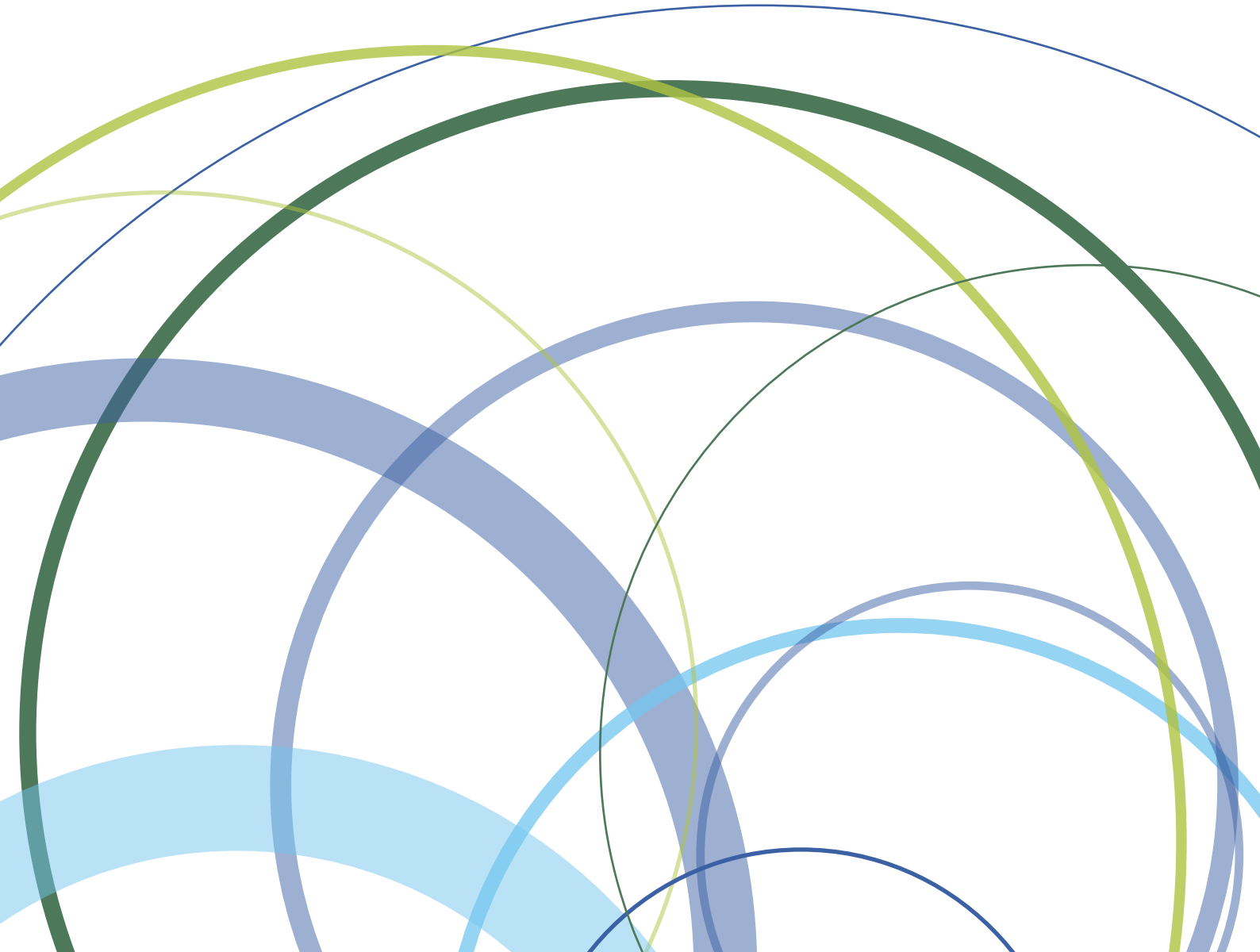
Health Quality & Safety Commission New Zealand
Kupu Taurangi Hauora o Aotearoa

"… Unuhia i te rito o te harakeke …"
"… taken away too early …"

Child and Youth Mortality Review Committee

15th data report
Te pūrongo raraunga 15

2015–19



Haere rā e hika, koutou ko ō mātua
Unuhia i te rito o te harakeke
Ka tū i te aroakapa
Aku nui, aku rahi e
Aku whakatamarahi ki te rangi
Waiho te iwi e
Māna e mae noa ...

Farewell, oh child, to the land of your ancestors
Plucked like the simple shoot of the flax frond
I can still see you in the haka
My beautiful, loved child of whom I boasted to the skies
You leave behind your people wailing, bereft.

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- Health Quality & Safety Commission's mortality review committee secretariat for reviewing and supporting the publication of the report.

Te kupu whakataki a te manukura | Chairs' introduction

He puāwaitanga harakeke, he rito whakakīnga whāruarua

Kei aku rangatira, e ngā hau e whā e mihi ana ki a koutou katoa.

Welcome to the 15th data report of the Child and Youth Mortality Review Committee (the CYMRC).

For the first time the CYMRC delivers its data report with the guidance of two co-chairs as we embrace shared leadership and our Te Tiriti o Waitangi partnership.

This report is timely and will inform the health reforms as well as build a greater understanding of the inequitable outcomes experienced in Aotearoa/New Zealand by pēpi, tamariki and rangatahi, and the need to urgently address them.

Although this is a data report, it represents the lives of the many pēpi, tamariki and rangatahi who have died far too young. Our heart goes out to everyone who has experienced this heartbreak and bears the grief of loving and losing a young one. Life changing forever.

In Aotearoa/New Zealand in the period 2015–19, 2,666 pēpi, tamariki and rangatahi aged from 28 days to 24 years died. The most common causes of these deaths were suicide, transport incidents, cancers and sudden unexpected death in infancy (SUDI).

Knowing that many of these deaths could be prevented drives home the importance and urgency of doing more to reduce child and youth mortality.

This data report shows that while strong progress was made in reducing mortality rates among pēpi, tamariki and rangatahi in the past, momentum has been lost and mortality rates have been stagnant over the past five years. We find this unacceptable.

Furthermore, mortality is not evenly distributed in the population, with higher rates among Māori and Pacific pēpi, tamariki and rangatahi compared with babies, children and young people in other ethnic groups. These differences in life outcomes, which unfairly privilege some populations over others, are unacceptable, fully avoidable and unjust. We must challenge the persistent and systemic bias within our society that produces and tolerates unfair health outcomes.

These inequitable outcomes are why we urgently call for more action to protect our pēpi, tamariki and rangatahi from the things that can endanger their lives and to eliminate the poverty and deprivation that impact disproportionately on the health of Māori and Pacific pēpi, tamariki and rangatahi. We call on the decision-makers and the people of Aotearoa/New Zealand to end tolerance for the suffering represented in the pages of this report.

Persistent inequity and entrenched deprivation and poverty strongly influence mortality rates, and these effects represent a call to action. Action that will involve greater attention, commitment and investment to make every young life matter. Removing structural bias and systemic racism to disrupt adverse outcomes for pēpi, tamariki and rangatahi is a change for good. Both government and society must address inequity in health, education and employment and in providing access to adequate housing. This is essential to keep our pēpi, tamariki and rangatahi safe, healthy, alive and thriving.

The implementation of the health reforms brings the CYMRC renewed optimism. We can look forward to doing things differently: putting whānau wellbeing at the centre of our response to inequities; addressing the needs of whānau; and giving whānau the security they need to raise their

pēpi, tamariki and rangatahi to flourish in Aotearoa/New Zealand. Together, we can improve the system to reduce the inequitable outcomes for those who carry the greatest burden of mortality.

The CYMRC looks forward to discussing the data in this report with those with the power to act and to make and influence policy, including those involved with the health reforms, to help regain the previous momentum towards reducing child and youth mortality.

We are grateful to our CYMRC colleagues – those who contribute expertise on the national committee, the district health boards and agencies participating in the local review groups that enrich practice and system-wide quality improvement for pēpi, tamariki and rangatahi within local communities. We also thank and acknowledge the hard-working Dr Gabrielle McDonald and her team in the New Zealand Mortality Review Data Group at the University of Otago for analysing the data and writing this report. We thank Shanthi Ameratunga for her insightful peer review. Lastly, we thank the mortality review committee secretariat at the Health Quality & Safety Commission for support and coordinating other aspects of report production.

Ngā mihi nui,

Dr Alayne Mikahere-Hall Dr Matthew Reid

Child and Youth Mortality Review Committee co-chairs

Whakarāpopototanga matua | Executive summary

This report fulfils part of the requirement, as defined in the terms of reference of the Child and Youth Mortality Review Committee (the CYMRC), to report on deaths in the Committee's scope – children and young people aged 28 days to 24 years.

Mortality is multi-causal. Usually, no one single factor causes a death. The data in this report and in previous reports of the CYMRC shows the persistence of inequitable disparities for children who experience high levels of deprivation and economic hardship. Māori and Pacific children are more likely to be living with the harsh realities of deprivation and poverty and these are serious risk factors that contribute to higher rates of preventable deaths in tamariki Māori and Pacific children. The 15th data report considers equity as a key priority to protect tamariki Māori and Pacific children from preventable mortality. A system-wide quality improvement strategy is required to reduce inequities and prevent avoidable deaths.

This report series has been reporting on data collected from 2002. Over this time, some improvements have occurred. These are to be celebrated. The more detailed recommendations relating to specific topics are presented in other publications, though over recent years these have not gained much traction. However, there remain people in our society who are not given an equal chance to life and health. It is a common finding from our local review groups that many children and young people do not have the same opportunities, protections and safeguards as other children and young people. Tamariki and rangatahi Māori, children and young people from ethnic minorities (that is, those who are not of European descent) and those who live in areas of high deprivation usually have higher mortality rates. These children and young people live with, or die from, the burdens of living in an unequal society, and receive few of the benefits.

Te Tiriti o Waitangi underlies the health sector's obligations to Māori, and Māori rights to monitor the Crown to ensure that it meets these responsibilities and that equitable outcomes are achieved for Māori in the health sector. Treaty-based Māori rights are augmented by the broader rights of children and young people to equitable outcomes regardless of their ethnicity. A human rights-based approach to premature mortality reduction requires all those involved to reduce mortality in marginalised children and young people, and to 'take all appropriate measures to ensure equality and protect children against discrimination' (Office of the United Nations High Commissioner for Human Rights 2014).

This report describes mortality in children and young people, mostly for the years 2015–19. In total, 573 children and young people died in 2019. Medical conditions were the leading broad category of death, followed by injury (mainly transport related). The next most common category was suicide.

By individual cause of death over the five years from 2015–19, most deaths were from suicide (n=655), followed by transport incidents (n=498), cancers (n=218) and sudden unexpected death in infancy (SUDI) (n=198).

Mortality is not evenly distributed in the population: rates are higher in Māori and Pacific children and young people than in other ethnic groups. Mortality rates are also highest in areas of high socioeconomic deprivation, with those in the New Zealand Deprivation Index decile 10 (the group with the highest deprivation) three times more likely to die than those in decile 1 (the group with the lowest deprivation). The combined effect of these findings is that Māori and Pacific communities have a large burden of mortality. The main reasons for this are that, compared with the general population, their overall mortality rates are higher and a higher proportion of Māori and Pacific children and young people live in areas of high deprivation due to the inequitable distribution of

resources in Aotearoa/New Zealand, including access to appropriate education, employment, income, housing and health care.

Mortality in tamariki and rangatahi Māori

The five years from 2015–19 saw 1,012 deaths in tamariki and rangatahi Māori. The leading categories of death were medical conditions (31.4 percent of deaths) followed by injury (29.2 percent). The most common medical condition causing death was cancer.

Large inequities remain in mortality rates for tamariki and rangatahi Māori, compared with non-Māori non-Pacific children and young people. This inequity was most notable in the rate ratios comparing Māori with non-Māori non-Pacific for SUDI at 6.18 (95 percent confidence interval [CI] 4.29–8.88) and suicide at 2.48 (95 percent CI 2.12–2.91). The impact of deprivation on Māori mortality is disproportionate: in the most deprived areas of Aotearoa/New Zealand, Māori are nearly twice as likely to die as non-Māori non-Pacific living in similar areas (rate ratio 1.80, 95 percent CI 1.46–2.23). Significant progress is yet to be made in reducing both poverty and other structural influences on these inequities in mortality that are largely modifiable and preventable.

Mortality in Pacific children and young people

During 2015–19, 390 Pacific children and young people died. Nearly half of these deaths (44.9 percent) were due to medical conditions. The number of deaths in Pacific children and young people has fluctuated from year to year, indicating no clear overall trend of either an increase or a decrease. Marked inequities between Pacific and non-Pacific non-Māori children exist, in that overall Pacific infants are much more likely to die overall (rate ratio 3.82, 95 percent CI 2.98–4.89) and much more likely to die from SUDI (rate ratio 8.57, 95 percent CI 5.74–12.79). For every age group, excluding those aged five to nine years, Pacific children and young people were more likely to die overall compared with non-Pacific non-Māori children and young people, and were more likely to die from medical conditions.

SUDI

During the 18 years from 2002–19, 841 deaths from SUDI (sudden unexpected death in infants aged less than 12 months) occurred. Of these deaths, 45 occurred in 2019. An analysis by broad ethnic categories shows clear inequities: pēpi Māori have a higher SUDI rate than babies in non-Māori non-Pacific ethnic categories. Further, after a period when some gains were being made, the SUDI rate for Māori infants appears to have reached a plateau. The SUDI mortality rate for Pacific infants fluctuates somewhat, but over the period 2002–19 it did not have a statistically significant increase.

Suicide

During the 2002–19 period, 2,177 deaths were due to suicide. In 2019, suicide was the cause of death for 144 children and young people aged 10–24 years. While at younger ages (less than 14 years) the number of suicide deaths did not differ between males and females, male deaths predominate overall, with a male to female ratio of 2.4. Overall, deaths peak at the age of 20 years and reduce after that. By broad ethnic group, deaths in Māori have an earlier (younger) onset. As with deaths from all causes overall, deaths due to suicide were more frequent in those living in high-

deprivation areas, as measured by New Zealand Deprivation Index deciles. This finding reflects how poverty and lack of access to a wide range of resources interact with mortality.

Transport

From 2002–19, transport was the cause of 2,330 deaths in children and young people aged 28 days to 24 years. Of these, 498 deaths occurred in the most recent five-year period, from 2015–19. While the number of deaths has been consistent over the past five-year period, numbers have fallen substantially since 2002 among the groups aged 15–19 years and 20–24 years.

Of all transport deaths, most (64.5 percent) were car occupants, 12.2 percent were pedestrians and 7.4 percent were motorcyclists. Pedestrian deaths occurred in all ages, with peaks in those aged one to four and 15–24 years. The number of car occupant deaths peaked in those aged 18 years for both males and females. The highest mortality rates for cyclists were in those aged 10–14 years. Across all road user types, deaths in males outnumbered those in females by nearly three times. Marked disparities were evident by prioritised ethnic category, particularly in car occupant and pedestrian deaths, where Māori had significantly higher rates than non-Māori non-Pacific children and young people.

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Ngā whakapotonga | Abbreviations

BDM	Births, Deaths and Marriages
CI	confidence interval
CYMRC	Child and Youth Mortality Review Committee
DHB	district health board
LCYMRG	local child and youth mortality review group
MELAA	Middle Eastern, Latin American and African
NZMRDG	New Zealand Mortality Review Data Group
SUD	sudden unexpected death
SUDI	sudden unexpected death in infancy

Te tukanga | Method

Purpose of this report

The Child and Youth Mortality Review Committee (the CYMRC) is a mortality review committee, appointed under section 59E of the New Zealand Public Health and Disability Act 2000 (the Act) by the Health Quality & Safety Commission (the Commission). The CYMRC's terms of reference include to: 'review and report to the Commission on deaths that are within the Committee's scope, with a view to reducing deaths and to supporting continuous quality improvement'. This report fulfils part of the requirement to report on deaths in the CYMRC's scope – children and young people aged 28 days to 24 years.

The purpose of undertaking mortality reviews is to understand how and why children and young people have died in order to identify systems issues that could be modified to prevent future deaths and serious illness or injury.

Overview

The CYMRC was established in 2002. The review process has evolved since then, with local child and youth mortality review groups established over a number of years. Each district health board (DHB) region now has a local group.

Many people and organisations are involved in the review process, who provide information, review deaths, collate information, and analyse and review collated data. Two processes central to mortality review are: information-gathering and multidisciplinary review of individual deaths in the DHB region where the person lived; and national data collection and collation.

Case review and data collation involve the following steps.

1. Organisations provide information directly to the New Zealand Mortality Review Data Group (NZMRDG).
2. The information held centrally is available for use at local review meetings through DHB-appointed CYMRC local review group coordinators.
3. Following the review of each death, CYMRC coordinators add further information to the national database.
4. The NZMRDG collates and analyses information held in the national database for the CYMRC.
5. The CYMRC reviews the collated case information as well as locally identified issues, recommendations and actions. This information provides a detailed overview of local and national trends, which inform prevention strategies and support recommendations at both local and national levels.

Data collection

The NZMRDG collects, securely stores and links case information about all child and youth deaths from 1 January 2002 for the CYMRC. Information comes from a variety of sources, including the following.

1. Births, Deaths and Marriages (Department of Internal Affairs)
2. Ministry of Health
3. Oranga Tamariki[1]
4. Coroners
5. Coronial Services (Ministry of Justice)
6. Ministry of Education
7. Water Safety New Zealand
8. Ministry of Transport
9. Local child and youth mortality review groups

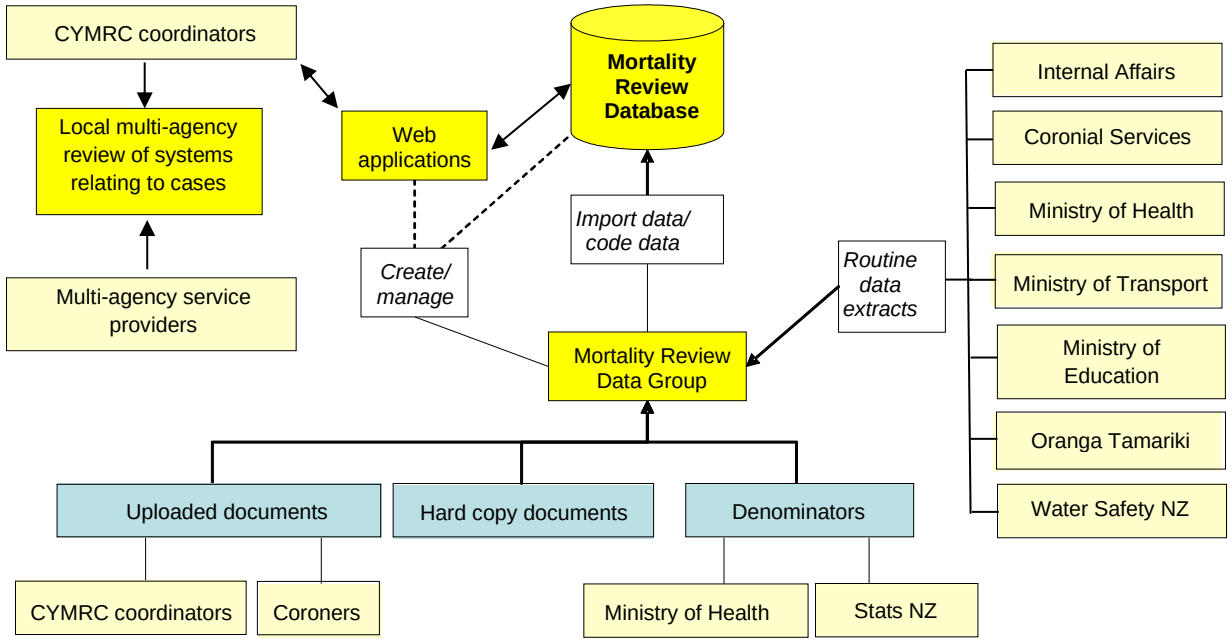
Information is provided in varying formats and sent at times and intervals that suit the data provider. A weekly extract from Birth, Deaths and Marriages is the primary source of notification of deaths. Organisations such as Water Safety New Zealand and the Ministries of Health and Transport routinely provide selected information on all relevant deaths. Starting in 2018, the Ministry of Education has also been contributing data. The CYMRC continues to consider other suitable data sources in addition to these and to liaise with other organisations.

Some source providers have changed data format or began providing information later than 2002. For example, Oranga Tamariki provides information for cases that it has had contact with from June 2006 onwards. However, in 2009 the age range of cases supplied to CYMRC expanded from infant and preschool to include deaths in children and young people up to 24 years of age. Most coroners have provided information on coronial cases since January 2003. The NZMRDG enters and codes all information from the disparate and sometimes conflicting data sources, in order to facilitate local review as well as national reporting.

Figure M1 outlines the sources of information and some of the processing of this information. The CYMRC local review group coordinator adds further details both before and after local review via the secure NZMRDG website. As well as directly entered data and coded data, the information system includes documents securely emailed by coronial offices, electronic format coronial case information (post 2010), uploaded documents and denominators (provided by Stats NZ Tatauranga Aotearoa (Stats NZ) and the Ministry of Health).

[1] Before 31 March 2017, this was Child, Youth and Family.

Figure M1: Flow of case information from sources to the Mortality Review Database



The NZMRDG identifies the National Health Index number, or other relevant identifying information, of the person for whom each item of information is received. It imports data into the Mortality Review Database and links the various sources of information that relate to each individual. Data is regularly cleaned to eliminate duplicate or incorrect records and to follow up on missing details, so records are complete and internally consistent.

When interpreting CYMRC data, note that it comes from a database that is constantly being updated. As well as details of new cases, new information and, at times, changing information for existing cases can be added. As a result, details can change from year to year, even for cases where the death occurred some years previously. This is particularly true of cases that require an inquest, because this process may sometimes not be completed until years after the death.

While this report includes deaths that occurred up until 31 December 2019, the 2019 data is the least complete of any year, for the above reasons. The incompleteness of the data is not randomly spread across all causes. Deaths referred to the coroner, such as unexpected deaths and some injury deaths, are less likely to have final information on cause of death available quickly. Therefore, information relating to deaths in 2019, in particular, needs to be interpreted with caution. This also means consecutive annual reports may have slightly different numbers in any one category. The most recent reports will be the most accurate.

Local review process

Deaths of children and young people are reviewed by the local child and youth mortality review group (LCYMRG) in the DHB in which the individual lived. The purpose of local review is to identify systems issues that can be modified to reduce the likelihood of future deaths.

Each LCYMRG has an appointed chair and coordinator, and members from different agencies including health, education, welfare, child protection, corrections, victim support and others. When the death of a child or young person aged between 28 days and 24 years occurs within a coordinator's region, the coordinator will access the secure database to gather initial information on the deceased. The coordinators also collect information from local organisations involved over the

life course of the child or young person, to create a shared understanding of the circumstances leading to their death. The coordinator will then initiate information requests to the various members of the LCYMRG, who each act as a representative of their particular organisation. Strict confidentiality requirements apply. Some of the new information gathered as part of the local review process is entered into the Mortality Review Database.

As official agents of the CYMRC, the LCYMRG members can access their organisation's records to identify and collect information that may be relevant to the review process. The members bring this information to the review meeting and provide relevant details, as needed, for the review. Reviews are focused on agency system responses over the life course of the individual. The local chair facilitates each review by bringing together all the relevant factors relating to a death.

Information shared in review meetings must remain confidential to that process. Issues identified in a meeting that require urgent action from participating agencies, such as aspects of professional competence or the safety of others, must be dealt with outside the review process using the normal interagency protocols and procedures. This means participants do not compromise the no-blame focus of the review process or the confidentiality agreement signed by all those involved in mortality review. The process is exempt from Official Information Act 1982 requirements, but complaints about procedures can be reported to and investigated by the Ombudsman.

A review group might meet several times before all the information has been gathered on a case. Once they have all the information, local members will consider relevant issues and where systems or service responses could be improved. They may make both local- and national-level recommendations. Local recommendations are delegated to the relevant member who can champion their organisation's practice or policy change, which may include community-based solutions. It is important for review groups to present the issues and recommendations in a way that does not assign blame but instead focuses on system changes that could prevent future deaths.

Once a local group has reviewed a death, the coordinator enters all the relevant data into the secure national database. In this way, issues, recommendations and follow-up actions are forwarded to the CYMRC.

The LCYMRG process allows high levels of detail about the context of a death. The process itself supports learning from cases to be acted on locally. Although only a proportion of deaths before 2009 have been reviewed, the increased coverage of the LCYMRGs allows for many more system improvements to address equity for children and young people.

Analysis and coding

Mortality data

The data used for this report is from the Mortality Review Database and was extracted on 5 November 2020. For the purposes of mortality review in Aotearoa/New Zealand, children and young people are defined as those aged from 28 days up to and including 24 years. In all tables, the year of death relates to the calendar year in which the individual died, rather than the year the death was registered. This is different from some official collections, which use the year the death is registered. Where neonatal deaths are included, these do not include stillbirths or terminations.

Male and female sex is used in this report, as these are the fields we receive from the Ministry of Health, and what is provided in the denominator set; we are not currently able to report on gender.

Cause of death

Previous reports used the broad categories of medical conditions, unintentional injury, intentional injury, SUDI/SUD and missing data. The intentional injury category included only deaths due to suicide and assault. Overall, and from the age of 10 years upwards, the vast majority of 'intentional' deaths were due to suicide. In response to feedback around the lack of similarity of these deaths and the potential to cause confusion, this category has been altered for this report. Assault deaths are now included in the 'injury' category and suicide is reported separately. Sudden unexpected death (SUD) is a category used to describe deaths that are similar to sudden unexpected death in infancy (SUDI) (see below), but that occur in children aged 12 to 23 months. Some international researchers use SUD as a category in the belief that these deaths are an extension of SUDI. However, given the low number of deaths (around 2 deaths per year over the past five years), we report these deaths using the International Classification of Diseases-10-Australian Modification (ICD-10-AM)[2] code groupings as we do for the older age groups, with the result that they are often categorised either as suffocation or as 'unexplained'. This report therefore uses the following categories to report deaths: medical conditions, injury, suicide, SUDI and missing data.

In response to requests for more detailed ICD-10-AM coding, the data received from the Ministry of Health was changed in 2008 to include its mortality coding. Cause of death is now assigned using the underlying cause of death from the Ministry of Health's Mortality Collection. This was backdated to include all cases in the database, not just those from 2008 onwards.

For deaths in infants less than one year of age, SUDI is assigned as the cause of death where any one of the following ICD-10-AM codes was listed as the underlying cause of death in the Mortality Collection:

- R95 Sudden infant death syndrome
- R96 Other sudden death, cause unknown
- R98 Unattended death
- R99 Other ill-defined and unspecified causes of mortality
- W75 Accidental suffocation and strangulation in bed
- W78 Inhalation of gastric contents
- W79 Inhalation and ingestion of food causing obstruction of respiratory tract.

The external causes of death, as presented in the cause of death tables, are arranged according to the International Collaborative Effort on Injury Statistics classification. This assigns ICD-10 groupings to various headings. The classification system in this report has been used since 2011 and is slightly different from the years before 2011; for this reason, data from some previous reports may not match exactly.

Ethnicity

Multiple sources of ethnicity data are available in the database. These are: Births, Deaths and Marriages (BDM); the Ministry of Health; coronial records; and the information entered by LCYMRG coordinators when reviewing a death. The ethnic group that is allocated comes from the most reliable source available for each case. The 'most reliable' source is determined by evidence of the quality and completeness of the above collections at a national level in Aotearoa/New Zealand. The ideal standards for collecting ethnicity data include the respondent identifying their own ethnicity and

[2] The ICD-10 classification is a global classification system used for classifying mortality and morbidity. This is the primary classification system used internationally. In official collections, Australia and New Zealand currently use an 'Australian Modification' of ICD-10, the ICD-10-AM.

allowing for ethnicity to change over time. Given these ideals, for infants, the order of preference is as follows: BDM birth certificate, BDM death certificate, Ministry of Health collections, coroner's file, and information entered by LCYMRG coordinators. For children and adolescents aged one year and older, the order of preference is: BDM death certificate, BDM birth certificate, Ministry of Health collections, coroner's file, and information entered by LCYMRG coordinators.

The main body of the report uses prioritised ethnic categories. Where an individual had multiple ethnic groups identified, we prioritised these following Ministry of Health protocols (Ministry of Health 2017). This gives priority to Māori, then Pacific, Asian, the Middle Eastern, Latin American and African group (MELAA), Other and finally European, and allocates a single prioritised ethnic group to each person for the purposes of analysis. Therefore, 'prioritised Māori' is the same as 'total Māori'. Using prioritised ethnic groupings is in keeping with standard health practice and enables the calculation of rates from population data. However, we recognise that the ethnic groups used are heterogeneous and much diversity exists within each group. Prioritising Māori ethnicity above others means some may not have their preferred ethnicity option.

The one exception to the above approach is the Pacific chapter, which uses a total response ethnicity classification. This means if an individual has a Pacific ethnic group as any one of their ethnicities, they will be included there. Under a prioritised system, if an individual is identified as being both Pacific and Māori, they would be counted as Māori. However, in the Pacific chapter, using a total response system, they will be included as Pacific.

DHB of residence

The DHB of residence is derived from the person's address as supplied from the coroner, police or Births, Deaths and Marriages. This is based on the individual's self-identified 'usual' place of residence and does not necessarily reflect their legal residential status.

Deprivation

This report uses the New Zealand Index of Deprivation to report on socioeconomic deprivation at the area level. For children and young people aged 1–24 years, we used NZDep2018. For infants, a large amount of NZDep2018 data was missing for 2015–18, so we used NZDep2013 for these years.

Statistics

The NZMRDG computed the data presented in this report from the Mortality Review Database. Percentages are expressed to one decimal point. In some cases, due to rounding, percentages do not sum to 100 exactly.

Rates in this report are presented as per 100,000 age-specific population for most age groups, except for infants less than one year of age, where rates are expressed as per 1,000 live births. Rates and confidence intervals (CI) are expressed to two decimal places. Rates were not calculated for when the numerator was less than three. Due to the differences in the way rates are calculated, and the different denominators used, variations may occur between the rates presented in this report and other published rates.

The denominators used in the main analyses are from two sources. The first is the number of live births in Aotearoa/New Zealand, as supplied by the Ministry of Health. Year is determined using the year of registration of birth, rather than the year of birth itself. The other denominator used is a derived estimated resident population. This is calculated for each year and is based on the Stats NZ

estimated resident population from census years 2006, 2013 and 2018. Linear extrapolation was undertaken to calculate the estimated resident population between census years. The denominator for the age group of one to four years was calculated using the above linear extrapolation methods to derive the population aged under four years. The number of live births from each year was subtracted from this total to compute the denominator for the age group of one to four years. While censuses in Aotearoa/New Zealand do not achieve complete population coverage, the 2018 census had lower response rates than previous years. In particular, response rates were low for Māori (68 percent), Pacific (65 percent) and Asian (82 percent) populations (all ages); the overall response rate for young people aged 15–29 years was also low (81 percent).[3] While every effort is made to present data as accurately as possible in this report, note that due to limitations of the denominator set, rates are estimates only.

Some figures in this document contain historical data dating back to 1980. The numerator for these deaths is as follows: we used CYMRC data for deaths aged 28 days to 24 years from 2002 onwards and Stats NZ data before 2002. For neonatal deaths (0–27 days), we used Perinatal and Maternal Mortality Review Committee data from 2007 onwards and Stats NZ data before 2007. The denominator used to calculate infant mortality rates was live births from Stats NZ (1980–2016). The denominators used to calculate mortality rates for children and young people aged 1–24 years were population estimates from Stats NZ (1980–2016). Stats NZ uses a historical de facto population for years before 1991 and, from 1991, the estimated resident population. The historical de facto population estimates are based on counts of all people present at a given time and do not account for those who are not usually resident, or who are usually resident but temporarily out of the country.[4] The estimated resident population takes into account residents who are temporarily overseas and makes an adjustment for net census undercount, as well as excluding visitors from overseas.[5]

To examine trends over time, we used simple linear regression, once testing for autocorrelation had confirmed this would be appropriate.

Numbers are suppressed in cells that have only one or two cases. In these instances, instead of a value, '<3' is entered in the cell.

The deaths of non-New Zealand residents are excluded from the main sections of the report because the denominator in the rate calculations (as above) excludes visitors from overseas. Data on this population is provided as a supplement, with rates not calculated (see Appendix 14: Overseas residents).

Notes on interpretation

The term 'statistical significance' in this report indicates a statistical test has provided sufficient evidence that the groups being compared are different (with a statistical significance level of 0.05, that is, the probability that the groups are the same is less than 5 percent).

[3] Jack M, Graziadei C. 2019. *Report of the Independent Review of New Zealand's 2018 Census*. Wellington: New Zealand Government. URL: https://www.stats.govt.nz/assets/Uploads/Report-of-the-Independent-Review-of-New-Zealands-2018-Census/independent-review-report.pdf (accessed 16 August 2021).

[4] Stats NZ Tatauranga Aotearoa. Historical de facto population estimates. URL: http://datainfoplus.stats.govt.nz/item/nz.govt.stats/bec27cc6-c9e2-4b7a-b1f4-cb5e096f91ad (accessed 30 November 2015).

[5] Stats NZ Tatauranga Aotearoa. Population concepts. URL: http://datainfoplus.stats.govt.nz/Item/nz.govt.stats/7751f101-7b2d-4e97-a487-3ac4126d22d4 (accessed 30 November 2015).

For figures, bars that have non-overlapping 95 percent confidence intervals can reasonably be considered to be statistically different. However, the converse is not necessarily true. Where confidence intervals do overlap, a statistical test of the rate ratio between the two factors in question has been undertaken. Where this indicates a statistically significant difference, a footnote reports on this.

1. Te tirohanga whānui ki ngā raraunga ā-motu mō Aotearoa | Aotearoa/New Zealand national data overview

This chapter provides an overview of mortality in children and young people by age, year and cause of death.

Key findings

- In 2019, there were 573 deaths in children and young people.
- Medical conditions were the leading broad category of death, followed by injury (mostly transport related).
- By individual cause of death during 2015–19, the most deaths were from suicide (n=655), followed by transport incidents (n=498), cancers (n=218) and sudden unexpected death in infancy (SUDI) (n=198).
- Mortality is not evenly distributed in the population, with rates higher in Māori and Pacific children and young people, compared with those in European and Other and Asian ethnic groups.
- Mortality rates were highest in areas of high deprivation: children and young people in the New Zealand Deprivation Index decile 10 were three times more likely to die than those in decile 1.

In Aotearoa/New Zealand, during the period 2015–19, 2,666 children and young people aged 28 days to 24 years died. Overall, the leading category of death was medical conditions (36.8 percent). This was followed by injury (30.6 percent) and suicide (24.6 percent) deaths. Sudden unexpected death in infancy (SUDI) accounted for 7.4 percent of deaths (**Table 1.1**).

The leading category of death changes with age. Medical conditions were the most common cause of death in children aged younger than 15 years, suicide was the most common category in those aged 15–19 years, and injury was the main cause in those aged 20–24 years (**Table 1.1**).

