2022

State of Child Health

in Aotearoa New Zealand

cure kids
big research
for little lives

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ACKNOWLEDGEMENTS

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CONTENTS

FOREWORD

Tēnā koutou katoa,

Kia kuru pounamu te rongo—that all mokopuna may live their best lives. This is our vision at the Office of the Children's Commissioner. I believe it's a shared goal in Aotearoa. We all want our children, no matter who they are, to grow up among loving and supportive whānau with the resources they need to grow and thrive.

The following State of Child Health report clearly shows us that we have a lot of work to do before this is true for all of our young people. Covering data from 2000 to the end of 2021, including two years of the COVID-19 pandemic, this report shines a spotlight on unacceptably high numbers of mokopuna who live with health issues, many of them preventable.

As in previous reports, inequity plays a major role. We know that most children in Aotearoa enjoy good health and feel positive and happy overall. However, Māori children, Pasifika children, and those living in areas with greatest socioeconomic deprivation carry the greatest burden of disease.

Access to health care is complicated by living in poverty. For example, while the service is free, getting there isn't. It can be hard to get a timely appointment. Nor is it necessarily easy to organise childcare for other children while you take one to the doctor. We need to look at how we can better support all whānau because currently services aren't reaching them. We need to take healthcare to families!

Being unwell has a ripple effect. Time spent in hospital and away from school and other activities negatively affects children, creates stress for whānau, and in many cases leads to health problems that carry through to adulthood.

Building on the findings in last year's report, Cure Kids has highlighted four major health issues which continue to have a huge impact on children and their whānau, chosen for their prevalence, cost to the health system, and long-term consequences for the future. These are respiratory conditions, skin infections, rheumatic fever and rheumatic heart disease, and mental health issues.

It's concerning that rates of both rheumatic fever and rheumatic heart disease remain at unacceptable levels relative to other OECD countries, with very high rates suffered by Māori and Pasifika children. Similarly, Aotearoa has one of the highest rates of childhood skin infections among developed countries, with those children in low socioeconomic status neighbourhoods more likely to be admitted to hospital with them.

Especially worrying are the findings on childhood mental health, included in this report for the first time. By now it's well known that we suffer one of the highest rates of adolescent suicide in the OECD and twice the average. This very point was a matter for concern at the recent sixth Periodic review of New Zealand by the Committee on the Rights of the Child under the United Nations Convention on the Rights of the Child (9 February 2023).

Perhaps less well known is that the average number of hospitalisations for mental and behavioural disorders for mokopuna up to 19 years of age between 2017 and 2021 was almost double the average rate between 2000 and 2004, affecting young people from all backgrounds.

continued over >

As Children's Commissioner, I represent the 1.2 million people in Aotearoa under the age of 18. I campaign for children's rights to be recognised and upheld, ensure children's voices are heard and advocate for systems-level change, with a focus on mental wellbeing, equitable education, ending family violence, and monitoring places of detention. Each of these areas is impacted by poverty and disadvantage, as are our health challenges.

In a resource-rich country like ours, this is simply unacceptable. We all need to do more.

I acknowledge the expertise and dedication of the Cure Kids team, who this year joined forces with the Paediatric Society of NZ, the Royal Australasian College of Physicians, the NZ Child and Youth Epidemiology Service at the University of Otago and other expert advisors across the motu to produce this important report.

Good data helps us to clearly see our problems, and track our progress towards solving them. I hope everyone who reads this report will see it as an opportunity for a systems change in Aotearoa New Zealand, for the future wellbeing of our people.

The health of mokopuna as they grow will affect their lives, the lives of their own children, and the health of society too. We simply must work harder to reduce poverty and find ways to eliminate inequity in our systems.

Poipoia te kākano kia puawai — nurture the seed and it will blossom.

Ngā mihi,

Children's Commissioner,
Judge Frances Eivers (Ngāti Maniapoto, Waikato)

01
INTRODUCTION

Tēnā koutou katoa,

In 1971, Professor Sir Bob Elliott and Dr Ron Caughey founded Cure Kids, inspiring our vision for healthier lives and brighter futures for our mokopuna. New Zealand children deserve the same right to health as children anywhere in the world. Our tamariki needed then, and still now, a paediatric research programme specific to our own unique population and its health challenges. At Cure Kids, we support medical and scientific research in order to raise the standard of health of our tamariki in Aotearoa New Zealand and the Pacific Islands.

Over more than 50 years, Cure Kids has invested more than $66 million into research to enable healthier children, with brighter futures. Our breakthroughs include major advances in the understanding of risk factors for stillbirth, premature birth, and sudden unexpected deaths in infancy saving thousands of lives, here in New Zealand and around the world. Other research has led to inventions of a new diagnostic test for cystic fibrosis, several devices to prevent brain injuries, and a promising gene therapy for Batten Disease (a rare neurological disorder).

Cure Kids' purpose is to support research on the big health issues that impact the lives of our tamariki. To identify the health issues which are in most urgent need of solutions, we have joined forces with the Paediatric Society of NZ, the Royal Australasian College of Physicians, the NZ Child and Youth Epidemiology Service at the University of Otago, and with other expert advisors around the country to develop the Cure Kids State of Child Health Report.

For this 2022 report, our advisors built on the previous reports prepared in 2020 and 2021 and selected four major classes of health condition which have a big impact on the lives of infants, children, and young people in Aotearoa New Zealand:

- **respiratory conditions**
- **rheumatic fever and rheumatic heart disease**
- **skin infections**
- **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 their 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. Māori children, Pasifika children, and children living in areas with 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 New Zealand.

This year, the Cure Kids State of Child Health Report shines a spotlight on the dire statistics for hospitalisations due to mental health in our youth. The rate of young people admitted to hospital before the age of 19 years due to mental health diagnoses has doubled in the past 15 years.

Reversing these trends will require deliberate and collaborative efforts. National actions to reduce child poverty, by delivering equitable access to healthcare, nutrition, and housing, would reduce risk factors for these four diseases. We aim to galvanise action on these health issues. The high rates of disease among our tamariki are shocking — and represent an opportunity for change. 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 Benge
Chief Executive, Cure Kids

02

RESPIRATORY CONDITIONS

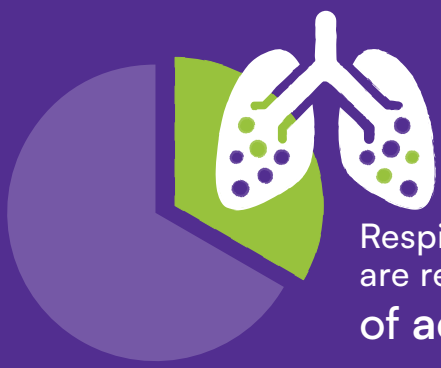
Mate romahā

Respiratory conditions are responsible for more than one third of all acute hospitalisations for children.

Children younger than 5 years make up three quarters of all hospitalisations of children for acute respiratory conditions.

Children who live with the worst socioeconomic deprivation have more than double the rate of hospitalisations for respiratory conditions compared with other children.

The hospitalisation rate for respiratory conditions in children has continued to increase since 2000, with temporary reductions due to pandemic-response measures.



Respiratory conditions are responsible for about a **third** of **acute hospitalisations** for children

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

The rates of children treated in hospital for acute respiratory conditions are from the NZ Ministry of Health's National Minimum Dataset (NMDS)[1] between January 2000 and December 2021, based on the diagnostic codes at discharge. Rates include all acute (and semi-acute) hospitalisations for children and adolescents whose primary diagnosis was coded as:

- upper respiratory infections (ICD-10-AM: J00—J06),
- influenza (J09—J11),
- lower respiratory infections, namely pneumonia (J12—J16, J18), acute bronchitis (J20), or acute bronchiolitis (J21),
- asthma and wheeze (J45, J46, R06.2), or
- bronchiectasis (J47; excluding cystic fibrosis).

Together, these acute and semi-acute respiratory conditions account for approximately 85% of all hospitalisations for respiratory-related conditions.

LATEST DATA

Over the 5 years to the end of 2021, the average number of children aged 0—19 years admitted to hospital every year for acute respiratory conditions was almost 25,000. Around 35% of all acute hospitalisations for children are due to respiratory conditions.[2]

Hospitalisation rates are highest for children younger than 2 years old.[2,3] On average, 77% of all hospitalisations for acute respiratory conditions are for children younger than 5 years.

TREND

Figure 2.1 shows that hospitalisation rates for respiratory conditions have increased over the past two decades — most notably for children younger than 5 years. Hospitalisations 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. Despite this drop in hospital admissions during the period of restrictions associated with the COVID-19 pandemic, the rate of hospitalisations for preschool children remained relatively high. After a partial re-opening of the international border in April 2021, which allowed quarantine-free travel with Australia, there was an increase in respiratory infections such as respiratory syncytial virus (RSV),[4,5] and hospitalisations increased to near pre-pandemic levels for under-5-year-olds.

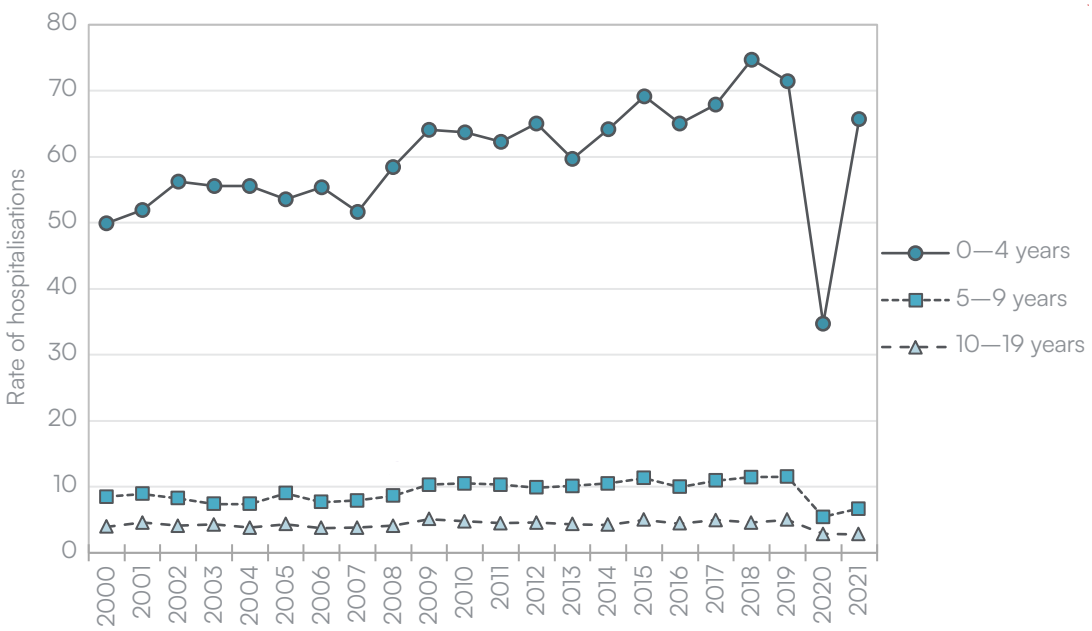


Figure 2.1: Trends in hospitalisations of children for respiratory conditions, by age group (2000—21)
Source: NMDS and NZCYES estimated resident population.
Rate per 1,000 children in each age group.

Over the 5 years to the end of 2021, 43% of acute 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 hospitalisations, and 27% were for asthma or wheeze.

LATEST DATA

Figure 2.2 shows that the type of respiratory conditions causing hospital admissions varies by age. The most frequent causes of hospitalisation for children younger than 5 years were acute bronchiolitis and acute upper respiratory tract infections, followed by preschool wheeze. The most frequent cause of hospitalisation for older children over this 5-year period was asthma, followed by acute upper respiratory tract infections.

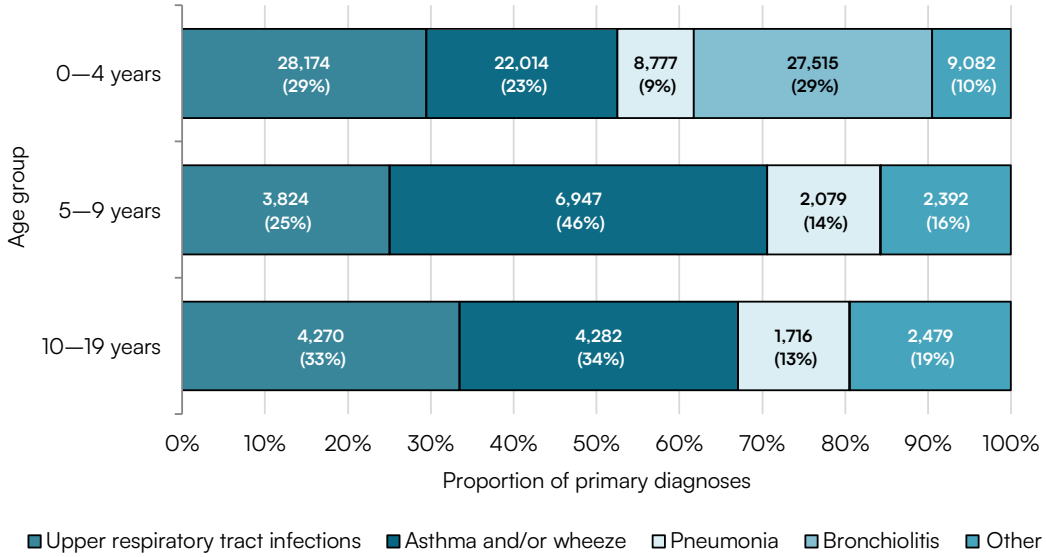


Figure 2.2: Causes of hospitalisations for acute respiratory conditions by age group (2017—21)
Source: NMDS and NZCYES estimated resident population.
Rate per 1,000 children in each age group. Other acute respiratory conditions include influenza, bronchitis, and bronchiectasis (excluding cystic fibrosis).

Children in Aotearoa New Zealand have some of the highest rates of asthma in the world.[6] Data from the New Zealand Health Survey show that in 2021, one in eight children aged 2—14 years (11.4%) were using medication for diagnosed asthma.[7] Since 2000, hospitalisation rates for asthma and wheeze have increased, particularly for children younger than 5 years. Children who are hospitalised with preschool wheeze are likely to be admitted with recurrent episodes.[8] About half of children will grow out of asthma and wheeze as they age.[9]

TREND

Bronchiectasis is a relatively rare respiratory condition in which a series of recurrent respiratory infections causes permanent damage to the airways and long-term chronic lung disease. Figure 2.3 shows that rates of hospitalisation for bronchiectasis increased sharply over the past decade, particularly in the youngest children. The rate has decreased somewhat since 2017 for 0—4-year-olds, but has not for 5—9-year-olds.

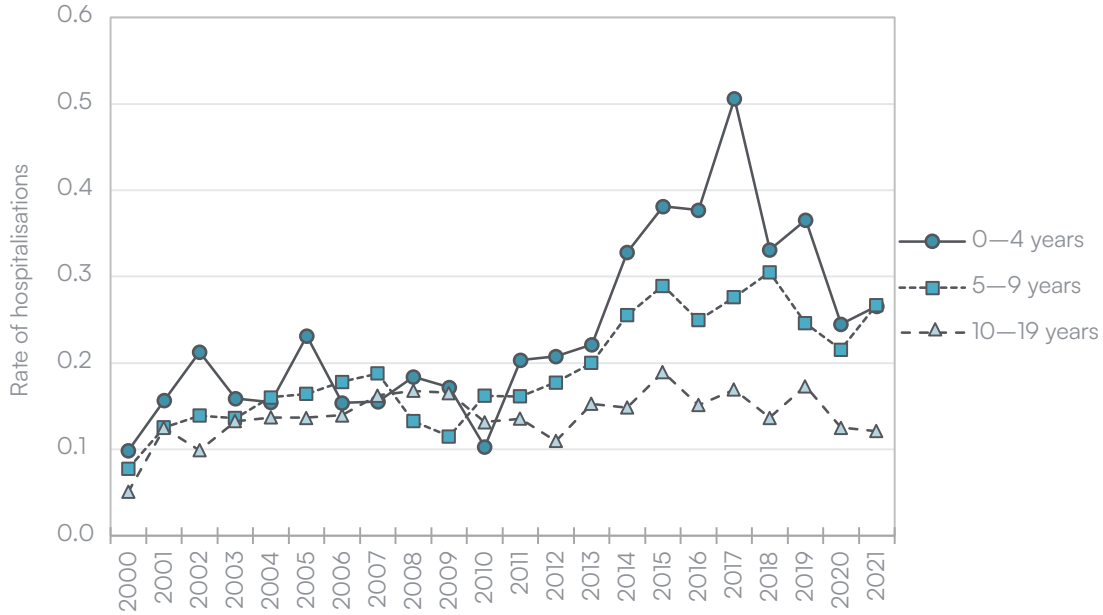


Figure 2.3: Trends in hospitalisations for bronchiectasis, by age group (2000—21)
Source: NMDS and NZCYES estimated resident population.

Rate per 1,000 children. Cases of bronchiectasis related to cystic fibrosis represent less than 1% of all hospitalisations for bronchiectasis for 0—19-year-olds. Between 2000 and 2021, there were 21 hospital admissions for bronchiectasis related to cystic fibrosis; they are not shown on this graph.

INEQUALITIES IN RESPIRATORY HEALTH IN AOTEAROA NEW ZEALAND

Hospitalisation rates for respiratory conditions vary widely for children in different ethnic and socioeconomic groups in Aotearoa New Zealand, revealing a high degree of inequality.[2,9] Between 2017 and 2021, the rate of hospitalisations of Pasifika children for respiratory conditions was 2.5 times that of children of European or Other ethnicities. The rate for Māori children was double that of children of European or Other ethnicities. The gaps between rates were greater for acute bronchiolitis (3.8 times higher for Pasifika children and 3.2 times higher for Māori children), and greater still for bronchiectasis (4.6 times higher for Pasifika children and 3.5 times higher for Māori children).

