pacific families and interpreters should be used if necessary.³

People who are living on low incomes face a number of barriers to getting the health care they need when it is needed. These include distance to the nearest medical centre, not having a means of transport or not being able to afford a bus or taxi to get there, not being able to afford to attend appointments or collect prescription medicines, and time delays in getting an available doctor's appointment. These barriers can cause parents to delay seeking help for children with conditions such as asthma, until the problem becomes severe or there is a health emergency. Emergency department visits and hospital stays can be prevented by making it easier for individuals and families in low-income and high-needs groups to access primary care services.² Technology such as mobile phones, combined with a culturally sensitive approach, can be used to facilitate adherence to treatment.¹⁹ It may be appropriate to trial interventions such as patient education delivered by health-care

professionals and long-term follow-up after acute care visits provided that an appropriate plan is in place to monitor effectiveness.¹⁵

The New Zealand child and adolescent asthma guidelines outline ten key ways in which health professionals can improve outcomes and reduce inequities, in addition to prompting accurate diagnosis and clinically appropriate management.³

1. Encourage continuity of care with doctors and nurses in primary and secondary care with easy access to a trusted nurse and telephone follow-up where possible. These relationships are important.
2. Do not accept sickness as the norm and work with families to attain and maintain wellness.
3. Ask about smoke exposure, and encourage reducing tobacco smoke exposure in the child's environment (home and car). Recommend smoking cessation and give appropriate advice including referral to local services.
4. Recognise that many New Zealanders live in unhealthy housing, and some families are homeless. Ask about housing and unhealthy features (crowding, cold, damp, mouldy, unflued gas heater). Provide the family with information about having a healthy home and if relevant, refer for healthy housing assessment if available in your region.
5. Assume that most families struggle with income and ask about it. Enquire about ability to access the doctor, the pharmacy and paying for prescriptions. Check if the child's health condition meets the criteria for the Child Disability Allowance. Also check that the family is aware of the prescription subsidy scheme <https://www.health.govt.nz/your-health/conditions-and-treatments/treatments-and-surgery/medications/prescription-subsidy-scheme>
6. Assume little health literacy, and specifically ask the child and whānau what they understand, what they want to know, and use simple language to explain about asthma.
7. Check inhaler device technique and ask about adherence in an open way, such as “Many people take less preventer than the doctor prescribes—about how many times a week do you take your asthma preventer?”
8. Develop an appropriate asthma action plan with the child and family and check on each visit and make this available to schools and child care facilities where appropriate.
9. Identify any barriers that prevent the child or family from accessing care appropriate to asthma severity. Consider referral to an asthma educator, Māori providers or a paediatrician where available and appropriate.
10. Ensure the family know when and how to call an ambulance and clarify if this service will incur a charge in your region.

Guidelines, evidence-based reviews, New Zealand publications, and other relevant publications and websites

New Zealand strategies and guidelines

- Asher I, et al. 2017. **Asthma and respiratory foundation NZ child and adolescent asthma guidelines: A quick reference guide**. New Zealand Medical Journal, 130(1466), 10-33. <https://www.nzasthmaguidelines.co.nz/childguidelines-654716.html>
- Asthma and Respiratory Foundation of New Zealand. 2015. **Te hā ora (The breath of life): National Respiratory Strategy**. Wellington: The Asthma Foundation. <https://www.asthmafoundation.org.nz/about-us/advocacy/national-respiratory-strategy>

International guidelines

- Global Initiative for Asthma. 2016. **Global Strategy for Asthma Management and Prevention**. <http://ginasthma.org/2016-gina-report-global-strategy-for-asthma-management-and-prevention/>
- British Thoracic Society, Scottish Intercollegiate Guidelines Network. 2014. **British guideline on the management of asthma: A national clinical guideline**. London, Edinburgh: British Thoracic Society,

Scottish Intercollegiate Guidelines Network <https://www.brit-thoracic.org.uk/document-library/clinical-information/asthma/btssign-asthma-guideline-2014/>

- Chung KF, Wenzel SE, Brozek JL, et al. 2014. **International ERS/ATS guidelines on definition, evaluation and treatment of severe asthma.** *European Respiratory Journal*, 43(2), 343-73. <http://dx.doi.org/10.1183/09031936.00202013>
- Lougheed MD, Lemiere C, Ducharme FM, et al. 2012. **Canadian Thoracic Society 2012 guideline update: diagnosis and management of asthma in preschoolers, children and adults.** *Canadian Respiratory Journal*, 19(2), 127-64. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3373283/>
- Sveum R, Bergstrom J, Brottman G, et al. 2012. **Diagnosis and Management of Asthma.** Bloomington, MN: Institute for Clinical Systems Improvement. https://www.icsi.org/_asset/rsjvnd/Asthma.pdf

Evidence-based medicine reviews

- Okelo SO, Butz AM, Sharma R, et al. 2013. **Interventions to modify health care provider adherence to asthma guidelines. Comparative effectiveness review No. 95. (Prepared by Johns Hopkins University Evidence-based Practice Center under Contract No. 290-2007-10061-I.) AHRQ Publication No. 13-EHC022-EF.** Rockville, MD: Agency for Healthcare Research and Quality. <http://www.ncbi.nlm.nih.gov/books/NBK144097/>
- Frazer K, et al. 2016. **Legislative smoking bans for reducing harms from secondhand smoke exposure, smoking prevalence and tobacco consumption.** *Cochrane Database of Systematic Reviews*, (2). <http://dx.doi.org/10.1002/14651858.CD005992.pub3>
- Cates CJ & Rowe BH. 2013. **Vaccines for preventing influenza in people with asthma.** *Cochrane Database Syst Rev*(2) <http://dx.doi.org/10.1002/14651858.CD000364.pub4>

Other relevant publications

- Jones B, Ingham TR, Reid S, et al. 2015. **He māramatanga huangō: Asthma health literacy for Māori children in New Zealand.** Wellington: University of Otago. <https://www.asthmafoundation.org.nz/research/he-maramatanga-huangō-asthma-health-literacy-for-maori-children-in-new-zealand>
- Mogasale V, Vos T. 2013. **Cost-effectiveness of asthma clinic approach in the management of chronic asthma in Australia.** *Australia and New Zealand Journal of Public Health*, 37(3), 205-10 <http://dx.doi.org/10.1111/1753-6405.12060>

Websites

- **Asthma and Respiratory Foundation NZ** <http://asthmafoundation.org.nz/>
- PHARMAC. 2010. **Space to breathe.** <http://www.spacetobreathe.co.nz/>
- **Menzies School of Health Research Centre for Research Excellence in respiratory health** http://www.menzies.edu.au/page/Research/Centres_for_Research_Excellence/Centre_for_Research_Excellence_CRE_in_Respiratory_Health/

References

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3. Asher I, McNamara D, Davies C, et al. 2017. Asthma and Respiratory Foundation NZ child and adolescent asthma guidelines: A quick reference guide. *New Zealand Medical Journal*, 130(1466) 10-33. <https://www.nzasthmaguidelines.co.nz/childguidelines-654716.html>
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6. Ministry of Health. 2018. Regional data explorer 2014-17: New Zealand Health Survey. <https://minhealthnz.shinyapps.io/nz-health-survey-2014-17-regional-update> accessed May 2018.
7. World Health Organization. 2016. Chronic respiratory diseases. <http://www.who.int/respiratory/en/> accessed October 2016.
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9. Ministry of Health. 2017. Immunisation handbook 2017. Wellington: Ministry of Health. <https://www.health.govt.nz/publication/immunisation-handbook-2017>
10. Forum of International Respiratory Societies. 2013. Respiratory diseases in the world: realities of today - Opportunities for tomorrow. <https://www.ersnet.org/pdf/publications/firs-world-report.pdf> accessed October 2018.
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13. British Thoracic Society, Scottish Intercollegiate Guidelines Network. 2014. British guideline on the management of asthma: A national clinical guideline. London, Edinburgh: British Thoracic Society, Scottish Intercollegiate Guidelines Network. <https://www.brit-thoracic.org.uk/document-library/clinical-information/asthma/bttsign-asthma-guideline-2014/>
14. Telfar Barnard L, Zhang J. 2016. The impact of respiratory disease in New Zealand: 2016 update. <https://www.asthmafoundation.org.nz/research/the-impact-of-respiratory-disease-in-new-zealand-2014-update> accessed October 2018.
15. Finn PW, Cohen R. 2015. Approaches to achieving equality in respiratory health. *The Lancet Respiratory Medicine*, 3(2) 97-98. DOI:[http://dx.doi.org/10.1016/S2213-2600\(14\)70247-4](http://dx.doi.org/10.1016/S2213-2600(14)70247-4)
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17. Gillies TD, Tomlin AM, Dovey SM, et al. 2013. Ethnic disparities in asthma treatment and outcomes in children aged under 15 years in New Zealand: analysis of national databases. *Primary Care Respiratory Journal*, 22(3) 312-8. DOI:<http://dx.doi.org/10.4104/pcrj.2013.00068>
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11. Gastroenteritis

Acute gastroenteritis is a descriptive term for inflammation of the gastrointestinal tract from any cause.¹ It results in diarrhoea (three or more loose stools per day) and/or vomiting and it is spread via the faecal-oral route through close personal contact and fomites (contaminated objects such as door handles, towels, soiled clothes and linen and shared toys).² Gastroenteritis is a very common illness in children and a common reason for hospitalisation, especially in infants.³ Most cases are due to viruses (e.g. rotavirus and norovirus) but bacteria (e.g. *Campylobacter* and *Salmonella*) and protozoa (e.g. *Giardia* and *Cryptosporidium*) can also cause acute gastroenteritis.³ The main complication of acute gastroenteritis is dehydration which can necessitate admission to hospital for fluid replacement.³

This indicator presents information on hospitalisations of under-15 year olds for gastroenteritis using information from the National Minimum Dataset.

Data sources and methods

Hospitalisations of 0–14 year olds for gastroenteritis

Number of under-15 year olds discharged from hospital (excluding waiting list admissions) with a primary diagnosis of gastroenteritis (per 1,000 age-specific population)

Data sources

Numerator: National Minimum Dataset (NMDS)

Denominator: NZCYES extrapolated estimated resident population (with intercensal extrapolation)

Additional information

An acute hospitalisation is an unplanned hospitalisation occurring on the day of presentation, while an arranged hospitalisation (referred to elsewhere as a semi-acute hospitalisation) is a non-acute hospitalisation with an admission date less than seven days after the date the decision was made that the hospitalisation was necessary.

A description of the National Minimum Dataset and the limitations of the data utilised from this collection are outlined in the appendices. Please read these before interpreting any trends.

Hospitalisations for gastroenteritis of New Zealand children aged 0–14 years gradually rose between 2000 and 2014, although there were year to year fluctuations. After the introduction of the rotavirus vaccine in mid-2014, the gastroenteritis hospitalisation rate fell 40% between 2014 and 2015 (Figure 11-1).

In the five years from 2013–2017 there were over 20,000 hospitalisations of 0–14 year olds for gastroenteritis. Hospitalisation rates were highest for under-two year olds (Figure 11-2).

Figure 11-1. Hospitalisations of 0–14 year olds for gastroenteritis, New Zealand 2000–2017

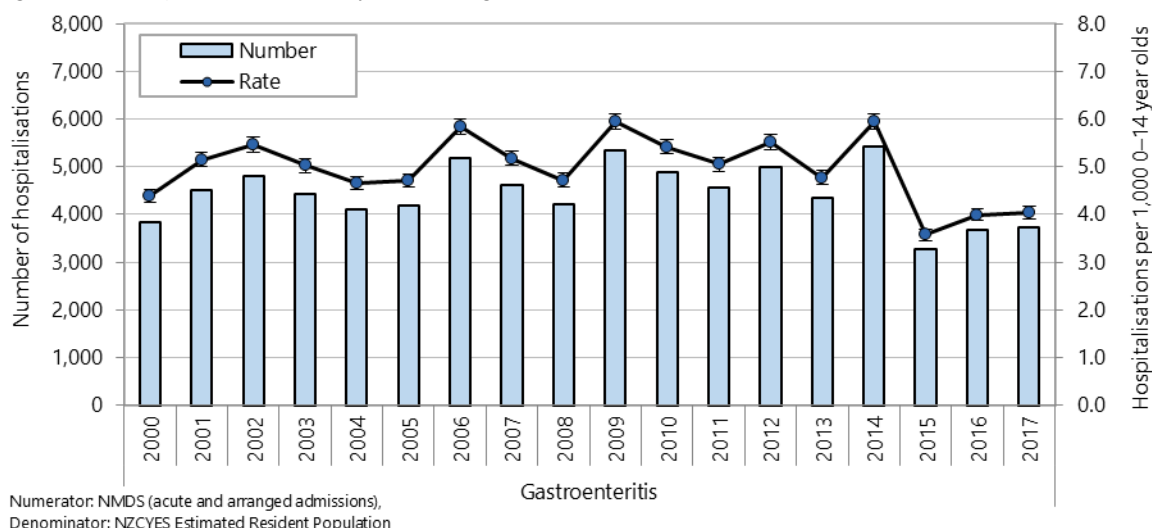
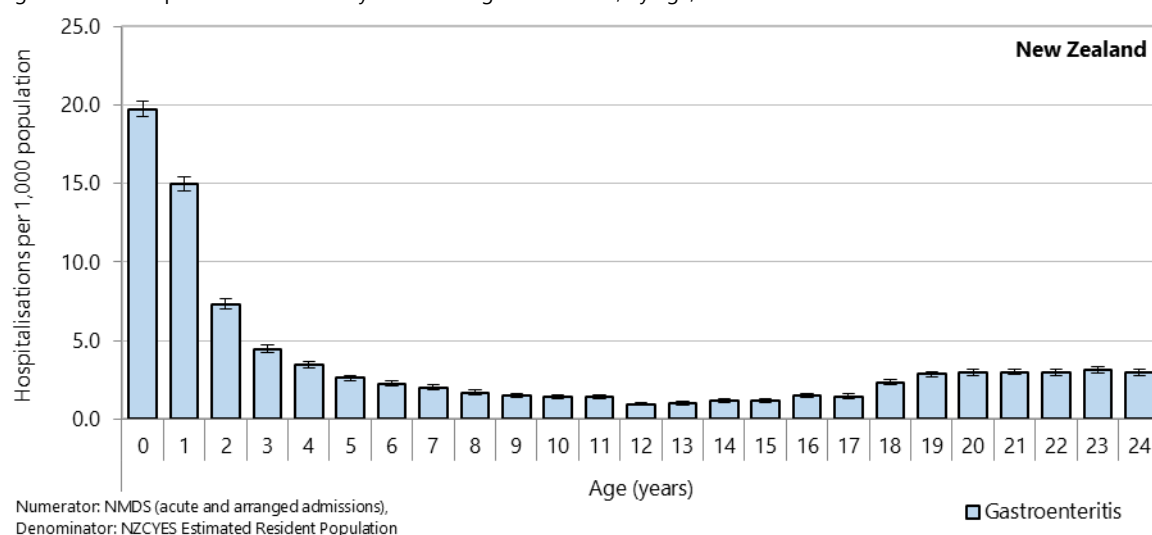


Figure 11-2. Hospitalisations of 0–14 year olds for gastroenteritis, by age, New Zealand 2013–2017



Over half of the gastroenteritis hospitalisations of under-15 year olds were presumed infectious although the specific agent was not identified. Where identified, viral infections were most common (Table 11-1). Following the introduction of the rotavirus vaccine, a drop of around 40% was observed for these two diagnoses, while hospitalisation for a bacterial gastroenteritis increased by over 20% (Figure 11-3).

Table 11-1. Hospitalisations of 0–14 year olds for gastroenteritis, by primary diagnosis, New Zealand 2013–2017

Primary diagnosis	Number	Annual average (n)	Rate per 1,000 0–14 year olds	95% CI	%
Hospitalisations of 0–14 year olds for gastroenteritis during 2013–2017					
New Zealand					
<i>Bacterial</i>					
Typhoid and paratyphoid fevers	61	12	0.01	0.01–0.02	0.3
Other salmonella infections	169	34	0.04	0.03–0.04	0.8
Shigellosis	33	7	0.01	0.00–0.01	0.2
Other bacterial intestinal infections	593	119	0.13	0.12–0.14	2.9
Other bacterial foodborne intoxications	35	7	0.01	0.01–0.01	0.2
<i>Parasitic</i>					
Amoebiasis	2	s	s	s	0.0
Other protozoal intestinal diseases	126	25	0.03	0.02–0.03	0.6
<i>Viral</i>					
Norovirus	167	33	0.04	0.03–0.04	0.8
Rotavirus	1,660	332	0.36	0.35–0.38	8.1
Other viral	6,928	1,386	1.51	1.48–1.55	34.0
<i>Other infectious</i>					
Other gastroenteritis and colitis of infectious origin	10,427	2,085	2.28	2.24–2.32	51.1
Other (presumed non-infectious)					
Non-infective gastroenteritis and colitis, unspecified	200	40	0.04	0.04–0.05	1.0
Total	20,401	4,080	4.46	4.40–4.52	100.0

Numerator: NMDS (acute and arranged admissions), Denominator: NZCYES Estimated Resident Population

Figure 11-3. Trends in hospitalisations of 0–14 year olds for gastroenteritis, by primary diagnosis, New Zealand 2000–2017

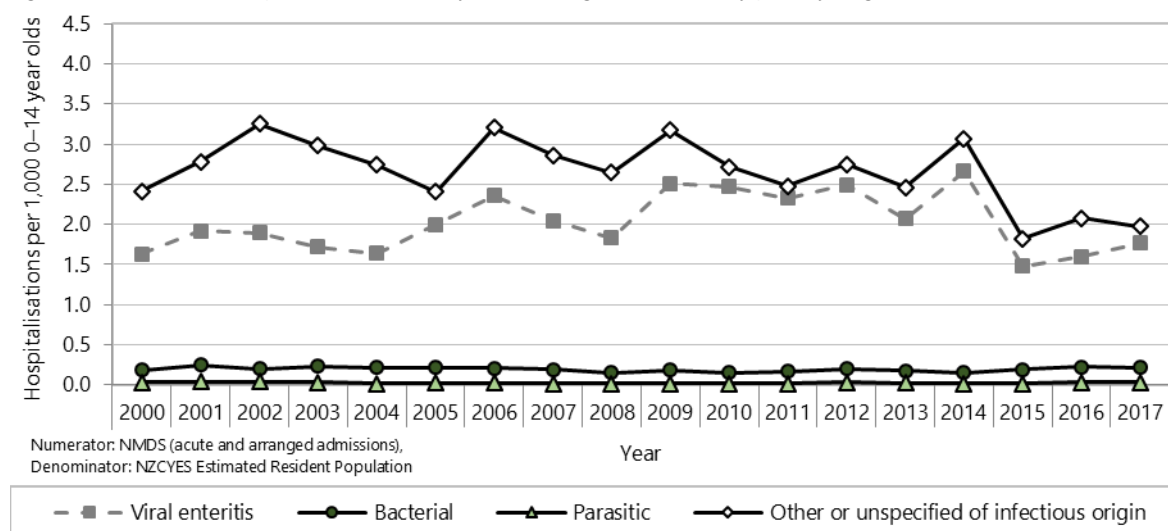


Figure 11-4 presents the unadjusted rate ratios of under-15 year olds for gastroenteritis, during 2013 to 2017, by residential deprivation score (NZDep2013 index), age, ethnicity, and gender. The trends in hospitalisation rates by ethnicity and by residential deprivation score are presented in Figure 11-5 and Figure 11-6. The unadjusted rate ratio presents the gap, if any, between the groups and the reference group. The following associations were observed, bearing in mind that this univariate analysis does not quantify the independent effect of each factor.

- Rates for under-5 year olds were over eight times higher than rates of 10–14 year olds. There was a clear social gradient with increasing hospitalisation rates for children living in areas with higher scores on the NZDep2013 index of deprivation (Figure 11-4), and this has been a consistent pattern over time (Figure 11-6). Hospitalisation rates for children who lived in areas with the highest NZDep2013 scores were twice the rate of children living in areas with the lowest scores (Figure 11-4).

- Hospitalisation rates were significantly lower for Māori compared with European/Other, while rates for under-15 year olds of Pacific, Asian/Indian, or MELAA ethnicities were over 1.5 times the hospitalisation rates of European/Other children (Figure 11-4). Patterns over time among the ethnic groups were similar to the overall national rate, with similar year-on-year fluctuations. Pacific rates were consistently higher than all other groups except MELAA, while Asian/Indian rates had increased to rates similar to Pacific children. Hospitalisation rates decreased for all ethnic groups following the introduction of the rotavirus vaccine (Figure 11-5).

Figure 11-4. Hospitalisations of 0–14 year olds for gastroenteritis, by demographic factors, New Zealand 2013–2017

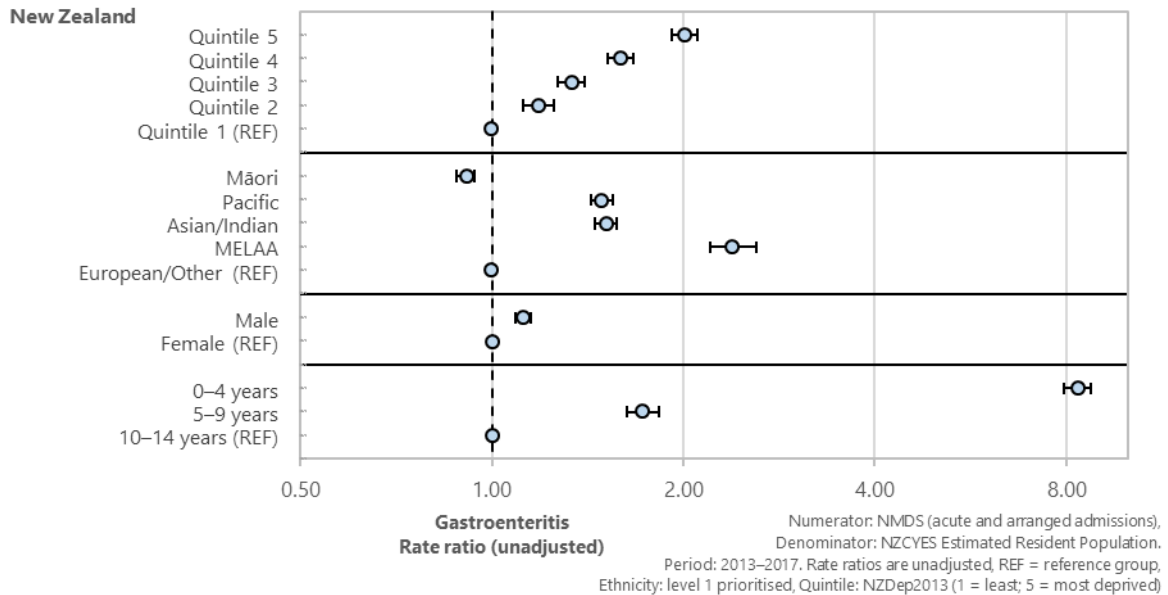


Figure 11-5. Hospitalisations of 0–14 year olds for gastroenteritis, by ethnicity, New Zealand 2000–2017

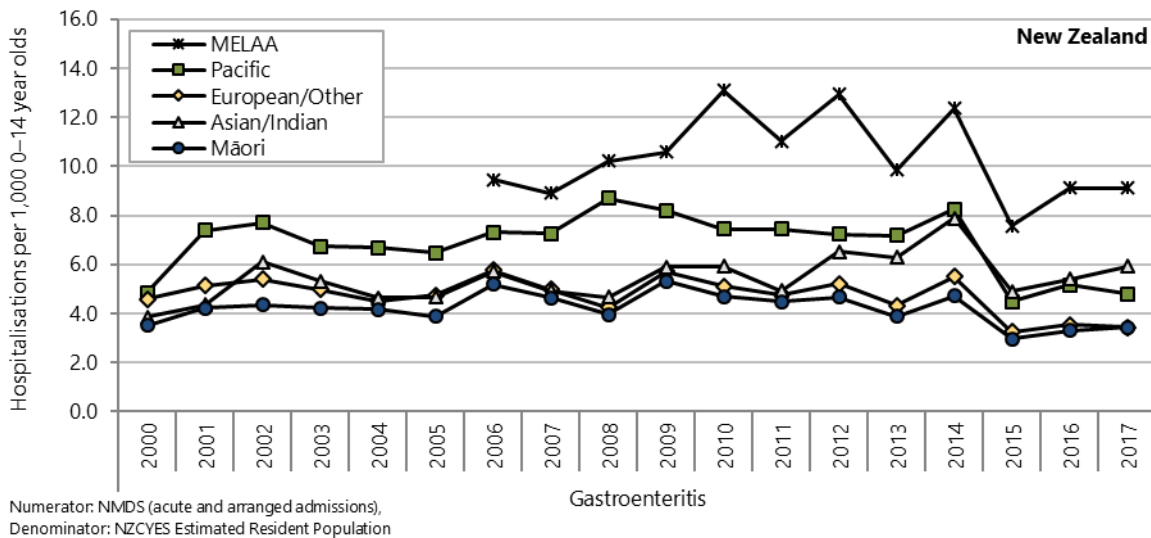
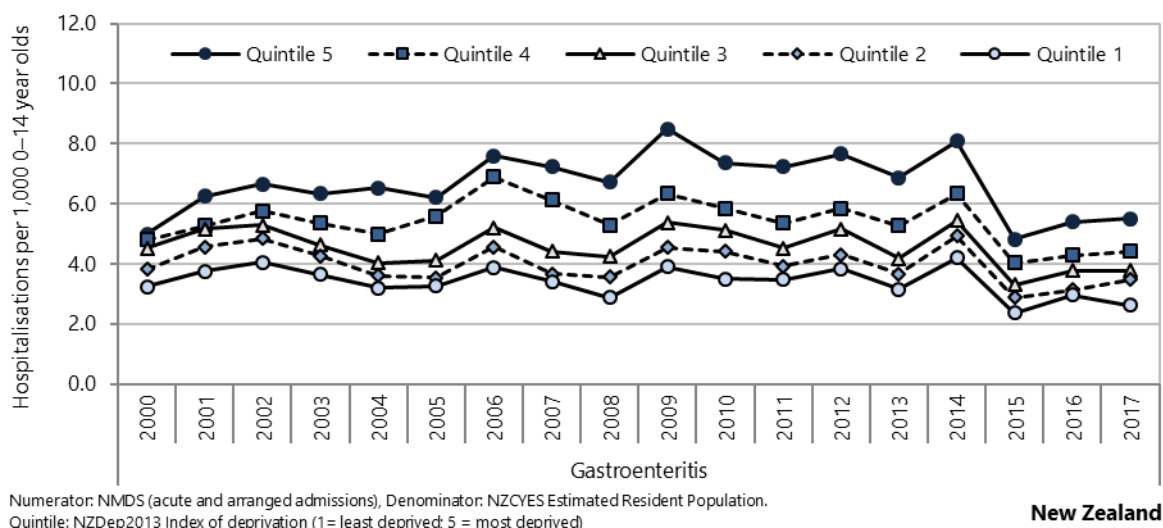


Figure 11-6. Hospitalisations of 0–14 year olds for gastroenteritis, by deprivation score, New Zealand 2000–2017



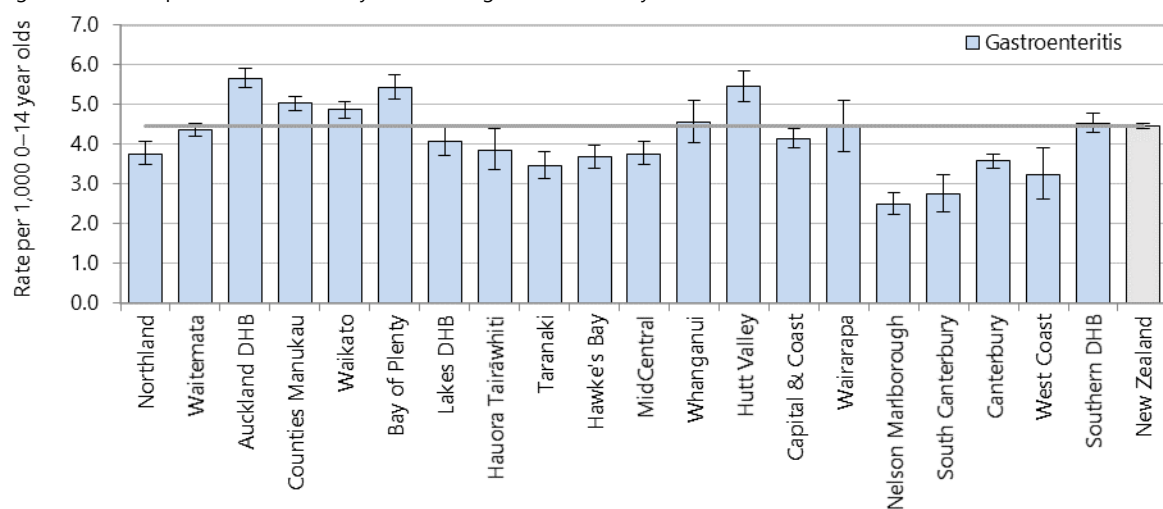
Gastroenteritis hospitalisation rates for under-15 year olds were significantly higher in Hutt Valley DHB than the national rate, and not significantly different for Capital & Coast and Wairarapa DHBs (Table 11-2, Figure 11-7). While there were year-on-year fluctuations, hospitalisations of under-15 year olds for gastroenteritis in Hutt Valley was consistently higher than the New Zealand rate. The rates of gastroenteritis hospitalisations in Capital & Coast had been consistently lower prior to 2012, after which they followed a similar pattern to the national rate, while rates were similar to national for Wairarapa from 2012 onwards (Figure 11-8).

Table 11-2. Hospitalisations of 0–14 year olds for gastroenteritis, Hutt Valley, Capital & Coast and Wairarapa DHBs vs New Zealand 2013–2017

DHB	Individuals (n)	Hospitalisations (n)	Annual average (n)	Rate per 1,000 0–14 year olds	Rate ratio	95% CI
Hospitalisations of 0–14 year olds during 2013–2017						
Gastroenteritis						
Hutt Valley	703	805	161	5.45	1.22	1.14–1.31
Capital & Coast	1,045	1,147	229	4.14	0.93	0.88–0.99
Wairarapa	176	187	37	4.43	0.99	0.86–1.15
New Zealand	18,108	20,401	4,080	4.46	1.00	

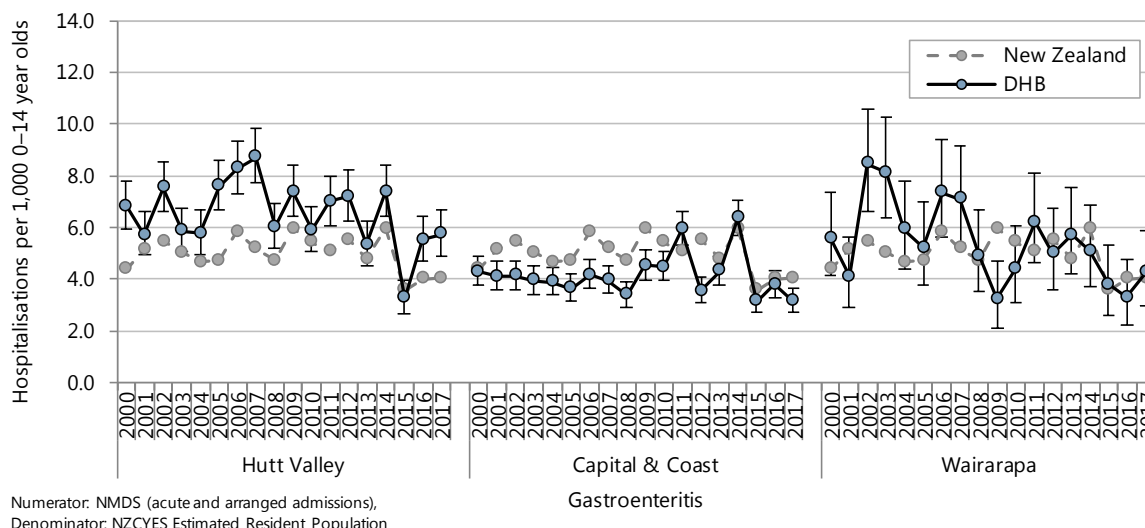
Numerator: NMDS (acute and arranged admissions), Denominator: NZCYES Estimated Resident Population. Rate ratios are unadjusted

Figure 11-7. Hospitalisations of 0–14 year olds for gastroenteritis, by district health board, New Zealand 2013–2017



Numerator: NMDS (acute and arranged admissions), Denominator: NZCYES Estimated Resident Population

Figure 11-8. Hospitalisations of 0–14 year olds for gastroenteritis, Hutt Valley, Capital & Coast and Wairarapa DHBs vs New Zealand 2000–2017



Evidence for good practice

Possibilities for prevention

The most common cause of severe gastroenteritis in children is rotavirus.⁴ Rotavirus is highly infectious and good sanitation and hygiene practices are inadequate for prevention.⁴ Nearly all children in high income countries have had a rotavirus infection by 3–5 years of age. Repeat infections are common but each successive infection is typically associated with milder symptoms and infections in adults are often asymptomatic.⁴

The best protection from rotavirus is vaccination with orally-administered live attenuated vaccines. The New Zealand immunisation schedule specifies that babies should receive two oral doses of Rotarix at the six week and three month visits.⁵ It is important that the first dose is given before 15 weeks of age to reduce the risk of intussusception (a condition in which the small bowel folds back inside another part of the intestine, causing a bowel obstruction).^{5,6} The vaccine offers greater than 80% protection against needing hospitalisation because of rotavirus infection in the first two years of life.⁷ The benefits of the vaccination greatly outweigh the slightly increased risk of intussusception in the first week after the first dose of the vaccine (estimated to be one or two additional cases per 100,000 vaccinated infants).^{6,8}

Case control studies in developed countries have shown that lack of breast feeding (in infants < 6 months of age⁹), prematurity, and low birth weight are associated with increased risk of hospital admission for rotavirus gastroenteritis.^{9,10} While observational studies have shown that breastfeeding appears to be protective, a case control study done in Bangladesh found that although exclusive breastfeeding greatly reduced the risk of severe rotavirus diarrhoea, breastfeeding in the second year of life (when children are also receiving solid food) was associated with a higher risk, so that the overall risk for the first two years of life was not changed by breastfeeding. The study authors stated that these findings suggested that effect of breastfeeding is to postpone rather than prevent severe rotavirus diarrhoea.¹¹

A recently published Australian study¹² estimated the degree of risk for gastroenteritis hospitalisation associated with gestational age, vaginal birth or caesarean delivery (by labour onset) and formula-only feeding while adjusting for confounders. The children who had the lowest risk of hospitalisation were those born vaginally after spontaneous onset of labour at 39+ weeks' gestation and who had any breastfeeding. The children with the highest risk for acute gastroenteritis hospitalisation were those born preterm by modes of birth other than vaginal birth following the spontaneous onset of labour and who received formula-only at discharge from birth care (62–78% higher risk than the lowest risk group). The study authors suggested that the protective effects of vaginal birth and breastfeeding may be related to their effects on the development of the infant gut microbiota and immunity.

The pathogens causing gastroenteritis, whether they are viruses, bacteria or parasites, are largely spread by the faecal oral route (although contact with infected vomit may also cause infection). In high income countries it is rare for faecal matter to get into drinking water so the main way pathogens are ingested is by contaminated hands touching food (or other objects that children put into their mouths).

A 2015 Cochrane review of handwashing interventions for preventing diarrhoea found high quality evidence that handwashing promotion (education activities, sometimes with the provision of soap) in day-care centres or schools prevents around one third of episodes of diarrhoea in high income countries.¹³ A New Zealand RCT of hand sanitiser in schools did not find that it prevented respiratory or gastrointestinal illness of severity sufficient to cause school absence.¹⁴

Educational interventions to improve people's food safety practices at home have the potential to reduce food-borne gastroenteritis. Surveys of food safety behaviours in the US, Canada and the UK have found that many consumers do not follow key safe food handling recommendations.¹⁵⁻¹⁷ A systematic review of qualitative studies dealing with barriers and facilitators to safe food handling found that, in general most consumers are not greatly concerned about food safety or motivated to change their behaviours based on new knowledge about food safety risks but they are amenable to changing their food handling habits through relevant social pressures.¹⁸ Some facilitators that were identified included: being concerned about children's welfare, the cost and inconvenience of illness, previous experience of food-borne illness, healthcare providers as a trusted source of food safety information, media coverage of food safety messages, and cultural traditions.¹⁸

A 2015 systematic review¹⁹ of food safety education interventions for consumers in developed countries identified 79 studies, including 17 RCTs. Study outcomes were knowledge, attitudes and behaviours (often self-reported) but not health measures (such as rates of gastrointestinal illness). The review authors stated that they had moderate-to high confidence in the results of two large well-conducted RCTs which found that food safety educational training and course interventions (specifically workshops and a web-based video game implemented in a classroom setting) are effective at improving behaviour outcomes in children and youth. Two small RCTs found that a video message in the form of a dialogue and an instructional written message about *Salmonella* improved food safety behavioural intentions in adults. Fifty of the 79 studies in the review used an uncontrolled before-and-after design and these studies provide low or very low quality evidence that many different educational interventions improve consumer food safety outcomes in a variety of contexts.

