

State of Child Health in Aotearoa New Zealand



ACKNOWLEDGEMENTS

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Every endeavour has been made to use accurate data in this report. Nevertheless, variations in the way data are collected by various agencies may result in errors, omissions or inaccuracies in the information in this report. We do not accept liability for any inaccuracies arising from the use of these data in the production of these reports, or for any losses arising as a consequence.

FOREWORD

It's fair to say that most New Zealanders share the same ambition for our children: That each of them, no matter their background, grows up knowing they belong, among loving and supportive families and whānau who have what they need to flourish.

These are the fundamentals that lie behind the goal that Aotearoa New Zealand be the best place to be a child. They provide the foundations needed for a good life, and the good health which this report describes.

Sadly, however, not every child has access to these foundational supports. While about 70 percent of children are doing well, and have what they need to thrive, about 30 percent do not. On many measures about 20 percent of New Zealanders aged under 18 are doing it tough, and 10 percent experience persistent life-damaging disadvantage.

As a nation we are much better than this. We can and we must demand more for our children.

In my role as Children's Commissioner, I see the tentacles of child poverty reaching out into all areas of a child's life. Poverty does not occur in a vacuum. It is not just a set of statistics. It is designed into our society and the economic structures that either support us or leave us out. Poverty affects family wellbeing, educational achievement, the chances of being involved in criminal justice and the court system, and of course has health implications. Socioeconomic deprivation is a direct causative factor of many preventable illnesses.

Now, faced with the economic fallout from COVID-19 we are confronted with the possibility that outcomes for children will worsen. Together, we have some big decisions to make about the extent to which we will accept that increases in poverty, ill health and disadvantage are inevitable consequences of COVID-19, or whether we can set a better course for our children's futures.

I welcome the publication of this report, based on research and information from the New Zealand Child and Youth Epidemiology Service at the University of Otago. The Office of the Children's Commissioner partners with this Service, and the JR McKenzie Trust to produce the annual Child Poverty Monitor which is also due to be published about now.

This report provides a compelling and disturbing snapshot of the health of our children. First and foremost, it shows about 40,000 children are admitted to hospital each year for what are clearly preventable illnesses.

This report focuses on dental disease, respiratory, and skin conditions that are simply the result of living in poverty. I find it utterly unacceptable in Aotearoa New Zealand that so many of our children are hospitalised from preventable causes like these.

This report is a clarion call to spur our policy makers and politicians into action.

The foundations for progress have been laid over the last three years, in cross-party support for the Child Poverty Reduction Act 2018, the Child and Youth Wellbeing Strategy, and the decision to peg benefit increases to wage rises.

But if we are to halve child poverty and hardship by 2028, in line with Government's targets, then children and young people will need to see much bigger and bolder action from our decision makers – indeed from all of us.

Just as we came together to keep each other safe from COVID-19, together we can redesign our systems to solve poverty and ensure every child has what they need to thrive.

Only then will we see the transformation in the health and wellbeing that children deserve and are relying on us to provide.

Children's Commissioner, Judge Andrew Becroft

INTRODUCTION

STATE OF CHILD HEALTH IN AOTEAROA NZ

Cure Kids was founded by Professor Sir Bob Elliott and Dr Ron Caughey nearly 50 years ago, in an effort to reduce the disproportionate burden of diseases on children in New Zealand. Since then, Cure Kids has been working to enable medical and scientific research to improve the health of our children.

Dr Bruce Scoggins, the Chair of Cure Kids' Medical & Scientific Advisory Committee, saw the need for an annual "snapshot" of the health of children in New Zealand, to help identify the most urgent priorities for research. He consulted with the Royal College of Paediatrics and Child Health in the United Kingdom, which has produced similar annual reports since 2017.

Cure Kids has consulted with the Paediatric Society of New Zealand and the Royal Australasian College of Physicians, and contracted the New Zealand Child and Youth Epidemiology Service at the University of Otago to prepare this inaugural report.

This report summarises the best available data on the health of our children in three areas:

- **dental disease**
- **respiratory conditions**
- **skin infections.**

Cure Kids has selected the health issues for this inaugural report based on consultation with partners about both the burden of disease and the availability of data in each area. In 2021, we'll consult more widely to add new health issues to next year's report, and continue to add more as needed every year. We'll also work to update and enrich the data in each area every year.

This report gathers national statistics on the state of child health, to provide a snapshot in 2020 as a starting point for comparisons over time and between groups, and to highlight data gaps. The series of reports will be used to raise awareness of the burden of disease for children, and of the need for medical and scientific research in priority areas.

Cure Kids will use the series of reports to prioritise investments, so that we can enable research to answer the most urgent questions. These reports will demonstrate areas in which evidence-based medicine is improving child health, and will also highlight areas where this vital evidence is lacking. We will focus on the unanswered questions about these health conditions – such as how to diagnose, prevent, and treat diseases, and how to improve care for children. We hope that this report on the State of Child Health in Aotearoa NZ will also guide others to target research and evidence-based actions to improve health and wellbeing for infants, children, and young people.

The health of our children as they grow and develop will affect their lives, and even the lives of their own children. We need to find ways – specific to Aotearoa NZ – to enable ALL children to thrive, and to eliminate inequalities in health outcomes. In the context of COVID-19, which has imposed unprecedented stress on children, whanau, and society, a focus on the health of our children is vital to a sustainable recovery for our country. Accurate data can help us to truly see the problem, and to monitor our progress towards transforming the health of children. We look forward to tracking improvements in child health over the coming years.

Frances Benge
Chief Executive
Cure Kids

CHAPTER 1

MEASURING THE STATE OF CHILD HEALTH

CHILDREN IN AOTEAROA NEW ZEALAND

As at 30 June 2018, the estimated population of Aotearoa NZ included nearly 1 million children younger than 15 years – almost 20% (or one fifth) of the total. Boys made up a slightly higher proportion of the population than girls (51% and 49% respectively).¹

There are several ways to define children, depending on the environment, health system, legal requirements, and system for data collection. This report generally includes children aged 0 to 14 years (inclusive), an age range which spans from infancy through to early adolescence. This age range may vary depending on the data sources and the health condition.

HEALTH CONDITIONS

This inaugural report will summarise the best available data for three health issues which affect children in Aotearoa NZ:

- **dental disease**
- **respiratory conditions**
- **skin infections.**

These health issues have been selected based on a robust but pragmatic process, which considered criteria including the prevalence and burden of disease, public importance, including for Māori,² rates of hospitalisation or death, and availability of robust published data for Aotearoa NZ, including both recent and current data.

DATA SOURCES AND GAPS

The report focuses on data which are nationally representative, to enable population-level comparisons. The report draws predominantly on national administrative collections held by the NZ Ministry of Health, which gather information as part of service delivery (e.g. the National Minimum Dataset) and national surveys undertaken by the Ministry of Health or by Stats NZ, which are administered to adults or caregivers of children (e.g. the New Zealand Health Survey). Future reports may incorporate information from specific national collections, or utilise routine linkage data, including from the Stats NZ Integrated Data Infrastructure.

The National Minimum Dataset (NMDS) is an administrative data collection, held by the NZ Ministry of Health, which captures information about all discharges from publicly funded hospitals in Aotearoa NZ.³ This report presents data on discharges as representative of hospitalisations. Note that data are limited to acute and arranged admissions to hospital (see Glossary).

Information on hospitalisations helps to identify differences in health status and access to health services. This report presents the most frequent causes of hospitalisation, which have been summarised based on the primary diagnoses, and therefore are not a complete list. Events were excluded if there were transfers, short stays in the Emergency Department (less than 3 hours) or if overseas visitors were involved. Unless stated otherwise, hospitalisation information is presented by calendar year (Jan to Dec), prioritised ethnicity, or NZ Index of Deprivation (NZDep). Prioritised ethnicity means that each child is allocated to a single ethnic group which they have identified with, in the following order of priority: Māori, Pasifika, Asian, MELAA (Middle Eastern, Latin American, and African) and European/Other.

Started in 2011, the New Zealand Health Survey (NZHS) is an annual survey that asks adults and children (generally through a parent or caregiver) questions relating to their health and wellbeing. The 2018/19 NZHS included 4,503 children.⁴ The NZHS data report each child in all the ethnic groups that they identify with (i.e. potentially multiple groups).

National data collections are useful for assessing the health of children over time. But there are opportunities to fill gaps in these collections and to overcome their limitations. Some gaps affect the overall quality of reporting; others are specific to health areas. For example, relatively few routine national surveys include the views and voices of children. The Youth2000 series and the Mai World: Child and Youth Voices⁵ project by the Office of the Children's Commissioner provide useful insights, but are not yet national or ongoing. Another issue is that data from longitudinal studies, such as the Auckland-based Growing up In NZ⁶ study and the Dunedin Longitudinal Study,⁷ are not nationally representative. However, although their birth cohorts are regionally defined, they can highlight some of the determinants of health and development.

Health data are limited for several groups of children who are at increased risk of experiencing health inequities in Aotearoa NZ. These include children with disabilities, children whose families are refugees or asylum seekers, children who are culturally or linguistically diverse, who are gender or sexually diverse, who live in out-of-home or state care, who live in rural or isolated areas, or who are involved with youth justice.^{1,2,8} This series of reports will highlight gaps overall, and for specific health issues and groups.

METHODS

Unless otherwise stated, rates are age-specific. An age-specific rate is defined as the number of observed discharge events for a specified age group over a specified period (for example, a year) divided by the total population at risk of the event in that age group. Rates of hospitalisation are per 1,000 children.

Population attributable fraction, or potential rate reduction, measures the relative difference in one group's health ($rate_{group}$) compared to the health of the group with the lowest or best health ($rate_{ref}$).⁹⁻¹² It estimates the potential health improvements for all groups if they had the same experiences as the reference group.

$$PAF\% = \frac{rate_{group} - rate_{ref}}{rate_{group}}$$

Unless stated otherwise, rates are calculated using the NZCYES estimated resident population. This population-based denominator is derived from customised Stats NZ's census data with linear interpolation for non-census years.