Table 1.1: Mortality (number of deaths) in children and young people aged 28 days to 24 years by cause of death and age group, Aotearoa/New Zealand 2015–19 combined (n=2,666 deaths)

Category	<1 year*	1–4 years	5–9 years	10–14 years	15–19 years	20–24 years	Total	Percentage (%)
Medical	215	166	105	94	161	240	981	36.8
Injury	26	86	49	60	233	363	817	30.6
Suicide	–	–	–	43	263	349	655	24.6
SUDI	198	–	–	–	–	–	198	7.4
Missing data	3	–	<3	–	5	6	15	0.6
Total	**442**	**252**	**155**	**197**	**662**	**958**	**2,666**	**100.0**

* This category represents infants 28 days and older, and less than one calendar year in age.
Source: Mortality Review Database.

The leading medical causes of death also change with age. Congenital anomalies and perinatal conditions are the main medical causes in the first year of life. In those aged one to four years, diseases of the nervous system and cancers are the leading causes. From five years of age onwards, cancers are the primary medical cause of death. In adolescents, diseases of the nervous

system are also prevalent. These include deaths due to epilepsy (50 percent of adolescent neurological deaths), cerebral palsy (21 percent) and muscular dystrophy (17 percent).

Injury deaths in children and young people occurred in two peaks: the first in children aged under five years, where the percentage of deaths due to drowning was high compared with other age groups; and the second in adolescence. Transport incidents are the leading cause of injury deaths overall.

From 10 years of age onwards, suicide deaths are the single most common cause of death. Deaths due to assault also occur in two peaks: the first in children under the age of five years and the second in adolescence (**Table 1.2**).

Table 1.2: Mortality (number of deaths and rate per 100,000 population) by cause of death and age group, Aotearoa/New Zealand 2015–19 combined (n=2,666 deaths)

Cause of death	<1 year*	1–4 years	5–9 years	10–14 years	15–19 years	20–24 years	Total	%	Rate 2015–19
Medical									
Infectious and parasitic disease	16	11	3	3	4	4	41	1.5	0.52
Neoplasms	11	30	35	28	54	60	218	8.2	2.74
Diseases of the blood and blood-forming organs and immune system	4	<3	–	<3	3	<3	11	0.4	0.14
Endocrine, nutritional and metabolic diseases	4	6	6	4	10	16	46	1.7	0.58
Mental and behavioural disorders	–	–	–	<3	<3	6	9	0.3	0.11
Diseases of the nervous system	14	31	16	16	30	40	147	5.5	1.85
Diseases of the eye and adnexa	–	–	–	–	<3	<3	<3	x	s
Diseases of the ear and mastoid process	–	–	–	–	–	–	–	–	–
Diseases of the circulatory system	10	9	4	10	16	32	81	3.0	1.02
Diseases of the respiratory system	15	23	15	13	4	15	85	3.2	1.07
Diseases of the digestive system	3	<3	<3	<3	<3	<3	12	0.5	0.15
Diseases of the skin and subcutaneous tissue	–	–	–	–	–	–	–	–	–
Diseases of the musculoskeletal system and connective tissue	–	<3	–	<3	<3	5	9	0.3	0.11
Diseases of the genitourinary system	–	–	–	–	–	6	6	0.2	0.08
Pregnancy, childbirth and the puerperium	–	–	–	–	–	4	4	0.2	0.05
Certain conditions originating in the perinatal period	56	<3	<3	–	<3	–	60	2.3	0.75
Congenital anomalies	82	28	20	10	22	16	178	6.7	2.24
Symptoms and abnormal findings not elsewhere classified	–	23	3	4	10	32	72	2.7	0.91
Total medical	215	166	105	94	161	240	981	36.8	12.34

Cause of death	<1 year*	1–4 years	5–9 years	10–14 years	15–19 years	20–24 years	Total	%	Rate 2015–19
Injury									
Cut/pierce	–	–	–	–	<3	<3	3	0.1	0.04
Drowning	<3	21	6	7	15	38	89	3.3	1.12
Fall	<3	3	3	<3	6	6	21	0.8	0.26
Fire/hot object or substance	<3	–	3	–	3	<3	9	0.3	0.11
Firearm	–	–	–	<3	<3	4	6	0.2	0.08
Machinery	–	–	–	–	3	4	7	0.3	0.09
Transport	6	21	31	37	167	236	498	18.7	6.26
Natural/environmental	<3	3	–	–	<3	<3	8	0.3	0.10
Poisoning	<3	3	<3	3	11	25	45	1.7	0.57
Struck by, against	–	7	–	–	<3	<3	10	0.4	0.13
Suffocation	–	8	3	4	3	5	23	0.9	0.29
Other specified, classifiable	<3	–	–	<3	3	3	8	0.3	0.10
Other specified, not elsewhere classified	–	–	–	<3	3	<3	5	0.2	0.06
Unspecified	<3	<3	–	<3	<3	–	5	0.2	0.06
Assault	11	19	<3	3	11	34	80	3.0	1.01
Total injury	**26**	**86**	**49**	**60**	**233**	**363**	**817**	**30.6**	**10.27**
Suicide ‡	–	–	–	43	263	349	655	24.6	13.62
SUDI (28 days to <1 year)†	198	–	–	–	–	–	198	7.4	0.66
Missing data	3	–	<3	–	5	6	15	0.6	0.19
Total	**442**	**252**	**155**	**197**	**662**	**958**	**2,666**	**100.0**	**33.53**

'x' indicates percentage not calculated due to small numbers.
's' indicates rate not calculated due to small numbers.
* This category represents infants 28 days and older, and less than one calendar year in age.
‡ Suicide rate is per 100,000 children and young people aged 10–24 years.
† SUDI rate is per 1,000 live births. See **Table 7.1** for SUDI deaths by ICD-10-AM code.
Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 0–24 years.

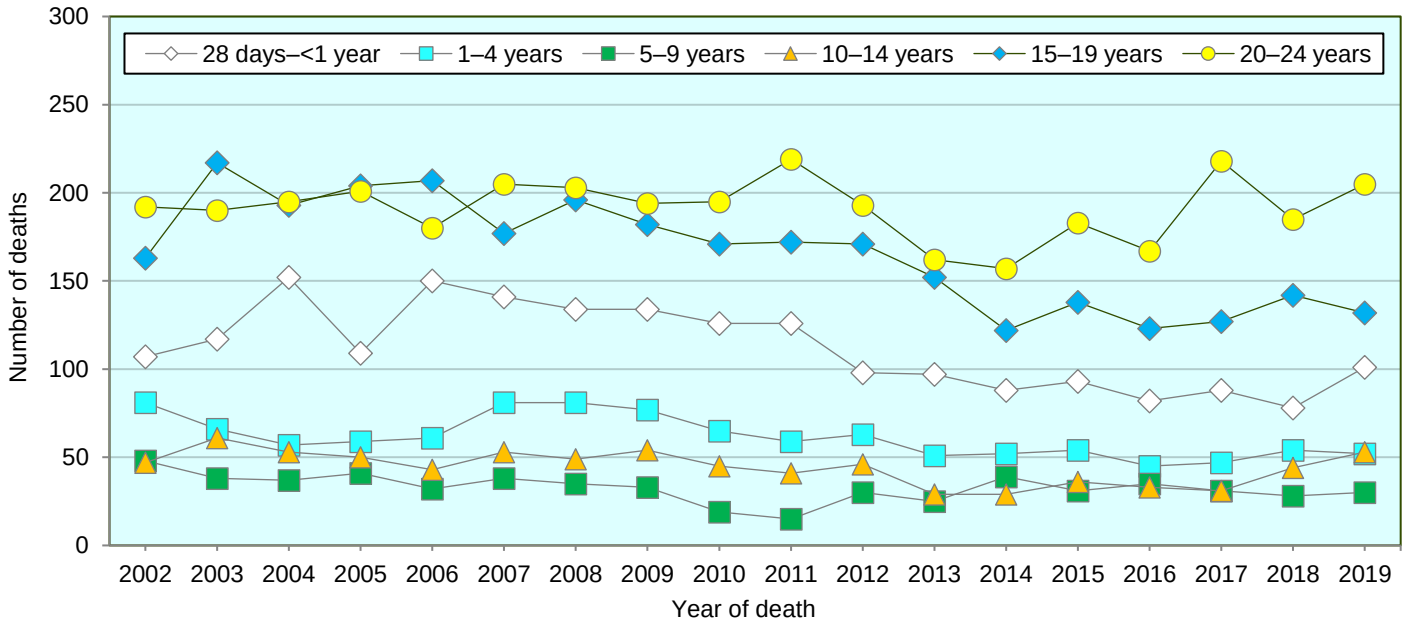
Table 1.3: Mortality (number of deaths) in children and young people aged 28 days to 24 years by age group and year of death, Aotearoa/New Zealand 2015–19 (n=2,666 deaths)

Age group	2015	2016	2017	2018	2019	Total	%
28 days–<1 year	93	82	88	78	101	442	16.6
1–4 years	54	45	47	54	52	252	9.5
5–9 years	31	35	31	28	30	155	5.8
10–14 years	36	33	31	44	53	197	7.4
15–19 years	138	123	127	142	132	662	24.8
20–24 years	183	167	218	185	205	958	35.9
Total	**535**	**485**	**542**	**531**	**573**	**2,666**	**100.0**

Source: Mortality Review Database

The overall mortality rate did not increase or decrease to a statistically significant degree over the period 2015–19. In terms of absolute numbers, in 2019 a higher number of deaths occurred in post-neonatal infants. Driving this was a higher number of deaths from congenital anomalies and SUDI. Those aged 10–14 years had the highest absolute number of deaths since 2009, mainly because of a higher number of transport deaths. The number of deaths in young people aged 20–24 years was also higher (**Table 1.3** and **Figure 1.1**).

Figure 1.1: Mortality (number of deaths) in children and young people aged 28 days to 24 years by age group and year of death, Aotearoa/New Zealand 2002–19 (n=10,941 deaths)



Source: Mortality Review Database.

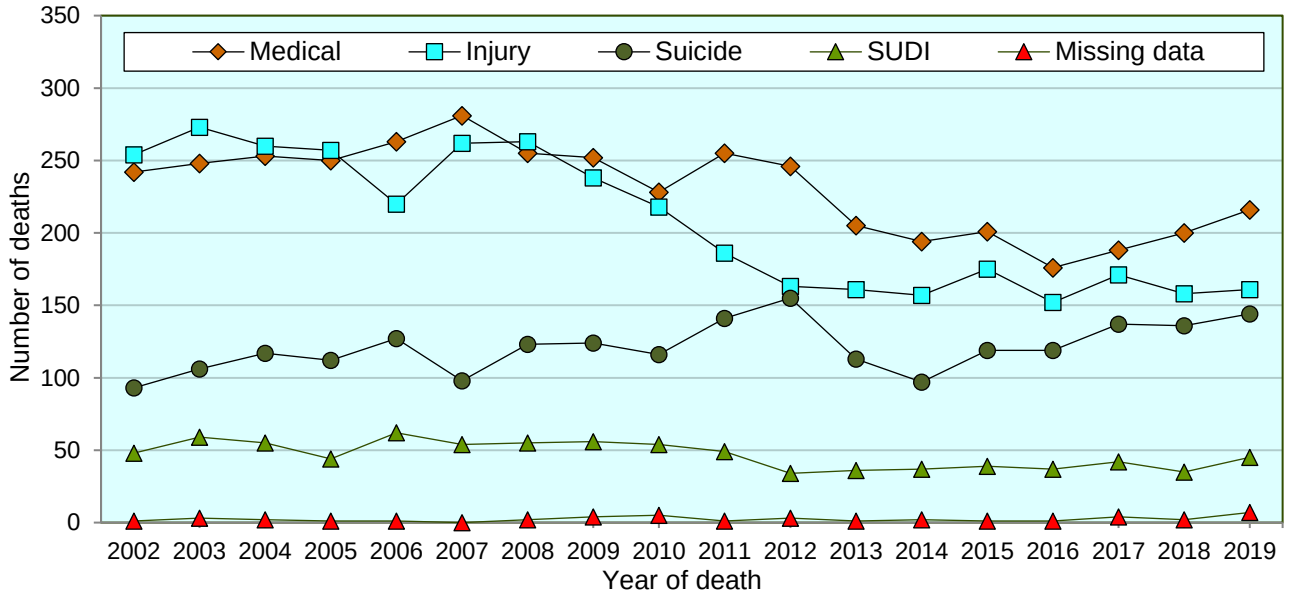
Table 1.4: Mortality (number of deaths) in children and young people aged 28 days to 24 years by cause and year of death, Aotearoa/New Zealand 2015–19 (n=2,666 deaths)

Category	2015	2016	2017	2018	2019	Total	%
Medical	201	176	188	200	216	981	36.8
Injury	175	152	171	158	161	817	30.6
Suicide	119	119	137	136	144	655	24.6
SUDI	39	37	42	35	45	198	7.4
Missing data	<3	<3	4	<3	7	15	0.6
Total	**535**	**485**	**542**	**531**	**573**	**2,666**	**100.0**

Source: Mortality Review Database.

The absolute number of deaths for all causes of death increased in 2019, compared with the previous five years. However, while deaths due to injuries are gradually reducing over time, those due to suicide and SUDI are not, no matter whether the period we examine is 2015–19 (**Table 1.4**) or 2002–19 (**Figure 1.2**).

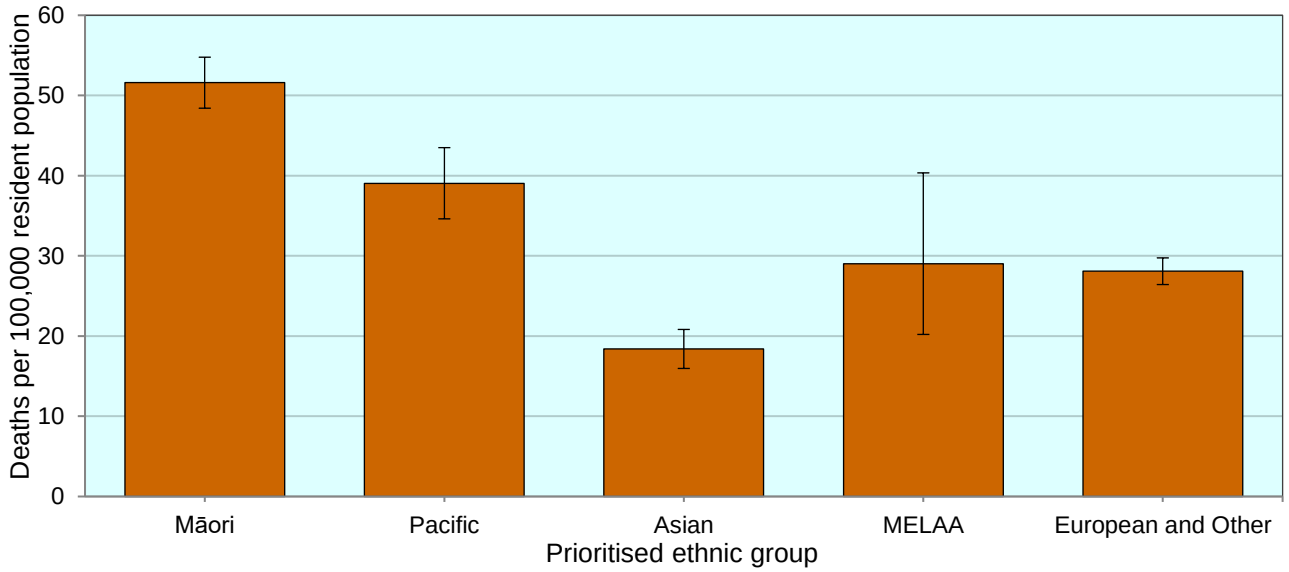
Figure 1.2: Mortality (number of deaths) in children and young people aged 28 days to 24 years by cause and year of death, Aotearoa/New Zealand 2002–19 (n=10,941 deaths)



Source: Mortality Review Database.

Among prioritised ethnic groups, tamariki and rangatahi Māori and Pacific children and young people had the highest mortality rates and these were statistically significantly higher than mortality rates for European and Other children and young people. Asian children and young people had the lowest mortality rate overall (**Figure 1.3**).

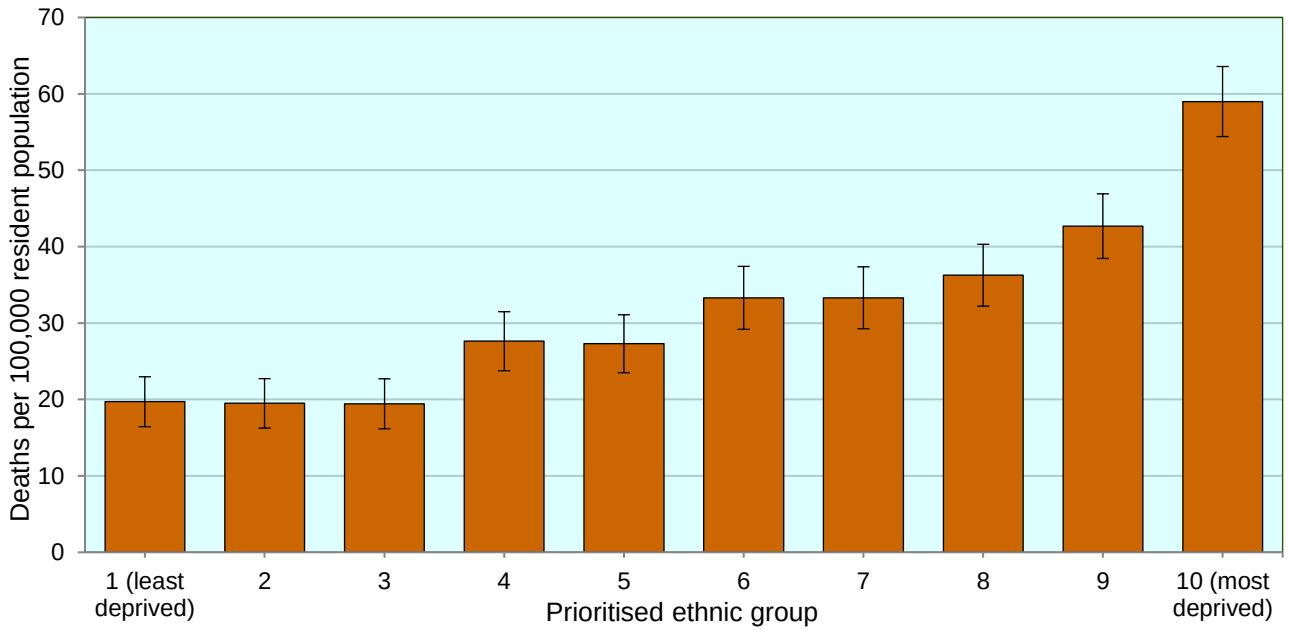
Figure 1.3: Mortality (rates per 100,000 population and 95 percent confidence intervals) in children and young people aged 28 days to 24 years by prioritised ethnic group, Aotearoa/New Zealand 2015–19 combined (n=2,663 deaths*)



* Excludes three cases with no available ethnicity data.
MELAA = Middle Eastern, Latin American and African.
Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 0–24 years.

Mortality rates vary by deprivation, as measured by the New Zealand Deprivation Index. For children and young people overall, a consistent pattern was that mortality rates were higher with increasing deprivation. Of note, those in decile 10 (most deprived) had a mortality rate three times higher than those in decile 1 (least deprived) (rate ratio 2.99, 95% CI 2.49–3.59) (**Figure 1.4**).

Figure 1.4: Mortality (rates per 100,000 population and 95 percent confidence intervals) in children and young people aged 28 days to 24 years by NZ Deprivation Index decile, Aotearoa/New Zealand 2015–19 combined (n=2,659 deaths*)



* Excludes seven cases with no available deprivation data.
Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 0–24 years.

2. Ngā mate o ngāi Māori | Māori mortality

This chapter examines mortality in tamariki and rangatahi Māori. Throughout this chapter, we compare outcomes for tamariki and rangatahi Māori with outcomes for non-Māori non-Pacific children and young people. Te Tiriti o Waitangi underlies the health sector's obligations to Māori, as well as Māori rights to monitor the Crown to ensure that it meets these responsibilities and that equitable outcomes are achieved for Māori in the health sector. Reinforcement for Treaty-based Māori rights comes from the broader rights of children and young people to equitable outcomes regardless of their ethnicity. Here we present comparisons between different ethnic groups not to provide commentary on the deficits of any particular ethnic group, but rather to highlight the deficits of a society that creates, maintains and tolerates these differences.

The analyses in this chapter exclude Pacific children and young people (n=297) and those whose ethnicity is unknown or not recorded (n=3). This chapter reports on deaths that occurred in Aotearoa/New Zealand during the years 2015–19.

Key findings

- During the five-year period 2015–19, there were 1,012 deaths in tamariki and rangatahi Māori.
- The leading categories of death were medical conditions (31.4 percent of deaths), followed by injury (29.2 percent). The most common medical conditions causing death were cancers, followed by congenital anomalies.
- Large inequities remain in mortality rates for tamariki and rangatahi Māori, compared with non-Māori non-Pacific children and young people. These inequities were most notable for SUDI, where the rate ratio comparing Māori with non-Māori non-Pacific is 6.18 (95 percent CI 4.29–8.88), and suicide, where the rate ratio is 2.48 (95 percent CI 2.12–2.91).
- Deprivation has a disproportionate impact on Māori mortality. Māori children are more likely to be born into areas of high deprivation, which are associated with higher mortality rates. In addition, in the most deprived areas of Aotearoa/New Zealand, Māori are nearly twice as likely to die as non-Māori non-Pacific living in similar areas (rate ratio 1.80, 95 percent CI 1.46–2.23). Significant progress remains to be made in reducing both poverty and structural influences that produce these inequities in mortality.

During 2015–19, there were 1,012 deaths in tamariki and rangatahi Māori. The overall leading category of death for all ages was medical conditions (31.4 percent). The four leading causes of medical death were: cancers (n=68); congenital anomalies (n=57); diseases of the nervous system (n=36); and diseases of the respiratory system (n=31). The next most common category of death was injury (29.2 percent). For the same period, there were 281 deaths due to suicide (27.8 percent) and 114 deaths due to SUDI (11.3 percent). Overall, tamariki and rangatahi Māori had higher mortality rates compared with non-Māori non-Pacific. This was most notable for SUDI (rate ratio 6.18 (95 percent CI 4.29–8.88) and suicide deaths (rate ratio 2.48, 95 percent CI 2.12–2.91) (**Table 2.1**). The total number of deaths fluctuates from year to year, but was greater in 2019 than in the previous four years (**Table 2.2**).

Table 2.1: Mortality (number of deaths and rates per 100,000 population) in tamariki and rangatahi Māori aged 28 days to 24 years by cause of death and age group, compared with non-Māori non-Pacific children and young people, Aotearoa/New Zealand 2015–19 combined (n=2,366 deaths)

Category	Māori						Total		Rate		Rate ratio (95% CI)
	<1 year*	1–4 years	5–9 years	10–14 years	15–19 years	20–24 years	Māori	Non-Māori non-Pacific	Māori	Non-Māori non-Pacific	
Medical	88	53	30	34	43	70	318	523	16.21	10.00	1.62 (1.41–1.86)
Injury	12	33	19	30	94	107	295	454	15.04	8.68	1.73 (1.50–2.01)
Suicide ǂ	–	–	–	27	119	135	281	332	25.37	10.23	2.48 (2.12–2.91)
SUDI ɬ	114	–	–	–	–	–	114	39	1.31	0.21	6.18 (4.29–8.88)
Missing data	<3	–	–	–	<3	<3	4	6	0.20	0.11	1.78 (0.50–6.30)
Total	215	86	49	91	257	314	1,012	1,354	51.60	25.89	1.99 (1.84–2.16)

* This category represents infants 28 days and older, and less than one calendar year in age.
ǂ Suicide rate is per 100,000 ethnic specific resident population aged 10–24 years.
ɬ SUDI rate is per 1,000 live births.
Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 0–24 years.

Table 2.2: Mortality (number of deaths and rates per 100,000 population) in tamariki and rangatahi Māori aged 28 days to 24 years by cause and year of death, compared with non-Māori non-Pacific children and young people, Aotearoa/New Zealand 2015–19 (n=2,366 deaths)

Category	Māori					Total		Rate		Rate ratio (95% CI)
	2015	2016	2017	2018	2019	Māori	Non-Māori non-Pacific	Māori	Non-Māori non-Pacific	
Medical	55	64	61	71	67	318	523	16.21	10.00	1.62 (1.41–1.86)
Injury	49	49	65	61	71	295	454	15.04	8.68	1.73 (1.50–2.01)
Suicide ǂ	51	47	60	60	63	281	332	25.37	10.23	2.48 (2.12–2.91)
SUDI ɬ	18	22	25	19	30	114	39	1.31	0.21	6.18 (4.29–8.88)
Missing data	<3	–	–	<3	<3	4	6	0.20	0.11	1.78 (0.50–6.30)
Total	174	182	211	212	233	1,012	1,354	51.60	25.89	1.99 (1.84–2.16)

ǂ Suicide rate is per 100,000 ethnic specific resident population aged 10–24 years.
ɬ SUDI rate is per 1,000 live births.
Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 0–24 years.

Mortality rates varied considerably by age group: the rate in those aged five to nine years was the lowest (11.31 per 100,000), and the rate in those aged 28 days to one year was the highest (2.47 per 1,000; equivalent to 247 per 100,000). Similarly, inequities between Māori and non-Māori non-Pacific varied considerably by age group. Tamariki Māori aged five to nine years have a similar mortality rate to non-Māori non-Pacific, but pēpi Māori (28 days to one year) have an all-cause mortality rate three times higher than non-Māori non-Pacific (rate ratio 3.01, 95 percent CI 2.44–3.70) (**Table 2.3**). Other than for those aged five to nine years, mortality rates for tamariki and rangatahi Māori were statistically significantly higher than those for non-Māori non-Pacific children and young people at every age group.

Table 2.3: Mortality (number of deaths and rates per 100,000 population) in tamariki and rangatahi Māori aged 28 days to 24 years by age group and year of death, compared with non-Māori non-Pacific children and young people, Aotearoa/New Zealand 2015–19 (n=2,366 deaths)

Age group	Māori					Total		Rate		Rate ratio (95% CI)
	2015	2016	2017	2018	2019	Māori	Non-Māori non-Pacific	Māori	Non-Māori non-Pacific	
28 days–<1 year*	36	45	42	37	55	215	151	2.47	0.82	3.01 (2.44–3.70)
1–4 years	16	18	12	19	21	86	131	25.81	16.83	1.53 (1.17–2.01)
5–9 years	3	13	12	12	9	49	91	11.31	8.91	1.27 (0.90–1.80)
10–14 years	11	10	19	26	25	91	86	22.64	8.61	2.63 (1.96–3.53)
15–19 years	57	50	47	55	48	257	347	69.14	32.86	2.10 (1.79–2.47)
20–24 years	51	46	79	63	75	314	548	93.95	46.02	2.04 (1.78–2.35)
Total	174	182	211	212	233	1,012	1,354	51.60	25.89	1.99 (1.84–2.16)

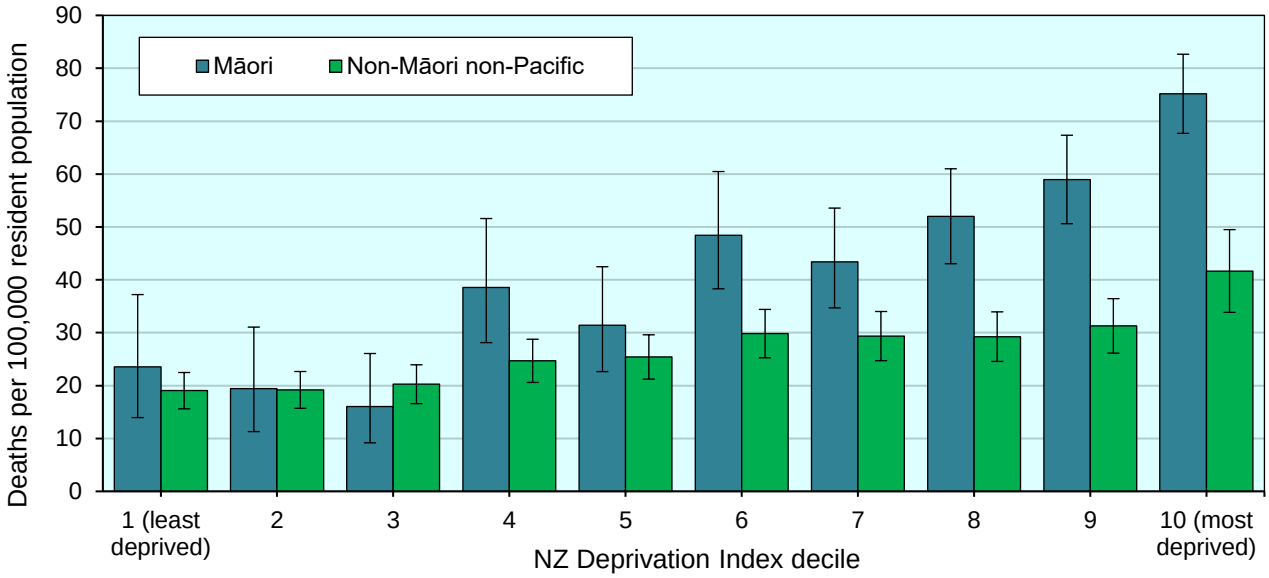
* Rate is per 1,000 live births.

Sources: Numerator: Mortality Review Database; Denominator: NZMRDG age-specific Estimated Resident Population 2015–19, 0–24 years.

Mortality varied significantly by deprivation, as measured by New Zealand Deprivation Index decile. Those living in high-decile areas (most deprived) had significantly higher mortality rates than those in lower-decile areas (least deprived), regardless of ethnic group. However, tamariki and rangatahi Māori had statistically significantly higher mortality rates than non-Māori non-Pacific at most levels of deprivation. Mortality rates were statistically significantly higher in Māori from decile 4 onwards, except for decile 5[6] (**Figure 2.1**). In the most deprived areas of Aotearoa/New Zealand, Māori are nearly twice as likely to die as non-Māori non-Pacific living in similar areas (rate ratio 1.80, 95 percent CI 1.46–2.23). Given the high proportion of tamariki and rangatahi Māori living in high-decile areas, conditions that are influenced by deprivation will have a disproportionate impact on Māori (see Appendix 17: New Zealand Deprivation Index).

[6] The Māori:non-Māori non-Pacific rate ratio for decile 4 is 1.56, 95 percent CI 1.12–2.19; and for decile 7 is 1.48, 95 percent CI 1.13–1.92.

Figure 2.1: Mortality (rates per 100,000 population and 95 percent confidence intervals) in tamariki and rangatahi Māori aged 28 days to 24 years by NZ Deprivation Index decile, compared with non-Māori non-Pacific children and young people, Aotearoa/New Zealand 2015–19 combined (n=2,361 deaths*)



* Excludes five cases with no available deprivation data.
Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 0–24 years.

Post-neonatal pēpi Māori

During the five-year period 2015–19, there were 215 deaths in pēpi Māori aged 28 days to one year. Pēpi Māori were three times more likely to die than non-Māori non-Pacific infants (rate ratio 3.01, 95 percent CI 2.44–3.70). The most common cause of death was SUDI, with 114 deaths. The next leading cause of death was medical conditions, with 88 deaths. For both SUDI and medical conditions, the mortality rate in Māori was statistically significantly higher than that in non-Māori non-Pacific babies (SUDI rate ratio 6.18, 95 percent CI 4.29–8.88; medical rate ratio 1.86, 95 percent CI 1.40–2.48). There were 12 deaths from injury (**Table 2.4**).

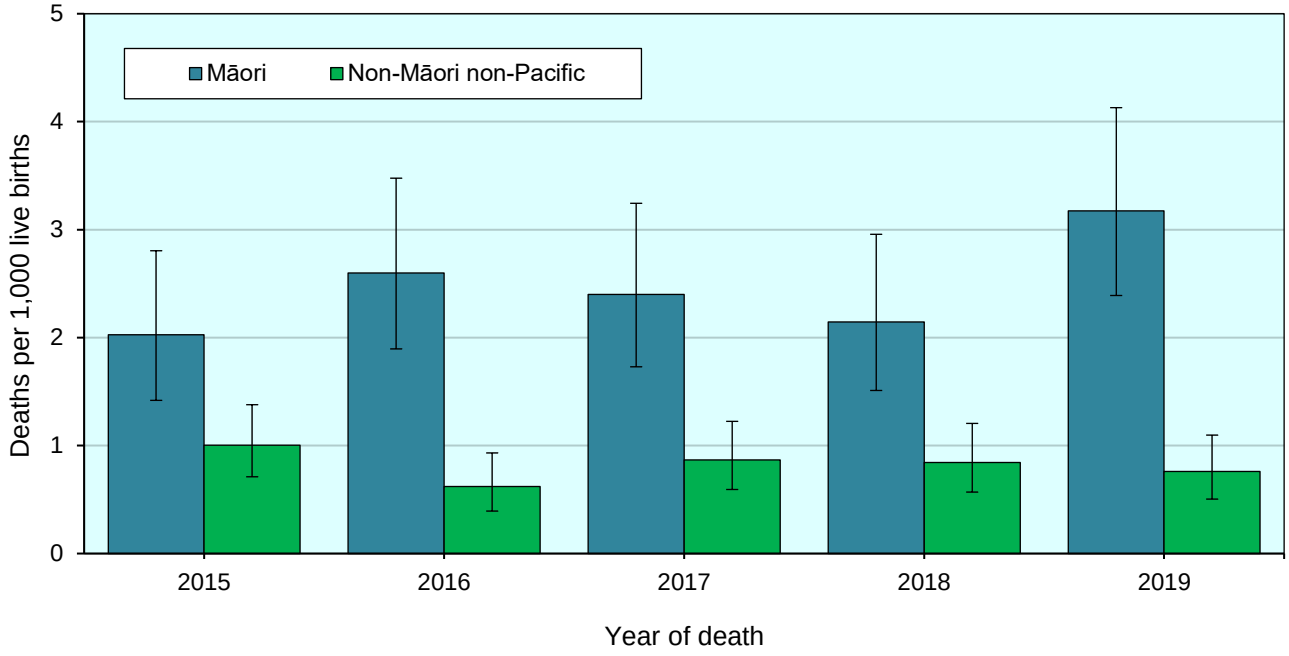
Table 2.4: Mortality (number of deaths and rates per 1,000 live births) in post-neonatal pēpi Māori by cause and year of death, compared with non-Māori non-Pacific infants, Aotearoa/New Zealand 2015–19 (n=366 deaths)

Category	2015	2016	2017	2018	2019	Total		Rate		Rate ratio (95% CI)
						Māori	Non-Māori non-Pacific	Māori	Non-Māori non-Pacific	
Medical	17	19	15	16	21	88	100	1.01	0.54	1.86 (1.40–2.48)
Injury	<3	4	<3	<3	3	12	12	0.14	0.07	2.11 (0.95–4.70)
SUDI	18	22	25	19	30	114	39	1.31	0.21	6.18 (4.29–8.88)
Missing data	–	–	–	–	<3	<3	–	s	–	–
Total	36	45	42	37	55	215	151	2.47	0.82	3.01 (2.44–3.70)

's' indicates rate not calculated due to small numbers.
Sources: Numerator: Mortality Review Database; Denominator: Ministry of Health Live Birth Registrations 2015–19.