Good health practice in treating gastroenteritis

When assessing a child with diarrhoea and vomiting, it is important to determine whether there are signs and symptoms of clinical dehydration and shock and look for signs that indicate a more serious condition than infectious gastroenteritis.²⁰ Although infectious gastroenteritis is by far the most common cause of diarrhoea and vomiting in children, other more serious illnesses can also cause these symptoms, for example pneumonia, appendicitis and meningococcal disease.²⁰⁻²²

Parents should be asked about duration of illness, number of episodes of vomiting and diarrhoea per day, urine output, blood or mucus in the stool, bile-stained vomit, fever, abdominal pain, urinary complaints, food and fluid intake, immunisation history, recent antibiotics, recent contact with someone with acute diarrhoea and/or vomiting, exposure to a potentially contaminated water or food, and recent overseas travel.^{3,20}

Laboratory testing of stool samples is not usually necessary,^{20,23} but it may be appropriate in some circumstances, such as uncertainty about the diagnosis, diarrhoea with blood or mucus, suspicion of septicaemia, prolonged diarrhoea (> 7 days), an immunocompromised child, a history of overseas travel, or a community outbreak of gastroenteritis.^{20,24}

Children with gastroenteritis need to drink plenty of fluid to prevent dehydration.²⁵ They should take small amounts of fluid often (a teaspoonful every minute or a quarter of a cup every 15 minutes), even if they have been vomiting.²⁵ Babies should continue with breastfeeding or bottle feeding.^{20,26} Older children should be discouraged from drinking undiluted fruit juice or fizzy drinks as these have high concentrations of sugar which may make diarrhoea worse, but they may be given these drinks diluted

with five parts of water to one part of juice or fizzy drink or an oral rehydration solution such as Gastrolyte and Pedialyte.^{20,27}

Children with moderate to severe dehydration as a result of gastroenteritis need to spend time in hospital, and receive fluids either orally, through a nasogastric tube, or intravenously.²⁷ Most can be successfully treated with oral rehydration therapy, which is safer and more effective than intravenous therapy for all levels of dehydration except shock.^{27,28} A period of observation and treatment in the emergency department may be sufficient to achieve rehydration and allow discharge home.

Oral rehydration solutions (ORS) contain glucose (because it enhances the absorption of water and sodium from the intestine), electrolytes (sodium, potassium, chloride), and an alkalinising agent to counter acidosis (e.g. citrate). Oral rehydration solutions vary slightly in composition and those used in New Zealand are lower in sodium than the World Health Organization (WHO) formulation²⁹ because New Zealand children typically have less severe sodium loss than children in some other countries.^{27,30} Polymer-based oral rehydration solutions contain glucose polymers derived from whole rice, sorghum and maize to release glucose slowly into the gut and improve the absorption of the water and salt in the solution. There is evidence (mostly from trials in more tropical countries than NZ) that polymer-based ORS have advantages over glucose-based ORS with osmolarity ≥ 310 mOsm/l (the WHO standard prior to 2004) but more research is needed to compare the efficacy of polymer-based ORS with glucose-based ORS with osmolarity ≥ 270 mOsm/l (the current WHO standard).³¹

The available evidence indicates that oral rehydration therapy is as effective as intravenous fluid therapy in preventing admission to hospital from the emergency department and return visits to the emergency department.³²

The use of anti-emetics (drugs that reduce vomiting, particularly Ondansetron) reduces the chances that a child will require intravenous rehydration and/or hospitalisation but tends to increase the frequency of diarrhoea.³²⁻³⁴

The routine use of antibiotics for acute gastroenteritis is not recommended by international guidelines.³⁵ but there are rare circumstances where antibiotic treatment may be indicated, such as in infants aged less than three months with Salmonella.^{27,36}

Probiotics are preparations of microorganisms that are thought to have health benefits for people consuming them. Well-known probiotics are *Lactobacilli* and the yeast *Saccharomyces*. There have been many RCTs of probiotics for acute infectious diarrhoea in infants and young children.³⁷ This evidence indicates that, when used alongside rehydration therapy, probiotics appear to be safe and have clear benefits in shortening the duration of diarrhoea and reducing stool frequency, but that more research is needed regarding the use of particular probiotic regimens in specific groups of patients.³⁷

Antimotility drugs (such as Loperamide) are commonly used by adults with acute diarrhoea but most international guidelines and the WHO explicitly discourage their use in children under 12 years of age for the following reasons: they can cause severe paralytic ileus which can be fatal; they may prolong infection by delaying elimination of the causative organism; they can cause sedation; and some agents have been reported to have caused fatal central nervous system toxicity.^{35,38,39}

The antisecretory agent Racecadotril (not available in New Zealand, but used in the UK and parts of Europe) can prevent the loss of fluid and electrolytes from the bowel without affecting intestinal motility.⁴⁰ A 2016 systematic review⁴⁰ that used the Cochrane collaboration's methodology synthesised the evidence from seven RCTs all judged to be at moderate-to-high risk of bias. This review found that children with acute diarrhoea who were given Racecadotril rather than a placebo had significantly shorter duration of symptoms (mean difference -53.48 hours, 95% CI -65.64 to -41.33, data from 3 studies with 642 participants) and no difference in the rate of adverse events. The National Institute for Health and Care Excellence (NICE) noted that Racecadotril is more expensive than other anti-diarrhoeal drugs (which are not recommended from children younger than 12 years, although some are licenced in the UK for children aged 4 years and over) and does not remove the need for oral rehydration therapy.³⁶

Once a child is no longer dehydrated they can resume eating their usual solid foods as there is no evidence that resuming eating solid food before diarrhoea has ceased leads to increased vomiting, need for IV fluids or persistent diarrhoea.^{20,41,42} Young children with acute diarrhoea may temporarily lose their ability to digest lactose (the most common type of sugar in milk).⁴³ There is some evidence that, for bottle-fed or weaned young children, a change to a lactose free diet probably reduces the duration of acute diarrhoea (on average, by about 18 hours).^{43,44} This evidence comes mostly from trials involving hospital inpatients in high and middle income countries.⁴³

Parents should be advised to keep their child away from daycare, kindergarten and school until they have had no diarrhoea for 48 hours and they should be encouraged to use good hygiene practices at home: thorough handwashing and cleaning of bathrooms and toilets, washing the ill child's soiled clothing and linen separately in hot water, and avoiding sharing food and drinks.²⁵

Equity

Gastroenteritis is a very common condition in children and most cases are managed by parents at home.⁴⁵ The 2009 Acute Gastrointestinal Illness (AGI) study⁴⁶ asked a random sample of New Zealanders whether they had experienced at least one episode of diarrhoea and/or vomiting in the past four weeks. This survey found that almost 16% of children aged less than five years had experienced AGI. Among people of all ages, although both Māori and Pacific participants had higher prevalence of AGI than European /Other participants only the higher relative risk for Māori was statistically significant (Relative risk 1.29, 95% CI 1.02 to 1.64). There was no clear relationship between the prevalence of AGI and household size or household income or deprivation score (in either rural and non-rural populations). Multivariate regression indicated that only age (increasing risk with decreasing age) and season (increased risk in summer and autumn) were significantly associated with AGI. Māori were more likely than non-Māori to seek advice or treatment from a health professional (41% vs. 33%).

A 2018 systematic review⁴⁷ identified 102 English-language studies that quantitatively assessed an association between any symptomatic gastrointestinal infection (GI) in a representative population sample and socioeconomic status measured at an individual or aggregate level by occupation, income, education, employment or area-level deprivation, and were conducted after 1980 in an OECD country. Most of the studies (n=54) were judged to be of low quality, but 27 were of medium quality, and 19 of high quality.

The findings for children were as follows. All the population-based surveys, the hospitalisation studies and the GP presentation studies, and almost all the laboratory record studies found either no association between SES (either at the area or individual level) and GI or that GIs were higher in disadvantaged groups. Most of these studies were of low quality. The laboratory report studies indicated that there was a higher risk of GI infection in more disadvantaged children for person-to-person (viral and *Shigella*) and foodborne (*Campylobacter*, *Salmonella*, *Yersinia enterocolitica*) GI infections and no association for waterborne infections (*Giardia*, *Cryptosporidium*). Meta-analysis indicated that the overall gastrointestinal infection risk was significantly higher for children with lower SES than those with higher (RR 1.51, 95% CI 1.26–1.83).

In New Zealand there was a clear social gradient in rotavirus hospitalisations during 2010–2014 with the rate in the most deprived quintile being double the rate in the least.⁴⁸ The MELAA (Middle Eastern/Latin American/African) ethnic group had the highest rotavirus hospitalisation rates, followed by Pacific and then Māori for most years during 2010–2014. Following the introduction of the Rotavirus vaccination in July 2014, there was a dramatic drop in rotavirus hospitalisation rates for all deprivation groups in 2015, and differences between groups were no longer significant (although the most deprived group still had the highest rate).

A UK study evaluating the impact of rotavirus vaccination (in July 2013) in Merseyside found that the vaccine had the greatest impact in the most deprived populations, despite lower vaccine uptake.⁴⁹ The study authors estimated that, in 2014/15 for children aged less than 12 months, the rate of all-cause gastroenteritis hospitalisations averted per 1,000 first-dose rotavirus vaccinations delivered was 28 in the most deprived populations vs. 15 in the least. The corresponding figures in 2015/16 were 26 and 13.

Guidelines, evidence-based reviews, New Zealand publications, and other relevant publications and websites

New Zealand publications and websites

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International guidelines

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12. Serious skin infections

Skin infections are very common in children and they can be caused by bacteria, fungi, viruses and parasites.¹ Bacterial skin infections are commonly caused by *Staphylococcus aureus* or *Streptococcus pyogenes* and include impetigo, cellulitis, and skin abscesses. Fungal infections include ringworm and Tinea pedis (Athlete's foot).¹ Viral infections include *Molluscum contagiosum*, *Herpes simplex* and papilloma viruses, which cause cutaneous warts. The most common parasitic infections are scabies and head lice.¹ Skin infections have a wide range of severity, from the trivial pimple to the life threatening necrotising fasciitis.²

New Zealand has one of the highest rates of childhood skin infections in the Western world.³ Māori and Pacific children and children living in areas of high socioeconomic deprivation have especially high rates.⁴

Most skin infections can be effectively managed in primary care but serious skin infections need treatment in hospital. Reasons why a child with a skin infection may need hospital treatment include: needing intravenous antibiotics because of extensive cellulitis, needing surgical intervention for example to drain a large abscess or to deal with a complex wound, possible sepsis, having another serious illness such as diabetes, or being immunocompromised, for example because of organ transplantation or chemotherapy for cancer.^{5,6}

It has been estimated that there are 14 cases of skin infections treated in the community by general practitioners or other primary care providers for every one hospitalisation.⁷ Hospitalisations for skin infections are potentially avoidable through good primary care.⁸

The following section presents information on hospitalisations for skin infections in under-15 year olds. It concludes with a brief overview of evidence-based reviews and guidelines which consider the most effective interventions for preventing and managing serious skin infections.

Data sources and methods

Hospitalisations for skin infections in 0–14 year olds

Acute and arranged hospitalisations of 0–14 year olds with a primary diagnosis of (serious) skin infection (per 1,000 age-specific population).

Data sources

Numerator: National Minimum Dataset (NMDS)

Denominator: NZCYES estimated resident population (with intercensal extrapolation)

Additional information

An acute hospitalisation is an unplanned hospitalisation occurring on the day of presentation, while an arranged hospitalisation (referred to elsewhere in this report as a semi-acute hospitalisation) is a non-acute hospitalisation with an admission date less than seven days after the date the decision was made that the hospitalisation was necessary.

An overview of the National Minimum Dataset, and outline of its data limitations, are provided in the appendices for review before interpreting any patterns. The appendices also contain a list of the codes included.

The hospitalisation rates of under-15 year olds with skin infections gradually increased from 2000 to 2011 and then declined. The rate in 2017 was above the rate in 2000 (Figure 12-1).

The hospitalisation rate for skin infections during 2013 to 2017 was 3.4 hospitalisations per 1,000 0-14 year olds. For the same period, over 40% of the under-15 year olds hospitalised with skin infections were hospitalised with a primary diagnosis of cellulitis, and around 35% with cutaneous

abscess, furuncle and carbuncle (Table 12-1). Since 2008, there has been a gradual increase in the diagnosis of cellulitis in under-15 year olds (Figure 12-2).

Figure 12-1. Hospitalisations of 0–14 year olds for skin infections, New Zealand 2000–2017

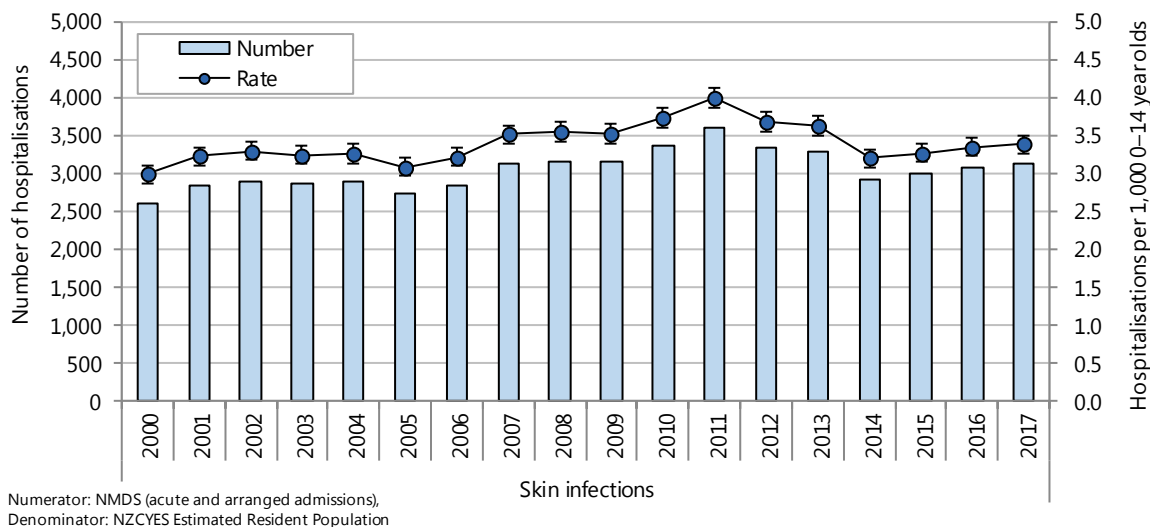
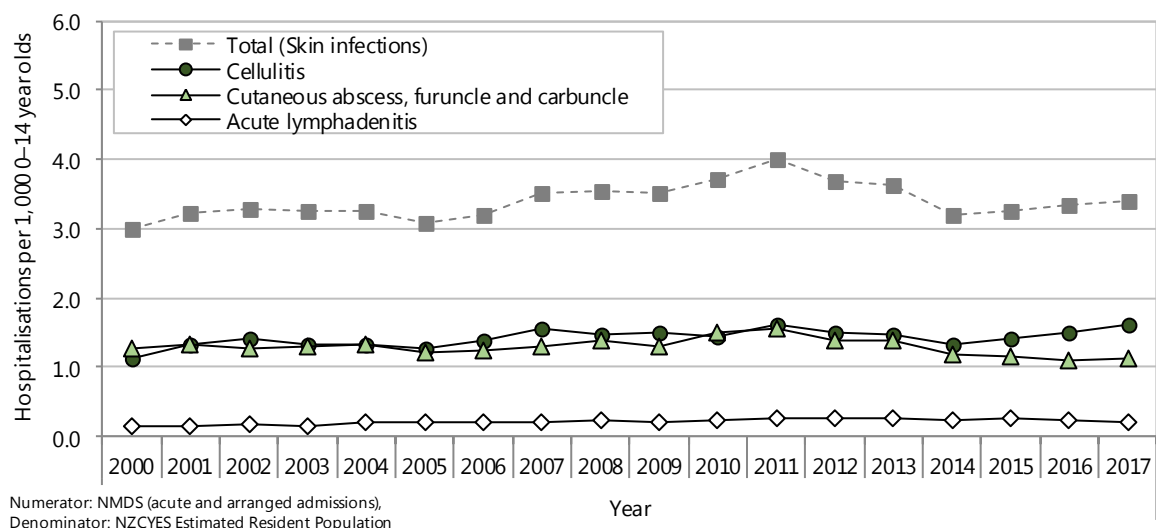


Table 12-1. Hospitalisations of 0–14 year olds for skin infections, by primary diagnosis, New Zealand 2013–2017

Primary diagnosis	Number	Annual average (n)	Rate per 1,000 0–14 year olds	95% CI	%
Hospitalisations of 0–14 year olds for skin infections during 2013–2017					
New Zealand					
Cellulitis	6,702	1,340	1.47	1.43–1.50	43.6
Cutaneous abscess, furuncle and carbuncle	5,416	1,083	1.18	1.15–1.22	35.2
Acute lymphadenitis	1,054	211	0.23	0.22–0.24	6.9
Impetigo	734	147	0.16	0.15–0.17	4.8
Other local infections of skin and subcutaneous tissue	563	113	0.12	0.11–0.13	3.7
Hordeolum and other deep inflammation of eyelid	382	76	0.08	0.08–0.09	2.5
Staphylococcal scalded skin syndrome	183	37	0.04	0.03–0.05	1.2
Other disorders of nose and nasal sinuses	152	30	0.03	0.03–0.04	1.0
Pilonidal cyst	132	26	0.03	0.02–0.03	0.9
Other disorders of skin and subcutaneous tissue, NEC	47	9	0.01	0.01–0.01	0.3
Non-infectious dermatoses of eyelid	11	2	<0.01		0.1
Total	15,376	3,075	3.36	3.31–3.42	100.0

Numerator: NMDS (acute and arranged admissions), Denominator: NZCYES Estimated Resident Population. NEC = not elsewhere classified

Figure 12-2. Trends in hospitalisations of 0–14 year olds for skin infections, by primary diagnosis, New Zealand 2000–2017



The hospitalisation rate for skin infections was highest for one-year-olds, and fell with increasing age until ages 12 to 13 years. Hospitalisation rates increased with increasing age for 14 to 19 year olds and remained at that higher level through to age 24 years (Figure 12-3).

Figure 12-3. Hospitalisations for skin infections in 0–24 year olds, by age, New Zealand 2013–2017

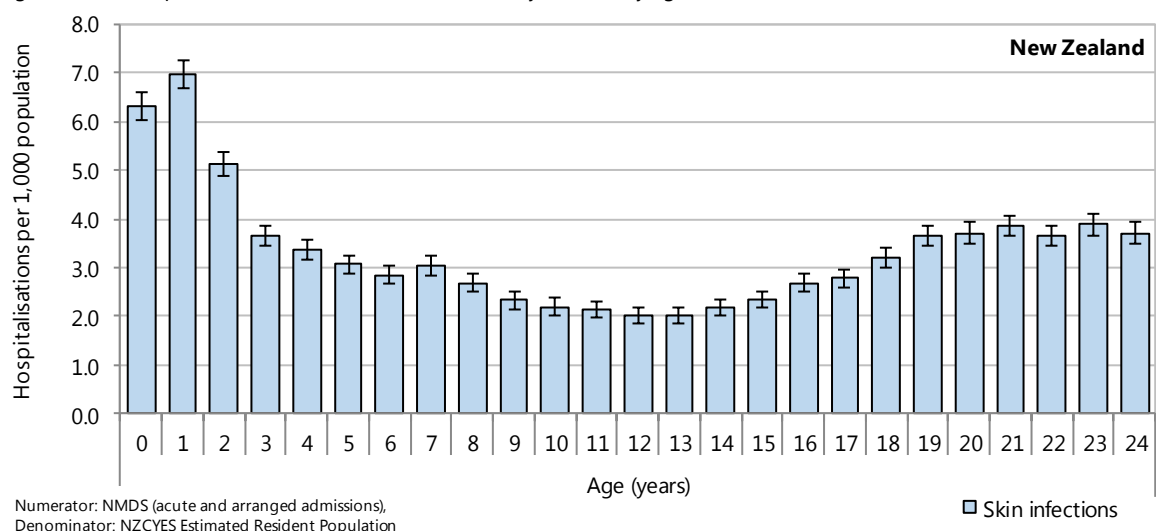


Figure 12-4 presents the unadjusted rate ratios for under-15 year olds hospitalised with skin infections by residential deprivation score (NZDep2013 index), age, ethnicity, and gender. The trends in hospitalisation rates by ethnicity and by residential deprivation score are presented in Figure 12-5 and Figure 12-6. The unadjusted rate ratio presents the gap, if any, between the groups and the reference group. The following associations were observed, bearing in mind that this univariate analysis does not quantify the independent effect of each factor.

There was a gradient of increasing hospitalisation rates for skin infections among under-15 year olds with each increasing quintile of neighbourhood NZDep2013 deprivation scores. The gap between quintile 5 and the other quintiles was particularly marked (Figure 12-4, Figure 12-6). Between 2009 and 2013 there was a notable increase in the rate of skin infections for quintile 5 and a widening of the gap between levels of social and material deprivation. The hospitalisation rate for under-15 year olds residing in quintile 5 neighbourhoods was nearly four times as high as the rate for those residing in areas with the lowest scores (quintile 1).

The hospitalisation rates for under-15 year olds of European/Other ethnicity were significantly lower than the other ethnic groups. For under-15 year olds of Pacific ethnicity, the hospitalisation rate was

almost five times as high and for Māori under-15 year olds the rate was more than twice as high as the rate for their European/Other peers (Figure 12-4). Hospitalisation rates were consistently highest for Pacific under-15 year olds, followed by Māori. From 2006 to 2011 there was an increase in skin infection hospitalisation rates for Māori and Pacific under-15 year olds, with a decline in hospitalisation rates for these groups since 2011. From 2014–2017 hospitalisation rates for skin infections have increased for MELAA and Asian/Indian children. European/Other under-15 year olds skin infection hospitalisation rates remained consistent around 1.9 per 1,000 0–14 year olds from 2000–2017 (Figure 12-5).

The skin infection hospitalisation rate was significantly higher for male under-15 year olds (RR:1.11) compared to female under-15 year olds, and rates for under-5 year olds were 2.4 times higher than the rates for 10–14 year olds.

Figure 12-4. Hospitalisations of 0–14 year olds for skin infections, by demographic factors, New Zealand 2013–2017

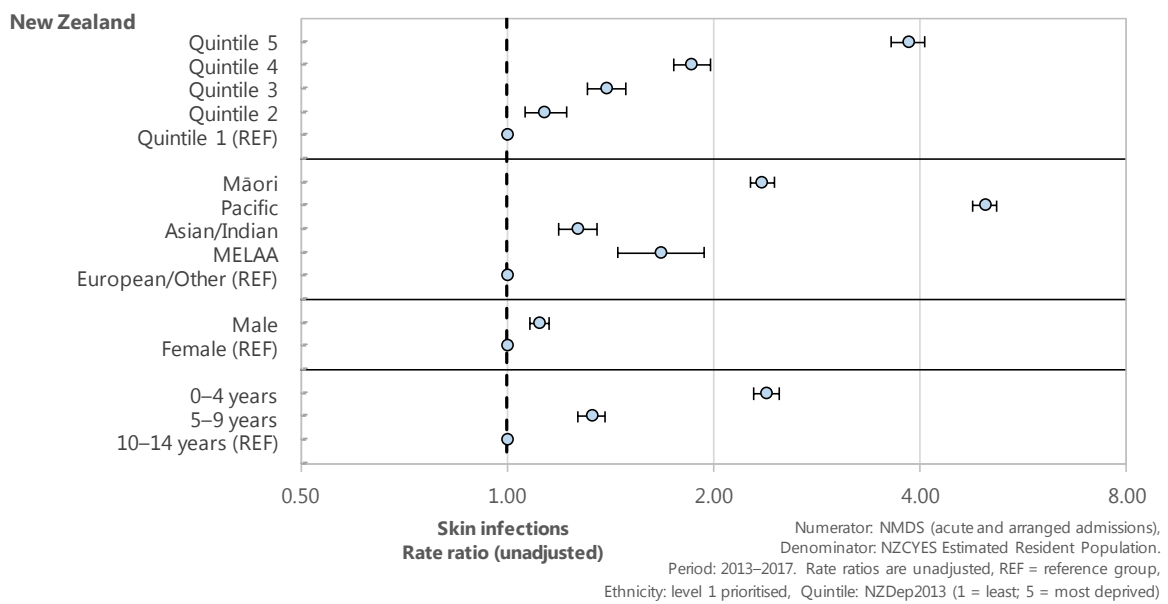


Figure 12-5. Hospitalisations of 0–14 year olds for skin infections, by ethnicity, New Zealand 2000–2017

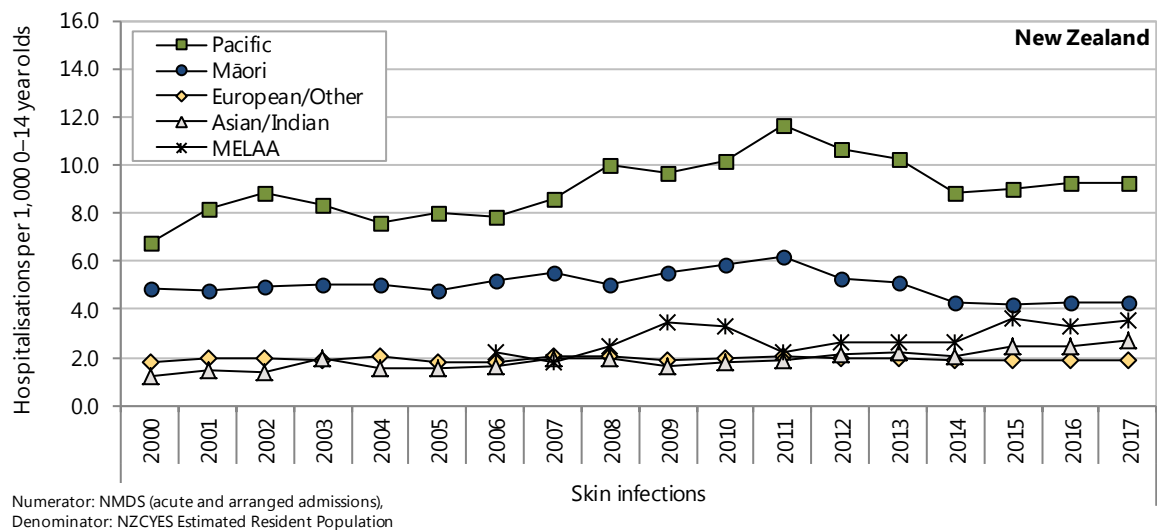
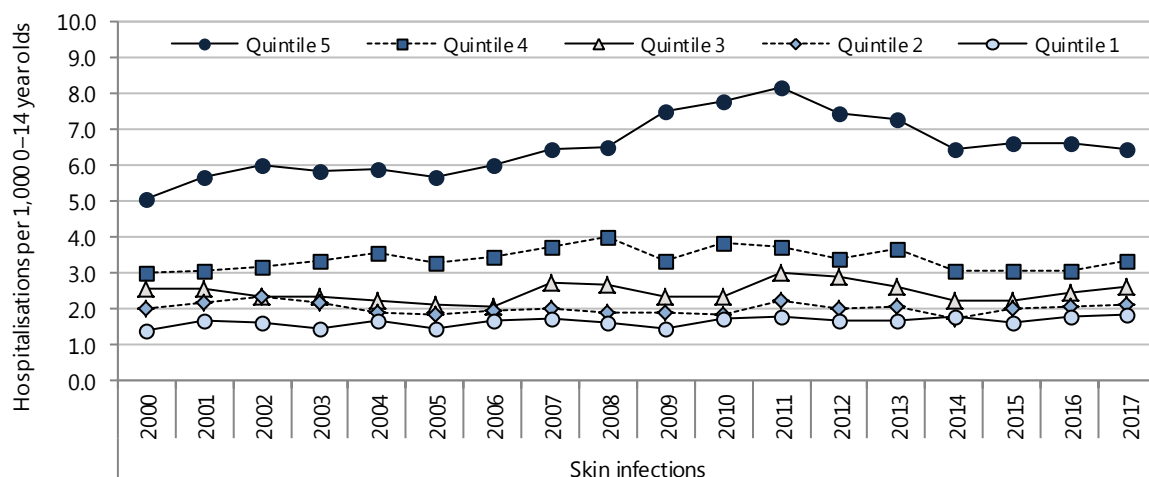


Figure 12-6. Hospitalisations of 0–14 year olds for skin infections, by NZ Deprivation Index quintile, New Zealand 2000–2017

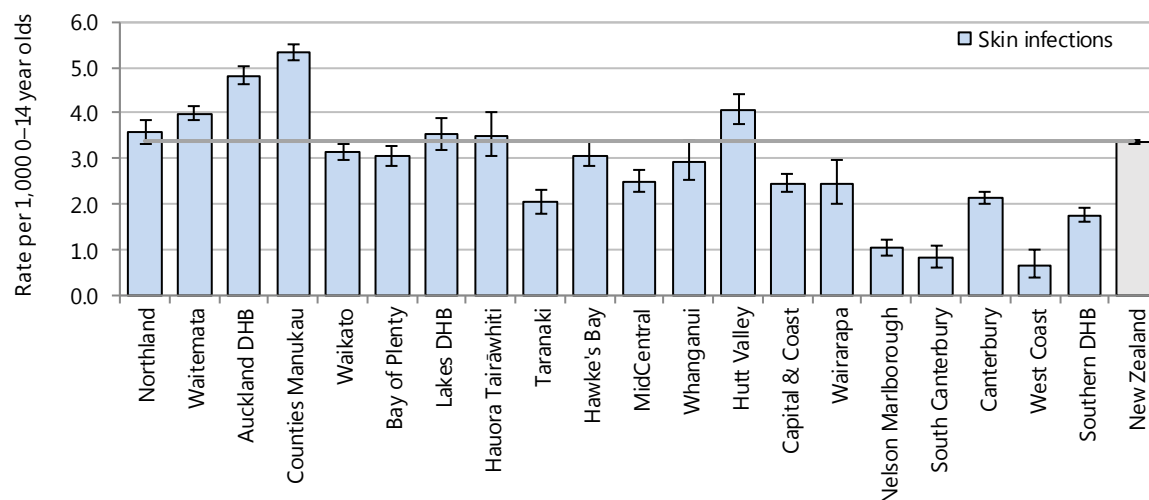


Numerator: NMDS (acute and arranged admissions), Denominator: NZCYES Estimated Resident Population.
 Quintile: NZDep2013 Index of deprivation (1= least deprived; 5 = most deprived)

New Zealand

Figure 12-7 and Table 10-2 present the hospitalisation rates of under-15 year olds with skin infections during 2013–2017, by district health board. Individuals in Hutt Valley, Capital & Coast and Wairarapa DHBs who were hospitalised with skin infections were admitted on average 1.4 times during 2013–2017. The hospitalisation rates of under-15 year olds with skin infections in Hutt Valley DHB were significantly higher than the New Zealand skin infection hospitalisation rate, and rates were significantly lower for Capital & Coast and Wairarapa DHBs (Table 10-2). Hutt Valley had the highest hospitalisation rate for skin infections among these DHBs.

Figure 12-7. Hospitalisations of 0–14 year olds for skin infections, by district health board, New Zealand 2013–2017



Numerator: NMDS (acute and arranged admissions), Denominator: NZCYES Estimated Resident Population

Table 12-2. Hospitalisations of 0–14 year olds for skin infections, Hutt Valley, Capital & Coast and Wairarapa DHBs vs New Zealand 2013–2017

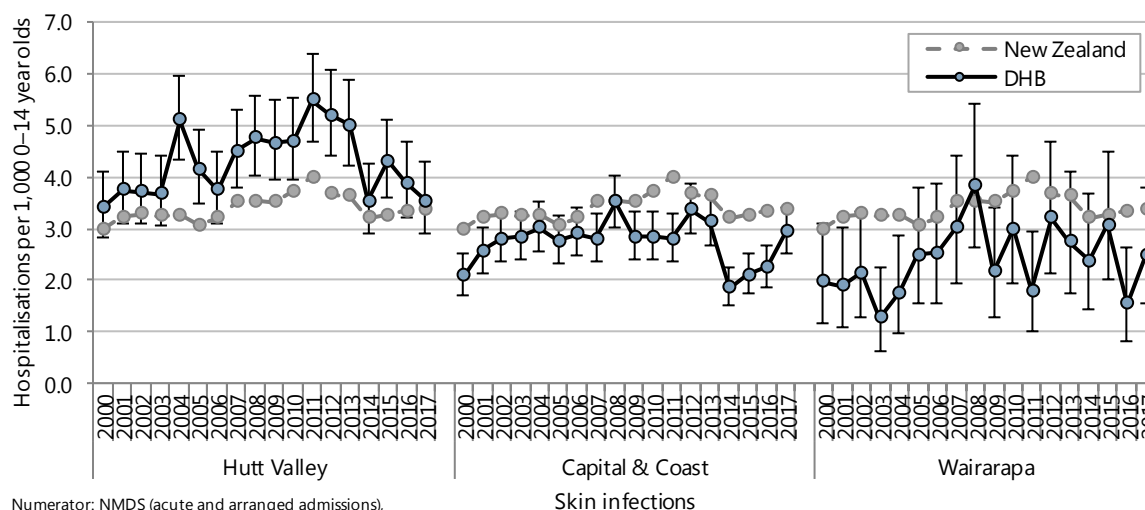
DHB	Individuals (n)	Hospitalisations (n)	Annual average (n)	Rate per 1,000 0–14 year olds	Rate ratio	95% CI
Hospitalisations of 0–14 year olds during 2013–2017						
Skin infections						
Hutt Valley	491	599	120	4.06	1.21	1.11–1.31
Capital & Coast	638	679	136	2.45	0.73	0.68–0.79
Wairarapa	88	103	21	2.44	0.72	0.60–0.88
New Zealand	13,622	15,376	3,075	3.36	1.00	

Numerator: NMDS (acute and arranged admissions), Denominator: NZCYES Estimated Resident Population. Rate ratios are unadjusted

The skin infection hospitalisation rates for under-15 year olds residing in Hutt Valley has increased over the period 2000 to 2017, and have been consistently higher than the rate for New Zealand as a whole. Rates for Capital & Coast and for Wairarapa have been lower than the New Zealand rates over the same period and have risen, with year-to-year variability, from the rates in 2000 (Figure 12-8).

Table 12-3 to Table 12-5 present the frequency of primary skin infection diagnoses among hospitalised under-15 year olds during 2013–2017. Over 70% of the under-15 year olds hospitalised during 2013–2017 for skin infection in each of the three DHBs had a primary diagnosis of cellulitis or of cutaneous abscesses, furuncles or carbuncles (Table 12-3–Table 12-5).

Figure 12-8. Hospitalisations of 0–14 year olds for skin infections, Hutt Valley, Capital & Coast and Wairarapa DHBs vs New Zealand 2000–2017



Numerator: NMDS (acute and arranged admissions),
Denominator: NZCYES Estimated Resident Population

Table 12-3. Hospitalisations of 0–14 year olds for skin infections, by primary diagnosis, Hutt Valley DHB 2013–2017

Primary diagnosis	Number	Annual average (n)	Rate per 1,000 0–14 year olds	95% CI	%
Hospitalisations of 0–14 year olds for skin infections during 2013–2017					
Hutt Valley DHB					
Cellulitis	270	54	1.83	1.62–2.06	45.1
Cutaneous abscess, furuncle and carbuncle	200	40	1.35	1.17–1.56	33.4
Impetigo	47	9	0.32	0.23–0.42	7.8
Other local infections of skin and subcutaneous tissue	31	6	0.21	0.14–0.30	5.2
Hordeolum and other deep inflammation of eyelid	21	4	0.14	0.09–0.22	3.5
Acute lymphadenitis	14	3	0.09	0.05–0.16	2.3
Pilonidal cyst	8	2	0.05	0.02–0.11	1.3
Other disorders of skin and subcutaneous tissue, NEC	3	s	s	s	0.5
Staphylococcal scalded skin syndrome	3	s	s	s	0.5
Other disorders of nose and nasal sinuses	2	s	s	s	0.3
Non-infectious dermatoses of eyelid	0	..	..	..	0.0
Total	599	120	4.06	3.74–4.39	100.0

Numerator: NMDS (acute and arranged admissions), Denominator: NZCYES Estimated Resident Population. NEC = not elsewhere classified

Table 12-4. Hospitalisations of 0–14 year olds for skin infections, by primary diagnosis, Capital & Coast DHB 2013–2017

Primary diagnosis	Number	Annual average (n)	Rate per 1,000 0–14 year olds	95% CI	%
Hospitalisations of 0–14 year olds for skin infections during 2013–2017					
Capital & Coast DHB					
Cellulitis	291	58	1.05	0.93–1.18	42.9
Cutaneous abscess, furuncle and carbuncle	209	42	0.75	0.66–0.86	30.8
Acute lymphadenitis	57	11	0.21	0.16–0.27	8.4
Other local infections of skin and subcutaneous tissue	43	9	0.16	0.11–0.21	6.3
Impetigo	34	7	0.12	0.09–0.17	5.0
Hordeolum and other deep inflammation of eyelid	19	4	0.07	0.04–0.11	2.8
Staphylococcal scalded skin syndrome	13	3	0.05	0.02–0.08	1.9
Other disorders of nose and nasal sinuses	7	1	0.03	0.01–0.05	1.0
Other disorders of skin and subcutaneous tissue, NEC	3	s	s	s	0.4
Pilonidal cyst	2	s	s	s	0.3
Non-infectious dermatoses of eyelid	1	s	s	s	0.1
Total	679	136	2.45	2.27–2.64	100.0

Numerator: NMDS (acute and arranged admissions), Denominator: NZCYES Estimated Resident Population. NEC = not elsewhere classified

Table 12-5. Hospitalisations of 0–14 year olds for skin infections, by primary diagnosis, Wairarapa DHB 2013–2017

Primary diagnosis	Number	Annual average (n)	Rate per 1,000 0–14 year olds	95% CI	%
Hospitalisations of 0–14 year olds for skin infections during 2013–2017					
Wairarapa DHB					
Cellulitis	46	9	1.09	0.80–1.45	44.7
Cutaneous abscess, furuncle and carbuncle	29	6	0.69	0.46–0.99	28.2
Acute lymphadenitis	7	1	0.17	0.07–0.34	6.8
Other local infections of skin and subcutaneous tissue	6	1	0.14	0.05–0.31	5.8
Impetigo	5	1	0.12	0.04–0.28	4.9
Staphylococcal scalded skin syndrome	5	1	0.12	0.04–0.28	4.9
Hordeolum and other deep inflammation of eyelid	2	s	s	s	1.9
Pilonidal cyst	2	s	s	s	1.9
Other disorders of skin and subcutaneous tissue, NEC	1	s	s	s	1.0
Other disorders of nose and nasal sinuses	0	..	..	..	0.0
Non-infectious dermatoses of eyelid	0	..	..	..	0.0
Total	103	21	2.44	1.99–2.96	100.0

Numerator: NMDS (acute and arranged admissions), Denominator: NZCYES Estimated Resident Population. NEC = not elsewhere classified

Evidence for good practice

Possibilities for prevention

Preventing serious skin infection involves preventing skin infections from occurring in the first place and, if a skin infection does occur, ensuring that prompt treatment prevents it from getting worse.

