Our Children's Health

Key findings on
the health of
New Zealand children

Cover artwork by Phoebe Morris, aged 6.

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Foreword

Our Children's Health: Key findings on the health of New Zealand children is one of two related documents that together provide the basis for the strategic direction for child health services, the *Child Health Strategy*. The other document is the *Child Health Programme Review*. In addition, the Health Funding Authority is producing a report that provides regional comparisons of child health status, where such data are available.

Part of the process of developing an effective strategy to improve child health is identifying what we know about the health of our children. Thus, *Our Children's Health: Key findings on the health of New Zealand children* formed the basis for identifying the areas of child health chosen for examination in the *Child Health Programme Review*. The key findings from that review are incorporated within the *Child Health Strategy*.

Our Children's Health: Key findings on the health of New Zealand children draws together information from disparate sources to identify patterns and trends in the health of this country's children. The report looks at child health from population, behavioural and issue-based perspectives. It presents recent information on the demographic and social circumstances of children, along with patterns of mortality, morbidity and health-related behaviours among children in New Zealand. Where possible, the report identifies inequalities among sub-groups of the child population, and also compares the situation in New Zealand with that in other countries.

The key data sources available when this report was prepared were the 1994 mortality data and the 1995 morbidity data. My annual report on the state of the public health (*Progress on Health Outcome Targets. Te Haere Whakamua ki ngā Whainga Hua mō te Hauora: The state of the public health in New Zealand*) provides regular updates of some of the material in this report. In addition, as the datasets are updated, the Ministry intends to provide updated tables, graphs and a data appendix on its Web site (http://www.moh.govt.nz).

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Introduction

Drawing on statistics collected in the last decade, this report summarises key trends in the health and wellbeing of New Zealand children. It is intended for both general and specialist audiences, and focuses on the age group 0–14 years, although information on the age group 15–19 years is provided, where relevant, to highlight age-related trends.

The report is presented in three major parts, focusing on child health from population, behavioural and issue-based perspectives. Part A (a population perspective of child health) begins with a chapter describing key demographic and social features of New Zealand children. This establishes a context for interpreting the other health-related sociodemographic information presented in the remainder of the report. The next two chapters summarise patterns in child and infant mortality and morbidity. These identify the health problems most likely to lead to infants and children dying or being hospitalised at different ages. A chapter outlining what is known about the health of children with disabilities in New Zealand is also included. Part A concludes with a chapter on Tamariki Māori Hauora (health of Māori children), which brings together the main information on the health of Māori children presented in other parts of the report. This enables readers with a special interest in the health of Māori, the tangata whenua of Aotearoa, to access this information without having to read through the whole report.

Part B is a behavioural perspective on child health. It focuses on important health-related behaviours among New Zealand children, including chapters on nutrition, tobacco, alcohol and other substances, and sexual and reproductive health.

The final part of the report gives an issue-based perspective on child health, arranged into chapters on communicable diseases, injuries (intentional and unintentional), mental health, and important chronic diseases (asthma, cancer, diabetes, and oral health).

In most instances, each chapter begins with a section describing the likely acute and long-term health effects for children of the particular illnesses, disorders or health-related behaviours under consideration. Evidence from New Zealand studies is then used to show how widespread these health problems are in the age group 0–14 years. This information may include mortality and hospitalisation data, or prevalence data from surveys. Where reliable New Zealand information exists, trends over time in the prevalence of an illness, disorder or health-related behaviour are described and, if appropriate, assessed in relation to international trends.

The key data sources available when this report was prepared were the 1994 mortality data and the 1995 morbidity data. The Director-General's annual report on the state of the public health (*Progress on Health Outcome Targets. Te Haere Whakamua ki ngā Whainga Hua mō te Hauora: The state of the public health in New Zealand*) provides regular updates of some of the material in this report. In addition, as the datasets are updated, the Ministry intends to provide updated tables, graphs and data appendix on its Web site (http://www.moh.govt.nz).

Each chapter also summarises the main biological and sociocultural factors thought to influence whether or not New Zealand children experience a particular illness or engage in a particular health-related behaviour.

Even though Pacific and Asian children make up 7 percent and 5 percent respectively of New Zealand's child population, summary chapters for these two groups are not presented in the report. There are two main reasons for this. The first is that much of the mortality and hospitalisation data

related to Pacific and Asian children must be treated with caution because of the small numbers involved. In many instances this means that annual mortality and morbidity rates cannot be reliably reported and compared with rates for other children, especially for less common health problems.

The second reason is that to date very few national and regional surveys, including the Christchurch and Dunedin longitudinal studies, have contained large enough numbers of Pacific and Asian children to allow reliable conclusions to be reached about the prevalence of particular health conditions or health-related behaviours in these groups. Hopefully this relative lack of reliable statistical information on the health problems affecting Pacific and Asian children can be addressed in time for future reports on the health of New Zealand children.

Tabulated data used to generate charts in this report are included in a separate appendix. A copy of the appendix is available on request by writing to:

General Manager
Public Health Group
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PO Box 5013
Wellington
New Zealand.

This report and the data appendix are also available on the Ministry of Health's Web site at http://www.moh.govt.nz

Data Sources and Methods of Analysis

This section discusses the key data sources used in this report and some of the relevant methodological issues.

Key data sources

National Minimum Dataset (NMDS)

This dataset is managed by the New Zealand Health Information Service (NZHIS). It is essentially a combination of existing public and private morbidity, mortality, mental health, and cancer data collections. There is provision to include additional data in the NMDS that is outside the scope of these collections (for example, data on primary health care and disabilities). All diagnoses are classified according to the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM). This classification was used for the first time in New Zealand for the 1988 mortality data.

Hospital morbidity data

Data on the morbidity of various diseases and conditions are primarily based on all hospitalisations from public hospitals (strictly speaking, these hospitalisations are referred to as 'hospital separations'). Day cases are counted as hospitalisations (since 1986) but attendances at outpatient clinics or emergency departments are not included. Hospitalisation data are counts of the number of episodes of care rather than the number of individual people. Therefore, readmissions for the same condition are counted as additional admissions and patients who are transferred to another hospital are counted twice. Hospital separations include patients who die in hospital after formal admission.

In the past, concern has been expressed about the accuracy of the ICD-9-CM coding of hospital discharge diagnoses in New Zealand (Smith 1989). However, data suppliers now contract for at least a 95 percent level of accuracy. Furthermore, NZHIS audits indicate a concordance between notes and codes of over 90 percent.

A general issue with using hospitalisation rates for outcome measures is that reductions in such rates can reflect either a real decrease in incidence, improved primary health care (thus reducing the need for hospital care), or a decrease in access to (or provision of) hospital services. The relative importance of these factors is often not known.

Mortality data

The current mortality statistics maintained by NZHIS are based on death certificates completed by medical practitioners, postmortem reports, coroners' certificates, and death registration forms

completed by funeral directors. Supplementary data are obtained from a variety of other sources (such as, public hospitals and the National Cancer Registry).

National mortality statistics are based on registrations (not actual deaths) during a specific year. However, this only leads to a very small variation each year between the number of registrations and the number of deaths.

One validation study of mortality data for ischaemic heart disease found that the codes were accurate to within approximately 10 percent (Jackson et al 1988). Cause of death coding accuracy is likely to be similar for most other causes.

Cancer data

The National Cancer Registry (NCR) was established in the Department of Health in 1948. The NCR is now maintained by NZHIS and is a register of people who develop all types of cancer except basal and squamous cell skin cancers. Information from the NCR has been used extensively in many New Zealand and international research projects, and data are regularly supplied to the International Agency for Research on Cancer. Nevertheless, the Registry has experienced under-reporting in the past (such as, for melanoma) (Elwood and Glasgow 1993). In an attempt to address this general problem, the Cancer Registry Act was passed in 1993 and came into force in July 1994. This Act requires all pathology laboratories to supply the NCR with a copy of any pathology report with a diagnosis of cancer and related conditions. It is likely that this will improve the value of the NCR data, but additional auditing is required to confirm this. The quality of data on cancer stages has been improving but this too still needs further evaluation.

Longitudinal development studies

This report makes considerable use of results from New Zealand's two longitudinal health and development studies, the Dunedin Multidisciplinary Health and Development Study and the Christchurch Health and Development Study (Silva and Stanton 1996; Christchurch Health and Development Study 1997). For more than 20 years these studies have tracked patterns of health and wellbeing in two large samples of young people, providing valuable information on possible relationships between the diseases and health-related behaviours experienced by children and various biological, demographic and social factors.

Use of ethnicity data

Where possible, this report includes rates for Māori and Pacific children. However, all the ethnic-specific rates need to be treated with caution for the following reasons:

- misclassification of ethnicity and under-reporting of Māori patients is known to have occurred in hospitalisation data (for example, Pōmare et al 1995)
- the numerator and denominator used to calculate the hospitalisation rates do not refer to exactly the same population
- the mortality rates refer only to Māori of half or more Māori ancestry, and not to the total population of Māori descent (or those who self-identify as Māori), which results in under-reporting of Māori mortality (Graham et al 1989).

Recognising that people of Māori descent are probably underestimated in hospitalisation data before 1996, this report has used the total national Māori population who are of 'sole' Māori ethnicity as the denominator to calculate Māori hospitalisation rates. The 'sole' Māori population comprises people who indicated that they belong to the Māori ethnic group only. The population of 'sole' Māori ethnicity identified in the Census of Population and Dwellings (Statistics New Zealand 1997) is smaller than the population of 'mixed' Māori ethnicity, which includes Māori who also belong to other ethnic groups, and does not accord with the definition of 'Māori' as being anyone descended from a Māori or who self-identify as Māori. However, it would appear to be the more valid denominator, given that the hospitalisation data (the numerator) have not included all people of Māori descent (or who self-identify as Māori).

For mortality data, the population of 'sole' Māori ethnicity has been used as the denominator in calculating Māori mortality rates. While this denominator provides the best match with the numerator for the mortality data collected prior to September 1995, it is acknowledged that some rates are likely to under-represent the true rates for all those with Māori ancestry or who self-identify as Māori.

When comparisons are made in this report between Māori and non-Māori it is important to recognise that, unless stated otherwise, non-Māori includes Pacific people, for whom certain mortality and hospitalisation rates may also be relatively high compared with those for New Zealanders of European ethnicity.

Recent changes in ethnicity coding

Hospitalisation data: From 1 July 1996 the method of collecting ethnicity information was revised to enable people admitted to hospital to self-identify with one or more ethnic groups. This collection method replicates that used in the Statistics New Zealand population censuses (1991 and 1996) and will be relevant to how rates are calculated in future analyses.

Vital statistics: From 1 September 1995 changes were also made to the collection of ethnicity information for all births and deaths. From this time, data have been collected on the ethnic group or groups with which individuals identify themselves. The new forms allow for coding of up to three ethnic groups and also include a field for Māori ancestry. Infant death registrations will continue to be linked back to the infant's birth registration to avoid biases in the calculation of rates.

Reporting date

The key data sources available when this report was prepared were the 1994 mortality data and the 1995 morbidity data. The Director-General's annual report on the state of the public health (*Progress on Health Outcome Targets. Te Haere Whakamua Ki Ngā Whainga Hua Mō Te Hauora: The state of the public health in New Zealand*) provides regular updates of some of the material in this report. In addition, as the datasets are updated, the Ministry intends to provide updated tables, graphs and data appendix on its Web site (http://www.moh.govt.nz).

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Jackson R, Graham P, Beaglehole R, et al. 1988. Validation of coronary heart disease death certificate diagnoses. *NZ Med J* 101: 658-60.

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Part A

Child Health:

A population perspective

Chapter 1

Growing up in New Zealand

Key points

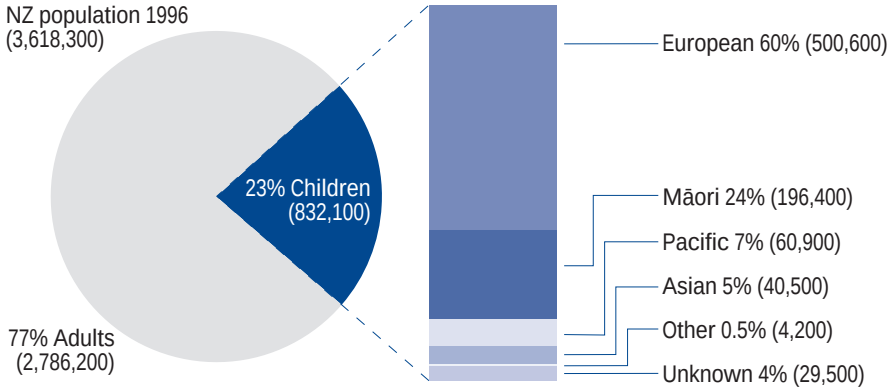
- In 1996, a total of 832,100 children aged 0–14 years were living in New Zealand. Twenty-four percent of these were Māori children, 7 percent were Pacific children and 5 percent were Asian children.
- Compared to previous decades, children now make up a smaller proportion of the total New Zealand population.
- New Zealand's Māori, Pacific and Asian ethnic groups contain much greater proportions of children than the European ethnic group.
- More than 90 percent of Pacific and Asian children lived in the main urban areas in 1996. More than a quarter of European and just under a third of Māori children lived in either rural or minor urban areas.
- In 1996, 53 percent of Pacific children and 32 percent of Māori children lived in households containing six or more people. Only 16 percent of European children and 24 percent of Asian children lived in households this size.
- In 1996, 23 percent of children were living in one-parent families, compared to 22 percent in 1991 and 12 percent in 1981.
- In 1996, mothers of 62 percent of children from two-parent families were participating in full or part-time work. In 1991, the corresponding figure was 53 percent. In 1981, it was 46 percent.
- In 1996, 11 percent of children had at least one parent who claimed the unemployment benefit.
- In 1996, 23 percent of children did not have a parent participating in the labour force.
- In July 1996, 93 percent of four-year-olds were enrolled in an early childhood service.
- Over a third of Māori and over a quarter of Pacific young people left school with no formal educational qualifications, in 1996.

Demographic features

Number of children living in New Zealand

In 1996, 832,100 children aged 0–14 were living in New Zealand. Nearly two out of every three of these children were European, one in four was Māori, one in 14 was Pacific and one in 20 was Asian (Figure 1.1).

Figure 1.1: Size of New Zealand's child population, aged 0–14 years, in 1996, by ethnic group



Source of data:
Statistics New Zealand, 1996 Census of Population and Dwellings.

Of these 832,100 children, 54,700 (6 percent) were infants aged 0–12 months, 224,900 (27 percent) were preschoolers aged 1–4 years, and 552,500 (66 percent) were school children aged 5–14 years (Table 1.1).

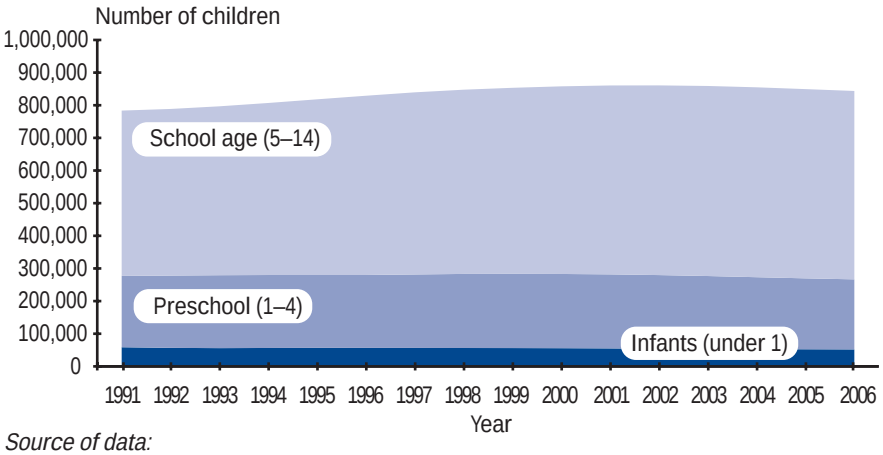
Table 1.1: Numbers of infant, preschool and school age children in the New Zealand population in 1996, by ethnic group

	European	*Māori*	*Pacific*	*Asian*
Infants (0–12 months)	31,400	14,800	4,700	2,700
Preschoolers (1–4 years)	133,700	56,800	18,200	10,300
School age (5–14 years)	335,500	124,700	38,000	27,500
Total	500,600	196,400	60,900	40,500

Source of data:
Statistics New Zealand, 1996 Census of Population and Dwellings.
Note:
Columns may not sum to totals due to rounding.

From 1997 to 2002, the number of children in the New Zealand population is projected to increase by approximately 2.5 percent to reach 860,800. After 2002, the number of children is expected to decrease to less than 845,000 by the year 2006 (Figure 1.2).

Figure 1.2: Projected trends in the number of infant, preschool and school age children in the New Zealand population, 1991–2006



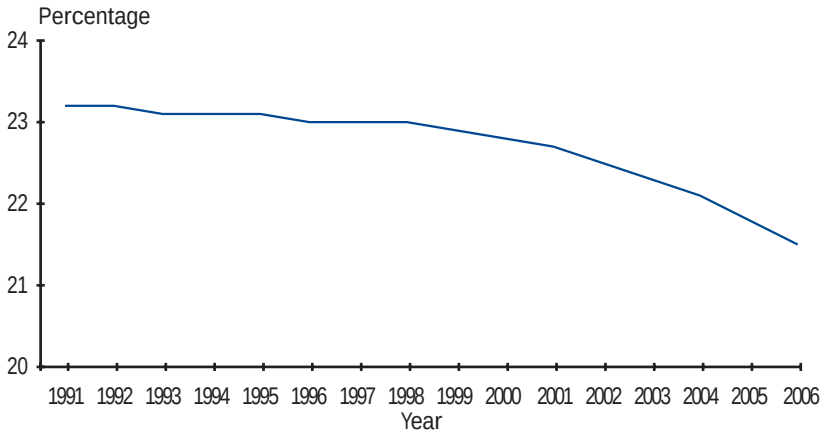
Source of data:
Statistics New Zealand.
Note:
Projections made in June 1997 using 1996 Census of Population and Dwellings as the base. Assumes medium fertility, medium mortality and medium migration.

Children as a proportion of the New Zealand population

Compared to earlier decades, children now make up a smaller proportion of the total New Zealand population. In 1996, 23 percent of the population were children aged 0–14 years. In 1976, 33 percent were children (Statistics New Zealand 1995a).

Over the next decade, the proportion of children in the population is expected to continue to decline. This is linked to a reduced proportion of people in the childbearing ages, the New Zealand population's increasing life expectancy and the trend towards smaller families.[1] By 2006, children are forecast to make up 21.5 percent of the total population, falling further to 19.7 percent and 17.3 percent respectively by 2011 and 2031 (Figure 1.3) (Statistics New Zealand 1997a).

Figure 1.3: Projected trends in the percentage of children aged 0–14 years in the New Zealand population, 1991–2006



Source of data:
Statistics New Zealand.
Note:
Projections made in June 1997 using 1996 Census of Population and Dwellings as the base. Assumes medium fertility, medium mortality and medium migration.

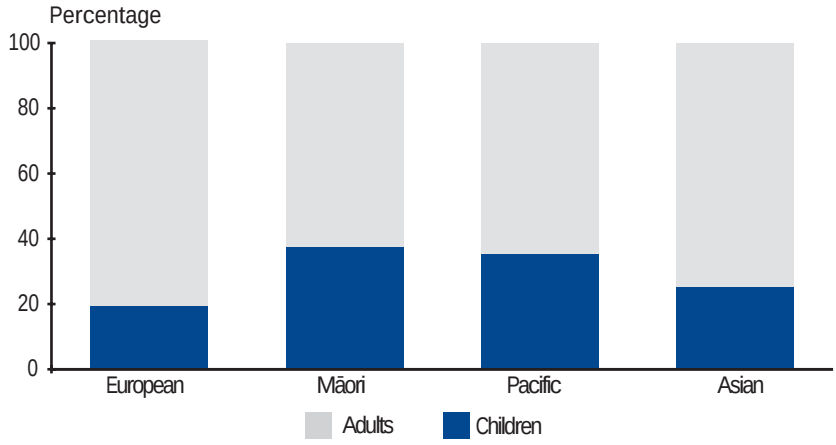
1 In the 25 years from 1966 to 1991, the average number of children in the New Zealand family dropped from 2.49 to 1.97 children (Statistics New Zealand 1995b).

In 1991, the proportion of children in the New Zealand population (23 percent) was slightly higher than that of Australia (22 percent), the United States (22 percent) and Canada (21 percent) and higher than that of the United Kingdom (19 percent) and Sweden (18 percent) (Statistics New Zealand 1995a).

Children in the main ethnic groups

Compared to the European ethnic group, the Māori, Pacific and Asian ethnic groups contain a much greater proportion of children (Figure 1.4). In 1996, more than one in three Māori and Pacific people living in New Zealand were under 15 years of age, whereas only one in five European people were in this age group. Two important reasons for this are that the New Zealand population has a higher concentration of Māori and Pacific people in the childbearing ages, and Māori and Pacific people tend to raise larger families than Europeans (Pool 1994; Statistics New Zealand 1995a).

Figure 1.4: Percentage of children aged 0–14 years and adults in New Zealand's four main ethnic groups in 1996



Source of data:
Statistics New Zealand, 1996 Census of Population and Dwellings.

Social features

A number of studies in developed countries like New Zealand have identified how differences in the prevalence of illness and injury among children tend to mirror differences in their social backgrounds and life circumstances. In general, children from relatively disadvantaged communities and households are more likely to get sick, be hospitalised or die than children from more socioeconomically advantaged communities and households (Barwick 1992; Bor et al 1993; Jolly 1990; Townsend and Davidson 1982).

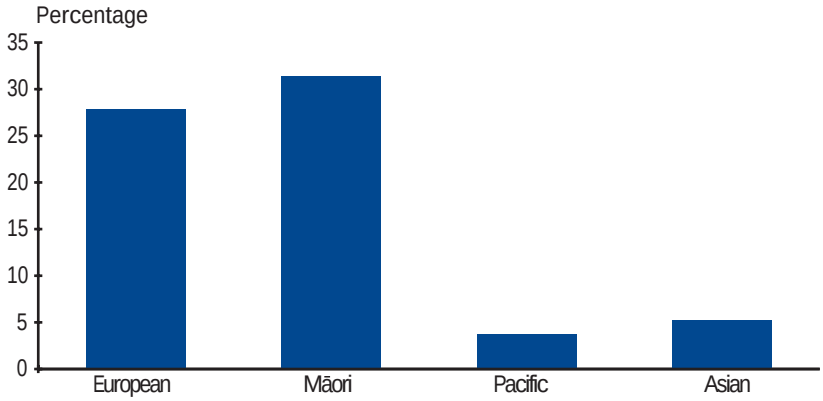
The remainder of this chapter presents general statistics on the social circumstances of New Zealand children. This provides a foundation for subsequent chapters in which specific factors, including social factors, are linked to particular health conditions.

Location

In 1996, just over 83 percent of New Zealand children lived in urban areas. The rest lived in rural communities of less than 1000 people.

Māori and European children are more likely than children of other ethnic groups to live in the smaller population centres. In 1996, over a quarter of European and nearly a third of Māori children lived in either rural or minor urban areas. By contrast, over 90 percent of Pacific and Asian children lived in the main urban areas.[2]

Figure 1.5: Percentage of children aged 0–14 years living in minor urban or rural areas in 1996, by ethnic group



Source of data:
Statistics New Zealand, 1996 Census of Population and Dwellings.

Dwelling types

Pacific and Māori children are more likely than children from other ethnic groups to live in rented or leased accommodation rather than accommodation owned by their caregivers. In 1996, slightly more than 31 percent of all New Zealand children lived in rented or leased accommodation, while 54 percent of Pacific children and 48 percent of Māori children lived in this kind of accommodation.

Living in substandard housing, whether rented or owned, can increase the risk of ill health, especially if there is inadequate protection from damp and cold (Barwick 1992; Williamson et al 1997).

Household size and composition

Size of household

The number of people living in a household is thought to be a factor influencing susceptibility to infectious diseases, respiratory problems and mental health problems, as well as perhaps violence and sexual abuse (Barwick 1992). In New Zealand, Pacific and Māori children are more likely than

2 A minor urban area is a centre which has a population ranging from 1000 to 9999 people. A main urban area has a population of 30,000 or more people. A rural area has less than 1000 people (Statistics New Zealand 1995a).

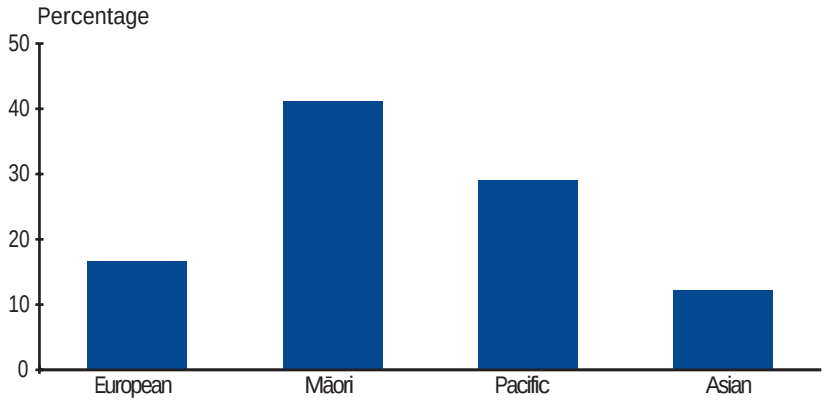
European children to live in large households. In 1996, 53 percent of Pacific children and 32 percent of Māori children lived in households containing six or more people. Only 16 percent of European children and 24 percent of Asian children lived in households this large.

One- and two-parent families

Compared to two-parent families, one-parent families are generally disadvantaged in terms of employment, income, education, and housing (Statistics New Zealand 1995b). This is thought to be one of the reasons why children from one-parent families tend to have more health problems than children living in two-parent families (Barwick 1992; Roberts 1997).

In 1996, 23 percent of children aged 0–14 were living in one-parent families, compared to 22 percent in 1991 and 12 percent in 1981 (Statistics New Zealand 1995a). As Figure 1.6 illustrates, Māori children and Pacific children were more likely than European and Asian children to live in one-parent families.

Figure 1.6: Percentage of children aged 0–14 years living in one-parent families in 1996, by ethnic group



Source of data:
Statistics New Zealand, 1996 Census of Population and Dwellings.

In 1996, 43 percent of Māori preschoolers and 31 percent of Pacific preschoolers were living in one-parent families, compared to 15 percent of European and 9 percent of Asian preschoolers.

Living in households with more than one family

Families experiencing economic hardship are more likely to share housing to reduce living costs (Statistics New Zealand 1995b). In 1996, 46 percent of Pacific children and 38 percent of Māori children from one-parent families lived in households shared by more than one family. Corresponding rates for Asian and European children from one-parent families were 33 percent and 23 percent respectively.

Parents' income

Studies show that the health of a population is related not just to the absolute level of income but also to the size of the gap between high and low incomes (Barwick 1992; Jolly 1990; Maskill 1991; Townsend and Davidson 1982).

Statistics New Zealand has used equivalised income data to compare the relative economic wellbeing of 'income units'[3] containing and not containing children under 15 years of age. In the decade from 1981 to 1991, the income disparity between New Zealand families with children increased rather than narrowed. In 1991, fewer families with children were in the middle income groups and more families with children were in either the upper or lower ends of the income spectrum. Pacific and Māori children were more likely to be in families in the lower income group and European children were more likely to be in families in the upper income groups. Sixty percent of children living in one-parent families had family incomes in the bottom 20 percent of all family incomes. Children aged 0–4 and 5–9 were more likely than children aged 10–14 to be in families with lower incomes (Statistics New Zealand 1995a).

Parents' labour force participation

The type and amount of paid work that parents do is likely to be a key determinant of the amount of income they have to provide for their children. It can also influence parents' risk of illness or injury (Pool 1994), which in turn may influence their capacity to care for their children. For example, people working in lower socioeconomic status occupations tend to do more heavy lifting and be exposed more often to dangerous chemicals and other work-related health risks (Barwick 1992).

Full-time and part-time work

An increasing percentage of children from two-parent families have mothers who work outside the home. In 1996, mothers of 62 percent of children from two-parent families were participating in full- or part-time work. In 1991, the corresponding figure was 53 percent, while in 1981, it was 46 percent (Statistics New Zealand 1995a, 1998). Mothers of European children from two-parent families (66 percent) were more likely to be employed than mothers of Māori children (54 percent), Pacific children (49 percent) and Asian children (47 percent) from two-parent families.

In 1996, 25 percent of children from two-parent families had both parents working full time (compared to 23 percent in 1991) (Statistics New Zealand 1997b).

Not in paid work

Unemployment, where people are part of the labour force but cannot find paid work, is generally associated with a low income. Among other things, this may reduce the range and level of resources parents can call upon to protect their children from the risk of illness or injury (Council of Europe 1987).

In 1996, 11 percent of New Zealand children had at least one parent who claimed the unemployment benefit (the percentage was the same in 1991) (Statistics New Zealand 1997a). Pacific children (22 percent), Māori children (18 percent) and Asian children (15 percent) were more likely than European children (6 percent) to have a parent claiming the unemployment benefit. Eight percent of children from two-parent families had both parents claiming the unemployment benefit.

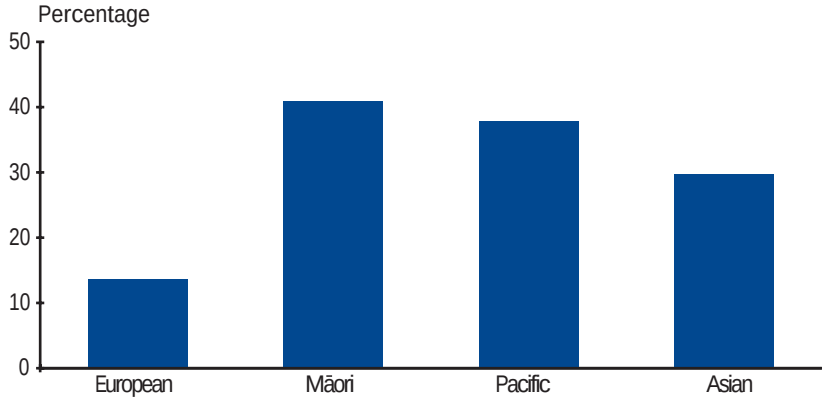
3 Defined as a single adult or couple and any children dependent on that adult or couple (Statistics New Zealand 1995a).

Not participating in the labour force

Parents not participating in the labour force are not looking for work and may derive income from the paid work of their partner or other family members, or from benefits such as the domestic purposes benefit or the sickness benefit.

In 1996, 23 percent of children had no parent participating in the labour force. Māori children (41 percent), Pacific children (38 percent) and Asian children (30 percent) were more likely than European children (14 percent) to have no parent participating in the labour force.

Figure 1.7: Percentage of children aged 0–14 years without a parent participating in the labour force in 1996, by ethnic group

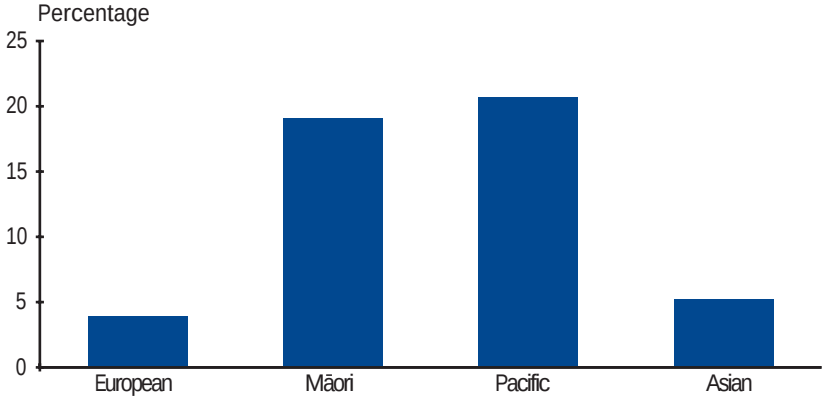


Source of data:
Statistics New Zealand, 1996 Census of Population and Dwellings.

Access to transport

In 1996, 19 percent of Māori children and 21 percent of Pacific children lived in a household where no vehicle was available for the use of its residents. This compares to 5 percent of Asian children and 4 percent of European children.

Figure 1.8: Percentage of children aged 0–14 years living in households without a motor vehicle in 1996, by ethnic group



Source of data:
Statistics New Zealand, 1996 Census of Population and Dwellings.

Education and employment

Many studies indicate the complex linkages between health status and measures of peoples' educational development and attainment (Barwick 1992; Jolly 1990; Rahkonen et al 1997; Silva 1996).

Participation in early childhood education

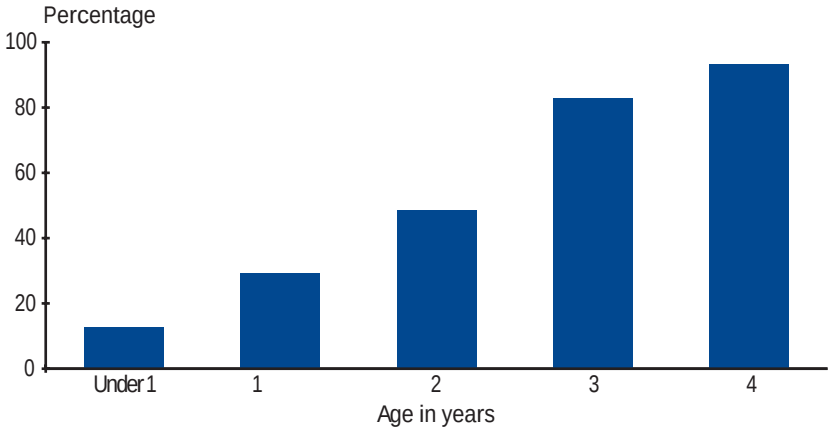
Participation in appropriate preschool education is thought to improve children's integration and achievement at primary school (Podmore 1994). This has implications for young people's subsequent educational, career and employment options, which in turn can be important determinants of their levels of exposure to the health risks associated with unemployment, underemployment and socioeconomic disadvantage.

In New Zealand, an increasing percentage of preschool children are being enrolled in early childhood education services (for example, kindergartens, childcare services, playcentres, Te Kohanga Reo, playgroups, and Pacific Islands Language Groups). In 1992, 46 percent of 0–4-year-olds were enrolled in one of these services, rising to an estimated 54 percent in 1996 (Ministry of Education 1997a).

More than a third of Māori and Pacific preschoolers participate in some kind of formal early childhood education, with Māori children most likely to attend either Kohanga Reo, kindergartens or childcare centres. Pacific children are most likely to attend either Pacific Islands Language Groups, kindergartens or childcare centres. European and Asian children are most likely to attend either kindergartens or childcare centres (Ministry of Education 1997a; Newell 1996; Statistics New Zealand 1995a).

Older preschoolers are especially likely to participate in early childhood education services. In July 1996, 93 percent of four-year-olds were enrolled on the regular rolls of early childhood education services (Figure 1.9) (Ministry of Education 1997a).

Figure 1.9: Percentage of preschool children on the regular rolls of early childhood education services at 1 July 1996, by age



Source of data:
Ministry of Education 1997a.
Note:
Includes children on regular rolls at Kindergartens, Playcentres, Childcare Services, Playgroups, Te Kohanga Reo, and Pacific Islands Language Groups.

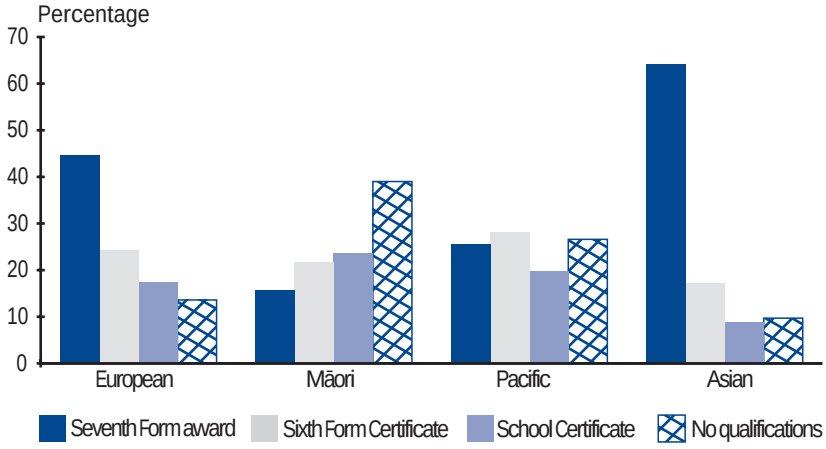
Non-English speaking background students

Non-English speaking background students come from homes where English is not the predominant language. In some cases, difficulties with English may inhibit educational development. In July 1996, 9 percent of primary and secondary school students were from a non-English speaking background. Of this group, nearly one in 10 was unable to understand greetings, simple instructions and questions in English. Just under a quarter of the group (23 percent) could converse a little in English but had minimal English reading and writing skills or minimal oral English (Ministry of Education 1997a).

Highest educational attainment at secondary school

In 1996, Asian young people (64 percent) were more likely than European (44 percent), Pacific (25 percent) and Māori (16 percent) young people to leave secondary school with a seventh-form award of some type (Figure 1.10). Over a third of Māori and over a quarter of Pacific young people left school with no formal educational qualifications (Ministry of Education 1997b).

Figure 1.10: Highest educational attainment of school leavers in 1996, by ethnicity



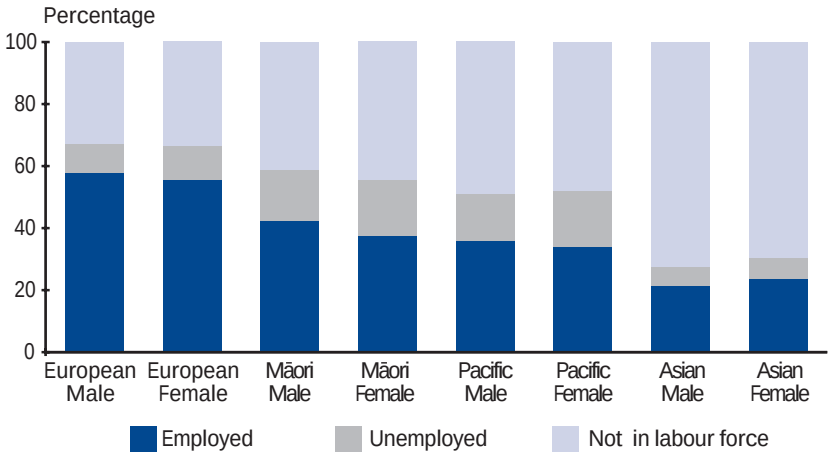
Source of data:
Ministry of Education 1997b.
Note:
Seventh Form awards includes A or B Bursary, Entrance Qualification from Bursary and Higher School Certificate.

Youth employment

Compared to other young people, Asian adolescents are more likely to go on to post-secondary school education and training rather than enter the labour force straight from school. On Census night in March 1996, two-thirds of European 15–19-year-olds (67 percent) and over half of Māori (57 percent) and Pacific (51 percent) 15–19-year-olds were participating in the labour force (that is, either in work or unemployed). By contrast, the rate of labour force participation for Asian 15–19-year-olds was 29 percent (Statistics New Zealand 1998).

Māori and Pacific 15–19-year-olds participating in the labour force in 1996 were more likely to be unemployed than their Asian or European counterparts. Just on 30 percent of Māori and 32 percent of Pacific youth were unemployed, compared to 22 percent of Asian youth and 15 percent of European youth. Young women were more likely to be unemployed than young men (Statistics New Zealand 1998).

Figure 1.11: Labour force participation of 15–19-year-olds in 1996, by sex and ethnic group



Source of data:
Statistics New Zealand 1998, 1996 Census of Population and Dwellings.

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Chapter 2

Mortality and Morbidity in Children

Key points

- The New Zealand mortality rate for children aged 0–4 years currently ranks 15th out of 21 OECD countries. This is a fall from a position of sixth out of 21 countries in 1960. Between 1960 and 1995, New Zealand experienced the fifth smallest decline in the under-five-year-old mortality rate of these 21 OECD countries.
- In New Zealand, 620 children aged 0–14 died in 1994, an age-specific rate of 76 deaths per 100,000 population.
- The death rate for Māori children aged 0–14 years is consistently higher than for non-Māori (83 percent higher in 1994).
- Infants (aged under one year) are considerably more at risk of death than are older children. Two-thirds of childhood deaths each year are infants under one year of age. In 1994, the infant death rate was 16 times higher than the death rate for 1–4-year-olds and 35 times the death rate for 5–14-year-olds.
- The major causes of infant death are sudden infant death syndrome (SIDS), congenital anomalies and perinatal conditions. These three causes accounted for 84 percent of all infant deaths in 1992–94.
- Injury and poisoning is the leading cause of death for children aged 1–14 years. Each year this cause accounts for close to half of all deaths for children in this age group.
- Māori record higher death rates than non-Māori for most of the major causes of death in children. In 1994, particularly high disparities between Māori and non-Māori were apparent for SIDS, respiratory conditions, and injuries and poisonings.
- Childhood death rates are declining over time. Between 1980 and 1994 there was an average annual decline of 2.7 percent in the overall death rate of 0–14-year-olds.
- There was a total of 111,571 hospitalisations (excluding newborns) for 0–14-year-olds in 1995. Just over a third (35 percent) of these hospitalisations were for infants (aged 0–12 months).
- Hospitalisation rates decrease markedly after the first year of life, with 1–4-year-olds hospitalised at one-fifth the rate of infants.
- Within each age group, and for most of the major causes of hospitalisation, Māori children are hospitalised at higher rates than non-Māori children.
- Children are being hospitalised at an increasing rate. Over the period 1988-95, there was an average annual increase of 5 percent in the hospitalisation rate of 0–14-year-olds.

Mortality

Childhood deaths totalled 620 in 1994. This represents an age-specific rate of 76 deaths per 100,000 children aged 0–14 years (Table 2.1).

More boys than girls die each year in New Zealand, with boys accounting for 56 percent of childhood deaths in 1994. Māori children are at higher risk of dying before the age of 15 years than are non-Māori children. In 1994, Māori children recorded a death rate that was 83 percent higher than non-Māori children (125 and 68 per 100,000 children aged 0–14 years for Māori and non-Māori respectively)

Table 2.1: Deaths from all causes, by sex and ethnicity, 0–14-year-olds, 1994

	Number	*Percentage*	*Rate**
Total	620		76
Male	349	56%	83
Female	271	44%	68
Relative risk for males			*1.22*
Māori	134	22%	125
Non-Māori	486	78%	68
Relative risk for Māori			*1.83*

**Age-specific rate per 100,000 population.*
Source of data:
Ministry of Health 1998.

Infants under one year are at much greater risk of dying than are older children (Table 2.2). In 1994, two-thirds of all childhood deaths were infants (a rate of seven infant deaths per 1000 livebirths).

The risk of dying in childhood decreases rapidly after the first year. In 1994, the death rate for children aged 1–4 years was 44 per 100,000, a rate 16 times lower than for infants, although still twice the rate recorded in the 5–9 and 10–14 year age groups.

The disparity between Māori and non-Māori death rates in children is apparent in each of the age groups, shown in table 2.2.

Table 2.2: Deaths from all causes, by age group, 0–14-year-olds, 1994

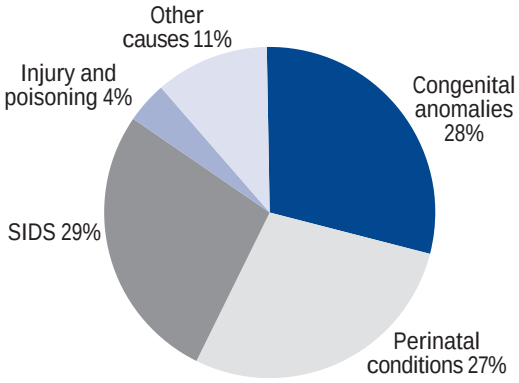
	Total		*Māori*		*Non-Māori*	
Age group	*Number*	*Rate**	*Number*	*Rate**	*Number*	*Rate**
<1 year	414	**7	98	**13	316	**6
1–4 years	102	44	18	61	84	41
5–9 years	53	20	8	21	45	19
10–14 years	51	20	10	30	41	19
Total	620	76	134	125	486	69

** Age-specific rate per 100,000 population.*
*** Infant death rate per 1000 livebirths.*
Source of data:
Ministry of Health 1998.

Sudden infant death syndrome (SIDS) is the most common cause of death for infants under one year of age. In 1992–94, SIDS accounted for 29 percent of all infant deaths (Figure 2.1).

Other major causes of infant death include congenital anomalies and perinatal conditions[1] (28 percent and 27 percent of infant deaths respectively in 1992–94). In total, these three causes accounted for 84 percent of all infant deaths between 1992–94.

Figure 2.1: Major causes of death of infants aged less than one year, 1992–94

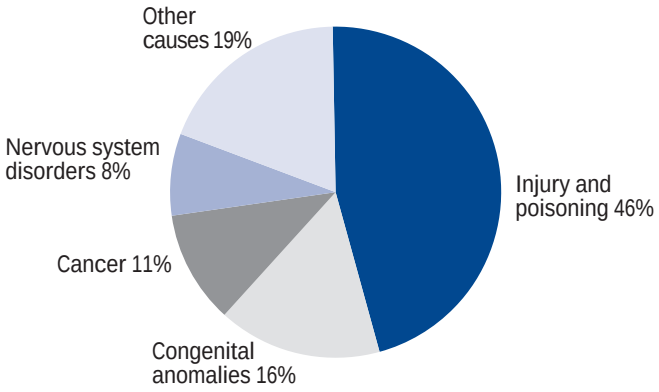


Source of data:
Ministry of Health 1998.

For children aged 1–4 years, injury and poisoning accounted for nearly half (46 percent) of all deaths between 1992–94 (Figure 2.2). Congenital anomalies are still the second most common cause of death in this age group and accounted for 16 percent of deaths in 1992–94.

[1] Perinatal conditions involve those conditions originating in the perinatal period (between 28 weeks gestation and seven days after birth). These often relate to short gestation and low birthweight infants.

Figure 2.2: Major causes of death of 1–4-year-olds, 1992–94

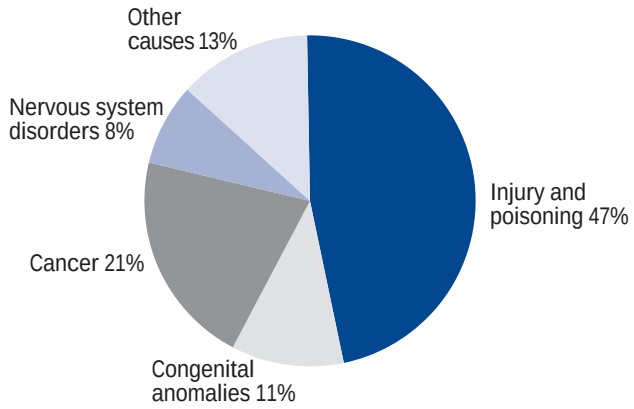


Source of data:
Ministry of Health 1998.

Injury and poisoning is also the most common cause of death in the 5–9 and 10–14 year age groups, accounting for nearly half of all deaths each year (47 percent in the 5–9 year age group and 48 percent in the 10–14 year age group in 1992-94) (Figures 2.3 and 2.4).

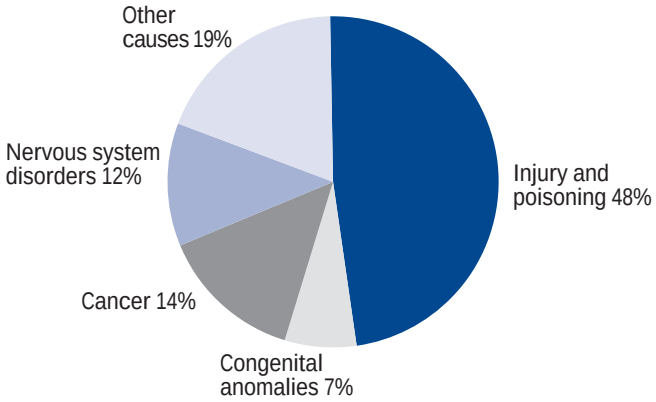
Cancer is also a common cause of death for children in the 5–9 and 10–14 year age groups, accounting for 21 percent and 14 percent of deaths respectively in these age groups in 1992–94.

Figure 2.3: Major causes of death of 5–9-year-olds, 1992–94



Source of data:
Ministry of Health 1998.

Figure 2.4: Major causes of death of 10–14-year-olds, 1992–94



Source of data:
Ministry of Health 1998.

Māori children are at greater risk of death than non-Māori children for most of the major causes (Table 2.3). Between 1992 and 1994, the greatest disparity in death rates between Māori and non-Māori children was recorded for SIDS and respiratory conditions. For SIDS, Māori children recorded a rate 4.5 times the non-Māori rate, while for respiratory conditions the Māori death rate was 2.7 times that for non-Māori children. For road traffic injuries and for other injuries and poisonings, Māori children recorded death rates 1.5 times higher than non-Māori children. Compared to non-Māori children, death rates for Māori were similar or lower for congenital anomalies, perinatal conditions, cancer, nervous system disorders, and infectious diseases.