Figure 2.4 shows that over the past two decades, Pasifika children have experienced the highest rate of hospitalisations for respiratory conditions. Rates have also remained disproportionately high for Māori children and children of Middle Eastern, Latin American, and African ethnicities. Public health measures associated with the COVID-19 pandemic in 2020 reduced hospitalisations for all ethnic groups.

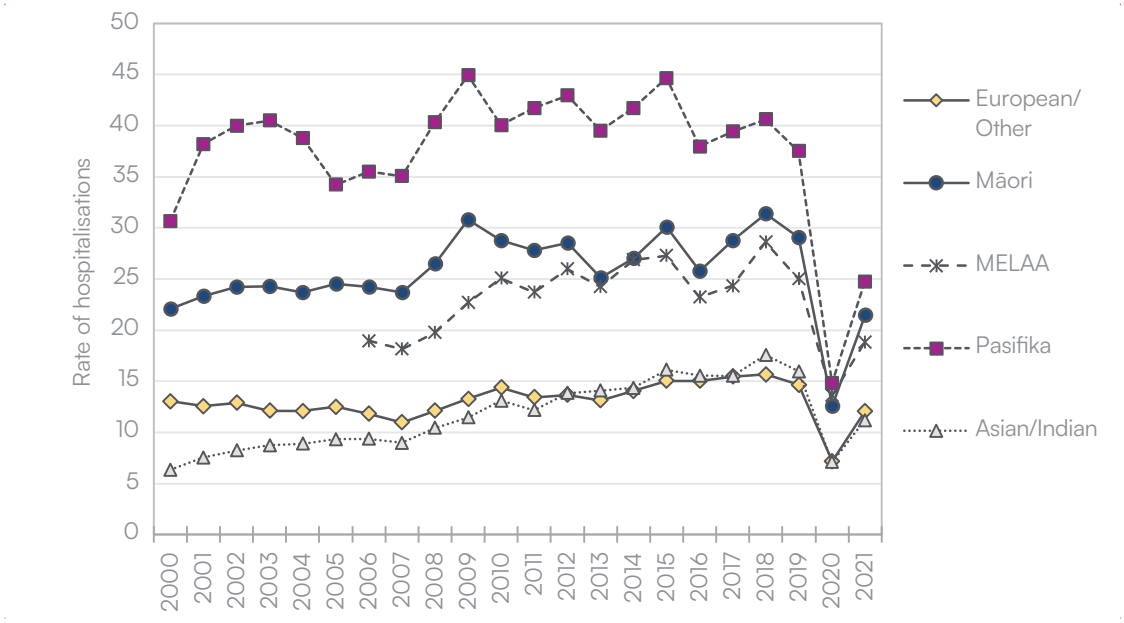


Figure 2.4: Trends in hospitalisations of children and adolescents for respiratory conditions, by ethnicity (2000—21)
Source: NMDS and NZCYES estimated resident population.
Rate per 1,000 children. MELAA = Middle Eastern, Latin American, or African.

Figure 2.5 shows that children living in areas with the most deprivation have had the highest hospitalisation rates for respiratory conditions over the past two decades. Rates decreased while borders were closed due to the COVID-19 pandemic but increased again in 2021.

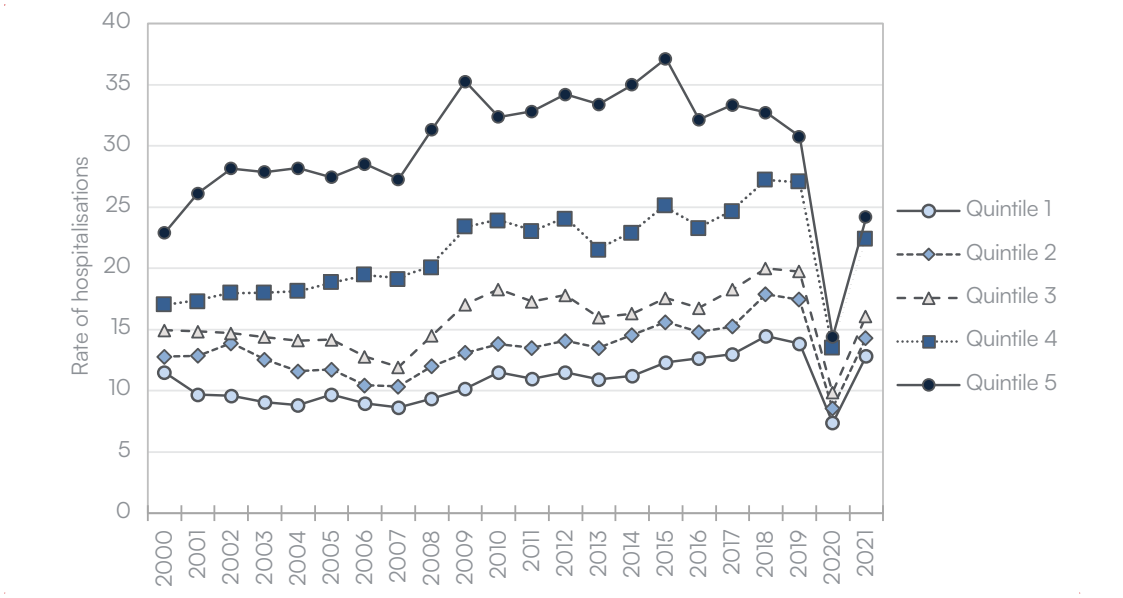
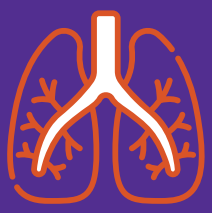


Figure 2.5: Trends in hospitalisations for respiratory conditions, by socioeconomic deprivation (2000—21)
Source: NMDS and NZCYES estimated resident population.
Rate per 1,000 children. NZDep Index of Deprivation (where Quintile 1 = least socioeconomically deprived neighbourhood, and Quintile 5 = most deprived).

Between 2017 and 2021, the rate of respiratory hospitalisations of children living in areas with the most deprivation was more than twice as high as that of children living in areas with the least deprivation. The gaps between rates were greater for acute bronchiolitis (3.7 times higher for children living in areas with the most deprivation) and greatest for bronchiectasis (6.1 times higher for children living in areas with the most deprivation).



The rate of hospitalisation for bronchiectasis - irreversible lung damage - is

6 times higher

for children who live with the worst socioeconomic deprivation

Children who live with the worst socioeconomic deprivation have

more than 2x

the rate of **hospitalisations** for **respiratory conditions** as other children

VOICES OF YOUNG PEOPLE AND THEIR WHĀNAU

Strategies for prevention and treatment of respiratory conditions should be informed by children's experiences of respiratory conditions, and by their aspirations for respiratory health. Research has shed light on these experiences, along with those of their families and caregivers, and shown that children and families are keen to have information and tools to self-manage their respiratory conditions, and to gain access to healthcare services and appropriate support.[11]

> **"It's like really hard to breathe and it feels like you're going to fall and stuff like that, and like it feels like your lungs are about to explode."**
>
> (Mia, 9 years, Auckland, describing her asthma)

> **"You know what to look out for before taking him to get to seek medical advice. It was always just looking at his breathing and how hard he's having, you know, to breathe, just to get the air in his ribs because you start seeing his rib cage. That's when I knew...just the way he would breathe it's like he was trying to gasp for air like he couldn't, and I could see."**
>
> (Eseta, mother, Christchurch)

> **"While we were in that previous property, he was admitted about four times to hospital, so twice he was taken by ambulance from the 24 hours because of his breathing and then the other two times we just took him in. I didn't think anything of it until a few days ago where I had noticed it has been over 4 months, nearly 4 months, since he's had any breathing problems."**
>
> (Eseta, mother, Christchurch)

> **"Having a child with asthma can be one of those things, they could be fine one minute and completely not the next, and I think if we can see those signs really quickly and identify them and deal with them it would be good."**
>
> (Rangi, mother, Christchurch)

Fa'alili-Fidow J, Lyndon M, Ikihele AM, et al. Improving the respiratory health of Māori and Pacific children in Aotearoa. Auckland, NZ: Moana Research; 2021. Available on request.[11]

WHY PRIORITISE RESPIRATORY HEALTH FOR CHILDREN?

In most children, the symptoms of respiratory conditions are mild, and children can be treated at home or in primary care, recovering within a few weeks. Children experience wheezing, coughing, and difficulty breathing, which can disturb their sleep, disrupt education and other activities, and require healthcare and hospital admissions for treatment to manage symptoms and prevent complications.[8,9]

In order to reverse the trend in hospitalisations for respiratory conditions it will be important to educate children and families to enable self-management and to address some of the root causes of disease at the national level. Triggers and risk factors for respiratory conditions in childhood are multifactorial, and include socioeconomic deprivation, poor-quality housing conditions, air pollution, exposure to tobacco smoke, malnutrition, and missed immunisations.[5,12-17] Modelling suggests that climate change will exacerbate respiratory conditions through extreme weather events, wildfires, air pollutants, moulds, pollen and other allergens, and changes in the transmission of infectious diseases.[18,19]

Most respiratory tract infections are caused by viruses, such as influenza, human rhinovirus, and respiratory syncytial virus (RSV); bacteria can also cause respiratory infections like pneumonia and pertussis.[20] Funded vaccines are available to protect children against some infectious agents (e.g. pertussis, haemophilus, and pneumococcus), but not others (e.g. RSV, staphylococcus, and other streptococcus). Immunisation is particularly important for children who have chronic respiratory diseases such as asthma or bronchiectasis, and those who have been hospitalised previously for respiratory illnesses. In 2023, influenza vaccines will be free for most children, on the basis that levels of natural immunity to influenza are low due to COVID-response measures.[21] For other free childhood vaccines, rates of timely immunisation have not met the targets needed to ensure protection, and have fallen markedly since 2020, when the COVID-19 pandemic disrupted delivery and uptake of immunisation.[21a] The risk is particularly high for Māori children, who have the lowest immunisation coverage at all milestone ages.[21a] Recent strategies such as an improved system for registering immunisations, vaccination in pharmacies, and community-led initiatives will be vital to achieving delivery and timely uptake of vaccines.[21a] If immunisation rates do not improve, outbreaks of infectious diseases such as pertussis and measles, with associated spikes in hospitalisations, are inevitable.

In the lower respiratory tract, infections can cause pneumonia, bronchitis, or bronchiolitis. Without early diagnosis and treatment, severe or recurrent respiratory infections can lead to permanent damage and long-term chronic diseases such as bronchiectasis or chronic obstructive pulmonary disease.[22,23] Bronchiectasis is chronic, irreversible, and progressive, and can compromise lung function and reduce life expectancy for children. Although bronchiectasis is a rare disease, prevalence rates are particularly high for children in Aotearoa New Zealand, and disproportionately so for Pasifika and Māori children.[23] More research is needed to improve understanding of risk factors, and to enable earlier diagnosis and treatment.

Acute (upper and lower) respiratory infections, acute bronchiolitis, 'asthma and wheeze', influenza, and pneumonia were all independently associated with socioeconomic deprivation. The risk of being hospitalised for any of these respiratory conditions was at least doubled for children who lived in areas with the highest socioeconomic deprivation. Other research has shown the combined effect of ethnicity and deprivation: Māori and Pasifika children in the most deprived quintile were nearly five times as likely to be hospitalised for respiratory conditions as other children in the wealthiest quintile.[3]

Some of the inequality in hospitalisation rates is related to inequitable delivery of primary healthcare services to prevent and treat respiratory conditions before symptoms become so severe that they require hospital admission.[24,25] From July 2023, the Paediatric Society of New Zealand will be expanding its Cystic Fibrosis Clinical Network to include all respiratory conditions. This collaborative initiative will provide leadership, resources and best-practice recommendations to address the inequities outlined in this report. Investment in community-based interventions to deliver wrap-around care to protect children who are known to be at highest risk, including timely immunisations and other preventative care, could reduce Aotearoa New Zealand's overall rates of respiratory conditions.

REFERENCES

1. NZ Ministry of Health. National Minimum Dataset (hospital events). Wellington; 2021. Available from: https://www.health.govt.nz/nz-health-statistics/national-collections-and-surveys/collections/national-minimum-dataset-hospital-events
2. Duncanson M, Oben G, Adams J, et al. Health and wellbeing of under-15 year olds in Aotearoa 2018 [Internet]. Dunedin: New Zealand Child and Youth Epidemiology Service, University of Otago; 2019. (National Health and wellbeing of under-15 year olds). Available from: https://www.otago.ac.nz/nzcyes
3. Telfar Barnard L, Zhang J. The impact of respiratory disease in New Zealand: 2018 update [Internet]. Asthma and Respiratory Foundation NZ and University of Otago; 2019. Available from: https://www.asthmafoundation.org.nz/research/the-impact-of-respiratory-disease-in-new-zealand-2018-update
4. Trenholme A, Webb R, Lawrence S, et al. COVID-19 and Infant Hospitalizations for Seasonal Respiratory Virus Infections, New Zealand, 2020. Emerg Infect Dis. 2021;27(2):641-643. https://doi.org/10.3201/eid2702.204041
5. Huang S, Wood T, Jelley L, et al. Impact of the COVID-19 nonpharmaceutical interventions on influenza and other respiratory viral infections in New Zealand. Nat Commun. 2021; 12: 1001.doi: 10.1038/s41467-021-21157-9
6. Beasley R, Semprini A, Mitchell EA. Risk factors for asthma: is prevention possible? Lancet 2015;386(9998):1075-85.
7. NZ Ministry of Health. Annual Data Explorer 2019/20: New Zealand Health Survey [Data File] [Internet]. 2020. Available from: https://minhealthnz.shinyapps.io/nz-health-survey-2019-20-annual-data-explorer/
8. Walsh A, Gangakhedkar A, Jelleyman T, Grant CC. Pre-school wheeze hospital presentations: A demographic profile and review of clinical management. J Paediatr Child Health. 2023 Apr 10. doi: 10.1111/jpc.16404.
9. McNamara D, Asher I, Davies C, et al. Asthma and Respiratory Foundation NZ New Zealand Child Asthma Guidelines: a quick reference guide. Wellington: Asthma and Respiratory Foundation NZ; 2020. Available from: https://www.nzrespiratoryguidelines.co.nz/childguidelines-654716.html
10. Duncanson M, Oben G, Wicken A, et al. Child Poverty Monitor 2022 Technical Report [Internet]. Dunedin: NZ Child and Youth Epidemiology Service, University of Otago; 2022. Available from: http://nzchildren.co.nz/
11. Fa'alili-Fidow J, Lyndon M, Ikihele AM, et al. Improving the respiratory health of Māori and Pacific children in Aotearoa. Auckland, NZ: Moana Research; 2021. Available on request.
12. 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; 2017. Available at: https://cdn.auckland.ac.nz/assets/growingup/research-findings-impact/GUiNZ_Now%20we%20are%20four%20report.pdf
13. Asthma and Respiratory Foundation of New Zealand. Te hā ora (The breath of life): National Respiratory Strategy [Internet]. Wellington: The Asthma Foundation; 2015. Report No: 978-0-473-34001—8. Available from: https://www.asthmafoundation.org.nz/about-us/advocacy/national-respiratory-strategy
14. 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; Sep 1;74(9):849.
15. 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 [Internet]. 2016;15(1):120.
16. Loto-Aso E, Howie SR, Grant CC. Childhood pneumonia in New Zealand. J Paediatr Child Health. 2022 May;58(5):752—757. doi: 10.1111/jpc.15941
17. Best Practice Advocacy Centre NZ Clinical resources. Is it asthma? Assessing and managing wheeze in pre-school children. Dunedin: BPAC; 2020. Available at https://bpac.org.nz/2020/wheeze.aspx
18. Royal Society of New Zealand. Human health impacts of climate change for New Zealand: evidence summary Wellington, NZ: Royal Society Te Aparangi; 2017. Available at: https://royalsociety.org.nz/assets/documents/Report-Human-Health-Impacts-of-Climate-Change-for-New-Zealand-Oct-2017.pdf
19. Bolton A. Climate Change and Environmental Health. Porirua, NZ: Institute of Environmental Science and Research Ltd; 2018. Available at: https://www.esr.cri.nz/assets/Uploads/Climate-Change-and-Env-Health-FINAL-20180517.pdf
20. Best Practice Advocacy Centre NZ Clinical resources. Navigating uncertainty: managing respiratory tract infections. Dunedin: BPAC; 2019. Available at https://bpac.org.nz/2019/rti.aspx
21. Pharmac. Decision to widen access to influenza vaccine. 2 March 2023. Wellington: Pharmac; 2023. Available at https://pharmac.govt.nz/news-and-resources/consultations-and-decisions/2023-03-02-decision-to-widen-access-to-influenza-vaccine/

21a. Te Whatu Ora Immunisation Taskforce. Initial Priorities for the National Immunisation Programme in Aotearoa. Wellington: Te Whatu Ora Health NZ; 2022. Available at https://www.tewhatuora.govt.nz/assets/Whats-happening/Work-underway/Taskforces/Immunisation-Taskforce-Report.pdf

22. Best Practice Advocacy Centre NZ Clinical resources. Preventing and managing bronchiectasis in high-risk paediatric populations. Dunedin: BPAC; 2020. Available at https://bpac.org.nz/2020/bronchiectasis.aspx
23. Byrnes CA. 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. doi: 10.1136/thoraxjnl-2019-213142.
24. Schlichting D, Fadason T, Grant CC, et al. Childhood asthma in New Zealand: the impact of on-going socioeconomic disadvantage. N Z Med J. 2021;134(1533):80-95.
25. Moss R, Farrant B, Byrnes CA. Transitioning from paediatric to adult services with cystic fibrosis or bronchiectasis: What is the impact on engagement and health outcomes? J Paediatr Child Health 2021;57:548—53. doi.org/10.1111/jpc.15264.

03

RHEUMATIC FEVER AND RHEUMATIC HEART DISEASE

Kirikā rūmātiki me mate manawa rūmātiki

Rates of hospitalisation for acute rheumatic fever are 100 times higher for Pasifika children, and 40 times higher for Māori children than for children of European or Other ethnic groups.

