2023

State of Child Health

in Aotearoa New Zealand

cure kids

big research for little lives

CONTENTS

This report is published in September 2024. It presents data extracted by the Ministry of Health in May 2023 and represents the most up-to-date data available at the time of publication.

FOREWORD

E ngā mana, e ngā waka, e ngā hau e whā e te iwi whānui

Tēnā koutou, Tēnā koutou, Tēnā koutou katoa

This year's State of Child Health report clearly shows us that concerted action is needed to ensure all children in our country experience the highest attainable standard of health, and enjoy flourishing childhoods.

In my role as the independent advocate working for and with children and young people, I hear from them, and from their families and whānau, that they want to experience good health. But for far too many — especially mokopuna Māori, Pacific children, disabled children, and those living in areas with greatest socioeconomic deprivation — there are barriers in the way.

That's why this fourth annual State of Child Health in Aotearoa New Zealand report is so important. It guides where our focus needs to be to address poor child health outcomes. It reminds us that to make positive change in children's health in our country, we must make sound decisions grounded in robust evidence, and that change requires deliberate, collaborative, sustained efforts.

This report presents powerful data and insights that need to be used to inform, shape and help make good decisions on children's health — including at the systemic level.

Based on national data on hospitalisations from 2000 to the end of 2022, it identifies five priority areas for urgent action: respiratory conditions, rheumatic fever and rheumatic heart disease, skin infections, dental disease, and mental health concerns.

Good health and wellbeing in the first 2000 days of children's lives is crucial. Concerningly though, this report finds that babies are experiencing more than half of all hospitalisations of children for respiratory conditions.

The socioeconomic inequities this report lays bare also provide a rallying call to action to deepen poverty reduction and elimination efforts. Children who live in the most deprived socioeconomic areas have double the rate of hospitalisations for respiratory conditions than other children, and hospitalisation for tooth decay is also particularly high for this cohort. This alone shows that it's essential we secure cross-party consensus to end child poverty. We need to make it our ongoing project of national significance.

Children and young people often tell me that urgent action is needed to better meet their mental health needs. The significant unmet and increasing need for mental health assistance for children of all ages shown by this report highlights how important their asks are. Even more so, given that a fifth of young people report serious psychological distress, a proportion that has increased more than 300% over the past 12 years.

Health issues contribute to stress, and in some cases, crises, for whānau. They require visits to hospital, time away from school and cause significant family and whānau disruptions.

continued over >

Yet many of the poor outcomes highlighted in this report are preventable. In a small, resource-rich country like ours, this current state of child health is simply unacceptable. It is inconsistent with New Zealand's obligations under the UN Convention on the Rights of the Child, and Te Tiriti o Waitangi. Continued focus and action that prioritises children's hauora — in all dimensions of their Te Whare Tapa Whā — is needed, and it's achievable.

I support the recommendations made throughout this report. I will continue to advocate for them to be actioned, so we see tangible, measurable change for children's hauora.

I share my gratitude for the deep expertise and dedication of the Cure Kids team, together with the Paediatric Society of New Zealand, the Royal Australasian College of Physicians, the New Zealand Child and Youth Epidemiology Service - University of Otago, and the expert advisors across the motu who have produced this important report. Ko tēnei taku mihi nunui ki a koutou katoa — your ongoing commitment to the health of Aotearoa New Zealand's children is inspiring. Thank you for bringing forward the evidence and recommendations to help chart a brighter way forward.

After all, what could be more important? Childhood is a relatively short period of our life, but it sets the foundation for a lifetime. Children born today will most likely still be alive in 2100, so it is crucial that we choose to take an intergenerational view when investing in children's health.

Kia kuru pounamu te rongo — All mokopuna live their best lives.

To realise this moemoeā, we must keep the rights and needs of children central in decision-making, and work together to build a healthy and thriving Aotearoa New Zealand.

Ngā manaakitanga,

Dr Claire Achmad
Te Kaikōmihana Matua — Chief Children's Commissioner
Mana Mokopuna — Children and Young People's Commission

01 INTRODUCTION

Tēnā koutou katoa,

When Professor Sir Bob Elliott and Dr Ron Caughey founded Cure Kids in 1971 they had a goal of reducing the disproportionate burden of diseases on children in Aotearoa NZ. Tamariki need paediatric research specific to our own unique population and health challenges and our purpose. Cure Kids supports research into these big health issues in order to raise the standard of health of our tamariki in Aotearoa NZ and the Pacific Islands.

Cure Kids have once again joined forces with the NZ Child and Youth Epidemiology Service at the University of Otago to write the report with input from the Paediatric Society of NZ, the Royal Australasian College of Physicians, and with other expert advisors around the country.

For this 2023 report, our advisors built on the previous three reports prepared since 2020 and selected five major classes of health conditions that have a big impact on the lives of infants, children, and young people in Aotearoa NZ:

- **Respiratory conditions**
- **Rheumatic fever and rheumatic heart disease**
- **Skin infections**
- **Dental disease**
- **Mental health concerns**

These conditions were chosen because of their prevalence, the cost to the health system, the severity of disease for individual children, and the long-term consequences for children's future health. We believe that these are the most urgent priorities for child health. Not only have rates of hospital admissions remained unacceptably high over two decades, but the burden of disease is inequitable. Tamariki Māori, Pasifika children, and children living in areas with the greatest socioeconomic deprivation are disproportionately affected.

These health issues cause crises for children and their whānau, requiring visits to hospital, time away from school, and significant disruption to families. In the long term, this burden of disease causes chronic conditions that can persist into adulthood, with significant social and economic impacts for Aotearoa NZ.

This year, the Cure Kids State of Child Health Report not only shines a spotlight on the unacceptably high rates of disease that our tamariki are experiencing but also highlights some opportunities to improve outcomes across these five health areas. For example:

- **Respiratory conditions** — Continued subsidisation of the influenza vaccine annually. Data has shown that increasing access to the vaccine by subsidisation is a highly cost-effective measure to reduce the risk of influenza-associated hospitalisation.
- **Rheumatic fever and rheumatic heart disease** — Continued funding of research programmes that are investigating the immune pathogenesis of ARF, developing a diagnostic test for ARF, and developing Group A Streptococcus (GAS) vaccines.

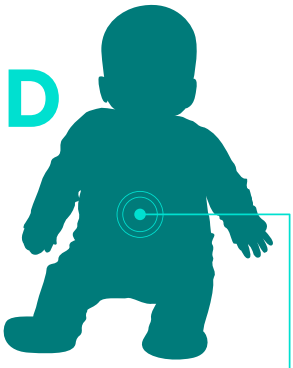
continued over >

- **Skin infections** — Investigation into free treatment (anti-septics and dressings) for minor skin infections/injuries in the community through public nursing, school-based care, pharmacies, and primary care.
- **Dental disease** — Oral health providers need to work with communities to improve access to care and ensure that care is delivered in a culturally appropriate manner. This will ensure that children with some of the greatest need for treatment are seen prior to needing hospital-level care.
- **Mental health concerns** — Quality research into effective treatment strategies, service delivery, and prevention methods (e.g., digital interventions or community development strategies) that 'stem the tide' of increasing population level distress is needed. These interventions must be specific to the populations they are targeting and must address the wider social determinants of mental wellbeing.

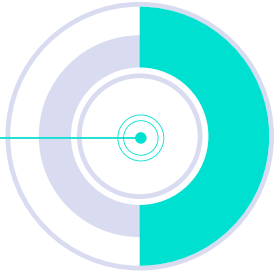
National action to reduce child poverty, by delivering equitable access to healthcare, nutrition, and appropriate housing, remains one of the most important ways to positively impact the health of our tamariki and reduce risk factors across the five health areas highlighted in this report. Targeted investment into the health of children will generate long-term population-level benefits that far exceed the initial costs. Cure Kids is committed to investing in the big research questions that prevent our children from living their best lives. Only by intentional action will we achieve our vision of healthier children with brighter futures.

Frances Soutter
Chief Executive, Cure Kids

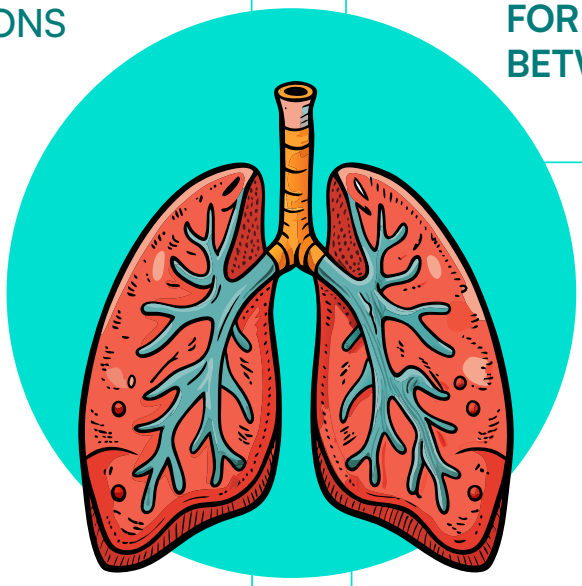
02 RESPIRATORY CONDITIONS
Mate romahā



CHILDREN AGED
1 YEAR AND YOUNGER
ACCOUNT FOR MORE THAN HALF OF ALL HOSPITALISATIONS
OF CHILDREN FOR RESPIRATORY CONDITIONS

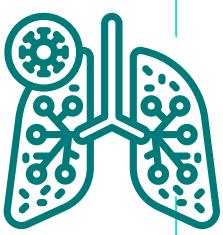


ASTHMA AND / OR WHEEZE WAS RESPONSIBLE FOR ALMOST
HALF OF ALL RESPIRATORY HOSPITALISATIONS
FOR CHILDREN AGED BETWEEN 3 AND 9 YEARS



OVER THE PAST
TWO DECADES,
THEIR HOSPITALISATION RATES HAVE
INCREASED BY 44%

CHILDREN WHO LIVE IN THE
MOST DEPRIVED SOCIOECONOMIC AREAS
HAVE
DOUBLE
THE RATE OF **HOSPITALISATIONS FOR RESPIRATORY CONDITIONS** COMPARED WITH OTHER CHILDREN



RATES OF **HOSPITALISATION** FOR **BRONCHIOLITIS** ARE HIGHEST FOR **CHILDREN UNDER ONE YEAR,** ACCOUNTING FOR **41% OF ADMISSIONS** IN THIS AGE GROUP

THE EFFECTS OF **ETHNICITY** AND **SOCIOECONOMIC DEPRIVATION** ON THE RATE OF HOSPITALISATIONS FOR RESPIRATORY CONDITIONS ARE **ADDITIVE**

KEY RECOMMENDATIONS

- **Continued subsidisation of the influenza vaccine annually.** The data have shown that increasing access to this vaccine by subsidising it is highly cost-effective as it reduces the risk of influenza-associated hospitalisation in children and, by association, in their elderly relatives. Infections in pre-school and school-age children are a driver of spread in the community.
- **Review and approval from Medsafe of Nirsevimab** for infants at high risk of complication from **respiratory syncytial virus (RSV)** infection. The evidence from Europe and Australia shows that it delivers a considerable **reduction in hospitalisation rates for RSV-associated diseases.**
- **Research into new, culturally appropriate strategies to support access to immunisations.** A collaborative approach with the community to reverse the declining levels of vaccine coverage is needed.
- **Improving access to affordable, warm, dry, suitably sized homes and reducing a child's exposure to tobacco smoke and smoking** will have significant effects on reducing the rates of respiratory related hospital admissions and rates of asthma and wheeze in young children.

KEY FINDINGS

- **Children aged 1 year and younger account for more than half of all hospitalisations** of children for respiratory conditions. These infants are **28 times more likely to be hospitalised** for respiratory conditions than are children 10 years and older and, **over the past two decades, hospitalisation rates have increased 44%.**
- **Rates of hospitalisation for bronchiolitis** (inflammation of the small passages of the lungs) are **highest for children under one year, accounting for 41% of admissions** in this age group. Aotearoa NZ has some of the highest rates of hospitalisations for bronchiolitis internationally. The most common cause is infection with RSV.
- **Hospitalisation rates for respiratory conditions in children halved in 2020**, due to elimination of community transmission of viruses, especially influenza and RSV, through COVID control measures and corresponding changes in vaccination subsidies. Once restrictions were lifted, hospitalisation rates surged to **pre-pandemic levels in all age groups, showing the importance of community transmission of these viruses in driving respiratory hospitalisations.**
- **Asthma and/or wheeze was responsible for almost half of all respiratory hospitalisations for children aged between 3 and 9 years,** and incidence rates among Aotearoa NZ children remain amongst the highest in the world.
- **Children who live in the most deprived socioeconomic areas have double the rate of hospitalisations for respiratory conditions** compared with other children.
- **Rates of hospitalisations for respiratory conditions are disproportionately high for Pasifika children** (2.5 times more likely to be hospitalised), **followed by tamariki Māori** (1.8 times more likely to be hospitalised) and **Middle Eastern, Latin American, or African (MELAA) children.**
- **The greatest socioeconomic disparities are seen in hospitalisation rates for bronchiectasis** (permanent widening and scarring of the airways); **children living in areas with the most deprivation are 5.2 times more likely to be hospitalised** than are children living in areas with the least deprivation.
- **The effects of ethnicity and socioeconomic deprivation on the rate of hospitalisations for respiratory conditions are additive.**

WHY PRIORITISE RESPIRATORY HEALTH FOR CHILDREN?

Acute respiratory illnesses are commonplace during childhood.[1] In more severe cases the wheezing, coughing, and difficulty breathing associated with respiratory illnesses requires hospitalisation.[2 3] Repeated, severe respiratory infections can lead to permanent, irreversible lung damage and chronic respiratory diseases, such as bronchiectasis or chronic obstructive pulmonary disease, ultimately affecting life expectancy.[4-6]

Triggers and risk factors for respiratory conditions in childhood interact cumulatively and in complex ways, and include socioeconomic deprivation, poor-quality housing conditions, air pollution, tobacco smoke and vape exposure, malnutrition, and missed immunisations.[7-16] Climate change also exacerbates respiratory conditions through extreme weather events, wildfires, air pollutants, moulds, pollen and other allergens, and changes in the transmission of infectious diseases.[17-19] Whānau Māori and Pasifika families have greater exposure to these risk factors and unequal access to primary care,[3 5 20-22] resulting in disproportionately high rates of hospitalisation for respiratory infections among Māori and Pasifika children. There have been repeated calls by experts to address these inequities and reduce overall rates of respiratory disease by improving access to affordable, warm, dry, uncrowded homes; working to eliminate poverty; reducing tobacco smoking and exposure to tobacco smoke; reducing air pollution; and reducing childhood obesity.[7 12 23] In doing so, we stand to significantly decrease respiratory-related hospitalisations for the most vulnerable children.

CURRENT DATA ON THE STATE OF RESPIRATORY HEALTH FOR CHILDREN IN AOTEAROA NZ

Hospitalisation rates for respiratory conditions are taken from the NZ Ministry of Health's National Minimum Dataset (NMDS),[24] based on the diagnostic codes at discharge between January 2000 and December 2022. Rates include all acute and semi-acute (arranged) hospitalisations (including emergency department (ED) stays of > 3 hours) for those aged 0—19 years whose primary diagnosis was coded (ICD-10-AM) as:

- upper respiratory infections (J00—J06),
- influenza (J09—J11),
- lower respiratory infections, namely pneumonia (J12—J18, J69, J85.1), acute bronchitis (J20), acute bronchiolitis (J21), or unspecified acute lower respiratory infection (J22),
- asthma and wheeze (J45, J46, R06.2), or
- bronchiectasis (J47; excluding cystic fibrosis).

Together, these selected respiratory conditions account for approximately 87% of all hospitalisations for respiratory-related conditions in children. Henceforth, respiratory hospitalisations will refer to this select group of respiratory illnesses.

Data on the prevalence of diagnosed and medicated asthma are from the NZ Health Survey (NZHS).[25] The NZHS includes data for children aged 0—14 years (as reported by their caregivers) and for young people aged 15—24 years (who answered independently).

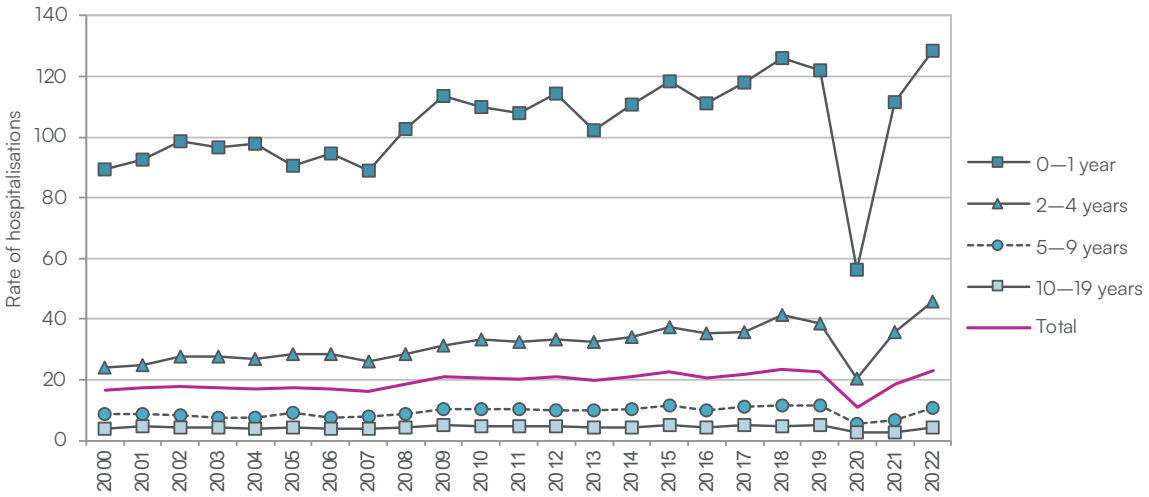
For further information on data sources, measurement, and methods please refer to the appendix.

Hospitalisations for respiratory illnesses

Over the 5 years to the end of 2022, the average number of children per year aged 0—19 years admitted to hospital for acute respiratory conditions was 25,228 (minimum = 14,161 hospitalisations in 2020 and maximum = 29,979 hospitalisations in 2022).

Hospitalisation rates are highest for children aged 1 year and younger; on average, just over half (52%) of all hospitalisations for respiratory conditions are for children in this age group. These children are 28 times more likely to be hospitalised for respiratory conditions than are children and young people aged 10 years and older.

Figure 2.1 shows that hospitalisation rates for respiratory conditions have increased over the past 23 years — most notably for children younger than 5 years, and from 2007/2008. From 2000 to 2022, hospitalisation rates for respiratory conditions have increased 44% for children aged 1 year and younger and have almost doubled for children aged 2—4 years. Hospitalisation rates for respiratory conditions halved at the start of the COVID-19 pandemic in 2020 due to public health measures to limit the transmission of the SARS-CoV-2 virus, such as border control, physical distancing, hand hygiene, household isolation, and lockdowns. This was conclusively shown to be associated with elimination of community transmission of influenza (2020 and 2021) and respiratory syncytial virus (RSV, 2020), as well as reduction in other pathogens, in Aotearoa NZ.[26] Immediately following the brief opening of the international border to Australia (from April to June 2021), there was a large resurgence in respiratory hospitalisations in children aged 2 years and younger, largely due to RSV.[27] In 2022, following opening of borders to all international visitors, amid a resurgence of influenza and widespread community COVID-19 transmission, there was a return to pre-pandemic levels of hospitalisation for all age groups.[26] Examining the trends in hospitalisations for respiratory illnesses pre- and post-pandemic afford us the unique opportunity to highlight learnings from the COVID-19 pandemic and underscore the importance of public health measures to break the chain of transmission of respiratory illnesses in community settings.



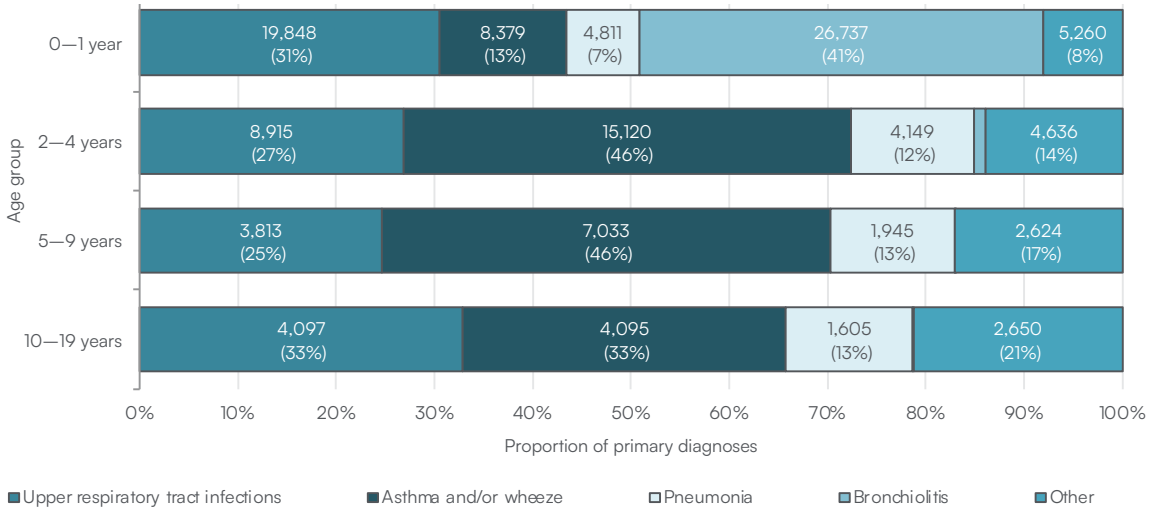
Source: NMDS, NZCYES Estimated Resident Population. Rate per 1,000 age-specific population.

Figure 2.1: Trends in hospitalisations of 0—19-year-olds for respiratory conditions, by age group, Aotearoa NZ (2000—22)

Causes of respiratory hospitalisations

Over the 5 years to the end of 2022, 42% of respiratory hospitalisations in children aged 0—19 years were for lower respiratory tract infections (including pneumonia and acute bronchiolitis). Upper respiratory tract infections (such as colds, sinusitis, tonsillitis, laryngitis, and pharyngitis) made up about 29% of respiratory hospitalisations, and 27% were for asthma or wheeze.

Figure 2.2 shows that the type of respiratory conditions that children were hospitalised for varied by age. The most frequent causes of respiratory hospitalisations for children aged 1 year and younger were bronchiolitis (41%) and upper respiratory tract infections (31%). For children aged 2—4 years and 5—9 years, asthma and/or wheeze accounted for almost half of all respiratory hospitalisations (46% in both age groups), with upper respiratory tract infections being the next most frequent cause (27% and 25%, respectively). For children and young people aged 10 years and older, asthma and/or wheeze and upper respiratory tract infections accounted for one third of all respiratory hospitalisations each.



Source: NMDS. Other acute respiratory conditions include influenza, bronchitis, and bronchiectasis (excluding cystic fibrosis).

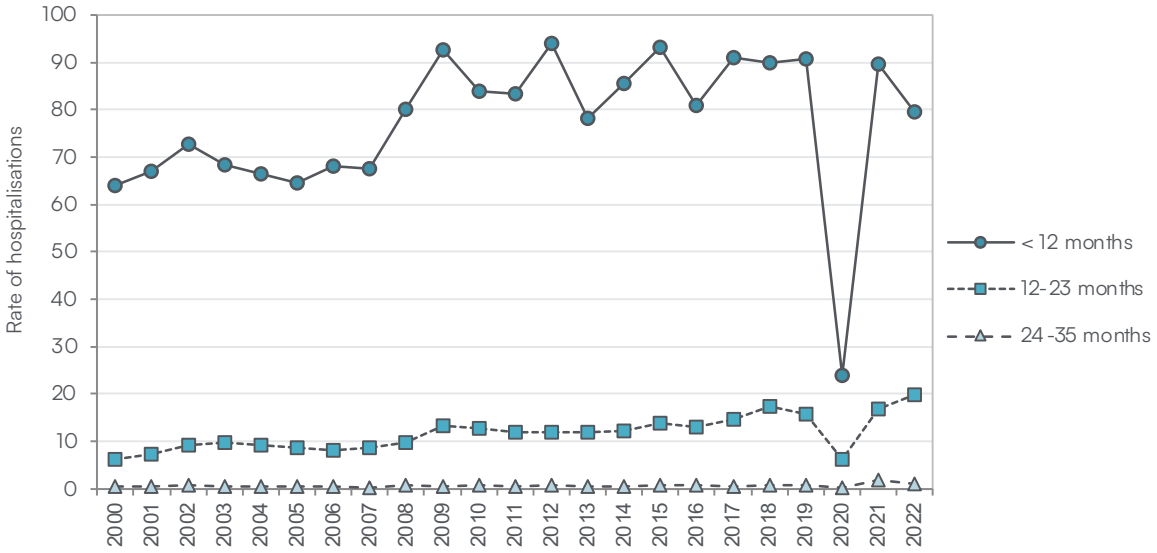
Figure 2.2: Causes of hospitalisations for respiratory conditions by age group, Aotearoa NZ (2018—22)

Bronchiolitis

Bronchiolitis is inflammation of the bronchioles in young infants that is usually caused by an acute viral illness, in two thirds of cases by respiratory syncytial virus (RSV).[28 29] Figure 2.3 shows that rates of hospitalisation for bronchiolitis for infants younger than 12 months of age are five times that of those aged between 12 and 23 months, and become miniscule from 2 years of age. Since 2000, rates of hospitalisation for bronchiolitis have increased for all children aged 35 months and younger. For 12—23-month-olds, in particular, the number of hospitalisations more than tripled from 355 in 2000 to 1,187 in 2022. Most of the increase in hospitalisations for bronchiolitis occurred after 2008, which could be a result of increased testing prompted by the 2009 H1N1 influenza (swine flu) outbreak. The increased testing (which has persisted) may have generated higher numbers of RSV positive tests, which will have fed into diagnoses coded as bronchiolitis. Hospitalisations for bronchiolitis halved at the start of the COVID-19 pandemic in 2020 but have since increased to pre-pandemic levels.

In 2021, immediately following the brief opening of the international border to Australia, a surge in bronchiolitis cases occurred due to resurgence of RSV.[27] In response to this, and the wider COVID-19 pandemic, Pharmac NZ temporarily funded palivizumab in 2022 and 2023,[30] a monoclonal antibody (mAb) that is currently the only licensed immunoprophylactic therapy for RSV in Aotearoa NZ.[31] Palivizumab requires monthly intramuscular injections and has a high cost, and is only licenced for infants at high risk of RSV infection.[31] Funding of palivizumab during this period reduced hospitalisations for bronchiolitis in those receiving it. Unfortunately, the temporary

COVID-19 funding for palivizumab was withdrawn in 2023.[30] Aotearoa NZ remains an international outlier in high-income countries in not having funded access to palivizumab, and paediatric experts have repeatedly called for reinstatement of funding.[32 33] Internationally, a newer mAb, nirsevimab, has become available for immunoprophylactic therapy for RSV. Unlike palivizumab, nirsevimab is a single intramuscular injection, with long-lasting protection (at least 6 months) and is licenced for all infants. It has been universally offered to infants in some countries in Europe and some states in Australia with real-world evidence resulting in considerable reductions in the incidence of hospitalisations due to bronchiolitis.[34] Given that Aotearoa NZ has some of the highest rates of hospitalisations due to bronchiolitis internationally, nirsevimab represents an important therapy to significantly reduce bronchiolitis burden.



Source: NMDS, NZCYES Estimated Resident Population. Rate per 1,000 age-specific population.

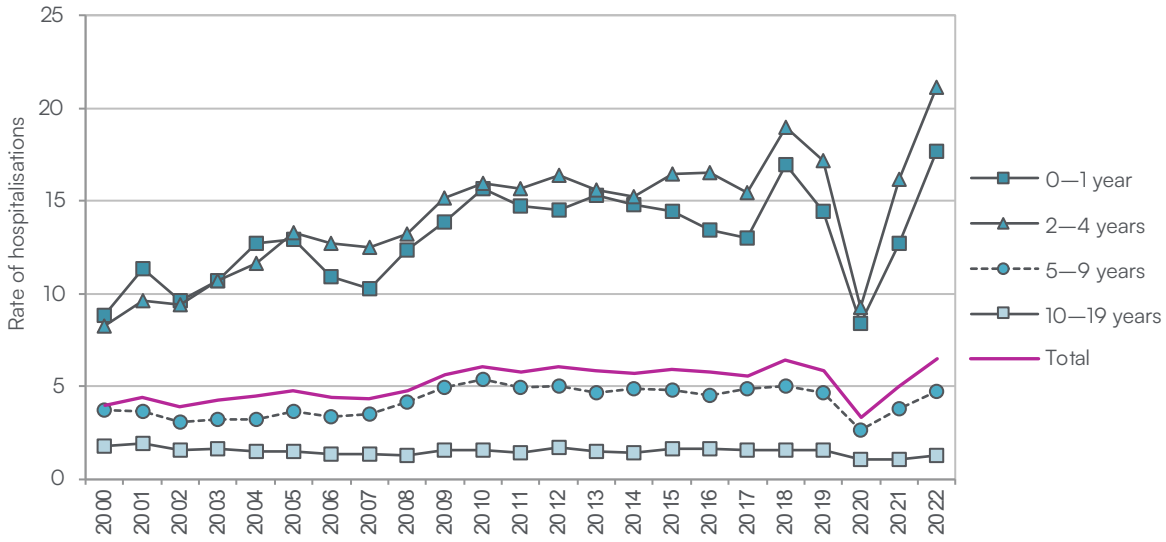
Figure 2.3: Trends in hospitalisations of under-3-year-olds for bronchiolitis, by age, Aotearoa NZ (2000—22)

Asthma and wheeze

Children in Aotearoa NZ have some of the highest rates of asthma in the world.[23] The most recent (2022/23) NZ Health Survey (NZHS) shows that one in eight children aged 2—14 years (12.4%) and 15.5% of young people aged 15—24 years were using medication for diagnosed asthma.

Wheeze in children aged younger than 5 years is a precursor to asthma but has different underlying pathophysiology.[2 28] However, about half of children aged younger than 5 years who wheeze grow out of this as they age and do not go on to develop asthma.[3]

Since 2000, rates of hospitalisations for asthma and/or wheeze have increased, and this is most notable for children aged younger than 5 years (Figure 2.4). During the period of public health interventions associated with the COVID-19 pandemic in 2020, the rate of hospitalisation for asthma and/or wheeze declined by 43% — in keeping with viral respiratory infection being a substantial contributor to precipitating wheezing illness — but has since exceeded pre-pandemic levels. Given that the estimated median direct medical cost of each preschool wheeze hospitalisation in Aotearoa NZ is NZ$1,279, significant cost savings could be made by identifying and implementing primary and secondary prevention strategies for preschool wheeze.[2 35] There is emerging evidence that oral immunostimulants may prevent wheezing attacks provoked by acute respiratory tract illnesses (the main cause of recurrent wheezing attacks in preschool-aged children)[36 37] but further clinical trials are required.[2]



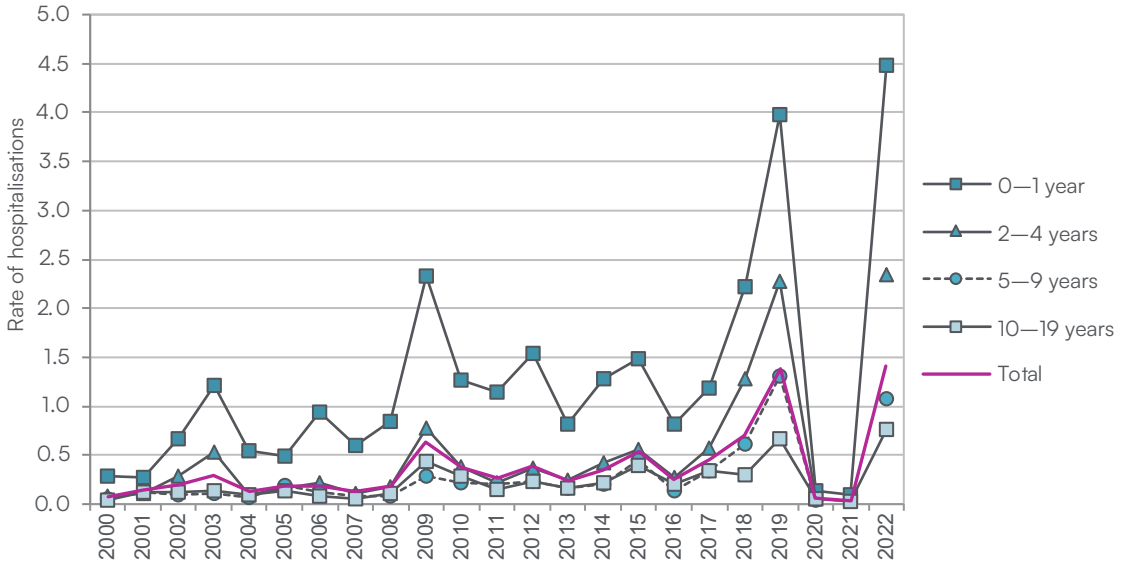
Source: NMDS, NZCYES Estimated Resident Population. Rate per 1,000 age-specific population.

Figure 2.4: Trends in hospitalisations of 0—19-year-olds for asthma and/or wheeze, by age group, Aotearoa NZ (2000—22)

Influenza

Influenza is an orthomyxovirus which infects humans (types A and B) and a wide range of birds and other animals. In temperate countries such as Aotearoa NZ, influenza circulates mostly during the winter months. Although common, symptoms can be severe enough to require hospitalisation and lead to serious complications.[38] Figure 2.5 shows that rates of hospitalisation for influenza are highest for the very youngest children and decrease with age. For all age groups, rates of hospitalisation for influenza increased sharply in 2019. After a period of very few influenza-related hospitalisations during the COVID-19 pandemic in 2020 and 2021, rates of hospitalisation for influenza increased sharply in 2022, related to a post-pandemic surge following no influenza in 2020 or 2021.[26]

Severity of influenza is greatest in the very young and the very old. Although unlike the elderly, children rarely die from influenza, children aged younger than 5 years have similarly high rates of hospitalisation and other severe outcomes.[39-41] While the risk of hospitalisation for influenza is greatest in children with underlying cardiac or respiratory disease, previously healthy children account for at least half of hospitalisations and deaths due to influenza[40] and infection in pre-school and school-age children is a driver of the spread of influenza viruses in the community.[39 41 42] In response to the COVID-19 pandemic, Pharmac NZ temporarily funded influenza vaccination of all children younger than 12 years in 2023, but withdrew this funding in 2024 to previous levels of support for only high-risk children. Many countries comparable to Aotearoa NZ have found influenza vaccination of all children, particularly those aged younger than 5 years, to be cost-effective not only for prevention of influenza in children, but also in the elderly.[43] It is vital that such a strategy is considered within Aotearoa NZ.



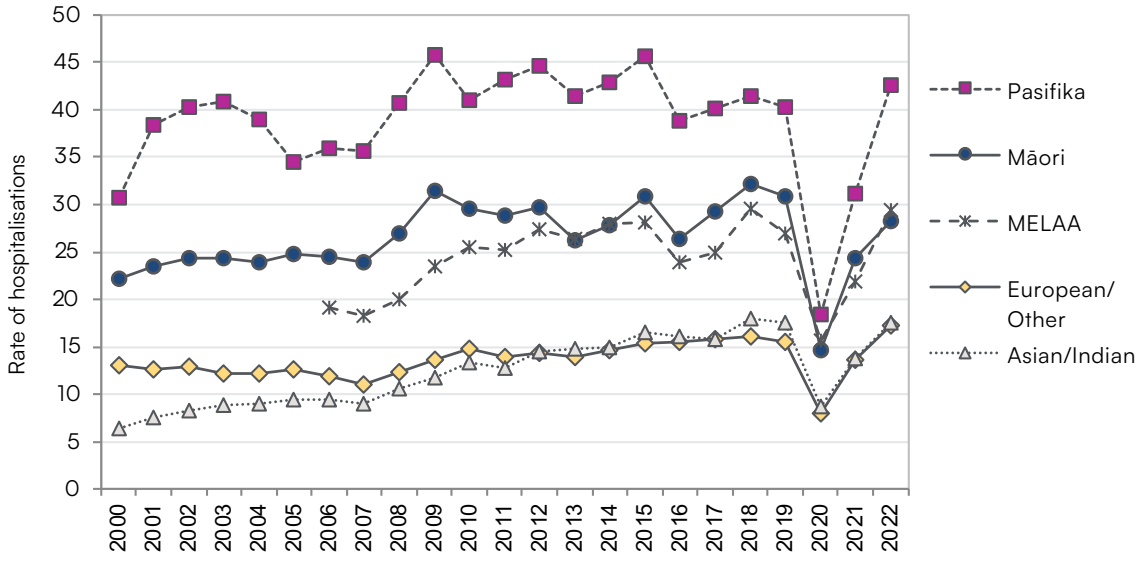
Source: NMDS, NZCYES Estimated Resident Population.
Rate per 1,000 age-specific population. Rates suppressed where n < 6.

Figure 2.5: Trends in hospitalisations of 0—19-year-olds for influenza, by age group, Aotearoa NZ (2000—22)

ETHNIC DIFFERENCES IN RESPIRATORY HEALTH FOR CHILDREN IN AOTEAROA NZ

Over the last five years to 2022, tamariki Māori were 1.8 times more likely and Pasifika children were 2.5 times more likely to be hospitalised for respiratory conditions than were European/Other children.

Figure 2.6 shows that over the past two plus decades, Pasifika children have experienced the highest rate of hospitalisations for respiratory conditions. Rates have also remained disproportionately high for tamariki Māori and children of Middle Eastern, Latin American, and African ethnicities (MELAA). Public health measures associated with the COVID-19 pandemic in 2020 reduced hospitalisations for all ethnic groups, related to enormous decreases in circulation of respiratory viruses, but rates returned to pre-pandemic levels by 2022.

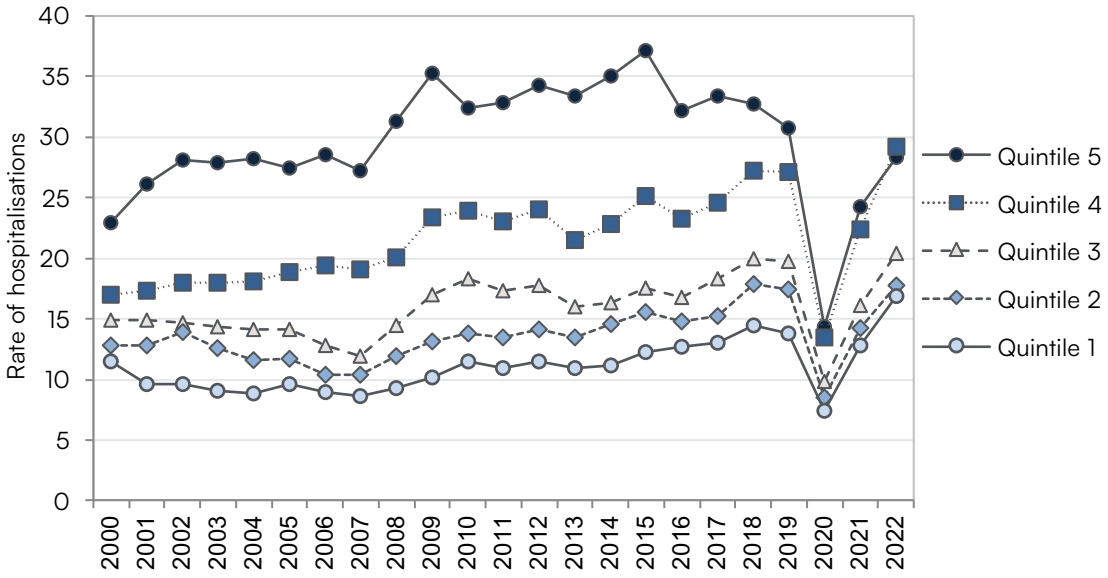


Source: NMDS, NZCYES Estimated Resident Population.
Rate per 1,000 0—19-year-olds. MELAA = Middle Eastern, Latin American, or African.