Table 2.3: Major causes of death, by ethnicity, 0–14-year-olds, 1992–94

	Māori		*Non-Māori*		*Relative risk for Māori*
	Number	*Rate**	*Number*	*Rate**	
Congenital anomalies	50	15.5	392	18.7	0.8
SIDS**	144	6.7	231	1.5	4.5
Perinatal conditions**	50	2.3	301	2.0	1.2
Injury and poisoning (other than road traffic injuries)	43	13.4	182	8.7	1.5
Road traffic injuries	26	8.1	113	5.4	1.5
Cancer	12	3.7	92	4.4	0.8
Nervous system disorders	7	2.2	83	4.0	0.6
Respiratory conditions	21	6.5	51	2.4	2.7
Infectious diseases	7	2.2	35	1.7	1.3
All other causes	13	4.0	84	4.0	1.0
All causes	373	115.9	1564	74.7	1.6

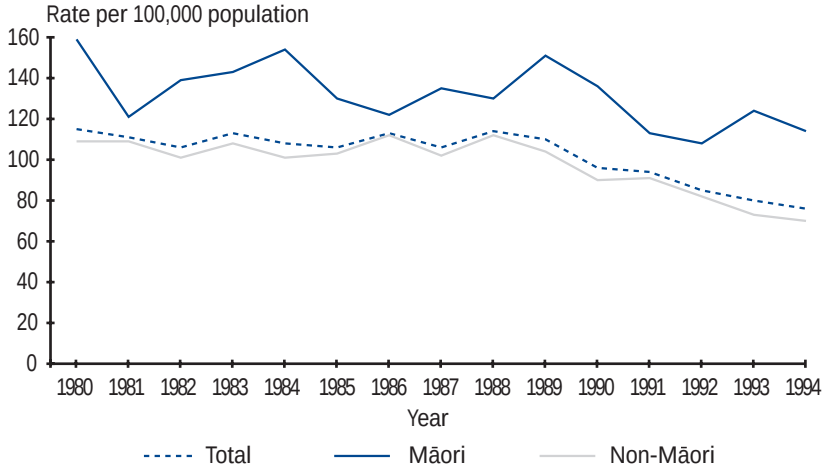
** Rate per 100,000 population.*
*** Infant deaths only, rates per 1000 livebirths.*
Source of data:
Ministry of Health 1998.

Changes over time

Childhood death rates are continuing to decline in New Zealand. Between 1980 and 1994, the death rate for the 0–14 year age group decreased from 115 to 76 per 100,000, an annual average decrease of 2.9 percent (Figure 2.5).

This decrease was not evenly shared between Māori and non-Māori. For Māori children, an annual average decrease of 1.7 percent was recorded between 1980 and 1994, compared to an annual average decrease of 3.3 percent for non-Māori. Overall, during this 15–year period the disparity between Māori and non-Māori rates of childhood deaths increased.

Figure 2.5: Deaths from all causes, by ethnicity, 0–14-year-olds, 1980–94



Source of data:
Ministry of Health 1998.

Decreases in all-cause death rates have been recorded for all age groups under 15 years between 1980 and 1994 (Table 2.4). For each age group, an annual average decrease of between 2.7 percent and 3.3 percent in the overall death rate was recorded during this time.

Table 2.4: Reduction in numbers and rates of death, by age group, 0–14-year-olds, 1980–94

	1980		*1994*		*Total reduction*	*Annual reduction*
	No.	**Rate*	*No.*	**Rate*		
<1 year	657	**11.6	414	**7.2	38%	3.1%
1–4 years	138	67.2	102	43.5	35%	2.9%
5–9 years	96	32.5	53	19.7	39%	3.3%
10–14 years	96	31.7	51	20.0	37%	3.0%
Total	987	115.5	620	75.9	34%	2.7%

** Age-specific rate per 100,000 population.*
*** Infant mortality rate per 1000 livebirths.*
Source of data:
Ministry of Health 1998.

Morbidity

This section summarises recent hospitalisation data from the National Minimum Dataset, maintained by the New Zealand Health Information Service. The data presented here are based on numbers of hospitalisation events, not numbers of unique individuals hospitalised. Both daypatient and inpatient hospitalisations are included. One unique individual may be represented in the data several times if they were hospitalised as a daypatient or inpatient more than once.

In 1995, hospitalisations totalled 111,571 for New Zealand 0–14-year-olds (Table 2.5).

Table 2.5: Hospitalisations from all causes, by sex and ethnicity, 0–14-year-olds, 1995

	Number	*Percentage*	*Rate**
Total	111,571		13,450
Male	63,416	57%	14,890
Female	48,155	43%	11,920
Relative risk for males			*1.25*
Māori	24,259	22%	22,660
Non- Māori	87,312	78%	12,080
Relative risk for Māori			*1.88*

** Age-specific rate per 100,000 population.*
Source of data:
Ministry of Health 1998.
Note:
Sums of males and females, and Māori and non-Māori may be less than totals, as a small number of patients for whom sex and ethnicity were not recorded are included in totals.

In 1995, as is usually the case, a greater proportion of boys (57 percent) than girls (43 percent) were hospitalised. In addition, Māori children were hospitalised at nearly twice the rate of non-Māori children.

Hospitalisation rates decrease with increasing age during childhood (Table 2.6). Infants less than one year old record the highest rate of hospitalisation. In 1995, infants were hospitalised at almost 10 times the rate of any other childhood age group and accounted for 35 percent of all childhood hospitalisation events.

Those aged 10–14 years are the least likely childhood group to be hospitalised. In 1995, 10–14-year-olds were hospitalised at one twentieth of the infant hospitalisation rate and at half of the 1–4-year-old hospitalisation rate.

Table 2.6: Hospitalisations from all causes, by age group and ethnicity, 0–14-year-olds, 1995

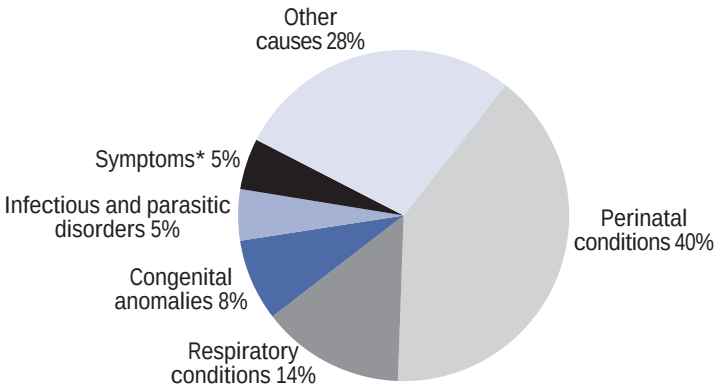
		<1 year	*1–4 years*	*5–9 years*	*10–14 years*
Total	No.	39,674	33,659	22,602	15,570
	%	35%	30%	20%	14%
	Rate*	660	14,310	8,120	6,060
M ori	No.	9,074	7,625	4,559	2,994
	%	37%	32%	19%	12%
	Rate*	1,285	27,240	11,710	9,040
Non- M ori	No.	30,600	26,034	18,043	12,576
	%	3%	30%	21%	14%
	Rate*	582	12,560	7,530	5,620
Relative risk for M ori		2.2	2.2	1.6	1.6

** Age-specific rate per 100,000 population, except for infants, where rate is per 1000 livebirths.*
Source of data:
Ministry of Health 1998.
Note 1:
New-born babies without complications (ICD-9 codes V30-V39) are excluded from the above data.
Note 2:
Sums of males and females, and Māori and non-Māori may be less than totals, as a small number of patients for whom sex and ethnicity were not recorded are included in totals.

Māori children are hospitalised at higher rates than non-Māori children at every age. The greatest disparities between Māori and non-Māori hospitalisation rates occur in the infant and the 1–4 year age groups. In 1995, Māori children in these age groups were hospitalised at slightly more than twice the rate of their non-Māori counterparts.

Infants under one year are hospitalised for perinatal conditions[2] more often than for any other reasons (Figure 2.6). In 1995, 40 percent of infant hospitalisations were due to these causes. Respiratory conditions accounted for 14 percent and congenital anomalies for 8 percent of infant hospitalisations in 1995.

Figure 2.6: Major causes of hospitalisation of infants under one year of age, 1995

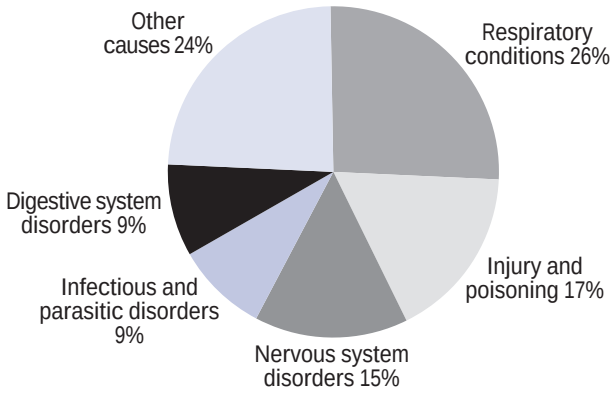


** Symptoms, signs, and ill-defined conditions (ICD-9 codes 780-799).*
Source of data:
Ministry of Health 1998.

[2] Perinatal conditions involve those conditions originating in the perinatal period (between 28 weeks gestation and seven days after birth). These often relate to short gestation and low birthweight infants.

For children aged 1–4 years, respiratory conditions are the most common reason for hospitalisation. These conditions accounted for 26 percent of hospitalisations in this age group in 1995 (Figure 2.7). Injury and poisoning was the second most common reason for hospitalisation.

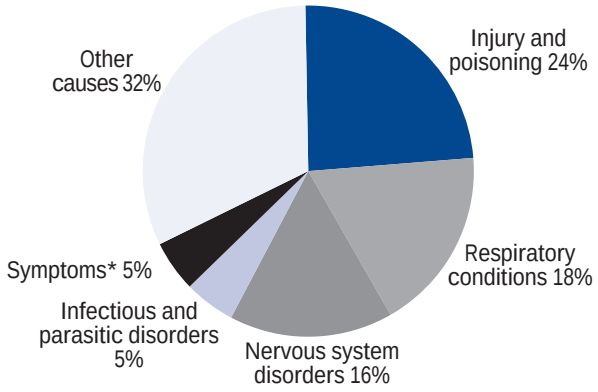
Figure 2.7: Major causes of hospitalisation of 1–4-year-olds, 1995



Source of data:
Ministry of Health 1998.

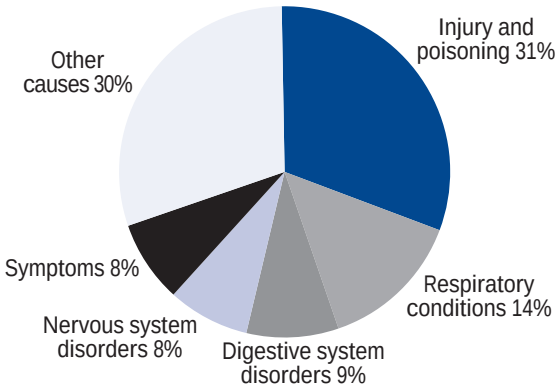
From age five years and older, more children are hospitalised due to an injury or poisoning than for any other reason. In 1995, nearly one-quarter (24 percent) of hospitalisations for 5–9-year-olds and nearly one-third (31 percent) of hospitalisations for 10–14-year-olds were due to these causes (Figures 2.8 and 2.9).

Figure 2.8: Major causes of hospitalisation of 5–9-year-olds, 1995



* *Symptoms, signs, and ill-defined conditions (ICD-9 codes 780-799).*
Source of data:
Ministry of Health 1998.

Figure 2.9: Major causes of hospitalisation of 10–14-year-olds, 1995



Source of data:
Ministry of Health 1998.

In 1995, respiratory conditions (including asthma, pneumonia, influenza, and bronchitis), were the second most common reason for the hospitalisation of children aged 5–14 years.

Compared to non-Māori, Māori children have higher rates of hospitalisation for almost every group of conditions. The largest disparities between Māori and non-Māori hospitalisation rates are evident for nervous system conditions, respiratory conditions, and injuries and poisonings. For each of these groups of causes, Māori children are hospitalised at about twice the rate of non-Māori children.

Table 2.7: Major causes of hospitalisation, by ethnicity, 0–14-year-olds, 1995

Cause	*Total No.*	*Māori No.*	*Rate**	*Non-Māori No.*	*Rate**	*Relative risk for Māori*
Respiratory conditions	20,709	5,613	5,244	15,096	2,089	2.5
Injury and poisoning	15,492	3,348	3,128	12,144	1,680	1.9
Perinatal conditions	15,907	3,107	2,903	12,800	1,771	1.6
Nervous system diseases	10,848	2,700	2,522	8,148	1,127	2.2
Digestive system disorders	8,279	1,735	1,621	6,544	906	1.8
Symptoms**	6,931	1,375	1,285	5,556	769	1.7
Infectious and parasitic diseases	6,829	1,343	1,255	5,486	759	1.7
Congenital anomalies	5,712	1,113	1,040	4,599	636	1.6
Genitourinary disorders	3,019	459	429	2,560	354	1.2
Musculoskeletal diseases	2,180	401	375	1,779	246	1.5
All causes	111,571	24,259	22,660	87,312	12,080	1.9

** Age-specific rate per 100,000 population.*
*** Symptoms, signs, and ill-defined conditions (ICD-9 codes 780-799).*
Source of data:
Ministry of Health 1998.
Note:
Columns do not sum to totals because totals include causes other than the ones shown.

Changes over time

Changes in hospitalisation rates may be due to a number of factors including:

- changes in hospital admission policy
- changes in hospital recording systems (for example, revised definitions of daypatients and outpatients)
- changes in the case-mix of patients presenting for treatment (for example, more severe cases)
- changes in the rate of disease in the community.

Between 1988 and 1995, an increasing number of children aged 0–14 years were hospitalised. In 1988, there were 77,817 childhood hospitalisations, rising to 111,571 in 1995 (Table 2.8). This translates to an average annual increase in the childhood hospitalisation rate of 5 percent. The infant hospitalisation rate increased the most, with an overall increase of 40 percent recorded between 1988 and 1995.

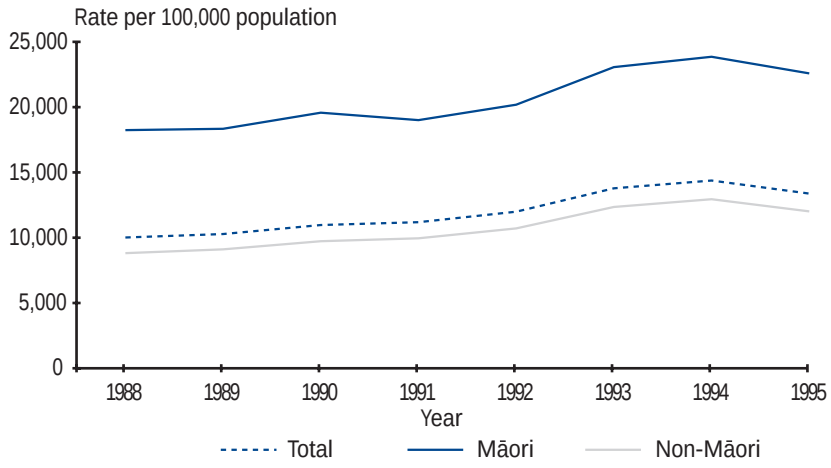
Table 2.8: Increase in hospitalisation numbers and rates for 0–14-year-olds, 1988–95

	1988		*1995*		*Total increase*	*Annual increase*
AGE	*No.*	*Rate**	*No.*	*Rate**		
<1 year	24,798	431	39,176	660	53%	6.3%
1–4 years	23,940	11,500	33,659	14,310	24%	3.2%
5–9 years	15,744	6,290	22,602	8,120	29%	3.8%
10–14 years	13,335	5,010	15,570	6,060	21%	2.8%
Total	77,817	10,020	111,571	13,380	34%	4.3%

** Age-specific rate per 100,000, except for infants, where rate is per 1000 livebirths.*
Source of data:
Ministry of Health 1998.

Hospitalisation rates for non-Māori children increased more during this time than for Māori children (an annual average increase of 4.7 percent and 3.4 percent for non-Māori and Māori children respectively) (Figure 2.10). Consequently, the disparity between Māori and non-Māori hospitalisation rates decreased between 1988 and 1995, from 107 percent in 1988 to 88 percent in 1995.

Figure 2.10: Total hospitalisation rates, by ethnicity, 0–14-year-olds, 1988–95



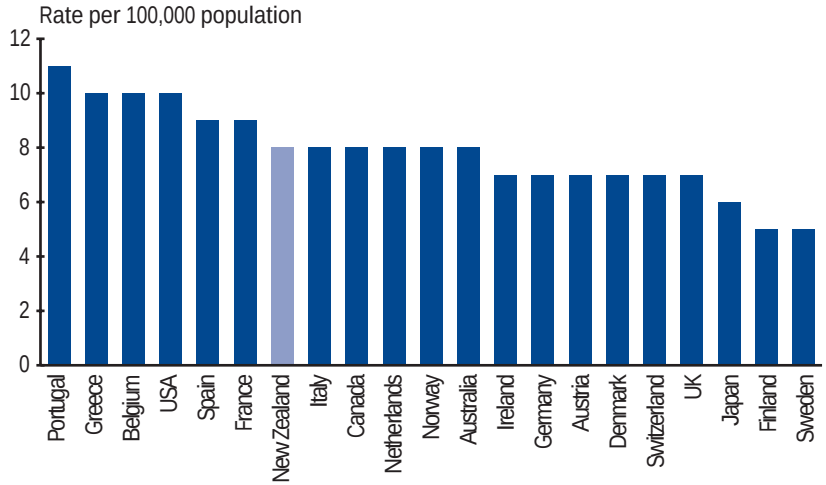
Source of data:
Ministry of Health 1998.

International comparisons

Under-five mortality

The under-five mortality rate is a well-accepted indicator of a country's overall health status. New Zealand ranks 15th out of the 21 OECD countries that have reliable child mortality data available for comparison (Figure 2.11). Sweden reported the lowest under-five mortality rate in 1995, with the United Kingdom and Australia ranked fourth and 10th respectively (UNICEF 1995).

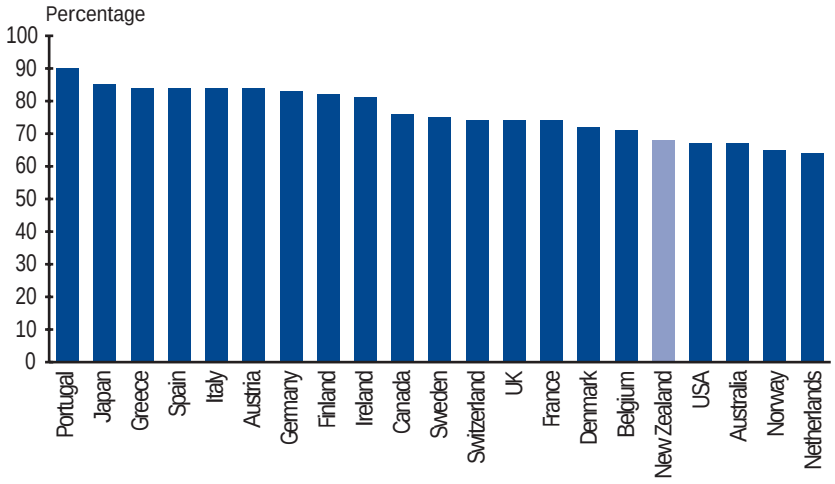
Figure 2.11: Under–5-year-old mortality rates, OECD countries



Source of data:
UNICEF 1995.

New Zealand's international ranking in under-five mortality has worsened over the last 25 years. In 1960, New Zealand ranked sixth out of 21 OECD countries with available data for this measure. Between 1960 and 1995, New Zealand experienced the fifth lowest rate of change in under-five mortality out of these 21 OECD countries (Figure 2.12).

Figure 2.12: Percentage fall in under–5-year-old mortality rates, OECD countries, 1960–95



Source of data:
UNICEF 1995.

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Chapter 3

Infant Health

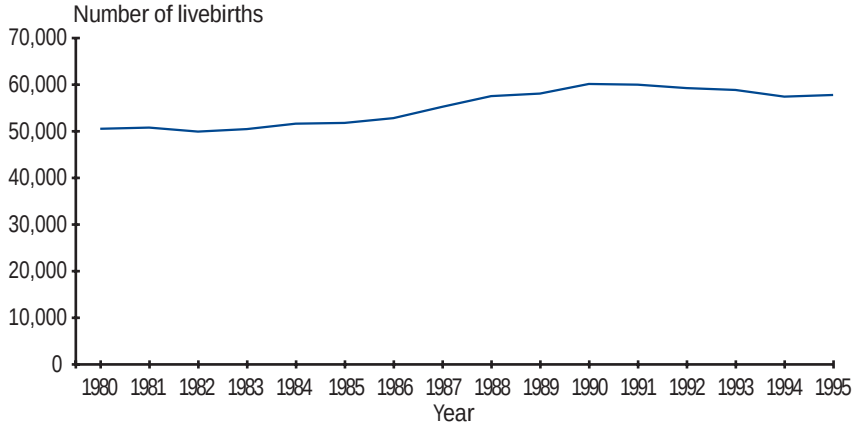
Key points

- The New Zealand infant mortality rate has decreased over the past 50 years. Between 1985 and 1994, the rate fell from 10.9 to 7.2 deaths per 1000 livebirths.
- Internationally, the New Zealand infant death rate remains comparatively high with a current ranking of 17th out of 21 OECD countries for which information is available.
- Major causes of infant mortality include sudden infant death syndrome (SIDS), congenital anomalies and perinatal conditions. Combined, these causes accounted for 84 percent of all infant deaths in 1992–94.
- The Māori infant death rate is consistently higher than the rate for Pacific and European children.
- Reductions in the New Zealand infant death rate in the last decade have been largely due to a decrease in the SIDS rate. Between 1985 and 1994, SIDS rates halved in New Zealand.
- Most of the decrease in the New Zealand SIDS rate in the last decade was recorded over the period 1989–91. This is thought to be largely due to a change in the proportion of babies sleeping prone.
- The high Māori infant death rate and the increase in the disparity between Māori and non-Māori infant death rates over recent years is largely accounted for by the high Māori SIDS rate. The SIDS rate among Māori did not decline as much as the non-Māori rate in the period 1985–94. In 1992–94, the Māori SIDS rate was 4.5 times the non-Māori rate. SIDS rates for Pacific infants are similar to the average for all ethnic groups.
- Major risk factors for SIDS and non-SIDS infant mortality are strongly correlated with one another, and include low birthweight, maternal smoking, maternal age being less than 20 years and low maternal socioeconomic status.
- Low birthweight is a major cause and correlate of perinatal and infant mortality. Low birthweight infants are over 20 times more likely to die in the first year of life.
- Maternal smoking is strongly correlated with SIDS, with over half of all SIDS deaths each year attributable to maternal smoking. One-third of all women smoke during pregnancy. For Māori women the proportion is two-thirds.

Fertility

There were 57,791 livebirths in 1995. Between 1980 and 1990, the number of livebirths rose steadily, from 50,542 in 1980 to a high of 60,153 in 1990. Since 1990, the number of livebirths has slowly declined (Figure 3.1).

Figure 3.1: Total livebirths, 1980–95



Source of data:
Statistics New Zealand 1996.

In 1995, 12.5 percent of all livebirths were classified as Māori ethnic group and 7.6 percent as one of the Pacific ethnic groups (Statistics New Zealand 1996). From 1 September 1995, a new question was asked on all birth registration forms based on the concept of self-identification of ethnicity. This replaces the old system where the ethnic group of the child was assigned according to the degree of Māori or Pacific blood of the parents. This definitional change is likely to result in an increase in the proportion of the total livebirths each year that are identified as Māori and Pacific children.

The total fertility rate (TFR) is the average number of children a woman would have in her lifetime if she experienced throughout her reproductive lifetime the age-specific fertility rates of a particular year. The TFR in 1995 was 2.04. In 1983, a low point in the TFR of 1.92 was recorded. This increased to 2.18 in 1990 and decreased again between 1990 and 1995 (Statistics New Zealand 1996).

Women aged 25–29 years recorded the highest age-specific fertility rates in 1995, followed by those aged 30–34 years (126.9 and 111.3 per 1000 respectively). Māori women are more likely to have children at a younger age than the total population. The highest age-specific fertility rate for Māori was recorded for the 20–24 year age group, followed by the 25–29 year age group (150.4 and 116.9 per 1000 respectively) (Statistics New Zealand 1996).

Age-specific fertility continues to trend towards child bearing in older ages. Between 1980 and 1995, increases in the age-specific fertility rates were recorded for women over 30 years of age. A 63 percent increase was recorded for those aged 30–34 years while a doubling in the age-specific rate was recorded for women aged 35–39 years (Statistics New Zealand 1996).

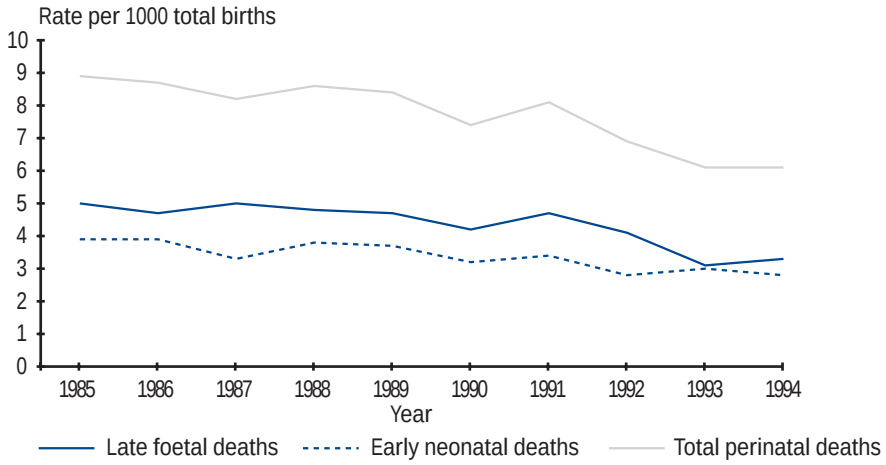
In 1995, there were 13,652 legally induced abortions recorded. The abortion ratio was 4.2, meaning that for approximately every four pregnancies resulting in a livebirth there was one pregnancy that resulted in an induced abortion. Younger women are more likely to have a pregnancy resulting in an induced abortion. One-fifth of all induced abortions occur in women aged 15 to 19 years. Between 1987 and 1995, abortion rates increased across all age groups (Abortion Supervisory Committee 1997).

Perinatal death

There were 351 perinatal deaths[1] recorded in 1994, a rate of 6.1 per 1000 total births. Of these deaths, 190 were late foetal deaths (stillbirths) and 161 were early neonatal deaths. For Māori, 38 perinatal deaths were recorded in 1994, a rate of 5.4 per 1000 total births (Ministry of Health 1998a).

Between 1985 and 1994, the total perinatal death rate decreased by 31 percent (Figure 3.2). This is a continuation in the downward trend in perinatal deaths which has occurred in New Zealand over the past 30 years. The Māori perinatal death rate is following a similar downward trend (Ministry of Health 1998a).

Figure 3.2: Perinatal deaths, by death periods, 1985–94



Source of data:
Ministry of Health 1998a.

Much of the decline in perinatal deaths can be attributed to the decreasing late foetal death rate. The lowest late foetal death rate of 3.1 per 1000 total births was recorded in 1993. The rate increased slightly to 3.3 per 1000 in 1994 (Ministry of Health 1998a).

Compared with other OECD countries, New Zealand has a relatively low rate of perinatal death. It has the sixth lowest perinatal death rate of 19 countries based on the most recent available data (PHC 1994a).

1 Foetal deaths of 28 completed weeks of gestation or more (late foetal death), plus infant deaths within seven days after births (early neonatal deaths).

Infant deaths

In 1994, infant deaths[2] totalled 414, a rate of 7.2 per 1000 livebirths (Table 3.1). Of these deaths, 53 percent were male infants. In the same year, the infant death rate for Māori was around twice the death rate for infants from other ethnic groups.

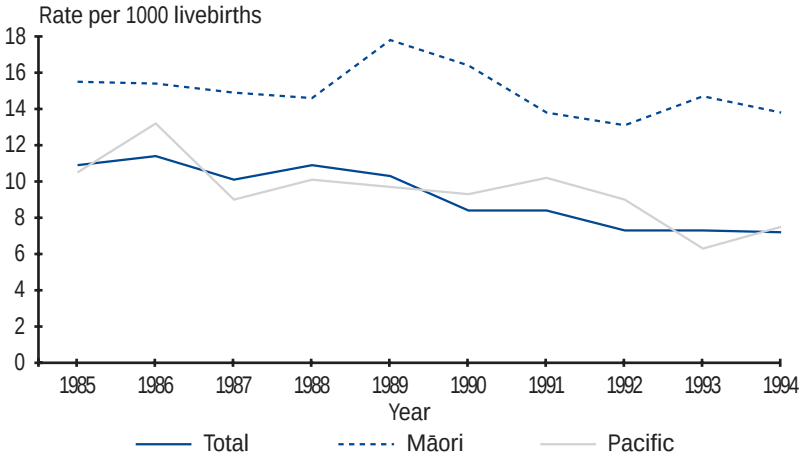
Table 3.1: Infant deaths, by sex and ethnicity, 1994

	Number	*Percent*	*Rate**
Total	414		7.2
Males	218	53	7.4
Females	196	47	7.0
Māori	97	23	13.8
Pacific	32	8	7.5
European or other	285	69	6.2

** Rate per 1000 livebirths.*
Source of data:
Ministry of Health 1998a.

Between 1985 and 1994, the infant death rate decreased by one-third, from 10.9 to 7.2 deaths per 1000 live births (Figure 3.3). This is an average annual decrease of 4 percent.

Figure 3.3: Infant death rates, by ethnicity, 1985–94



Source of data:
Ministry of Health 1998a.

Over the period 1985–94, the Māori infant mortality rate was consistently higher than the rate for Pacific infants and infants from other ethnic groups. While the Māori infant mortality rate decreased 11 percent during this time (from 15.5 to 13.8 deaths per 1000 livebirths), the overall disparity between Māori infant deaths and the total infant death rate increased from 1.4 to 1.9.

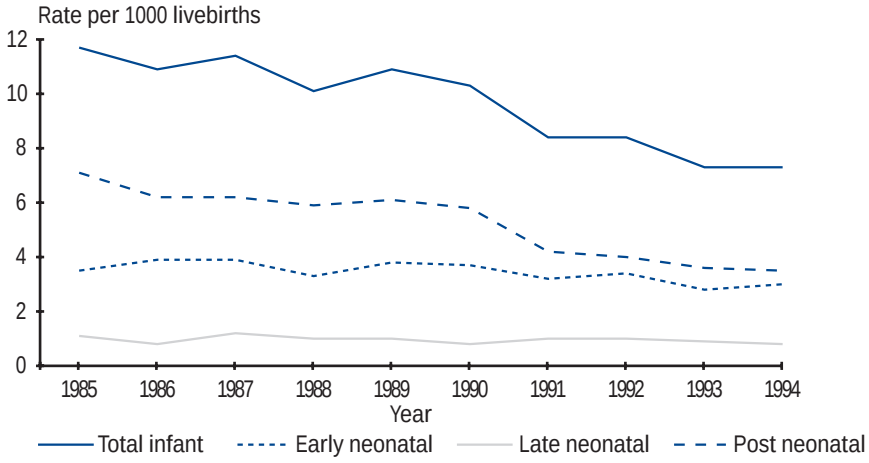
The high Māori infant death rate is largely attributable to a high number of post-neonatal[3] deaths (mostly SIDS) (Ministry of Health 1998a).

2 Infant deaths include all liveborns dying within the first year of life.
3 Post-neonatal deaths include liveborn infants dying after 28 days and before the first year of life is complete.

The Pacific infant death rate, while fluctuating somewhat because of the small numbers involved, was generally similar to the rate recorded for non-Māori non-Pacific ethnic groups between 1985 and 1994.

The decline in the post-neonatal death rate had the greatest effect on the decreasing total infant death rate in 1985–94, with the rate almost halving during that period (Figure 3.4). In 1994, 51 percent of all infant deaths occurred in the post-neonatal period, compared with 57 percent in 1985 (Ministry of Health 1998a).

Figure 3.4: Total infant deaths, by death periods, 1985–94



Source of data:
Ministry of Health 1998.

A decline in the rate of sudden infant death syndrome (SIDS) was the main contributor to the overall drop in the post-neonatal death rate that has occurred over the last decade. Between 1985 and 1994, around 80 percent of the decline in the post-neonatal death rate was due to reduced numbers of SIDS deaths in the post-neonatal period.

There are three major causes of infant mortality; congenital anomalies, SIDS and perinatal conditions. These causes accounted for 84 percent of all infant deaths in 1992–94 (Table 3.2).

Table 3.2: Major causes of infant deaths, 1992–94

Causes	*Number*	*%*	*Rate**
Congenital anomalies	362	28%	2.1
SIDS	375	29%	2.1
Perinatal conditions	349	27%	2.0
Injury and poisoning	67	5%	0.4
Other causes	124	10%	0.7
All causes	1277	100%	7.3

** Infant mortality rate per 1000 livebirths.*
Source of data:
Ministry of Health 1998a.
Note:
Columns may not sum to totals because of rounding.

Compared to non-Māori, Māori infants are at greater risk of death from most of the major causes of infant death. The greatest Māori, non-Māori disparity is for SIDS, with the Māori infant death rate for SIDS being 4.5 times the non-Māori death rate in 1992–94 (Table 3.3). For injury and poisoning, the Māori infant death rate 3.5 times that of the non-Māori rate.

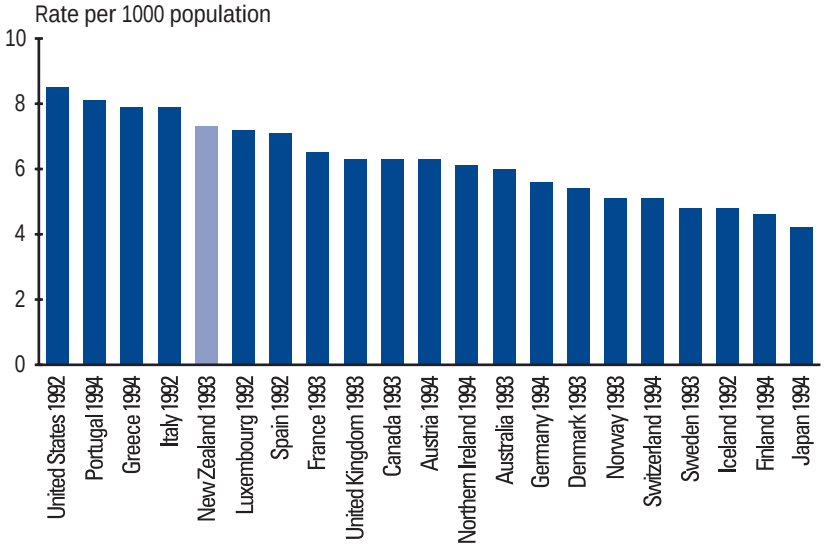
Table 3.3: Major causes of infant deaths, by ethnicity, 1992–94

	Māori		*Non-Māori*		*Rate ratio*
Cause	*No.*	*Rate**	*No.*	*Rate**	
Congenital anomalies	41	1.9	321	2.1	0.9
SIDS	144	6.7	231	1.5	4.5
Perinatal conditions	51	2.4	301	2.0	1.2
Injury and poisoning	21	1.0	46	0.3	3.5
Other causes	29	1.4	92	0.6	2.8
All causes	286	13.4	991	6.4	2.1

** Infant mortality rate per 1000 livebirths.*
Source of data:
Ministry of Health 1998.
Note:
Columns may not sum to totals because of rounding.

By international standards, over the past two decades New Zealand's infant mortality rate has been high. This is largely due to a high post-neonatal mortality rate (PHC 1994a). Among OECD countries, New Zealand ranks 17th out of 21 countries for its infant mortality rate (Figure 3.5).

Figure 3.5: Infant mortality rates in OECD countries



Source of data:
WHO annual statistical reports 1993, 1994, 1995.

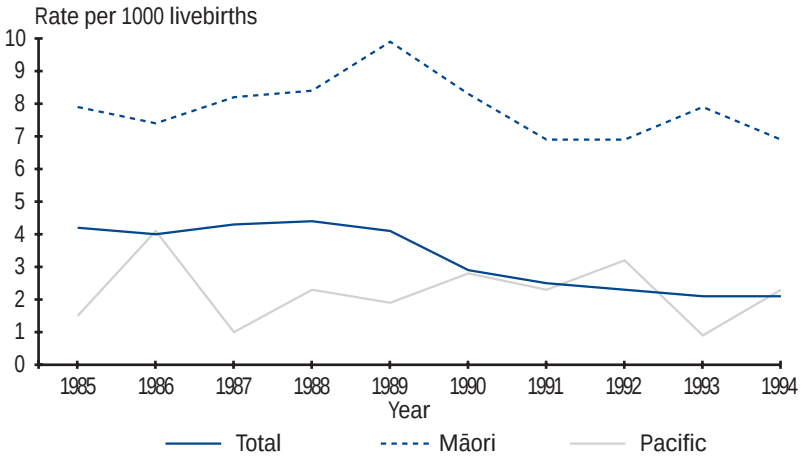
Sudden infant death syndrome (SIDS)

Out of a total of 414 infant deaths recorded in New Zealand in 1994, 118 (29 percent) were due to SIDS. Male infants are more likely to die from SIDS than female infants.

Māori infants are at greater risk of death from SIDS than infants from other ethnic groups. Over the period 1992–94, Māori infants were 4.5 times more likely to die from SIDS than non-Māori infants.

Between 1985 and 1994, the SIDS rate in the total infant population halved, from 4.2 to 2.1 deaths per 1000 livebirths (Figure 3.6). Most of the decrease occurred in the period 1989–91. This coincided with the National Cot Death Prevention Campaign, which promoted modification of three risk factors (prone sleep position, lack of breastfeeding and maternal smoking). Much of this drop in the total SIDS rate can be attributed to a decline in the incidence of prone sleeping in infants (Mitchell and Scragg 1994).

Figure 3.6: Infant deaths due to SIDS, by ethnicity, 1985–94



Source of data:
Ministry of Health 1998a.

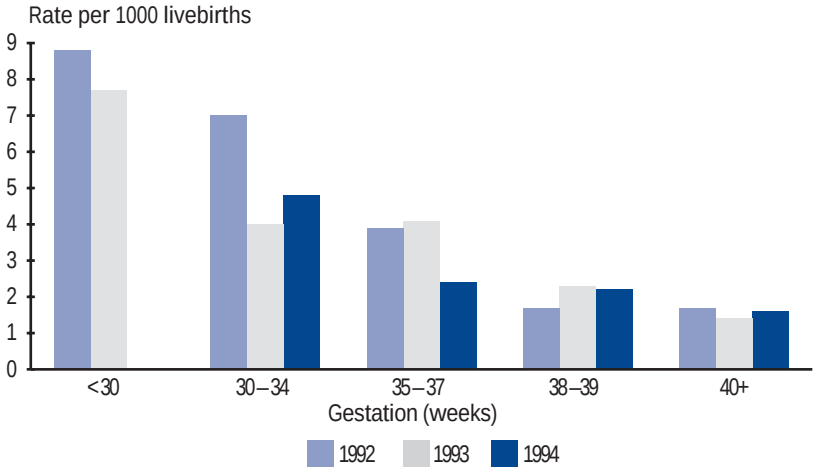
The decrease in the total SIDS rate is not been equally distributed across the Māori and non-Māori rates. The non-Māori SIDS rate decreased by 62 percent in 1985–94, while the Māori rate decreased by only 13 percent over the same period. The effect of this has been an overall increase in the disparity between Māori and non-Māori SIDS rates. In 1985, the Māori SIDS rate was twice the non-Māori rate (7.9 compared to 3.7 deaths per 1000 live births for Māori and non-Māori respectively). In 1994, the Māori SIDS rate was 4.9 times the non-Māori rate (6.9 compared to 1.4 deaths per 1000 livebirths for Māori and non-Māori respectively) (see Figure 3.6).

Mitchell and Scragg (1994) investigated the difference in SIDS mortality rates between Māori and non-Māori. Their findings suggest that the difference between Māori and non-Māori SIDS rates can largely be explained by differences in the prevalence of the known risk factors, as discussed later.

Reported numbers of SIDS deaths for Pacific infants suggest rates for these children are similar to the total New Zealand infant population. However, recent studies have suggested that SIDS rates for Pacific infants have not decreased in recent years in line with the total population and may even have increased (Tukuitonga 1996).

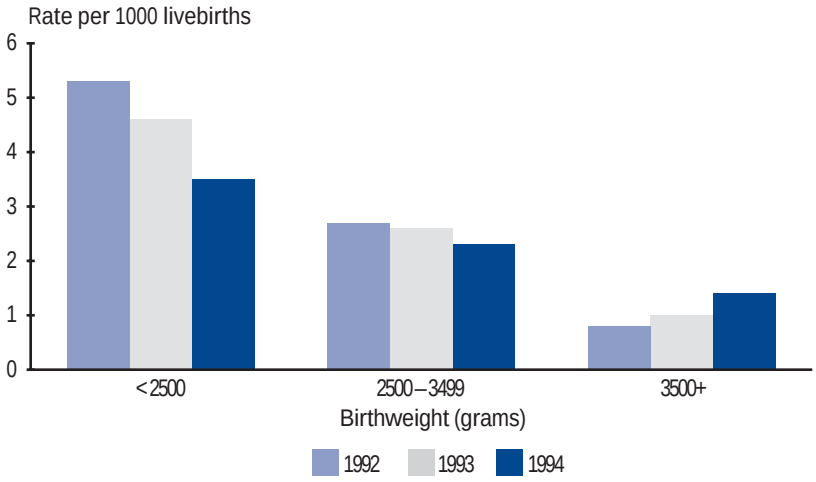
The rate of SIDS decreases with increasing length of gestation. The highest SIDS rates are recorded for those infants of less than 35 weeks gestation (Figure 3.7). Similarly, SIDS rates decrease with increasing birthweight, with the highest SIDS rates being for infants with the lowest birthweight (Figure 3.8). SIDS rates also correlate to maternal age. Rate are highest for the youngest mothers (Figure 3.9).

Figure 3.7: Infant deaths due to SIDS, by period of gestation, 1992–94



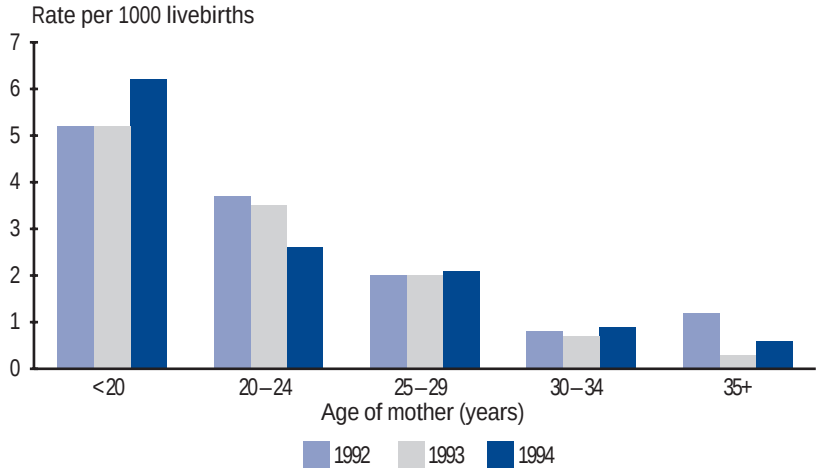
Source of data:
Ministry of Health 1998a.

Figure 3.8: Infant deaths due to SIDS, by birthweight, 1992–94



Source of data:
Ministry of Health 1998a.

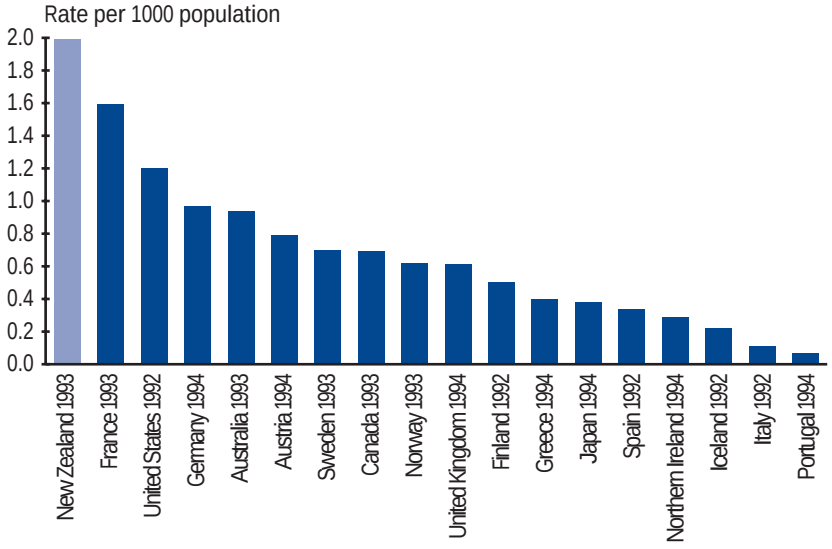
Figure 3.9: Infant deaths due to SIDS, by age of mother, 1992–94



Source of data:
Ministry of Health 1998a.

Despite an overall declining SIDS rate, New Zealand still has the highest SIDS rate among the OECD countries (Figure 3.10).

Figure 3.10: Infant deaths due to SIDS, in OECD countries



Source of data:
WHO annual statistical reports 1993, 1994, 1995.

Hospitalisations

In 1995, a total of 39,176 infant hospital discharges were recorded (excluding healthy liveborn infants born in hospital). Male infants were more likely to be hospitalised than female infants, with male infants accounting for 56 percent of all infant hospitalisations (Table 3.4). The Māori rate of hospitalisation for infants was twice as high as the non-Māori rate in 1995.

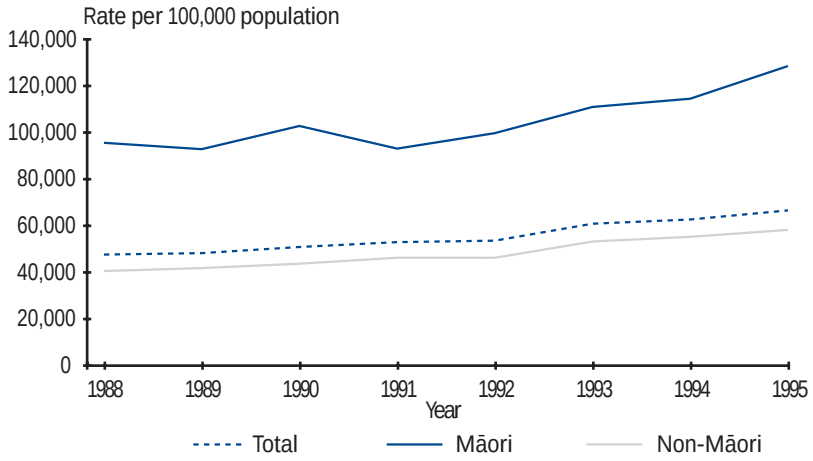
Table 3.4: Infant hospitalisations*, by sex and ethnicity, 1995

	No.	*%*	*Rate***
Total	39,176		66,600
Male	22,072	56%	72,860
Female	17,103	44%	59,940
Relative risk for males			*1.2*
Māori	8,995	23%	128,540
Non-Māori	30,181	77%	58,230
Relative risk for Māori			*2.2*

** Excluding healthy liveborn infants born in hospital.*
*** Age-specific rate per 100,000 population.*
Source of data:
Ministry of Health 1998b.
Note:
Sums of males and females, and Māori and non-Māori may be less than totals, as a small number of patients for whom sex and ethnicity were not recorded are included in totals.

Between 1988 and 1995, there was an average annual increase of 4.9 percent for infant hospitalisations (Figure 3.11). This is likely to be due in part to the increasing proportion of daypatient hospitalisations, with several daypatient admissions replacing a longer inpatient stay in hospital. The non-Māori hospitalisation rate increased more than the Māori rate during this time (an overall rate change of 43 percent for non-Māori compared to 34 percent for Māori).

Figure 3.11: Infant hospitalisations, by ethnicity, 1988–95



Source of data:
Ministry of Health 1998b.

Perinatal conditions account for more infant hospitalisations each year than any other set of conditions. Forty percent of infants were hospitalised due to these causes in 1995 (Table 3.5). Respiratory conditions also account for a large proportion of infant hospitalisations each year (14 percent in 1995).

Table 3.5: Major causes of infant hospitalisation*, 1995

Cause	*Number*	*%*	*Rate***
Injury and poisoning	1,020	2.6	1,730
Infectious diseases	1,968	5.0	3,350
Digestive system diseases	1,759	4.5	2,990
Nervous system diseases	851	2.2	1,450
Respiratory conditions	5,490	14.0	9,330
Congenital anomalies	3,005	7.7	5,110
Perinatal conditions	15,816	40.4	26,900
Symptoms***	2,074	5.3	3,530
All other causes	7,193	18.4	12,230
Total, all causes	39,176	100.0	66,600

** Excluding healthy liveborn infants born in hospital.*
*** Rate per 100,000 population.*
**** Symptoms, signs, and ill-defined conditions (ICD-9 codes 780–799).*
Source of data:
Ministry of Health 1998b.