Damaged skin allows bacteria to enter so it is important to protect skin from becoming damaged, for example by wearing shoes outdoors, removing sharp objects from the environment, wearing insect repellent and treating pets for fleas to prevent insect bites, and keeping children away from hot objects so they don't get burnt.

Keeping the skin clean, washing hands regularly, keeping the environment clean and regular washing of clothes and linen all help to prevent skin infections.⁹

Many children's skin conditions, such as eczema, chickenpox and insect bites are itchy and children will scratch and introduce bacteria into their damaged skin. For this reason, children's fingernails should be kept short and clean. When a child has an infectious skin condition, such as impetigo or

scabies, parents should ensure that the child's clothes and linen are washed separately (ideally in hot water) and that clothes, bedding, towels and bathwater are not shared to prevent other family members from becoming infected. If washing in hot water is too expensive then a capful of bleach can be added to the regular wash cycle (or when hand washing clothes).¹⁰

Diligent management of eczema with daily bathing (no soap) followed by generous use of emollients and application of steroid cream to areas of active eczema can help prevent broken skin which can lead to infection.¹¹

Raising parents' health literacy regarding skin care and the need to clean and cover minor skin wounds and watch for signs of infection that indicate a need for medical care is important because research has indicated that some parents perceive skin infections as minor problems that will clear up on their own.^{3,12}

Removing barriers to good skincare commonly experienced in disadvantaged communities could help reduce serious skin infections. Improving people's living conditions so that it becomes easier for them to keep themselves, their clothes and linen, and their house clean, reducing overcrowding, and reducing the costs (both in time and money) of obtaining supplies (such as sticking plasters) and healthcare for skin conditions are all likely to reduce hospitalisations for skin infections.¹³

Good health practice

When assessing a child for a potentially serious skin infection health practitioners should take a good history as this can provide clues to the likely cause of the infection. They should ask about immunisation status, chronic medical conditions, a baby's birth and neonatal history (e.g. were they premature, did they spend time in NICU?), underlying skin disorders like eczema, previous personal or family history of cellulitis and skin sepsis, recent travel, surgery or chickenpox, how the wound (if any) occurred, whether there has been significant water exposure (such as a wound incurred while in a stream or pond), whether the child been bitten (by a dog, cat, human or insects), systemic upset (appearing generally unwell), previous swabs taken, and what treatment they have already had, including previous antibiotic therapy.^{14,15}

When examining the child, they should look for signs of sepsis (such as a high temperature, rapid breathing and low blood pressure), insect bites, wounds, swollen lymph nodes, and abscess formation (fluctuant swelling or discharge of pus).^{14,15}

Children who are systemically unwell should have blood cultures and a full blood count, which can guide antibiotic choice and help identify the cause of infection.^{14,15}

Abscesses and other collections of pus require incision and drainage and this can mean that the child has to be admitted to hospital so the procedure can be done under general anaesthetic. Antibiotics are usually unnecessary,^{14,15} although a 2018 systematic review¹⁶ concluded: "In patients with uncomplicated skin abscesses, moderate-to-high quality evidence suggests trimethoprim-sulfamethoxazole (TMP-SMX) or clindamycin confer a modest benefit for several important outcomes, but this is offset by a similar risk of adverse effects".

Children who are past infancy and have mild and early cellulitis or erysipelas (both diffuse, spreading skin infections characterised by swelling, redness, heat, and sometimes inflamed lymphatic channels visible as red streaks and/or swollen regional lymph nodes) can be treated with oral antibiotics and reviewed in the next 1–2 days.¹⁵ Children with moderate to severe cellulitis, and those who have failed to improve with oral antibiotics, need intravenous antibiotics.¹⁵

It is important to be alert to signs suggesting a serious necrotising skin and soft tissue infection (rare, but potentially fatal), such as: severe constant pain; failure to respond to initial antibiotic therapy; a hard, wooden feel to the subcutaneous tissue; systemic toxicity, often with altered mental status; bullous (blister-like) lesions; and bleeding under the skin or areas of dead skin.¹⁴

While the child is in hospital, the parents should be reminded about the preventive measures they can use to avoid further serious skin infections.¹⁵

Equity

There are marked ethnic and socioeconomic disparities in children's rates of skin infection between different ethnic and socioeconomic groups in New Zealand. A study which examined hospitalisation rates for serious skin infection for the period 1990–2007¹⁷ found that in 1990–1999 the rate was 2.3 times higher in Māori children, and 3.7 times higher in Pacific children, compared to children of other ethnicities. By 2000–2007, that difference had increased to 2.9 times higher in Māori children and 4.5 times higher in Pacific children. In 1990–1999, the skin infection hospitalisation rate for children from NZDep 9–10 areas was 3.6 times higher than for children from NZDep 1–2 areas. By 2000–2007, this difference had increased significantly to 4.3 times higher.

A study done in the Tairāwhiti region⁷ that compared the incidence of skin infections seen in primary care with skin infection hospitalisation rates, during 10 weeks in 2008, found that the disparity between Māori and non-Māori children was similar for primary care consultations and hospitalisations. This indicated that the higher hospitalisation rates for Māori children were a reflection of the reflection of a similarly higher burden of disease at the primary care level, rather than ethnic disparities in hospital admission thresholds.

Poor health literacy contributes to ethnic and socioeconomic inequities in skin infection rates. A study that interviewed mothers of Pacific children who were hospitalised for skin infections during 2006–2008¹² found that parents initially perceived their child's skin infection as something minor that would go away on its own. Parents couldn't recall ever having been told by health professionals about how to prevent or care for skin sores. When their children's symptoms become alarming parents need confidence to demand that their child be seen urgently if they are offered a primary care appointment in several days' time. One father in this study was able to do this and his child was immediately admitted to hospital.

A number of socioeconomic factors are linked to greater frequency of skin infections including affordability of hot water, washing machines and dryers, access to medical care, household crowding, and inadequate nutrition.¹⁸

Removing barriers to obtaining primary medical care for skin infections can reduce the number of children needing hospital care. School-based clinics set up in Counties Manukau to address rheumatic fever skin and the management of skin infections (the Mana Kidz programme) assessed 23,318 possible skin infection presentation in 2013.¹⁹ Of these, 6,774 skin infections were treated (the vast majority with topical cleaning and covering; if antibiotics were needed, fusidic acid (Foban) or, more rarely, cephalexin or flucloxacillin were used). In 2014 (up until 30th September) a total of 10,823 skin infections were treated. Following the introduction of the programme, there was an encouraging decrease in skin infection hospitalisations in Māori and Pacific 5–12 year olds in CMDHB, and school staff, as well as Mana Kidz staff, reported that children's skin conditions had greatly improved. Key stakeholders reported that skin abrasions and infections are dealt with early, and that children look healthier. School staff members reported that impetigo and scabies, which were previously commonplace in most of the schools, had vastly reduced.

A study published in 2017²⁰ found that, nationally, there was a fall in children's skin infections hospitalisation rates from their peak 2011 to 2014 and this decline was driven primarily by decline in hospitalisation rates in high-risk groups including children living in the most deprived areas and Māori and Pacific children. The study authors suggested that targeted policies focused on improved healthcare access through school-based and primary care-based interventions in these high-risk groups could potentially explain the decline in hospitalization rates. They noted that, even with the closing of the inequality gap, significant socioeconomic and ethnic health disparities remained.

Guidelines, evidence-based reviews, New Zealand publications, and other relevant publications and websites

New Zealand publications and websites

- Kids Health. 2018. **Skin**. <https://www.kidshealth.org.nz/tags/skin>
- KidsHealth **Caring for your child's eczema (management plan)** <https://www.kidshealth.org.nz/caring-your-childs-eczema-management-plan>

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13. Mental health and developmental disorders

Mental health disorders in children manifest as problems in the areas of learning, behaviour or managing emotions. They include neurodevelopmental disorders, such as autism, attention deficit hyperactivity disorder (ADHD), intellectual disability and specific learning disorders; behavioural disorders, such as oppositional defiant disorder and conduct disorder; anxiety disorders; mood disorders (most commonly depression); and eating disorders. It is not uncommon for children with mental health problems to be diagnosed with multiple mental health disorders.¹

Worldwide, mental disorders affect more than 10% of children and adolescents.² Around half of all lifetime mental health disorders have their onset before 14 years of age.³ The emotional wellbeing of young children is directly related to that of their parents and families so emotional and behavioural problems in a child can be a sign of parental problems such as mental illness, child abuse and neglect, substance abuse, domestic violence or poverty.⁴ Adverse early experiences can affect brain development and have lasting impacts on learning, the ability to form relationships, and physical and mental health.^{4,5} For all these reasons, children's mental health is an important public health issue.

This section presents data on the prevalence of mental health and developmental disorders from the New Zealand Health Survey and data on hospitalisations for mental and behavioural disorders from the National Minimum Dataset.

Data sources and methods

Indicators

1. Prevalence of specified mental health and developmental disorders in 2–14 year olds
2. Hospitalisations for mental and behavioural disorders in 0–14 year olds

Prevalence of specified mental health and developmental disorders

Data source:

New Zealand Health Survey, as published by the Ministry of Health

- National data (2006/07–2016/17),⁶ refer to data source appendix
- Regional data (Pooled year: 2014–2017).⁷

Further information on the survey methodology can be found on the Ministry of Health website:

<https://www.health.govt.nz/publication/methodology-report-2016-17-new-zealand-health-survey>

Hospitalisations for mental and behavioural disorders

Numerator: Number of 0–14 year olds discharged from hospital with a primary diagnosis of a mental or behavioural disorder (day cases and emergency department cases included)

Numerator source: National Minimum Dataset (NMDS)

Denominator: NZCYES Estimated Resident Collection (with intercensal extrapolation)

Additional information

In the New Zealand Health Survey, child respondents were defined as having [*specified disorder*] if their parent or caregiver answered "Yes" to the question: Have you ever been told by a doctor that [*child's name*] has [*specified disorder*]? The disorders enquired about were: depression; anxiety; attention deficit disorder (ADD) and attention deficit and hyperactivity disorder (ADHD); and autism spectrum disorder (including Asperger's syndrome). The indicator "emotional and/or behavioural problems" includes children reported as having any of the following conditions: depression, anxiety, ADD or ADHD.

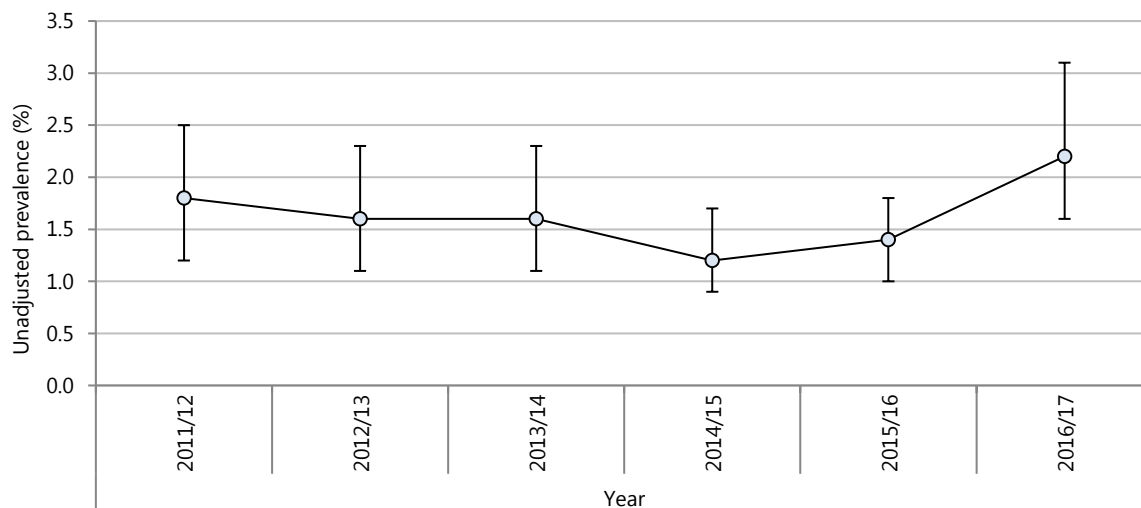
The survey is likely to have underestimated the number of children with a mental or developmental disorder as some people may not be aware that their child has such as disorder. Note that not all children who have ever had a mental or behavioural disorder would have met the criteria for such a disorder at the time they were surveyed

Prevalence of specified mental and developmental disorders

Autism spectrum disorder

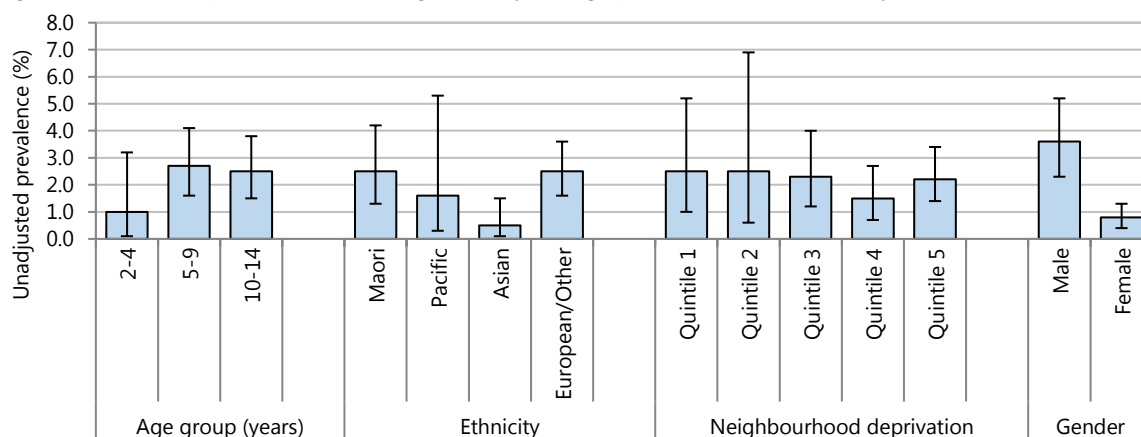
The prevalence of autism spectrum disorder in New Zealand children, as measured by the New Zealand Health Survey (NZHS), has not changed over the period 2011/12 to 2016/17 (Figure 13-1). The 2016/17 NZHS indicated that the prevalence of autism spectrum disorder is significantly higher in males than females but there are no significant differences by age group, ethnicity or neighbourhood deprivation (Figure 13-2). This pattern was seen for both unadjusted prevalence (Figure 13-2) and adjusted rate ratios (not presented).⁷

Figure 13-1. Autism Spectrum Disorder (diagnosed), by survey year, NZ Health Survey 2011/12–2016/17



Source: NZ Health Survey;
Diagnosed Autism Spectrum Disorder (including Aspergers Syndrome) (2–14 years)

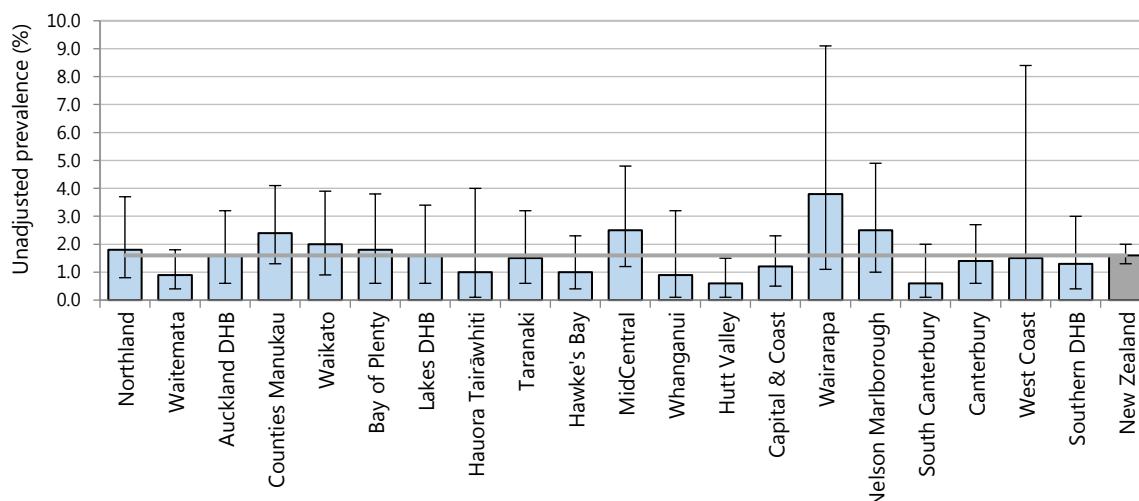
Figure 13-2. Autism Spectrum Disorder (diagnosed), by demographic factor, NZ Health Survey 2016/17



Source: NZ Health Survey. Diagnosed Autism Spectrum Disorder (including Aspergers Syndrome) (2–14 years);
Ethnicity is total response; Quintile is NZDep2013 Index of deprivation (1= least deprived; 5 = most deprived)

The 2016/17 NZHS indicated no significant variations in autism spectrum disorder prevalence by district health board (Figure 13-3).

Figure 13-3. Autism Spectrum Disorder (diagnosed) in 2–14 year olds, by district health board, NZ Health Survey 2014–2017

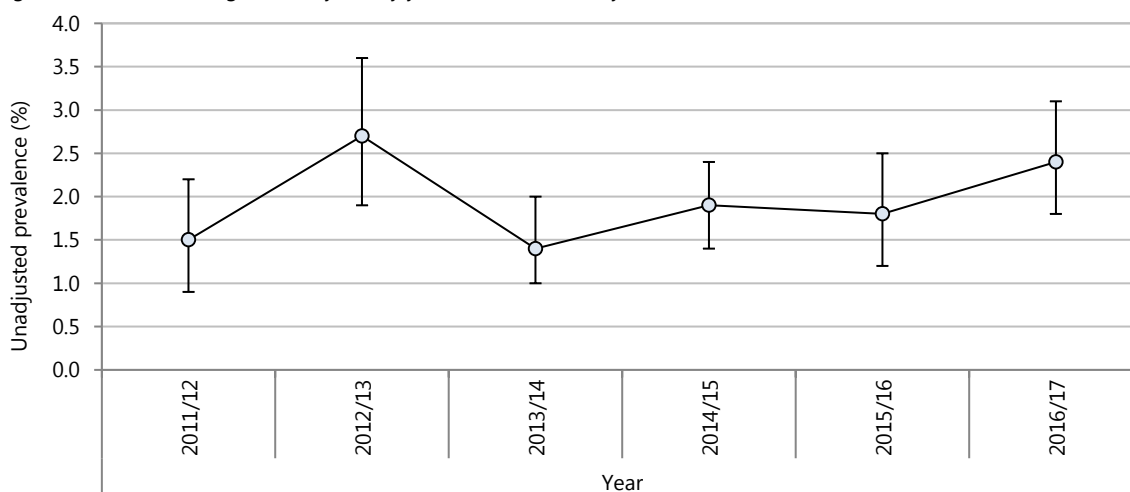


Source: NZ Health Survey 2014–2017; Diagnosed Autism Spectrum Disorder (including Aspergers Syndrome) (2–14 years)

Attention deficit hyperactivity disorder

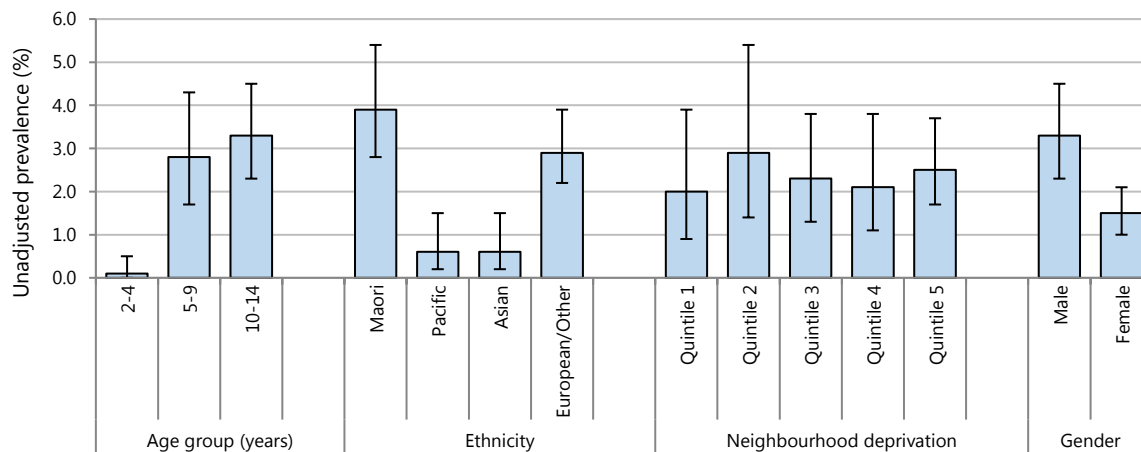
The prevalence of attention deficit hyperactivity disorder (ADHD) in New Zealand children, as measured by the New Zealand Health Survey (NZHS), has not changed over the period 2011/12 to 2016/17 (Figure 13-4). Unadjusted results from the 2016/17 NZHS indicated that the prevalence of ADHD is significantly lower in 2–4 year olds compared to 5–14 year olds, and in Pacific and Asian children compared to European or Māori children, and significantly higher in boys than girls (Figure 13-5). There were no significant differences by deprivation quintile (Figure 13-5). Adjusted rate ratios (not presented) indicated that the only significant demographic difference was the higher prevalence in boys than girls.⁸ The adjusted rate ratios, calculated by the Ministry of Health, indicated no significant difference by ethnic group (each ethnic group compared with all the other ethnic groups) or by deprivation (most deprived with least deprived neighbourhoods).⁹

Figure 13-4. ADHD (diagnosed), by survey year, NZ Health Survey 2011/12–2016/17



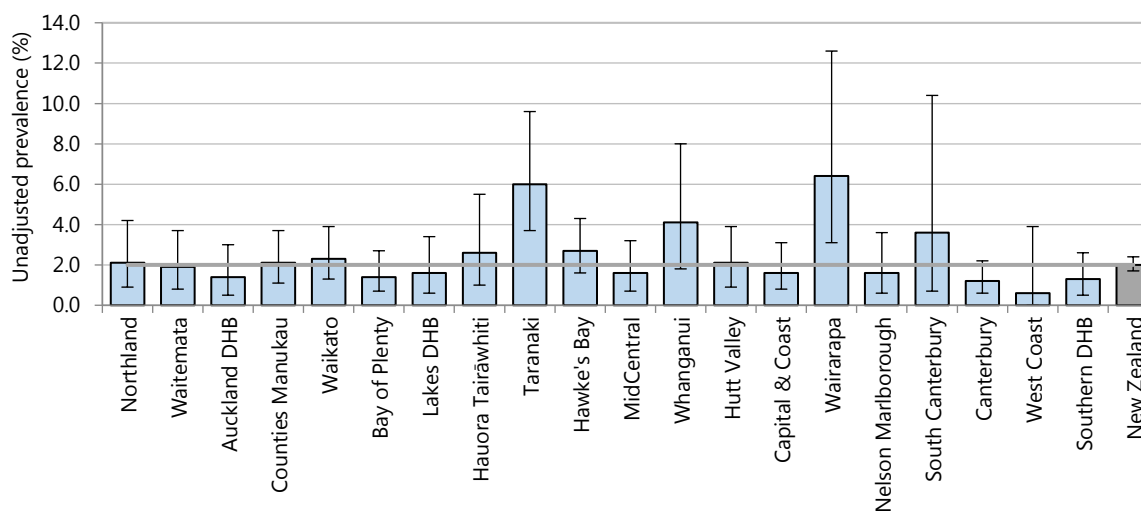
Source: NZ Health Survey; Diagnosed ADHD (2–14 years)

Figure 13-5. ADHD (diagnosed), by demographic factor, 2016/17 NZ Health Survey



Source: NZ Health Survey; Diagnosed ADHD (2–14 year olds; Ethnicity is total response; Quintile is NZDep13 Index of deprivation (1 = least deprived; 5 = most deprived)

Figure 13-6. ADHD (diagnosed) of 2–14 year olds, by district health board, NZ Health Survey 2014–2017

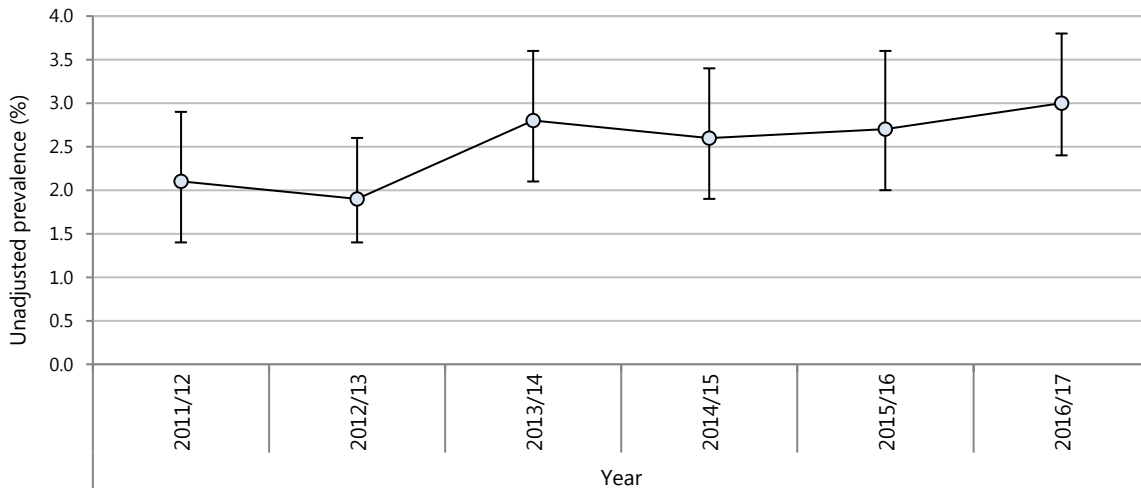


Source: NZ Health Survey 2014–2017; Diagnosed ADHD (2–14 years)

The 2016/17 NZHS indicated that, compared to the prevalence in New Zealand as a whole, the prevalence of diagnosed ADHD was significantly higher in Wairarapa DHB. Hutt Valley and Capital & Coast DHBs had similar prevalence to New Zealand as a whole (Figure 13-6).

Anxiety

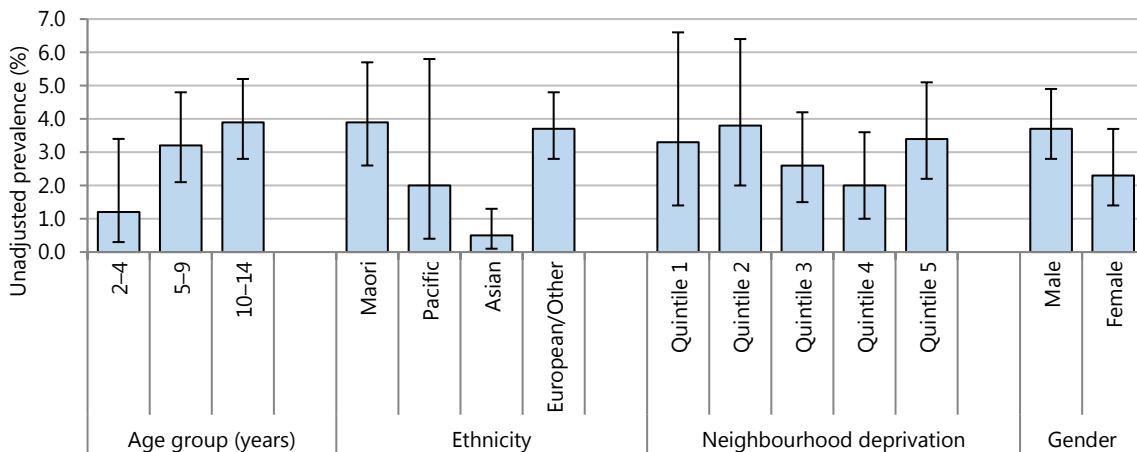
Figure 13-7. Anxiety disorders (diagnosed), by NZ Health Survey year, 2011/12–2016/17



Source: NZ Health Survey; Diagnosed anxiety disorders (2–14 years)

While prevalence of diagnosed anxiety disorders has risen slightly from 2011/12 to 2016/16, differences between NZHS years are within the surveys' margins of error (Figure 13-7).

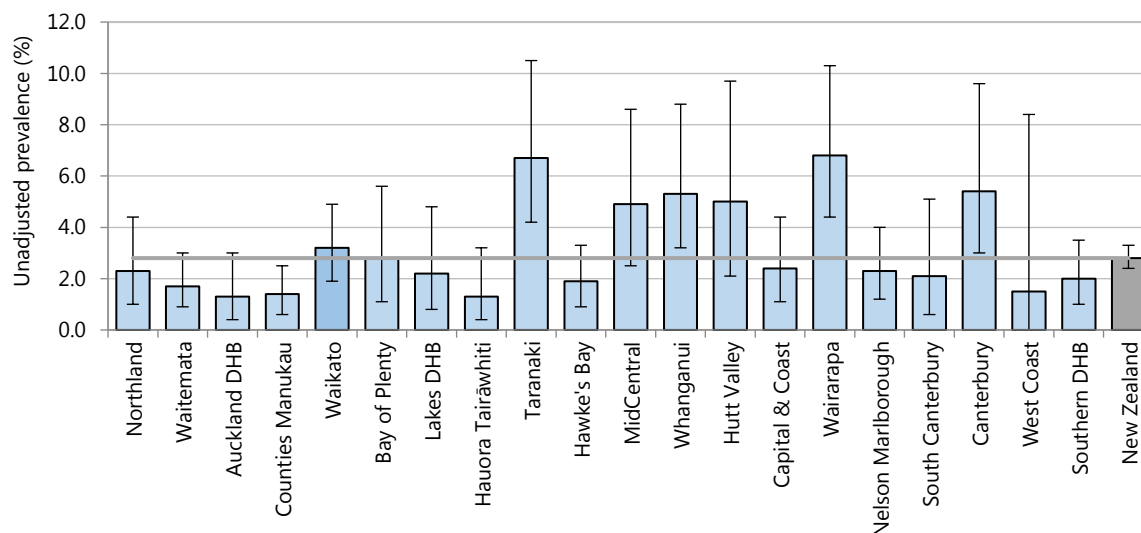
Figure 13-8. Diagnosed anxiety disorders, by demographic factor, 2016/17 NZ Health Survey



Source: NZ Health Survey; Diagnosed anxiety disorders (2–14 years); Ethnicity is total response; Quintile is NZDep2013 Index of deprivation (1= least deprived; 5 = most deprived)

The prevalence of anxiety among Asian children was significantly lower than for Māori or European. There were no significant differences in anxiety prevalence by the other demographic factors (Figure 13-8). Adjusted rate ratios (not presented)¹⁰ also indicated that the only significant difference by any single demographic factor was the significantly lower diagnosed anxiety rate among Asian children (compared to non-Asian children).

Figure 13-9. Diagnosed anxiety disorders, by district health board, NZ Health Survey 2014–2017

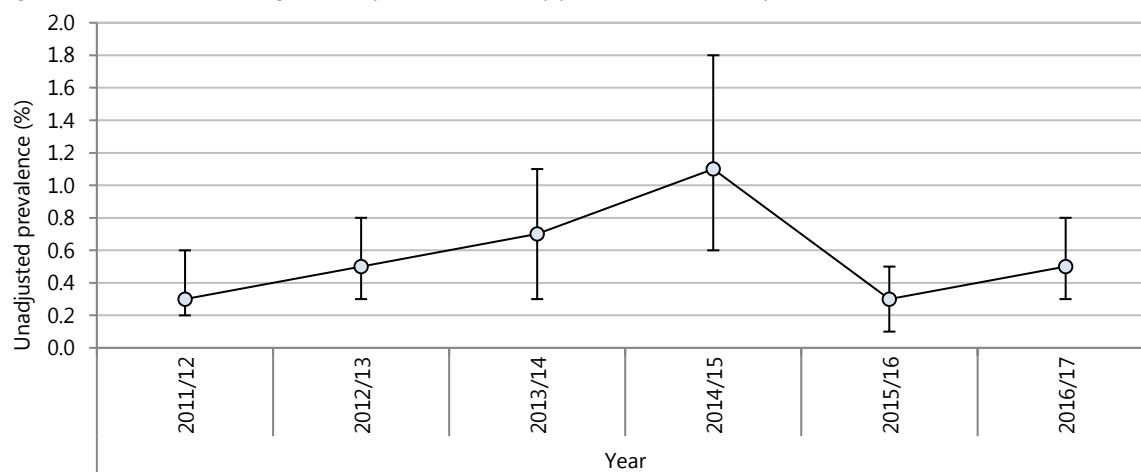


Source: NZ Health Survey 2014–2017; Diagnosed anxiety disorders (2–14 year olds)

The NZHS indicated that, compared to the prevalence in New Zealand as a whole, the prevalence of diagnosed anxiety disorders during 2014–17 was significantly higher in Hutt Valley and Wairarapa DHBs but not significantly different in Capital & Coast DHB (Figure 13-9).

Depression

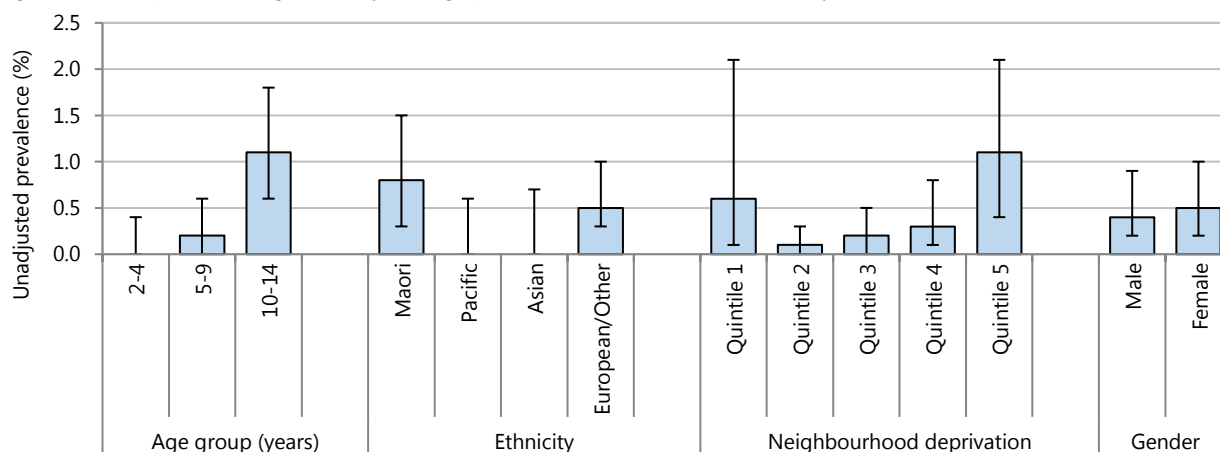
Figure 13-10. Depression (diagnosed), by NZ Health Survey year, NZ Health Survey 2011/12–2016/17



Source: NZ Health Survey; Diagnosed depression (2–14 years)

The prevalence of diagnosed depression in New Zealand children has not changed significantly from 2011/12 to 2016/17. Differences between survey years are within the surveys' margins of error (Figure 13-10).

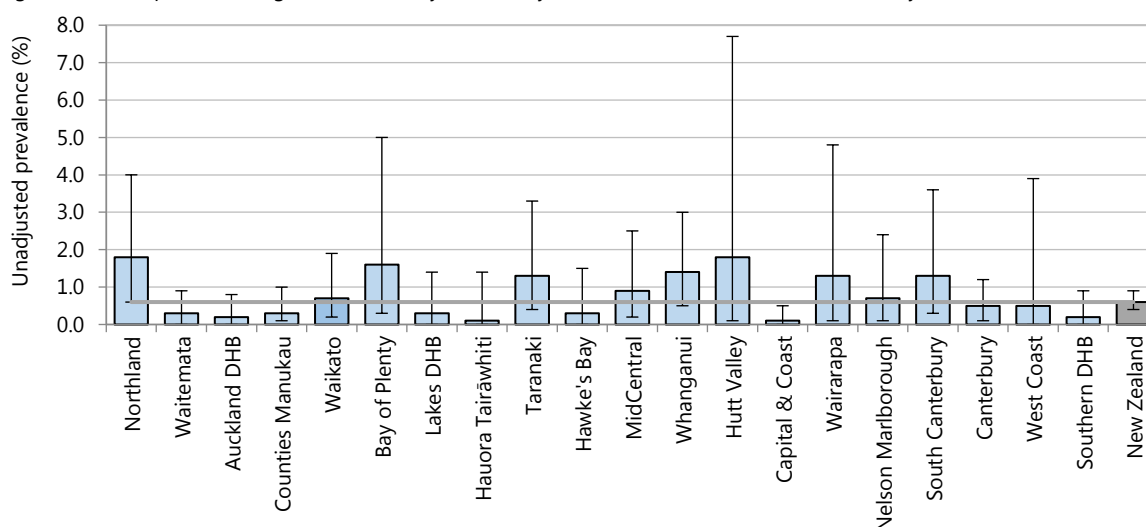
Figure 13-11. Depression (diagnosed), by demographic factor, 2016/17 NZ Health Survey



Source: NZ Health Survey; Diagnosed depression (2–14 year olds); Ethnicity is total response; Quintile is NZDep2013 Index of deprivation (1= least deprived; 5 = most deprived)

The prevalence of diagnosed depression in the 2016/17 NZHS was significantly higher in 10–14 year olds than in 2–4 year olds (Figure 13-11). There were no significant differences by ethnicity, deprivation quintile or gender (Figure 13-11).

Figure 13-12. Depression (diagnosed) in 2–14 year olds, by district health board, NZ Health Survey 2014–2017



Source: NZ Health Survey 2014–2017; Diagnosed depression (2–14 years)

Over the period 2014–2017, the NZHS indicated that the prevalence of diagnosed depression in Hutt Valley and Wairarapa DHBs was higher than the national prevalence, and lower in Capital & Coast DHB (Figure 13-12).

Hospitalisations for mental and behavioural disorders

Causes of mental health hospitalisations in 0–14 year olds

In New Zealand during 2013–17, the most common reasons for mental health hospitalisations in 0–14 year olds were eating disorders, acute alcohol intoxication, developmental disorders (especially childhood autism and disorders of speech and language), anxiety and depression (Table 13-1).