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. He korowai oranga: Māori health strategy. Wellington: Ministry of Health; 2002.
3. NZ Ministry of Health. National Minimum Dataset (hospital events) Data Dictionary. 7.9 ed. Wellington: Ministry of Health; 2018.
4. NZ Ministry of Health. Methodology report 2018/19: New Zealand Health Survey. Wellington: Ministry of Health; 2019. Available from: <https://www.health.govt.nz/nz-health-statistics/national-collections-and-surveys/surveys/new-zealand-health-survey>
5. Office of the Children's Commissioner (OCC). Mai World, Summary of engagements 2017-2018. Wellington: OCC; 2018. Available from <https://www.occ.org.nz/assets/Uploads/Mai-World-Summary-of-Engagements-2017-18.pdf>
6. Morton SMB, et al. Growing Up in New Zealand: A longitudinal study of New Zealand children and their families. Now We Are Eight. Auckland: Growing Up in New Zealand; 2020. Available at: https://www.growingup.co.nz/sites/growingup.co.nz/files/documents/GUINZ_Now_We_Are_8_ONLINE.pdf
7. Melchior M, et al. Why do children from socioeconomically disadvantaged families suffer from poor health when they reach adulthood? A lifecourse study. *Am J Epidemiol* 2007; 166(166), 966-974. Available at: <https://dunedinstudy.otago.ac.nz/files/1589865538995.pdf>
8. Office of the Children's Commissioner, Oranga Tamariki. What makes a good life? Children and young people's views on wellbeing. Wellington: Office of the Children's Commissioner and Oranga Tamariki; 2019. <https://www.occ.org.nz/publications/reports/what-makes-a-good-life/>
9. Regidor E. Measures of health inequalities: Part 2. *Journal of Epidemiology and Community Health*. 2004;58(11):900-3. 10.1136/jech.2004.023036
10. Harper S, Lynch J. Methods for measuring cancer disparities: Using data relevant to healthy people 2010 cancer-related objectives. Bethesda, MD: National Cancer Institute; 2005. <https://seer.cancer.gov/archive/publications/disparities/>
11. World Health Organization. Handbook on health inequality monitoring: With a special focus on low- and middle-income countries. Geneva: World Health Organization; 2013. https://www.who.int/gho/health_equity/handbook/en/
12. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Summary measures of socioeconomic inequalities in health. Toronto, ON: Queen's Printer for Ontario; 2013. <https://www.publichealthontario.ca/-/media/documents/S/2013/socioeconomic-inequality-measures.pdf?la=en>

CHAPTER 2

DENTAL DISEASE

KEY FINDINGS

- Healthy teeth and gums are essential for children's overall health and wellbeing.
- In 2018, 40% of 5-year-olds and 34% of Year-8 children (aged around 12 years) had evidence of tooth decay. Rates were higher for Māori and Pasifika children.
- Tooth decay is the main reason why children older than 1 year require pre-arranged hospital treatment.
- Hospitalisation for tooth decay is particularly high for children living in areas of high deprivation.
- Less than 60% of children brush their teeth at least twice daily with a standard fluoride toothpaste.

WHY PRIORITISE DENTAL DISEASE IN CHILDREN?

Dental disease is a major public health issue, because dental decay is the most widespread non-communicable disease worldwide.¹ Dental disease reduces general health and quality of life, and affects other aspects of life including nutrition, ability to sleep, educational performance, confidence, mental and physical wellbeing, and development.²⁻⁷ Therefore, good oral health is important for children of all ages.

Tooth decay occurs when mouth bacteria produce acids that soften the outer covering (enamel) of the tooth.² Progression of decay can lead to pain and difficulty with eating, sleeping, and concentrating.² Research suggests that oral hygiene practices and diet can minimise growth of these bacteria.^{6,8-10} Since the bacteria convert sugar into acids, reducing sugar can inhibit tooth decay.⁸⁻¹² Use of fluoride toothpaste can also minimise tooth decay, particularly in regions where the water supply is not fluoridated.¹³

Children with good oral health have little or no active tooth decay, and a lower-than-average number of decayed, filled, or missing teeth. For children with severe tooth decay, delaying dental visits can lead to further deterioration, and treatment may eventually require hospitalisation. Rates of hospitalisation rates for dental services indicate the need for earlier access to treatment for severe cases of dental decay.

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

In the government's most recent Health Survey,¹⁴ 4.5% of children older than 1 year had had teeth extracted in the previous year due to decay, abscess, infection, or gum disease.

Latest data: In Aotearoa NZ, 60% of 5-years-olds examined in 2018 by Community Oral Health Services had no obvious tooth decay (i.e. they were 'caries-free').¹⁵ By 5 years of age, children had on-average 1.8 decayed, missing, or filled primary teeth (dmft). For Year-8 children (aged 12–13 years), 66% were caries-free and the average number of decayed, missing or filled permanent teeth (DMFT) was 0.7.

Trend: Figure 2.1 shows that the proportion of children without tooth decay at age 5 or in Year 8 at school has gradually improved, particularly for children aged 5 years. The average number of decayed, missing or filled teeth for both age groups has declined since 2000 (Figure 2.2), with the greatest decrease seen for Year-8 children.



Figure 2.1: Trends in proportion of children without dental decay (caries-free) by age at examination, Aotearoa NZ, 2000–18. Source: COHS data.

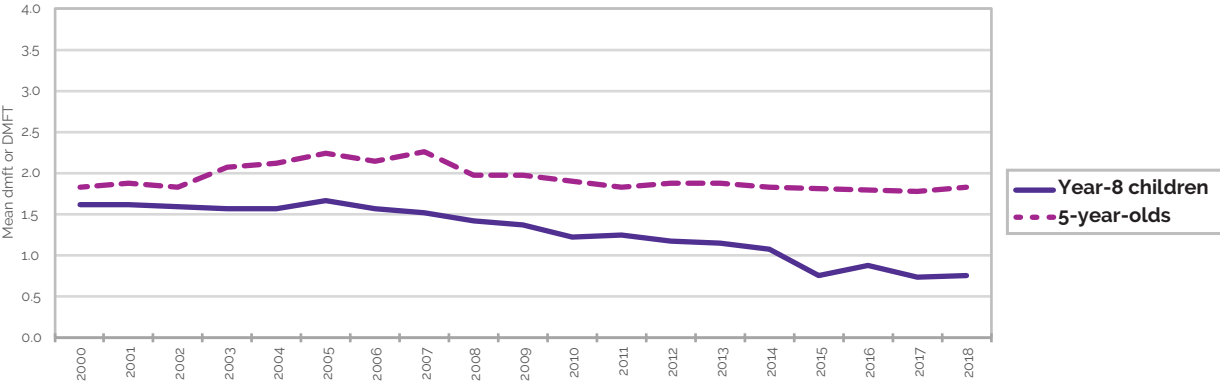


Figure 2.2: Trends in mean number of decayed, missing and filled teeth by age at examination, Aotearoa NZ, 2000–18. Source: COHS data.

Frequent consumption of sugary drinks and foods is a leading cause of dental decay,¹² as well as other health conditions, such as obesity and type 2 diabetes.⁹⁻¹¹ The Health Survey (NZHS) asked parents of children aged 2 to 14 years about their children’s consumption of fast food and fizzy drinks. The 2018/19 NZHS reported that 10.2% of children were consuming fizzy drinks at least three times per week, and that 7.1% were eating fast food three or more times per week.¹⁴ Less than 60% of children (56.1%) were brushing their teeth at least twice daily with a standard fluoride toothpaste.¹⁴

Parents said that 82.1% of children older than 1 year had visited a dentist or other dental healthcare worker in the past 12 months, but 2.4% of parents reported they avoided taking their child to a dental healthcare worker because of perceived cost.¹⁴ In Aotearoa NZ, children and adolescents have access to publicly funded basic oral health services such as routine examinations for decay, sealants or cleaning, and treatments like fluoride, fillings, or extraction.¹⁶ One in four of all children who needed a procedure in hospital had a dental procedure.¹⁷

Latest data: In 2019, more than 7,000 hospitalisations were needed to treat dental decay in children, representing a rate of 8.2 hospitalisations per 1,000 children.

Trend: Figure 2.3 shows that since 2000, the rate of hospitalisations for dental decay has increased steadily.

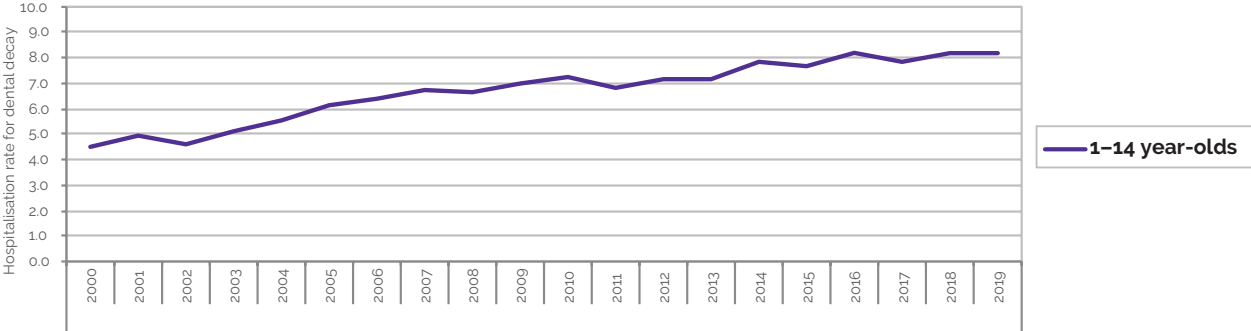


Figure 2.3: Trend in rate of children (aged 1 to 14 years) hospitalised for dental decay, Aotearoa NZ, 2000–19. Source: NMDS and NZCYES estimated resident population.

Latest data: Between 2015 and 2019, more than 80% of hospitalisations for dental disease in children older than 1 year were caused by dental decay (dental caries).

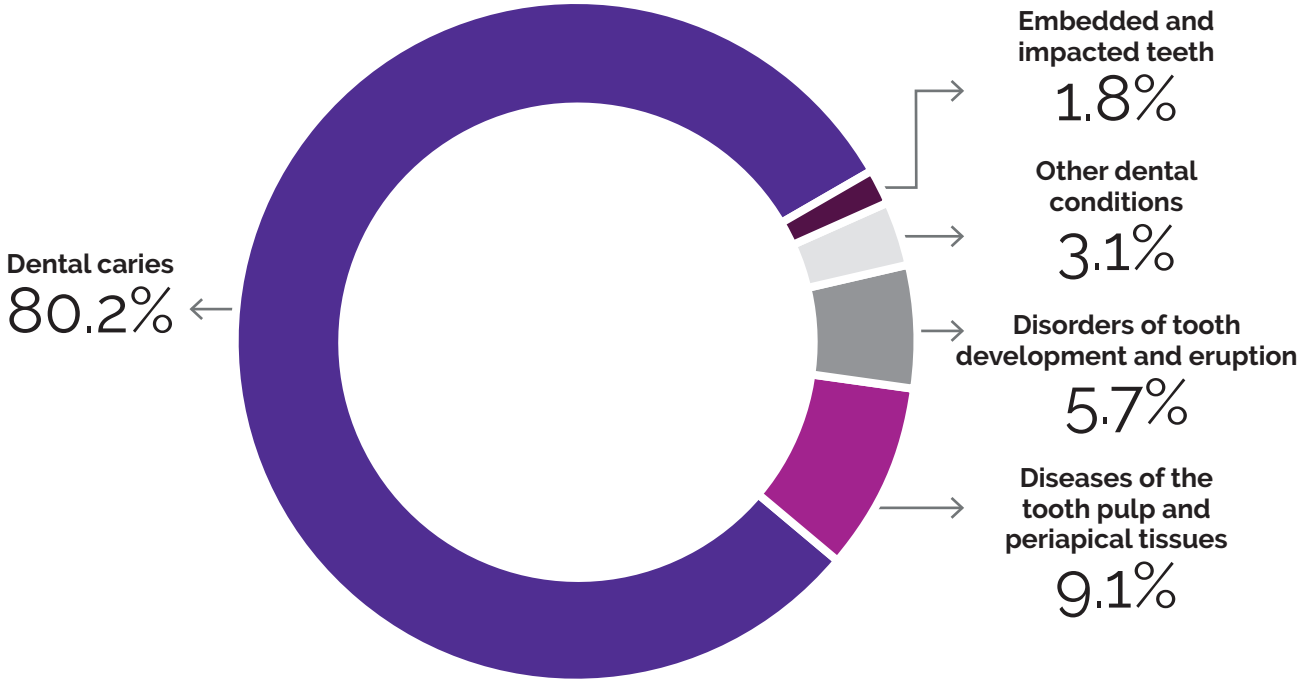
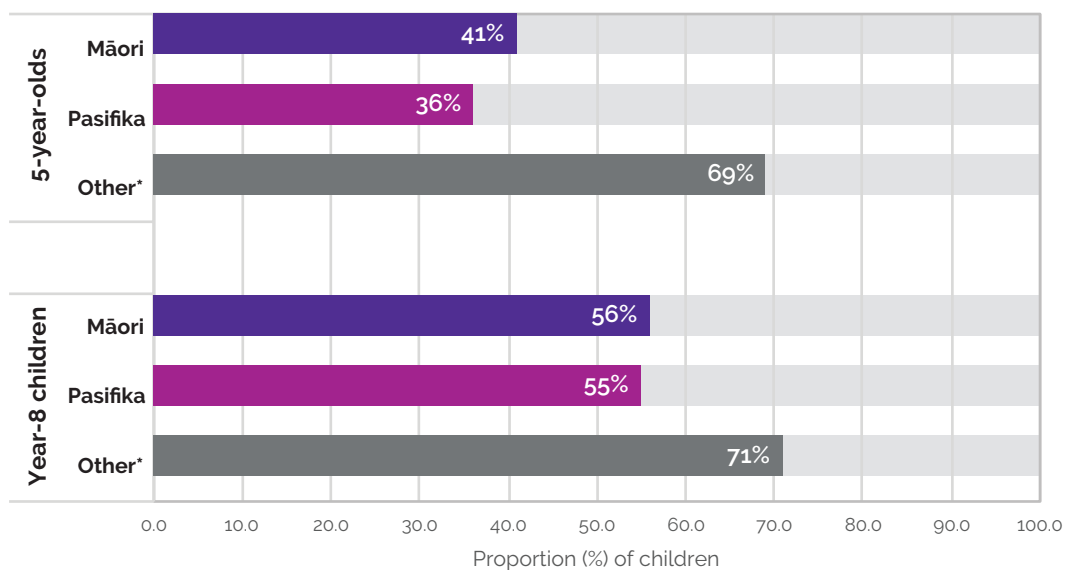