Figure 2.6: Trends in hospitalisations of 0—19-year-olds for respiratory conditions, by ethnicity, Aotearoa NZ (2000—22)

SOCIOECONOMIC DIFFERENCES IN RESPIRATORY HEALTH FOR CHILDREN IN AOTEAROA NZ

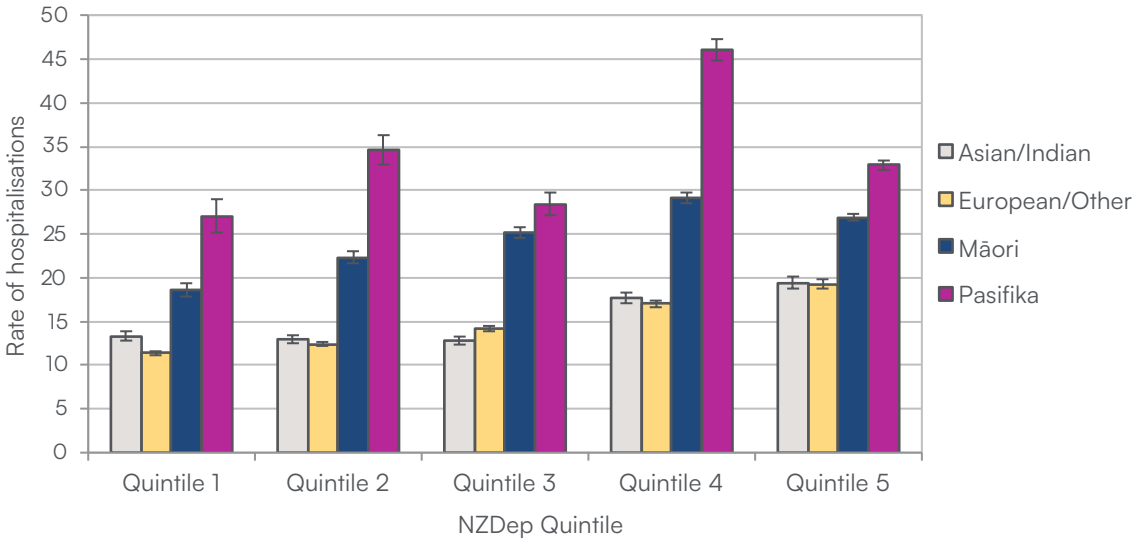
Figure 2.7 shows that children and young people living in areas with the most deprivation have had the highest hospitalisation rates for respiratory conditions since 2000. Rates decreased while borders were closed due to the COVID-19 pandemic but increased again after 2021 such that they are now on par with pre-pandemic rates. For the period between 2018 and 2022, hospitalisations of children living in the two quintiles with the most socioeconomic deprivation accounted for 58% of all hospitalisations for respiratory conditions despite children living in these two quintiles accounting for only 45% of the population. Children and young people living in the most deprived areas were hospitalised for respiratory conditions twice as frequently as were their peers living in the least deprived areas. The gaps between rates are even greater for bronchiolitis (children living in areas with the most deprivation are hospitalised almost 3 times as frequently) and greatest for bronchiectasis (children living in areas with the most deprivation are hospitalised 5.2 times as frequently).



Source: NMDS, NZCYES Estimated Resident Population. Rate per 1,000 0—19-year-olds.
Quintile: NZDep Index of deprivation (1 = least deprived; 5 = most deprived).

Figure 2.7: Trends in hospitalisations of 0—19-year-olds for respiratory conditions, by socioeconomic deprivation, Aotearoa NZ (2000—22)

The effects of ethnicity and socioeconomic deprivation on the rate of hospitalisations for respiratory conditions are additive. For the period from 2018 to 2022, although there were deprivation gradients present for children in each ethnic group, rates of hospitalisations for respiratory conditions were highest for Pasifika children followed by tamariki Māori, regardless of the socioeconomic area in which they lived (Figure 2.8).



Source: NMDS and NZCYES estimated resident population. Rate per 1,000 0—19-year-olds.
Quintile: NZDep Index of deprivation (1 = least deprived; 5 = most deprived). Ethnicity is level 1 prioritised.

Figure 2.8: Hospitalisations of 0—19-year-olds for respiratory conditions, by socioeconomic deprivation and by ethnicity, Aotearoa NZ (2018—22)

WHAT IS THE STATE OF RESPIRATORY HEALTH FOR CHILDREN IN AOTEAROA NZ?

Most respiratory tract infections are caused by viruses, such as influenza, human rhinovirus, adenovirus, and RSV, although bacteria (e.g., *Bordetella pertussis, Haemophilus influenzae,* pneumococcus, and staphylococcus) are important causes of more severe respiratory infections, including pneumonia.[44] Immunisation during childhood is important to protect children from vaccine preventable diseases, and is particularly important for children who have chronic respiratory diseases and those who have been hospitalised previously for respiratory illnesses.[6] Fully-funded vaccines in Aotearoa NZ are available to protect children against some infectious agents (e.g., pertussis, Haemophilus influenzae type b, and 13 types of pneumococcus), but not others (e.g., RSV).[45] In 2023, influenza vaccines were free for all children aged 12 years and younger, on the basis that levels of natural immunity to influenza would be low due to COVID-19 response measures.[46] For other free childhood vaccines, rates of timely immunisation have not met the targets needed to maximise protection, and have fallen since 2016.[47 48] Immunisation rates fell further still after 2020, when the COVID-19 pandemic disrupted delivery and uptake of immunisation.[47 48] The risk is particularly high for tamariki Māori and for children from socioeconomically deprived areas, who have the lowest immunisation coverage at all milestone ages and for whom coverage has been rapidly declining since 2018.[47 48] Children admitted to hospital for a respiratory cause or who require preventer treatment for asthma continue to be eligible for funded influenza vaccines and checking eligibility and offering the seasonal influenza vaccine prior to being discharged from hospital is an important preventive measure available to reduce the likelihood of re-admission with respiratory infection.[6] Strategies to support access to immunisation, such as an improved system for registering immunisations, vaccination in pharmacies, and community-led initiatives are the most important factors in improving delivery and uptake of vaccines.[47]

It remains a priority to review service provision for any potential disparities between Māori and non-Māori because health inequity persists in most domains. Rather than solely attributing inequity to surface causes (e.g., health practices, psychosocial resources, health system access) or social status (e.g., socioeconomic position, ethnicity), we need to work with Māori health providers and researchers to advocate for rangatiratanga (sovereignty) and reorientation of systemic factors (e.g., colonial basis upon which our current cultural, economic, political, and legal systems are founded), and support equity-focused policies and practices.[49] This is not an insignificant undertaking but will reap many benefits for tamariki Māori and for all children and young people in Aotearoa NZ.

REFERENCES

1. Morton SMB, Grant CC, Berry SD, et al. Growing Up in New Zealand: A longitudinal study of New Zealand children and their families. Now We Are Four: Describing the preschool years. Auckland: Growing Up in New Zealand. Auckland, New Zealand: The University of Auckland, 2017. https://cdn.auckland.ac.nz/assets/growingup/research-findings-impact/GUiNZ_Now%20we%20are%20four%20report.pdf
2. Walsh E, Gangakhedkar A, Jelleyman T, et al. Pre-school wheeze hospital presentations: A demographic profile and review of clinical management. Journal of Paediatrics and Child Health 2023;59(7):871-78. https://doi.org/10.1111/jpc.16404
3. McNamara D, Asher I, Davies C, et al. Asthma and Respiratory Foundation NZ New Zealand Child Asthma Guidelines: A quick reference guide. Wellington, New Zealand: Asthma and Respiratory Foundation NZ, 2020. https://www.nzrespiratoryguidelines.co.nz/uploads/8/3/0/1/83014052/arf_nz_child_asthma_guidelines_update_30.6.20.pdf
4. Byrnes CA, Trenholme A, Lawrence S, et al. Prospective community programme versus parent-driven care to prevent respiratory morbidity in children following hospitalisation with severe bronchiolitis or pneumonia. Thorax 2020;75(4):298-305. https://doi.org/10.1136/thoraxjnl-2019-213142
5. Schlichting D, Fadason T, Grant CC, et al. Childhood asthma in New Zealand: The impact of on-going socioeconomic disadvantage (2010-2019). New Zealand Medical Journal 2021;134(1533):80-95. https://www.proquest.com/docview/2537156188?pq-origsite=gscholar&fromopenview=true&sourcetype=Scholarly%20Journals
6. Seibt S, Gilchrist CA, Reed PW, et al. Hospital readmissions with acute infectious diseases in New Zealand children <2 years of age. BMC Pediatrics 2018;18(1):98. https://doi.org/10.1186/s12887-018-1079-x
7. Asthma and Respiratory Foundation of New Zealand. Te Hā Ora (The Breath of Life): National Respiratory Strategy. Wellington, New Zealand: The Asthma Foundation, 2015. https://www.asthmafoundation.org.nz/assets/images/Asthma-National-Respiratory-Strategy-online-version.pdf
8. Ingham T, Keall M, Jones B, et al. Damp mouldy housing and early childhood hospital admissions for acute respiratory infection: A case control study. Thorax 2019;74(9):849-57. https://doi.org/10.1136/thoraxjnl-2018-212979
9. Tin Tin S, Woodward A, Saraf R, et al. Internal living environment and respiratory disease in children: Findings from the Growing Up in New Zealand longitudinal child cohort study. Environmental Health 2016;15(1):120. https://doi.org/10.1186/s12940-016-0207-z
10. Loto-Aso E, Howie SR, Grant CC. Childhood pneumonia in New Zealand. Journal of Paediatrics and Child Health 2022;58(5):752-57. https://doi.org/10.1111/jpc.15941
11. Huang QS, Wood T, Jelley L, et al. Impact of the COVID-19 nonpharmaceutical interventions on influenza and other respiratory viral infections in New Zealand. Nature Communications 2021;12(1):1001. https://doi.org/10.1038/s41467-021-21157-9
12. Telfar Barnard L, Zhang J. The impact of respiratory disease in New Zealand: 2020 update. Dunedin, New Zealand: University of Otago, Asthma and Respiratory Foundation NZ, 2021. https://www.asthmafoundation.org.nz/assets/documents/Respiratory-Impact-report-final-2021Aug11.pdf
13. Pickett KE, Vafai Y, Mathai M, et al. The social determinants of child health and inequalities in child health. Paediatrics and Child Health 2022;32(3):88-94. https://doi.org/10.1016/j.paed.2021.12.003
14. Colosia AD, Masaquel A, Hall CB, et al. Residential crowding and severe respiratory syncytial virus disease among infants and young children: A systematic literature review. BMC Infectious Diseases 2012;12(1):95. https://doi.org/10.1186/1471-2334-12-95
15. Fisk WJ, Eliseeva EA, Mendell MJ. Association of residential dampness and mold with respiratory tract infections and bronchitis: A meta-analysis. Environmental Health 2010;9(1):72. https://doi.org/10.1186/1476-069X-9-72
16. Fisk WJ, Lei-Gomez Q, Mendell MJ. Meta-analyses of the associations of respiratory health effects with dampness and mold in homes. Indoor Air 2007;17(4):284-96. https://doi.org/10.1111/j.1600-0668.2007.00475.x
17. Royal Society Te Apārangi. Human health impacts of climate change for New Zealand: Evidence summary. Wellington, New Zealand: Royal Society Te Apārangi, 2017. https://royalsociety.org.nz/assets/documents/Report-Human-Health-Impacts-of-Climate-Change-for-New-Zealand-Oct-2017.pdf
18. Bolton A. Climate change and environmental health. Porirua, New Zealand: Institute of Environmental Science and Research Ltd, 2018. https://www.esr.cri.nz/digital-library/climate-change-and-environmental-health-report/
19. Thien F, Beggs PJ, Csutoros D, et al. The Melbourne epidemic thunderstorm asthma event 2016: An investigation of environmental triggers, effect on health services, and patient risk factors. The Lancet Planetary Health 2018;2(6):e255-e63. https://doi.org/10.1016/S2542-5196(18)30120-7
20. Ministry of Health. Tupu Ola Moui: Pacific Health Chart Book 2012. Wellington, New Zealand: Ministry of Health, 2012. https://www.health.govt.nz/system/files/documents/publications/tupu-ola-moui-pacific-health-chart-book_1.pdf
21. Ministry of Health. Tatau Kahukura: Māori Health Chart Book 2015 (3rd edition). Wellington, New Zealand: Ministry of Health, 2015. https://www.health.govt.nz/system/files/documents/publications/tatau-kahukura-maori-health-chart-book-3rd-edition-oct15.pdf
22. Tukuitonga C, Percival T, McAllister J. CPAG 2023 Policy Brief on Pacific child health: Optimising health for Pacific children. Auckland, New Zealand: Child Poverty Action Group, 2023. https://static1.squarespace.com/static/60189fe639b6d67b861cf5c4/t/650e6c7c2e0af2761c7d29a6/1695444094086/2023+Policy+Brief+on+Pacific+Child+Health.pdf
23. Beasley R, Semprini A, Mitchell EA. Risk factors for asthma: Is prevention possible? The Lancet 2015;386(9998):1075-85. https://doi.org/10.1016/S0140-6736(15)00156-7
24. Ministry of Health. National Minimum Dataset (Hospital Events) Data Dictionary. Wellington, New Zealand: Ministry of Health, 2021. https://www.health.govt.nz/publication/national-minimum-dataset-hospital-events-data-dictionary

25. Ministry of Health. Methodology Report 2022/23: New Zealand Health Survey. Wellington, New Zealand: Ministry of Health, 2023. https://www.health.govt.nz/system/files/documents/publications/methodology-report-2022-23-new-zealand-health-survey-dec23.pdf

26. Huang QS, Turner N, Wood T, et al. Impact of the COVID-19 related border restrictions on influenza and other common respiratory viral infections in New Zealand. Influenza and Other Respiratory Viruses 2024;18(2):e13247. https://doi.org/10.1111/irv.13247

27. Grant CC, Huang QS, Trenholme A, et al. What can we learn from our 2021 respiratory syncytial virus experience? New Zealand Medical Journal 2021;134(1540):7-12. https://nzmj.org.nz/media/pages/journal/vol-134-no-1540/what-can-we-learn-from-our-2021-respiratory-syncytial-virus-experience/741a2fd1dc-1696478240/what-can-we-learn-from-our-2021-respiratory-syncytial-virus-experience.pdf

28. Bpac NZ. Is it asthma? Assessing and managing wheeze in pre-school children. Dunedin, New Zealand: Bpac NZ, 2020. https://bpac.org.nz/2020/wheeze.aspx

29. Dalziel SR, Haskell L, O'Brien S, et al. Bronchiolitis. The Lancet 2022;400(10349):392-406. https://doi.org/10.1016/S0140-6736(22)01016-9

30. Pharmac. End of temporary funding of palivizumab for preventing RSV. Pharmac; 2023. Available from: https://pharmac.govt.nz/news-and-resources/news/end-of-temporary-funding-of-palivizumab-for-preventing-rsv.

31. Prasad N, Read JM, Jewell C, et al. Modelling the impact of respiratory syncytial virus (RSV) vaccine and immunoprophylaxis strategies in New Zealand. Vaccine 2021;39(31):4383-90. https://doi.org/10.1016/j.vaccine.2021.05.100

32. Asthma and Respiratory Foundation of New Zealand. More babies at risk of serious illness next winter due to underfunding of Pharmac. Wellington, New Zealand: Asthma and Respiratory Foundation of New Zealand; 2023. Available from: https://www.asthmafoundation.org.nz/news-events/2023/more-babies-at-risk-of-serious-illness-next-winter-due-to-underfunding-of-pharmac.

33. Radio New Zealand. Pharmac asked to reconsider funding RSV drug for at-risk babies. Radio New Zealand 2023. https://www.rnz.co.nz/news/national/502004/pharmac-asked-to-reconsider-funding-rsv-drug-for-at-risk-babies

34. Australian Immunisation Handbook. Respiratory syncytial virus (RSV). Canberra, Australia: Department of Health and Aged Care, Australian Government; 2024 updated 27 June 2024. Available from: https://immunisationhandbook.health.gov.au/contents/vaccine-preventable-diseases/respiratory-syncytial-virus-rsv.

35. Stevens CA, Turner D, Kuehni CE, et al. The economic impact of preschool asthma and wheeze. European Respiratory Journal 2003;21(6):1000-06. https://doi.org/10.1183/09031936.03.00057002

36. de Boer GM, Żółkiewicz J, Strzelec KP, et al. Bacterial lysate therapy for the prevention of wheezing episodes and asthma exacerbations: a systematic review and meta-analysis. European Respiratory Review 2020;29(158):190175. https://doi.org/10.1183/16000617.0175-2019

37. Razi CH, Harmancı K, Abacı A, et al. The immunostimulant OM-85 BV prevents wheezing attacks in preschool children. Journal of Allergy and Clinical Immunology 2010;126(4):763-69. https://doi.org/10.1016/j.jaci.2010.07.038

38. The Immunisation Advisory Centre. Influenza. Auckland, New Zealand: The Immunisation Advisory Centre; 2024. Available from: https://www.immune.org.nz/diseases/influenza2024.

39. Buchan SA, Hottes TS, Rosella LC, et al. Contribution of influenza viruses to medically attended acute respiratory illnesses in children in high-income countries: a meta-analysis. Influenza and Other Respiratory Viruses 2016;10(6):444-54. https://doi.org/10.1111/irv.12400

40. Li-Kim-Moy J, Yin JK, Blyth CC, et al. Influenza hospitalizations in Australian children. Epidemiology and Infection 2017;145(7):1451-60. https://doi.org/10.1017/S0950268816003381

41. Ruf BR, Knuf M. The burden of seasonal and pandemic influenza in infants and children. Eur J Pediatr 2014;173(3):265-76. https://doi.org/10.1007/s00431-013-2023-6

42. The Immunisation Advisory Centre. Influenza and vaccination for children. Auckland, New Zealand: The Immunisation Advisory Centre; 2024. Available from: https://www.immune.org.nz/factsheets/influenza-children2024.

43. Marsh S, Paynter J, McIntyre P, et al. Flu vaccines are no longer free for all under-12s in NZ — children living in poverty and at higher risk will bear the brunt. The Conversation 2024 https://theconversation.com/flu-vaccines-are-no-longer-free-for-all-under-12s-in-nz-children-living-in-poverty-and-at-higher-risk-will-bear-the-brunt-228095

44. Bpac NZ. Navigating uncertainty: Managing respiratory tract infections. Dunedin, New Zealand: Bpac NZ; 2019. Available from: https://bpac.org.nz/2019/rti.aspx.

45. Te Whatu Ora Health New Zealand. New Zealand Immunisation Schedule. Wellington, New Zealand: Te Whatu Ora Health New Zealand; 2023. Available from: https://www.tewhatuora.govt.nz/for-the-health-sector/vaccine-information/new-zealand-immunisation-schedule/.

46. Pharmac. Decision to widen access to influenza vaccine. Pharmac; 2023. Available from: https://pharmac.govt.nz/news-and-resources/consultations-and-decisions/2023-03-02-decision-to-widen-access-to-influenza-vaccine.

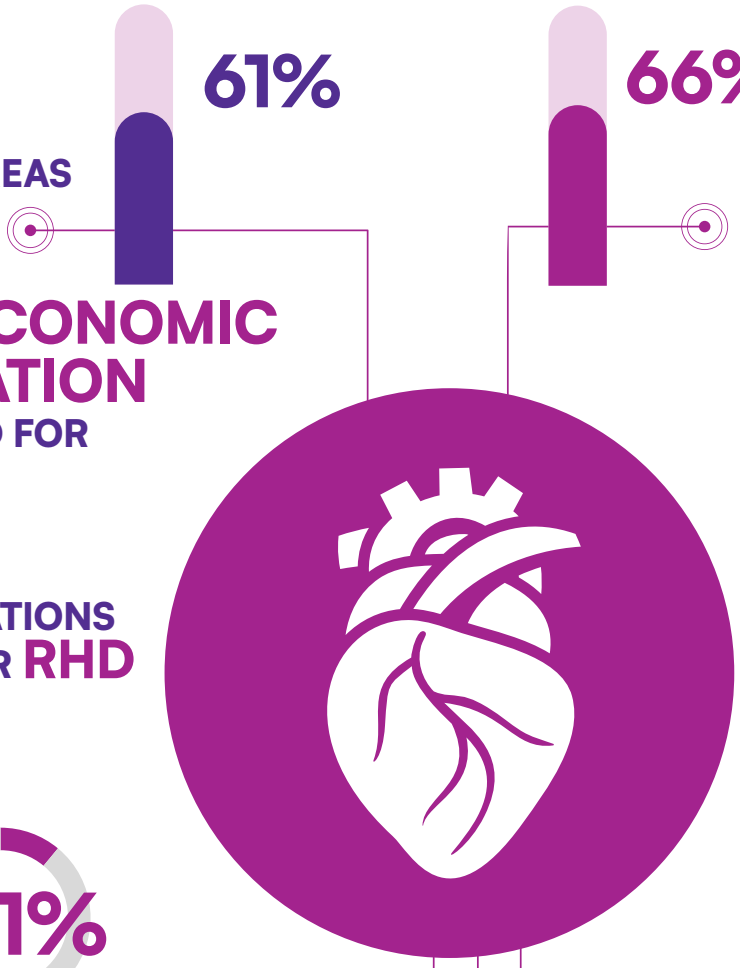
47. Te Whatu Ora Immunisation Taskforce. Initial Priorities for the National Immunisation Programme in Aotearoa. Wellington, New Zealand: Te Whatu Ora Health NZ, 2022. https://www.tewhatuora.govt.nz/assets/Whats-happening/Work-underway/Taskforces/Immunisation-Taskforce-Report.pdf

48. Immunisation Advisory Centre. Immunisation coverage protects everyone. Wellington, New Zealand: Immunisation Advisory Centre; 2023. Available from: https://www.immune.org.nz/immunisation/introduction-to-immunisation.

49. Hobbs M, Ahuriri-Driscoll A, Marek L, et al. Reducing health inequity for Māori people in New Zealand. The Lancet 2019;394(10209):1613-14. https://doi.org/10.1016/S0140-6736(19)30044-3

03 RHEUMATIC FEVER AND RHEUMATIC HEART DISEASE

Kirikā rūmātiki me mate manawa rūmātiki



CHILDREN LIVING IN AREAS WITH THE **MOST SOCIOECONOMIC DEPRIVATION** ACCOUNTED FOR **61%** OF ALL HOSPITALISATIONS FOR **ARF** OR **RHD** IN 2022

THE NEW ZEALAND GOVERNMENT-FUNDED **RHEUMATIC FEVER PREVENTION PROGRAMME** BETWEEN 2012 AND 2017 WAS SUCCESSFUL, LIKELY RESULTING IN THE CORRESPONDING DROP IN FIRST RHD ADMISSIONS OF **66%**

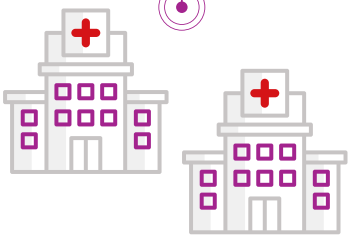
11% OF CHILDREN HOSPITALISED WITH THEIR FIRST PRIMARY DIAGNOSIS OF ARF HAD **A CONCURRENT DIAGNOSIS OF RHD**

OVER THE PAST FIVE YEARS, THERE HAVE BEEN AN AVERAGE OF...

188

HOSPITALISATIONS PER YEAR FOR ARF OR RHD

PASIFIKA CHILDREN ARE **115x MORE LIKELY** TO BE HOSPITALISED FOR ARF



AND TAMARIKI MĀORI ARE **46x MORE LIKELY**

KEY RECOMMENDATIONS

- **Continued rollout of the National Register for secondary antibiotic prophylaxis** (aka the National Rheumatic Fever Care Coordination System).
- **Continued funding of new, promising, subcutaneous infusion of penicillin treatments** for prevention of rheumatic heart disease (RHD). These new treatments have so far proved to be less painful and longer lasting than the current treatment and have the added potential benefit of increasing adherence to this important secondary prophylaxis.
- **Expansion of the pharmacy-led sore throat swabbing programme.** This programme provides antibiotic treatments for those with sore throats who are at high risk of developing acute rheumatic fever (ARF) if not treated.
- **Implementing a national RHD echocardiography screening programme** to detect previously undiagnosed/clinically silent RHD (currently under investigation).
- **Continued funding of research programmes** that are investigating **the immune pathogenesis of ARF,** developing **a diagnostic test for ARF**, and developing **Group A Streptococcus (GAS) vaccines.**
- Decrease barriers in access to care by **employment of whānau navigators** to support whānau seeking treatment for tamariki and rangatahi. Work with Māori communities to co-design and implement interventions in culturally safe and responsible ways, in line with Te Tiriti o Waitangi principles.
- **Work with Pasifika communities, primary healthcare organisations, and schools** to implement the co-design ideas outlined in the Rheumatic Fever Roadmap and the Aotearoa NZ ARF and RHD guidelines, raise awareness, implement effective screening strategies, and reduce barriers to effective and timely care.
- Education of health professionals on **culturally appropriate care delivery**. Making a welcoming and supportive environment to increase adherence to treatment regimens.
- Funding for the creation of **multi-lingual resources on understanding ARF and RHD** for the community.

KEY FINDINGS

- Compared to children of European or Other ethnic groups, **Pasifika children were 115 times more likely and tamariki Māori were 46 times more likely to be hospitalised for ARF.** Aotearoa NZ rates of both ARF and RHD are among the highest for a developed country globally, and the conditions are almost exclusively seen in Māori and Pasifika populations.
- **The NZ government-funded Rheumatic Fever Prevention Programme between 2012 and 2017 was successful, likely resulting in the corresponding drop in first RHD admissions of 66%.** The programme included awareness campaigns and school-based screening and treatment for GAS infections in the most at-risk children to prevent ARF. Rates rebounded on cessation of the programme (most markedly for Pasifika children) until infection control measures instituted for the COVID-19 pandemic took effect.
- **During the COVID-19 pandemic, the rates of hospitalisations for ARF and RHD more than halved** but have started to **increase again in 2023 to pre-pandemic levels.**
- **Over the past five years, there have been an average of 188 hospitalisations per year for ARF or RHD** in people younger than 20 years. As RHD represents cumulative damage to the heart valves from repeated episodes of ARF, **most hospitalisations for RHD occur in older children and adolescents and peak in adulthood. However, the high rates of ARF in Aotearoa NZ mean that even younger children are presenting with RHD.**
- Over the last 22 years, **11% of children hospitalised with their first primary diagnosis of ARF had a concurrent diagnosis of RHD.** A further **14% went on to be hospitalised with RHD later, after an average of 4 previous hospitalisations for ARF.**
- **Children living in areas with the most socioeconomic deprivation accounted for 61% of all hospitalisations** for ARF or RHD in 2022.

WHY PRIORITISE ERADICATION OF RHEUMATIC FEVER FOR CHILDREN?

Acute rheumatic fever (ARF) is an autoimmune disease that can arise after an infection with Group A Streptococcus (GAS) bacteria.[1-3] Inflammation due to recurrent episodes of ARF can cause cumulative damage to the heart valves, causing long-term damage known as rheumatic heart disease (RHD).[4 5] RHD is irreversible, often requiring cardiac surgery, and increases the risk of premature death.[6] Rates of both ARF and RHD in Aotearoa NZ are among the highest in developed countries around the world, and the conditions are almost exclusively seen in Māori and Pasifika populations.[3 4 7-9] Because RHD represents cumulative damage to heart valves, most hospitalisations for RHD occur in older children and adolescents, with a peak in adulthood. However, the high rates of ARF in Aotearoa NZ mean that even younger children are presenting with RHD. Prior to the COVID-19 pandemic, rates of ARF were not decreasing for tamariki Māori and were increasing for Pasifika children.[8] ARF is also twice as likely to progress to RHD for Māori and Pasifika peoples and does so more rapidly than in other populations.[10] Unfortunately, because ARF is an uncommon disease affecting minority populations, the burden of these diseases on these populations can be masked.[4 11 12]

Following a diagnosis of ARF, it is recommended that individuals receive long-term secondary prophylaxis, involving monthly intramuscular injections of a long-acting antibiotic (benzathine penicillin G, BPG) for a period not less than 10 years.[1 13] Without this secondary prophylaxis, the risk of recurrent ARF is as high as 75% among patients who develop another GAS throat infection.[14 15] The antibiotic regimen minimises recurrent hospitalisation for ARF and halts progression of latent RHD.[15-17] Adherence to the schedule of injections is challenging, however, not least because it entails monthly painful intramuscular injections over such a long period.[15-17] However, adherence is very high in children but ARF recurrence rates as a proportion of new cases increase in late adolescence and adulthood as individuals opt out of secondary prophylaxis.[5] Additional barriers to adherence include geographic distance from healthcare services, cost of healthcare, poor relationships between healthcare providers and communities, and lack of BPG supply.[17 18] Factors that promote adherence, on the other hand, include positive interactions within health services, younger age, and greater number of people per household.[5 17]

The financial cost to Aotearoa NZ of ARF and RHD was estimated to be NZD$12 million annually more than a decade ago[19] and will now be significantly higher. Most of the cost is associated with RHD and is incurred after the age of 30, with 71% purportedly for heart valve surgery.[19] This cost does not take into account the huge personal cost to individuals with ARF or RHD and their whānau.[6] As a country then, we stand to gain much by preventing ARF.

CURRENT DATA ON THE STATE OF RHEUMATIC FEVER AND RHEUMATIC HEART DISEASE FOR CHILDREN IN AOTEAROA NZ

The rates of children treated in hospital for rheumatic fever and/or rheumatic heart disease are taken from the NZ Ministry of Health's National Minimum Dataset (NMDS),[20] based on the diagnostic codes at discharge between January 2000 and December 2022. Rates include all acute and semi-acute (arranged) hospitalisations for those aged 0—19 years whose primary diagnosis was coded as acute rheumatic fever (ICD-10-AM: I00—I02) or chronic rheumatic heart disease (ICD-10-AM: I05—I09). Note that researchers have argued that some codes for RHD (e.g., tricuspid valve diseases, multiple valve diseases with no mitral involvement) may include individuals who have heart conditions that are not RHD and thus including these codes may overestimate the prevalence of RHD.[10 21-23] Published responses to clinical coding queries submitted to the New Zealand Coding Authority state that because there is a high level of interest in rates of RHD in Aotearoa NZ, from a public health perspective it is important to identify where possible if the heart

valve disease, and in particular multiple valve disease, is rheumatic or non-rheumatic.[24] As such, disorders of multiple heart valves that are specified as non-rheumatic should not be coded under multiple valve diseases. Because these guidelines should decrease the number of non-RHD heart conditions coded to the RHD group of codes and to maintain consistency with Ministry of Health and Te Whatu Ora Health NZ guidelines and other published research, all codes for RHD have been included here.

Episodes of ARF are notifiable to the Medical Officer of Health under the Health Act 1956.[25] Data on the number of ARF notifications are from the Institute of Environmental Science and Research (ESR).[26]

Streptococcal pharyngitis is a known risk factor for ARF and more recent evidence shows that Group A Streptococcus (GAS) skin infections may also pose a risk for subsequent development of ARF.[3 4 11 27-34] For these reasons, the preceding hospitalisations of children treated in hospital for ARF were examined to determine any diagnoses of prior streptococcal infections, including cellulitis (ICD-10-AM: L03), impetigo (ICD-10-AM: L01), streptococcal pharyngitis (ICD-10-AM: J02.0), scarlet fever (ICD-10-AM: A38), scabies (ICD-10-AM: B86), streptococcal infection of unspecified site (ICD-10-AM: A49.1), and streptococcus as the cause of diseases classified to other chapters (ICD-10-AM: B95.0—B95.5).

For further information on data sources, measurement, and methods please refer to the appendix.

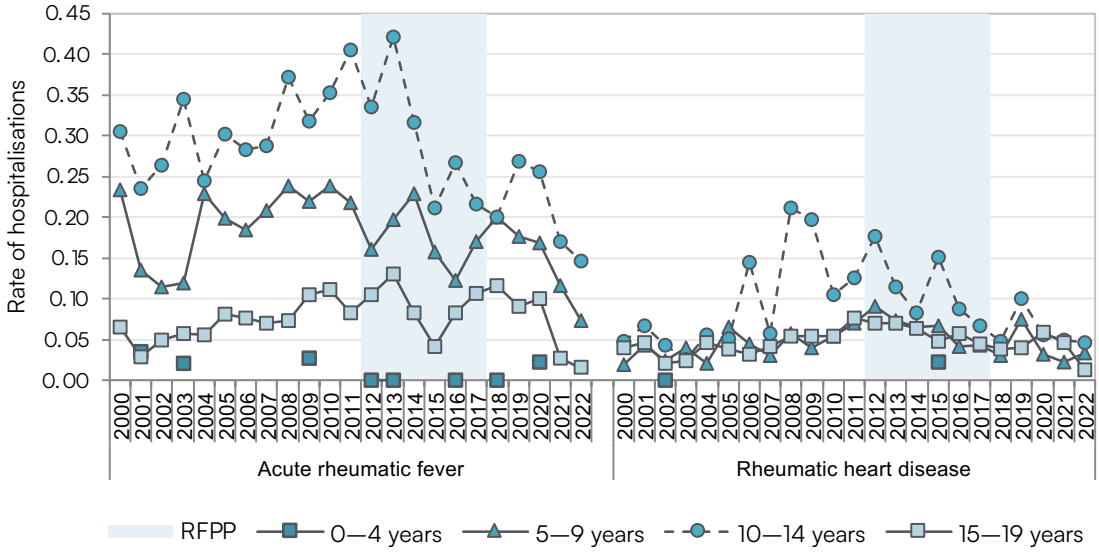
Hospitalisations for ARF or RHD

Over the past 5 years (2018—2022), there have been, on average, 188 hospitalisations per year for ARF or RHD in people younger than 20 years.

Nearly 2,800 children aged 0—19 years have been hospitalised with ARF and 856 children aged 0—19 years have been hospitalised with RHD in Aotearoa NZ between 2000 and 2022. Approximately 11% of children who were hospitalised with their first primary diagnosis of ARF also had a concurrent diagnosis of RHD. A further 14% went on to be hospitalised with RHD subsequently. Those who were subsequently hospitalised with RHD had experienced, on average, 4 previous hospitalisations for primary diagnoses of ARF.

Of the 2,793 children aged 0—19 years who have been hospitalised with ARF between 2000 and 2022, a sizable proportion (12%) had previously been hospitalised with any evidence of a streptococcal infection. Note, however, that a very small minority (0.4%) of the 83,381 children who were hospitalised with any evidence of a streptococcal infection were later hospitalised with ARF, supporting other evidence that infections due to GAS do not progress to ARF in most children.[15 35]

Figure 3.1 shows that over the past two decades the rates of hospitalisations for ARF and RHD have been highest for children aged between 10 and 14 years followed by children aged between 5 and 9 years. Overall, hospitalisations for ARF are roughly three times as high as hospitalisations for RHD and are particularly high for children aged between 10 and 14 years, reflecting the cumulative damage that causes RHD and the fact that RHD in Aotearoa NZ tends to get diagnosed in adulthood. Hospitalisations for ARF or RHD are rare for children younger than 5 years old.



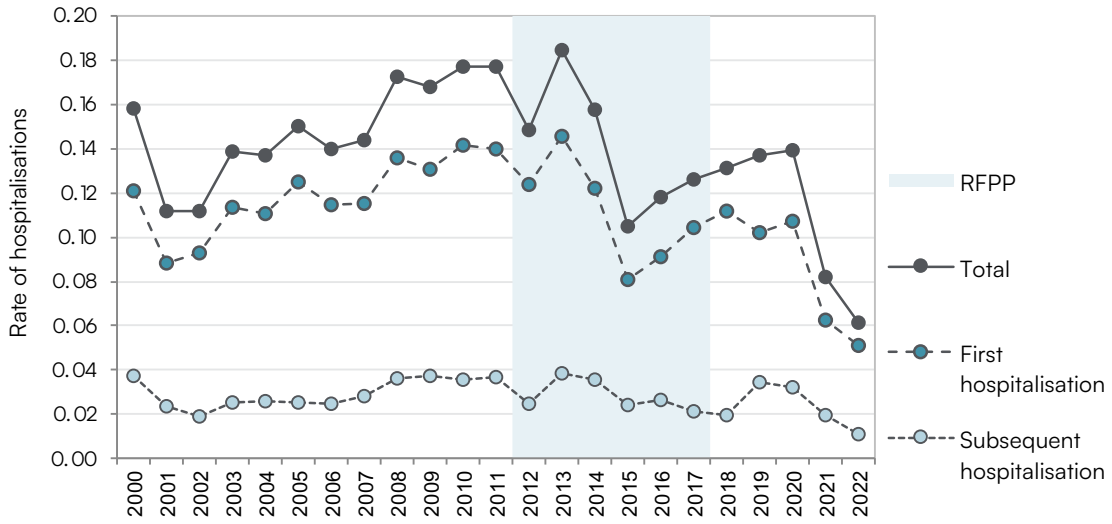
Source: NMDS, NZCYES Estimated Resident Population. Rate per 1,000 age-specific population.
Rates suppressed where n < 6. RFPP = Rheumatic Fever Prevention Programme (July 2012—June 2017).

Figure 3.1: Trends in hospitalisations of 0—19-year-olds for acute rheumatic fever and rheumatic heart disease, by age group, Aotearoa NZ (2000—22)

First hospitalisations for ARF

Between 2012 and 2017, the NZ government funded a targeted Rheumatic Fever Prevention Programme that involved awareness campaigns and school-based screening and treatment for sore throats.[36] The programme aimed to prevent ARF by identifying and treating GAS pharyngitis for the most at-risk children. Skin infection management was also implemented in some regions.[36]

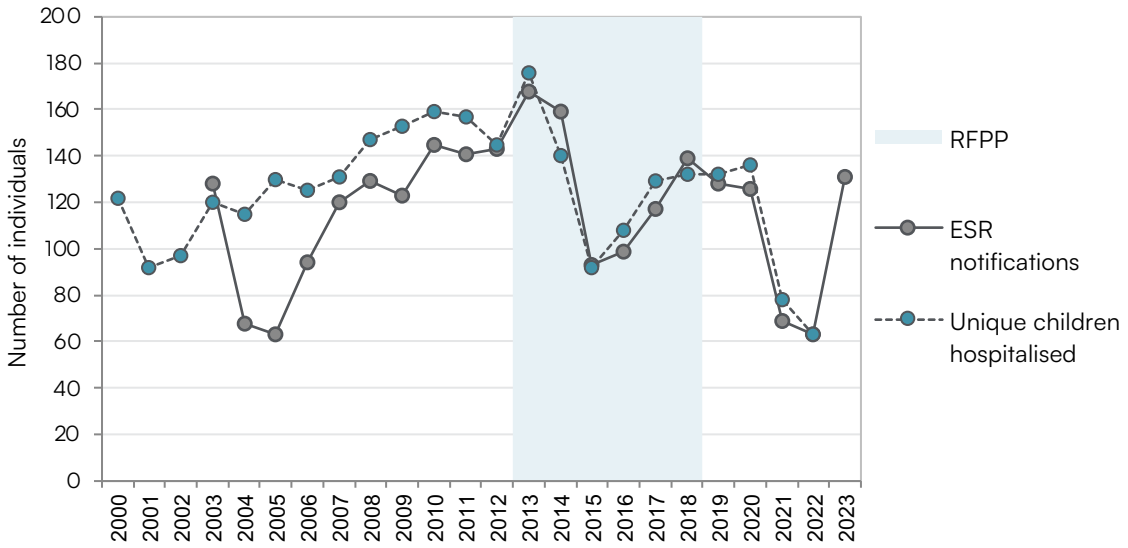
Hospitalisations for ARF decreased during the implementation of the Rheumatic Fever Prevention Programme, particularly first hospitalisations for ARF (which constitute almost 80% of all hospitalisations for ARF), but this decrease was not sustained (Figure 3.2). Hospitalisations for ARF decreased again after the start of the COVID-19 pandemic in 2020, likely secondary to public health measures in response to the pandemic and individuals not presenting to hospital during the early parts of the pandemic. Between 2019 and 2022, the rate of hospitalisations for ARF more than halved (Figure 3.2) for all age groups (see Figure 3.1).



Source: NMDS, NZCYES Estimated Resident Population. Rate per 1,000 0—19-year-olds.
RFPP = Rheumatic Fever Prevention Programme (July 2012—June 2017).

Figure 3.2: Trends in hospitalisations of 0—19-year-olds for acute rheumatic fever, Aotearoa NZ (2000—22)

Figure 3.3 shows the number of ARF notifications from the Institute of Environmental Science and Research (ESR) since 2003 alongside the number of individual children hospitalised for ARF. The most recent data for 2023 from ESR show that cases of ARF are starting to increase back to pre-pandemic levels (Figure 3.3); the number of ARF notifications in 2023 (*n* = 131) was more than double that of the previous year (*n* = 63). Hospitalisation data for 2023 were not available at the time of writing but are expected to closely mirror the notification data as has been the case previously.

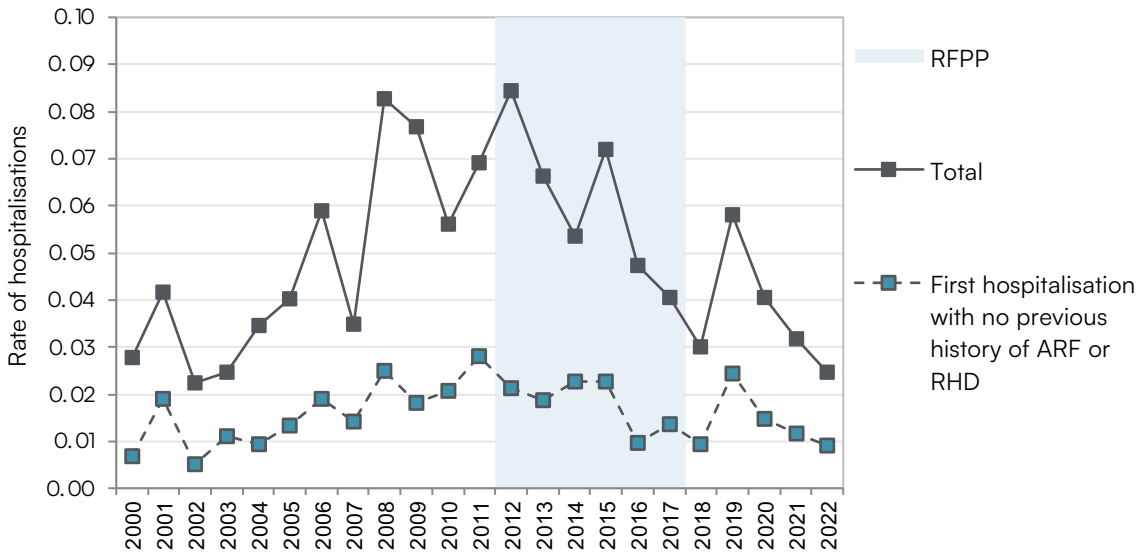


Source: ESR, NMDS, NZCYES Estimated Resident Population.
RFPP = Rheumatic Fever Prevention Programme (July 2012—June 2017)

Figure 3.3: Trends in notifications for acute rheumatic fever and hospitalisations of unique 0—19-year-olds, Aotearoa NZ (2000—23)

First hospitalisations for RHD

Figure 3.4 shows that over one third of all hospitalisations for RHD are first hospitalisations (defined as such if RHD was the primary diagnosis and there had been no previous hospitalisation for either ARF or RHD since 1988). The 66% reduction in first cases during implementation of the Rheumatic Fever Prevention Programme may mean that children were more likely to be diagnosed with and treated for ARF during this period, rather than being admitted to hospital with RHD as a first diagnosis. Rates of hospitalisations for RHD increased markedly at the end of the programme in 2019 but fell again after the start of the COVID-19 pandemic in 2020. As with ARF, this reduction is likely secondary to public health measures in response to the COVID-19 pandemic and individuals not presenting to hospital during the early parts of the pandemic. Research is ongoing to understand the complex effects of the pandemic, the response measures, and restrictions on access to hospital care.