Table 13-1. Causes of mental health hospitalisation in 0–14 year olds, New Zealand 2013–2017

Primary diagnosis	Number	Annual average	Rate per 100,000 population	%
Mental health hospitalisations of 0–14 year olds during 2013–2017				
New Zealand				
Eating disorders	430	86	9.40	11.8
Mental and behavioural disorders due to harmful use of alcohol	386	77	8.44	10.6
<i>Acute alcohol intoxication</i>	375	75	8.20	10.3
<i>Other alcohol-related mental and behavioural disorders</i>	11	2	0.24	0.3
Pervasive developmental disorders	291	58	6.36	8.0
<i>Childhood autism</i>	257	51	5.62	7.0
<i>Other pervasive developmental disorders</i>	34	7	0.74	0.9
Developmental disorders of speech and language	234	47	5.12	6.4
Other developmental disorders	306	61	6.69	8.4
Depression	264	53	5.77	7.2
Other mood disorders	61	12	1.33	1.7
Anxiety disorders	234	47	5.12	6.4
Reaction to stress	221	44	4.83	6.1
Conduct disorders	152	30	3.32	4.2
Postconcussional syndrome	147	29	3.21	4.0
Tic disorders	130	26	2.84	3.6
Dissociative convulsions	102	20	2.23	2.8
Other dissociative disorders	74	15	1.62	2.0
Schizophrenia and delusional disorders	98	20	2.14	2.7
Somatoform disorders	77	15	1.68	2.1
Mental and behavioural disorders due to use of other or multiple psychoactive substances	32	6	0.70	0.9
Mental and behavioural disorders due to use of cannabinoids	23	5	0.50	0.6
Other mental and behavioural disorders	385	77	8.42	10.6
Total	3,647	729	79.75	100.0

Numerator: NMDS, Denominator: NZCYES Estimated Resident Population

The most common causes of mental health hospitalisation varied according to children's ages. In 0–4 year olds, the vast majority of mental health hospitalisations were for developmental disorders (Table 13-2). In 5–9 year olds, developmental disorders were also the most common causes for mental health hospitalisation. The next most common causes in this age group were tic disorders, followed by postconcussional syndrome, anxiety disorders and conduct disorders (Table 13-3).

Table 13-2. Causes of mental health hospitalisation in 0–4 year olds, New Zealand 2013–2017

Primary diagnosis	Number	Annual average	Rate per 100,000 population	%
Mental health hospitalisations of 0–4 year olds during 2013–2017				
New Zealand				
Developmental disorders of speech and language	189	37.8	11.84	29.2
Pervasive developmental disorders	110	22.0	6.89	17.0
<i>Childhood autism</i>	105	21.0	6.58	16.2
<i>Other pervasive developmental disorders</i>	5	1.0	0.31	0.8
Other developmental disorders	203	40.6	12.71	31.3
Postconcussional syndrome	16	3.2	1.00	2.5
Tic disorders	14	2.8	0.88	2.2
Conduct disorders	8	1.6	0.50	1.2
Eating disorders	8	1.6	0.50	1.2
Somatoform disorders	6	1.2	0.38	0.9
Mental and behavioural disorders due to harmful use of alcohol	2	s	s	s
Mental and behavioural disorders due to use of other or multiple psychoactive substances	2	s	s	s
Depression	1	s	s	s
Other mental and behavioural disorders	89	17.8	5.57	13.7
Total	648	129.6	40.58	100.0

Numerator: NMDS, Denominator: NZCYES NZ Estimated Resident Population

Table 13-3. Causes of mental health hospitalisation in 5–9 year olds, New Zealand 2013–2017

Primary diagnosis	Number	Annual average	Rate per 100,000 population	%
Mental health hospitalisations of 5–9 year olds during 2013–2017				
New Zealand				
Pervasive developmental disorders	99	20	6.55	18.0
<i>Childhood autism</i>	89	18	5.89	16.2
<i>Other pervasive developmental disorders</i>	10	2	0.66	1.8
Developmental disorders of speech and language	44	9	2.91	8.0
Other developmental disorders	85	17	5.62	15.4
Tic disorders	61	12	4.03	11.1
Postconcussional syndrome	34	7	2.25	6.2
Anxiety disorders	33	7	2.18	6.0
Conduct disorders	29	6	1.92	5.3
Somatoform disorders	18	4	1.19	3.3
Eating disorders	12	2	0.79	2.2
Dissociative convulsions	9	2	0.60	1.6
Other dissociative disorders	20	4	1.32	3.6
Reaction to stress	5	1	0.33	0.9
Depression	2	s	s	s
Mental and behavioural disorders due to harmful use of alcohol	2	s	s	s
Other mental and behavioural disorders	98	20	6.48	17.8
Total	551	110	36.44	100.0

Numerator: NMDS, Denominator: NZCYES Estimated Resident Population

Table 13-4. Causes of mental health hospitalisation in 10–14 year olds, New Zealand 2013–2017

Primary diagnosis	Number	Annual average	Rate per 100,000 population	%
Mental health hospitalisations of 10–14 year olds during 2013–2017				
New Zealand				
Eating disorders	410	82	28.00	16.7
<i>Anorexia nervosa</i>	332	66	22.67	13.6
<i>Other eating disorders</i>	78	16	5.33	3.2
Acute alcohol intoxication	372	74	25.41	15.2
Depression	261	52	17.82	10.7
other mood disorders	61	12	4.17	2.5
Reaction to stress	216	43	14.75	8.8
Anxiety disorders	201	40	13.73	8.2
Conduct disorders	115	23	7.85	4.7
Schizophrenia and related disorders	98	20	6.69	4.0
Postconcussional syndrome	97	19	6.62	4.0
Dissociative convulsions	93	19	6.35	3.8
Other dissociative disorders	54	11	3.69	2.2
Pervasive developmental disorders	82	16	5.60	3.3
<i>Childhood autism</i>	63	13	4.30	2.6
<i>Other pervasive developmental disorders</i>	19	4	1.30	0.8
Developmental disorders of speech and language	1	s	s	s
Other developmental disorders	18	4	1.23	0.7
Tic disorders	55	11	3.76	2.2
Somatoform disorders	53	11	3.62	2.2
Mental and behavioural disorders due to use of other or multiple psychoactive substances	30	6	2.05	1.2
Mental and behavioural disorders due to use of cannabinoids	23	5	1.57	0.9
Other alcohol-related mental and behavioural disorders	10	2	0.68	0.4
Other mental and behavioural disorders	198	40	13.52	8.1
Total	2,448	490	167.18	100.0

Numerator: NMDS, Denominator: NZCYES Estimated Resident Population

In 10–14 year olds, the most common causes of mental health hospitalisations were eating disorders, especially anorexia nervosa, and acute alcohol intoxication, followed by depression, reaction to stress, anxiety disorders and conduct disorders (Table 13-4).

In Hutt Valley DHB there were 178 hospitalisations of 0–14 year olds for mental health conditions during 2013–17. The most common causes of such hospitalisations were depression, developmental disorders (especially childhood autism) and acute alcohol intoxication (Table 13-5).

There were 256 hospitalisations of 0–14 year olds for mental health conditions in Capital & Coast DHB during 2013–2017. The most common causes of such hospitalisations were developmental disorders of various kinds, acute alcohol intoxication, eating disorders and depression (Table 13-6).

In Wairarapa DHB during 2013–2017, there were 54 hospitalisations of 0–14 year olds for mental health conditions. Due to the small numbers of hospitalisations, a primary diagnosis table has not been presented.

Table 13-5. Mental health diagnoses of hospitalised 0–14 year olds, Hutt Valley 2013–2017

Primary diagnosis	Number	Annual average	Rate per 100,000 population	%
Mental Health hospitalisations of 0–14 year olds during 2013–2017				
Hutt Valley				
Depression	31	6	20.99	17.4
Other mood disorders	10	2	6.77	5.6
Pervasive developmental disorders	22	4	14.90	12.4
<i>Childhood autism</i>	18	4	12.19	10.1
<i>Other pervasive developmental disorders</i>	4	s	s	s
Developmental disorders of speech and language	1	s	s	s
Other developmental disorders	5	1	3.39	2.8
Acute alcohol intoxication	21	4	14.22	11.8
Reaction to stress	16	3	10.84	9.0
Eating disorders	10	2	6.77	5.6
<i>Anorexia nervosa</i>	6	1	4.06	3.4
<i>Other eating disorders</i>	4	s	s	s
Conduct disorders	9	2	6.10	5.1
Tic disorders	9	2	6.10	5.1
Anxiety disorders	8	2	5.42	4.5
Schizophrenia and related disorders	7	1	4.74	3.9
Dissociative convulsions	5	1	3.39	2.8
Postconcussional syndrome	2	s	s	s
Mental and behavioural disorders due to use of cannabinoids	1	s	s	s
Other mental and behavioural disorders	21	4	14.22	11.8
Total	178	36	120.55	100.0

Numerator: NMDS, Denominator: NZCYES Estimated Resident Population

Table 13-6. Mental health diagnoses of hospitalised 0–14 year olds, Capital & Coast 2013–2017

Primary diagnosis	Number	Annual average	Rate per 100,000 population	%
Mental Health hospitalisations of 0–14 year olds during 2013–2017				
Capital & Coast				
Acute alcohol intoxication	38	8	13.72	14.8
Eating disorders	30	6	10.83	11.7
<i>Anorexia nervosa</i>	20	4	7.22	7.8
<i>Other eating disorders</i>	10	2	3.61	3.9
Depression	27	5	9.75	10.5
Other mood disorders	7	1	2.53	2.7
Pervasive developmental disorders	19	4	6.86	7.4
<i>Childhood autism</i>	14	3	5.06	5.5
<i>Other pervasive developmental disorders</i>	5	1	1.81	2.0
Developmental disorders of speech and language	8	2	2.89	3.1
Other developmental disorders	28	6	10.11	10.9
Anxiety disorders	16	3	5.78	6.3
Postconcussional syndrome	10	2	3.61	3.9
Tic disorders	8	2	2.89	3.1
Conduct disorders	6	1	2.17	2.3
Reaction to stress	6	1	2.17	2.3
Dissociative convulsions	4	s	s	s
Other dissociative disorders	4	s	s	s
Schizophrenia and related disorders	4	s	s	s
Somatoform disorders	4	s	s	s
Mental and behavioural disorders due to use of cannabinoids	2	s	s	s
Other alcohol-related mental and behavioural disorders	1	s	s	s
Mental and behavioural disorders due to use of other or multiple psychoactive substances	1	s	s	s
Other mental and behavioural disorders	33	7	11.92	12.9
Total	256	51	92.45	100.0

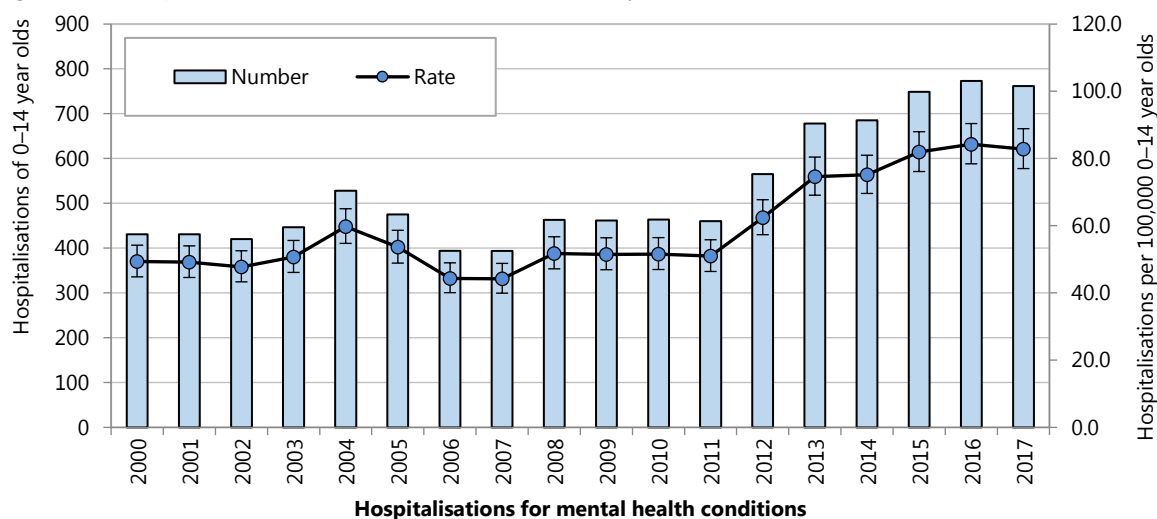
Numerator: NMDS, Denominator: NZCYES Estimated Resident Population

Patterns over time

The rate of hospitalisations for mental and behavioural disorders in New Zealand 0–14 year olds changed little from 2000 to 2011 but increased by over 50% from 2011 to 2015, before levelling off in the last few years (Figure 13-13).

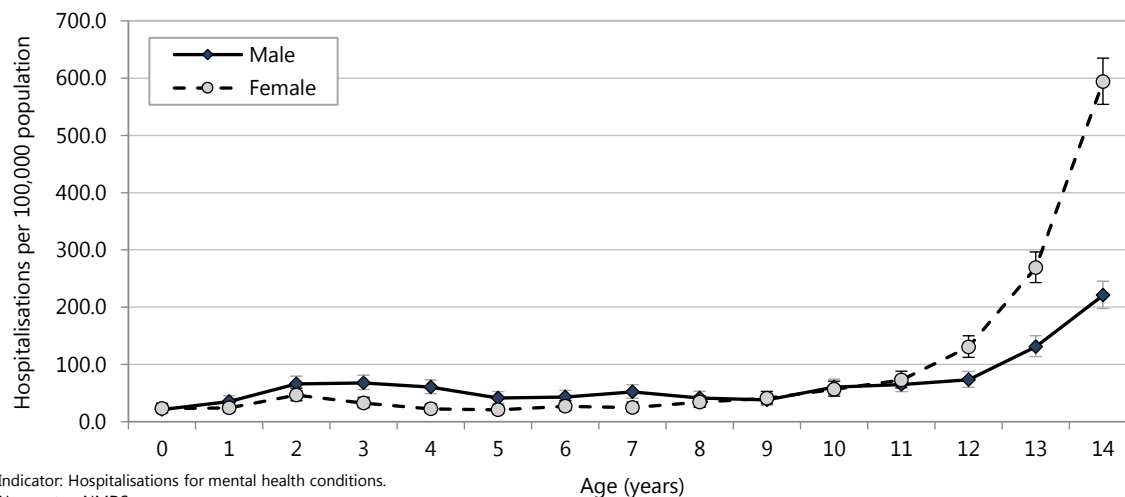
In early and middle childhood, boys had higher hospitalisation rates than girls, but rates varied little with age. From the age of 11–12 years, rates rose with increasing age for both boys and girls, but much more steeply in girls so that, by the age of 14 years, the rate for girls was more than two-and-a-half times that for boys (Figure 13-14).

Figure 13-13. Hospitalisations for mental health conditions in 0–14 year olds, New Zealand 2000–2017



Indicator: Hospitalisations for mental health conditions.
 Numerator: NMDS, Denominator: NZCYES Estimated Resident Population

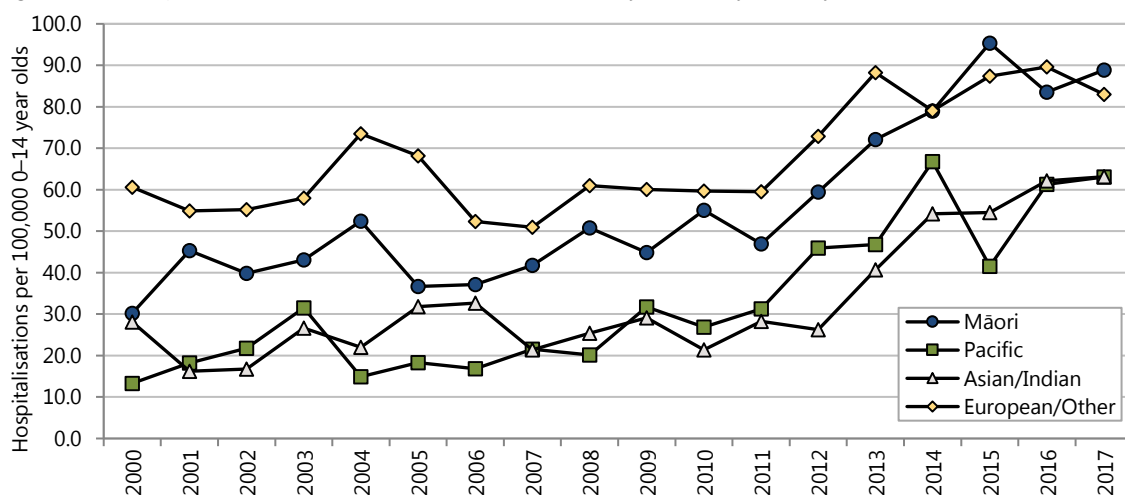
Figure 13-14. Hospitalisations for mental health conditions in 0–14 year olds, by age and gender, New Zealand 2013–2017



Indicator: Hospitalisations for mental health conditions.
 Numerator: NMDS,
 Denominator: NZCYES Estimated Resident Population. Period: 2013–2017

Over the period 2000–2017, mental health hospitalisation rates for European children were mostly higher than those for Māori children, but the gap narrowed over time so that the two rates became similar in recent years (Figure 13-15). Pacific and Asian/Indian children had rates that were similar to each other and consistently lower than rates for either European or Māori children (Figure 13-15). Rates for all four ethnic groups increased over time (Figure 13-15).

Figure 13-15. Hospitalisations for mental health conditions in 0–14 year olds, by ethnicity, New Zealand 2000–2017

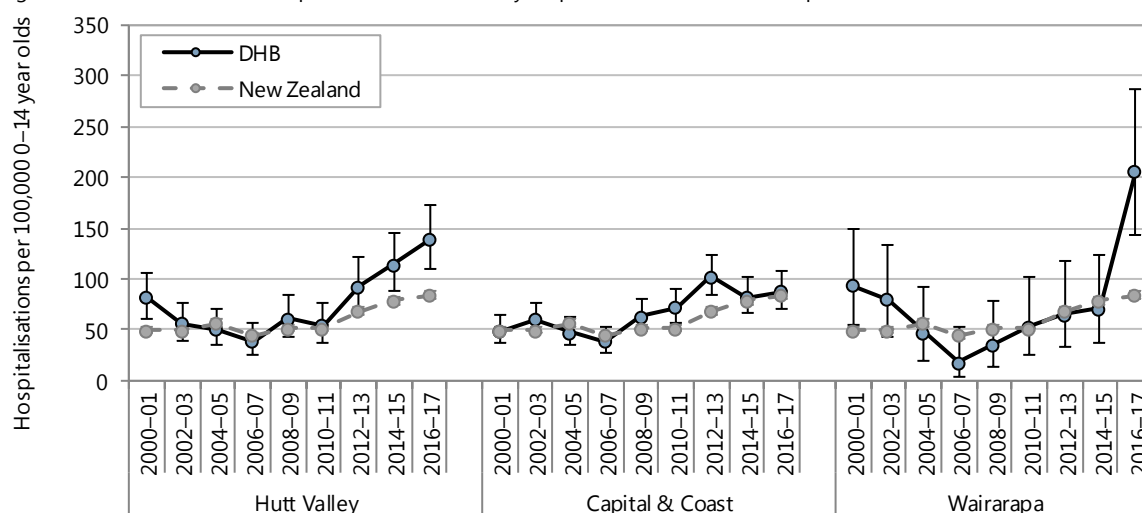


Indicator: Hospitalisations for mental health conditions.

Numerator: NMDS, Denominator: NZCYES Estimated Resident Population.

Rates are subject to small number variation, especially in the Asian/Indian and Pacific groups and are suppressed for MELAA

Figure 13-16. Mental health hospitalisations, Hutt Valley, Capital & Coast, and Wairarapa DHBs vs New Zealand 2000–2017



Numerator: NMDS, Denominator: NZCYES Estimated resident population.

Rates for Wairarapa are subject to small number variations

Over the years 2000–2017, mental health hospitalisation rates for 0–14 year olds in the Hutt Valley, Capital & Coast, and Wairarapa DHBs generally increased from 2006–2007 onwards, consistent with the national trend (Figure 13-16). In Wairarapa, there was an unusually large number of hospitalisations in 2016–2017. This was entirely due to one very ill child who had multiple admissions.

Regional variation

Hutt Valley, Capital & Coast and Wairarapa DHBs all had significantly higher mental health hospitalisation rates than the New Zealand average for 0–14 year olds during 2013–2017 (Figure 13-17, Table 13-7).

Figure 13-17. Hospitalisations due to mental health conditions in 0–14 year olds, by district health board, 2013–2017

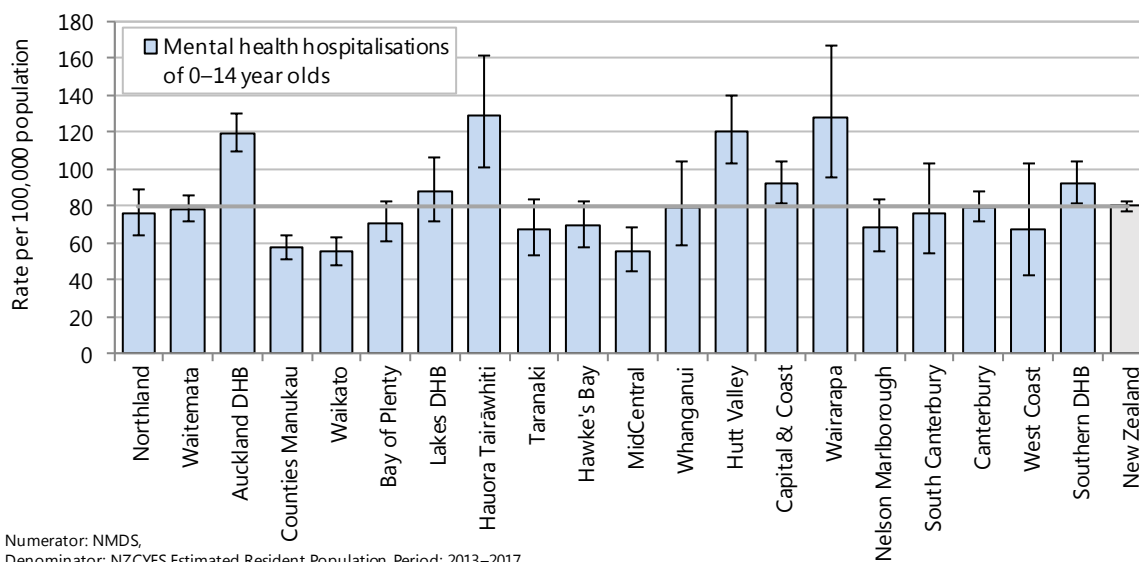


Table 13-7. Hospitalisations for mental health conditions in 0–14 year olds, Hutt Valley, Capital & Coast and Wairarapa DHBs vs New Zealand, 2013–2017

DHB	Number	Annual average	Rate per 100,000 population	Rate ratio	95% CI
Hospitalisations of 0–14 year olds during 2013–2017					
Mental health conditions					
Hutt Valley	178	36	120.5	1.51	1.30–1.76
Capital & Coast	256	51	92.5	1.16	1.02–1.32
Wairarapa	54	11	127.8	1.60	1.23–2.10
New Zealand	3,647	729	79.7	1.00	

Numerator: NMDS, Denominator: NZCYES Estimated Resident Population

Demographic variation

Table 13-8. Mental health hospitalisations of 0–14 year olds, by demographic factors, New Zealand 2013–2017

Variable	Number	Rate per 100,000 population	Rate ratio	95% CI
Mental health hospitalisations of 0–14 year olds during 2013–2017				
New Zealand				
NZDep2013 index of deprivation quintile				
Quintile 1 (least deprived)	708	78.8	1.00	
Quintile 2	629	76.7	0.97	0.87–1.08
Quintile 3	688	79.7	1.01	0.91–1.12
Quintile 4	740	77.9	0.99	0.89–1.10
Quintile 5 (most deprived)	865	83.1	1.05	0.95–1.16
Prioritised ethnicity				
Māori	998	83.8	0.98	0.91–1.06
Pacific	249	55.9	0.65	0.57–0.75
Asian/Indian	289	55.2	0.65	0.57–0.73
MELAA	50	82.3	0.96	0.73–1.28
European/Other	2,050	85.5	1.00	
Gender				
Male	1,586	67.6	0.73	0.68–0.78
Female	2,061	92.5	1.00	

Numerator: NMDS, Denominator: NZCYES Estimated Resident Population. Rate ratios are unadjusted, Ethnicity is level 1 prioritised, Quintile is NZDep2013

During 2013–2017 there was no variation in children’s mental health hospitalisation rates by residential deprivation score (NZDep13), but Pacific and Asian/Indian children had significantly lower hospitalisation rates than Māori and European/Other children. Girls had significantly higher hospitalisation rates than boys (Table 13-8).

Evidence for good practice

Interventions to promote children's mental wellbeing

Good mental health is only one aspect of wellbeing and the things that promote good mental health also promote wellbeing in general, for both children and adults: supportive families and friends, adequate material resources, opportunities for physical activity, secure and stable housing, access to healthcare, family-friendly employment and government policies, safe communities, and the absence of violence, prejudice and discrimination.^{11,12}

The foundations for good mental health are laid early in life by a secure mother-infant relationship and nurturing family relationships.^{11,13} The first three years are the critical time for children's brain development so interventions during this time are likely to have the greatest effects on children's mental wellbeing in later life.¹³ Supporting parents, especially those facing adversities such as poverty, intimate partner violence or mental illness, to be the best parents they can be is a key strategy for promoting children's mental health.¹³ Supporting other close relationships, both within and beyond the family, also strengthens children's social and emotional development.¹³ High quality childcare that stimulates language development, promotes age-appropriate learning opportunities, and provides parenting education can mitigate some of the effects of stressful home environments.¹³

Many interventions to guide parents of young children have been developed. A 2015 review¹⁴ for the UK Early Intervention Foundation considered the effectiveness of 75 interventions aimed at improving young children's development through supporting the parent-child relationship. The review identified 17 programmes with good evidence and a further 18 programmes that are based on firm scientific principles but have yet to be evaluated. It found that, overall, the evidence is strongest for programmes delivered to children showing early signals of risks in child development, and that there is greater evidence for effectiveness for programmes focussed on children's behavioural self-regulation than for those focussed on attachment or cognitive development.

Programmes considered to have good evidence of effectiveness in improving attachment were: Child First, Child-parent psychotherapy, Family Foundations, and Family Nurse Partnership.¹⁴ Programmes with good evidence for improving behaviour were: Empowering Parenting and Empowering Communities (EPEC), Family Check-up, Helping the Non-compliant Child, Hitkashrut, Incredible Years Preschool, ParentCorps, the New Forest Parenting Programme and several Triple P programmes.¹⁴ Programmes with good evidence for improving cognitive outcomes were Let's Play in Tandem, and Raising Early Achievement in Literacy (REAL).¹⁴

In later childhood, early childhood education and schools play an important part in children's mental wellbeing. Many countries, including New Zealand,¹⁵ have initiated policies and guidelines for schools to promote children's mental wellbeing.^{16,17} A 2006 evidence review for the World Health Organization (WHO) on school health promotion and the health promoting schools approach¹⁸ found that school-based programmes to promote mental health are effective, especially if they are developed and implemented in accordance with the health promoting schools approach: involvement of the whole school, changes to the school psychosocial environment, personal skill development, involvement of parents and the wider community, and implementation over a long period of time (more than a year).

The 2011 systematic review by Weare and Nind¹⁹ for the European Union Dataprev project identified 52 systematic reviews and meta-analyses of mental health interventions in schools. Although the reviews covered many different interventions, issues, topics and populations, and were of variable quality, there was considerable overlap between them and some key interventions were included in many reviews. The interventions identified by the reviews had benefits for children, families and communities in improving a range of mental health, social, emotional and educational outcomes. Across the whole range of outcomes, interventions consistently had much greater impacts for higher risk children. Adverse effects were generally few. Most interventions had variable impacts: they only worked if they were completely and accurately implemented. Features of more effective interventions included: teaching skills, focussing on positive mental health, starting early with the youngest children and continuing with the older ones, balancing universal and targeted approaches, continuing for a long period of time, and being embedded within a multimodal/whole school approach that included

features such as changes to the curriculum (including teaching skills and linking with academic learning), improving the school ethos and culture, teacher education, liaison with parents, parenting education, community involvement, and coordinated work with outside agencies.

A 2018 review²⁰ of newer studies of mental health promotion interventions in schools (published since 1 January 2007) identified 10 studies of universal, whole-of-school interventions, eight of which reported positive effects. Only two studies had long term follow-up (2–3 years). The review authors noted that one of the challenges they faced in identifying relevant studies was the variety of names given to interventions, for example: mental health promotion, mental wellbeing, social and emotional learning, social and emotional wellbeing, positive mental health, and emotional health. They reported that, overall, there had been limited advancement in research on mental health promotion in schools, the research was of variable quality, and there was a lack of research on digital interventions or internet-based approaches.

A 2016 Cochrane review²¹ of psychological depression prevention programmes (such as cognitive behavioural therapy) for children and adolescents found that, although there had been many RCTs of such interventions (most carried out in schools), and overall these had small beneficial effects, there was still not enough evidence to support the implementation of depression prevention programmes. The review authors noted most trials had not used attention placebo control groups (which attempt to control for non-specific factors that may be responsible for an intervention apparently having an effect, like involvement in a trial and attention from researchers).

Good practice in treating children with mental health problems

Children's capabilities for social, emotional and behavioural regulation vary with their developmental level and caregiver and environmental situations so it can sometimes be difficult for clinicians to tell whether a child has a significant mental health problem or not.²² Nevertheless, it is important to identify significant behavioural and mental health problems because early intervention can improve outcomes, both for the child and his or her family.²² Multiple informants, such as parents and teachers, can be helpful for determining whether a child has a problem and the nature of the problem (if any), although the evidence for the validity of the multi-informant approach is better for mental health problems that are easy to observe, such as aggressive and disruptive behaviour, than for less obvious problems, such as anxiety or depression.²³ When services refuse to offer assessment or treatment until a child's problems are severe, and waiting times are long, opportunities for early intervention are lost.

Mental health services need to be family-focussed rather than client-focussed so that the needs of the whole family can be addressed, whether the initial service contact is because of a parent's or a child's mental health problem.^{4,24} A child's poor mental health may stem from problems in their family or community, such as parental depression or substance abuse, family conflict, food and housing insecurity, difficulties at school, or living in a dangerous neighbourhood.^{25,26} Attending to such issues may be the most effective way to improve the child's mental health.

Intervention for child mental health problems often requires coordination between multiple agencies and services,⁴ for example: well child services, general practice, early childhood education, schools and school-based health services, special education, child and adult mental health services, paediatric specialists, Oranga Tamariki, youth forensic mental health services, disability support services, and non-governmental organisations. Concerns about privacy regulations can inhibit information sharing between organisations, hampering co-ordination of care. This fragmentation of child mental health services is not unique to New Zealand. The US Surgeon General's Conference on Children's Mental Health in 2000²⁷ noted the need for a common language to describe children's mental health, to facilitate service delivery across systems (such as health and education).

The high prevalence of mental health problems in children and the importance of early intervention for improving long term outcomes suggest that primary care needs to play a greater role in identifying mental health issues and supporting children's mental wellbeing.²⁸ Currently the Ministry of Health funds access to primary care mental health interventions for youth aged 12–17 years, but not for children.²⁹ Parents may not disclose their child's emotional and behavioural problems to a primary care practitioner for a variety of reasons: a lack of awareness of mental health issues, a belief that the child will grow out of it, the stigma associated with mental health disorders, or a cultural belief that such matters are best dealt with by the extended family.³⁰ General practitioners see children and their

parents for other conditions, and so have opportunities to build rapport with families, become aware of the issues they face, and sensitively enquire about mental health concerns.³⁰

Primary care practitioners face a number of barriers to managing child mental health problems effectively. A 2016 review³¹ found that these barriers include: poor ability to recognise children's emotional and behavioural problems; short appointment times; lack of reimbursement for extended consultations; having a lack of confidence, knowledge, and training in recognising and treating children's mental health problems; lack of services to refer children to; long waiting times for services or services refusing to accept referrals; lack of opportunities to collaborate with other professionals (such as being able to phone or email a mental health specialist for advice or having mental health practitioners on site); and parents being reluctant to accept referral.

There is evidence (mostly from the US) that integrated primary medical-behavioural care models can lead to improved child and adolescent mental health outcomes (compared to usual care).³² Integrated care includes a variety of models, such as bringing behavioural health expertise into primary care settings using consultation, web-based, telephone and/or other resources; colocating behavioural health services in primary care practices; and team-based collaborative care models.³²

The 2015 review by Asarnow et al.³² identified 31 RCTs that had evaluated integrated care for children and adolescents, 25 of which could be classed as treatment interventions. Integrated care was associated with significant benefits for several mental health conditions: depression, anxiety and behaviour. The strongest effects were for collaborative care interventions, which provide team-based care with primary care practitioners, care managers, and mental health specialists working together to evaluate, treat and monitor patients' progress. The collaborative care intervention trials included evidence-based medication algorithms plus evidence-based psychotherapy. The other treatment trials with significant individual effects used interventions with empirical support such as Triple P, Incredible Years, interpersonal psychotherapy, guideline medication protocols, and cognitive behavioural therapy for anxiety and somatic concerns. The review authors noted that both effective care systems and effective care are necessary for improving patient outcomes: there is no point in improving the care system if the care that is being delivered is ineffective.

Equity

There are ethnic and socioeconomic disparities in some indicators of child mental health in New Zealand.³³ The New Zealand Health Survey in 2012/13, 2014/15 and 2015/16 assessed the social, emotional and behavioural functioning of children aged 3–14 years via the Strengths and Difficulties Questionnaire (SDQ) which asks parents questions about a range of positive and negative behaviours related to emotions, peer interactions, hyperactivity and conduct.³³ The prevalence of difficulties based on the overall SDQ was significantly higher for Māori children compared with non-Māori and for children living in the most deprived areas compared to the least.³³

The Youth'12 survey of secondary school students found that the proportion of students who reported excellent emotional wellbeing (on the WHO-5 scale) in students from the least deprived areas (by NZDep06) was almost double that in students from the most deprived areas.³⁴ It also found two patterns of household deprivation that were associated with significant depressive symptoms: high housing stress together with moderate material deprivation, and high levels across all indicators of family socioeconomic deprivation, particularly material deprivation.³⁵ Students from poor households were more likely to report depressive symptoms if they lived in affluent neighbourhoods or attended more affluent schools.³⁵

A 2013 systematic review³⁶ of 55 studies (mostly from North America, Europe and Australia) on the relationships between various commonly used indicators of socioeconomic status (SES) and mental health outcomes for children and adolescents aged four to 18 years reported that 52 of the 55 studies indicated that lower socioeconomic status was associated with higher rates of mental health problems. Persistently low SES and a decrease in SES were major predictors of the onset of mental health problems.

Interventions to reduce inequities in children's mental wellbeing need to operate at multiple levels: at the child and family level; at the neighbourhood, school and community level and at the societal level.³⁷ Action on the wider social determinants of mental health, including education, housing, employment conditions and family incomes will have the greatest impact on the social gradient in

child mental health conditions.³⁷ WHO recommends that services for disadvantaged families are delivered in accordance with the proportionate universalism approach: services to promote mental wellbeing and strengthen parent-child relationships should be provided for all families, with the level of support matched to the level of need.³⁷ It is important to ensure that the most disadvantaged families are not excluded from accessing services because of factors such as lack of income, time, or transport, otherwise inequalities may be increased.³⁸

A 2015 evidence review for the Victoria Health Promotion Foundation,³⁸ entitled *Addressing the social determinants of inequities in mental wellbeing*, found relatively few interventions that aimed to improve the mental wellbeing of children but many more interventions aimed at prevention and early detection of mental illness. Almost none of the interventions reported a specific equity focus, although many were delivered to disadvantaged groups. The review's authors stated that: "Only delivering programs to disadvantaged groups does not address the gradient in health outcomes, is not well aligned with the proportionate universalism approach and it does not promote wellbeing at a population level".³⁸

The review's recommendations included:

- Increase the emphasis on promoting mental wellbeing in interventions (as opposed to preventing or treating mental illness)
- Sustained interventions: Long term interventions achieve better results than short term ones
- Remove time and cost barriers to families participating in interventions
- Recognise and address the psychosocial risk factors associated with low SES
- Apply the principal of proportionate universalism to interventions
- Provide accessible group-based parenting programmes
- Provide support for children of parents affected by mental illness (because these children are at higher risk for mental illness)
- Invest in interventions to increase children's physical activity
- Invest in interventions to promote wellbeing in education settings, and involve parents in these
- Develop online interventions: the internet is an important setting for young people's wellbeing
- Develop interventions to improve the physical and social environment
- Develop interventions to support the school to work transition (a critical period in young people's lives)
- Develop performance measures so that the effectiveness of initiatives can be assessed
- Measure effectiveness of actions according to equity indicators
- Use health impact assessments and the Equity Focused Health Impact Assessment Framework³⁹ to evaluate public policy, including policies outside health and education.

There is good evidence that school-based interventions to promote mental health and prevent mental health problems have positive effects and that interventions have much greater effects for higher risk children on positive mental health, mental health problems and disorders, violence and bullying, and pro-social behaviour.¹⁹

Guidelines, evidence-based reviews, New Zealand publications, and other relevant publications and websites

In the following section, all the New Zealand publications are grouped together, followed by publications grouped according to the particular mental health issue or condition they deal with.

There are no publications on schizophrenia or bipolar disorder as these disorders are rare in under fifteen year olds.⁴⁰ There are no publications on substance abuse disorders either because literature on preventing and treating these disorders in pre-teen children is sparse compared to the literature pertaining to this issue in adolescents. This omission should not be taken to mean that there is no need to address alcohol and drug abuse by pre-teen children as these children do present to emergency departments with alcohol intoxication⁴¹ and there is some evidence that starting to drink early (before 14 years) increases the likelihood of alcohol problems in later life.^{42,43} Information on schizophrenia, bipolar disorder, and drug and alcohol abuse will be provided in next year's report, which will focus on issues relevant to young people aged 15 to 24 years.