Māori recorded higher rates of hospitalisation from all major causes of infant hospitalisation in 1995 (Table 3.6). The largest disparities between Māori and non-Māori were recorded for respiratory conditions, infectious diseases and nervous system and sensory system diseases (mostly related to glue ear).

Table 3.6: Major causes of infant hospitalisation*, by ethnicity, 1995

Causes	*Māori*		*Non-Māori*		*Relative risk*
	Number	*Rate***	*Number*	*Rate***	
Injury and poisoning	259	3,700	761	1,470	2.5
Infectious diseases	522	7,460	1,446	2,790	2.7
Digestive system diseases	410	5,860	1,349	2,600	2.3
Nervous system diseases	230	3,290	621	1,200	2.7
Respiratory conditions	2,091	29,880	3,399	6,560	4.6
Congenital anomalies	627	8,960	2,378	4,590	2.0
Perinatal conditions	3,086	44,100	12,730	24,560	1.8
Symptoms***	434	6,200	1,640	3,160	2.0
All other causes	1,336	19,090	5,857	11,300	1.7
Total, all causes	8995	128,540	30,181	58,230	2.2

** Excluding healthy liveborn infants born in hospital.*
*** Rate per 100,000 population.*
**** Symptoms, signs, and ill-defined conditions (ICD-9 codes 780–799).*
Source of data:
Ministry of Health 1998b.

Risk and protective factors

Infant deaths, and in particular infant deaths from SIDS, have been found to be strongly associated with a number of demographic and socioeconomic factors, which are strongly correlated. These include:

- low birthweight
- maternal smoking
- maternal age of 19 years or less
- low maternal educational status
- low maternal socioeconomic status
- maternal marital status 'single'
- Māori ethnicity.

A recent report from a British expert group found no evidence to support the hypothesis that SIDS is linked to toxic gases emitted from mattresses (UK Department of Health 1998).

Low birthweight

Low birthweight[4] is a major cause and correlate of perinatal and infant mortality (Ministry of Health 1996). In New Zealand in 1994, low birthweight infants were 23 times more likely than other infants to die during the perinatal period and more than three times more likely to die in the post-neonatal period (Ministry of Health 1998).

Compared to other infants, low birthweight infants are more likely to die from all the major causes of infant death. Babies under 2500 grams at birth were almost twice as likely as normal birthweight infants to die from SIDS (Ministry of Health 1998).

The perinatal death rate of low birthweight babies is decreasing, with a 32 percent drop in the death rate for these babies recorded in 1985–94. Over this same time period, the proportion of infants weighing less than 2500 grams at birth increased, suggesting continuing improvements are being made in levels of obstetric and infant care. An annual average of 6.1 percent of all infants born in 1988–92 weighed less than 2500 grams (Ministry of Health 1998; De Boer et al 1990; Bourchier 1991; Midland Health 1995).

Low birthweight infants result from either short gestation or from intrauterine growth problems. In developed countries, prematurity due to short gestation accounts for most of the low birthweight infants. Factors causing short gestation births are largely unknown. However, strong associations between a number of demographic and socioeconomic indicators have been widely observed in international reviews. These include:

- maternal smoking
- maternal age less than 19 years
- low maternal educational status
- low maternal socioeconomic status

4 A liveborn infant weighing less than 2500 grams at birth.

- unmarried mother
- ethnicity of mother.

Direct analysis of New Zealand data (Morrell 1990) supports strong associations between low birthweight infants and:

- maternal age less than 19 years
- single marital status
- Māori ethnicity.

Low birthweight infants have been shown to be more susceptible to serious illness during infancy, early childhood and also later in life (Silva and Stanton 1996; Niven and Harding 1995).

Maternal smoking

About one women in three smokes during pregnancy. The proportion is higher among Māori women, where, in 1991, two-thirds smoked during pregnancy. Recent evidence suggests that differentials between Māori and non-Māori rates of maternal smoking, although wide, may be starting to narrow (Ministry of Health 1997b).

There is a strong correlation between SIDS and maternal smoking, both during pregnancy and postnatally. Over half of the SIDS deaths in recent years can be attributed to maternal smoking (Mitchell and Scragg 1994). This appears to be risk factor independent of other factors, such as low socioeconomic status. Smoking by fathers has also been found to increase the risk of SIDS (PHC 1994b).

Maternal smoking is also strongly implicated as a risk factor for low weight births, both through intrauterine growth retardation and prematurity. Thirty-five percent of low weight births due to intrauterine growth problems are attributed to maternal cigarette smoking (Morrell 1990).

Mothers who smoke have been reported to be less likely to exclusively breastfeed their babies at discharge from the obstetric hospital and less likely to be breastfeeding at all by six months of age (Clements et al 1997).

A national study of New Zealand mothers and their children in 1990/91 found that 33 percent of mothers had smoked during pregnancy (Alison et al 1993). Especially high rates of smoking during pregnancy (over 60 percent) were found in teenage mothers, Māori women (68 percent), single women and women with lower educational levels.

Breastfeeding

Lack of breastfeeding has been identified as an important SIDS risk factor in New Zealand. The National Cot Death Study found that those infants not exclusively breastfed at discharge from hospital post-delivery had twice the risk of SIDS as breastfed infants. This difference remained when confounders were removed from the analysis. Further examination of the data from this study has shown that a reduced risk of SIDS persisted during the first six months for those infants who were breastfed (Ford et al 1993).

Breastfeeding rates are high in New Zealand compared to other countries. Sixty percent of New Zealand mothers breastfeed their babies at three months. In the United Kingdom the proportion is 24 percent. New Zealand rates of breastfeeding have been found to be similar among Māori, Pacific and European women (Ford et al 1995).

Mothers under 19 years of age, mothers who do not attend antenatal classes, mothers who smoke, and mothers who use a dummy for their child have been reported as less likely to breastfeed (Clements et al 1997).

Breastfeeding is an important protective factor against a range of infant problems, such as: respiratory infections, gastroenteritis, glue ear, meningitis, and diabetes, and enhances cognitive function in later childhood (Midland Health 1995).

Sleeping position and bed-sharing

Infants who sleep prone have nearly three times the risk of SIDS compared with infants who sleep on their back or side (Mitchell et al 1992). In 1988, 40 percent of infants were placed face down for sleep. By 1991, fewer than 5 percent of infants were sleeping in this position. For Māori, the proportion appears to be just over 5 percent (Mitchell and Scragg 1994; Ministry of Health 1997b).

Sleep position is the only modifiable risk factor for SIDS that has changed significantly since 1987. It has been suggested that the decrease in SIDS identified over this period is largely attributable to the change in the prevalence of this risk factor (Mitchell 1994).

Bed-sharing was originally identified as a risk factor for SIDS. International and New Zealand research now suggests that for mothers who smoke, infants who bed-share with another person are at increased risk from SIDS. Where the mother does not smoke, the risk of SIDS while bed-sharing is not significantly altered. Fifty-one percent of Māori infants and 62 percent of Pacific infants share a bed at age three months, compared to 29 percent of European and other infants (Scragg et al 1995; Ministry of Health 1997b).

Maternal age

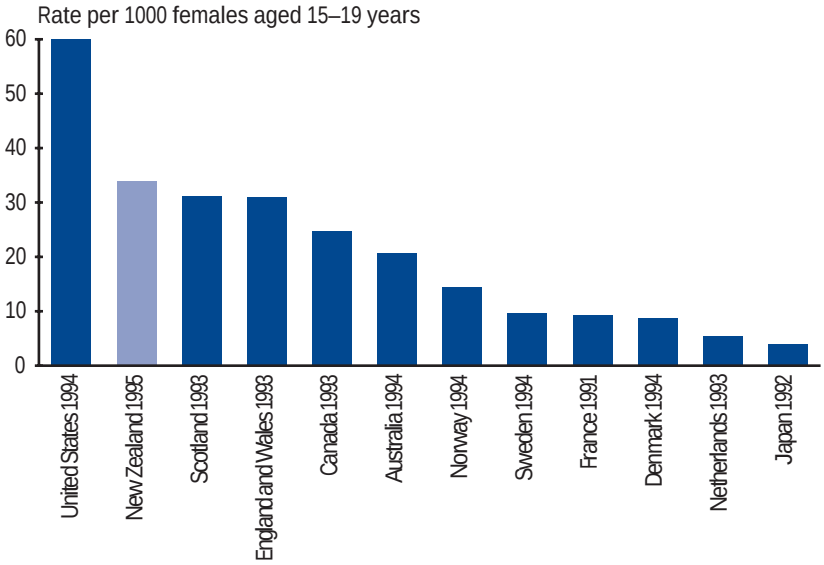
The infant death rate from SIDS decreases with increasing maternal age. Infants born to women under 20 years of age are at the greatest risk, with these infants dying from SIDS at a rate of 6.2 per 1000 livebirths in 1994. This is three times the infant death rate from SIDS in that year (for infants of mothers of all ages). Infants whose mothers are over 35 years of age were the least likely to die in 1994 (0.6 infant deaths from SIDS per 1000 livebirths) (Ministry of Health 1998).

Younger maternal age is also a factor linked to other known risk factors for SIDS, such as non-attendance at antenatal and postnatal clinics, low birth weight and maternal smoking (PHC 1994b).

Teenage fertility in New Zealand is high compared to other developed countries (Figure 3.12). The New Zealand fertility rate for women under 20 years of age (34.0 per 1000) was second only to the United States (60.0 per 1000) among OECD countries, and similar to rates reported for England and Wales (31.0 per 1000) and Scotland (31.2 per 1000). Japan reported the lowest teenage fertility rate (3.9 per 1000) (Statistics New Zealand 1996).

Within the New Zealand population, Māori consistently record higher teenage fertility rates than the total population. In 1995, the Māori rate of 82.3 per 1000 was over twice the rate for the total population (34.0 per 1000) (Statistics New Zealand 1996).

Figure 3.12: International comparison of fertility rates for under–20-year-olds



Source of data:
Statistics New Zealand 1996.

Socioeconomic disadvantage

Infants from low income groups have three times the rate of SIDS of infants from higher income groups. In addition, infants from the low income groups have shown the least reduction in the SIDS rate during recent years. The effect of social and economic conditions is being increasingly considered as a major determinant of SIDS (Ford and Nelson 1995; Mitchell and Tipene-Leach 1996).

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Chapter 4

Children with Disabilities

Key points

- About 11 percent of New Zealand children aged 0–14 years have a physical, intellectual, sensory, psychiatric, or psychological disability or a long-term disease or illness.
- School-age children, boys and Māori children are more likely to have a disability then preschool children, girls and European children.
- Around 16,500 children receive some kind of disability-related government benefit.
- Four percent of children aged 0–14 years are estimated to have a sensory disability related to sight, speech or hearing.
- Around 4000 children aged 0–4 years have an uncorrectable sight disability.
- About 1 percent of children have a hearing disability.
- In 1996, the National Audiology Centre identified 59 new cases of hearing loss in preschool or school-age children. Family history and congenital infection were the most common known causes of these hearing losses.
- In 1995/96, 7.6 percent of three-year-olds and 8.5 percent of new school entrants (five-year-olds) failed hearing screening tests. Māori and Pacific children were twice as likely as children from other ethnic groups to fail these hearing tests.
- Between 1 and 2 percent of children aged 0–14 years are estimated to have an intellectual disability, intellectual handicap or intellectual developmental delay.
- Slightly less than one percent of 0–14-year-olds use technical aids such as wheelchairs or artificial limbs.
- It is estimated that 2.5 percent of 0–14-year-olds have disabilities related to long-term emotional, behavioural, psychological, nervous, or mental health problems.
- About 4 percent of New Zealand children have disabilities related to chronic illnesses such as cancer, severe asthma, diabetes, or epilepsy.
- Most childhood disabilities are caused by conditions present at birth (39 percent) or chronic diseases (37 percent).
- Up to one in 25 newborns have some kind of congenital condition, with problems among male newborns being about 30 percent more common than among female newborns.
- The most common types of congenital conditions are musculoskeletal deformities, genital and urinary system abnormalities, and heart defects.
- Short gestation and low birthweight, neonatal jaundice and birth asphyxia are some of the most common types of perinatal conditions associated with long-term disabilities in children.

Introduction

Disability is defined as a long-lasting physical, sensory, intellectual, or developmental difficulty that restricts a person's ability to perform activities considered to be within the normal range for human beings (WHO 1980). This definition focuses on functional outcomes, rather than the causes of disability.

Disability has the potential to restrict a child's educational development, career opportunities and life chances. Although most New Zealand children with a disability attend mainstream schools, studies indicate that the formal education of 20 percent of 5–14-year-olds with a disability may be interrupted for long periods of time because of their disability (Statistics New Zealand 1997). The Dunedin Multidisciplinary Health and Development Study found that 46 percent of 18-year-olds with a serious disability considered the one feature of their daily life most affected by their disability had been their education (Stanton et al 1995).

Prevalence

All disability[1]

Household Disability Survey

The 1996 Household Disability Survey, conducted by Statistics New Zealand, measured the prevalence of disability in a representative sample of 0–14-year-olds. It also examined the nature, causes, duration, and severity of the disabilities experienced by these children, as well as their patterns of service use. The survey defined disability as any limitation in activity resulting from a long-term (six months or more) condition or health problem (Statistics New Zealand 1997).

The survey found that just over 11 percent of New Zealand children aged 0–14 (an estimated 84, 248 individuals) had some kind of disability, including disabilities caused by chronic ill health. This compares with 19 percent in the New Zealand population as a whole and 21 percent of adults aged 15 years or more.

Children have a lower rate of disability than adults because many long-term health conditions, such as heart-disease, cancer or non-insulin-dependent diabetes, are more likely to develop as people get older. In addition, adults are more likely than children to be disabled by workplace injuries and traffic crashes.

In the 1996 survey, school age children were more likely than preschool children to have a disability (13 percent compared to 7 percent respectively). In addition, 0–14-year-old boys were more likely than girls of the same age to have a disability (13 percent compared to 9 percent). Māori children were also over-represented in the disability statistics, with 16 percent having a disability compared to 11 percent of European children.

Geographically, children living in the region of the Northern Office of the Health Funding Authority were less likely to have a disability than children living in the Health Funding Authority's Midland, Central and Southern Office regions (only 10 percent compared to 11.9 percent, 11.7 percent and 12.9 percent for the Midland, Central and Southern Office regions respectively).[2]

1 Note that data from the disability surveys described in this section are not directly comparable because they have used different definitions of disability and different survey methods.

2 Previously known at the end of 1997 as regions of the Transitional Health Authority and before July 1997 as the four Regional Health Authorities.

More than a third (41 percent) of children with a disability had more than one disability (Statistics New Zealand 1997).

Disability among Dunedin 13- and 18-year-olds

In 1985-86, parents of 831 13-year-olds participating in the Dunedin Multidisciplinary Health and Development Study were asked to report on 'difficulties' their children had in seven disability categories based on the World Health Organization's International Classification of Impairments, Disabilities and Handicaps (ICIDH).[3] The three most common difficulties were writing and spelling (26 percent), coping with dust pollens or chemical agents (21 percent) and coping with school work (15 percent). Total disability scores based on the 51 questionnaire items were low for the vast majority of the sample (Langley 1989).

A further study of 871 of the Dunedin sample when they were 18 years old (1990-91) found that 72 percent had difficulties of one kind or another (Dixon et al 1995). About a quarter of those with some kind of difficulty rated the limitation imposed by this difficulty as 'high' or 'severe' (Stanton et al 1995).

Chronic conditions among Auckland children

Using secondary data, such as local registers and incidence data, a recent study estimated the prevalence of 21 different types of chronic diseases and congenital conditions among Auckland 0-14-year-olds. Asthma was found to be the most common condition (119 per 1000 children). Other common conditions were mental retardation (26 per 1000), autistic spectrum disorders (9.1 per 1000), and congenital heart disease (5.1 per 1000) (Vogel et al 1996). Some of these conditions are likely to involve functional disability but the study did not specifically investigate this aspect.

Receipt of benefits and allowances

Statistics on the receipt of disability-related benefits also give some indication of the level of disability experienced by children.

The handicapped child allowance is non-taxable and is payable to caregivers with 'a seriously physically or mentally handicapped child' who needs constant care for at least 12 months and is being cared for at home (Ministry of Youth Affairs 1995). As at 30 June 1997, 15,941 caregivers were receiving the handicapped child's allowance (personal communication, Income Support, 1997).

The 1996 Household Disability Survey estimated that about 16,500 (20 percent) of the 84,248 children (0–14 years) with a disability had received a disability-related benefit[4] of some kind in the previous year. Over 25,000 of these children received other government assistance such as home support, respite care, transport costs, and special grants to get equipment or medication. A smaller proportion of children with disabilities (12 percent) required special equipment. Two percent needed adaptations to the interior of their home to improve their functional status, while 1 percent required modifications to their home's external access (Statistics New Zealand 1997).

3 The study used a specially-designed written questionnaire based on the ICIDH two-digit disability categories. Disability was defined as any restriction or lack (resulting from impairment) of ability to perform an activity in the manner or within the range considered normal for a human being.

4 Includes disability allowance and handicapped child's allowance.

Disability among Māori and Pacific children

New Zealand disability surveys have generally not included large enough samples of Māori or Pacific children to estimate the prevalence of disability among these groups, particularly when looking at individual types of disability. Even the 1996 Household Disability Survey, which had a large overall sample size of 20,000, did not include enough Māori or 'other' children to reliably estimate the number of these children with the various types of disability discussed below (Statistics New Zealand 1997). This information gap is significant, given suggestions that the attitudes of Māori and Pacific families towards children with a disability may be different from other cultural groups and that, as a result, Māori and Pacific children with a disability may have quite distinctive support needs and service use patterns (Carpinter 1995; PHC 1994).

Different types of disability

The 1996 Household Disability Survey used a definition of disability primarily based on the functional ability of children, rather than the cause of the disability. The survey classified children's disabilities under six main headings:

- children with sensory disabilities (hearing, seeing, speaking)
- children who use technical aids
- children with disabilities associated with long-term diseases or illnesses (for example, asthma, heart disease, cancer, or diabetes)
- children with intellectual disabilities
- children with psychiatric or psychological disabilities
- children with other types of disabilities not included above.

Figure 4.1 shows the number of New Zealand children estimated to have these different kinds of disability (Statistics New Zealand 1997). It also provides further details of the way in which disabilities were classified are also provided. Some children had more than one type of disability, and are counted in more than one of the categories. The first three categories (sensory, technical aids, chronic conditions) relate primarily to physical disabilities. The next two categories focus on intellectual, psychological and psychiatric disabilities, while the 'other' category includes both physical and intellectual/psychological disabilities.

Sensory disabilities

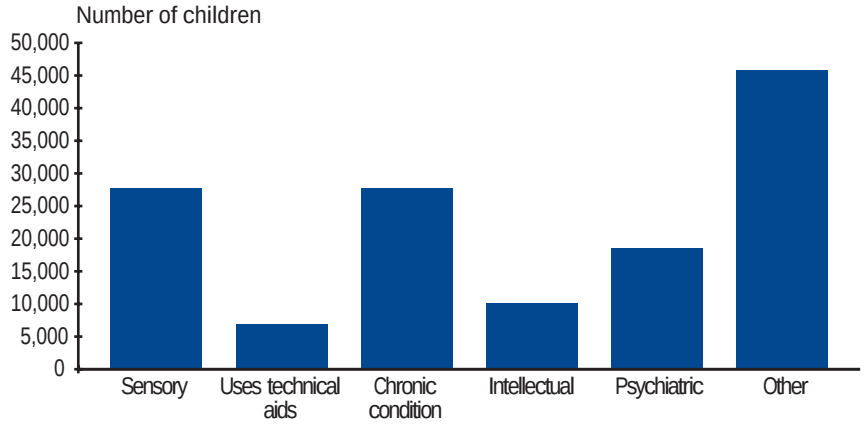
The 1996 Household Disability Survey found that about 27,700 children had a sensory disability related to sight, speech or hearing. This represents a little under 4 percent of all children aged 0–14 years and 33 percent of all children with a disability living in New Zealand households (Statistics New Zealand 1997).

Disabilities of vision

When examined at seven years of age, in 1979-80, over 9 percent of children in the Dunedin Multidisciplinary Health and Development Study had at least one kind of eye defect. About 4 percent had been prescribed glasses (Simpson et al 1984). Five percent had poor distance visual acuity (6/12 or worse in one or both eyes) and 4 percent had poor near vision (N8 or worse in one or both eyes). Other defects included manifest strabismus (4 percent) and occlusion of one eye for amblyopia (3 percent).

From the 1996 Household Disability Survey, it has been estimated that around 4000 New Zealand children aged 0–14 years (0.5 percent) have a seeing disability that cannot be corrected by glasses or contact lenses (Statistics New Zealand 1997).

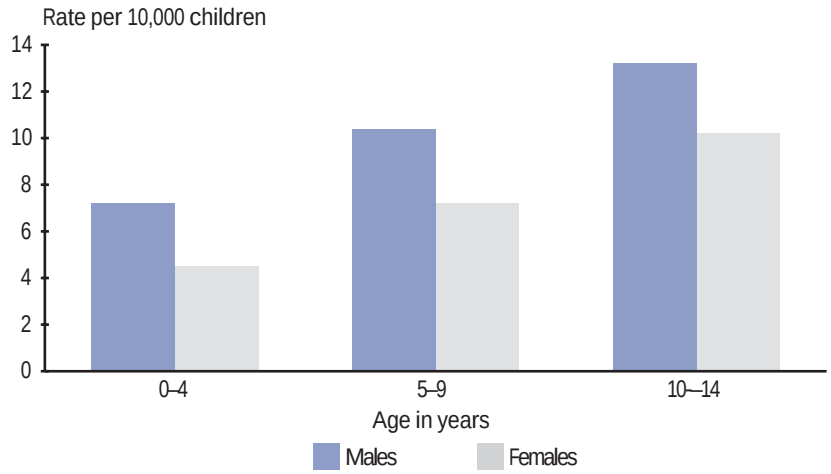
Figure 4.1: Number of New Zealand children aged 0–14 years with a disability in 1996, by disability type



Source of data:
1996 Household Disability Survey, Statistics New Zealand 1997.
Note:
Sensory includes:
children who are deaf or have difficulty hearing that is not corrected by hearing aids or grommets; children who are blind or have difficulty with seeing that is not corrected by glasses or contact lenses.
Uses technical aids includes:
children who use specialised or technical aids, such as a brace (not including braces on teeth), a wheelchair, special buggy or a trolley, crutches, walking sticks, a walking frame or any other kind of walking aid, a standing frame, an artificial limb, or any other type of aid used because of a condition or health problem (not including asthma inhalers, braces for teeth or grommets).
Chronic condition includes:
children who have a chronic condition, such as severe asthma, lung condition or disease (not including mild asthma or bronchitis), heart condition or disease (not including heart murmurs), kidney condition or disease, cancer, diabetes, epilepsy, cerebral palsy, long-term chronic gastro-intestinal condition, or growth failure or failure to thrive.
Intellectual includes:
children with an intellectual disability, intellectual handicap, or an intellectual developmental delay.
Psychiatric/psychological includes:
children who, because of a long-term emotional, behavioural, psychological, nervous, or mental health problem, are limited in the kind or amount of activity that they can do at home, school or play.
Other includes:
children who are limited in their participation at school, play, or any other activities considered normal for children of their age because of a long-term condition or health problem not mentioned in the above categories; also children with speaking disabilities; and those with special education needs because of learning or developmental difficulties, including dyslexia and attention deficit disorder.

In 1997, 733 children (0–14 years old) were members of the Royal New Zealand Foundation for the Blind (60 percent males, 40 percent females). The Foundation's membership rates for children increase with age and there is a greater proportion of males than females in all three of the age groups 0–4, 5–9 and 10–14 (Figure 4.2).

Figure 4.2: Royal Foundation for the Blind 1997 membership rates for children aged 0–14 years, by sex and age group



Source of data:
Royal New Zealand Foundation for the Blind.

Causes of visual impairment among the children who are members of the Foundation include optic atrophy (5 percent), albinism (5 percent), cataracts (4 percent), retinitis pigmentosa (1 percent), aphakia (0.5 percent), and glaucoma (0.4 percent). There are also large numbers of impairments with causes classified as 'other' (35 percent) or 'unknown' (50 percent).

Between 1986 and 1997, the number of 0–14-year-olds who were members of the Royal New Zealand Foundation for the Blind increased by over 200 (40 percent) (De Boer et al 1990; personal communication, Royal New Zealand Foundation for the Blind 1997).

Disabilities of hearing

The 1996 Household Disability survey estimated that in 1996 about 9,055 New Zealand children aged 0–14 (1 percent) had a hearing disability (Statistics New Zealand 1997). Loss of hearing in early childhood can have a significant effect on the development of speech and language and can have serious consequences for a child's learning ability at school. Hearing loss can also affect a child's emotional and social development (Ministry of Health 1997).

Hearing loss notifications

The National Audiology Centre collects data for children under 18 years of age who have a hearing loss at birth, or a hearing loss that cannot be remedied by medical or surgical intervention. These children require hearing aids and/or surgery (National Audiology Centre 1997).

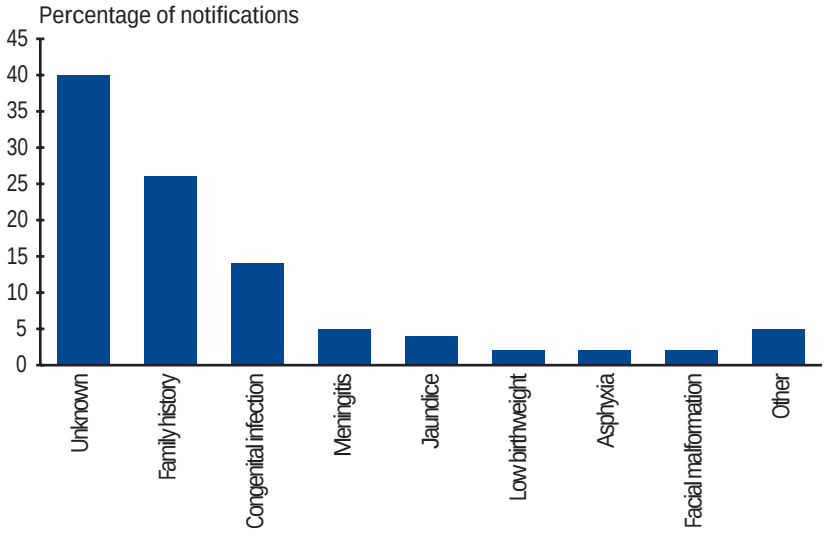
In 1996, 59 children were notified as having a hearing loss greater than 30 dB in the better ear over four frequencies 500-4000 Hz (excluding unilateral and slight hearing losses). Of these 59 children, 66 percent had mild hearing losses (30-55 dB HL), 14 percent had severe hearing losses (56-85 dB HL) and 20 percent had profound hearing losses (over 85 dB HL). Unlike previous years, Māori children were not over-represented in the 1996 notifications.

Since 1990, the incidence of profound deafness among children has increased. In addition, the age at which a hearing loss is detected appears to be increasing, although profound losses are still usually detected at an earlier age than milder losses.

In 1996, the average age that children were identified with a hearing loss was just over three years. Ten of the 59 children notified with a hearing loss were diagnosed at the target age of less than six months and 14 were identified by the age of 12 months.

The cause of hearing loss among children is often unknown (Figure 4.3). Of the known causes or associations, the most common are family history and congenital infection.

Figure 4.3: Causes of hearing loss in children aged 0–14 years according to 1996 notifications of hearing loss



Source of data:
National Audiology Centre 1997.

Hearing loss among three-year-olds and new school entrants

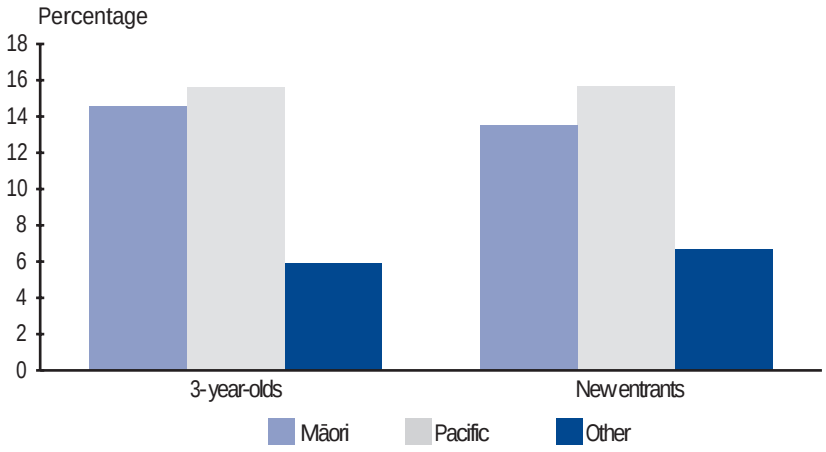
Three-year-old children attending preschool education are tested with tympanometry. However, the coverage of this testing is not complete and pure tone audiometry is usually not carried out. From June 1995 to July 1996, 88 percent of preschool children were covered by this preschool screening test.[5]

Children starting at primary school (usually at age five) are screen tested with pure tone audiometry and tympanometry, with two hearing test failures usually required to identify children who have chronic otitis media with effusion (OME, 'glue ear') (National Audiology Centre 1996). Close to 100 percent of new entrants (five-year-olds) are covered by this screening programme (Ministry of Health 1997).

Figure 4.4 shows hearing test failure rates for three-year-olds and new entrants in 1995/1996. Similar patterns are apparent for both age groups, with overall failure rates of 7.6 percent for three-year-olds and 8.5 percent for new entrants. Over the past few years, hearing test failure rates among children have decreased, particularly for Māori and Pacific children. However, Māori and Pacific children in these age groups are roughly twice as likely as children from other ethnic groups to fail the hearing tests.

5 Some four-year-olds are likely to be included in this figure.

Figure 4.4: Percentage of 3-year-old and new-entrant children failing hearing tests in 1995/96 by ethnic group



Source of data:
National Audiology Centre 1996.

Use of hearing aids

About 2300 school age children currently receive hearing aid assistance from the National Audiology Centre (personal communication, National Audiology Centre, 1997).

Children who use technical aids

The 1996 Household Disability Survey examined New Zealand children's use of technical aids such as wheelchairs or artificial limbs. The survey found that just under 7000 children used technical aids, slightly less than 1 percent of all children aged 0–14 years and about 8 percent of all children with a disability (Statistics New Zealand 1997).

Disabilities related to chronic health conditions

Many children with a chronic illness have reduced participation in the normal developmental tasks of childhood and adolescence. Cancer, diabetes, epilepsy, failure to thrive, or severe asthma are all conditions that can sometimes restrict the kind or amount of activity that children can do. In 1996, approximately 27,700 children were identified as being disabled in this way. This represents 4 percent of all children aged 0–14 years and 33 percent of all children with a disability living in New Zealand households (Statistics New Zealand 1997).

A number of these disability-related health conditions are discussed more extensively in other chapters of this report.

Intellectual disabilities

A child with an intellectual disability has a limitation in his or her intellectual functioning compared with children of the same age living in similar situations. Although the cause of an individual child's intellectual disability is often unknown, the following conditions may result in functional intellectual impairments:

- genetic disorders such as Down syndrome and 'fragile X' syndrome
- maternal infections, malnutrition or exposure to chemicals during pregnancy
- oxygen deprivation or physical injury during birth
- infections, other diseases, injuries, or social deprivation during childhood.

In 1996, approximately 10,000 New Zealand children aged 0–14 years with an intellectual disability, intellectual handicap or intellectual developmental delay were residing in private households. This represents between 1 and 2 percent of all children aged 0–14 years and about 12 percent of all children with a disability living in New Zealand households (Statistics New Zealand 1997).

Other disabilities also commonly found among children with intellectual disability include cerebral palsy, epilepsy, sensory disorders, speech disorders, and severe behaviour disturbances (Midland Health 1995).

Psychiatric and psychological disabilities

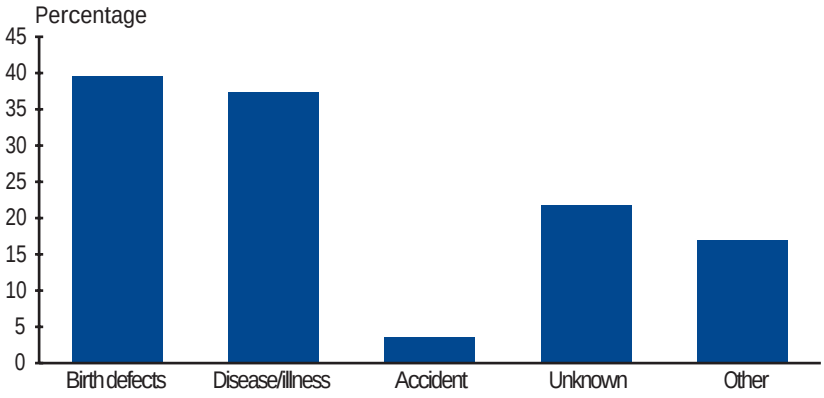
The 1996 Household Disability Survey estimated that 18,500 children (2.5 percent of all 0–14-year-olds) are limited in the kind or amount of activity they can do at home, school or play by a long-term emotional, behavioural, psychological, nervous, or mental health problem. About 22 percent of all children with disabilities have one or more of these psychiatric or psychological disabilities (Statistics New Zealand 1997).[6]

Risk factors

Disability can take many forms and can have a wide range of causes. The 1996 Household Disability Survey found that most childhood disabilities were present at birth (39 percent) or were due to chronic diseases (37 percent). Less than 4 percent were attributed to accidents. Parents could not state a cause for 22 percent of the disabilities identified in the survey (Figure 4.5) (Statistics New Zealand 1997).

6 Chapter 12 provides further information on childhood psychiatric and psychological disorders.

Figure 4.5: Main causes of disability in New Zealand children aged 0–14 years in 1996



Source of data:
1996 Household Disability Survey, Statistics New Zealand 1997.

Given the many different ways that disability can be caused, it is impractical in this section to try to summarise the extensive array of risk factors thought to be associated with, or to cause, childhood disability.[7] However, as Figure 4.5 shows, conditions present at birth contribute to a significant proportion of all childhood disability. For this reason, it is appropriate to focus here on these particular causes of childhood disability.

The main two groups of conditions present at birth, or occurring just after birth, are congenital conditions (also known as birth defects or congenital anomalies) and conditions occurring in the perinatal period.

Congenital conditions

As noted in Chapter 3, congenital conditions account for over a quarter of infant deaths. For surviving infants, congenital conditions may produce physical, sensory, or intellectual disabilities that are permanent. They may also contribute to the development of chronic illness in childhood. As such, congenital conditions cut across the disabilities categories used by the 1996 Household Disability Survey (Statistics New Zealand 1997).

Some congenital conditions may be corrected by surgery or other means (such as, diet for phenylketonuria), meaning they are unlikely to persist into childhood as a special need or disability.

The Birth Defects Monitoring Programme collects hospital data on babies born with various types of congenital conditions as classified under the International Classification of Diseases (ICD) category 'Congenital Anomalies'. In 1992, there was a change in the method of data collection, so that notifications of congenital conditions became non-compulsory. As a result, currently there may be some under-reporting of these conditions (PHC 1995, Dr Barry Borman, personal communication, 1998). Note, too, that some conditions present at birth, such as cerebral palsy, cystic fibrosis and congenital blindness and deafness, are not included in the ICD category 'Congenital Anomalies' (PHC 1995).

7 See the relevant chapters of this report for further information on risk factors for childhood psychiatric disorders and chronic health conditions such as asthma and insulin dependent diabetes.

Overall, in 1995/96, the rate of congenital conditions recorded in New Zealand was 454.4 per 10,000 livebirths for males and 346.8 per 10,000 livebirths for females. This means that up to one in 25 babies are born with congenital conditions[8] (Table 4.1).

Musculoskeletal deformities (for example, congenital hip dislocation and club foot), anomalies of the genital organs (like hypospadias[9] and undescended testes), anomalies of the urinary system (such as, kidney abnormalities) and heart defects are the most common types of congenital conditions.

In the Plunket National Child Health Study, which examined a cohort of over 4000 infants born in New Zealand during 1990/91, 4.3 percent of the infants were found to have congenital conditions (Tuohy et al 1993). Higher rates of congenital conditions were found among infants from Elley-Irving Socioeconomic Group Two[10] and the unemployed group. The most common types of congenital conditions were musculoskeletal, genital, skin, and ear and face.

Historical trends

Table 4.1 shows the rate of incidence of congenital conditions for three periods in the 1980s and 1990s. Readers should note that it is inappropriate to use these data to analyse historical trends across the two decades. This is because the 1980s data refer to total births (that is, both live- and stillbirths), whereas the 1995/96 data refer to livebirths only. In addition, there is the change in data collection methods noted above.

Through the 1980s, the incidence of neural tube defects (for example, hydrocephaly, anencephaly and spina bifida) declined. This was probably because of increased ultrasound detection rates resulting in more pregnancy terminations (PHC 1995). Decreases also occurred in the rates of cleft palate, cleft lip, and atresias of the gastrol-intestinal tract. However, the incidence of Down syndrome increased slightly over the same period, probably due to an increase in the average age at which women gave birth.

International comparisons

Compared with other countries, New Zealand has lower rates of anencephaly, hydrocephaly, spina bifida, cleft lip, and cleft palate (PHC 1995).

8 This figure is a maximum as some newborns will have more than one birth defect, which means the true case rate will be lower.
9 An abnormality of the urethral opening of the penis.
10 Elley-Irving categories are based on the education and income levels associated with different occupations. Socioeconomic Group Two is the second highest group in the Elley-Irving scale.

Table 4.1: Birth defects, rate per 10,000 births for 1980–82 and 1989–91, and by gender for 1995–96

ICD code	*Description*	*1980–82**	*1989–91**	*1995–96***		
		Total	*Total*	*Total*	*Males*	*Females*
754	**Certain congenital musculoskeletal deformities**			**94.7**	**83.9**	**105.9**
752	**Congenital anomalies of genital organs**			**40.7**	**75.1**	**5.0**
752.6	Hypospadias and epispadias	#10.9	#11.6	#12.4	24.4	#0.0
753	**Congenital anomalies of urinary system**			**30.6**	**38.9**	**21.9**
745	**Bulbus cordis anomalies and anomalies of cardiac septal closure**			**29.1**	**31.5**	**26.6**
757	**Congenital anomalies of the integument**			**26.2**	**25.4**	**26.9**
750	**Other congenital anomalies of upper alimentary tract**			**21.1**	**31.8**	**9.9**
750.3	Tracheoesophageal fistula, atresia and stenosis	1.5	1.1	2.1	2.8	1.4
756	**Other congenital musculoskeletal anomalies**			**20.3**	**21.6**	**18.8**
756.7	Anomalies of abdominal wall			3.1	4.0	2.2
755	**Other congenital anomalies of limbs**			**18.6**	**19.7**	**17.4**
747	**Other congenital anomalies of circulatory system**			**18.1**	**17.1**	**19.0**
744	**Congenital anomalies of ear, face and neck**			**15.9**	**16.4**	**15.4**
746	**Other congenital anomalies of heart**			**13.4**	**15.9**	**10.8**
749	**Cleft palate and/or cleft lip**			**13.1**	**15.4**	**10.8**
749.0	Cleft palate	6.0	5.3	5.9	6.1	5.7
749.1	Cleft lip	9.1	6.7	3.0	4.0	2.0
749.2	Cleft palate with cleft lip			4.2	5.4	3.1
748	**Congenital anomalies of respiratory system**			**12.6**	**13.0**	**12.2**
758	**Chromosomal anomalies**			**11.5**	**9.9**	**13.1**
758.0	Down syndrome	8.2	9.4	8.3	8.3	8.3
751	**Other congenital anomalies of digestive system**			**11.5**	**13.8**	**9.2**
751.2	Atresia and stenosis of large intestine, rectum and anal canal	2.2	1.8	2.5	2.8	2.2
742	**Other congenital anomalies of nervous system**			**8.5**	**9.7**	**7.4**
742.3	Congenital hydrocephalus	4.0	2. 4	4.1	5.0	3.1
759	**Other and unspecified congenital anomalies**			**6.7**	**7.6**	**5.7**
743	**Congenital anomalies of eye**			**5.5**	**4.8**	**6.3**
741	**Spina bifida**	**9.6**	**4.1**	**3.2**	**1.9**	**4.5**
740	**Anencephalus and similar anomalies**	**6.4**	**1.3**	**0.4**	**0.7**	**0.2**
Total				401.6	454.4	346.8

Source of data:
** PHC 1995: 9 and ** calculated by authors from data supplied by Dr Barry Borman, Birth Defects Monitoring Programme.*
** These rates are for total births (live and still) and are based on data that were collected before the change in collection method (they are not necessarily directly comparable with later data).*
*** These rates are for livebirths only and refer to the rates of defects rather than the case rate (that is, if babies have more than one birth defect, they will be counted more than once).*
 # This is a male-only condition.

Perinatal conditions

Like congenital anomalies, some conditions originating in the perinatal period[11] can lead to various types of long-term functional disabilities in childhood. As discussed in Chapter 3, perinatal conditions account for about a quarter of all infant deaths. They are also the most common reason (40 percent) that infants are hospitalised. Table 4.2 shows the most common types of perinatal conditions leading to hospitalisation.

Table 4.2: Most common perinatal conditions leading to hospitalisations in 1995/96

Perinatal condition (and ICD-9 code number)	*Percentage of hospitalisations for perinatal conditions (n = 15,749)*
Short gestation and low birthweight (765)	23
Respiratory conditions of foetus and newborn[12] (770)	17
Perinatal jaundice (774)	9
Long gestation and high birthweight (776)	9
Slow foetal growth and malnutrition (764)	8
Intrauterine hypoxia and birth asphyxia (765)	8

Source of data:
Ministry of Health 1997b.

Some of these perinatal conditions are associated with long-term disabilities and health outcomes. In particular, short gestation and low birthweight can lead to later neurodevelopmental problems, chronic lung disease, retinopathy (and subsequent blindness), and deafness (Bourchier 1994; Darlow and Horwood 1992; Darlow et al 1997; Maskill 1992; Morrell 1990). Intrauterine growth retardation is correlated with neurological developmental disabilities in childhood, including attention deficit disorder, and with cardiovascular disease and diabetes in later life (Gross-Tsur et al 1991; Hofman et al 1997; Kjellmer et al 1992).

Birth asphyxia can cause cerebral palsy, seizures and other neurological disabilities (Shankaran et al 1991; Thornberg et al 1995), while neonatal jaundice can be associated with hearing loss, learning disabilities and neurological damage (Weir and Millar 1997; Worley et al 1996).

'Genetic' conditions

One group of conditions present at birth that has not been fully covered in the previous two sections is what is sometimes described as 'genetic' conditions. These include chromosomal abnormalities and inherited conditions.

11 From 28 weeks gestation to seven days after birth.
12 Includes aspiration syndrome and pulmonary haemorrhage.

Chromosomal abnormalities

The prevalence of chromosomal abnormalities (for example, Down syndrome) has already been reported above from data collected by the Birth Defects Monitoring Programme (see Table 4.1).

Inherited conditions

Inherited conditions include; cystic fibrosis, some types of muscular dystrophy, haemophilia, and some cases of deafness (PHC 1995). While most of these conditions are rare, they are often associated with various degrees of functional disability among children. Prevalence data for many inherited conditions are not systematically collected by the Birth Defects Monitoring Programme because they are not classified under the ICD group 'Congenital Anomalies'.[13] Incidence data (for example, number of hospital discharges) are not particularly useful for identifying the level of disability experienced by children as a result of inherited conditions.

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13 Cystic fibrosis is classified as a metabolic disorder, haemophilia as a blood disorder, deafness as a sense organ disorder and muscular dystrophy as a nervous system disorder.

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Chapter 5

Tamariki Māori Hauora

Key points

- Tamariki Māori make up more than a third of all Māori living in New Zealand and just under a quarter of New Zealand's 832,100 children aged 0–14 years.
- Tamariki are more likely than European children to live in social circumstances associated with an increased risk of serious ill-health.
- Compared to non-Māori children, tamariki are 83 percent more likely to die before reaching 15 years of age.
- Tamariki are more likely than non-Māori children to die as a result of injuries and poisonings, road traffic injuries, SIDS, respiratory conditions, and infectious diseases – all potentially preventable health conditions.
- Tamariki are also much more likely than non-Māori children to be admitted to hospital. This is particularly so in the first five years of life.
- Compared to non-Māori children, tamariki Māori are more likely to be hospitalised for respiratory conditions, injuries and poisoning, and nervous system diseases.
- The difference between tamariki Māori and non-Māori infant mortality rates has widened rather than narrowed in the 10 years to 1994. This is largely because of the relatively high number of tamariki post-neonatal deaths, the majority of which are from SIDS.
- Tamariki are over-represented in the disability statistics. The 1996 Household Disability Survey found 16 percent of tamariki aged 0–14 years had a disability, compared to 11 percent of European children.
- Tamariki, especially girls aged 12–15 years, are continuing to take up smoking and become committed smokers at rates well above those of young teenagers from other ethnic groups.
- Despite significant improvements in the health status of tamariki over the last 10 years, in general tamariki still experience substantially poorer health than non-Māori children when assessed in terms of conventional heath status measures such as age-specific mortality and hospitalisation.

Introduction

This chapter draws together the information presented in all sections of this report on the health status of tamariki Māori. This enables readers with a special interest in Māori child health to access this information without having to search through the whole report.

Measuring the health status of tamariki Māori

The child health status measures summarised in this report (such as age-specific mortality and hospitalisation rates) reflect a primarily European cultural bias and are not indicators that all Māori would necessarily accept as the most significant or meaningful for them.

To properly evaluate the health of Māori, commentators have highlighted the need to look beyond conventional mortality and morbidity data and develop measures that better reflect Māori spiritual, emotional and family dimensions (Durie 1994). Alternative or additional measures of tamariki Māori health status that have been proposed include: *cultural affirmation* (being secure in one's identity as a Māori person, including the use of te reo Māori); *skills and knowledge* (to make healthy choices); *safety* (including physical, emotional, spiritual, and cultural safety); *participation in recreation* (which may be difficult for stressed families, the unemployed and those on low incomes); *educational attainment* (the capacity to learn in both Māori and non-Māori contexts); and *social functioning* (the ability to move easily within both Māori society and the wider New Zealand society) (Ratima and Ratima 1997).

Māori also emphasise that iwi, hapū and whānau – the traditional Māori social system – should be the central framework of analysis used when reporting on Māori health and wellbeing (Department of Health 1993).

Because culturally appropriate approaches to assessing the health status of tamariki are only just beginning to be developed and applied, this chapter only presents data on the more conventional child health status measures.[1] It is hoped future child health profiles will include data from health status studies that have applied Māori health concepts.

Population and society

In 1996, there were 196,400 tamariki Māori aged 0–14 years living in New Zealand, making up nearly a quarter (24 percent) of the country's total child population.

The Māori population is a comparatively young population. In 1996, more than a third of New Zealand's Māori population (37 percent) were under 15 years of age. This is quite different from the European population, where only 19 percent were less than 15 years old.

1 All New Zealand health status data reported by ethnic groups must be interpreted carefully. This is because Māori ethnicity is defined in different ways in different kinds of health information. See the discussion "Data sources and methods of analysis" earlier in this publication for further details.

Fertility

In comparison to the total New Zealand female population, Māori women are more likely to be young mothers. Māori women are most likely to have children between the ages of 20 and 24 years (150 births per 1000 women). In 1995, the fertility rate for Māori women aged 15–19 years was more than twice the rate for all women aged 15–19 years living in New Zealand (82 versus 34 births per 1000 women) (Statistics New Zealand 1996).

Living circumstances

Tamariki are more likely than European children to live in social circumstances generally associated with an increased risk of ill-health (Jolly 1990).

In 1996, tamariki were more likely than European children to have a parent receiving the unemployment benefit. They were also more likely than European children not to have a parent in the paid workforce (41 percent compared to 14 percent). Just under one in five tamariki lived in a household without a car, compared to less than one in 20 European children.

As suggested by those indicators, tamariki are more likely than European children to live in low-income households. In fact, evidence suggests that over the decade from 1981 to 1991 the disparity between the incomes of Māori and European families widened rather than narrowed (Statistics New Zealand 1995).

Tamariki are more likely than European children to live in a one-parent family. In 1996, 43 percent of Māori preschoolers were living in a one-parent family, compared to 15 percent of European preschoolers. Tamariki from one-parent families were also more likely than European children from one-parent families to live in households shared by more than one family (38 percent compared to 23 percent, in 1996). In the same year, just under 32 percent of Māori children lived in households containing six or more people. Only 16 percent of European children lived in households this big.