WHAT IS THE STATE OF RHEUMATIC FEVER AND RHEUMATIC HEART DISEASE FOR CHILDREN IN AOTEAROA NEW ZEALAND?

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),[1] between January 2000 and December 2021, based on the diagnostic codes at discharge. Rates include all acute and semi-acute (arranged) hospitalisations for children and adolescents whose primary diagnosis was coded as rheumatic fever (ICD-10-AM: I00—I02) or rheumatic heart disease (ICD-10-AM: I05—I09).

Acute rheumatic fever (ARF) is an autoimmune disease that can arise after an infection with Group A Streptococcus (GAS) bacteria.[2-4] Inflammation due to ARF can affect the heart valves, causing long-term damage known as rheumatic heart disease (RHD).[5] RHD is irreversible, and recurrent episodes of ARF can cause cumulative damage which may require cardiac surgery, and increase the risk of premature death. Rates of both ARF and RHD in Aotearoa New Zealand are among the highest reported in developed countries around the world.

LATEST DATA

Over the past 5 years (2017—2021), there have been, on average, 200 hospitalisations per year for ARF or RHD in people younger than 20 years. Nearly 3,000 children aged 0—19 years have been hospitalised with ARF in New Zealand since 2000.

TREND

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. Overall, hospitalisations for treatment of 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 which causes RHD.

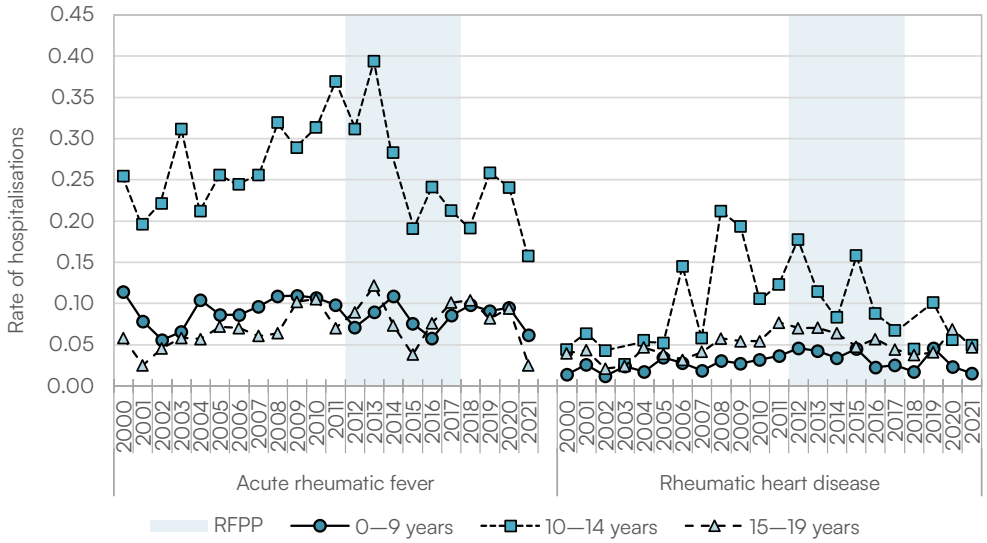


Figure 3.1: Trends in hospitalisations of children and adolescents for acute rheumatic fever and rheumatic heart disease, by age group (2000—21)
Source: NMDS and NZCYES estimated resident population.
Rate per 1,000 children in each age group. RFPP = Rheumatic Fever Prevention Programme (July 2012—June 2017).

TREND

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. Hospitalisations for both ARF and RHD decreased during the implementation of this Programme, and again in 2021 after the COVID-19 pandemic (Figure 3.2).

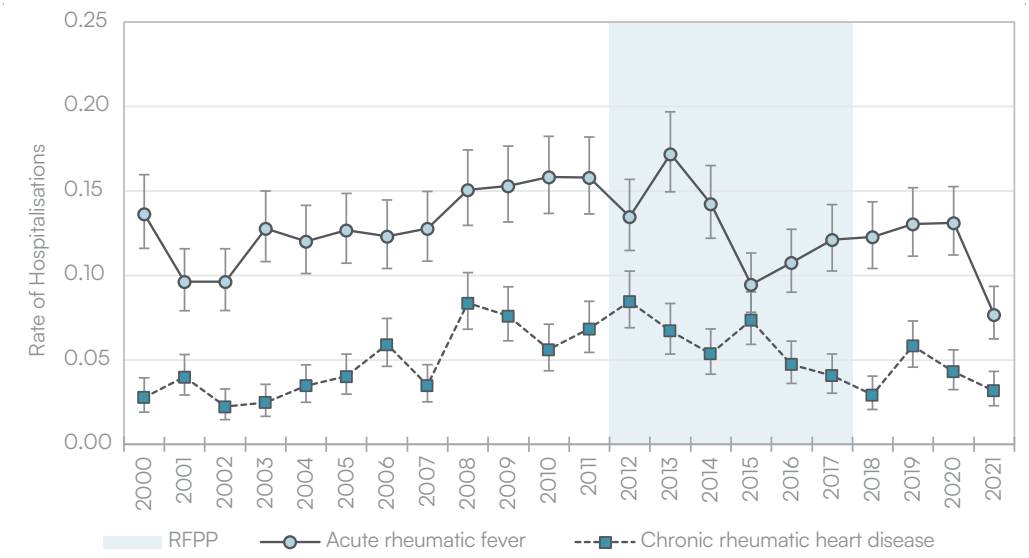


Figure 3.2: Trends in hospitalisations of children and adolescents for acute rheumatic fever and rheumatic heart disease, by primary diagnosis (2000—21)
Source: NMDS and NZCYES estimated resident population.
Rate per 1,000 children. RFPP = Rheumatic Fever Prevention Programme (July 2012—June 2017).

TREND

Figure 3.3 shows that about three-quarters of all hospitalisations for ARF are first hospitalisations. The Rheumatic Fever Prevention Programme aimed to identify and treat ARF, and to ensure that children who experience ARF should receive regular ongoing prophylaxis, which should prevent subsequent hospitalisations for ARF and RHD.

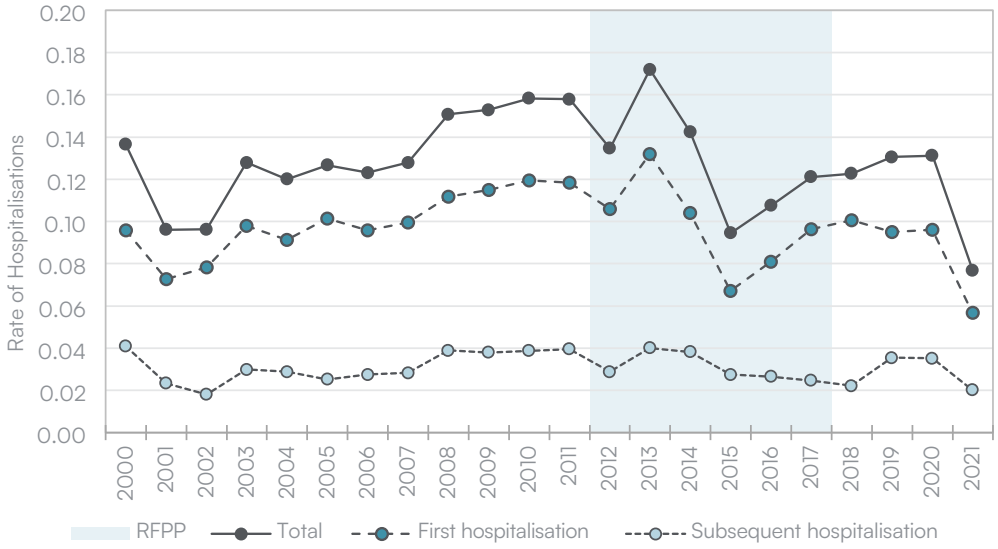


Figure 3.3: Trends in hospitalisations of children and adolescents for acute rheumatic fever (2000—21)
Source: NMDS and NZCYES estimated resident population.
Rate per 1,000 children. RFPP = Rheumatic Fever Prevention Programme (July 2012—June 2017).

TREND

Figure 3.4 shows that around 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 reduction in first cases during implementation of the Rheumatic Fever Prevention Programme may mean that children were more likely to be diagnosed and treated with ARF during this period, rather than being admitted to hospital with RHD as a first diagnosis. Numbers of hospitalisations for RHD increased markedly at the end of the Programme in 2019, but fell again in 2020 and 2021, likely secondary to public health measures in response to the COVID-19 pandemic. Research is ongoing to understand the complex effects of the pandemic, the response measures, and restrictions on access to hospital care.

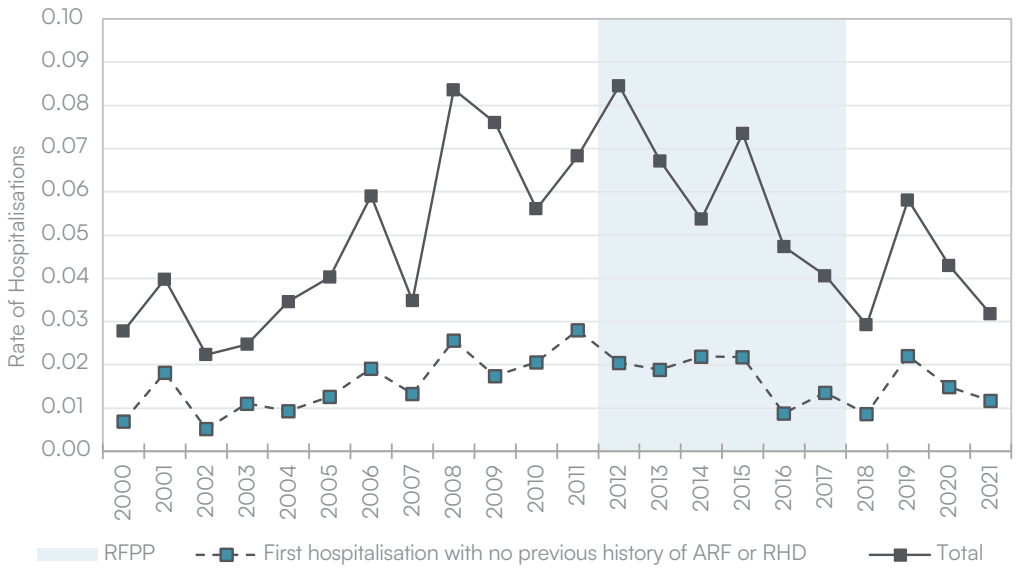


Figure 3.4: Trends in hospitalisations of children and adolescents for rheumatic heart disease (2000—21)
Source: NMDS and NZCYES estimated resident population.
Rate per 1,000 children. RFPP = Rheumatic Fever Prevention Programme (July 2012—June 2017).

INEQUALITIES IN RHEUMATIC FEVER IN AOTEAROA NEW ZEALAND

Figure 3.5 shows that between 2017 and 2021, the rate of hospitalisations of Pasifika children with ARF were 104 times greater than the rate of hospitalisations of European or Other children (reference group). The rate for Māori children was 40 times greater than the rate for European or Other children. The pattern is similar for RHD. Disparities were greater before the 2 years of reduced rates associated with the COVID pandemic.

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.

Figure 3.5: Relative gap in hospitalisation rate of children and adolescents with acute rheumatic fever by demographic factors (2017—21)
Source: NMDS and NZCYES estimated resident population.
Rate per 1,000 children. Data for MELAA (Middle Eastern, Latin American, or African) are suppressed due to small numbers.

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.

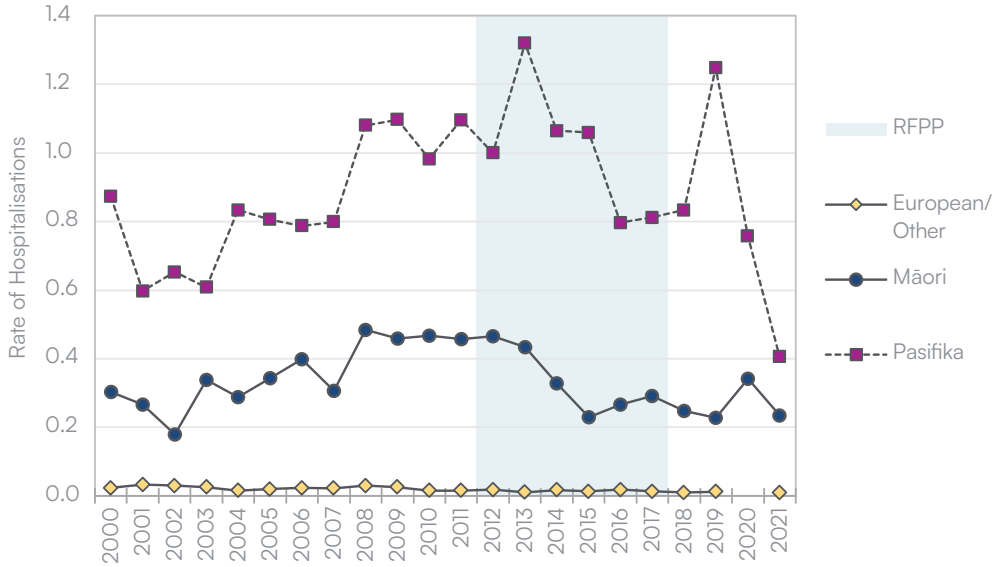


Figure 3.6: Trends in hospitalisations for acute rheumatic fever or rheumatic heart disease, by ethnicity (2000—21)

Source: NMDS and NZCYES estimated resident population.

Rate per 1,000 children. RFPP = Rheumatic Fever Prevention Programme (July 2012—June 2017). Ethnicity is level 1 prioritised. Rates for Asian/Indian and MELAA (Middle Eastern, Latin American, or African) and for European/Other for 2020 were suppressed due to small numbers.

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 and unacceptably high.

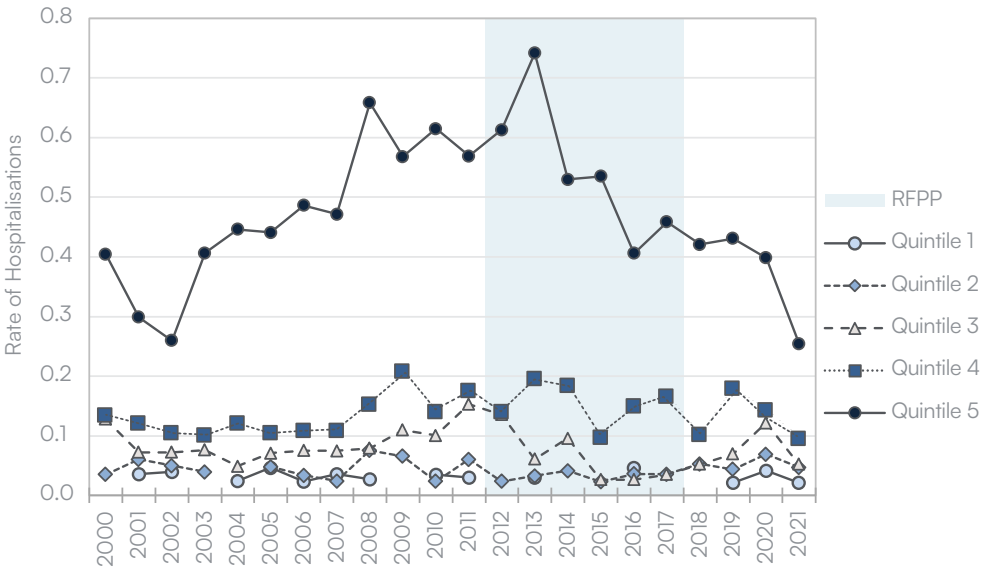


Figure 3.7: Trends in hospitalisations for acute rheumatic fever or rheumatic heart disease, by socioeconomic deprivation (2000—21)

Source: NMDS and NZCYES estimated resident population.

Rate per 1,000 children. RFPP = Rheumatic Fever Prevention Programme (July 2012—June 2017).
Quintile: NZDep Index of Deprivation (1 = least deprived; 5 = most deprived). Rates are suppressed for some years for quintile 1 due to small numbers.

VOICES OF YOUNG PEOPLE AND THEIR WHĀNAU

When surveyed, young people reported that ARF and RHD caused them significant illness, disruption, and pain, but that frequent painful injections of antibiotics were also difficult, especially when they were feeling well and the injections brought no obvious or immediate benefit.[6,7]

> **"I just couldn't stand and I held onto the walls, I just couldn't hold myself up and then I had to use crutches all the time."**
>
> Patient aged 14 years, son of Tongan parents[6]

> **"I was off school for about four, five months, and then I got home-schooled. And then that made me, after that experience, I felt a bit depressed for the next few years, I felt a bit depressed because I had to repeat fifth form. Moved back to Auckland and then I had to repeat. And I felt like I missed out A LOT."**
>
> Langakali, aged 16-18 years, from Tonga[7]

> **"They [the health care professionals] said I had rheumatic heart fever and that I had to have an operation ... So it ruined everything I used to do, sports and all that. I wasn't allowed to [do] all that ... I wasn't allowed to play sports, or do anything physical."**
>
> Miro, Māori adult[7]

> **"We have to get monthly injections and those are really, really sore. Like, is there any way we can make it not so sore and scary?"**
>
> Miare, Cook Islands[7]

Ryan, D. Health care experiences of Pacific families who have children with rheumatic fever. Wellington, NZ: Pacific Perspectives; 2015.[6]

Anderson A, Leversha A, Ofanoa M, et al. Māori and Pacific whānau experiences of recurrent rheumatic fever and unexpected rheumatic heart disease in New Zealand. Auckland, NZ: University of Auckland; 2017.[7]

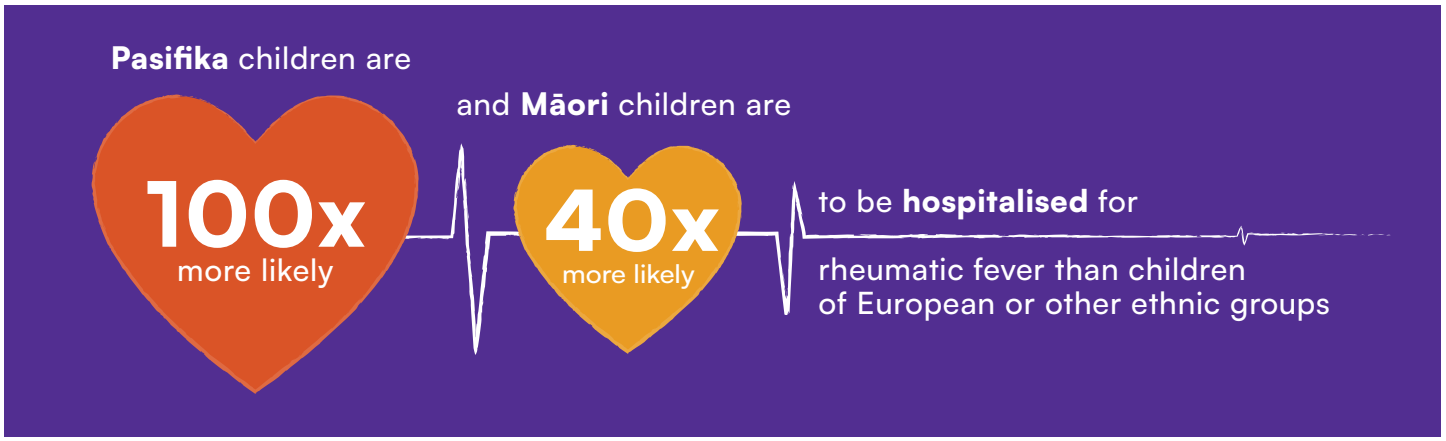
WHY PRIORITISE ERADICATION OF RHEUMATIC FEVER FOR CHILDREN?