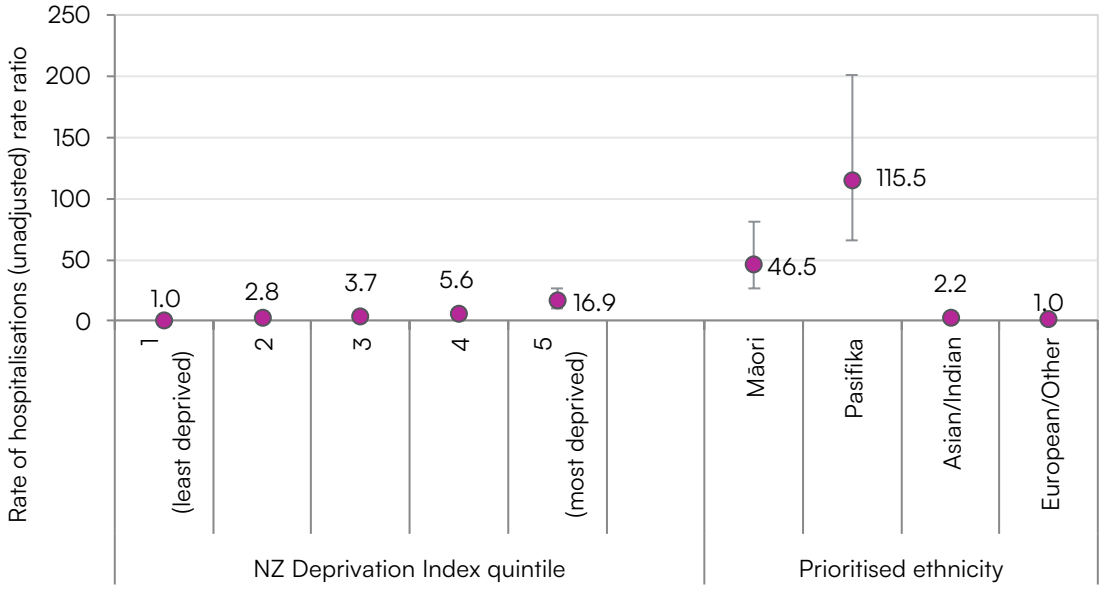
Source: NMDS, NZCYES Estimated Resident Population. Rate per 1,000 0—19-year-olds.
RFPP = Rheumatic Fever Prevention Programme (July 2012—June 2017).

Figure 3.4: Trends in hospitalisations of 0—19-year-olds for rheumatic heart disease, Aotearoa NZ (2000—22)

ETHNIC DIFFERENCES IN RHEUMATIC FEVER AND RHEUMATIC HEART DISEASE

Figure 3.5 shows that between 2018 and 2022, the rate of hospitalisations of Pasifika children with ARF were 115 times the rate of hospitalisations of European or Other children (reference group). The rate for Māori children was 46 times the rate for European or Other children. The pattern is similar for RHD.

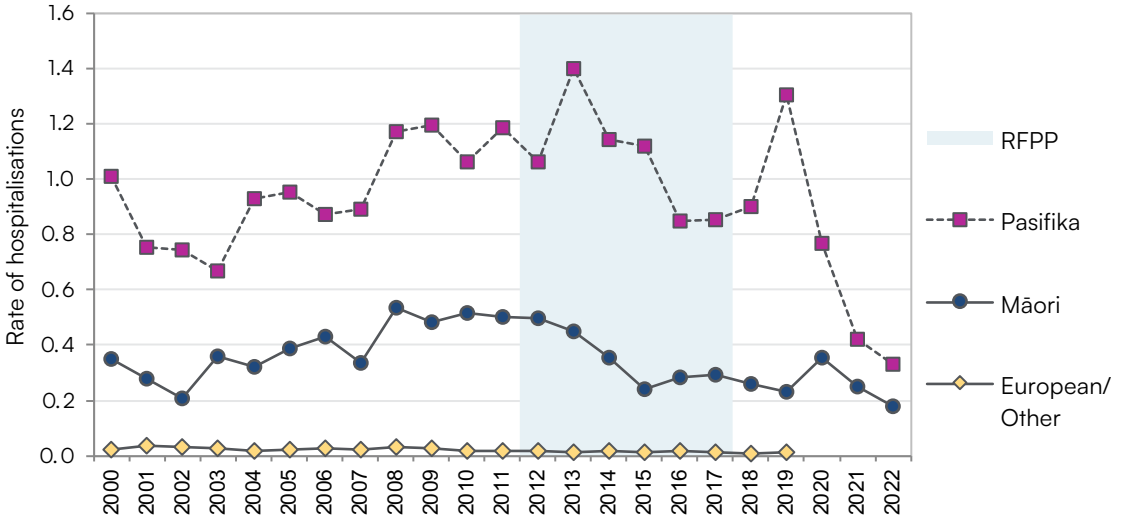
Children living in more socioeconomically deprived areas have also experienced relatively high rates of hospitalisation with ARF; however, the association with ethnicity is much stronger than the link with socioeconomic deprivation. Although statistically adjusting for socioeconomic deprivation resulted in slightly lower rates of hospitalisation for Māori and Pasifika children, the rates of hospitalisations of Pasifika and Māori children with ARF were still 89 times and 34 times, respectively, the rate of hospitalisations of European or Other children (reference group).



Source: NMDS, NZCYES Estimated Resident Population.
Data for MELAA (Middle Eastern, Latin American, or African) are suppressed due to small numbers.

Figure 3.5: Relative differences in hospitalisation rates of 0—19-year-olds with acute rheumatic fever, by demographic factors, Aotearoa NZ (2018—22)

Figure 3.6 shows that Pasifika children have experienced the highest rates of hospitalisation for ARF or RHD over the past two decades. Hospitalisations had been increasing, and reached a peak in 2013, and another peak in 2019. The rate of hospitalisations for ARF or RHD decreased during the Rheumatic Fever Prevention Programme for both Pasifika and Māori children but subsequently increased sharply, particularly for Pasifika children. Disparities were greater before the 3 years of reduced rates associated with the COVID-19 pandemic.

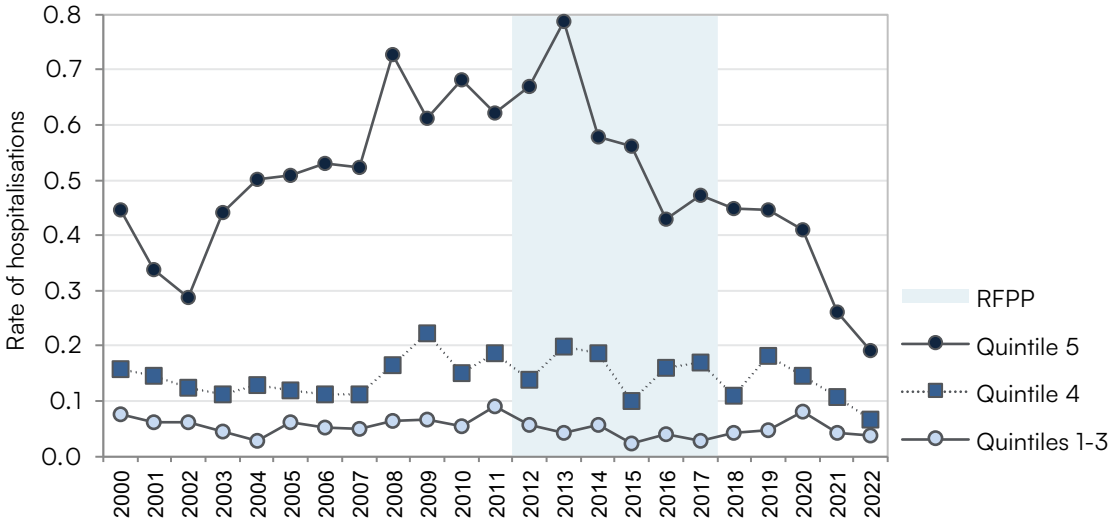


Source: NMDS, NZCYES Estimated Resident Population. Rate per 1,000 0—19-year-olds. RFPP = Rheumatic Fever Prevention Programme (July 2012—June 2017). Rates for Asian/Indian and MELAA were suppressed due to small numbers. Rates suppressed where n < 6.

Figure 3.6: Trends in hospitalisations of 0—19-year-olds for acute rheumatic fever or rheumatic heart disease, by ethnicity, Aotearoa NZ (2000—22)

SOCIOECOMONIC DIFFERENCES IN RHEUMATIC FEVER AND RHEUMATIC HEART DISEASE

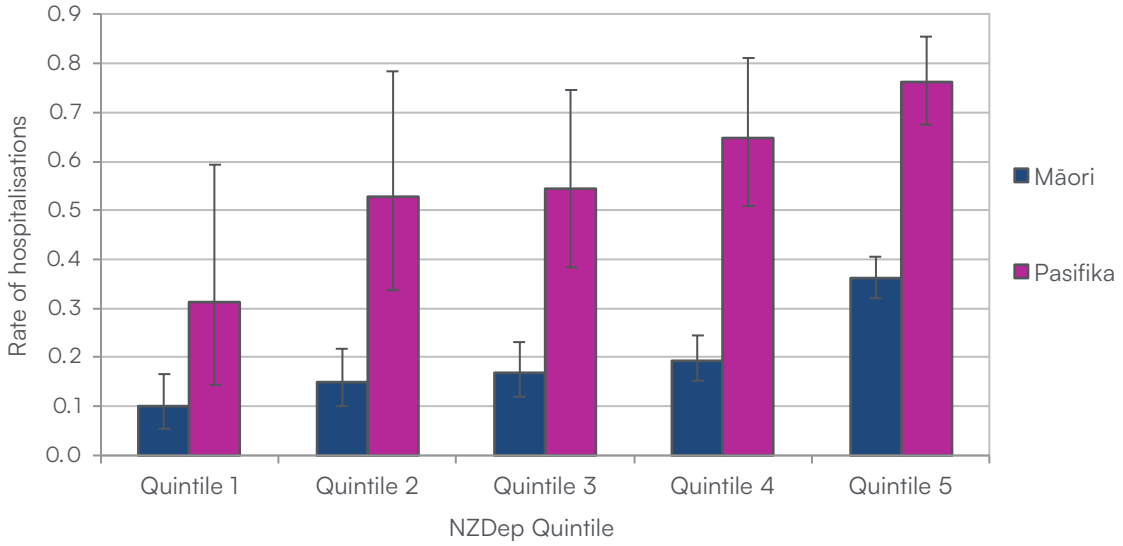
Hospitalisation rates for ARF or RHD have also been disproportionately high for children living in areas with the most socioeconomic deprivation (Figure 3.7). Although rates for those children reached a peak in 2013 and have subsequently declined, they remain inequitable; children living in areas with the most socioeconomic deprivation (quintile 5) accounted for 61% of all hospitalisations for ARF or RHD in 2022.



Source: NMDS, NZCYES Estimated Resident Population. Rate per 1,000 0—19-year-olds.
RFPP = Rheumatic Fever Prevention Programme (July 2012—June 2017).
Quintile: 1 = least deprived; 5 = most deprived. Rates for quintiles 1-3 combined due to small numbers.

Figure 3.7: Trends in hospitalisations of 0—19-year-olds for acute rheumatic fever or rheumatic heart disease, by socioeconomic deprivation, Aotearoa NZ (2000—22)

For the period from 2018 to 2022, tamariki Māori living in areas with the most socioeconomic deprivation were hospitalised with ARF or RHD at a greater rate than were tamariki Māori living in all other socioeconomic areas (Figure 3.8). For Pasifika children, the only significant difference was between children living in the least deprived area and most deprived area. There were so few hospitalisations of children of other ethnicities during this period that statistical analyses were not possible.



Source: NMDS and NZCYES estimated resident population. Rate per 1,000 0—19-year-olds.
Quintile: NZDep Index of deprivation (1 = least deprived; 5 = most deprived). Ethnicity is level 1 prioritised.

Figure 3.8: Trends in hospitalisations of 0—19-year-olds for acute rheumatic fever or rheumatic heart disease, by socioeconomic deprivation and by ethnicity, Aotearoa NZ (2018—22)

WHAT IS THE STATE OF RHEUMATIC FEVER FOR CHILDREN?

People with a family history of rheumatic fever are at higher risk for both ARF and RHD[3] [27 37 38] but the specific risk factors and triggers for both conditions are not yet fully understood.[3 4 31 39 40] It is clear, however, that GAS exposure plays a major role in the pathogenesis of ARF. GAS bacteria can infect the upper respiratory tract (typically presenting as a sore throat) or the skin (e.g., impetigo).[3] [27 32 33] Children who develop ARF have experienced approximately three times as many GAS infections as have healthy children living in similar environments.[27] Children who have experienced skin conditions such as scabies or impetigo as well as strep throat are at high risk for ARF.[31-33 39 40] These findings support an "immune priming" hypothesis, whereby multiple GAS infections initiate autoimmune processes, leading to a peak incidence of ARF at 5—14 years of age.[27 28 30 31 39 41] In order to prevent ARF, therefore, we need to prevent GAS exposure.[4] A recent NZ study shows that there is high diversity in GAS strains in children in Aotearoa NZ, which makes disease management and control more challenging.[42] The authors of this study underscore the importance of ongoing surveillance and monitoring of GAS in Aotearoa NZ,[42] including making invasive GAS a notifiable disease in Aotearoa NZ.[6] Other effective strategies to prevent recurrent GAS infections require community awareness of ARF and RHD, fewer barriers to primary care access, and screening programmes, including school-based clinics, to detect and treat both GAS pharyngitis and GAS skin infections as early as possible.[9 28 36 41 43-45] Candidate vaccines against GAS are also under development.[42 46-48]

Findings that Māori and Pasifika peoples have higher rates of GAS carriage (both pharyngeal and skin) as well as higher rates of ARF have been theorised to explain the ethnic differences in ARF.[31] Note, however, that the increased risk of ARF for Māori and Pasifika peoples is much higher than rates of GAS infections in these populations, suggesting that ARF is also driven by factors other than infection with GAS.[4 49] Genome-wide association studies suggest that complex interactions between polygenic factors and environmental conditions shared within families may produce

the observed patterns of disease. Environmental conditions include socioeconomic deprivation, housing conditions, and household crowding, which are all associated with recurrent GAS infections, ARF, and RHD.[1 3 6 11 13 15 27 28 38 50-55] Programmes to address these issues, and household crowding in particular, for the worst-affected children should be key targets to reduce rates of ARF and RHD as well as a number of other conditions prevalent in Aotearoa NZ,[4 48 52] including all of the other conditions presented in this report. In addition, priority should be given to optimising healthcare services and reducing barriers to access for Māori and Pasifika youth.[48 56]

Hospitalisations for both ARF and RHD fell dramatically between 2020 and 2022. Research is ongoing to understand what proportion of this effect was due to reduced surveillance for GAS infections, ARF, and RHD due to the COVID-19 pandemic or to people not presenting to hospital, and what proportion was due to specific disease-control measures, such as closures of international borders, public health advice, household isolation, and school closures.[48 53] If the most effective measures can be identified, it may be feasible to adapt them for prevention of ARF and RHD on an ongoing basis.

There is currently no diagnostic test for ARF[57] although research in Aotearoa NZ and Australia is ongoing to develop a diagnostic tool, including testing biomarker signatures that may identify ARF.[40] The high proportion of patients who are admitted to hospital with RHD, but have no prior history of ARF suggests that previous episodes of ARF have gone undiagnosed or are clinically silent without the painful joints of ARF.[11 58] This could be addressed by screening for RHD among high-risk groups, using portable echocardiography devices to detect heart damage, and offer antibiotic prophylaxis.[4 6 37] In 2024, a pilot programme of RHD screening is being developed using a translational science approach to ascertain whether there is community engagement and workforce capability for a national programme.[48 59]

Researchers are working on a range of additional approaches to combat ARF and RHD, many of which feature in the new 5-year Rheumatic Fever Roadmap published by Te Whatu Ora Health NZ.[48] At present, there are numerous regional registers to track and deliver secondary prophylaxis for ARF, but there are inherent problems with so many different systems, such as losing patients to follow-up or delayed prophylaxis if they have moved.[48] Over at least the last decade, researchers have urged the NZ Government to improve surveillance of ARF and RHD by implementing a national patient register to support detection and notification of ARF and RHD, and consistent access to and delivery of secondary prophylaxis.[5 10 58 60-63] Encouragingly, the newly-developed Aotearoa NZ RHD Registry of 5,000 individuals with moderate and severe RHD has demonstrated a very high specificity for RHD and will be able to provide new data on the extent of the morbidity of RHD in Aotearoa NZ.[58 62 63]

In terms of secondary prophylaxis for ARF, new formulations of the antibiotic, BPG, are under development.[64] It is hoped that a less painful and longer lasting alternative to the current schedule of monthly painful intramuscular injections will improve adherence, thereby improving long-term cardiac outcomes.[4] There is also some evidence for a role of the antirheumatic drug, hydroxychloroquine (HCQ), in preventing the progression of rheumatic carditis in patients with ARF.[65]

Although the Rheumatic Fever Prevention Programme demonstrated that rates of ARF and RHD are amenable to co-ordinated efforts, such as nurse-led and school-based clinics,[36] it also had the unfortunate effect of "responsibilising" the most-affected communities.[66] It is important to co-design and implement any interventions in culturally safe and responsive ways that do not shift responsibility to the individuals and communities who experience the greatest burdens of disease.[48 66-68] The new Rheumatic Fever Roadmap[48] goes some way towards this by balancing scientific evidence with kaupapa Māori and Pasifika approaches while prioritising Te Tiriti o Waitangi principles, as will the updated version of the Aotearoa NZ ARF and RHD guidelines that will be released in late 2024. In 2020 the Ministry of Health set up the rheumatic fever co-design initiative[69 70] with teams from the three priority groups: Te Tima Māori,[71] the Samoan team,[72] and the Lomipeau (Tongan) team.[73] The teams engaged with whānau and communities through

whanaungatanga (relationship) to gain insights and guidance from those with lived experience of ARF. They then worked with health practitioners to create strengths-based models of care that can be embedded into the health systems and provide culturally safe ways of preventing and managing ARF that resonate with Pasifika families and whānau Māori.[70 74]

REFERENCES

1. National Heart Foundation of New Zealand. New Zealand guidelines for rheumatic fever: Diagnosis, management and secondary prevention of acute rheumatic fever and rheumatic heart disease: 2014 update. Auckland, New Zealand: National Heart Foundation of New Zealand, 2014. https://assets.heartfoundation.org.nz/documents/shop/marketing/non-stock-resources/diagnosis-management-rheumatic-fever-guideline.pdf?mtime=1667526708?1710461843
2. Te Whatu Ora - Health New Zealand. Rheumatic fever guidance. Wellington, New Zealand: Te Whatu Ora Health New Zealand; 2024. Available from: https://www.tewhatuora.govt.nz/for-the-health-sector/health-sector-guidance/diseases-and-conditions/rheumatic-fever-guidance/.
3. Baker MG, Gurney J, Moreland NJ, et al. Risk factors for acute rheumatic fever: A case-control study. The Lancet Regional Health — Western Pacific 2022;26 https://doi.org/10.1016/j.lanwpc.2022.100508
4. Office of the Prime Minister's Chief Science Advisor. Evidence synthesis: Group A Streptococcus and acute rheumatic fever in Aotearoa New Zealand. Auckland, New Zealand: Office of the Prime Minister's Chief Science Advisor, 2021. https://www.pmcsa.ac.nz/topics/antimicrobial-resistance-and-infectious-disease/rheumatic-fever/
5. Dennison A, Peat B, Wilson E, et al. Rheumatic fever recurrences in New Zealand 2010—14. New Zealand Medical Journal 2020;133(1516):47-57. https://nzmj.org.nz/journal/vol-133-no-1516/rheumatic-fever-recurrences-in-new-zealand-201014
6. New Zealand College of Public Health Medicine. Rheumatic fever policy statement. Wellington, New Zealand: NZCPHM, 2023. https://nzcphm.org.nz/filescust/CMS/Policy/2023%20NZCPHM%20%20Rheumatic%20Fever%20Policy%20Statement.pdf
7. Watkins DA, Johnson CO, Colquhoun SM, et al. Global, regional, and national burden of rheumatic heart disease, 1990—2015. New England Journal of Medicine 2017;377(8):713-22. https://doi.org/10.1056/NEJMoa1603693
8. Bennett J, Zhang J, Leung W, et al. Rising ethnic inequalities in acute rheumatic fever and rheumatic heart disease, New Zealand, 2000-2018. Emerging Infectious Diseases 2021;27(1):36-46. https://doi.org/10.3201/eid2701.191791
9. Webb R, Wilson N. Rheumatic fever in New Zealand. Journal of Paediatrics and Child Health 2013;49(3):179-84. https://doi.org/10.1111/j.1440-1754.2011.02218.x
10. Oliver J, Robertson O, Zhang J, et al. Ethnically disparate disease progression and outcomes among acute rheumatic fever patients in New Zealand, 1989—2015. Emerging Infectious Diseases 2021;27(7) https://doi.org/10.3201/eid2707.203045
11. Wyber R, Wade V, Anderson A, et al. Rheumatic heart disease in Indigenous young peoples. The Lancet Child & Adolescent Health 2021;5(6):437-46. https://doi.org/10.1016/S2352-4642(20)30308-4
12. Gurney JK, Stanley J, Baker MG, et al. Estimating the risk of acute rheumatic fever in New Zealand by age, ethnicity and deprivation. Epidemiology and Infection 2016;144(14):3058-67. https://doi.org/10.1017/S0950268816001291
13. Carapetis JR, Beaton A, Cunningham MW, et al. Acute rheumatic fever and rheumatic heart disease. Nature Reviews Disease Primers 2016;2(1):15084. https://doi.org/10.1038/nrdp.2015.84
14. Spinetto H, Lennon D, Horsburgh M. Rheumatic fever recurrence prevention: A nurse-led programme of 28-day penicillin in an area of high endemnicity. Journal of Paediatrics and Child Health 2011;47(4):228-34. https://doi.org/10.1111/j.1440-1754.2010.01942.x
15. Watkins DA, Beaton AZ, Carapetis JR, et al. Rheumatic Heart Disease Worldwide. Journal of the American College of Cardiology 2018;72(12):1397-416. https://doi.org/10.1016/j.jacc.2018.06.063
16. Beaton A, Okello E, Rwebembera J, et al. Secondary antibiotic prophylaxis for latent rheumatic heart disease. New England Journal of Medicine 2021;386(3):230-40. https://doi.org/10.1056/NEJMoa2102074
17. Kevat PM, Reeves BM, Ruben AR, et al. Adherence to secondary prophylaxis for acute rheumatic fever and rheumatic heart disease: A systematic review. Current Cardiology Reviews 2017;13(2):155-66. https://doi.org/10.2174/1573403x13666170116120828
18. Anderson A, Mills C, Eggleton K. Whānau perceptions and experiences of acute rheumatic fever diagnosis for Māori in Northland, New Zealand. New Zealand Medical Journal 2017;130(1465):80-88. https://nzmj.org.nz/journal/vol-130-no-1465/whanau-perceptions-and-experiences-of-acute-rheumatic-fever-diagnosis-for-maori-in-northland-new-zealand
19. Milne RJ, Lennon D, Stewart JM, et al. Mortality and hospitalisation costs of rheumatic fever and rheumatic heart disease in New Zealand. Journal of Paediatrics and Child Health 2012;48(8):692-97. https://doi.org/10.1111/j.1440-1754.2012.02446.x
20. Ministry of Health. National Minimum Dataset (Hospital Events) Data Dictionary. Wellington, New Zealand: Ministry of Health, 2021. https://www.health.govt.nz/publication/national-minimum-dataset-hospital-events-data-dictionary
21. Fitz-Gerald JA, Ongzalima CO, Ng A, et al. A validation study: How predictive is a diagnostic coding algorithm at identifying rheumatic heart disease in Western Australian hospital data? Heart, Lung and Circulation 2020;29(8):e194-e99. https://doi.org/10.1016/j.hlc.2019.08.020
22. Katzenellenbogen JM, Nedkoff L, Cannon J, et al. Low positive predictive value of International Classification of Diseases, 10th Revision codes in relation to rheumatic heart disease: A challenge for global surveillance. Internal Medicine Journal 2019;49(3):400-03. https://doi.org/10.1111/imj.14221
23. Bond-Smith D, Seth R, de Klerk N, et al. Development and evaluation of a prediction model for ascertaining rheumatic heart disease status in administrative data. Clinical Epidemiology 2020;12:717-30. https://doi.org/10.2147/clep.S241588

24 Te Whatu Ora - Health New Zealand. New Zealand Coding Authority coding queries. Wellington, New Zealand: Te Whatu Ora Health New Zealand; 2012 updated 2023. Available from: https://www.tewhatuora.govt.nz/for-health-professionals/data-and-statistics/classification-information/new-zealand-coding-authority/new-zealand-coding-authority-coding-queries/.

25. Ministry of Health. Health Act 1956. 2024. https://legislation.govt.nz/act/public/1956/0065/latest/DLM305840.html?search=ts_act_health+act_resel&p=1&sr=1

26. Institute of Environmental Science and Research. Infectious disease intelligence and surveillance. Porirua, New Zealand: ESR; 2024. Available from: https://www.esr.cri.nz/expertise/public-health/infectious-disease-intelligence-surveillance/#Resources.

27. Baker MG, Gurney J, Oliver J, et al. Risk factors for acute rheumatic fever: Literature review and protocol for a case-control study in New Zealand. International Journal of Environmental Research and Public Health 2019;16(22):4515. https://doi.org/10.3390/ijerph16224515

28. Bennett J, Moreland NJ, Zhang J, et al. Risk factors for group A streptococcal pharyngitis and skin infections: A case control study. The Lancet Regional Health — Western Pacific 2022;26 https://doi.org/10.1016/j.lanwpc.2022.100507

29. O'Sullivan L, Moreland NJ, Webb RH, et al. Acute rheumatic fever after Group A Streptococcus pyoderma and Group G Streptococcus pharyngitis. The Pediatric Infectious Disease Journal 2017;36(7):692-94. https://doi.org/10.1097/inf.0000000000001558

30. Oliver J, Bennett J, Thomas S, et al. Preceding group A streptococcus skin and throat infections are individually associated with acute rheumatic fever: Evidence from New Zealand. BMJ Global Health 2021;6(12):e007038. https://doi.org/10.1136/bmjgh-2021-007038

31. Thomas S, Bennett J, Jack S, et al. Descriptive analysis of group A Streptococcus in skin swabs and acute rheumatic fever, Auckland, New Zealand, 2010—2016. The Lancet Regional Health - Western Pacific 2021;8:100101. https://doi.org/10.1016/j.lanwpc.2021.100101

32. Thornley S, King R, Marshall R, et al. How strong is the relationship between scabies and acute rheumatic fever? An analysis of neighbourhood factors. Journal of Paediatrics and Child Health 2020;56(4):600-06. https://doi.org/10.1111/jpc.14697

33. Thornley S, Marshall R, Jarrett P, et al. Scabies is strongly associated with acute rheumatic fever in a cohort study of Auckland children. Journal of Paediatrics and Child Health 2018;54(6):625-32. https://doi.org/10.1111/jpc.13851

34. Francis JR, Gargan C, Remenyi B, et al. A cluster of acute rheumatic fever cases among Aboriginal Australians in a remote community with high baseline incidence. Australian and New Zealand Journal of Public Health 2019;43(3):288-93. https://doi.org/10.1111/1753-6405.12893

35. Bryant PA, Robins-Browne R, Carapetis JR, et al. Some of the people, some of the time. Circulation 2009;119(5):742-53. https://doi.org/doi:10.1161/CIRCULATIONAHA.108.792135

36. Jack SJ, Williamson DA, Galloway Y, et al. Primary prevention of rheumatic fever in the 21st century: Evaluation of a national programme. International Journal of Epidemiology 2018;47(5):1585-93. https://doi.org/10.1093/ije/dyy150

37. Culliford-Semmens N, Tilton E, Wilson N, et al. Echocardiography for latent rheumatic heart disease in first degree relatives of children with acute rheumatic fever: Implications for active case finding in family members. eClinicalMedicine 2021;37 https://doi.org/10.1016/j.eclinm.2021.100935

38. National Heart Foundation of New Zealand. Group A Streptococcal sore throat management guideline. 2019 update. Auckland, New Zealand: National Heart Foundation of New Zealand, 2019. https://assets.heartfoundation.org.nz/documents/shop/heart-healthcare/non-stock-resources/gas-sore-throat-rheumatic-fever-guideline.pdf?mtime=1667526707?1710451682

39. Bennett J, Moreland NJ, Oliver J, et al. Understanding group A streptococcal pharyngitis and skin infections as causes of rheumatic fever: protocol for a prospective disease incidence study. BMC Infectious Diseases 2019;19(1):633. https://doi.org/10.1186/s12879-019-4126-9

40. Ralph AP, Webb R, Moreland NJ, et al. Searching for a technology-driven acute rheumatic fever test: the START study protocol. BMJ Open 2021;11(9):e053720. https://doi.org/10.1136/bmjopen-2021-053720

41. Lorenz N, Ho TKC, McGregor R, et al. Serological profiling of Group A Streptococcus infections in acute rheumatic fever. Clinical Infectious Diseases 2021;73(12):2322-25. https://doi.org/10.1093/cid/ciab180

42. Lacey JA, Bennett J, James TB, et al. A worldwide population of Streptococcus pyogenes strains circulating among school-aged children in Auckland, New Zealand: A genomic epidemiology analysis. The Lancet Regional Health: Western Pacific 2024;42:100964. https://doi.org/10.1016/j.lanwpc.2023.100964

43. Lennon D, Anderson P, Kerdemilidis M, et al. First presentation acute rheumatic fever is preventable in a community setting: A school-based intervention. The Pediatric Infectious Disease Journal 2017;36(12):1113-18. https://doi.org/10.1097/inf.0000000000001581

44. Walsh L, Innes-Smith S, Wright J, et al. School-based streptococcal A sore-throat treatment programs and acute rheumatic fever amongst indigenous Māori: A retrospective cohort study. The Pediatric Infectious Disease Journal 2020;39(11):995-1001. https://doi.org/10.1097/inf.0000000000002770

45. Bennett J, Rentta N, Leung W, et al. Structured review of primary interventions to reduce group A streptococcal infections, acute rheumatic fever and rheumatic heart disease. Journal of Paediatrics and Child Health 2021;57(6):797-802. https://doi.org/10.1111/jpc.15514

46. Loh JMS, Rivera-Hernandez T, McGregor R, et al. A multivalent T-antigen-based vaccine for Group A Streptococcus. Scientific Reports 2021;11(1):4353. https://doi.org/10.1038/s41598-021-83673-4

47. Steer AC. Historical aspects of rheumatic fever. Journal of Paediatrics and Child Health 2015;51(1):21-27. https://doi.org/10.1111/jpc.12808

48. Te Whatu Ora - Health New Zealand. Rheumatic fever roadmap, 2023 - 2028. Wellington, New Zealand: Te Whatu Ora Health New Zealand, 2023. https://www.tewhatuora.govt.nz/publications/rheumatic-fever-roadmap-2023-2028/

49. Oliver J, Upton A, Jack SJ, et al. Distribution of streptococcal pharyngitis and acute rheumatic fever, Auckland, New Zealand, 2010-2016. Emerging Infectious Diseases 2020;26(6):1113-21. https://doi.org/10.3201/eid2606.181462

50. Lennon D. Rheumatic fever as an indicator of child health. New Zealand Medical Journal 2017;130(1460):6-9. https://nzmj.org.nz/journal/vol-130-no-1460/rheumatic-fever-as-an-indicator-of-child-health

51. Abouzeid M, Wyber R, La Vincente S, et al. Time to tackle rheumatic heart disease: Data needed to drive global policy dialogues. Global Public Health 2019;14(3):456-68. https://doi.org/10.1080/17441692.2018.1515970

52. Coffey PM, Ralph AP, Krause VL. The role of social determinants of health in the risk and prevention of group A streptococcal infection, acute rheumatic fever and rheumatic heart disease: A systematic review. PLOS Neglected Tropical Diseases 2018;12(6):e0006577. https://doi.org/10.1371/journal.pntd.0006577

53. Institute of Environmental Science and Research Ltd (ESR). Invasive group A streptococcal infection in New Zealand, 2017-2022. Porirua, New Zealand: ESR, 2023. https://www.esr.cri.nz/digital-library/invasive-group-a-streptococcal-infection-in-new-zealand-2017-2022/

54. Kerdemelidis M, Lennon DR, Arroll B, et al. The primary prevention of rheumatic fever. Journal of Paediatrics and Child Health 2010;46(9):534-48. https://doi.org/10.1111/j.1440-1754.2010.01854.x

55. World Health Assembly. Rheumatic fever and rheumatic heart disease, WHA 17.14. 2018. Available from: https://apps.who.int/gb/ebwha/pdf_files/WHA71/A71_R14-en.pdf.

56. Anderson A, Brown R, Wheeler J, et al. Pacific Fono: a community-based initiative to improve rheumatic fever service delivery for Pacific Peoples in South Auckland. Journal of Primary Health Care 2020;12(4):384-90. https://doi.org/10.1071/hc20022

57. Jack S, Moreland NJ, Meagher J, et al. Streptococcal serology in acute rheumatic fever patients: Findings from 2 high-income, high-burden settings. The Pediatric Infectious Disease Journal 2019;38(1):e1-e6. https://doi.org/10.1097/inf.0000000000002190

58. Tilton E, Mitchelson B, Anderson A, et al. Cohort profile: Methodology and cohort characteristics of the Aotearoa New Zealand Rheumatic Heart Disease Registry. BMJ Open 2022;12(12):e066232. https://doi.org/10.1136/bmjopen-2022-066232

59. Murphy T. Rheumatic heart disease echo screening pilot in intermediate aged children: A potential approach for a national screening programme. National Rheumatic Fever Sector Symposium; 2024 July; Auckland, New Zealand.

60. Oliver J, Pierse N, Baker MG. Improving rheumatic fever surveillance in New Zealand: Results of a surveillance sector review. BMC Public Health 2014;14(1):528. https://doi.org/10.1186/1471-2458-14-528

61. Bennett J, Anderson A, 'Ofanoa M, et al. Acute rheumatic fever—a preventable, inequitable disease: A call for action. New Zealand Medical Journal 2021;134(1535):93-95. https://nzmj.org.nz/journal/vol-134-no-1535/acute-rheumatic-fevera-preventable-inequitable-disease-a-call-for-action

62. Tilton E, Mitchelson B, Anderson A, et al. New Zealand Rheumatic Heart Disease Registry. Heart, Lung and Circulation 2022;31:S273-S74. https://doi.org/10.1016/j.hlc.2022.06.461

63. Wilson N, Mitchelson B, Peat B, et al. The New Zealand Rheumatic Heart Disease Registry. Heart, Lung and Circulation 2018;27:S19. https://doi.org/10.1016/j.hlc.2018.05.141

64. Sika-Paotonu D, Tiatia R, Sung YK, et al. The Benzathine Penicillin G (BPG) reformulation preferences study-edging closer towards a new Penicillin for Rheumatic Fever and Rheumatic Heart Disease. The Journal of Immunology 2018;200(1_Supplement):120.35-20.35. https://doi.org/10.4049/jimmunol.200.Supp.120.35

65. Wilson NJ, Concannon A, Malcolm J, et al. The treatment of acute rheumatic fever: Novel use of hydroxychloroquine. The Pediatric Infectious Disease Journal 2020;39(7):e120-e22. https://doi.org/10.1097/inf.0000000000002647

66. Anderson A, Spray J. Beyond awareness: Towards a critically conscious health promotion for rheumatic fever in Aotearoa, New Zealand. Social Science & Medicine 2020;247:112798. https://doi.org/10.1016/j.socscimed.2020.112798

67. Tu'akoi S, Ofanoa M, Ofanoa S, et al. Addressing rheumatic fever inequities in Aotearoa New Zealand: A scoping review of prevention interventions. Journal of Primary Health Care 2023;15(1):59-66. https://doi.org/10.1071/hc22093

68. Anderson A, Peat B, Ryland J, et al. Mismatches between health service delivery and community expectations in the provision of secondary prophylaxis for rheumatic fever in New Zealand. Australian and New Zealand Journal of Public Health 2019;43(3):294-99. https://doi.org/10.1111/1753-6405.12890

69. Te Whatu Ora - Health New Zealand. Rheumatic fever co-design initiative. Wellington, New Zealand: Te Whatu Ora - Health New Zealand; 2024 updated 5/7/2024. Available from: https://www.tewhatuora.govt.nz/publications/rheumatic-fever-co-design-initiative/.

70. ThinkPlace Project Team. Rheumatic fever co-design initiative: Tāmaki Makaurau, 2020—2023. Reflections on the initiative. Wellington, New Zealand: Te Whatu Ora - Health New Zealand, 2023. https://www.tewhatuora.govt.nz/publications/rheumatic-fever-co-design-initiative/

71. Davis K, Davis P, Tipene G, et al. Te Tīma Māori: Rheumatic fever co-design initiative. A Kaupapa Māori response, October 2023. Wellington, New Zealand: Te Whatu Ora - Health New Zealand; 2023. Available from: https://www.tewhatuora.govt.nz/publications/rheumatic-fever-co-design-initiative/.

72. Ualesi A, Ryan L, Lafolua S, et al. A tale of two systems. Phase 3 report: Samoa team, rheumatic fever co-design initiative. Wellington, New Zealand: Te Whatu Ora - Health New Zealand, 2023. https://www.tewhatuora.govt.nz/publications/rheumatic-fever-co-design-initiative/

73. Lomipeau - Tongan rheumatic fever co-design initiative. Phase 3 Report: Prototype embedding phase - September 2023. Wellington, New Zealand: Te Whatu Ora - Health New Zealand, 2023. https://www.tewhatuora.govt.nz/publications/rheumatic-fever-co-design-initiative/

74. Davis K, Ualesi A, Nofo'akifolau R. Rheumatic Fever Co-design Initiative in Tāmaki Makaurau. National Rheumatic Fever Sector Symposium; 2024 July; Auckland, New Zealand.

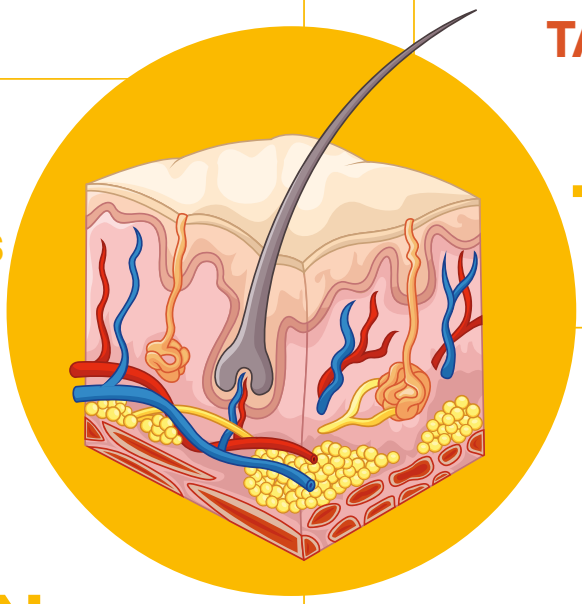
04 SKIN INFECTIONS
Mate kiri

HOSPITALISATION RATES FOR **SERIOUS SKIN INFECTIONS** IS

HIGHEST
FOR CHILDREN AGED
2 YEARS
AND YOUNGER

THE RATE OF HOSPITALISATION FOR
PASIFIKA CHILDREN
WITH SERIOUS SKIN INFECTIONS IS
THREE TIMES
THAT OF CHILDREN OF EUROPEAN OR OTHER ETHNIC GROUPS
AND FOR
TAMARIKI MĀORI,
IT IS ALMOST
TWICE THE RATE

55%
OF HOSPITALISATIONS
FOR SKIN INFECTIONS WERE FOR CHILDREN LIVING IN THE
HIGHEST LEVEL OF SOCIAL DEPRIVATION



HOSPITALISATION RATES FOR SKIN INFECTIONS WERE DECLINING IN ALL AGE-GROUPS PRIOR TO THE COVID-19 PANDEMIC
AND HAVE NOT RETURNED TO PRE-PANDEMIC LEVELS

THE MOST COMMON CAUSES OF HOSPITALISATIONS FOR SERIOUS SKIN INFECTIONS

37%
CELLULITIS

34%
CUTANEOUS ABSCESS, FURUNCLE OR CARBUNCLE

KEY RECOMMENDATIONS

- The Government and Crown agencies should ensure that **all tamariki in Aotearoa NZ live in environments that minimise the risk of excess skin infections:** Adequate nutrition, appropriate housing, with adequate resources for affordable hot water and electricity to wash and dry clothes and bedding.
- Te Whatu Ora Heath NZ should **investigate free treatment (antiseptics and dressings) for minor skin infections/injuries in the community** through public nursing, school-based care, pharmacies, and primary care.
- **High dose oral antibiotics** have good bioavailability and should be **considered for use in management of cellulitis/skin infection in children** without signs of sepsis/systemic infection. All guidelines for general practice, emergency medicine, and paediatric care should clearly state this as an appropriate option.
- **Single daily intravenous antibiotics can be used in the community as an alternative to hospital admission.** Te Whatu Ora Health NZ should ensure that this option is available throughout Aotearoa NZ.