New Zealand publications and websites

- Dominic C. 2018. **Inter-parental relationship quality and its effects on children: A literature review to support analysis and policy.** Wellington: Ministry of Social Development. <http://www.msd.govt.nz/about-msd-and-our-work/publications-resources/literature-reviews/inter-parental-relationships/index.html>
- Social Policy and Research Unit. 2017. **Improving youth mental health: What has worked, what else could be done.** Summary of findings from the phase 2 evaluation of the Prime Minister's Youth Mental Health Project. <http://www.superu.govt.nz/sites/default/files/YMHP%20Research%20Summary.pdf>
- The University of Auckland. 2017. **Te Whānau Pou Toru.** Wellington: Ministry of Health. <https://www.health.govt.nz/publication/te-whanau-pou-toru> (This report describes the outcomes of a RCT evaluating the effectiveness of Te Whānau Pou Toru, a culturally adapted version of the Primary Care Triple P – Discussion Groups).
- Ministries of Health and Education. 2016. **New Zealand autism spectrum disorder guideline.** Wellington: Ministry of Health. <https://www.health.govt.nz/publication/new-zealand-autism-spectrum-disorder-guideline>
- Ministry of Health. **Youth Mental Health Project.** <https://www.health.govt.nz/our-work/mental-health-and-addictions/youth-mental-health-project> (this page has links to many resources relating to this project).
- Malatest International. 2016. **Evaluation report: The Youth Primary Mental Health Service.** Wellington: Ministry of Health. <https://www.health.govt.nz/publication/evaluation-report-youth-primary-mental-health-service>
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- New Zealand Youth Mentoring Network. **Guide to safe and effective practice in youth mentoring, Aotearoa New Zealand, 2nd edition.** 2016. Auckland: New Zealand youth Mentoring Network. <http://www.youthmentoring.org.nz/research/publications.cfm>
- The Prime Minister's Youth Mental Health Project. 2015. **Guidelines: Supporting young people with stress, anxiety and/or depression.** Wellington: Ministry of Social Development. <https://www.mentalhealth.org.nz/assets/supporting-young-people-stress-anxiety-depression.pdf>
- Quigley and Watts. 2015. **Youth Mental Health project research review.** Wellington: Social Policy Evaluation and Research Unit (Superu). <http://www.superu.govt.nz/sites/default/files/YMHP%20Research%20Review%20Report%202015%20Superu.pdf>
- Ministry of Health. 2015. **Supporting parents, healthy children.** Wellington: Ministry of Health. <https://www.health.govt.nz/publication/supporting-parents-healthy-children> (A guideline on supporting the children of parents with mental illness)
- Social Policy Evaluation and Research Unit (SuPERU). 2015. **Effective Parenting Programmes: A review of the effectiveness of parenting programmes for parents of vulnerable children.** Wellington: Families Commission. <http://www.superu.govt.nz/sites/default/files/Effective-Parenting-Programme-Report.pdf>
- Education Review Office. 2015. **Wellbeing for success: A resource for schools.** Wellington: Education Review Office. <http://www.ero.govt.nz/assets/Uploads/Wellbeing-resource-WEB.pdf>
- Mental Health Foundation of New Zealand. 2014. **Young people's experience of discrimination in relation to mental health issues in Aotearoa New Zealand: Remove the barriers for our young**

people from yesterday, today and tomorrow. Auckland, New Zealand: Mental Health Foundation of New Zealand. <https://www.mentalhealth.org.nz/assets/Our-Work/Young-People-2014.pdf>

- Ministry of Health. 2014. **Transition planning guidelines for infant, child and adolescent mental health/alcohol and other drugs services 2014.** Wellington: Ministry of Health. <https://www.health.govt.nz/publication/transition-planning-guidelines-infant-child-and-adolescent-mental-health-alcohol-and-other-drugs>
- Ministry of Health. 2012. **Healthy beginnings: Developing perinatal and infant mental health services in New Zealand.** Wellington: Ministry of Health. <https://www.health.govt.nz/publication/healthy-beginnings-developing-perinatal-and-infant-mental-health-services-new-zealand>
- Ministry of Health. 2011. **Youth Forensic Services Development Guidance for the health and disability sector on the development of specialist forensic mental health, alcohol and other drug, and intellectual disability services for young people involved in New Zealand's justice system.** Wellington: Ministry of Health. <https://www.health.govt.nz/publication/youth-forensic-services-development>
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- New Zealand Government. **S.K.I.P. Tips for parents.** <https://whanau.skip.org.nz/>
- The Advisory Group on Conduct Problems. 2009. **Conduct Problems: Best practice report.** Wellington: Ministry of Social Development. <http://www.msdc.govt.nz/documents/about-msdc-and-our-work/publications-resources/research/conduct-problems-best-practice/conduct-problems.pdf>
- **Sparx** (an online e-therapy tool for young people with mild-to-moderate depression and anxiety). <https://sparx.org.nz/home>
- Health Navigator New Zealand. 2018. **Parenting programmes and support.** <https://www.healthnavigator.org.nz/healthy-living/parenting-children/parenting-programmes-support/>

Interventions to promote children's mental wellbeing and prevent mental health problems

- **The Early Intervention Foundation Guidebook.** 2018. <http://guidebook.eif.org.uk/about-the-guidebook> This online guidebook provides information about early intervention programmes that have at least preliminary evidence of achieving positive outcomes for children.
- Center on the Developing Child at Harvard University. 2016. **From best practices to breakthrough impacts: A science-based approach to building a more promising future for young children and families.** <https://developingchild.harvard.edu/resources/from-best-practices-to-breakthrough-impacts/>
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- Forum on Promoting Children's Cognitive, Affective and Behavioral Health, Board on Children, Youth and Families, Institute of Medicine, et al. 2014. **Strategies for scaling effective family-focused preventive interventions to promote children's cognitive, affective, and behavioral health: Workshop summary.** Washington (DC): National Academies Press (US). <http://dx.doi.org/10.17226/18808>
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Parenting programmes and other support for families

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14. Nurture and protection

The right to “grow up in a family environment of happiness, love and understanding” and “protection from sexual exploitation, abuse and economic exploitation” are two of the rights to which all children aged under 18 years are entitled by the United Nations Convention on the Rights of the Child (UNCROC),¹ and ratified in New Zealand in 1993.² The healthy development of a child is the primary responsibility of families and communities, and is achieved by providing supportive relationships and positive learning experiences.³

Harming a child physically (including giving them hidings or smacking), yelling or swearing at them, shaming or rejecting them, involving them in sexual activities, or fabricating or inducing illness are all forms of abuse. In the Youth’12 survey, conducted in 2012, 50% of school children (majority aged 13–17 years) had witnessed in the preceding 12 months adults yelling or swearing at a child in their home, and 14% reported that they had been hit or physically harmed during that preceding year in their home by an adult.^{4,5}

In June 2007, a change in New Zealand law removed the statutory defence for “use of parental force for the purpose of correction” from the Crimes Act, thereby making physical punishment illegal.⁶

Surveillance of the important and sensitive issue of child safety while protecting the privacy of individual children can be achieved via de-identified data.⁷ There are limitations to such surveillance, such as underestimating injury hospitalisations perpetrated by parents or caregivers, underestimating prevalence of child maltreatment, and potential reporting bias with the diagnoses being more readily used for children perceived to be at risk.⁷⁻¹⁰

This section presents information on physical punishment of under-15 year olds and also on deaths and hospitalisations due to assault, neglect or maltreatment.

Data sources and methods

Child respondents aged 0–14 years who received physical punishment in past 4 weeks

Child respondents (aged 0–14 years) are defined as having experienced physical punishment in past 4 weeks if the child’s parent or caregiver answered ‘Physical punishment, such as smacking’ to question C3.15 in the New Zealand Health Survey (NZHS).

Deaths of under-15 year olds from intentional injury associated with assault, maltreatment or neglect

Deaths of 0–14 year olds where the underlying cause of death was intentional injury (assault; per 100,000 age-specific population).

Hospitalisations for injuries arising from the assault, neglect, or maltreatment of 0–14 year olds

Hospitalisations of 0–14 year olds with a primary diagnosis of injury and an intentional injury (assault) external cause code in any of the first 10 external cause codes (per 100,000 age-specific population).

Data sources

New Zealand Health Survey (NZHS), as published by the Ministry of Health

- National data (2006/07–2016/17)¹¹, refer to data source appendix
- Regional data (Pooled year: 2014–2017)¹²

Numerator (deaths): National Mortality Collection (MORT)

Numerator (hospitalisations): National Minimum Dataset (NMDS)

Denominator: NZCYES estimated resident population (with intercensal extrapolation)

Additional information

An acute hospitalisation is an unplanned hospitalisation occurring on the day of presentation, while an arranged hospitalisation (referred to elsewhere in this report as a semi-acute hospitalisation) is a non-acute hospitalisation with an admission date less than seven days after the date the decision was made that the hospitalisation was necessary.

For more information on the NZ Health Survey, please refer either to the Ministry of Health website (<https://www.health.govt.nz>) or to appendices in this report. An overview of NMDS and MORT, and outline of the data limitations, are provided in the appendices for review before interpreting any patterns. The appendices also contain a list of the codes included. Clinical codes used to identify assault, maltreatment or neglect within NMDS and MORT are provided before the references for this indicator.

Physical punishment

Physical punishment, such as spanking of misbehaving children, has been shown to be an ineffective disciplinary method.^{13,14} It is a predictor of negative developmental outcomes, including increased child aggression, antisocial behaviour, poorer cognitive development, decreased family relationships, depression and other mental health problems.¹⁴

Promotion of positive disciplinary approaches, such as the NZ Government's SKIP resources (Strategies with Kids, Information for Parents), supporting parents and primary caregivers to utilise positive parenting strategies, aim to decrease the use of physical punishment.¹⁵ In June 2007, a change in New Zealand law removed the "use of parental force for the purpose of correction" clause from the Crimes Act, thereby making physical punishment illegal.⁶

Question C3.15: Thinking back over the past 4 weeks, when [child's name] misbehaved, which of the following, if any, have you done? Just read out the number next to the words.

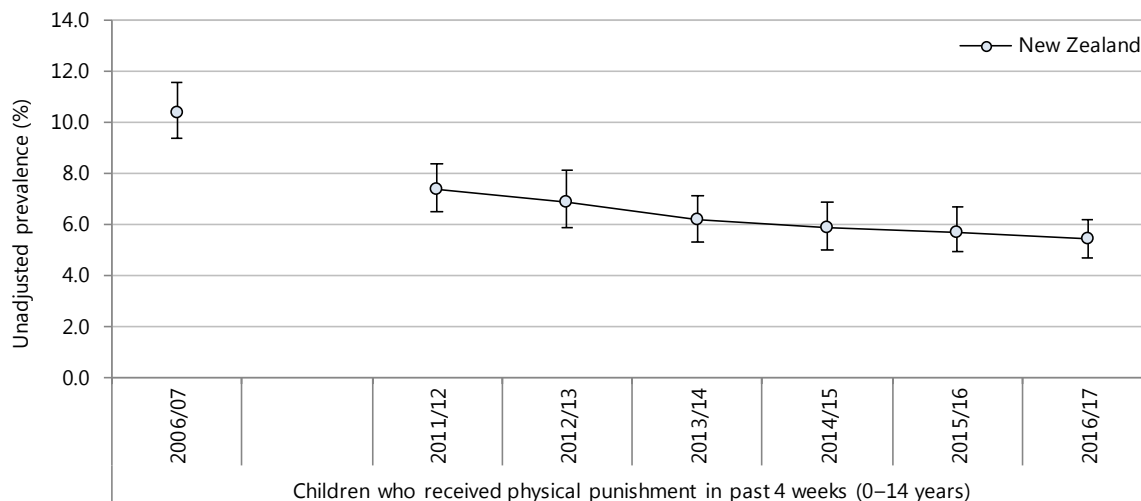
1. Made him/her go without something or miss out on something
2. Yelled at him/her
3. Explained why he/she should not do it
4. Physical punishment, such as smacking
5. Told him/her off
6. Sent him/her to the bedroom or other place in the house
7. Ignored his/her behaviour
8. Something else [specify] _____
9. My child has not misbehaved during the past 4 weeks

Source: New Zealand Health Survey Annual Data Explorer 2016/17¹¹

Figure 14-1 presents the percentage of 0–14 year old children who were physically punished for misbehaviour in the four weeks preceding the survey, as answered by the parents or primary caregivers in interviews for the New Zealand Health Survey. The percentage has gradually decreased from 10.4% in 2006/07 to 5.4% in 2016/17.

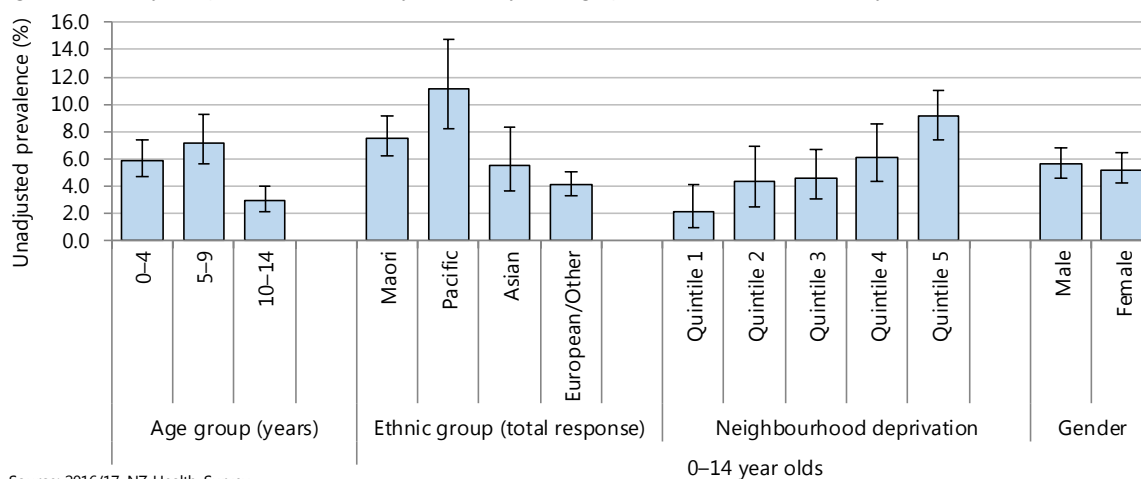
Rates of physical punishment were higher for children aged under ten years (Figure 14-2). The percentage of 0–14 year olds physically punished by demographic factor are presented as unadjusted rates in Figure 14-2 and as adjusted rates in Figure 14-3. Rates were significantly higher for 0–14 year olds who were Pacific (2.5 times higher than non-Pacific) or Māori (1.6 times higher than non-Māori). For 0–14 year olds living in areas with high deprivation scores, the rates of physical punishment were 2.8 times higher than those living in neighbourhoods with the lowest deprivation scores (Figure 14-3).

Figure 14-1. Physical punishment of 0–14 year olds, by survey year, NZ Health Survey 2006/07–2016/17



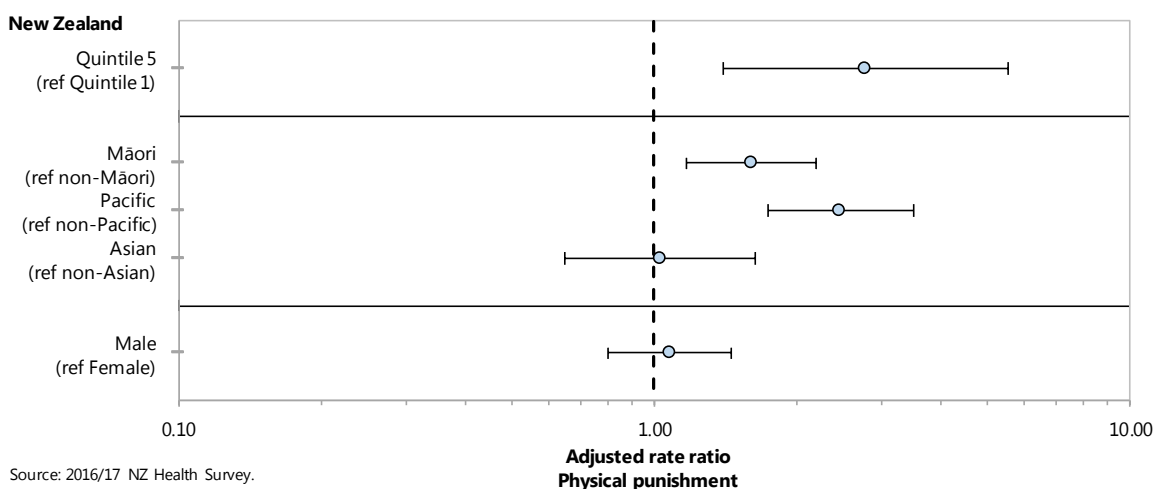
Source: NZ Health Survey

Figure 14-2. Physical punishment of 0–14 year olds, by demographic factor, NZ Health Survey 2016/17



Source: 2016/17 NZ Health Survey.
 Children who received physical punishment in past 4 weeks (0–14 years);
 Quintile is NZDep2013 Index of deprivation (1 = least deprived; 5 = most deprived)

Figure 14-3. Physical punishment of 0–14 year olds, by demographic factor, NZ Health Survey 2016/17

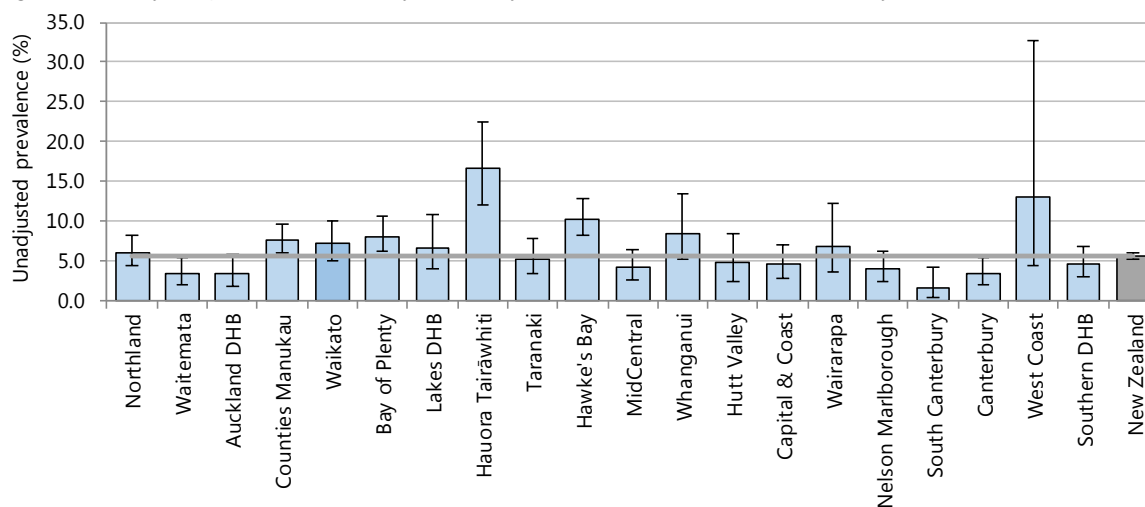


Source: 2016/17 NZ Health Survey.
 Children who received physical punishment in past 4 weeks (0–14 years);
 Ethnicity is total response, Quintile is NZDep2013 Index of deprivation (1 = least deprived; 5 = most deprived)

Figure 14-4 shows the percentage of 0–14 year olds who were physically punished varied for the district health boards based on the pooled 2014/15 to 2016/17 New Zealand Health Surveys. There

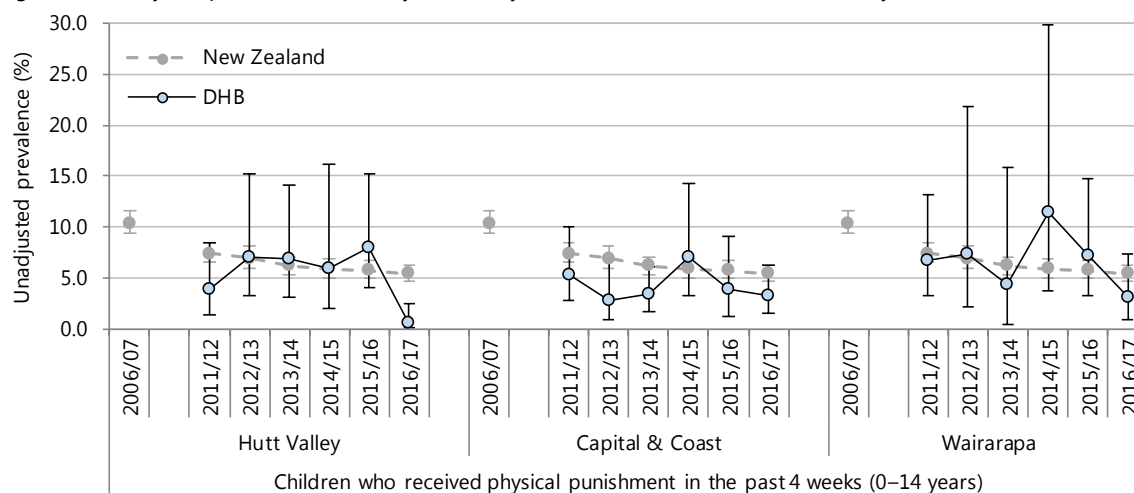
was no significant difference from the national rate for the three DHBs. Rates of physical punishment in Capital & Coast and Wairarapa DHBs have generally decreased, while rates in Hutt Valley had increased prior to the 2016/17 survey (Figure 14-5).

Figure 14-4. Physical punishment of 0–14 year olds, by district health board, NZ Health Survey 2014–2017



Source: NZ Health Survey 2014–2017; Children who received physical punishment in past 4 weeks (0–14 years)

Figure 14-5. Physical punishment of 0–14 year olds, by district health board, NZ Health Survey 2006/07–2016/17



Source: NZ Health Survey. Percent of children (among children aged 0–14 years; unadjusted prevalence, 95% confidence intervals)

Assault, neglect or maltreatment

Child maltreatment is a serious public health issue that is recognised internationally.^{8,16}

“Any act of commission or omission by a parent or other caregiver that results in harm, potential for harm, or threat of harm to a child” is considered child maltreatment.¹⁷

Child abuse (or acts of commission) involves harming a child physically (including giving them hidings), psychologically/emotionally (which includes yelling or swearing at them, shaming or rejecting them), sexually (including involving them in sexual activities), or fabricating or inducing illness. Child neglect (or acts of omission) involves failing to meet a child’s physical and emotional needs. Neglect includes failure to provide (e.g. food, clothing and shelter; care, love, and attention; access education, medical or dental care) and failure to supervise (such as not giving them adequate supervision, security, or preventing exposure to violent environments).^{17,18} The form of abuse or neglect rarely occurs in isolation from other forms of maltreatment, and often with a lack of obvious signs and symptoms.¹⁸

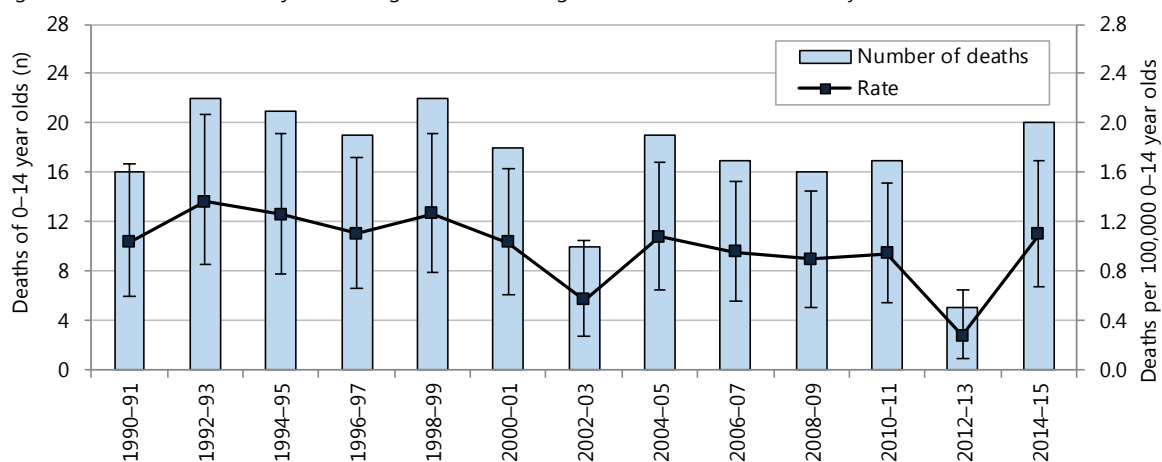
The consequences of maltreatment can range from mild or short-term to severe with the effects lasting into adulthood. The effects of maltreatment during childhood can be wide ranging and present as physical, psychological, behavioural and/or sexual disorders. Consequences of maltreatment may also impact wider society.

Deaths from assault, neglect or maltreatment

There were 222 children aged 0–14 years who died from injuries arising from assault, neglect, or maltreatment between 1990 and 2015. Lower rates in 2002–03 and 2012–13 were not statistically different from the rates in other years (Figure 14-6).

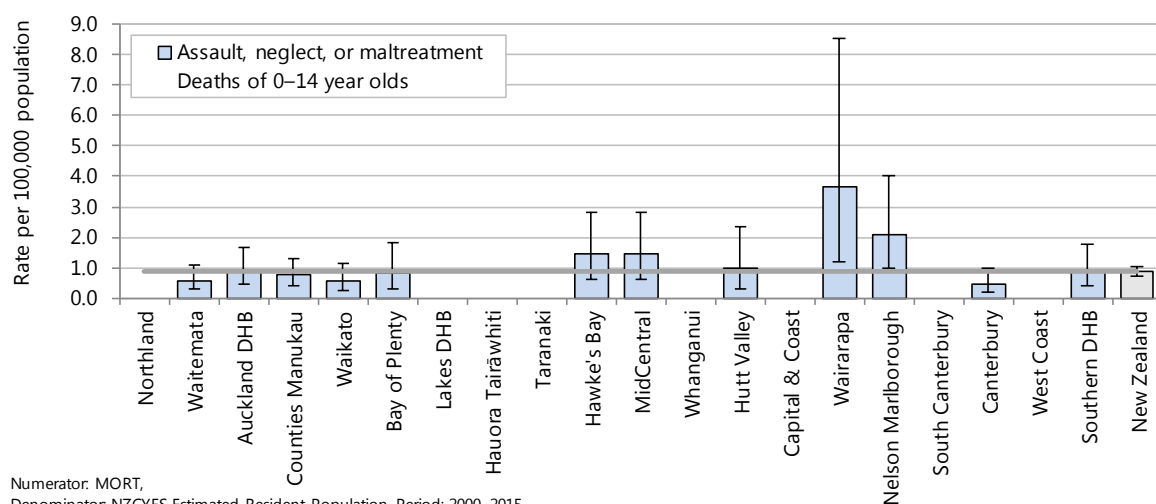
In the five-years from 2011–2015 there were 34 deaths of 0–14 year olds as a result of assault, neglect or maltreatment. Of these deaths 16 were of female and 18 were of male children. Deaths occurred predominantly in the first year of life (38%, n=13), with six deaths each for 1–4 year olds and 5–14 year olds respectively.

Figure 14-6. Deaths due to injuries arising from assault, neglect, or maltreatment of 0–14 year olds, New Zealand 1990–2015



Indicator: Injuries arising from the assault, neglect, or maltreatment of children
 Numerator: MORT, Denominator: NZCYES Estimated Resident Population.
 Year is year of death registration

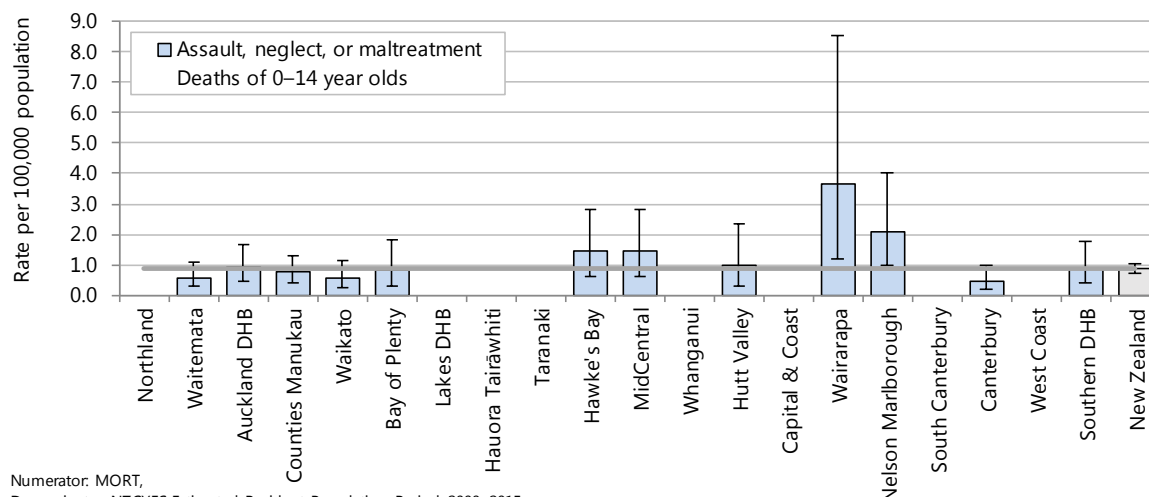
Figure 14-7. Deaths due to injuries arising from the assault, neglect, or maltreatment of 0–14 year olds, by district health board, 2000–2015



Numerator: MORT,
 Denominator: NZCYES Estimated Resident Population. Period: 2000–2015
 DHB rates suppressed for: Northland, Lakes DHB, Hauora Tairāwhiti, Taranaki, Whanganui, Capital & Coast, and West Coast

Child abuse and neglect deaths for the DHBs included in this report are presented in Table 14-1 and Figure 14-8, and in general reflect the underlying population size. Because rates are based on small numbers they should be interpreted with caution.

Figure 14-8. Deaths due to injuries arising from the assault, neglect, or maltreatment of 0–14 year olds, by district health board, 2000–2015



Numerator: MORT,
Denominator: NZCYES Estimated Resident Population. Period: 2000–2015
DHB rates suppressed for: Northland, Lakes DHB, Hauora Tairāwhiti, Taranaki, Whanganui, Capital & Coast, and West Coast

Table 14-1. Deaths due to injuries arising from the assault, neglect, or maltreatment of 0–14 year olds, Hutt Valley, Capital & Coast, and Wairarapa DHBs vs New Zealand 2000–2015

DHB	Number	Annual average	Rate per 100,000 population	95% CI
Deaths of 0–14 year olds during 2000–2015				
Assault, neglect, or maltreatment				
Hutt Valley	5	0	1.00	0.32–2.34
Capital & Coast	<5	s	s	s
Wairarapa	5	0	3.66	1.18–8.54
New Zealand	122	8	0.85	0.71–1.02

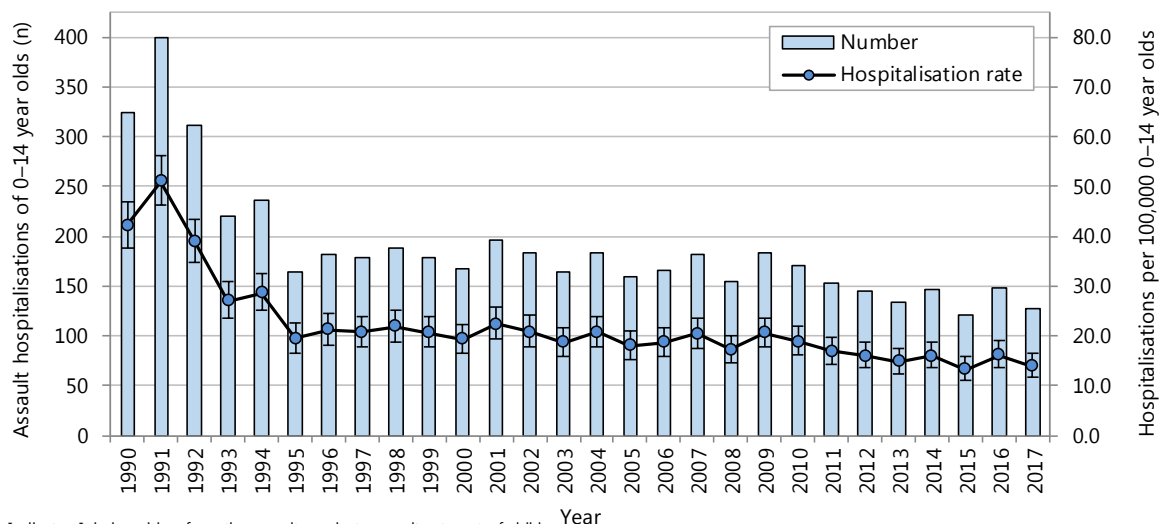
Numerator: MORT, Denominator: NZCYES Estimated Resident Population

Hospitalisations due to assault, neglect or maltreatment

There was an overall fall in both the number and rate of hospitalisations for injuries arising from assault, neglect or maltreatment of New Zealand children aged 0–14 years from 1990 to 1995, and then more gradually from 2001 (Figure 14-9).

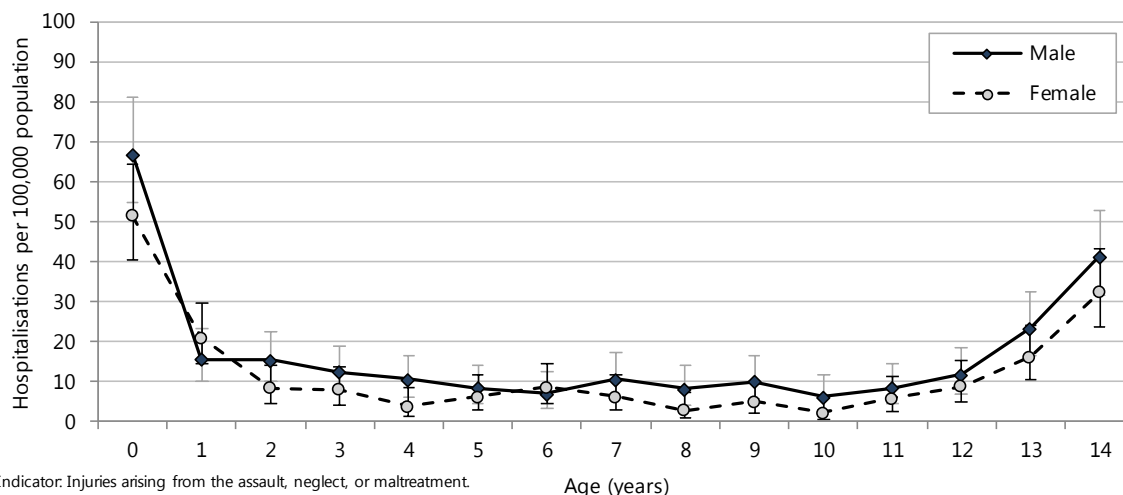
In the five years from 2013–2017 there were 677 hospitalisations of 0–14 year olds for injuries arising from assault, neglect or maltreatment. Age-specific hospitalisation rates were highest in the first year of life (Figure 14-10).

Figure 14-9. Hospitalisations due to injuries arising from the assault, neglect, or maltreatment of 0–14 year olds, New Zealand 1990–2017



Indicator: Injuries arising from the assault, neglect, or maltreatment of children
 Numerator: NMDS (ED cases excluded), Denominator: NZCYES Estimated Resident Population

Figure 14-10. Hospitalisations due to injuries arising from assault, neglect, or maltreatment of 0–14 year olds, by age and gender, New Zealand 2013–2017



Indicator: Injuries arising from the assault, neglect, or maltreatment
 Numerator: NMDS (ED cases excluded),
 Denominator: NZCYES Estimated Resident Population. Period: 2013–2017

Nearly half of the assault-related hospitalisations of 0–14 year olds were for head injuries, with traumatic brain injuries being the most common primary diagnosis (Table 14-2). By age group, fractures of the skull or facial bones were the primary reason for hospitalisation (Table 14-3). Among the 5–9 year olds, over 30% of the hospitalisations were for head injuries and over 20% for injuries to thorax (includes rib fractures), abdomen, lower back, and pelvis (Table 14-3).

Table 14-2. Nature of injuries, 0–14 year olds hospitalised for injuries arising from assault, neglect, or maltreatment, New Zealand 2013–2017

Primary diagnosis	Number	Annual average	Rate per 100,000 population	%
Assault, neglect, or maltreatment hospitalisations of 0–14 year olds during 2013–2017				
New Zealand				
Traumatic brain injuries	119	24	2.60	17.6
Superficial head injury	94	19	2.06	13.9
Fracture skull or facial bones	52	10	1.14	7.7
Other head injuries	72	14	1.57	10.6
Injuries to thorax (including rib fractures)	17	3	0.37	2.5
Injuries to abdomen, lower back, and pelvis	61	12	1.33	9.0
Injuries to upper limb	81	16	1.77	12.0
Fractured femur	11	2	0.24	1.6
Other injuries to lower limbs	35	7	0.77	5.2
Maltreatment	78	16	1.71	11.5
Other injuries	57	11	1.25	8.4
Total	677	135	14.80	100.0

Numerator: NMDS (ED cases excluded), Denominator: NZCYES Estimated Resident Population

Table 14-3. Nature of injuries, 0–14 year olds hospitalised for injuries arising from the assault, neglect, or maltreatment, by age group, New Zealand 2013–2017

Primary diagnosis	Number	Annual average	Rate per 100,000 population	%
Assault, neglect, or maltreatment hospitalisations of 0–14 year olds during 2013–2017				
0–4 year olds				
Fracture skull or facial bones	85	17	5.32	25.5
Superficial head injury	21	4	1.32	6.3
Traumatic brain injuries	<10	s	s	s
Other head injuries	58	12	3.63	17.4
Injuries to thorax (including rib fractures)	<10	s	s	s
Injuries to abdomen, lower back, and pelvis	23	5	1.44	6.9
Injuries to upper limb	<10	s	s	s
Fractured femur	<10	s	s	s
Other injuries to lower limb	36	7	2.25	10.8
Maltreatment	57	11	3.57	17.1
Other injuries	21	4	1.32	6.3
Total	333	67	20.85	100.0
5–9 year olds				
Superficial head injury	13	3	0.86	11.7
Other head injuries	22	4	1.45	19.8
Injuries to thorax*, abdomen, lower back, and pelvis	24	5	1.59	21.6
Injuries to upper limb	12	2	0.79	10.8
Injuries to lower limb (including fractured femur)	15	3	0.99	13.5
Maltreatment	15	3	0.99	13.5
Other injuries	10	2	0.66	9.0
Total	111	22	7.34	100.0

Numerator: NMDS (ED cases excluded), Denominator: NZCYES Estimated Resident Population; * Injuries to thorax includes rib fractures

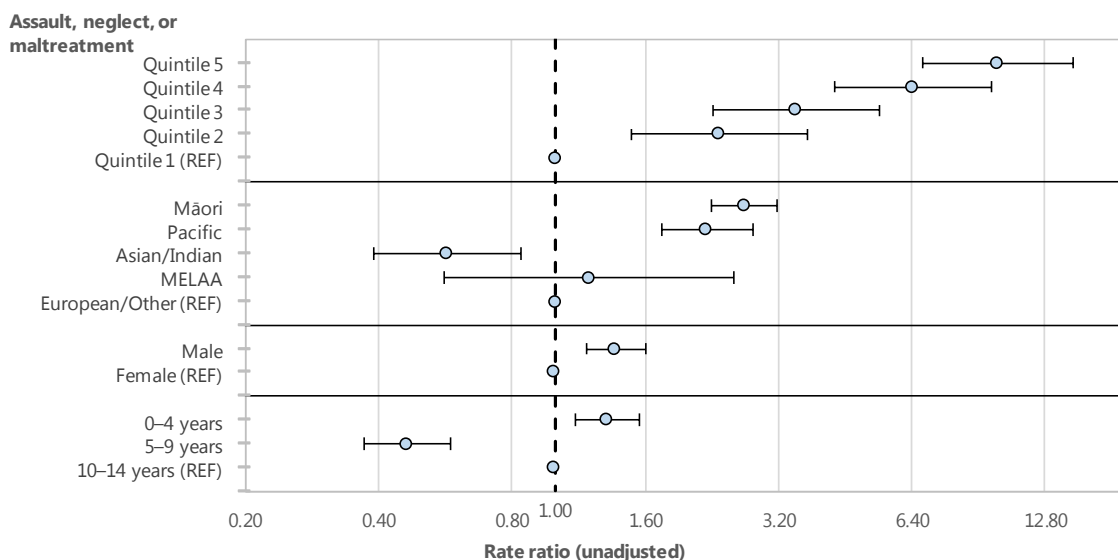
Table 14.3. Continued from previous page.