Figure 2.4: Causes of hospitalisation due to dental disease in children older than 1 year, Aotearoa NZ, 2015–19. Source: NMDS.

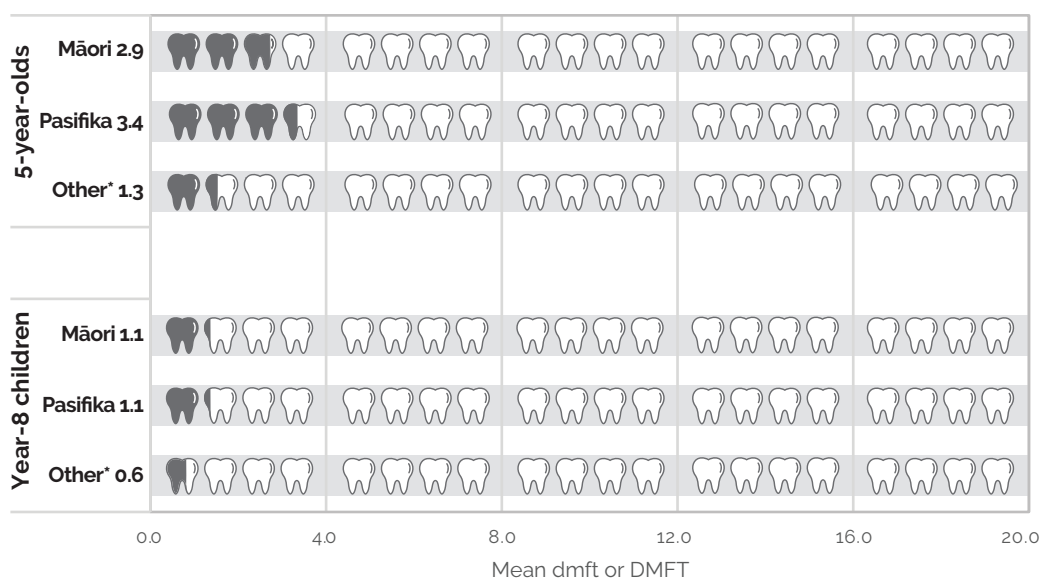
INEQUALITIES IN ORAL HEALTH FOR CHILDREN IN AOTEAROA NZ

Māori children, Pasifika children, and children who live in areas of moderately high or high deprivation have disproportionate rates of dental decay. Figure 2.5 shows that in 2018, the proportion of Pasifika children who were free of dental decay was nearly half that of children of other ethnicities. At the same time, Māori and Pasifika children had double the average number of decayed, missing, or filled teeth (mean dmft or DMFT), as shown in Figure 2.6. Although average numbers of decayed, missing, or filled teeth among Year-8 children have been declining, particularly for Māori,¹⁷ outcomes for oral health remain inequitable for Māori.¹⁸



*Other includes Pasifika children who live outside the seven District Health Boards with the highest numbers of Pasifika.

Figure 2.5: Proportion of children without dental decay (carries-free) by age at examination and ethnicity, Aotearoa NZ, 2018. Source: COHS data.

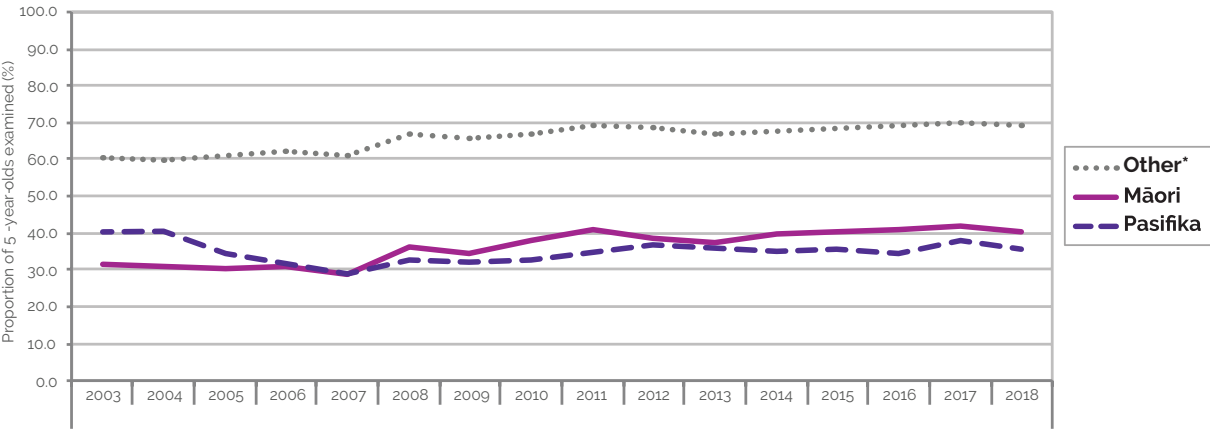


*Other includes Pasifika children who live outside the seven District Health Boards with the highest numbers of Pasifika.

Figure 2.6: Average number of decayed, missing, or filled teeth by age at examination and ethnicity, Aotearoa NZ, 2018. Source: COHS data.

Please note, most children have 20 primary teeth, which are gradually replaced by 32 permanent teeth. This graph represents number of teeth, not percentage.

Figure 2.7 shows that the proportion of Māori 5-year-olds who are decay-free has increased gradually since 2003; however, for Pasifika children this proportion has been decreasing.

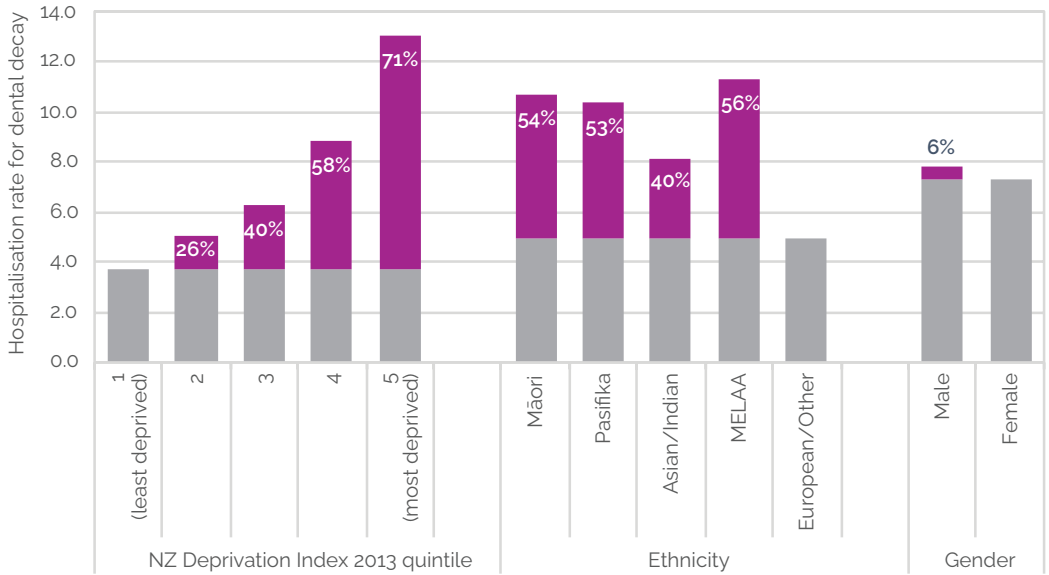


*Other includes Pasifika children who live outside the seven District Health Boards with the highest numbers of Pasifika.

Figure 2.7: Trends in the proportion of children without dental decay (caries-free) at age 5 years by ethnicity and year, in Aotearoa NZ, 2003–18. Source: COHS data.

Disproportionate rates of dental decay among Māori and Pasifika children were also observed in the hospitalisations needed to treat dental decay. The ratio of tooth extractions in the past year doubled for boys who were Māori, and for children who lived in the most deprived areas.¹⁴

Figure 2.8 presents the proportion of hospitalisations that could potentially be reduced if inequalities were eliminated. For instance, during 2015–2019, if Māori children had the same low rate of hospitalisation for dental decay as children of “European or Other” ethnicities (reference group), their rate of hospitalisations would have decreased by 54%.



MELAA= Middle Eastern, Latin American, or African

Figure 2.8: Potential reduction (attributable fraction) in hospitalisation rate for dental decay in children older than 1 year by demographic factors, in Aotearoa NZ, 2015–19.

Source: NMDS and NZCYES estimated resident population.

DATA ON DENTAL DISEASE

The Community Oral Health Services (COHS) is a universal annual dental examination for children aged 1 year of age up to and including Year 8 of school (aged around 12 to 13 years).¹⁵ COHS reports decay-free (caries-free), decayed, missing, or filled teeth. Each Community Oral Health Service supplies information on use of their service to the Ministry of Health. This report specifically looks at COHS data from universal dental examinations of 5-year-old children during their first year at primary school and children in Year 8, during their first year at intermediate school. For 5-year-olds these data relate to primary (deciduous, baby, or milk) teeth; for children in Year 8, data relate to permanent teeth.

Enrolled children are examined every 6–12 months, and offered necessary treatment.¹⁵ Information on deprivation is not available for COHS. In 2018, 43,489 5-year-olds and 48,585 Year-8 children were examined.¹⁹

NMDS data show the rate of children (older than 1 year) who have been treated in hospital for dental decay, and the top causes of hospitalisation due to dental disease and oral health-related conditions. This report summarises NMDS data for dental disease based on the primary diagnosis being an oral-health-related condition (ICD-10-AM: K00–K08).