Participation in education and employment

In 1996, more than a third of Māori preschoolers were enrolled in some kind of formal early childhood education, especially Kohanga Reo, kindergartens or childcare centres (Ministry of Education 1997a). However, in general, compared to children from the other main ethnic groups, a smaller percentage of Māori preschoolers participate in early childhood education (Newell 1996; Ministry of Education 1994).

In 1996, 16 percent of Māori young people left school with a seventh form qualification of some type. This compares with 25 percent of Pacific school leavers, 44 percent of European school leavers and 64 percent of Asian school. Over a third of Māori young people left school with no formal educational qualifications (Ministry of Education 1997b).

Youth employment

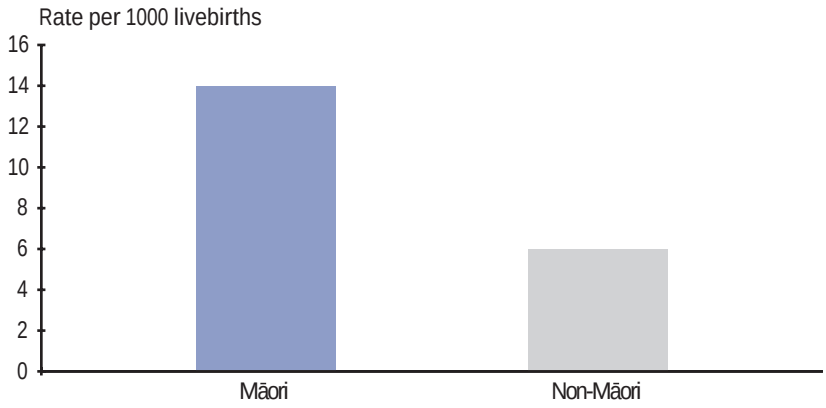
At Census night in March 1996, over half of Māori (57 percent) 15–19-year-olds were participating in the labour force (that is, either in work or unemployed) (Statistics New Zealand 1998). Just on 30 percent of this group were unemployed. Young Māori women were more likely to be unemployed than young Māori men (Statistics New Zealand 1998).

Mortality and morbidity in tamariki

Mortality from all causes

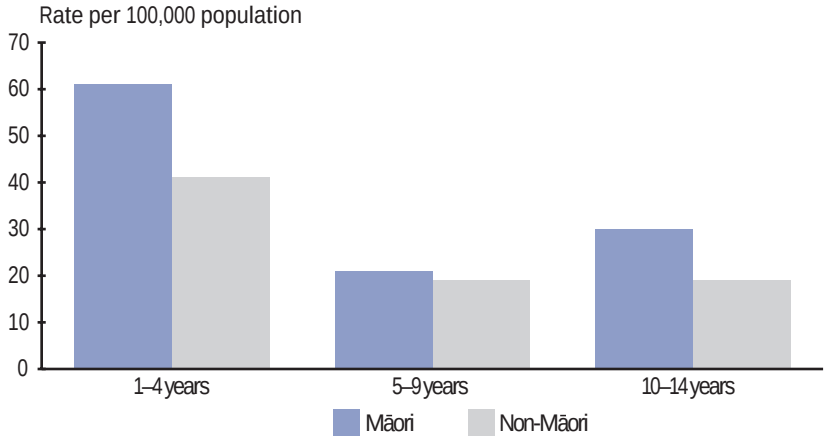
Compared to non-Māori children, tamariki Māori are more likely to die before reaching 15 years of age. In 1994, tamariki recorded a death rate 83 percent higher than non-Māori children (125 versus 68 deaths per 100,000 children aged 0–14 years for Māori and non-Māori respectively). Disparities between Māori and non-Māori were greatest in the infant (aged less than one year), 1–4 and 10–14 year age groups (Figures 5.1, 5.2).

Figure 5.1: Mortality from all causes, Māori and non-Māori infants, 1992–94



Source of data:
Ministry of Health 1997a.

Figure 5.2: Mortality from all causes, Māori and non-Māori 1–14-year-olds, by age group, 1994

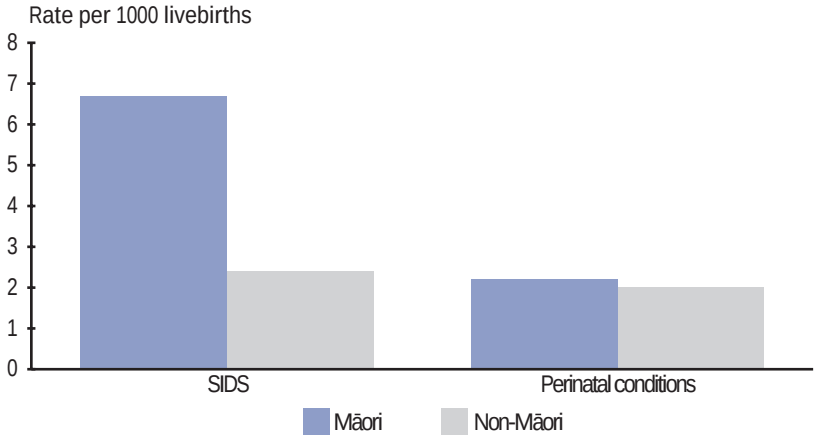


Source of data:
Ministry of Health 1997a.

Causes of death

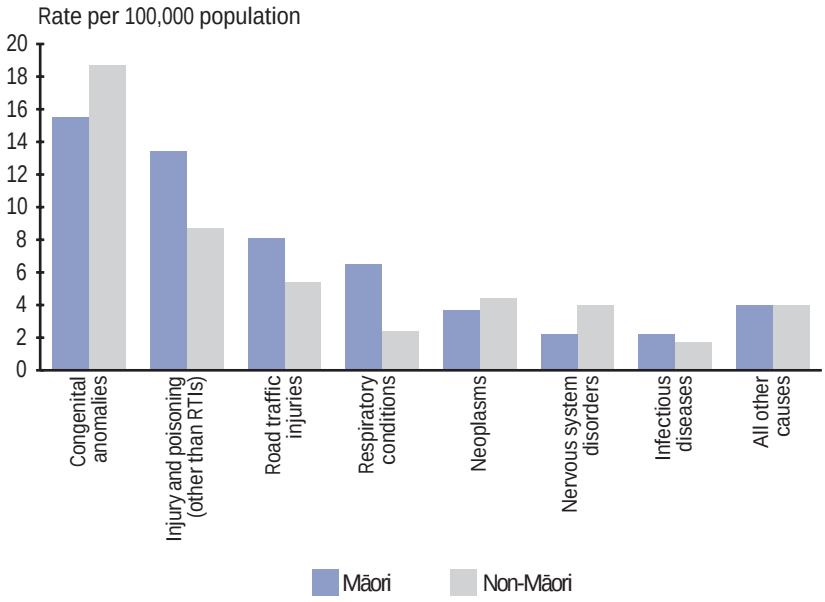
Examining the specific causes of these deaths, tamariki are more likely than non-Māori children to die as a result of injuries and poisonings (including road traffic injuries), SIDS, respiratory conditions, and infectious diseases – all potentially preventable health conditions (Figures 5.3, 5.4). They are less likely than non-Māori children to die as a result of congenital anomalies, neoplasms (such as cancer) and nervous system disorders (childhood health conditions that are relatively less amenable to prevention at present).

Figure 5.3: Māori and non-Māori infant mortality rates, SIDS and perinatal conditions, 1992–94



Source of data:
Ministry of Health 1997a.

Figure 5.4: Māori and non-Māori mortality rates, by cause, 0–14-year-olds, 1992–94

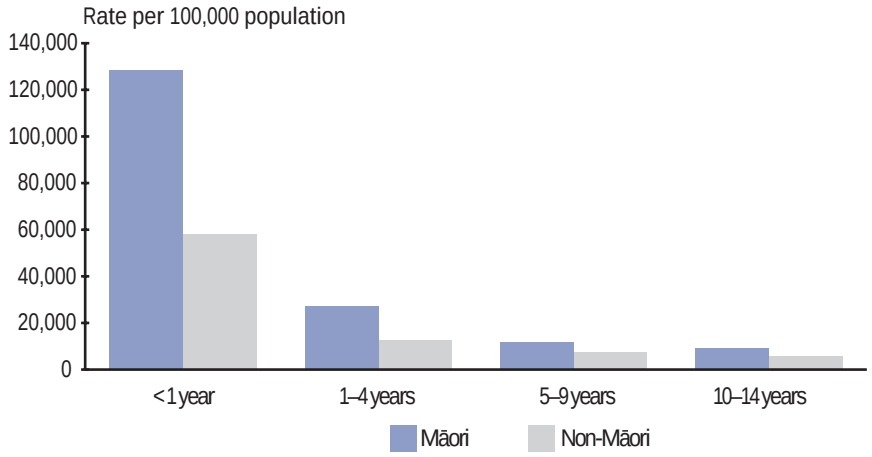


Source of data:
Ministry of Health 1997a.

Hospitalisation from all causes

Tamariki Māori are also much more likely than non-Māori children to be admitted to hospital. This is particularly the case in the first five years of life. In 1995, Māori infants and preschoolers were hospitalised at more than double the rate of non-Māori infants and preschoolers (Figure 5.5).

Figure 5.5: Hospitalisation rates from all causes, Māori and non-Māori 0–14-year-olds, by age group, 1995



Source of data:
Ministry of Health 1997c.

Causes of hospitalisation

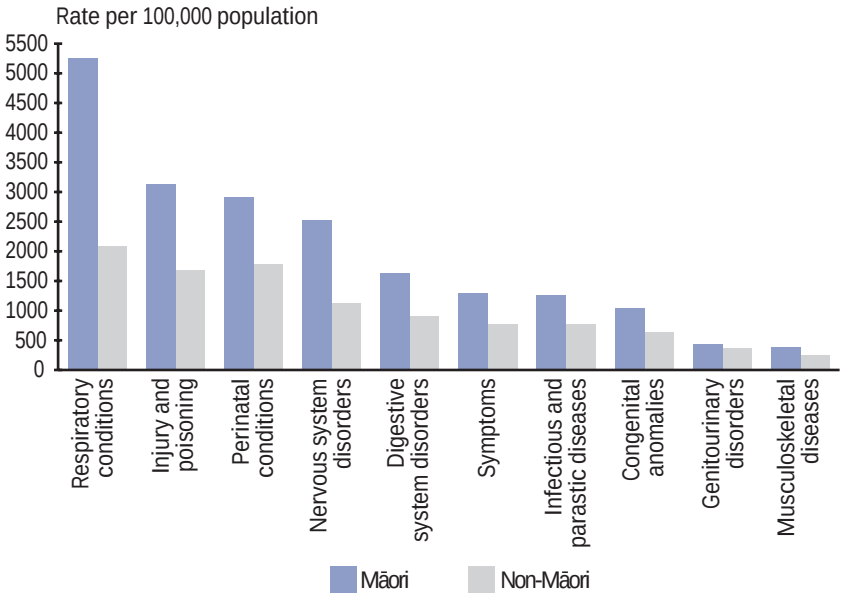
Comparing the main causes of hospitalisations for Māori and non-Māori, tamariki are particularly likely to be hospitalised for respiratory conditions, injuries and poisonings, and nervous system diseases (Figure 5.6).

Infant health

Like the non-Māori infant death rate, the Māori infant death rate has declined in recent years (from 15.5 deaths per 1000 livebirths in 1985 to 13.8 deaths per 1000 livebirths in 1994). However, despite these improvements, in 1994 tamariki were still about twice as likely as non-Māori children to die before reaching their first birthday. This difference between Māori and non-Māori infant mortality rates has widened rather than narrowed in the 10 years to 1994. This is largely because of the relatively high number of tamariki post-neonatal deaths, the majority of which are from SIDS (Ministry of Health 1996).[2]

2 Post-neonatal deaths include liveborn infants dying after 28 days and before the first year of life is complete.

Figure 5.6: Māori and non-Māori hospitalisation rates, by cause, 0–14-year-olds, 1995



Source of data:
Ministry of Health 1997c.

SIDS

Over the period 1992–94, the Māori infant death rate from SIDS was 4.5 times the non-Māori rate. While the non-Māori SIDS rate decreased by 62 percent between 1985 and 1994, over the same period the Māori rate decreased by only 13 percent, resulting in the gap widening between Māori and non-Māori SIDS rates.

Reflecting these trends, Māori infants are more likely than non-Māori infants to be exposed to the major SIDS risk factors such as maternal smoking during pregnancy, bed-sharing and young maternal age. There is evidence that although the prevalence of smoking during pregancy is higher among Māori women than among non-Māori women, the gap is narrowing (Ministry of Health 1997b). Research suggests 51 percent of Māori infants share a bed with their parent or another person at the age of three months, compared to 29 percent of European infants (Scragg et al 1995; Tuohy et al 1997). Māori women are also more likely than non-Māori women to have children when they are very young. In 1995, the fertility rate of Māori women aged 15–19 years was 82.3 per 1000 women. This was over twice the fertility rate of the total New Zealand female population aged 15–19 years (34.0 per 1000 women) (Statistics New Zealand 1996).

Tamariki with disabilities

Tamariki are over-represented in the disability statistics. The 1996 Household Disability Survey found that 16 percent of Māori aged 0–14 years had a disability, compared to 11 percent of European children (Statistics New Zealand 1997).

Hearing impairment

In recent years, rates of hearing test failure among Māori three-year-olds and new school entrants (generally five-year-olds) have decreased. However, Māori in these age groups are still about twice as likely as European children to fail these hearing tests. In 1995/96, 13.5 percent of tamariki were found to have a hearing loss at school entry (five years old), compared to 8.5 percent of school entrants overall (National Audiology Centre 1996).

Significant hearing loss is discovered later in tamariki than in European children. On average, a hearing loss in a Māori child is identified when the child is about four years old, whereas a hearing loss in a European child is usually identified when the child is about 21 months old (Ratima and Ratima 1997).

In 1996, in contrast to previous years, tamariki were not over-represented in the National Audiology Centre's notifications of children with either a hearing loss at birth or a hearing loss that cannot be remedied by medical or surgical intervention (National Audiology Centre 1997).

Nutrition

Obesity

There is currently very little data available on the nutritional status and body mass index (BMI) of tamariki. However, the Life in New Zealand survey found that, compared to non-Māori adults 15 years or older, Māori adults were less likely to eat three or more servings of vegetables and two or more servings of fruit per day. Intake of both total fat and saturated fat was higher in Māori than other New Zealanders (Ministry of Health 1997b).

Food security

A recent national school study estimated that over 20,000 New Zealand school children are perceived by their teachers to be inadequately fed during the school day (Food and Nutrition Consultancy Services 1995). Children from regions with a higher proportion of Māori and Pacific children and children from large inner city schools were most likely to be rated as inadequately fed.

Iron deficiency

A number of New Zealand surveys conducted in the 1960s found that iron deficiency anaemia was more prevalent and severe among Māori infants. Reported rates of iron deficiency anaemia at six months ranged from 58 percent to 75 percent in Māori infants, compared to 29 percent in European infants (Reeves 1968; Akel et al 1963; Neave et al 1963).

The only recent community-based study of iron deficiency anaemia in an ethnically mixed New Zealand paediatric population was conducted in 1991–92 in a low socioeconomic population living in Porirua (Crampton et al 1994). This was a small non-random sample of children aged six to 36 months. Iron deficiency was identified in 24 percent of these children.

Tobacco

Younger teenage Māori girls and boys are continuing to take up smoking and become committed smokers at rates well above those of teenagers from other ethnic groups. A national school survey conducted in 1992 found Māori fourth form students were significantly more likely than European and Pacific students to be current smokers. Thirty-five percent of Māori students were current smokers compared to 23 percent of European and 18 percent of Pacific students (Ford et al 1995). Of all the students surveyed, Māori girls were most likely to be current smokers (45 percent), with 33 percent of the Māori girls reporting that they were daily smokers. This rate of daily smoking among fourth form Māori girls is very high when compared to rates for 15-year-olds from other developed countries (UNICEF 1996).

In countries such as New Zealand where there has been an overall decline in smoking rates across the total adult population in recent years, smoking is now most common in the more socioeconomically disadvantaged groups (Amos 1996; WHO 1997).

Alcohol, cannabis and other drugs

The prevalence of alcohol, cannabis and other drug use among tamariki has yet to be accurately surveyed. However, a national survey of 516 Māori aged 14–65 conducted in 1995 provides some guidance on possible patterns of alcohol consumption among younger Māori. The survey found that, compared to non-Māori, Māori were less likely to be drinkers. On the other hand, Māori drinkers consumed more alcohol in a year than non-Māori drinkers. They also consumed significantly greater quantities of alcohol on each drinking occasion (Dacey et al 1997).

Sexual and reproductive health

The Christchurch Health and Development Study found Māori teenagers were more likely than their European counterparts to begin sexual intercourse at a younger age (Lynskey and Fergusson 1993).

This trend was confirmed in a more recent national survey of 1000 high school students (Lungley et al 1993). Māori students (48 percent) were more likely than Pacific (28 percent) and European students (24 percent) to report having had sexual intercourse. Sexually experienced Māori students were less likely than the sexually experienced European students to have used condoms the last time they had sex (43 percent versus 70 percent).

Communicable diseases

Tamariki are more likely than non-Māori children to contract most communicable diseases, including *Haemophilus influenzae* type b (Hib) disease, tuberculosis, hepatitis A, hepatitis B, rheumatic fever and meningococcal disease (Ameratunga and Martin 1994; Galloway and Baker 1995; ESR 1993). Northland Māori have been recognised to be particularly likely to contract hepatitis A and be hospitalised with pertussis (whooping cough) (Epidemiology Unit 1992; Ministry of Health 1997b). Māori adults are also more likely than non-Māori adults to experience the disabling long-term side effects of childhood communicable diseases, such as the chronic heart problems caused by rheumatic fever and primary liver cancer associated with hepatitis B infection (Purchas et al 1984; Flight 1984; Wilson et al 1993). In the period 1991–94, the average annual age-standardised death rate for Māori of all ages from chronic rheumatic heart disease was 10.6 per 100,000 population, compared with 1.9 per 100,000 people for non-Māori (Ministry of Health 1997a). Primary liver cancer death rates were 5.8 per 100,000 people for Māori and 1.7 per 100,000 people for non-Māori (Ministry of Health 1997a).

It is possible that factors such as lower immunisation rates, larger family sizes, higher numbers of occupants per house, poorer housing quality, relatively restricted access to health care, and even psychosocial factors associated with stressful living or concerns about inequality, are relevant in explaining these health differentials. Although no conclusive evidence exists, distinctive Māori cultural practices, such as the emphasis on close contact with whānau (extended family) and shared sleeping arrangements on marae, may be significant for increasing the exposure of Māori children to airborne infectious diseases.

Injuries

Unintentional injuries

In 1990–94, tamariki had higher death rates than non-Māori children for all the major causes of unintentional and deliberate injury. Overall, tamariki were 33 percent more likely than other children to die as a result of injuries (including both unintentional and intentional).

While the injury death rate for all children aged 0–14 years decreased in the 15 years from 1980–94 (from 21 deaths per 100,000 in 1980 to 15 deaths per 100,000 in 1994), over the same period the rate increased for tamariki (from 20 deaths per 100,000 to 29 deaths per 100,000). If Māori had experienced the same injury death rate as non-Māori over this period, 51 fewer tamariki would have died.

Compared to non-Māori children, between 1988 and 1995 tamariki had higher rates for both of the major causes of injury resulting in hospitalisation (falls and road traffic injuries). Over this period,

tamariki were hospitalised for injuries at a rate 86 percent higher than other children. If tamariki had experienced the same injury hospitalisation rate as non-Māori throughout this period, 1500 fewer tamariki would have been hospitalised each year.

The rate of pedestrian injury among tamariki is almost three times the non-Māori rate. This may be because children from socioeconomically disadvantaged areas are more likely to live in households and communities where there are no physical barriers between child play areas and driveways (Roberts et al 1992; Roberts et al 1995).

Abuse and violence

Compared to non-Māori children, tamariki are nearly four times as likely to be hospitalised for injuries sustained as a result of deliberately inflicted physical harm (62.6 hospitalisations per 100,000 population for tamariki in 1995, compared to 17.0 hospitalisations per 100,000 for non-Māori).

Tamariki continue to be hospitalised for child battering and other maltreatment at a greater rate than non-Māori children. There are signs, though, that this differential may have narrowed in the three years from 1993–95.[3]

Māori are over-represented in the socioeconomic groups considered to be at greater risk of child abuse. In 1994, 51 percent of Women's Refuge clients were Māori, considerably higher than the proportion of Māori in the total New Zealand female population (Ratima and Ratima 1997).

Mental health

To date, no statistically reliable community surveys have conclusively identified differences in the prevalence of psychiatric disorder among New Zealand's Māori and non-Māori aged 0–14 years. However, in 1995, when assessed at age 18 years, Māori in the Christchurch Health and Development Study were 1.5 times more likely than non-Māori to be identified as having a mental disorder (Fergusson et al 1997). This suggests that younger Māori teenagers may also be more likely than their non-Māori counterparts to experience mental disorder.

Suicide

Between 1974 and 1993, there was a four-fold increase in the suicide rate among New Zealand males aged 15–24 (Coggan 1997). Over this time, the annual rate of Māori male youth suicide generally remained below the non-Māori rate. However, between 1991 and 1995, annual suicide rates for 15–19-year-old Māori were generally similar or slightly higher than for 15–19-year-old non-Māori, both for males and females. This suggests that Māori 15–19-year-olds may now be just as likely to commit suicide as their non-Māori counterparts (Ministry of Health 1997b).

3 At least some of this differential between Māori and non-Māori hospitalisations for child battering may be a result of biases in the hospital diagnoses given to injured non-Māori children. Hospital staff have been found to be less inclined to confirm cases of child battering in non-Māori children (Chalmers et al 1993).

Chronic diseases

Asthma

In 1995, there were 5869 hospitalisations for children aged 0–14 years due to asthma. Tamariki were hospitalised for asthma at over twice the rate of non-Māori children, with Māori males being hospitalised at a 70 percent higher rate than Māori females in this age group.

Disparities between Māori and non-Māori rates of asthma hospitalisation were especially marked in the 0–4 year age group. Compared to non-Māori, Māori in this age group were three times more likely to be hospitalised for asthma in 1995.

Between 1988 and 1995, rates of hospitalisation for asthma decreased by 27 percent for tamariki. However, this decrease was only slightly larger than for the 0–14 year age group as a whole (25 percent). This means that over this period there was essentially no reduction in the disparity between the tamariki and total child asthma hospitalisation rates.

The biggest decrease in asthma hospitalisation rates was recorded for Māori females aged 0–14 years. Between 1988 and 1995, this group had a 35 percent decrease in asthma hospitalisations.

Studies suggest that across the different New Zealand ethnic groups the proportion of people with asthma is fairly similar. This means that factors apart from variations in the prevalence of asthma are likely to be leading to tamariki being hospitalised for asthma at higher rates than other children. One of the most widely accepted explanations for these differences is that Māori experience relatively reduced access to and uptake of effective asthma prevention and self-management strategies, including preventive medication (Robson et al 1993; Ministry of Health and Statistics New Zealand 1993; Shaw et al 1994; Pattermore et al 1989; Mitchell 1983; Māori Asthma Review Team 1991; Wairarapa Māori Executive/Taiwhenua o Ngati Kahungunu, Wellington Asthma Research Group 1992).

Cancer

In 1994, cancer was the second leading cause of death for children aged 1–14 years (Ministry of Health 1997a). In that year, 35 children aged 1–14 years died from cancer. Seven of these were tamariki.

In the period 1980–94, tamariki and non-Māori children had similar rates of newly diagnosed cancers.

Diabetes

Auckland data suggest that, compared to Europeans, Māori have lower incidence and hospitalisation rates for insulin-dependent diabetes mellitus (IDDM) (Elliott and Pilcher 1985).

Oral health

Separate data on rates of missing or filled teeth (MFT) for tamariki Māori have been reported for some New Zealand regions (Ministry of Health 1997b). These indicate that tamariki in Form Two (approximately 12 years of age) had, on average, 60 percent more MFT than non-Māori in 1995. A study in the Manawatu-Wanganui Area Health Board showed that tamariki were three times more likely than non-Māori to have dental caries at their first dental treatment after starting primary school. They were also three times more likely to have higher caries rates (five or more MFT) (Thomson 1993). Māori preschoolers were less likely to be enrolled in the School Dental Service. Form Two tamariki (aged approximately 12 years) also had higher caries prevalence than their non-Māori counterparts. Other studies show that tamariki are more likely than non-Māori children to require general anaesthetic as part of treatment for extreme dental caries (Thrupp 1993).

Dental caries is a disease with a strong socioeconomic gradient, with those most disadvantaged having greater disease experience (NHMRC 1991; Treasure and Dever 1992).

Conclusion

Reflecting equity concerns and obligations under the Treaty of Waitangi, ideally the health status of tamariki Māori should be as good as that of other New Zealand children (Ratima and Ratima 1997). However, despite significant improvements in the health status of tamariki over the last 10 years, in general tamariki still experience substantially poorer health than non-Māori children when assessed in terms of most conventional measures, such as age-specific mortality and hospitalisation.

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Part B

Child Health:

A behavioural perspective

Chapter 6

Nutrition

Key points

Obesity

- The prevalence of obesity in New Zealand children has not been accurately determined. However, overseas data suggest a large increase in child obesity is occurring and predicts significant ill-health during childhood (including psychological and social consequences), in many cases progressing to numerous serious diseases in adults.
- Adult diseases influenced by child obesity include coronary heart disease, stroke and cancer. These are presently the three main causes of illness and death in adult New Zealanders.
- Child obesity is influenced by many different factors including genetics, dietary intake, physical activity, and prenatal factors.

Food security

- Food security covers issues of hunger, food quality, food quantity, and cultural appropriateness of foods.
- Under-nutrition and malnutrition during any period of childhood can lead to impaired cognitive development, increased fatigue, and numerous nutrition related illnesses.
- The prevalence of food insecurity is unknown in New Zealand children, but there is significant anecdotal evidence suggesting a serious problem.
- The major risk factor for food insecurity in families is low socioeconomic status, especially housing tenure, education, employment, and car ownership, which all impact on the ability to procure and store food.

Iron deficiency

- Iron deficiency is the most common nutrient deficiency found in industrialised countries. It is particularly common among infants and children.
- The serious effects of iron deficiency include poor growth, increased risk of infection and impaired psychological development.
- The prevalence of iron deficiency in New Zealand children has not been well established, although small studies have shown up to 24 percent of children may be iron deficient.

- The risk factors for iron deficiency are well understood and they vary depending on the age group. Risk factors have been reported for age-specific groups in New Zealand.
- Dietary iron intake is also poorly understood in New Zealand. The only significant studies looking at dietary intake have focused on children aged 10–15 years. These studies show a mix of results from poor dietary iron intakes in 13–15-year-old girls to adequate dietary iron intakes in 10–11-year-old boys and girls.
- Once they become iron deficient, a child's iron levels may be restored using iron supplementation. However, the cognitive impairment caused by prolonged iron deficiency may be irreversible.

Calcium intake

- An optimal calcium intake during childhood and adolescence is required to maximise peak bone mass.
- Attaining peak bone mass in childhood and adolescence significantly reduces the risk of individuals developing osteoporosis, the debilitating bone disease, later in life. Osteoporosis causes significant death and illness due to wrist and hip fractures.
- The only significant New Zealand studies looking at childhood dietary calcium intake have focused on children aged 10–15 years. These showed that up to 59 percent of children were not consuming adequate amounts of calcium.

Food safety

- Providing microbiologically safe food for children is essential to maintain good health. Thousands of New Zealand children suffer significant illness due to food poisoning each year and some deaths occur.
- The risk factors for food poisoning are well understood and are related to unsafe handling and food preparation, both in the home and in the food industry.

Introduction

Appropriate nutrition during childhood is essential for maintaining growth and good health. This section reviews five major areas of nutritional concern relevant to New Zealand children: obesity, food security, iron status, calcium intake, and food safety.

Morbidity and mortality

Obesity

Obesity is a major public health problem in developed and developing countries. In New Zealand, the National Plan of Action for Nutrition (NPAN) has targets for adult obesity but not for childhood obesity, due to the lack of national prevalence data (PHC 1995).

The diagnosis of obesity usually involves a measure of weight and height. A measure of body composition such as skinfolds may also be included where practical (Gibson 1990).[1]

Childhood is a critical period for the initiation of obesity-related ill-health, particularly coronary heart disease. Adolescents are vulnerable to significant cardiovascular risk through abnormal glucose tolerance, hypertension and lipid profile abnormalities (Must 1996).

Research from a 55-year follow-up to the Third Harvard Growth Study showed mortality from all causes, coronary heart disease, stroke, and colon cancer was greater in adult males who had been overweight during adolescence than in adult males who had been normal weight adolescents. Similarly, morbidity was higher in people who had been overweight adolescents compared to people who had been normal-weight adolescents. The study also highlighted the strong tendency for overweight adolescents to remain overweight as adults (Must et al 1992). Adult obesity is strongly associated with diabetes, high blood pressure, hyperlipidemia, cardiovascular disease, and certain cancers (Pi-Sunyer 1993).

While there is little evidence to suggest that overweight preadolescents have a lower self-esteem than normal-weight preadolescents (Hill and Silver 1995), obesity may have serious psychological and social consequences for some children. Preadolescent children associate overweight body shape with poor social functioning, impaired academic success and reduced health and fitness. Adolescents are strongly socialised to the importance of appearance and weight is critical in the relationship between body image and self-concept (Striegel-Moore et al 1986). Studies of obese adolescents often report significant depression and lower self-esteem (Sheslow et al 1993). A seven-year follow-up of adolescent girls showed that, compared to their non-overweight counterparts, the overweight girls completed fewer years at school, were less likely to be married, had lower incomes, and had higher rates of household poverty. This was regardless of baseline socioeconomic and aptitude scores (Gortmaker et al 1993).

Having said that, it is important not to overlook the social cost of the drive for slimness, which is particularly common in Western developed societies. For young people this contributes to significant nutrition-related problems such as dieting and eating disorders (Lifshitz 1993).

Food security

The phenomenon loosely labelled hunger is now being discussed in a much broader context as food security – a relatively new and evolving concept. Food security is defined as access by all people at all times to the food needed for a healthy life. Existence of adequate quantities of food does not guarantee food security. Achieving food security has three dimensions. First, it is necessary to ensure a safe and nutritionally adequate food supply both at the national and household level. Second, it is necessary to have a reasonable degree of stability in the supply of food both from one year to the other and during the year. Third, and most critically, it is necessary to ensure that each household has physical, social and economic access to enough food to meet its needs. This means

1 Definitions of 'overweight' and 'obesity' differ in the international literature and there are no agreed national standards for assessing overweight and obesity in New Zealand children and adolescents. Obesity in children is often defined as a weight for height, age and sex greater than or equal to the 85th percentile, or triceps skinfold thickness greater than or equal to the 85th percentile (Sherman and Alexander 1990). Body mass index (BMI) is also reported frequently in the literature and a child is considered at high risk of being overweight when his/her index is greater than or equal to the 85th percentile, and overweight when his/her index is greater than or equal to the 95th percentile (Himes and Dietz 1994). Slight differences exist with many other authors recommending the cut off to define overweight for BMI indices to be greater than or equal to the 85th percentile (Harlan 1993; United States Department of Health and Human Services 1988). Research has shown the potential for the misclassification of obesity when North American measures are applied to Australian children, suggesting the importance of developing nation-specific cut-off values (Lazarus et al 1995). Results from a recent Auckland study suggest that it may be important to develop unique standards for defining obesity and overweight in Pacific children (Salesa et al 1997).

that each household must have the knowledge and ability to produce, procure or prepare the food it needs on a sustainable basis. It is also important to encourage the proper distribution of food within the household, among all its members (PHC 1995).

The International Conference on Nutrition in Rome 1992 identified household food security as a key focus for improving nutrition. Those most at risk of being food-insecure were identified as children, women and the aged (FAO/WHO 1992).

Childhood hunger indicators have been developed and are being used in the United States (Wheeler et al 1992). These indicators are composite measures of various aspects of food insufficiency due to constrained resources.

While the Ministry of Health has developed indicators of food security for the New Zealand adult population in the 1997 National Nutrition Survey (Quigley and Watts 1997), to date no such measures of food security have been developed for New Zealand children. The Ministry plans to address this gap with a national nutrition survey for children, scheduled to begin in 1999.

Recent research supports the view that under-nutrition during any period of childhood can have detrimental effects on the cognitive development of children and their later productivity as adults. Undernourished children decrease their activity levels and become more apathetic. This in turn affects their social interactions, inquisitiveness and overall cognitive functioning (Centre on Hunger, Poverty and Nutrition Policy 1995; Leather 1997; Gratham-McGregor et al 1989).

The majority of international studies on the relationship of birthweight to adult chronic disease report cohorts with birthweights at the lower end of normal having higher prevalence of coronary heart disease, hypertension and diabetes (Kuh and Ben-Shlomo 1997).

Pregnant women who are undernourished are likely to have low birthweight babies (less than 2500 grams). Along with other health risks common to low birthweight babies, these infants are more likely to suffer developmental delays. In the case of very low birthweight infants, permanent cognitive deficiencies associated with smaller head circumference may reflect diminished brain growth (Centre on Hunger, Poverty and Nutrition Policy 1995). The latest available New Zealand data showed that 5.9 percent of children had a birthweight less than 2500 grams (New Zealand Health Information Service 1996).

Research in the United States has shown undernourished children are typically fatigued and uninterested in their social environment. They are also more susceptible to illness and more likely to be absent from school (Centre on Hunger, Poverty and Nutrition Policy 1995).

A significant amount of research has been completed in the United Kingdom which shows diet-related illnesses are more prevalent among vulnerable groups, especially children, pregnant women and older people living in low-income households. Infants in low-income households are less likely to be breastfed and have a higher prevalence of anaemia. Toddlers in low-income households have higher intakes of saturated fatty acids and sugars and lower vitamin and mineral intakes. Pregnant women in low-income households have lower energy and nutrient intakes and higher rates of low birthweight babies (Low Income Project Team for the United Kingdom Nutrition Taskforce 1996).

United Kingdom studies indicate that young children in persistently poor families have substantial nutritional deficits compared to children from other families. There is an association between long-term measures of income and child nutritional status, whereas, current short-term income measures and child nutritional status do not show any association (Miller and Korenman 1994).

Iron status

Iron deficiency (ID) is the most common micronutrient deficiency found in the industrialised countries. It is particularly common among infants, women and children (Cook 1994).

The 1992 International Conference on Nutrition in Rome declared that one of its principal aims was to have ID reduced by one-third by the year 2000 (FAO/WHO 1992). The Ministry of Health has identified research into the prevalence of iron deficiency in at-risk groups, such as infants and children, as a priority (PHC 1995).

The debilitating effects of iron deficiency anaemia (IDA) on the health of populations and individuals are well documented. They include poor growth, increased risk of infections and delayed cognitive development. Levels of iron depletion and ID not severe enough to result in anaemia can still cause significant deterioration in health and wellbeing (Yip and Dallman 1996).

Iron deficiency has been associated with psychological problems in children. Iron-deficient children exhibit shorter attention spans, lower intelligence and delayed psychomotor development, which in turn affects language development and body balance (Beard et al 1993; Pollitt 1993; Walter 1993).

Several studies have shown that iron-deficient or anaemic infants who have received iron supplements have regained normal haematological values. However, there has been no corresponding improvement in their cognitive status (Lozoff et al 1987; Walter et al 1983; Pollitt et al 1989). Pollitt (1993) found that anaemic children had poor school achievement scores and that these achievement scores were not fully corrected following iron supplementation.

Table 6.1: Recommended dietary intakes (RDI)

Age		*Iron (mg/day)*
Infants	Breastfed	0.5
	Bottle-fed	3.0
	7–12 months	9.0
Children	1–11 years	6–8
	12–15 years	10–13

Note:
These recommended dietary intake figures have been adopted by New Zealand (Nutrition Taskforce 1991) from the revised Australian Dietary Intakes (National Health and Medical Research Council 1990).

Calcium

Most research on calcium in children has focused on its role in bone health. Osteoporosis is the reduction in bone mass that increases the susceptibility of bones to fracture. Although the disease predominantly affects post-menopausal women, dietary measures taken during childhood have been demonstrated to help prevent the onset or minimise the severity of osteoporosis later in life. Osteoporosis is a disease that begins in childhood and adolesence; therefore, prevention must begin in these age groups (Carrie-Fassler and Bonjour 1995)

Vertebral, femoral and forearm fractures are most commonly associated with osteoporosis. Femoral fractures in particular have a disproportionate frequency in the population in comparison with the age of the population. Femoral fractures cause immediate disability, are characterised by both early and late mortality and cause considerable morbidity (Garrow and James 1993).

In New Zealand, in 1994, the mean length of hospital stay for patients with hip fractures was 22.4 days. In the United States it has been suggested that as many as 50 percent of patients suffering a hip fracture will require long-term nursing care. Sixteen percent of people who have hip fractures die within six months (Sainsbury and Richards 1997).

Food safety

There are a number of different bacteria associated with significant foodborne illness. The major bacterial causes in New Zealand are *Salmonella, Campylobacter, Escherichia coli* and *Yersinia. Listeria monocytogenes* is rare, but very serious when it occurs. New Zealand is witnessing a trend towards an increasing number of notified cases of foodborne illness, ensuring that food safety remains a significant public health issue.

Bacteria associated with significant foodborne illness can produce a range of different symptoms in an infected person. These include cramps, nausea, diarrhoea, vomiting, and fever. More serious complications that are potentially fatal include: dehydration and meningitis (Benenson 1995). The majority of foodborne illnesses result in 1–5 days of sickness. However, in more vulnerable people such as young children the recovery can be prolonged. Similarly, because children are much smaller than adults, the consequences of food poisoning in a child can be far more serious than that in an adult. Children may increase the spread of foodborne illness by acting as carriers of the disease.

Other food safety issues such as food contaminated with foreign material, pesticide residues, additives, and chemical contaminants have a high public profile, but pose a low risk compared with foodborne illness.

Prevalence

Obesity

To date, little research has been conducted on the dietary intake and nutritional status of New Zealand children and the prevalence of childhood obesity in New Zealand has not been clearly established (Figures 6.1 and 6.2 show the normal growth patterns of New Zealand 0–5-year-olds). The body size of Pacific children is known to be greater in comparison to international growth data. New Polynesian growth charts need to be developed that allow accurate determination of overweight and obesity for the specific population (Salesa et al 1997).

Using an adult cut off point of BMI greater than 25 (usually reserved for adults over 18 years of age), the Dunedin Multidisciplinary Health and Development Study determined that 7.5 percent of 15-year-old girls and 4.6 percent of 15-year-old boys were overweight or obese (Worsley et al 1990).

Food security

There is considerable anecdotal evidence that New Zealand families, and in particular children, are experiencing a lack of food security. One indicator is the increase in the availability and use of foodbanks. Between 1990 and 1993, the number of Salvation Army foodbanks operating in New Zealand increased ten-fold (Gunby 1996). A 1995 study of foodbank clients found that most were families with children. Two in every three of these families were single-parent families. Half of the total number of people receiving food parcels were children under the age of 15 years (Young 1995).

In New Zealand, it has been estimated that between 14 and 46 percent of single-parent households are considered to be below the poverty line when income is used as the measure of poverty. The incidence of poverty was highest in households with children, especially those households containing several children (Stephens et al 1995).

A study of the food-related needs of 108 South Auckland families found that over half reported having insufficient food (Turner et al 1992). Of this group, 72 percent reported missing meals due to lack of food or money.

A recent national school study conducted by the Food and Nutrition Consultancy Service showed that over 20,000 New Zealand school children are perceived by their teachers to be inadequately fed during the school day (Food and Nutrition Consultancy Services 1995). Children from regions with a higher proportion of Māori and Pacific children and children from large inner city schools were most likely to be rated as inadequately fed. Thirty-eight percent of all schools (850 schools) provided free food and/or beverages for their students. A further 7 percent of schools did not provide free food but perceived a need to do so.

Iron status

A number of New Zealand surveys conducted in the 1960s found a high frequency of IDA in infants and children (Reeves 1968; Akel et al 1963; Neave et al 1963). ID was more prevalent and severe among Māori infants and children. Reported rates of IDA at six months ranged from 58 percent to 75 percent in Māori infants, compared with 29 percent in European infants (Akel et al 1963; Neave et al 1963).

More recent epidemiological studies indicate that ID remains a problem (Moyes et al 1990; Poppe 1993; Crampton et al 1994). However, the methodology of many of these studies is questionable. They were carried out on children at the time of admission to hospital and, as a consequence, their results are likely to be confounded by the effects of acute infection on haemoglobin and serum ferritin levels.

The only community-based study of ID in an ethnically-mixed New Zealand paediatric population in the past 15 years was conducted in 1991–92 in a low socioeconomic population living in Porirua (Crampton et al 1994). This was a small, opportunistic sample of children aged 6–36 months and iron deficiency was demonstrated in 24 percent of these children.

In a national school-based study of 13–15-year-olds, more girls (37 percent) than boys (14 percent) were found to have an iron intake below 70 percent of the recommended daily intake (Brinsdon et al 1993). In a similar study of 10- and 11-year-olds, boys were found to have a significantly higher

intake of iron than girls. Four percent of boys and 7 percent of girls had an iron intake below 70 percent of the recommended dietary intake (RDI) (Brinsdon et al 1992).

In a study of third and fourth form girls in Dunedin and Otago, a small number of participants were found to be iron deficient (10 percent had ferritin <12 µg/l and 6 percent <10 µg/l). Only 3 percent were found to have IDA (haemoglobin <120 g/l). There was no significant difference in iron intake between those with low and normal serum ferritin levels (Skeaff 1994).

Calcium

Calcium intake in the New Zealand diet

Calcium is not widely distributed in the commonly available food groups. As a result, compared to other nutrients, it can be more difficult for people to ensure an adequate dietary intake of calcium. Milk and milk-based foods are the major sources of calcium in the New Zealand diet. These contribute as much as 70 percent of dietary calcium for children (Department of Community Services and Health 1989).

Sardines are also a good source of calcium and smaller amounts of calcium are found in eggs, green leafy vegetables, legumes, nuts, and wholegrains. However, the bioavailability of calcium from dairy products is significantly higher than from these other sources (Williams 1989; Whitney et al 1990).

In a New Zealand dietary study, 45 percent of girls and 30 percent of boys aged 10–11 years had calcium intakes that fell below 70 percent of the recommended dietary intake (note; the calcium RDI for girls is higher than that for boys). The girls consumed less calcium-rich foods than the boys (Brinsdon et al 1992).

In a similar study of New Zealand girls and boys aged 13–15 years, 55 percent of boys and 59 percent of girls had a calcium intake below 70 percent of the RDI (Brinsdon et al 1993).

Food safety

The notifiable disease system collects some information on the national incidence of foodborne illness. Virtually all cases reported in New Zealand are cases diagnosed and reported by doctors. Not all transmission of food poisoning organisms are foodborne, as many agents may be spread by drinking water and direct personal contact with other cases or infected animals.

The most frequently notified foodborne illnesses are those due to *Campylobacter* and *Salmonella* species. There were 2044 cases of campylobacteriosis among children aged under 15 years in 1997 (Y Galloway, personal communication, June 1998). In 1997, there were 485 notified cases of salmonellosis among children (Y Galloway, personal communication, June 1998). The number of notified salmonellosis cases has had a slow rise over the past twenty years. Notifications suggest preschool children are most frequently affected by both diseases. However, the higher number of notifications for preschool children may also reflect the fact that these children are more likely to come to the attention of health professionals than are older children or adults with foodborne illness.

Listeriosis notifications are more rare than other foodborne diseases notified in New Zealand, but they have increased each year for the past 10 years. The notifications for listeriosis between 1990 and 1996 numbered 100 (M Baker, personal communication, January 1998). In the first seven months of 1997, listeriosis resulted in the deaths of five unborn New Zealand children (M Clements, personal communication, 4 December 1997).

Limited data are available on *Yersinia* and *Escherichia coli*. However, a system of voluntary notifications of *Yersinia* showed that the notified incidence exceeded that of *Campylobacte*r cases in Hawke's Bay (W Littlely, personal communication, 28 June 1994). In a six-month study in Auckland the reverse was found, *Yersinia* notifications being approximately twelve times fewer than *Campylobacter* (G Simmons, personal communication, 8 January 1998).

The two major types of protozoan illness are giardiasis and cryptosporidiosis. Both became notofiable in mid-1996. Large waterborne and foodborne outbreaks of these diseases have been reported overseas.

Viral outbreak data suggest that a foodborne viral disease is a significant concern in New Zealand. Probable and confirmed cases of viral outbreak cases total 262 from July 1996 to June 1997, compared with 212 probable and confirmed bacterial outbreak cases (Lake 1997).

Notifications do not reveal the true incidence of foodborne illness. It has been estimated that only 10–25 percent of foodborne infections are reported through statutory and voluntary laboratory reports (Thacker et al 1983).

In comparison to the larger notifications for foodborne diseases, food contaminated with foreign material (glass) ranged between 57–70 cases in the years 1994–96 (P Roberts, personal communication, 8 January 1998). Eight probable and confirmed cases from a food outbreak of chemical poisoning occurred from July 1996 to June 1997 (Lake 1997).

International comparisons

Obesity

Two recent overseas studies have determined the prevalence of obesity in Australian children. In a representative sample of 1543 children aged six to 11 years, 7.4 percent of males and 5.7 percent of females had BMIs above the 95th percentile. A larger proportion of males (16.8 percent) than females (11.4 percent) had BMIs above the 90th percentile. When these results were compared with those of a similar 1985 survey, the prevalence of obesity had increased for Australian boys but not for Australian girls (Wilcken et al 1996). A prospective study of 213 adolescents aged 14–15 years showed 21 percent of males and 18 percent of females had BMIs greater than the 90th percentile (Tienboon et al 1994).

In the United States, the prevalence of childhood obesity has remained at about 15 percent for 2–19-year-olds from 1963–80 (with obesity assessed as being at or above the 85th percentile of the BMI). However, a definite upward trend has been identified in the proportion of children who are most overweight (greater than 95th percentile). In addition, triceps skinfold values are increasing, reflecting an increase in obesity for this group (Kuczmarski 1993).

Food security

While some developed countries now recognise the need to collect data on food insecurity, debate continues over the best ways to collect information on this issue. To date, most information on food insecurity has been collected on adult populations. Data collected on children that may be indicative of food insecurity include measures of iron deficiency and malnutrition.

Iron status

In North America the prevalence of ID in low-income families declined from 7.8 percent in 1975 to 2.9 percent in 1985 (Anon 1986). Data from the third National Health and Nutrition Examination Survey 1988–94 shows that for American children aged one to two years the prevalence of ID was nine percent and for IDA the prevalence was 3 percent. In children aged 3 to 11 years the prevalence of IDA declined to less than 1 percent. ID and IDA are not common in adolescent boys aged 12–15 years (less than 1 percent), yet adolescent girls aged 12–15 years had an ID prevalence of 9 percent, and a further 2 percent had IDA (Looker et al 1997).

The United Kingdom national diet and nutrition survey found that 6 percent of children aged between 2.5 and 3.5 years were anaemic (Gregory et al 1995).

The 1985 Australian National Dietary Survey of Schoolchildren showed iron deficiency was uncommon among 15-year-old boys, and 9- and 12-year-old girls and boys. However, amongst 15-year-old girls, 20 percent had low serum ferritin levels (less than 12 μg/l), indicating iron deficiency (English and Bennet 1990). Unfortunately, the 1995/96 Australian National Dietary Survey did not collect blood samples, so iron status cannot be determined (Australian Bureau of Statistics et al 1997).

Risk and protective factors

Obesity

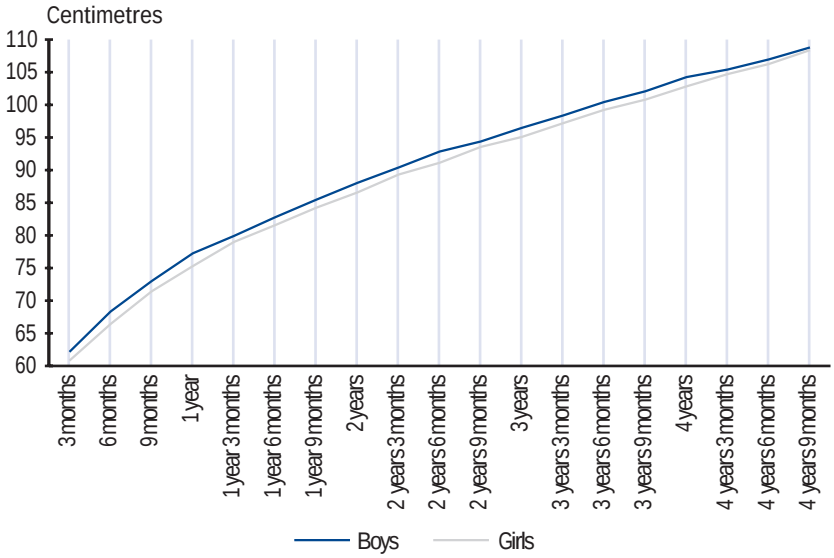
Although the exact mechanisms are unclear, a number of prenatal, genetic, familial, and environmental influences are thought to play a hand in the development of obesity.