The number of deaths each year has fluctuated, largely because of changes in the number of deaths from SUDI. In 2019, however, more deaths from both medical conditions and SUDI occurred (**Table 2.4**). For every year, the mortality rate for pēpi Māori was statistically significantly higher than for non-Māori non-Pacific infants (**Figure 2.2**).

Figure 2.2: Mortality (rates per 1,000 live births and 95 percent confidence intervals) in post-neonatal pēpi Māori by year of death, compared with non-Māori non-Pacific infants, Aotearoa/New Zealand 2015–19 (n=215 Māori and 151 non-Māori non-Pacific deaths)

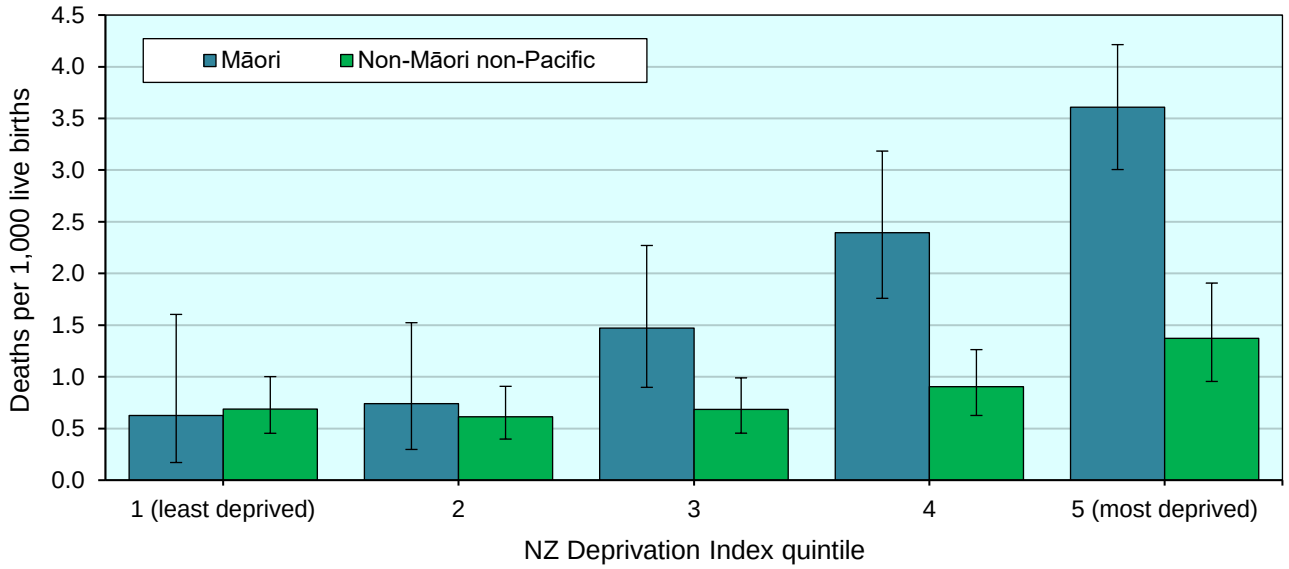


Sources: Numerator: Mortality Review Database; Denominator: Ministry of Health Live Birth Registrations 2015–19.

Analysis of the data by deprivation showed mortality rates in pēpi Māori were higher in those living in more deprived areas. Pēpi Māori had statistically significantly higher mortality rates than non-Māori non-Pacific infants in quintiles 3 to 5[7] (**Figure 2.3**).

[7] The Māori:non-Māori non-Pacific rate ratio for quintile 3 is 2.15, 95 percent CI 1.21–3.81.

Figure 2.3: Mortality (rates per 1,000 live births and 95 percent confidence intervals) in post-neonatal pēpi Māori by NZ Deprivation Index quintile, compared with non-Māori non Pacific infants, Aotearoa/New Zealand 2015–19 combined (n=215 Māori and 149 non-Māori non-Pacific deaths*)



* Excludes two cases with no available deprivation data.
Sources: Numerator: Mortality Review Database; Denominator: Ministry of Health Live Birth Registrations 2015–19.

Tamariki Māori aged one to four years

During 2015–19, there were 86 deaths in tamariki Māori aged one to four years. Medical conditions were the leading cause (62 percent), while injury accounted for 38 percent. Tamariki Māori had a higher mortality rate from injuries (rate ratio 1.79, 95 percent CI 1.14–2.82) and overall (rate ratio 1.53, 95 percent CI 1.17–2.01), compared with non-Māori non-Pacific children (**Table 2.5**).

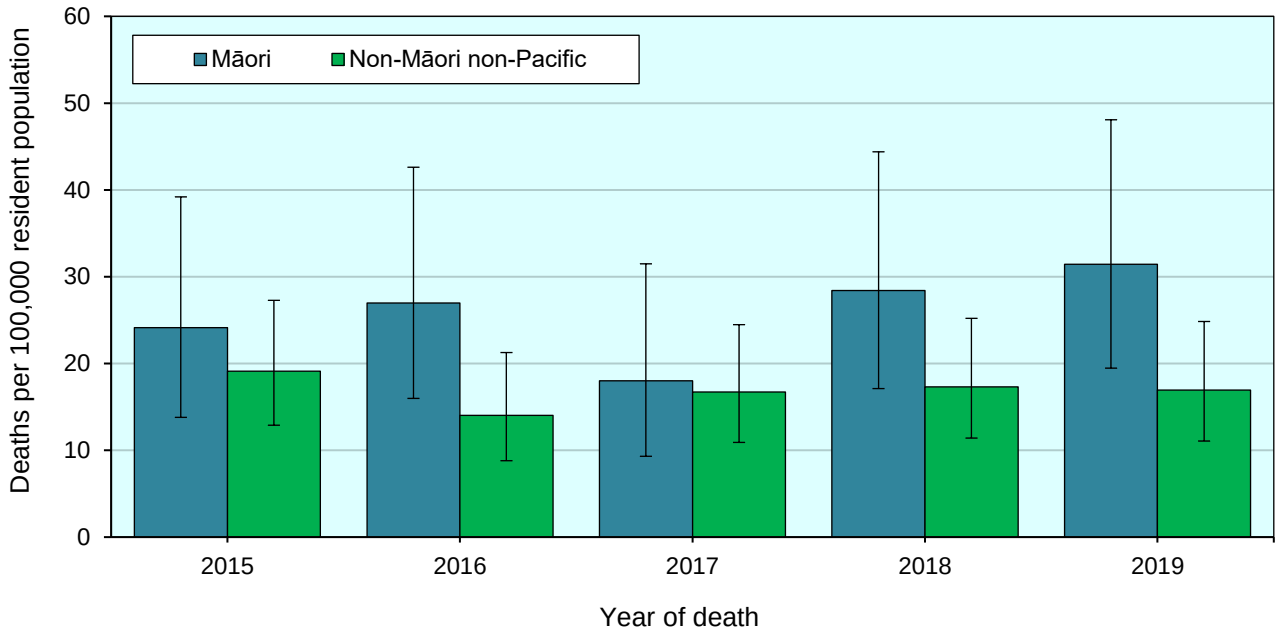
Table 2.5: Mortality (number of deaths and rates per 100,000 population) in tamariki Māori aged one to four years by cause and year of death, compared with non-Māori non-Pacific children, Aotearoa/New Zealand 2015–19 (n=217 deaths)

Category	2015	2016	2017	2018	2019	Total		Rate		Rate ratio (95% CI)
						Māori	Non-Māori non-Pacific	Māori	Non-Māori non-Pacific	
Medical	9	13	7	14	10	53	88	15.90	11.30	1.41 (1.00–1.98)
Injury	7	5	5	5	11	33	43	9.90	5.52	1.79 (1.14–2.82)
Missing data	–	–	–	–	–	–	–	–	–	–
Total	16	18	12	19	21	86	131	25.81	16.83	1.53 (1.17–2.01)

Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, one to four years.

Mortality in this age group has fluctuated from year to year, with no statistically significant change over the 2015–19 period for tamariki Māori or non-Māori non-Pacific children (**Figure 2.4**).

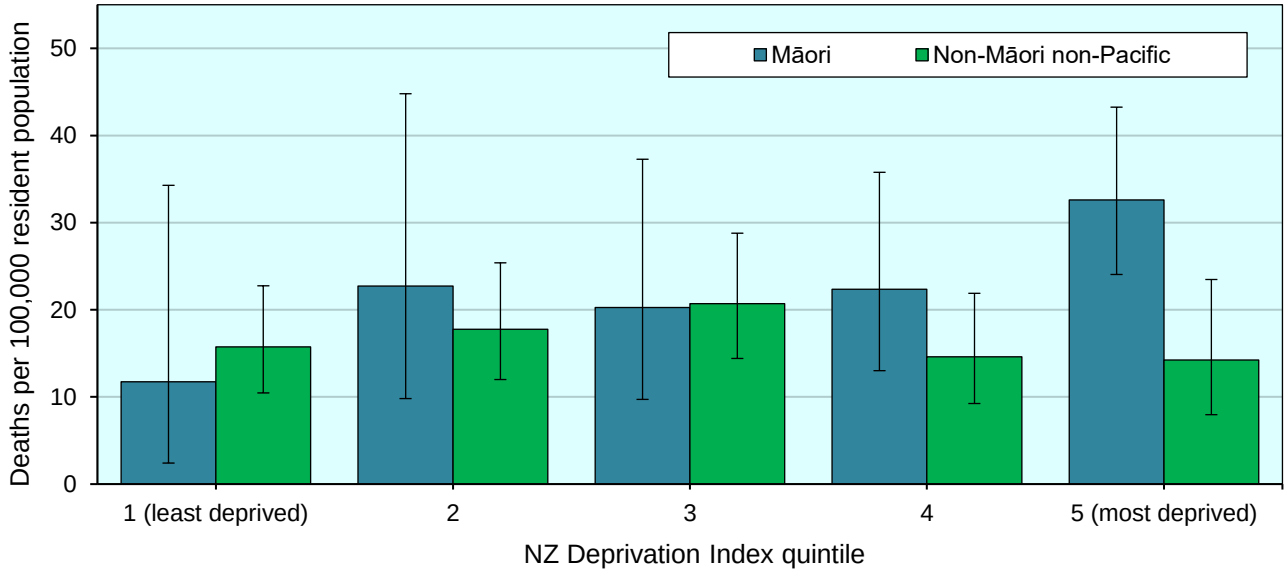
Figure 2.4: Mortality (rates per 100,000 population and 95 percent confidence intervals) in tamariki Māori aged one to four years by year of death, compared with non-Māori non-Pacific children, Aotearoa/New Zealand 2015–19 (n=86 Māori and 131 non-Māori non-Pacific deaths)



Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, one to four years.

For tamariki Māori aged one to four years, deaths were higher among tamariki Māori than non-Māori non-Pacific children at quintile 5, but not in other quintiles (**Figure 2.5**).

Figure 2.5: Mortality (rates per 100,000 population and 95 percent confidence intervals) in tamariki Māori aged one to four years by NZ Deprivation Index quintile, compared with non-Māori non-Pacific children, Aotearoa/New Zealand 2015–19 combined (n=86 Māori and 131 non-Māori non-Pacific deaths)



Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, one to four years.

Tamariki Māori aged five to nine years

In children aged five to nine years, there were 49 deaths in tamariki Māori during 2015–19. Medical conditions accounted for 30 deaths (61 percent) and injury for 19 deaths (39 percent). No statistically significant differences between the mortality rates in tamariki Māori and non-Māori non-Pacific children were evident (**Table 2.6**).

Table 2.6: Mortality (number of deaths and rates per 100,000 population) in tamariki Māori aged five to nine years by cause and year of death, compared with non-Māori non-Pacific children, Aotearoa/New Zealand 2015–19 (n=140 deaths)

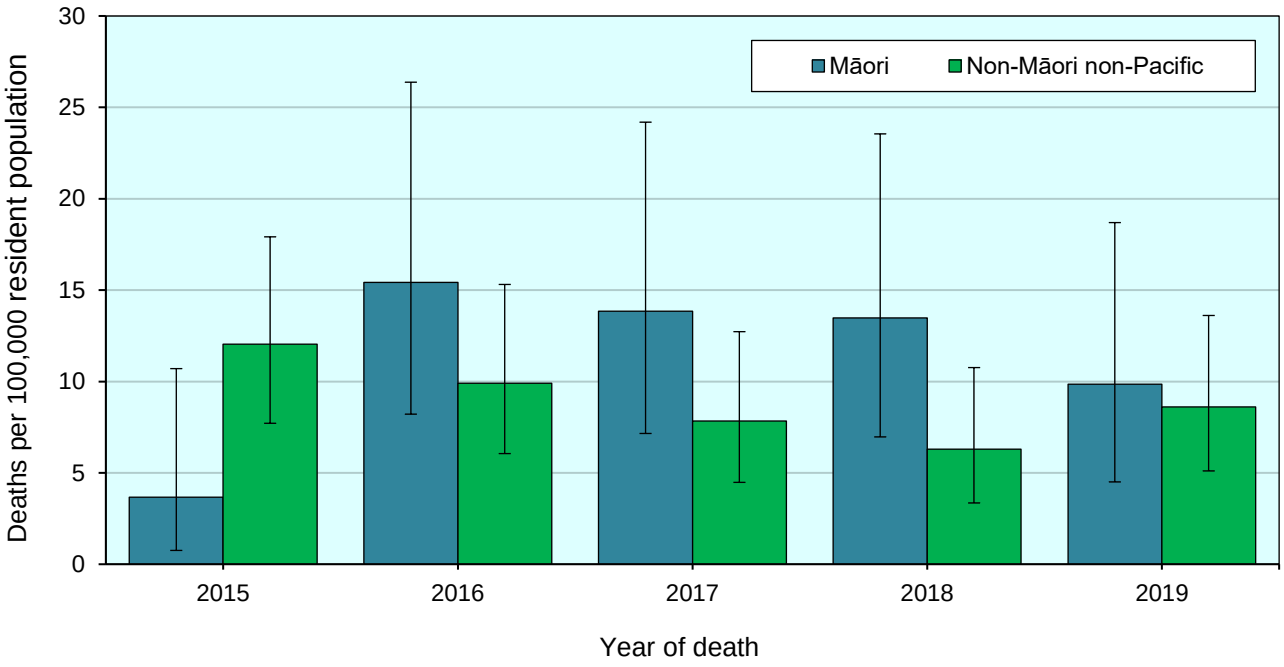
Category	2015	2016	2017	2018	2019	Total		Rate		Rate ratio (95% CI)
						Māori	Non-Māori non-Pacific	Māori	Non-Māori non-Pacific	
Medical	<3	9	7	8	5	30	62	6.92	6.07	1.14 (0.74–1.76)
Injury	<3	4	5	4	4	19	28	4.39	2.74	1.60 (0.89–2.86)
Missing data	–	–	–	–	–	–	<3	–	s	–
Total	3	13	12	12	9	49	91	11.31	8.91	1.27 (0.90–1.80)

‘s’ indicates rate not calculated due to small numbers.

Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, five to nine years.

Mortality rates varied substantially over the five-year period, but no consistent statistically significant differences were evident in mortality rates between the years or between tamariki Māori and non-Māori non-Pacific children (**Figure 2.6**).

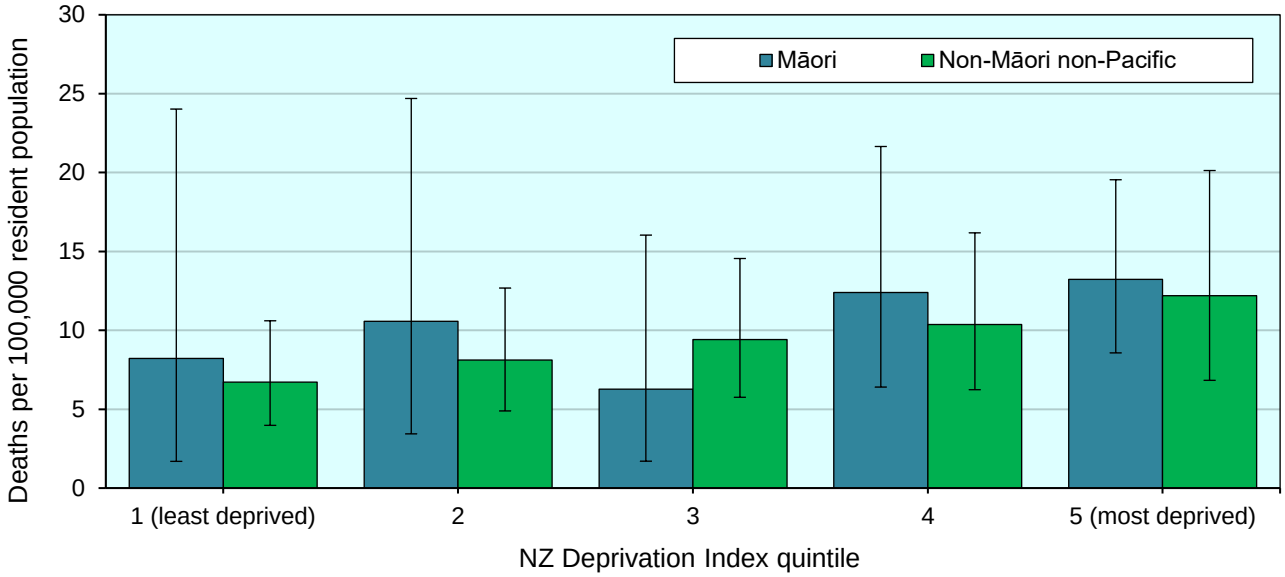
Figure 2.6: Mortality (rates per 100,000 population and 95 percent confidence intervals) in tamariki Māori aged five to nine years by year of death, compared with non-Māori non-Pacific children, Aotearoa/New Zealand 2015–19 (n=49 Māori and 91 non-Māori non-Pacific deaths)



Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, five to nine years.

Analysis of the data by New Zealand Deprivation Index quintile showed no statistically significant differences in mortality rates either by deprivation quintile or between tamariki Māori and non-Māori non-Pacific children (**Figure 2.7**).

Figure 2.7: Mortality (rates per 100,000 population and 95 percent confidence intervals) in tamariki Māori aged five to nine years by New Zealand Deprivation Index quintile, compared with non-Māori non-Pacific children, Aotearoa/New Zealand 2015–19 combined (n=49 Māori and 91 non-Māori non-Pacific deaths)



Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, five to nine years.

Tamariki Māori aged 10–14 years

During the 2015–19 period, 91 tamariki Māori aged 10–14 years died. The overall mortality rate of 22.64 per 100,000 was statistically significantly higher than the mortality rate for non-Māori non-Pacific children of the same age (rate ratio 2.63, 95 percent CI 1.96–3.53). Medical conditions were the leading cause of death (37 percent), while injury accounted for 33 percent and suicide for 30 percent. Compared with non-Māori non-Pacific children, tamariki Māori had statistically higher mortality rates for the categories of medical conditions (rate ratio 1.84, 95 percent CI 1.18–2.86), injury (2.76, 95 percent CI 1.64–4.65) and suicide (5.16, 95 percent CI 2.66–10.01). They also had a higher mortality rate overall (**Table 2.7**).

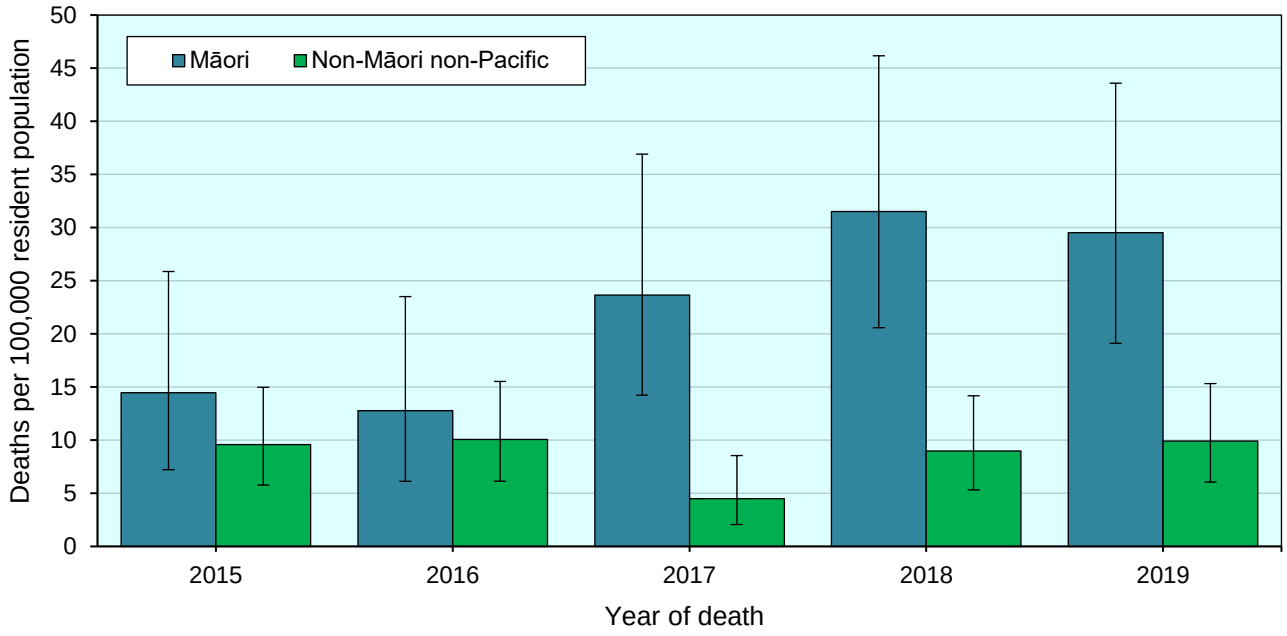
Table 2.7: Mortality (number of deaths and rates per 100,000 population) in tamariki Māori aged 10–14 years by cause and year of death, compared with non-Māori non-Pacific children, Aotearoa/New Zealand 2015–19 (n=177 deaths)

Category	2015	2016	2017	2018	2019	Total		Rate		Rate ratio (95% CI)
						Māori	Non-Māori non-Pacific	Māori	Non-Māori non-Pacific	
Medical	5	3	5	14	7	34	46	8.46	4.60	1.84 (1.18–2.86)
Injury	s	3	7	7	11	30	27	7.47	2.70	2.76 (1.64–4.65)
Suicide	4	4	7	5	7	27	13	6.72	1.30	5.16 (2.66–10.01)
Missing data	-	-	-	-	-	-	-	-	-	-
Total	11	10	19	26	25	91	86	22.64	8.61	2.63 (1.96–3.53)

Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 10–14 years.

Analysis of the data by year showed the mortality rate in tamariki Māori was statistically significantly higher during the years 2017–19, compared with non-Māori non-Pacific children (**Figure 2.8**).

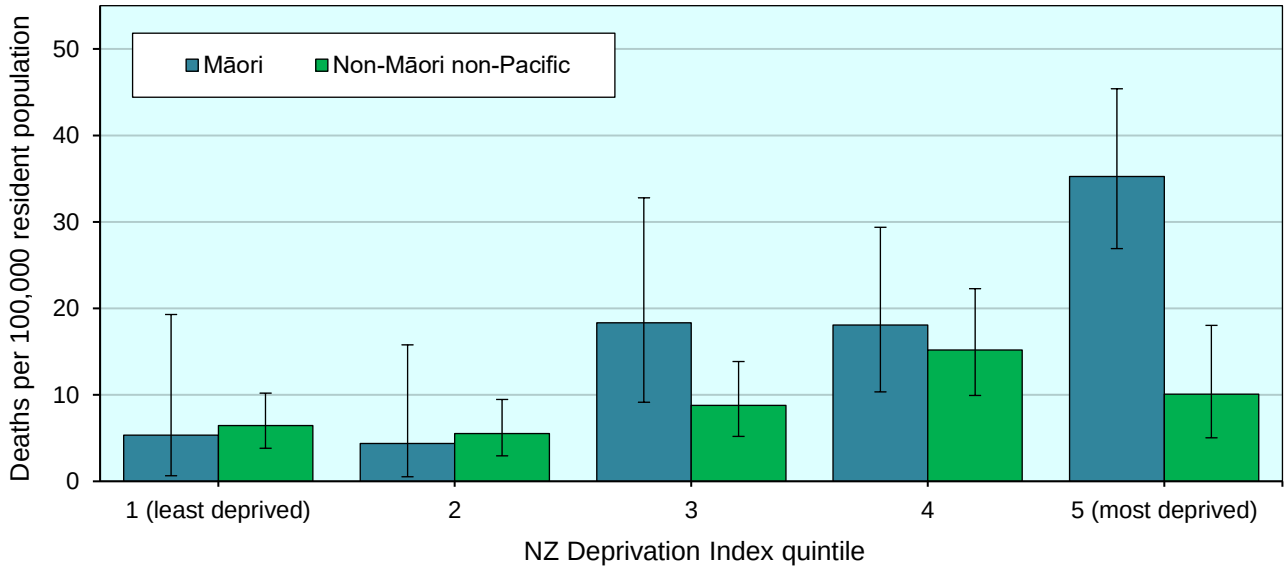
Figure 2.8: Mortality (rates per 100,000 population and 95 percent confidence intervals) in tamariki Māori aged 10–14 years by year of death, compared with non-Māori non-Pacific children, Aotearoa/New Zealand 2015–19 (n=91 Māori and 86 non-Māori non-Pacific deaths)



Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 10–14 years.

Mortality rates varied somewhat by deprivation, with a pattern of higher mortality rates in the most deprived areas. The mortality rate was statistically significantly higher in tamariki Māori than in non-Māori non-Pacific children in quintile 5 (**Figure 2.9**).

Figure 2.9: Mortality (rates per 100,000 population and 95 percent confidence intervals) in tamariki Māori aged 10–14 years by NZ Deprivation Index quintile, compared with non-Māori non-Pacific children, Aotearoa/New Zealand 2015–19 combined (n=91 Māori and 86 non-Māori non-Pacific deaths)



Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 10–14 years.

Rangatahi Māori aged 15–19 years

During the 2015–19 period, there were 257 deaths in rangatahi Māori aged 15–19 years. Suicide was the leading cause of death (46 percent), accounting for 119 deaths during the five-year period. The remaining deaths were due to injury (37 percent) and medical conditions (17 percent). The leading cause of injury death was transport (n=74; 79 percent), followed by assault (n=5; 5 percent) and poisoning (n=4; 4 percent). The leading medical causes of death were neoplasms (cancers) (n=16; 37 percent), congenital anomalies (n=8; 19 percent) and diseases of the circulatory system (n=7; 16 percent). Mortality rates for rangatahi Māori in this age group were statistically significantly higher both overall and for deaths due to injury and suicide, compared with non-Māori non-Pacific young people (**Table 2.8**).

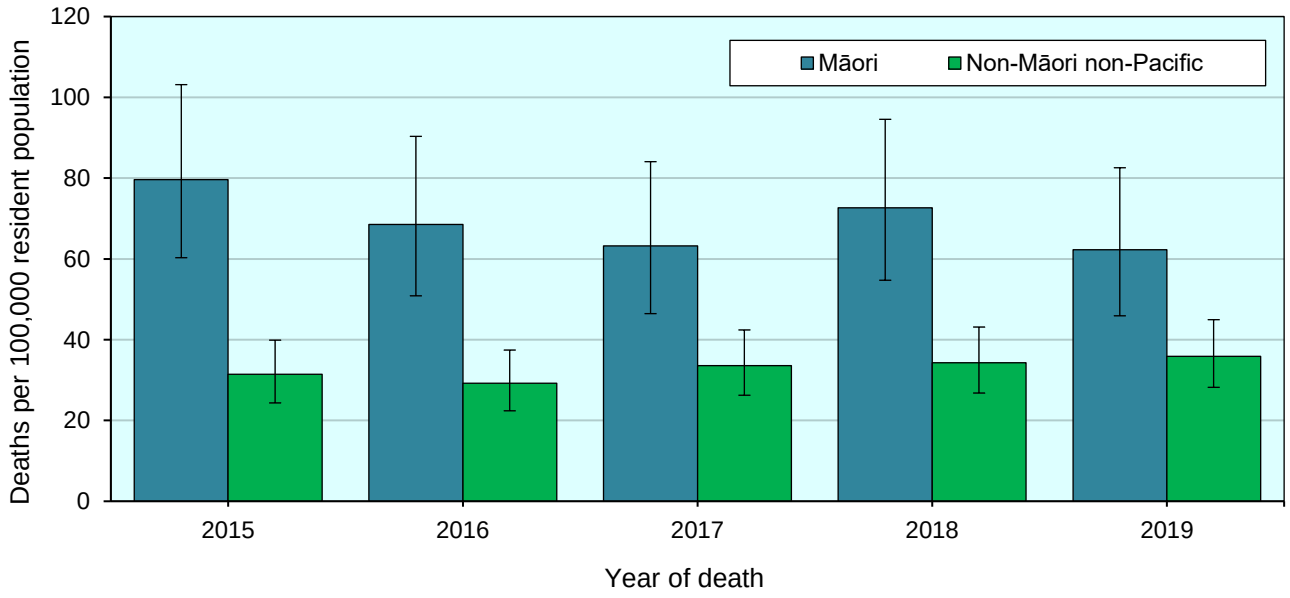
Table 2.8: Mortality (number of deaths and rates per 100,000 population) in rangatahi Māori aged 15–19 years by cause and year of death, compared with non-Māori non-Pacific young people, Aotearoa/New Zealand 2015–19 (n=604 deaths)

Category	2015	2016	2017	2018	2019	Total		Rate		Rate ratio (95% CI)
						Māori	Non-Māori non-Pacific	Māori	Non-Māori non-Pacific	
Medical	12	10	6	8	7	43	93	11.57	8.81	1.31 (0.92–1.89)
Injury	19	17	18	23	17	94	125	25.29	11.84	2.14 (1.63–2.79)
Suicide	26	23	23	23	24	119	127	32.02	12.03	2.66 (2.07–3.42)
Missing data	–	–	–	<3	–	<3	<3	s	s	–
Total	57	50	47	55	48	257	347	69.14	32.86	2.10 (1.79–2.47)

's' indicates rate not calculated due to small numbers.

Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 15–19 years.

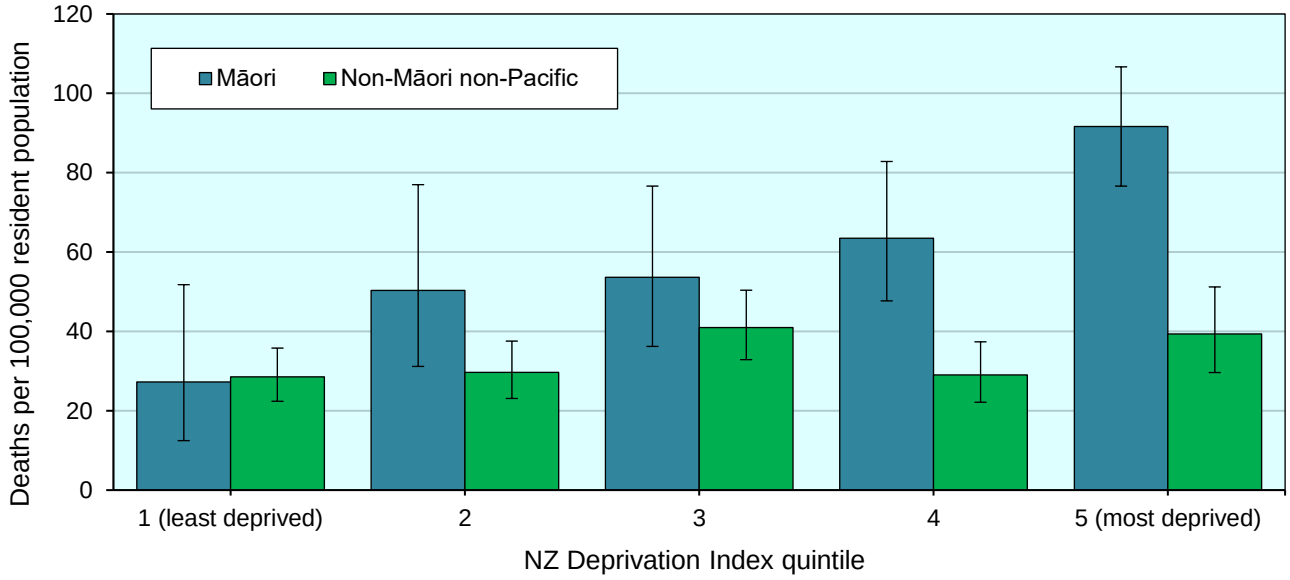
Figure 2.10: Mortality (rates per 100,000 population and 95 percent confidence intervals) in rangatahi Māori aged 15–19 years by year of death, compared with non-Māori non-Pacific young people, Aotearoa/New Zealand 2015–19 (n=257 Māori and 347 non-Māori non-Pacific deaths)



Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 15–19 years.

Mortality rates were statistically significantly higher for rangatahi Māori than non-Māori non-Pacific young people in this age group over the 2015–19 period (**Figure 2.10**).

Figure 2.11: Mortality (rates per 100,000 population and 95 percent confidence intervals) in rangatahi Māori aged 15–19 years by NZ Deprivation Index quintile, compared with non-Māori non-Pacific young people, Aotearoa/New Zealand 2015–19 combined (n=257 Māori and 347 non-Māori non-Pacific deaths)



Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 15–19 years.

An analysis by deprivation quintile showed Māori had a higher mortality rate than non-Māori non-Pacific at quintiles 2, 4 and 5.[8] The highest mortality rates were for Māori living in the most deprived areas of Aotearoa/New Zealand (**Figure 2.11**).

Rangatahi Māori aged 20–24 years

During 2015–19, there were 314 deaths in rangatahi Māori aged 20–24 years. The leading cause of death was suicide (43 percent), followed by injury (34 percent) and medical conditions (22 percent). Transport incidents accounted for 64 percent of injury deaths (n=68). The leading medical causes of death were neoplasms (n=20), symptoms and abnormal findings not elsewhere classified (12 deaths) and diseases of the circulatory system (10 deaths). Rangatahi Māori had a higher overall mortality rate, compared with non-Māori non-Pacific young people (rate ratio 2.04, 95 percent CI 1.78–2.35), and statistically significantly higher mortality from each category of death (**Table 2.9**).

[8] The Māori:non-Māori non-Pacific rate ratio for quintile 2 was 1.70, 95 percent CI 1.04–2.76.