The New Zealand Health Survey also reports caregivers' descriptions of the behaviour of their children in relation to oral health.^{16,20} This report includes data on how often children older than 2 years consumed fast food or fizzy drinks, and brushed their teeth with a fluoride toothpaste. The NZHS defined fast food as food purchased from a fast-food place or takeaway shop (e.g. fish and chips, burgers, fried chicken or pizza), but excluded other fast food and takeaways (e.g. sushi, wraps or curries). Soft or fizzy drinks included sports drinks or energy drinks, but excluded diet or reduced-sugar varieties, sparkling water, flavoured waters, fruit juices, and drinks made from cordial, concentrate, or powder. Standard fluoride toothpaste was defined as any brand of toothpaste that contains at least 1000ppm fluoride (0.221% sodium fluoride or 0.76% sodium monofluorophosphate).

Although national data for this indicator are currently limited, the Ministry of Health has plans to roll out an Electronic Oral Health Record. Future reports may include this data.

REFERENCES

1. World Health Organization. Sugars and dental caries report. Geneva: WHO; 2019. Available from: https://www.who.int/oral_health/publications/sugars-dental-carries-keyfacts/en/
2. Petersen PE. World Health Organization global policy for improvement of oral health - World Health Assembly 2007. *International Dental Journal*. 2008;58(3):115-21.
3. Gift H, Redford M. Oral health and the quality of life. *Clinics in Geriatric Medicine*. 1992;8(3):673-83.
4. Ha DH, Xiangqun J, Cecilia MG, Jason A, Do LG, Jamieson LM. Social inequality in dental caries and changes over time among indigenous and non-indigenous Australian children. *Australian and New Zealand Journal of Public Health*. 2016;40(6):542-7.
5. NZ Ministry of Health. Early childhood oral health: A toolkit for District Health Boards, primary health care and public health providers and for oral health services relating to infant and preschool oral health. Wellington: Ministry of Health; 2008. Available from: <https://www.health.govt.nz/publication/early-childhood-oral-health>
6. Petersen PE, Ogawa H. The global burden of periodontal disease: Towards integration with chronic disease prevention and control. *Periodontology* 2000. 2012;60(1):15-39.
7. Royal Australasian College of Physicians. Oral health of children and young people: position statement. 2012. Available from: <https://www.racp.edu.au/docs/default-source/default-document-library/pa-pos-oral-health-in-children-and-young-people%20.pdf>
8. Wilson N, Signal L, Nicholls S, Thomson G. Marketing fat and sugar to children on New Zealand television. *Preventive Medicine*. 2006;42(2):96-101.
9. Mishra MB, Mishra S. Sugar-sweetened beverages: General and oral health hazards in children and adolescents. *International Journal of Clinical Pediatric Dentistry*. 2011;4(2):119-23.
10. Moynihan PJ, Kelly SAM. Effect on caries of restricting sugars intake: Systematic review to inform who guidelines. *Journal of Dental Research*. 2013;93(1):8-18.
11. New Zealand Dental Association. Sugary drinks. Auckland: New Zealand Dental Association; 2020. Available from: <https://www.nzda.org.nz/public/our-initiatives/sugary-drinks>.
12. Thornley S, Bach K, Bird A, Farrar R, Bronte S, Turton B, et al. What factors are associated with early childhood dental caries? A longitudinal study of the Growing up in New Zealand cohort. *International Journal of Paediatric Dentistry*. 2020. Doi: 10.1111/ipd.12686.
13. NZ Ministry of Health. Fluoride. Wellington: Ministry of Health; 2019. Available from: <https://www.health.govt.nz/your-health/healthy-living/teeth-and-gums/fluoride>.
14. NZ Ministry of Health. Annual data explorer 2018/19: New Zealand Health Survey [data file]. Wellington: MoH; 2019. Available from: <https://minhealthnz.shinyapps.io/nz-health-survey-2018-19-annual-data-explorer/>.
15. NZ Ministry of Health. Community Oral Health Services for children and some adolescents (previously child oral health services): Tier two service specification. Wellington: Ministry of Health, Nationwide Service Framework Library; 2015.
16. NZ Ministry of Health. Publicly funded dental care. Wellington: Ministry of Health; 2019. Available from: <https://www.health.govt.nz/your-health/services-and-support/health-care-services/visiting-dentist/publicly-funded-dental-care>.
17. Duncanson M, Oben G, Adams J, Richardson G, Wicken A, Pierson M. Health and wellbeing of under-15 year olds in New Zealand 2018. Dunedin: New Zealand Child and Youth Epidemiology Service, University of Otago; 2019. Available from: <https://www.otago.ac.nz/nzcyes>
18. Makowharemahihhi C, Wall J, Keay G, Britton C, McGibbon M, LeGeyst P, et al. Quality improvement: Indigenous influence in oral health policy, process, and practice. *Journal of Health Care for the Poor and Underserved*. 2016;27(1):54-60.
19. NZ Ministry of Health (2018). Age 5 and Year 8 oral health data from the Community Oral Health Service. Wellington, Ministry of Health.
20. NZ Ministry of Health (2019). Methodology Report 2018/19: New Zealand Health Survey. Wellington, Ministry of Health.

CHAPTER 3

RESPIRATORY CONDITIONS

KEY FINDINGS

- Respiratory conditions are the leading cause of acute admissions to hospital for children.
- 'Asthma and wheeze' was the most frequent diagnosis, with 6,685 hospitalisations in 2019.
- Māori children, Pasifika children, and children living in areas of high deprivation have the highest rates of hospitalisations for asthma and wheeze.

WHY PRIORITISE RESPIRATORY CONDITIONS IN CHILDREN?

Respiratory conditions affect the airways, including lungs and nasal passages.¹ These conditions can be long-lasting (chronic) or short-term (acute).² Children with these conditions have difficulty breathing, wheezing, chest tightness, and cough. Common respiratory conditions include asthma, chronic obstructive pulmonary disease (such as emphysema or chronic bronchitis), 'hay fever' (allergic rhinitis), and other problems such as bronchiectasis and chronic sinusitis.¹

The total cost of respiratory conditions, based on 2015 figures, has been estimated at more than \$7 billion every year.³ Asthma in children younger than 15 years has been estimated to cost more than \$78 million per annum.³

Research shows that risk factors for respiratory conditions like asthma include poverty, mouldy, damp, or poorly heated homes, crowded households, unhealthy diets, frequent or severe lower respiratory infections during childhood, exposure to tobacco smoke and environmental air pollution, and genetic factors.^{1,4-9}

Rates of hospitalisations for respiratory conditions vary widely for children in different ethnic and socioeconomic groups in Aotearoa NZ, revealing a high degree of inequality.³

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

In the government's most recent Health Survey,¹⁰ 13.1% of children aged 2–14 years had been diagnosed in the previous year (2018/2019) and were currently being treated for asthma.

Around 35% of acute admissions to hospital for children are due to respiratory infections.¹¹ For children who need hospitalisation, the most common respiratory conditions, which are also associated with socioeconomic deprivation¹² are acute (upper and lower) respiratory infections, acute bronchiolitis, pneumonia, asthma and wheeze.

Rates of hospitalisation for children with asthma have been decreasing since 2010, but at the same time, hospitalisations for wheeze have increased. Children aged 1 year have higher rates of hospitalisation than older children.¹¹

Latest data: Figure 3.1 shows that from 2015 to 2019, 'asthma and wheeze' was the most frequently recorded diagnosis for children admitted to hospital for respiratory conditions, followed by acute bronchiolitis.



*Multiple or unspecified sites

Figure 3.1: Causes of hospitalisations for respiratory conditions in children, Aotearoa NZ, 2015-19. Source: NMDS.

Figure 3.2 shows that the most frequent cause of hospitalisation for children younger than 5 years was acute bronchiolitis. The most frequent cause of hospitalisation for older children was asthma.

Age group	Most frequent	Second-most common	Third-most common
0-4 years	Acute bronchiolitis (30.4%)	Acute upper respiratory infections* (18.2%)	Wheeze (14.5%)
5-9 years	Asthma (36.1%)	Pneumonia‡ (12.1%)	Acute upper respiratory infections* (9.1%)
10-14 years	Asthma (38.1%)	Pneumonia‡ (12.6%)	Acute lower respiratory infections‡ (7.3%)

*Multiple or unspecified sites; †Organism unspecified; ‡Unspecified sites.

Figure 3.2: Leading causes of hospitalisations for respiratory conditions in children by age group, Aotearoa NZ, 2015-19. Source: NMDS.

Latest data: In 2019, 6,685 children were hospitalised for asthma and wheeze, 6,527 for acute bronchiolitis, and 4,244 for acute upper respiratory infections (of multiple and unspecified sites).

Trend: Figure 3.3 shows that since 2000, the rate of hospitalisations has increased for all three diagnoses, most notably for asthma and wheeze and acute bronchiolitis.

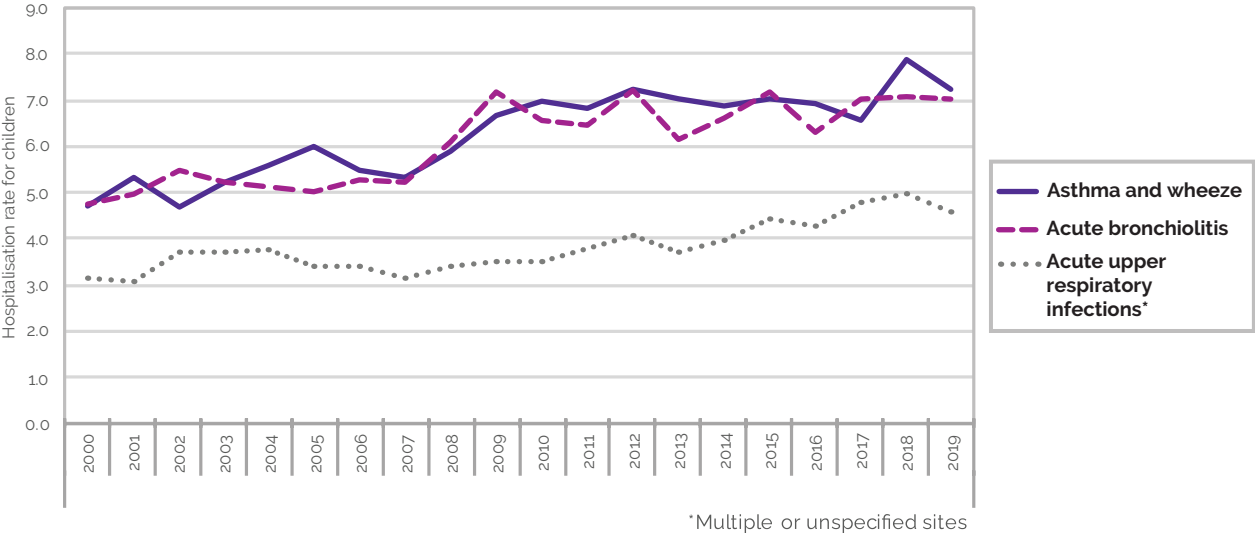


Figure 3.3: Trends in hospitalisations of children for respiratory conditions, by primary diagnosis, Aotearoa NZ, 2000–19.