Rates of ARF and RHD for children in Aotearoa New Zealand are among the highest reported by high-income countries around the world, and the disparity is particularly striking for Pasifika children in this country.[4,8,9]

Group A Streptococcus (GAS) bacteria can infect the upper respiratory tract (typically presenting as a sore throat) or the skin (impetigo). Sore throats are very common, and are often caused by viral infections. It's difficult to differentiate throat infections due to GAS bacteria clinically, and throat infections due to GAS do not progress to ARF in most children.

Epidemiological data support an "immune priming" hypothesis, with multiple GAS infections that initiate autoimmune processes, leading to a peak incidence for ARF at 5—14 years of age.[10-14] Children who develop ARF have experienced approximately three times as many GAS infections as healthy children living in similar environments.[10] These children also tend to have high rates of respiratory illnesses, including bronchiolitis and bronchiectasis.[15] Children who have experienced skin conditions such as scabies or impetigo as well as strep throat are at high risk for ARF.[11-14,16]

Interventions to prevent ARF and RHD should continue to aim for prevention of recurrent GAS infections.[9,17-20] Effective prevention requires community awareness of the disease, and screening programmes, including school-based clinics, to detect and treat both GAS pharyngitis and GAS skin infections as early as possible.[9,17-20]



Strategies to eradicate RHD should include improved delivery of long-term secondary prophylaxis, involving regular intramuscular injections of a long-acting antibiotic (benzathine penicillin G).[8,18] Without this secondary prophylaxis, the risk of recurrent ARF is as high as 75% among patients who develop another GAS throat infection.[21] The antibiotic regimen does minimise recurrent hospitalisation for ARF and halt progression of latent RHD, but adherence to the schedule of injections over such a long period is challenging.[22]

Because RHD represents cumulative damage to heart valves, most hospitalisations for RHD occur in older children and adolescents, with a peak in adulthood.[23] However, the high rates of GAS infections in Aotearoa New Zealand mean that even younger children are presenting with RHD. 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. This could be addressed by screening for RHD among high-risk groups, using portable echocardiography devices to detect heart damage, and offer antibiotic prophylaxis.[5,23]

More research is needed to understand the specific risk factors and triggers for both ARF and RHD.[4,11-14] People with a family history of rheumatic fever are at higher risk. Genome-wide association studies suggest that complex interactions between polygenic factors and environmental conditions shared within families may produce the observed patterns of disease.[24] Nutritional status, consumption of sugar-sweetened drinks, intake of micronutrients, and dental caries have also been associated with the incidence of ARF.[4,25]

Recurrent GAS infections, ARF, and RHD are associated with socioeconomic deprivation, housing conditions, and household crowding.[26] Programmes to address these issues for the worst-affected children would be likely to reduce rates of disease. High rates of disease are also associated with barriers that affect early diagnosis and adherence to prophylaxis, such as geographic distance from healthcare services, cost of healthcare, and poor relationships between healthcare providers and communities.[27] Strategies to eradicate RHD should include better access to high-quality primary healthcare as well as secondary services, particularly for Pasifika children, Māori children, and children who live with socioeconomic deprivation.

Hospitalisations for both ARF and RHD fell dramatically in 2020 and 2021. 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, and what proportion was due to specific disease-control measures, such as closures of international borders, public health advice, household isolation, and school closures. 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.

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. Researchers are working on a range of additional approaches to combat this disease, including optimising healthcare services and reducing barriers to access for Māori and Pasifika youth,[28] developing candidate vaccines against GAS,[29] new formulations of antibiotics,[30] other medicines to prevent RHD,[31] better diagnostic tools for acute rheumatic fever,[14] and a national patient register to support consistent detection and notification of rheumatic fever.[32] Strategies for eradication of RHD must be co-designed with the most-affected communities so that targeted interventions and awareness campaigns don't contribute to further stigma.[33-35]

REFERENCES

1. NZ Ministry of Health. National Minimum Dataset (hospital events). Wellington: Ministry of Health; 2021. Available from: https://www.health.govt.nz/nz-health-statistics/national-collections-and-surveys/collections/national-minimum-dataset-hospital-events
2. Heart Foundation of New Zealand. Diagnosis, management and secondary prevention of acute rheumatic fever and rheumatic heart disease: 2014 update. Auckland: Heart Foundation; 2014. Available from: https://assets.heartfoundation.org.nz/documents/shop/marketing/non-stock-resources/diagnosis-management-rheumatic-fever-guideline.pdf
3. New Zealand Ministry of Health. Your health: Rheumatic fever. Wellington: Ministry of Health; 2017. Available from: https://www.health.govt.nz/your-health/conditions-and-treatments/diseases-and-illnesses/rheumatic-fever
4. Baker MJ et al. Risk factors for acute rheumatic fever: A case-control study. Lancet Reg Health West Pac. 2022;26:100508. doi: 10.1016/j.lanwpc.2022.100508.
5. Office of the Prime Minister's Chief Science Advisor. Evidence synthesis: Group A Streptococcus and acute rheumatic fever in Aotearoa New Zealand. 2021. Available from: https://cpb-ap-se2.wpmucdn.com/blogs.auckland.ac.nz/dist/f/688/files/2021/12/OPMCSA-rheumatic-fever-to-upload-on-Nov-19-v2.pdf
6. Ryan, D. Health care experiences of Pacific families who have children with rheumatic fever. Wellington, NZ: Pacific Perspectives; 2015. Available at: https://2ad85816-c406-4fbd-96af68d86f851586.filesusr.com/ugd/840a69_3f5dc99e07f14c5790c3d9e2fb11bcdc.pdf
7. Anderson A, Leversha A, Ofanoa M, et al. Māori and Pacific whānau experiences of recurrent rheumatic fever and unexpected rheumatic heart disease in New Zealand. Auckland, NZ: University of Auckland; 2017. Available at: https://www.fmhs.auckland.ac.nz/assets/fmhs/MAPAS/Recurrent%20Rheumatic%20Final%20document.pdf
8. Bennett J, et al. Rising Ethnic Inequalities in Acute Rheumatic Fever and Rheumatic Heart Disease, New Zealand, 2000—2018. Emerg Infect Dis. 2021; 27(1): 36—46. doi: 10.3201/eid2701.191791
9. Webb R, Wilson N. Rheumatic fever in New Zealand. Review. J Paediatr Child Health. 2013 Mar;49(3):179-84. doi: 10.1111/j.1440-1754.2011.02218.x.
10. Baker MJ, Gurney J, Oliver J, et al. Risk Factors for Acute Rheumatic Fever: Literature Review and Protocol for a Case-Control Study in New Zealand. Int J Environ Res Public Health. 2019; 16(22): 4515.doi: 10.3390/ijerph16224515
11. Thomas S, et al. Descriptive analysis of group A Streptococcus in skin swabs and acute rheumatic fever, Auckland, New Zealand, 2010-2016. Lancet Reg Health West Pac. 2021 Feb 5;8:100101. doi: 10.1016/j.lanwpc.2021.100101.
12. 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. Epidemiol Infect. 2017; 145(4): 678-84.
13. Bennett J, et al. Understanding group A streptococcal pharyngitis and skin infections as causes of rheumatic fever: protocol for a prospective disease incidence study. BMC Infect Dis. 2019 Jul 17;19(1):633. doi: 10.1186/s12879-019-4126-9.
14. 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:e053720. doi: 10.1136/bmjopen-2021-053720
15. Simpson J, Adams J, Oben G, et al. The Determinants of Health for Māori Children and Young People in New Zealand. University of Otago, Dunedin: New Zealand Child and Youth Epidemiology Service; 2016. Available at: http://hdl.handle.net/10523/6384.
16. Thornley S, King R, Marshall R, et al. How strong is the relationship between scabies and acute rheumatic fever? An analysis of neighbourhood factors. J Paediatr Child Health 2020;56:600—6. https://dx.doi.org/10.1111/jpc.14697
17. Lorenz N et al. Serological Profiling of Group A Streptococcus Infections in Acute Rheumatic Fever. Clinical Infectious Dis 2021; 73(12): 2322—25. https://doi.org/10.1093/cid/ciab180
18. Lennon D, et al. First Presentation Acute Rheumatic Fever is Preventable in a Community Setting: A School-based Intervention. Pediatr Infect Dis J. 2017;36(12):1113-1118. doi: 10.1097/INF.0000000000001581.
19. Walsh L, et al. School-based Streptococcal A Sore-throat Treatment Programs and Acute Rheumatic Fever Amongst Indigenous Māori: A Retrospective Cohort Study. Pediatr Infect Dis J. 2020 Nov;39(11):995-1001. doi: 10.1097/INF.0000000000002770.
20. Bennett J, et al. Structured review of primary interventions to reduce group A streptococcal infections, acute rheumatic fever and rheumatic heart disease. J Paediatr Child Health. 2021;57(6):797-802. doi: 10.1111/jpc.15514.
21. Spinetto, H, Lennon, D, Horsburgh M. Rheumatic fever recurrence prevention: a nurse‐led programme of 28‐day penicillin in an area of high endemnicity. J Paed Child Health. 2011; 47(4): 228—34.
22. Beaton A, et al. Secondary antibiotic prophylaxis for latent rheumatic heart disease. N Engl J Med. 2022; 386(3):230—40. doi: 10.1056/NEJMoa2102074.
23. Webb, R. Rheumatic heart disease in New Zealand children: Echocardiographic disease burden and clinical outcomes. Auckland, NZ: University of Auckland; 2020. Available at: https://researchspace.auckland.ac.nz/bitstream/handle/2292/53433/Webb-2019-thesis.pdf
24. Sika-Paotonu D, Beaton A, Raghu A, et al. Acute Rheumatic Fever and Rheumatic Heart Disease. In Ferretti JJ, Stevens DL, Fischetti VA, eds. Streptococcus pyogenes : Basic Biology to Clinical Manifestations [Internet]. Oklahoma City, USA: University of Oklahoma Health Sciences Center; 2017. Available at: https://www.ncbi.nlm.nih.gov/books/NBK425394/

25. Thornley S. Sugar, dental caries and the incidence of acute rheumatic fever: a cohort study of Māori and Pacific children. J Epidemiol Community Health; 2017;71(4):364-70. doi: 10.1136/jech-2016-208219.

26. Lennon D. Rheumatic fever as an indicator of child health. NZMJ. 2017; 130(1460): 6-9. Available at https://journal.nzma.org.nz/journal-articles/rheumatic-fever-as-an-indicator-of-child-health

27. Anderson A, Mills C, Eggleton K. Whānau perceptions and experiences of acute rheumatic fever diagnosis for Māori in Northland, New Zealand. N Z Med J. 2017;130(1465):80-88.

28. The National Hauora Coalition; Anneka Anderson A, Brown R, et al. Pacific Fono: a community-based initiative to improve rheumatic fever service delivery for Pacific Peoples in South Auckland. J Prim Health Care. 2020;12(4):384-390. doi: 10.1071/HC20022.

29. Loh JS, Rivera-Hernandez T, McGregor T, et al. A multivalent T-antigen-based vaccine for Group A Streptococcus. Sci Rep. 2021; 11: 4353. doi: 10.1038/s41598-021-83673-4

30. 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. Journal of Immunology. 2018;200(1).

31. Wilson NJ, Concannon A, Malcolm J. The treatment of acute rheumatic fever: novel use of hydroxychloroquine. Pediatr Infect Dis J. 2020;39(7):e120-e122. doi: 10.1097/INF.0000000000002647.

32. 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 Dec 30;12(12):e066232. doi: 10.1136/bmjopen-2022-066232.33.

33. Anderson A, Spray J. Beyond awareness: Towards a critically conscious health promotion for rheumatic fever in Aotearoa, New Zealand. Soc Sci Med. 2020 Jan 11;247:112798. doi: 10.1016/j.socscimed.2020.112798.

34. Tu'akoi T, Ofanoa M, Ofanoa S, et al. Addressing rheumatic fever inequities in Aotearoa New Zealand: a scoping review of prevention interventions. J Prim Health Care. 2023;15(1):59-66. doi: 10.1071/HC22093.

35. 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. Aust N Z J Public Health. 2019;43(3):294-299. doi: 10.1111/1753-6405.12890.

04

SKIN INFECTIONS

Mate kiri

The rate of hospitalisation for Pasifika children with serious skin infections is three times higher than for children of European or Other ethnic groups, and for Māori children, it is almost twice the rate.

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

The rate of children treated in hospital for serious skin infections is taken from the NZ Ministry of Health's NMDS,[1] between January 2000 and December 2021, based on the diagnostic codes at discharge. Rates include all acute and semi-acute hospitalisations for children and adolescents 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).

LATEST DATA

Over the past 5 years (2017—2021), there have been, on average, almost 3,600 hospitalisations per year for skin infections in children aged 0—19 years in Aotearoa New Zealand. Skin infections made up 1.6% of all acute and semi-acute hospitalisations for children. The rate of hospitalisations for skin infections is highest for children younger than 5 years (38%); followed by adolescents aged between 15 and 19 years (25%).

TREND

Between 2000 and 2011, the rates of hospitalisations for children with serious skin infections increased; since then, they have declined, most notably for children younger than 5 years (Figure 4.1). During the period of public health measures associated with the COVID-19 pandemic in 2020, hospitalisations for skin infections fell further.

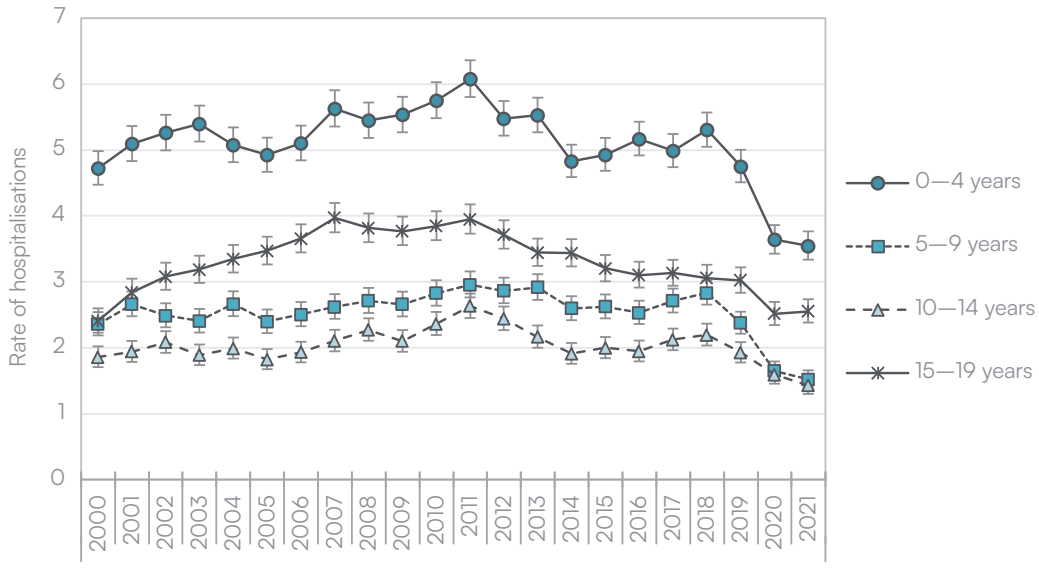


Figure 4.1: Trends in hospitalisations of children for serious skin infections, by age (2000—21)
Source: NMDS and NZCYES estimated resident population.
Rate per 1,000 children in each age group.

LATEST DATA

Overall, from 2017 to 2021, the most common cause of hospitalisation for serious skin infections was 'cellulitis' (38%), followed by 'cutaneous abscess, furuncle, or carbuncle' (34%).

This pattern of infections was similar for most children younger than 15 years, but for older adolescents, the most common skin infection was 'pilonidal cyst' (39%), followed by 'cutaneous abscess, furuncle, or carbuncle' (34%) and 'cellulitis' (22%) (Figure 4.2).