KEY FINDINGS

- The rate of **hospitalisations for serious skin infections is highest for children aged 2 years and younger.**
- From 2018—2022, **the most common cause of hospitalisations for serious skin infections was 'cellulitis' (37%), followed by 'cutaneous abscess, furuncle or carbuncle' (34%).**
- **Hospitalisation rates for skin infections were declining in all age-groups prior to the COVID-19 pandemic but rates declined further in all age groups by 17—31%** in 2019—2020 and have not returned to pre-pandemic levels. This drop accounted for most of the decline in hospitalisation rates of Pasifika children.
- Although disparities in rates of hospitalisation for serious skin infections in children have reduced in the last five years, inequities remain. **The rate of hospitalisation for Pasifika children with serious skin infections is three times that of children of European or Other ethnic groups, and for tamariki Māori, it is almost twice the rate.**
- In 2022, **55% of all hospitalisations for skin infections were for children living in the two highest quintiles of social deprivation.** The disparity in rates was highest for Pasifika children, but the same pattern was also seen for tamariki Māori.

WHY PRIORITISE SKIN HEALTH FOR CHILDREN?

Children in Aotearoa NZ have relatively high rates of skin infections, particularly serious skin infections, such as cellulitis, compared with other high-income countries.[1-4] Damage to the skin (whether caused by injuries, stings or bites, chickenpox, scabies, or skin conditions like eczema) can provide an entry point for infection with bacteria, fungi, viruses, or parasites, as can hair follicles.[5 6] The most common bacteria associated with skin infections are *Staphylococcus aureus* and *Streptococcus pyogenes*.[4 5 7 8]

Children who have skin infections can experience symptoms such as itching, pain, redness, swelling, and fever. Sores can be blistered, crusted, or weeping and infected hair follicles can fill with pus to become boils or abscesses, depending on their size and depth.[5] Most mild skin infections can be treated at home by keeping infected sores clean and covered and using over-the-counter medicines. Other infections can be effectively managed in primary care.[5 9-11]

If minor skin infections are not detected and treated early, they can cause complications that require admission to hospital.[9 11-14] Serious skin infections may need costly treatment with intravenous antibiotics for cellulitis or sepsis or surgical interventions for abscesses or complex wounds.[9 11 13-16] In very serious cases, skin infections due to Group A streptococcal (GAS) bacteria can cause sepsis or post-streptococcal glomerulonephritis (a rare kidney disease), which can lead to renal failure.[9 11 17] Children who develop skin infections due to infection with GAS bacteria and who also experience strep throat are at higher risk of acute rheumatic fever and, therefore, rheumatic heart disease.[17-20]

CURRENT DATA ON THE STATE OF SKIN HEALTH FOR CHILDREN IN AOTEAROA NZ

The rates of children treated in hospital for serious skin infections are taken from the NZ Ministry of Health's National Minimum Dataset (NMDS),[21] based on the diagnostic codes at discharge between January 2000 and December 2022. Rates include all acute and semi-acute (arranged) hospitalisations for those aged 0—19 years whose primary diagnosis was coded as:

- skin and subcutaneous tissue infections (ICD-10-AM: L00—L08, includes staphylococcal scalded skin syndrome, impetigo, cutaneous abscess, furuncle and carbuncle, cellulitis, acute lymphadenitis, pilonidal cyst);
- hordeolum and other deep inflammation of eyelid (H00.0);
- blepharitis (non-infectious dermatoses of eyelid, H01.0);
- abscess, furuncle, and carbuncle of the nose (J34.0); and
- pyogenic granuloma (L98.0).

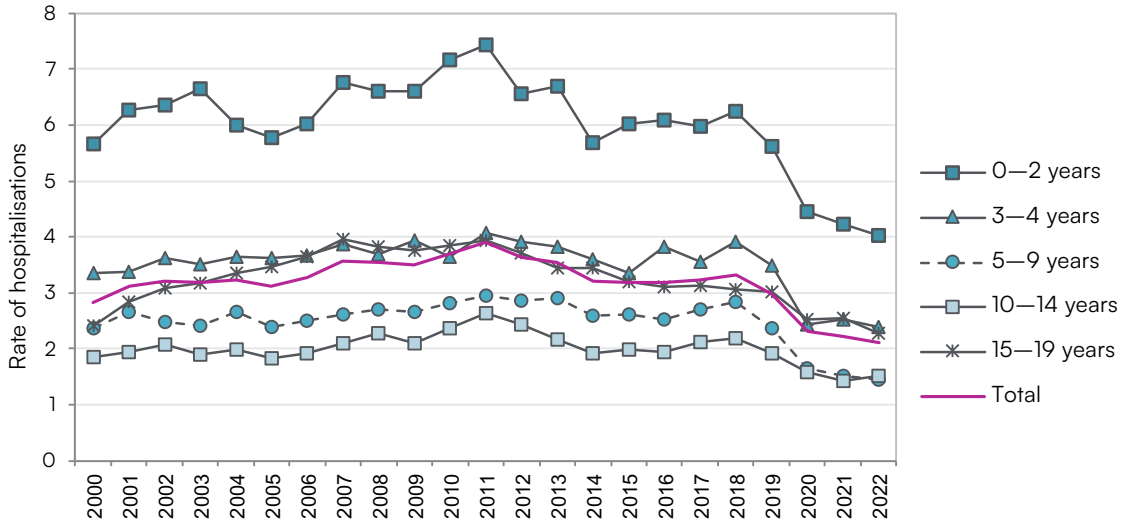
The codes listed above were taken from the skin infections sub-category of the Ministry of Health's indicator of potentially avoidable hospitalisations (PAH) under the Child and Youth Wellbeing Strategy.[12] PAH are hospitalisations that can potentially be avoided by the provision of appropriate healthcare interventions and early disease management, public health interventions, or social policy interventions.[12] Note that researchers in Aotearoa NZ have argued that this somewhat narrow case definition of serious skin infections is likely to underestimate the true burden of serious skin infections and have, instead, suggested a broader case definition.[22]

For further information on data sources, measurement, and methods please refer to the appendix.

Hospitalisations for skin infections

Over the past 5 years (2018—2022), there have been, on average, 3,319 hospitalisations per year for skin infections in people younger than 20 years in Aotearoa NZ. Skin infections made up 1.5% of all acute and semi-acute hospitalisations for children. The rate of hospitalisations for skin infections is highest for children two years and younger; although they make up only 14% of the population aged under 20 years, hospitalisations for skin infections in these young children account for more than a quarter of all hospitalisations for skin infections in under-20-year-olds.

Between 2000 and 2011, the rates of hospitalisations for children with serious skin infections increased; since then, they declined by about 24% to 2019, on average (Figure 4.1). During the period of public health measures associated with the COVID-19 pandemic in 2020, hospitalisations for skin infections fell in all age groups (between 17% and 31% from 2019 to 2020) and, to date, have not returned to pre-COVID levels.

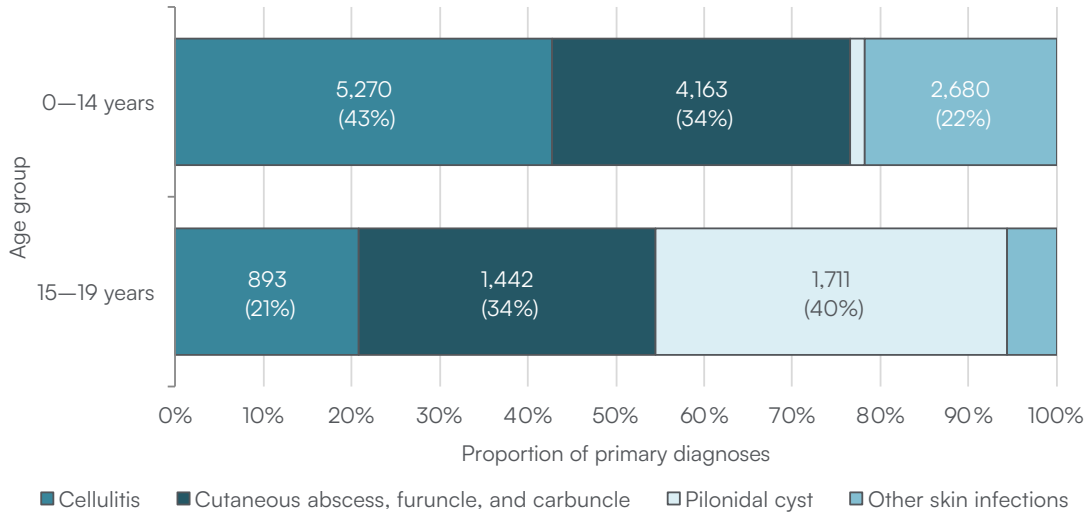


Source: NMDS, NZCYES Estimated Resident Population.
Rate per 1,000 age-specific population.

Figure 4.1: Trends in hospitalisations of 0—19-year-olds for serious skin infections, by age group, Aotearoa NZ (2000—22)

Overall, from 2018 to 2022, the most common cause of hospitalisation for serious skin infections was 'cellulitis' (37%), followed by 'cutaneous abscess, furuncle, or carbuncle' (34%).

This pattern of infections was similar for most children younger than 15 years and has been fairly consistent over the last 23 years since 2000. For older adolescents, however, the most common skin infection was 'pilonidal cyst' (40%), followed by 'cutaneous abscess, furuncle, or carbuncle' (34%) and 'cellulitis' (21%) (Figure 4.2). For these older adolescents, the proportions of skin infections due to 'cutaneous abscess, furuncle, or carbuncle' or other skin infections have been consistent during the last 23 years but there have been proportionately slightly fewer hospitalisations due to cellulitis and slightly more hospitalisations due to pilonidal cysts over time.



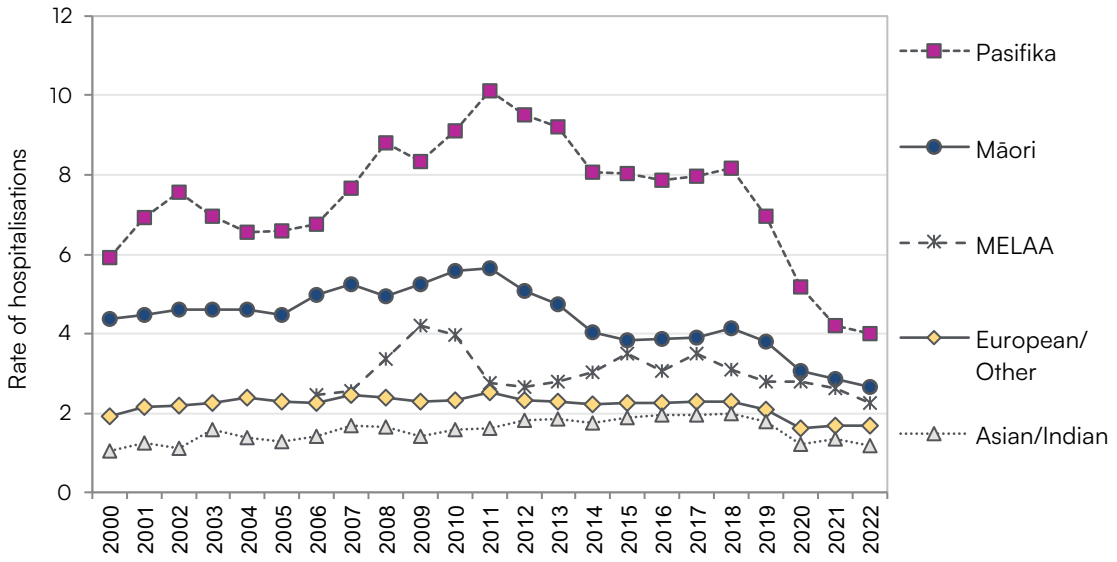
Source: NMDS, NZCYES Estimated Resident Population. Other skin infections included mostly acute lymphadenitis, impetigo, and other local infections of skin and subcutaneous tissue.

Figure 4.2: Causes of hospitalisations due to serious skin infections in 0—19-year-olds, by age group, Aotearoa NZ (2018—22)

ETHNIC DIFFERENCES IN SKIN HEALTH FOR CHILDREN

Pasifika children in Aotearoa NZ have a disproportionally high rate of hospitalisation for serious skin infections compared with other ethnic groups. On average, between 2018 and 2022, the rate of hospitalisation of Pasifika children for skin infections was 3 times that of European or Other children. For tamariki Māori, the rate of hospitalisation for skin infections was 1.7 times that of European or Other children. In addition, hospitalisations for skin infections in tamariki Māori make up a third of all hospitalisations for skin infections in children.

Figure 4.3 shows that the rates of hospital admissions for Pasifika children with serious skin infections have been significantly higher than those of all other children since 2000, although the gap has narrowed since 2011. Rates have been high for tamariki Māori as well. Rates were lowest for children of Asian or Indian ethnicities. During the period of public health measures associated with the COVID-19 pandemic in 2020, hospitalisations for skin infections fell for all ethnic groups and have not returned to pre-COVID levels. The drop associated with the COVID-19 pandemic accounts for most of the decrease in the rate of hospitalisations for skin infections in Pasifika children.

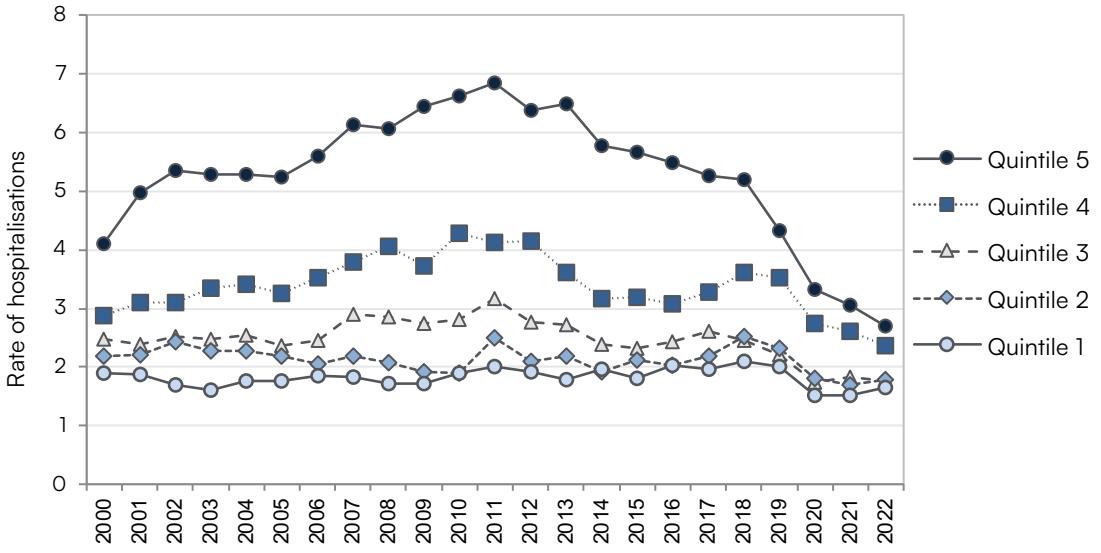


Source: NMDS, NZCYES Estimated Resident Population.
Rate per 1,000 0—19-year-olds. MELAA = Middle Eastern, Latin American, or African.

Figure 4.3: Trends in hospitalisations of 0—19-year-olds for serious skin infections, by ethnicity, Aotearoa NZ (2000—22)

SOCIOECONOMIC DIFFERENCES IN SKIN HEALTH FOR CHILDREN

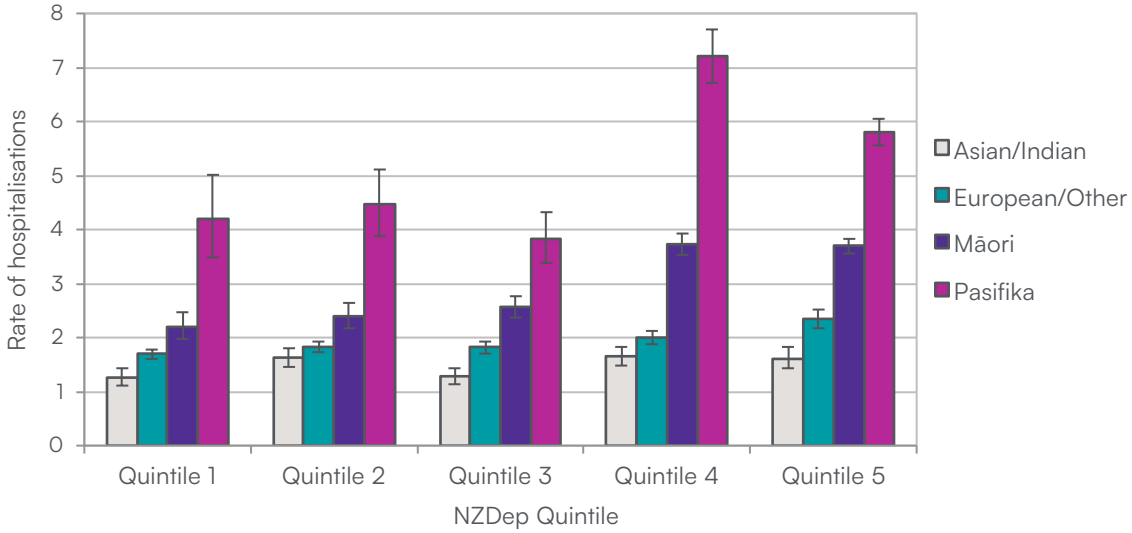
Since 2000, Aotearoa NZ's rates of hospitalisation for serious skin infections have remained highest for children living in areas with the most socioeconomic deprivation (Figure 4.4). Although the gap has narrowed significantly since 2019, mostly following the COVID-19 pandemic, hospitalisations for skin infections for children living in the two quintiles with the most socioeconomic deprivation still accounted for almost 55% of all hospitalisations for skin infections in children during 2022.



Source: NMDS, NZCYES Estimated Resident Population. Rate per 1,000 0—19-year-olds.
Quintile: NZDep Index of deprivation (1 = least deprived; 5 = most deprived).

Figure 4.4: Trends in hospitalisations of 0—19-year-olds for serious skin infections, by socioeconomic deprivation, Aotearoa NZ (2000—22)

For the period from 2018 to 2022, rates of hospitalisations for skin infections were highest for Pasifika children followed by tamariki Māori, regardless of the socioeconomic area in which they lived (Figure 4.5). In addition, there were higher rates for Pasifika and Māori children living in the two most deprived areas (quintiles 4 and 5) compared to less deprived areas (quintiles 1—3), reflecting the added burden of socioeconomic deprivation for these whānau. These patterns were not present to the same extent for Asian/Indian or European/Other children.



Source: NMDS and NZCYES estimated resident population. Rate per 1,000 0—19-year-olds.
Quintile: NZDep Index of deprivation (1 = least deprived; 5 = most deprived). Ethnicity is level 1 prioritised.

Figure 4.5: Trends in hospitalisations of 0—19-year-olds for serious skin infections, by socioeconomic deprivation and by ethnicity, Aotearoa NZ (2018—22)

WHAT IS THE STATE OF SKIN HEALTH FOR CHILDREN IN AOTEAROA NZ?

For every child who is sent to hospital for treatment of a skin infection, about 14 cases of skin infections are treated by primary-care professionals in the community.[3] Consistent with this, data from the Growing Up in New Zealand longitudinal study show that over a 12-month period, 12% of preschool children experienced a skin infection but fewer than 1% were admitted to hospital.[23] Thus, hospital discharge data only capture a small proportion of the overall burden of skin infections in the community.[3] Public health measures to reduce rates of skin infections and associated complications should include renewed support for parents and caregivers to prevent and treat skin conditions at home, including prevention of transmission, with education on how to maintain healthy skin and the potential for skin infections to have serious and long-term consequences.[1 24]

Some skin infections, like varicella (chickenpox), measles, and rubella, are vaccine-preventable and should be positively impacted by recent targeted measures to improve timely immunisation for children.[25-27] Experts have called for a group A Streptococcus (GAS) vaccine to be made available in Aotearoa NZ, which would have a major impact on the burden of skin infections as well as their sequelae (e.g., invasive GAS disease and acute rheumatic fever).[16] The recent decrease in hospitalisations for serious skin infections that we have observed show that public health measures associated with the COVID-19 pandemic (e.g., hand and respiratory hygiene, physical distancing, and adequate indoor ventilation) may also be important to prevent the spread of bacteria associated with skin infections.[28-30]

A recently-introduced primary-care intervention, Primary Options for Acute Care, has allowed children with cellulitis (who would ordinarily have been treated in hospital) to receive intravenous antibiotics in a primary-care setting.[31] Together with improved access to best practice paediatric skin infection guidelines for staff in primary care settings, this intervention may also have contributed to some of the decline in rates of hospitalisation for serious skin infections.[31] It is important to note, however, that care must be taken with the use of antibiotics so as not to contribute to antibiotic resistance. Most multi-drug-resistant *S. aureus* (MRSA) infections in Aotearoa NZ are now acquired in the community, via skin and soft tissue infections.[7 32] Recent changes to guidelines for prescription of topical antimicrobials will, if followed, minimise further development of antimicrobial resistance.[33-35]

Research has shown that socioeconomic deprivation is linked to skin infections through factors such as inadequate nutrition, overcrowded and unhealthy housing, and unaffordability of hot water, electricity, and machines for washing and drying clothes.[4 7 9 11 12 28 29 32] Measures to ameliorate these upstream risk factors would have huge benefits for children's skin health. Lack of access to high-quality medical care is another issue for children living with socioeconomic deprivation that contributes to a greater likelihood of being hospitalised for skin infections.[9 11 24 31 36 37] These barriers disproportionately affect Māori and Pasifika children,[6 31 36-42] which indicates that other factors, such as persistent racial discrimination and differential treatment within health services, are likely to be driving ethnic inequalities in rates of hospitalisation for serious skin infections.[31 42] Targeted interventions to reduce disparities in serious skin infections, and reduce skin infections overall, should include primary care services that are more accessible, affordable, and culturally responsive, supplemented by community-based initiatives in pharmacies, schools, and early learning centres.[2 3 20 24 31 36-38 42 43]

REFERENCES

1. White C, Reid S, Damiris V, et al. Health literacy and the prevention and management of skin infections. Auckland, New Zealand: Workbase Education Trust, 2013. https://www.health.govt.nz/publication/health-literacy-and-prevention-and-management-skin-infections
2. Jack SJ, Williamson DA, Galloway Y, et al. Primary prevention of rheumatic fever in the 21st century: Evaluation of a national programme. International Journal of Epidemiology 2018;47(5):1585-93. https://doi.org/10.1093/ije/dyy150
3. O'Sullivan C, Baker MG. Skin infections in children in a New Zealand primary care setting: exploring beneath the tip of the iceberg. The New Zealand Medical Journal (Online) 2012;125(1351):70-9. https://www.proquest.com/scholarly-journals/skin-infections-children-new-zealand-primary-care/docview/1034432219/se-2?accountid=14700
4. O'Sullivan CE, Baker MG, Zhang J. Increasing hospitalizations for serious skin infections in New Zealand children, 1990—2007. Epidemiology and Infection 2011;139(11):1794-804. https://doi.org/10.1017/S0950268810002761
5. Clebak KT, Malone MA. Skin Infections. Primary Care: Clinics in Office Practice 2018;45(3):433-54. https://doi.org/10.1016/j.pop.2018.05.004
6. Ricciardo BM, Kessaris H-L, Kumarasinghe SP, et al. The burden of bacterial skin infection, scabies and atopic dermatitis among urban-living Indigenous children in high-income countries: A protocol for a systematic review. Systematic Reviews 2022;11(1):159. https://doi.org/10.1186/s13643-022-02038-8
7. Lewthwaite H, Priest P, Brooks H. Prevalence of Staphylococcus Aureus colonisation and skin conditions in Otago school children. The New Zealand Medical Student Journal 2015(20):6-9. http://www.nzmsj.com/uploads/3/1/8/4/31845897/issue_20_prevalence_of_staphylococcus_aureus.pdf
8. Lacey JA, Bennett J, James TB, et al. A worldwide population of Streptococcus pyogenes strains circulating among school-aged children in Auckland, New Zealand: A genomic epidemiology analysis. The Lancet Regional Health — Western Pacific 2024;42 https://doi.org/10.1016/j.lanwpc.2023.100964
9. Healthy Skin in Greater Wellington Group. Healthy skin in greater Wellington: Protocols for the management of skin infections in children and young people, in community and primary health care settings, Wellington sub-region. Wellington, New Zealand: Healthy Skin in Greater Wellington Group, 2012. https://www.rph.org.nz/public-health-topics/skin-infections/healthy-skin-in-the-greater-wellington-region/skin-health-protocols.pdf
10. Jackson G, Tobias M. Potentially avoidable hospitalisations in New Zealand, 1989—98. Australian and New Zealand Journal of Public Health 2001;25(3):212-21. https://doi.org/10.1111/j.1467-842X.2001.tb00565.x
11. Lakes District Health Board. Healthy skin: Protocols for the management of skin infections in children and young people in community and primary health care settings, in the Lakes District Health Board region. Rotorua, New Zealand: Lakes District Health Board, 2015. https://toiteora.govt.nz/public/assets/Toi-Te-Ora-Public-Health/A-Z-Health-Information/Healthy-Skin/Healthy-Skin-Resources/Healthy-Skin-Protocols-Signed-2016.pdf
12. Ministry of Health. Indicator of potentially avoidable hospitalisations for the Child and Youth Wellbeing Strategy: A brief report on methodology. Wellington, New Zealand: Ministry of Health, 2020. https://www.health.govt.nz/publication/indicator-potentially-avoidable-hospitalisations-child-and-youth-wellbeing-strategy-brief-report
13. Leversha A, Naylor D. Starship Clinical Guidelines: Cellulitis. Auckland, New Zealand: Starship Child Health, 2019. https://starship.org.nz/guidelines/cellulitis/
14. Jamison S, Naylor D, Peterson J, et al. Starhsip Clinical Guidelines: Acute cellulitis pathway. Auckland, New Zealand: Starship Child Health, 2023. https://starship.org.nz/guidelines/acute-cellulitis-pathway/
15. Sartelli M, Malangoni MA, May AK, et al. World Society of Emergency Surgery (WSES) guidelines for management of skin and soft tissue infections. World Journal of Emergency Surgery 2014;9(1):57. https://doi.org/10.1186/1749-7922-9-57
16. Cannon JW, Zhung J, Bennett J, et al. The economic and health burdens of diseases caused by group A Streptococcus in New Zealand. International Journal of Infectious Diseases 2021;103:176-81. https://doi.org/10.1016/j.ijid.2020.11.193
17. Lennon D. Rheumatic fever as an indicator of child health. New Zealand Medical Journal 2017;130(1460):6-9. https://nzmj.org.nz/journal/vol-130-no-1460/rheumatic-fever-as-an-indicator-of-child-health
18. Thornley S, King R, Marshall R, et al. How strong is the relationship between scabies and acute rheumatic fever? An analysis of neighbourhood factors. Journal of Paediatrics and Child Health 2020;56(4):600-06. https://doi.org/10.1111/jpc.14697
19. Bennett J, Moreland NJ, Oliver J, et al. Understanding group A streptococcal pharyngitis and skin infections as causes of rheumatic fever: Protocol for a prospective disease incidence study. BMC Infectious Diseases 2019;19(1):633. https://doi.org/10.1186/s12879-019-4126-9
20. Thomas S, Bennett J, Jack S, et al. Descriptive analysis of group A Streptococcus in skin swabs and acute rheumatic fever, Auckland, New Zealand, 2010—2016. The Lancet Regional Health - Western Pacific 2021;8:100101. https://doi.org/10.1016/j.lanwpc.2021.100101
21. Ministry of Health. National Minimum Dataset (Hospital Events) Data Dictionary. Wellington, New Zealand: Ministry of Health, 2021. https://www.health.govt.nz/publication/national-minimum-dataset-hospital-events-data-dictionary
22. O'Sullivan CE, Baker MG. Proposed epidemiological case definition for serious skin infection in children. Journal of Paediatrics and Child Health 2010;46(4):176-83. https://doi.org/10.1111/j.1440-1754.2009.01658.x
23. Morton SMB, Grant CC, Berry SD, et al. Growing Up in New Zealand: A longitudinal study of New Zealand children and their families. Now We Are Four: Describing the preschool years. Auckland: Growing Up in New Zealand. Auckland, New Zealand: The University of Auckland, 2017. https://cdn.auckland.ac.nz/assets/growingup/research-findings-impact/GUiNZ_Now%20we%20are%20four%20report.pdf

24. Wilson MK, Pienaar F, Large R, et al. Analysis of skin condition emergency department outcomes via the free Healthline service from Whakarongorau Aotearoa. New Zealand Medical Journal 2023;136(1586):32-50. https://nzmj.org.nz/journal/vol-136-no-1586/analysis-of-skin-condition-emergency-department-outcomes-via-the-free-healthline-service-from-whakarongorau-aotearoa

25. Immunisation Advisory Centre. Immunisation coverage protects everyone. Wellington, New Zealand: Immunisation Advisory Centre; 2023. Available from: https://www.immune.org.nz/immunisation/introduction-to-immunisation.

26. Seibt S, Gilchrist CA, Reed PW, et al. Hospital readmissions with acute infectious diseases in New Zealand children <2 years of age. BMC Pediatrics 2018;18(1):98. https://doi.org/10.1186/s12887-018-1079-x

27. Te Whatu Ora Immunisation Taskforce. Initial Priorities for the National Immunisation Programme in Aotearoa. Wellington, New Zealand: Te Whatu Ora Health NZ, 2022. https://www.tewhatuora.govt.nz/assets/Whats-happening/Work-underway/Taskforces/Immunisation-Taskforce-Report.pdf

28. Bennett J, Moreland N, Birrell J, et al. Likely rise in invasive strep infections in NZ requires a strategy. Wellington, New Zealand: Public Health Communication Centre, 2023. https://www.phcc.org.nz/briefing/likely-rise-invasive-strep-infections-nz-requires-strategy

29. Bennett J, Moreland NJ, Zhang J, et al. Risk factors for group A streptococcal pharyngitis and skin infections: A case control study. The Lancet Regional Health — Western Pacific 2022;26 https://doi.org/10.1016/j.lanwpc.2022.100507

30. Mason B, Stott S, Beamish R. Reduced presentations with fractures or orthopaedic infections to a major children's hospital during a national COVID-19 elimination strategy. ANZ Journal of Surgery 2022;92(1-2):206-11. https://doi.org/10.1111/ans.17354

31. Lim A, Rumball-Smith J, Jones R, et al. The rise and fall of hospitalizations for skin infections in New Zealand, 2004-2014: Trends by ethnicity and socioeconomic deprivation. Epidemiology & Infection 2017;145(4):678-84. https://doi.org/10.1017/s0950268816002685

32. Hobbs MR, Grant CC, Thomas MG, et al. Staphylococcus aureus colonisation and its relationship with skin and soft tissue infection in New Zealand children. European Journal of Clinical Microbiology & Infectious Diseases 2018;37(10):2001-10. https://doi.org/10.1007/s10096-018-3336-1

33. Office of the Prime Minister's Chief Science Advisor. Kotahitanga: Uniting Aotearoa against infectious disease and antimicrobial resistance. Auckland, New Zealand: Office of the Prime Minister's Chief Science Advisor, 2021. https://cpb-ap-se2.wpmucdn.com/blogs.auckland.ac.nz/dist/f/688/files/2022/06/OPMCSA-AMR-Full-report-FINAL-V3-PDF.pdf

34. Pattis I, Weaver L, Burgess S, et al. Antimicrobial Resistance in New Zealand—A One Health Perspective. Antibiotics 2022;11(6):778. https://www.mdpi.com/2079-6382/11/6/778

35. Primhak S, Gataua A, Purvis D, et al. Treatment of Impetigo with Antiseptics—Replacing Antibiotics (TIARA) trial: A single blind randomised controlled trial in school health clinics within socioeconomically disadvantaged communities in New Zealand. Trials 2022;23(1):108. https://doi.org/10.1186/s13063-022-06042-0

36. Jeffreys M, Smiler K, Ellison Loschmann L, et al. Consequences of barriers to primary health care for children in Aotearoa New Zealand. SSM - Population Health 2022;17:101044. https://doi.org/10.1016/j.ssmph.2022.101044

37. Ete-Rasch E, Nelson K. Management of skin infections in Pacific children prior to hospitalisation. Journal of Primary Health Care 2013;5(1):43-51. https://pdfs.semanticscholar.org/db40/8e2239d7b60835256f63b26d1affc317075c.pdf

38. Jeffreys M, Smiler K, Loschmann LE, et al. Prevalence and consequences of barriers to primary health care. Wellington, New Zealand: Ministry of Social Development, 2021. https://www.msd.govt.nz/documents/about-msd-and-our-work/publications-resources/research/barriers-to-primary-health-care/prevalence-and-consequences-of-barriers-to-primary-health-care.pdf

39. Stats NZ. Child poverty statistics: Year ended June 2023. Wellington, New Zealand: Stats NZ; 2024. Available from: https://www.stats.govt.nz/information-releases/child-poverty-statistics-year-ended-june-2023/#:~:text=In%20the%20year%20ended%20June,unchanged%20from%20the%20previous%20year.

40. Paine S-J, Li C, Wright K, et al. The economic cost of Indigenous child health inequities in Aotearoa New Zealand-an updated analysis for 2003—2014. The New Zealand Medical Journal (Online) 2023;136(1568):23. https://www.proquest.com/scholarly-journals/economic-cost-indigenous-child-health-inequities/docview/2768531911/se-2?accountid=14700

41. Ricciardo BM, Kessaris H-L, Kumarasinghe P, et al. The burden of atopic dermatitis and bacterial skin infections among urban-living Indigenous children and young people in high-income countries: A systematic review. Pediatric Dermatology 2023;40(1):35-43. https://doi.org/10.1111/pde.15153

42. Komene E, Adams S, Clark T. Kōrero mai: A Kaupapa Māori study exploring the experiences of whānau Māori caring for tamariki with atopic dermatitis. Nursing Praxis in Aotearoa New Zealand 2022;38(2):12-22. https://praxis.scholasticahq.com/article/83397-korero-mai-a-kaupapa-maori-study-exploring-the-experiences-of-whanau-maori-caring-for-tamariki-with-atopic-dermatitis

43. Anderson P, King J, Moss M, et al. Nurse-led school-based clinics for rheumatic fever prevention and skin infection management: Evaluation of Mana Kidz programme in Counties Manukau. New Zealand Medical Journal 2016;129(1428):37-46. https://www.proquest.com/docview/1757969713?pq-origsite=gscholar&fromopenview=true&sourcetype=Scholarly%20Journals

05 DENTAL DISEASE
Ngā take hauora niho

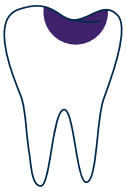
NEARLY **50%**

NEARLY HALF OF 5-YEAR-OLDS HAVE **NOT BEEN SEEN BY THE COHS**

LOWER PROPORTIONS
OF MĀORI AND PASIFIKA CHILDREN ARE EXAMINED BY COHS ANNUALLY

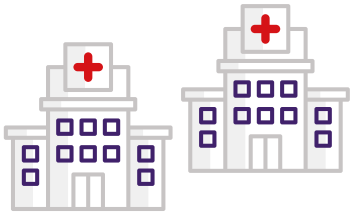
44%

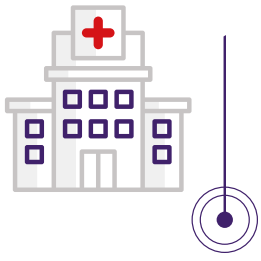
44% OF THOSE SEEN **HAVE TOOTH DECAY**



TAMARIKI MĀORI HAVE **HIGHER LEVELS OF TOOTH DECAY** AND THE **GREATEST INCREASE** IN RATES OF **HOSPITALISATION** FOR TOOTH DECAY

THE RATE OF HOSPITALISATIONS FOR TOOTH DECAY IN CHILDREN AGED 5—9 YEARS **HAS MORE THAN DOUBLED** OVER THE PAST TWO DECADES





YEAR 8 STUDENTS WERE LESS LIKELY TO HAVE TOOTH DECAY
AND THIS HAS BEEN DECLINING OVER THE LAST TWO DECADES

LEVELS OF TOOTH DECAY AS WELL AS HOSPITALISATIONS FOR TOOTH DECAY ARE ALSO **HIGH FOR PASIFIKA CHILDREN**

KEY RECOMMENDATIONS

- Continued collaboration between the Government and local authorities to **extend community water fluoridation,** ensuring that public water supplies are at levels necessary for oral health benefits. This is a safe and cost-effective way to reduce the prevalence of dental caries in the population.
- Continuation by the Ministry of Health of **the distribution of toothbrushes and toothpastes** to high-risk families.
- **Approval of the application to Medsafe for Topamine**, a silver diamine fluoride product, and creation of the necessary usage guidelines. Silver diamine fluoride is proven to arrest the progression of painful carious lesions at minimal cost and with minimal intervention.
- **Increase the number of oral health therapists in training and retain oral health therapists in the public sector.** If this is not achieved, then it will be difficult to sustain the Community Oral Health Service (COHS) in its current form, and it may be necessary to make it available only to the children most in need (i.e., to implement targeting of oral health services).
- **It is crucial to work with Māori communities and Māori health providers to reduce the barriers to tamariki Māori accessing appropriate oral health care and preventative care earlier,** especially in rural areas, and support whānau to implement culturally appropriate and effective strategies to combat tooth decay.
- **Additional resources need to be targeted to working with Pasifika organisations and communities to design culturally appropriate oral health care and preventative treatment programmes,** especially for those children who are also living in areas of high socioeconomic deprivation.

KEY FINDINGS

- In 2000, the Community Oral Health Service (COHS) was reaching more than three quarters of 5-year-olds. In 2022, **nearly half of 5-year-olds had not been seen by the COHS.** Of those who were seen, **44% had tooth decay. The rate of hospitalisations for tooth decay in children aged 5—9 years has more than doubled** over the past two decades. Despite a decrease during the COVID-19 pandemic, it has already nearly returned to pre-pandemic levels.
- **Year 8 students were less likely to have tooth decay and a lower burden of tooth decay** in terms of the number of decayed, missing, and filled teeth (DMFT). For these older children, the proportions with tooth decay, as well as the mean number of DMFT, have been **declining over the last two decades.** There has been **little change in these measures for 5-year-old children**.
- **Lower proportions of Māori and Pasifika children are examined by COHS annually**, with flow-on effects of greater likelihood of having tooth decay and a higher burden associated with that decay. This may mean that **the prevalence and severity of caries is underestimated** for these children.
- **Tamariki Māori have higher levels of tooth decay** than do non-Māori non-Pasifika children, and also the **greatest increase in rates of hospitalisation for tooth decay** over the last two decades. Tamariki Māori living in areas with the most socioeconomic deprivation experienced even greater rates of hospitalisation for tooth decay.
- **Levels of tooth decay as well as hospitalisations for tooth decay are also high for Pasifika children,** particularly those living in areas of high socioeconomic deprivation.

WHY PRIORITISE DENTAL DISEASE IN CHILDREN?