Source: NMDS and NZCYES estimated resident population.

Asthma and wheeze are the most common cause of hospitalisations for children with respiratory conditions. Asthma is a long-term condition of the airways, and is the most common non-communicable disease in children. Asthma symptoms range from mild to severe, and can be triggered by cold air, exercise, or psychological distress.^{1,4} Asthma varies by age and gender; in children, it is more common among boys.^{1,10,11} Children with well-controlled asthma have few symptoms, use their relievers (inhalers) less than 2 days per week, don't have disturbed sleep, and don't experience limitations on their activity.¹³ Admission to hospital for children with asthma is required when symptoms are potentially life-threatening, or can't be managed at home or by a General Practitioner (GP).¹³

Latest data: In 2019, the rate of hospitalisation for asthma and wheeze was 7.2 children per 1,000. This rate was highest for children younger than 5 years (13.8 hospitalisations per 1,000).

Trend: Since 2000, rates of hospitalisations for asthma and wheeze have increased, and most notably for children younger than 5 years.

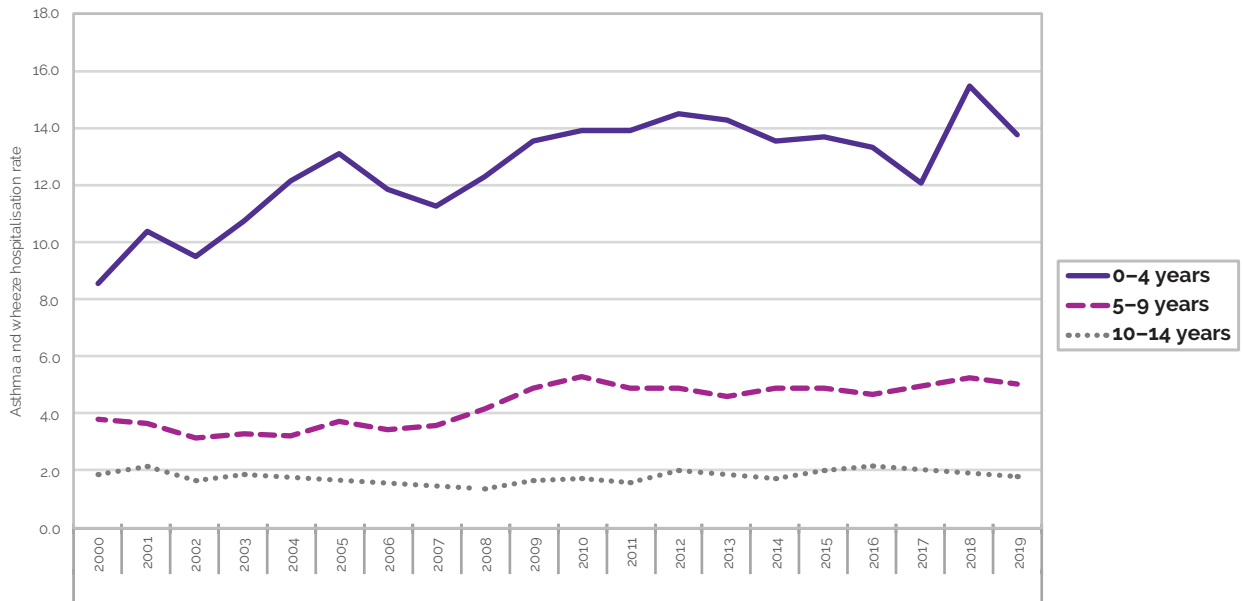


Figure 3.4: Trends in hospitalisations of children for asthma and wheeze by age, Aotearoa NZ, 2000–19. Source: NMDS and NZCYES estimated resident population.

INEQUALITIES IN RESPIRATORY HEALTH IN AOTEAROA NZ

Rates of hospitalisation for respiratory conditions differ between children in different ethnic and socioeconomic groups.^{11,14} According to the 2018/19 NZ Health Survey,¹⁰ asthma was more common for boys and for Māori children than for other children aged 2–14 years.

Pasifika children, Māori children, and children living in areas of high socioeconomic deprivation have higher risks of being hospitalised for asthma and wheeze.^{10,11,14} Figure 3.5 shows the proportion of hospitalisations that could potentially be reduced if inequalities were eliminated. For instance, during 2015–2019, if Pasifika children had the same low rate of hospitalisation for asthma and wheeze as children of “European/Other” ethnicities (reference group), their rate of hospitalisation would decrease by 69%.

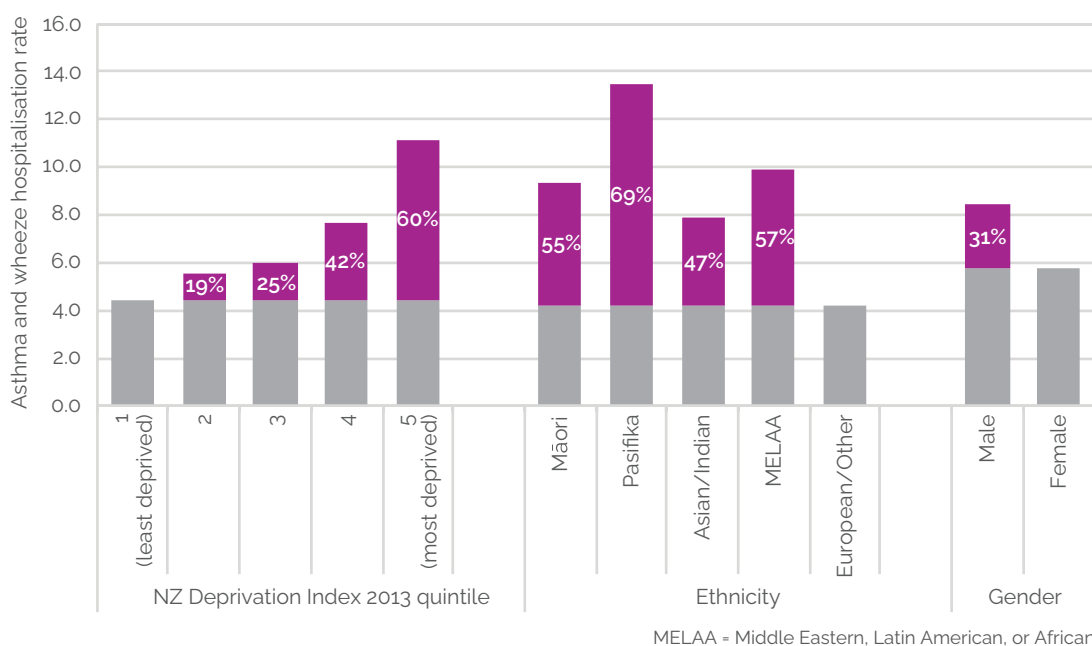


Figure 3.5: Potential reduction (attributable fraction) in hospitalisation rates for asthma and wheeze in children older than 1 year by demographic factors, Aotearoa NZ, 2015–19.

Source: NMDS and NZCYES estimated resident population.

Figure 3.6 shows that since 2000, the hospitalisation rates of children for asthma and wheeze have been increasing for all children except those of “European/Other” ethnicities. Over that period, Pasifika children, and children living in areas with the highest deprivation scores have consistently had the highest rates of hospitalisation.

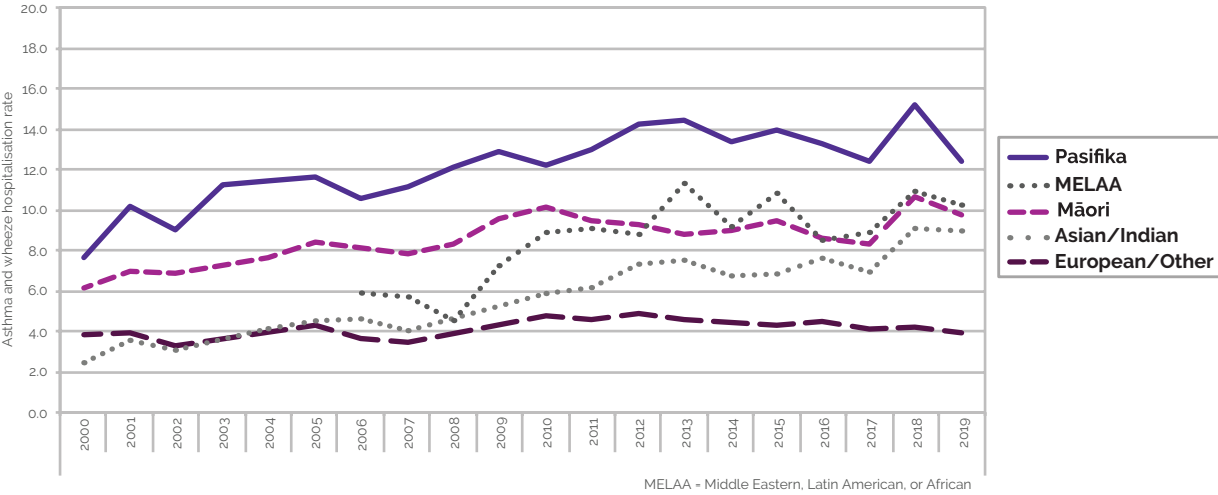


Figure 3.6: Trends in rates of children hospitalised for asthma and wheeze by ethnicity, Aotearoa NZ, 2000–19. Source: NMDS and NZCYES estimated resident population.

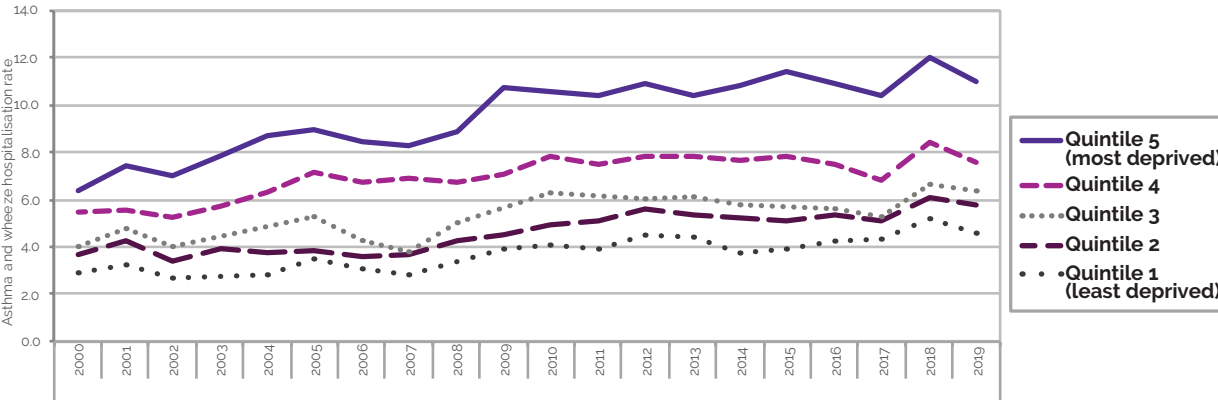


Figure 3.7: Trends in rates of children hospitalised for asthma and wheeze by deprivation quintile, Aotearoa NZ, 2000–19.

Source: NMDS and NZCYES estimated resident population.