Prenatal risk from in utero over-nutrition (or under-nutrition) may effect the hypothalmic centres responsible for food intake (Dietz 1994). In addition, third trimester and postnatal over-nutrition may protect against or promote obesity through changes to adipose cells (Ravelli et al 1976).

Genetic influence is hypothesised to be a complex multifactorial, multigenic gene-gene and gene-environment interaction. The transmission from nuclear families and adoption data suggest heritability levels for obesity of about 20–30 percent. Twin studies have yielded higher estimates of heritability, ranging from 60 to 90 percent (Bouchard and Perusse 1993). Obviously, families share more than just genes; they also share the lives of the other family members. However, it is highly likely that the genetic impact of having an obese parent increases the risk of obesity for the child. Family factors combined with genetics produce data that show that a child has an 80 percent chance of obesity if both parents are obese, and a 40 percent chance if one parent is obese. When neither parent is obese the risk of the child becoming obese reduces to 7 percent (Story and Alton

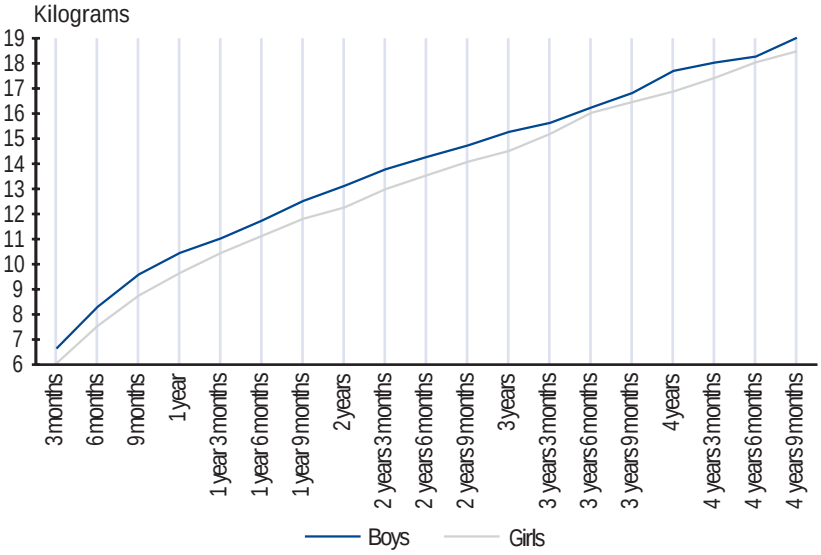
1991). Parenting styles may influence the development of food preferences and the ability of the child to regulate intake. Families serve as models that reinforce and support the acquisition and maintenance of eating and exercise behaviour (Epstein 1996). In addition, New Zealand studies indicate that adolescent food choice and nutritional intake can be influenced by a range of other factors, including parents' and children's perceptions and knowledge about the health value of different foods, taste preferences, the influence of friends, cultural and religious events, participation in sport, food advertising, the types of food available, the cost of food, and economic circumstances (Harding et al 1988; Maskill et al 1996; Fuamata et al 1996).

Figure 6.1: Normal growth patterns of New Zealand preschool boys and girls, mean height, 1989



Source of data:
Binney et al 1991. Based on a representative sample of 12,311 New Zealand children.

Figure 6.2: Normal growth patterns of New Zealand preschool boys and girls, mean weight, 1989



Source of data:
Binney et al 1991. Based on a representative sample of 12,311 New Zealand children.

Dietary intake is an obvious risk factor for obesity. Research with adults has found a strong association between obesity and the intake of dietary fat, although not total energy intake (Miller et al 1990). The same evidence exists for children (Eck et al 1992). The type of dietary fat that people consume may also be important in determining the development of insulin resistance and altering the disposition of individuals to gain fat (Maron et al 1991; Borkman et al 1993). An increased intake of carbohydrates is believed to aid weight control in adults (Astrup and Raben 1992).

Physical activity is believed to be important for weight control. Physical activity is a common complement to dietary management for avoiding weight gain or losing weight because it burns energy and maintains muscle mass. Physical activity favourably alters the distribution of body fat (United States Department of Health and Human Services 1996). Whilst physically active adults are commonly believed to be less likely to gain weight over the course of their lives, research with children is less conclusive on this question (United States Department of Health and Human Services 1996). However, extreme physical inactivity, as indicated by a single measure (the amount of television watched), has been shown to be related to child and adolescent obesity (Gortmaker et al 1990).

Food security

Studies conducted overseas have consistently found that, compared to people from higher socioeconomic status groups, people from lower socioeconomic groups are less likely to purchase foods that meet the recommendations of the national dietary guidelines (Kingsey 1994; Mooney 1990).

Lower income is associated with poorer health. Car ownership, housing tenure, education, and employment are all associated with differentials in health. All of these factors impact on the ability of parents to procure and store food for themselves and their children. In addition, many people on low incomes spend a considerable part of their disposable income on fixed living costs such as accommodation. This leaves relatively little income for spending on food (Low Income Project Team for the United Kingdom Taskforce 1996).

Iron deficiency

Infants older than six months and young children are particularly vulnerable to iron deficiency. This is because iron stores deplete during periods of rapid growth. Other contributing factors are the low iron content of many infant diets and the early use of cow's milk. A milk-based diet provides most of the energy consumed during the first year of life. Therefore, the iron content and bioavailability of various milks is one risk factor to consider for iron status. Breastfed infants and those consuming mainly iron-fortified formulas are at low risk from iron deficiency. However, those fed non-fortified formulas or cow's milk have a 30–40 percent risk of becoming iron deficient by nine months of age, dependent also on the weaning diet. This risk increases by 12 months old. Breastfed infants without adequate iron from other sources are at risk of becoming iron deficient by six months old (Akel et al 1963, Pizarro et al 1991).

Iron requirements climb at puberty. For boys, the double burden of providing iron for a larger body size and increased erythrocyte mass results in an approximate 25 percent increase in total body iron requirements in the year of peak growth. The iron need of adolescent girls is also high, particularly with the onset of menstruation. Iron requirements increase during pregnancy to a level that exceeds any stores. Pregnancy during adolescence places young women at especially high risk of iron deficiency (Yip and Dallman 1996).

Calcium

Skeletal calcium and peak bone mass (PBM)

A peak bone mass (PBM) at skeletal maturity is considered the best protection against osteoporosis and subsequent fracture risk later in life. PBM is the maximum level of bone mineral content achieved during young adulthood (MacKerras 1995). Peak bone mass is probably the result of the interaction between endogenous (heredity, endocrine) and exogenous (nutrition, physical activity) factors. Eighty percent of peak bone mass is thought to be controlled by endogenous factors and 20 percent by exogenous factors (Weaver 1994). The two strongest exogenous factors are weight-bearing exercise (walking, jogging, aerobics) and dietary calcium.

Bone is in a phase of rapid growth and remodelling from birth until about 16 years of age, with bone mass accumulation extending from puberty to the mid-30s (Ott 1990; Chan 1991). The most critical period for maximal bone mass formation is during puberty and early adolescence (7–8 percent gain/year). For females, maximal bone mass formation occurs between nine and 10 years of age, reaching maximum velocity in growth at around 12 years of age (Matkovic 1991). For boys, maximal bone mass occurs at 13 years of age (Carrie-Fassler and Bonjour 1995). Bone density at certain sites continues increasing past 17 years of age (Gilchrist 1997).

Overseas dietary surveys conducted on children have shown that during the years when an increase in calcium intake is most needed for PBM development, the consumption of milk decreases significantly. The trend seems to be a movement away from drinking milk to drinking increased levels of soft drinks and cordial. Concern that increasing the consumption of milk will lead to an increase in the dietary intake of fat need not be warranted, as there is a wide range of low-fat milks available on the market. New Zealand research has shown that supplementation with dairy products in 15-year-old girls for two years significantly increased bone density, yet weight, total body fat or blood cholesterol levels for the supplemented group did not differ from the control group (Gilchrist 1997).

Calcium absorption and excretion

Absorption of calcium may not be sufficient at times of high requirements and its bioavailability from the diet is variable. Calcium is also continuously excreted in urine, faeces and sweat as an obligatory loss.

The major determinants of calcium absorption are the amount of calcium in the diet and the vitamin D status of the individual (Peacock 1991). The presence of lactose in a meal also appears to enhance calcium absorption (Williams 1989; Renner 1994). It is assumed that since most New Zealand children spend plenty of time out of doors, even in winter, vitamin D status is likely to be adequate. Encouraging regular exercise and play is also important for bone mineralisation.

Several dietary factors affect the bioavailability of calcium. Some foods that contain fibre, oxalic acid (present in spinach) and phytic acid (present in wheat bran) inhibit calcium absorption by combining with calcium and forming insoluble complexes which cannot be absorbed by the body (Williams 1989; Renner 1994). Milk contains no inhibitory factors. The calcium absorption rate of non-fortified soy milk can be reduced by up to 20 percent, compared with cow's milk, due to the presence of phytate (Renner 1994).

The dietary calcium:phosphorus ratio is an important factor in calcium bioavailability. A 16:1 ratio appears to be sufficient to achieve a positive calcium balance. Dairy foods have a 36:1 ratio and, therefore, calcium retention is strongly favoured by consuming products containing milk (Heaney 1993).

The obligatory calcium loss in urine can also be affected by diet. Increased dietary intakes of sodium and protein elevate urinary calcium excretion (Truswell et al 1990; Heaney 1993). However, no study has proven conclusively that high intakes of either sodium or protein have a detrimental effect on bone mass during growth (Carrie-Fassler and Bonjour 1995). Sodium intakes should be kept to a minimum by avoiding salty snacks and reducing salt used in food preparation (Goulding 1990). Increased urinary calcium excretion occurs when protein levels are high and phosphate intake is low. If phosphate intake increases with protein intake, there is a minimal effect on calcium absorption (Chan 1991). Excess dietary fat inhibits calcium absorption by forming an insoluble calcium salt. Excess dietary calcium remains unabsorbed by the body and is excreted in the faeces (Williams 1989).

Food safety

Most raw foods are naturally contaminated with bacteria. Each step between harvesting and the consumer introduces the possibility of further contamination or growth of the naturally occurring bacteria. Food manufacturers, processors, wholesalers, transporters, and retailers all contribute to food safety, and they must have processes in place to reduce and eliminate the risks from these bacteria.

Prevention of foodborne illness depends on education of food handlers in appropriate methods of preparing, cooking and storing food, and in personal hygiene. The World Health Organization has developed 'Ten Golden Rules for Safe Food Preparation'(Benenson 1995), as follows:

1. Choose foods processed for safety.
2. Cook food thoroughly.
3. Eat cooked foods immediately.
4. Store cooked foods carefully.
5. Reheat cooked foods thoroughly.
6. Avoid contact between raw food and cooked food.
7. Wash hands repeatedly.
8. Keep all kitchen surfaces meticulously clean.
9. Protect food from insects, rodents and other animals.
10. Use safe water.

Food prepared in the home is subject to the same risks for foodborne illness as that prepared by food services. In a community survey of Canterbury adults, 20 percent of the sample lacked basic safe food handling knowledge (Hodges 1993). Similar inadequacies were found in an Auckland Healthcare survey of adults covering basic safe food-handling knowledge (Greg Simmons, personal communication, 8 January 1998).

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Chapter 7

Tobacco

Key points

- Tobacco smoke damages children's health when:
  - pregnant women smoke
  - children are exposed to environmental tobacco smoke (passive smoking)
  - children themselves become regular or committed smokers.
- About a third of New Zealand women smoke when they are pregnant. Smoking during pregnancy is especially common among Māori women, single women, teenage girls and women with lower educational levels.
- Children from less-advantaged backgrounds are more likely to be exposed to cigarette smoke in the home.
- Assessments by the Dunedin Multidisciplinary Health and Development Study in the 1980s found that about a third of children had tried cigarettes by age 11.
- The same study found that more than 80 percent of 15-year-olds had tried cigarettes. Eighteen percent of 15-year-old girls and 11 percent of 15-year-old boys were daily smokers.
- A nationwide survey in 1992 found that two-thirds of fourth form children (aged 14–15 years) had tried smoking and 12 percent smoked every day.
- Māori fourth formers were more likely than European and Pacific fourth formers to be current smokers.
- Smoking was especially common among fourth form Māori girls. Forty-five percent were current smokers. One in three smoked daily.
- As teenagers grow older, an increasing proportion become committed smokers. In 1996, over 30 percent of 20–24-year-olds were smokers.
- Certain groups of younger teenagers, such as Māori females, are continuing to take up smoking and become committed smokers at rates well above those of their peers.

Introduction

Tobacco smoke can damage the health of children in a number of ways. If a mother smokes during pregnancy, this increases the risk of her unborn child having a low birthweight (Haste et al 1990) or dying from sudden infant death syndrome (SIDS). It also increases the risk of miscarriage.

The health of children is also compromised by exposure to environmental tobacco smoke (passive smoking). If children live in a house with people who smoke, they are more likely to inhale tobacco smoke passively. This increases the risk of SIDS (Scragg et al 1993; Mitchell et al 1993). Environmental tobacco smoke increases the childhood risk of croup, pneumonia, bronchitis and bronchiolitis by 60 percent in the first 18 months of life, increases the risk of asthma by 50 percent, and is a cause of glue ear (NHMRC Working Party 1995). Other studies have found passive smoking associated with an increase in night cough and nasal symptoms, asthma and other symptoms of airflow limitation in children aged 8–13 years (Moyes et al 1995; Shaw et al 1994; Sherrill et al 1992). Glue ear is also more likely to occur in children exposed to environmental tobacco smoke (PHC 1995).

A child's health can also be compromised if they themselves smoke. This is especially likely if the child becomes a committed or addicted smoker and continues to smoke into adulthood (WHO 1997). Numerous studies have identified the wide range of diseases and conditions caused or exacerbated by smoking. These include: cancers (especially lung cancer), heart disease, chronic bronchitis and stroke, and, for women, cervical cancer and other diseases of the reproductive system (United States Department of Health and Human Services 1988; Amos 1996).

Prevalence

Smoking during pregnancy

A national study of New Zealand mothers and their children in 1990/91 found that 33 percent of mothers had smoked during pregnancy (Alison et al 1993). Especially high rates of smoking during pregnancy (over 60 percent) were found in teenage mothers, Māori women (68 percent), single women and women with lower educational levels.

A Christchurch study conducted in 1993/94 found an identical proportion of women who smoked during pregnancy (33 percent) (Tappin et al 1996). The study used blood cotinine (a metabolite of nicotine, indicative of recent tobacco consumption) to confirm smoking status. Research suggests that up to a quarter of New Zealand women who smoke during pregnancy may not record this fact when asked in self-completed surveys (Ford et al 1997).

Exposure to environmental tobacco smoke

In the Dunedin Multidisciplinary Health and Development Study, 38 percent of mothers and 43 percent of fathers were smokers (Stanton and Silva 1993). Fathers were more likely than mothers to be ex-smokers.

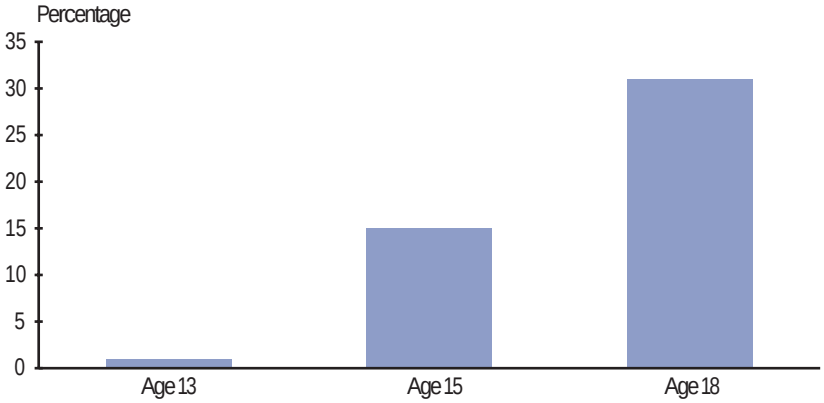
Children from disadvantaged backgrounds are more likely to be exposed to cigarette smoke in the home. A study conducted in a lower-socioeconomic suburb of Christchurch found that 44 percent of the children living there were exposed to passive smoking, compared to an overall rate of 29 percent for all children living in the city (Wilkie et al 1995).

Children who smoke

Assessments by the Dunedin Multidisciplinary Health and Development Study in the 1980s found that about a third of children had tried cigarettes by 11 years of age (McGee and Stanton 1993). By 13 years of age, 10 percent of boys and 9 percent of girls in the study had smoked in the last month, rising to 21 percent and 33 percent respectively by age 15 (Stanton 1996). More than 80 percent of 15-year-olds had tried cigarettes at some time (Stanton et al 1989).

In the Dunedin study, daily cigarette smoking started to become increasingly prevalent as young people approached 14–15 years of age. Only 1 percent of the 13-year-olds reported daily cigarette smoking when assessed in 1985. Two years later, at 15 years of age, 18 percent of girls and 11 percent of boys indicated they usually smoked every day (15 percent of the sample as a whole) (Stanton 1996).

Figure 7.1: Proportion of young people in the Dunedin Multidisciplinary Health and Development Study who were daily smokers at age 13, 15 and 18 years

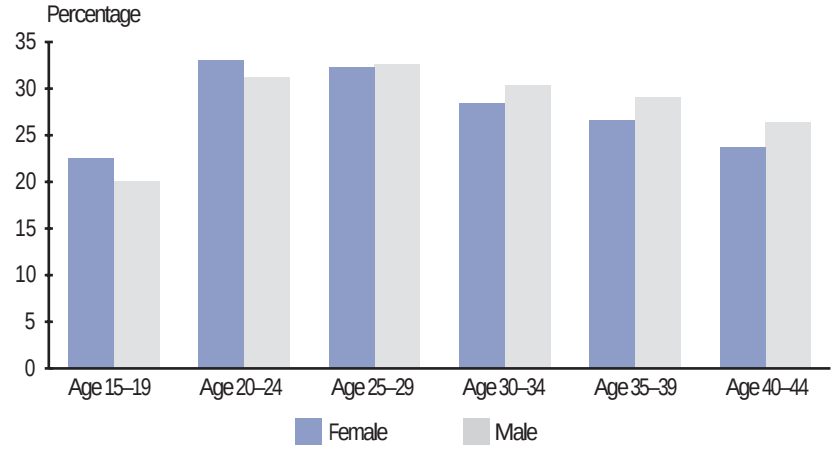


Source of data:
Dunedin Multidisciplinary Health and Development Study (Stanton 1996).

Generally, similar rates of smoking were found in a more recent 1992 national survey of 14,000 fourth form children aged 14–15 years (Ford et al 1995). Twelve percent of these children smoked every day. Two-thirds (66 percent) had tried smoking. A third (34 percent) had never smoked.

Results from the 1996 Census of Population and Dwellings (Statistics New Zealand 1997) indicate that as young people reach their late teens an increasing proportion become committed smokers, with over 30 percent of 20–24-year-olds being current smokers (Figure 7.2).

Figure 7.2: Current smokers, by age and sex, 1996

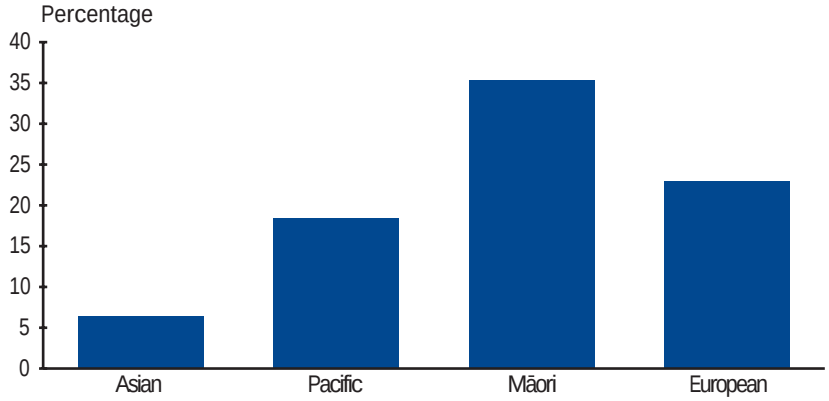


Source of data:
Statistics New Zealand, 1996 Census of Population and Dwellings.
Note:
Excludes ex-smokers and those who never smoked regularly.

The 1992 national fourth form study also confirmed that children's smoking status varies markedly by sex and ethnic group. In 1992, girls were more likely than boys to be current smokers, although overall the boys who smoked were more likely than the girls who smoked to smoke daily and to be heavier smokers (that is, smoke more than 21 cigarettes per week).

Māori were more likely than European and Pacific students to be current smokers (Figure 7.3). Māori girls were most likely to be current smokers (45 percent), with 33 percent reporting that they were daily smokers. These ethnic disparities in early adolescent smoking prevalence are similar to those found in the New Zealand adult population, suggesting that these differences become established quite early in the teenage years.

Figure 7.3: Proportion of New Zealand Form Four students 14–15 years old who are current smokers, by ethnic group



Source of data:
Ford et al 1995.
Note:
'Current smoker' defined as smoking more than one cigarette per month.

Changes over time

Smoking in pregnancy

Nelson et al (1995) examined the relationship between income and levels of smoking in Christchurch women of childbearing age (15–40 years) in selected years from 1976 to 1992. While the study identified an overall decline in the proportion of women who smoked, this was largely because of reduced smoking by women in the higher income bracket. Smoking rates among women in the lowest income groups remained high, with 37–40 percent being current smokers.

Although there are signs that the percentage of pregnant Māori women who smoke has declined in the period 1991–96, interpretation of this trend is complicated by differences in the way statistics on smoking in pregnancy are collected (Ministry of Health 1997).

Children who are smokers

Since the mid 1970s, girls under 15 years of age have been more likely to be smokers than boys of the same age. They have also been less likely than boys to quit smoking (Ford et al 1995).

There are indications that in the early 1990s, compared to the 1970s and 1980s, probably a lower proportion of New Zealand young people under 16 years of age were daily smokers (McGee et al 1995; Stanton et al 1989). This is in keeping with the broader decline in smoking prevalence evident in New Zealand over the last 20 years.[1]

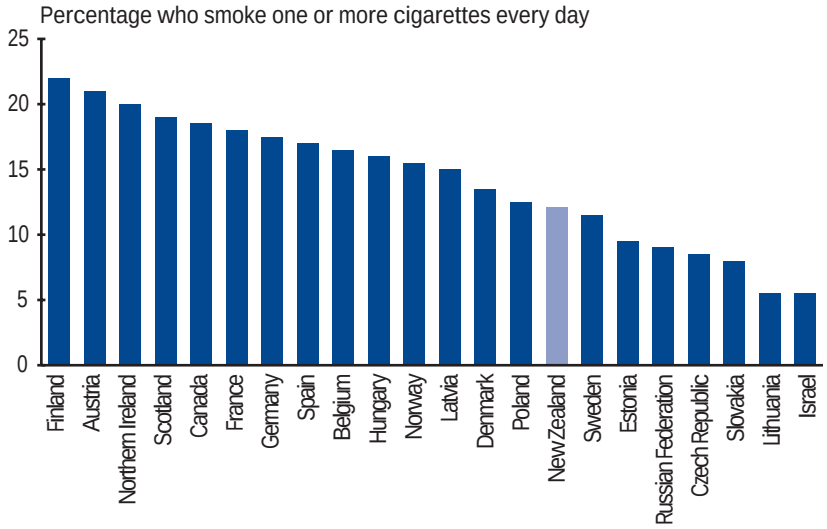
Having said this, recent evidence from a study of Wellington high school students suggests that the proportion of fourth formers who smoke daily may have increased between 1991 and 1997, with certain groups, such as Māori females, continuing to take up smoking and becoming regular smokers at rates well above those of their peers (Bandaranayake and McCool 1997).

International comparisons

The rate of daily smoking among New Zealand fourth form students (14–15-year-olds) is in the mid-range when compared to rates for 15-year-olds from other developed countries (UNICEF 1996; Ford et al 1995) (Figure 7.4). However, the rate of daily smoking among Form Four Māori females is very high when considered in this context.

1 In 1976, 35 percent of males and 32 percent of females over the age of 15 were smokers (Ministry of Health 1995). By contrast, latest New Zealand Census figures indicate that 25 percent of males and 23 percent of females over the age of 15 years were smokers in 1996 (Statistics New Zealand 1997).

Figure 7.4: Rates of daily smoking by 15-year-olds in selected countries



Source of data for all countries except New Zealand:
WHO Europe 1993–1994 survey on health behaviours in school-aged (15-year-old) children (UNICEF 1996).
Source of data for New Zealand:
Ford et al (1995). Sample comprised 37 percent 14-year-olds and 63 percent 15-year-olds surveyed in November 1992.
Note:
In 1987, 15 percent of Dunedin 15-year-olds were daily smokers (Stanton et al 1989). In 1997,14 percent of Wellington Fourth Form students (mainly aged 14–15 years) were daily smokers (Bandaranayake and McCool 1997).

In other developed countries, as in New Zealand, teenage girls are taking up smoking at higher rates than teenage boys. As well, especially in countries where smoking rates in the adult population are declining overall, smoking is now increasingly associated with socioeconomic disadvantage (Amos 1996; WHO 1997).

Risk and protective factors

Smoking during pregnancy

Similar to smokers generally, women who smoke while pregnant tend to be younger, have fewer educational qualifications and be socioeconomically disadvantaged (Nelson et al 1995). In a Christchurch study of pregnant women in 1993-94, rates of smoking in pregnancy were found to be as low as 11 percent in socioeconomically advantaged areas and as high as 57 percent in socioeconomically disadvantaged areas (Tappin et al 1996). Women who smoked in pregnancy were also more likely to be unemployed, Māori, have a lower average income and work in manual and more elementary occupations.

It is unclear precisely why women living in relatively disadvantaged socioeconomic circumstances are more likely to become regular or addicted smokers, and smoke when they are pregnant. Complex social and individual factors may be operating that make smoking more attractive to women from these backgrounds (WHO 1997). Overseas studies suggest that young women who feel they do not have a lot of control over their life use smoking to build self-confidence (Amos 1996).

Environmental tobacco smoke

Again, as with smoking in pregnancy, a number of social and family factors have been found to be associated with an increased likelihood that parents of young children will be smokers. In the Dunedin Multidisciplinary Child Development Study, mothers who smoked were more likely than those who did not to have fewer educational qualifications, change residence relatively frequently, be young, and be assessed as being under stress (Stanton and Silva 1993).

Smoking in childhood

The nine-year-olds in the Dunedin study who experimented with cigarettes were more likely than the non-experimenters to have one or both parents who smoked, as well as one or more friends who smoked. They were also less likely to be doing well at school, especially in mathematics (Oei et al 1986).

The probability that children will start to smoking regularly by age 15 years increases if they are female, have smoked a cigarette by 11 years of age and come from a disadvantaged background (McGee and Stanton 1993). Children may be less likely to become smokers if they have strong beliefs that smoking is distasteful or objectionable, and their parents oppose cigarette smoking (McGee and Stanton 1993; Stanton and Silva 1991).

The previously described national survey of fourth form children identified three modifiable risk factors estimated to account for 36 percent of the smoking prevalence in the group. These were: parental smoking, a poor knowledge of the adverse health effects of smoking and a preference for watching televised sports (Ford et al 1995). After adjusting the research results for sex, age and ethnicity, children in the study who had two parents who smoked were 75 percent more likely to be current smokers.

Other New Zealand studies highlight the importance of peer group influences. The Christchurch Health and Development Study found that teenagers who experimented with smoking early in life were more likely than non-experimenting teenagers to have groups of friends who smoked. These friends tended to reinforce the young person's commitment to smoking (Fergusson and Horwood 1995). The Dunedin Multidisciplinary Health and Development Study mentioned earlier concluded that parental influences were important for shaping children's decisions to start smoking. However, peer influences were more important for determining which children carried on smoking through the early teenage years (Stanton and Silva 1991).

Broader environmental factors thought to play a part in influencing young people's smoking patterns include illegal sales of cigarettes to underage children (Ford 1997), the price of cigarettes, advertising and media images, and the availability of tobacco health education and smoking cessation programmes (Amos 1996; McGee et al 1995; Whitlock et al 1997).

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Chapter 8

Alcohol, Cannabis and Other Substances

Key points

Alcohol

- Studies suggest that most New Zealand children have their first taste or sip of alcohol between the ages of six and 10 years.
- On average, children have their first full drink of alcohol at about 12 or 13 years of age.
- In the Christchurch Health and Development Study, 7 percent of young people were drinking alcohol at least once a week by age 15. Around a quarter of 15-year-olds did not drink alcohol and another quarter drank only once or twice a year. Twelve percent of 15-year-olds reported drinking more than the equivalent of three standard-sized bottles of beer at their last big drinking session. About 5 percent met criteria for alcohol abuse.
- In the same study, young people who, compared to their peers, drank more frequently, or regularly consumed high amounts of alcohol in a drinking session, or had more alcohol-related problems, were more likely to:
  - drink with their peers in venues away from their family and parents
  - have their own money to spend
  - come from lower socioeconomic status families
  - have their first drink of alcohol before 13 years of age
  - use other substances like tobacco and cannabis
  - be sexually active at a relatively early age (that is, by age 15 years)
  - engage in unprotected sexual intercourse
  - experience episodes of depression
  - have contact with the police.

Cannabis

- In the Dunedin Multidisciplinary Health and Development Study in 1985, about one in a hundred 13-year-olds reported using cannabis.
- By age 15 years, between 10 and 15 percent of children in the study had used cannabis at least once.
- Of the 15-year-olds in the Christchurch Health and Development Study who had tried cannabis, 23 percent had used it on more than 10 occasions. Ten percent had used it at school.
- Cannabis use becomes increasingly prevalent as young people approach the middle and late teenage years. At age 15 years, over half the cannabis users in the Christchurch study said they would definitely or probably use cannabis again.
- Young people in the Christchurch study with higher cannabis use at age 16 were more likely than their low cannabis using counterparts to come from socially disadvantaged backgrounds. They were also more likely to have been exposed to family adversities during childhood. In addition, they were more likely to have formed affiliations with delinquent or substance-using peers by 16 years of age and to report poorer parental attachment and social adjustment difficulties.
- Cannabis use before age 16 is associated with later problems in adolescence such as juvenile offending, mental health disorders, leaving high school without qualifications and unemployment. The Christchurch study concluded that these adolescent problems mainly arise because of earlier childhood social and behavioural factors. However, cannabis use in the early teenage years could exacerbate the negative impact of these factors.

Other substances

- There is little reliable information available on young New Zealanders' use of other psychoactive substances.
- In the Dunedin Multidisciplinary Health and Development Study, 5.8 percent of 15 year-old girls and 3.2 percent of 15 year-old boys had used inhalants (petrol, glue) in the last 12 months. 2.6 percent of girls and 3.4 percent of boys had tried other drug substances such as opiates or cocaine.

Introduction

Alcohol

Alcohol use can increase young people's risk of experiencing a range of health and social problems (Maskill 1991). In infants and young children, alcohol consumption can lead to serious adverse effects including hypoglycaemic brain injury. For all age groups, alcohol intoxication can increase the risk of death or injury while undertaking technically demanding or hazardous activities such as swimming, boating or operating heavy machinery. Consuming very large amounts of alcohol in a single drinking session can be highly toxic and, in some cases, fatal. Other hazards include those linked to alcohol's function as a disinhibitor, with drinking triggering the expression of ideas, emotions or behaviours that in other situations would be concealed. The negative health consequences of this disinhibition can include the physical and psychological results of unprotected sexual intercourse (unwanted pregnancies, sexually transmitted diseases) or violence. Finally, because alcohol is often used to help generate feelings of conviviality, euphoria and wellbeing, it has the potential to produce dependence or addiction in vulnerable individuals.

The health of children can also be significantly affected by adult alcohol misuse. One example is the injuries to children caused by alcohol-impaired motor vehicle drivers. Another is the foetal alcohol syndrome. This occurs when pregnant women drink heavily and damage the development of their unborn child. Sixty-three children under 10 years of age were reported to be under paediatric care for foetal alcohol syndrome in New Zealand in 1993. This figure is considered to be an under-estimate (Leversha and Marks 1995).

Children's early social development may also be compromised by prolonged exposure to home environments where a parent has a serious alcohol problem. In the Dunedin Multidisciplinary Child Development Study, 35 percent of nine-year-olds with a parent with severe alcohol problems were rated by their teacher as showing high levels of classroom behaviour problems, compared to 12 percent of the nine-year-olds whose parents did not have severe alcohol problems (Connolly et al 1993).

Cannabis

Cannabis is thought to produce psychological dependence when taken in large daily doses over an extended period of weeks or months. Although the long-term effects are not yet fully understood, inhaled cannabis smoke is probably injurious to the lungs in much the same way as tobacco. A source of concern is its regular use by children and teenagers. Cannabis intoxication can alter thinking and interfere with young people's learning (Ministry of Health 1997).

Other substances

Apart from alcohol, tobacco and cannabis, five other types of psychoactive substances are used in New Zealand for recreational or non-medical purposes (Black and Casswell 1993; Chetwynd 1997). These are the opioids (such as, heroin, morphine), sedative-hypnotics (for example, barbiturates such as sleeping pills, minor tranquillisers such as diazepam), stimulants (for example, cocaine, amphetamines), hallucinogens (for example, LSD) and inhalants (for example, glue, petrol, aerosols).

The use of these psychoactive substances can be hazardous to health in many ways. In the short term, because they alter body chemistry, they can impair a person's ability to think or react properly when driving or working with other dangerous machinery or equipment. Taking toxic levels of a drug, or using drugs that have impurities in them, can damage vital organs and, in some instances, lead to coma or death. Injecting drugs increases the risk of transmission of the human immunodeficiency virus (HIV) and hepatitis B and C if equipment is shared. Prolonged daily use of drugs such as cocaine and amphetamines can produce psychotic symptoms similar to those of schizophrenia. Many drugs, especially if used regularly over a long period, produce a physiological addiction. Users can experience quite severe and disabling withdrawal symptoms when the drug is suddenly no longer available. The desire or craving to experience a drug's effects, or to avoid the sensations of psychological or physiological withdrawal, can also lead some drug users to engage in theft or prostitution to obtain the money to buy expensive illicit drugs. Criminal prosecutions, whether for possessing drugs or for the criminal behaviours associated with obtaining money for drugs, can lead to imprisonment, unemployment and ostracism by family and friends.

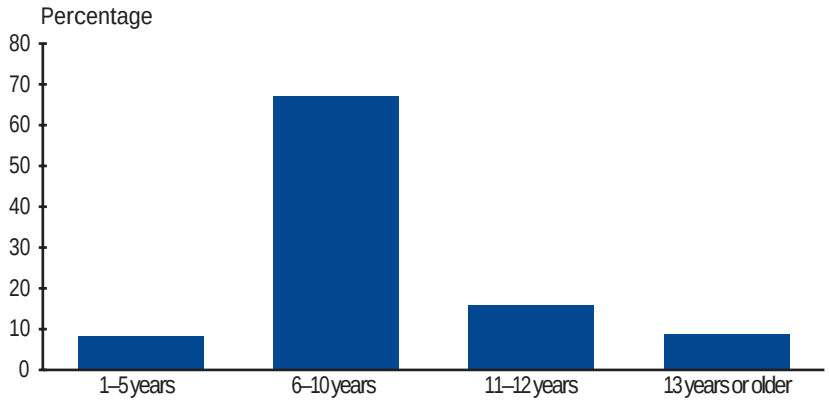
Prevalence

Alcohol

First tastes of alcohol in early and middle childhood

Most children in the Dunedin Multidisciplinary Health and Development Study remembered having their first taste of alcohol when they were about seven years old (Casswell 1996). This was typically a sip of alcohol given to them at home by their father. The Christchurch Health and Development Study identified similar trends, with most children saying they received their first drink of alcohol sometime between the ages of six and 10 years. It was uncommon for children in the Christchurch study to have their first drink either before six years of age or after 12 years of age (Fergusson et al 1994b).

Figure 8.1: Age when Christchurch 15-year-olds had their first sip or drink of alcohol



Source of data:
Christchurch Health and Development Study, Fergusson et al 1994b.

When assessed in 1981 at age nine, over 90 percent of the children in the Dunedin study had tasted alcohol. Again, this was usually only a sip taken from someone else's glass (Casswell 1996). One in four of the nine-year-olds (25 percent) said they received a sip or their own glass of alcohol about once every month. Just over one in 20 (6 percent) said they had a drink of alcohol every week.

More recent surveys have asked young people to identify when they had their first full glass of alcohol, rather than their first sip or taste. Findings suggest that the average age when New Zealand children have their first full drink of alcohol is likely to be about 12–13 years old (Business Research Centre 1997; Children's Research Unit 1994).

Drinking frequency

In assessments completed in 1992, the Christchurch Health and Development Study found that most 15-year-olds (73 percent) had consumed alcohol either very rarely (none or 1–2 occasions in the last year) or infrequently (more than 1–2 occasions in the last year but less than once a month). A smaller group, 7 percent, reported having a drink of alcohol at least once every week over the past year (Fergusson et al 1994a).

Table 8.1: Number of drinking occasions experienced by Christchurch 15-year-olds in the previous year

Occasions	*Number*	*Percent*
None	274	28.4
1–2 occasions	231	23.9
Less than one a month	197	20.4
At least one a month	198	20.5
At least one a week	65	6.7

Source:
Christchurch Health and Development Study, Fergusson et al 1994a.

In a 1992 study of patterns of alcohol consumption in a sample of 4662 Auckland people, 76 percent of 14–15-year-old boys and 61 percent of 14–15-year-old girls reported drinking alcohol in the last 12 months. In the 18–19 year age group, a much higher proportion of respondents – over 90 percent of males and over 80 percent of females – were drinkers (Wyllie et al 1993).

More recent surveys in Auckland suggest that the proportion of teenagers who drink has declined in the three years from 1994 to 1996, with over 80 percent of 14–19-year-olds drinking alcohol in 1994 but only about 66 percent doing so in 1996. However, these studies also found that the 14–19-year-olds who were drinkers in 1996 were consuming greater quantities of absolute alcohol during a typical drinking occasion than the 14–19-year-olds who were drinkers in 1994. In addition, the 14–19-year-old drinkers in 1996 were more likely to report a greater number of occasions when they felt drunk and a greater number of problems associated with their own drinking (Alcohol and Public Health Research Unit 1998).

Amounts consumed at drinking sessions

Fifteen-year-olds in the Dunedin Multidisciplinary Health and Development Study reported consuming the equivalent of about two to three cans of beer on average in each drinking session (Casswell 1996).

When asked to identify the largest amount of alcohol they had consumed at any drinking session in the last three months, 12 percent of the 15-year-olds in the Christchurch Health and Development Study who were drinkers recalled drinking more than 90 millilitres of pure alcohol – the equivalent of three standard-sized bottles of beer (Fergusson et al 1994a).

In the period from age nine to age 15, boys in the Dunedin study usually consumed much the same amounts of alcohol as the girls during a drinking occasion. It was not until 16 years of age that boys started drinking markedly larger amounts of alcohol than girls (Casswell 1996). In addition, 68 percent of the 15-year-olds in the Dunedin study thought they would definitely or probably get drunk in the future.

Survey data from Auckland in 1992 confirms that 16 is the age when boys generally begin to consume significantly larger quantities of alcohol during a typical drinking occasion. The greatest volumes of alcohol per typical drinking occasion were consumed by young men and women in the 18–19 and 20–24-year age groups (Wyllie et al 1993).

Problems associated with alcohol use

Self-reported problems

About one in five of the 15-year-olds in the Christchurch Health and Development Study who drank alcohol reported experiencing some kind of alcohol-related problem in the past year. Eighteen percent of drinkers reported physical problems (that is, hangovers, vomiting, passing out) and 7 percent of drinkers reported social problems (that is, behaving in socially embarrassing or inappropriate ways, or behaving aggressively).

In a 1997 study of over 500 adolescents aged 14–18 years commissioned by the Alcohol Advisory Council of New Zealand (ALAC), nearly half the respondents reported sometimes vomiting after drinking and a third reported episodes of memory loss associated with heavy alcohol consumption. A third also reported falling over or hurting themselves as a result of drinking, while one in eight indicated that they had got into a sexual situation they were not happy with while drinking (Alcohol Advisory Council of New Zealand 1997).

Alcohol dependence/abuse

The Christchurch Health and Development Study assessed the proportion of young people who appeared to be drinking in ways that conformed to standard international diagnostic criteria for alcohol abuse. The study concluded that 5 percent of 15-year-olds met criteria for alcohol abuse (Fergusson et al 1994a).

Results from the Dunedin Multidisciplinary Health and Development Study for age 18 years suggest that 10 percent of 18-year-olds fulfilled the criteria for alcohol dependence (Feehan et al 1994).

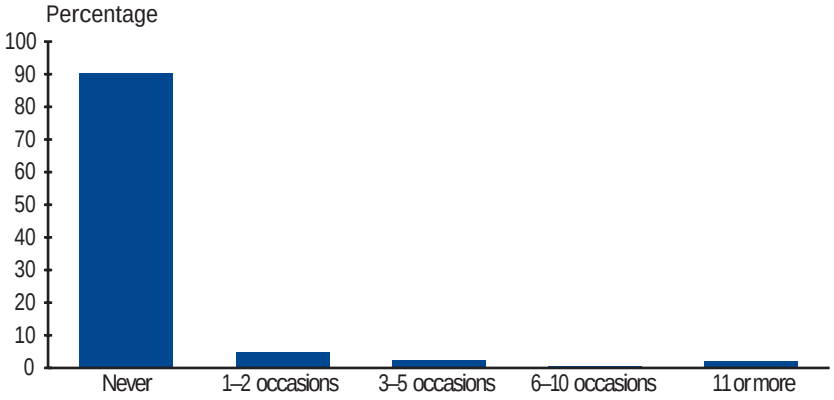
Prevalence of cannabis use

New Zealand studies suggest that cannabis use becomes increasingly prevalent in young people from about the ages of 14 or 15 years. When assessed in 1985 at age 13, only about one in a hundred of the young people in the Dunedin Multidisciplinary Health and Development Study reported ever having used cannabis. However, two years later, at age 15, about one in seven (15 percent) had used cannabis at least once in the last 12 months. By age 18, 44 percent reported using cannabis in the last year. By age 21 this figure had increased to 52 percent (Poulton et al 1997).

In the Christchurch Health and Development Study, assessments of the sample at 15 years of age in 1992 revealed that 9.8 percent had used cannabis at least once before the age of 15 (Fergusson et al 1993b). Nearly half the cannabis users (49 percent) said they had tried cannabis only once or twice. One in four (23 percent) of the users said they had used cannabis on more than 10 occasions. Seven of the 949 children in the study (just under 1 percent) said they had used cannabis on more than 50 different occasions before age 15 years of age.

When assessed again a year later at age 16, one in five (20 percent) of the Christchurch sample reported using cannabis in the previous year (Fergusson and Horwood 1997).

Figure 8.2: Number of occasions Christchurch children had used cannabis by age 13–15 years



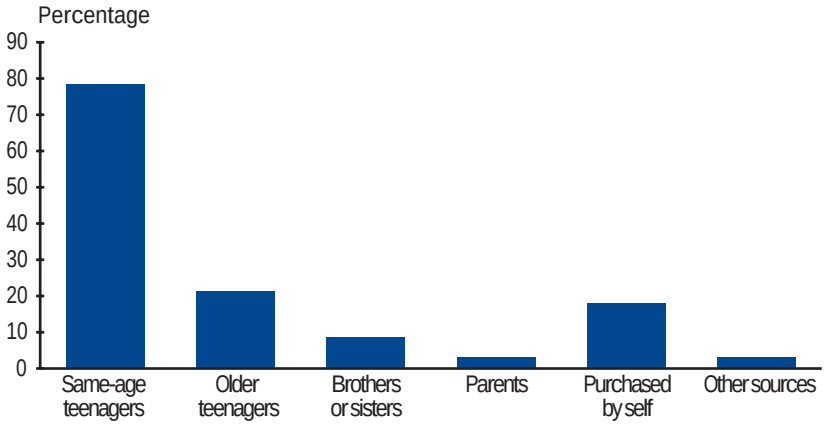
Source of data:
Christchurch Health and Development Study, Fergusson et al 1994a.

These trends are similar to those identified in a survey of drug use in a sample of 5126 Auckland and Bay of Plenty 15–45-year-olds, including over 600 Māori and Pacific respondents, undertaken in 1990 by the Alcohol and Public Health Research Unit (Black and Casswell 1993). Here a quarter of the 556 15–17-year-olds surveyed had tried cannabis. Across the sample as a whole, cannabis use was most common in the 18–19 and 20–24 age groups, with young men more likely than young women to be users.[1]

In the Christchurch study it was relatively rare for children to purchase their own cannabis (Figure 8.3). Between 13 and 15 years of age, their most common source of cannabis was other teenagers the same age as them or older (Fergusson et al 1993a).

1 In keeping with the wishes of the Māori and Pacific communities consulted during the development of the study, the results of the study were not analysed by ethnic group.

Figure 8.3: Christchurch children's sources of cannabis at age 13–15 years



Source of data:
Christchurch Health and Development Study, Fergusson et al 1993b. Figures sum to over 100 percent because some children used more than one cannabis source.

Just under one in 10 of the 15-year-old Christchurch cannabis users (7.8 percent) reported using cannabis at school.

Problems associated with cannabis use

User reports

The Christchurch 15-year-olds who used cannabis described mainly positive rather than negative experiences after using the drug. Over half the users (58 percent) said they would definitely or probably use cannabis again. One in five (21 percent) said they definitely would not (Fergusson et al 1993a).

Among 18-year-olds in the Dunedin Dunedin Multidisciplinary Health and Development Study the most commonly reported problems were: use where there was a risk of injury, using more cannabis than they intended, the quantity of time spent obtaining and using cannabis, recovering from the drug's effects, and tolerance to the drug's effects (McGee 1993).

Cannabis dependence

Estimates of the prevalence of cannabis abuse or dependence are not available for New Zealand teenagers under 15 years old.

In the Dunedin study, 6.6 percent of the 18-year-olds, mainly males (8.6 percent), met standardised psychiatric diagnostic criteria for cannabis dependence. This rate increased to 9.6 percent by 21 years of age. Two-thirds of those who were cannabis dependent were also alcohol dependent (Poulton et al 1997).

At 18 years of age, 7.3 percent of the Christchurch sample met criteria for a diagnosis of cannabis abuse or dependence (Fergusson and Horwood 1997).

Prevalence of use of other substances

Only a small amount of reliable survey information is available on young New Zealanders' use of other psychoactive substances such as inhalants and opioids.

Inhalants

In assessments undertaken in 1985, the Dunedin study found that 1.2 percent of 13-year-old girls and 2.5 percent of 13-year-old boys had used inhalants at some time in their life (mainly glue and petrol). By age 15, 5.8 percent of girls and 3.2 percent of boys had used inhalants in the last 12 months.

In a 1990 survey of drug use among Auckland and Bay of Plenty 15–45-year-olds, solvent use was most prevalent among teenagers, with two percent of 15–17-year-olds reporting that they had tried solvents or inhalants (Black and Casswell 1993).

Opiates and cocaine

Less than a third of 1 percent of 13-year-olds in the Dunedin Multidisciplinary Health and Development Study reported having tried drugs such as opiates or cocaine at some time in their life. However, by age 15 years, 2.6 percent of girls and 3.4 percent of boys had tried one or more of these kinds of drugs some time in the last 12 months.

Use of drugs such as opiates or cocaine at age 15 does not mean that young people necessarily will go on to use these same drugs throughout adolescence. Of those 15-year-olds in the Dunedin study who had tried drugs like opiates or cocaine at age 15 years, 61 percent had not recently used these drugs when surveyed again at 18 years of age.

Problems associated with using other substances

There are no known community studies that clearly identify the level of health or social problems that New Zealand young people experience as a result of using illicit substances before the age of 15 years. However, it is well accepted that persistent drug use or drug dependence in adulthood is likely to be accompanied by a range of psychological problems including depression, anxiety and personality disorders (Chetwynd 1997).

Changes over time

Alcohol

The use of different survey questions and sampling methods makes it difficult to compare results from the Dunedin Multidisciplinary Health and Development Study and the Christchurch Health and Development Study with those of other New Zealand surveys of teenage drinking. However, generally it seems that levels of childhood and early teenage exposure to alcohol have remained broadly similar over the last two decades. A 1977 survey found 90 percent of Form Two students (usual age 12 years) and 95 percent of Form Four students (usual age 14 years) had tasted or drunk

alcohol (Routledge and Taylor 1981). A 1985 survey of 374 Hastings fifth formers (usual age 15 years) found that 16 percent classified themselves as non-drinkers (Cullen 1985)

Cannabis and other substances

There is a lack of reliable data on the prevalence of cannabis and other substance use among New Zealand young people. This makes it difficult to identify if teenagers are currently using these substances in greater quantities, or at an earlier age, than the teenagers assessed by the Dunedin and Christchurch studies in the 1980s and early 1990s.