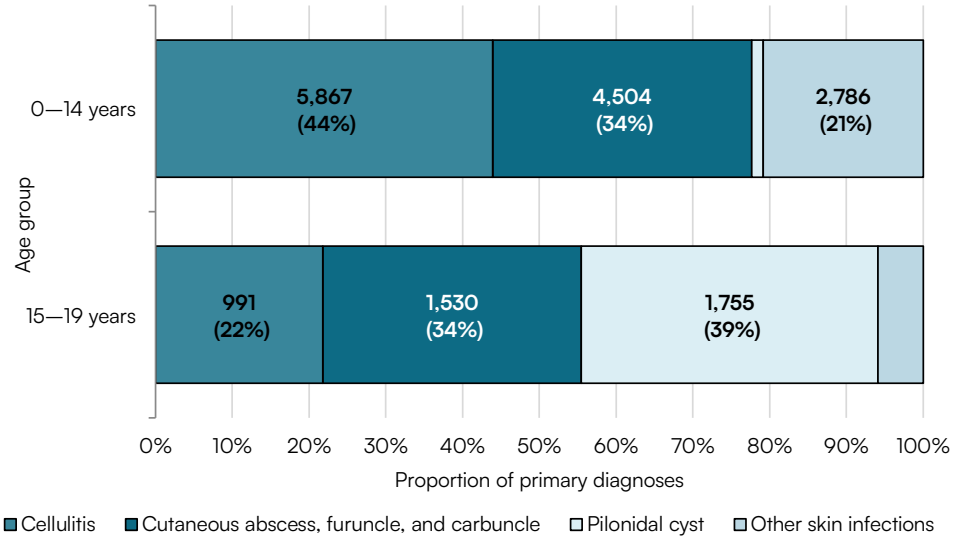


Figure 4.2: Causes of hospitalisation due to serious skin infections in children, by age group (2017—21)
Source: NMDS and NZCYES estimated resident population.

Other skin infections include acute lymphadenitis, impetigo, pyogenic granuloma, staphylococcal scalded skin syndrome, abscess, furuncle, and carbuncle of nose, hordeolum and other deep inflammation of eyelid, blepharitis (non-infectious dermatoses of eyelid), and other local infections of skin and subcutaneous tissues.

INEQUALITIES IN SKIN HEALTH FOR CHILDREN IN AOTEAROA NEW ZEALAND

Pasifika children living in New Zealand have a disproportionally high rate of hospitalisation for serious skin infections compared with other ethnic groups.[3] Rates are also relatively high for Māori children.[3]

TREND

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 over the past two decades since 2000, although the gap has narrowed since 2011. Rates have been high for Māori children as well, making up a third of all hospitalisations for skin infections in children. Rates were lowest for children of Asian or Indian ethnicities. On average, between 2017 and 2021, the rate of hospitalisation of Pasifika children for skin infections was 3.2 times higher than that for European or Other children (reference group). For Māori children, the rate was 1.8 times higher than for European or Other children.

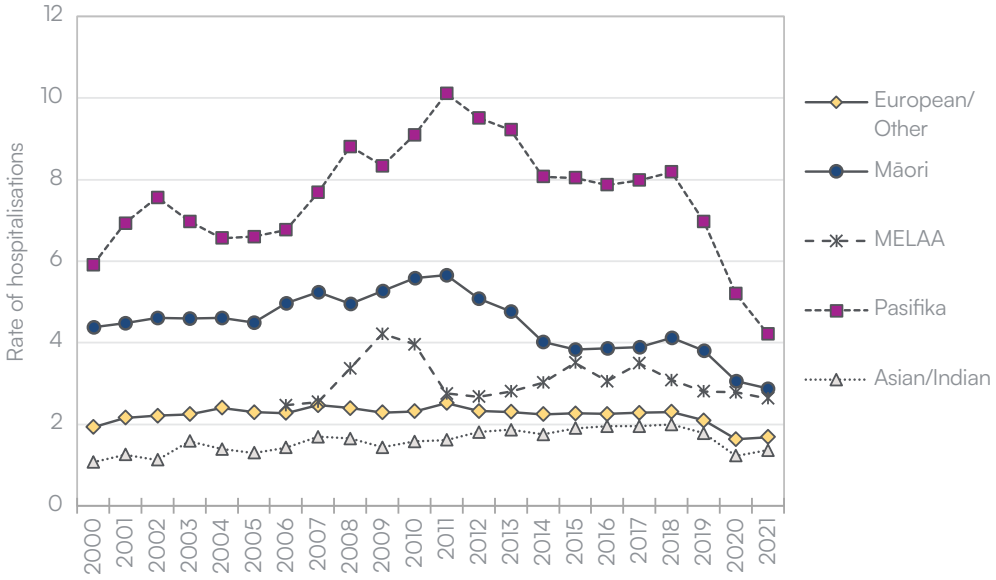


Figure 4.3: Trends in rates of hospitalisations for serious skin infections, by ethnicity (2000—21)
Source: NMDS and NZCYES estimated resident population.

Rate per 1,000 children. MELAA = Middle Eastern, Latin American, or African.

The rate of **hospitalisations** for **Pasifika** children with **skin infections** is

3x HIGHER

... and almost

2x HIGHER

for **Māori** children than the rate for European or Other children

TREND

Since 2000, Aotearoa New Zealand'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 since 2011, hospitalisations for skin infections for children living in the two quintiles with the most socioeconomic deprivation still accounted for almost 60% of all hospitalisations for skin infections in children during 2021.

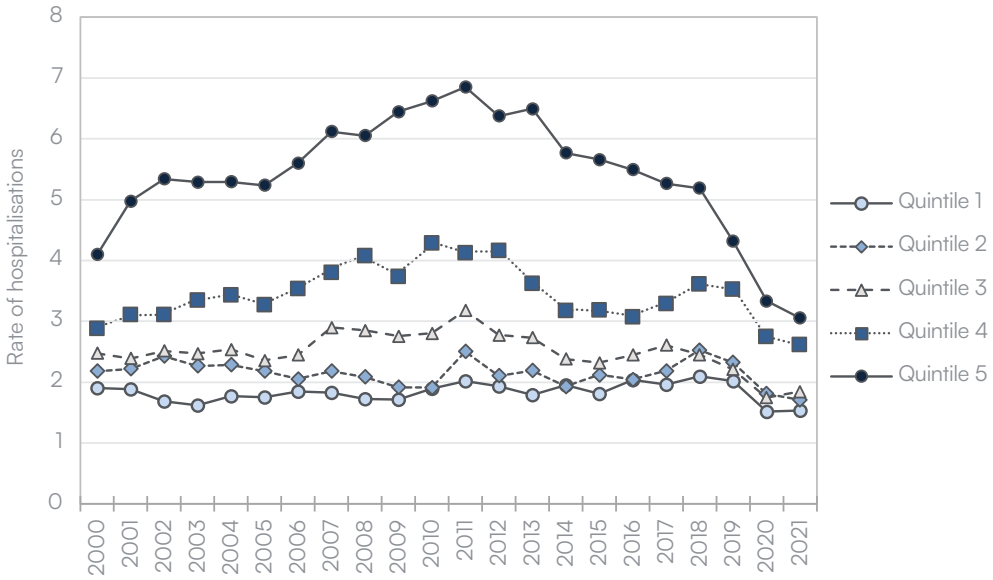


Figure 4.4: Trends in rates of hospitalisations for serious skin infections, by socioeconomic deprivation (2000—21)
Source: NMDS and NZCYES estimated resident population.

Rate per 1,000 children. NZDep Index of Deprivation (where Quintile 1 = least socioeconomically deprived neighbourhood, and Quintile 5 = most deprived).

VOICES OF YOUNG PEOPLE AND THEIR WHĀNAU

Surveys of children with experience of hospitalisation due to skin infections show that children experience pain, discomfort, and embarrassment.[4-6] Their parents have an important role in detecting infections, providing first aid, preventing the spread of infection, and recognising when to seek medical care.[4-6] Strategies for prevention and treatment of skin infections should be informed by these experiences.

"It's very hard cause we don't have a bath here, just the tub for the baby, cause I need to soak her. [...] Hard to manage cause its itchy and its quite severe especially in winter."

Mother of a Pasifika child who had eczema for about 5 years, with several hospitalisations.[4]

"[He] came up with what looked like flea bites... in the morning he showed us he'd been bitten all up his left arm and they were quite red, they looked like angry rashes... One in particular at the back of his right leg started to bubble, he [also] had bites on his left foot. [...] We stripped the bed, cleaned all his linen, around the bedroom and the clothes that he'd been wearing. We also did the same for his baby brother because they share the room together."

Cook Islands mother of a toddler admitted to hospital with impetigo.[5]

"I try to treat it at home [...] I put her in the bath or bathed by my mother-in-law... they give her the Samoan oil and Savlon."

Mother of a Pasifika child admitted to hospital with cellulitis.[5]

"It happened very fast. It was a big bubble on his leg, it was all red, he was crying, he had a fever, so we took him straight to A&E and they admitted him. They said that oral antibiotics is not going to work so he has to get a drip. He started vomiting as well... we could tell he was dehydrating, [he was] really unwell."

Samoan mother of a toddler admitted to hospital with cellulitis.[5]

"It took us a very long time to fix it [eczema] up [...] to get her mamae [pain] under control. If you don't treat it and keep on top of it [...] the child will have a very bad time."

Tipene, father of a child with eczema in South Auckland.[6]

"[Other children would] point and stare... she actually got laughed at and pointed out."

Mere and Hone, parents of a child with eczema in South Auckland.[6]

"[parents should be] given more advice around the whole thing ... not just giving them the cream."

Roimata, mother of a child with eczema in South Auckland.[6]

"Like don't look at my child. Right? Don't judge us because we do try."

Maia, mother of a child with eczema in South Auckland.[6]

Ete-Rasch E. Shining a light on Pacific children's high rates of ambulatory sensitive hospitalisations in New Zealand: parents' perspectives. Thesis: Victoria University of Wellington; 2022.[4]

Ete-Rasch E, Nelson K. Management of skin infections in Pacific children prior to hospitalisation. J Prim Health Care. 2013;5(1):43-51.[5]

Komene E, Adams S, Clark TC. 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.[6]

WHY PRIORITISE SKIN HEALTH FOR CHILDREN?

Children in Aotearoa New Zealand have relatively high rates of serious skin infections compared with other high-income countries.[3,7] Damaged areas of skin (whether caused by injuries, stings or bites, chickenpox, scabies, or skin conditions such as eczema) can be infected, as can hair follicles. Children who have skin infections can experience symptoms such as itching, pain, redness, swelling, and fever.

Most mild skin infections can be treated at home by keeping blistered, crusted, or weeping sores clean and covered, and using over-the-counter medicines. Other infections can be effectively managed in primary care.[7] If minor skin infections are not detected and treated early, they can cause complications that require admission to hospital, with intravenous antibiotics for cellulitis or sepsis or surgical interventions for abscesses or complex wounds.[8,9] 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.[8] 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.[10]

The most common bacteria associated with skin infections are *Staphylococcus aureus* and *Streptococcus pyogenes*.[3] In serious cases, skin infections can cause sepsis, or a rare kidney disease, post-streptococcal glomerulonephritis, which in the long term can lead to renal failure.[11] Children who develop impetigo 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.[12-14] Some *S. aureus* bacteria are resistant to commonly used antibiotics. Most multi-drug-resistant *S. aureus* (MRSA) infections in Aotearoa New Zealand are now acquired in the community, via skin and soft-tissue infections. Recent changes to guidelines for prescription of topical antimicrobials, based on new evidence, will, if followed, minimise further development of antimicrobial resistance.[15-17]

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. 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. 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.[3,7] Measures to ameliorate these upstream risk factors would have 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 high rates of skin infections. Targeted interventions to reduce serious skin infections could include primary care services that are more accessible, affordable, and culturally responsive, supplemented by community-based initiatives in pharmacies, schools, and early learning centres.[14,18,19]

REFERENCES

1. NZ Ministry of Health. National Minimum Dataset (hospital events). Wellington: Ministry of Health; 2021. Available from: https://www.health.govt.nz/nz-health-statistics/national-collections-and-surveys/collections/national-minimum-dataset-hospital-events
2. Jack SJ, Williamson DA, Galloway Y et al. Primary prevention of rheumatic fever in the 21st century: evaluation of a national programme. Int J Epidemiol. 2018;47(5):1585-1593. doi: 10.1093/ije/dyy150.
3. O'Sullivan C, Baker MG, Zhang J. Increasing hospitalizations for serious skin infections in New Zealand children, 1990—2007. Epidemiology and Infection [Internet]. 2010/12/15 ed. 2011;139(11):1794—804. Available from: https://www.cambridge.org/core/article/increasing-hospitalizations-for-serious-skin-infections-in-new-zealand-children-19902007/6C803669353C2CCD125E13BE1E946EBD
4. Ete-Rasch E. Shining a light on Pacific children's high rates of ambulatory sensitive hospitalisations in New Zealand: parents' perspectives. Thesis: Victoria University of Wellington; 2022. Available at: https://openaccess.wgtn.ac.nz/ndownloader/files/37894056
5. Ete-Rasch E, Nelson K. Management of skin infections in Pacific children prior to hospitalisation. J Prim Health Care. 2013;5(1):43-51. Available at :https://pdfs.semanticscholar.org/db40/8e2239d7b60835256f63b26d1affc317075c.pdf
6. Komene E, Adams S, Clark TC. 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://doi.org/10.36951/27034542.2022.09
7. NZ Ministry of Health. Indicator of potentially avoidable hospitalisations for the Child and Youth Wellbeing Strategy: A brief report on methodology [Internet]. Wellington: Ministry of Health; 2020 Jul. Available from: https://www.health.govt.nz/publication/indicator-potentially-avoidable-hospitalisations-child-and-youth-wellbeing-strategy-brief-report
8. Leversha A, Naylor D. Starship Clinical Guidelines: Cellulitis [Internet]. Auckland: Starship Child Health; 2018 May. Available from: https://www.starship.org.nz/for-health-professionals/starship-clinical-guidelines/c/cellulitis/
9. Lennon D. Rheumatic fever as an indicator of child health. NZMJ. 2017; 130(1460): 6—9. Available at https://journal.nzma.org.nz/journal-articles/rheumatic-fever-as-an-indicator-of-child-health
10. 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; 2017. Available at: https://cdn.auckland.ac.nz/assets/growingup/research-findings-impact/GuiNZ_Now%20we%20are%20four%20report.pdf
11. Lennon D. Rheumatic fever as an indicator of child health. NZMJ. 2017; 130(1460): 6—9. Available at https://journal.nzma.org.nz/journal-articles/rheumatic-fever-as-an-indicator-of-child-health
12. Thornley S, King R, Marshall R, et al. How strong is the relationship between scabies and acute rheumatic fever? An analysis of neighbourhood factors. J Paediatr Child Health 2020;56:600—6. doi:10.1111/jpc.14697
13. 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 Infect Dis. 2019 Jul 17;19(1):633. doi: 10.1186/s12879-019-4126-9.
14. 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. Lancet Reg Health West Pac. 2021;8:100101. doi: 10.1016/j.lanwpc.2021.100101.
15. Gerrard J. Kotahitanga: Uniting Aotearoa against infectious disease and antimicrobial resistance. Auckland, NZ: The Office of the Prime Minister's Chief Science Advisor;2022. https://doi.org/10.17608/k6.OPMCSA.17073683. Available at: https://cpb-ap-se2.wpmucdn.com/blogs.auckland.ac.nz/dist/f/688/files/2022/06/OPMCSA-AMR-Full-report-FINAL-V3-PDF.pdf
16. Pattis I, Weaver L, Burgess S, et al. Antimicrobial Resistance in New Zealand—A One Health Perspective. Antibiotics. 2022; 11(6): 778.
17. 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. doi: 10.1186/s13063-022-06042-0.
18. 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. N Z Med J. 2016;129(1428):37-46.
19. 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. Epidemiol Infect. 2017; 145(4): 678-84.

05

MENTAL HEALTH CONCERNS

Ngā take hauora hinengaro

The number of annual hospitalisations for mental health concerns for young people in Aotearoa New Zealand doubled between 2000 and 2021.

Almost a quarter of young people report serious psychological distress: a five-fold increase over the past decade.

WHAT IS THE STATE OF MENTAL HEALTH FOR CHILDREN IN AOTEAROA NEW ZEALAND?

Hospitalisation rates for serious mental health concerns are taken from the NZ Ministry of Health's National Minimum Dataset (NMDS), based on the diagnostic codes at discharge between January 2000 and December 2021. 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).[1] NMDS data do not include use of outpatient Child And Adolescent Mental Health Services. 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.

Data on the prevalence of mental health concerns, based on self-report or parental report of anxiety, depression, loneliness, and psychological distress, are from the New Zealand Health Survey (NZHS).[2] The NZHS includes data for children aged 2—14 years (as reported by their caregivers) and for young people aged 15—24 years (who answered independently). These data are likely to represent an undercount of mental health concerns, since 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).

LATEST DATA

Over the 5 years to the end of 2021, the average number of hospitalisations for mental and behavioural disorders among young New Zealanders was 3,486 per year — almost double the average number between 2000 and 2004. Most (77%) of these hospitalisations were adolescents aged 15—19 years, followed by younger adolescents aged 10—14 years (15%).

TREND

Figure 5.1 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.

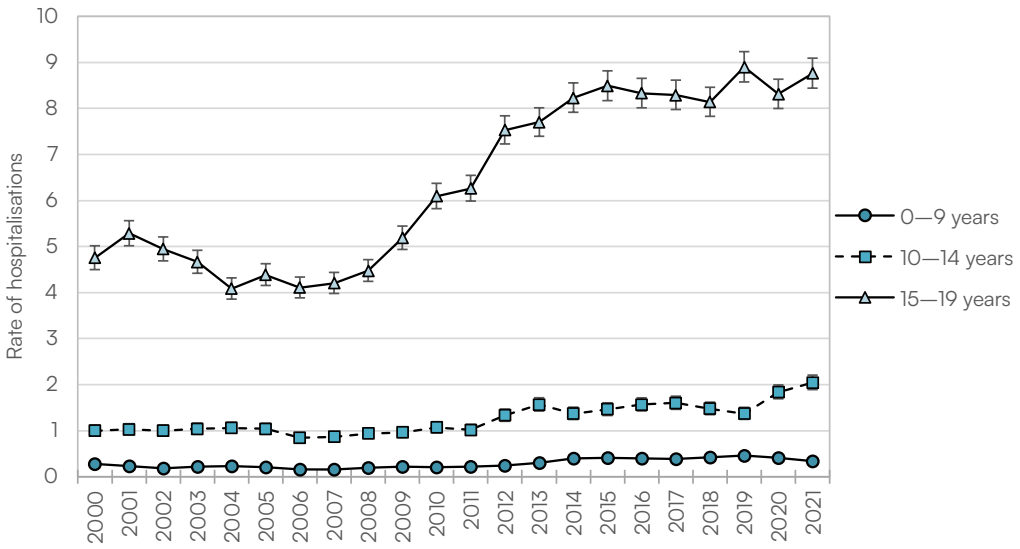


Figure 5.1: Trend in hospitalisations of children and adolescents for mental and behavioural disorders, by age (2000—21)
Source: NMDS and NZCYES Estimated Resident Population.
Rate per 1,000 children in each age group.