Table 2.9: Mortality (number of deaths and rates per 100,000 population) in rangatahi Māori aged 20–24 years by cause and year of death, compared with non-Māori non-Pacific young people, Aotearoa/New Zealand 2015–19 (n=862 deaths)

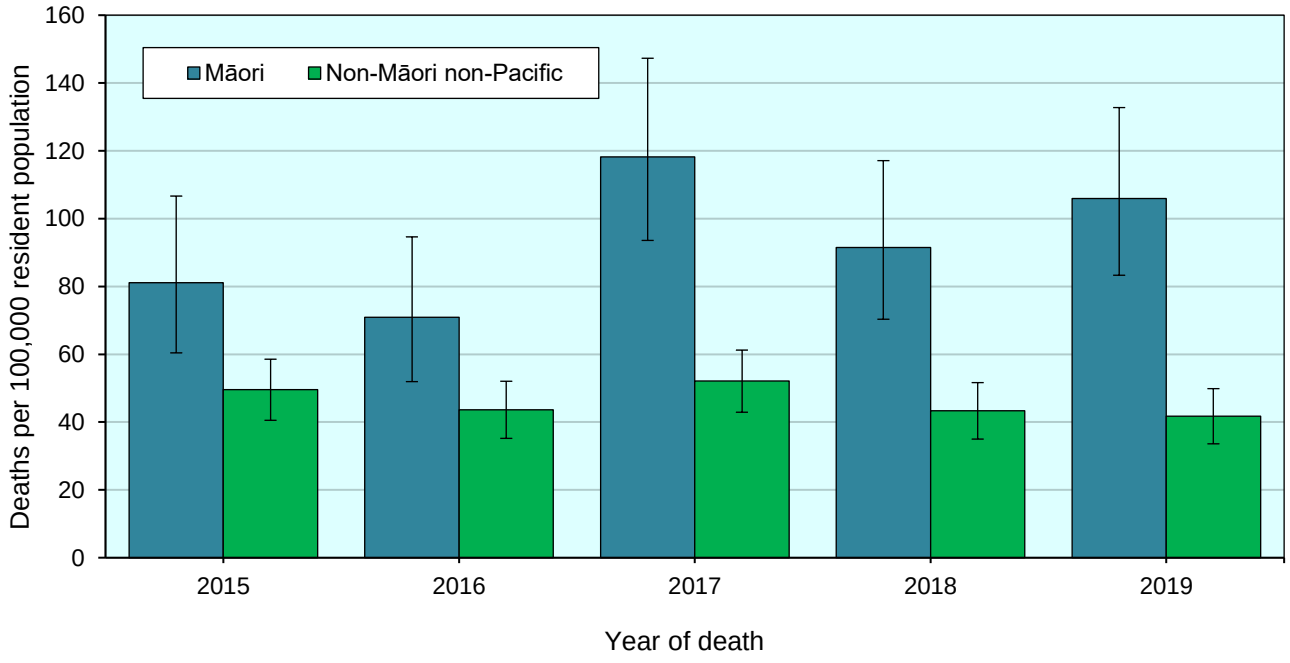
Category	2015	2016	2017	2018	2019	Total		Rate		Rate ratio (95% CI)
						Māori	Non-Māori non-Pacific	Māori	Non-Māori non-Pacific	
Medical	11	10	21	11	17	70	134	20.94	11.25	1.86 (1.39–2.48)
Injury	18	16	28	20	25	107	219	32.02	18.39	1.74 (1.38–2.19)
Suicide	21	20	30	32	32	135	192	40.39	16.13	2.51 (2.01–3.12)
Missing data	<3	–	–	–	<3	<3	3	s	0.25	–
Total	51	46	79	63	75	314	548	93.95	46.02	2.04 (1.78–2.35)

's' indicates rate not calculated due to small numbers.

Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 20–24 years.

Mortality rates for rangatahi Māori have not changed substantially since 2015. However, the mortality rates for rangatahi Māori have been statistically significantly higher than those for non-Māori non-Pacific young people each year for the past five years[9] (**Figure 2.12**).

Figure 2.12: Mortality (rates per 100,000 population and 95 percent confidence intervals) in rangatahi Māori aged 20–24 years by year of death, compared with non-Māori non-Pacific young people, Aotearoa/New Zealand 2015–19 (n=314 Māori and 548 non-Māori non-Pacific deaths)

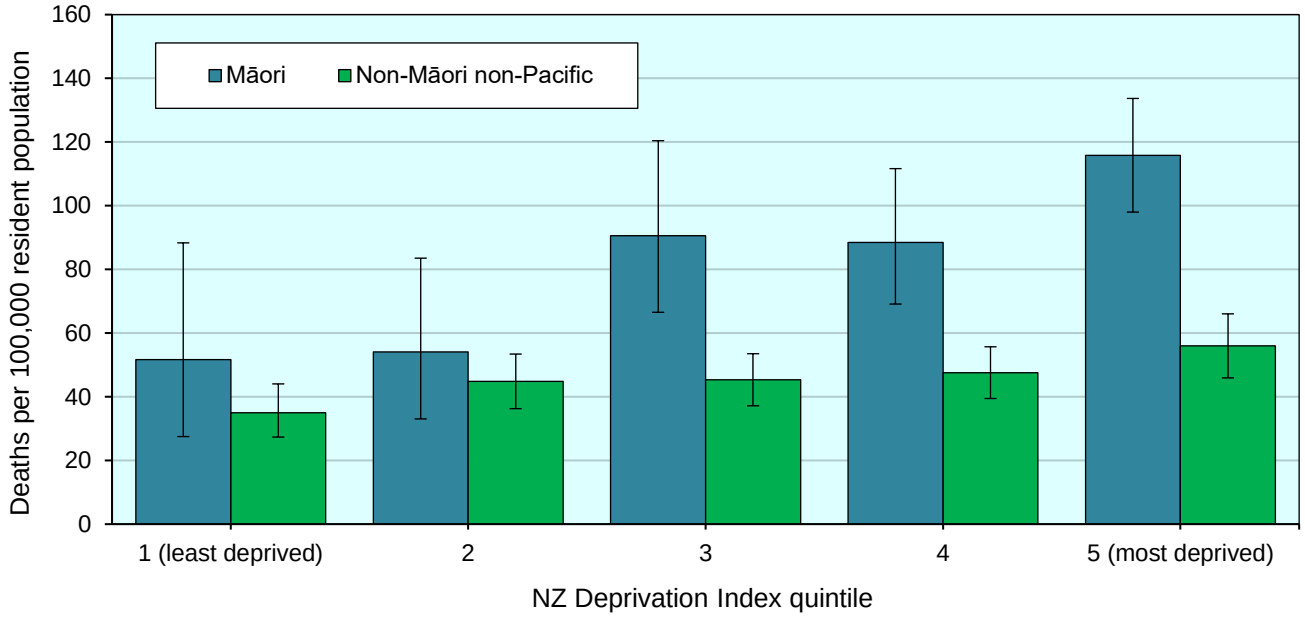


Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 20–24 years.

Mortality rates were statistically significantly higher for rangatahi Māori than non-Māori non-Pacific young people living in more deprived areas (quintiles 3–5) (**Figure 2.13**).

[9] The Māori:non-Māori non-Pacific rate ratio in 2016 was 1.63, 95 percent CI 1.15–2.30.

Figure 2.13: Mortality (rates per 100,000 population and 95 percent confidence intervals) in rangatahi Māori aged 20–24 years by NZ Deprivation Index quintile, compared with non-Māori non-Pacific young people, Aotearoa/New Zealand 2015–19 combined (n=313 Māori and 546 non-Māori non-Pacific deaths*)



* Excludes three cases with no available deprivation data.
Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 20–24 years.

3. Ngā mate o ngā iwi Moana-nui-a-Kiwa | Pacific mortality

This chapter reports on mortality in Pacific children and young people. We used 'total response' ethnicity to determine Pacific ethnicity for this chapter. This means that, if an individual has a Pacific ethnic group as any one of their ethnicities, they will be included here. In contrast, the rest of this report uses 'prioritised' ethnicity. Prioritised ethnicity assigns one ethnic group to each individual, giving precedence to Māori, followed by Pacific, Asian and MELAA and then European and Other ethnicities. Therefore, in the other chapters, if an individual identified as being both Pacific and Māori, they would be counted as Māori. In this chapter, however, they will be included as Pacific.

This chapter uses non-Pacific non-Māori as a comparator group. Therefore, Māori who do not also identify as Pacific (n=919) are excluded, as are those with unknown ethnicity (n=3).

Key findings

- During the 2015–19 period, 390 Pacific children and young people died.
- Nearly half of these deaths (44.9 percent) were due to medical conditions.
- While the overall number of deaths for Pacific children and young people has fluctuated, no clear trends of either an increase or a decrease in the number of deaths overall are evident.
- Marked inequities exist between Pacific and non-Pacific non-Māori children. Pacific post-neonatal infants are much more likely to die overall (rate ratio 3.82, 95 percent CI 2.98–4.89) and are much more likely to die from SUDI (rate ratio 8.57, 95 percent CI 5.74–12.79).
- For every age group, except for those aged five to nine years, Pacific children and young people are more likely to die overall compared with non-Pacific non-Māori children and young people, and are more likely to die from medical conditions.

During 2015–19, 390 Pacific children and young people died. The 'Pacific' ethnic group is heterogeneous, in that it is made up of children and young people who identify with many different ethnic groups (**Table 3.1**). From the way the data is provided to the Mortality Review Database, it is not possible to determine if someone identified more strongly with a particular ethnic group. Therefore, we present the groups here in the order the Ministry of Health follows.

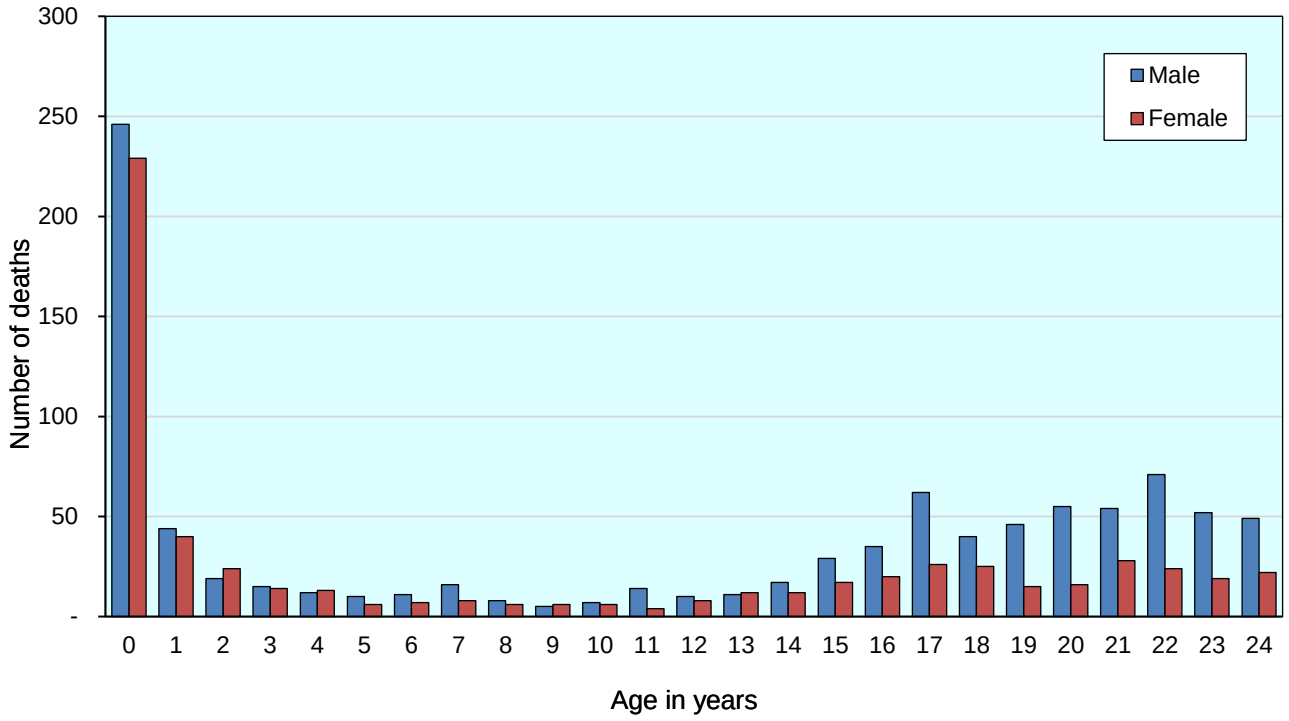
Table 3.1: Pacific mortality (number of deaths) in children and young people aged 28 days to 24 years by ethnic group and year of death, Aotearoa/New Zealand 2015–19 (n=390 deaths)

Ethnic group	Year of death					
	2015	2016	2017	2018	2019	Total
Samoan	30	18	27	25	34	134
Samoan, Cook Islands Māori	0	<3	5	<3	<3	11
Samoan, Cook Islands Māori, Tongan	0	0	0	<3	0	<3
Samoan, Cook Islands Māori, Tuvaluan	0	0	0	<3	0	<3
Samoan, Tongan	0	0	4	3	0	7
Samoan, Tongan, Niuean	0	<3	0	0	0	<3
Samoan, Niuean	<3	<3	0	0	<3	5
Samoan, Tokelauan	<3	0	0	0	<3	<3
Samoan, Fijian, Rotuman	0	0	0	0	<3	<3
Samoan, Tuvaluan	0	0	<3	0	<3	<3
Cook Islands Māori	21	16	16	11	17	81
Cook Islands Māori, Tongan	<3	<3	0	<3	0	4
Cook Islands Māori, Niuean	0	0	<3	<3	0	3
Cook Islands Māori, Fijian	0	0	0	<3	0	<3
Tongan	13	18	13	19	13	76
Tongan, Niuean	0	<3	0	0	<3	<3
Niuean	3	<3	<3	6	4	16
Tokelauan	0	<3	<3	<3	<3	4
Fijian	4	6	3	5	4	22
Fijian, Tuvaluan, Pacific Peoples nfd	0	0	0	0	<3	<3
Indigenous Australian	0	0	0	0	<3	<3
Kiribati	<3	0	<3	0	0	<3
Rotuman	<3	0	0	0	0	<3
Solomon Islander	<3	0	0	<3	0	<3
Tuvaluan	<3	<3	0	<3	<3	5
Ni Vanuatu	0	0	0	0	<3	<3
Pacific peoples nfd	0	0	0	<3	<3	3
Total	79	69	74	81	87	390

Note: Non-Pacific ethnicities are not displayed.
'nfd' = not further defined.
Source: Mortality Review Database.

During the 2002–19 period, there were 1,545 deaths in Pacific children and young people. The highest number of deaths was in those aged 28 days to one year and then numbers reduced in older age groups. As in the non-Pacific non-Māori population, deaths in the teenage years increased. This increase, however, was not as high as what might have been expected given the pattern of death in the population overall (see **Figure 3.1**).

Figure 3.1: Pacific mortality (number of deaths) in children and young people aged 28 days to 24 years by age and sex, Aotearoa/New Zealand 2002–19 (n=1,545 deaths)



Source: Mortality Review Database.

During the years 2015–19, there were 390 deaths in Pacific children and young people. Nearly half were due to medical conditions (45 percent), while 23 percent were due to injuries. Suicide and SUDI each accounted for 16 percent of deaths (**Table 3.2**).

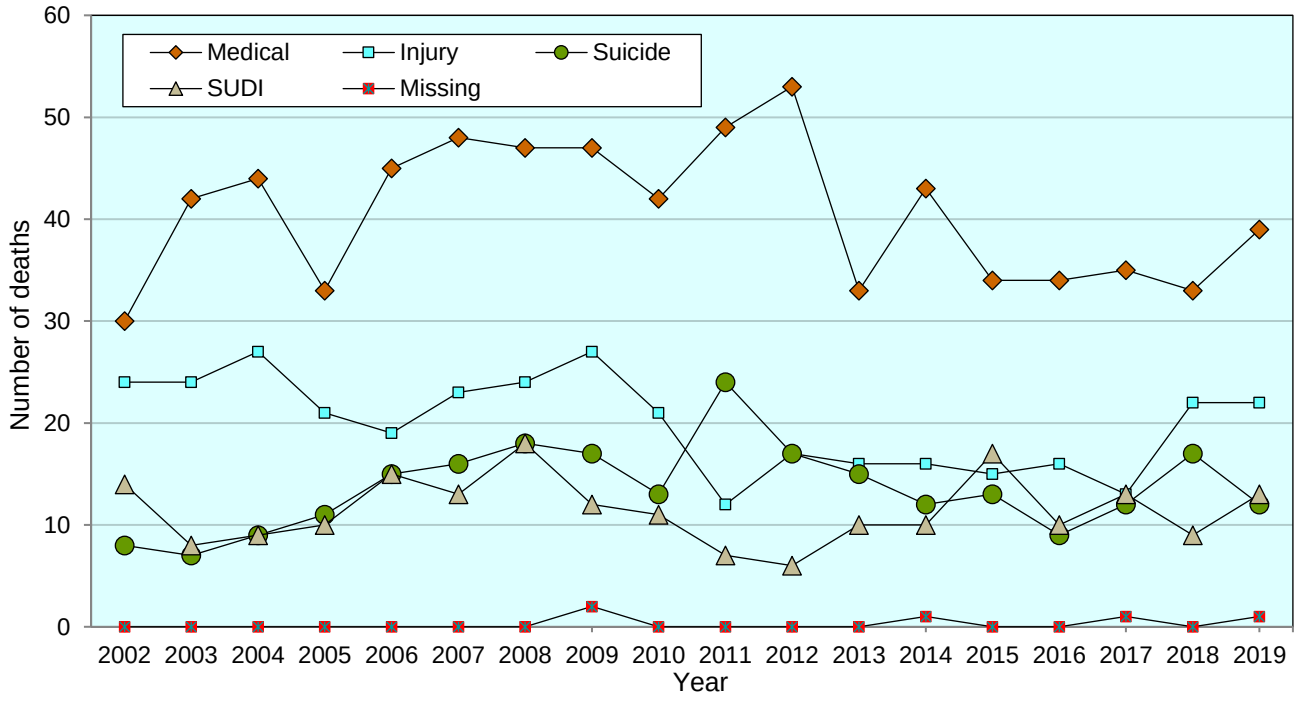
Table 3.2: Pacific mortality (number of deaths) in children and young people aged 28 days to 24 years by cause of death and age group, Aotearoa/New Zealand 2015–19 combined (n=390 deaths)

Category	<1 year*	1–4 years	5–9 years	10–14 years	15–19 years	20–24 years	Total	Percentage (%)
Medical	41	30	16	17	28	43	175	44.9
Injury	3	14	3	5	22	41	88	22.6
Suicide	–	–	–	4	28	31	63	16.2
SUDI	62	–	–	–	–	–	62	15.9
Missing data	<3	–	–	–	<3	–	<3	–
Total	107	44	19	26	79	115	390	100.0

* This category represents infants 28 days and older, and less than one calendar year in age.
Source: Mortality Review Database.

The number of deaths by cause has fluctuated over the years since 2002. No clear trends of either an increase or decrease in the number of deaths are evident (**Figure 3.2** and **Table 3.3**).

Figure 3.2: Pacific mortality (number of deaths) in children and young people aged 28 days to 24 years by cause and year of death, Aotearoa/New Zealand 2002–19 (n=1,545 deaths)



Source: Mortality Review Database.

Table 3.3: Pacific mortality (number of deaths and rates per 100,000 population) in children and young people aged 28 days to 24 years by age group and year of death, Aotearoa/New Zealand 2015–19 (n=390 deaths)

Category	2015	2016	2017	2018	2019	Total	Percentage (%)	Rate
28 days to 1 year	25	19	20	18	25	107	27.4	2.32*
1–4 years	8	9	10	11	6	44	11.3	27.38
5–9 years	4	4	3	5	3	19	4.9	8.77
10–14 years	7	5	5	<3	8	26	6.7	13.36
15–19 years	17	12	16	22	12	79	20.3	42.95
20–24 years	18	20	20	24	33	115	29.5	69.63
Total	79	69	74	81	87	390	100.0	40.32

* Rate is per 1,000 live births.

Sources: Numerator: Mortality Review Database; Denominator: Stats NZ Total Response Pacific usually resident population 2015–19, 0–24 years.

Medical conditions were the leading category of death, resulting in 175 deaths from 2015–19. The most common causes of medical death were neoplasms (n=28), congenital anomalies (n=27), diseases of the respiratory system (n=24), diseases of the circulatory system (n=21) and diseases of the nervous system (n=20). Injury accounted for 22.6 percent of deaths; within that category, transport accounted for 39 deaths (44 percent). There were 63 deaths (16 percent) due to suicide and 62 (16 percent) due to SUDI (**Table 3.4**).

Table 3.4: Pacific mortality (number of deaths and rates per 100,000 population) by cause of death and age group, Aotearoa/New Zealand 2015–19 combined (n=390 deaths)

Cause of death	<1 year*	1–4 years	5–9 years	10–14 years	15–19 years	20–24 years	Total	%	Rate 2015–19
Medical									
Infectious and parasitic disease	4	4	<3	–	–	–	9	2.3	0.93
Neoplasms	–	7	4	3	4	10	28	7.2	2.89
Diseases of the blood and blood-forming organs and disorders of the immune system	<3	–	–	–	<3	–	3	0.8	0.31
Endocrine, nutritional and metabolic diseases	–	–	<3	<3	<3	3	9	2.3	0.93
Mental and behavioural disorders	–	–	–	–	–	–	–	–	–
Diseases of the nervous system	3	<3	3	4	<3	6	20	5.1	2.07
Diseases of the eye and adnexa	–	–	–	–	–	–	–	–	–
Diseases of the ear and mastoid process	–	–	–	–	–	–	–	–	–
Diseases of the circulatory system	<3	4	<3	<3	5	7	21	5.4	2.17
Diseases of the respiratory system	3	6	<3	5	<3	7	24	6.2	2.48
Diseases of the digestive system	–	–	–	–	<3	–	<3	x	s
Diseases of the skin and subcutaneous tissue	–	–	–	–	–	–	–	–	–
Diseases of the musculoskeletal system and connective tissue	–	<3	–	–	<3	<3	4	1.0	0.41
Diseases of the genitourinary system	–	–	–	–	–	4	4	1.0	0.41
Pregnancy, childbirth and the puerperium	–	–	–	–	–	<3	<3	x	s
Certain conditions originating in the perinatal period	14	–	–	–	–	–	14	3.6	1.45
Congenital anomalies	13	3	3	<3	6	<3	27	6.9	2.79
Symptoms and abnormal findings not elsewhere classified	–	3	–	–	4	<3	9	2.3	0.93
Total medical	**41**	**30**	**16**	**17**	**28**	**43**	**175**	**44.9**	**18.09**
Injury									
Cut/pierce	–	–	–	–	–	<3	<3	x	s
Drowning	<3	3	–	<3	4	6	16	4.1	1.65
Fall	–	–	–	–	–	<3	<3	x	s
Fire/hot object or substance	–	–	–	–	<3	–	<3	x	s
Firearm	–	–	–	–	–	–	–	–	–
Machinery	–	–	–	–	–	<3	<3	x	s
Transport	<3	3	<3	<3	10	21	39	10.0	4.03
Natural/environmental	–	–	–	–	<3	–	<3	x	s
Overexertion	–	–	–	–	–	–	–	–	–
Poisoning	–	<3	<3	–	<3	3	7	1.8	0.72
Struck by, against	–	3	–	–	–	–	3	0.8	0.31
Suffocation	–	<3	–	<3	–	–	<3	x	s
Other specified, classifiable	–	–	–	–	<3	<3	<3	x	s
Other specified, not elsewhere classified	–	–	–	–	<3	–	<3	x	s
Unspecified	–	–	–	–	<3	–	<3	x	s
Complications of medical and surgical care	–	–	–	–	–	–	–	–	–
Sequelae of surgical and medical care as external cause	–	–	–	–	–	–	–	–	–
Assault	<3	<3	–	–	<3	6	10	2.6	1.03
Total injury	**3**	**14**	**3**	**5**	**22**	**41**	**88**	**22.6**	**9.10**

Cause of death	<1 year*	1–4 years	5–9 years	10–14 years	15–19 years	20–24 years	Total	%	Rate 2015–19
Suicide	–	–	–	4	28	31	63	16.2	6.51
SUDI (28 days to <1 year)	62	–	–	–	–	–	62	15.9	6.41
Missing data	<3	–	–	–	<3	–	<3	x	s
Total	**107**	**44**	**19**	**26**	**79**	**115**	**390**	**100.0**	**40.32**

* This category represents infants 28 days and older, and less than one calendar year in age.
'x' indicates percentage not calculated due to small numbers.
's' indicates rate not calculated due to small numbers.
Sources: Numerator: Mortality Review Database; Denominator: Stats NZ Total Response Pacific usually resident population 2015–19, 0–24 years.

Post-neonatal infants

During the 2015–19 period, there were 107 deaths in Pacific post-neonatal infants aged 28 days to one year. The leading category of death in this age group was SUDI (57.9 percent), followed by medical conditions (38.3 percent) (**Table 3.5**). Compared with non-Pacific non-Māori infants, Pacific infants had a higher rate of SUDI deaths (rate ratio 8.57, 95 percent CI 5.74–12.79) and a higher rate of medical deaths (rate ratio 2.21, 95 percent CI 1.54–3.18) (**Table 3.5**). Pacific infants had a higher overall mortality rate, compared with non-Pacific non-Māori infants (rate ratio 3.82, 95 percent CI 2.98–4.89).

Table 3.5: Mortality (number of deaths and rates per 1,000 live births) in infants aged 28 days to less than one year by cause and year of death, Pacific compared with non-Pacific non-Māori, Aotearoa/New Zealand 2015–19 (n=258 deaths)

Category	2015	2016	2017	2018	2019	Total		Rate		Rate ratio (95% CI)
						Pacific	Non-Pacific non-Māori	Pacific	Non-Pacific non-Māori	
Medical	8	9	7	7	10	41	100	0.89	0.40	2.21 (1.54–3.18)
Injury	–	–	–	<3	<3	3	12	0.06	0.05	1.35 (0.38–4.78)
SUDI	17	10	13	9	13	62	39	1.34	0.16	8.57 (5.74–12.79)
Missing data	–	–	–	–	<3	<3	–	s	–	–
Total	25	19	20	18	25	107	151	2.32	0.61	3.82 (2.98–4.89)

's' indicates rate not calculated due to small numbers.
Sources: Numerator: Mortality Review Database; Denominator: Ministry of Health Live Birth Registrations 2015–19.

Children aged one to four years

There were 44 deaths in Pacific children aged one to four years during 2015–19. The leading category of death was medical conditions. The most common medical causes of death were neoplasms (n=7), diseases of the respiratory system (n=6), infectious and parasitic diseases (n=4) and diseases of the circulatory system (n=4). Fourteen deaths were due to injury (31.8 percent), which included three deaths as a result of each of the following: transport, drowning and 'struck by, against'. Compared with non-Pacific non-Māori children, Pacific children aged one to four years had a higher overall mortality rate, as well a higher rate of deaths from both injury and medical causes (**Table 3.4** and **Table 3.6**).

Table 3.6: Mortality (number of deaths and rates per 100,000 population) in children aged one to four years by cause and year of death, Pacific compared with non-Pacific non-Māori, Aotearoa/New Zealand 2015–19 (n=175 deaths)

Category	2015	2016	2017	2018	2019	Total number		Rate		Rate ratio (95% CI)
						Pacific	Non-Pacific non-Māori	Pacific	Non-Pacific non-Māori	
Medical	4	4	10	8	4	30	88	18.67	8.59	2.17 (1.44–3.29)
Injury	4	5	-	3	<3	14	43	8.71	4.20	2.07 (1.14–3.79)
Missing data	-	-	-	-	-	-	-	-	-	-
Total	8	9	10	11	6	44	131	27.38	12.79	2.14 (1.52–3.01)

Sources: Numerator: Mortality Review Database; Denominator: Stats NZ Total Response Pacific usually resident population 2015–19, one to four years.

Children aged five to nine years

Table 3.7: Mortality (number of deaths and rates per 100,000 population) in children aged five to nine years by cause and year of death, Pacific compared with non-Pacific non-Māori, Aotearoa/New Zealand 2015–19 (n=110 deaths)

Category	2015	2016	2017	2018	2019	Total		Total		Rate ratio (95% CI)
						Pacific	Non-Pacific non-Māori	Pacific	Non-Pacific non-Māori	
Medical conditions	3	3	3	5	<3	16	62	7.38	4.63	1.60 (0.92–2.77)
Injury	<3	<3	–	–	<3	3	28	1.38	2.09	0.66 (0.20–2.18)
Missing data	–	–	–	–	–	–	<3	–	s	–
Total	4	4	3	5	3	19	91	8.77	6.79	1.29 (0.79–2.12)

‘s’ indicates rate not calculated due to small numbers.

Sources: Numerator: Mortality Review Database; Denominator: Stats NZ Total Response Pacific usually resident population 2015–19, five to nine years.

In Pacific children aged five to nine years during 2015–19, there were 19 deaths. The leading category of death was medical conditions, with 16 deaths (**Table 3.7**). The most common medical conditions causing death were neoplasms (n=4), congenital anomalies (n=3) and diseases of the nervous system (n=3) (**Table 3.4**).

No statistically significant differences in the mortality rates were evident between Pacific children and non-Pacific non-Māori children (**Table 3.7**).

Children aged 10–14 years

During the 2015–19 period, there were 26 deaths in Pacific children aged 10–14 years. The leading category of death was medical conditions (n=17). The most common medical conditions causing death were diseases of the respiratory system (n=5) and diseases of the nervous system (n=4). Four deaths in this age group were due to suicide. Pacific children aged 10–14 years had statistically significantly higher mortality rates from medical conditions and overall (**Table 3.4** and **Table 3.8**).

Table 3.8: Mortality (number of deaths and rates per 100,000 population) in children aged 10–14 years by cause and year of death, Pacific compared with non-Pacific non-Māori, Aotearoa/New Zealand 2015–19 (n=112 deaths)

Category	2015	2016	2017	2018	2019	Total		Rate		Rate ratio (95% CI)
						Pacific	Non-Pacific non-Māori	Pacific	Non-Pacific non-Māori	
Medical	3	3	4	<3	6	17	46	8.74	3.63	2.41 (1.38–4.20)
Injury	<3	<3	<3	–	<3	5	27	2.57	2.13	1.21 (0.46–3.13)
Suicide	3	<3	–	–	–	4	13	2.06	1.02	2.01 (0.65–6.15)
Missing data	–	–	–	–	–	–	–	–	–	–
Total	7	5	5	<3	8	26	86	13.36	6.78	1.97 (1.27–3.06)

Sources: Numerator: Mortality Review Database; Denominator: Stats NZ Total Response Pacific usually resident population 2015–19, 10–14 years.

Young people aged 15–19 years

In Pacific young people aged 15–19 years, there were 79 deaths during 2015–19. The leading categories of death were medical conditions and suicide (n=28 deaths each). There were 22 deaths due to injury. Of the deaths due to medical conditions, six were due to congenital anomalies and five due to diseases of the circulatory system. The leading cause of injury death was transport incidents, which resulted in 10 deaths (45 percent of injury deaths). Mortality rates for Pacific young people in this age group were statistically significantly higher overall, as well for medical conditions and suicide, compared with non-Pacific non-Māori (**Table 3.4** and **Table 3.9**).

Table 3.9: Mortality (number of deaths and rates per 100,000 population) in young people aged 15–19 years by cause and year of death, Pacific compared with non-Pacific non-Māori, Aotearoa/New Zealand 2015–19 (n=426 deaths)

Category	2015	2016	2017	2018	2019	Total		Rate		Rate ratio (95% CI)
						Pacific	Non-Pacific non-Māori	Pacific	Non-Pacific non-Māori	
Medical	6	8	5	5	4	28	93	15.22	7.44	2.05 (1.34–3.12)
Injury	<3	<3	4	9	5	22	125	11.96	10.00	1.20 (0.76–1.88)
Suicide	9	<3	6	8	3	28	127	15.22	10.16	1.50 (1.00–2.26)
Missing	–	–	<3	–	–	<3	<3	s	s	–
Total	17	12	16	22	12	79	347	42.95	27.76	1.55 (1.21–1.98)

‘s’ indicates rate not calculated due to small numbers.

Sources: Numerator: Mortality Review Database; Denominator: Stats NZ Total Response Pacific usually resident population 2015–19, 15–19 years.

Young people aged 20–24 years

During 2015–19, there were 115 deaths in Pacific young people aged 20–24 years. The leading category of death was medical conditions; the most common medical causes were neoplasms (n=10), diseases of the circulatory and respiratory systems (n=7 deaths each) and diseases of the nervous system (n=6). The leading cause of injury death was transport incidents (51 percent of injury deaths). Thirty-one deaths were due to suicide. Pacific young people in this age group had statistically significantly higher rates of medical and injury deaths, and a higher mortality rate overall, compared with non-Pacific non-Māori young people (**Table 3.4** and **Table 3.10**).

Table 3.10: Mortality (number of deaths and rates per 100,000 population) in young people aged 20–24 years by cause and year of death, Pacific compared with non-Pacific non-Māori, Aotearoa/New Zealand 2015–19 (n=663 deaths)

Category	2015	2016	2017	2018	2019	Total		Rate		Rate ratio (95% CI)
						Pacific	Non-Pacific non-Māori	Pacific	Non-Pacific non-Māori	
Medical	10	7	6	7	13	43	134	26.04	10.21	2.55 (1.81–3.59)
Injury	7	7	8	8	11	41	219	24.83	16.69	1.49 (1.07–2.08)
Suicide	<3	6	6	9	9	31	192	18.77	14.63	1.28 (0.88–1.87)
Missing data	–	–	–	–	–	–	3	–	0.23	–
Total	18	20	20	24	33	115	548	69.63	41.76	1.67 (1.36–2.04)

Sources: Numerator: Mortality Review Database; Denominator: Stats NZ Total Response Pacific usually resident population 2015–19, 20–24 years.

4. Te mate ohorere o te kōhungahunga | Sudden unexpected death in infancy (SUDI)

This chapter reports on deaths due to SUDI from 2002 to 2019.

Key findings

- There were 841 deaths from SUDI during the 18 years from 2002 to 2019.
- Forty-five of these deaths occurred in 2019.
- An analysis of the data by broad ethnic categories shows clear inequities: pēpi Māori and Pacific babies have higher SUDI rates than non-Māori non-Pacific infants.
- While over the whole period a reduction in the SUDI rate for Māori was statistically significant, previous gains appear to have reached a plateau.
- The SUDI mortality rate for Pacific infants fluctuates somewhat; however, over the period 2002–19 there was no statistically significant increase.

During the years 2002–19, there were 841 deaths due to SUDI in post-neonatal infants (aged 28 days to 11 months). While the SUDI mortality rate has varied substantially over this time, ranging from a low of 0.55 per 1,000 live births in 2012 to a high of 1.05 per 1,000 live births in 2003, there has been a statistically significant decrease in the overall SUDI rate (**Table 4.1** and **Figure 4.1**).