International comparisons

Comparing rates of alcohol, cannabis and other substance use between countries is generally very difficult. Reasons for this include differences in survey methodology, sample characteristics and assessment periods.

Alcohol

A nationally representative survey of United States adults found that just under 12 percent of drinkers had their first drink at age 15 or younger (Chou and Pickering 1992). The average age of having a first drink for the 18–29-year-olds in the survey was 17 years. Given recent survey research indicating that New Zealand young people are having their first full drink of alcohol on average at around 12 or 13 years of age, this suggests New Zealand teenagers begin to drink alcohol somewhat earlier than their North American counterparts (Children's Research Unit 1994; Business Research Centre 1997).

The same United States study found that the earlier in their teens people had started to drink, the more likely they were to experience symptoms of alcohol dependence at some time in their life. Compared to those who started drinking between ages 15 and 20, those who started drinking before they were 15 years old were significantly more likely to report subsequent symptoms of alcohol dependence (Chou and Pickering 1992).

Cannabis and other substances

The prevalence estimates for early teenage cannabis and other substance use identified in the Dunedin Multidisciplinary Health and Development Study and the Christchurch Health and Development Study are similar to those found in North American community studies. In Ontario, Canada, a 1983 survey found that 13 percent of 14–16-year-old boys and 18 percent of 14–16-year-old girls had used marijuana (Boyle and Offord 1986). Five percent of the boys and 7 percent of the girls had tried hard drugs.

Comparing findings from their 1990 survey of drug use in the Auckland and Bay of Plenty regions with those from similar overseas studies, Black and Casswell (1993) concluded that the lifetime use of cannabis among New Zealand 17–18-year-olds (39 percent) was very similar to that of Australian (39 percent) and the United States (44 percent) 17–18 years. However, cocaine use in this age group was much higher in the United States (10 percent) than in New Zealand (under 1

percent), and the reported use of solvents/inhalants was considerably greater in both Australia (23 percent) and the United States (19 percent) compared to New Zealand (2 percent). Rates of reported lifetime use of the hallucinogens (for example, LSD) were similar in the United States (10 percent) and New Zealand (8 percent).

Risk factors

Common factors

The Christchurch and Dunedin studies corroborate overseas studies indicating that teenagers who engage in one kind of problem behaviour, such as daily cigarette smoking, are also more likely to engage in other problem behaviours, such as alcohol misuse, cannabis use and early or unprotected sexual intercourse (Jessor 1987). Compared to non-problem behaviour teenagers, problem behaviour prone teenagers are more likely to have been exposed to a diverse array of potentially destabilising individual, family, and social circumstances during childhood. Problem behaviour prone teenagers are also more likely to associate with like-minded peers, who tend to help sustain and reinforce a young person's commitment to engaging in problem behaviours (Fergusson et al 1996).

Factors associated with children's alcohol use

Parents' drinking styles

Childrens' patterns of alcohol use during late childhood and early adolescence tend to reflect the drinking styles modelled by adult family members. In the Dunedin Multidisciplinary Health and Development Study, children who remained abstainers in the seven years from age nine to 15 were more likely to have mothers and fathers who drank infrequently or mothers who drank only very small amounts of alcohol (Casswell et al 1991).

Other social factors

In the Dunedin study, young people tended to drink alcohol more often, and in greater quantities, when they drank with their peers in venues away from their family and parents, when they had their own money to spend, and when they purchased alcohol for themselves or had it given to them by other young people (Casswell et al 1991; Connolly et al 1992).

This finding is consistent with observations by some Pacific researchers and commentators that Pacific young people are more likely to misuse alcohol in situations where, for various reasons such as employment or education, they end up living apart from their families and away from the influence of traditional family, community or religious authority structures (PHC 1994; Sector Analysis 1997).

Other broader social factors thought to play a hand in shaping patterns of alcohol consumption among young people include media images (such as advertising), server intervention practices and licensing laws and their enforcement (Stewart 1997).

Quantities of alcohol consumed

The 15-year-olds in the Christchurch Health and Development Study who drank more often than their peers, or in greater quantities, were more likely to report experiencing alcohol-related problems. Compared to those who consumed less than three standard-sized bottles at their biggest drinking session in the last three months, those who consumed more than the equivalent of three standard-sized bottles of beer at their biggest drinking session were seven times more likely to experience alcohol-related problems (Fergusson et al 1994a).

Age of first introduction to alcohol

In contrast to children who did not drink alcohol before age 13, children in the Christchurch study who had been introduced to alcohol before six years of age were up to 2.4 times more likely to report frequent, heavy or problem drinking at age 15 (Fergusson et al 1994b). This finding suggests that children who grow up in home environments with permissive attitudes to alcohol, and who are encouraged to sip or drink alcohol at a very early age (that is, under six years old), are perhaps more prone to experience alcohol-related problems by age 15 years.

Early childhood environment

When the Christchurch study compared the features of the abusive or hazardous drinkers at age 16 with those of their non-drinking or non-abusive drinking peers, three factors were found to be significant predictors of abusive or hazardous drinking. One of these was gender (16-year-old boys were more likely than 16-year-old girls to misuse alcohol). Another was being affiliated with other substance using peers at age 15 years. The third was drinking relatively large amounts of alcohol at drinking sessions at age 14 years (Fergusson et al 1995).

A closer analysis of factors associated with drinking large amounts of alcohol at age 14 found that the risk of heavy drinking at this age was highest among children from disadvantaged homes, children who exhibited conduct problems early in childhood, children who were introduced to alcohol before age five, children whose parents reported heavy alcohol consumption, and children who had a number of different adult caregivers (Fergusson et al 1995).

The Dunedin Multidisciplinary Health and Development Study found that children from lower socioeconomic status families were more likely than children from higher socioeconomic status families to drink frequently or in greater quantities by age 15 (Connolly et al 1992).

Use of other substances

In the Christchurch study, 15-year-olds who used alcohol frequently, or consumed large amounts of alcohol at their last drinking session, or reported alcohol related problems, were between six and 18 times more likely to report cannabis use or daily cigarette smoking (Fergusson et al 1994a).

Sexual activity

In the Christchurch study, 15-year-olds who used alcohol frequently or consumed large amounts of alcohol at their last drinking session, or reported alcohol-related problems, were eight to 12 times more likely to report having had sexual intercourse before age 15 (Fergusson et al 1994a).

Similarly, the study found strong correlations between patterns of alcohol misuse in 16-year-olds and reported high rates of early onset sexual intercourse and unprotected sex. Compared to the 16-year-olds who did not misuse alcohol, the 16-year-olds who misused alcohol were 4.5 to 6.9 times more likely to engage in unprotected intercourse (Fergusson and Lynskey 1996).[2]

Depression

In the same study, 15-year-olds who consumed large amounts of alcohol at their last drinking sessions, or reported alcohol-related problems, or who met criteria for alcohol abuse were two to five times more likely to have been depressed in the previous year (Fergusson et al 1994a).

Factors associated with early or high cannabis use

Family and social factors

The Christchurch Health and Development Study found clear differences between the backgrounds of the 16-year-olds who were high cannabis users and the 16-year-olds who were low cannabis users. High cannabis users (that is, those who used cannabis on 10 or more occasions) were more likely to come from socially disadvantaged backgrounds (for example, mother with no formal educational qualifications, semi-skilled or unskilled socioeconomic status families, child in lower 25 percent of IQ distribution by age eight years). They were also more likely to have been exposed to family adversities during childhood (such as high parental conflict, high parental history of offending, high parental history of illicit drug use, exposure to childhood sexual abuse). On top of this, by age 16 years the high cannabis users were more likely to have formed affiliations with delinquent or substance using peers and to report poorer parental attachment and social adjustment difficulties (that is, mood disorder, anxiety disorder, alcohol abuse, illicit substance use, daily smoking, and a history of property or violent offending) (Fergusson and Horwood 1997).

Early history of childhood conduct disorder

Children in the Christchurch study with a history of major conduct problems were 2.8 times more likely to use cannabis before they were 15 years old than children with no history of conduct disorder (Fergusson et al 1993b). On the other hand, the majority of the young people who had conduct problems early in childhood did not go on to use cannabis by age 15. Children prone to early conduct problems tended to come from lower socioeconomic status families and families with a high level of parental discord.

Results from the Dunedin Multidisciplinary Health and Development Study suggest it may be a history of depression, rather than conduct disorder, which makes some young people more prone to use cannabis by age 15 years (Henry et al 1993).

Early cannabis use and later problems in adolescence

The Christchurch study found that early cannabis users (that is, before age 16 years) were more likely to experience a range of problems later in adolescence. These problems included juvenile offending, mental health disorders, leaving high school without qualifications, and unemployment.

2 See also Chapter 9, Sexual and reproductive health.

The study concluded that early cannabis users were more likely to experience these problems largely because of the impact of early childhood social and behavioural circumstances (that is, social disadvantage and an early family life marked by disharmony and poor relationships between and with parents). However, cannabis use before age 16 could exacerbate the negative impact of these childhood circumstances (Fergusson and Horwood 1997).

Risk factors for other substance use

The Dunedin study concluded that tobacco, rather than alcohol, was the major 'gateway drug' to the use of harder drugs in adolescence (Stanton 1996). Young people who regularly smoked cigarettes early in adolescence were more likely than their non-smoking counterparts to try inhalants and other drugs such as opiates. For boys, there was a high correlation between smoking by age 13 and the use of these other substances by age 15.

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Chapter 9

Sexual and Reproductive Health

Key points

- On average, New Zealand girls have their first menstruation (menarche) when they reach 149 cm in height and just under 13 years of age.
- Studies suggest that by the time they reach 15 years of age, about 10–30 percent of New Zealand young people have had sexual intercourse.
- Early sexual intercourse appears to be associated with:
  - being female
  - being Māori
  - a background of socioeconomic disadvantage
  - sexual abuse in childhood
  - alcohol misuse in early adolescence.
- Most sexually active young people use contraception on at least some of the occasions they have sex. Condoms are the main form of contraception they use.
- Younger teenagers and Māori teenagers are less likely than older teenagers and non-Māori teenagers to use contraception.
- Compared to other occasions, teenagers are less likely to use contraception on the first occasion they have sex.
- Each year about three in every 10,000 girls aged less than 15 years gets pregnant and has a child. About three in every 10,000 girls aged less than 15 years gets pregnant and has an induced abortion.
- While the incidence of sexually transmitted diseases is low for children under 15 years old, these diseases are more likely to have serious long-term consequences for teenagers than for adults.

Introduction

A certain amount of sexual exploration is normal for young people, although sexual intercourse as part of this exploration can lead to various undesirable outcomes including unintended pregnancy and sexually transmitted diseases (STDs) (Ministry of Health 1997a, 1997b).

While considerable research has been conducted in New Zealand on the reproductive and sexual health of older adolescents, reliable up-to-date information on 0–14-year-olds is relatively scarce (Maskill 1991). This is particularly the case for Māori and Pacific children.

Physical development

Puberty is the time when young people develop their reproductive capacity. Puberty normally begins for females between the ages of nine and 14 years. For males it is a little later, between the ages of 11 and 16 years (Maskill 1991).

Puberty is normally associated with a rapid growth in body weight and height. In the Dunedin Multidisciplinary Health and Development Study, the mean weight of girls at the time they had their first menstrual periods (menarche) was 41 kg. Their mean height was 149 cm and their mean age was 12.9 years (St. George et al 1994). Height was found to be the most reliable predictor of when a girl could expect to have her first period.

Psychosocial development

As well as experiencing various physical changes to their bodies, during puberty young people start to think about and in some cases form sexual relationships (Bennett 1984).

Prevalence

Sexual intercourse before 16 years of age

There is evidence that a sizeable minority of New Zealand teenagers have had sexual intercourse before they reach 16 years of age. There are also indications that compared to previous generations, New Zealand women are starting to have intercourse earlier (Health and Disability Analysis Unit 1997).

A 1986 study of 15-year-old girls living in Wellington's Hutt Valley found that 29 percent had experienced sexual intercourse (Lewis 1987). Just under 2 percent of the group had first intercourse at age 12, while 12 percent had first intercourse at age 15. A similar study of 16–19-year-olds attending an urban coeducational high school found that 22 percent of students were sexually active before age 16 (McEwan et al 1988).

When assessed at age 15 in 1992, 8.5 percent of young people in the Christchurch Health and Development Study reported having had sexual intercourse at least once (Lynskey and Fergusson 1993). Girls (10.2 percent) were more likely than boys (6.8 percent) to have had sex. A year later, at age 16, a quarter of the sample reported having had sexual intercourse (Fergusson et al 1994).

Somewhat higher rates of early sexual intercourse were found in a 1992 survey of nearly a 1000 New Zealand high school students aged 12–17 years. Here, 13 percent of 13-year-olds and 40 percent of 16–17-year-old students said they had experienced sexual intercourse (Lungley et al 1993).

In the Dunedin Multidisciplinary Health and Development Study the median age of first sexual intercourse was 16 for women and 17 for men. Overall, 16 percent of the sample reported sexual intercourse before age 15, and 30 percent before 16 years of age. In this study, 70 percent of women who first experienced intercourse before they were 16 said at the 21-year-old assessment that they 'should have waited longer' (Dickson et al 1998).

Frequency of sexual intercourse

Half of the sexually active 15-year-olds in the Christchurch Health and Development Study had sexual intercourse on five occasions or less. Girls were more likely than boys to have had sexual intercourse on several occasions. About half the sexually active 15-year-olds had only ever had one sexual partner (Lynskey and Fergusson 1993).

Similarly, about half the sexually active girls in the Hutt Valley high school study had only ever had one sexual partner. A quarter had more than three sexual partners (Lewis 1987).

Sociodemographic features

In the Christchurch study, Māori and Pacific teenagers, and those from socioeconomically disadvantaged families, were more likely to have sexual intercourse at a younger age than their European and socioeconomically advantaged counterparts (Lynskey and Fergusson 1993). Similar trends were found in a 1995 survey of Northland fourth and fifth form students where the majority of Māori students reported having sex before the age of 14 (Tarrant and Scanlen 1995).

In Lungley et al's 1993 survey of 12–17-year-old high school students, Māori students (48 percent) were more likely than Pacific students (28 percent), European students (24 percent) or students from other ethnic groups (21 percent) to have had sexual intercourse. Students who regularly went to church were less likely to have had sex (22 percent) than students who attended church irregularly or not at all (30 percent) (Lungley et al 1993).

Contraceptive use

In the Christchurch Health and Development Study in 1992, 89 percent of sexually active 15-year-olds reported using contraception at least once (Lynskey and Fergusson 1993). Condoms were by far the most popular contraceptive (used by 82 percent of those who had sex), followed by the contraceptive pill (20 percent). However, it was estimated that, on average, these teenagers did not use any form of contraception about 13 percent of the times they had sex. Two of the teenage girls in the study had been pregnant.

In 1993, when the same cohort was studied at age 16, condoms had become a less popular form of contraception. The pill, by contrast, had increased in popularity (Fergusson et al 1994).

The previously mentioned survey of 1000 high school students found that 68 percent of the sexually experienced students reported normally using some kind of protection against pregnancy or STDs (Lungley et al 1993). Sixty-three percent indicated they had used this protection the last time they had sex. Sexually experienced European students (76 percent) were more likely than sexually experienced Māori students (50 percent) to have used protection the last time they had sex.

Condoms (40 percent) were the most common form of protection used, followed by condoms in combination with the contraceptive pill (16 percent) and the pill alone (11 percent). Thirteen-year-old students were less likely (56 percent) than students aged 16 or more (62 percent) to use condoms the last time they had sex. In addition, European students (70 percent) were more likely than Māori students (43 percent) to use condoms the last time they had sex.

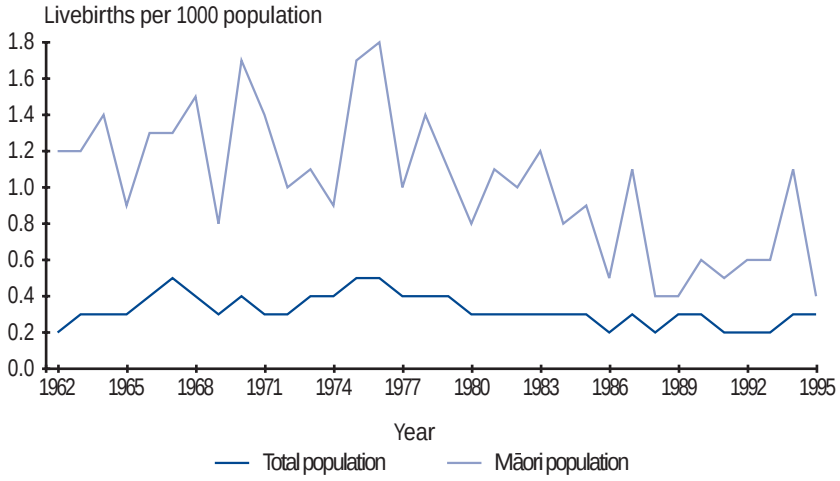
Condoms (76 percent) were also the most common type of contraception used by 15-year-old Hutt Valley high school girls, followed by the pill (48 percent) and withdrawal (39 percent) (Lewis 1987). However, 16 percent of the sexually active girls had never used any form of contraception.

Other New Zealand studies have shown that 30-40 percent of first sexual experiences do not involve any form of contraception. In addition, the younger people are when they first have sex, the less likely they are to use contraception (Maskill 1991).

Fertility

The current birth rate for 10–14-year-old New Zealand girls is approximately three live births per 10,000 females per annum (Statistics New Zealand 1996). The rate is higher for Māori than non-Māori 0–14-year-olds, although the Māori rate has trended downwards in recent years (Figure 9.1).

Figure 9.1: Fertility rates among females aged 10–14 years, 1962–95



Source of data:
Statistics New Zealand 1996.
Note:
Rates are based on small numbers and should be interpreted with caution.

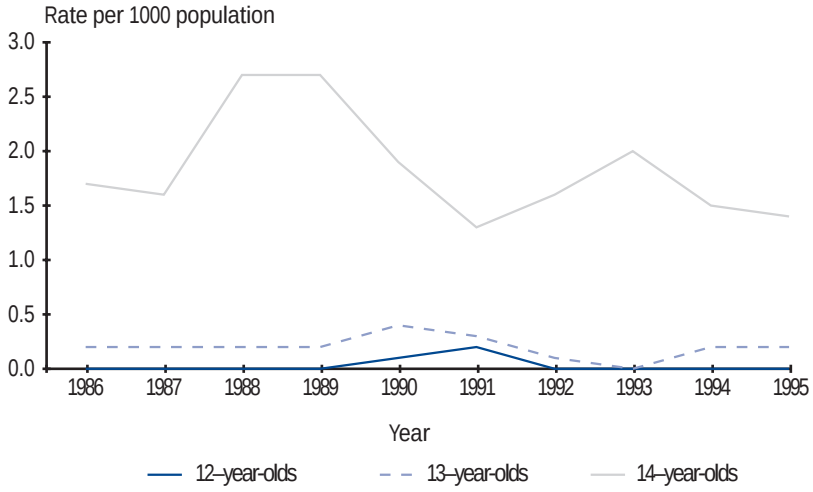
Induced abortions

Compared with women in the other childbearing age groups, in New Zealand induced abortions are relatively rare among 10–14-year-old girls. From 1991 to 1995 there was an average of 44 abortions for girls in this age group per year (Abortion Supervisory Committee 1996). The majority of these abortions were carried out on 14-year-olds.

Figure 9.2 shows the annual rates of induced abortions among 12–14-year-olds from 1986 to 1995 (there were no abortions among younger females over this period).

For under 15-year-olds, the ratio of induced abortions to live births is relatively high compared with other age groups. For example, in 1995 the ratio of abortions to livebirths among under 15-year-olds was about 1:1.[1] This suggests that a very high proportion of the conceptions experienced by younger adolescent females are unplanned.

Figure 9.2: Rates of induced abortions among 12–14-year-olds, 1986–95



Source of data:
Abortion Supervisory Commitee 1996.
Note:
Rates are based on small numbers and should be interpreted with caution.

Sexually transmitted diseases

Sexually transmitted diseases (STDs) can have more serious physical consequences for teenagers than for older people. For example, younger women are at significantly higher risk of developing pelvic inflammatory disease (Cates 1991). Many agents that can cause STDs can also infect babies during the birth process.

Sexual health clinic surveillance data suggests that STDs are relatively uncommon among children. Nationally, in 1997, 45 male and 252 female new clinic patients aged less than 15 years were seen at STD clinics. These people made up less than one percent of all new STD clinic patients seen that year (ESR 1998).[2]

1 Calculated by the authors from Abortion Supervisory Committee and Statistics New Zealand data.
2 Other STD data for 0–14-year-olds are presented in Chapter 10, Communicable diseases.

In the Dunedin Multidisciplinary Health and Development Study, by age 20 years, 7.5 percent of men and 15.9 percent of women reported ever having had an STD. Genital warts and chlamydial infection were the most common STDs among men, and chlamydial infection, genital warts, and genital herpes were the most common among women (Dickson et al 1996).

International comparisons

Prevalence rates for early teenage sexual intercourse reported in New Zealand appear to be broadly similar to those found in several other OECD countries, including Canada, the United States and the United Kingdom. In these countries, between 20 and 25 percent of 16-year-olds have had sex (Friedman 1992). While the proportion of younger adolescents (that is, those under 15 years of age) who have had sex appears to be increasing in these and other developed countries (Cates 1991; Friedman 1992), it is unclear to what extent a similar trend exists amongst younger adolescents in New Zealand. Certainly, there is evidence that the proportion of 17–18-year-old New Zealanders with experience of sexual intercourse has increased substantially between 1970 and 1990 (Dickson et al 1993).

It is difficult to make international comparisons of fertility rates and abortion rates for under 15-year-olds because of a lack of data. However, fertility rates among New Zealand under 20-year-olds are lower than those of the United States, higher than those of Australia, Canada, Japan, and some European countries, and similar to those of the United Kingdom (Statistics New Zealand 1996). Teenage abortion rates in the late 1980s were low in New Zealand compared to other countries (Maskill 1991).

Risk factors

Alcohol use

Alcohol use is considered to make social situations more relaxed and give teenagers more confidence to embark on sexual activity (Holibar and Wyllie 1992; Lungley et al 1993).

The Christchurch Health and Development Study found that alcohol misuse at age 16 years was associated with a greater likelihood of early sexual intercourse and unprotected sex (Fergusson and Lynskey 1996).

Lungley et al (1993) found that 35 percent of high school students had consumed at least some alcohol on the last occasion they had sex. Males and females (as well as Māori and non-Māori) were equally likely to have been drinking. However, 13–15-year-old students were less likely than students aged 16 or more to have been drinking on the last occasion they had sex (32 percent compared to 58 percent).[3]

3 See Chapter 8 for more information on alcohol consumption.

Childhood sexual abuse

In the Christchurch Health and Development Study, 18-year-olds who had been sexually abused before the age of 16 were more likely to engage in risky sexual activity (Fergusson et al 1997). In particular, sexually abused 18-year-olds were also more likely to have experienced:

- their first (consensual) sexual activity when they were under 16 years old
- a teenage pregnancy
- multiple sexual partners
- unprotected intercourse
- STDs
- a sexual assault against them after the age of 16.

The Christchurch study concluded that the risks of childhood sexual abuse were closely correlated to adverse family factors such as social disadvantage, family instability, impaired parent-child relationships and parental adjustment difficulties. Independent of other factors, experience of childhood sexual abuse appeared to increase the risk of early (consensual) sexual activity. In turn, this early sexual activity was correlated to the other negative outcomes such as, teenage pregnancy and unprotected intercourse.

The Otago Women's Health Survey found that childhood sexual abuse involving intercourse was a significant risk factor for pregnancy in adolescence (Romans et al 1997).[4]

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4 See Chapter 11 for more information on childhood sexual abuse.

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Part C

Child Health:

An issue-based perspective

Chapter 10

Communicable Diseases

Key points

- Approximately 10 percent of child deaths in New Zealand are caused by communicable diseases, with pneumonia and influenza being the leading cause in 1994.
- Infectious disease death rates in New Zealand children have declined substantially in the period 1980–94.
- The most common communicable diseases in children are upper respiratory tract viral infections, which are usually mild and self-limiting. Campylobacteriosis was the most commonly notified communicable disease in children in 1997. Lower respiratory tract infections were the most common communicable diseases leading to the hospitalisation of children in 1995.
- The incidence of several communicable diseases has declined greatly after introduction of routine vaccinations, but few have been eradicated. Rates of meningococcal infection have continued to increase, and the current hyperendemic situation may continue for some years yet.
- Māori and Pacific children have higher rates of a number of communicable diseases. Reasons for this may include genetic components, as well as socioeconomic status and various cultural practices.

Mortality

In 1994, the leading causes of child communicable disease deaths were pneumonia and influenza, bacterial meningitis (other than meningococcal), meningococcal infection, and congenital pneumonia (Table 10.1). In 1995 there were two deaths from listeriosis (one intrauterine death and one stillbirth) (ESR 1996). Five children younger than 15 years died in the 1991 measles epidemic.

Table 10.1: Communicable disease deaths, for 0–14-year-olds, 1994

Disease (ICD-9 code)	*Number*	*Rate per 100,000 children per year*
Pneumonia and influenza (480–487)	15	1.8
Bacterial meningitis (other than meningococcal) (320)	8	1.0
Meningococcal infection (036)	6	0.7
Congenital pneumonia (770.0)	6	0.7
Infections specific to perinatal period (771)	4	0.5
Viral infection of central nervous system (045–049)	3	0.4
Other viral infections (070–079)	3	0.4
Chronic bronchitis (491)	3	0.4
Asthma (493)	2	0.2
Tuberculosis (010–018)	1	0.1
Other bacterial diseases (040–041)	1	0.1
Mycoses (110–118)	1	0.1
Total all causes (001–999)	617	75.5

Source of data:
Ministry of Health 1997a.

Premature death as an adult from communicable diseases acquired in childhood can occur for hepatitis B infection, HIV infection and rheumatic fever.

Using a re-coding of the International Classification of Diseases adapted from that of Pinner et al (1996) to identify diseases with an infectious aetiology, approximately 11 percent of deaths under five years of age, and 8 percent of deaths in the 5–14 year age group, were caused by infectious diseases in the period 1980–93 in New Zealand (Christie and Tobias 1998).

Morbidity

Upper respiratory tract viral infections (such as colds) are the most common communicable diseases affecting all age groups. These illnesses are usually mild, self-limiting and do not cause respiratory distress. Lower respiratory tract infections (LRI) are more serious and cause croup, bronchitis, bronchiolitis, and pneumonia. A United States study found a cumulative incidence of first episodes of LRI in infants to be 33 percent (Wright et al 1989). Such respiratory infections are the major causes of hospitalisation of children in New Zealand (Table 10.2).

Diarrhoeal illness from viral enteric agents, such as rotavirus, is also common in the first few years of life. Data for United States children suggest an average total of eight episodes of diarrhoea per child prior to age five, most of which are due to viral infections. The risk of hospitalisation for diarrhoea during this period was reported at 6.5 percent (Glass and Bern 1994). Campylobacteriosis is the most commonly notified enteric disease among children in New Zealand, followed by giardiasis (Table 10.2).

One of the most important causes of serious morbidity from communicable diseases comes from the current hyperendemic situation for meningococcal disease (Wilson et al 1995). The incidence rate of this disease continues to increase (ESR 1997a).

In terms of long-term morbidity, rheumatic fever (associated with rheumatic heart disease) and hepatitis B (associated with chronic liver disease and liver cancer) are probably the most important preventable communicable diseases affecting children in New Zealand (PHC 1995). STDs acquired in adolescence can lead to subsequent infertility, ectopic pregnancy, pelvic inflammatory disease and, in the case of human papilloma virus infection, cervical cancer.

Table 10.2: Communicable disease notifications and hospitalisations in the population aged 0–14 years

	Notified cases, 1997		*Hospitalisations, 1995*	
Disease (ICD-9 code)	*Number*	*Rate per 100,000*	*Number*	*Rate per 100,000*
General disease groupings and respiratory infections				
Intestinal infectious diseases (001–009)	-	-	3219	388.0
Viral diseases accompanied by exanthema (050–057)	-	-	322	38.8
Other diseases due to viruses and chlamydiae (070–079)	-	-	2189	263.8
Acute laryngitis and tracheitis (464)	-	-	1041	125.5
Acute upper respiratory infection (465)	-	-	2207	266.0
Acute bronchitis & bronchiolitis (466)	-	-	2978	358.9
Pneumonia & influenza (480–487)	-	-	3445	415.2
Vaccine preventable diseases				
Hepatitis B (070.2–070.3)	14	1.6	3	0.4
Hib invasive disease (320.0)	7	0.8	15	1.8
Measles (055)*	1577	184.5	13[a]	1.6[a]
Mumps (072)*	74	8.7	19[b]	2.3[b]
Pertussis (whooping cough) (033)*	187	21.9	178[c]	21.5[c]
Rubella (056)*	65	7.6	5	0.6
Varicella (chickenpox) (052)	-	-	123	14.8
Herpes zoster (053)	-	-	17	2.0
Influenza (487)	-	-	84	10.1
Food and waterborne diseases				
Campylobacteriosis	2044	239.1	-	-
Giardiasis (007.1)*	768	89.9	18	2.2
Salmonellosis (003.0)	485	56.7	34	4.1
Cryptosporidiosis*	237	27.7	-	-
Hepatitis A (070.0, 070.1)	4	0.5	9	1.1
Shigellosis (004)	40	4.7	20	2.4
Yersiniosis*	160	18.7	-	-
Typhoid (002)	2	0.2	3	0.4
Listeriosis (027.0)	0	0.0	2	0.2
HIV & STDs				
HIV/AIDS (042)	0	0.0	1	0.1
Syphilis (090–097)	0	0.0	1	0.1
Gonorrhoea (098)	0	0.0	3	0.4
Other diseases				
Acute rheumatic fever (390–392)	79	9.2	104	12.5
Chronic rheumatic heart disease (393–398)	-	-	38	4.6
Meningococcal disease (036)	474	55.5	247	29.8
Tuberculosis (010–018)	30	3.5	32	3.9
Malaria (084)	1	0.1	11	1.3

** Became notifiable 1 June 1996.*
a Outbreaks at least every six years, with 507 child hospitalisations (rate = 86 per 100,000) in 1991 outbreak.
b Outbreaks every four or so years, with 150–300 hospitalisations (rate = 20–40 per 100,000) per outbreak.
c Outbreaks every four or so years, with 300–600 hospitalisations (rate = 40–70 per 100,000) per outbreak.
Source of data:
ESR 1997 (notifications) and Ministry of Health 1997c (hospitalisations).

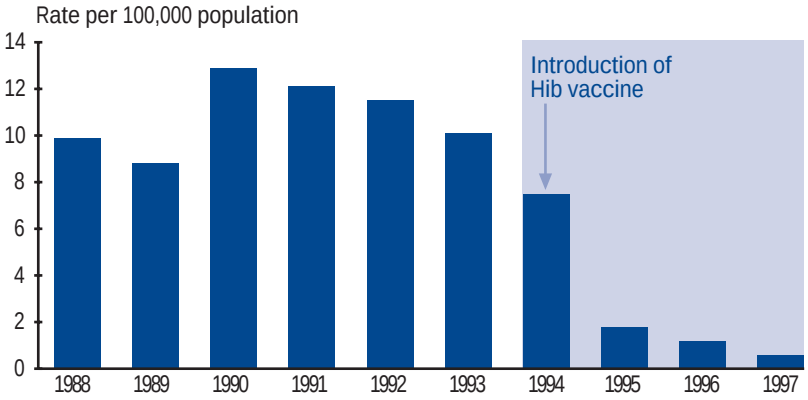
Changes over time

Child death rates from infectious diseases have declined in New Zealand in recent years. When the methods of Pinner et al (1996) are applied to New Zealand mortality data, it is revealed that infectious disease death rates for children declined from 16.3 per 100,000 in 1980 to 6.8 per 100,000 in 1993. As a proportion of all child deaths, infectious diseases declined from 14 to 9 percent in the 14 years 1980–93.

There has been a decline in the overall incidence of most of the vaccine-preventable diseases detailed in Table 10.2 (Ministry of Health 1996). Exceptions include influenza and varicella (chickenpox), for which routine immunisations are not currently in place. The incidence of *Haemophilus influenzae* type b (Hib) disease was greatly reduced by the addition of Hib vaccine to the National Immunisation Schedule in 1994, but has not yet been eradicated (ESR 1997c, Figure 10.1). Measles epidemics now occur less frequently than before the 1980s, but immunisation coverage is not yet sufficiently high to prevent epidemics (Tobias et al 1997, Figure 10.2). Acute rheumatic fever rates declined substantially in the 1970s and early 1980s, but have remained stable since then (Baker and Chakraborty 1996, Figure 10.3).

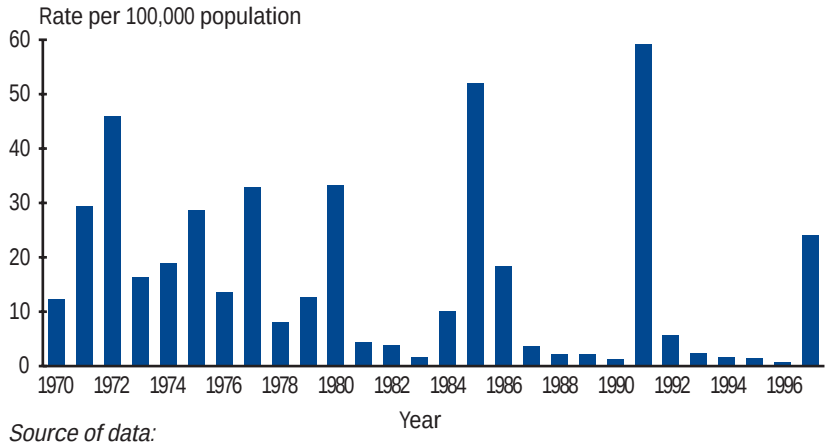
New Zealand is experiencing a hyperendemic period of meningococcal disease, with 474 cases of children younger than 15 years old notified in 1997. The meningococcal disease hospitalisation rate continued to increase in 1997 (Figure 10.4). Overseas experience suggests that such hyperendemic periods can persist for a decade or longer (Wilson and Mansoor 1995).

Figure 10.1: *Haemophilus influenzae* meningitis (ICD-9 code 320.0) hospitalisations, ages 0–14 years, 1988–97



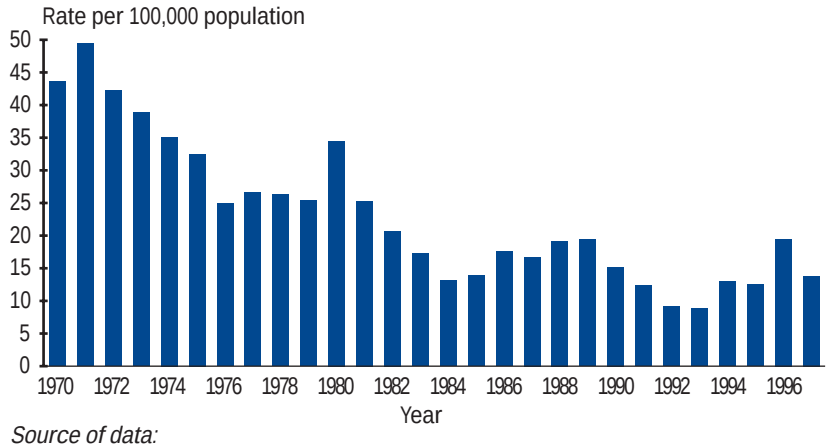
Source of data:
Ministry of Health 1997c.
Note:
Data for 1996 and 1997 are provisional.

Figure 10.2: Measles (ICD-9 code 055) hospitalisations, 0–14-year-olds, 1970–97



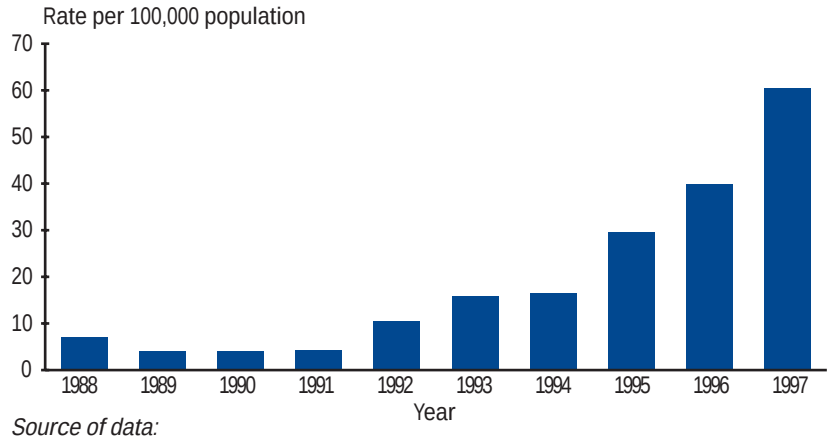
Source of data:
Ministry of Health 1997c.
Note:
Data for 1996 and 1997 are provisional.

Figure 10.3: Acute rheumatic fever (ICD-9 codes 390–392) hospitalisations, 0–14-year-olds, 1970–97



Source of data:
Ministry of Health 1997c.
Note:
Data for 1996 and 1997 are provisional.

Figure 10.4: Meningococcal disease (ICD-9 code 036) hospitalisations, 0–14-year-olds, 1988–97



Source of data:
Ministry of Health 1997c.
Note:
Data for 1996 and 1997 are provisional.

International comparisons

Child death rates from communicable diseases are generally high in New Zealand compared to Australia, Japan, United States, Canada, and United Kingdom (Table 10.3).

Table 10.3: Communicable disease death rates for 0–14-year-olds, selected countries

	Rate per 100,000 per year					
Disease (ICD-9 codes)	*New Zealand (1990–94)*	*Australia (1993)*	*Canada (1993)*	*Japan (1994)*	*United Kingdom (1993)*	*United States of America (1992)*
Infectious and parasitic (001–139)	1.8	1.5	1.2	1.7	2.2	1.8
Meningococcal infection (036)	0.4	0.5	0.3	0.0	1.0	0.1
Pneumonia (480–486)	1.7	0.7	0.7	1.3	1.6	1.5
Meningitis other than meningococcal (320–322)	0.9	0.9	0.3	0.2	0.5	0.3
Chronic obstructive respiratory disease (490–496)	0.6	0.5	0.2	0.6	0.4	0.4
Acute respiratory disease (460–466)	0.6	0.2	0.3	0.3	0.6	0.3

Source of data:
World Health Organization 1996 and Ministry of Health 1997a.
Note:
Rates have been calculated by averaging male and female rates.

Risk and protective factors

New Zealand's immunisation schedule for children (Ministry of Health 1996) includes vaccines to protect against smallpox, polio, diptheria, Hib disease, hepatitis B, mumps, congenital rubella, measles, pertussis, and tetanus. A 1996 survey of vaccine coverage levels in the North Health region of New Zealand indicated that at two years of age, full immunisation had been achieved by 45 percent of Māori children, 53 percent of Pacific children, and 72 percent of other children (North Health 1997).

Unmodifiable risk factors for most of the communicable diseases within the 0–14-year age group include young age and being male. Ethnicity as a risk factor for communicable disease may represent both genetic components which are not modifiable and also modifiable components associated with socioeconomic status and various cultural practices. From the notification data and a number of other studies, Māori and Pacific people are known to have relatively high rates of Hib disease (Ameratunga and Martin 1994), tuberculosis (Galloway and Baker 1995), hepatitis A, hepatitis B, rheumatic fever, and meningococcal disease (ESR 1993). Māori in Northland have been at particularly increased risk from hepatitis A in recent years (Epidemiology Unit 1992) and for being

hospitalised with pertussis (Ministry of Health 1997b). Pacific people also have higher rates of malaria and shigellosis (ESR 1993). Māori and Pacific people also suffer disproportionately from the long-term sequelae such as rheumatic heart disease (Purchas et al 1984; Flight 1984) and primary liver cancer (associated with HBV infection) (Wilson et al 1993).

The components that might explain these ethnic differentials have not been examined but it is possible that such factors as poorer immunisation levels, larger family sizes, higher numbers of occupants per house, poorer housing quality, poorer access to health care, and even psychosocial factors associated with stressful living or concerns about inequality might be relevant. Cultural practices such as greater involvement of the extended family/whānau and shared sleeping arrangements associated with hui on marae may be significant for droplet-borne infections, though there are no New Zealand-specific data on this.

There has been no apparent ethnic differential associated with notifications of AIDS (ESR 1997b). However, Māori may conceivably be at increased risk of HIV because of a number of risk factors such as low socioeconomic status, young age structure, drug use, and lack of access to culturally appropriate services (Te Puni Kōkiri 1994).

Modifiable risk factors for respiratory infections include outdoor air pollution, indoor air pollution (including tobacco smoke exposure), attendance at child care centres, possibly crowding or large family size, possibly low birthweight, and possibly psychosocial factors (as reviewed by Graham 1994). An estimated 54 percent of New Zealand's 0–4-year-olds attend organised early childhood education centres (Ministry of Education 1997).

Modifiable risk factors for other communicable diseases include lack of personal hygiene, absence of breast feeding and unsafe sexual behaviour.

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Chapter 11

Injuries: Unintentional injuries, Abuse and violence

Unintentional injuries

Key points

- Injuries are the leading cause of death for children aged over one year. Injuries are also the second leading cause of child hospitalisation.
- An average of 127 children under 15 years of age died from injuries each year in the period 1990–94. The leading cause was road traffic injuries, followed by submersion or suffocation, homicide, and fire or flames.
- Injury death rates decreased for children aged 1–14 years between 1980 and 1994, but increased for infants.
- Nearly 17,000 child injury hospitalisations occurred in 1995. The leading cause was falls, followed by road traffic injuries, medical or surgical procedures, and cutting or piercing injuries.
- For both deaths and hospitalisations caused by injuries, boys have higher rates than girls, and Māori children have higher rates than non-Māori.
- If Māori were to experience the same hospitalisation and death rates as non-Māori, 10 fewer Māori children would die from injuries each year, and 1500 fewer would be hospitalised.
- Child injury hospitalisation rates have increased in recent years, but this may reflect factors other than the incidence of injuries.
- New Zealand has a high rate of child injury deaths, compared to other OECD countries.
- There is good evidence for a range of strategies that could reduce child injuries in New Zealand.

Introduction

Injuries are the leading cause of death in the age group 1–14 years. Predominantly child injury deaths are unintentional, though intentional causes (suicide and homicide) are also important.

Injury morbidity records in the National Minimum Dataset (Ministry of Health 1997c) include coding of both the physical manifestation of injury (for example, fracture of ankle) and the external circumstances in which the injury occurred (for example, accidental fall from ladder). Codes for external circumstances of injury are referred to as E-codes in the International Classification of Diseases (ICD), and each code begins with E. For example, accidental fall from ladder is given the ICD-9 code E881.0. The analysis presented in this chapter uses E-codes, the coding of external circumstances of injury, since these are relevant to the field of injury prevention.

After examining the injury morbidity and mortality data, adjacent codes with significant numbers of deaths or hospitalisations were grouped into the injury categories shown in Table 11.1.1.

Table 11.1.1: ICD-9 codes for injury categories in this analysis

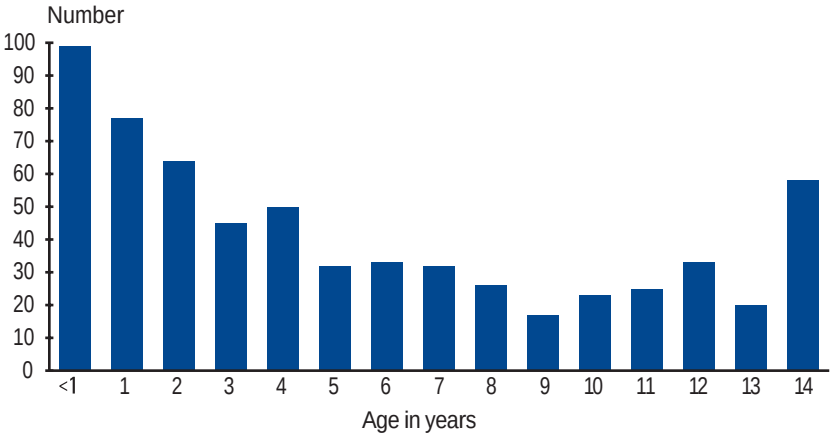
ICD-9 codes	*Description*
E800–E999	All injuries
E800–E949	Unintentional injuries
E950–E999	Intentional injuries
E810–E819, E826–E829	Road traffic injuries
E850–E869	Poisoning
E878–E879	Medical/surgical procedures
E880–E888	Falls (unintentional)
E890–E899	Fire, flames
E910–E915	Submersion, suffocation
E917	Struck unintentionally
E920	Cutting, piercing
E950–E959	Suicide, self-inflicted injury
E960–E969	Homicide, purposely inflicted by others

Mortality

In the five years from 1990–94, 635 children under the age of 15 years died from injuries, giving a rate of 16.0 per 100,000 per year. The death rate for boys (19.6 per 100,000) was 62 percent higher than the rate for girls (12.1 per 100,000). The rate for Māori children (20.3 per 100,000) was 33 percent higher than the rate for all other children (15.3 per 100,000).

Child injury deaths were concentrated in the young ages in the period 1990–94 (Figure 11.1.1). Of the injury deaths in the 0–14 year age group, 53 percent were children under five years old.

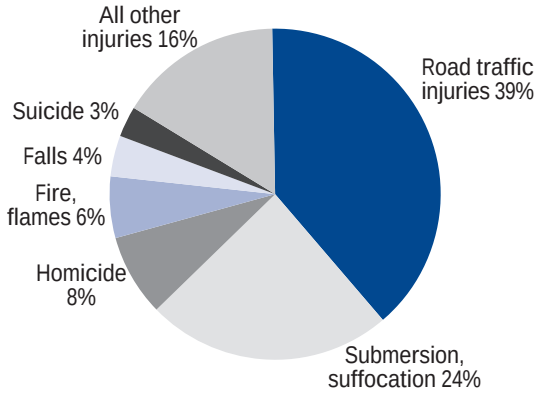
Figure 11.1.1: Injury deaths among children, 0–14–year-olds, number by age, 1990–94



Source of data:
Ministry of Health 1997a.

Road traffic injuries was the leading cause of injury death of children in the period 1990–94, followed by submersion or suffocation, and homicide (Figure 11.1.2).

Figure 11.1.2: Injury deaths among children, 0–14-year-olds, proportion by cause of injury, 1990–94



Source of data:
Ministry of Health 1997a.

The relative importance of different causes of injury deaths varies with age (Table 11.1.2). For older children, road traffic injuries are the most common cause of injury death. At younger ages submersion or suffocation has more importance as the most common cause of injury death.

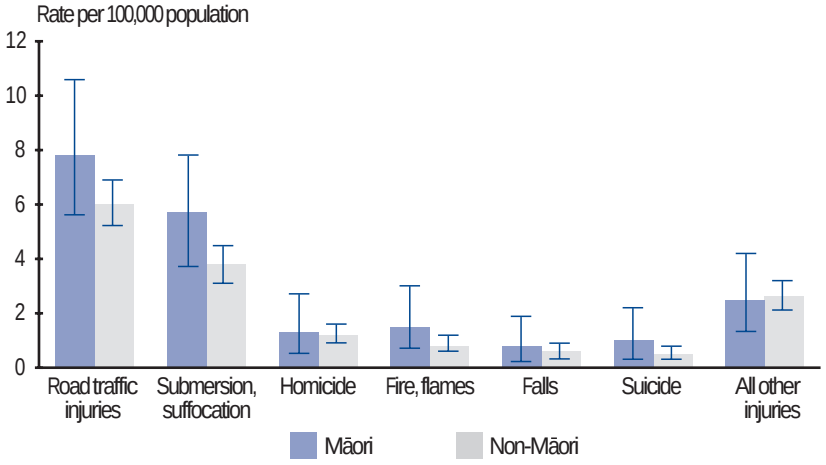
Table 11.1.2: Child injury deaths, number by cause and age group, 1980–84 and 1990–94

	1980–84					*1990–94*				
	<1	*1–4*	*5–9*	*10–14*	***Total 0—14***	*<1*	*1–4*	*5–9*	*10–14*	***Total 0—14***
Road traffic injuries	9	82	116	115	322	19	81	70	78	248
Submersion, suffocation	34	135	28	32	229	52	65	24	14	155
Homicide	10	15	5	1	31	11	18	10	10	49
Fire, flames	5	15	6	4	30	2	22	7	6	37
Accidental falls	8	13	2	8	31	0	9	9	5	23
Suicide	0	0	0	15	15	0	0	2	19	21
All other injuries	15	65	37	33	150	16	41	18	27	102
All injuries	81	325	194	208	808	100	236	140	159	635

Source of data:
Ministry of Health 1997a.