LATEST DATA

The most common primary diagnoses at discharge for mental and behavioural disorders over the 5 years to 2021 were anxiety disorders and stress-related reactions, mood disorders and depressive episodes, and concerns related to substance-use, primarily alcohol (Table 5.1). 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.[3]

PRIMARY DIAGNOSIS	PERCENTAGE OF DIAGNOSES
Mental and behavioural disorders due to use of psychoactive substances	**21.3%**
Alcohol	15.3%
Cannabinoids	3.1%
Neurotic, stress-related, and somatoform disorders	**17.8%**
Reaction to severe stress, and adjustment disorders	6.6%
Other anxiety disorders (e.g. mixed anxiety and depressive disorder, panic disorder, generalised anxiety disorder)	6.6%
Dissociative [conversion] disorders	3.0%
Mood [affective] disorders	**16.6%**
Depressive episode	10.5%
Bipolar affective disorder	1.8%
Persistent mood [affective] disorders	1.3%
Recurrent depressive disorder	1.1%
Behavioural syndromes associated with physiological disturbances and physical factors	**12.2%**
Eating disorders	12.0%
Schizophrenia, schizotypal and delusional disorders	**11.4%**
Unspecified nonorganic psychosis	6.5%
Schizophrenia	3.2%
Other mental and behavioural disorders	**20.6%**
Specific personality disorders	5.7%
Pervasive developmental disorders (e.g. autism)	3.5%
Unspecified disorder of psychological development	1.7%
Post-concussional syndrome	1.6%
Tic disorders	1.3%
Conduct disorders	1.2%
Specific developmental disorders of speech and language	1.1%

Table 5.1: Primary diagnoses of hospitalisations for mental and behavioural disorders in children and adolescents aged 0-19 years (2017—21)
Source: NMDS and NZCYES estimated resident population.

Percent of hospitalisations for mental and behavioural disorders. This table is not exhaustive; it includes examples of common sub-diagnoses, which do not sum to the category totals.

TREND

NZHS data show an increase in reports of diagnosed anxiety disorder and depression between 2011 and 2021, particularly of anxiety disorder in older adolescents (Figure 5.2).[4] In the 2021/22 Survey, almost 20% of all young people aged 15—24 years reported that they had been diagnosed with anxiety disorder, which includes panic attacks, phobia, post-traumatic stress disorder, and obsessive-compulsive disorder.[2,4]

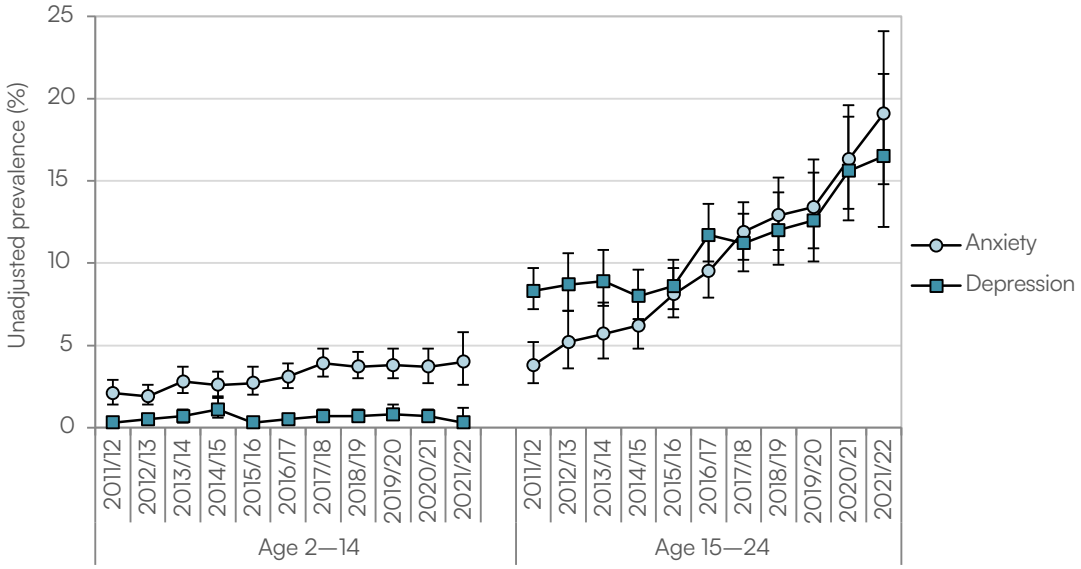


Figure 5.2: Trends in prevalence of diagnosed anxiety disorder and of depression, by age group (2011—21)
Source: NZ Health Survey.
Smaller sample sizes in 2019/20 and 2020/21.

TREND

NZHS data show that the proportion of young people who reported experiencing serious psychological distress within the past 4 weeks increased from 5% in 2011/12 to almost 25% in 2021/22 (Figure 5.3). The proportion who reported psychological distress in 2021/22 was significantly higher than that before the COVID-19 pandemic.

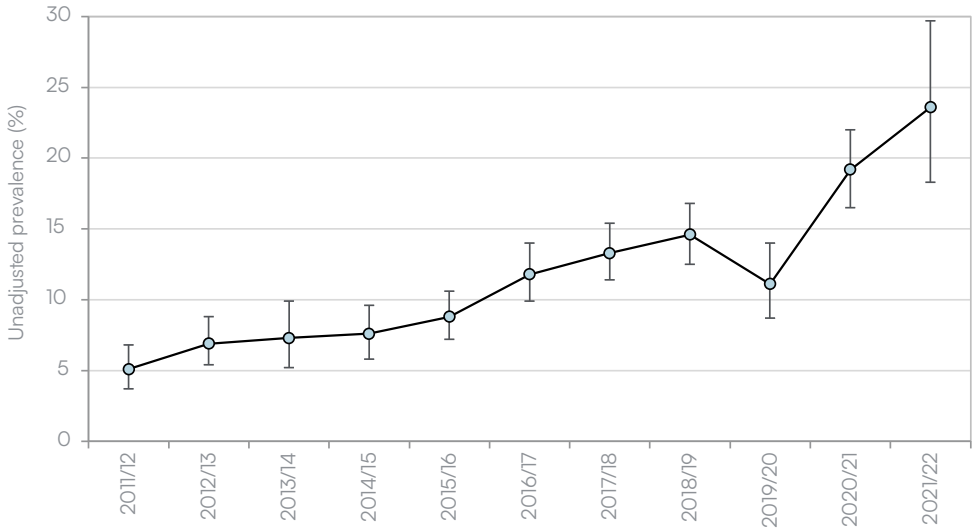


Figure 5.3: Trends in prevalence of psychological distress among 15—24-year-olds (2011—21)
Source: NZ Health Survey.
Score of 12 or more on the Kessler Psychological Distress Scale (K10), representing high or very high levels of psychological distress.
Smaller sample sizes in 2019/20 and 2020/21. These data are not available for younger children.

Since 2016, the NZ Health Survey has asked participants about feelings of loneliness in the past 4 weeks. In the 2021/22 Survey, just under 8% of young people reported feeling lonely all or most of the time.[4] About one third (33%) of 15—17-year-olds reported difficulty with everyday activities, communicating, or socialising because of mental health concerns.[4,5]

LATEST DATA

Over the 5 years to the end of 2021, an average of 3,270 children and adolescents have been hospitalised for intentional self-harm per year — almost five times the average number between 2000 and 2004. Most (81%) of these hospitalisations were for adolescents aged 15—19 years.

TREND

Hospitalisation rates for intentional self-harm increased significantly from 2000 to 2021, particularly over the past decade (Figure 5.4). The increase has been particularly steep for younger adolescents: for those aged 10—14 years, the rate of hospitalisations for self-harm in 2021 was 448% of the rate in 2011, compared with a 130% increase for 15—19-year-olds.

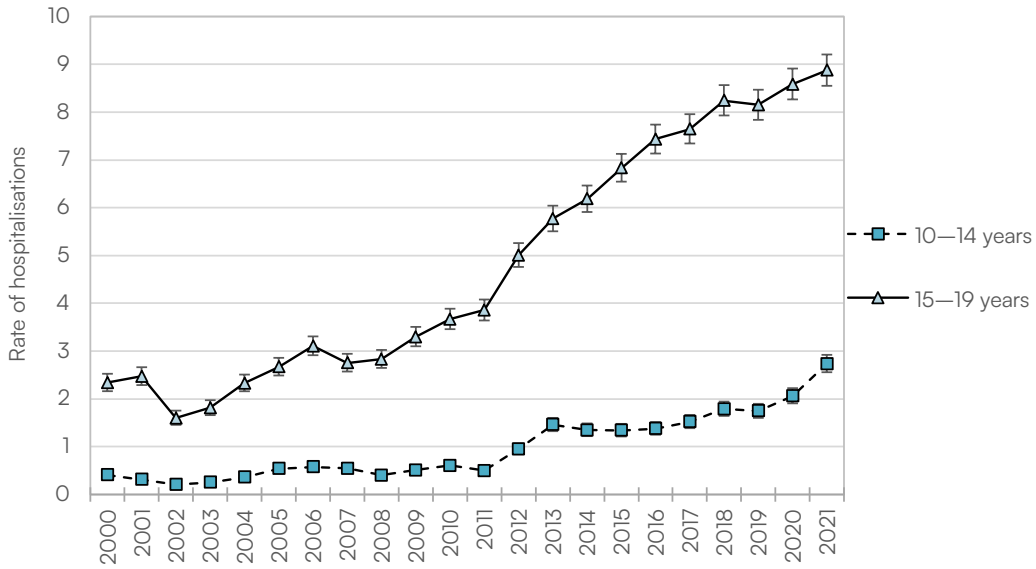


Figure 5.4: Trend in rates of hospitalisation of adolescents for intentional self-harm, by age (2000—21)
Source: NMDS and NZCYES Estimated Resident Population.
Rate per 1,000 adolescents in each age-group. Rates for younger children suppressed due to low numbers.

INEQUALITIES IN MENTAL HEALTH CONCERNS IN AOTEAROA NEW ZEALAND

Overall, the rates of hospitalisations for mental health disorders have increased for girls and young women since about 2011, with a widening gender difference (Figure 5.5).

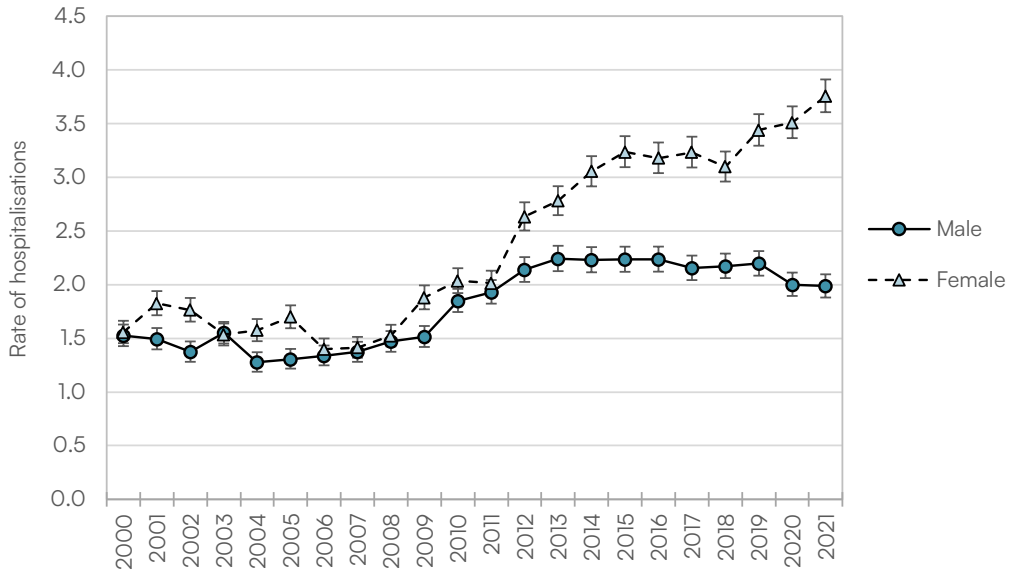


Figure 5.5: Trend in rates of hospitalisation for mental and behavioural disorders, by gender (2000—21)
Source: NMDS and NZCYES Estimated Resident Population.
Rate per 1,000 children.

Hospitalisations for intentional self-harm have also been more frequent for adolescent girls than for adolescent boys.[3] On average, 80% of hospitalisations for intentional self-harm among 1—19-year-olds are for girls. In 2021, rates for girls were 4.9 times higher than those for boys.

Figure 5.6 shows that for adolescent girls, the overall rate of intentional self-harm increased 383% between 2000 and 2021. Rates increased 655% for girls aged 10—14 years. For adolescent boys, the equivalent increases were 189% for 10—14-year-olds and 175% for 15—19-year-olds.

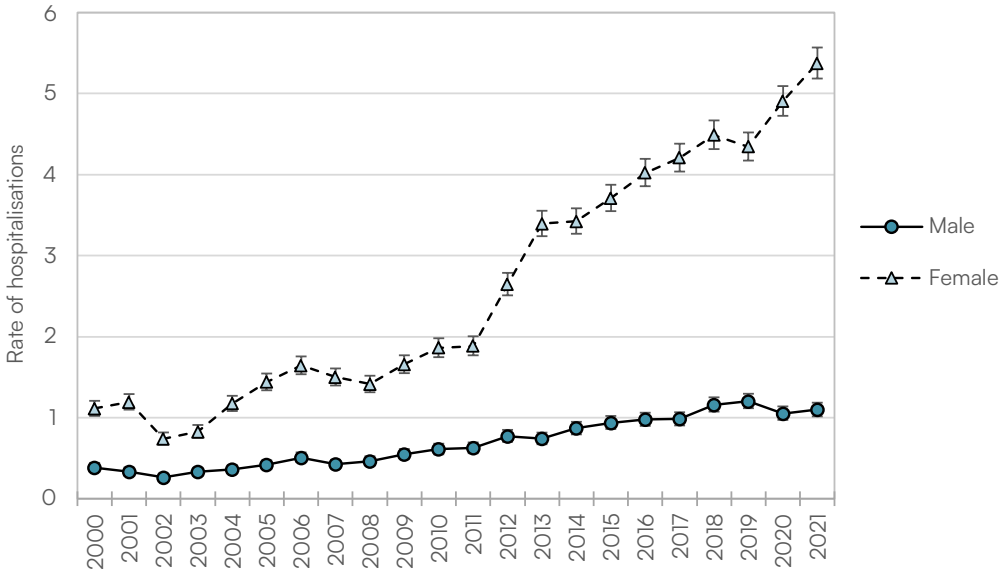


Figure 5.6: Trend in rates of hospitalisation for intentional self-harm, by gender (2000—21)
Source: NMDS and NZCYES Estimated Resident Population.
Rate per 1,000 children and young people aged 1—19 years.

Rates of hospitalisations for mental health disorders have been highest for children and young people in Māori and European or Other ethnic groups between 2000 and 2021 (Figure 5.7). Hospitalisation rates for children and young people who identified with Middle Eastern, Latin American, and African ethnic groups, were also high although difficult to interpret because of low numbers. The lowest rates are in young people from Asian and Indian ethnic groups, although there is known to be considerable variation within this group.[6] Hospitalisations for intentional self-harm had a similar pattern: they were highest for young people of European or Other ethnic groups, and also high for rangatahi Māori, with a three-fold increase in rates of hospitalisation for intentional self-harm from 2000 to 2021 for these ethnic groups.

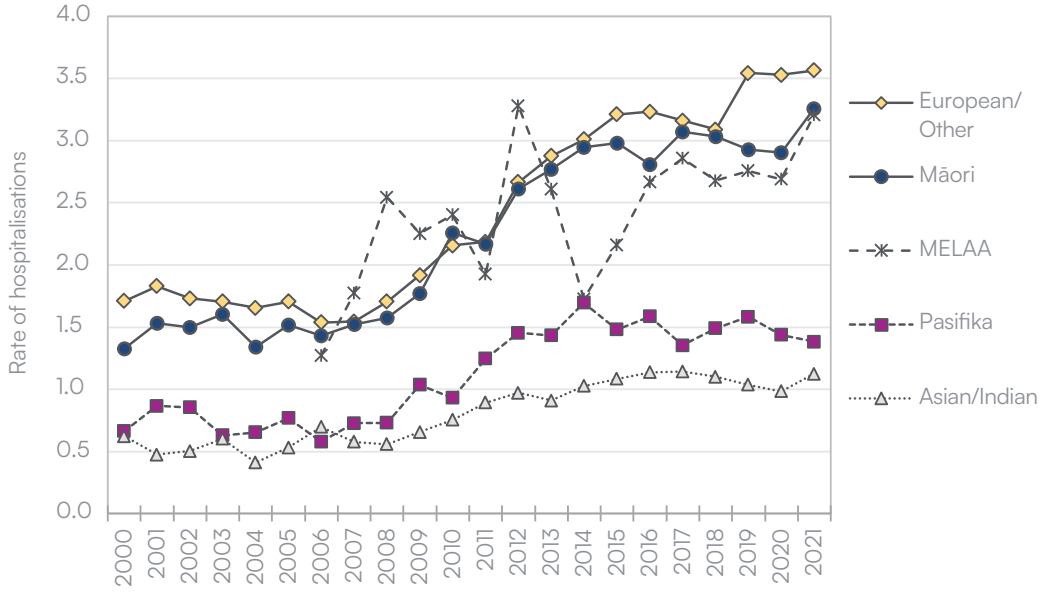


Figure 5.7: Trend in rates of hospitalisation for mental and behavioural disorders, by ethnicity (2000—21).
Source: NMDS and NZCYES Estimated Resident Population
Rate per 1,000 children. MELAA = Middle Eastern, Latin American, or African.