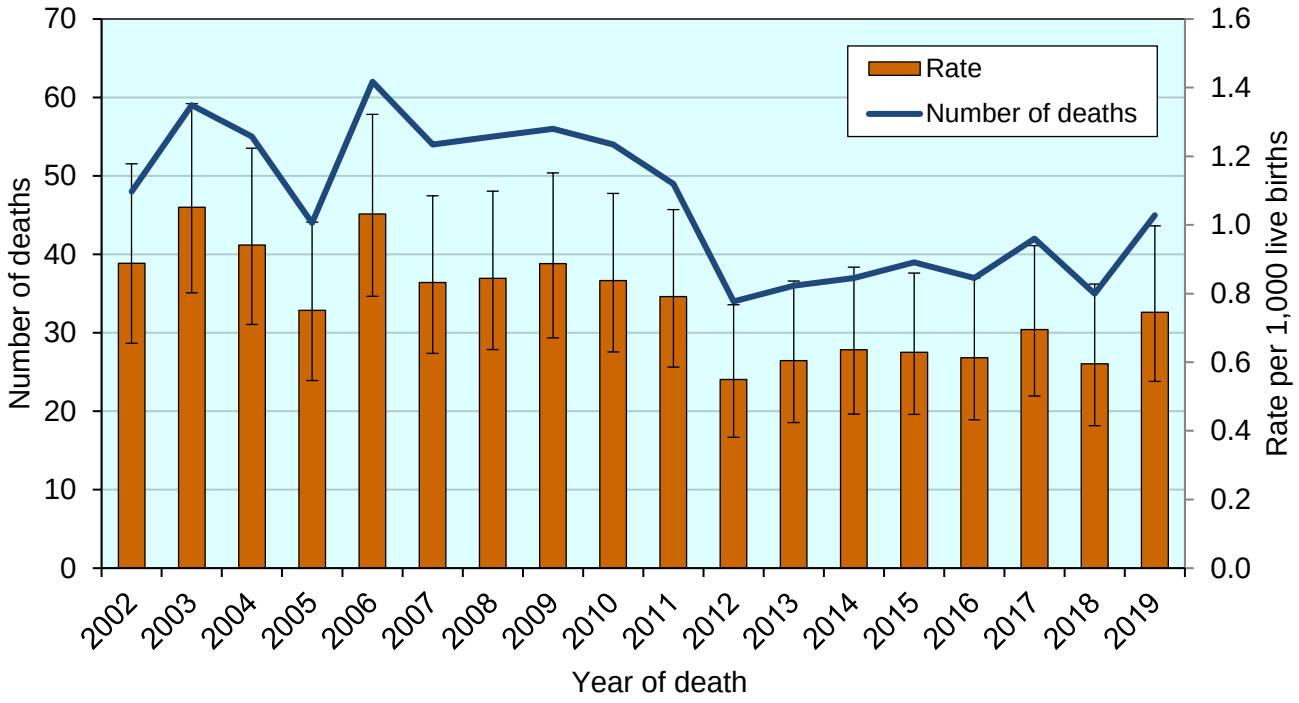
Table 4.1: Post-neonatal SUDI mortality (number of deaths and rates per 1,000 live births) by year of death, Aotearoa/New Zealand 2002–19 (n=841 deaths)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total*
Number of deaths	48	59	55	44	62	54	55	56	54	49	34	36	37	39	37	42	35	45	841
Rate	0.89	1.05	0.94	0.75	1.03	0.83	0.84	0.89	0.84	0.79	0.55	0.60	0.64	0.63	0.61	0.70	0.60	0.75	0.77

* Regression for trend 2002–19: -0.022 (95% CI -0.032, -0.012; p-value <0.01).

Sources: Numerator: Mortality Review Database; Denominator: Ministry of Health Live Birth Registrations 2002–19.

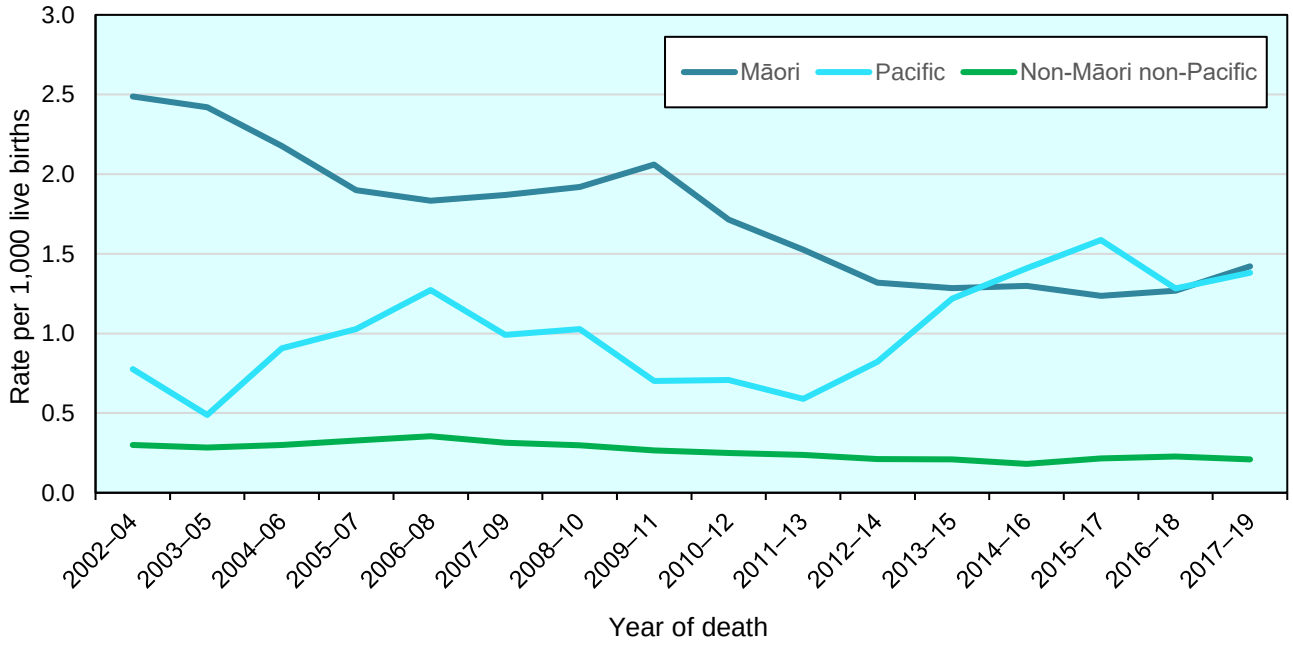
Figure 4.1: Post-neonatal SUDI mortality (number of deaths and rates per 1,000 live births) by year of death, Aotearoa/New Zealand 2002–19 (n=841 deaths)



Sources: Numerator: Mortality Review Database; Denominator: Ministry of Health Live Birth Registrations 2002–19.

An analysis by broad ethnic categories shows clear inequities: Māori and Pacific babies have a higher SUDI rate than those in the non-Māori non-Pacific group. The SUDI mortality rate for Pacific post-neonatal infants fluctuates somewhat; however, over the period 2002–19 there is no statistical evidence of an increase in the SUDI rate (**Figure 4.2**).

Figure 4.2: Post-neonatal SUDI mortality (three-year rolling rates per 1,000 live births) by prioritised ethnic category and year of death (rolling three-year periods), Aotearoa/New Zealand 2002–19 (n=840 deaths*)



* Excludes one case with unknown ethnicity.
Sources: Numerator: Mortality Review Database; Denominator: Ministry of Health Live Birth Registrations 2002–19.

Similarly, SUDI mortality rates varied substantially by DHB of residence. Some DHBs had no, or very few, SUDI deaths during the five-year period, while others had a large number. In most DHBs where rates could be calculated, the SUDI mortality rate in pēpi Māori was higher than in non-Māori non-Pacific infants. The pattern was the same for Pacific infants, where the SUDI rates were higher than in non-Pacific non-Māori infants in each DHB (**Table 4.2**).

Table 4.2: Post-neonatal SUDI mortality (number of deaths and rates per 1,000 live births), by DHB of residence and prioritised ethnic category, Aotearoa/New Zealand 2015–19 combined (n=198 deaths)

DHB of residence	Māori			Pacific			Non-Māori non-Pacific			Total		
	Deaths	Rate	95% CI	Deaths	Rate	95% CI	Deaths	Rate	95% CI	Deaths	Rate	95% CI
Northland	5	0.73	0.24–1.71	–	–	–	5	1.15	0.37–2.68	10	0.87	0.42–1.60
Waitematā	7	1.00	0.40–2.06	3	0.73	0.15–2.13	3	0.11	0.02–0.31	13	0.33	0.18–0.56
Auckland	7	1.86	0.75–3.82	11	2.38	1.19–4.25	<3	s	–	19	0.66	0.40–1.04
Counties Manukau	23	2.21	1.40–3.32	17	1.42	0.82–2.27	<3	s	–	42	1.00	0.72–1.35
Waikato	13	1.16	0.62–1.98	3	2.61	0.54–7.62	5	0.32	0.10–0.75	21	0.75	0.47–1.15
Lakes	<3	s	–	<3	s	–	–	–	–	<3	s	–
Bay of Plenty	11	1.65	0.82–2.95	–	–	–	<3	s	–	12	0.79	0.41–1.38
Tairāwhiti	5	1.90	0.62–4.43	–	–	–	<3	s	–	6	1.63	0.60–3.56
Hawke's Bay	12	2.37	1.23–4.15	–	–	–	<3	s	–	13	1.22	0.65–2.09
Taranaki	<3	s	–	–	–	–	<3	s	–	4	0.52	0.14–1.33
MidCentral	4	0.94	0.26–2.41	–	–	–	3	0.49	0.10–1.43	7	0.64	0.26–1.31
Whanganui	4	1.90	0.52–4.87	<3	s	–	<3	s	–	7	1.63	0.65–3.35
Capital & Coast	5	1.44	0.47–3.37	<3	s	–	<3	s	–	8	0.47	0.20–0.92
Hutt	3	1.01	0.21–2.95	<3	s	–	–	–	–	4	0.40	0.11–1.02
Wairarapa	<3	s	–	–	–	–	–	–	–	<3	s	–
Nelson Marlborough	<3	s	–	–	–	–	<3	s	–	<3	s	–
West Coast	–	–	–	–	–	–	<3	s	–	<3	s	–
Canterbury	8	1.34	0.58–2.63	4	2.26	0.62–5.78	7	0.29	0.12–0.59	19	0.59	0.35–0.92
South Canterbury	–	–	–	–	–	–	–	–	–	–	–	–
Southern	<3	s	–	<3	s	–	3	0.23	0.05–0.67	6	0.35	0.13–0.75
New Zealand	114	1.31	1.07–1.55	45	1.48	1.08–1.98	39	0.21	0.15–0.29	198	0.66	0.56–0.75

‘s’ indicates rate not calculated due to small numbers.

Sources: Numerator: Mortality Review Database; Denominator: Ministry of Health Live Birth Registrations 2015–19.

5. Te mate whakamomori | Suicide mortality

During the 2002–19 period, there were 2,177 deaths due to suicide. The age range for these deaths was 9–24 years. The rest of this chapter refers only to deaths in those aged 10–24 years.

Key findings

- During the 2002–19 period, there were 2,176 deaths due to suicide.
- In 2019, there were 144 suicide deaths in children and young people aged 10–24 years.
- Male deaths are much more common, with an overall male to female ratio of 2.4.
- In children aged 10–14 years, the number of deaths did not differ between males and females.
- Overall, deaths peak at age 20–21 years and reduce in the older years.
- By broad ethnic group, deaths in Māori have an earlier (younger) onset.
- Deaths due to suicide were more frequent in those living in high-deprivation areas, as measured by the New Zealand Deprivation Index.

The suicide rate in children and young people aged 10–24 years has varied considerably over the past 14 years. The lowest rate occurred in 2014 with 10.39 deaths per 100,000 population, and the highest rate was in 2012 with 16.80 per 100,000 population (**Table 5.1**). While suicide mortality rates have fluctuated a lot, no statistically significantly change in the overall rate has occurred over this timeframe (**Figure 5.1**).

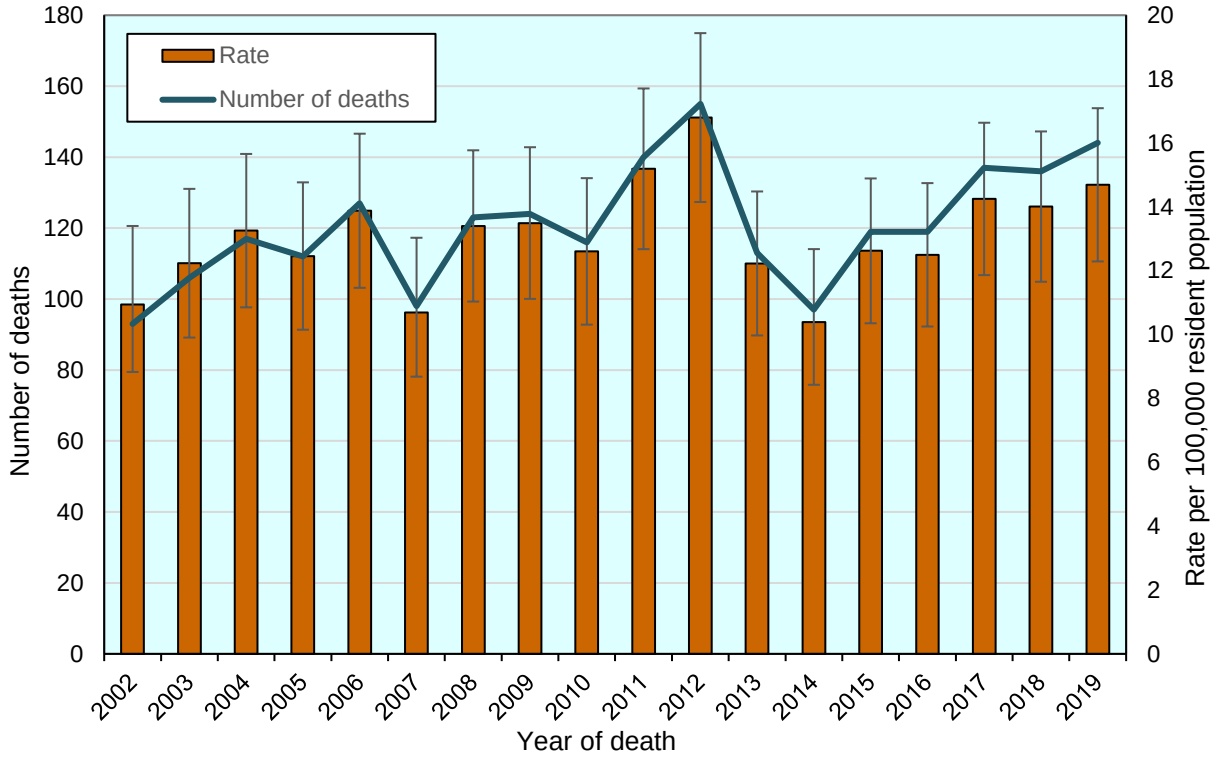
Table 5.1: Suicide mortality (number of deaths and rates per 100,000 population) in children and young people aged 10–24 years by year of death, Aotearoa/New Zealand 2002–19 (n=2,176 deaths)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total*
Number of deaths	93	106	117	112	127	98	123	124	116	140	155	113	97	119	119	137	136	144	2,176
Rate	10.94	12.23	13.25	12.46	13.88	10.69	13.40	13.49	12.60	15.19	16.80	12.23	10.39	12.62	12.50	14.25	14.01	14.69	13.11

* Regression for trend 2002–19: 0.100 (95% CI -0.051, 0.251; p-value>0.05).

Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2002–19, 10–24 years.

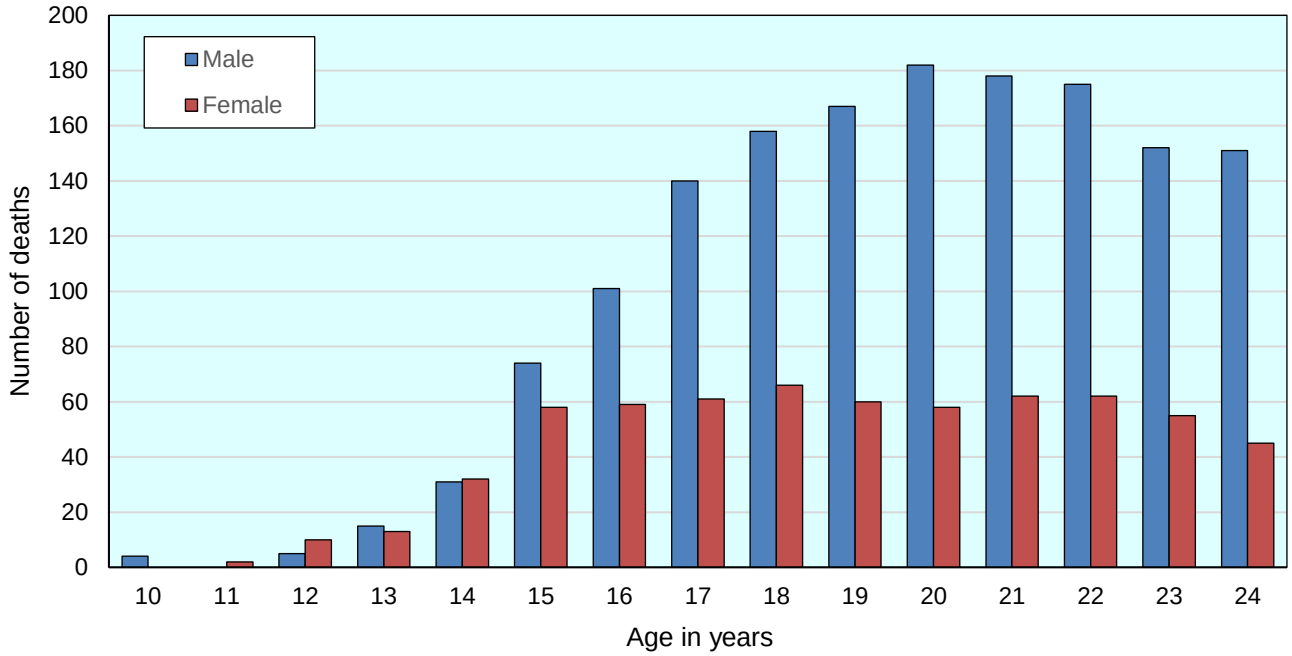
Figure 5.1: Suicide mortality (number of deaths and rates per 100,000 population) in children and young people aged 10–24 years by year of death, Aotearoa/New Zealand 2002–19 (n=2,176 deaths)



Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2002–19, 10–24 years.

An analysis by age and sex reveals several patterns. Male deaths due to suicide far outweigh female deaths, with an overall male to female ratio of 2.4. However, in the childhood years (10–14 years of age) the number of suicide deaths does not differ between males and females. It is not until adolescence that the higher rate among males becomes evident. From age 17 years onwards, suicide deaths in males are at least two times higher, and over three times more in some ages, compared with females. The total number of deaths peaks at age 20–21 years and slightly reduces in the older years (**Figure 5.2**).

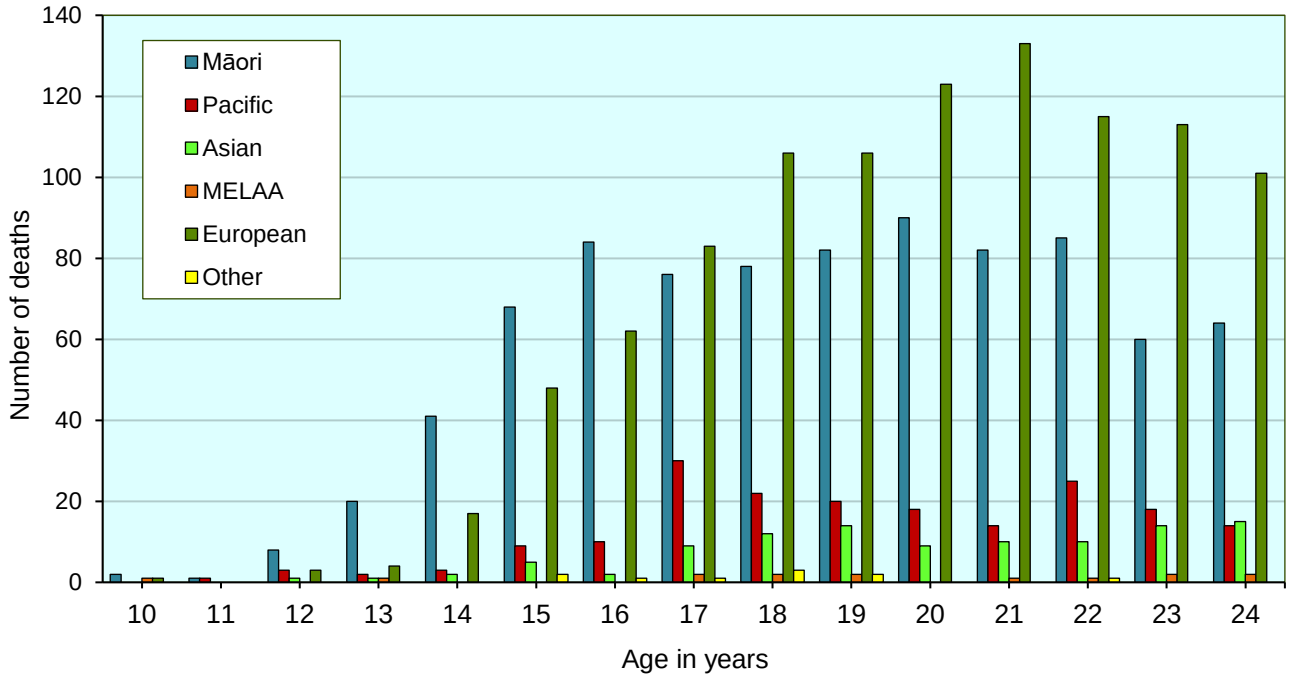
Figure 5.2: Suicide mortality (number of deaths) in children and young people aged 10–24 years by age and sex, Aotearoa/New Zealand 2002–19 (n=2,176 deaths)



Source: Mortality Review Database.

The age distribution of suicide deaths varies by prioritised ethnic group. Suicide deaths in Māori tend to have a slightly earlier onset: 64 percent of deaths in those aged 10–14 years are in tamariki Māori. While the main peak in suicide deaths in children and young people is at 20 years of age, this varies by ethnic group. For Māori, as well as starting earlier than in other ethnic groups, deaths due to suicide increase sharply up to 16 years of age and do not start to reduce until 20 years of age. For those in the European ethnic group, suicide deaths peak at 21 years of age (**Figure 5.3**).

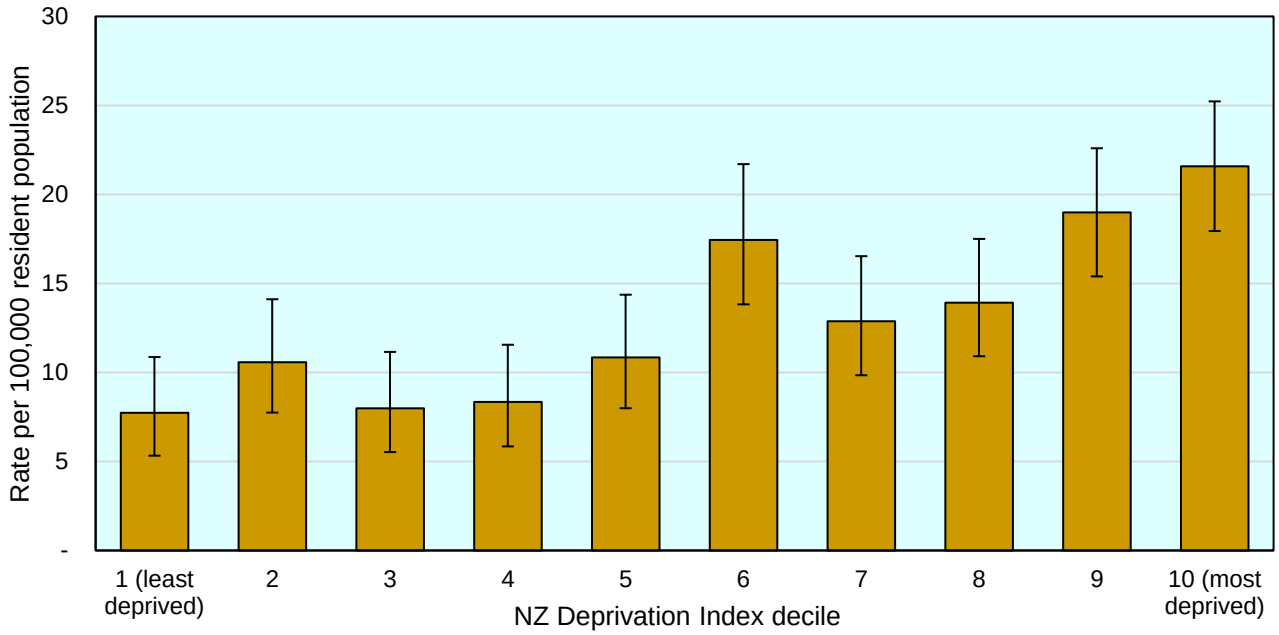
Figure 5.3: Suicide mortality (number of deaths) in children and young people aged 10–24 years by age and prioritised ethnic group, Aotearoa/New Zealand 2002–19 (n=2,173 deaths*)



* Excludes three cases where ethnicity was unknown.
MELAA = Middle Eastern, Latin American and African.
Source: Mortality Review Database.

Deaths due to suicide were more frequent in those living in high-deprivation areas, as measured by the New Zealand Deprivation Index. Nearly half of all deaths (48 percent) occurred in children and young people living in deprivation deciles 8–10 (**Figure 5.4**).

Figure 5.4: Suicide mortality (rates per 100,000 population) in children and young people aged 10–24 years by New Zealand Deprivation Index decile, Aotearoa/New Zealand 2015–19 (n=653 deaths*)



* Excludes two cases where deprivation was unknown.
Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 10–24 years.

6. Te mate haere waka | Transport mortality

This chapter provides a broad overview of transport-related mortality in children and young people. The numbers in this chapter need to be interpreted with caution, given that we generally have no information about exposure (for example, time spent walking or travelling in a car), which can influence mortality. This chapter includes all deaths related to transport, including those on and off the road, in pedestrians, cyclists, all motorised vehicles, and water and aircraft incidents.

Key findings

- In the years 2002–19 inclusive, there were 2,330 deaths in children and young people aged 28 days to 24 years due to transport.
- There were 498 deaths in the most recent five-year period, from 2015–19.
- While the number of deaths has been consistent over the most recent five-year period, the number of deaths has reduced substantially since 2002 in the age groups 15–19 years and 20–24 years.
- Of all transport deaths, the most occurred among car occupants (64.5 percent), followed by 12.2 percent among pedestrians and 7.4 percent among motorcyclists.
- Pedestrian deaths occurred at all ages, with peaks in those aged one to four years and 15–24 years.
- The number of car occupant deaths peaked in those aged 18 years for both males and females.
- For all road user types, deaths in males far outnumbered those in females.
- Marked disparities were evident by prioritised ethnic group. In particular, in car occupant and pedestrian deaths, tamariki and rangatahi Māori had significantly higher rates than non-Māori non-Pacific children and young people.

In the years 2002–19 inclusive, there were 2,330 deaths in children and young people aged 28 days to 24 years due to transport. There were 498 deaths in the most recent five-year period, from 2015–19 (**Table 6.1**).

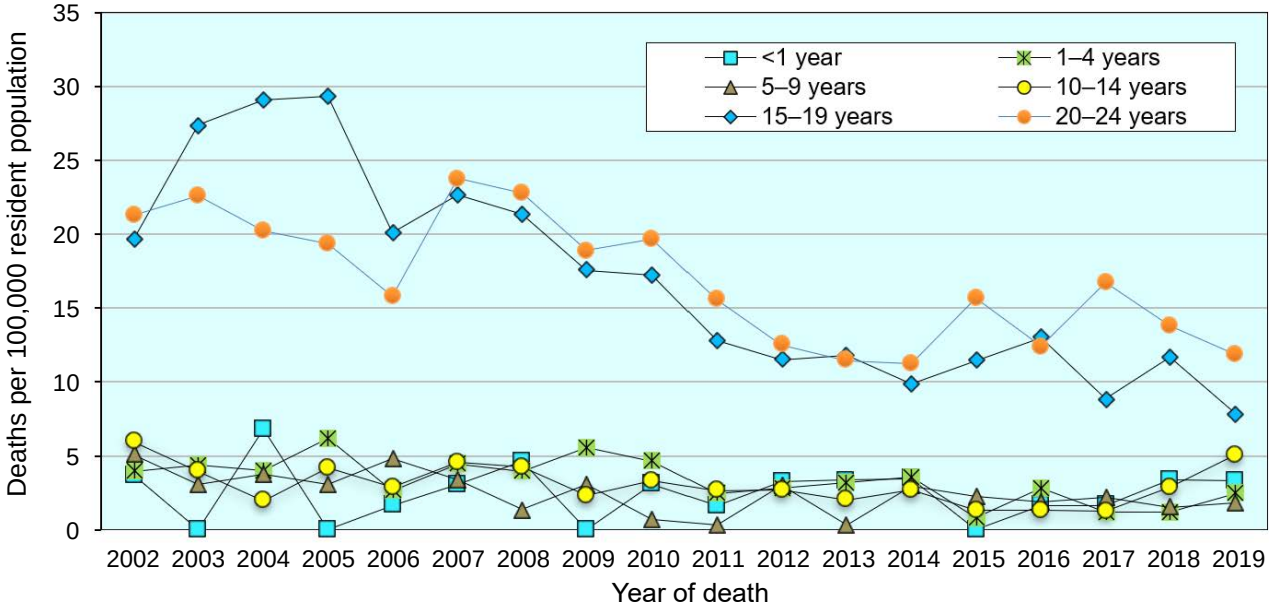
Table 6.1: Transport mortality (number of deaths and rates per 100,000 population) in children and young people aged 28 days to 24 years by age group and year of death, Aotearoa/New Zealand 2015–19 (n=498 deaths)

Category	2015	2016	2017	2018	2019	Total	Percentage (%)	Rate per 100,000
28 days–<1 year	0	<3	<3	<3	<3	6	1.2	1.99
1–4 years	<3	7	3	3	6	21	4.2	1.71
5–9 years	7	6	7	5	6	31	6.2	1.92
10–14 years	4	4	4	9	16	37	7.4	2.39
15–19 years	36	41	28	37	25	167	33.5	10.56
20–24 years	51	41	56	47	41	236	47.4	14.09
Total	100	100	99	103	96	498	100.0	6.26

Sources: Numerator: Mortality Review Database; Denominator: NZMRDG age-specific Estimated Resident Population 2015–19, 0–24 years.

The number of deaths from transport has remained similar over the period 2015–19, at between 96 and 103 deaths each year. Most deaths (81 percent) are in adolescents aged 15–24 years (**Table 6.1**). While the number of deaths has been reasonably similar over the most recent five years, the number of deaths has reduced substantially since 2002 in the age groups 15–19 years and 20–24 years (**Figure 6.1**).

Figure 6.1: Transport mortality (rates per 100,000 population) in children and young people aged 28 days to 24 years by age group and year of death, Aotearoa/New Zealand 2002–19 (n=2,330 deaths)



Sources: Numerator: Mortality Review Database; Denominator: NZMRDG age-specific Estimated Resident Population 2002–19, 0–24 years.

Of all transport deaths, the most occurred among car occupants (64.5 percent), followed by 12.2 percent among pedestrians and 7.4 percent among motorcyclists (**Table 6.2**).

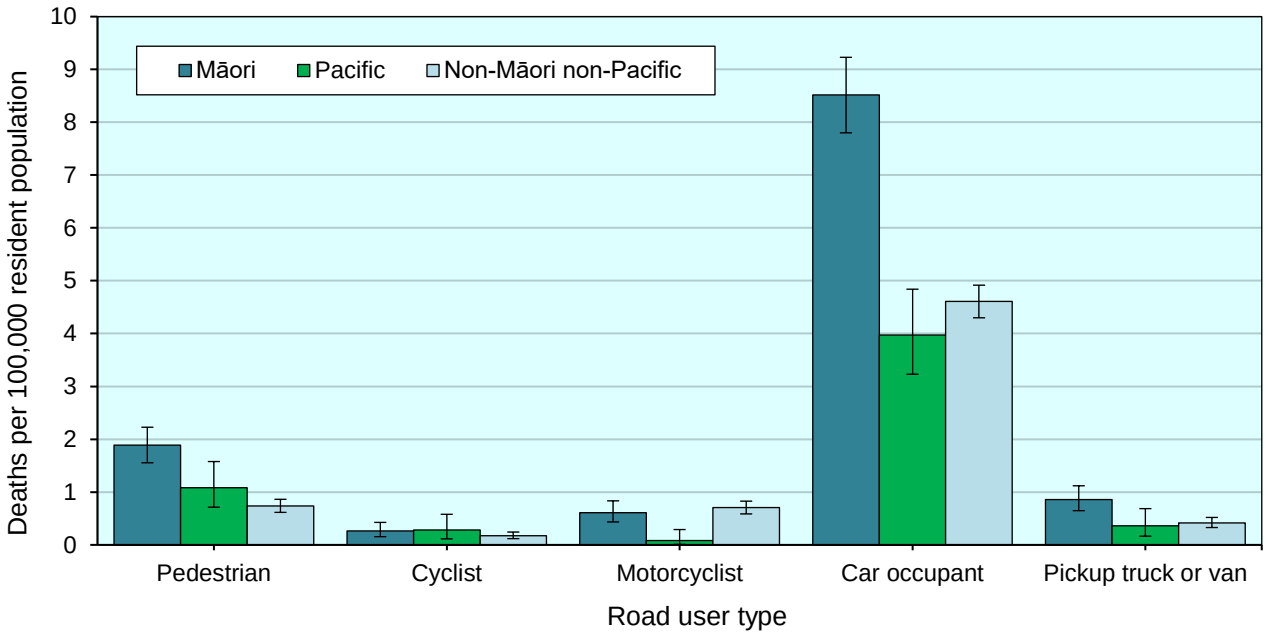
Table 6.2: Transport mortality (number of deaths) in children and young people aged 28 days to 24 years by transport user type and age group, Aotearoa/New Zealand 2002–19 combined (n=2,330 deaths)

Category	<1 year*	1–4 years	5–9 years	10–14 years	15–19 years	20–24 years	Total	Percentage (%)
Pedestrian	5	74	34	28	72	72	285	12.2
Cyclist	–	3	10	22	13	8	56	2.4
Motorcyclist	–	<3	3	12	63	93	172	7.4
Car occupant	20	54	52	73	685	619	1,503	64.5
Pickup truck or van	<3	5	9	11	51	63	141	6.1
Heavy transport vehicle	–	<3	<3	<3	10	9	24	1.0
Industrial/agricultural vehicles	–	<3	–	–	3	14	19	0.8
ATVs	–	<3	10	9	18	8	47	2.0
Helicopter and aircraft	–	–	4	–	6	12	22	0.9
Watercraft	–	–	9	6	10	19	44	1.9
Other	–	–	–	6	3	4	13	0.6
Unspecified	–	–	<3	–	–	3	4	0.2
Total	27	142	134	169	934	924	2,330	100.0

* This category represents infants 28 days and older, and less than one calendar year in age.
Source: Mortality Review Database.