Primary diagnosis	Number	Annual average	Rate per 100,000 population	%
Assault, neglect, or maltreatment hospitalisations of 0–14 year olds during 2013–2017				
0–4 year olds				
10–14 year olds				
Fracture skull or facial bones	39	8	2.66	16.7
Superficial head injury	30	6	2.05	12.9
Traumatic brain injuries	23	5	1.57	9.9
Other head injuries	37	7	2.53	15.9
Injuries to thorax (including rib fractures)	<10	s	s	s
Injuries to abdomen, lower back, and pelvis	18	4	1.23	7.7
Injuries to upper limb	19	4	1.30	8.2
Injuries to lower limb (including fractured femur)	30	6	2.05	12.9
Maltreatment	<10	s	s	s
Other injuries	26	5	1.78	11.2
Total	233	47	15.91	100.0

Numerator: NMDS (ED cases excluded), Denominator: NZCYES Estimated Resident Population; * Injuries to thorax includes rib fractures

There was a clear social gradient with increasing hospitalisation rates for children living in areas with higher scores on the NZDep2013 index of deprivation. Hospitalisation rates were eight times higher for children who lived in areas with the highest NZDep2013 scores compared with children living in areas with the lowest scores. There was also disparity by ethnicity, with hospitalisation rates for Māori and for Pacific children over twice the hospitalisation rates of European/Other children (Figure 14-11).

Figure 14-11. Hospitalisations due to injuries arising from assault, neglect, or maltreatment of 0–14 year olds, comparison by demographic factors, New Zealand 2013–2017



Numerator: NMDS (ED cases excluded), Denominator: NZCYES Estimated Resident Population. Period: 2013–2017. Rate ratios are unadjusted, REF: reference group, Ethnicity: level 1 prioritised, Quintile: NZDep2013 (1 = least deprived; 5 = most deprived)

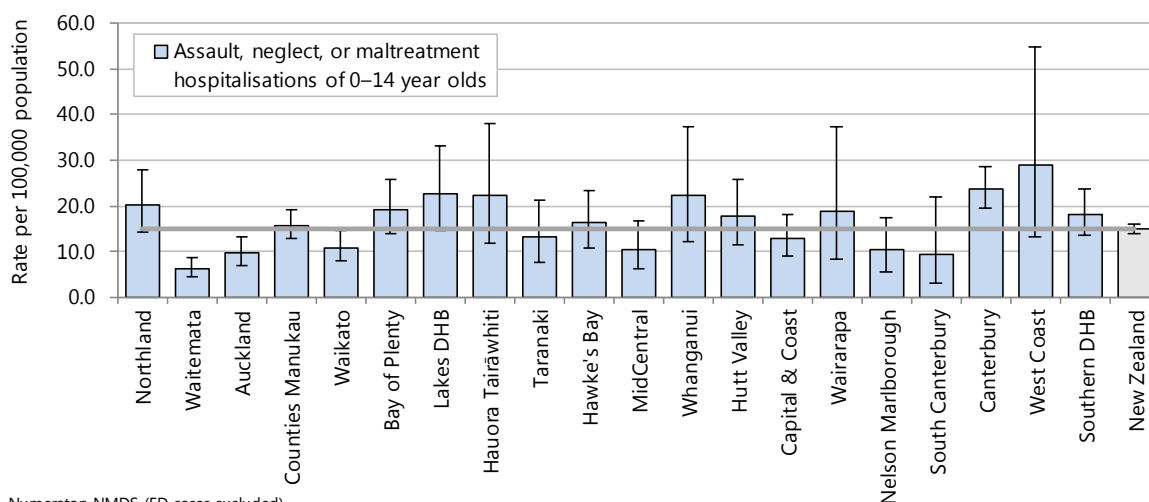
Assault hospitalisation rates were not significantly different from the national rate for Hutt Valley, Capital & Coast, and Wairarapa DHBs (Table 14-4, Figure 14-12). While there has been year-on-year fluctuations for the three DHBs, the overall trend for both Hutt Valley and Capital & Coast has been a decline in hospitalisation rates for assault, neglect, or maltreatment (Figure 14-13). For Wairarapa DHB, there was a total of 46 assault, neglect, or maltreatment hospitalisations between the years 1990 to 2017.

Table 14-4. Hospitalisations due to injuries arising from assault, neglect, or maltreatment of 0–14 year olds, by district health board, 2013–2017

DHB	Number	Annual average	Rate per 100,000 population	Rate ratio	95% CI
Hospitalisations of 0–14 year olds during 2013–2017					
Assault, neglect, or maltreatment					
Hutt Valley	26	5	17.61	1.19	0.80–1.76
Capital & Coast	36	7	13.00	0.88	0.63–1.23
Wairarapa	8	2	18.93	1.28	0.64–2.57
New Zealand	677	135	14.80	1.00	

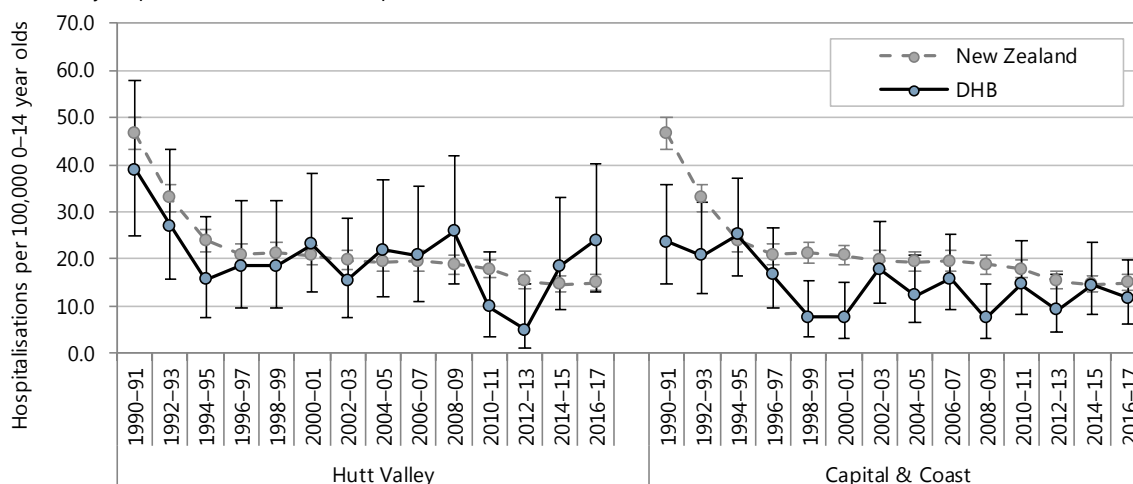
Numerator: NMDS (ED cases excluded), Denominator: NZCYES Estimated Resident Population. Rate ratios are unadjusted

Figure 14-12. Hospitalisations due to injuries arising from assault, neglect, or maltreatment of 0–14 year olds, by district health board, 2013–2017



Numerator: NMDS (ED cases excluded), Denominator: NZCYES Estimated Resident Population. Period: 2013–2017

Figure 14-13. Trends in hospitalisations due to injuries arising from the assault, neglect, or maltreatment of 0–14 year olds, Hutt Valley, Capital & Coast and Wairarapa DHBs vs New Zealand 1990–2017



Numerator: NMDS (ED cases excluded), Denominator: NZCYES Estimated Resident Population. Rates suppressed for Wairarapa due to small numbers

Care and protection

In April 2017, Oranga Tamariki—Ministry for Children (Oranga Tamariki) replaced Child Youth and Family.¹⁹ The Children, Young Persons, and Their Families (Oranga Tamariki) Legislation Act 2017 established a statutory framework to create a more child-centred operating model for Oranga Tamariki.²⁰

This section on care and protection provides information on children and young people from Oranga Tamariki. The section reports on care and protection notifications and notifiers, investigation assessment outcomes and their substantiated findings, and children and young people in the custody of the Chief Executive.

Data sources and methods

Data sources

Oranga Tamariki

Indicators

Care and protection notifications requiring further action

Numerator: Number of care and protection notifications requiring further action

Denominator: Total number of care and protection notifications

Reports of Concern from notifiers issuing reports of concern

Numerator: Number of type of investigation assessment outcome

Denominator: Total number of investigation assessment outcomes

Investigation assessment outcomes

Numerator: Number of type of investigation assessment outcome

Denominator: Total number of investigation assessment outcomes

Types of substantiated findings

Numerator: Number of type of substantiated finding of investigation assessment outcome

Denominator: Total number of substantiated findings of investigation assessment outcome

Distinct children and young people in the custody of the Chief Executive

Numerator: Number of distinct children and young people in the custody of the Chief Executive

Denominator: Total number of distinct children and young people in the custody of the Chief Executive

Additional information

Children and young people are “distinct” where they are counted once in the period.

For more information on Oranga Tamariki data please refer either to the Ministry of Social Development website (<https://www.msd.govt.nz/about-msd-and-our-work/publications-resources/statistics/cyf/index.html>) or to the data source appendix in this report.

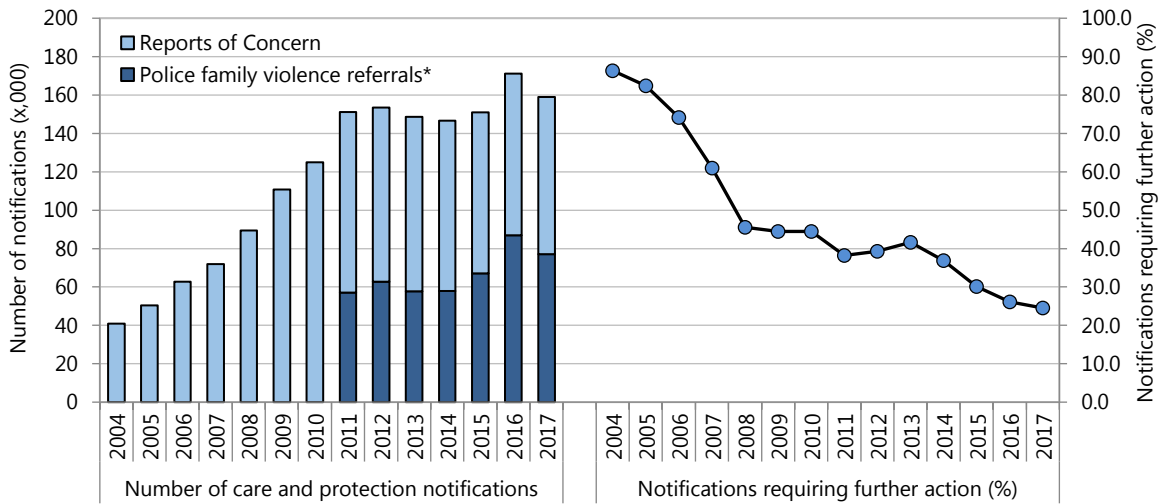
Care and protection notifications

Figure 14-14 presents an overview for 2004 to 2017 of the number of care and protection notifications for children and young people and the proportion of care and protection notifications that require further action by Oranga Tamariki, as assessed by a social worker. Reports of concern are received from notifiers about the wellbeing of a child or young person and indicate the children or young people who may require support. Police family violence referrals are the result of Police attending a family violence incident where children were present and where Police assess that Oranga Tamariki action is not required. The number of Reports of Concern and Police family violence referrals are similar. A child or young person may have more than one notification for each period.

After a steep increase between 2004 and 2013, the total number of care and protection notifications has remained relatively stable in recent years; there were 158,921 notifications in 2017.

The proportion of notifications requiring further action has declined since 2004, from 86% of notifications in 2004 to around 30% in the last three years.

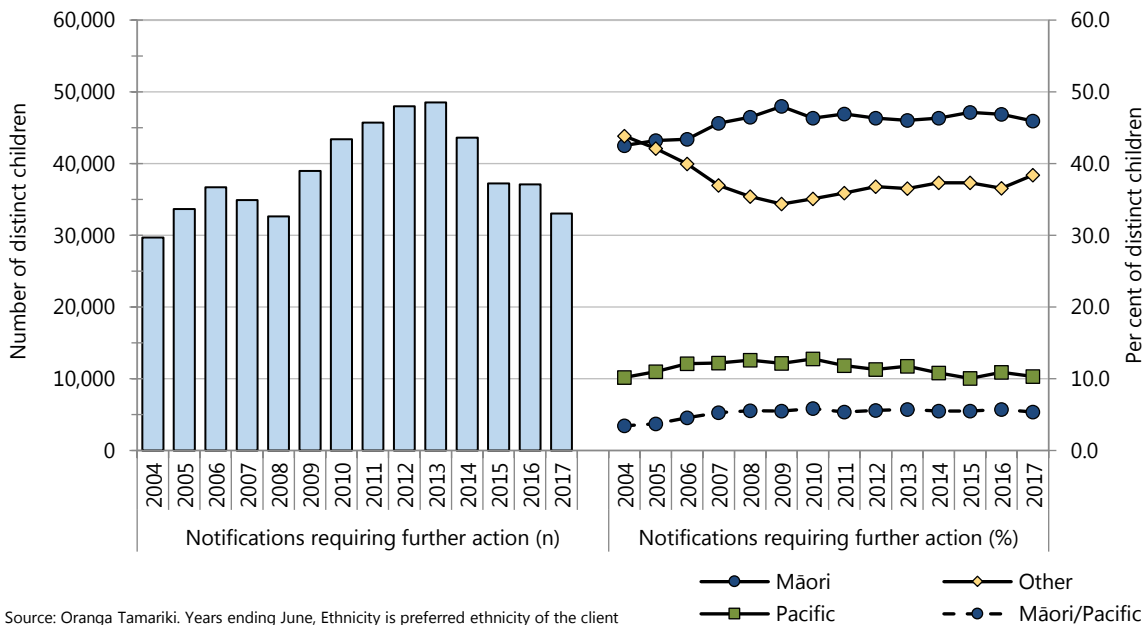
Figure 14-14. Care and protection notifications and proportion requiring further action, New Zealand 2004–2017



Source: Oranga Tamariki. Years ending June. * Police family violence referrals not reported separately by Oranga Tamariki prior to 2011

Figure 14-15 and Table 14-5 presents the number of distinct children and young people represented in each period with a notification requiring further action, by ethnic group, for 2004 to 2017. The overall number of individuals peaked in 2012 and 2013 and has since declined. The Māori/Pacific ethnic group includes children and young people who identified as both Māori and Pacific. The proportion of distinct children with notifications requiring further action has remained relatively stable in recent years for each ethnic group. Overall, 44% of children with reports of concern were Māori, 10% were Pacific, 5% identified as both Māori and Pacific and 38% were in other ethnic groups.

Figure 14-15. Distinct children with care and protection notifications requiring further action, by ethnicity, New Zealand 2004–2017



Source: Oranga Tamariki. Years ending June, Ethnicity is preferred ethnicity of the client

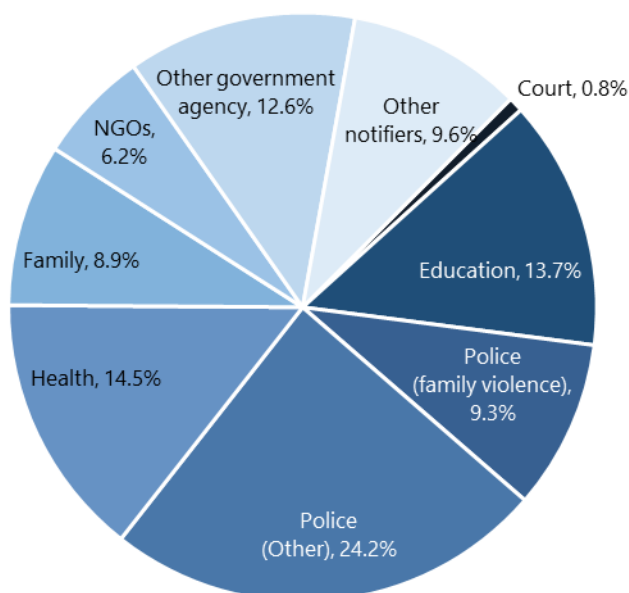
Table 14-5. Children with care and protection notifications requiring further action, New Zealand 2004–2017

Distinct children and young people with care and protection notifications requiring further action					
New Zealand					
Year	Total (n)	Ethnic group			
		Māori (n)	Pacific (n)	Māori/Pacific (n)	Other (n)
2004	29,707	12,630	3,027	1,024	13,026
2005	33,665	14,553	3,694	1,244	14,174
2006	36,690	15,924	4,438	1,669	14,659
2007	34,927	15,927	4,258	1,836	12,906
2008	32,646	15,170	4,105	1,816	11,555
2009	38,990	18,700	4,742	2,152	13,396
2010	43,390	20,102	5,538	2,532	15,218
2011	45,717	21,450	5,419	2,447	16,401
2012	48,000	22,231	5,422	2,682	17,665
2013	48,527	22,326	5,691	2,787	17,723
2014	43,590	20,192	4,720	2,404	16,274
2015	37,223	17,544	3,741	2,052	13,886
2016	37,093	17,378	4,039	2,117	13,559
2017	33,029	15,173	3,410	1,767	12,679

Source: Oranga Tamariki. Years ending June, Ethnicity is preferred ethnicity of the client

The notification sources (i.e. notifiers) of the 81,840 Reports of Concern notifications made to Oranga Tamariki are presented for 2017 in Figure 14-16. Reports of Concern from the health and education sectors, plus those from the Police (other) comprised more than 50% of all Reports.

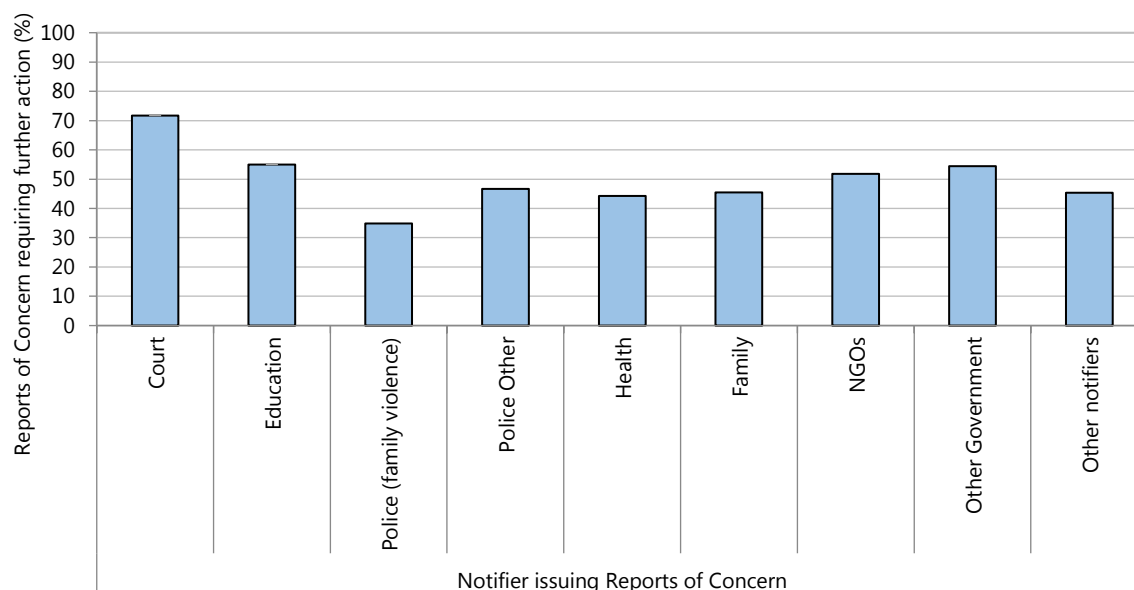
Figure 14-16. Notifications to Oranga Tamariki, by notifier New Zealand 2017



Source: Oranga Tamariki. Year ending June 2017.
 "Police other" pertains to reports of concern not related to family violence

Figure 14-17 and Table 14-6 present the proportion of Reports of Concern that required further action by notifier for the year ending June 2017. The notifier with the highest proportion of Reports requiring further action was Court at 72%, followed by Education and Other Government at around 55%.

Figure 14-17. Referrer reports of concern requiring further action, by notifier, New Zealand 2017



Source: Oranga Tamariki. Year ending June 2017.
 "Police other" pertains to reports of concern not related to family violence

Table 14-6. Referrer reports of concern requiring further action, by notifier, New Zealand 2017

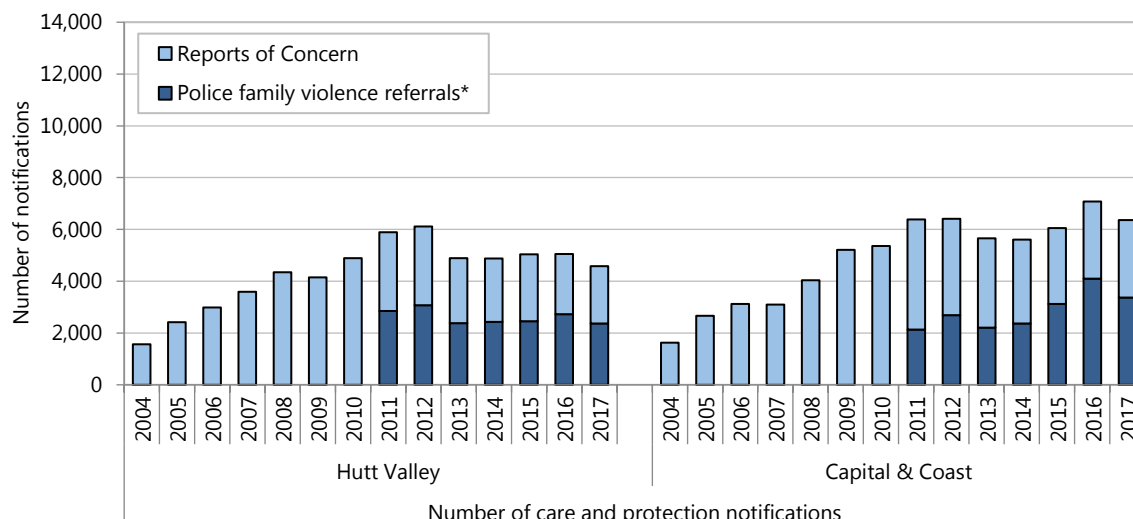
Notifier group	Total number of Reports of Concern	% of Reports of Concern	Requiring further action (RFA)	
			Number	% of Notifier group
Care and protection reports of concern for children and young people notified in 2017				
New Zealand				
Court	665	0.8	477	71.7
Education	11,249	13.7	6,187	55.0
Police (family violence)	7,621	9.3	2,655	34.8
Police Other	19,830	24.2	9,249	46.6
Health	11,879	14.5	5,258	44.3
Family	7,309	8.9	3,322	45.5
NGOs	5,073	6.2	2,629	51.8
Other Government	10,328	12.6	5,624	54.5
Other notifiers	7,886	9.6	3,574	45.3
Total care and protection reports of concern	81,840	100.0	38,975	47.6
Distinct children and young people†	59,317		33,029	55.7

Source: Oranga Tamariki. Year ending June 2017. "Police other" pertains to reports of concern not related to family violence

Figure 14-18 and Figure 14-19 present an overview from 2004 to 2017, for the Hutt Valley, Capital & Coast and Wairarapa DHBs, of the number of care and protection notifications for children and young people.

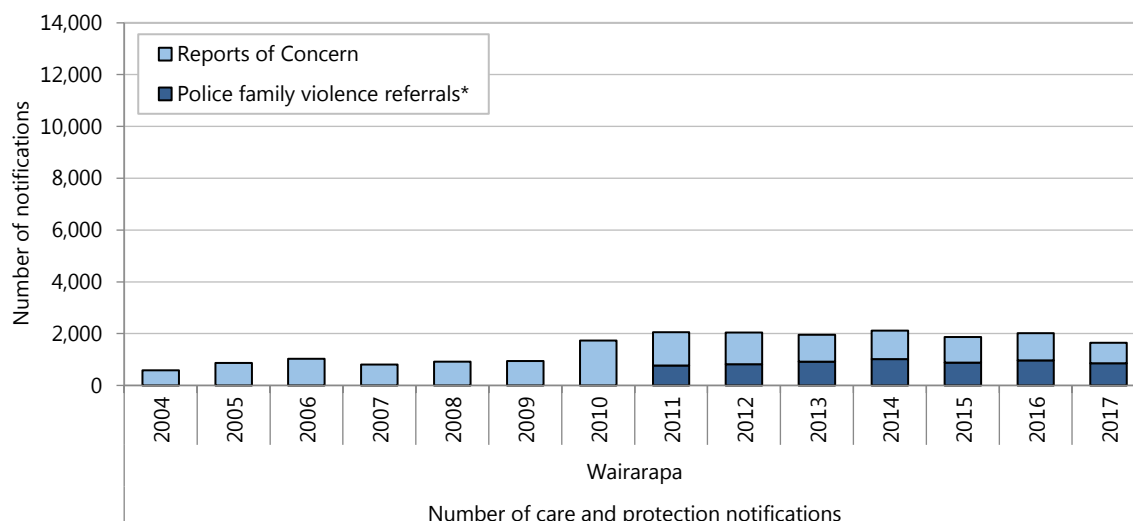
The number of care and protection notifications has remained relatively stable in recent years for Hutt Valley and Wairarapa DHBs after a steep increase between 2004–2015 and 2004–2012, respectively. The total number of notifications for 2017 ranged from 1,653 notifications in Wairarapa to 6,358 in Capital & Coast. A child or young person may have more than one notification for each period.

Figure 14-18. Care and protection notifications, Hutt Valley and Capital & Coast DHBs 2004–2017



Source: Oranga Tamariki.
Years ending June. * Police family violence referrals not reported separately by Oranga Tamariki prior to 2011

Figure 14-19. Care and protection notifications, Wairarapa DHB 2004–2017



Source: Oranga Tamariki.
Years ending June. * Police family violence referrals not reported separately by Oranga Tamariki prior to 2011

Investigations

Figure 14-20 shows outcomes from investigation assessments (abuse, non-abuse, and not found) and the types of substantiated findings for the abuse outcome for 2004 to 2017 in New Zealand. A finding is made after an investigation has been completed by Oranga Tamariki and abuse or neglect has been verified.

For almost every period, at least 50% of investigation assessments have resulted in a “Not Found” outcome, which is where there is not clear and sufficient evidence to substantiate a finding. Investigation assessments with a “Non-Abuse” outcome are classified as either Behavioural Relationship Difficulties or Self Harm Suicidal, of which the majority are Behavioural Relationship Difficulties. The proportion of assessments that have resulted in an “Abuse” outcome have increased in recent years and have also increased since 2004.

In New Zealand, and where abuse was substantiated, the most common type of abuse was emotional (49% of investigations); neglect was substantiated in 23% of investigations, physical abuse in 21% and sexual abuse in 7%.

Figure 14-20. Investigation assessment outcomes or substantiated abuse findings for children and young people notified to Oranga Tamariki, by year, New Zealand 2004–2017

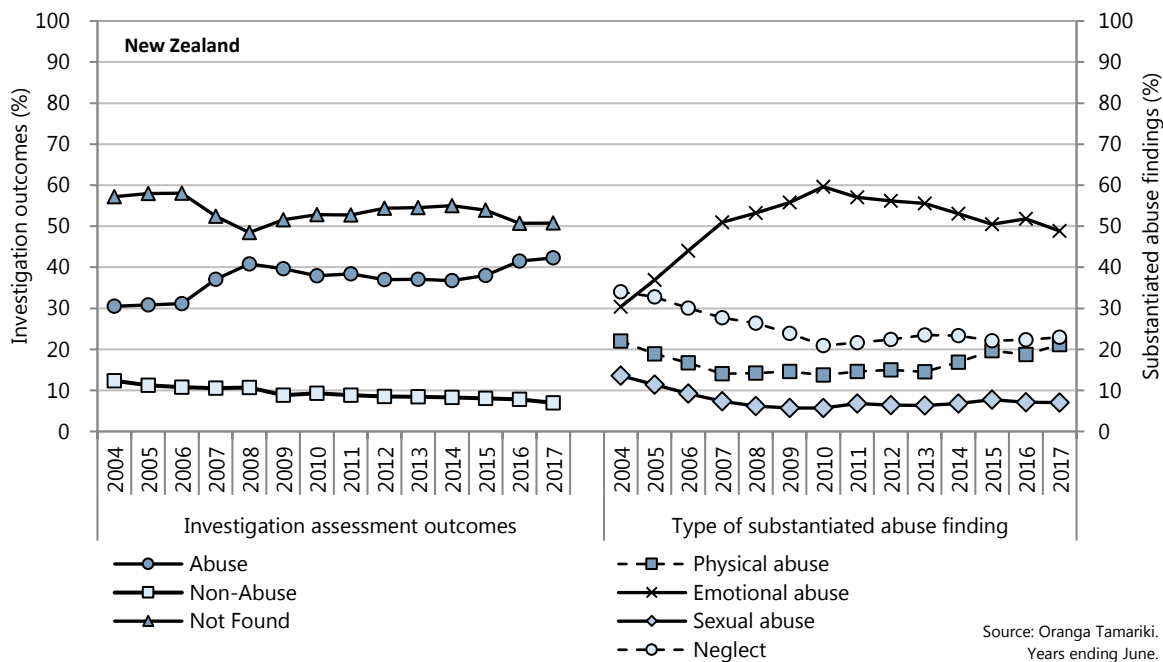


Figure 14-21 to Figure 14-23 and Table 14-7 show outcomes from investigation assessments (abuse, non-abuse, and not found) and the types of substantiated findings for the abuse outcome for 2004 to 2017 in the Hutt Valley, Capital & Coast and Wairarapa DHBs.

In almost every period for the Hutt Valley, Capital & Coast and Wairarapa DHBs combined, between 50% and 60% of investigation assessments have resulted in a “Not Found” outcome. The proportion of assessments with “Not Found” has steadily declined since 2014 to 41% in 2017 while the proportion with an “Abuse” outcome has increased since 2012 to 52%.

Substantiated abuse findings for the Hutt Valley, Capital & Coast and Wairarapa DHBs were similar to proportions seen nationally. Where abuse was substantiated, the most common type of abuse was emotional (49% of investigations); neglect and physical abuse were substantiated in around 22–24% of investigations, and sexual abuse in 4%.

Figure 14-21. Investigation assessment outcomes or substantiated abuse findings for children and young people notified to Oranga Tamariki, by year, Hutt Valley DHB 2004–2017

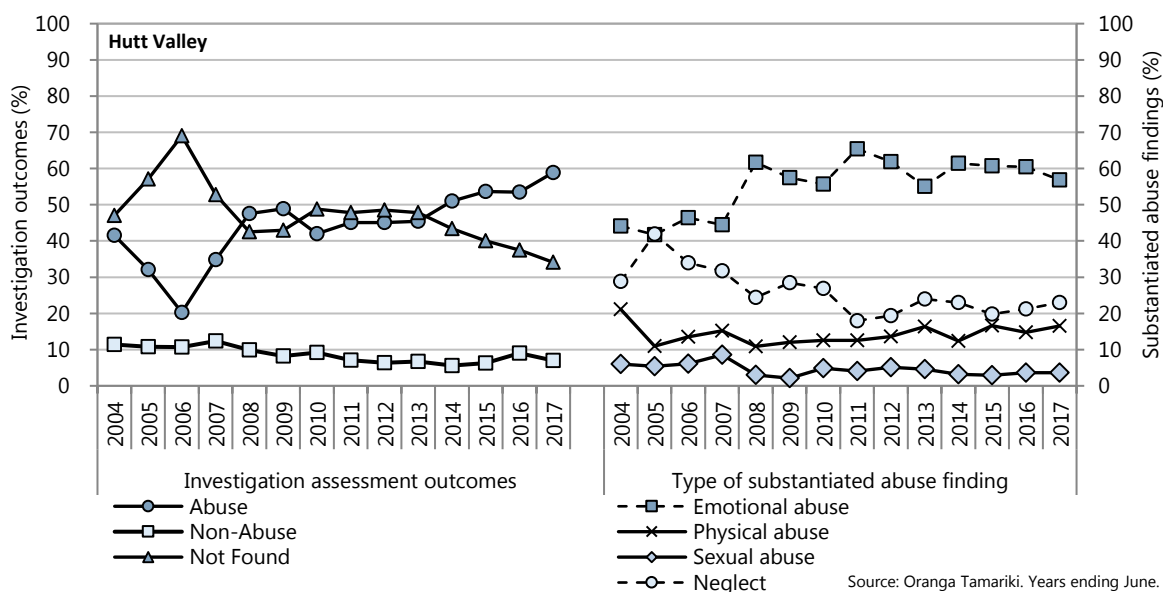


Figure 14-22. Investigation assessment outcomes or substantiated abuse findings for children and young people notified to Oranga Tamariki, by year, Capital & Coast DHB 2004–2017

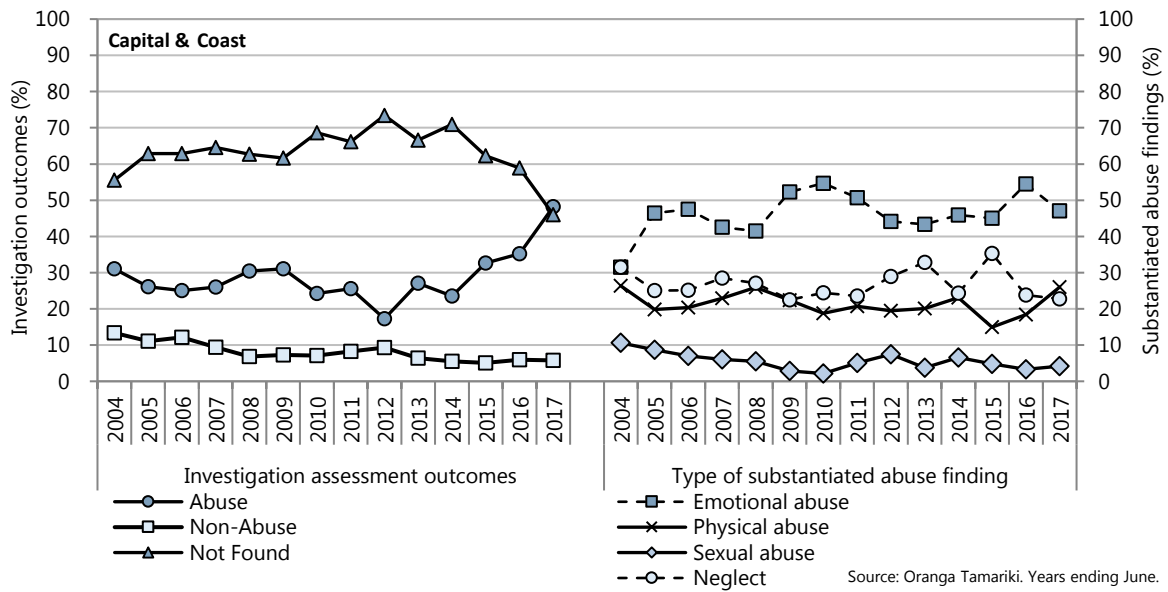


Figure 14-23. Investigation assessment outcomes or substantiated abuse findings for children and young people notified to Oranga Tamariki, by year, Wairarapa DHB 2004–2017

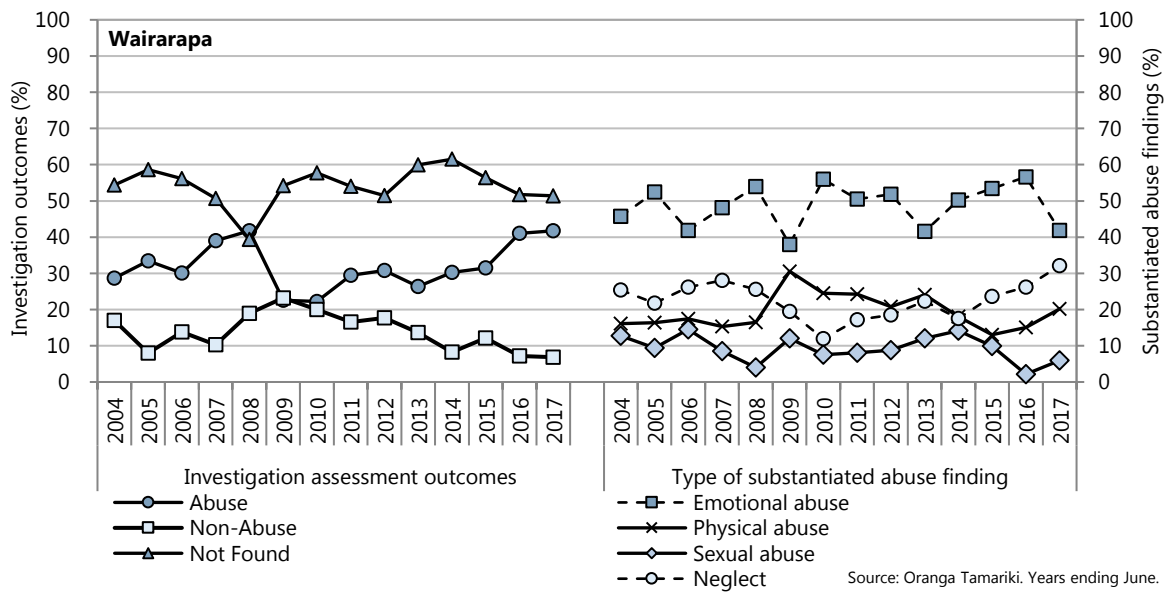


Table 14-7. Investigation assessment outcomes and substantiated abuse findings for children and young people notified to Oranga Tamariki, Hutt Valley, Capital & Coast and Wairarapa DHBs 2004–2017

Year	Type of investigation outcome (n)			Substantiated abuse findings (n)			
	Abuse	Non-Abuse	Not Found	Emotional abuse	Physical abuse	Sexual abuse	Neglect
Hutt Valley							
2004	431	118	488	190	91	26	124
2005	501	169	892	209	55	27	210
2006	377	199	1,284	175	51	23	128
2007	479	170	725	213	73	41	152
2008	762	159	680	470	83	23	186
2009	808	136	710	464	97	17	230
2010	700	153	813	390	88	34	188
2011	885	139	939	579	111	36	159
2012	890	126	957	551	121	46	172
2013	801	119	844	441	131	37	192
2014	874	96	745	537	108	28	201
2015	784	92	586	476	130	23	155
2016	576	97	404	348	85	21	122
2017	387	46	224	220	64	14	89
Capital & Coast							
2004	330	142	590	104	87	35	104
2005	459	194	1,105	213	91	40	115
2006	457	221	1,147	217	93	32	115
2007	362	131	899	154	83	22	103
2008	547	123	1,126	227	142	30	148
2009	662	155	1,315	346	148	19	149
2010	512	149	1,447	280	96	11	125
2011	608	195	1,571	308	126	31	143
2012	390	210	1,657	172	76	29	113
2013	646	152	1,591	280	130	24	212
2014	484	113	1,457	222	112	32	118
2015	482	75	919	217	72	23	170
2016	450	76	753	245	83	15	107
2017	599	72	572	282	156	25	136
Wairarapa							
2004	118	70	224	54	19	15	30
2005	202	48	354	106	33	19	44
2006	172	79	321	72	30	25	45
2007	235	62	305	113	36	20	66
2008	176	80	166	95	29	7	45
2009	108	111	259	41	33	13	21
2010	159	143	413	89	39	12	19
2011	198	111	363	100	48	16	34
2012	216	124	361	112	45	19	40
2013	166	86	377	69	40	20	37
2014	205	56	417	103	37	29	36
2015	161	62	289	86	21	16	38
2016	279	49	352	158	42	6	73
2017	134	22	165	56	27	8	43

Source: Oranga Tamariki. Years ending June.