DATA ON RESPIRATORY CONDITIONS

The rate of children treated in hospital for respiratory-related conditions is taken from the National Minimum Dataset (NMDS).¹⁵ Data on asthma and wheeze are also presented. Hospitalisations due to respiratory conditions in children were identified from diagnostic codes for cause of hospital attendance (between 2000 and 2019). These data are limited to acute and arranged admissions to hospital. Definitions used for identifying hospitalisations were: Acute and arranged (semi-acute) hospitalisations with acute upper respiratory infections (ICD-10-AM: J00–J06), asthma and wheeze (J45, J46, R06.2), acute lower respiratory infections – including acute bronchitis (J20), acute bronchiolitis (J21), pneumonia (J12–J16, J18, J10.0, J11.0) – and bronchiectasis (J47), or influenza (J09–J11) as the primary diagnosis.

Data on diagnosed asthma were sourced from the New Zealand Health Survey, based on the prevalence of asthma diagnosed by a doctor among children aged 2 to 14 years and currently using inhalers, medicine, tablets, pills, or other medication.^{10,16}

National data for respiratory conditions are limited. Symptoms, triggers, diagnoses and treatment of respiratory conditions like asthma and wheeze may differ for individuals. Currently, data are not available for children seen by primary care services (such as in general practice or in nurse-led school clinics) and limited data are available on dispensed treatment. Future reports will consider inclusion of other sources, such as visits to the emergency department lasting less than 3 hours and pharmacy-dispensed treatments.

REFERENCES

1. Australian Institute of Health and Welfare. Australia's health 2018. Canberra: AIHW; 2018. Available from: <https://www.aihw.gov.au/reports/australias-health/australias-health-2018>
2. Australian Institute of Health and Welfare. Australian burden of disease study: Impact and causes of illness and death in Australia 2015. Canberra: AIHW; 2019. Available from: <https://www.aihw.gov.au/reports/burden-of-disease/burden-of-disease-study-illness-death-2015>
3. Telfar Barnard L, Zhang J. The impact of respiratory disease in New Zealand: 2018 update. Asthma and Respiratory Foundation NZ and University of Otago; 2018. p. pp156.
4. World Health Organization. Asthma fact sheet 2017 [updated 31 August 2017]. Geneva: WHO; 2017. Available from: <http://www.who.int/news-room/fact-sheets/detail/asthma>.
5. Asthma and Respiratory Foundation of New Zealand. Te hā ora (the breath of life): National respiratory strategy. Wellington: The Asthma Foundation; 2015. Available from: <https://www.asthmafoundation.org.nz/our-work/advocacy/national-respiratory-strategy>
6. World Health Organization. Chronic respiratory diseases Geneva: WHO; 2017 [updated 31 August 2017]. Available from: <https://www.who.int/respiratory/en/>.
7. Ingham T, Keall M, Jones B, Aldridge DRT, Dowell AC, Davies C, et al. Damp mouldy housing and early childhood hospital admissions for acute respiratory infection: A case control study. *Thorax*. 2019;74(9):849-57. 10.1136/thoraxjnl-2018-212979
8. Telfar Barnard L, Zhang J. The impact of respiratory disease in New Zealand: 2016 update. Wellington: The Asthma and Respiratory Foundation NZ; 2016. Available from: <https://www.asthmafoundation.org.nz/research/the-impact-of-respiratory-disease-in-new-zealand-2014-update>.
9. Tin Tin S, Woodward A, Saraf R, Berry S, Atatoa Carr P, Morton SMB, et al. Internal living environment and respiratory disease in children: Findings from the Growing Up in New Zealand longitudinal child cohort study. *Environmental Health*. 2016;15(1):120. Doi: 10.1186/s12940-016-0207-z
10. NZ Ministry of Health. Annual data explorer 2018/19: New Zealand Health Survey [data file]. Wellington: MoH; 2019 Available from: <https://minhealthnz.shinyapps.io/nz-health-survey-2018-19-annual-data-explorer/>
11. Duncanson M, Oben G, Adams J, Richardson G, Wicken A, Pierson M. Health and wellbeing of under-15 year-olds in New Zealand 2018. Dunedin: New Zealand Child and Youth Epidemiology Service, University of Otago; 2019. Available at: <https://www.otago.ac.nz/nzcyes>
12. Duncanson M, Richardson G, Oben G, Wicken A, Adams J. Child Poverty Monitor 2019: Technical report. Dunedin: New Zealand Child and Youth Epidemiology Service, University of Otago; 2019. Report No.: 2357-2078. Available at: <https://nzchildren.co.nz>
13. Australian Institute of Health and Welfare. Asthma. Canberra: AIHW; 2019. Available from: <https://www.aihw.gov.au/reports/chronic-respiratory-conditions/asthma>
14. Gillies TD, Tomlin AM, Dovey SM, Tilyard MW. Ethnic disparities in asthma treatment and outcomes in children aged under 15 years in New Zealand: Analysis of national databases. *Primary Care Respiratory Journal*. 2013;22:312. 10.4104/pcrj.2013.00068
15. NZ Ministry of Health. National Minimum Dataset (hospital events). Wellington; MoH; 2019. [updated 29 May 2019]. Available from: <https://www.health.govt.nz/nz-health-statistics/national-collections-and-surveys/collections/national-minimum-dataset-hospital-events>.
16. NZ Ministry of Health. Methodology report 2018/19: New Zealand Health Survey. Wellington: Ministry of Health; 2019. Available from: <https://www.health.govt.nz/nz-health-statistics/national-collections-and-surveys/surveys/new-zealand-health-survey>

CHAPTER 4: SKIN INFECTIONS

KEY FINDINGS

- 'Cellulitis' and 'cutaneous abscesses, furuncles and carbuncles' are the skin infections most likely to cause hospitalisation for children.
- Rates of hospitalisation for serious skin infections are highest in Pasifika children, Māori children, children younger than 5 years, and children living in areas with socioeconomic deprivation.

WHY PRIORITISE SKIN INFECTIONS IN CHILDREN?

Skin infections are very common in children and can be caused by bacteria, fungi, viruses and parasites.¹ Aotearoa NZ has one of the highest rates of childhood skin infections among resource-rich countries.²

Most skin infections can be effectively managed in primary care if detected and treated early,³ but serious skin infections need treatment in hospital. Hospitalisation of a child with a skin infection may involve intravenous antibiotics to treat extensive cellulitis, or surgical intervention to drain a large abscess or deal with a complex wound. Serious skin infections can lead to sepsis or be complicated by the presence of other serious illnesses.^{4,5}

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

GPs and other primary-care providers are estimated to treat 14 cases of skin infections in the community for every one hospitalisation for a skin infection.⁶ Skin infections make up nearly 4% of hospitalisations for children.⁷ The highest rate of hospitalisations for skin infections is seen in 1-year-olds. The main causes for hospitalisation due to skin infection were cellulitis, cutaneous abscesses, furuncles, and carbuncles (boils and blocked pores).⁷

Latest data: In 2019, nearly 3,000 children were treated in hospital for serious skin infections — a rate of 3.2 hospitalisations per 1,000 children. Hospitalisation rates were highest for those younger than 5 years (4.5 hospitalisations per 1,000).

Trend: Since 2000, the rate of hospitalisations for children with skin infections gradually increased until 2011. Since then, rates have generally declined, most notably for children younger than 5 years (Figure 4.1).

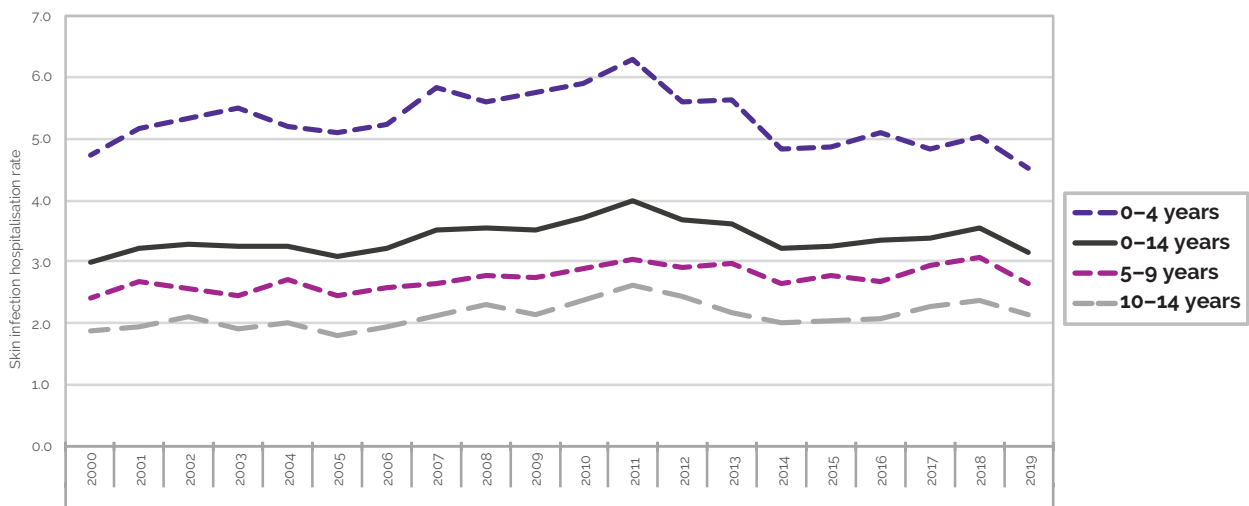


Figure 4.1: Trends in hospitalisations of children for skin infections by age, Aotearoa NZ, 2000–19. Source: NMDS and NZCYES estimated resident population.

Latest data: Figure 4.2 shows that from 2015 to 2019, the most frequent cause of hospitalisation for skin infections was recorded as 'cellulitis', with little variation by age.

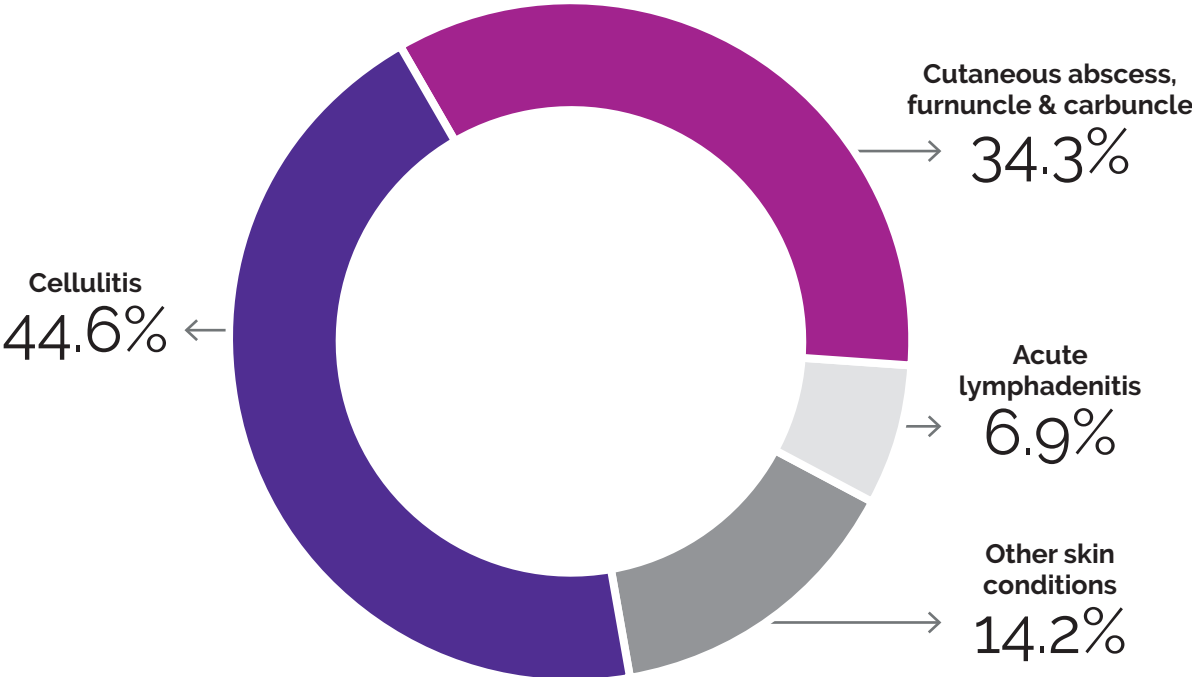


Figure 4.2: Causes of hospitalisation due to skin infections in children, Aotearoa NZ, 2015-19. Source: NMDS.