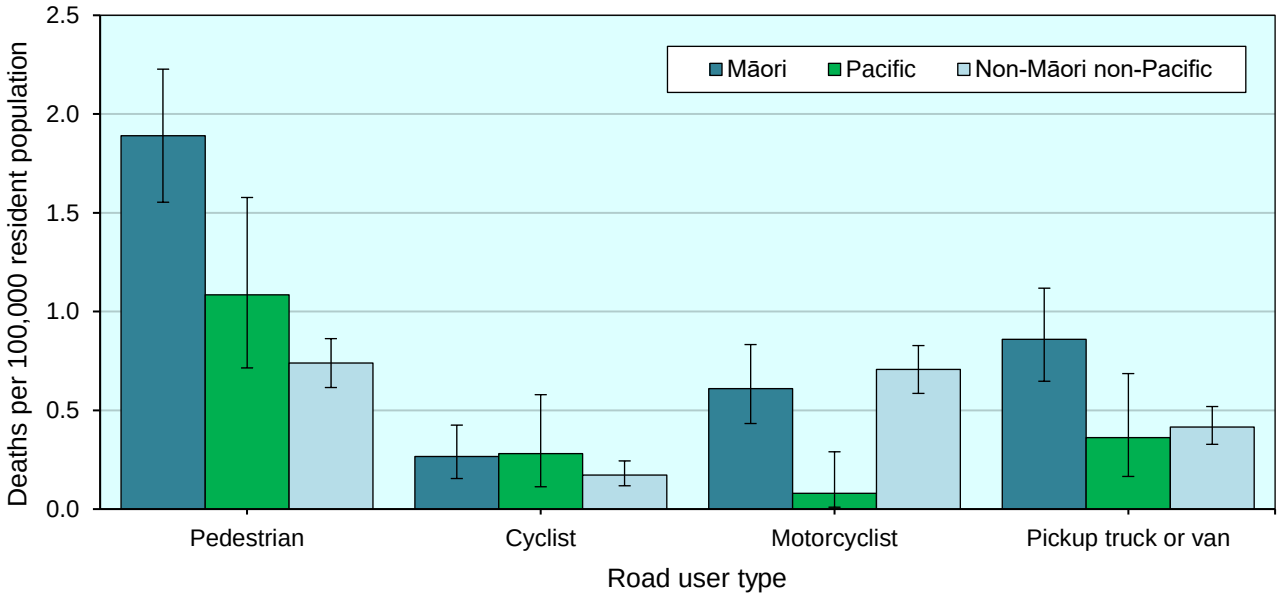
The number of deaths from transport incidents is substantially higher among car occupants than any other transport group. By broad ethnic category, mortality rates were statistically significantly higher in Māori for car occupants and pickup trucks and vans, compared with other ethnic groups. Mortality rates for Pacific were similar to non-Pacific non-Māori for all transport groups except motorcyclists, where Pacific mortality was statistically significantly lower (**Figure 6.2** and **Figure 6.3**).

Figure 6.2: Transport mortality (rates per 100,000 population and 95 percent confidence intervals) in children and young people aged 28 days to 24 years by road user type (five most common types) and prioritised ethnic category, Aotearoa/New Zealand 2002–19 combined (n=2,152 deaths*)



* Excludes five cases with unknown ethnicity.
Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2002–19, 0–24 years.

Figure 6.3: Transport mortality (rates per 100,000 population and 95 percent confidence intervals) in children and young people aged 28 days to 24 years by road user type (five most common types, excluding car occupants) and prioritised ethnic category, Aotearoa/New Zealand 2002–19 combined (n=654 deaths)

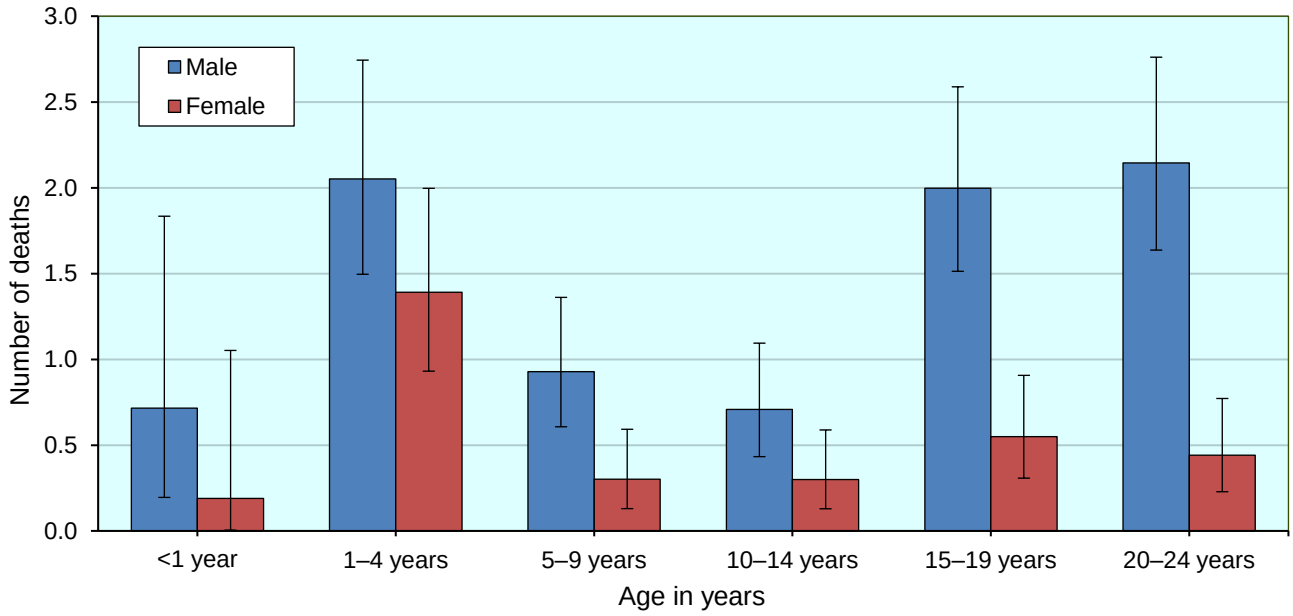


Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2002–19, 0–24 years.

Pedestrians

Mortality rates in pedestrians varied considerably by age group, with rates highest in those aged one to four years and 15–24 years. From the age of five years upwards, the mortality rate was statistically significantly higher in males than females (**Figure 6.4**).[10]

Figure 6.4: Pedestrian mortality (rates per 100,000 population and 95 percent confidence intervals) in children and young people aged 28 days to 24 years by sex and age group, Aotearoa/New Zealand 2002–19 combined (n=285 deaths)



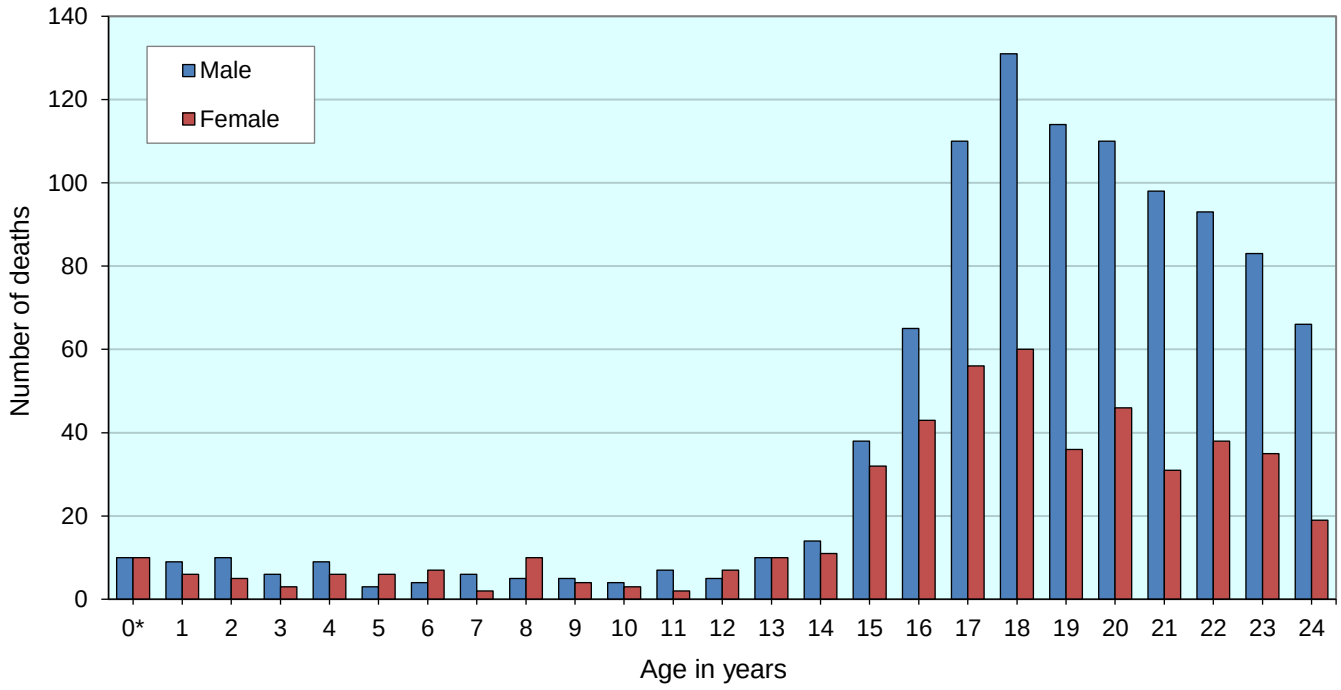
Sources: Numerator: Mortality Review Database; Denominator: <1 year: Ministry of Health Live Birth Registrations 2002–19; 1–24 years: NZMRDG age-specific Estimated Resident Population 2002–19.

[10] The male:female rate ratio for the age group five to nine years was 3.09, 95 percent CI 1.40–6.82; for the age group 10–14 years, the rate ratio was 2.37, 95 percent CI 1.05–5.39.

Car occupants

Over the 18 years from 2002–19, there were 1,503 deaths in car occupants. Most deaths occurred in adolescents, with numbers increasing steeply around 17 years of age. While the number of deaths in both males and females increased at a similar age, male deaths were more common, which was particularly evident from the age of 17 years (**Figure 6.5**).

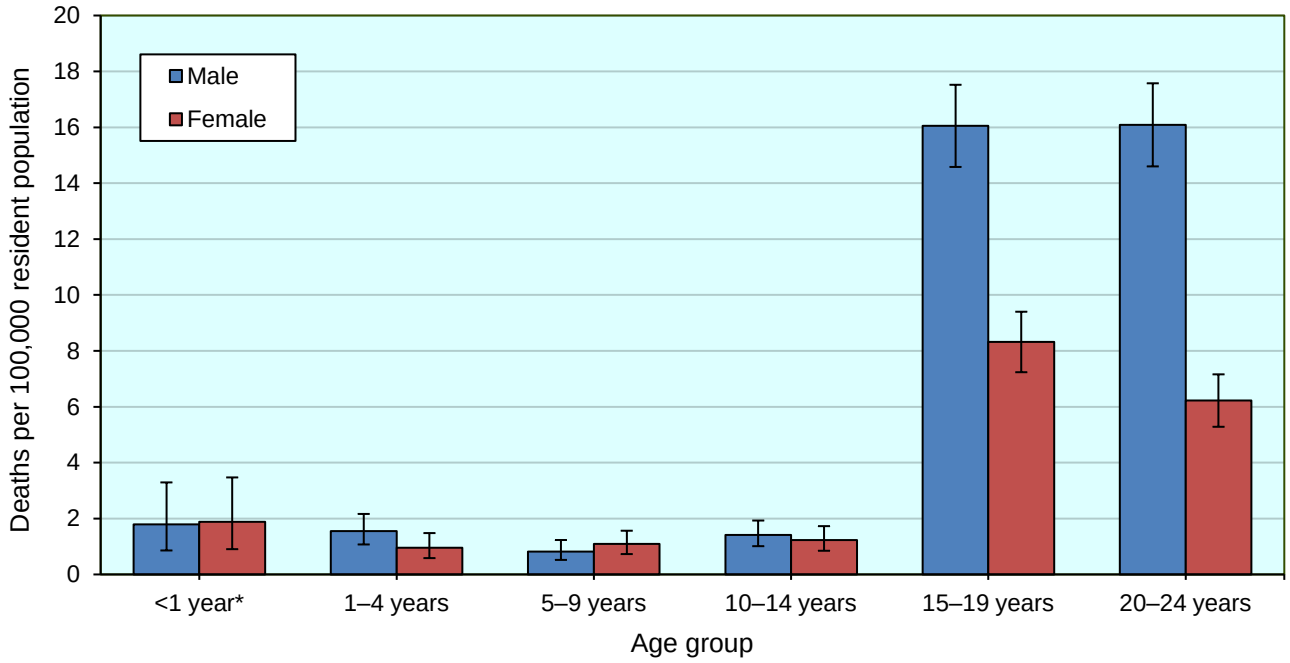
Figure 6.5: Car occupant mortality (number of deaths) in children and young people aged 28 days to 24 years by sex and age, Aotearoa/New Zealand 2002–19 combined (n=1,503 deaths)



* Indicates 28 days to less than one calendar year.
Source: Mortality Review Database.

As well as having a higher number of deaths, those aged 15–24 years and males had higher mortality rates. **Figure 6.6** shows that mortality rates in car occupants are statistically significantly higher in adolescents aged 15–24 years. Mortality rates are similar by sex in children under the age of 15 years; however, in those aged 15–19 years and 20–24 years, the mortality rate in males was statistically significantly higher.

Figure 6.6: Car occupant mortality (rates per 100,000 population and 95 percent confidence intervals) in children and young people aged 28 days to 24 years by sex and age group, Aotearoa/New Zealand 2002–19 combined (n=1,503 deaths)

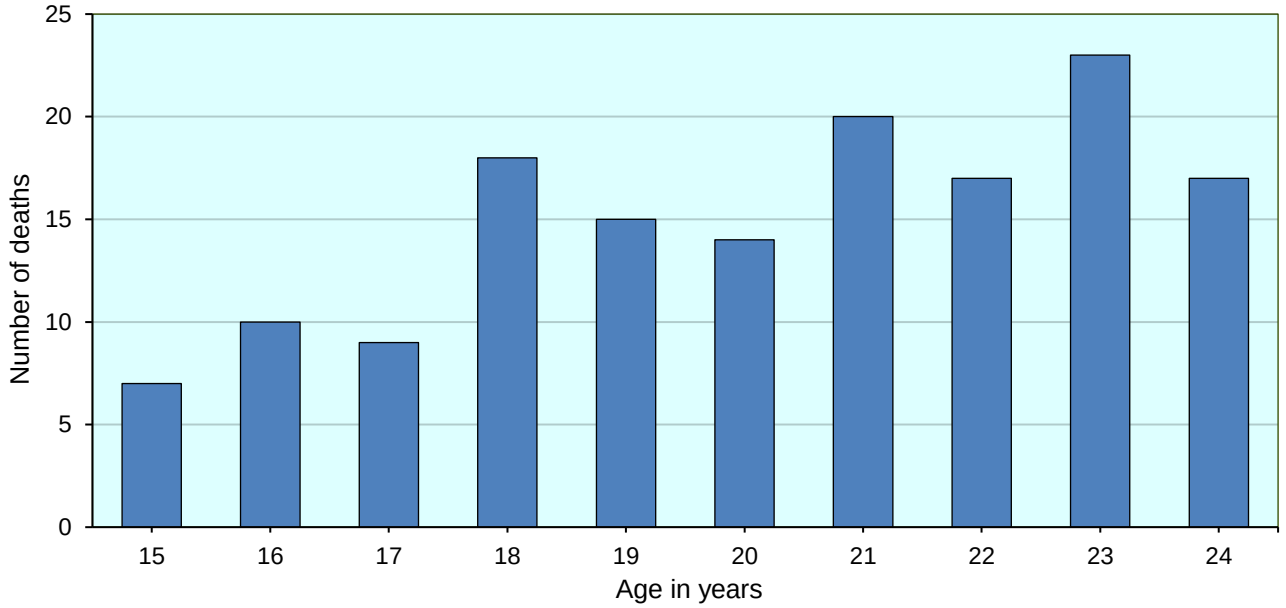


* Indicates 28 days to less than one calendar year.
Sources: Numerator: Mortality Review Database; Denominator: <1 year: Ministry of Health Live Birth Registrations 2002–19; 1–24 years: NZMRDG age-specific Estimated Resident Population 2002–19.

Motorcyclists

During the 2002–19 period, there were 172 deaths in motorcyclists. Of these deaths, 162 (94 percent) were males. As with car occupants, the number of deaths increased from around the age of 18 years (**Figure 6.7**).

Figure 6.7: Motorcyclist mortality (number of deaths) in male young people aged 15–24 years by year of age, Aotearoa/New Zealand 2002–19 combined (n=150 deaths*)

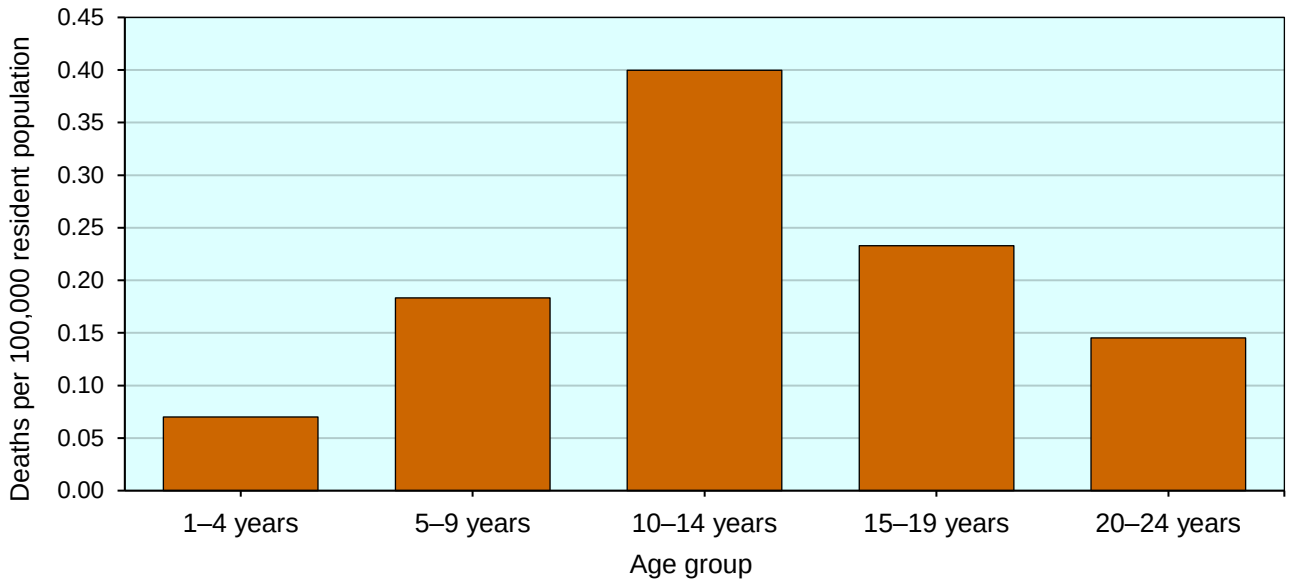


* Due to small numbers, 10 females were excluded from the figure, as were 12 males under the age of 15 years.
Source: Mortality Review Database.

Cyclists

During 2002–19, there were 56 cyclist deaths. Of these, 44 were in males and 12 were in females. The highest mortality rate was in those aged 10–14 years (**Figure 6.8**).

Figure 6.8: Pedal cyclist mortality (rates per 100,000 population) in children and young people aged 1–24 years by age group, Aotearoa/New Zealand 2002–19 combined (n=56 deaths)



Note: There were no pedal cyclist deaths in post-neonatal infants (28 days to one year).
Sources: Numerator: Mortality Review Database; Denominator: NZMRDG age-specific Estimated Resident Population 2015–19, 1–24 years.

Ngā tohutoro | References

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Ngā āpitihanga | Appendices

7. Post-neonatal infants: 28 days to less than one year

Table 7.1: Post-neonatal infant mortality (number deaths and rates per 1,000 live births) by cause and year of death, Aotearoa/New Zealand 2015–19 (n=442 deaths)

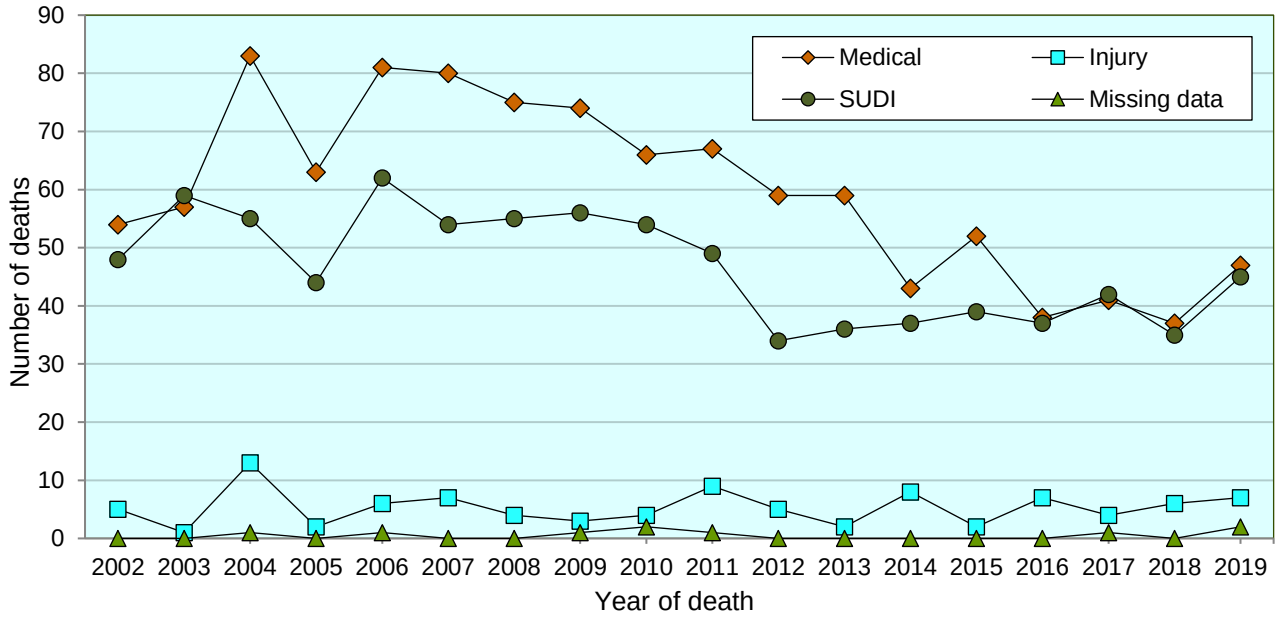
Cause of death	2015	2016	2017	2018	2019	Total	%	Rate 2015–19
Medical								
Infectious and parasitic disease	4	<3	3	3	5	16	3.6	0.05
Neoplasms	4	<3	–	<3	3	11	2.5	0.04
Diseases of the blood and blood-forming organs and disorders of the immune system	<3	<3	–	<3	–	4	0.9	0.01
Endocrine, nutritional and metabolic diseases	<3	<3	–	<3	–	4	0.9	0.01
Mental and behavioural disorders	–	–	–	–	–	–	–	–
Diseases of the nervous system	3	<3	3	3	4	14	3.2	0.05
Diseases of the ear and mastoid process	–	–	–	–	–	–	–	–
Diseases of the circulatory system	<3	<3	7	–	–	10	2.3	0.03
Diseases of the respiratory system	4	<3	3	3	3	15	3.4	0.05
Diseases of the digestive system	<3	<3	–	<3	–	3	0.7	0.01
Diseases of the skin and subcutaneous tissue	–	–	–	–	–	–	–	–
Diseases of the musculoskeletal system and connective tissue	–	–	–	–	–	–	–	–
Diseases of the genitourinary system	–	–	–	–	–	–	–	–
Pregnancy, childbirth and the puerperium	–	–	–	–	–	–	–	–
Certain conditions originating in the perinatal period	11	13	9	11	12	56	12.7	0.19
Congenital anomalies	21	13	16	12	20	82	18.6	0.27
Symptoms and abnormal findings not elsewhere classified	–	–	–	–	–	–	–	–
Total medical	**52**	**38**	**41**	**37**	**47**	**215**	**48.6**	**0.71**
Injury								
Cut/pierce	–	–	–	–	–	–	–	–
Drowning	–	<3	–	<3	–	<3	x	s
Fall	–	–	–	–	<3	<3	x	s
Fire/hot object or substance	–	–	<3	–	–	<3	x	s
Firearm	–	–	–	–	–	–	–	–
Machinery	–	–	–	–	–	–	–	–
Transport	–	<3	<3	<3	<3	6	1.4	0.02
Natural/environmental	–	<3	–	–	–	<3	x	s
Poisoning	–	–	<3	<3	–	<3	x	s
Struck by, against	–	–	–	–	–	–	–	–
Suffocation	–	–	–	–	–	–	–	–
Other specified, classifiable	–	<3	–	–	–	<3	x	s
Other specified, not elsewhere classified	–	–	–	–	–	–	–	–
Unspecified	–	–	–	–	<3	<3	x	s
Complications of medical and surgical care	–	–	–	–	–	–	–	–
Sequelae of surgical and medical care as external cause	–	–	–	–	–	–	–	–
Assault	<3	3	<3	<3	3	11	2.5	0.04
Total injury	<3	**7**	**4**	**6**	**7**	**26**	**5.9**	**0.09**
SUDI								
R950 Sudden infant death syndrome	14	17	26	14	8	79	17.9	0.26
R959 Other sudden death, cause unknown	–	<3	<3	<3	4	8	1.8	0.03
R98 Unattended death	–	–	–	–	–	–	–	–
R99 Other ill-defined and unspecified causes of mortality	3	<3	<3	11	31	48	10.9	0.16
W75 Accidental suffocation and strangulation in bed	21	17	14	7	<3	61	13.8	0.20
W78 Inhalation of gastric contents	<3	–	–	–	–	<3	x	s
W79 Inhalation and ingestion of food causing obstruction of respiratory tract	–	–	–	<3	–	<3	x	s
Total SUDI	**39**	**37**	**42**	**35**	**45**	**198**	**44.8**	**0.66**
Missing data	–	–	<3	–	<3	3	0.7	0.01
Total	**93**	**82**	**88**	**78**	**101**	**442**	**100.0**	**1.46**

'x' indicates percentage not calculated due to small numbers.

's' indicates rate not calculated due to small numbers.

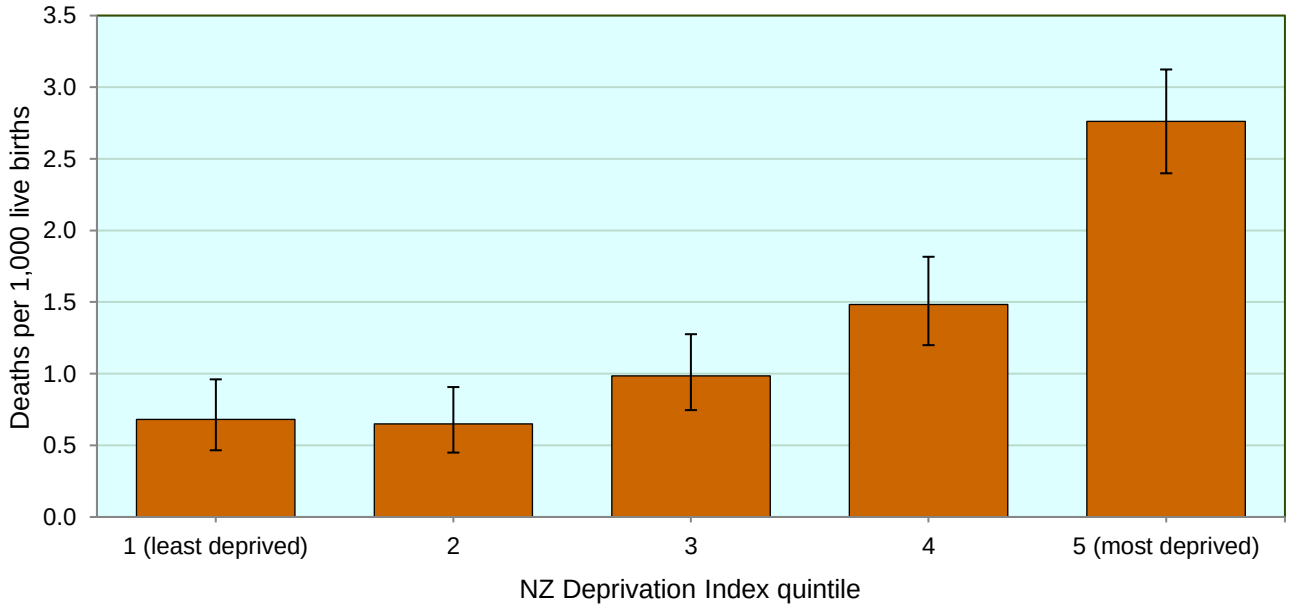
Sources: Numerator: Mortality Review Database; Denominator: Ministry of Health Live Birth Registrations 2015–19.

Figure 7.1: Post-neonatal infant mortality (number of deaths) by cause and year of death, Aotearoa/New Zealand 2002–19 (n=1,706 deaths)



Source: Mortality Review Database.

Figure 7.2: Post-neonatal infant mortality (rates per 1,000 live births and 95 percent confidence intervals) by NZ Deprivation Index quintile, Aotearoa/New Zealand 2015–19 combined (n=440 deaths*)



* Excludes two cases with no available deprivation data.
Sources: Numerator: Mortality Review Database; Denominator: Ministry of Health Live Birth Registrations 2015–19.

8. Children aged one to four years

Table 8.1: Mortality (number of deaths and rates per 100,000 population) in children aged one to four years by cause and year of death, Aotearoa/New Zealand 2015–19 (n=252 deaths)

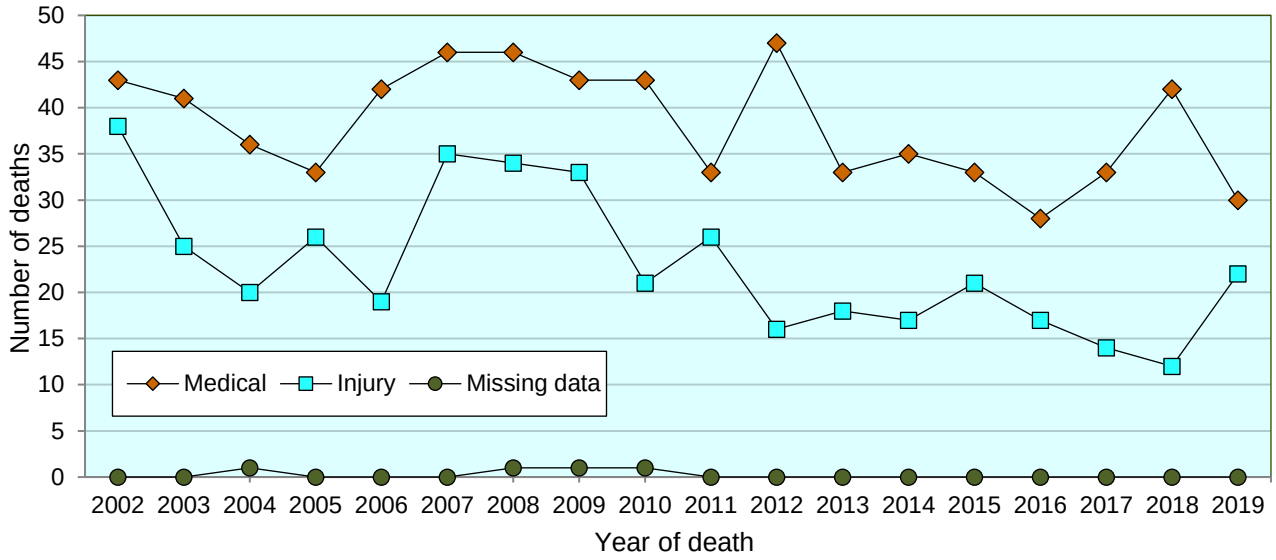
Cause of death	2015	2016	2017	2018	2019	Total	%	Rate 2015–19
Medical								
Infectious and parasitic disease	<3	<3	3	4	<3	11	4.4	0.89
Neoplasms	7	5	7	6	5	30	11.9	2.44
Diseases of the blood and blood-forming organs and disorders of the immune system	–	–	–	–	<3	<3	x	s
Endocrine, nutritional and metabolic diseases	3	–	–	<3	<3	6	2.4	0.49
Mental and behavioural disorders	–	–	–	–	–	–	–	–
Diseases of the nervous system	4	7	8	6	6	31	12.3	2.52
Diseases of the ear and mastoid process	–	–	–	–	–	–	–	–
Diseases of the circulatory system	<3	<3	4	<3	–	9	3.6	0.73
Diseases of the respiratory system	5	4	<3	9	4	23	9.1	1.87
Diseases of the digestive system	–	<3	–	–	–	<3	x	s
Diseases of the skin and subcutaneous tissue	–	–	–	–	–	–	–	–
Diseases of the musculoskeletal system and connective tissue	–	–	–	<3	–	<3	x	s
Diseases of the genitourinary system	–	–	–	–	–	–	–	–
Pregnancy, childbirth and the puerperium	–	–	–	–	–	–	–	–
Certain conditions originating in the perinatal period	–	–	–	<3	<3	<3	x	s
Congenital anomalies	7	4	7	8	<3	28	11.1	2.28
Symptoms and abnormal findings not elsewhere classified	4	4	3	5	7	23	9.1	1.87
Total medical	**33**	**28**	**33**	**42**	**30**	**166**	**65.9**	**13.49**
Injury								
Cut/pierce	–	–	–	–	–	–	–	–
Drowning	3	<3	7	<3	7	21	8.3	1.71
Fall	–	–	<3	<3	–	3	1.2	0.24
Fire/hot object or substance	–	–	–	–	–	–	–	–
Firearm	–	–	–	–	–	–	–	–
Machinery	–	–	–	–	–	–	–	–
Transport	<3	7	3	3	6	21	8.3	1.71
Natural/environmental	<3	<3	–	–	<3	3	1.2	0.24
Poisoning	<3	<3	–	–	–	3	1.2	0.24
Struck by, against	<3	<3	–	<3	<3	7	2.8	0.57
Suffocation	<3	4	<3	–	<3	8	3.2	0.65
Other specified, classifiable	–	–	–	–	–	–	–	–
Other specified, not elsewhere classified	–	–	–	–	–	–	–	–
Unspecified	<3	–	–	–	–	<3	x	s
Complications of medical and surgical care	–	–	–	–	–	–	–	–
Sequelae of surgical and medical care as external cause	–	–	–	–	–	–	–	–
Assault	9	<3	<3	4	4	19	7.5	1.54
Total injury	**21**	**17**	**14**	**12**	**22**	**86**	**34.1**	**6.99**
Missing data	–	–	–	–	–	–	–	–
Total	**54**	**45**	**47**	**54**	**52**	**252**	**100.0**	**20.48**

'x' indicates percentage not calculated due to small numbers.

's' indicates rate not calculated due to small numbers.