Eating and enjoyment of food are critical to good nutrition and a sense of well-being. All parts of the mouth are important for oral health, with the development and function of teeth most often the focus of attention. Each individual has two sets of dentition (teeth) in their lifetime. The first set of 20 teeth, referred to as primary, deciduous, baby, or milk teeth, is half-formed by birth and erupts within the first 2.5 years of life. After the age of 5 years, these deciduous teeth are gradually replaced by permanent (or secondary) dentition, which is completed by the individual's early twenties.[1 2]

Oral disease, and dental caries (tooth decay) in particular, has been described as a global public health problem that has reached epidemic proportions; it is the most prevalent non-communicable disease worldwide despite the fact that it is preventable.[3-6] Dental caries affect all age groups, beginning with the eruption of the first teeth, but children and adolescents are most at risk for developing caries.[4 7] Dental disease can have significant effects on children's general health and quality of life, causing pain and discomfort, tooth loss, eating and sleeping difficulties, speech difficulties, chronic infection, adverse growth patterns, impaired school performance (due to frequent absences from school and concentration problems), and decreased self-esteem due to missing teeth, visible decay, or discoloured teeth.[3-9] The effects of dental decay are long-lasting; children with tooth decay have poorer oral health outcomes in adulthood (e.g., higher susceptibility to developing new caries lesions, periodontal disease, tooth loss) as well as other health issues (e.g., diabetes, cardiovascular disease, pneumonia).[9-14] Because dental disease in childhood has long-term implications for individuals' health and, consequently, for a country's health system, the World Health Assembly recommended in 2021 that oral health care interventions should be included in universal health coverage programmes.[4]

In Aotearoa NZ, children and adolescents have access to publicly funded basic oral health services such as routine examinations for decay, dental x-rays, sealants and cleaning, and also for treatment including fluoride, fillings, or extraction.[5 15] Unfortunately the oral health care system in Aotearoa NZ is under-resourced and suffering massive stress with long waiting lists and inconsistent access to care across the country.[5 16-18] For children with severe tooth decay, delaying dental visits can lead to further deterioration, and treatment may eventually require hospitalisation, which is very costly.[5 7-9 19 20] Despite reductions in symptoms and associated morbidity after surgical intervention, measures to prevent further caries still need to be implemented.[5]

Socio-demographic factors, such as ethnicity, socioeconomic deprivation, and geographical location, play key roles in and interact to affect the prevalence and burden of oral disease, as well as access to timely oral health care, for many children.[3 5 7 8 11 21-25] Consequently, it is a minority of children who carry the greatest burden of disease.[8] There have been minimal improvements in children's oral health in Aotearoa NZ in recent years and huge inequalities between different ethnic and socioeconomically-disadvantaged communities persist.[5 16 23] Recommendations to redress these inequities include adequate resourcing of oral health care services, greater representation of Māori and Pasifika in the oral health workforce, reducing the numbers of children living in poverty, empowering whānau, engaging with Māori at the outset of service design, and integrating mātauranga Māori and tikanga Māori in oral health care delivery.[5 16 17 22 24-26]

CURRENT DATA ON THE STATE OF ORAL HEALTH FOR CHILDREN IN AOTEAROA NZ

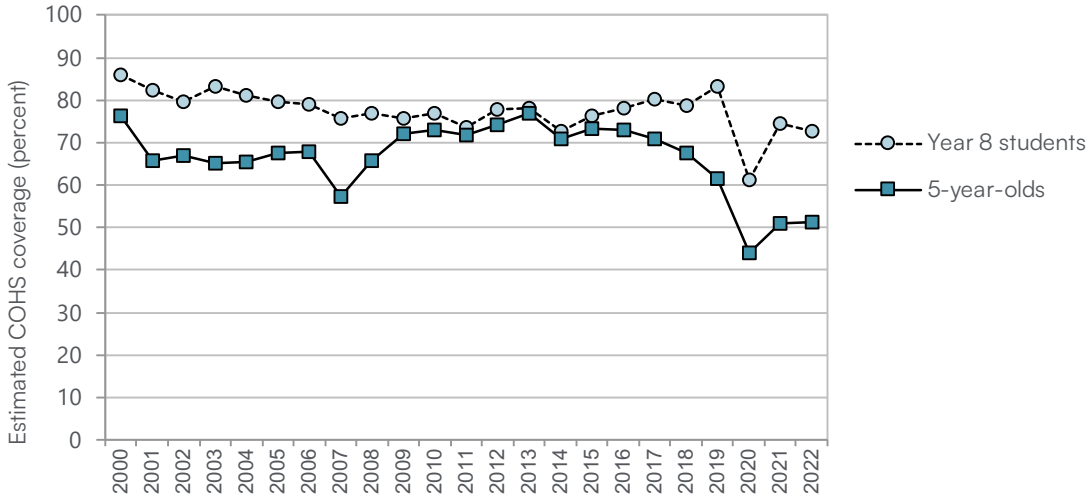
Hospitalisation rates for dental issues were taken from the NZ Ministry of Health's National Minimum Dataset (NMDS),[27] based on the diagnostic codes at discharge between January 2000 and December 2022. Rates include all acute and semi-acute (arranged) hospitalisations for those aged 0—19 years whose primary diagnosis was coded as a dental issue (ICD-10-AM: K00—K08).

Data on the prevalence of children with tooth decay (dental caries) and the number of decayed, missing, and filled teeth were from the Community Oral Health Services (COHS).[28]

For further information on data sources, measurement, and methods please refer to the appendix.

COHS examination

Over the 5 years to the end of 2022, the average proportion of children examined annually by COHS in Aotearoa NZ was 55% for 5-year-olds and 74% for Year 8 students (12- or 13-year-olds). Figure 5.1 shows that estimated COHS coverage[a] has declined since 2000 for both 5-year-olds and for Year 8 students, but to a greater extent for 5-year-olds olds (decline of 33% vs 15% for Year 8 students). For both age groups, much of the decline in coverage has taken place since the start of the COVID-19 pandemic in 2020 and has not yet recovered to pre-pandemic levels. This decline is likely due to a combination of factors, including public health measures to limit the transmission of the SARS-CoV-2 virus (e.g., household isolation and lockdowns) and a significant workforce shortage of oral health therapists within the COHS.



Source: COHS and Stats NZ estimated resident population. For a number of years, results for certain DHBs have been excluded owing to various data collection problems.

Figure 5.1: Trends in estimated Community Oral Health Service coverage, by age at examination, Aotearoa NZ (2000—22)

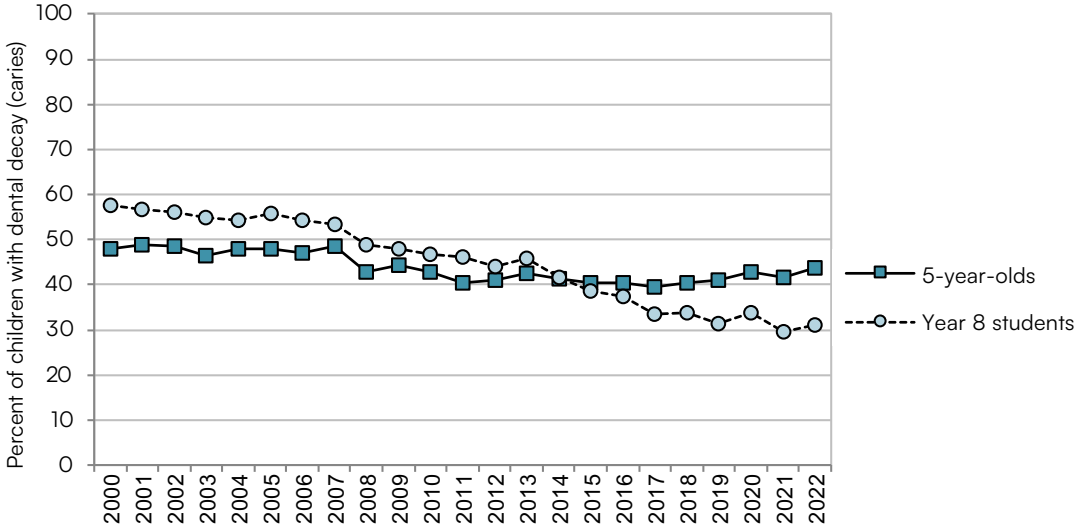
Tooth decay

Children with good oral health have little or no active tooth decay and a lower-than-average number of decayed (d), missing (m), or filled (f) teeth (t).[9] DMFT is a measure of cumulative caries experience over time[4 29] and is usually denoted using lowercase letters (dmft) for primary dentition and uppercase letters (DMFT) for permanent dentition.

In Aotearoa NZ, 42% of 5-year-olds examined by COHS during the period 2018—2022 had tooth decay (dental caries). Of the 5-year-old children with tooth decay, the average number of decayed, missing, or filled primary teeth (dmft) was 4.6. For Year 8 students, 32% had tooth decay and the average number of decayed, missing or filled permanent teeth (DMFT) for these children was 2.2.

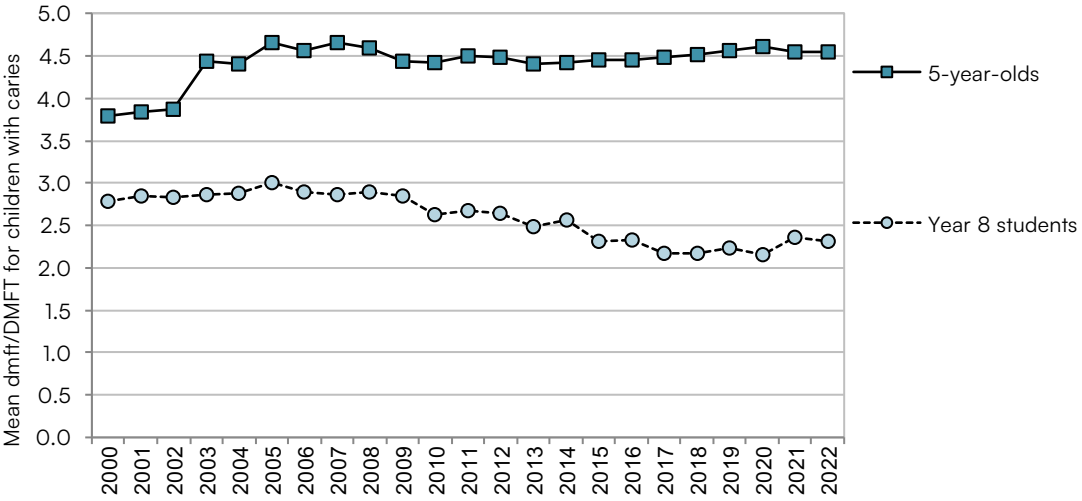
a Estimated coverage for each year was calculated using the numbers of children in each age group who were examined by COHS as the numerator and the Stats NZ estimated resident population for each age group as the denominator.

Figure 5.2 shows that the proportion of Year 8 students with tooth decay has decreased steadily over the last 23 years (decline of 46% since 2000). In contrast, there has been a much smaller decrease in the proportion of 5-year-olds with tooth decay (decline of 9% since 2000). The mean DMFT in Year 8 students with caries has been declining over the last 2 decades (19% decrease since 2003) (Figure 5.3). In contrast, the mean dmft in 5-year-old children with caries has remained relatively steady since 2003.



Source: COHS. For a number of years, results for certain DHBs have been excluded owing to various data collection problems.

Figure 5.2: Trends in proportions of children with tooth decay (caries), by age at examination, Aotearoa NZ (2000—22)

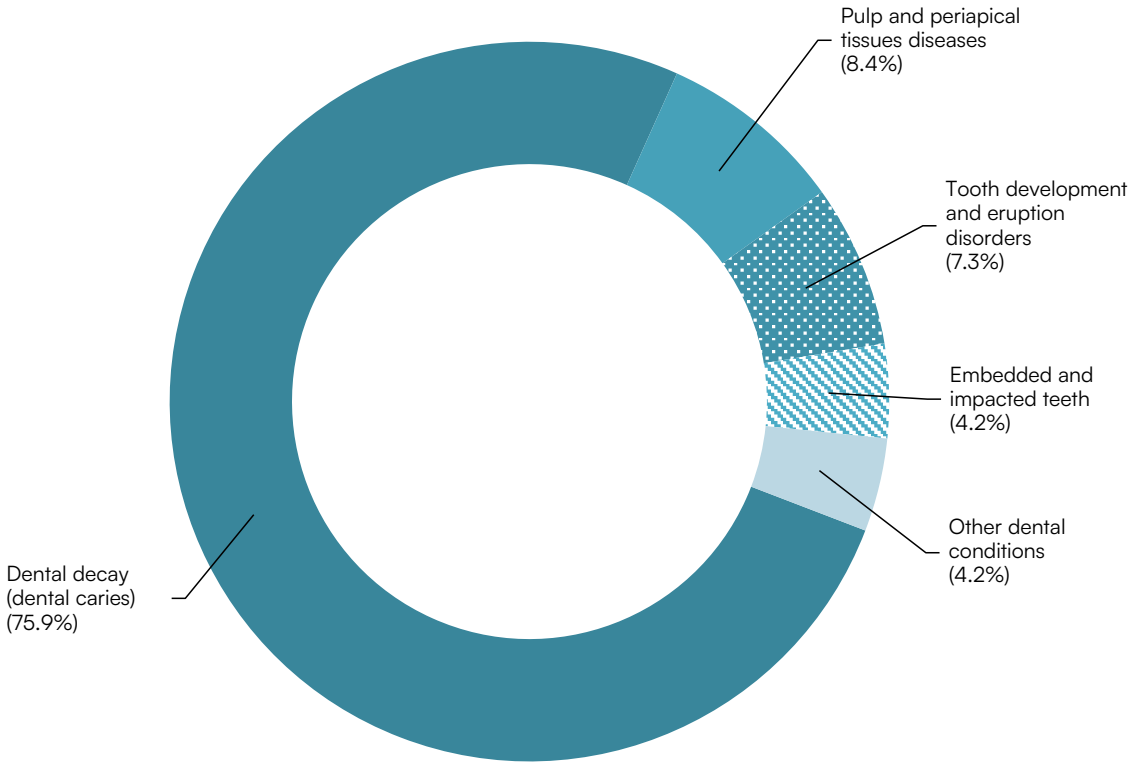


Source: COHS. For a number of years, results for certain DHBs have been excluded owing to various data collection problems. Dmft/DMFT = decayed, missing, and filled teeth (lowercase = primary teeth, uppercase = permanent teeth).

Figure 5.3: Mean dmft/DMFT for children with tooth decay (caries), by age at examination, Aotearoa NZ (2000—22)

Hospitalisations for dental disease

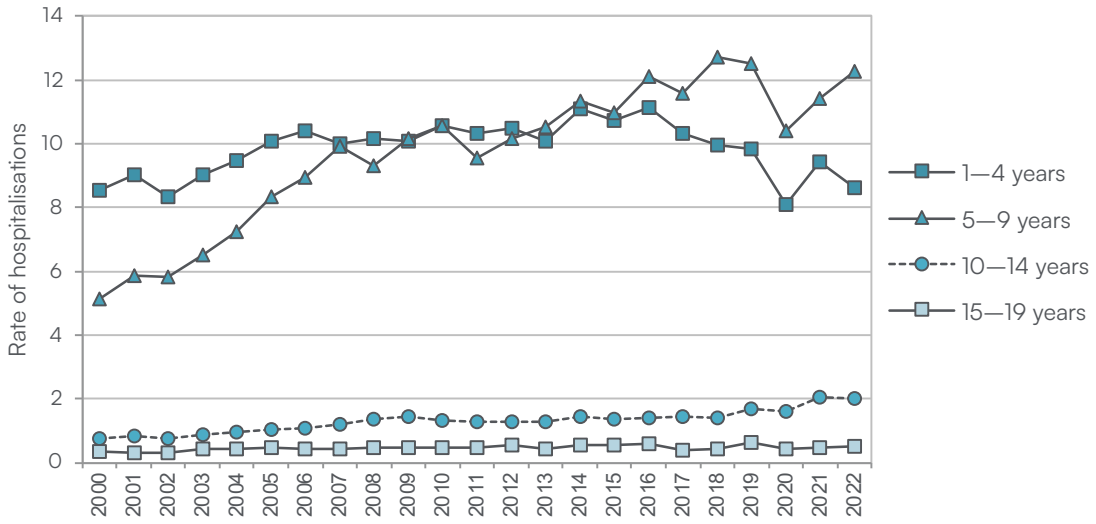
Over the 5 years to the end of 2022, an average of 9,187 hospitalisations per year were undertaken to treat dental problems in children aged 0—19 years, representing an increase of almost 70% from 2000—2004. Most of these hospitalisations were for dental caries (76%) or 'pulp and periapical tissues diseases' (8%), most of which were probably caused by tooth decay (Figure 5.4).



Source: NMDS and NZCYES estimated resident population.

Figure 5.4: Causes of hospitalisation due to dental disease in 0—19-year-olds, Aotearoa NZ (2018—22)

Rates of hospitalisations for dental caries increased significantly from 2000 to 2022 and were highest for those aged 1—9 years (Figure 5.5). Rates of hospitalisations for dental caries had increased for 1—4-year-olds until 2016 but have since decreased somewhat. For 5—9-year-olds, rates of hospitalisation for dental caries have more than doubled since 2000. Although rates of hospitalisation for dental caries are much lower for 10—14-year-olds, rates have almost tripled since 2000 in this age group. Rates of hospitalisation for dental caries were lowest for 15—19-year-olds and have remained relatively steady over the last 23 years. It is no surprise that fewer than 10 children under the age of 1 year were hospitalised with a primary diagnosis of dental caries over the entire 23-year period, given that these infants have far fewer teeth that are only just beginning to erupt. On average, between 2018 and 2022, 1—4-year-olds were 18 times more likely, 5—9-year-olds were 24 times more likely, and 10—14-year-olds were 3 times more likely to be hospitalised for dental caries than were 15—19-year-olds.



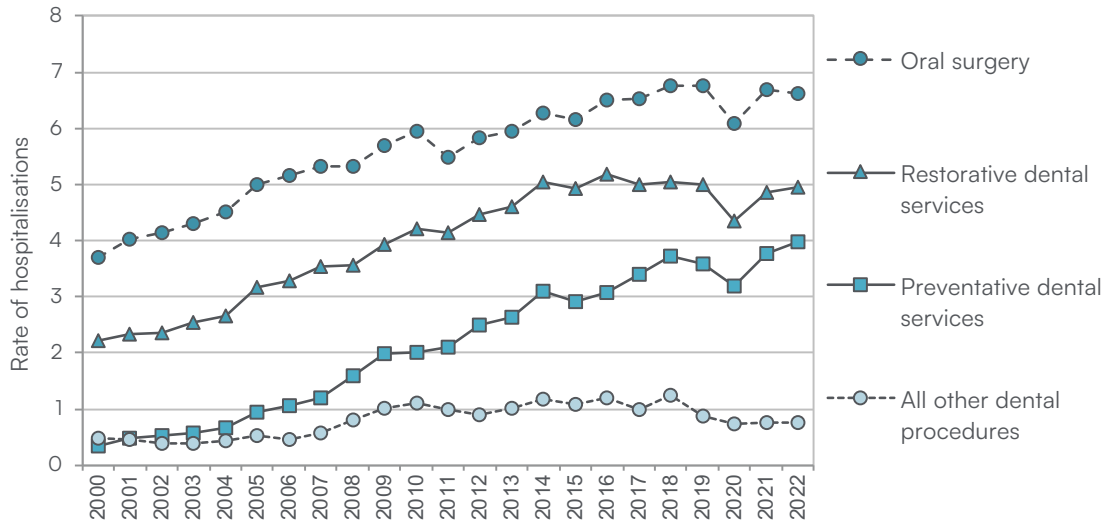
Source: NMDS and NZCYES estimated resident population. Rate per 1,000 age-specific population. Under 1-year-olds excluded due to small numbers.

Figure 5.5: Trend in rates of hospitalisation for primary diagnoses of dental caries in 0—19-year-olds, by age group, Aotearoa NZ (2000—22)

Dental procedures

During the period 2018—2022, the majority of 0—19-year-olds who were hospitalised for a primary diagnosis of dental issues also underwent at least one dental procedure (95%). On average, children aged under 20 years underwent 5.69 dental procedures[b] per hospitalisation (95% CI [5.66,5.73]).

Figure 5.6 shows that the most common dental procedure was oral surgery (largely routine dental extractions), followed by restorative dental services (predominantly bonded restorations and stainless-steel crowns), and then preventative dental services (mostly fissure sealants). Other dental services were mostly endodontics or diagnostic dental services (e.g., intra-oral radiographs). The rates of hospitalisations involving any of these types of dental procedures have all increased since 2000. The rate of hospitalisations involving preventative dental services, in particular, has experienced a more than 10-fold increase from 2000 to 2022. Note that preventive dental services are unlikely to be a reason for hospitalisation; rather once a child is under anaesthesia for other dental procedures, it makes sense to apply fluoride varnish and fissure sealants to prevent further tooth decay.



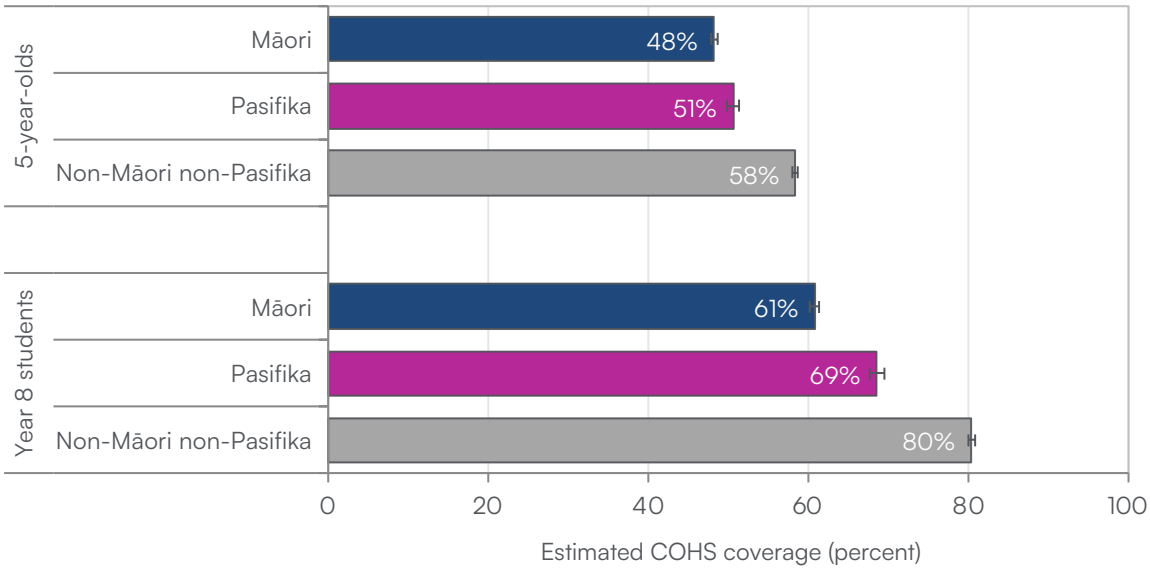
Source: NMDS and NZCYES estimated resident population. Rate per 1,000 0—19-year-olds.

Figure 5.6: Trend in rates of hospitalisations involving dental procedures in 0—19-year-olds, by type of procedure, Aotearoa NZ (2000—22)

b The number of dental procedures performed refers to the number of different dental procedures performed (e.g., fillings, extractions, fissure sealants, etc.) rather than the number of teeth treated.

ETHNIC DIFFERENCES IN ORAL HEALTH FOR CHILDREN

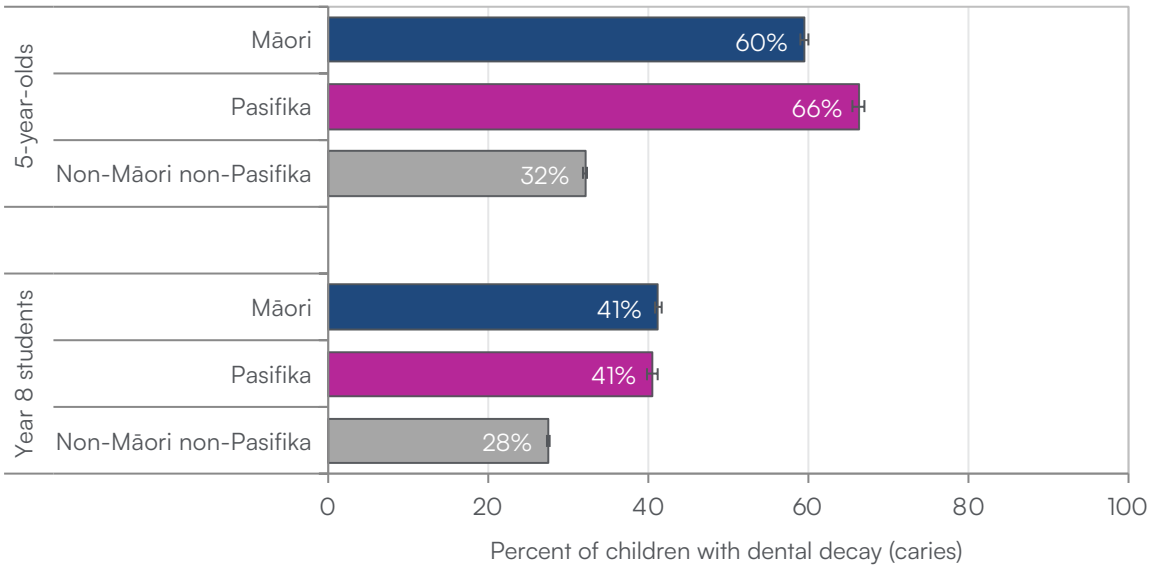
Over the 5 years to the end of 2022, lower proportions of tamariki Māori and Pasifika children were examined by COHS compared to their non-Māori non-Pasifika peers, both at age 5 years and at Year 8 (Figure 5.7).



Source: COHS, Stats NZ estimated resident population. For a number of years, results for certain DHBs have been excluded owing to various data collection problems.

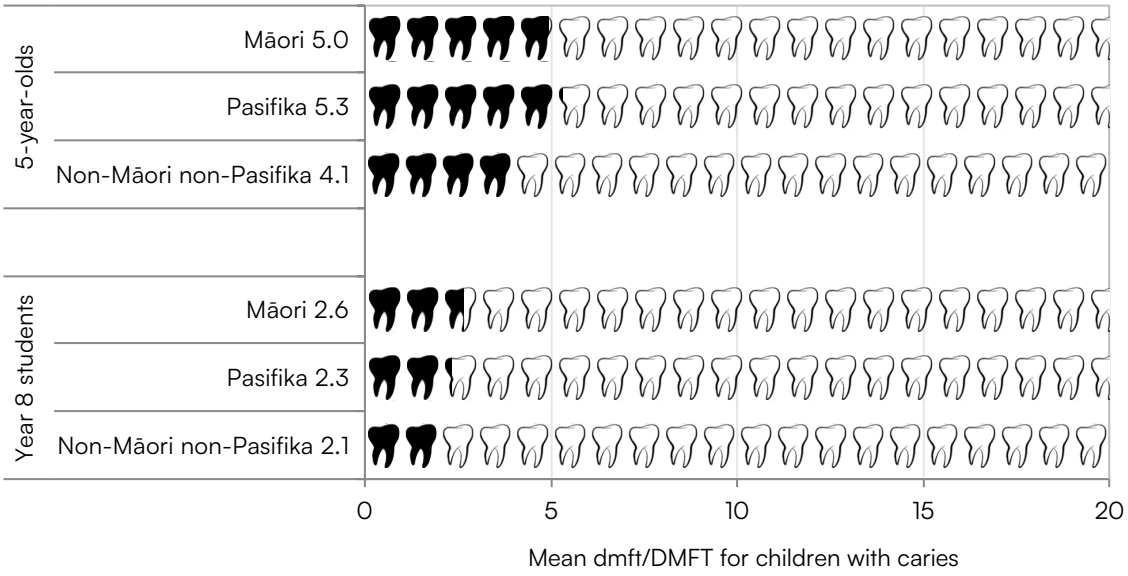
Figure 5.7: Estimated Community Oral Health Services coverage, by age at examination and by ethnicity, Aotearoa NZ (2018—22)

Tamariki Māori and Pasifika children have disproportionate rates of tooth decay. During the period from 2018 to 2022, the proportions of Pasifika and Māori children who had tooth decay were up to double that of non-Māori non-Pasifika children (Figure 5.8). In addition, the severity of dental caries was greater for Māori and Pasifika children; Māori and Pasifika 5-year-olds had 1 more decayed, missing, or filled tooth (dmft), on average, than did non-Māori non-Pasifika 5-year-olds (Figure 5.9). Although Māori and Pasifika children in Year 8 also had a higher caries experience (DMFT) than did non-Māori non-Pasika children, the difference among these older children was smaller (half a tooth, on average).



Source: COHS. For a number of years, results for certain DHBs have been excluded owing to various data collection problems.

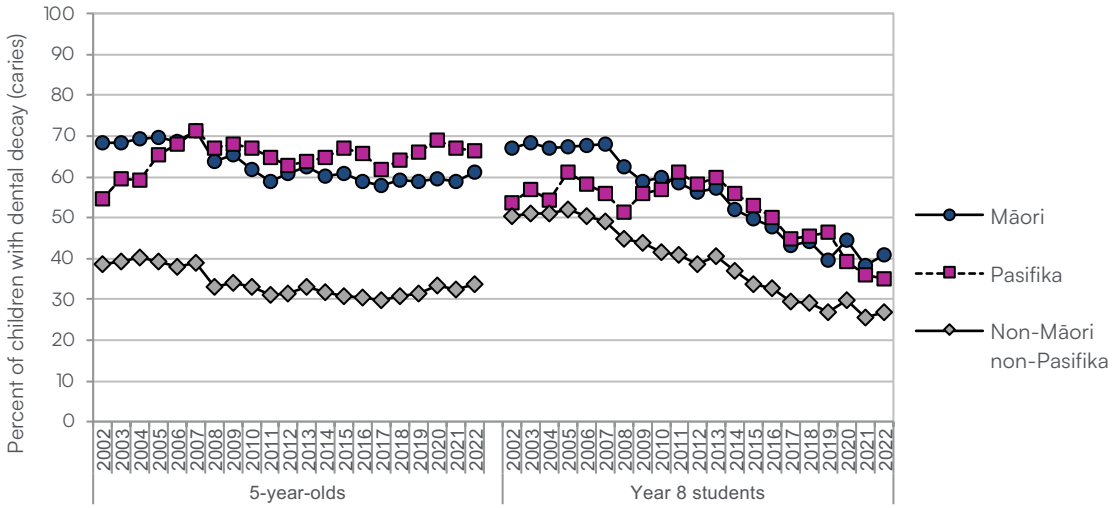
Figure 5.8: Proportions of children with tooth decay (caries), by age at examination and by ethnicity, Aotearoa NZ (2018—22)



Source: COHS. For a number of years, results for certain DHBs have been excluded owing to various data collection problems. This graph represents number of teeth, not percentage.

Figure 5.9: Mean dmft/DMFT for children with tooth decay (caries), by age at examination and by ethnicity, Aotearoa NZ (2018—22)

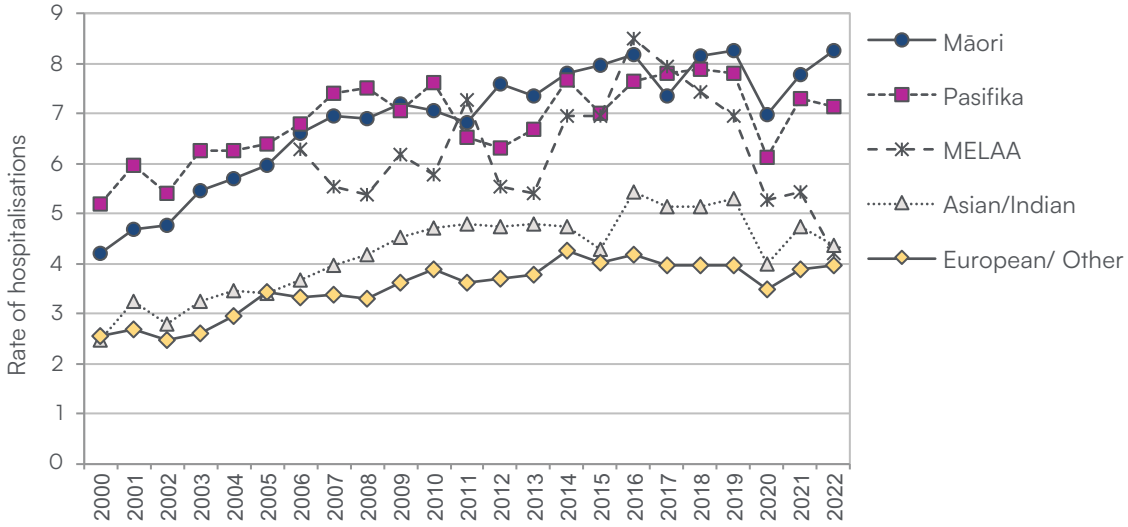
Figure 5.10 shows that the prevalence of tooth decay (caries) has been consistently higher for Māori and Pasifika children compared to non-Māori non-Pasifika children, particularly in the 5-year-old age group. Although the proportions of Year 8 students with tooth decay have decreased across all ethnic groups, the rate of decrease has been more rapid for non-Māori non-Pasifika children and the proportions of those with tooth decay remain higher for Māori and Pasifika children. Given that lower proportions of Māori and Pasifika children were examined by COHS compared to their non-Māori non-Pasifika peers (see Figure 5.7) it is possible that we are underestimating the current prevalence and severity of caries.



Source: COHS. For a number of years, results for certain DHBs have been excluded owing to various data collection problems.

Figure 5.10: Trends in proportions of children with tooth decay (caries), by age at examination and by ethnicity, Aotearoa NZ (2002—22)

Rates of hospitalisation for dental caries (but not other dental issues) have been consistently highest for Māori and Pasifika children and consistently lowest for Asian/Indian and European/Other children (Figure 5.11). Rates of hospitalisation for dental caries have increased since 2000 in each of these groups, but to the greatest extent for tamariki Māori. On average, between 2018 and 2022, the rates of hospitalisation of Māori and Pasifika children for dental caries was about twice as high as the rate for European/Other children (reference group).

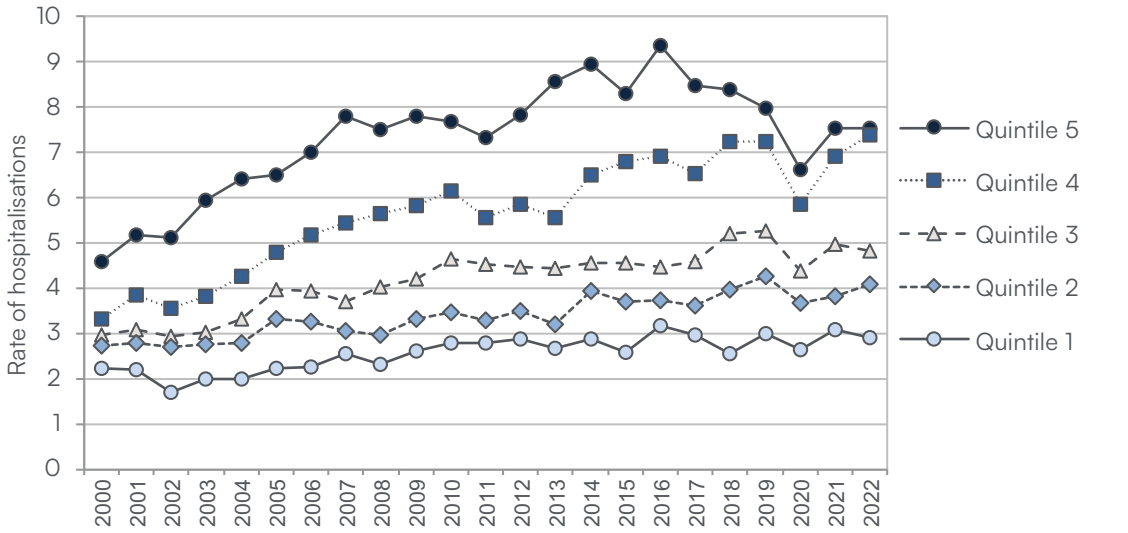


Source: NMDS and NZCYES estimated resident population. Rate per 1,000 0—19-year-olds.
MELAA = Middle Eastern, Latin American, or African. Ethnicity is level 1 prioritised.

Figure 5.11: Trend in rates of hospitalisation for primary diagnoses of dental caries in 0—19-year-olds, by ethnicity, Aotearoa NZ (2000—22)

SOCIOECONOMIC DIFFERENCES IN ORAL HEALTH FOR CHILDREN

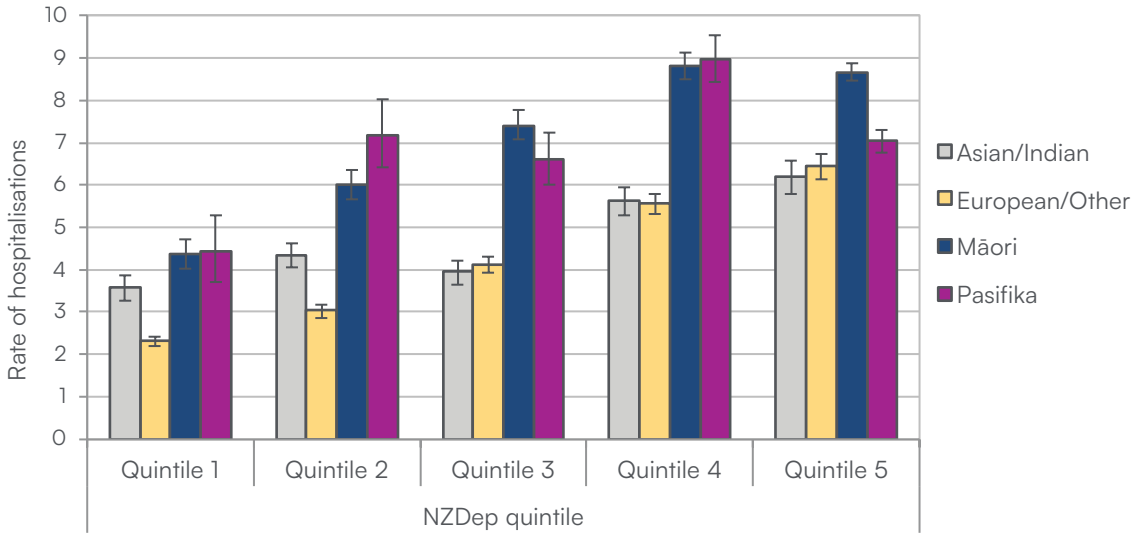
Figure 5.12 shows a very clear deprivation gradient in rates of hospitalisation for dental caries, with children living in the most deprived areas experiencing the highest rates of hospitalisation. Rates of hospitalisations for dental caries have increased (to varying degrees) since 2000 for children living in all deprivation quintiles. On average, between 2018 and 2022, children and young people living in the most deprived areas (quintiles 4 and 5) were hospitalised more than twice as frequently as were their peers living in the least deprived areas (quintile 1). Hospitalisations for dental caries for children living in these two quintiles with the most socioeconomic deprivation accounted for 61% of all hospitalisations for dental caries between 2018 and 2022.



Source: NMDS and NZCYES estimated resident population. Rate per 1,000 0—19-year-olds.
Quintile: NZDep Index of deprivation (1 = least deprived; 5 = most deprived).

Figure 5.12: Trend in rates of hospitalisation for primary diagnoses of dental caries in 0—19-year-olds, by socioeconomic deprivation, Aotearoa NZ (2000—22)

The effects of ethnicity and socioeconomic deprivation on the rate of hospitalisations for dental caries are additive. For the period from 2018 to 2022, although there were deprivation gradients present for children in each ethnic group, rates of hospitalisations for dental caries were highest for Māori and Pasifika children, regardless of the socioeconomic area in which they lived (Figure 5.13).



Source: NMDS and NZCYES estimated resident population. Rate per 1,000 0—19-year-olds.
Quintile: NZDep Index of deprivation (1 = least deprived; 5 = most deprived). Ethnicity is level 1 prioritised.

Figure 5.13: Rates of hospitalisation for primary diagnoses of dental caries in 0—19-year-olds, by socioeconomic deprivation and by ethnicity, Aotearoa NZ (2018—22)

WHAT IS THE STATE OF ORAL HEALTH FOR CHILDREN IN AOTEAROA NZ?

This report has outlined the dire state of child oral health in Aotearoa NZ, the persistent inequalities in the oral health of New Zealand children, and the decreased access to oral health services since the COVID-19 pandemic. Urgent action is required to address the prevalence and severity of tooth decay and the poor access to dental care for children and adolescents. Both upstream and downstream interventions are required to address these issues, with a focus on improving equity and also with an understanding that it will take several years (certainly more than a single electoral cycle) to achieve significant change.

Tooth decay occurs when bacteria in the mouth produce acids that soften enamel and dentine of the tooth.[5-8] Because these bacteria convert sugar into acids, reducing sugar intake can inhibit tooth decay.[5-7 11 30-32] The latest New Zealand Health Survey (NZHS)[33] results (2022/23) show that 13.3% of children aged 2 to 14 years were consuming fizzy drinks at least three times per week and that 9.4% were eating fast food three or more times per week. International evidence shows that banning promotion of sugary drinks may be more effective than an industry sugar levy, an idea that needs to be tested in Aotearoa NZ given NZ children's high exposure to advertising of sugary drinks and processed foods.[5 24 34] Affordability of healthy food is also a major issue, as is confusion around what foods are healthy.[5 35] For example, individually packaged baby food is highly processed and sweetened, despite recommendations from the World Health Organization to avoid sugar for children aged under 2 years.[5 7 35]

Proper toothbrushing with fluoride toothpaste is another effective preventative measure for early childhood caries; beginning toothbrushing before the age of 12 months and having teeth brushed by parents/caregivers (rather than by the child themself) lowers the risk of caries.[5 6 11 31 32 36] Unfortunately, however, access to fluoride toothpaste and toothbrushes is hampered by affordability issues as well as the increasing availability of fluoride-free toothpastes in supermarkets.[5 22 37] Among a host of actions to reduce potentially avoidable hospitalisations, the NZ Government in 2021/22 provided free toothbrushes and fluoride toothpaste to children and families. Promising results from the NZHS[33] show increases in the proportion of children aged under 4 who had their teeth brushed at least twice per day with standard fluoride toothpaste (defined as containing at least 1000ppm fluoride) from 42% before the introduction of this initiative to 54% in the most recent survey. Overall, the proportion of children aged under 15 years brushing their teeth at least twice per day has increased to a similar extent for all ethnic groups.