Individuals in custody of the Chief Executive

In New Zealand, there was a total of 5,708 distinct children and young people in the custody of the Chief Executive in 2017. Those in the custody of the Chief Executive are presented by age group for the years 2013 to 2017 in Figure 14-24 and Table 14-8. Since 2013, the proportion of children aged 5–9 years in Chief Executive custody has increased and the proportions of children in the age groups 10–13 and 14–18 years have decreased.

Figure 14-24. Children and young people in the custody of the Chief Executive, by age group New Zealand 2013–2015

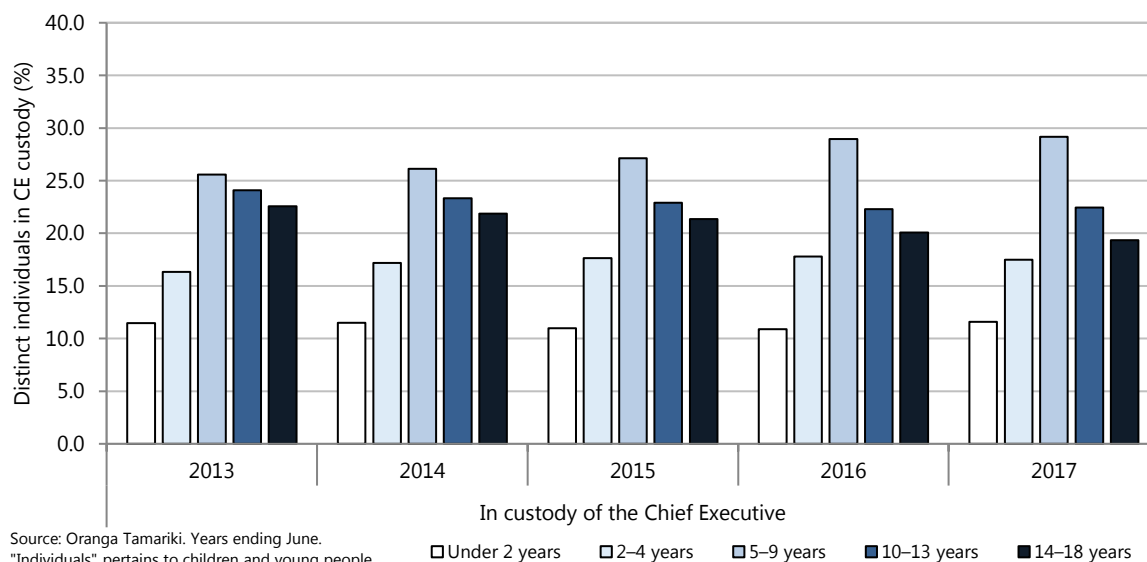


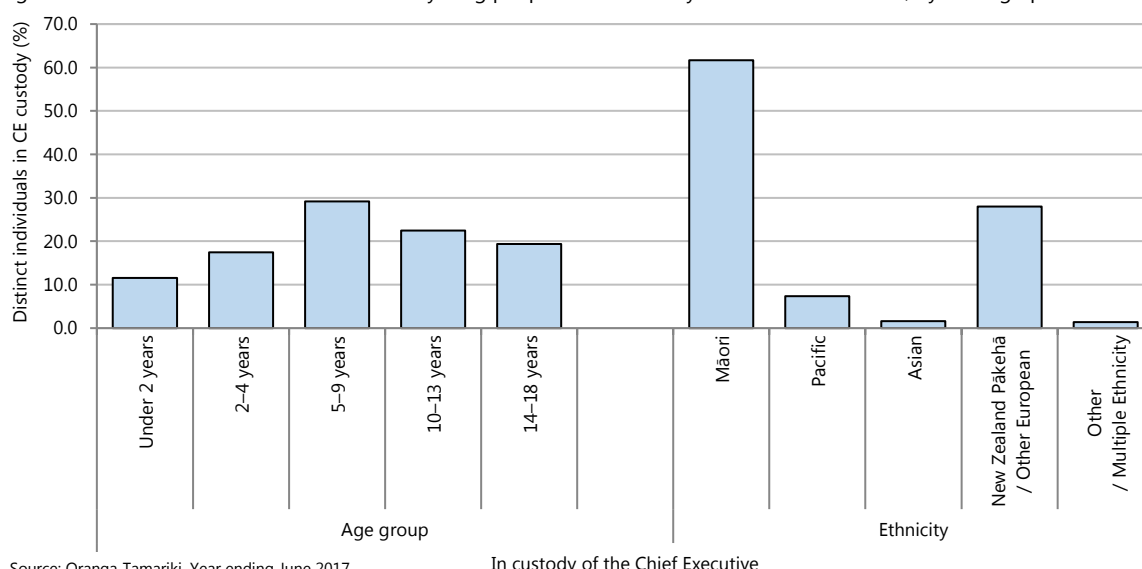
Table 14-8 Children and young people in the custody of the Chief Executive, by age group, New Zealand 2013–2017

Year	Distinct children and young people in custody of the Chief Executive					
	Under 2 years	2-4 years	5-9 years	10-13 years	14-18 years	Total
	New Zealand					
	Number of distinct children and young people					
2013	569	810	1,268	1,194	1,119	4,960
2014	596	892	1,356	1,210	1,134	5,188
2015	552	887	1,363	1,151	1,073	5,026
2016	578	945	1,538	1,184	1,067	5,312
2017	661	998	1,664	1,281	1,104	5,708
	Percent of distinct children and young people					
2013	11.5	16.3	25.6	24.1	22.6	100.0
2014	11.5	17.2	26.1	23.3	21.9	100.0
2015	11.0	17.6	27.1	22.9	21.3	100.0
2016	10.9	17.8	29.0	22.3	20.1	100.0
2017	11.6	17.5	29.2	22.4	19.3	100.0

Source: Oranga Tamariki. Years ending June

National demographic data for distinct children and young people in the custody of the Chief Executive in 2017 is represented in Figure 14-25 and Table 14-9. Children aged 5–9 years comprise the largest proportion of individuals in Chief Executive custody at nearly 30%. Over 60% of children in the custody of the Chief Executive in 2017 were Māori, compared with 28% New Zealand Pākehā/Other European, 7% Pacific and 3% Asian, multiple or other ethnicities.

Figure 14-25. Percent of distinct children and young people in the custody of the Chief Executive, by demographic factor 2017



Source: Oranga Tamariki. Year ending June 2017. Ethnicity is self identified primary ethnic group

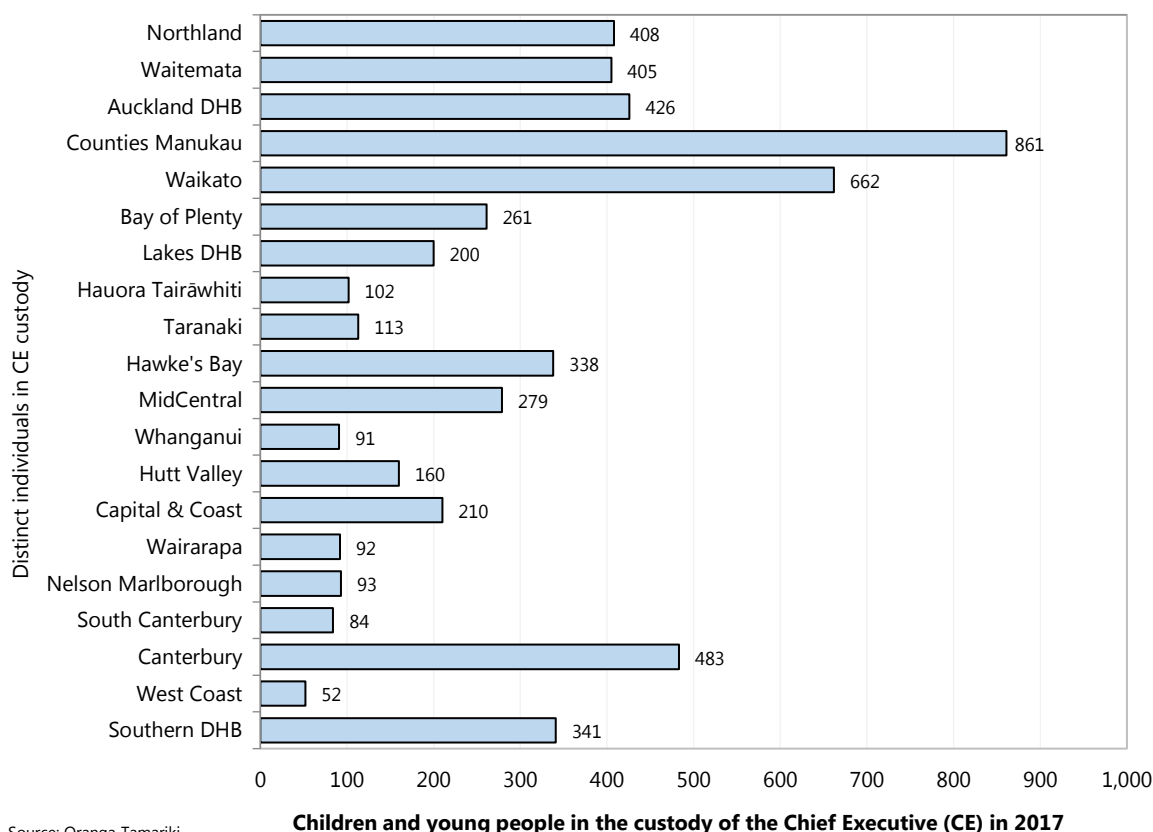
Table 14-9. Distinct children and young people in the custody of the Chief Executive, by demographic factor 2017

Demographic variable	Number	%
Distinct children and young people in custody of the Chief Executive in 2017		
New Zealand		
Age group		
Under 2 years	661	11.6
2-4 years	998	17.5
5-9 years	1,664	29.2
10-13 years	1,281	22.4
14-18 years	1,104	19.3
Ethnicity		
Māori	3,518	61.6
Pacific	418	7.3
Asian	93	1.6
NZ Pākehā / Other European	1,598	28.0
Other / Multiple Ethnicity	81	1.4

Source: Oranga Tamariki. Year ending June 2017. Ethnicity is self identified primary ethnic group

The numbers of distinct children and young people in the custody of the Chief Executive during 2013–2017 are presented by DHB in Figure 14-26 for 2017 and Table 14-10. The numbers of distinct individuals in all three DHBs was higher in 2017 than in the preceding four years (Table 14-10).

Figure 14-26. Children and young people in the custody of the Chief Executive by District Health Board, 2017



Source: Oranga Tamariki.
Year ending June 2017. "Individuals" pertains to children and young people

Table 14-10. Children and young people in the custody of the Chief Executive, Hutt Valley, Capital & Coast and Wairarapa DHBs 2013–2017

	2013	2014	2015	2016	2017
Children and young people in the custody of the Chief Executive					
Distinct individuals (n)					
Hutt Valley	116	124	139	147	160
Capital & Coast	199	186	189	189	210
Wairarapa	56	70	55	74	92
New Zealand	4,960	5,188	5,026	5,312	5,708

Source: Oranga Tamariki. Years ending June. "Individuals" pertains to children and young people

Evidence for good practice

Children should grow up in environments that are sensitive to their needs in which they experience nurturing and enriching interactions that provide strong foundations for their flourishing.^{21,22} Children should be enabled to develop strengths and positive experiences while also being protected from threats to their wellbeing and supported responsively when adverse events do happen. Children and young people themselves want to live lives where they are being healthy, staying safe, enjoying and achieving, making positive contributions, and experiencing economic wellbeing.²³

Children who experience maltreatment (abuse, neglect, or witnessing violence) and children who are being cared for by Oranga Tamariki have at least the same needs as other children and some additional needs that need to be heard and addressed in order to support them to develop their potential.

This evidence for good practice guideline highlights recommendations and cumulative evidence on: things that indicate children may be more at risk of or more protected from experiencing vulnerability or maltreatment; evidence on predictive assessments of child maltreatment; community, family/whānau, and child interventions for preventing child maltreatment or its reoccurrence; and

implications for health services as they try to work across agencies and support professionals, children, family and whānau in ways that are appropriate and responsive.

This evidence for good practice largely focuses on adverse experiences as they pertain to child maltreatment and can be read in conjunction with the in-depth topic more specific to children who have been removed from their carers, titled “Health needs of children and young people in State Care”.²⁴

Protecting children

Risk and protective indicators for child maltreatment

It is important to adopt a lens that acknowledges that risk and protective indicators associated with child maltreatment operate at several levels.²⁵ Indicators involved in child abuse and neglect include those at the individual level (child or perpetrator);²⁵⁻²⁷ family and whānau;^{26,27} the community level;^{25,27} and the social, cultural and economic context.²⁵⁻²⁸ This lens acknowledges the relationship between sociocultural values and economic forces and how they shape the choices families have to make in the context of these factors.^{25,27,28}

Studies on child maltreatment have identified several risk indicators. These are sometimes referred to as "indicators" (rather than "factors") because they are correlates of child maltreatment and do not point directly to any causal relationships.²⁹ Key risk indicators for child maltreatment include but are not limited to:

- Poor parent-child relationship(s) and bonding;^{27,30}
- Negative interactions between the parent and child;^{27,30}
- Socioeconomic disadvantage and poverty;^{25,27,30-34}
- Household overcrowding²⁵ and inadequate housing;^{27,34}
- Parental lack of understanding of children’s needs, child development, or parenting skills;^{27,30}
- Parental thoughts or emotions that support maltreatment behaviours^{27,30} and normalisation of and tolerance for violence against children;^{27,35}
- Parental difficulties managing anger, impulses or other emotions;^{25,27,36}
- Parental stress or distress,^{25,30,36} low self-esteem or antisocial behaviour,^{25,27} or mental or cognitive health problems that negatively impact on parenting tasks;^{25,27,32,33,36,37}
- Low service uptake by parent³⁶ or difficulty reaching social support systems and social isolation;^{25,27}
- Other family dysfunction or episodes of abuse or violence,^{25,30-32,36-39}
- Young, single, or non-biological parent(s);^{6,30}
- Parental history of abuse or neglect in family of origin;^{25,27,30,36}
- Parental or family substance abuse.^{25,27,30-34,36,37,40}

Poverty and inequity are identified as having a profound impact on the other risk indicators that are associated with child maltreatment outcomes.^{25-27,33} Inequities particularly relevant to child vulnerability relate to educational attainment, gender, and employment inequities.^{25,26}

Risk indicators more recently identified as being important to child physical abuse risk include:

- Male child;^{25,29}
- Infant (for fatal physical abuse);^{25,29}
- Experience of recent life stressors;²⁹
- Maternal psychiatric impairment;²⁹

- Low maternal education attainment;²⁹
- Lack of attendance at prenatal classes;²⁹
- Substance abuse;²⁹
- Low community participation (particularly religious attendance)²⁹ or low community cohesion.^{25,31}

Risk indicators specific to child neglect include parental sociopathic behaviour²⁹ and low utilisation of universal services.³² Children with disability are at higher risk of experiencing maltreatment,^{27,41} particularly neglect.^{32,41} Sexual abuse risk indicators include young maternal age,²⁹ child age (adolescent),²⁵ child gender (female),²⁵ perpetrator gender (male),²⁵ and parental death.²⁹

Several protective and resilience indicators against child maltreatment are recognised in the literature, including:

- Strong and stable parent-child attachment^{27,33,39} and a warm, positive relationship with an adult;²⁷
- Positive parenting^{27,33} that is sensitive and consistent;⁴²
- Stability in child's life⁴² and lack of other stressors;^{27,33}
- A sense of cultural identity;³³
- Parental knowledge about child development;³³
- Family characteristics and behaviour (e.g. coping strategies, communication, cohesion);³³
- Community cohesion;^{27,33}
- Social capital,^{25,43,44}
- Social support.^{33,39}

Interventions for protecting children against child maltreatment should recognise the reciprocal relationship between individuals and the neighbourhood, communities, and cultures of which they are part.⁴³

Utilising knowledge about risk and protective indicators

Many studies aim to identify the indicators that can distinguish between cases where children will be maltreated versus those that will not.⁴⁰

A recent project examined whether a Predictive Risk Model (PRM) could be developed and validated for identifying risk of maltreatment in New Zealand children.⁴⁵ A full ethical evaluation of PRM in New Zealand is required before implementation.⁴⁵ The project utilised over 200 predictor variables in its algorithm to predict risk of maltreatment in children and the algorithm was developed in a way that it could be used on administrative data at the start or change of every benefit spell.⁴⁵ The variables are not causal and a full list of the coefficients were not provided in the report.⁴⁵

A New Zealand study published in 1989 produced a nine-item checklist for predicting childhood abuse or neglect, which was subsequently implemented in the hospital setting for routine use by nurses.⁴⁶

There are several other assessment procedures for risk of child maltreatment but evidence on their predictive validity remains unclear²⁹ and insufficient for identifying neglect²⁶.

Some evidence indicates that predictive tools are weak at identifying at-risk families,²⁶ have a high false positive rate, and high risk of mislabelling people as potential abusers.²⁹ One systematic review found two possible tools that may have sufficient levels of specificity and sensitivity for use in the clinical setting,⁴⁷ including one developed and implemented in New Zealand;⁴⁶ however, at least half of the families predicted to be at risk of child maltreatment did not go on to maltreat their child.⁴⁷ There is also insufficient evidence to conclude whether risk screening for maltreatment improves

patient outcomes.⁴⁸ Risk assessments of child abuse potential seem to lead to very small increases in programme efficacy.⁴⁹

The Canadian Task Force of Preventive Health Care²⁹ recommends (grade D) that screening procedures and tools should not be conducted as a means to identify individuals at risk of maltreatment.²⁹ The focus of policy and research resources should be on developing assessment skills in professionals working with children⁴⁰ and on developing the evidence-base on effective interventions,⁴⁷ rather than on predictive tools. Attempts to predict abuse may be a mistaken approach premised on a fallacy that prediction is possible while also risking stigmatising families.^{47,49} It may be more useful to conceptualise prevention of child maltreatment as not trying to identify problematic needles in a haystack, but as intervention to stop hay from turning into needles.⁵⁰

Overall, there is an emphasis away from predictive screening tools towards a genuine partnership with parents to improve outcomes for both parents and children.⁴⁷

When using risk-predictive checklists or tools, health professionals should prioritise use of their clinical and assessment skills and use tools only to help inform professional judgement.^{40,51}

Interventions for child maltreatment

Interventions for protecting children against maltreatment should recognise the reciprocal relationship between individuals and the neighbourhood, communities, and cultures of which they are a part⁴³ and thus address the indicators at these several levels.^{26,27,33} Therefore, interventions can be tailored to:

- The individual level (child or perpetrator),²⁵⁻²⁷
- The family and whānau level;^{26,27}
- The community level;^{25,27} and
- The social, cultural and economic context.²⁵⁻²⁸

Recognition that these multiple levels impact on the lives of children are critical to a more proactive approach to preventing and responding to child maltreatment.⁵²

Prevention is strengthened when efforts address negative experiences in families alongside efforts to facilitate positive experiences in families.⁵³ Key areas impacting on poor outcomes for children need to be addressed (such as those detailed above: poverty, substance abuse, and more) and strong foundations for wellbeing need to be established (also detailed above: community cohesion, positive relationships, and more) so that children, family and whānau can benefit from more effective prevention.^{23,31} The timing of nurturing and protection is also critical because of the developmental adaption that takes place as children grow in that facilitating positive experiences and preventing negative experiences early on in the lives of children is powerful in their lifelong outcomes.^{21,27}

A three tier model of preventing the incidence of child maltreatment identifies: primary, universal interventions to prevent abuse before it occurs; secondary, targeted interventions delivered to higher risk families to prevent abuse before it occurs; tertiary, interventions to prevent the recurrence of abuse or treat the consequences of abuse.^{28,32,54}

Universal interventions are non-stigmatising^{32,49} and have the potential to reach children who have not otherwise been identified as being at-risk or in-need of services.³² Universal initiatives to prevent child maltreatment also impact on the overall wellbeing of all children.⁵⁴

Several types of secondary and tertiary interventions have been developed to prevent child maltreatment from occurring or, in cases where maltreatment has already occurred, prevent it from reoccurring.²⁵ The evidence on interventions will be explored in following sections with a summary of implications for health services.

The matter of how secondary interventions should be targeted continues to be explored in the literature. Utilising primary health care professionals as the gateway to targeted services may be the best approach.³² Risk assessment tools can be provided to primary health care professionals to be used routinely to help them identify children who could potentially benefit more from secondary, targeted interventions.^{32,47} Secondary approaches can also be targeted to families likely to be in more need of

support through delivering them to communities areas with poverty or inadequate social or human services capacity.⁵⁵

The evidence-base on interventions

While there is evidence on risk indicators, as detailed above, it is clear that more evidence is needed to identify interventions that are effective so that it is possible to refer families to any evidence-based support.^{25,27,28,47} More robust evaluation of preventive interventions needs to take place.²⁷ In particular, more evidence on interventions at the societal and cultural level is required.²⁸ Many studies exploring programme interventions focus on examining outcomes rather than engagement processes and characteristics that contribute to outcomes.⁵⁶ More evidence is needed specific to interventions aimed to prevent different types of abuse or their reoccurrence.²⁸ More evidence is particularly needed on neglect, including on initiatives for protecting children from neglect and interventions for children who have experienced neglect.²⁵ There is a lack of evidence on interventions on preventing recidivism of neglect.⁵⁷ Many of the intervention studies examined in reviews and recommendations were conducted prior to the year 2000 and there is a paucity of more recent studies.

Many studies have investigated the effect of child abuse preventive programmes with mothers, with parents of other genders underrepresented in comparison.⁵³ There is very little evidence on interventions directed towards adolescents, fathers, and families of diverse ethnicity.³²

As a consequence, guidelines provide little recommendation about effective intervention. The U.S. Preventive Services Task Force concluded in 2013 that current evidence was insufficient to recommend a specific preventative intervention for child maltreatment.³⁰ The Canadian Task Force on Preventive Health Care²⁹ found evidence insufficient to recommend any interventions. The Task Force also concluded that further evidence is required before making any recommendations on programme features/characteristics directly or indirectly related to child maltreatment outcomes.²⁹ Specific to primary care, The American Academy of Family Physicians concluded that there was not sufficient evidence on primary care interventions for the prevention of child maltreatment to make a recommendation for or against any interventions.⁵⁸ However, a 2010 publication from the Office of the Children's Commissioner identified home visitation, parent education and multi-component programmes as preventive interventions that have shown some benefit.²⁶

A new framework for child maltreatment prevention focuses on strengthening approaches, such as supporting social networks, enhancing peoples' abilities to care for children, building on the strengths of children at their different life stages, developing good inter-agency working in the overall system of services, and enhancing social contexts for families and whānau.⁵⁵

Society and community

Things that prevent the maltreatment of children are inextricably linked to things that improve children's lives as a whole and maximise children's potential.^{23,33} The presence of protective factors against child maltreatment at the community level, and service support for these community-level factors, makes it less likely that children in an entire community will experience maltreatment.³¹ A social environment in which children's rights are recognised and respected should be facilitated generally but is also specifically required to address child maltreatment, as is challenging attitudes that legitimise or normalise violence against children.^{27,35} Communities should have a sense of shared responsibility for the wellbeing of children.⁴² Communities should feature connectedness as protective factors.^{27,31} Good social and community networks are protective contextual indicators for children, even when other risk indicators are present (poverty, violence, substance abuse).²⁵

It is widely identified that reducing child poverty is important to providing good foundations for safety in children's lives.^{23,25,26,33} Communities should be supported so that children have more opportunity to grow up in social environments that have less crime and violence and more safe locations for recreational activity.²³

Where forms of violence (such as child maltreatment, intimate partner violence, youth violence) have shared risk and protective indicators, shared indicators can be targeted for the effective prevention of several unwanted issues.^{31,59,60} For example, low social cohesion and social isolation,^{27,31,32}

unemployment and low economic opportunities,³¹ and societal normalisation of aggression^{27,31} are indicators associated with other forms of violence and public health issues.

Societal and community interventions pertain to investment supporting access to education and support systems,^{26,27,55} addressing deprivation and inequity (particularly educational attainment and employment),^{25,27,55} addressing social and cultural factors that normalise violence,^{25,26 27,31} and addressing environments (for example, accessibility of alcohol and drugs).^{26,27,32} There is a paucity of evidence on the effectiveness of societal and community interventions on child maltreatment outcomes.^{25,26} The effectiveness of developed community-level initiatives is yet to be established by quality evaluations.⁴⁴ Most prevention for child maltreatment focus on the individual (child and perpetrator) level rather than addressing root causes at the societal level.²⁵ Evidence is also unclear about whether mandatory reporting laws are effective in preventing cases of abuse and neglect.²⁵

Family and whānau

The World Health Organization recognises that family and whānau are in the best position to provide physical and emotional care to children and support their flourishing.³⁵ However, it is often the case that more attention needs to be paid to supporting families and whānau and the critical role they play.²³

Many programme interventions focus on improving parenting practices through providing training.²⁵ Parent education is usually delivered in groups to develop parental understanding of child development and skills for child-rearing and child management.^{25,26} They seem to have an impact on reducing youth violence and there is insufficient evidence on their impact on rates of child abuse and neglect.^{25,61} Some evidence suggests that the positive effects from these interventions do not last over time due to a lack of continued support.⁴³ They are often provided to parents identified as being high-risk, but training could be beneficial to all parents or prospective parents.²⁵

Most home visitation programmes involve parent education on problem solving and child development while they also promote positive parent-child interaction^{30,62} and support parental access to health and community services.^{25,30,62} Most home visitation programmes are delivered by a nurse or paraprofessional and most programmes are delivered to families with young children.³⁰ While home visitation programmes are common initiatives aimed to prevent child maltreatment,³⁰ and are also recommended by the National Institute for Health Care Excellence (NICE),³⁶ a number of authors conclude that there is a lack of evidence to indicate the effect of home visitation programmes on preventing child abuse or neglect^{30,32,63,64} or use of physical/corporal punishment.^{65,66} Other literature considers there to be strong evidence for their effectiveness in preventing child abuse or neglect,^{62,66,67} occurrences of child injury,⁶⁸ or that they have some benefit or are "promising".^{26,32,55} Home visitation programmes may also be associated with improved parental attitudes and behaviour.⁶³ Further, a study conducted in the USA found a diminished belief in corporal punishment in mothers who received twenty home visits on a regularly scheduled basis.⁶⁵

While home visitation is not uniformly effective, New Zealand's Early Start programme is identified as being a home visitation intervention that shows significant benefit.⁵⁷ Lower risk families who have been referred to child protection services but do not meet criteria for ongoing services could potentially benefit from home visitation programmes.⁶¹

There are conflicting conclusions about the characteristics of home visitation programmes that are effective. In one systematic review there was not sufficient evidence to conclude which programme characteristics of home visitation programmes were associated with a variation in effect for child abuse.⁶⁴ In other literature,²⁵ the most important characteristics of 224 home visitation programmes targeted to children who experienced abuse or neglect were support to enhance parenting skills and improve parental coping skills as well as emotional support to the family provided on a frequent basis (weekly to two weekly over 6 months to two years). The Canadian Task Force on Preventive Health Care²⁹ identified that home visitation delivered frequently, by nurses, for an extended period (prenatally to when the child is two years of age), and to disadvantaged families are associated with prevention of child maltreatment. Programmes targeted specifically to low-income groups seemed to be more successful compared to other studies.⁶⁴ NICE³⁶ recommends that home visitation programmes should include support that: develops positive parent-child relationships, enhances parental understanding of child behaviour, helps parents model good parenting and develop problem-

solving skills, helps parents address any substance use, helps parents address any of their own trauma history or mental health issues, and makes other services more accessible to parents. Parents also need to have some motivation to make and sustain the changes that parental education interventions aim to instil.³²

A meta-analysis found recidivism for physical abuse lower in families (referred to Child Protection Services) who received behavioural parenting training based on Social Learning Theory principles.⁶⁹ Studies were conducted almost exclusively in the US or Canada.⁶⁹ Training programmes were for one to two hour sessions over two to six months and contained practice of parental skills and child management strategies.⁶⁹ Parent–child interaction therapy is also effective at preventing the recurrence of physical abuse, as evidenced by the number of child protection reports.⁵⁷

Family preservation interventions are aimed at keeping the family together to prevent children from being moved to substitute care.²⁵ Family preservation interventions are short (a few weeks or a few months) and intense (10 to 30 hours per week) and are tailored to the needs of the family, such as providing therapy or temporary rent subsidies.²⁵ Evidence on the effectiveness of these programmes in keeping families together is limited, largely due to heterogeneity in intervention.²⁵ Characteristics that were associated with better programme results (compared to programmes without these characteristics) included building on the strengths of the family, high participant involvement, an added social support component.²⁵

Family interventions alone are not sufficient to address the significant problem of child maltreatment; more interventions are needed to target wider contexts, especially communities.⁴⁴

Children and young people

Identifying children who could benefit from targeted support and providing help should be done early rather than once issues have reached a crisis point.^{21,23} Disadvantage experienced by children in their early years is very important to inequity and these experiences can compound as children get older.^{21,23}

A number of studies have explored preventing child sexual abuse through efforts targeted toward children and young people. The effect of child education on reducing the incidence of child sexual abuse is yet to be established,^{29,57} and evidence does not show that self-protection skills promoted in education for children are transferred into practice by the child.^{25,29} Community-based programmes against sexual abuse are often incorporated with school curriculums and involve child education about body ownership and types of physical contact, recognising dangerous situations, responding to these situations, and telling an adult about situations where they were asked to do something that made them uncomfortable.^{25,70} Evidence shows these programmes are effective in developing protective skills in children, but there is a paucity of evidence about how long the skills acquired from these programmes are retained and whether they are transferred into practice.²⁵

For child maltreatment more generally, appropriate responses to children who have experienced maltreatment requires sensitivity to many factors, including the child's age and developmental level,²⁵ cultural or religious beliefs³⁶ and the presence of continued sources of stress for the child.²⁵

Therapeutic day care that emphasises supporting cognitive and developmental skills is a popular therapeutic intervention for children who have experienced physical abuse or have emotional, behavioural, or attachment-related problems.^{25,40}

Limited research suggests that the mental health of children who have experienced sexual abuse is improved by individual, group, or family therapy (approaches which vary considerably depending on the relationship between the child and perpetrator), and there is less evidence on other benefits.²⁵ Cognitive-behavioural therapy can be beneficial to children who have experienced sexual abuse and have symptoms of post-traumatic stress.⁵⁷

There is no direct evidence on whether attachment-based interventions address psychological abuse; however, there is some evidence that they address attachment insecurity.⁵⁷

There is little and often contradictory evidence on interventions with children who have been witness to violence.²⁵

Due to the heterogeneity of intervention and study designs, a systematic review was unable to conclude which programme characteristics of therapeutic interventions for children in foster care were associated with a variation in child wellbeing and quality of life.⁷¹

Health service implications

Vulnerable children often have high and complex needs while also living in situations of high deprivation.⁷² Simultaneously, there are significant inadequacies in service provision experienced by children, families and whānau and front-of-line staff, who express a sense of fighting for basic needs to be met.⁷² Health services, district health boards, and health professionals face the task of planning and delivering services that are responsive and appropriate to this population.

Overall, services should provide a supportive framework that not just aims to prevent negative outcomes but also aims to support every child to reach their potential.²³

Working within and across professions, services, and agencies

The short and long-term effects of child maltreatment can be severe for both children and wider society.^{27,42,55} Better integration across social, health, and education services centred around the needs of children is critical to working towards better prevention of and response to child maltreatment and children being removed from the home.^{23,27,32,33} Early intervention can be compromised by poor co-ordination across services and between professionals, a lack of information sharing, and a strained system coping with staff vacancies, a lack of training, and poor management.²³

Resources and expertise have been established in New Zealand that can assist in advocating for, planning for, and implementing coordinated services to children, such as the Child Protection Clinical Network.⁷³

It is important to support communication and information-sharing between services.^{23,32,51} Good communication between district health boards is also critical for transient families. Professionals should be better able to get a whole-of-picture perspective, rather than having to make decisions about a child's need for services only based on a snapshot.^{23,74} It has been identified by the Office of the Children's Commissioner that a shared, intersectoral understanding of child neglect needs to be developed in New Zealand.²⁶ The chronic, cumulative, less physically observable natures of neglect and emotional abuse can make them more difficult to understand when compared to other forms of abuse, and thus agreeing on thresholds (ways of determining the likelihood of child maltreatment in cases) and protocols can be more difficult.³² It is important for inter-agency working that understandings of types of abuse are consistent across professions, teams, and agencies and that there is some consistency and transparency about thresholds for determining child maltreatment, particularly for neglect and emotional abuse.³²

Also, supporting the development of common data standards, recording standards and common assessment frameworks^{23,51} and clearly communicating and providing practice advice on these to professionals is important.²⁶ Where warnings exist but may not be sufficient for intervention, clear markers of concern (traffic light markers, for example) can be explored as way for professionals to quickly convey information to other professionals, services or agencies, which could subsequently allow for quicker pattern identification.²³ Children may "fall through the cracks" if professionals are not aware of other warning signs perceived by other professionals and other organisations.^{23,32} There can also be lead professionals coordinating information-sharing across agencies.^{36,74} Where a child features in or needs more than one service, a single professional ("lead professional") should take on a coordinating role for that case to coordinate service provision around that child's needs.^{23,32,33}

Shared records have potential for better communication and working across professions, services, and agencies.²³ They can contain information about where service contact with a child has occurred and key professionals working with the child while they can be updated as changes occur in the child's life.²³ Because children are often in-touch with several different services at once, it is anticipated that shared records better enable the monitoring of a child's wellbeing while also avoiding duplication (multiple assessments by different professionals that are very similar).²³ Secure communication pathways and technology infrastructure should be enhanced to facilitate the sharing of information and shared records.²³

Raising awareness in workforces about the professional roles involved in supporting children (such as the role for general practitioners (GPs), nurses, or mental health professionals) is recommended, including how those roles fit with others, and role expectations and practice standards.^{23,36,74} This should facilitate contact-making between professionals and a more consistent response to the needs of children, family and whānau.²³ A "who's who" list could be a useful resource for professionals, with the roles and responsibilities of professionals and agencies closely working with children detailed.²⁶ GPs and other health professionals should be made aware of readily-accessible service options that are rooted in the local community.²³ In addition to higher service-integration, it is important that organisations, services, and professionals have a sense of what they are accountable for and their roles, so as to avoid disagreements about responsibility which can contribute to children in need falling through the cracks.^{23,32}

Schools also have a critical role in facilitating child development and protection.³⁵ Inter-sectoral collaboration between health and education can utilise this important role. Further information about the importance of integrated services, features that make them successful, and planning and implementing integrated services, is provided in our earlier report: "Effectiveness of integrated social services (health, educational and social)" in *The Determinants of Health for Children and Young People in New Zealand 2014*.⁷⁵

Supporting professionals working with children and whānau

The health sector and health professionals have a vital role in helping identify, refer, and treat cases of child maltreatment early on.^{25,54} GPs are well-positioned to identify emerging problems and should have high quality continuous professional development in the skills required to work positively with children and with other professionals working with children.²³

Identifying risk of child maltreatment often involves screening (identifying that abuse is a potential issue before signs and symptoms appear) and identifying actual child maltreatment often involves specific interview techniques and physical examination.²⁵ A New Zealand study on the accuracy of educational, health (general practitioners), and mental health professionals in identifying abuse found that professionals were most accurate on scenarios involving alleged sexual abuse and least accurate for neglect scenarios.⁷⁶ This could indicate that neglect is under-identified and underreported.⁷⁶ Physicians may underestimate the prevalence of violence and abuse in the general public, especially for groups not traditionally believed to be an at-risk group, while they may also focus on physical signs of abuse and under-identify less overt signs of abuse and neglect.⁷⁷ Neglect in particular is under-identified in adolescents.³² General practitioners can be hesitant to refer concerns about potential child maltreatment where they have less confidence in their suspicion, are concerned about the poor likelihood that services will be provided after referral, or are concerned about the future of their relationship with the parent and family.³² Hesitation on behalf of the GP about whether or not to refer suspected child abuse can result in delay to refer or no referral and compromise effective inter-agency working.³²

Evidence on other health professionals indicates that around two thirds of professionals believe they can recognise maltreatment, while there is also evidence that health professionals largely agree about the five most serious signs of child neglect.⁴⁰ Some evidence suggests that professionals can often have high thresholds for recognising emotional abuse and neglect or show reluctance to refer when cases are suspicious but somewhat unclear.³² Health visitors are a group who are overall equipped to identify signs of child neglect (parental and developmental factors).³²

Continuing education is critical for enabling health care professionals to be alert to risk indicators of abuse, identify early signs of child maltreatment, know when to ask for help when they are faced with more complex issues, and report these cases to appropriate authorities.^{23,25,27,78} There are many studies that have focused on the training and education for health professionals to enhance their early recognition of signs and symptoms of child abuse and neglect.²⁵ Medical education about child abuse is a recommended modality for professional training.^{77,79}

The core areas suggested by the Children's and Young People's Unit for professional development training delivered to all professionals working with children include:²³

- understanding the developmental nature of childhood;

- parents, parenting and family life;
- managing transitions;
- understanding child protection;
- understanding risk and protective factors;
- listening to and involving children and young people.