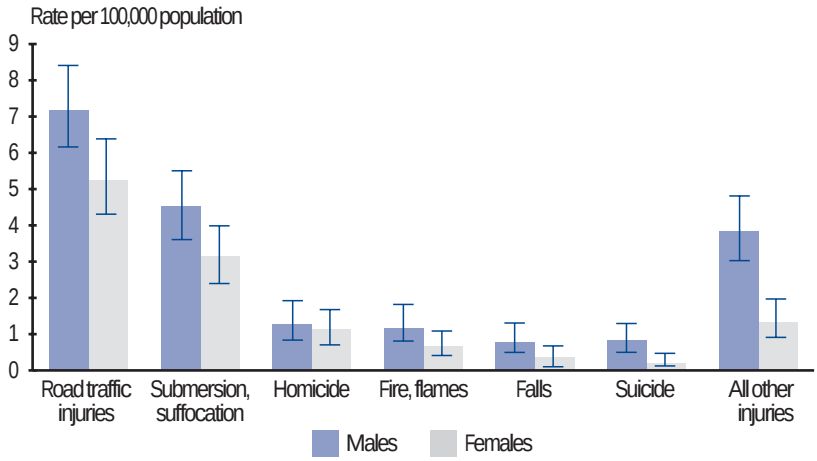
Māori children had higher injury death rates for all major causes than non-Māori children in 1990–94 (Figure 11.1.3). Similarly, boys had higher death rates than girls for all major causes of injury (Figure 11.1.4). Overall, the injury death rate for Māori children was 33 percent higher than for other children, and rates for boys were 62 percent higher than for girls.

Figure 11.1.3: Injury deaths among children, 0–14-year-olds, rate (and 95 percent confidence interval) by cause of injury and ethnic group, 1990–94



Source of data:
Ministry of Health 1997a.

Figure 11.1.4: Injury deaths among children, 0–14-year-olds, rate (and 95 percent confidence interval) by cause of injury and sex, 1990–94

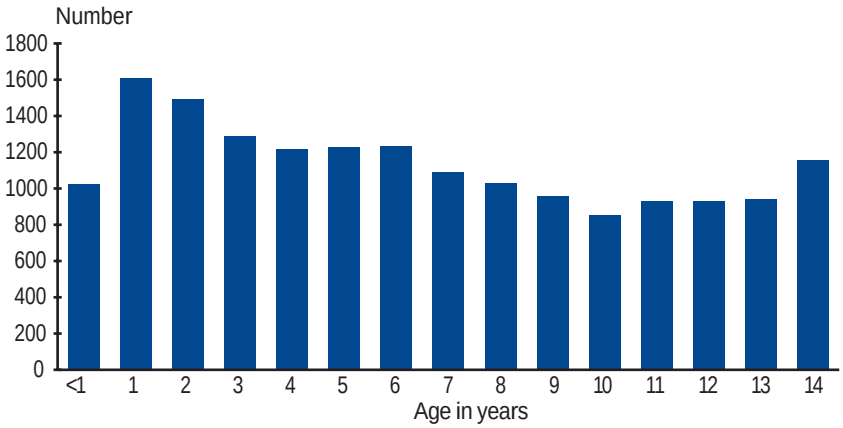


Source of data:
Ministry of Health 1997a.

Morbidity

Excluding births, injuries are the second leading cause of the hospitalisation of children (respiratory disease is the leading cause). Seventeen thousand injury hospitalisations for children under the age of 15 years occurred in 1995. The number of injury hospitalisations peaked in the 1–6 year age group. The number was lowest among infants and in the 9–13 year age group (Figure 11.1.5) (Ministry of Health 1997c).

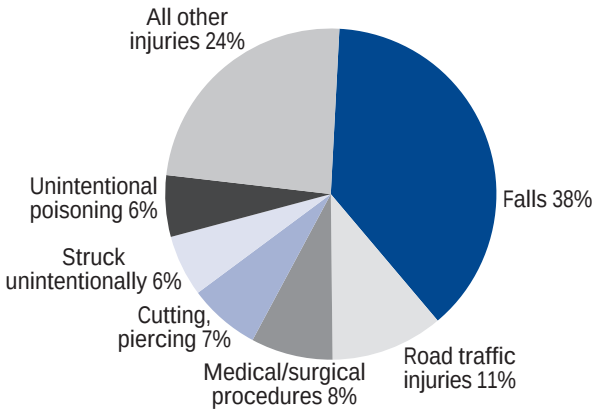
Figure 11.1.5: Injury hospitalisation among children, 0–14-year-olds, number by age, 1995



Source of data:
Ministry of Health 1997c.

Falls were the leading cause of child injury hospitalisation in 1995, followed by road traffic injury, and injuries from medical or surgical procedures (Figure 11.1.6).

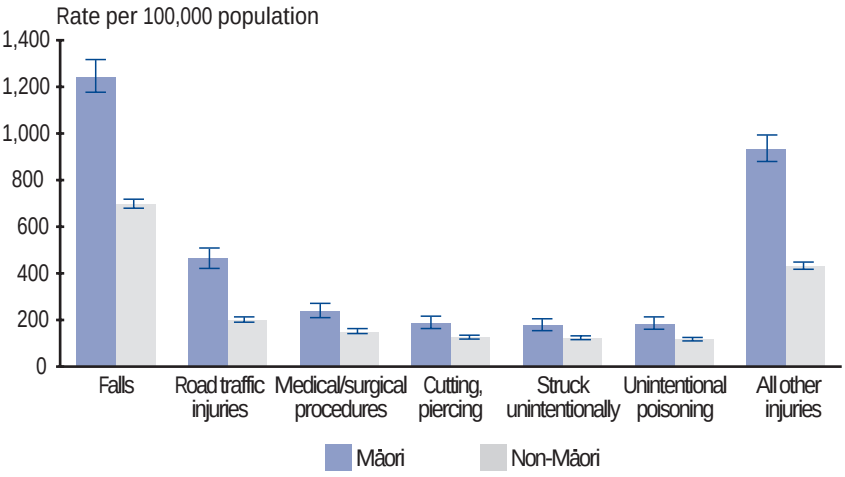
Figure 11.1.6: Injury hospitalisation among children, 0–14-year-olds, proportion by cause of injury, 1995



Source of data:
Ministry of Health 1997c.

Compared to non-Māori children, Māori children had higher injury hospitalisation rates for each cause of injury (Figure 11.1.7). Overall, injuries caused Māori children to be hospitalised at a rate 86 percent higher than other children in 1995 (Ministry of Health 1997c).

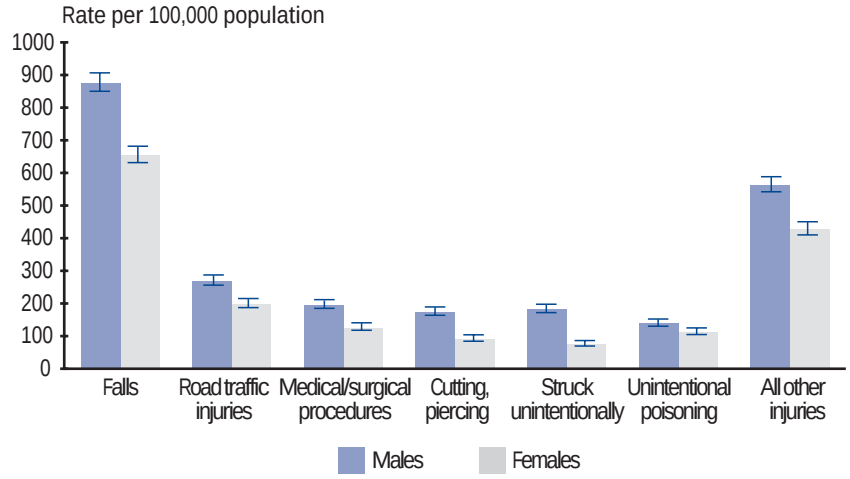
Figure 11.1.7: Injury hospitalisation among children aged less than 15 years, rate (and 95 percent confidence interval) by cause of injury and ethnic group, 1995



Source of data:
Ministry of Health 1997c.

Compared to girls, boys had higher injury hospitalisation rates for all major causes of injury (Figure 11.1.8). Overall, injuries caused boys to be hospitalised at a rate 42 percent higher than girls in 1995.

Figure 11.1.8: Injury hospitalisation among children, 0–14-year-olds, rate (and 95 percent confidence interval) by cause of injury and sex, 1995



Source of data:
Ministry of Health 1997c.

Changes over time

Major causes of child injury death for the periods 1980–84 and 1990–94 are shown in Table 11.1.3. Overall the number of deaths declined. However, this did not apply for some causes and for some age groups. In particular, while the number of road traffic deaths decreased for older children, it increased for infants. The same pattern applies for deaths caused by submersion or suffocation. The number of homicide deaths increased for children of all ages.

The injury death rate for all children aged under 15 years decreased from 21 per 100,000 (n=176) in 1980 to 15 per 100,000 (n=122) in 1994. However, the injury death rate for Māori children increased from 20 per 100,000 (n=22) to 29 per 100,000 (n=31) over the same period. If Māori had experienced the same injury death rate as non-Māori over this period, 51 fewer Māori children would have died.

Between 1980 and 1994, injury mortality rates declined by 39, 27 and 42 percent for the 1–4, 5–9 and 10–14 year age groups respectively. However, rates increased by 12 percent for infants.

Major causes of child injury hospitalisation in 1988 and 1995 are shown in Table 11.1.3. Changes in injury hospitalisation patterns do not necessarily reflect changes in the true incidence or severity of injuries. Instead they may reflect changes in other factors, such as hospital admission thresholds. Despite the number of child injury deaths decreasing, the number of hospitalisations has increased from 13,000 in 1988 to 17,000 in 1995. The number of hospitalisations from falls, in particular, increased over this period.

The injury hospitalisation rate for all children under 15 years old increased from 1629 per 100,000 in 1988 to 2044 per 100,000 in 1995. Over this period, the rate of hospitalisation of Māori children was 86 percent higher than that of non-Māori. If Māori had experienced the same injury hospitalisation rate as non-Māori, 1500 fewer Māori children would have been hospitalised each year.

Between 1988 and 1995, injury hospitalisation rates increased by 27, 20, 32 and 23 percent for the age groups 0–12 months, 1–4 years, 5–9 years and 10–14 years respectively.

Table 11.1.3: Child injury hospitalisations, number by cause and age group, 1988 and 1995

	1988					*1995*				
	<1	*1–4*	*5–9*	*10–14*	***Total 0—14***	*<1*	*1–4*	*5–9*	*10–14*	***Total 0—14***
Falls	180	1130	1704	1248	4262	258	1785	2703	1618	6364
Road traffic injuries	25	364	658	955	2002	27	369	734	809	1939
Medical/surgical	114	165	120	151	550	254	379	356	347	1336
Cutting, piercing	5	152	240	276	673	5	303	427	368	1103
Struck unintentionally	12	148	253	444	857	27	252	297	496	1072
Poisonings	42	838	46	33	959	58	867	55	57	1037
All other injuries	335	1316	749	955	3355	396	1644	961	1113	4114
All injuries	713	4113	3770	4062	12,658	1025	5599	5533	4808	16,965

Source of data:
Ministry of Health 1997c.

International comparisons

Compared to other OECD countries, New Zealand has a high child injury death rate. In the early 1990s, New Zealand's unintentional injury death rate for 0–4-year-olds ranked worst out of 21 OECD countries for which data were available.

Child injury mortality in New Zealand has recently been compared with the United States (Langley and Smeijers 1997). New Zealand's overall child injury mortality rate is similar to that of the United States, but there are marked differences for some causes of injury. New Zealand 0–14-year-olds have lower death rates from firearms and fire/flames. But they have higher rates of pedestrian deaths, suffocation (in the first year of life), falls, cutting/piercing, and poisoning (in the 10–14-year age group).

New Zealand's injury mortality rates for children aged 0–4 years and 5–9 years were nearly twice as high in 1994 as the rates reported for Australian children in the same age groups. However, injury mortality rates for New Zealand 10–14-year-olds were only marginally higher than for their Australian counterparts (Moller and Kreisfeld 1997).

Risk and protective factors

As described above, age, sex and ethnicity are all associated with risk of injury hospitalisation and death among children in New Zealand. Within an age-sex category, Māori children have high mortality and morbidity rates for most major causes of injury, particularly road traffic injuries and deaths, drowning and fall injuries. Māori children also have high rates of burn injuries and poisoning (Ministry of Health 1997b).

Age or developmental stage is a major determinant of risk of burn injuries, with risk being much higher for children between the ages of six and 24 months (Simon and Baron 1994). Left-handedness has been shown to be a risk factor for unintentional injury among children and adolescents (Graham et al 1993). Children with epilepsy are at greatly increased risk of submersion injury (Diekema et al 1993).

A number of aspects of the road environment have been identified as risk factors for child pedestrian injuries (Roberts et al 1995; Stevenson et al 1995). These factors include high volumes of traffic, high vehicle speeds and high density of curb parking.

A number of interventions have been shown to be effective in reducing child injuries. In a review of effectiveness of interventions to reduce child injuries, Dowswell et al (1996) concluded that there is good evidence for the effectiveness of bicycle helmet legislation in preventing cyclist head injuries, area-wide traffic calming measures in preventing pedestrian and cyclist injuries, child safety restraint legislation in reducing motor vehicle occupant injuries, child-resistant packaging in preventing poisoning, and window bars in preventing falls. For a range of other interventions there is good evidence for their effectiveness in changing behaviour, but less clear evidence on whether this necessarily translates into fewer injuries. Such interventions include bicycle helmet education, child restraint loan schemes, child restraint educational campaigns, pedestrian education aimed at children and parents, provision of smoke detectors, and parent education on home hazard reduction.

Nearly one-third of child injury deaths in the United States are considered to be readily preventable (Rivara and Grossman 1996). The proportion may be less in New Zealand, given that this country already has bicycle helmet laws, swimming pool fencing laws and has much tighter firearms control than the United States (Table 11.1.4).

Table 11.1.4: Possible scope for further injury prevention among children and adolescents

Injury	*Intervention*	*Potential decrease in mortality with available interventions**	*Deaths prevented per year if applied to NZ (ages 0–19 years)***
Motor vehicle occupant injuries	Airbags, lap/shoulder harness	40.0%	32
Pedestrian injuries	Community-wide traffic calming	39.2%	10
Motor cycle crashes	Helmets	15.1%	2
Bicycle injuries	Helmets	65.9%	5
Drownings	Pool fencing, prevention of bathtub drowning, prevention of alcohol use in adolescents	58.4%	15
Fire, burns	Fire-safe cigarette, smoke detectors	63.2%	6
Poisonings	Poison packaging, elimination of carbon monoxide deaths	59.6%	2
Falls	Window bars	42.1%	3
Firearm violence	Elimination or secure storage of handguns in the home	36.8%	1
Total (all injury deaths aged 0–19 years)	All the above strategies + others	31.1%	81

** Based on United States estimates, Rivara and Grossman 1996.*
*** Calculated by applying potential proportionate decrease by average annual number of NZ deaths 1990–94, ages 0–19 years.*
Source of data:
Ministry of Health 1997a.

Abuse and violence

Key points

- Abuse or violence can seriously damage a child's physical and psychological health, with the consequences often continuing to be experienced well into adolescence and adulthood.
- In the Christchurch Health and Development Study, one in 25 young people (4 percent) reported receiving severe or harsh and abusive treatment from one or both of their parents before the age of 16 years.
- In a 1993 telephone poll, 22 percent of parents thought it was acceptable in certain circumstances for a parent to hit their child or teenager.
- Ten percent of teenagers in the Christchurch Health and Development Study (17 percent of females and 6 percent of males) reported experiencing some kind of sexual abuse by age 16. About 6 percent of females and under 2 percent of males reported abuse involving attempted or completed intercourse.
- In an Otago study of women aged 18–65, one in five (20 percent) said they had been sexually abused in some way before age 12. Nearly a third (32 percent) reported being sexually abused before age 16. Four percent reported that the abuse included completed intercourse.
- The same study found that female sexual abuse was most likely to occur when girls were between eight and 12 years old. Males were the abusers in 98 percent of cases, with the victims in most instances knowing their abusers.
- Only 7 percent of the abused women in the Otago study had ever reported the abuse to social work services or the police.
- In New Zealand in 1994, 13 children died as a result of injuries deliberately inflicted by others, including child battering. Seven of these children were preschool children (0–4 years).
- In 1995, 194 children were hospitalised because of injuries purposely inflicted by others, an annual rate of 23 hospitalisations per 100,000 (the lowest rate recorded since 1988.
- Boys are more likely than girls to be hospitalised because of physical abuse, but girls are more likely than boys be hospitalised because of sexual abuse.
- Māori children continue to be hospitalised for child battering and other maltreatment at a greater rate than non-Māori children. However, there are indications that this differential has narrowed during 1993-95.
- In 1996/97, a total of 3901 offences against children were reported to the police, an increase of 190 on the previous year. As in earlier years, sexual offences were the most common (48 percent), followed by assault (29 percent) and child abuse (20 percent).
- In 1995, 73 percent of court convictions for violent sexual offences involved offences committed on children and teenagers under 17 years old (most commonly indecent assault and unlawful sexual connection).
- A wide range of factors have been found to be associated with children being at increased risk of sexual abuse or physical violence. In particular, research has highlighted the importance of social and family factors.
- Compared to parents in the 1960s and 1970s, fewer New Zealand parents now appear to be using stronger forms of physical punishment on their children, such as hitting with a strap or stick.

Introduction

Violence and abuse perpetrated by adults on children can include:

- deliberately inflicted physical injury (for example, assault or poisoning)
- emotional abuse (for example, severe or persistent emotional ill treatment or rejection)
- sexual abuse (rape and other forms of unwanted sexual contact or exposure)
- neglect (for example, exposing children to dangerous situations such as cold or lack of food) (Belsey 1993).

In addition, children can suffer psychological and emotional harm as a consequence of witnessing violence between other family members (Robertson and Busch 1994). School bullying is also recognised to be a significant source of harm (Maxwell and Carroll-Lind 1997).

Abuse or violence can have a major negative impact on a child's physical and psychological health, with the consequences often continuing to be felt well into adolescence and adulthood.

Physically abused or maltreated children are up to three times more likely than non-abused children to engage in violent behaviour and criminal offending, attempt suicide and experience anxiety disorders when they are teenagers. They are also more likely to be victims of violent assault (Fergusson et al 1997). This risk remains even after controlling for broader social and contextual factors associated with the incidence of childhood physical abuse (that is, poverty, low parent education, impaired parenting skills, stress). In other words, the direct psychological effects of physical abuse independently increase the chances of children experiencing these negative outcomes in adolescence.

Sexual abuse in childhood can also contribute to the development of a range of teenage and adult health problems. Women who report being sexually abused as a child are more likely than non-abused women to become pregnant before age 19, harm themselves deliberately and be diagnosed as having a post-traumatic stress disorder and other associated psychiatric symptoms. These outcomes are especially likely for women subjected to the more intrusive kinds of sexual abuse (for example, intercourse) (Romans et al 1997; Romans et al 1995b; Briggs and Joyce 1997; Bushnell et al 1992; Beautrais et al 1994; Sullivan et al 1995). Studies in Otago indicate that adult women subjected to highly intrusive sexual abuse in childhood are also more likely than non-abused women to have low self-esteem and experience sexual problems as adults (Romans et al 1996; Mullen et al 1996).

Even after controlling for family and other related background factors, in comparison to their non-abused counterparts, 18-year-olds in the Christchurch Health and Development Study who reported a history of childhood sexual abuse had higher rates of major depression, anxiety disorder, conduct disorder, substance use disorder, and suicidal behaviours (Fergusson et al 1996a). The highest risk of psychiatric disorder was identified in teenagers reporting childhood sexual abuse involving intercourse.

Results from the Christchurch study also confirm the international evidence suggesting that exposure to childhood sexual abuse increases the chances of teenagers engaging in consensual sexual activity at a younger age than their non-abused peers. Sexually abused children are also more likely to engage in sexual risk-taking and be sexually victimised as teenagers (Fergusson et al 1996b). Compared to their non-abused counterparts, teenage girls in the Christchurch study who reported childhood sexual abuse involving attempted or completed intercourse had higher rates of teenage pregnancy, early sexual activity, unprotected intercourse, and STDs. They also experienced higher rates of sexual victimisation (sexual assault and reports of rape or attempted rape) after age 16. These risks remained even after adjusting for the possible influences of other childhood and family factors, such as socioeconomic disadvantage and childhood adversity.

Mortality

In 1994, a total of 13 children aged 0–14 years were classified as having died as a result of deliberately inflicted injuries, including child battering. Seven of these children were preschool children, giving a rate of two deaths per 100,000 children aged 0–4 years (Figure 11.2.1).

Figure 11.2.1: Deaths of children aged 0–4 years from child battering and other maltreatment, and all other injuries purposely inflicted by others (ICD-9 codes E960–E969), 1980–94

Source of data:
Ministry of Health 1997a.

Notes:
Causes of death include fight, brawl, rape, corrosive or caustic substances, poisoning, hanging, strangulation, submersion, firearms, explosives, cutting and piercing and child battering and other maltreatment.
Rates are based on small numbers and should be interpreted with caution.

Kotch et al (1993) found that either physical abuse by a parent or caretaker, or sexual abuse by any person, could be attributed as the cause of death for 74 percent of the children aged 0–16 years fatally assaulted in New Zealand from 1978-87. Virtually all of the 58 children who died from physical abuse (95 percent) were abused by their parent, step-parent or the de facto spouse of their natural parent.

Morbidity

Because physical and emotional abuse can be inflicted on children in a wide variety of circumstances, judgements about national levels of child abuse and violence can only be made after carefully evaluating data from several sources. These include national mortality and hospitalisation data for child abuse, Ministry of Justice data on convictions for sexual offences against children, Children, Young Persons and Their Families Service statistics on the outcome of investigations for suspected child abuse, NZ Police statistics on offences against children, and results from studies of child abuse in community samples of children and adults.

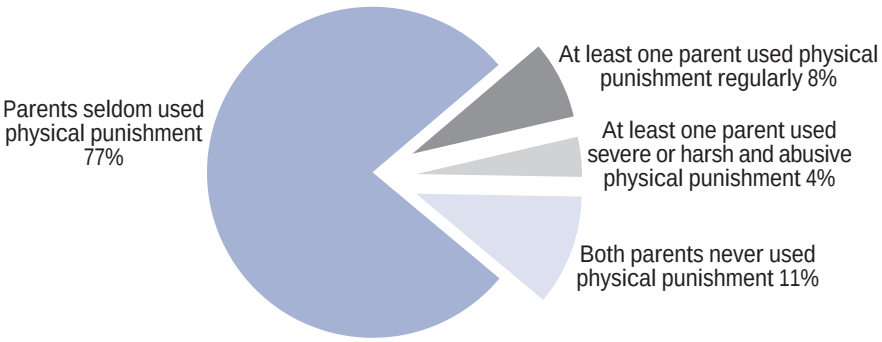
Community studies

Physical abuse

In the Dunedin Multidisciplinary Health and Development Study, 4 percent of 13-year-olds and 3 percent of 15-year-olds reported having been deliberately physically injured by another person (Gafford et al 1996).

At age 18, participants in the Christchurch Health and Development Study were asked about their levels of exposure to physical abuse in childhood (0–16 years). Four percent of these teenagers recalled experiencing severe or harsh and abusive treatment from their parents (Figure 11.2.2). Of this group, 65 percent reported being hit around the head or body with fists, 57 percent reported being hit around the head or body with a cane, strap or similar object, and 52 percent reported being kicked.[1] Eighty percent reported that this severe, harsh or abusive treatment resulted in them being injured (Fergusson and Lynskey 1997).

Figure 11.2.2: Levels of childhood physical abuse recalled by Christchurch 18-year-olds



Source of data:
Christchurch Health and Development Study, Fergusson and Lynskey 1997.

A 1995 study interviewed 259 children aged 11–13, living in the lower half of the North Island, about their experiences of violence in the previous nine months. One in ten reported they had been punched, kicked or beaten at least once by an adult over this time and half indicated they had been punched, kicked or beaten at least once by other children. One in five had been punished by smacking by an adult in the last nine months, while more than one in 20 had been punished by 'belting' by an adult (Maxwell and Carroll-Lind 1996).

1 Some participants recalled experiencing more than one type of severe physical punishment, thus percentages total more than 100.

Corporal punishment

In a 1993 telephone poll of 1000 New Zealanders aged 15 years or more, parents in the sample with children under the age of 17 were asked about their beliefs and practices related to the physical punishment of children (Maxwell 1993). While 88 percent agreed that there were certain circumstances when it was acceptable for a parent to punish a child by smacking, only 1 percent agreed that there were certain circumstances when it was all right for a parent to 'thrash' a child ('thrashing' being rated as the most severe kind of physical punishment). A minority of parents, 16–17 percent, agreed that there were certain circumstances when it was acceptable for a father to hit his teenage son as a punishment and, likewise, for a mother to hit her teenage daughter.[2] Only 9 percent agreed that a father could punish his teenage daughter by hitting in certain circumstances. Overall, 22 percent of parents indicated that they thought it was acceptable in certain circumstances for a parent to hit their child or teenager.

Of the parents who reported their children had misbehaved in the past week, 20 percent reported using smacking as a punishment. Reports of punishment using pushing, shoving or grabbing (3 percent) and hitting with a strap, stick or other object (2 percent) were relatively rare. No parent reported giving their child a 'thrashing' in the last week, but 11 percent reported having either hit or 'thrashed' their child some time in the past (Maxwell 1993).

Sexual abuse

When studied at age 18, 10.4 percent of the participants in the Christchurch Health and Development Study (17.3 percent of females and 6 percent of males) reported experiencing childhood sexual abuse before age 16 (Table 11.2.1). Just on 5.6 percent of females and 1.4 percent of males reported abuse involving attempted or completed intercourse (Fergusson et al 1996a).

Table 11.2.1: Christchurch girls' and boys' exposure to sexual abuse up to age 16 years

Type of experience	*Percent Girls*	*Percent Boys*
Reported no childhood sexual abuse	82.7	96.6
Reported non-contact childhood sexual abuse (indecent exposure or suggestions)	4.2	1.8
Reported contact childhood sexual abuse but not attempted or completed intercourse	7.5	2.8
Reported attempted or completed vaginal, oral or anal intercourse	5.6	1.4

Source of data:
Christchurch Health and Development Study Fergusson et al 1996a.

2 In the survey questionnaire 'hitting' was contrasted to 'smacking', with the latter presumed to be a less severe form of physical contact.

In a study of 3000 Otago women aged 18–65 in 1989–90, 20 percent reported being sexually abused in some way before age 12. Nearly a third (32 percent) reported being sexually abused before they were 16 years old (Anderson et al 1993; Romans et al 1995a). The sexual abuse identified included non-contact abuse involving exposure, spying or indecent suggestions, non-genital contact, non-penetrative genital contact, and attempted or completed intercourse. Nearly 4 percent of women reported being abused by way of completed intercourse (Table 11.2.2).

Table 11.2.2: Childhood sexual abuse recalled by Otago women aged 18–65 years

Experience	*Percent*
Total abused before age 12	20.3
Total abused before age 16	31.9
Non-contact abuse before age 16	6.8
Non-genital contact abuse before age 16	5.5
Touched in the genital area before age 16	7.1
Genital touching of the abuser before age 16	5.4
Attempted intercourse by abuser before age 16	3.5
Completed intercourse by abuser before age 16	3.8

Source of data:
Anderson et al, 1993.

Sexual abuse occurred most often when the women were between eight and 12 years of age. Males were the abusers in 98 percent of cases, and in most instances the victims knew their abusers (46 percent of abusers were acquaintances, 38 percent were family members and 15 percent were strangers). Sixty-five percent of victims were first abused before the onset of menses. For 10 percent of the abuse victims (about 2 percent of women taking part in the study), episodes of abuse were inflicted over a period of three or more years. Only 7 percent of the abused women had ever reported the abuse to social work services or the police. Abuse by close family members was much less likely to be reported than abuse by acquaintances or strangers (Romans et al 1995a; Romans et al 1996).

School bullying

High levels of physical and emotional bullying have been identified in New Zealand schools. In a 1995 study of 259 Form One and Two children (ages 11–13 years) from eight schools, 49 percent of children reported having been punched, kicked, beaten, or hit by other children at their school in the last nine months. Sixty-seven percent indicated they had been threatened, frightened or called names by other children. Over half recalled being ganged up on, left out or not spoken to by other children. About a quarter of children who had been physically or emotionally bullied by other children rated these experiences as being one of the three worst things that had ever happened to them (Maxwell and Carroll-Lind 1997).

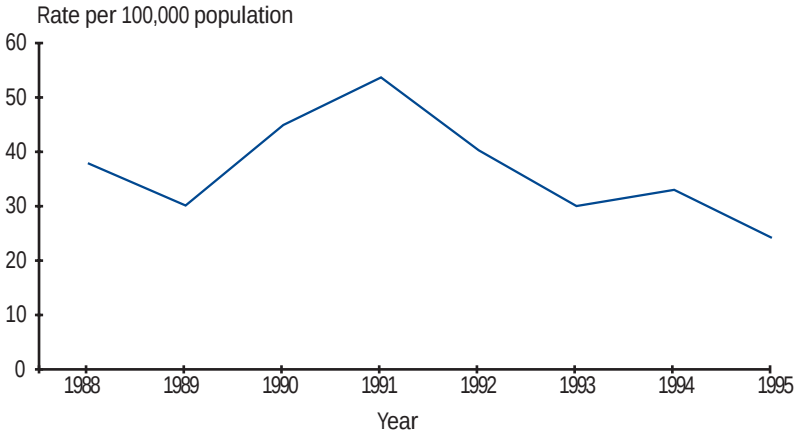
CYPFS statistics

Statistics collected by the Children, Young Persons and Their Families Service (CYPFS) show that for the 12 months to 1 July 1997, a total of 6128 New Zealand children or young people were assessed by the service as having been severely neglected or seriously abused physically, emotionally or sexually (Children, Young Persons and Their Families Service, personal communication, December 1997).

Hospitalisation

In 1995, a total of 194 children aged 0–14 were hospitalised for injuries classified as being purposely inflicted by others. The hospitalisation rate of 23 per 100,000 for 1995 was the lowest recorded in the eight years from 1988 (Figure 11.2.3).[3]

Figure 11.2.3: Hospitalisation of children aged 0–14 years for child battering and other maltreatment, and all other injuries purposely inflicted by others (ICD-9 codes E960–E969), 1988–95



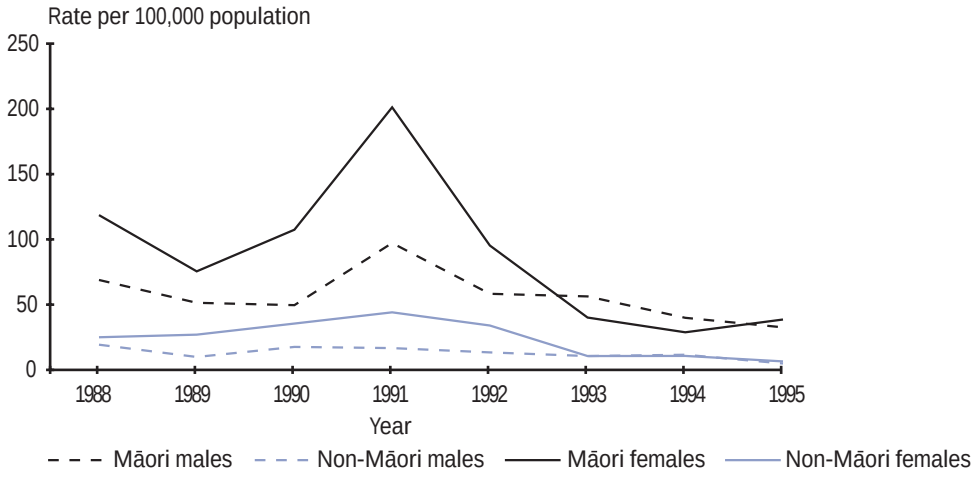
Source of data:
Ministry of Health 1997c.
Note:
Causes of hospitalisation include fight, brawl, rape, corrosive or caustic substances, poisoning, hanging, strangulation, submersion, firearms, explosives, cutting and piercing and child battering and other maltreatment.

In recent years, Māori aged 0–14 years have continued to be hospitalised for child battering and other maltreatment at a greater rate than non-Māori. However, there are indications that this differential has narrowed in the three years from 1993-95 (Figure 11.2.4).

A detailed study of child abuse hospitalisation data for 1988 showed that physical abuse was the main cause of these hospitalisations (61 percent), followed by sexual abuse (39 percent). Hospitalised boys were more likely to have been physically abused, while hospitalised girls were more likely to have been sexually abused. Hospitalisation for physical abuse was most common among preschool children (1–4 years old) and hospitalisation for sexual abuse was most common for younger primary school children (5–9-year-olds). In over 80 percent of physical abuse cases resulting in hospitalisation, the abuser was the child's parent or de facto parent (Kotch et al 1993).

3 It should be remembered that rates of hospitalisation are likely to be influenced by other factors apart from actual patterns of abuse.

Figure 11.2.4: Hospitalisation of children aged 0–14 years for child battering and other maltreatment (ICD-9 code E967), by sex and ethnicity, 1988–95



Source of data:
Ministry of Health 1997c.

Police statistics on offences against children

Data on offences against children reported to the New Zealand police provide another general indication of levels of childhood physical and sexual abuse. However, it is important to interpret these figures with caution as they may not reflect the true incidence of these offences. Reporting of offences against children may be influenced by a number of factors, including greater public emphasis on disclosure and increased public confidence that reports will be acted on by authorities (Ministry of Health 1996). It is also important to remember that only a proportion of reported offences result in charges being laid and a subsequent conviction in a court of law.

In 1996/97, a total of 3901 offences against children were reported to the police, an increase of 190 on the previous year. As in earlier years, sexual offences were the most frequent, making up nearly half (48 percent) of all the offences reported. Assault of children 0–13 years old made up a further 29 percent of the reported offences.

Convictions for sexual offences against children

Most court convictions for violent sexual offences are for offences committed on children and young people under 17 years of age. In 1995, there was a total of 1914 convictions in the New Zealand courts for violent sexual offences (rape, unlawful sexual connection, attempted sexual violation or indecent assault). Of these convictions, 746 (40 percent) involved offences on children under the age of 12, mainly girls. A further 634 (33 percent) involved children aged 12–16 years. Convictions were most commonly made for indecent assault and unlawful sexual connection. There were 60 convictions for rape involving girls younger than 12 years of age (Ministry of Justice 1996).

Changes over time

Physical abuse

Results from a nationwide telephone survey conducted in 1993 suggest that, compared to parents in the 1960s and 1970s, a smaller proportion of New Zealand parents may now be using more severe forms of physical punishment on their children, such as hitting with a strap or stick. The survey also identified what appears to be an increase in the proportion of parents using explanation or discussion with their children to deal with concerns, rather than physical punishment. However, over 80 percent of parents considered there were circumstances when it was all right for a parent to smack a child – a level of support for smacking very similar to that found in earlier New Zealand surveys (Maxwell 1993).

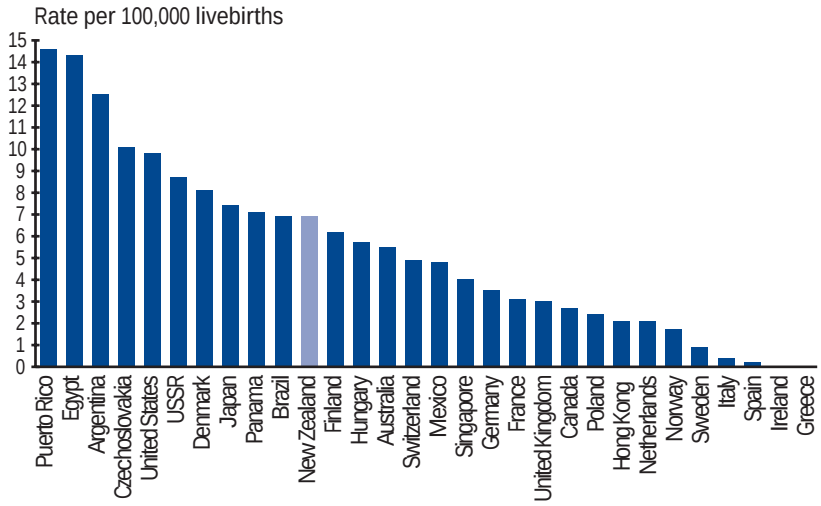
Sexual abuse

Results from the 1989–90 Otago study of women aged 18–65 years suggest that female childhood sexual abuse rates have remained roughly similar over the last 50 years. However, in keeping with findings in other countries, younger adult women appear to be more likely to report being subjected to the most intrusive forms of sexual abuse during childhood (that is, serious contact abuse, including intercourse) (Anderson et al 1993).

International comparisons

Comparing child abuse statistics across countries is very difficult, not least because of the many different recording systems used internationally (Ministry of Health 1996). The only recently published attempt to compare rates of abuse between countries used ICD-9 code data on homicide and 'deaths from injury undetermined whether accidentally or purposely inflicted' (Belsey 1993). While considerable caution must be used when comparing abuse statistics between countries, the results suggest that New Zealand's rate of infant abuse was probably higher between 1985 and 1990 than in other developed countries such as Australia, the United Kingdom, Ireland, Italy, France, Canada, Norway, and Sweden (Figure 11.2.5).

Figure 11.2.5: Presumed child abuse death rate of infants (aged 0–12 months) in selected countries, 1985–90



Source of data:
Belsey, 1993. 'Presumed child abuse death rate' calculated using national available data on ICD-9 codes B55 (homicides) and B56 (deaths from injury undetermined whether accidentally or purposely inflicted).

Note:
Comparisons between countries must be treated with caution. In countries with a small population where the annual number of infant homicides is low, small variations in the number of homicide deaths will produce large fluctuations in mortality rates.

Risk factors

New Zealand studies have identified a wide range of factors associated with children being at increased risk of sexual abuse or physical violence. In particular, research has highlighted the importance of social and family factors. Compared to their non-abused peers, young people in the Christchurch Health and Development Study (Fergusson and Lynskey 1997) who reported receiving abusive or harsh physical treatment in childhood were more likely to:

- come from single-parent families
- be the children of young mothers
- be the children of mothers who lacked formal educational qualifications
- experience more than two changes of parents or parent figures up to age 15
- experience high levels of parental conflict
- have parents with a history of criminal offending and substance use problems
- come from economically disadvantaged families
- experience childhood adversity and disadvantage (for example, a low level of preschool education, low participation in preventive health care)
- be exposed to childhood sexual abuse.

The Christchurch study found similar factors underlying the risk of sexual abuse (Fergusson et al 1996b). Compared to young women who reported no childhood sexual abuse, young women who reported childhood sexual abuse were more likely to:

- be raised by a young mother
- be raised by a mother who lacked formal educational qualifications
- experience at least one change of parent or parent figure before age 15
- be raised with a step-parent
- be exposed to high levels of parental conflict
- be raised in a disadvantaged home environment
- report frequent or severe physical punishment during childhood
- report poor parental attachment
- have parents who used illicit drugs
- have parents who reported alcohol problems or alcoholism.

The Christchurch Health and Development Study also identified clear overlaps between the risks for childhood sexual and physical abuse. Thirty-seven percent of the 18-year-olds who experienced severe or harsh physical punishment in childhood had also been sexually abused as children. This compares to 9.9 percent of 18-year-olds who did not experience severe or harsh physical punishment in childhood (Fergusson and Lynskey 1997).

Other New Zealand studies have identified factors that can exacerbate, or alternatively protect against, the long-term negative effects of childhood sexual abuse. Women sexually abused in childhood appear to be more likely to experience negative outcomes as adults if, during their childhood and adolescence, they also experience inadequate mother-father and parent-child relationships, early pregnancy and poor academic, sporting and social performance. Positive long-term outcomes are more common in abused women who have a good relationship with their father, who participated in sport as a teenager, and who have formed a supportive and positive relationship with a husband or partner in adulthood. These protective factors appear to help curb the development of low self-esteem and psychiatric disorder (Romans et al 1995a).

Studies suggest that child abuse may be more likely to occur in homes already characterised by spousal abuse (McKay 1994).

Other studies have found that, compared to children who do not live in households where spousal violence occurs, children living in households where spousal violence occurs are more likely to be anxious, withdrawn or distressed, and have lower self-esteem. They are also more likely to be disobedient, aggressive and destructive. In addition, there are indications that boys and girls brought up in households where spousal violence occurs are themselves more likely to become spouse abusers as adults (Robertson and Busch 1994).

Results from a 1995 study suggest that about half of New Zealand 11–13-year-olds have witnessed adults verbally or physically fighting each other. This violence was witnessed mainly at home or in the community and usually involved at least one of the children's parents (Maxwell and Carroll-Lind 1996).

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Chapter 12

Mental Health

Key points

- Studies suggest that about one in four New Zealand children are likely to experience some kind of significant mental health problem before they reach adolescence.
- Up to age 13 years, boys are more likely than girls to experience a mental health disorder. This pattern reverses by age 15 years, with girls becoming more likely than boys to experience a disorder.
- About 39 percent of 5–9-year-olds with a mental health disorder are likely to go on to have the same or a different kind of mental health problem later in childhood or adolescence.
- Biological (including genetic), socioeconomic, family, school, and peer group factors are all thought to be important in shaping the patterns of mental health disorder found in New Zealand children.
- Compared to primary school children from advantaged families, primary school children from disadvantaged families are three and a half times more likely to experience a persistent or recurring mental health problem in childhood or early adolescence.
- Suicide among children under 15 years of age is comparatively rare, with rates being substantially higher in the 15–19 and 20–24 year age groups. In the five years from 1990 to 1994, a total of 21 children aged 5–14 years committed suicide.
- Studies suggest that by age 16 at least 15 percent of New Zealand young people have either attempted suicide thought seriously about doing so. From 1988 to 1995, a total of 958 children aged 0–14 were hospitalised as a result of suicide attempts.
- Psychologically difficult or traumatic childhood experiences can increase the risk of suicide during adolescence or early adulthood.
- Almost 90 percent of young people who attempt suicide have some kind of pre-existing mental health problem.

Introduction

Mental illness can significantly impair a child's social and educational development, in turn restricting their abilities and opportunities later in adolescence and adulthood (Birmaher et al 1996; Ministry of Health 1997a).

The diagnostic and statistical manuals of the American Psychiatric Association are widely used to classify mental illness (American Psychiatric Association 1994). While mental illness can take a variety of forms, five broad groupings are most commonly diagnosed in children: anxiety disorders, mood disorders, conduct disorders, attention deficit disorders, and substance dependence disorders (Table 12.1).

Table 12.1: Features of the most common childhood mental health disorders

Anxiety disorders	Persistent fears or phobias which interfere with a child's daily life and development. Separation anxiety is an intense state of anxiety or panic that can arise when a child is separated from a caregiver or other close person.
Mood disorders	Depression is the most common mood disorder in childhood. It is marked by persistent feelings of sadness, worthlessness or hopelessness, as well as perhaps other symptoms like fatigue, restlessness, disturbed sleep and appetite, irritability, crying, or antisocial behaviour. In some children, depression can be accompanied by episodes of mania (with the disorder then being known as bipolar disorder).
Conduct disorders	When a child persistently engages in anti social or aggressive behaviours such as theft, lying, fire lighting, truancy, destruction of property, cruelty to animals, bullying, or starting fights.
Attention deficit disorders (ADD)	These conditions affect a child's activity levels, concentration and ability to learn. The child is very inattentive, impatient and impulsive, and has great difficulty finishing things.
Substance dependence disorders	This category includes mental health disorders related to the use of alcohol, marijuana and other drugs.[1]

Source:
Adapted from American Psychiatric Association, 1994.

1 See Chapter 8, Alcohol, Cannabis and Other Substances.

Morbidity

The Dunedin and Christchurch longitudinal health and development studies have each tracked the age-specific prevalence of mental health disorder in samples of nearly 1000 children born in the 1970s. While both studies contain a smaller proportion of Māori, Pacific and Asian children than the New Zealand population as a whole, they remain the most reliable sources of New Zealand-specific information on the prevalence of mental health problems in young people.

The studies show that children can experience a significant mental health problem at any age, but that the chances of this occurring increase as young people approach and enter adolescence. In 1975, when assessed at three years of age, 11 percent of the children in the Dunedin Multidisciplinary Health and Development Study were identified as having a behavioural or emotional problem (McGee et al 1996). Eight years later, at 11 years of age, 17 percent were assessed as having a mental health disorder of some kind (Fergusson et al 1997). At age 15 the proportion rose to 22 percent (Fergusson et al 1997). Overall, the Dunedin study concluded that up to one in four children may have experienced at least one significant mental health problem in the period from age three to preadolescence (McGee et al 1996).

When assessed in 1992 at 15 years of age, 24 percent of the children in the Christchurch Health and Development Study were considered to have some kind of psychiatric disorder (Fergusson et al 1997). Some of these disorders would have been very mild and of short duration. Others would have been quite disabling and persistent.

The preschool years

Hyperactive behaviour, management problems and shy or inhibited behaviour were the three most common psychological problems identified in the three-year-olds assessed by the Dunedin Multidisciplinary Health and Development Study in 1975/76. Altogether, 11 percent were found to have at least one of these problems (McGee et al 1996).

A 1992 study estimated that about 22 percent of Dunedin preschoolers had some kind of behaviour problem, ranging from mild to quite serious disorders (Pavuluri et al 1995).

In the Dunedin Multidisciplinary Health and Development Study, 2 percent of three-year-olds were assessed as having a hyperactive behaviour disorder. Another three percent were described by their mothers as being difficult to manage. These children, most of whom were boys, all had associated low levels of cognitive and academic performance, including poorer comprehension and language skills. In most cases, these difficulties continued into adolescence (McGee et al 1996).

The same study found that five-year-old boys with hyperactivity, low IQ scores and delayed motor development were more likely than five-year-old boys without these features to go on to engage in antisocial behaviours, including crime, later in childhood and adolescence (Moffitt and Harrington 1996).

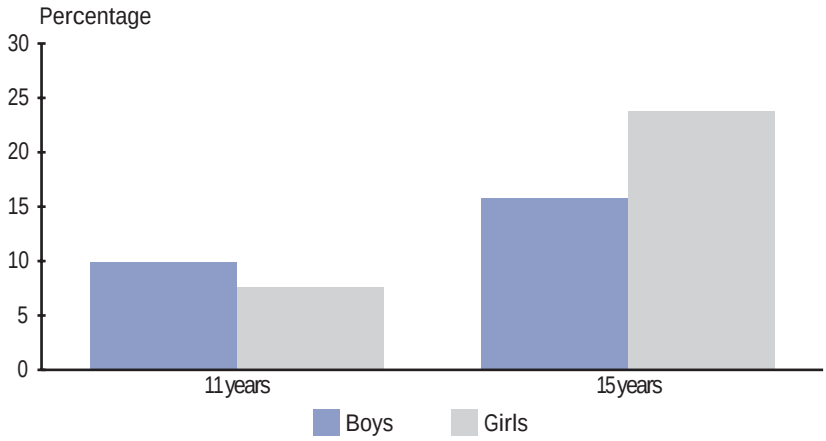
The primary school years

At assessments completed between the ages of five and nine years, 23 percent of boys and 12 percent of girls in the Dunedin Multidisciplinary Health and Development Study were identified as having some kind of mental health disorder (McGee et al 1996). At ages 11 and 13 years, boys continued to be twice as likely as girls to have a disorder. Inattention-hyperactivity disorders, conduct disorders and anxiety disorders were the most common problems at 11 years of age. Childhood depression was comparatively rare (McGee et al 1992).

The secondary school years

The Dunedin study found that the gender imbalance in the prevalence of mental health disorder began to reverse after age 13 years. Mental health disorder became increasingly prevalent in girls while the rates for boys remained reasonably steady (Figure 12.1). By 15 years of age, girls in the study were more likely than boys to have a mental health disorder (McGee et al 1992).

Figure 12.1: Prevalence of mental health disorder in Dunedin boys and girls at age 11 and age 15 years



Source of data:
Dunedin Multidisciplinary Health and Development Study, McGee et al 1992.
Note:
Although other reports from the Dunedin study identified higher prevalence of mental disorder among children at ages 11 and 15 years, the broad sex differences shown here remained.

Similarly, in the Christchurch Health and Development Study, by age 15 years girls outnumbered boys in virtually all diagnostic groups, especially depression and anxiety. The main exceptions were inattention, aggressive conduct disorder and social phobia, where boys continued to be disproportionately represented (Fergusson et al 1993).

Why girls become more vulnerable to mental health disorder as they enter adolescence is unclear. Overseas research suggests that a range of factors may be important including genetics, biological changes during puberty, personal attitudes, and social expectations (Birmaher et al 1996).

Other conditions

A number of rarer but potentially very disabling mental health disorders are also found in children. Overseas studies indicate that pure autism occurs in about five in every 10,000 children under 14 years old. Childhood schizophrenia is found in about one in 1000 children aged five and over, while obsessive-compulsive disorder is found in about one in 500 children assessed in clinical settings (Fergusson et al 1997).[1]

Persistence of childhood mental health problems

Some children can have mental health problems that persist or recur over the course of several years. In the Dunedin Multidisciplinary Health and Development Study, 39 percent of children assessed as having a mental health disorder at some stage between the ages of five and nine were subsequently found to have the same or a different kind of mental health disorder later in their childhood or adolescence (McGee et al 1996).