Overall, hospitalisation rates for mental health concerns do not show a marked gradient for young people living with different socioeconomic circumstances (Figure 5.8).

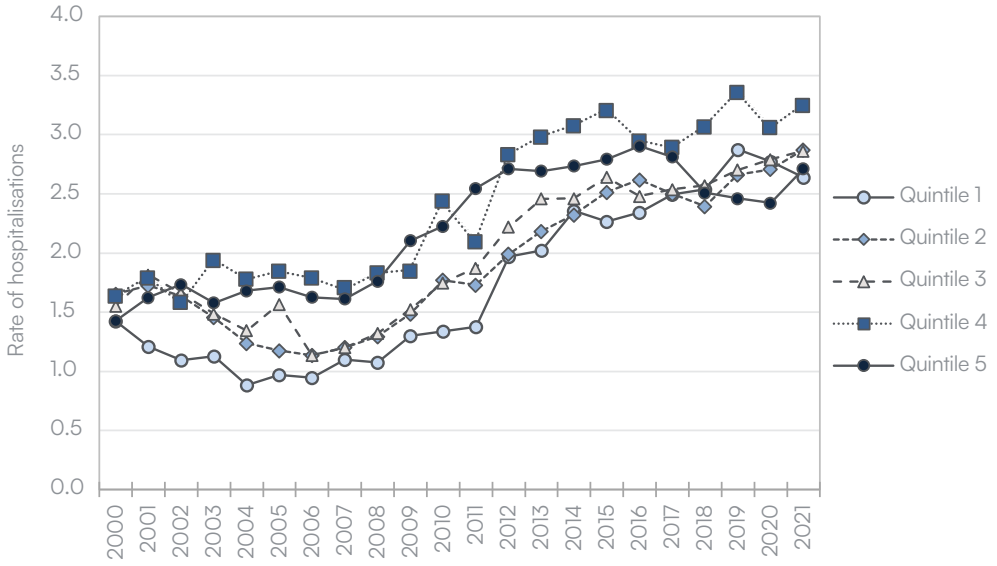


Figure 5.8: Trend in rates of hospitalisations for mental and behavioural disorders, by socioeconomic deprivation (2000—21)
Source: NMDS and NZCYES Estimated Resident Population.
Rate per 1,000 children. NZDep Index of Deprivation (where Quintile 1 = least socioeconomically deprived neighbourhood, and Quintile 5 = most deprived).

VOICES OF YOUNG PEOPLE AND THEIR WHĀNAU

A survey of young people in Aotearoa New Zealand that asked school-aged participants "What are the biggest problems for young people today?" found that students were most likely to raise concerns about emotional and mental health.[7] Students were also asked "What is one thing that would make things better for young people you know who have a hard time or who feel bad?"

"Loss of motivation, self-confidence, belief that they are worthy of good things (e.g. support, happiness, etc.) Self worth."

Asian female, aged 14 years.[7]

"Not knowing how to ask people for help with their mental state, and not knowing how to deal with it themselves."

Māori male, aged 16 years.[7]

"Expectations. The expectation to be the best at all times... all of this pressure affects kids greatly."

European female, aged 15 years.[7]

"The ease of getting drugs and alcohol."

European male, aged 14 years.[8]

"Parents seem to be the main problem whether they are neglectful or overprotective."

European male, age 15 years.[8]

"Not as much pressure in general or even from parents to do well at school or to get into a relationship etc."

Māori female, aged 15 years.[8]

"Make the kids not live the life they may have been in for (e.g. struggled and had nothing when they were young)."

Māori male, aged 14 years.[8]

"Guys aren't meant to be sad or down so you just suck it up. It would be better if this was different."

European male, aged 14 years.[8]

"To reach out there's so many kids in [place name] that have lost their self to suicide depression and so much more [...] we need to help out in any way as possible and look at things at a different angle."

Māori male, aged 15 years.[8]

"Honestly, technology actually helps a lot of young people feel better. Even though older people think it makes things worse it helps a lot of us forget our problems for a while."

Māori female, aged 14 years.[8]

"It is really hard to be put into the mental health system and takes a long time to get help from a psychologist or psychiatrist... I would want that process to be faster so that young people like me don't have to wait and get worse before they get help."

European female, aged 16 years.[8]

Fleming, T, Ball J, Kang K, et al. Youth19 — Youth Voice Brief. Wellington: The Youth19 Research Group; 2020.[7]

Sutcliffe K, Ball J, Clark TC, et al. What would make things better for young people experiencing distress? A Youth19 brief. 2023. Unpublished.[8]

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 New Zealand are happy, healthy, and are satisfied with their lives overall.[9-11] The transition into adolescence is when mental health concerns are most likely to emerge, due to puberty, neurological development, shifts in identity, and changing societal expectations related to maturation.[9]

Mental health concerns, mental illnesses, and mental disorders can interfere with children's cognitive, emotional, or social abilities, and affect how they feel, think, behave, and interact with others. Young people with mental health concerns may be less able to cope with the normal stresses of life, to engage with the education system, or to realise their potential to live fulfilling and productive lives.[12,13] Mental illnesses can vary in severity and duration, and may also be episodic. Diagnosable mental disorders are generally characterised by a combination of abnormal thoughts, emotions, and behaviours that significantly affect young people's cognitive, emotional, or social abilities.[14]

Young people who intentionally harm or injure themselves may or may not intend to die; self-harm can be a short-term response to distressing emotions and difficult situations.[15] Although up to half of adolescents engage in self-harm, most will not seek help or need hospitalisation, and most will not self-harm more than once, particularly if they receive appropriate care and support.[15-18]

This report highlights a trend of deteriorating mental health among Aotearoa New Zealand's children and young people over the past two decades that is consistent with the results from a series of cross-sectional surveys of school-aged adolescents over this period.[19] In the Youth19 rangatahi smart survey, young people reported high and increasing rates of significant depressive symptoms, particularly for girls at this age.[20] 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.[21-23]

Some of the findings in this report differed from other research, which may partly reflect the fact that NMDS data do not record young people treated via outpatient services or primary care settings. The Youth19 surveys and other investigations report significantly higher rates of mental health concerns, suicidal ideation, and suicide attempts among rangatahi Māori and young Pasifika peoples, whereas data on hospitalisations do not reflect those inequities as strongly.[11,20,14-26] Young people who are lesbian, gay, bisexual, trans, intersex, queer, questioning, or who have other alternative sexual orientations or gender identities are also at a disproportionate risk of experiencing mental health concerns and are not identified in hospitalisation data.[11,13,27] Although about one in five hospitalisations for mental and behavioural disorders relates to substance use, primarily alcohol, the Youth19 surveys found a significant downward trend in misuse of alcohol and other substances by young people between 2001 and 2019.[20] 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.[13,34]

Rates of hospitalisations for mental health concerns do not show a marked gradient by socioeconomic circumstances. This is unexpected because the significant negative impacts of socioeconomic deprivation on mental health have been well established. 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.[7,11,19]

If mental health concerns are not diagnosed or well managed, they can progressively become more debilitating for young people, interfering with everyday functioning and potentially triggering development of more serious mental illnesses. Data show that a significant proportion of young people do not receive sufficient professional help for mental health concerns.[4,11] 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.[13]

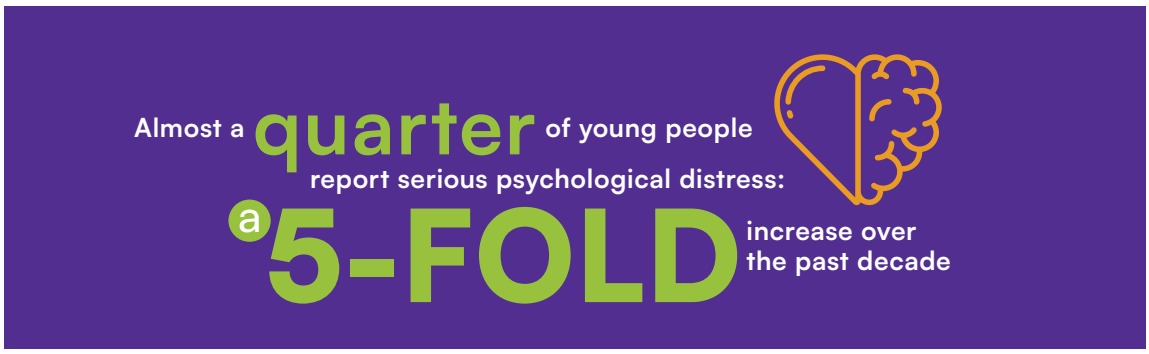
The most unacceptable consequence of mental health concerns in children is that Aotearoa New Zealand's rate of suicide among adolescents aged between 15 and 19 years exceeds that in most other high-income countries.[21-23] The rate is highest for adolescent boys, and the rate of death by suicide for rangatahi Māori is significantly higher than that for all other ethnic groups.[21-23,28] Importantly, although hospitalisations for intentional self-harm increased in conjunction with COVID-19, the pandemic has not been associated with a rise in deaths by suicide in Aotearoa New Zealand.[29]

Research on the risk factors that have caused increasing numbers of children to develop mental health concerns over time has generated multiple hypotheses. Changing diagnostic criteria and improved communication about mental health concerns can only be a partial explanation, given the magnitude of the increase.[12]

Exposure to negative environments, whether in schools, communities, neighbourhoods, or online, can significantly increase distress for young people.[38] Young people's use of the internet and smartphones has increased significantly over the past decade. Social media platforms have introduced youth-targeted features that promote addictive behaviour, social comparison, and perfectionism, and that facilitate cyber-bullying.[12,30] Young people may also encounter objectionable, violent, and pornographic material disseminated over the internet.[12,30] Use of digital technology has been shown to amplify anxiety, depression, loneliness, and negative perceptions of body image.[12,30] Some of these feelings may stem from the ubiquity of online content about global and societal challenges.[12] Young people have reported overwhelming uncertainty and anxiety about their futures in the context of the climate crisis, economic pressures, and political polarisation.[20] Another risk factor for future mental health concerns may be that both parents and children are increasingly engaged with their devices rather than interacting with each other, being physically active, or even sleeping.[13]

The role of parents and other family and social relationships is important for children's mental health, development of self-regulation, and for social, cognitive, and emotional development.[12] Some children experience harm through neglect, parental use of alcohol and other drugs, sexual abuse, or violence, particularly if adults are experiencing their own mental health concerns, intergenerational trauma, or stress due to environmental factors.[31] Children who have adverse experiences in childhood, whether within the family or in other contexts such as school or state care, are at higher risk for experiencing mental health concerns.[13,32] Research suggests the need for targeted antenatal and postnatal care, including home visits and parenting programmes, to provide advice and support to parents, caregivers, and wider whanau, and to identify concerns and refer for intervention as early as possible.[35] Pathways to identify and refer families and children who are experiencing psychological distress through early childhood education, community organisations, and schools should also improve mental health for young people.[35]

Mental health concerns can be caused or exacerbated by factors such as poverty and material hardship, social isolation or overcrowding, pressure to achieve, and bullying or discrimination.[12,20,27,33] Young people can experience negative consequences of risk-taking behaviour, such as substance addiction, unplanned pregnancies, or injuries.[20] The government should implement recommendations to minimise the harm associated with alcohol and other drugs, including via addiction treatment services and evidence-based policies and laws to restrict access for young people.[13,34]



Many mental health concerns can be successfully prevented or treated in the community, with appropriate advice, support, and access to care. For children, optimal sleep, exercise, and nutrition, and secure-attachment relationships with caring adults from a young age are essential.[12] 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. Public health campaigns to reduce stigma about mental illness, counter discrimination and racism, and promote mental wellbeing should also help to prevent mental health concerns and enable early and effective interventions.[14]

Despite negative effects linked 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 their communities. 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. 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.[13] Some treatment, such as cognitive behavioural therapy, can also be delivered online.[13,36] 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.[13]

Evidence points to the need for integrated care for physical and mental health, linked with social support services, to achieve better mental health outcomes for young people.[14] Access points for these services should include primary healthcare, schools, youth centres, and 'youth one stop shops'. Mental health services should incorporate core values in Te Ao Māori, and likewise in Pasifika cultures, that place importance on balanced relationships with culture, spirituality, family, community, and the natural environment.[24,26,37] Bolstering the workforce of mental health professionals at all levels, including training for health navigators and community workers, will be necessary to increase access to care. Strategies to reduce rates of mental health concerns among young people in Aotearoa New Zealand should focus on early intervention through mental health services that are evidence-based, co-designed, youth-focused, and culturally informed.[14,26,36,37]

REFERENCES

1. NZ Ministry of Health. National Minimum Dataset (hospital events). Wellington: Ministry of Health; 2021. Available from: https://www.health.govt.nz/nz-health-statistics/national-collections-and-surveys/collections/national-minimum-dataset-hospital-events
2. NZ Ministry of Health. Methodology report 2021/2022: New Zealand Heath Survey. Wellington: Ministry of Health, 2022. https://www.health.govt.nz/publication/methodology-report-2021-22-new-zealand-health-survey
3. Adams J, Duncanson M, Oben G, et al. Indicators of child and youth health status in Aotearoa 2021. Dunedin: NZ Child and Youth Epidemiology Service. 2022. Available at: https://ourarchive.otago.ac.nz/bitstream/handle/10523/14853/Aotearoa%20report_2021_NZCYES.pdf
4. Manatū Hauora. Annual Update of Key Results 2021/22: New Zealand Health Survey. Wellington: Manatū Hauora; 2022. Available from: https://www.health.govt.nz/publication/annual-update-key-results-2021-22-new-zealand-health-survey accessed January 2023.
5. Wilson, A & Nicolson, M. Mental Health in Aotearoa: Results from the 2018 Mental Health Monitor and the 2018/19 New Zealand Health Survey. Wellington: Te Hiringa Hauora/ Health Promotion Agency; 2020. Available from: https://www.hpa.org.nz/sites/default/files/Mental_Health_Aotearoa_Insight_2020.pdf
6. Peiris-John, R, Kang K, Bavin L., et al. East Asian, South Asian, Chinese and Indian Students in Aotearoa: A Youth19 Report. Auckland: The University of Auckland; 2021. Available at: https://www.youth19.ac.nz/publications/asian-students-report
7. 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. J Royal Soc NZ. 2022; 52(4): 426—49, DOI: 10.1080/03036758.2022.2072349.
8. Sutcliffe K, Ball J, Clark TC, et al. What would make things better for young people experiencing distress? A Youth19 brief. 2023. Unpublished.8a
9. 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
10. Manatū Hauora. Annual Update of Key Results 2021/22: New Zealand Health Survey. Wellington: Manatū Hauora; 2022. Available from: https://www.health.govt.nz/publication/annual-update-key-results-2021-22-new-zealand-health-survey accessed January 2023.
11. Fleming T, Tiatia-Seath J, Peiris-John R, et al. Youth19 Rangatahi Smart Survey, initial findings: Hauora hinengaro/emotional and mental health. New Zealand: The Youth19 Research Group - The University of Auckland and Victoria University of Wellington; 2020. Available at: https://static1.squarespace.com/static/5bdbb75ccef37259122e59aa/t/5f338e4cfb539d2246e9e5ce/1597214306382/Youth19+Mental+Health+Report.pdf
12. Menzies R, Gluckman P, Poulton R. Youth mental health in Aotearoa: Greater urgency required. New Zealand: Koi Tū: The Centre for Informed Futures - University of Auckland; 2020. Available at: https://informedfutures.org/wp-content/uploads/Youth-Mental-Health-in-Aotearoa-NZ.pdf
13. Patterson R, Durie M, Disley B, et al. He Ara Oranga : Report of the Government Inquiry into Mental Health and Addiction. Wellington: NZ Government; 2018. Available at: https://mentalhealth.inquiry.govt.nz/inquiry-report/he-ara-oranga/
14. 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. Doi.org/10.5694/mja17.00694.
15. Hetrick SE, Subasinghe A, Anglin K, et al. Understanding the needs of young people who engage in self-harm: a qualitative investigation. Front Psychol. 2020 Jan 10;10:2916. Doi: 10.3389/fpsyg.2019.02916.
16. 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. Aust N Z J Psychiatry 2016;50(10):939-1000. https://doi.org/10.1177/0004867416661039
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 Adolesc Psychiatry Ment Health. 2015 Jul 8;9:28. Doi: 10.1186/s13034-015-0055-6. eCollection 2015.
18. 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
19. 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. Aust N Z J Psychiatry. 2023;57(2):264-282. doi: 10.1177/00048674221138503.
20. 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. J Royal Soc NZ. 2022; 52(4): 426—49, DOI: 10.1080/03036758.2022.2072349.
21. Organisation for Economic Co-operation and Development. OECD Family Database: CO4.4 Teenage suicides. [Online] Paris, France: OECD; 2020. Available from: http://www.oecd.org/els/family/database
22. Office of the Chief Coroner of New Zealand. Annual provisional suicide statistics for deaths reported to the Coroner between 1 July 2007 and 30 June 2020. [Online] Office of the Chief Coroner of New Zealand. Available from: https://coronialservices.justice.govt.nz/ assets/Documents/Publications/2020-AnnualProvisional-Suicide-Statistics.pdf

23. Office of the Chief Coroner of New Zealand . Annual suicide statistics since 2011. [Online] Office of the Chief Coroner of New Zealand . Available from: https://coronialservices.justice.govt.nz/suicide/annual-suicide-statisticssince-2011/

24. Health Quality & Safety Commission, Grey C, Ryan D, Talemaitoga A. Bula Sautu — A window on quality 2021: Pacific health in the year of COVID-19. Wellington, NZ: Health Quality & Safety Commission; 2021. Available at: https://www.hqsc.govt.nz/assets/Our-data/Publications-resources/BulaSautu_WEB.pdf

25. Lee CH, Duck IM, Sibley CS. Ethnic inequality in diagnosis with depression and anxiety disorders. NZ Med J. 2017;130(1454):10-20.