Community water fluoridation (CWF) is a widely-used and cost-effective tool that has strong evidence of reducing dental caries, particularly among those living with the most socioeconomic deprivation.[5 8 36 38-42] At the recommended concentration of 0.7—1 parts per million, there are no adverse health risks.[41] Currently, around 60% of the population in Aotearoa NZ have access to fluoridated water.[41 43 44] This figure differs geographically, however, with those in Te Waipounamu (South Island) and those in non-urban areas having the least access to fluoridated water supplies.[44] In 2021, the government passed the Health (Fluoridation of Drinking Water) Amendment Act 2021, which allows the Director-General of Health to direct local authorities to add fluoride to their drinking water supplies, a process that is now underway and, if successful, will result in a further 11% of the population gaining access to fluoridated water.[5 43 45 46] The Director General has also advised an additional 27 local authorities that they are being actively considered for a direction to fluoridate, which combined with those areas already fluoridated or directed to fluoridate would result in 80% of the population having access to fluoridated water.[43 45 46] Note, however, that fluoride levels are inconsistent in most water supplies in Aotearoa NZ and, consequently, are below that necessary for oral health benefits, leading to calls for central oversight and regulation.[47]

A further, promising primary intervention is improving oral health literacy of parents/caregivers as well as healthcare professionals.[6 48] Research in Australia and Aotearoa NZ shows that nondental health professionals who receive adequate training, resources, and support can effectively promote good oral health practices to families, resulting in increased uptake of these important preventative oral health practices.[48]

REFERENCES

1. Hillson S. Dental anatomy. In: Hillson S, ed. Dental Anthropology. Cambridge, UK: Cambridge University Press 1996:6-67. https://doi.org/10.1017/CBO9781139170697.002
2. Hillson S. Sequence and timing of dental growth. In: Hillson S, ed. Dental Anthropology. Cambridge, UK: Cambridge University Press 1996:118-47. https://doi.org/10.1017/CBO9781139170697.005
3. Peres MA, Macpherson LMD, Weyant RJ, et al. Oral diseases: a global public health challenge. The Lancet 2019;394(10194):249-60. https://doi.org/10.1016/S0140-6736(19)31146-8
4. World Health Organization. Global oral health status report: Towards universal health coverage for oral health by 2030. Geneva, Switzerland: World Health Organization, 2022. https://www.who.int/publications/i/item/9789240061484
5. Boyd DH, Moffat SM, Foster Page LA, et al. Oral health of children in Aotearoa New Zealand—time for change. Journal of the Royal Society of New Zealand 2022;52(4):335-56. https://doi.org/10.1080/03036758.2022.2069826
6. Pitts NB, Baez RJ, Diaz-Guillory C, et al. Early Childhood Caries: IAPD Bangkok Declaration. International Journal of Paediatric Dentistry 2019;29(3):384-86. https://doi.org/10.1111/ipd.12490
7. World Health Organization. WHO technical information note: Sugars and dental caries. Geneva, Switzerland: World Health Organization, 2017. https://iris.who.int/bitstream/handle/10665/259413/WHO-NMH-NHD-17.12-eng.pdf?sequence=1
8. RACP Paediatric and Child Health Policy Committee. The Royal Australasian College of Physicians: Oral health in children and young people position statement. Sydney, Australia: The Royal Australasian College of Physicians, 2013. https://www.racp.edu.au/docs/default-source/advocacy-library/oral-health-in-children-and-young-people.pdf
9. American Academy of Pediatric Dentistry. Policy on early childhood caries (ECC): Consequences and preventive strategies. The Reference Manual of Pediatric Dentistry 2022:90—93. https://www.aapd.org/globalassets/media/policies_guidelines/p_eccconsequences.pdf
10. Broadbent JM, Page LAF, Thomson WM, et al. Permanent dentition caries through the first half of life. British Dental Journal 2013;215(7):E12-E12. https://doi.org/10.1038/sj.bdj.2013.991
11. Health Promotion Agency. A literature review on oral health in preschoolers. Wellington, New Zealand: Health Promotion Agency, 2015. https://www.hpa.org.nz/sites/default/files/Literature%20review%20oral%20health.pdf
12. Phantumvanit P, Makino Y, Ogawa H, et al. WHO global consultation on public health intervention against early childhood caries. Community Dentistry and Oral Epidemiology 2018;46(3):280-87. https://doi.org/10.1111/cdoe.12362
13. Pussinen PJ, Paju S, Koponen J, et al. Association of childhood oral infections with cardiovascular risk factors and subclinical atherosclerosis in adulthood. JAMA Network Open 2019;2(4):e192523-e23. https://doi.org/10.1001/jamanetworkopen.2019.2523
14. Tinanoff N, Baez RJ, Diaz Guillory C, et al. Early childhood caries epidemiology, aetiology, risk assessment, societal burden, management, education, and policy: Global perspective. International Journal of Paediatric Dentistry 2019;29(3):238-48. https://doi.org/10.1111/ipd.12484
15. Te Whatu Ora Health New Zealand. Publicly funded dental care. Te Whatu Ora Health New Zealand; 2024. Available from: https://info.health.nz/keeping-healthy/teeth-and-gums/dental-care/#publicly-funded-dental-care.
16. Lacey JK, Thomson WM, Crampton P, et al. Working towards Māori oral health equity: Why te Tiriti o Waitangi needs to underpin the oral health system, using evidence from the New Zealand Oral Health Survey. New Zealand Dental Journal 2021;117(September 2021), https://www.nzda.org.nz/assets/files/Archives/NZDJ_Articles/2021/September_2021/Working_towards_Maori_oral_health_equity_-_Why_te_Tiriti_o_Waitangi_needs_to_underpin_the_oral_health_system_using_evidence_from_the_New_Zealand_Oral_Health_Survey.pdf
17. Dental Council of New Zealand. Dental Council workforce analysis 2018-2019. Wellington, New Zealand: Dental Council of New Zealand, 2021. https://dcnz.org.nz/assets/Uploads/Publications/workforce-analysis/Workforce-Analysis-2018-2019.pdf
18. Hunt G, Foster Page L, Thomson W. Dental treatment of children under general anaesthesia in District Health Boards in New Zealand. New Zealand Dental Journal 2018;114(4):156-63. https://www.nzdoctor.co.nz/sites/default/files/2019-02/Dental_Treatment_of_children_under_general_anaesthesia_in_District_Health_Boards_in_New_Zealand.pdf
19. Jatrana S, Crampton P, Filoche S. The case for integrating oral health into primary health care. N Z Med J 2009;122(1301):43-52. https://www.otago.ac.nz/__data/assets/pdf_file/0022/327028/-the-case-for-integrating-oral-health-into-primary-health-care-020426.pdf
20. Smith M, Stroud C, Low M, et al. Non-traumatic dental presentations at emergency departments in New Zealand. New Zealand Medical Journal 2021;134(1544):99-112. https://journal.nzma.org.nz/journal-articles/non-traumatic-dental-presentations-at-emergency-departments-in-new-zealand
21. Broomhead T, Rodd HD, Baker SR, et al. A rapid review of variation in the use of dental general anaesthetics in children. British Dental Journal 2020;229(1):31-39. https://doi.org/10.1038/s41415-020-1846-6
22. Schluter PJ, Kokaua J, Lee M. Severe early childhood caries: a modern (neglected) epidemic? The New Zealand Medical Journal (Online) 2020;133(1518):10. https://www.proquest.com/scholarly-journals/severe-early-childhood-caries-modern-neglected/docview/2430112416/se-2?accountid=14700
23. Kanagaratnam S, Schluter PJ. A review of early childhood caries, risk factors and preventive strategies. New Zealand Dental Journal 2019;115(September 2019):132—50. https://www.nzda.org.nz/assets/files/Archives/NZDJ_Articles/2019/December_2019/A_review_of_early_childhood_caries__risk_factors_and_preventive_strategies.pdf
24. Shackleton N, Broadbent JM, Thornley S, et al. Inequalities in dental caries experience among 4-year-old New Zealand children. Community Dentistry and Oral Epidemiology 2018;46(3):288-96. http://doi.org/10.1111/cdoe.12364

25. Lee JJM, Schluter PJ, Hodgett M, et al. Adolescents and oral health service utilization in Canterbury, New Zealand: A geospatial cross-sectional study. Community Dentistry and Oral Epidemiology 2023;51(3):388-98. http://doi.org/10.1111/cdoe.12858

26. Broughton JR, Thomson WM, Maipi J TeH, et al. Mokopuna Māori me oranga niho (Māori infants and oral health) an early childhood caries randomised control trial among New Zealand Māori children. New Zealand Dental Journal 2021;117:129—36. https://www.nzda.org.nz/assets/files/Archives/NZDJ_Articles/2021/September_2021/Mokopuna_Maori_me_oranga_niho_(Maori_infants_and_oral_health)_an_early_childhood_caries_randomised_control_trial_among_New_Zealand_Maori_children.pdf

27. Ministry of Health. National Minimum Dataset (Hospital Events) Data Dictionary. Wellington, New Zealand: Ministry of Health, 2021. https://www.health.govt.nz/publication/national-minimum-dataset-hospital-events-data-dictionary

28. Ministry of Health. Age 5 and Year 8 oral health data from the Community Oral Health Service. 2023. Available from: https://www.health.govt.nz/nz-health-statistics/health-statistics-and-data-sets/oral-health-data-and-stats/age-5-and-year-8-oral-health-data-community-oral-health-service.

29. Machiulskiene V, Campus G, Carvalho Joana C, et al. Terminology of dental caries and dental caries management: Consensus report of a workshop organized by ORCA and Cariology Research Group of IADR. Caries Research 2019;54(1):7-14. https://doi.org/10.1159/000503309

30. Heyman MB, Abrams SA. Fruit juice in infants, children, and adolescents: Current recommendations. Pediatrics 2017;139(6) http://doi.org/10.1542/peds.2017-0967

31. Oral Health Clinical Advisory Network. Clinical guidelines for child and adolescent oral health. New Zealand: Oral Health Clinical Advisory Network, 2019. https://www.nzohcan.org.nz/wp-content/uploads/2019/09/OHCAN_Clinical-Guidelines-for-Child-and-Adolescent-Oral-Health_2019-July_online-2-3-2.pdf

32. Pitts NB, Twetman S, Fisher J, et al. Understanding dental caries as a non-communicable disease. British Dental Journal 2021;231(12):749-53. https://doi.org/10.1038/s41415-021-3775-4

33. Ministry of Health. Methodology Report 2022/23: New Zealand Health Survey. Wellington, New Zealand: Ministry of Health, 2023. https://www.health.govt.nz/system/files/documents/publications/methodology-report-2022-23-new-zealand-health-survey-dec23.pdf

34. Dogbe W, Revoredo-Giha C. Industry levy versus banning promotion on soft drinks in Scotland: A distributional analysis. Food Policy 2022;106:102191. https://doi.org/10.1016/j.foodpol.2021.102191

35. Watt RG, Daly B, Allison P, et al. Ending the neglect of global oral health: time for radical action. The Lancet 2019;394(10194):261-72. https://doi.org/10.1016/S0140-6736(19)31133-X

36. Jullien S. Prophylaxis of caries with fluoride for children under five years. BMC Pediatrics 2021;21(Suppl 1):351. http://doi.org/10.1186/s12887-021-02702-3

37. Hobbs M, Marek L, Clarke R, et al. Investigating the prevalence of non-fluoride toothpaste use in adults and children using nationally representative data from New Zealand: a cross-sectional study. British Dental Journal 2020;228(4):269-76. https://doi.org/10.1038/s41415-020-1304-5

38. Hobbs M, Wade A, Jones P, et al. Area-level deprivation, childhood dental ambulatory sensitive hospitalizations and community water fluoridation: evidence from New Zealand. International Journal of Epidemiology 2020;49(3):908-16. https://doi.org/10.1093/ije/dyaa043

39. Schluter PJ, Hobbs M, Atkins H, et al. Association Between Community Water Fluoridation and Severe Dental Caries Experience in 4-Year-Old New Zealand Children. JAMA Pediatrics 2020;174(10):969-76. https://doi.org/10.1001/jamapediatrics.2020.2201

40. McLaren L, Patterson SK, Faris P, et al. Fluoridation cessation and children's dental caries: A 7-year follow-up evaluation of Grade 2 schoolchildren in Calgary and Edmonton, Canada. Community Dentistry and Oral Epidemiology 2022;50(5):391-403. http://doi.org/10.1111/cdoe.12685

41. Office of the Prime Minister's Chief Science Advisor. Fluoridation: An update on evidence. 2021. Available from: https://www.pmcsa.ac.nz/topics/fluoridation-an-update-on-evidence/.

42. Sapere Research Group. Review of the benefits and costs of water fluoridation in New Zealand. Wellington, New Zealand: Ministry of Health, 2015. https://www.health.govt.nz/publication/review-benefits-and-costs-water-fluoridation-new-zealand

43. Ministry of Health. Annual report on drinking-water quality 2020—2021. Wellington, New Zealand: Ministry of Health, 2022. https://www.health.govt.nz/system/files/documents/publications/annual-report-on-drinking-water-quality-2020-2021-mar22.pdf

44. Environmental Health Intelligence NZ. Access to fluoridated drinking-water. Wellington, New Zealand: Environmental Health Intelligence NZ, Massey University, 2023. https://www.ehinz.ac.nz/indicators/water/drinking-water-quality/access-to-fluoridated-drinking-water/

45. Ministry of Health. Community water fluoridation in Aotearoa New Zealand. 2023. Available from: https://www.health.govt.nz/our-work/preventative-health-wellness/oral-health/community-water-fluoridation-aotearoa-new-zealand accessed October 2023.

46. Taumata Arowai. Register of drinking water suppliers. Wellington, New Zealand: Ministry of Health; 2021. Available from: https://www.taumataarowai.govt.nz/for-communities/public-registers/public-register-2/.

47. Chambers T, Hobbs M, Broadbent JM. An assessment of compliance with optimal fluoride levels for oral health benefit by New Zealand drinking water suppliers. Journal of Public Health Dentistry 2023;83(2):217-21. https://doi.org/10.1111/jphd.12548

48. Nation A, Pukallus M, Stormon N, et al. Health professionals delivering oral health interventions in early childhood: A scoping review of Australian and New Zealand literature. Health Promotion Journal of Australia 2023;34(2):303-15. http://doi.org/10.1002/hpja.678

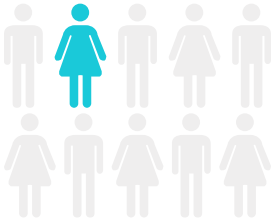
06 MENTAL HEALTH CONCERNS
Ngā take hauora hinengaro

DISABLED CHILDREN WERE
10 TIMES MORE LIKELY
TO HAVE
EMOTIONAL AND/OR BEHAVIOURAL PROBLEMS
THAN WERE NON-DISABLED CHILDREN

NEARLY ONE THIRD REPORTED UNMET NEED

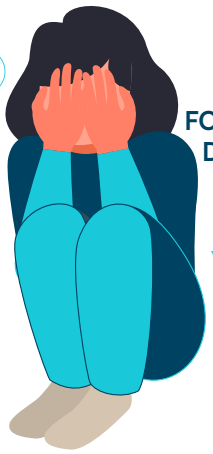
TWICE
AS MANY YOUNG PEOPLE REPORTED HIGH OR VERY HIGH LEVELS OF
PSYCHOLOGICAL DISTRESS
DURING THE COVID-19 PANDEMIC

THERE IS **SIGNIFICANT UNMET** AND **INCREASING NEED** FOR MENTAL HEALTH ASSISTANCE



1 IN 10 CHILDREN
AGED 2—14 YEARS
ARE LIKELY TO HAVE
EMOTIONAL AND/OR BEHAVIOURAL PROBLEMS

EUROPEAN/OTHER CHILDREN LIVING IN SOCIOECONOMICALLY DREPRIVED AREAS WERE SIGNIFICANTLY
MORE LIKELY
TO RECEIVE
MENTAL HEALTH SERVICES OR BE HOSPITALISED
THAN WERE MĀORI AND PASIFIKA CHILDREN LIVING IN SOCIOECONOMICALLY DEPRIVED AREAS



RATES OF HOSPITALISATION FOR MENTAL AND BEHAVIOURAL DISORDERS HAVE INCREASED RAPIDLY FOR
GIRLS AND YOUNG WOMEN
SINCE 2011, AND YOUNG WOMEN ARE
1.7 TIMES
MORE LIKELY TO BE HOSPITALISED

KEY RECOMMENDATIONS

- **Investment into child and youth mental health services that is proportional to the population** (currently children and adolescents have 10% of the mental health budget despite making up 22% of the population). Every child and young person should have access to equitable and culturally appropriate care.
- **Quality research into effective treatment strategies, service delivery, and prevention methods** (e.g., digital interventions or community development strategies) that 'stem the tide' of increasing population-level distress is needed. These interventions must be specific to the populations they are targeting and must address the wider social determinants of mental wellbeing.
- **Strategies to reduce stigma, counter exclusion, and promote mental wellbeing** (e.g., public health campaigns and training programmes) to prevent psychological distress and isolation, encourage help-seeking, and enable early and effective interventions by reducing the barriers to support (e.g., stigma and racism/discrimination).
- **Understand the drivers of rapid increases in mental health concerns and widening inequities. Better data** are needed across all groups in order to have a **greater understanding of the scale of mental distress in the community** so that the care provided matches need. While mental health concerns are increasingly affecting more children and young people in our society, this burden is not evenly distributed and there are ethnic inequalities and widening gaps for girls, those with disabilities, and those living with socioeconomic deprivation.
- **Creating responsive, inclusive, and developmentally appropriate models of care** (e.g., culturally specific strategies, services for infant mental health) that foster safe, trusting relationships, are intuitive and welcoming, and ensure that everyone can utilise services that meet their needs and preferences.
- **Growth of the child and youth mental health workforce is needed.** There are not enough clinicians to respond to the growing demand for mental health support in child and adolescent mental health. Current child and youth mental health services have become crisis services, responding only to the most urgent issues. This means important and effective early intervention strategies are side-lined. Growing the sector will require purposeful investment in the workforce pipeline and thinking more creatively about strategies to support families seeking help before reaching crisis point.

KEY FINDINGS

- **Hospitalisations for mental health concerns or for intentional self-harm have increased exponentially** since 2000, especially for younger adolescents and for young women. Although hospitalisations for **self-harm in adolescents increased during the COVID-19 pandemic**, there was no corresponding increase in the suicide rate.
- **Twice as many young people (15—24 years) reported high or very high levels of psychological distress during the COVID-19 pandemic.** This proportion peaked at 24% in 2021/22 but dropped slightly in 2022. **Hospitalisations for mental health issues and self-harm also declined between 2021 and 2022**, perhaps reflecting some recovery from the impact of the COVID-19 pandemic on the mental health of our young people.
- **Rates of hospitalisation for mental and behavioural disorders have increased rapidly for girls and young women** since 2011, and **young women are 1.7 times more likely to be hospitalised** for mental health concerns, when compared to young men.
- **Most publicly funded mental health care occurs in community-based settings.** For every individual under the age of 15 years who was hospitalised for mental health concerns, 40 were seen by publicly funded mental health services. These services see just under 50,000 children and adolescents per year.
- **One in ten children** aged 2—14 years are **likely to have emotional and/or behavioural problems.**
- **Tamariki Māori were more likely to have emotional concerns and/or behavioural problems** but **less likely to access specialist care or be hospitalised for mental health concerns,** especially if they were experiencing socioeconomic deprivation.
- **European/Other children living in socioeconomically deprived areas were significantly more likely to receive mental health services or be hospitalised for their concerns** than were Māori and Pasifika children living in socioeconomically deprived areas.
- **Disabled children were 10 times more likely to have emotional and/or behavioural problems than were non-disabled children** and were more likely to seek help, but **nearly one third reported unmet need.**
- There is **significant unmet and increasing need** for mental health assistance.

WHY PRIORITISE MENTAL HEALTH FOR CHILDREN AND YOUNG PEOPLE?

Mental health is a key component of overall health and wellbeing, and most children and young people in Aotearoa NZ are happy, healthy, and satisfied with their lives overall.[1-3] Mental health concerns often arise during the transition to adolescence due to puberty, neurological development, shifts in identity, and changing societal expectations related to maturation.[3 4] However, it is important to recognise that challenges commonly faced by children such as ADHD, anxiety and autism spectrum disorders can be diagnosed through childhood.

Mental health concerns, mental illnesses, and mental disorders interfere with children and young people's cognitive, emotional, or social abilities, and affect how they feel, think, behave, and interact with others.[5] Young people with mental health concerns are less able to cope with the normal stresses of life, to engage with the education system, and to realise their potential to live fulfilling and productive lives.[6-8] If mental health concerns are not addressed early, they can progress to more serious mental illnesses. Furthermore, the younger someone is when they experience mental health difficulties, the greater the functional impact and accumulation of comorbid disorders and psychopathology.[9 10]

Intentional self-harm is increasingly common.[11-13] Young people who intentionally injure themselves may not intend to die; self-harm can be a short-term response to distressing emotions and difficult situations.[14] Up to half of adolescents engage in self-harm in their lifetime but most only self-harm once and do not seek help of any kind.[14-17] Those who receive appropriate care and support are more likely to discontinue self-harming.[14-17] However, self-harm that results in presentation to hospital is a strong predictor of death by suicide[16] and so this must be recognised as an opportunity to ensure that they receive the support they need. The most unacceptable consequence of mental health concerns in young people is that Aotearoa NZ's rate of suicide among adolescents aged between 15 and 19 years exceeds that of most other high-income countries and is more than double the OECD average.[18-20]

CURRENT DATA ON THE STATE OF MENTAL HEALTH FOR CHILDREN AND YOUNG PEOPLE IN AOTEAROA NZ

Information on the mental health of young people was derived both from data collected routinely by the New Zealand Government and from reports from young people and their parents or caregivers.

Data on hospitalisations (in emergency departments, paediatric wards, and psychiatric inpatient settings) for mental health concerns were taken from the NZ Ministry of Health's National Minimum Dataset (NMDS), based on the diagnostic codes at discharge between January 2000 and December 2022. Rates include all acute and semi-acute (arranged) hospitalisations for those aged 0—19 years whose primary diagnosis was coded as mental and behavioural disorders (ICD-10-AM: F00-F99).[21] Rates for intentional self-harm were also taken from the NMDS, and include all hospitalisations coded as intentional self-harm (ICD-10-AM: X60-X84) or sequelae of intentional self-harm (Y87.0) for those aged 1—19 years.

Information on the provision of publicly funded secondary mental health and alcohol and drug services, including secondary inpatient, outpatient, and some community care provided by hospitals and non-Government organisations, is taken from the NZ Ministry of Health's Programme for the Integration of Mental Health Data (PRIMHD) between January 2017 and December 2022.[22]

Data on the prevalence of mental health concerns as well as help-seeking behaviour, based on self-report or parental report (for children aged under 15 years) are from the annual New Zealand Health Survey (NZHS).[23] For children aged 2—14 years, the NZHS uses the Strengths and Difficulties Questionnaire, which measures the risk of experiencing substantial difficulties in emotional symptoms, conduct problems, hyperactivity, and peer problems. The NZHS also asks about whether children have ever had diagnoses of attention deficit hyperactivity disorder (ADHD) or Autism Spectrum Disorder. For young people and adults, the NZHS measures loneliness as well as levels of psychological distress using the Kessler Psychological Distress Scale (K10).

There are problems inherent in each of these data sets. The hospitalisation data reflect only those children and young people who present to hospital with the most serious mental health concerns. In addition, the hospitalisation data as well as the data on publicly funded secondary mental health services do not include primary mental health presentations, e.g., primary care consultations, school-based health service data, and school pastoral care data, among others. With regard to data from the NZHS, many children and young people will not have disclosed mental health concerns to their caregivers and, in other cases, they may not have been able to access professional help to receive a diagnosis (e.g., due to stigma, financial barriers, or long wait-times for mental health services). For these reasons, the data from each of these sources, in isolation, are likely to underestimate the types and magnitude of mental health concerns among children and young people in Aotearoa NZ. By providing information from all three of these sources, we hope to provide a more rounded, though by no means complete, picture of the state of child and adolescent mental health in Aotearoa NZ.

For further information on data sources, measurement, and methods please refer to the appendix.

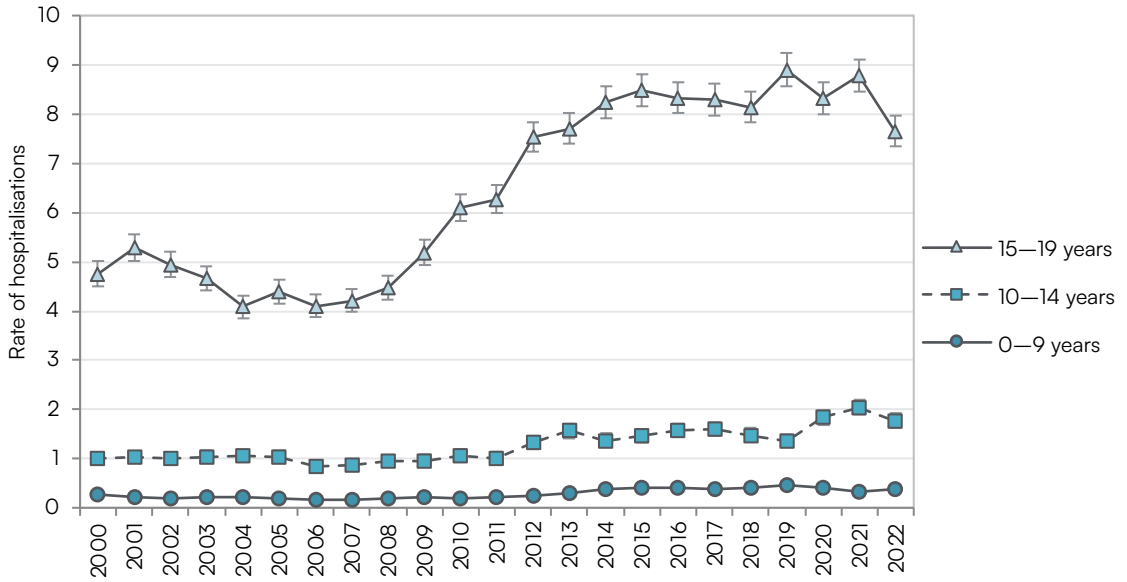
Hospitalisations for mental health concerns

Over the 5 years to the end of 2022, the average number of hospitalisations for mental and behavioural disorders among young New Zealanders was 3,472 per year — almost double the average annual number between 2000 and 2004. Most (77%) of these hospitalisations were for adolescents aged 15—19 years, followed by younger adolescents aged 10—14 years (16%).

Hospitalisation for child and adolescent mental health problems is uncommon in Aotearoa NZ, with most children and young people being treated in the community. Nevertheless, mental and behavioural disorders made up 2.3% of all (total) acute and semi-acute hospitalisations for children and young people during the period 2018—2022; this is a 67% increase since 2000—2004. This proportion differed by age group, with mental and behavioural disorders making up 0.3% of hospitalisations for children younger than 10 years and 7% of hospitalisations for adolescents aged 15—19 years.

For the 5-year period from 2018 to 2022, children and young people who were hospitalised for mental or behavioural disorders were most commonly admitted to general hospitals (76%), followed by mental health units within the public system (21%), and then non-hospital mental health services (2.5%). The median length of stay in general hospital admissions was only 1 day (which may reflect emergency department presentations) whereas admissions to specific mental health units or services had median lengths of stay of 6 to 8 days.

Figure 6.1 shows that hospitalisation rates for mental and behavioural disorders among children and young people have increased significantly. Rates increased from about 2009 in adolescents 15 years and older, and although rates are much lower for younger adolescents, they have doubled over that time. There have been slight downward trends for both groups of adolescents for the 2022 year.



Source: NMDS, NZCYES Estimated Resident Population. Rate per 1,000 age-specific population.

Figure 6.1: Trends in hospitalisations of 0—19-year-olds for mental and behavioural disorders, by age group, Aotearoa NZ (2000—22)

Reasons for hospitalisation

As shown in Table 6.1, the most common reasons for hospitalisation for younger adolescents were eating disorders (26%), anxiety disorders or stress-related reactions (24%), and mood disorders (12%). Older adolescents were most commonly hospitalised for concerns related to substance-use, primarily alcohol (24%), followed by mood disorders (19%) and anxiety disorders or stress-related reactions (18%). Despite the finding that one in five hospitalisations for mental and behavioural disorders relates to substance use, the Youth19 surveys found a significant downward trend in misuse of alcohol and other substances by young people between 2001 and 2019.[24] While this is encouraging, the role of alcohol in mental health concerns remains clear from the fact that it is implicated in at least half of youth suicides.[7 25 26] The government should implement recommendations to minimise the harm associated with alcohol and other drugs, including addiction treatment services and evidence-based policies and laws to restrict access for young people.[7 26-28]

Children aged under 10 years were most likely to be hospitalised for autism and related conditions (25%), speech and language development disorders (12%), and other, unspecified disorders usually first diagnosed in infancy, childhood, or adolescence (23%). A not insignificant proportion were also hospitalised for anxiety disorders or stress-related reactions (9%). It is possible that some of the hospitalisations of young children reflect the lack of options for families struggling with managing behaviour at home.

Primary diagnosis	Age group 0—9	10—14	15—19
Substance-related disorders	**<1%**	**11.0%**	**23.8%**
Alcohol		9.0%	16.0%
Cannabinoids		1.4%	4.1%
Anxiety disorders	**8.8%**	**24.1%**	**17.8%**
Reaction to severe stress, and adjustment disorders	<1%	7.1%	7.2%
Other anxiety disorders*	4%	8.5%	6.5%
Dissociative [conversion] disorders	2.2%	5.8%	2.8%
Mood disorders	**<1%**	**12.3%**	**18.8%**
Depressive episode		8.2%	11.5%
Bipolar affective disorder		<1%	2.5%
Persistent mood [affective] disorders		1.8%	1.4%
Recurrent depressive disorder		<1%	1.4%
Eating or sleep disorders	**2.8%**	**26.4%**	**12.3%**
Eating disorders	1.6%	26.3%	12.2%
Disorders usually first diagnosed in infancy, childhood, or adolescence	**82.7%**	**16.9%**	**4.7%**
Autism and other related conditions	24.6%	4.7%	1.4%
Specific developmental disorders of speech and language	12.2%	<1%	<1%
Tic disorders	5.3%	3.2%	<1%
Disruptive, impulse-control, and conduct disorders	2.9%	2.8%	<1%
Feeding disorder of infancy and childhood	2.9%	<1%	-
Motor disorders	2.6%	<1%	<1%
Attention deficit and related disorders	2.4%	1.7%	<1%
Intellectual disabilities	1.6%	1.1%	<1%
Unspecified disorders†	22.7%	<1%	<1%
Schizophrenia and other psychotic disorders	**<1%**	**3.7%**	**14.1%**
Unspecified nonorganic psychosis		1.9%	8.0%
Schizophrenia		1.1%	3.8%
Other mental and behavioural disorders	**4.7%**	**5.6%**	**8.6%**
Specific personality disorders	<1%	1.2%	6.7%
Postconcussional syndrome	3.6%	2.8%	<1%

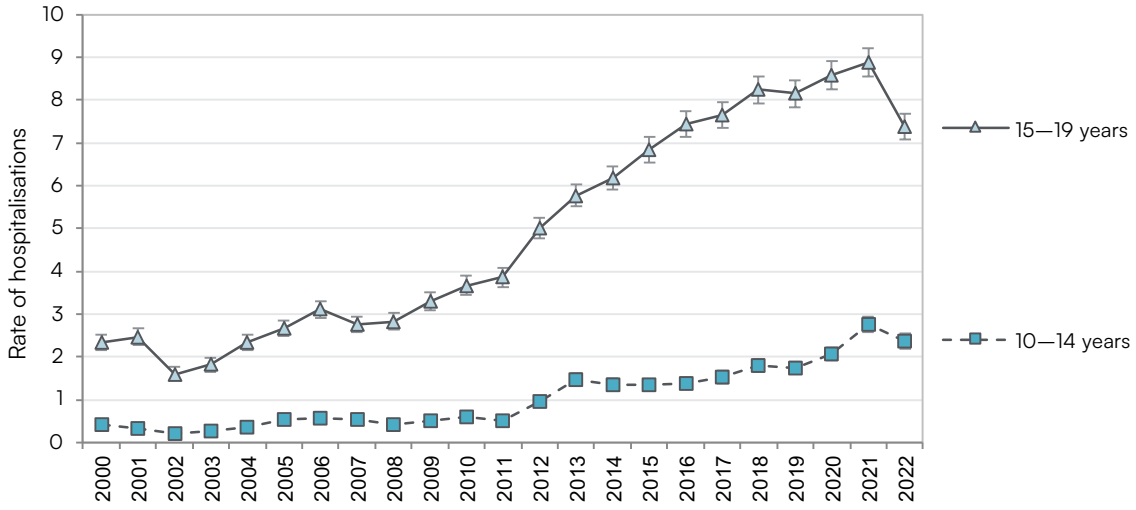
Table 6.1: Primary diagnoses of hospitalisations for mental and behavioural disorders in 0—19-year-olds, by age group, Aotearoa NZ (2018—22)

Source: NMDS. Percent of hospitalisations for mental and behavioural disorders for each age group. This table is not exhaustive; it includes examples of common sub-diagnoses, which do not sum to the category totals. * Other anxiety disorders include mixed anxiety and depressive disorder, panic disorder, generalised anxiety disorder. † Unspecified disorders (within disorders usually first diagnosed in infancy, childhood, or adolescence) are those classified as "unspecified disorders of psychological development" in the NMDS.

Hospitalisations for self-harm

Over the 5 years to the end of 2022, an average of 3,323 children and adolescents have been hospitalised for intentional self-harm per year — almost five times the average number between 2000 and 2004. Most (79%) of these hospitalisations were for adolescents aged 15—19 years.

Hospitalisation rates for intentional self-harm increased significantly from 2000 to 2022, particularly after 2011 (Figure 6.2). The increase has been very steep for younger adolescents: For those aged 10—14 years, the rate of hospitalisations for self-harm at its peak in 2021 was 450% of the rate in 2011, compared with a 130% increase for 15—19-year-olds. There have been slight downward trends of approximately 15% for both groups of adolescents for the 2022 year. Although hospitalisations for intentional self-harm increased in conjunction with COVID-19, the pandemic was, fortunately, not associated with a rise in deaths by suicide in Aotearoa NZ.[18 29]



Source: NMDS, NZCYES estimated resident population. Rate per 1,000 age-specific population.
Rates for 1—9-year-olds suppressed due to low numbers.

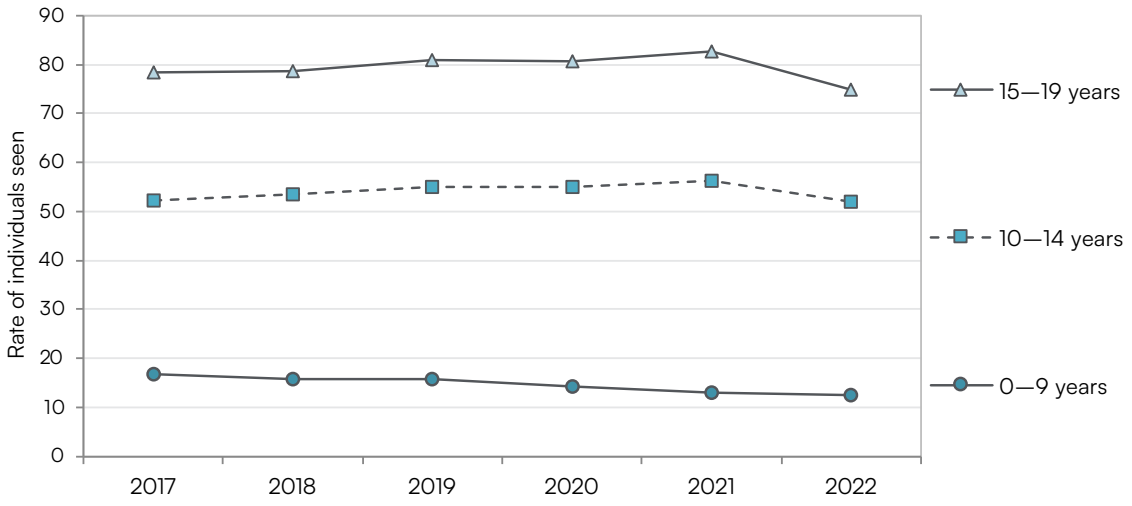
Figure 6.2: Trends in hospitalisations of 10—19-year-olds for intentional self-harm, by age group, Aotearoa NZ (2000—22)

Publicly funded mental health service use

The majority of publicly funded mental health care occurs in community-based settings, not hospitals. A crude comparison against unique children and young people who were hospitalised for mental and behavioural disorders shows that for every individual hospitalised, approximately 40 children and young adolescents (under the age of 15 years) are seen by publicly funded mental health services. For older adolescents, however, 14 individuals are seen by publicly funded mental health services for every young person hospitalised.

Over the 6 years to the end of 2022, just under 50,000 children and adolescents were seen by publicly funded mental health services per year. Older adolescents (15—19 years) were most frequently seen (49%), followed by younger adolescents (33%), and then children under the age of 10 years (18%). Unlike hospital data, there is often no diagnosis entered, or the diagnosis is deferred, after children and young people have been contacted by mental health services (up to 73%). When there is diagnosis information present, children and young people are most often ascribed diagnoses of 'disorders usually first diagnosed in infancy, childhood, or adolescence' (such as attention-deficit and related disorders, autism and other related conditions, and disruptive, impulse-control, and conduct disorders) (16%), anxiety disorders (15%), and mood disorders (11%).

Figure 6.3 shows that rates of children and adolescents seen by mental health services have remained relatively steady for adolescents aged 10 years and older from 2017 until 2021. There have been downward trends for both groups of adolescents for the 2022 year. Rates for children under the age of 10 years who were seen by mental health services have decreased by 26% since 2017.



Source: PRIMHD, NZCYES Estimated Resident Population. Rate per 1,000 age-specific population.

Figure 6.3: Trends in unique individuals seen by publicly funded mental health services, by age group, Aotearoa NZ (2017—22)

Mental health concerns for children

Emotional and behavioural concerns. The latest (2022/23) NZHS data show that one in ten (9.6%) children aged 2—14 years were likely to have emotional symptoms and/or behavioural problems.

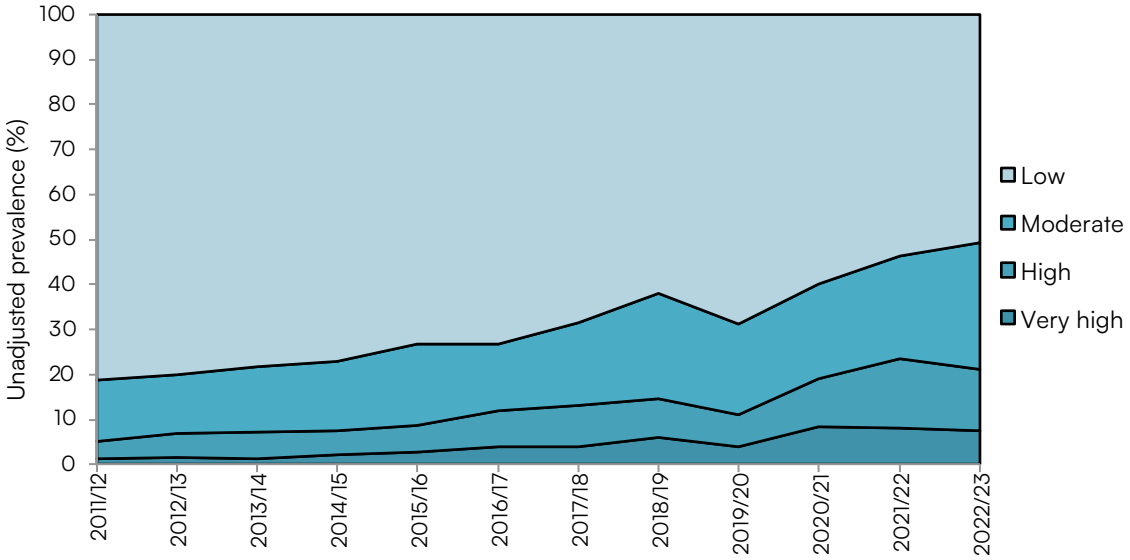
Neurodevelopmental conditions. Approximately 3% of children had been diagnosed by a doctor as having attention deficit hyperactivity disorder (ADHD) and 2.5% had a diagnosis of Autism Spectrum Disorder.

Similar proportions of parents sought help for their children's mental health issues from family or friends (8.1%), a GP or nurse (7.6%), or a teacher (8.6%), with a lower proportion seeking help from a mental health professional (3.5%) in the past 12 months. For 6.6% of children, parents reported unmet need for mental health or addiction services in the past 12 months.