INEQUALITIES IN SKIN HEALTH FOR CHILDREN IN AOTEAROA NZ

Rates of skin infection differ widely in children from different ethnic and socioeconomic groups. Rates of skin infections were significantly higher for Māori than for other children, in both the data for primary care consultations and hospitalisations.⁸

Pasifika and Māori children, as well as children living in areas with more socioeconomic deprivation, are at higher risk of being hospitalised for skin infections than other children.⁸ Figure 4.3 shows the proportion of hospitalisations that could potentially be reduced if inequalities were eliminated. For instance, during 2015–2019, if Pasifika children had the same low rate of hospitalisation for skin infections as children of Asian or Indian ethnicities (reference group), their rate of hospitalisation would have decreased by 83%.

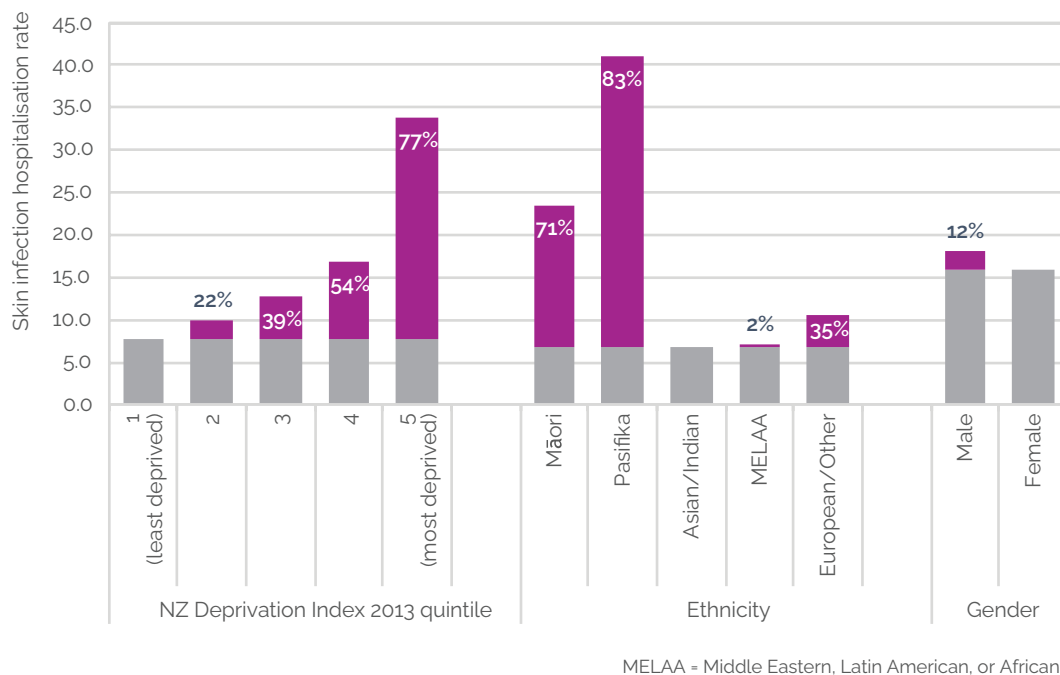


Figure 4.3: Potential reduction (attributable fraction) in hospitalisation rate for skin infections in children older than 1 year by demographic factors, Aotearoa NZ 2015–19.

Source: NMDS and NZCYES estimated resident population.

Research has shown that deprivation is linked to skin infections through factors such as affordability of hot water, electricity, and machines for washing and drying clothes; access to medical care; adequacy of nutrition; and crowded housing conditions.² Since 2000, rates of Pasifika children hospitalised for skin infections have risen relative to other children (Figure 4.4), as have rates for children living in areas with the highest deprivation scores (Figure 4.5).

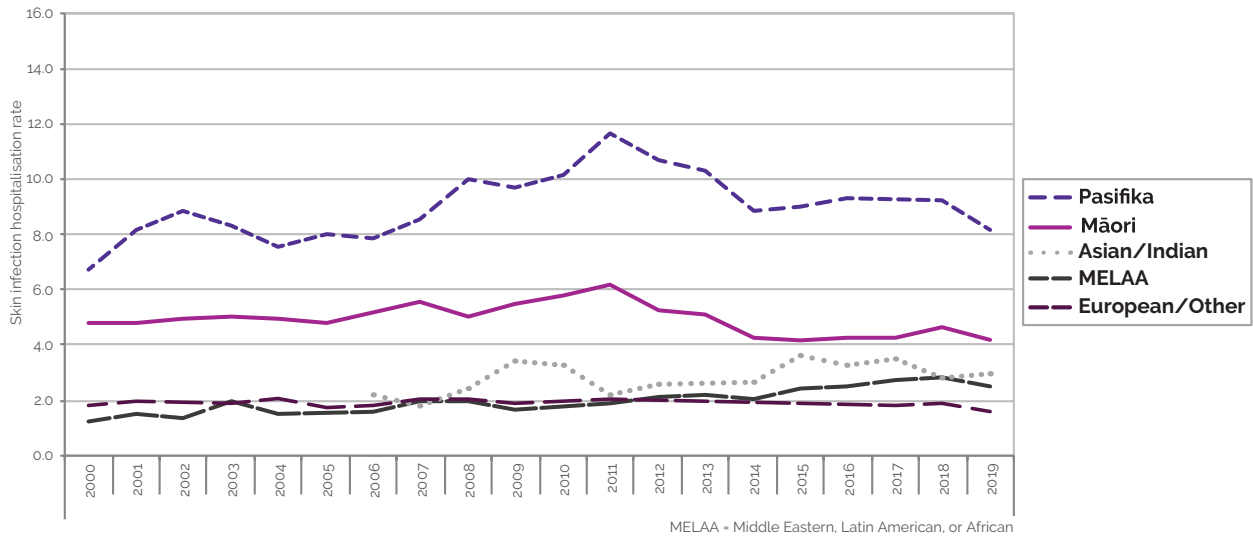


Figure 4.4: Trends in rates of hospitalisations for serious skin infections by ethnicity, Aotearoa NZ 2000–19. Source: NMDS and NZCYES estimated resident population.

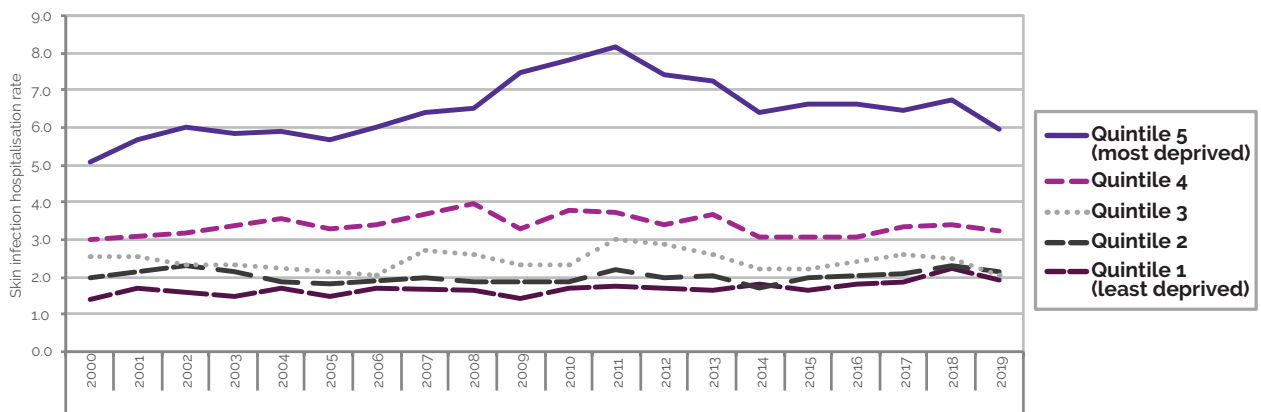


Figure 4.5: Trends in rates of hospitalisations for serious skin infections by deprivation quintile, Aotearoa NZ, 2000–19. Source: NMDS and NZCYES estimated resident population.

DATA ON SKIN INFECTIONS

The rate of children treated in hospital for serious skin infections is taken from the NMDS.⁹ Hospitalisations due to (serious) skin infection were identified from diagnostic codes for cause of hospital attendance (between 2000 and 2019). These data are limited to acute and arranged admissions to hospital. Definitions used for identifying hospitalisations for children were: Acute and arranged (semi-acute) hospitalisations with 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) as the primary diagnosis.

National data for skin infections are limited. No data are available for children seen by primary care services (such as in general practice or in nurse-led school clinics). Future reports may include other sources, such as visits to the emergency department lasting less than 3 hours or pharmacy-dispensed treatments.

REFERENCES

1. Clebak KT, Malone MA. Skin infections. Primary care. 2018;45(3):433-54. Available from: <http://dx.doi.org/10.1016/j.pop.2018.05.004>
2. White C, Reid S, Damiris V, Percy K. Health literacy and the prevention and management of skin infections. 2013. Available from: [https://www.moh.govt.nz/notebook/nbbooks.nsf/O/A3450A1425F82CC6CC257C2800768838/\\$file/Report-Skin-infections.pdf](https://www.moh.govt.nz/notebook/nbbooks.nsf/O/A3450A1425F82CC6CC257C2800768838/$file/Report-Skin-infections.pdf)
3. Regional Public Health. Healthy Skin in Greater Wellington. Protocols for the management of skin infections in children and young people, in community and primary health care settings, Wellington sub-region. Wellington: Regional Public Health, Hutt Valley DHB, Wairarapa DHB and Capital & Coast DHB; 2012. Available from: <http://www.rph.org.nz/public-health-topics/skin-infections/healthy-skin-in-the-greater-wellington-region/skin-health-protocols.pdf>
4. Leversha A, Naylor D. Starship clinical guidelines: Cellulitis. Auckland: Starship Child Health; 2018 [14 May 2018]. Available from: <https://www.starship.org.nz/for-health-professionals/starship-clinical-guidelines/c/cellulitis/>
5. Sartelli M, Malangoni MA, May AK, Viale P, Kao LS, Catena F, et al. World Society of Emergency Surgery (WSES): Guidelines for management of skin and soft tissue infections. World Journal of Emergency Surgery. 2014;9(1):57. 10.1186/1749-7922-9-57
6. O'Sullivan C, Baker MG. Skin infections in children in a New Zealand primary care setting: Exploring beneath the tip of the iceberg. New Zealand Medical Journal. 2012;125 (1351). Available from: <https://www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2012/vol-125-no-1351/article-osullivan3>
7. Duncanson M, Oben G, Adams J, Richardson G, Wicken A, Pierson M. Health and wellbeing of under-15 year olds in New Zealand 2018. Dunedin: New Zealand Child and Youth Epidemiology Service, University of Otago; 2019. <https://www.otago.ac.nz/nzcyes>
8. O'Sullivan CE, Baker MG, Zhang J. Increasing hospitalizations for serious skin infections in New Zealand children, 1990–2007. Epidemiology and Infection. 2011;139(11):1794-804. Doi: 10.1017/S0950268810002761
9. NZ Ministry of Health. National Minimum Dataset (hospital events) Data Dictionary. 7.9 ed. Wellington: Ministry of Health; 2018.