26. 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, NZ: Health Promotion Agency; 2018. Available from: https://www.hpa.org.nz/sites/default/files/FinalReport-TeKaveinga-Mental%20health%20and%20wellbeing%20of%20Pacific%20peoples-Jun2018.pdf

27. The Royal Australasian College of Physicians. Recognising and addressing the mental health needs of the LGBTIQ+ population. Position statement 83. Wellington, NZ: RACP; 2021. Available at: https://www.ranzcp.org/news-policy/policy-and-advocacy/position-statements/mental-health-needs-lgbtiq

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

29. Office of the Chief Coroner of New Zealand. Deputy Chief Coroner releases annual provisional suicide statistics, 2022. Available from: https://coronialservices.justice.govt.nz/suicide/suicide-statistics/

30. 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.

31. McAnally HM, Iosua E, Sligo JL, et al. Childhood disadvantage and adolescent socioemotional wellbeing as predictors of future parenting behaviour. J Adolesc. 2021 Jan;86:90-100. doi: 10.1016/j.adolescence.2020.12.005.

32. Hashemi L, Fanslow J, Gulliver P, Tracey McIntosh T. Exploring the health burden of cumulative and specific adverse childhood experiences in New Zealand: Results from a population-based study. Child Abuse Negl. 2021;122:105372. doi: 10.1016/j.chiabu.2021.105372.

33. 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. Available at: https://www.racp.edu.au/docs/default-source/advocacy-library/indigenous-ch-statement-on-ich.pdf

34. Gluckman P. Youth Suicide in New Zealand: A discussion paper. Wellington: Office of the Prime Minister's Chief Science Advisor; 2017. Available at: www.pmcsa.org.nz/wp-content/uploads/17-07-26-Youth-suicide-in-New-Zealand-a-Discussion-Paper.pdf

35. Tuohy P, Eastood J, Hannan K. Early Childhood: The Importance of the Early Years. Sydney, Australia: The Royal Australasian College of Physicians; 2019. Available at: https://www.racp.edu.au/docs/default-source/advocacy-library/early-childhood-importance-of-early-years-position-statement.pdf

36. 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

37. 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—281. Available from: doi:10.1111/ inr.12565

38. 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(9):115893. DOI:10.1016/j.socscimed.2023.115893

06

PRIORITIES FOR THE HEALTH OF OUR CHILDREN

This report may make uncomfortable reading, but the conclusion is inescapable: we are failing a significant proportion of our children. We have the means and the knowledge to make a difference, and it is our responsibility to provide healthy futures for the children of Aotearoa New Zealand.

The data presented in this report mean that these four health conditions should be national priorities for Aotearoa New Zealand. The government has introduced fundamental changes such as the collective accountability approach embodied in New Zealand's Child and Youth Wellbeing Strategy, which aims to ensure that children and young people are happy and healthy.[1] Three of the five measures for progress towards that goal align directly with the data in this report: reducing psychological distress, intentional self-harm, and preventable admissions to hospital for children and young people. Major ongoing structural changes to the health system have increased emphasis on primary healthcare services, population health, and health equity. With these foundations in place, the children of Aotearoa New Zealand deserve our focused and sustained attention to reduce the burden of these four health conditions.

The reason that the report specifically highlights rates of hospitalisation for bronchiectasis is that this complex disease exemplifies the long-term health outcomes of not reducing rates of other respiratory conditions. It results from recurrent bouts of pneumonia and respiratory infections, and the fact that it is seen even among young children demonstrates the high burden of these infections in Aotearoa New Zealand. Bronchiectasis compromises children's ability to thrive, and these data show that the greatest burden of this chronic disease is carried by children who live with the most socioeconomic deprivation. The future costs for Aotearoa New Zealand throughout the lifetimes of these children will far outweigh the cost of prevention unless we act now.

Another stark example of inequity is the burden of skin infections, rheumatic fever, and RHD, particularly among Pasifika children in Aotearoa New Zealand. As with bronchiectasis, RHD is the end-result of recurrent childhood infections and illnesses. Incomplete understanding of the risk factors for disease has hampered efforts to prevent and control RHD, as has the lack of tools such as diagnostic tests, treatments, and vaccines. Research designed to fill these evidence gaps needs greater investment, as does participatory action research to co-design innovative healthcare services with Pasifika and Māori communities and to monitor and evaluate these interventions to enable iterative improvements.

Many children are hospitalised due to vaccine-preventable disease. Immunisation rates in Aotearoa New Zealand had been increasing, although they had not yet met levels needed for protection. The COVID-19 pandemic further disrupted standard childhood immunisation programmes.[2,3] Rates of immunisation for pēpi Māori have decreased disproportionately since about 2016, and have remained dangerously low.[4] Counter-measures can build on strategies used during the pandemic response, such as making vaccination a key priority for the health sector, and taking services to hard-to-reach communities, for example through pop-up clinics, mobile services, and vaccination in pharmacies. Pasifika communities were particularly successful at mobilising to implement campaigns to deliver health education, resources, and vaccination.[5] To obtain the benefits of immunisation, the priority should be on-time delivery of vaccinations during pregnancy and early childhood for at-risk groups.[6] The new national immunisation register will be vital to improving critically low uptake of the vaccines necessary to prevent outbreaks of infectious diseases such as pertussis and measles. Until immunisation targets are reached, the children of Aotearoa New Zealand are vulnerable to serious illness and death.

Since the concept for this report was proposed, the mental health of children and young people has been a strong candidate for inclusion as a priority for Aotearoa New Zealand. The data presented here clearly show that increasing numbers of young people are experiencing serious emotional and behavioural problems such as anxiety, depression, and psychological distress. The causes of mental health concerns are complex and multifaceted, and a national approach to supporting young people to achieve mental health and wellbeing will require innovative approaches from several interconnected sectors, and concerted and sustained efforts at the community level. The fact that most of young people's mental health concerns are managed in the community underscores the urgent need for a mental health survey that includes adequate sampling of all children and young people.

This report presents national data on severe health events that require hospital-based care, but equivalent data are not available for the great bulk of treatments for health conditions, which happen in the primary healthcare setting. Investment in strategies to reverse health trends should include harnessing a broader range of data-collection initiatives to drive and monitor change. For example, the government's 2022 commitment to a national patient register for acute rheumatic fever and rheumatic heart disease should assist healthcare professionals to provide continuous care, treatment, and prevention for children, and will also support preventative public health measures by enabling disease surveillance and evaluation of interventions.

Previous editions of this report have catalogued the persistently high rates of hospitalisations for dental disease among children in Aotearoa New Zealand. The problem remains, and the measures proposed to address these other conditions should also have positive effects for oral health. Dental health is associated with nutritional deficiencies, food insecurity, and socioeconomic deprivation.[7,8,9] Evidence shows that improving diets during pregnancy and childhood, including breastfeeding, can promote healthy development and protect children against chronic diseases.[10,11] Children would also benefit from public health measures to regulate harmful products such as alcohol, tobacco, and unhealthy food.[11]

Investments in the social and economic determinants of health and wellbeing, such as improving nutrition, housing, and access to healthcare, should have positive effects on priority health conditions for children.[12] In Aotearoa New Zealand, access to quality primary healthcare is directly related to socioeconomic status, and vulnerable groups are more likely to experience barriers to accessing care during childhood.[13,14] This needs to be urgently addressed. Improved access to primary healthcare services for children — regardless of their location, socioeconomic status, and ethnicity — will support reduced hospital admissions for all four priority health conditions.

Primary healthcare is free for children younger than 13 years, and extending this to all young people would remove a significant barrier to access for older children. Additional help could be provided by offering financial support for families of children who experience recurrent hospitalisations, and increasing disability allowances for children with chronic diseases.[15] All children have guaranteed rights to health, development, and a decent standard of living under the Convention on the Rights of the Child, and Māori children have additional rights under Te Tiriti o Waitangi.[16,17] We must provide access to high-quality healthcare from their first 1000 days, to ensure healthy development and to protect them from diseases that can have a lifelong impact.[17]

Approaches to broaden access to professional healthcare despite workforce shortages could include school-based nurse-led services, whānau ora providers, and roles for healthcare assistants and kaiawhina who can work directly with families in disadvantaged communities to deliver health education and help them to navigate the healthcare system.[1,8] Healthcare delivery should focus on developing holistic, collaborative, and culturally appropriate approaches, with leadership from Pasifika and Māori communities.[13] Research that has canvassed the experiences of young people and families reveals that caregivers would welcome information, tools, and resources that would assist them to self-manage care within the home, with access to healthcare when necessary.

The data in this report once again reveal significant inequity in disease prevalence in Aotearoa New Zealand. The disparities have been longstanding and unaddressed, and for Māori are in direct conflict with the principles of Te Tiriti o Waitangi. Reviews have shown the systemic nature of inequity in the healthcare system in Aotearoa New Zealand, and have directly led to the creation of Te Aka Whai Ora.[16] Innovative approaches and concerted efforts by all in the health system to focus on addressing the multipliers of ethnicity, poverty, and systemic racism have the potential to deliver substantial improvements in all four of the health conditions highlighted in this report. Success in this endeavour would also show that the people of Aotearoa New Zealand value the health and lives of all tamariki equally.

Urgent and targeted investment in evidence-based strategies to reduce the most serious disease for children could generate long-term population-level benefits that far exceed the initial costs. Considerable investment has already been committed at the national level towards the overall aim of child health, but the scale of the challenge demands concerted action at every level. ‘Business as usual’ healthcare has not been able to keep pace. Reversing the trends highlighted in this report will require investment in nationwide collaborative actions, based on evidence and expert advice, co-designed with community and cultural leaders, that harness available technologies and data to drive change. It will mean targeting and integrating services for children and families to enable prevention and early intervention, and provide resources, advice, and support within local communities. There is a need for research to generate a pipeline of insights, feedback, and technologies that will enable healthcare professionals to provide better care for children. The aim of this report is to galvanise coordinated actions designed to address the health conditions that have the greatest impact on the lives of children in Aotearoa New Zealand.

REFERENCES

1. NZ Government. Child and Youth Wellbeing Strategy Annual Report (2021/2022). Wellington: Department of the Prime Minister and Cabinet; April 2022. Available at https://www.dpmc.govt.nz/sites/default/files/2022-04/cyws-annual-report-year-ended-june-2021.pdf
2. Duncanson M, Roy M, van Asten H, et al. Child Poverty Monitor 2022: Technical Report. Dunedin: NZ Child and Youth Epidemiology Service, University of Otago; 2022. Available at: https://ourarchive.otago.ac.nz/handle/10523/13707
3. Ministry of Health Manatū Hauora. National and DHB immunisation data. Wellington: NZ Government; 2021. Available from: https://www.health.govt.nz/our-work/preventative-health-wellness/immunisation/immunisation-coverage/national-and-dhbimmunisation-data
4. Sinclair O, Grant C. Viewpoint: New Zealand's immunisation policy fails again and entrenches ethnic disparities. N Z Med J. 2021; 134 (1542): 92—95.
5. Hill H, Vaisola-Sefo LS, Ryan D, Percival T. Why we should adopt a village model Covid-19 response. Newsroom. November 2021. Available at: https://www.newsroom.co.nz/ideasroom/why-we-should-adopt-a-village-model-covid-19-response
6. Loto-Aso E, Howie SRC, Grant CC. Childhood pneumonia in New Zealand. J Paediatr Child Health. 2022 May;58(5):752-757. doi: 10.1111/jpc.15941.
7. Saraf R, Jensen BP, Camargo CA, et al. Vitamin D status at birth and acute respiratory infection hospitalisation during infancy. Paediatr Perinat Epidemiol. 2021 Sep;35(5):540-548. doi: 10.1111/ppe.12755.
8. Goldfeld S, Woolfenden S, Asher I, et al. Inequities in Child Health: Position Statement. Sydney, Australia: The Royal Australasian College of Physicians; 2020. Available at: https://www.racp.edu.au/docs/default-source/advocacy-library/racp-inequities-in-child-health-position-statement.pdf
9. Gerritsen S, Park, A, Wall, C, et al. Now We Are Twelve: Food Insecurity. Snapshot 3. Auckland: Growing Up in New Zealand; 2023. Available from: https://www.growingup.co.nz/growing-up-report/food-insecurity
10. Tuohy P, Eastood J, Hannan K. Early Childhood: The Importance of the Early Years. Sydney, Australia: The Royal Australasian College of Physicians; 2019. Available at: https://www.racp.edu.au/docs/default-source/advocacy-library/early-childhood-importance-of-early-years-position-statement.pdf
11. The Royal Australasian College of Physicians. Make it the norm: Equity through the social determinants of health. Available at: https://www.racp.edu.au/docs/default-source/policy-and-adv/aotearoa-new-zealand/make-it-the-norm-equity-through-the-social-determinants-of-health.pdf
12. 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. Available at: https://www.racp.edu.au/docs/default-source/advocacy-library/indigenous-ch-statement-on-ich.pdf
13. Lewycka S, Dasgupta K, Plum A, et al. Determinants of ethnic differences in the uptake of child healthcare services in New Zealand: a decomposition analysis. Int J Equity Health. 2023;22(1):13. doi: 10.1186/s12939-022-01812-3.
14. Jeffreys M, Smiler K, Ellison Loschmann L, et al. Consequences of barriers to primary health care for children in Aotearoa New Zealand. SSM Popul Health. 2022 Feb 5;17:101044. doi: 10.1016/j.ssmph.2022.101044.
15. McBride-Henry K, Miller C, Trenholm A, Officer TN. 'You have to do what is best': The lived reality of having a child who is repeatedly hospitalized because of acute lower respiratory infection. Health Expect. 2022 Feb;25(1):466-475. doi: 10.1111/hex.13408.
16. Waitangi Tribunal. Hauora: Report on stage one of the health services and outcome kaupapa inquiry. Lower Hutt: Waitangi Tribunal. Available at: https://forms.justice.govt.nz/search/Documents/WT/wt_DOC_195476216/Hauora%202023%20W.pdf
17. Chandra N, Southey J, Wensley D, Wilson M. The Basic Health and Welfare Rights of Children 0-5 Years of Age in Aotearoa New Zealand: Thematic Report to the Committee on the Rights of the Child. New Zealand Council of Christian Social Services, Whānau Āwhina Plunket, Save the Children, Child Poverty Action Group; 2022. Available at: https://www.savethechildren.org.nz/assets/Files/Reports/Under-5s-Basic-Health-and-Welfare-Thematic-Report-Content-only.pdf

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.

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.

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.

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, is a chronic condition that causes dry, scaly, and itchy patches on the skin. It is not contagious.

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

Pilonidal cyst: is 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.

MENTAL HEALTH CONCERNS

Anxiety disorder: a chronic condition that causes intense worry or fear about everyday situations, and 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.

APPENDIX: DATA SOURCES, MEASUREMENT, AND METHODS

The estimated population of Aotearoa New Zealand 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 New Zealand.

The National Minimum Dataset (NMDS) is an administrative data collection held by the NZ Ministry of Health, that captures information about all discharges from publicly funded hospitals in Aotearoa New Zealand.[2] This report presents data extracted by the Ministry in September 2022 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) and semi-acute hospitalisations (i.e. arranged admissions within a week of referral). Hospitalisation events were excluded if there were transfers or short stays in the Emergency Department (fewer than 3 hours). 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 New Zealand, 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. For the purposes of this report, analyses of hospitalisations by gender or sex have only been presented where there are significant differences.

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, the NMDS allocates them 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 New Zealand. 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 2020/21, the Survey included data for 1,323 children with their parents or caregivers.[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 2021/22 were weighted to take account of the low response rate (52%), which was lower still for Māori (33%) and Pasifika (36%).[4]

REFERENCES

1. Stats NZ. Estimated resident population (2018-base): At 30 June 2018 — corrected [Internet]. Wellington: Stats NZ; 2020. Available from: https://www.stats.govt.nz/information-releases/estimated-resident-population-2018-base-at-30-june-2018.
2. NZ Ministry of Health. National Minimum Dataset (hospital events) Data Dictionary. 7.9 ed. Wellington: Ministry of Health; 2021. Available from: https://www.health.govt.nz/publication/national-minimum-dataset-hospital-events-data-dictionary
3. Ministry of Health. HISO 10001:2017 Ethnicity Data Protocols. Wellington: NZ 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: Statistics New Zealand; 2009. https://ndhadeliver.natlib.govt.nz/delivery/DeliveryManagerServlet?dps_pid=IE1632151
5. Atkinson J, Salmond C, Crampton P. NZDep2018 Index of Deprivation, Final Research Report. Wellington: University of Otago; 2020. Available athttps://www.otago.ac.nz/wellington/otago730394.pdf
6. NZ Ministry of Health. Methodology report 2021/2022: New Zealand Heath Survey. Wellington: Ministry of Health; 2020. Available from: https://www.health.govt.nz/publication/methodology-report-2021-22-new-zealand-health-survey

RESOURCES AND LINKS

If you need to talk or find extra support:

- Anxiety helpline: 0800 269 4389 (0800 ANXIETY)
- Depression Helpline: 0800 111 757 or text 4202
- Healthline: 0800 611 611
- Kidsline: 0800 543 754 (available 24/7)
- Lifeline: 0800 543 354
- Need to talk? Free call or text 1737
- Rainbow Youth: (09) 376 4155
- Samaritans: 0800 726 666
- Small steps: www.smallsteps.org.nz
- Suicide Crisis Helpline: 0508 828 865 (0508 TAUTOKO) (available 24/7)
- Youthline: 0800 376 633, free text 234
- Whatsup: 0800 942 8787 (12pm to 11pm)
- www.headstrong.org.nz (Aroha Chatbot app)
- www.outline.org.nz (rainbow counselling)
- www.sparx.org.nz (game)
- www.thelowdown.co.nz (or free text 5626)