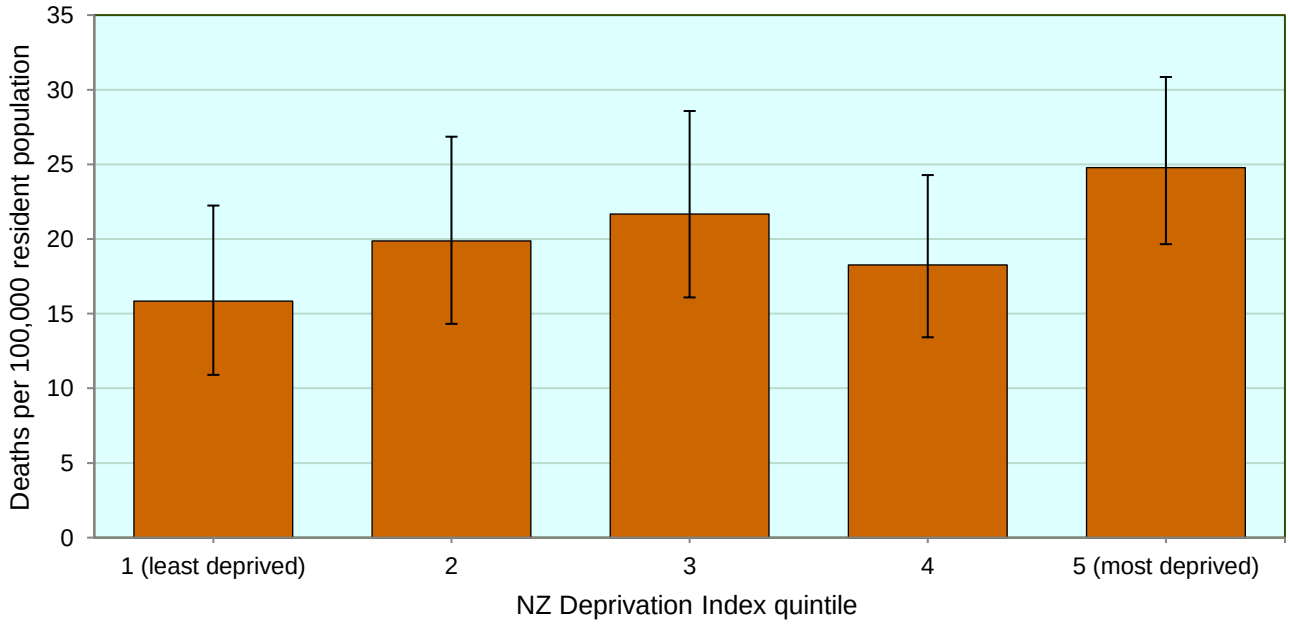
Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, one to four years.

Figure 8.1: Mortality (number of deaths) in children aged one to four years by cause and year of death, Aotearoa/New Zealand 2002–19 (n=1,105 deaths)



Source: Mortality Review Database.

Figure 8.2: Mortality (rates per 100,000 population with 95 percent confidence intervals) in children aged one to four years by NZ Deprivation Index quintile, Aotearoa/New Zealand 2015–19 combined (n=252 deaths)



Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, one to four years.

9. Children aged five to nine years

Table 9.1: Mortality (number of deaths and rates per 100,000 population) in children aged five to nine years by cause and year of death, Aotearoa/New Zealand 2015–19 (n=155 deaths)

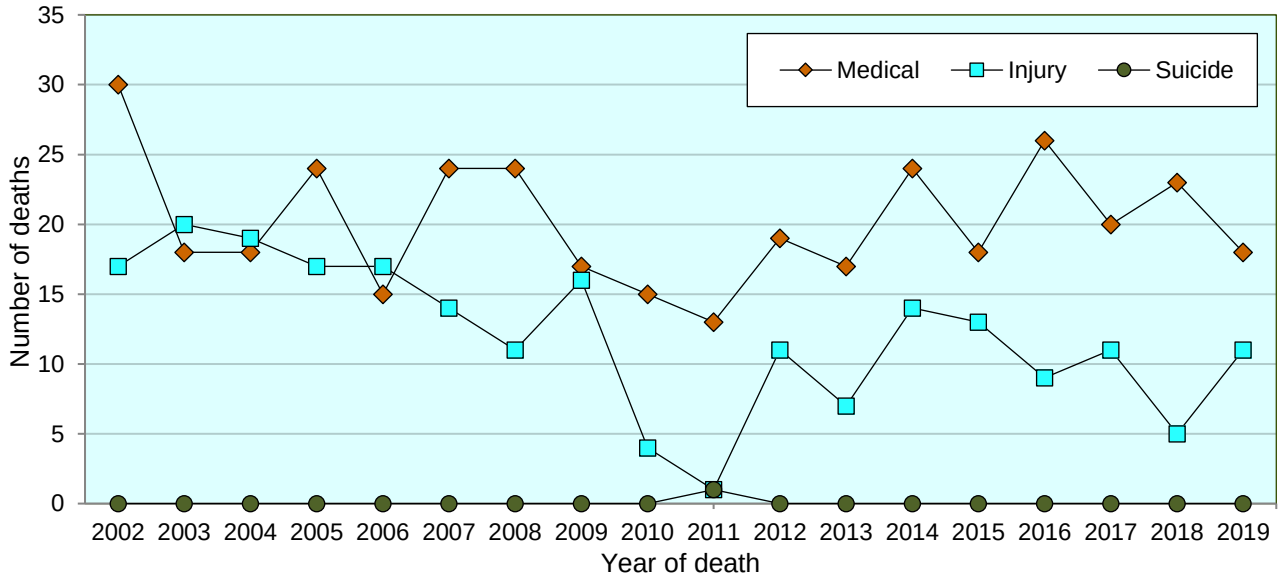
Cause of death	2015	2016	2017	2018	2019	Total	%	Rate 2015–19
Medical								
Infectious and parasitic disease	–	–	<3	<3	–	3	1.9	0.19
Neoplasms	7	11	6	4	7	35	22.6	2.17
Diseases of the blood and blood-forming organs and disorders of the immune system	–	–	–	–	–	–	–	–
Endocrine, nutritional and metabolic diseases	<3	<3	<3	<3	<3	6	3.9	0.37
Mental and behavioural disorders	–	–	–	–	–	–	–	–
Diseases of the nervous system	<3	3	<3	8	3	16	10.3	0.99
Diseases of the ear and mastoid process	–	–	–	–	–	–	–	–
Diseases of the circulatory system	–	<3	<3	–	<3	4	2.6	0.25
Diseases of the respiratory system	4	3	3	4	<3	15	9.7	0.93
Diseases of the digestive system	<3	<3	–	–	–	<3	x	s
Diseases of the skin and subcutaneous tissue	–	–	–	–	–	–	–	–
Diseases of the musculoskeletal system and connective tissue	–	–	–	–	–	–	–	–
Diseases of the genitourinary system	–	–	–	–	–	–	–	–
Pregnancy, childbirth and the puerperium	–	–	–	–	–	–	–	–
Certain conditions originating in the perinatal period	–	–	<3	–	–	<3	x	s
Congenital anomalies	4	4	6	<3	4	20	12.9	1.24
Symptoms and abnormal findings not elsewhere classified	–	<3	–	<3	<3	3	1.9	0.19
Total medical	**18**	**26**	**20**	**23**	**18**	**105**	**67.7**	**6.51**
Injury								
Cut/pierce	–	–	–	–	–	–	–	–
Drowning	–	<3	<3	–	3	6	3.9	0.37
Fall	–	<3	<3	–	<3	3	1.9	0.19
Fire/hot object or substance	<3	<3	–	–	–	3	1.9	0.19
Firearm	–	–	–	–	–	–	–	–
Machinery	–	–	–	–	–	–	–	–
Transport	7	6	7	5	6	31	20.0	1.92
Natural/environmental	–	–	–	–	–	–	–	–
Poisoning	<3	–	–	–	–	<3	x	s
Struck by, against	–	–	–	–	–	–	–	–
Suffocation	<3	–	<3	–	–	3	1.9	0.19
Other specified, classifiable	–	–	–	–	–	–	–	–
Other specified, not elsewhere classified	–	–	–	–	–	–	–	–
Unspecified	–	–	–	–	–	–	–	–
Complications of medical and surgical care	–	–	–	–	–	–	–	–
Sequelae of surgical and medical care as external cause	–	–	–	–	–	–	–	–
Assault	<3	–	–	–	<3	<3	x	s
Total injury	**13**	**9**	**11**	**5**	**11**	**49**	**31.6**	**3.04**
Missing data	–	–	–	–	<3	<3	x	s
Total	**31**	**35**	**31**	**28**	**30**	**155**	**100.0**	**9.62**

'x' indicates percentage not calculated due to small numbers.

's' indicates rate not calculated due to small numbers.

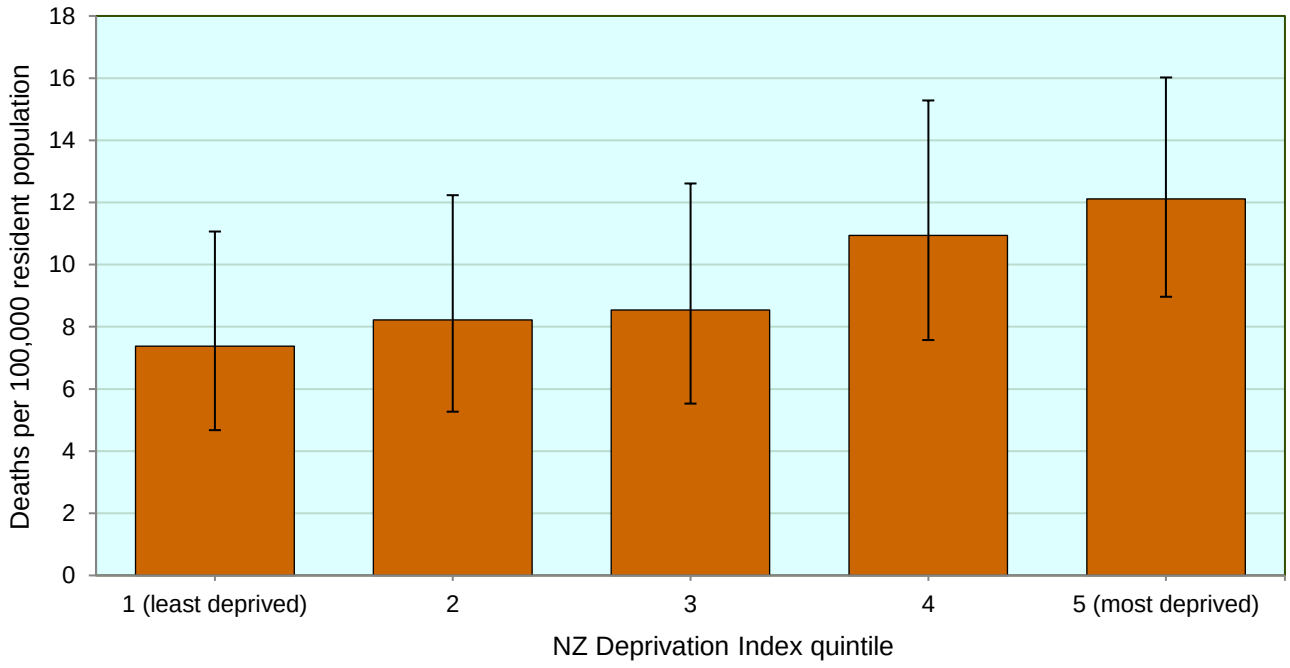
Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, five to nine years.

Figure 9.1: Mortality (number of deaths) in children aged five to nine years by cause and year of death, Aotearoa/New Zealand 2002–19 (n=585 deaths)



Source: Mortality Review Database.

Figure 9.2: Mortality (rates per 100,000 population with 95 percent confidence intervals) in children aged five to nine years by NZ Deprivation Index quintile, Aotearoa/New Zealand 2015–19 combined (n=155 deaths*)



* Excludes one case with no available deprivation data.
Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, five to nine years.

10. Children aged 10–14 years

Table 10.1: Mortality (number of deaths and rates per 100,000 population) in children aged 10–14 years by cause and year of death, Aotearoa/New Zealand 2015–19 (n=197 deaths)

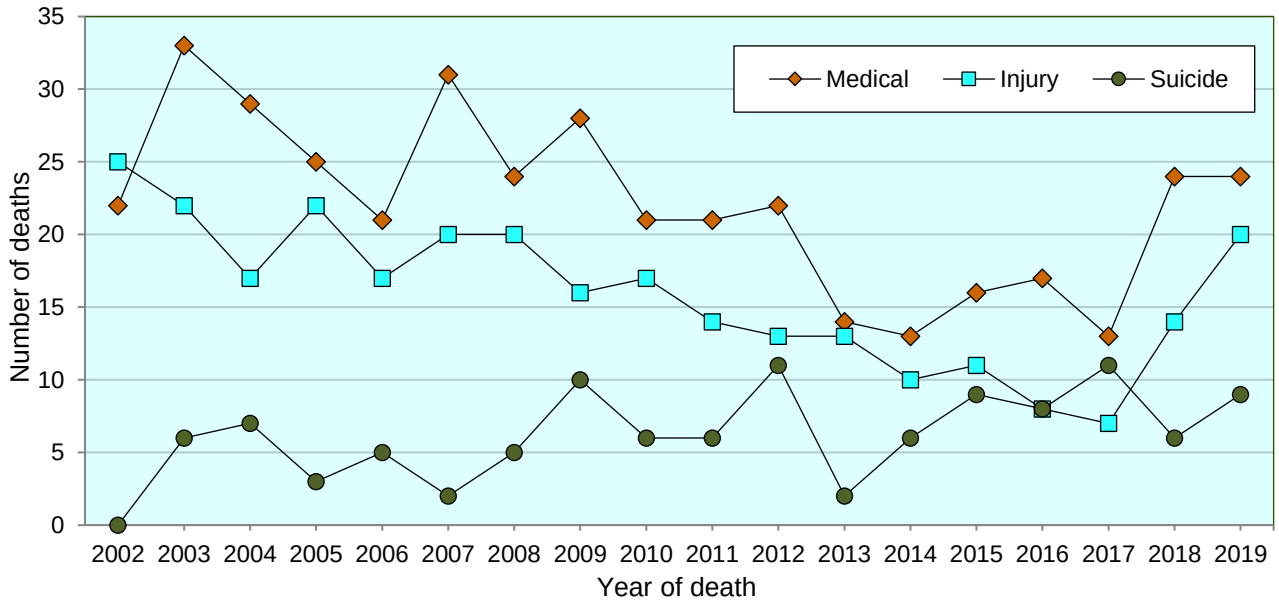
Cause of death	2015	2016	2017	2018	2019	Total	%	Rate 2015–19
Medical								
Infectious and parasitic disease	–	–	–	3	–	3	1.5	0.19
Neoplasms	6	5	4	8	5	28	14.2	1.81
Diseases of the blood and blood-forming organs and disorders of the immune system	–	–	–	<3	<3	<3	x	s
Endocrine, nutritional and metabolic diseases	<3	–	<3	<3	–	4	2.0	0.26
Mental and behavioural disorders	–	<3	–	–	–	<3	x	s
Diseases of the nervous system	3	<3	<3	3	6	16	8.1	1.03
Diseases of the ear and mastoid process	–	–	–	–	–	–	–	–
Diseases of the circulatory system	<3	3	<3	<3	<3	10	5.1	0.64
Diseases of the respiratory system	<3	4	<3	<3	4	13	6.6	0.84
Diseases of the digestive system	–	–	<3	–	<3	<3	x	s
Diseases of the skin and subcutaneous tissue	–	–	–	–	–	–	–	–
Diseases of the musculoskeletal system and connective tissue	–	<3	–	–	–	<3	x	s
Diseases of the genitourinary system	–	–	–	–	–	–	–	–
Pregnancy, childbirth and the puerperium	–	–	–	–	–	–	–	–
Certain conditions originating in the perinatal period	–	–	–	–	–	–	–	–
Congenital anomalies	<3	<3	<3	3	4	10	5.1	0.64
Symptoms and abnormal findings not elsewhere classified	–	–	–	3	<3	4	2.0	0.26
Total medical	**16**	**17**	**13**	**24**	**24**	**94**	**47.7**	**6.06**
Injury								
Cut/pierce	–	–	–	–	–	–	–	–
Drowning	<3	3	–	<3	<3	7	3.6	0.45
Fall	<3	–	–	–	–	<3	x	s
Fire/hot object or substance	–	–	–	–	–	–	–	–
Firearm	<3	–	–	–	–	<3	x	s
Machinery	–	–	–	–	–	–	–	–
Transport	4	4	4	9	16	37	18.8	2.39
Natural/environmental	–	–	–	–	–	–	–	–
Poisoning	–	–	<3	<3	–	3	1.5	0.19
Struck by, against	–	–	–	–	–	–	–	–
Suffocation	<3	<3	<3	<3	–	4	2.0	0.26
Other specified, classifiable	–	–	<3	–	–	<3	x	s
Other specified, not elsewhere classified	–	–	–	<3	–	<3	x	s
Unspecified	<3	–	–	–	–	<3	x	s
Complications of medical and surgical care	–	–	–	–	–	–	–	–
Sequelae of surgical and medical care as external cause	–	–	–	–	–	–	–	–
Assault	<3	–	–	–	<3	3	1.5	0.19
Total injury	**11**	**8**	**7**	**14**	**20**	**60**	**30.5**	**3.87**
Suicide	9	8	11	6	9	43	21.8	2.77
Missing data	–	–	–	–	–	–	–	–
Total	**36**	**33**	**31**	**44**	**53**	**197**	**100.0**	**12.70**

'x' indicates percentage not calculated due to small numbers.

's' indicates rate not calculated due to small numbers.

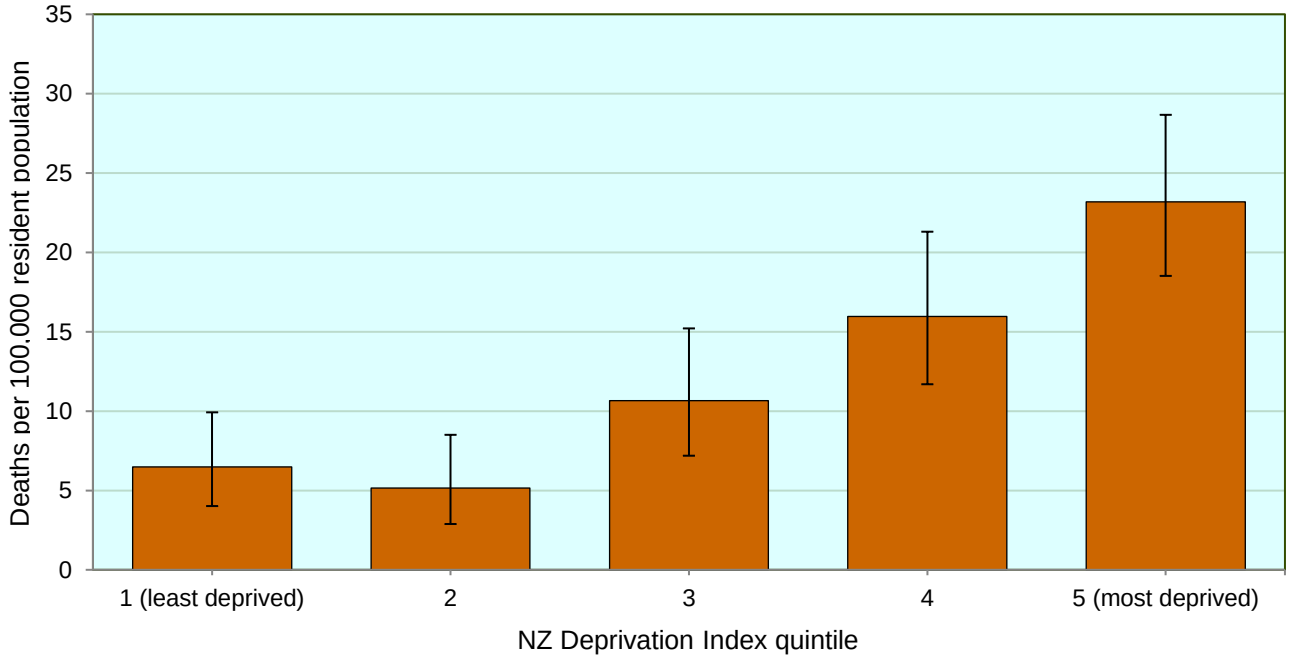
Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 10–14 years.

Figure 10.1: Mortality (number of deaths) in children aged 10–14 years by cause and year of death, Aotearoa/New Zealand 2002–19 (n=796* deaths)



* Excludes one missing case.
Source: Mortality Review Database.

Figure 10.2: Mortality (rates per 100,000 population with 95 percent confidence intervals) in children aged 10–14 years by NZ Deprivation Index quintile, Aotearoa/New Zealand 2015–19 combined (n=197 deaths)



Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 10–14 years.

11. Young people aged 15–19 years

Table 11.1: Mortality (number of deaths and rates per 100,000 population) in young people aged 15–19 years by cause and year of death, Aotearoa/New Zealand 2015–19 (n=662 deaths)

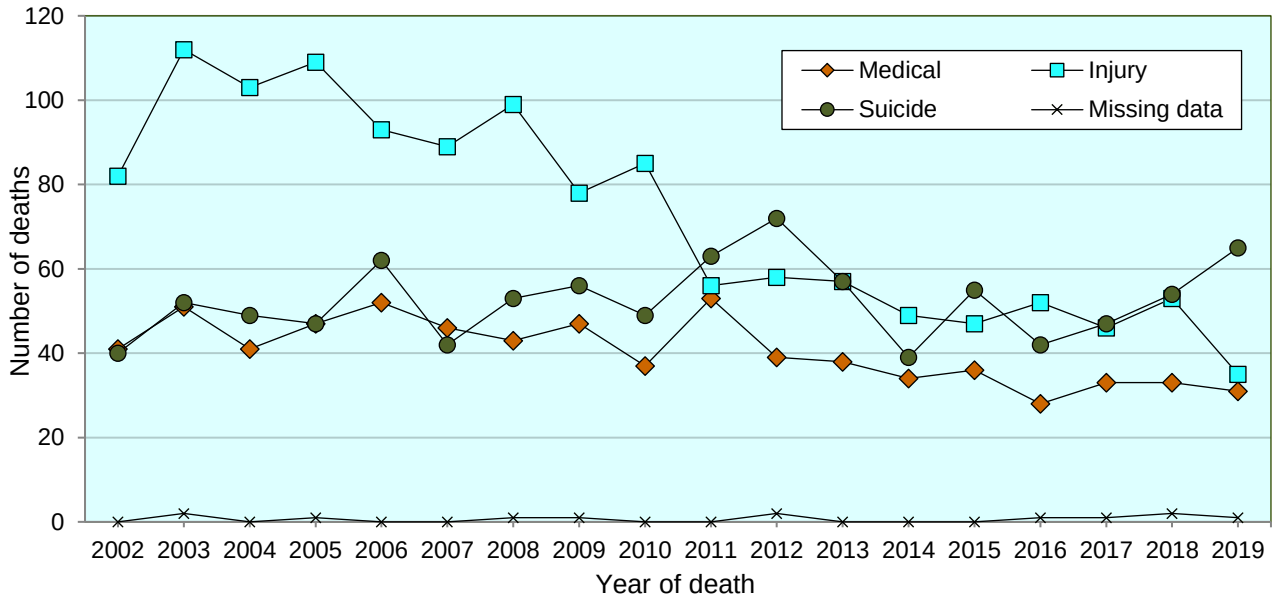
Cause of death	2015	2016	2017	2018	2019	Total	%	Rate 2015–19
Medical								
Infectious and parasitic disease	<3	–	<3	<3	–	4	0.6	0.25
Neoplasms	14	14	12	8	6	54	8.2	3.41
Diseases of the blood and blood-forming organs and disorders of the immune system	<3	<3	–	–	–	3	0.5	0.19
Endocrine, nutritional and metabolic diseases	3	<3	<3	<3	<3	10	1.5	0.63
Mental and behavioural disorders	<3	–	<3	–	–	<3	x	s
Diseases of the nervous system	6	5	7	8	4	30	4.5	1.90
Diseases of the eye and adnexa	–	–	–	<3	–	<3	x	s
Diseases of the ear and mastoid process	–	–	–	–	–	–	–	–
Diseases of the circulatory system	<3	<3	4	4	4	16	2.4	1.01
Diseases of the respiratory system	–	<3	<3	<3	–	4	0.6	0.25
Diseases of the digestive system	–	–	–	<3	–	<3	x	s
Diseases of the skin and subcutaneous tissue	–	–	–	–	–	–	–	–
Diseases of the musculoskeletal system and connective tissue	–	<3	–	–	<3	<3	x	s
Diseases of the genitourinary system	–	–	–	–	–	–	–	–
Pregnancy, childbirth and the puerperium	–	–	–	–	–	–	–	–
Certain conditions originating in the perinatal period	–	–	–	–	<3	<3	x	s
Congenital anomalies	7	<3	5	<3	7	22	3.3	1.39
Symptoms and abnormal findings not elsewhere classified	<3	<3	–	<3	6	10	1.5	0.63
Total medical	**36**	**28**	**33**	**33**	**31**	**161**	**24.3**	**10.18**
Injury								
Cut/pierce	–	–	<3	–	–	<3	x	s
Drowning	6	4	3	<3	–	15	2.3	0.95
Fall	<3	–	<3	4	–	6	0.9	0.38
Fire/hot object or substance	–	<3	<3	–	–	3	0.5	0.19
Firearm	<3	–	–	–	–	<3	x	s
Machinery	–	–	<3	–	<3	3	0.5	0.19
Transport	36	41	28	37	25	167	25.2	10.56
Natural/environmental	–	–	–	<3	–	<3	x	s
Poisoning	<3	<3	6	<3	–	11	1.7	0.70
Struck by, against	–	<3	–	–	<3	<3	x	s
Suffocation	<3	<3	–	–	<3	3	0.5	0.19
Other specified, classifiable	–	–	<3	–	<3	3	0.5	0.19
Other specified, not elsewhere classified	–	–	<3	<3	<3	3	0.5	0.19
Unspecified	–	–	–	<3	<3	<3	x	s
Complications of medical and surgical care	–	–	–	–	–	–	–	–
Sequelae of surgical and medical care as external cause	–	–	–	–	–	–	–	–
Assault	<3	<3	<3	4	3	11	1.7	0.70
Total injury	**47**	**52**	**46**	**53**	**35**	**233**	**35.2**	**14.73**
Suicide	55	42	47	54	65	263	39.7	16.63
Missing data	–	<3	<3	<3	<3	5	0.8	0.32
Total	**138**	**123**	**127**	**142**	**132**	**662**	**100.0**	**41.85**

'x' indicates percentage not calculated due to small numbers.

's' indicates rate not calculated due to small numbers.

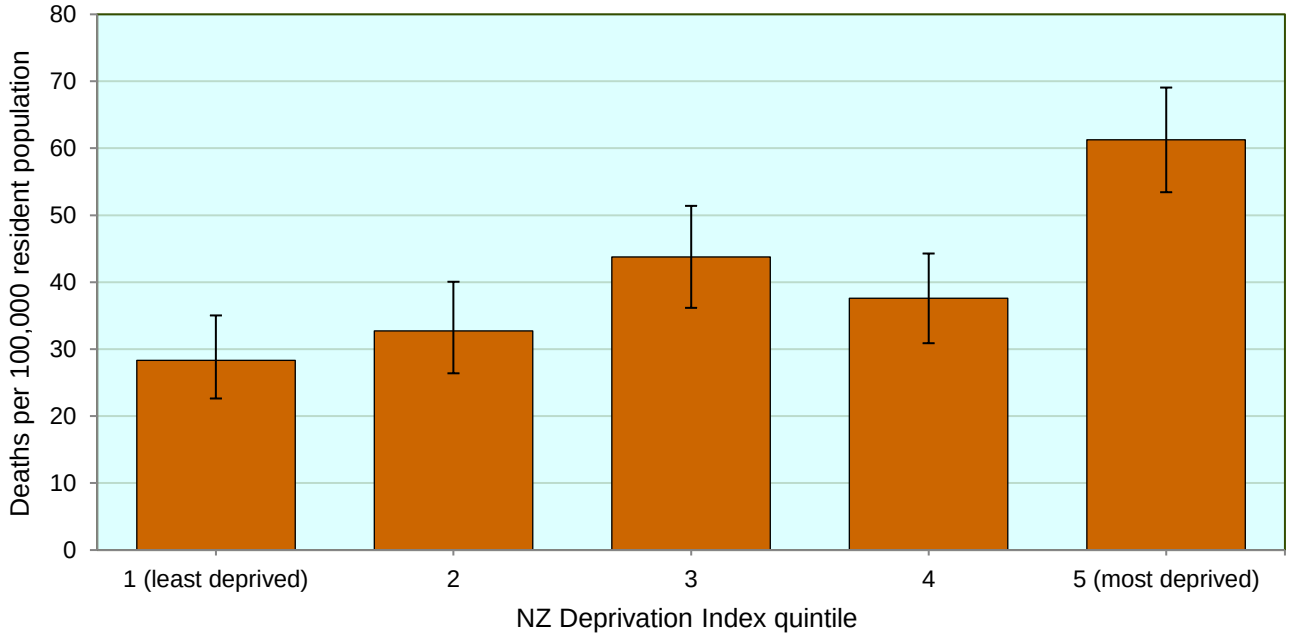
Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 15–19 years.

Figure 11.1: Mortality (number of deaths) in young people aged 15–19 years by cause and year of death, Aotearoa/New Zealand 2002–19 (n=2,989 deaths)



Source: Mortality Review Database.

Figure 11.2: Mortality (rates per 100,000 population with 95 percent confidence intervals) in young people aged 15–19 years by NZ Deprivation Index quintile, Aotearoa/New Zealand 2015–19 combined (n=662 deaths)



Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 15–19 years.

12. Young people aged 20–24 years

Table 12.1: Mortality (number of deaths and rates per 100,000 population) in young people aged 20–24 years by cause and year of death, Aotearoa/New Zealand 2015–19 (n=958 deaths)

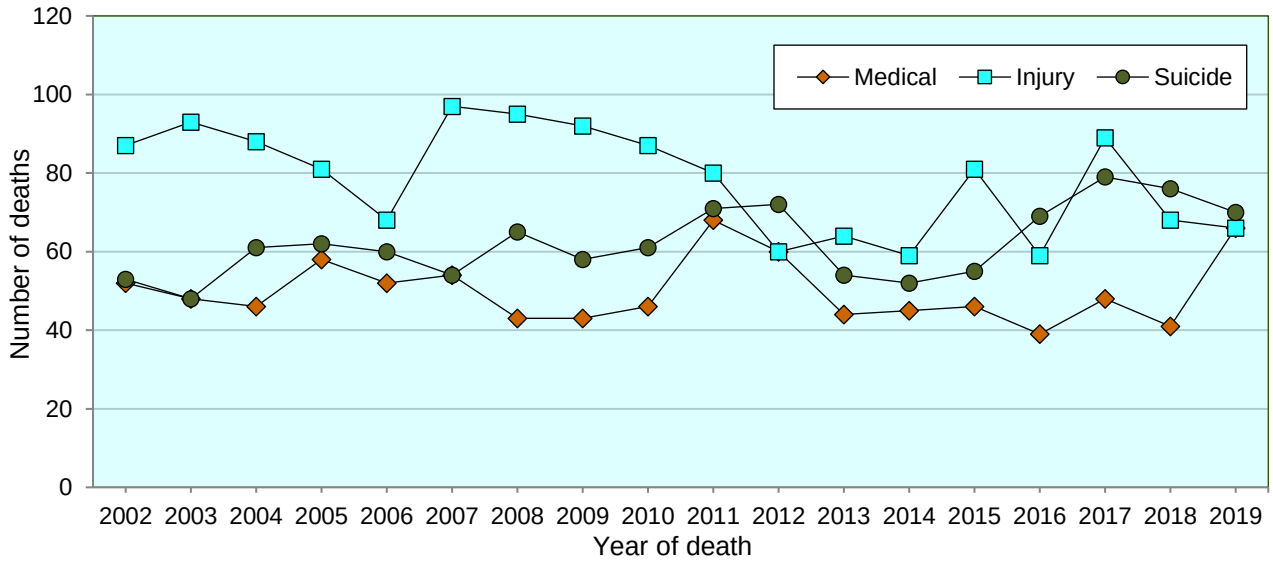
Cause of death	2015	2016	2017	2018	2019	Total	%	Rate 2015–19
Medical								
Infectious and parasitic disease	–	<3	<3	<3	<3	4	0.4	0.24
Neoplasms	10	13	13	11	13	60	6.3	3.58
Diseases of the blood and blood-forming organs and disorders of the immune system	–	–	–	<3	–	<3	x	s
Endocrine, nutritional and metabolic diseases	4	<3	3	3	5	16	1.7	0.96
Mental and behavioural disorders	3	<3	–	–	<3	6	0.6	0.36
Diseases of the nervous system	11	8	6	6	9	40	4.2	2.39
Diseases of the eye and adnexa	–	–	–	–	<3	<3	x	s
Diseases of the ear and mastoid process	–	–	–	–	–	–	–	–
Diseases of the circulatory system	5	5	10	7	5	32	3.3	1.91
Diseases of the respiratory system	<3	4	3	3	4	15	1.6	0.90
Diseases of the digestive system	–	–	<3	–	<3	<3	x	s
Diseases of the skin and subcutaneous tissue	–	–	–	–	–	–	–	–
Diseases of the musculoskeletal system and connective tissue	<3	–	<3	–	<3	5	0.5	0.30
Diseases of the genitourinary system	<3	<3	3	–	<3	6	0.6	0.36
Pregnancy, childbirth and the puerperium	<3	<3	<3	–	<3	4	0.4	0.24
Certain conditions originating in the perinatal period	–	–	–	–	–	–	–	–
Congenital anomalies	7	<3	3	<3	<3	16	1.7	0.96
Symptoms and abnormal findings not elsewhere classified	<3	<3	3	7	19	32	3.3	1.91
Total medical	**46**	**39**	**48**	**41**	**66**	**240**	**25.1**	**14.33**
Injury								
Cut/pierce	<3	–	–	–	<3	<3	x	s
Drowning	12	6	10	4	6	38	4.0	2.27
Fall	<3	–	3	<3	<3	6	0.6	0.36
Fire/hot object or substance	–	–	<3	<3	–	<3	x	s
Firearm	3	<3	–	–	–	4	0.4	0.24
Machinery	<3	–	<3	<3	–	4	0.4	0.24
Transport	51	41	56	47	41	236	24.6	14.09
Natural/environmental	–	–	<3	–	<3	<3	x	s
Poisoning	3	4	10	6	<3	25	2.6	1.49
Struck by, against	–	<3	–	–	–	<3	x	s
Suffocation	<3	<3	<3	<3	–	5	0.5	0.30
Other specified, classifiable	<3	–	<3	<3	–	3	0.3	0.18
Other specified, not elsewhere classified	–	–	<3	–	–	<3	x	s
Unspecified	–	–	–	–	–	–	–	–
Complications of medical and surgical care	–	–	–	–	–	–	–	–
Sequelae of surgical and medical care as external cause	–	–	–	–	–	–	–	–
Assault	6	5	3	6	14	34	3.5	2.03
Total injury	**81**	**59**	**89**	**68**	**66**	**363**	**37.9**	**21.67**
Suicide	55	69	79	76	70	349	36.4	20.83
Missing data	<3	–	<3	–	3	6	0.6	0.36
Total	**183**	**167**	**218**	**185**	**205**	**958**	**100.0**	**57.19**

'x' indicates percentage not calculated due to small numbers.

's' indicates rate not calculated due to small numbers.