Psychological distress in adolescents and young adults

The NZHS asks young people and adults about feelings of loneliness in the past 4 weeks. In the most recent survey, just under 8% of young people aged 15—24 years reported feeling lonely most or all of the time, the same as in the last report. Young people were most likely to seek help for mental health issues from family or friends (26%), followed by a GP or nurse (14%), or a mental health professional (12%). Just under 16% reported unmet need for mental health or addiction services in the past 12 months.

NZHS data show a trend towards young people aged 15—24 years reporting more psychological distress over time with the proportion of those who reported high or very high levels of psychological distress within the past 4 weeks increasing from 5% in 2011/12 to 21% in 2022/23 (Figure 6.4). The proportions who reported high levels of psychological distress doubled following the COVID-19 pandemic but, having peaked at 24% in 2021/22, has dropped a little in 2022/23, perhaps signalling that the acute distress associated with COVID-19 is abating.



NZHS. Kessler Psychological Distress Scale (K10).
Note: Smaller sample sizes in 2019/20 and 2020/21. These data are not available for younger children.

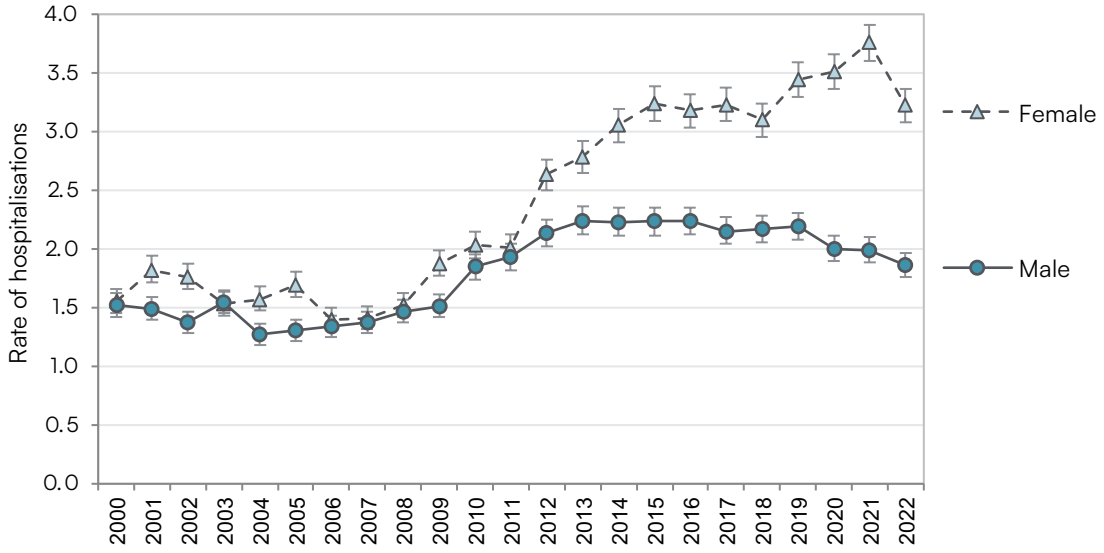
Figure 6.4: Trends in prevalence of levels of psychological distress in 15—24-year-olds, Aotearoa NZ (2011/12—2022/23)

GENDER/SEX DIFFERENCES IN MENTAL HEALTH AND ACCESS TO CARE

Hospitalisations for mental and behavioural disorders have been more frequent for adolescent girls than for adolescent boys. For the period from 2018 to 2022, 61% of hospitalisations for mental and behavioural disorders among 0—19-year-olds were for girls. During the same period, rates for girls were 1.7 times those for boys.

Overall, the rate of hospitalisations for mental and behavioural disorders has increased rapidly for girls and young women since about 2011, with a widening gender difference (Figure 6.5). Although rates of hospitalisation for young boys (under age 10) tend to be higher than those for young girls, this trend reverses after the age of 10 years.

In terms of the primary diagnoses for these hospitalisations, boys and young men were most likely to be hospitalised for concerns related to substance-use (27%), followed by schizophrenia and delusional disorders (20%), and then mood disorders (15%). Girls and young women, on the other hand, were most likely to be hospitalised for anxiety disorders or stress-related reactions (21%) and eating disorders (21%), followed by mood disorders (18%). For the period from 2018 to 2022, 93% of hospitalisations for eating disorders among 0—19-year-olds were for girls and young women. The COVID-19 pandemic has also been associated with a significant increase in the prevalence of eating disorders in children and young people, particularly among adolescent girls.[30]

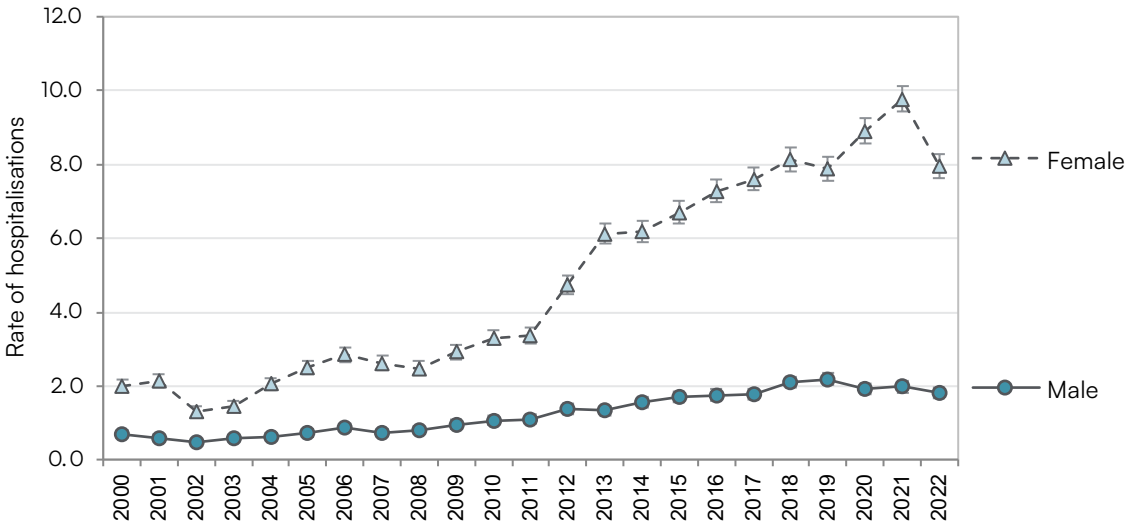


Source: NMDS, NZCYES estimated resident population. Rate per 1,000 0—19-year-olds.

Figure 6.5: Trends in hospitalisations of 0—19-year-olds for mental and behavioural disorders, by gender, Aotearoa NZ (2000—22)

Hospitalisations for intentional self-harm have also been more frequent for adolescent girls than for adolescent boys. On average, 80% of hospitalisations for intentional self-harm among 10—19-year-olds during 2018—2022 were for girls and rates for girls were 4.3 times those for boys.

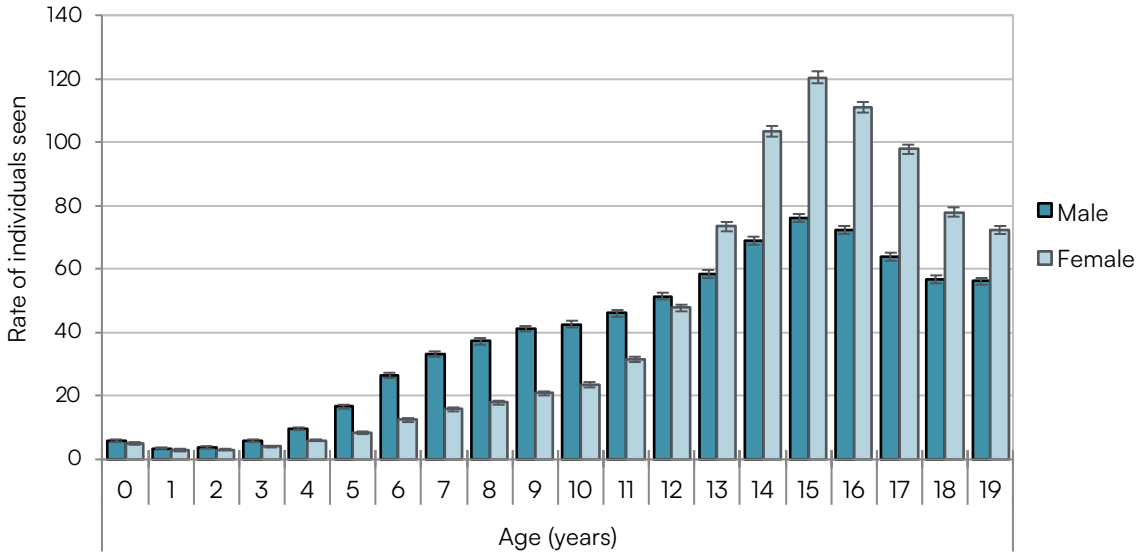
Figure 6.6 shows that for adolescent girls, the overall rate of intentional self-harm increased exponentially between 2000 and 2021 but has decreased slightly in 2022. From 2000 until the high point in 2021, rates increased 660% for girls aged 10—14 years and 322% for girls aged 15—19 years. For adolescent boys, the equivalent increases were 177% for 10—14-year-olds and 175% for 15—19-year-olds.



Source: NMDS, NZCYES estimated resident population. Rate per 1,000 children and young people aged 10—19 years. Rates for 1—9-year-olds suppressed due to low numbers.

Figure 6.6: Trends in hospitalisations of 10—19-year-olds for intentional self-harm, by gender, Aotearoa NZ (2000—22)

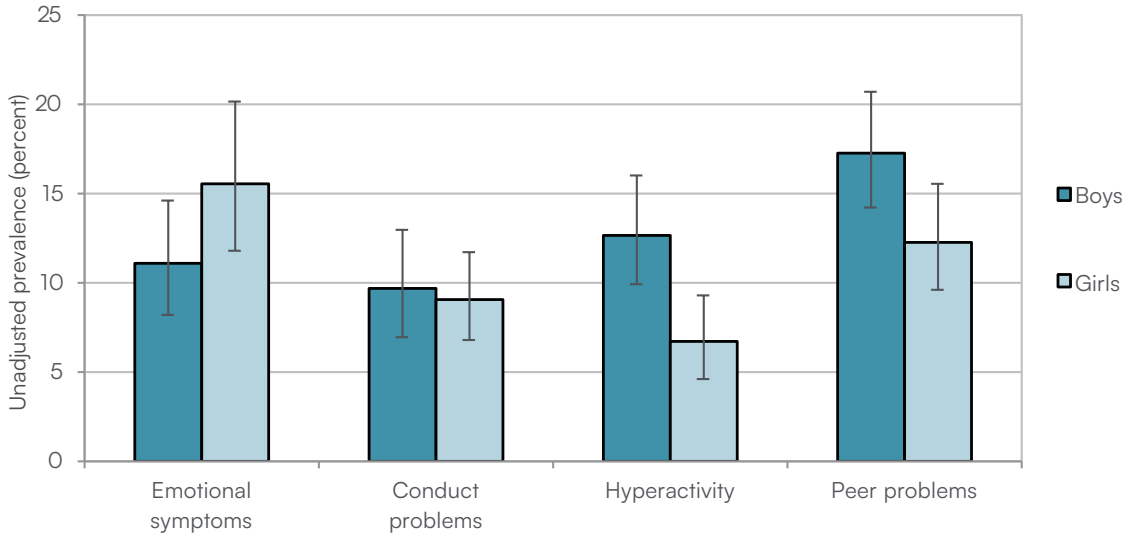
Although roughly equal numbers of girls/young women and boys/young men were seen by publicly funded mental health services over the 5 years to the end of 2022, there are significant differences by age. Figure 6.7 shows that boys are more likely than are girls to be seen by mental health services up until the age of 11 years, after which young women are more likely than are young men to be seen by mental health services. Despite these differences, both men and women were most likely to be seen by mental health services between the ages of 13 and 17 years.



Source: PRIMHD, NZCYES Estimated Resident Population. Rate per 1,000 age-specific population.

Figure 6.7: Unique individuals seen by mental health services, by age and gender, Aotearoa NZ (2018—22)

Data from the most recent (2022/23) NZHS show that although 2—14-year-old boys were no more likely than their female peers to have emotional and/or behavioural problems overall, they were more likely to be at risk of hyperactivity and peer problems, after adjustment for age (Figure 6.8). In addition, boys were approximately 4 times more likely than were girls to have diagnoses of ADHD or Autism Spectrum Disorder (after adjusting for age).



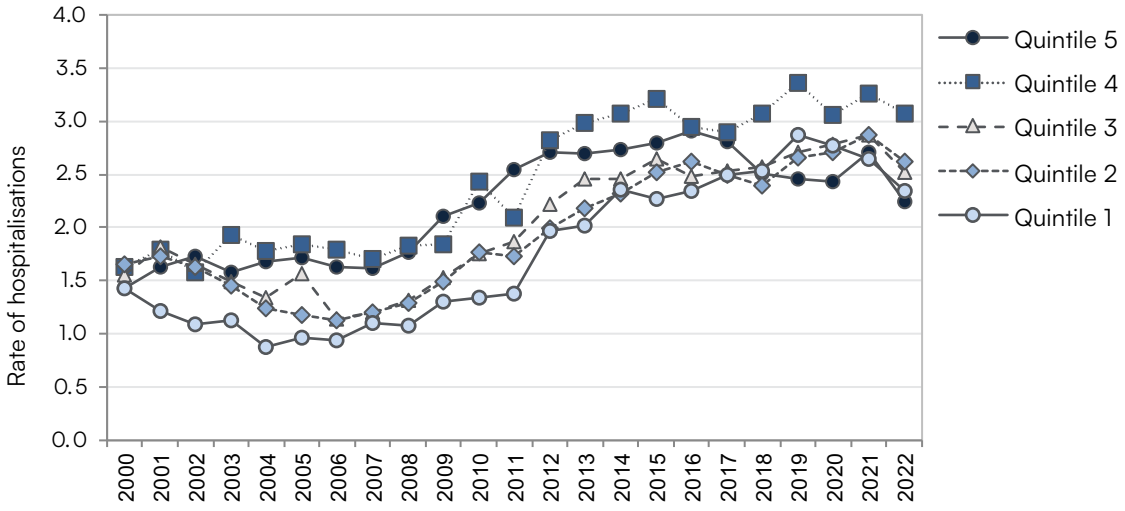
Source: NZHS. Children 'likely to have symptoms' based on the relevant subscale of the Strengths and Difficulties Questionnaire (SDQ).

Figure 6.8: Prevalence of emotional and/or behavioural problems in 2—14-year-olds, by gender, Aotearoa NZ (2022/23)

With regard to young people aged 15—24 years, NZHS data for 2022/23 show that the proportion of those experiencing high or very high levels of psychological distress was higher for young women (23.4%) than it was for young men (17.5%). Young women were also more likely to report feeling lonely most or all of the time (9.2%) than were young men (6.1%).

SOCIOECONOMIC DIFFERENCES IN MENTAL HEALTH AND ACCESS TO CARE

For hospitalisation data, there appear to be no significant differences by socio-economic gradient (i.e., no difference in socio-economic status), either for mental and behavioural disorders (Figure 6.9) or for intentional self-harm. Given the abundance of evidence showing that socioeconomic deprivation has significant impacts on children and young people's mental health, the hospitalisation data presented here is likely demonstrating healthcare access inequity — with those children and young people living in the most deprived communities not accessing mental health services, including hospitalisation, at the rates that would be expected.



Source: NMDS, NZCYES estimated resident population. Rate per 1,000 0—19-year-olds.
Quintile: 1 = least deprived; 5 = most deprived.

Figure 6.9: Trends in hospitalisations of 0—19-year-olds for mental and behavioural disorders, by socioeconomic deprivation, Aotearoa NZ (2000—22)

Data from the most recent (2022/23) NZHS show that there was no difference between children living with the most and the least socioeconomic deprivation in terms of their overall likelihood of having emotional and/or behavioural problems (after adjustment for age, gender, and ethnicity).

Children from the most deprived areas were, however, more than twice as likely to be at risk of conduct problems and peer problems than were children from the least deprived areas, effects that seem to be carried by girls. There was no effect of socioeconomic circumstances on children's likelihood of having diagnoses of ADHD or Autism Spectrum Disorder, but this null result is based on very small numbers. It is also possible that there is some undertreatment of children living in socioeconomically deprived areas.

The proportions of those seeking help from medical or psychological professionals, teachers, or friends and whānau did not differ according to socioeconomic circumstances. The proportion of those who reported unmet need for mental health care also did not differ according to socioeconomic circumstances.

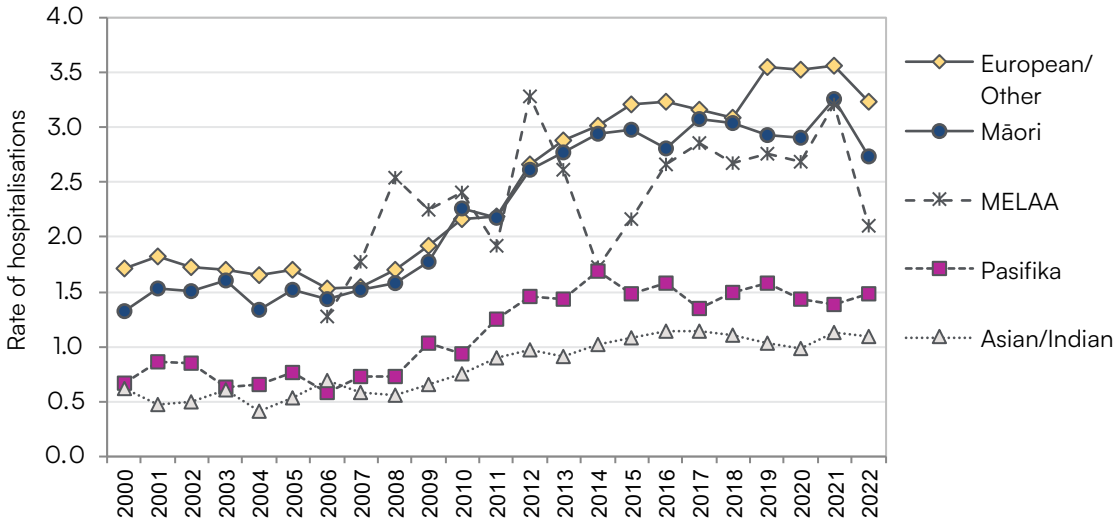
It should be reiterated that the lack of significant differences by socioeconomic circumstances reported here is due, at least in part, to small numbers of children and wide confidence intervals and should be interpreted with caution.

ETHNIC DIFFERENCES IN MENTAL HEALTH AND ACCESS TO CARE

Rates of hospitalisation have been highest for children and young people in European/Other and Māori ethnic groups between 2000 and 2022 (Figure 6.10). Hospitalisation rates for children and young people who identified with Middle Eastern, Latin American, and African (MELAA) ethnic groups were also high although difficult to interpret because of low numbers. The lowest rates were in young people from Asian and Indian ethnic groups, although there is known to be considerable variation within this group.[31]

Rates of hospitalisation for mental and behavioural disorders have approximately doubled since the start of the 21st century for all ethnic groups. Note also that there are ethnic differences in the ways that people access care. Because these data only reflect those who accessed care, they may not reflect the true prevalence of mental health concerns.

Hospitalisations specific to intentional self-harm had a similar pattern: They were highest for young people of European/Other ethnic groups, and also high for rangatahi Māori. Despite Asian and Indian young people and Pasifika young people having comparatively lower rates of hospitalisations for intentional self-harm, since 2000 rates have more than tripled for Asian and Indian young people and have increased by a factor of 5.7 for Pasifika young people.



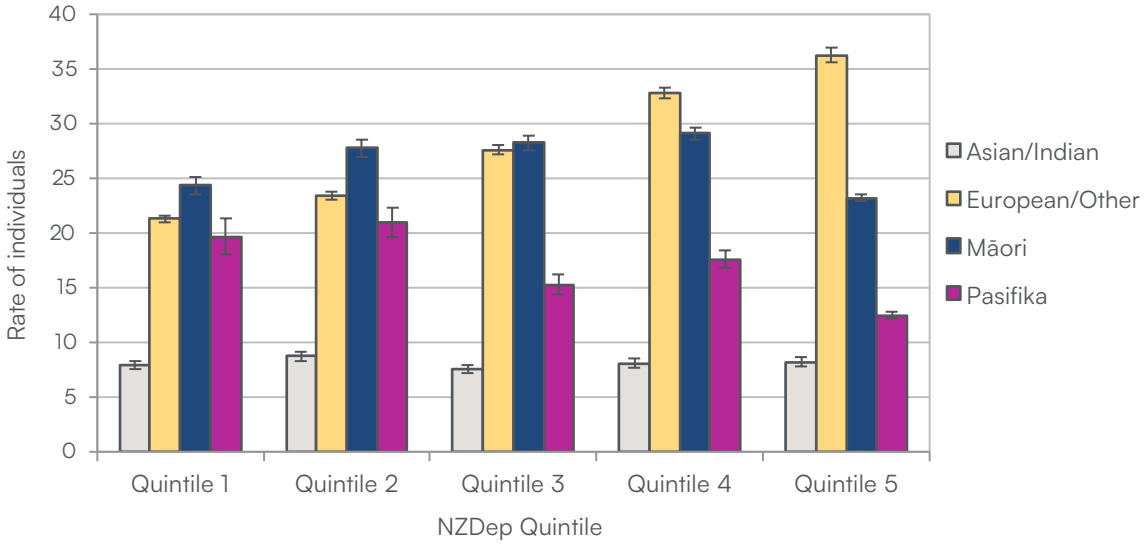
Source: NMDS, NZCYES estimated resident population. Rate per 1,000 0—19-year-olds.
MELAA = Middle Eastern, Latin American, or African.

Figure 6.10: Trends in hospitalisations of 0—19-year-olds for mental and behavioural disorders, by ethnicity, Aotearoa NZ (2000—22)

With regard to individuals who were seen by publicly funded mental health services for the 5 years ending 2022, Asian or Indian children and young people were least likely to be seen by mental health services and European or Other and Māori children and young people were most likely to be seen by mental health services, regardless of the socioeconomic area in which they lived (Figure 6.11).[c] In addition, there was a deprivation gradient present for European or Other children and young people wherein those from more deprived socioeconomic areas were seen at a greater rate by mental health services than were those from less deprived areas. In contrast, Māori and Pasifika children and young people living in socioeconomically deprived areas were less able to utilise mental health services than were European/Pakeha children and young people living in deprived areas. This same pattern of results was evident in hospitalisations of young people for mental and behavioural disorders as well as hospitalisations of young people for intentional self-harm.

c Hospitalisation rates broken down into ethnicity groups take into account the proportions of the population that identify as each ethnic group.

Together, these results show concerning inequities in access to specialist care and hospitalisation for Māori and Pasifika children and young people. However, we are unable to determine from these data whether these reverse deprivation gradients are due to restricted access to mental health services for those living in socioeconomically deprived areas, a reluctance to engage in mental health services, a mismatch in cultural needs by mental health services, discriminatory care, stigma, or a combination of factors.



Source: PRIMHD, NZCYES estimated resident population. Rate per 1,000 0—19-year-olds.
Quintile: NZDep Index of deprivation (1 = least deprived; 5 = most deprived). Ethnicity is level 1 prioritised.

Figure 6.11: Unique individuals seen by mental health services, socioeconomic deprivation and by ethnicity, Aotearoa NZ (2018—22)

Data from the most recent (2022/23) NZHS show that tamariki Māori were slightly more likely than were non-Māori children to have emotional and/or behavioural problems overall, an effect which seems to be carried by greater risks of conduct problems and peer problems for tamariki tāne compared to non-Māori boys. Tamariki tāne were also almost 5 times more likely to have a diagnosis of Autism Spectrum Disorder than were non-Māori boys.

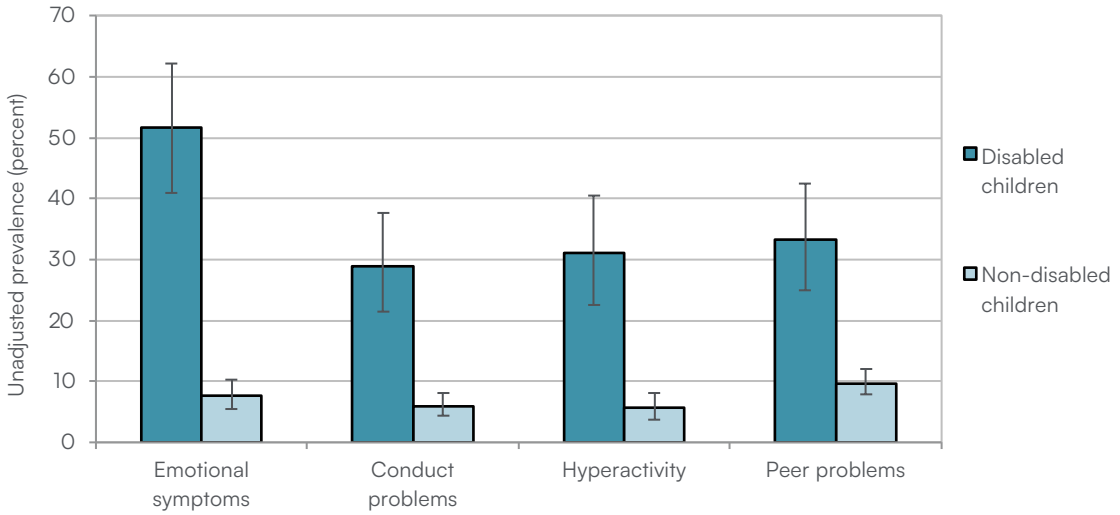
Although Asian children were no more or less likely than their non-Asian peers to have emotional and/or behavioural problems overall, they were significantly less likely to be at risk of conduct problems and hyperactivity, after adjustment for age and gender.

Pasifika boys were no more or less likely than were non-Pasifika boys to have emotional and/or behavioural problems in any domain. Pasifika girls were, however, twice as likely as were non-Pasifika girls to have emotional and/or behavioural problems overall, but no significant differences in any specific domain.

In terms of help-seeking behaviour, parents or caregivers of tamariki Māori were more likely to report seeking help for mental health from a GP or nurse than were parents of non-Māori children, after adjusting for age and gender. In contrast, parents of Asian children were less likely to report seeking help for mental health from a GP or nurse or a teacher than were parents of non-Asian children. Parents of Pasifika children were less likely to report seeking help for mental health from a teacher than were parents of non-Pasifika children.

DISABILITY AND MENTAL HEALTH

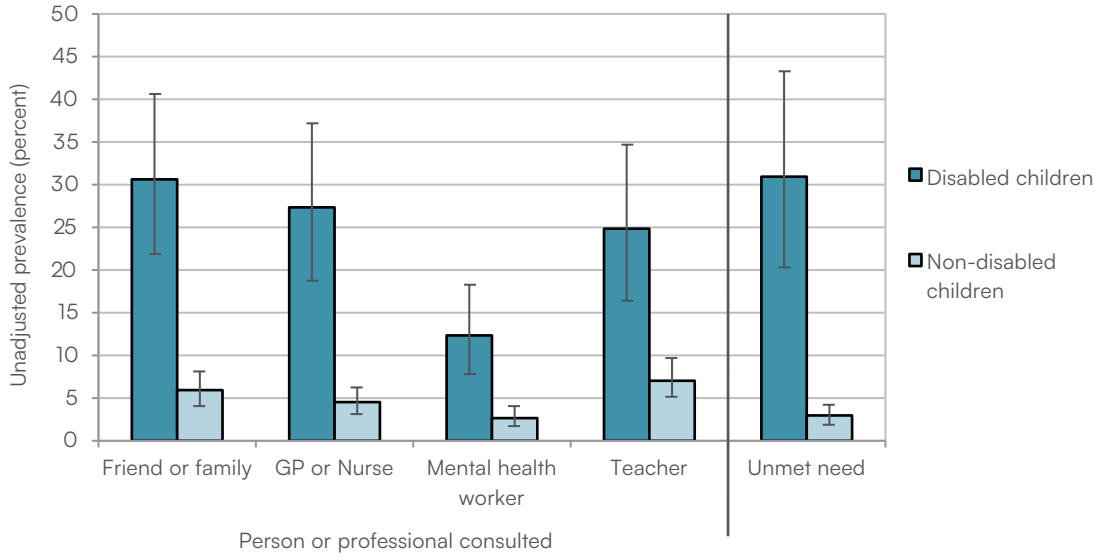
Data from the most recent (2022/23) NZHS show that disabled children aged 5—14 years were 10 times more likely to have emotional and/or behavioural problems than were their non-disabled peers (after adjusting for age and gender). Disabled children had increased risk of experiencing substantial difficulties in all 4 aspects of development (emotional symptoms, conduct problems, hyperactivity, and peer problems) (Figure 6.12). In addition, disabled children were 14 times more likely than were non-disabled children to have a diagnosis of ADHD (after adjusting for age and gender), which may reflect greater access to specialists and, hence, likelihood of being assessed.



Source: NZHS. Children 'likely to have symptoms' based on the relevant subscale of the Strengths and Difficulties Questionnaire (SDQ).

Figure 6.12: Prevalence of emotional and/or behavioural problems in 5—14-year-olds, by disability status, Aotearoa NZ (2022/23)

Perhaps unsurprisingly, parents or caregivers of disabled children were between 3 and 6 times more likely than were parents or caregivers of non-disabled children to have sought help for their children's mental health issues from family or friends, a GP or nurse, a teacher, or a mental health worker, with nearly one third reporting unmet need for mental health or addiction services in the past 12 months (Figure 6.13).



Source: NZHS.

Figure 6.13: Prevalence of mental health care or consultation and unmet need for mental health or addiction services in the past 12 months in 5—14-year-olds, by disability status, Aotearoa NZ (2022/23)

WHAT IS THE STATE OF MENTAL HEALTH FOR CHILDREN AND YOUNG PEOPLE?

This report highlights a trend of deteriorating mental health among Aotearoa NZ's children and young people over the past two plus decades that is consistent with the results from a series of cross-sectional surveys of school-aged adolescents over this period.[32] It is also important to note that there have been some improvements since our last report, with declining hospitalisations between 2021 and 2022. This may reflect some recovery from the impact of the COVID-19 pandemic on the mental health of our young people.

Research on the risk factors that have caused increasing numbers of children to develop mental health concerns over time has generated multiple hypotheses and is complex.[4] Changing diagnostic criteria and improved communication about mental health concerns can only be a partial explanation, given the magnitude of the increase.[6]

In the Youth19 rangatahi smart survey, young people reported high and increasing rates of significant depressive symptoms, particularly for girls.[24 33] Sex and gender differences in rates of mental health concerns are not unusual, but research is needed to ascertain whether this widening gap is due to factors such as greater willingness among girls to seek help, a higher burden of distress for girls, or inadequate delivery of mental health services for boys. Importantly, rates of suicide are higher for adolescent boys, and may suggest that current measures of distress and service delivery are inadequate for this population.[18-20]

Adverse childhood experiences, such as exposure to neglect, parental use of alcohol and other drugs, sexual abuse, violence, parental mental distress, intergenerational trauma, stress, pressure to achieve, bullying, school exclusion, and racism or discrimination can influence children's mental health.[6 7 24 33-40] The significant negative impacts of socioeconomic deprivation on mental health have also been well established. Mental health concerns can be caused or exacerbated by factors such as poverty and material hardship and social isolation or overcrowding.[6 24 35-37] The Youth19 surveys report that young people who experienced the most socioeconomic deprivation were also at highest risk for mental health concerns, including attempted suicide.[1 24 32 33]

Young people who are lesbian, gay, bisexual, trans, intersex, queer, questioning, or who have same sex attractions or other gender identities,[1 7 33 36 41 42] those young people with disabilities or long-term health conditions,[42-45] young people in state care/Oranga Tamariki,[7 46] young people in Alternative Education,[47] and those not in education employment or training (NEETS)[48] are also at disproportionate risk of experiencing mental health concerns. Data on hospitalisations and, to a lesser extent, those seen by mental health services, do not reflect these populations as strongly, as many groups are invisible in these statistics (e.g., young people in the rainbow community).

The Youth19 surveys and other investigations also report significantly higher rates of mental health concerns, suicidal ideation, and suicide attempts among rangatahi Māori,[1 32 33 46 49] Pasifika,[1 25 32 33 46 49 50] and ethnic minority populations.[1 5 15 32 33] Despite being more likely to experience depression or anxiety, Māori, Pasifika, and Asian New Zealanders are less likely to receive actual diagnoses, which will affect access to mental health services and treatment.[49 51] In addition, awareness of where to get help for mental distress and awareness of national mental health websites is low among Pasifika peoples and trust is a significant issue for whānau Māori.[50 52] The findings reported here that Māori and Pasifika children and young people in the most socioeconomically deprived areas were less likely than were Māori and Pasifika children and young people in less deprived areas to be seen by publicly funded mental health services suggests that there may be bias in the way that services are providing care for those Māori and Pasifika families living with socioeconomic deprivation. In contrast, European children and young people who live with socioeconomic deprivation were more likely to get the care they required when compared to other ethnic groups. This too speaks to how those who often need healthcare the most have the least resources, greater barriers, discriminatory treatment, and poorer access to care.[52-57]

Digital technology and the online world is an entrenched part of youths' experience, and the negative aspects of this contribute to and can increase distress for young people.[58-60] Social media platforms have introduced youth-targeted features to promote addictive behaviour, social comparison, and perfectionism, and that facilitate cyber-bullying.[6 58 60 61] Young people may also encounter objectionable, violent, and pornographic material disseminated over the internet.[6 61] Consequently, use of digital technology has been shown to amplify anxiety, depression, loneliness, and negative perceptions of body image.[6 58 60 61] Some of these feelings may stem from the ubiquity of online content about global and societal challenges;[6] young people have reported overwhelming uncertainty and anxiety about their futures in the context of the climate crisis, economic pressures, and political polarisation.[24] Parents and children being increasingly engaged with their devices rather than interacting with each other, being physically active, or even sleeping, may pose yet more risk for future mental health concerns.[7 62] There is also concern about suicide contagion in young people through the use of social media and an appropriate public health response is needed in this situation.[63 64] The need to protect children and young people from the adverse effects of technology is increasingly recognised with clear guidance on appropriate use in school and early childhood settings that has been reviewed and endorsed by the Paediatric Society of New Zealand.[65]

Despite the negative effects associated with social media, it also offers young people the opportunity to explore interests, access information and skills, develop independent identities, generate and share creative content, engage with their peers, and interact with people outside of their communities.[58 60] From a public health perspective, it can also be employed as a vehicle to disseminate positive messages and information, encourage healthy behaviours, counter harmful content, address stigma and discrimination, facilitate connections and support from peers, and to prompt young people to seek help from mental health services.[58] Some support services are already offered online and by phone or text, providing reliable information and education about mental illness and addiction, free confidential advice from trained professionals, and referral to other services for treatment or social supports.[7 60] Some treatment, such as cognitive behavioural therapy, can also be delivered online.[7 66 67] If effectively delivered, these kinds of digital options could extend the accessibility of mental health supports and services (particularly in rural or isolated areas) and alleviate pressures on the capacity of mental health specialists.[7 60 67-70]

International comparisons show that Aotearoa NZ has high rates of hospitalisation for mental health concerns with short stays, similar to Sweden and Belgium, and substantially higher than Australia and the United Kingdom.[71] This is despite (or perhaps because of) the fact that Aotearoa NZ has among the lowest bed numbers per head of population (4 per 100,000), similar to Australia (5 per 100,000) and much lower than England and Scotland (>10 per 100,000). Consequently, Aotearoa NZ relies on community-level care for mental health concerns.[71] Although many mental health concerns can be successfully prevented or treated in the community, with appropriate advice, support, and access to care,[40] a significant proportion of young people in Aotearoa NZ do not receive sufficient professional help for mental health concerns.[1 2 72-74]

Given that one in five New Zealanders experience mental health challenges at any one time (a figure that is even higher for young people)[33 75] and most will experience some form of mental disorder during their lifetime,[9] having only 3% of the population able to access specialist support is inadequate.[7 33 73] This unmet need reflects factors such as unequal access to care and workforce shortages for mental health professionals such as psychologists, mental health nurses, and psychiatrists.[7 72 73 76] In addition, although children and young people make up 22% of the population in Aotearoa NZ,[77] the proportion share of expenditure on mental health services (which reflects funding allocation) for this population was only 10% for the 2022/23 financial year.[78] This proportional share of the expenditure has declined over the last 5 years — it was 13% in 2018/19.[77 78] Although in dollar terms there have been increases in expenditure for mental health services for all age groups since 2018/19, child and youth services have seen the smallest increase (21%)

compared to an increase of 49% for adult mental health services and an increase of 104% for older adult (65+ years of age) mental health services.[78]

Bolstering the workforce of mental health professionals at all levels, including training for health navigators and community workers, is a necessity to increase access to care.[73 79] In a joint briefing to the incoming Minister for Mental Health, the Ministry of Health, Te Whatu Ora Health New Zealand, and the Māori Health Authority have stated that the mental health and addiction system is under significant pressure, and the capacity of mental health and addiction services and workforce growth have not kept pace with increasing demand.[79] The Government has committed to increase the mental health and addiction workforce by training 500 professionals each year.[80 81] As the Mental Health Foundation of New Zealand recommends, there will need to be a comprehensive mental health and addiction workforce plan that is developed in partnership with Māori and people with lived experience.[82]

Integrated care for physical and mental health, linked with social support services, is critical to achieve better mental health outcomes for young people.[5 15 72] Access points for these services can and do include primary healthcare, schools, youth centres, and 'youth one-stop shops.' Going forward, it will be important to determine what the barriers to young people accessing these services are. At present, it is not clear whether it is because there are not enough of these services to address need; whether there are issues with the coverage, availability, access criteria, quality, or quantity of care; workforce shortages; or combinations thereof.