RECOMMENDATIONS TO IMPROVE THE STATE OF CHILD HEALTH IN AOTEAROA NZ

This exercise has revealed that from their earliest years, children in Aotearoa NZ experience a significant burden of dental disease, respiratory conditions, and skin infections. This snapshot of the state of child health in these areas should galvanise urgent attention and action.

The available data highlight large and persistent inequalities in oral, respiratory, and skin health for different ethnic groups – and particularly for Māori children and Pasifika children. For dental disease, rates in Māori and Pasifika children are approximately double those of “European/Other” children; for respiratory conditions and skin infections, rates of serious disease requiring hospitalisation are three or even four times greater. This report also confirms the substantial negative impact of deprivation across all three areas of health.

Cure Kids, the Paediatric Society of New Zealand, the Royal Australasian College of Physicians, and the New Zealand Child and Youth Epidemiology Service at the University of Otago agree on the need to urgently prioritise equity in health outcomes for all children.¹ We support the introduction of the evidence-based policies set out in the Child and Youth Wellbeing Strategy and the Child Poverty Reduction Act, to address and monitor progress toward equity for all children. Not only is there an ethical imperative to create an environment where all our children can thrive, but delaying action is also likely to result in long-term economic costs for the country due to poor health.²

Compilation of this report has revealed some gaps in data collection and reporting. Planned initiatives like the national Health Information Platform (nHIP)³ and the Electronic Oral Health Record (EOHR)^{4,5} would fill some of these crucial information gaps, but others will require further work. Epidemiological data, and evaluations of service delivery will be particularly beneficial for oral health, and for primary care services, to enable evaluation and monitoring of access to care, prevention, and treatment.

We commit to continuing to produce this report, to expanding it, and to incorporating the voices of children in measures of the state of child health.⁶ We will also commission expert analysis of other priority health areas, such as infectious diseases, mental health and wellbeing, and infant and child mortality. We hope that this series of reports will inform advocacy on behalf of children, and will raise awareness of the burden of disease, and opportunities to improve the health of children.

Cure Kids, the Paediatric Society of New Zealand, the Royal Australasian College of Physicians, and the New Zealand Child and Youth Epidemiology Service agree on the importance of broad multidisciplinary collaboration to achieve the aim of improved child health. This will include social educational, healthcare, cultural, economic, and research initiatives, to promote health for children, including the three health conditions profiled in this report.

Research has demonstrated that rates of hospitalisation for common but severe dental, respiratory, and skin conditions can be reduced through early access to primary healthcare, and ongoing education for parents, children, and healthcare providers.⁷ Programmes have been developed to foster health literacy, and give families the education and tools to proactively manage and improve their own health and wellbeing⁸ including advice and information which is culturally appropriate and targeted to the

Continued over >

specific needs of communities in Aotearoa NZ. Strong research evidence supports investment in cost-effective preventive strategies at the national level to reduce risk factors associated with housing conditions,⁹ limit tooth decay,^{10,13} reduce and replace unhealthy foods and drinks with nutritious choices,^{1,12,13} enable nurse-led school-based clinics and other child-centred services to address skin health,¹⁴ and to integrate dental services within the health system to improve oral health.^{3-5,15}

However, many research questions are still unanswered – for example, the underlying causes of conditions like asthma,¹⁷ or the potential role of Group A streptococcal skin infections in rheumatic heart disease.¹⁸ Improving understanding of health, from the population level to the molecular level, should lead to new tools, tests, and treatments to prevent, diagnose, and manage disease. Clinical and translational research to evaluate these scientific discoveries and develop useful healthcare interventions should also happen in the specific context of Aotearoa NZ, rather than overseas. Health services research will also be vital, to understand the potential effects on children as our health sector adopts a population-health approach.¹⁹ This will require significant and coordinated investments in health research, from government and from a range of other research funders, including iwi, community funders, charities, and private-sector companies. Researchers will need to collaborate with community providers, public health officials, healthcare professionals in both primary and secondary care, and with young people themselves.

We believe that creating a dynamic environment within the health system, in which data collection, medical and scientific studies, translational research, and iterative improvement of services will raise the standard of care at the same time as they generate evidence. Achieving improvement in the health of our children will require new data to inform policy and practice. This report has summarised the available data and scoped some of the gaps. We hope that this inaugural effort will help to signpost the evidence and information which will be needed to safeguard the health of our children – our most valuable national resource.

REFERENCES

1. Royal Australasian College of Physicians. Make it the norm. Wellington: RACP; 2020. Available from: <https://www.racp.edu.au/advocacy/make-it-the-norm>
2. Jatrana S, Crampton P. Do financial barriers to access to primary health care increase the risk of poor health? Longitudinal evidence from New Zealand. *Social Science & Medicine*. 2020;113255. doi: 10.1016/j.socscimed.2020.113255
3. Health Informatics New Zealand. nHIP delayed due to covid-19. In: McBeth R, editor. *eHealthNewsnz: HINZ*; 2020.
4. Ministry of Health. Communicable disease control manual 2012. Wellington: Ministry of Health; 2012. Report No.: 978-0-478-36622-8. Available from: <http://www.health.govt.nz/publication/communicable-disease-control-manual-2012>
5. TAS. Electronic oral health record programme updated 18 March 2020. Available from: <https://tas.health.nz/dhb-programmes-and-contracts/oral-health-programme/electronic-oral-health-record-programme/>
6. Ministry of Youth Development. Youth plan 2020-2022: Turning voice into action – rebuilding and recovering. Wellington: Ministry of Youth Development – Te Manatū Whakahiato Taiohi; 2020.
7. British Thoracic Society, Scottish Intercollegiate Guidelines Network. British guideline on the management of asthma: A national clinical guideline. London, Edinburgh: British Thoracic Society, Scottish Intercollegiate Guidelines Network; 2014. Available from: <https://www.brit-thoracic.org.uk/document-library/clinical-information/asthma/btssign-asthma-guideline-2014/>
8. Adams J. Making health easier: Reducing inequalities in child health through addressing low health literacy. In: Duncanson M, Oben G, Adams J, Wicken A, Morris S, Richardson G, et al., editors. *Health and wellbeing of under-five year olds in New Zealand 2017*. Dunedin: New Zealand Child and Youth Epidemiology Service, University of Otago; 2019.
9. NZ Ministry of Health. Healthy homes initiative 2020 updated 01 September 2020. Available from: <https://www.health.govt.nz/our-work/preventative-health-wellness/healthy-homes-initiative>
10. Broadbent JM. Invest in prevention to improve child oral health in the long-term. *The New Zealand Medical Journal* 2020;133(1518):7-9.
11. NZ Ministry of Health. Proposed legislative changes: Decision making on the fluoridation of drinking water supplies. Wellington: New Zealand Ministry of Health; 2016. Available at: <http://www.health.govt.nz/our-work/preventative-health-wellness/fluoride-and-oral-health/water-fluoridation/proposed-legislative-changes-decision-making-fluoridation-drinking-water-supplies>
12. Thornley S, Bach K, Bird A, Farrar R, Bronte S, Turton B, et al. What factors are associated with early childhood dental caries? A longitudinal study of the Growing up in New Zealand cohort. *International Journal of Paediatric Dentistry*. Doi: 10.1111/ipd.12686
13. Beckett D, Meldrum A. Factors that influence inequity of oral health in New Zealand and what we can do about them. 2019. In: *Health and wellbeing of under-five year olds in New Zealand* [Internet]. Dunedin: New Zealand Child and Youth Epidemiology Service, University of Otago; [121-38].
14. Anderson P, King J, Moss M, Light P, McKee T, Farrell E, et al. Nurse-led school-based clinics for rheumatic fever prevention and skin infection management: Evaluation of mana kidz programme in Counties Manukau. *New Zealand Medical Journal* 2016;129(1428):36-45.
15. Crampton P. The ongoing evolution of capitation funding for primary care: The December 2018 PHO capitation funding changes for community services card holders. *N Z Med J*. 2019;132(1498):69-78.
16. Jatrana S, Crampton P, Filoche S. The case for integrating oral health into primary health care. *The New Zealand Medical Journal* 2009;122(1301).
17. Asher I, McNamara D, Davies C, Demetriou T, Fleming T, Harwood M, et al. Asthma and respiratory foundation. NZ child and adolescent asthma guidelines: A quick reference guide. *NZ Med J*. 2017;130(1466):10-33. Available from: <https://www.nzasthmaguidelines.co.nz/Childguidelines-654716.html>
18. 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; 19: 633. doi: 10.1186/s12879-019-4126-9
19. Health and Disability System Review. Final Report –Pūrongo Whakamutunga. Wellington: HDSR; 2020. Available from: www.systemreview.health.govt.nz/final-report

GLOSSARY OF KEY TERMS

- Acute admission to hospital:** An unplanned admission on the day of presentation at the admitting healthcare facility.
- Arranged admission to hospital:** A planned admission to hospital less than 7 days after the decision that hospitalisation is necessary.
- Asthma:** A common lung condition in which airways become inflamed and narrow. The symptoms include difficulty breathing, chest pain, cough and wheezing.
- Bronchiectasis:** A long-term lung condition where damaged airways cause mucus build-up and repeated, serious lung infections. The main symptom is a wet, chesty cough.
- Carbuncle:** A cluster of boils that develop under the skin. Carbuncles can cause severe infections 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.
- Chronic obstructive pulmonary disease:** A group of lung diseases that damage the lungs and block airflow. Symptoms include shortness of breath, wheezing or a chronic cough.
- Cutaneous abscess:** A cavity filled with pus, on any skin surface. Symptoms and signs are a hot, red, swollen and painful lump. The abscess contains white blood cells, dead tissue and bacteria. Treatment is incision and drainage.
- Deciduous teeth:** Primary or 'baby' teeth that emerge during infancy. A child usually has 20 deciduous teeth.
- Dental caries:** A disease process that can lead to cavities in the tooth structure that compromise both the structure and the health of the tooth, commonly known as tooth decay.
- Furuncle:** Also known as a boil; a painful bacterial infection that forms around a hair follicle and contains pus.
- Non-communicable diseases:** Chronic diseases that cannot pass from one person to another. They are often long-term conditions which significantly reduce quality of life.
- Permanent teeth:** Secondary or 'adult' teeth that start to emerge at around 6 years of age. A child usually has 32 permanent teeth.
- Teeth scores (dmft and DMFT):** Number of teeth that are decayed (d), missing due to caries (m), or filled because of caries (f); 'dmft' refers to deciduous teeth, and 'DMFT' to permanent teeth.