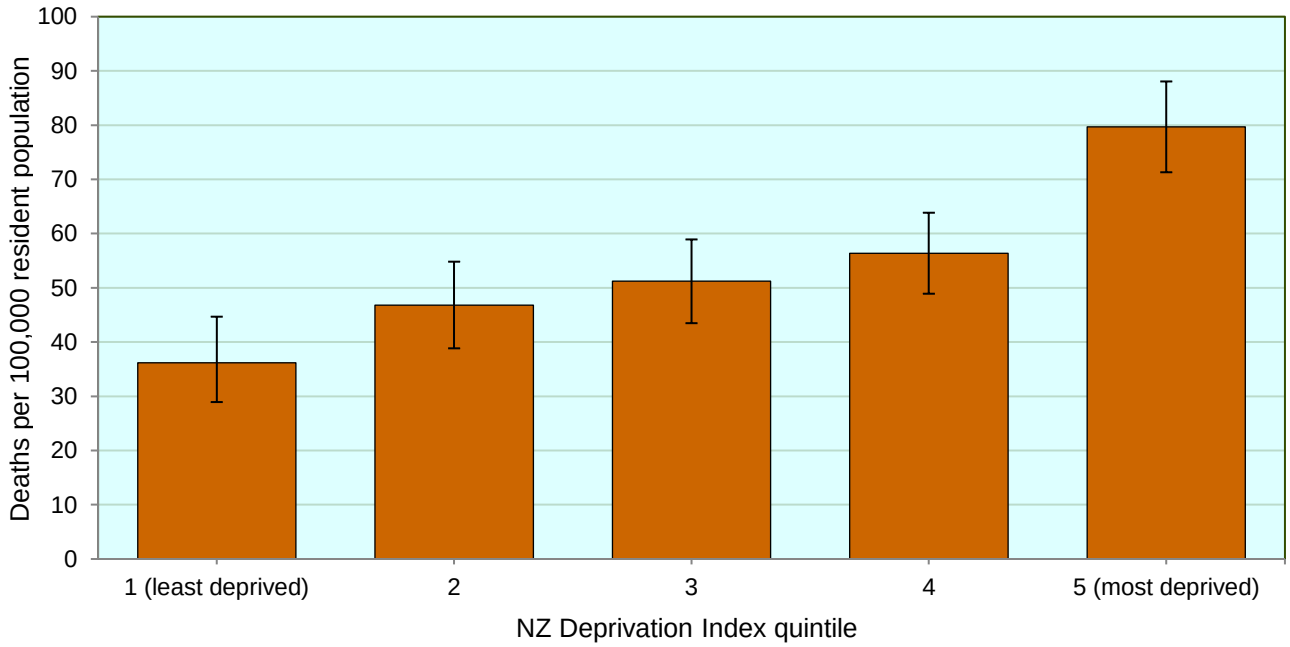
Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 20–24 years.

Figure 12.1: Mortality (number of deaths) in young people aged 20–24 years by cause and year of death, Aotearoa/New Zealand 2002–19 (n=3,433 deaths*)



* Excludes 11 missing cases.
Source: Mortality Review Database.

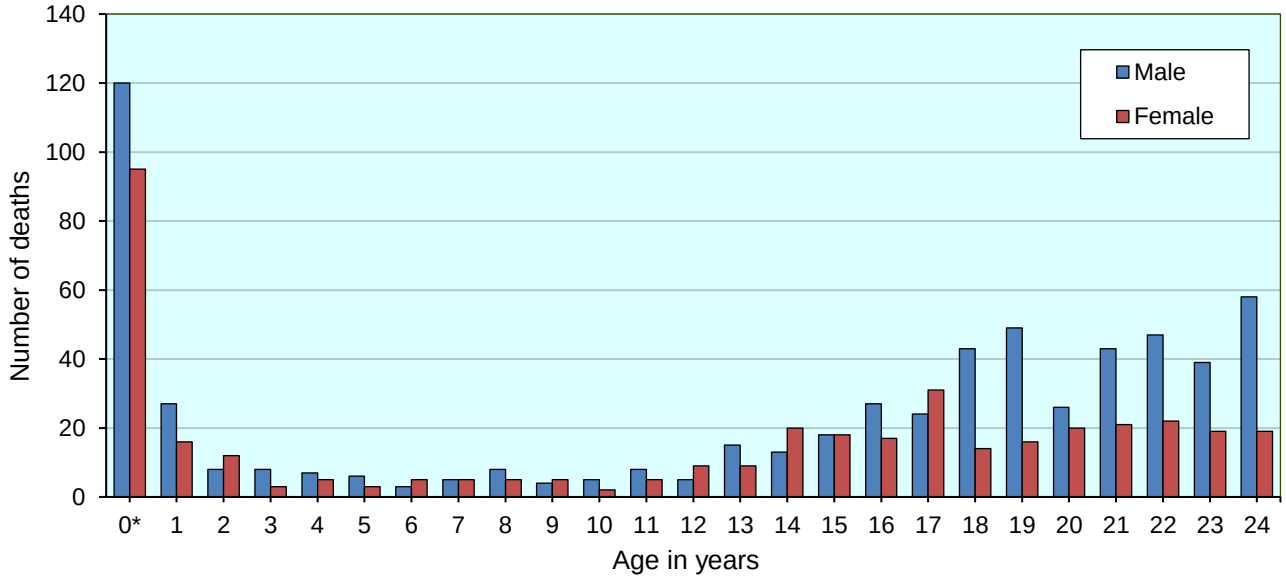
Figure 12.2: Mortality (rates per 100,000 population and 95 percent confidence intervals) in young people aged 20–24 years by NZ Deprivation Index quintile, Aotearoa/New Zealand 2015–19 combined (n=954 deaths*)



* Excludes four cases with no available deprivation data.
Sources: Numerator: Mortality Review Database; Denominator: NZMRDG Estimated Resident Population 2015–19, 20–24 years.

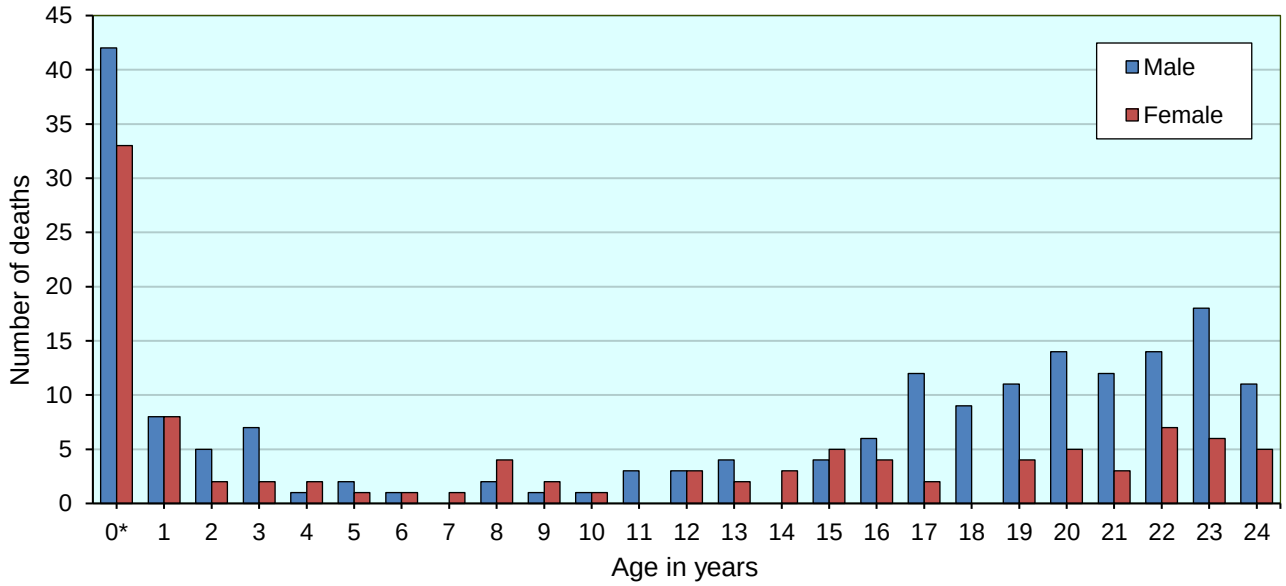
13. Mortality by sex

Figure 13.1: Mortality (number of deaths) in tamariki and rangatahi Māori aged 28 days to 24 years by age and sex, Aotearoa/New Zealand 2015–19 combined (n=1,012 deaths)



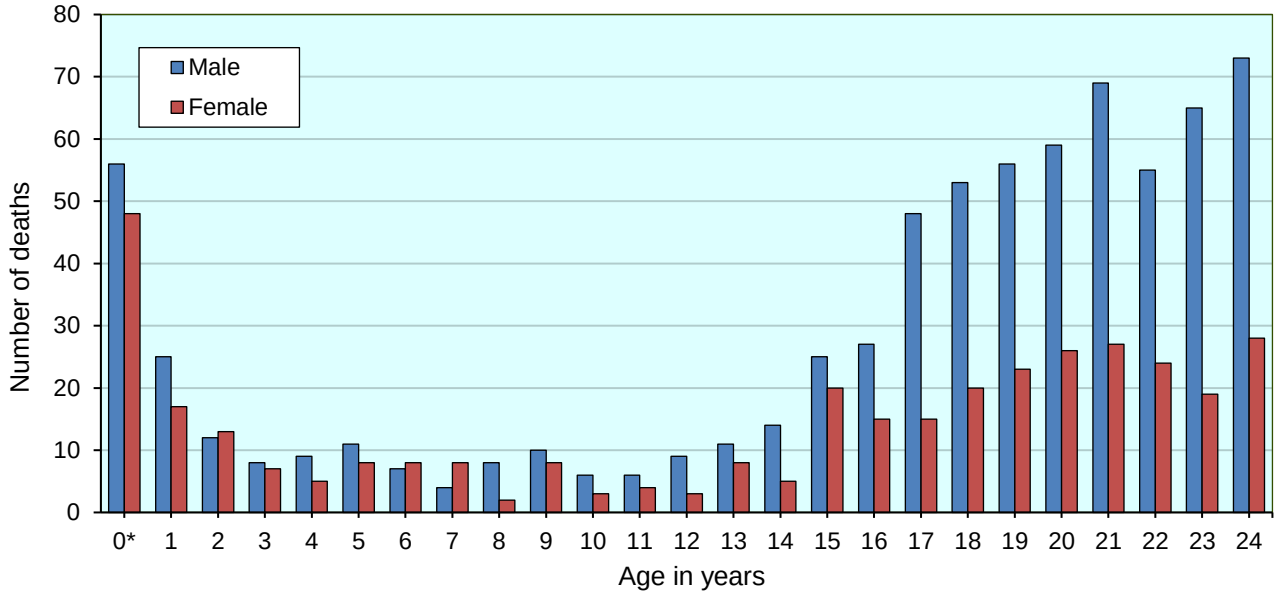
* This category represents infants 28 days and older, and less than one calendar year in age.
Source: Mortality Review Database.

Figure 13.2: Mortality (number of deaths) in Pacific children and young people aged 28 days to 24 years by age and sex, Aotearoa/New Zealand 2015–19 combined (n=297 deaths)



* This category represents infants 28 days and older, and less than one calendar year in age.
Source: Mortality Review Database.

Figure 13.3: Mortality (number of deaths) in European children and young people aged 28 days to 24 years by age and sex, Aotearoa/New Zealand 2015–19 combined (n=1,090 deaths)



* This category represents infants 28 days and older, and less than one calendar year in age.
Source: Mortality Review Database.

Table 13.1: Mortality (number of deaths) in children and young people aged 28 days to 24 years, by cause of death and sex, Aotearoa/New Zealand 2015–19 combined (n=2,666 deaths)

	Male	Female	Total
Medical			
Infectious and parasitic disease	22	19	41
Neoplasms	120	98	218
Diseases of the blood and blood-forming organs and immune system	4	7	11
Endocrine, nutritional and metabolic diseases	25	21	46
Mental and behavioural disorders	3	6	9
Diseases of the nervous system	84	63	147
Diseases of the eye and adnexa	<3	–	<3
Diseases of the ear and mastoid process	–	–	–
Diseases of the circulatory system	54	27	81
Diseases of the respiratory system	44	41	85
Diseases of the digestive system	6	6	12
Diseases of the skin and subcutaneous tissue	–	–	–
Diseases of the musculoskeletal system and connective tissue	5	4	9
Diseases of the genitourinary system	4	<3	6
Pregnancy, childbirth and the puerperium	–	4	4
Certain conditions originating in the perinatal period	37	23	60
Congenital anomalies	96	82	178
Symptoms and abnormal findings not elsewhere classified	52	20	72
Total medical	**558**	**423**	**981**
Percentage by sex	**56.9**	**43.1**	**100**
Injury			
Cut/pierce	3	–	3
Drowning	71	18	89
Fall	17	4	21
Fire/hot object or substance	5	4	9
Firearm	6	–	6
Machinery	6	<3	7
Transport	369	129	498
Natural/environmental	6	<3	8
Poisoning	30	15	45
Struck by, against	6	4	10
Suffocation	15	8	23
Other specified, classifiable	6	<3	8
Other specified, not elsewhere classified	<3	3	5
Unspecified	3	<3	5
Complications of medical and surgical care	–	–	–
Sequelae of surgical and medical care as external cause	–	–	–
Assault	49	31	80
Total injury	**594**	**223**	**817**
Percentage by sex	**72.7**	**27.4**	**100**
Suicide	439	216	655
Percentage by sex	**67.0**	**33.0**	**100**
SUDI (<1 year)	116	82	198
Percentage by sex	**58.6**	**41.4**	**100**
Missing	11	4	15
Total	**1,718**	**948**	**2,666**
Percentage by sex	**64.4**	**35.6**	**100**

Source: Mortality Review Database.

14. Overseas residents

Table 14.1: Mortality (number of deaths) in children and young people aged 28 days to 24 years among non-New Zealand residents, by cause of death and age group, Aotearoa/New Zealand 2015–19 combined (n=67 deaths)

Category	28 days–1 year	1–4 years	5–9 years	10–14 years	15–19 years	20–24 years	Total	%
Medical	<3	<3	<3	<3	5	4	14	20.9
Injury	–	<3	–	6	10	29	47	70.1
Suicide	–	–	–	–	<3	<3	4	6.0
SUDI	<3	–	–	–	–	–	<3	x
Missing data	–	–	–	–	–	<3	<3	x
Total	3	3	<3	7	17	36	67	100.0

'x' indicates percentage not calculated due to small numbers.
Source: Mortality Review Database.

Table 14.2: Mortality (number of deaths) in children and young people aged 28 days to 24 years among non-New Zealand residents by country of residence and year of death, Aotearoa/ New Zealand 2015–19 (n=67 deaths)

Country	Deaths per year					Total deaths	
	2015	2016	2017	2018	2019	Number	%
Australia	4	4	<3	<3	6	16	23.9
Canada	<3	0	0	0	<3	3	4.5
China	<3	<3	0	0	<3	4	6.0
Cook Islands	0	0	<3	0	0	<3	x
Denmark	0	0	0	0	<3	<3	x
Fiji	0	0	0	0	<3	<3	x
France	<3	0	0	0	0	<3	x
French Polynesia	0	<3	<3	0	0	<3	x
Germany	0	4	4	<3	<3	10	14.9
India	0	0	<3	0	0	<3	x
Malaysia	0	0	0	0	<3	<3	x
Qatar	0	0	0	<3	0	<3	x
Samoa	<3	0	0	3	0	4	6.0
South Korea	0	0	0	0	<3	<3	x
Tonga	0	<3	0	0	0	<3	x
USA	5	<3	0	3	<3	11	16.4
United Kingdom	<3	0	0	3	0	4	6.0
Total	**17**	**13**	**8**	**12**	**17**	**67**	**100.0**

'x' indicates percentage not calculated due to small numbers.
Source: Mortality Review Database.

15. Mortality by DHB of residence

Table 15.1: Mortality (number of deaths and rates per 100,000 population) in children and young people aged 28 days to 24 years by DHB of residence and age group, Aotearoa/New Zealand 2015–19 (n=2,666 deaths)

DHB	28 days–<1 year		1–4 years		5–9 years		10–14 years		15–19 years		20–24 years		Total	%	Rate:‡ per DHB	Number of deaths outside DHB of residence	Number of deaths in DHB of residence	% resident deaths outside DHB
	Number	Rate*	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate						
Northland	25	2.18	12	24.48	11	16.53	14	21.96	39	69.72	47	106.17	148	5.6	50.86	27	121	18.2
Waitematā	35	0.89	26	16.21	24	11.80	13	6.87	63	32.30	82	39.63	243	9.1	24.44	90	153	37.0
Auckland	30	1.05	15	13.95	7	5.08	<3	s	38	25.00	73	32.84	165	6.2	21.13	33	132	20.0
Counties Manukau	81	1.92	29	17.21	10	4.62	25	12.27	80	39.10	98	46.99	323	12.1	30.93	82	241	25.4
Waikato	60	2.15	29	25.48	20	13.46	18	12.71	70	50.42	98	69.05	295	11.1	41.40	33	262	11.2
Lakes	12	1.53	8	25.94	3	7.26	8	19.91	27	73.35	34	106.05	92	3.5	48.66	21	71	22.8
Bay of Plenty	31	2.04	18	28.47	7	8.32	13	15.60	42	56.96	56	89.54	167	6.3	43.70	25	142	15.0
Tairāwhiti	11	3.00	4	26.53	3	15.15	<3	s	14	80.18	18	129.12	52	2.0	58.16	14	38	26.9
Hawke's Bay	19	1.79	16	35.26	10	16.21	16	26.74	22	39.30	48	105.08	131	4.9	46.92	13	118	9.9
Taranaki	7	0.91	7	21.56	5	11.58	6	14.50	16	42.84	28	90.18	69	2.6	35.73	7	62	10.1
Whanganui	13	3.02	3	17.57	4	17.57	6	27.27	14	66.54	23	126.03	63	2.4	59.76	16	47	25.4
MidCentral	18	1.64	12	25.95	8	13.29	13	22.11	24	39.09	52	79.56	127	4.8	41.92	21	106	16.5
Capital & Coast	17	0.99	8	11.25	9	9.52	8	8.78	32	29.97	59	42.76	133	5.0	25.64	22	111	16.5
Hutt Valley	7	0.70	7	17.36	3	5.76	5	10.22	19	38.62	21	44.66	62	2.3	25.05	22	40	35.5
Wairarapa	4	1.57	3	27.21	<3	s	–	–	8	58.82	9	81.82	25	0.9	36.78	12	13	48.0
Nelson Marlborough	5	0.67	3	9.02	<3	s	3	6.23	13	29.22	25	70.74	50	1.9	23.16	6	44	12.0
West Coast	3	1.70	6	80.79	<3	s	<3	s	6	66.52	10	130.55	28	1.1	61.30	5	23	17.9
Canterbury	41	1.27	29	22.36	19	11.21	17	10.21	76	43.36	98	49.69	280	10.5	32.17	27	253	9.6
South Canterbury	<3	s	<3	s	<3	s	3	16.46	3	17.03	5	33.47	15	0.6	17.49	<3	14	6.7
Southern	22	1.27	16	21.58	7	7.02	23	23.61	56	48.56	73	55.69	197	7.4	36.82	33	164	16.8
Unknown	–	–	–	–	–	–	–	–	–	–	<3	s	<3	s	–	<3	–	x
Total	442	1.47	252	20.49	155	9.62	197	12.70	662	41.86	958	57.19	2,666	100.0	33.53	511	2,155	19.2

'x' indicates percentage not calculated due to small numbers.

's' indicates rate not calculated due to small numbers.

* Rate per 1,000 live births.

‡ Rate per 100,000 resident population.

Sources: Numerator: Mortality Review Database; Denominator: Ministry of Health Live Birth Registrations 2015–19 for 28 days to less than one year, NZMRDG age-specific Estimated Resident Population 2015–19 for ages 1–24 years.

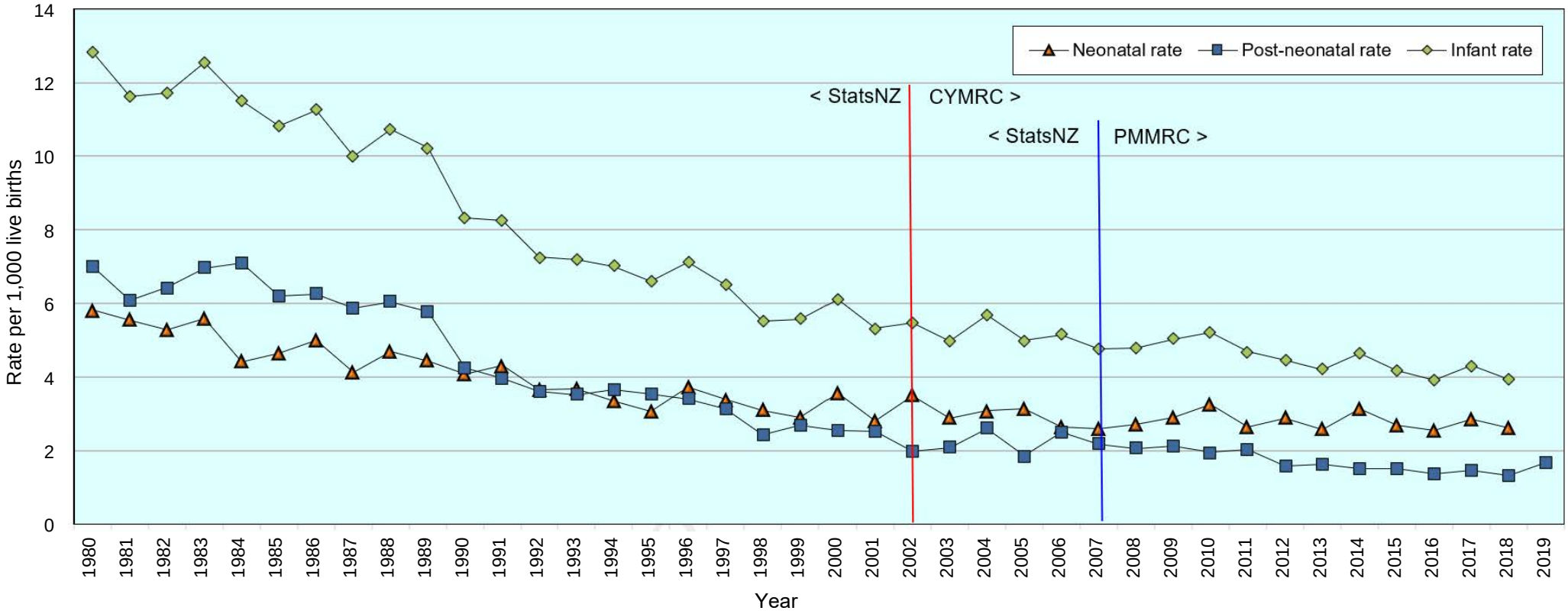
16. Historical data

Table 16.1: Mortality (number of deaths) in children and young people aged 28 days to 24 years by year of death and age group, Aotearoa/New Zealand 1980–2019

Year	28 days–<1 year	1–4 years	5–9 years	10–14 years	15–19 years	20–24 years	Total
1980	354	138	96	96	306	342	1,332
1981	309	159	78	96	318	327	1,287
1982	321	132	81	75	285	345	1,239
1983	351	111	78	93	279	381	1,293
1984	366	120	75	84	276	324	1,245
1985	321	111	87	96	306	324	1,245
1986	330	135	66	99	312	351	1,293
1987	324	111	72	93	324	372	1,296
1988	348	117	69	75	297	366	1,272
1989	336	111	66	69	336	360	1,278
1990	255	120	57	63	300	375	1,170
1991	237	96	63	66	240	324	1,026
1992	213	102	66	75	243	333	1,032
1993	207	111	42	57	249	336	1,002
1994	210	99	54	48	198	279	888
1995	204	90	54	60	222	330	960
1996	195	96	54	66	258	267	936
1997	180	99	51	60	237	240	867
1998	135	84	51	72	210	222	774
1999	153	75	39	66	198	219	750
2000	144	84	48	60	168	189	693
2001	141	75	48	63	189	210	726
2002	107	81	48	47	163	192	638
2003	117	66	38	61	217	190	689
2004	152	57	37	53	193	195	687
2005	109	59	41	50	204	201	664
2006	150	61	32	43	207	180	673
2007	141	81	38	53	177	205	695
2008	134	81	35	49	196	203	698
2009	134	77	33	54	182	194	674
2010	126	65	19	45	171	195	621
2011	126	59	15	41	172	219	632
2012	98	63	30	46	171	193	601
2013	97	51	25	29	152	162	516
2014	88	52	39	29	122	157	487
2015	93	54	31	36	138	183	535
2016	82	45	35	33	123	167	485
2017	88	47	31	31	127	218	542
2018	78	54	28	44	142	185	531
2019	101	52	30	53	132	205	573

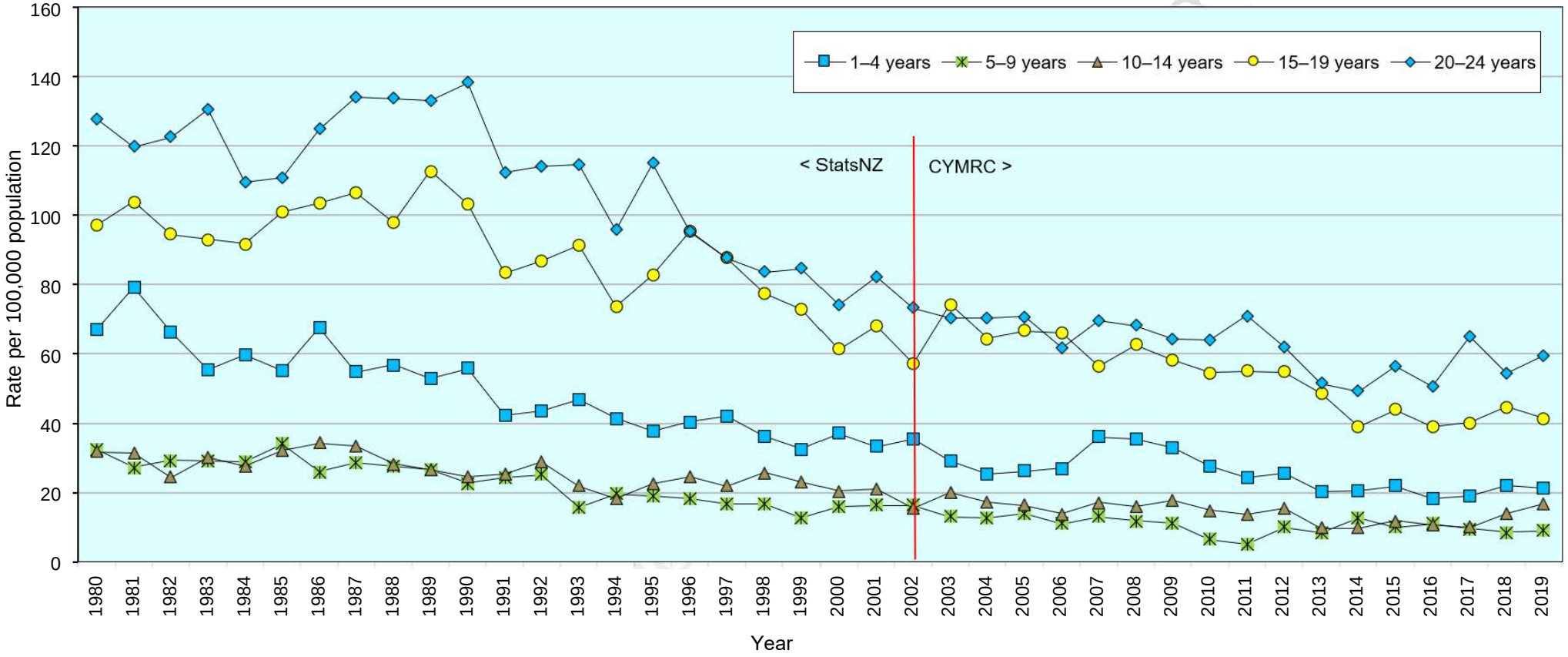
Sources: 1980–2001: Stats NZ. 2002–19: Mortality Review Database.

Figure 16.1: Neonatal, post-neonatal and infant mortality (rates per 1,000 live births) in infants 0 days to less than one year of age by year of death, Aotearoa/New Zealand 1980–2019



Sources: Numerator: Neonatal deaths (0–27 days): 1980–2006: Stats NZ. 2007–19: Mortality Review Database (PMMRC data). Note: 2019 data for neonatal deaths not yet available. Post-neonatal deaths (28 days to less than one year): 1980–2001: Stats NZ; 2002–19: Mortality Review Database (CYMRC data). Infant deaths (0 days to less than one year): sum of neonatal and post-neonatal deaths, as described above. Denominator: (all) Stats NZ live births 1980–2019.

Figure 16.2: Mortality (rates per 100,000 population) in children and young people aged 1–24 years by age group and year of death, Aotearoa/New Zealand 1980–2019

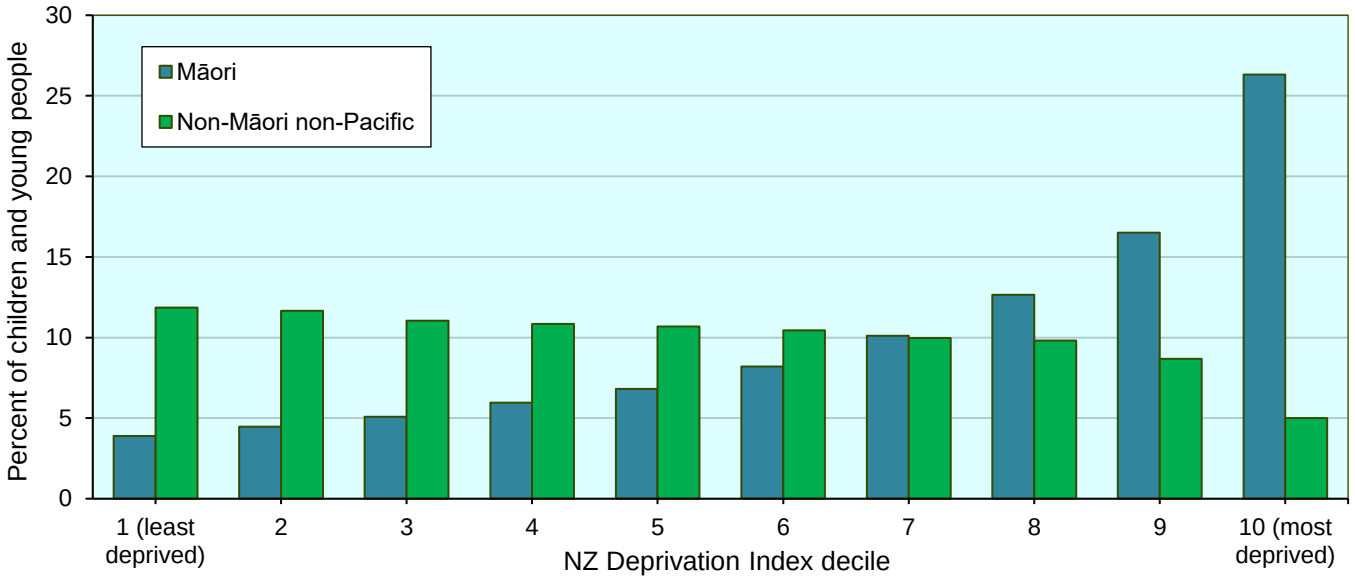


Sources: Numerator: 1980–2001: Stats NZ; 2002–19: Mortality Review Database; Denominator: Stats NZ age-specific estimated population 1980–2019.

17. New Zealand Deprivation Index

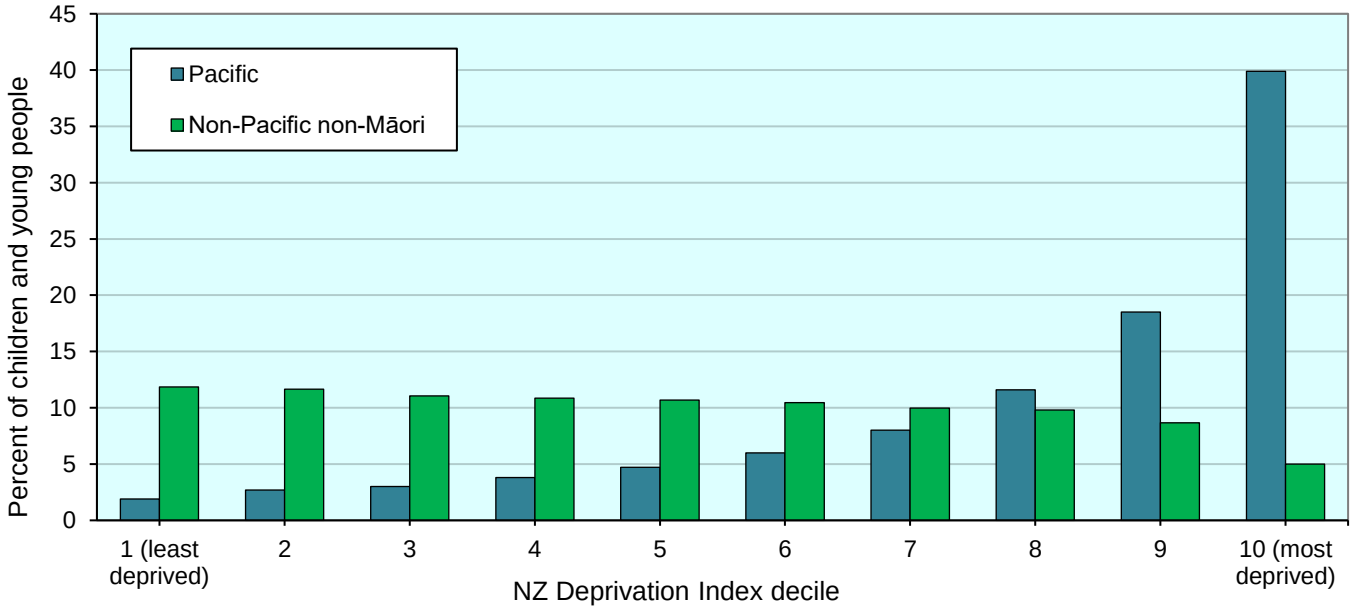
Higher proportions of tamariki and rangatahi Māori live in the most socioeconomically deprived (NZ Deprivation Index) areas of Aotearoa/New Zealand. During 2002–19, 40 percent of Māori aged 0–24 years, compared with 15 percent of non-Māori non-Pacific in the same age group, were living in NZ Deprivation Index deciles 9 and 10. **Figure 17.1** shows the distribution of tamariki and rangatahi Māori was heavily skewed to the most deprived deciles, whereas non-Māori non-Pacific children and young people were relatively evenly distributed across the deciles. A similar, but more extreme pattern is observed for Pacific children and young people (**Figure 17.2**).

Figure 17.1: Percentage of children and young people aged 0–24 years in Aotearoa/New Zealand by NZ Deprivation Index decile and prioritised ethnic category, Māori and non-Maori non-Pacific, 2015–19



Source: NZMRDG estimated resident population 2015–19, 0–24 years.

Figure 17.2: Percentage of children and young people aged 0–24 years in Aotearoa/New Zealand by NZ Deprivation Index decile and prioritised ethnic category, Pacific and non-Pacific non-Māori, 2015–19



Source: NZMRDG estimated resident population 2015–19, 0–24 years.