Strategies to reduce rates of mental health concerns among young people in Aotearoa NZ should focus on early intervention through mental health services that are evidence-based, co-designed, youth-focused, trauma informed, and culturally informed.[4 5 15 40 50 62 66 76 83-89] There should be particular emphasis on core values in Te Ao Māori, and other cultures, that place importance on balanced relationships with culture, spirituality, family, community, and the natural environment.2[5 40 50 83] Communities can provide additional support and enhance the mental health of children and young people by offering opportunities for work, study, cultural participation, creative activities, sports, and outdoor pursuits.[1 90]

Public health campaigns to reduce stigma about mental illness, counter discrimination and racism, and promote mental wellbeing should both help to prevent psychological distress and enable early and effective interventions by reducing the stigma associated with seeking help for mental health concerns.[5 15 84 91] The mental health system in Aotearoa NZ has historically focused on treatment of mental ill-health at the expense of mental health promotion, however, which continues to suffer from under-funding and under-resourcing.[84] Researchers have argued for a shift in the distribution of resources towards more cost-effective prevention efforts rather than increasingly unaffordable treatment and clinical services.[4 62 84] There is also an urgent need for good-quality data on the prevalence of mental health concerns among children and young people to inform both prevention efforts as well as the funding and provision of timely, accessible care for all those who need it.[76 92] The Government has recognised the importance of accessible care and has committed to providing faster access to specialist and primary mental health and addiction services for those who need it.[81]

Having safe and supportive early environments within the context of their whānau and communities is vital for children's wellbeing.[4 6 27 33 40 93-95] Longitudinal evidence shows that poor emotional and cognitive functioning at 2—3 years of age predicts an extensive life history of mental disorder,[9] which underscores the need for prevention and early intervention.[4] Recognising this, the Government has allocated 25% of mental health and addiction investment towards prevention and early intervention.[80 81] Examples of effective early intervention strategies include home visiting programmes, maternal mental health programmes, adequate social housing, reduction of poverty, and high-quality early childhood education. Pathways to identify and refer families and children who are experiencing psychological distress through early childhood education, community organisations, and schools should also be prioritised.[40 93]

REFERENCES

1. Fleming T, Tiatia-Seath J, Peiris-John R, et al. Youth19 Rangatahi Smart Survey, Initial Findings: Hauora Hinengaro/ Emotional and Mental Health. Auckland, New Zealand: The Youth19 Research Group, The University of Auckland, and Victoria University of Wellington, 2020. https://static1.squarespace.com/static/5bdbb75ccef37259122e59aa/t/5f338e4cfb539d2246e9e5ce/1597214306382/Youth19+Mental+Health+Report.pdf
2. Ministry of Health. Annual Update of Key Results 2022/23: New Zealand Health Survey. Wellington, New Zealand: Ministry of Health, 2023. https://www.health.govt.nz/publication/annual-update-key-results-2022-23-new-zealand-health-survey
3. World Health Organization. World mental health report: Transforming mental health for all. Geneva, Switzerland: World Health Organization, 2022. https://www.who.int/publications/i/item/9789240049338
4. Stubbing J, Rihari T, Bardsley A, et al. Exploring factors influencing youth mental health: What we know and don't know about the determinants of young people's mental health. Auckland, New Zealand: Koi Tū: The Centre for Informed Futures, 2023. https://informedfutures.org/youth-mental-health-factors/
5. Hetrick SE, Bailey AP, Smith KE, et al. Integrated (one-stop shop) youth health care: Best available evidence and future directions. Medical Journal of Australia 2017;207(S10):S5-S18. https://doi.org/10.5694/mja17.00694
6. Menzies R, Gluckman P, Poulton R. Youth mental health in Aotearoa: Greater urgency required. Auckland, New Zealand: Koi Tū: The Centre for Informed Futures - University of Auckland, 2020. https://informedfutures.org/youth-mental-health-in-aotearoa-nz/
7. Patterson R, Durie M, Disley B, et al. He Ara Oranga: Report of the Government Inquiry into Mental Health and Addiction. Wellington: New Zealand Government, 2018. https://mentalhealth.inquiry.govt.nz/inquiry-report/he-ara-oranga/
8. Gorman E, Bowden N, Kokaua J, et al. A national multiple baseline cohort study of mental health conditions in early adolescence and subsequent educational outcomes in New Zealand. Scientific Reports 2023;13(1):11025. https://doi.org/10.1038/s41598-023-38131-8
9. Caspi A, Houts RM, Ambler A, et al. Longitudinal assessment of mental health disorders and comorbidities across 4 decades among participants in the Dunedin Birth Cohort Study. JAMA Network Open 2020;3(4):e203221-e21. https://doi.org/10.1001/jamanetworkopen.2020.3221
10. Fergusson DM, Boden JM, Horwood LJ. Recurrence of major depression in adolescence and early adulthood, and later mental health, educational and economic outcomes. British Journal of Psychiatry 2007;191(4):335-42. https://doi.org/10.1192/bjp.bp.107.036079
11. Griffin E, McMahon E, McNicholas F, et al. Increasing rates of self-harm among children, adolescents and young adults: A 10-year national registry study 2007—2016. Social Psychiatry and Psychiatric Epidemiology 2018;53(7):663-71. https://doi.org/10.1007/s00127-018-1522-1
12. Cairns R, Karanges EA, Wong A, et al. Trends in self-poisoning and psychotropic drug use in people aged 5—19 years: A population-based retrospective cohort study in Australia. BMJ Open 2019;9(2):e026001. https://doi.org/10.1136/bmjopen-2018-026001
13. Robinson J. Repeated self-harm in young people: A review. Australasian Psychiatry 2017;25(2):105-07. https://doi.org/10.1177/1039856216679542
14. Hetrick SE, Subasinghe A, Anglin K, et al. Understanding the needs of young people who engage in self-harm: A qualitative investigation. Frontiers in Psychology 2020;10 https://doi.org/10.3389/fpsyg.2019.02916
15. Carter G, Page A, Large M, et al. Royal Australian and New Zealand College of Psychiatrists clinical practice guideline for the management of deliberate self-harm. Australian & New Zealand Journal of Psychiatry 2016;50(10):939-1000. https://doi.org/10.1177/0004867416661039
16. Fortune S, Hetrick S, Sharma V, et al. Multisite sentinel surveillance of self-harm in New Zealand: Protocol for an observational study. BMJ Open 2022;12(5):e054604. https://doi.org/10.1136/bmjopen-2021-054604
17. Garisch JA, Wilson MS. Prevalence, correlates, and prospective predictors of non-suicidal self-injury among New Zealand adolescents: Cross-sectional and longitudinal survey data. Child and Adolescent Psychiatry and Mental Health 2015;9(1):28. https://doi.org/10.1186/s13034-015-0055-6
18. Office of the Chief Coroner of New Zealand. Suicide statistics. Wellington, New Zealand: Office of the Chief Coroner of New Zealand; 2022. Available from: https://coronialservices.justice.govt.nz/suicide/suicide-statistics/2024.
19. Organisation for Economic Co-operation and Development. OECD Family Database: CO4.4 Teenage suicides (15-19 years old). Paris, France: OECD, 2017. https://www.oecd.org/els/family/CO_4_4_Teenage-Suicide.pdf
20. Organisation for Economic Co-operation and Development. Child well-being outcomes. Paris, France: OECD; 2020. Available from: https://www.oecd.org/en/data/datasets/child-well-being-outcomes0.html.
21. Ministry of Health. National Minimum Dataset (Hospital Events) Data Dictionary. Wellington, New Zealand: Ministry of Health, 2021. https://www.health.govt.nz/publication/national-minimum-dataset-hospital-events-data-dictionary
22. Ministry of Health. PRIMHD — mental health data. Wellington, New Zealand: Ministry of Health; 2024. Available from: https://www.tewhatuora.govt.nz/for-health-professionals/data-and-statistics/nz-health-statistics/national-collections-and-surveys/collections/primhd-mental-health-data/2024.
23. Ministry of Health. Methodology Report 2022/23: New Zealand Health Survey. Wellington, New Zealand: Ministry of Health, 2023. https://www.health.govt.nz/system/files/documents/publications/methodology-report-2022-23-new-zealand-health-survey-dec23.pdf
24. Fleming T, Ball J, Bavin L, et al. Mixed progress in adolescent health and wellbeing in Aotearoa New Zealand 2001—2019: A population overview from the Youth2000 survey series. Journal of the Royal Society of New Zealand 2022;52(4):426-49. https://doi.org/10.1080/03036758.2022.2072349

25. Health Quality & Safety Commission. Bula Sautu — A window on quality 2021: Pacific health in the year of COVID-19. Wellington, New Zealand: Health Quality & Safety Commission, 2021. https://www.hqsc.govt.nz/assets/Our-data/Publications-resources/BulaSautu_WEB.pdf

26. Boden J, Hetrick S, Bowden N, et al. Empowering community control over alcohol availability as a suicide and self-harm prevention measure: Policy opportunity in Aotearoa New Zealand. The Lancet Regional Health — Western Pacific 2022;29 https://doi.org/10.1016/j.lanwpc.2022.100631

27. Gluckman P. Youth Suicide in New Zealand: A discussion paper. Wellington, New Zealand: Office of the Prime Minister's Chief Science Advisor, 2017. https://www.dpmc.govt.nz/sites/default/files/2021-10/pmcsa-17-07-26-Youth-suicide-in-New-Zealand-a-Discussion-Paper.pdf

28. Hetrick SE, Hobbs M, Fortune S, et al. Proximity of alcohol outlets and presentation to hospital by young people after self-harm: A retrospective geospatial study using the integrated data infrastructure. Australian & New Zealand Journal of Psychiatry 2024;58(2):152-61. https://doi.org/10.1177/00048674231203909

29. Pirkis J, John A, Shin S, et al. Suicide trends in the early months of the COVID-19 pandemic: An interrupted time-series analysis of preliminary data from 21 countries. The Lancet Psychiatry 2021;8(7):579-88. https://doi.org/10.1016/S2215-0366(21)00091-2

30. Adams J, Duncanson M, Oben G, et al. Indicators of child and youth health status in Aotearoa 2021. Dunedin, New Zealand: NZ Child and Youth Epidemiology Service, 2022. https://ourarchive.otago.ac.nz/bitstream/handle/10523/14853/Aotearoa%20report_2021_NZCYES.pdf

31. Peiris-John R, Kang K, Bavin L, et al. East Asian, South Asian, Chinese and Indian students in Aotearoa: A Youth19 report. Auckland, New Zealand: The University of Auckland, 2021. https://www.youth19.ac.nz/publications/asian-students-report

32. Sutcliffe K, Ball J, Clark TC, et al. Rapid and unequal decline in adolescent mental health and well-being 2012—2019: Findings from New Zealand cross-sectional surveys. Australian & New Zealand Journal of Psychiatry 2023;57(2):264-82. https://doi.org/10.1177/00048674221138503

33. Sutcliffe K, Wilson M, Clark TC, et al. Distinct profiles of mental health need and high need overall among New Zealand adolescents — Cluster analysis of population survey data. Australian & New Zealand Journal of Psychiatry 2024 https://doi.org/10.1177/00048674241243262

34. McAnally HM, Iosua E, Sligo JL, et al. Childhood disadvantage and adolescent socioemotional wellbeing as predictors of future parenting behaviour. Journal of Adolescence 2021;86(1):90-100. https://doi.org/10.1016/j.adolescence.2020.12.005

35. Asher I, de Lore D, Edmonds L, et al. Indigenous child health in Australia and Aotearoa New Zealand. Sydney, Australia: The Royal Australasian College of Physicians, 2018. https://www.racp.edu.au/docs/default-source/advocacy-library/indigenous-ch-statement-on-ich.pdf

36. Royal Australian and New Zealand College of Psychiatrists. Position Statement 83: Recognising and addressing the mental health needs of the LGBTIQ+ population. Wellington, New Zealand: RACP, 2021. https://www.ranzcp.org/clinical-guidelines-publications/clinical-guidelines-publications-library/recognising-and-addressing-the-mental-health-needs-of-the-lgbtiq-population

37. Cotton SM, Filia KM, Hamilton MP, et al. Accelerating youth mental health services research. Australasian Psychiatry 2023;31(3):292-94. https://doi.org/10.1177/10398562231167691

38. Hashemi L, Fanslow J, Gulliver P, et al. Exploring the health burden of cumulative and specific adverse childhood experiences in New Zealand: Results from a population-based study. Child Abuse & Neglect 2021;122:105372. https://doi.org/10.1016/j.chiabu.2021.105372

39. Bendall S, Eastwood O, Spelman T, et al. Childhood trauma is prevalent and associated with co-occurring depression, anxiety, mania and psychosis in young people attending Australian youth mental health services. Australian & New Zealand Journal of Psychiatry 2023;57(12):1518-26. https://doi.org/10.1177/00048674231177223

40. Aron E, Londoño Tobón A, Finelli J, et al. Serving families where they live: Supporting multigenerational health during infancy and early childhood through community-centered approaches. Child and Adolescent Psychiatric Clinics 2024;33(3):331-42. https://doi.org/10.1016/j.chc.2024.03.007

41. Tan KKH, Byrne JL, Treharne GJ, et al. Unmet need for gender-affirming care as a social determinant of mental health inequities for transgender youth in Aotearoa/New Zealand. Journal of Public Health 2022;45(2):e225-e33. https://doi.org/10.1093/pubmed/fdac131

42. Roy R, Greaves LM, Peiris-John R, et al. Negotiating multiple identities: Intersecting identities among Māori, Pacific, Rainbow and Disabled young people. New Zealand: The Youth19 Research Group, The University of Auckland and Victoria University of Wellington, 2021. https://www.youth19.ac.nz/publications/negotiating-multiple-identities-report?rq=chronic

43. Clark T, Sutcliffe K, Greaves LM, et al. A Youth19 Brief: Rangatahi Māori with a disability or chronic condition. New Zealand: The Youth19 Research Group, The University of Auckland and Victoria University of Wellington, 2021. https://www.youth19.ac.nz/publications/rangatahi-with-a-disability-or-chronic-condition-a-youth19-brief?rq=disability

44. Fleming T, Sutcliffe K, Greaves LM, et al. A Youth19 Brief: Rainbow young people with a disability or chronic condition. New Zealand: The Youth19 Research Group, The University of Auckland and Victoria University of Wellington, 2021. https://www.youth19.ac.nz/publications/rainbow-students-with-disability?rq=disability

45. Tiatia-Seath J, Fleming T, Peiris-John R, et al. A Youth19 Brief: Pacific young people with a disability or chronic condition. New Zealand: The Youth19 Research Group, The University of Auckland and Victoria University of Wellington, 2021. https://static1.squarespace.com/static/5bdbb75ccef37259122e59aa/t/60dd134379170606fa5c3a87/1625101127012/Youth19+Brief_Pacific+young+people+with+a+disability+or+chronic+condition.pdf

46. Ngā Pou Arawhenua, Child and Youth Mortality Review Committee, Suicide Mortality Review Committee. Te Mauri The Life Force: Rangatahi suicide report. Wellington, New Zealand: Health Quality & Safety Commission Kupu Taurangi Hauora o Aotearoa, 2020. https://www.hqsc.govt.nz/assets/Our-work/Mortality-review-committee/SuMRC/Publications-resources/TeMauriTheLifeForce_final.pdf

47. Clark TC, Gontijo de Castro T, Bullen P, et al. Youth19 Rangatahi Smart Survey, The health and wellbeing of young people in Alternative Education. New Zealand: The Youth19 Research Group, The University of Auckland and Victoria University of Wellington, 2023. https://www.youth19.ac.nz/publications/health-wellbeing-alternative-education

48. Clark TC, Gontijo de Castro T, Pillay-Hansen K, et al. Youth19 Rangatahi Smart Survey, The health and wellbeing of Youth who are Not in Education, Employment or Training (Y-NEETs). New Zealand: The Youth19 Research Group, The University of Auckland and Victoria University of Wellington, 2022. https://www.youth19.ac.nz/publications/health-wellbeing-yneet

49. Lee CH, Duck IM, Sibley CG. Ethnic inequality in diagnosis with depression and anxiety disorders. The New Zealand Medical Journal 2017; 130(1454). http://europepmc.org/abstract/MED/28449012.

50. Ataera-Minster J, Trowland H. Te Kaveinga: Mental health and wellbeing of Pacific peoples. Results from the New Zealand Mental Health Monitor & Health and Lifestyles Survey. Wellington, New Zealand: Health Promotion Agency, 2018. https://www.hpa.org.nz/sites/default/files/FinalReport-TeKaveinga-Mental%20health%20and%20wellbeing%20of%20Pacific%20peoples-Jun2018.pdf

51. Ruhe T, Bowden N, Theodore R, et al. Identification of mental health and substance use-related conditions among Pasifika young people in Aotearoa New Zealand-a national cross-sectional study using the Integrated Data Infrastructure (IDI). Pacific Health Dialog 2023;21(10):663-72. https://doi.org/10.26635/phd.2022.147

52. Lindsay Latimer C, Le Grice J, Hamley L, et al. 'Why would you give your children to something you don't trust?': Rangatahi health and social services and the pursuit of tino rangatiratanga. Kōtuitui: New Zealand Journal of Social Sciences Online 2022;17(3):298-312. https://doi.org/10.1080/1177083X.2021.1993938

53. Crengle S, Robinson E, Ameratunga S, et al. Ethnic discrimination prevalence and associations with health outcomes: Data from a nationally representative cross-sectional survey of secondary school students in New Zealand. BMC Public Health 2012;12(1):45. https://doi.org/10.1186/1471-2458-12-45

54. Simon-Kumar R, Lewycka S, Clark TC, et al. Flexible resources and experiences of racism among a multi-ethnic adolescent population in Aotearoa, New Zealand: An intersectional analysis of health and socioeconomic inequities using survey data. The Lancet 2022;400(10358):1130-43. https://doi.org/10.1016/S0140-6736(22)01537-9

55. Clark TC, Ball J, Fenaughty J, et al. Indigenous adolescent health in Aotearoa New Zealand: Trends, policy and advancing equity for rangatahi Maori, 2001—2019. The Lancet Regional Health — Western Pacific 2022;28 https://doi.org/10.1016/j.lanwpc.2022.100554

56. Sutcliffe K, Ball J, Clark TC, et al. What would help young people who feel down? Voices of young people. A Youth19 Brief. Auckland, New Zealand: The Youth19 Research Group, The University of Auckland, and Victoria University of Wellington, 2023. https://www.youth19.ac.nz/publications/what-would-help-young-people

57. Peiris-John R, Farrant B, Fleming T, et al. Youth19 Rangatahi Smart Survey, Initial Findings: Access to Health Services. Wellington, New Zealand: Youth19 Research Group, The University of Auckland, and Victoria University of Wellington, 2020. https://www.youth19.ac.nz/publications/access-to-health-services-report?rq=health

58. Cullen J, Muntz A, Marsh S, et al. Impact of digital technologies on health and wellbeing of children and adolescents: A narrative review. New Zealand Journal of Physiotherapy 2024;52(1):62-77. https://doi.org/10.15619/nzjp.v52i1.364

59. Hobbs M, Bowden N, Marek L, et al. The environment a young person grows up in is associated with their mental health: A nationwide geospatial study using the integrated data infrastructure, New Zealand. Social Science & Medicine 2023;326:115893. https://doi.org/10.1016/j.socscimed.2023.115893

60. Thabrew H, Gega L. Editorial: Control alt delete — technology and children's mental health. Child and Adolescent Mental Health 2023;28(1):1-3. https://doi.org/10.1111/camh.12631

61. Royal Society of Public Health and Youth Health Movement. #StatusOfMind Social Media and Young People's Mental Health and Wellbeing. London, United Kingdom: RSPH, 2017. https://www.rsph.org.uk/our-work/campaigns/status-of-mind.html

62. Fleming T, Crengle S, Peiris-John R, et al. Priority actions for improving population youth mental health: An equity framework for Aotearoa New Zealand. Mental Health & Prevention 2024:200340. https://doi.org/10.1016/j.mhp.2024.200340

63. Martínez V, Jiménez-Molina Á, Gerber MM. Social contagion, violence, and suicide among adolescents. Current Opinion in Psychiatry 2023;36(3):237-42. https://doi.org/10.1097/yco.0000000000000858

64. Robertson L, Skegg K, Poore M, et al. An adolescent suicide cluster and the possible role of electronic communication technology. Crisis 2012;33(4):239-45. https://doi.org/10.1027/0227-5910/a000140

65. Cullen J, Muntz A, Marsh S, et al. Recommendations for the use of digital technologies: Schools, kura and early childhood education. New Zealand: Brainwave Trust, Office of Early Childhood Education, Sensible Screen Use, Australia & New Zealand Child Myopia Working Group, The Paediatric Society of New Zealand, New Zealand Pasifika Principals Association, 2024. https://www.paediatrics.org.nz/knowledge-hub/view-resource?id=59

66. Merry SN, Cargo T, Christie G, et al. Debate: Supporting the mental health of school students in the COVID-19 pandemic in New Zealand — a digital ecosystem approach. Child and Adolescent Mental Health 2020;25(4):267-69. https://doi.org/10.1111/camh.12429

67. Guiney H, Mahoney A, Elders A, et al. Internet-based cognitive behavioural therapy in the real world: Naturalistic use and effectiveness of an evidence-based platform in New Zealand. Australian & New Zealand Journal of Psychiatry 2024;58(3):238-49. https://doi.org/10.1177/00048674231183641

68. Cross SP, Nicholas J, Bell IH, et al. Integrating digital interventions with clinical practice in youth mental health services. Australasian Psychiatry 2023;31(3):302-05. https://doi.org/10.1177/10398562231169365

69. Ding X, Wuerth K, Sakakibara B, et al. Understanding Mobile Health and Youth Mental Health: Scoping Review. JMIR mHealth and uHealth 2023;11:e44951. https://doi.org/10.2196/44951

70. Moecke DP, Holyk T, Beckett M, et al. Scoping review of telehealth use by Indigenous populations from Australia, Canada, New Zealand, and the United States. Journal of Telemedicine and Telecare 2023;0(0):1357633X231158835. https://doi.org/10.1177/1357633x231158835

71. NHS Benchmarking Network. International comparisons of mental health services for children and young people. Manchester, United Kingdom: NHS Benchmarking Network, 2018. https://s3.eu-west-2.amazonaws.com/nhsbn-static/Other/2018/International%20CAMHS%20Benchmarking%2030-5-2018.pdf

72. Eapen V, Stylianakis A, Scott E, et al. Stemming the tide of mental health problems in young people: Challenges and potential solutions. Australian & New Zealand Journal of Psychiatry 2023;57(4):482-88. https://doi.org/10.1177/00048674221136037

73. Every-Palmer S, Grant ML, Thabrew H, et al. Not heading in the right direction: Five hundred psychiatrists' views on resourcing, demand, and workforce across New Zealand mental health services. Australian & New Zealand Journal of Psychiatry 2024;58(1):82-91. https://doi.org/10.1177/00048674231170572

74. Fortune S, Hetrick S. Suicide risk assessments: Why are we still relying on these a decade after the evidence showed they perform poorly? Australian & New Zealand Journal of Psychiatry 2022;56(12):1529-34. https://doi.org/10.1177/00048674221107316

75. Wilson A, Nicolson M. Mental Health in Aotearoa: Results from the 2018 Mental Health Monitor and the 2018/19 New Zealand Health Survey. Wellington, New Zealand: Te Hiringa Hauora/Health Promotion Agency, 2020. https://www.hpa.org.nz/sites/default/files/Mental_Health_Aotearoa_Insight_2020.pdf

76. Office of the Auditor-General. Meeting the mental health needs of young New Zealanders. Wellington, New Zealand, 2024. https://www.oag.parliament.nz/2024/youth-mental-health/docs/youth-mental-health.pdf

77. Stats NZ. Stats NZ Infoshare. 2024. Available from: https://infoshare.stats.govt.nz/Default.aspx accessed February 2024.

78. Te Hiringa Mahara — Mental Health and Wellbeing Commission. Te papatohu aroturuki — He Ara Āwhina dashboard. Data about mental health and addiction services in Aotearoa New Zealand. Wellington, New Zealand: New Zealand Government; 2024 updated 5/6/2024. Available from: https://www.mhwc.govt.nz/our-work/mental-health-and-addiction-system/he-ara-awhina-dashboard/.

79. Ministry of Health, Health New Zealand, Māori Health Authority. Joint briefing to the incoming Minister for Mental Health. Wellington, New Zealand: Ministry of Health, 2023. https://www.tewhatuora.govt.nz/assets/Uploads/Joint-briefing-to-the-incoming-Minister-for-Mental-Health.pdf

80. Te Whatu Ora - Health New Zealand. Health targets and mental health and addiction targets. 2024 updated 31/7/2024. Available from: https://www.tewhatuora.govt.nz/corporate-information/our-health-system/health-targets-and-mental-health-and-addiction-targets/.

81. Doocey M. Announcement of mental health targets and Mental Health and Addiction Community Sector Innovation Fund. Wellington, New Zealand: New Zealand Government; 2024 updated 4/7/2024. Available from: https://www.beehive.govt.nz/speech/announcement-mental-health-targets-and-mental-health-and-addiction-community-sector.

82. Mental Health Foundation of New Zealand. Briefing to the Minister for Mental Health. Auckland, New Zealand: Mental Health Foundation of New Zealand, 2023. https://mentalhealth.org.nz/resources/resource/briefing-to-the-minister-for-mental-health

83. Martel R, Reihana-Tait H, Lawrence A, et al. Reaching out to reduce health inequities for Māori youth. International Nursing Review 2020;67(2):275-81. https://doi.org/10.1111/inr.12565

84. Craik B, Egan R, Kewene F, et al. Mental health promotion practice in Aotearoa New Zealand: Findings from a qualitative study. Health Promotion International 2023;38(5) https://doi.org/10.1093/heapro/daad137

85. Knowles S, Sharma V, Fortune S, et al. Adapting a codesign process with young people to prioritize outcomes for a systematic review of interventions to prevent self-harm and suicide. Health Expectations 2022;25(4):1393-404. https://doi.org/10.1111/hex.13479

86. Mansoor Z, Stanley J, Fortune S, et al. Evaluating an emotion coaching programme for parents of young adolescents attending Child Adolescent Mental Health Services (CAMHS) in New Zealand: Protocol for a multi-site feasibility trial including co-design with service users. Pilot and Feasibility Studies 2023;9(1):70. https://doi.org/10.1186/s40814-023-01282-6

87. Meinhardt I, Cargo T, Te Maro B, et al. Development of guidelines for school staff on supporting students who self-harm: A Delphi study. BMC Psychiatry 2022;22(1):631. https://doi.org/10.1186/s12888-022-04266-7

88. Meinhardt I, Cuthbert S, Gibson K, et al. Young people and adult stakeholders' reflections on how school staff should support students who self-harm: A qualitative study. Journal of Adolescence 2022;94(7):969-80. https://doi.org/10.1002/jad.12078

89. Thabrew H, Biro R, Kumar H. O is for awesome: National survey of New Zealand school-based well-being and mental health interventions. School Mental Health 2023;15(2):656-72. https://doi.org/10.1007/s12310-023-09577-y

90. Lam LT, Lam MK. Child and adolescent mental well-being intervention programme: A systematic review of randomised controlled trials. Frontiers in Psychiatry 2023;14 https://doi.org/10.3389/fpsyt.2023.1106816

91. Tokolahi E, Fenwick J, Sutherland D, et al. Children's mental health promotion: The need for intersectorial and interprofessional collaboration. Psychology in the Schools 2024;61(6):2634-48. https://doi.org/10.1002/pits.23184

92. Te Hiringa Mahara—Mental Health and Wellbeing Commission. Kua tīmata te haerenga | The journey has begun—mental health and addiction service monitoring report 2024: Access and options. Wellington, New Zealand: Te Hiringa Mahara—Mental Health and Wellbeing Commission, 2024. https://www.mhwc.govt.nz/our-work/mental-health-and-addiction-system/mental-health-and-addiction-service-monitoring/#haa2024

93. Tuohy P, Eastwood J, Hannan K, et al. Early childhood: The importance of the early years, position statement. Sydney, Australia: The Royal Australasian College of Physicians, 2019. https://www.racp.edu.au/docs/default-source/advocacy-library/early-childhood-importance-of-early-years-position-statement.pdf

94. World Health Organization, United Nations Children's Fund, World Bank Group. Nurturing care for early childhood development: A framework for helping children survive and thrive to transform health and human potential. Geneva, Switzerland: World Health Organization, 2018. https://www.who.int/publications/i/item/9789241514064

95. The Lancet. Advancing Early Childhood Development: from Science to Scale. 2016. Available from: https://www.thelancet.com/series/ECD2016.

GLOSSARY OF KEY TERMS

RESPIRATORY CONDITIONS

Asthma: a common, non-communicable, chronic lung condition in which airways become inflamed and narrow. The symptoms include difficulty breathing, chest pain, cough, and wheezing.

Bronchiolitis: a chest condition caused by a viral infection (often RSV), which usually affects infants, and causes rapid breathing, wheezing, and retraction of the chest wall. Bronchiolitis involves inflammation of the bronchioles, the smallest airways in the lungs.

Bronchiectasis: a long-term lung condition where repeated, serious lung infections damage airways and cause mucus build-up. Bronchiectasis is characterised by chronic inflammation and destruction of bronchial walls. The main symptom for children is a wet, chesty cough.

Influenza: a virus that infects humans (types A and B) and a wide range of birds and other animals. It causes symptoms such as fever, chills, muscle or body aches, headache, runny or stuffy nose, cough, and sore throat (among others) and can lead to serious complications.

Pneumonia: a serious viral or bacterial infection causing inflammation of the lungs. Children with pneumonia can experience symptoms such as cough, difficulty breathing, fever, chills, and chest pain. If untreated, very severe pneumonia can be fatal.

SARS-CoV-2: Severe acute respiratory syndrome coronavirus 2 is a strain of coronavirus that causes COVID-19, the respiratory illness responsible for the COVID-19 pandemic.

Wheeze: defined clinically as musical, continuous sounds caused by breathing through narrowed airways, wheeze can be associated with bronchiolitis (in infants), viral-induced preschool wheeze, and asthma.

RHEUMATIC FEVER AND RHEUMATIC HEART DISEASE

Acute rheumatic fever (ARF): a disease caused by an autoimmune reaction after infection by streptococcus bacteria. Acute rheumatic fever is an inflammation in the heart, joints, skin, or central nervous system.

Group A Streptococcus (GAS): a type of bacteria that can cause skin, soft tissue, and respiratory tract infections. GAS infections can range from mild infection (e.g., a sore throat) to severe or life-threatening conditions (invasive GAS disease) and require antibiotic treatment.

Rheumatic heart disease (RHD): a condition in which permanent damage to heart valves is caused by recurrent episodes of rheumatic fever.

SKIN INFECTIONS

Abscess: a painful, pus-filled infection that has formed a cavity below the skin surface. An abscess forms around a break in the skin or a hair follicle and is filled with pus (white blood cells, dead tissue, and bacteria). Treatment is incision and drainage.

Boil or furuncle: a painful skin infection, typically caused by *Staphylococcus* bacteria, that forms around a hair follicle and contains pus.

Carbuncle: a cluster of boils that are usually relatively deep and severe and leave scars.

Cellulitis: a common bacterial infection of the lower dermis and subcutaneous tissue. It results in a localised area of red, painful, swollen skin, and systemic symptoms such as fever.

Eczema: also known as atopic dermatitis, it is a chronic condition that causes dry, scaly, and itchy patches on the skin. It is not contagious.

Impetigo: also known as 'school sores,' it is a highly contagious skin infection that is most common in infants and children.

Pilonidal cyst: a type of infected boil or abscess located near the tailbone, often caused by an ingrown hair. Treatment involves drainage and surgical removal of the cyst.

Sepsis: a potentially life-threatening condition that arises when the body's response to infection causes injury to its own tissues and organs. Without prompt treatment, it can lead to organ failure, tissue damage, and death.

DENTAL DISEASE

Primary teeth: the first set of 20 teeth, referred to as primary, deciduous, 'baby,' or milk teeth, is half-formed by birth and erupts within the first 2.5 years of life.

Dental caries: A disease process that can lead to cavities in the tooth structure that compromise both the structure and the health of the tooth, commonly known as tooth decay.

dmft/DMFT (teeth scores): the number of teeth that are decayed (d), missing due to caries (m), or filled because of caries (f); 'dmft' refers to primary teeth and 'DMFT' to permanent teeth.

Permanent teeth: Secondary or 'adult' teeth that start to emerge at around 6 years of age, a process that is completed by the individual's early 20s. Individuals usually have 32 permanent teeth.

Topamine: a topical Silver Diamine Fluoride complex (SDF) used to treat tooth decay. SDF combines the antimicrobial effects of silver with the remineralising effects of fluoride and has been shown to be effective at preventing the progress of dental cavities and reducing the need for dental treatment under general anaesthesia.

MENTAL HEALTH CONCERNS

Anxiety disorder: a chronic condition that causes intense worry or fear about everyday situations; it can be so excessive that it causes panic attacks and interferes with daily life.

Depression: an illness that involves the body, mood, and thoughts, and causes sadness, negative feelings, tiredness, and poor concentration. It can affect a child's learning, sleep, eating, and relationships.

Psychological distress: feelings of extreme stress, anxiety, nervousness, hopelessness, depression, fear, anger, tiredness, or sadness.

Self-harm: direct, deliberate action to hurt or injure the body, often as a way to cope with intense difficult emotions. Forms of self-harm include cutting, burning, and poisoning.

ACKNOWLEDGEMENTS

Contributing Authors
Dr Karen Tustin, NZ Child and Youth Epidemiology Service
Dr Jessica Fleming, Cure Kids

New Zealand Child and Youth Epidemiology Service, University of Otago
Andrew Wicken
Prof Barry Taylor
Dr Fiona Turnbull
Dr Helena McAnally
Dr Judith Adams
Dr Mavis Duncanson

Cure Kids
Dr Patricia Anderson
Prof Sally Merry
Prof Stephen Robertson
Prof Stuart Dalziel
Prof Terryann Clark

Royal Australasian College of Physicians
Dr Hamish McCay
Dr Jess Allen

Paediatric Society of New Zealand
Assoc Prof Nicola Austin

Expert Advisors
Carmen Denyer
Dr Christine McIntosh
Prof Colin Simpson
Dr Denise Bennett
Dr Diana Purvis
Dr Jin Russell
Prof John Thompson
Dr Julie Bennett
Dr Katie Ayers
Prof Nigel Wilson
Prof Peter McIntyre
Dr Tanya Wright

Please cite as: Tustin, K., & Fleming, J. State of child health in Aotearoa New Zealand 2023. Auckland: Cure Kids; September 2024. Available from https://www.curekids.org.nz

With thanks to the NZ Ministry of Health and others who supplied data and expert input for this report.

APPENDIX: DATA SOURCES, MEASUREMENT, AND METHODS

The estimated population of Aotearoa NZ includes about 1.3 million children younger than 20 years — almost a quarter of the total population.[1] This report includes nationally representative data for infants, children, and young people aged from 0 to 19 years (inclusive) in Aotearoa NZ.

The National Minimum Dataset (NMDS) is an administrative data collection held by the NZ Ministry of Health, which captures information about all discharges from publicly funded hospitals in Aotearoa NZ.[2] This report presents data extracted by the Ministry in May 2023 on discharges as representative of hospitalisations and represents the most up-to-date data available at the time of publication. Note that data are limited to acute hospitalisations (i.e., unplanned admissions on the day of presentation at the admitting healthcare facility, including emergency department (ED) stays of >3 hours) and semi-acute hospitalisations (i.e., arranged admissions within a week of referral for, e.g., investigation of severe disease or intensive therapy). Hospitalisation events were excluded if there were transfers. Unless stated otherwise, hospitalisation information is presented by calendar year (Jan to Dec). This report presents the most frequent causes of hospitalisation for children aged 0 to 19 years in Aotearoa NZ, which have been summarised based on the primary diagnoses and is, therefore, not a complete list.

Rates of hospitalisation are presented per 1,000 children. Unless otherwise stated, rates are age specific and are calculated using the NZ Child and Youth Epidemiology Service (NZCYES) estimated resident population. This population-based denominator is derived from customised census data from Stats NZ, with linear interpolation and extrapolation for non-census years. Age-specific rates are calculated by dividing the number of observed discharge events for a specified age group over a specified period (for example, a year) by the total population at risk of the event in that age group.

Ethnicity is self-identified at each hospital admission. Prioritised ethnicity means that if a child identifies with more than one of the six ethnic groups defined, they are allocated to a single group according to the following order of priority: Māori, Pasifika, Asian/Indian, Middle Eastern/ Latin American/ African, Other, and European. Māori are the indigenous people of Aotearoa NZ. This is a heterogeneous and dynamic ethnic group, with diverse lifestyles and identities. Pasifika includes people from Samoa, Tonga, Fiji, the Cook Islands, Niue, and Tokelau. This ethnic group encompasses people with unique and distinctive identities, cultures, and languages. Asian and Indian includes people from Chinese, Indian, Korean, and Filipino ethnic groups, including indirect Indian (e.g., Indo-Fijian and Chinese-Samoan). The Middle Eastern, Latin American, and African (MELAA) ethnic groups constitute a small proportion of the NZ population. The European group is the largest ethnic group; it includes Pākehā, European (e.g., British, Dutch, German, Russian), and indirect European (e.g., American, Canadian, South African, and Australian). The Other ethnic group comprises people who do not identify with any of these ethnic groups. In this report, European and Other ethnic groups are combined due to small numbers in the latter group and to enable consistency in time-series analyses following changes to the way in which ethnicity has been coded by Stats NZ and in health collection databases.[3,4]

The New Zealand Index of Deprivation measures the level of socioeconomic deprivation in neighbourhood areas and is based on variables from the NZ Census. Quintile 1 represents the 20% of areas with the lowest socioeconomic deprivation, and quintile 5 represents the 20% of areas with the highest deprivation.[5]

Started in 2011, the New Zealand Health Survey (NZHS) is an annual survey. In 2022/23, the Survey included data for 2,029 under-15-year-old children with their parents or caregivers and 576 young people aged 15—24 years.[6] Data from the Health Survey have not been analysed according to age, ethnicity, or socioeconomic deprivation for young people because demographic data are provided as an aggregate. The results for the NZHS in 2022/23 were weighted to take account of the lower-than-usual response rates (67% for children, 71% for adults).

The Community Oral Health Services (COHS) is a universal annual dental examination for children aged 1 year of age up to and including Year 8 of school (aged around 12—13 years).[7] Enrolled children are examined every 6—12 months and offered necessary treatment. Each Community Oral Health Service supplies information on use of their service to the Ministry of Health. COHS reports the number of children examined, the number of children who are decay-free (caries-free), and the number of decayed, missing, or filled teeth (dmft/DMFT). This report specifically looks at COHS data from universal dental examinations of 5-year-old children during their first year at primary school and children in Year 8 (the second year at intermediate school). For 5-year-olds, these data relate to primary (deciduous, baby, or milk) teeth; for children in Year 8, data relate to permanent teeth. Information on deprivation is not available for COHS but the following ethnic group breakdowns are provided: Māori, Pasifika, and non-Māori non-Pasifika. In 2022, 33,202 5-year-olds and 45,595 Year 8 children were examined.[8]

The Institute of Environmental Science and Research (ESR) provides intelligence on notifiable diseases and other serious health threats and manages the national notifiable disease database (EpiSurv) on behalf of the Ministry of Health.[9] Information on numbers of notifications are provided by age group, sex/gender, and prioritised ethnicity.

PRIMHD (Programme for the Integration of Mental Health Data) is the Ministry of Health's national database covering the provision of publicly funded secondary mental health and alcohol and drug services.[10] Commencing on 1 July 2008, it integrates information from the previous Mental Health Information National Collection (MHINC) and the MH-SMART data collection. It includes secondary inpatient, outpatient, and community care provided by hospitals and non-Government organisations (although some data from NGOs may be incomplete). It does not include information on mental health care in primary or private settings or outpatient visits to paediatricians. As such, where local referral pathways result in children seeing a paediatrician rather than a mental health professional for behavioural or emotional problems, this may significantly underestimate the prevalence of mental health issues (e.g., autism, ADHD, learning disorders) in the community. Referral pathways (i.e., the relative balance between paediatrics vs mental health services) are likely to vary both by region (depending on the availability of specialist child and youth mental health services) and by age (with the role of the paediatrician decreasing as adolescence approaches). As paediatric outpatient data is currently not coded by diagnosis, the workload of community/developmental paediatricians in this context remains invisible, making it difficult to assess the underlying prevalence of mental health conditions for children in the community. For adolescents/young adults however, PRIMHD may provide a better reflection of access to secondary services for mental and behavioural issues. Using PRIMHD data from 2017 onwards, analyses in this report have counted numbers of individual clients, rather than numbers of contacts. In this way, each client is counted only once in each category in which they have appeared, and particular clients may have been counted in more than one category. For example, the same client may have been seen in several different years or have been given more than one diagnosis. This means that the sum of the category totals may be greater than the overall total.

REFERENCES

1. Stats NZ. Stats NZ Infoshare. 2024. Available from: https://infoshare.stats.govt.nz/Default.aspx accessed February 2024.
2. Ministry of Health. National Minimum Dataset (Hospital Events) Data Dictionary. Wellington, New Zealand: Ministry of Health, 2021. https://www.health.govt.nz/publication/national-minimum-dataset-hospital-events-data-dictionary
3. Ministry of Health. HISO 10001:2017 Ethnicity Data Protocols. Wellington, New Zealand: Ministry of Health, 2017. https://www.tewhatuora.govt.nz/assets/Our-health-system/Digital-health/Health-information-standards/hiso_10001-2017_ethnicity_data_protocols_21_apr.pdf
4. Statistics New Zealand. Final report of a review of the official ethnicity statistical standard 2009. Wellington, New Zealand: Stats NZ, 2009. https://ndhadeliver.natlib.govt.nz/delivery/DeliveryManagerServlet?dps_pid=IE1632151
5. Atkinson J SC, Crampton P. NZDep2018 Index of Deprivation, Interim Research Report, December 2019. Wellington, New Zealand: University of Otago, 2019. https://www.otago.ac.nz/__data/assets/pdf_file/0025/327481/nzdep2018-index-of-deprivation-research-report-interim-dec-2019-730394.pdf
6. Ministry of Health. Methodology Report 2022/23: New Zealand Health Survey. Wellington, New Zealand: Ministry of Health, 2023. https://www.health.govt.nz/system/files/documents/publications/methodology-report-2022-23-new-zealand-health-survey-dec23.pdf
7. Ministry of Health. Community Oral Health Services for children and some adolescents (previously child oral health services): Tier two service specification. Wellington, New Zealand: Ministry of Health, 2021. https://www.tewhatuora.govt.nz/assets/Our-health-system/National-Service-Framework/Service-specifications/Oral-Health/t2_cohs_service_specification_final_may_2021.docx
8. Ministry of Health. Age 5 and Year 8 oral health data from the Community Oral Health Service. 2023. Available from: https://www.health.govt.nz/nz-health-statistics/health-statistics-and-data-sets/oral-health-data-and-stats/age-5-and-year-8-oral-health-data-community-oral-health-service.
9. Institute of Environmental Science and Research. Infectious disease intelligence and surveillance. Porirua, New Zealand: ESR; 2024. Available from: https://www.esr.cri.nz/expertise/public-health/infectious-disease-intelligence-surveillance/#Resources.
10. Ministry of Health. PRIMHD — mental health data. Wellington, New Zealand: Ministry of Health; 2024. Available from: https://www.tewhatuora.govt.nz/for-health-professionals/data-and-statistics/nz-health-statistics/national-collections-and-surveys/collections/primhd-mental-health-data/2024

RESOURCES AND LINKS

If you need to talk or find extra support:

- Anxiety helpline: 0800 269 4389 (0800 ANXIETY); https://anxiety.org.nz/
- Depression Helpline: 0800 111 757 (or text 4202)
- Healthline: 0800 611 116
- Lifeline: 0800 543 354 (or text 4537)
- Need to talk?: Free call or text 1737; https://1737.org.nz/
- Rainbow Youth: (09) 376 4155; https://ry.org.nz/
- Samaritans: 0800 726 666; https://www.samaritans.org.nz/
- Small Steps: www.smallsteps.org.nz
- Suicide Crisis Helpline: 0508 828 865 (0508 TAUTOKO) (available 24/7)
- Youthline: 0800 376 633 (free text 234) (webchat 10am to 10pm: https://youthline.co.nz/web-chat-counselling/)
- What's up: 0800 942 8787 (11am to 11pm); https://whatsup.co.nz/
- Headstrong: https://www.headstrong.org.nz/ (Aroha Chatbot app)
- OutLine: 0800 688 5463 (6pm to 9pm); https://outline.org.nz/ (rainbow counselling)
- SPARX: www.sparx.org.nz (e-therapy game)
- The Lowdown: www.thelowdown.co.nz