Education and clarification should be provided about information-sharing protocols and the privacy and confidentiality of the child, family and whānau.²³ When a health professional has a rigid understanding about privacy legislation, it may contribute to their hesitancy in sharing information that can result in delayed protective interventions or no services being provided at all.^{23,32}

Multicomponent, structured curricula are a possible training initiative, where training is provided to general medical students and working physicians while more training is provided to those with a special interest in developing their skills in the area.^{25,77} While training interventions for health professionals are supported and strongly recommended,^{23,25,51,77,79} there is a paucity of quality, objectively-evaluated studies and evidence on whether these health professional training interventions improve the knowledge, attitudes, and behaviours of health professionals⁷⁹ or improve the identification and referral of child abuse and neglect cases.²⁵ However, a study conducted in the USA found that paediatrician attitudes and confidence about their ability to identify and manage child abuse were significantly correlated with a high level of suspicion of abuse regarding a purposely ambiguous clinical vignette.⁸⁰ Participants who received some child-abuse-related continuing medical education expressed higher levels of confidence.⁸⁰

Previous experience with adverse events (e.g. losing patients, malpractice lawsuit) as a result of reporting suspected child abuse may impact on paediatrician confidence or hesitation to report suspected abuse.⁸⁰ Health professionals may need support to work on any hesitancy as a cause of these concerns.²⁷ Health professionals should be encouraged to view referrals as being about continuing to work in a multi-disciplinary way centred around the needs and rights of the child.³² NICE³⁶ and others³⁶ recommend that professionals seek advice from designated colleagues or leaders about cases of suspected child maltreatment, which requires that opportunities and mechanisms be established so that health professionals can do so.²³ Formally establishing an adviser or a learning mentor for child protection issues could facilitate opportunities for health professionals to discuss concerns.²³

Senior managers have a role in ensuring staff have skills to recognise and respond to child maltreatment and are aware of the expectations of their role with regard to child protection.³⁶ They can also encourage continuity in service provision.³⁶

Health professionals should be encouraged to prioritise use of their clinical and assessment skills and be advised that the use of checklists or tools only help inform professional judgement.^{40,51} The Emergency Nurses Association⁴⁸ and The Council on Ethical and Judicial Affairs⁷⁷ support routine, universal assessment for signs of child maltreatment. However, few approaches for identifying child maltreatment have been described.²⁵ Health professionals should be made aware that oral injuries can feature in cases of abuse.³⁶ Health professionals should be made aware that forms of maltreatment often coexist in cases.¹⁷

Publications such as *Interagency Guide to Breaking the Cycle* and other practice material could be an opportunity to provide information on warning signs of neglect, example case scenarios of neglect, risk indicators, and strengthening sample interview questions for health professional use that are specific to identifying neglect.²⁶

Other recommendations include:

- Supporting the specific skills of different professions but also supporting collaborative work between people in different professions.²³
- Supporting professionals who work closely with children by supporting the workforce of which they are part, including facilitating staff retention and workforce capacity while making child-centred work and services attractive career options.²³

- Identifying opportunities to reduce bureaucratic processes and free up time for face-to-face work with children, families and whānau.²³

Supporting children and whānau

All children and whānau

Government organisations have a role in providing policies, frameworks, and services to facilitate the abilities of people caring for and protecting children (such as parents/caregivers, family and whānau).³⁵

Health professionals such as GPs should work towards enhancing collaboration between themselves and the children, family and whānau in their care.²⁸ All family and whānau should be provided with support to help their role in developing their child's potential by routinely providing universal service opportunities that allow for space for these discussions to take place as well as information sharing and providing advice.²³ Support should be offered to all parents, regardless of gender, to help build positive relationships between children and their parents.²³

Helplines can offer immediate advice to children or family and whānau and signpost services and opportunities to them, and patients can be made aware of them.²³

Evidence was sufficient for the Canadian Task Force on Preventive Health Care to recommend (grade A) that consideration of referral to home visitation programmes should be included in all periodic health examinations, particularly for disadvantaged families.²⁹

Children and whānau who are more vulnerable

Hearing and respecting the voices of children is critical to understanding their needs and being responsive to their needs.³⁵ Vulnerable young people expressed to the Modernising Child, Youth and Family Expert Panel and in the 2016 State of Care Report several key needs, some of which were the need for nurturing and close relationships with adults,^{72,81} a sense of belonging,^{72,81} time and resources to support their processing of and coping with experienced events,⁷² and ongoing support from people around them and larger systems.⁷²

Children who have experienced maltreatment or who live in State care have at least the same health needs as other children while they may also experience some additional health needs that can be severe or complex.

Children and young people can experience short and long-term effects of child maltreatment.⁵⁵ Children who experience physical or sexual abuse or who have been witness to violence may exhibit behavioural, emotional, or social problems or delays in cognitive or physical development, while some may not.^{25,77} Emotional abuse or neglect in a child's early years often impact on the child's ability to undertake fundamental tasks of development, such as developing secure attachments, a sense of self-worth and trust in others, which are difficult to later overcome.³² Children in New Zealand who experience child sexual abuse also experience a higher rate of prevalence of mental health issues, higher rates of sexual risk-taking, and lower self-esteem of life satisfaction.⁸²

Children in out-of-home care have complex lives and need to be supported to develop a sense of stability.⁷² Where government has intervened to attach children to other carers, children should be supported to develop relationships with adults who are committed to them long-term and who support the maximisation of their potential as they get older.²³ In the 2016 State of Care Report, children and young people identified how much they valued the relationship with their social workers.⁸¹ Decision-making about a child's placement should consider the child's access to services, as is consistent with some of the needs noted by children and young people themselves.²³ A Cochrane review found children in kinship foster care experience less placement disruption than those in non-kinship foster care.⁸³ Children's need for a sense of stability may require more attention if they are in groups that experience higher rates of disruption, which can also make continuity in service provision and health professional relationships even more important.³⁶

Furthermore, children in State care experience other health issues at a higher rate of prevalence, including incomplete immunisation status,⁸⁴ malnutrition,⁸⁴ mental health issues,^{84,85} substance

use,^{84,85} early sexual initiation,⁸⁴ and teenage pregnancy.⁸⁴ They may also experience factors at a higher rate that could compromise their access to universal services, including unemployment, fragmented contact with health services and subsequent gaps in health records, poverty, homelessness, and transportation issues.⁸⁴ For more information about the needs of children and young people in State care, refer to “Health needs of children and young people in Child, Youth and Family Care” in *The Health of Children and Young People with Chronic Conditions and Disabilities in New Zealand 2016*.²⁴ This in-depth topic provides an overview of the needs of individuals in State care as they pertain to tinana (physical health and functioning), hinengaro: (psychological and emotional wellbeing), wairua (Beliefs regarding connectedness and spirituality), taiao (physical environment), and iwi katoa (services and systems).

It is critical that cultural competence is enhanced in the health care sector and State care so as to meet the needs of children.^{22,33,72} Intervention methodologies for violence prevention that are of Western orientation can be ineffective for Māori.²² Services that recognise Māori and Pacific cultural values and approaches are crucial to facilitating service engagement of family and whānau.³³ Of particular relevance to these groups is a shift in focus towards re-framing intervention approaches away from a deficit or pathological lens.²² Services should be mana-enhancing to children and young people if they are to effectively help them flourish.²²

Primary care should facilitate the contact between pregnant women/family/whānau and primary health care professionals and clinics.²³ Primary care should be accessible to all families and whānau, and maternity services in particular.^{23,27} There should be good availability of walk-in clinics, good identification and referral for post-natal depression, good routine questioning of domestic violence (particularly at ante-natal appointments), and better early-years support for children with disability.²³ Specialist care should be accessible to all children, family and whānau without requiring a hospital visit.²³

Service delivery and service access in more deprived areas should be enhanced.²³ Service hubs for children and whānau in areas of higher deprivation provide an opportunity for children to receive care and supervision while also having on-site multidisciplinary resources.²³ Hubs can also signpost other services and opportunities (sport, recreation, etc) to children and whānau.²³ Breakfast clubs and after-school clubs can be collaborated with to enable service-hub-like spaces for children.²³ The co-location of services (e.g. service hubs) could also potentially support service integration around children.²³

Health professionals should be proactive and creative about asking parents about parenting concerns and asking children about their experiences.⁴⁰ Frontline health professionals working closely with children may be in a better position to discuss initial concerns of maltreatment with the child or family/whānau, rather than immediately referring to a social worker.^{23,36} NICE provides guidance on how professionals can conduct conversations with children and with carers where there are concerns about child maltreatment.³⁶ NICE also provides guidance on interacting with children and with family and whānau when assessing the needs of children who have experienced child maltreatment.³⁶ The World Health Organization also provides guidance on responding to children’s disclosures, with conversational examples.²⁷ For example, health professionals should work towards ensuring conversations: take place somewhere private, involve open-ended questions, involve a check with the child that the professional has understood correctly, use the language used by the child, and give the child opportunities to pause the conversation.³⁶

Guidelines, evidence-based reviews, New Zealand publications, and other relevant publications and websites

Further NZCYES reading

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- <https://www.orangatamariki.govt.nz/>
- Clinical Network for Child Protection.
- <https://www.starship.org.nz/for-health-professionals/new-zealand-child-and-youth-clinical-networks/clinical-network-for-child-protection/>
- World Health Organization. **Child maltreatment**.
- http://www.who.int/violence_injury_prevention/violence/child/en/
- Office of the Children's Commissioner.
- **State of Care**. <http://www.occ.org.nz/our-work/state-of-care/>
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15. Appendices

Appendix 1: Evidence for good practice

For most indicators in this report there is a section devoted to evidence for good practice. These comprise evidence summaries, references and links that aim to provide readers with a starting point from which to consider the most effective interventions that are available to address particular child and youth health issues. Included are New Zealand policy documents such as Ministry of Health Strategies and Toolkits, New Zealand and international guidelines, and evidence-based reviews that are relevant to the prevention and management of child and youth health issues. The approach taken in these sections is intended to assist health professionals use the principles of evidence-based medicine (EBM), that is, to solve problems by using the best available research evidence and combining this with clinical expertise and patient values.¹ Evidence-based reviews, the best known of which are those produced by the Cochrane Collaboration, collate all the available evidence (published and unpublished trials, observational studies etc.) relevant to a particular health intervention, evaluate it in a rigorous manner, and publish the resulting synthesis of the evidence in a format that allows readers to quickly evaluate the effectiveness of the intervention.

When preparing the evidence for good practice section for each indicator, the authors searched a number of EBM journals and databases (e.g. the Cochrane Library) as well as Ovid MEDLINE and PubMed for systematic reviews of population level interventions in child and youth health. They also conducted smart searches in Google Scholar for journal articles and Google for government documents.

Methodology used in preparing policy/evidence of good practice sections

New Zealand policy documents

Each review section provides a list of Ministry of Health (or where appropriate, other Government Agency) policy documents and strategies relevant to the area. Using Google.com a smart search was conducted of Ministry of Health and other government departments.

Example smart searches used:

("fetal alcohol syndrome" OR "fetal alcohol spectrum disorder" OR FAS OR FASD) site:.health.govt.nz

("fetal alcohol syndrome" OR "fetal alcohol spectrum disorder" OR FAS OR FASD) site:.govt.nz

Evidence for good practice

The databases listed below were searched for reviews assessing the effectiveness of population level interventions to prevent and/or manage each of the issues included in this report. These databases were chosen because of the high calibre of the institutions maintaining them. The search strategy concentrated on publications that attempted to synthesise all of the available evidence, thereby providing the broadest possible coverage of the relevant literature. In general, only literature from the last three years was searched, although earlier publications were included if there was a lack of more recent information. Individual trials and protocols were not specifically sought but if there was no other relevant information available, an attempt was made to locate individual research reports or recommendations. It is hoped that that, although the lists of references provided are not completely comprehensive, they will nevertheless provide a useful starting point for DHBs wishing to explore strategies to address particular child and youth health issues.

Evidence-Based Medicine Reviews

This database allows seven EBM resources to be searched at once including The Database of Reviews of Effects (DARE), Health Technology Assessments (HTA) and the NHS Economic Evaluation Database (NHSEED) all produced by National Health Services' Centre for Reviews and Dissemination at the University of York, U.K., The Cochrane Database of Systematic Reviews, and the ACP Journal Club.

National Guideline Clearinghouse <http://www.guideline.gov>

This is a searchable database of evidence-based clinical practice guidelines maintained by the Agency for Healthcare Research and Quality in the United States.

Centre for Reviews and Dissemination (CRD) <http://www.york.ac.uk/inst/crd>

This is a department of the University of York and is part of the National Centre for Health Research (NCHR). While CRD produces the database of Review Effects (DARE), captured in the Evidence-Based Medicine Review Database, searching the CRD site identifies other reviews not captured by DARE. This database is available through most local library services. Due to cessation of funding, no new records have been added to the database since March 2015.

National Institute for Health and Clinical Excellence (NICE) <http://www.nice.org.uk>

This is an independent organisation based in the United Kingdom, which provides national guidance on the promotion of good health and the prevention and treatment of ill health.

Guide to Community Preventive Services: Systematic Reviews and Evidence Based Recommendations

This guide was developed by the non-federal Task Force on Community Preventive Services whose members are appointed by the Director of the Centre for Disease Control and Prevention (CDC). The Community Guide summarises what is known about the effectiveness, economic efficiency, and feasibility of interventions to promote community health and prevent disease <http://www.thecommunityguide.org/about>.

In addition to these databases the websites of the World Health Organization, and government health departments in Australia, the UK, the US, and Canada, often yielded relevant guidance, as did the sites of international clinical collaborations such as the European Cystic Fibrosis Society and the International Society for Pediatric and Adolescent Diabetes.

Appendix 2: Statistical methods

Inferential statistics are used when a researcher wishes to use a sample to draw conclusions about a larger population as a whole; for example, weighing a class of 10 year old boys, in order to estimate the average weight of all 10 year old boys in New Zealand. The findings obtained from the sample provide an estimate for the population, but will always differ from it to some degree, simply due to chance. Similarly, samples are used when a researcher questions whether the risk of developing a particular condition is different between two groups, and the fit of the estimate obtained from the samples to the actual population needs to be carefully considered. An example of this would be a study examining whether lung cancer is more common in smokers or non-smokers; researchers using sample groups would have to consider the possibility that some of the differences observed arose from chance variations in the populations sampled.

Over time, statisticians have developed a range of measures to quantify the uncertainty associated with random sampling error. These measures can assign a level of confidence to estimates and conclusions drawn from samples, allowing researchers to assess, for example, whether the average weight of boys in the sample reflects the true weight of all 10 year old boys, or the rates of lung cancer in smokers are really different to those in non-smokers. Two of the most frequently used statistical significance tests are:

P-values: The p -value from a statistical test measures the probability of finding a difference at least as large as the one observed between groups, if there were no real differences between the groups studied. For example, if statistical testing of the difference in lung cancer rates between smokers and non-smokers resulted in a p -value of 0.01, this tells us that the probability of such a difference occurring if the two groups were identical is 0.01 or 1%. Traditionally, results are considered to be statistically significant if the $p < 0.05$; that is, when the probability of the observed differences occurring by chance is less than 5%.²

Confidence Intervals: When sampling from a population a confidence interval is a range of values that contains the measure of interest. While a confidence interval for the average height of ten year old boys could be 20cm to 200cm, for example, the smaller range of 130cm to 150cm is a more informative statistic. A 95% confidence interval suggests that if you were to repeat the sampling process 100 times, 95 times out of 100 the confidence interval would include the true value.² Where the observed counts are small and the denominator is large, then a Poisson distribution has been utilised for both rate and confidence interval calculations.³

The indicators in this report are mainly presented using crude (unadjusted) rates with accompanying confidence intervals, where appropriate, or by age group (age-specific rates).

Crude rates: Measures the number of people with the condition of interest in relation to the number of people in the population. It is calculated by dividing the number of people with the condition of interest in a specific time period by the total number of people in the population in the same time period.

Age-specific rates: Measures the occurrence of an event within a defined age group in relation to the number of people in that group. Age-specific rate is calculated by dividing the number of people with the condition of interest in a specific age group and time period by the total number of people in the population in the same age group and time period. All rates by age group in this report are age-specific unless stated otherwise.

Statistical significance testing in this report

When tests of statistical significance have been applied in a particular section, the statistical significance of the associations presented has been signalled in the text with the words significant, or not significant. Where the words significant or not significant do not appear in the text, then the associations described do not imply statistical significance or non-significance.

Several data sources are used in this report. In general they belong to one of two groups: 1) population surveys or 2) routine administrative datasets. The relevant statistical testing for each of these data sources are as follows:

Population surveys: Some of indicators reported on here are derived from data from national surveys where information from a sample has been used to make inferences about the population as a whole. In this context, statistical significance testing is appropriate and, where such information is available in published reports, it has been included in the text accompanying graphs and tables. In a small number of cases, information on statistical significance was not available, and any associations described do not imply statistical significance.

Numbers derived from routine administrative data: A large number of the indicators included in this report are based on data from New Zealand's administrative datasets, for example the National Mortality Collection, which captures information on all of the events occurring in a particular category.

Rate ratios derived from routine administrative data: To facilitate comparisons between different time periods or demographic factors, and for examining the data from New Zealand in a wider context, whenever measures of association (rate ratios) are presented in this report, 95% confidence intervals have been provided.⁴

Appendix 3: Data sources

This report contains information derived from several national administrative datasets and population surveys. These are described briefly below, and limitations to be aware of when interpreting results drawn from these sources are outlined.

B4 School Check

The B4 School Check (B4SC) is a universal programme offered to all families with children turning four, and is the final core contact under the Well Child/Tamariki Ora schedule. The Check is designed to promote the health and well-being of four year olds by identifying and addressing any concerns about their health, behaviour, social and/or development, thereby ensuring they are healthy and have the ability to thrive at school. It replaced the School New Entrant check. Families are able to decline or opt-off the B4SC.

The B4SC information system (B4SC IS) is a national dataset managed by the Ministry of Health. It contains the information as documented during completion of the B4 School Check, including anthropometry, vision and hearing, oral health, development assessment (Parental Evaluation of Developmental Status; PEDS) and behaviour assessment (Strengths and Difficulties; SDQ) scores.

The Ministry of Health utilises the data to monitor and evaluate the programme for improving the health and wellbeing of children, particularly in relation to, coverage, referral to specialist services, follow-ups and/or retesting.⁵

National Mortality Collection

The National Mortality Collection (MORT) is a dataset managed by the Ministry of Health which contains information on the underlying cause, or causes, of death along with basic demographic data for all deaths registered in New Zealand since 1988. Fetal and infant death data are a subset of the Mortality Collection, with cases in this subset having additional information on factors such as birth weight and gestational age.⁶ Each of the approximately 28,000 deaths occurring in New Zealand each year is coded manually by Ministry of Health staff. For most deaths the Medical Certificate of Cause of Death provides the information required, although coders also have access to information from other sources such as Coronial Services, Police, NZ Transport Agency, the New Zealand Cancer Registry (NZCR), the Institute of Environmental Science and Research (ESR), and Water Safety NZ.⁷

National Minimum Dataset

The National Minimum Dataset (NMDS) is the national hospital discharge dataset and is maintained by the Ministry of Health. It is used for policy formation, performance monitoring, and research purposes, providing key information about the delivery of hospital inpatient and day patient health services both nationally and on a provider basis. It is also used for funding purposes.⁸

Information in the NMDS includes principal and additional diagnoses, procedures, external causes of injury, length of stay and sub-specialty codes; and demographic information such as age, ethnicity and usual area of residence. Data have been submitted by public hospitals electronically since the original NMDS was implemented in 1993, with additional data dating back to 1988 also included. The private hospital discharge information for publicly funded events has been collected since 1997. The current NMDS was introduced in 1999.⁸

Birth Registration Dataset

Under the provisions of the Births, Deaths, Marriages, and Relationships Registration Act 1995, every birth occurring in New Zealand must be registered.

Since 1995 all New Zealand hospitals and delivering midwives have been required to notify the Department of Internal Affairs (DIA) within five working days of the birth of a live or stillborn baby. This applies to stillborn babies born at or more than 20 weeks gestation, or those weighing 400g or more. Prior to 1995, only stillborn babies reaching more than 28 weeks of gestation required birth notification.

Information on the hospital's notification form includes maternal age, ethnicity, multiple birth status, and the baby's sex, birth weight and gestational age. In addition, parents must jointly complete a birth registration form as soon as reasonable practicable after the birth, and within two years of delivery, which duplicates the above information with the exception of birth weight and gestational age.

Once both forms are received by the DIA the information is merged into a single entry. This two-stage process is thought to capture 99.9% of births occurring in New Zealand and cross-checking at the receipting stage allows for the verification of birth detail. Stats NZ publish birth statistics derived from the birth registrations supplied by the DIA.⁹

New Zealand Health Survey

The Ministry of Health's New Zealand Health Survey (NZHS) became an annual survey in 2011. The survey is conducted by interviewing a sample of adults and children's parents or caregivers in New Zealand, and utilises a core set of questions that cover a range of health-specific indicator areas, including health behaviours, conditions and use of health services.¹⁰ Table 15-1 presents the number of participants selected for each NZ Health Survey conducted and the corresponding coverage rate, or approximate proportion of the population involved in the survey.

The NZ Health Survey utilises adjusted rate ratios to account for the potential influence of other demographic factors when undertaking demographic comparisons. Gender comparisons are adjusted for age, ethnic comparisons are adjusted for age and gender, and deprivation comparisons are adjusted for age, sex and ethnicity.¹⁰

Table 15-1. Number of survey participants and coverage, New Zealand Health Survey

Survey year (1 July–30 June)	Adults (15 years and over)		Children (0–14 year olds)	
	<i>n</i>	Coverage (%)	<i>n</i>	Coverage (%)
New Zealand Health Survey				
2006/2007	12,488	59	4,921	67
2011/2012	12,370	54	4,478	68
2012/2013	13,009	59	4,485	69
2013/2014	13,309	54	4,699	63
2014/2015	13,497	59	4,754	69
2015/2016	13,781	67	4,721	76
2016/2017	13,598	63	4,668	73

Source: New Zealand Health Survey Methodology reports 2006/07–2016/17

Estimated prevalence

The NZ Health Survey presents the demographic factors for each surveyed condition using unadjusted prevalence rates and adjusted rate ratios, and the total estimated prevalence as calculated by the Ministry of Health have been presented in this report. The survey uses the calibrated weighting method to construct survey weights that rate up the responding sample to represent the target population. This method takes into account the probability of selection of each respondent, and uses external population benchmarks (typically based on the most recent population census) to correct for any discrepancies between the sample and population benchmarks (by age, sex, ethnicity and the 2013 New Zealand Index of Deprivation).¹¹

The prevalence of a condition, or the proportion of the population with the condition e.g. diabetes, was estimated by calculating the sum of the weights for the survey respondents with the condition divided by the sum of the weights of all survey respondents. For example, the sum of the weights for survey respondents with diabetes is divided by the sum of the weights for all survey respondents.¹¹

Further information on the prevalence estimates, methodology and interpretation of the NZ Health Survey are available on the NZ Health Survey pages of Ministry of Health website <http://www.health.govt.nz/nz-health-statistics/national-collections-and-surveys/surveys/current-recent-surveys/new-zealand-health-survey>

PRIMHD

PRIMHD (Programme for the Integration of Mental Health Data; pronounced PRIMED) is the Ministry of Health's dataset that contains information on mental health and addiction service activity and outcomes for people using services. The district health boards and non-governmental organisations (NGOs) working in mental health provide data on client referrals and service activities to the Ministry and DHBs also provide information on any outcomes.

The Ministry of Health's "*NGO Guide to PRIMHD*" explains that the information gathered is intended to enhance service planning and provision by service providers at national and local levels. The intention is for PRIMHD to help determine whether services are being provided to people who need them, whether services are being provided at the right time and in the right place, and what effects on outcomes services are having. Further information is available on PRIMHD on the Ministry of Health's website: <http://www.health.govt.nz/nz-health-statistics/national-collections-and-surveys/collections/primhd-mental-health-data>

Data limitations

There are limitations when using any of these datasets. The following are of particular relevance to this report.

Clinical coding accuracy and coding changes over time

The quality of data submitted to the administrative national datasets may vary. While the data for the MORT and the Birth Registration Dataset are coded by single agencies, the clinical information held in the NMDS is entered by health providers before being collated by the Ministry of Health. In a 2001 review of the quality of coding in the data submitted to the NMDS, 2,708 events were audited over ten sites during a three-month period. Overall the audit found that 22% of events required a change in coding, although this also included changes at a detailed level. Changes to the principal diagnosis involved 11% of events, to additional diagnoses 23%, and to procedure coding, 11%. There were 1,625 external causes of injury codes, of which 15% were re-coded differently.¹² These findings were similar to an audit undertaken a year previously. While the potential for such coding errors must be taken into consideration when interpreting the findings of this report, the average 16% error rate indicated by the 2001 review may be an overestimate as, in the majority of the analyses undertaken in this report, only the principal diagnosis is used to describe the reason for admission.

Changes in the coding systems used over time may result in irregularities in time series analyses.⁷ New Zealand hospitals use the clinical coding classification developed by the World Health Organization and modified by the National Centre for Classification in Health, Australia. The current classification is called The International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM), the Australian Classification of Health Interventions (ACHI) and Australian Coding Standards (ACS). The introduction of ICD-10-AM represented the most significant change in classification in over 50 years, expanding the number of codes from ~5,000 to ~8,000, to provide for recently recognised conditions and allow greater specificity about common diseases.

From 1988 until 1999, clinical information in the NMDS was coded using versions of the ICD-9 classification system. From July 1999 onwards, the ICD-10-AM classification system has been used. Back and forward mapping between the two systems is possible using predefined algorithms,¹² and for most conditions there is a good correspondence between ICD-9 and ICD-10-AM codes. Care should still be taken when interpreting time series analyses which include data from both time periods as some conditions may not be directly comparable between the two coding systems.

Variation in reporting hospitalisations to the NMDS

Historically, there have been differences in the way New Zealand's 20 district health boards (DHBs) have reported their emergency department (ED) hospitalisations to the NMDS, which can affect the interpretation of hospitalisation data. Inconsistent recording of ED cases has resulted from differing definitions of the time spent in the ED, and at what point this time constitutes an admission. This is important in paediatrics where hospitalisations for acute onset infectious and respiratory diseases in

young children especially are mainly of short duration. In addition, there are regional differences in treatment processes for paediatric emergency cases.

This short report includes all ED day cases in its analyses of hospitalisations for medical conditions. This approach differs from that commonly used by the Ministry of Health when analysing NMDS hospital discharge data, which the Ministry of Health uses to minimise the impact of the inconsistent reporting of ED cases. Short stay ED events are often excluded from the Ministry's analyses to improve comparability between regions. However, as noted above, the treatment of children in acute cases differs from that of adults, and the inclusion of ED day cases is justified when considering hospitalisations for medical conditions, despite inconsistencies in the dataset. The Ministry of Health's practice of filtering out ED day cases for hospitalisations for injuries is followed in this report as it is considered that the processes for injury assessments are relatively consistent around the country.

Further information on the details of the inconsistencies can be seen in earlier reports by the NZCYES www.otago.ac.nz/ncyes

Changes in the way ethnicity information has been recorded over time

Due to inconsistencies in the way ethnicity information was recorded in the health sector, and in census data before 1996, all ethnic group specific analyses in this report are for the year 1996 onwards. See Appendix 4 for a brief review of the changes in the recording of ethnicity information over the past 35 years in New Zealand.

Appendix 4: Demographic factors

Ethnicity data

Because of inconsistencies in the manner in which ethnicity information in New Zealand was collected prior to 1996, all ethnic group specific analyses presented in this report are for the 1996 year onwards, and reflect self-identified concepts of ethnicity. Details of the changes made in the census question on ethnicity, and why they were made, can be found on the Stats NZ website www.stats.govt.nz.

Unless otherwise specified, prioritised ethnic group has been used to ensure that each health event is only counted once. Despite significant improvements in the quality of ethnicity data in New Zealand's national health collections since 1996, care must still be taken when interpreting the ethnic-specific rates as the potential still remains for Māori and Pacific children and young people to be undercounted in our national data collections.

The authors of Hauora IV developed a set of adjusters which could be used to minimise the bias such undercounting introduced when calculating population rates and rate ratios. These, or similar, adjusters were not utilised in this report because previous research has shown that ethnicity misclassification can change over time and ethnic misclassification may vary significantly by district health board.^{13,14} Adjusters developed using national level data (as in Hauora IV) may not be applicable to district health board level analyses, with separate adjusters needing to be developed for each.

In addition, the development of adjusters requires the linkage of the dataset under review with another dataset for which more reliable ethnicity information is available, and this process is resource-intensive and not without error, particularly if the methodology requires probabilistic linkage of de-identified data. The development of a customised set of period and age specific adjusters was seen as being beyond the scope of the current project. The data presented in this report may undercount Māori and Pacific children to a variable extent depending on the dataset used, and that in the case of the hospital admission dataset for Māori, this undercount may be as high as 5–6%.

Socioeconomic deprivation

The NZ index of deprivation (NZDep) was first created using information from the 1991 census, and has been updated following each census. It is a small area index of social and material deprivation, and is used as a proxy for socioeconomic status. The main concept underpinning small area indices of deprivation is that the socioeconomic environment in which a person lives can confer risks or benefits which may be independent of their own social position within a community.¹⁵ They are aggregate measures, providing information about the wider socioeconomic environment in which a person lives, rather than information about their individual socioeconomic status.

The latest index, NZDep2013, combines nine variables from the 2013 census to reflect eight dimensions of material and social deprivation, as shown in Box 1. Each variable represents a standardised proportion of people living in an area who lack a defined material or social resource. These are combined to give a score representing the average degree of deprivation experienced by people in that area. Individual area scores are ranked and placed on an ordinal scale from 1 to 10, with decile 1 reflecting the least deprived 10% of small areas and decile 10 reflecting the most deprived 10% of small areas.¹⁶

The advantage of the NZDep2013 is its ability to assign measures of socioeconomic status to the older population, the unemployed and to children, to whom income and occupational measures often don't apply, as well as to provide proxy measures of socioeconomic status for large datasets when other demographic information is lacking. Small area indices have limitations, however, as not all individuals in a particular area are accurately represented by their area's aggregate score. While this may be less of a problem for very affluent or very deprived neighbourhoods, in average areas, aggregate measures may be much less predictive of individual socioeconomic status.¹⁵ Despite these limitations, the NZDep2013 has been shown to be predictive of mortality and morbidity from a number of diseases in New Zealand.

Table 15-2. Variables used in the NZDep2013

Dimension	Variable in order of decreasing weight in the index
Communication	People aged < 65 with no access to the Internet at home
Income	People aged 18–64 receiving a means tested benefit
Income	People living in equivalised* households with income below an income threshold
Employment	People aged 18–64 unemployed
Qualifications	People aged 18–64 without any qualifications
Owned home	People not living in own home
Support	People aged <65 living in a single parent family
Living space	People living in equivalised* households below a bedroom occupancy threshold
Transport	People with no access to a car

*The setting of the household equivalised income threshold was based on two principles: 1) the proportion of the population identified as being socioeconomically deprived by the threshold should be broadly consistent with the other variables in the index, and 2) the threshold should be broadly consistent with other measures of income poverty¹⁶

Appendix 5: Clinical codes

The following are the codes associated with the conditions presented in this report.

Primary diagnosis	ICD-10-AM
Select conditions	
Serious skin infections	L00–L08, H00.0, H01.0, J34.0, L98.0
Asthma and Wheeze	J45–J46, R06.2
Gastroenteritis	A00–A09, K52.9
Vaccine-targeted diseases	
Diphtheria	A36
Tetanus	A33– A35
Pertussis	A37
Polio (poliomyelitis)	A80
(Acute) Hepatitis B	B16
<i>Haemophilus influenzae</i>	B96.3
Pneumococcal disease	J13, A40.3, B95.3
Measles	B05
Mumps	B26
Rubella	B06
Meningitis	A87, G00–G03
Meningococcal disease	A39
Tuberculosis	A15–A19
Varicella	B01
Other vaccine preventable diseases	P35.0, M01.4
Dental conditions	
Dental caries	K02
Disorders of tooth development/eruption	K00
Embedded/ impacted teeth	K01
Other diseases of the teeth hard tissue	K03
Diseases of the pulp/periapical tissue	K04
Gingivitis/periodontal diseases	K05
Other disorders of the gingiva/edentulous alveolar ridge	K06
Dentofacial anomalies/malocclusion	K07
Other disorders of the teeth or supporting structures	K08
Mental Health conditions	
Postconcussional syndrome	F072
Mental and behavioural (M+B) disorders due to harmful use of alcohol	F10
<i>Acute intoxication</i>	<i>F10.0</i>
M+B disorders due to harmful use of cannabinoids	F12
M+B disorders due to other/multiple psychoactive substances	All other F10–F19 codes
Schizophrenia, schizotypal and delusional disorders	F20–F29
Depression	F32, F33
Other mood disorders	All other F30–F39 codes
Anxiety disorders	F41
Reaction to stress	F43
<i>Post-traumatic stress disorder</i>	<i>F43.1</i>
<i>Adjustment disorder</i>	<i>F43.2</i>
Dissociative disorders	F44
<i>Dissociative convulsions</i>	<i>F44.5</i>
Somatoform disorders	F45
Eating disorders	F50
<i>Anorexia nervosa</i>	<i>F50.0</i>
Developmental disorders of speech and language	F80
Pervasive developmental disorders	F84
<i>Childhood autism</i>	<i>F84.0</i>
Other developmental disorders	All other F80–F89 codes
Conduct disorders	F91, F92
Tic disorders	F95

Appendix 6: Oranga Tamariki Subsites

The following are the Oranga Tamariki subsites associated with the District Health Boards presented in this report.

DHB	Oranga Tamariki subsite
Northland DHB	Kaikohe Kaitaia Te Kaipara Te Tai Tokerau Youth Justice Whangarei Tautahere-Whangarei North Teaotahi-Whangarei South
Waitemata DHB	North Harbour Youth Justice Orewa Takapuna Waitakere Waitakere City Youth Justice Westgate
Auckland DHB	Auckland City Youth Justice Grey Lynn Onehunga Otahuhu Otahuhu Youth Justice Panmure
Counties Manukau DHB	Homai Mangere Manurewa Manurewa Youth Justice Otara Otara Youth Justice Papakura Papakura Youth Justice Pukekohe
Waikato DHB	Hamilton North Hamilton South Hauraki Taumarunui Tokoroa Waikato East Waikato East Youth Justice Waikato Rural North Waikato Rural South Waikato West Waikato Youth Justice
Bay of Plenty DHB	Tauranga Nga Parirau–Tauranga East Te Ahuru Mowai–Tauranga West Tauranga Youth Justice Whakatane
Lakes DHB	Rotorua Rotorua Youth Justice Taupo
Hauora Tairāwhiti	Gisborne Tairāwhiti Youth Justice

DHB	Oranga Tamariki subsite
Taranaki DHB	Hawera New Plymouth Taranaki Taranaki Youth Justice
Hawke's Bay DHB	Hastings Hawkes Bay Youth Justice Napier Waipukurau Wairoa
MidCentral DHB	Dannevirke Horowhenua Lower North Island Youth Justice Manawatu
Whanganui DHB	Whanganui Whanganui Youth Justice
Hutt Valley DHB	Hutt Youth Justice Lower Hutt Upper Hutt
Capital & Coast DHB	Capital Coast Youth Justice Paraparaumu Porirua Wellington
Wairarapa DHB	Wairarapa
Nelson Marlborough DHB	Blenheim Upper South Youth Justice Nelson
South Canterbury DHB	Timaru South Canterbury
Canterbury DHB	Ashburton Christchurch East Christchurch East Youth Justice Christchurch West Christchurch West Youth Justice Papanui Rangiora Sydenham
West Coast DHB	West Coast
Southern DHB	Alexandra Balclutha Central Otago Gore Invercargill Oamaru Otago Urban Otago Youth Justice Southland Southland Youth Justice

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