Having said this, the absence of mental health disorder in childhood does not necessarily mean that the adolescent years will be problem-free. Four out of five of the teenagers in the Dunedin study assessed as having a mental health disorder at age 15 did not have any kind of mental health disorder when assessed earlier at 11 years of age (McGee et al 1992).

Subsequent work by the Dunedin study shows that about 74 percent of 21-year-olds with a mental health disorder have also experienced mental health problems in childhood or adolescence (Newman et al 1996).

Comorbidity

Comorbidity is when a person is diagnosed with two or more different kinds of mental health disorder. In the Christchurch Health and Development Study, 41 percent of 15-year-olds with a mental health disorder were found to have a second type of mental health disorder, either at age 15 years or when they were younger (Fergusson et al 1993).

Hospitalisation for psychiatric disorder

In New Zealand it is very rare for children to receive inpatient psychiatric hospital care. In 1993, 42 children (24 boys and 28 girls) aged 0–14 years were admitted for the first time to a psychiatric hospital, psychiatric unit, or a facility for people with intellectual disability (5.3 per 100,000). This was less than 1 percent of all first admissions made to psychiatric institutions that year. The most common psychiatric diagnosis given to these children was 'other personality disorders' NZHIS 1996).

1 See Chapter 4 for information on intellectual disability, intellectual handicap and intellectual developmental delay. Data on rates of long-term disability linked to psychiatric disorder are also presented.

Ethnicity

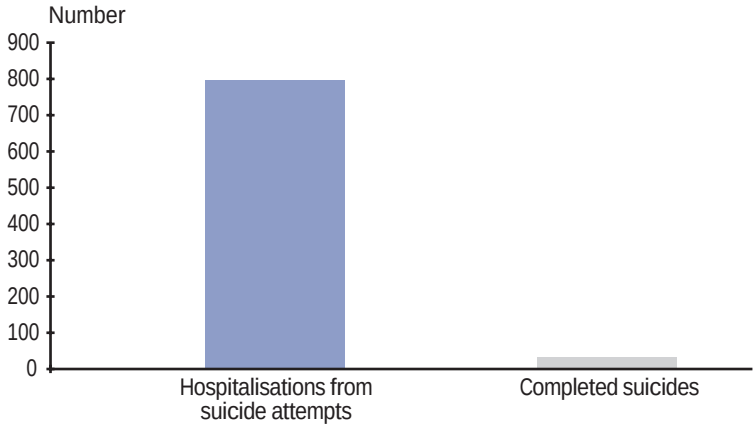
To date, no statistically reliable community studies have conclusively identified differences in the rates of mental health disorder among Māori, Pacific, Asian and European 0–14 years old. However, when assessed at 18 years of age in 1995, Māori in the Christchurch Health and Development Study were 1.5 times more likely than non-Māori to be identified as having a mental health disorder (Fergusson et al 1997). This raises the possibility that younger Māori teenagers are also more likely than their non-Māori counterparts to have a mental health disorder.

Attempted suicide

Despite the comparative rarity of completed suicide among younger adolescents, a notable proportion attempt suicide or think seriously about doing so.[2] Three percent of young people in the Christchurch study reported making a suicide attempt by 16 years of age. Most of these suicide attempts were relatively minor and did not require medical treatment. Girls (4.2 percent) were more likely than boys (1.9 percent) to report making these attempts (Fergusson and Lynskey 1995a). A further 12 percent of the Christchurch group reported thinking about committing suicide sometime in their life (Fergusson and Lynskey 1995b). A more recent study of Auckland and Northland senior high school students found that 19 percent had considered taking their own lives. Eight percent said they had made at least one suicide attempt (Coggan et al 1995).

In the six years between 1988 and 1993, a total of 620 New Zealand children aged 0–14 years (13.1 per 100,000) were hospitalised as a result of suicide attempts (Coggan 1997).

Figure 12.2: Number of completed suicides and hospitalisations for suicide attempts by New Zealand 0–14-year-olds, 1988–94



Source of data:
Coggan 1997 and Ministry of Health 1996, 1997.

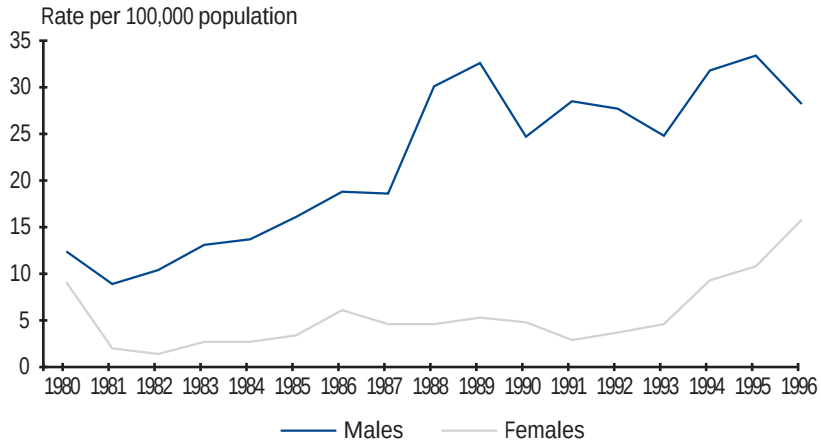
2 While the term 'attempted suicide' is used in this report, it is important to remember that some people who deliberately inflict harm on themselves do not seriously wish or expect to die as a result (Skegg 1997).

Changes over time

The Christchurch and Dunedin longitudinal studies followed up children born in the early and mid 1970s. Lack of comparable recent data means that it is difficult to say if New Zealand children born in the 1980s and early 1990s are likely to experience the same or different rates of mental disorder. However, research in countries comparable to New Zealand suggest that the prevalence of at least some kinds of childhood mental health disorders may be increasing. Compared to earlier decades, mood disorders, particularly mild and moderate depression, are now more widespread, especially in young adults. These disorders are also appearing at an earlier age (Birmaher et al 1996; Klerman 1988; Klerman and Wiesman 1989).

In the 1980s, New Zealand's male youth suicide rate increased sharply. The female youth suicide rate has increased sharply in the 1990s (Figure 12.3). From 1991 to 1995, about a third of all male youth suicides and more than 40 percent of all female youth suicides were in the 15–19-year age group (NZHIS 1997b). Over this same period, annual suicide rates amongst 15–19-year-old Māori male and females were generally similar or slightly higher than for their non-Māori counterparts, although the actual number of Māori suicide deaths in this age group was small in statistical terms and this trend therefore should be interpreted with caution.

Figure 12.3: Suicide trends for 15–19-year-olds, 1980–96



Source of data:
Ministry of Health 1997a, 1997b.

Because childhood adversity is an accepted risk factor for youth suicide, the generally upward trend in suicide rates in the 15–19 year age group recorded in recent years (Figure 12.3) suggests that an increasing proportion of New Zealand children may be experiencing psychologically and emotionally damaging events in their lives.

International comparisons

Rates of childhood mental health disorder identified in the Christchurch and Dunedin health and development studies are comparable to those found in similar studies in the United Kingdom and North America. In general, about 20–25 percent of children are thought to experience at least one significant behavioural or emotional disorder by age 15 years (McGee at al 1990; McGee et al 1992).

Large scale surveys of children and adolescents in other countries have identified reasonably similar predictors of mental health disorder to those found in the Christchurch and Dunedin studies. They include family adversity, stressful life events, learning disabilities, and parental mental health problems (Bird 1996).

Studies in other Western societies suggest that each year up to about 5 percent of adolescents may make a suicide attempt. In some overseas community studies the prevalence of suicidal thinking in young people has been found to be as high as 20–25 percent (Birmaher et al 1996).

In 1995, New Zealand's rates of suicide for men and women in the 15–24 age group were some of the very highest when compared to other OECD countries for which reliable statistics were available (NZHIS 1997b).

Risk factors

The determinants of mental health are complex and a wide range of possible risk factors have been linked to the development of mental health problems. These include: biological (including genetic), family, peer group, and broader sociocultural and economic factors (Collings and Ellis 1997).

Although much is still to be learned about the origins of mental health problems in New Zealand children, a number of risk factors have been identified. The Christchurch Health and Development Study found that children from low-income families living in relatively impoverished socioeconomic circumstances, and who had caregivers with limited formal education, were more likely to experience a mental health disorder. Styles of interpersonal communication and contact in a child's family and home life were also important predictors of disorder, as were multiple difficulties in the home environment such as marital conflict, caregiver separation and divorce, caregiver mental illness, exposure to abusive experiences, and excessive or inadequate supervision and discipline. Outside the home, experiences at school and with peers were also linked to changes in children's mental health status. For example, children with unresolved learning difficulties were found to be more prone to engage in antisocial behaviours, especially if other members of their peer group encouraged these behaviours (Fergusson et al 1997).

Risk factors for the persistence of disorder

The Dunedin Multidisciplinary Health and Development Study found a strong association between mental health problems in children aged 5–9 years and family disadvantage, in particular, poor maternal mental health and a history of parental separations. Poor language and literacy skills

were also factors linked to an increased risk of mental health disorder (McGee et al 1996). Primary school children from disadvantaged families were three and a half times more likely than primary school children from advantaged families to go on to have a history of persistent or recurring mental disorder later in childhood or early adolescence (McGee et al 1996).

The study also found that the risk of children developing certain kinds of mental illness increased if the children had a previous history of other kinds of mental illness. For example, boys with depression at 11 years of age were more likely to have a conduct disorder at age 15 (McGee et al 1996).

Risk factors for comorbidity

Children in the Christchurch Health and Development Study with anxiety disorders were six times more likely than other children to get a depressive disorder later in their childhood or adolescence. Children with conduct disorders were also at greater risk of substance use disorders. The study's researchers concluded that adolescent comorbidity may arise because different kinds of mental health disorder are capable of being triggered by similar childhood risk factors and life processes (Fergusson et al 1997).

Risk factors for attempted suicide and suicidal thinking

The causes of youth suicide in New Zealand remain difficult to pinpoint, although a wide range of factors have been identified as possibly important. These include: discrepancies between people's aspirations and the means available to achieve them (Deavoll et al 1993), the comparatively secular and 'normless' nature of New Zealand society, young people's patterns of substance use and risk-taking, and young people's reluctance to seek help when experiencing personal problems (Skegg 1997).

A recent Canterbury study investigated the personal life histories of 129 young people aged 13–24 years who made one or more medically serious suicide attempts. Compared to non-suicide attempters, suicide attempters were exposed to significantly higher levels of adversity in childhood. They were more likely to experience parental separation, poor relationships with parents, parental violence, parental alcohol problems, parental imprisonment, poor economic circumstances, placement in care during childhood, and childhood sexual and physical abuse. They were also more likely to be socially disadvantaged and to have a psychiatric disorder. Nearly 90 percent of the individuals who made serious suicide attempts met diagnostic criteria for mental disorder (Beautrais et al 1996).

An identical rate of psychiatric disorder was found among children in the Christchurch Health and Development Study who attempted suicide between the ages of 14 and 16. Almost 90 percent of the suicide attempters had at least one psychiatric disorder, compared to 35 percent of the non-attempters (Fergusson and Lynskey 1995a).[3]

3 Although psychiatric disorder is common among people who attempt or complete suicide, most people with a psychiatric disorder do not commit suicide (Skegg 1997).

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Chapter 13

Chronic Disease: Asthma, Cancer, Diabetes, and Oral health

Asthma

Key points

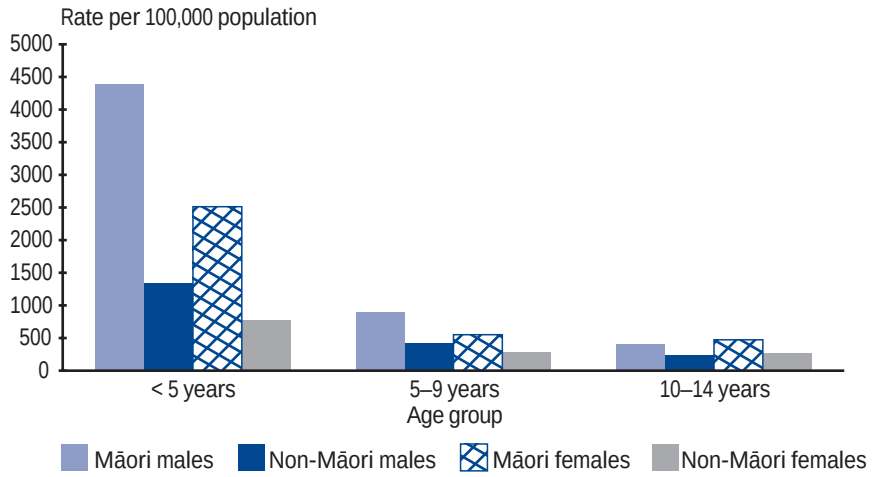
- In 1995, asthma accounted for 5869 hospitalisations among New Zealand 0–14-year-olds. Few New Zealand children now die from asthma. There were two deaths in 1994.
- An estimated 44 percent of New Zealand children experience asthma symptoms at some time before age 15. The prevalence of childhood asthma has increased over the last 20–30 years.
- There is a worldwide trend towards an increasing prevalence of asthma in childhood. The precise reason for this is unknown although multiple factors are thought to be contributing. Improved awareness of symptoms and diagnostic transfer do not fully account for the reported changes.
- Compared to other OECD countries, New Zealand and Australia appear to have high rates of childhood asthma.
- In New Zealand, ethnic differences in reported prevalence rates for childhood asthma are small and cannot account for the large disparity between the rates of hospitalisation for asthma evident for Māori and non-Māori. Between 1988 and 1995, Māori children were consistently hospitalised for asthma at more than twice the rate of non-Māori. Differential access to asthma care, including prophylactic medication, has been implicated in this disparity.
- The predisposition to asthma is genetically determined and is gender expressed, with males more likely to exhibit symptoms in childhood than females.
- Important allergens responsible for the development of asthma include house dust mites, the mould *Alternaria* and cats. These allergens are often more prevalent in sub-standard housing.
- Tobacco smoke is implicated as a factor contributing to the earlier onset and increased severity of childhood asthma.
- There is a critical period in early childhood when asthma may be induced in the genetically vulnerable child. Reducted exposure to allergens and other modifying factors such as maternal smoking, diet and infection early in life is thought to influence the development and severity of asthma.
- Adequate preventative medical care and asthma management by children and their families is important for effectively controlling asthma and preventing severe attacks.

Morbidity and prevalence

In 1995, there were 5869 hospitalisations of children due to asthma. Māori continue to be hospitalised at a higher rate than non-Māori, with the Māori rate being more than twice the non-Māori rate in 1995. Males aged 0–14 years are more likely to be hospitalised from asthma than are females. For the Māori population, the male rate was 69 percent higher than the female rate in 1995. For non-Māori, the male rate of hospitalisation from asthma exceeded the female rate by 53 percent (Ministry of Health 1997d).

Children aged 0–4 years accounted for 68 percent of all hospitalisations in the 0–14 year age group in 1995. Disparities between Māori and non-Māori and between males and females were most marked in this age group. Māori aged 0–4 years were three times as likely to be hospitalised for asthma as non-Māori in 1995 (Figure 13.1.1).

Figure 13.1.1: Hospitalisation due to asthma, 0–14-year-olds, 1995



Source of data:
Ministry of Health 1997d.

Over the last decade in New Zealand, a range of different measures of asthma prevalence and different tools for obtaining these measures has been used. This has resulted in wide variations in reported estimates of asthma prevalence. More recently, during the 1990s, a standard protocol for measuring asthma prevalence has been developed for the International Study of Asthma and Allergies in Childhood (ISAAC) (Asher et al 1995). The ISAAC protocol, which is now practised internationally, uses a video and a standard questionnaire to assess a range of respiratory symptoms such as 'wheeze' (Crane et al 1995).

Table 13.1.1 presents summary results from three recent New Zealand childhood asthma prevalence studies that have used the ISAAC protocol.

Table 13.1.1: Prevalence of asthma in New Zealand children, 1993–95

	Ages 5–8 years	*Ages 12–15 years*
Wheeze in last 12 months	26–28%[1,2,3]	22–28%[1,4]
Wheeze ever	44%[2]	44%[2,4]
Asthma ever	24–28%[1,2]	18–30%[1,3]

1 Moyes et al 1995
2 Wilkie et al 1995
3 Robson et al 1993
4 Pearce et al 1993

Males aged 0–14 years are more likely than females to experience asthma symptoms. Consistently higher rates of asthma symptoms and diagnosed asthma have been reported for males (Mitchell 1983; Shaw et al 1994; Ministry of Health and Statistics New Zealand 1993; Horwood et al 1985). One study involving a birth cohort found that boys were twice as likely as girls to develop asthma by age six years (Horwood et al 1985).

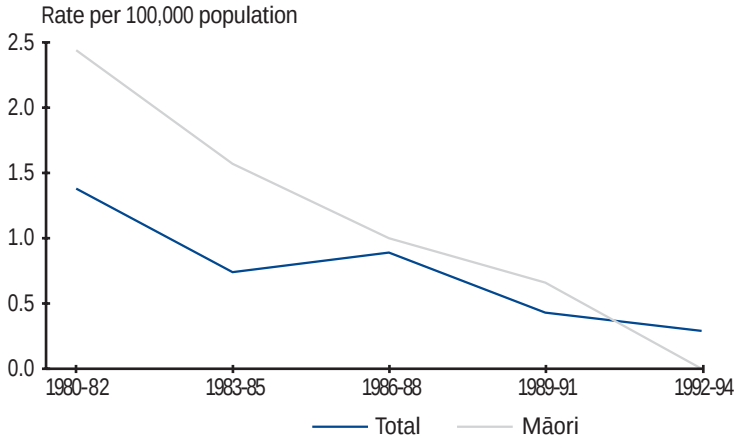
A number of New Zealand studies have reported on asthma prevalence by ethnicity. At most, there appear to be only minor differences in the prevalence of asthma between different ethnic groups in New Zealand. Any minor differences in the prevalence rates detected do not account for the high disparity between Māori and non-Māori rates of childhood hospitalisation for asthma. Nor does it appear that differences in socioeconomic status or passive smoking fully account for these differences. It is more likely that these differences are due to differential access and delivery of asthma care, including access to prophylactic medication (Robson et al 1993; Ministry of Health and Statistics New Zealand 1993; Shaw et al 1994; Pattermore et al 1989; Mitchell 1983).

Changes over time

There have been two epidemics of asthma deaths in New Zealand in the last 20 years, the first in the late 1970s and the second in the early 1980s. These epidemics have been attributed in part to the introduction and use of two specific asthma drugs (Beasley et al 1990; Pearce et al 1990; Pōmare et al 1992).

Few New Zealand children die each year due to asthma. In 1994, there were two asthma deaths recorded for children aged 0–14 years (Ministry of Health 1997b). The childhood asthma death rate has decreased since the early 1980s. Between 1980 and 1994 there was a five-fold decrease in the recorded death rate for 10–14-year-olds (Figure 13.1.2). A similar decline in the number of asthma deaths has occurred in both the total and Māori populations, as well as for both males and females (Ministry of Health 1997b).

Figure 13.1.2: Deaths due to asthma, 0–14-year-olds, 1980–94



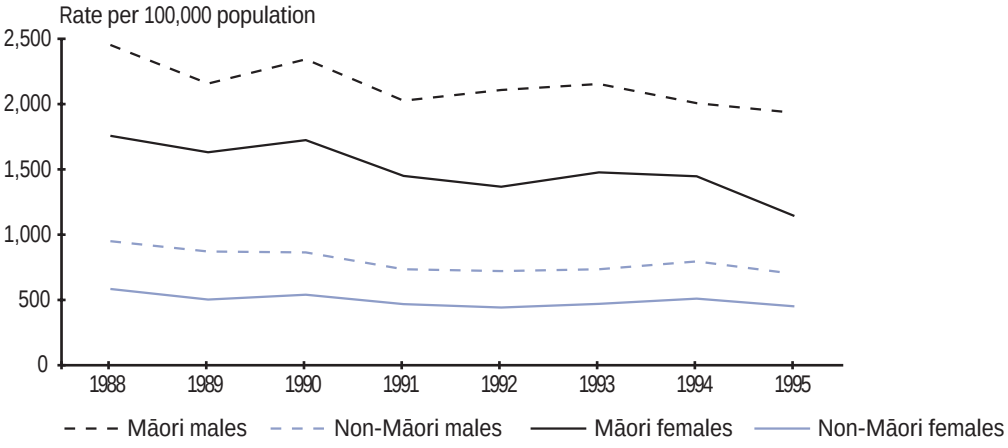
Source of data:
Ministry of Health 1997b.

Between 1988 and 1995, the hospitalisation rate for asthma decreased 25 percent for the 0–14 year age group. Māori hospitalisations for this age group also decreased in this period (by 27 percent), meaning that the disparity between the total and Māori asthma hospitalisation rates essentially remained unchanged (Figure 13.1.3).

The greatest rate decrease was recorded for Māori females aged 0–14 years. They had a 35 percent decrease in asthma hospitalisations between 1988 and 1995. This contributed to a decrease in the disparity between the Māori and non-Māori female rates. In 1988, Māori females were hospitalised at three times the rate of non-Māori females. By 1995 this disparity had decreased to 2.5 times. Over the same period the disparity between Māori and non-Māori males increased slightly (from 2.6 times in 1988 to 2.8 times in 1995).

Between 1988 and 1995, within the 0–14 year age group children aged 5–9 years experienced the largest drop in rates of hospitalisation for asthma, a 39 percent decrease (Ministry of Health 1997d).

Figure 13.1.3: Hospitalisation due to asthma, 0–14-year-olds, 1988–95



Source of data:
Ministry of Health 1997d.

The reported prevalence of childhood asthma is increasing worldwide. Surveys undertaken during the past 20 years using similar methods throughout have found a consistent increase in the prevalence of asthma (Newman-Taylor 1995; Mellis 1994).

A number of possible reasons have been postulated to account for this increase, although no single factor has yet been conclusively identified as the main contributor. Current reviews of available data indicate that this ubiquitous increase in asthma prevalence for children is likely to result from an interaction of multiple factors. Explanations proposed include an increase in allergen exposure (particularly to house-dust mites), higher rates of tobacco smoking in women of child-bearing age, and dietary changes (Newman-Taylor 1995).

While both physician and public awareness of the signs and symptoms of asthma have increased in the last 10–15 years, available data suggest that the increase in asthma prevalence in children cannot be fully accounted for by diagnostic transfer (Weiss et al 1993; Mellis 1994).

A number of studies have reported a significant increase in the prevalence of asthma symptoms in New Zealand children (Mitchell 1983; Mitchell and Asher 1994; Kljakovic 1991).

Mitchell and Asher (1994) reported a 33 percent increase in the prevalence of respiratory symptoms, with no significant increase in diagnosed asthma or severity indices. Mitchell (1983) found in an earlier study that the prevalence of asthma had doubled between 1969 and 1982. Kljakovic (1991) reported a 56 percent increase in the prevalence of 'wheeze' between 1971 and 1990.

International comparisons

During the asthma mortality epidemic of the 1980s, New Zealand children were dying from asthma at a higher rate than most other OECD countries. However, by the early 1990s, the New Zealand death rate from asthma compared favourably with the rest of the OECD (PHC 1994a).

Prevalence rates of asthma and respiratory symptoms appear to be higher for New Zealand and Australian children than for children in other OECD countries (Pearce et al 1993; Barry et al 1991; Burr et al 1994). A four-country comparative study of 12–15-year-olds using the ISAAC protocol found that Australian and New Zealand children reported higher rates of severe asthma than European children. However, rates of milder asthma symptoms did not vary significantly between countries (Pearce et al 1993). Two other studies found that Australian and New Zealand 12-year-olds had higher prevalence rates for a number of asthma symptoms than 12-year-olds from other OECD counties (Barry et al 1991; Burr et al 1994).

Risk and protective factors

The predisposition to asthma and atopy is genetically determined and is probably present in up to one-third of the population. The disease asthma is present once the pathological process responsible for altered airway responsiveness has developed. It is switched on by irritants, allergens or infectious agents. Studies have suggested that hereditability could account for 60 or 70 percent of hay fever and asthma. This genetic susceptibility is also gender expressed, with males more likely than females to exhibit asthma symptoms early in childhood (Landau 1993).

Three important groups of allergens thought to be responsible for asthma in children include house-dust mites, the mould *Alternaria*, and cats (Woolcock et al 1995; Newman-Taylor 1995). Living in substandard housing often results in excess exposure to these indoor allergens (Malveaux and Fletcher-Vincent 1995).

The frequency of allergic disease is increased in the offspring of women who smoke. Babies born to women who smoke have diminished lung function compared to those born to non-smokers (Newman-Taylor 1995). Tobacco smoke has also been implicated in the earlier onset and increased severity of asthma (Weiss et al 1993; Landau 1993; Abramson 1995; Malveaux and Fletcher-Vincent 1995).

Viral infections are well recognised to be precipitating factors in asthma attacks, especially respiratory infections before the age of two (Weiss et al 1993, Landau 1993).

There is no substantive evidence that air pollution is an important factor inducing allergies and asthma (Newman-Taylor 1995; Weiss et al 1993).

The current belief is that there is a critical period in early infancy when asthma may be induced in the genetically vulnerable child. Reduced exposure to allergens, as well as other modifying factors such as maternal smoking, diet, and infection early in life, is thought to influence the development and severity of childhood asthma (Mellis 1994; Woolcock et al 1995; Newman-Taylor 1995; Landau 1993).

Other important contributing factors are thought to include the provision of appropriate preventative medical care, and children and their families possessing good asthma knowledge and management skills (Malveaux and Fletcher-Vincent 1995).

Cancer

Key points

- There were 126 newly diagnosed cancers registered in New Zealand among children aged 0–14 years in 1994. Childhood cancer deaths totalled 35 in 1994.
- Leukaemia and brain tumours are the most common childhood malignancies in New Zealand, accounting for about 30 percent and 20 percent of newly diagnosed cases respectively.
- Since the mid-1960s there has been a significant increase in the incidence of leukaemia among New Zealand children. This increase appears to be mostly confined to the 0–4 year age group. This is consistent with similar increases in the incidence of childhood leukaemia reported in other western populations.
- Survival rates for children with leukaemia have improved greatly in recent years. This has been attributed to improved treatment protocols.
- There has been a major increase in the incidence rate of brain cancer in New Zealand since the 1950s. In particular, a significant increase has been found in the 0–4 year age group. These findings are consistent with worldwide trends in the reported incidence of brain cancer. However, brain cancer rates have remained stable in New Zealand children in more recent years.

- Only about one quarter of all brain cancer patients survive five years.
- There are only three known causes of childhood cancer: ionising radiation, genetic factors (for specific types of cancer) and cancer chemotherapy drugs. Industrial and agricultural chemicals are being assessed as possible causes of childhood cancer, but it is too early to make definitive statements about whether they have a causal role.
- Some childhood exposures such as cigarette smoke, ultraviolet light, and viruses may contribute to cancers that develop many years after childhood.
- Children are thought to be more susceptible than adults to the carcinogenic effects of some types of exposures, such as radiation.

Mortality

All cancers

Cancer is the second most common cause of death (after injuries) for children aged 1–14 years (Ministry of Health 1997b). Thirty-five children under 15 years of age died from cancer in 1994 (an age-specific rate of 4.3 per 100,000). Males accounted for 18 of the 35 deaths and Māori deaths numbered seven (Table 13.2.1).

Table 13.2.1: Childhood cancers, incidence and mortality, by sex and ethnicity, 1994

	Mortality (1994)		*Incidence (1994)*	
	No.	**Rate*	*No.*	**Rate*
Total	35	4.3	127	15.5
Males	18	4.3	72	17.2
Females	17	4.3	55	13.8
Relative risk for males		1.0		1.2
Māori	7	6.5	19	17.7
Non-Māori	28	3.9	108	15.2
Relative risk for Māori		1.7		1.2

** Age-specific rate per 100,000 population.*
Source of data:
Ministry of Health 1997b, 1998.

Leukaemia

Leukaemia (ICD-9 codes 204–208) accounted for 12 of the 35 childhood cancer deaths in 1994 (an age-specific rate of 1.5 per 100,000).

Brain cancer

Brain cancer (ICD-9 code 191) accounted for six of the 35 childhood cancer deaths in 1994 (an age-specific rate of 0.7 per 100,000). Only about a quarter of all brain cancer patients survive five years. Many of these patients remain impaired after aggressive surgical intervention or die later from a recurrence of the condition (Preston-Martin et al 1993).

Morbidity

Hospitalisations

In New Zealand in 1995, there were 1628 hospitalisation episodes involving children aged 0–14 years due to cancer (Ministry of Health 1997d). These cancer hospitalisations comprised 1 percent of all hospitalisations for this age group (excluding newborns).

Registrations

A national cancer register records newly diagnosed primary cancers in New Zealand. A statutory requirement to report cases to the register did not take effect until 1995. However, completeness of cancer registration was high even before then, at about 97 percent in the early 1990s (Dockerty et al 1997). Therefore, as in other countries in which cancer registries operate, cancer registration data are used to estimate cancer incidence in New Zealand. Registration data presented below exclude in situ cancers.

Childhood cancer registrations totalled 126 in 1994, an age-specific rate of 15 per 100,000. Males accounted for 71 (56 percent) of the 126 new cancers registered. Nineteen (15 percent) of the total registrations were for Māori children and 14 (11 percent) were Pacific children. Children aged 0–4 years accounted for 53 (42 percent) childhood cancers in 1994, compared with 38 (30 percent) aged 5–9 years and 35 (28 percent) aged 10–14 years.

There is a difference between Māori and non-Māori in the histological type of brain tumours diagnosed. Medulloblastoma is the most common paediatric brain-cancer among Māori. However, astrocytoma is the most common type among non-Māori children in New Zealand, as it is in most Western populations (Preston-Martin et al 1993).

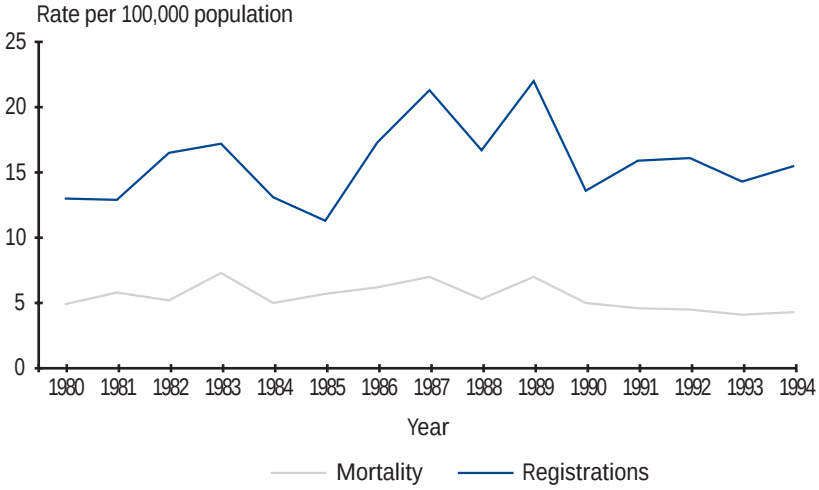
Changes over time

All cancers

Overall, childhood mortality rates for cancer decreased slightly in New Zealand between 1980 and 1994 (Figure 13.2.1). Between 1988 and 1995, an average annual increase in the rate of hospitalisations of 5 percent was recorded for children with cancer (Ministry of Health 1998). The proportion of hospitalisations that were daypatients increased across the period. However, the average inpatient length of stay decreased during this time.

Between 1980 and 1994, childhood cancer registration notes fluctuated from year to year, but there was no overall trend (Figure 13.2.1). The stable incidence yet lower mortality may indicate improvements in the treatment of childhood leukaemia over this period.

Figure 13.2.1: Childhood cancers, incidence and mortality, 1980–94



Source of data:
Ministry of Health 1997b, 1998.

Leukaemia

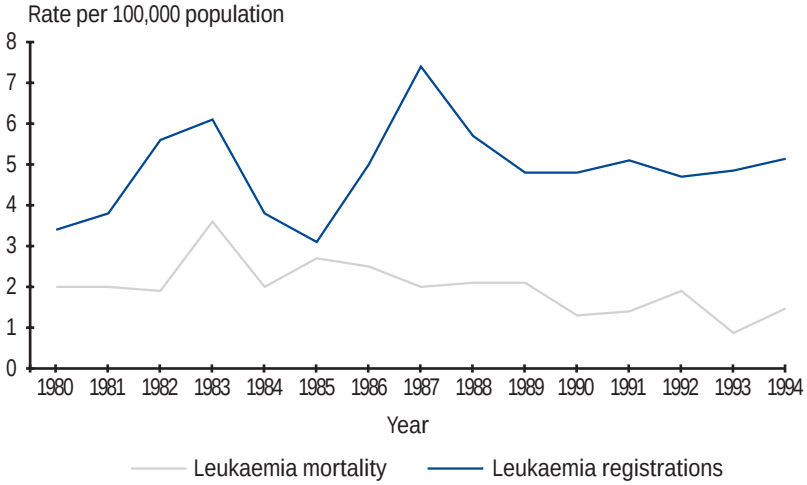
Mortality rates for childhood leukaemia remained relatively stable between 1980 and 1994 (Figure 13.2.2).

A recent study has analysed the time trends for childhood leukaemia using the New Zealand cancer registry data (Dockerty et al 1996). A highly significant increase was found in the incidence of leukaemia in children aged under five years between the mid-1960s and 1990. The increase was present in boys and girls and in the combined non-Māori population. For Māori, no overall statistically significant trend was detected. For the 5–9 and 10–14 year age groups, no statistically significant increases or decreases in the incidence of leukaemia were found.

The increase in incidence in the 0–4 year age group was attributed to an increase in acute lymphoblastic leukaemia (ALL). The incidence of acute non-lymphoblastic leukaemia (ANLL) decreased overall during the period being investigated. The risk of ALL was lower in the Māori than the non-Māori population. The risk of ANLL was higher among Māori. (Dockerty et al 1996). The increases in the incidence of ALL among children aged 0–4 or 1–4 years are consistent with findings reported in other countries (Dockerty et al 1996).

Survival rates for children diagnosed with leukaemia have improved greatly in recent years. One New Zealand study (Bailey and Lewis 1996) compared survival and disease-free survival of children with ALL over two periods, 1980–86 and 1986–92, when two different treatment protocols were used. Actuarial survival (life expectancy) increased from 53 percent to 93 percent and disease-free survival increased from 47 to 88 percent between the two periods. This significantly improved outcome was attributed to improved treatment.

Figure 13.2.2: Childhood leukaemia, incidence and mortality, 1980–94

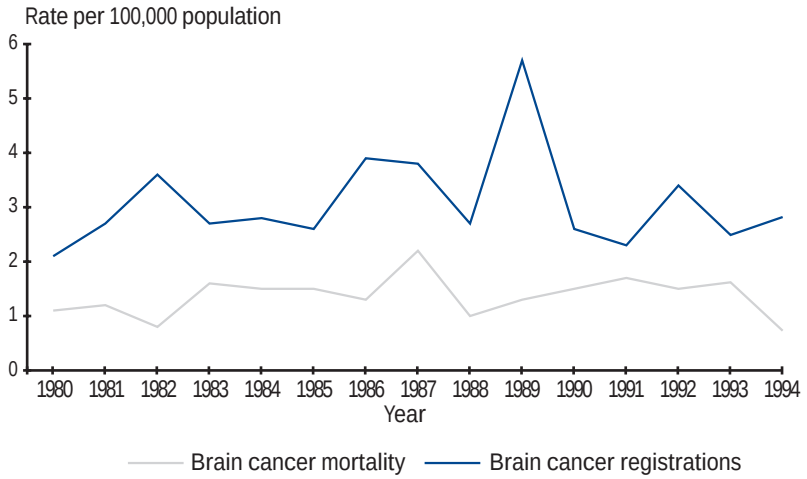


Source of data:
Ministry of Health 1997b, 1998.

Brain cancer

A worldwide increase in the incidence of brain cancer has been reported for recent decades. A New Zealand study analysed brain cancer registrations between 1948 and 1988 and found the age-standardised rate doubled over the 40 year time period. Statistically significant increases were found for several age groups, including the 0–4 year age group (Preston-Martin et al 1993). However, neither mortality rates nor registration rates of brain cancer in children changed significantly in more recent years (Figure 13.2.3).

Figure 13.2.3: Childhood brain cancer, incidence and mortality, 1980–94



Source of data:
Ministry of Health 1997b, 1998.

Risk factors

Environmental carcinogens

There are only three known causes of childhood cancer; ionising radiation, genetic factors (for specific types of cancer) and cancer chemotherapy drugs. Industrial and agricultural chemicals are being assessed as possible causes of childhood cancer, but it is too early to make definitive statements about whether they have a causal role.

Some childhood exposures, such as; cigarette smoke, ultraviolet light, and viruses, may contribute to the development of cancers that arise many years after childhood.

For some exposures, such as radiation and pesticides, there is limited evidence to suggest that children are more susceptible to the carcinogenic effects than adults who have been similarly exposed. There are also suggestions of possible interactions between environmental carcinogens and genetic susceptibility (Zahm and Devesa 1995).

The most well-established cause of childhood cancer is radiation, especially high dose radiation exposure such as that experienced by atomic bomb survivors and children receiving radiation therapy for cancer. The effects of lower dose radiation exposure are less well understood (Zahm and Devesa 1995).

The possibility that neonatal vitamin K prophylaxis increases the risk of leukaemia has not been excluded, but at most the risk is small (Von Kries 1996).

Sociodemographic factors

Several studies, but not all, have reported a higher risk of childhood leukaemia for first-born children. With a reduction in family sizes, the proportion of first-born children in the population will have increased (Dockerty et al 1996).

There is some evidence that children from the higher socioeconomic groups have an increased risk of childhood cancer, but findings are inconsistent (Dockerty et al 1996).

Diabetes

Key points

- Insulin-dependent diabetes mellitus (IDDM) is an important chronic childhood condition that is associated with major risks to health status in adulthood. It accounts for around 300 hospitalisations a year in the 0–14 year age group.
- The work on the epidemiology of IDDM in New Zealand is consistent with international work showing that a complex mixture of genetic and probable environmental factors (such as viral agents) are involved in IDDM causation.
- There is evidence that the incidence of IDDM in the 0–14 year age group is increasing in New Zealand.

Introduction

Insulin-dependent diabetes mellitus (IDDM) is a disorder in which there is a deficiency of the hormone insulin. This is due to autoimmune destruction of insulin-producing cells in the pancreas. IDDM is also known as type I diabetes or juvenile-onset diabetes. Without treatment, individuals with IDDM develop severe metabolic disturbances which can lead to death.

This section focuses entirely on IDDM, although a small proportion of diabetes in the 0–14 year age group could be classified as 'maturity-onset diabetes of youth' rather than IDDM.

Mortality

While diabetic ketoacidosis can result in death, diabetes causes fewer than one death per year in the 0–14 year age group in New Zealand (Ministry of Health 1997c). There were no deaths reported for 1994, the most recent year for which data were available at the time this document was written. However, diabetes is an important cause of premature death among adults and was the primary cause of death in an average of over 400 individuals per year in the period 1992–94 (Ministry of Health 1997c).

Morbidity

There is a significant burden associated with IDDM in terms of individuals requiring a daily injection of insulin, the need for them to closely monitor their metabolic control and the requirement for constant attention to dietary intake.

Incidence

Various estimates for the annual incidence of IDDM in children and adolescents are shown in Table 13.3.1.

Hospitalisations represent both new (incident) cases and readmissions for those with established IDDM. Between 1991 and 1995 there was an average of 296 hospitalisations per year for diabetes in the 0–14 year age group (an average annual rate of 36.8 hospitalisations per 100,000 population).

Table 13.3.1: Studies on the incidence of diabetes in New Zealand

Population	*Annual incidence per 100,000*	*Study*
0–15-year-olds, all NZ (1968–1972)	8.9	Crossley and Upsdell 1980
0–15-year-olds, Auckland (1977–84)	9.3	Elliott and Pilcher 1985
0–15-year-olds, Canterbury (1982–85)	10.2	Rewers et al 1988
0–14-year-olds, Canterbury (1982–92)	14.7	Brown 1993
0–19-year-olds, Canterbury (1990–92)	19.5	Forbes et al 1993

Hospitalisation rates are one indicator of the more severe end of the morbidity spectrum associated with diabetes. Hospitalisation data for Canterbury in 1983 showed that 15 percent of people with IDDM were hospitalised during the year (although 42 percent of these admissions were not recorded as being associated with diabetes) (Brown et al 1985).

Hospitalisations for ketoacidosis may also indicate how well IDDM in childhood is being managed. However, the recent data for New Zealand 0–14-year-olds indicate no significant trends. For the period 1988–90, the annual rate of hospitalisation for diabetic ketoacidosis was 9.8 per 100,000 children aged 0–14 years, compared to 10.4 per 100,000 children in 1991–93 and 9.4 per 100,000 children in 1994–95.

Prevalence

An estimate of the prevalence of IDDM in Canterbury in 1986 was 1.1 per 1000 population aged 0–19 years (Mason et al 1987). A more recent estimate for Auckland was 1.5 cases per 1000 children aged 0–14 years (Vogel et al 1996). This latter figure made diabetes the seventh most prevalent chronic childhood condition after asthma, mental retardation, autism, congenital heart disease, cerebral palsy, and cleft lip.

The prevalence of serious complications among young people with IDDM in New Zealand has not been described. Nevertheless, diabetes in adulthood is associated with complications from cardiovascular disease (including cerebrovascular disease), eye disease (retinopathy, glaucoma, cataracts, blindness), kidney disease, neuropathy, and foot and lower limb problems (Ministry of Health 1997a; Simmons 1996b).

Gender

For the period 1991–95, the average annual diabetes hospitalisation rate for females was higher than males (40.2 versus 33.4 per 100,000 population respectively) (Ministry of Health 1997d). No significant gender differences in IDDM incidence have been found in other New Zealand studies (Crossley and Upsdell 1980; Mason et al 1987).

Ethnicity

Lower incidence rates of IDDM for Māori and Pacific children are apparent in data for Auckland (Elliott and Pilcher 1985). In addition, hospitalisation rates are lower for Māori than non-Māori (21.6 versus 39.0 per 100,000 population respectively). Pacific peoples appear to have a generally low rate of IDDM in comparison to other ethnic groups (Unger and Foster 1992).

Age

Data from a Canterbury study (Scott and Brown 1991) show an increase in the annual incidence of IDDM with age, as does the national hospitalisation data (Table 13.3.2). The prevalence of IDDM more than doubles between age 0–9 years and 10–19 years.

Table 13.3.2: Incidence and hospitalisation rates for diabetes by age group (per 100,000 population)

Study details	*Age (years)*		
	0–4	*5–9*	*10–14*
Incidence rate – Canterbury (Scott et al 1992)	8.2	8.9	19.8
Annual hospitalisation rate – all New Zealand (primary diagnosis for 1991–95) (Ministry of Health 1998)	18.6	28.5	65.8

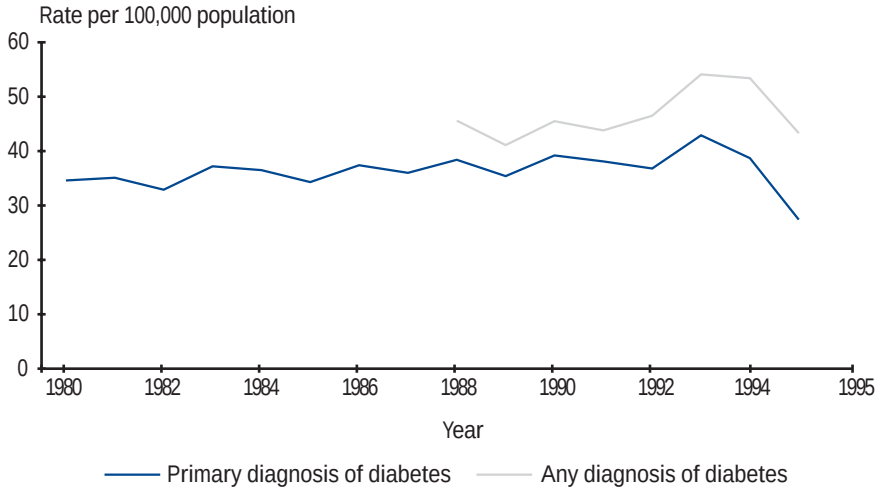
Changes over time

Data from Canterbury indicate no change in the incidence of IDDM among 0–19-year-olds over time (Scott et al 1992). However, data for Europeans in Auckland from 1977 to 1986 are suggestive of a 10 percent increase (but not in Māori and Pacific peoples) (DERI 1990). The national hospitalisation data shown in Figure 13.3.1 show no overall trend.

Hospitalisation rates are also influenced by changes in coding practices, especially where data are based on diabetes as the primary diagnosis alone (Simmons 1996a). The limitations of hospitalisation data for reflecting the true incidence of diabetes have been described before (Simmons 1996a).

The national trend data disguise the fact that within regions there are marked year-to-year fluctuations in risk and even the suggestion of 'epidemics' of IDDM in children (Brown 1993). A significant seasonal association to the onset of IDDM has also been found in boys, with incidence rates being significantly higher in winter than in summer (Scott et al 1992). Seasonal variation in the incidence of IDDM has been observed worldwide (reviewed by Dorman et al 1995).

Figure 13.3.1: Diabetes (ICD-9 code 250) hospitalisation, 0–14-year-olds,1980–95



Source of data:
Ministry of Health 1997d.
Note:
Communication with New Zealand Health Information Service suggests that changes in the coding of diabetes occurred in 1995, with a shift from the use of diabetes in the primary diagnostic categories to its use as a secondary or tertiary diagnosis. Further work to clarify this issue is required.

International comparisons

Compared to the incidence in other countries, New Zealand is 'mid-ranked' with rates similar to those in Australia, the United Kingdom and North America, but lower than in Scandinavian countries (Karvonen et al 1993).

There is some evidence that IDDM is increasing globally (LaPorte et al 1995).

Risk factors

IDDM is the outcome of a complex mixture of genetic and environmental factors. However, worldwide at least 60 percent of childhood diabetes, and perhaps as much as 95 percent, is considered to be environmentally triggered and therefore potentially preventable (DERI 1987). The following discussion on risk factors briefly considers the major issues.

Genetic factors

Genetic factors are clearly important in the causation of IDDM (Dorman et al 1995). Around 20 percent of individuals with IDDM have a family history of IDDM. A genetic susceptibility for IDDM has been identified in children and adolescents in the Canterbury region of the South Island (Brown 1993; Forbes et al 1993).

Nutrition

A number of nutritional practices have been associated with an increased risk of IDDM. These include the consumption of smoked/cured mutton (Helgason and Jonasson 1981), high dietary nitrosamimes (Dahlquist et al 1990) and high nitrate in water supplies (Kostraba et al 1992). There have also been numerous studies examining the early consumption of cow's milk and/or the absence of breastfeeding as possible risk factors for IDDM. Overall, it would seem that further studies are required to clarify the issue of cow's milk and other possible dietary factors.

Viruses

The global epidemiology of IDDM (WHO DIAMOND Project on Epidemics 1992) and occurrences of spatial clustering of IDDM (for example, Bodington et al 1995) are suggestive of a role for viral agents. Coxsackie viruses and cytomegalovirus infection have been implicated, but the evidence is still not conclusive and there may be complex host-environment interactions (Dorman et al 1995). Congenital rubella infection appears to be associated with the subsequent development of IDDM (for example, Forrest et al 1971). While the evidence for a role for rubella is quite good, it is equivocal for mumps (Dorman et al 1995).

New Zealand data supporting the importance of environmental causes for IDDM mainly derive from the epidemic nature of IDDM described in the South Island Canterbury region (Brown 1993) and the data suggestive of winter peaks (at least among boys (Scott et al 1992)).

Other risk factors

Older maternal age may be a risk factor for IDDM in the children of such women. Young maternal age (under age 25 years) may be a risk factor for children in the case of mothers with IDDM.

Other possible risk factors for IDDM that have limited relevance to the 0–14 year age group include: the occurrence of pregnancy and various other stressful life events. New Zealand research has indicated that women aged 15–19 years who become pregnant have more than a five-fold increased risk of developing IDDM compared to other women (Crossley and Upsdell 1980).

The evidence for the role of socioeconomic factors in IDDM is contradictory (Dorman et al 1995).

Oral health

Key points

- Major improvements in oral health of New Zealand children occurred in the 1970s and 1980s. Progress slowed in the 1990s and has worsened since 1994.
- In 1996, five-year-old children had an average of 1.7 missing or filled primary teeth (mft), and 55 percent had no dental caries. Form Two children had an average of 1.5 missing or filled permanent teeth (MFT), and 45 percent were caries-free.
- Form Two Māori children have on average 60 percent more MFT than non-Māori Form Two children.
- Children in socioeconomically disadvantaged families have more caries than others.
- Two important sources of fluoride to inhibit dental caries are fluoridated water and fluoride toothpaste. An estimated 47 percent of New Zealanders receive fluoridated water through reticulated supplies. Eighty-six percent of toothpaste sold in New Zealand contains fluoride.
- Children whose home water supply is fluoridated have 31 percent fewer mft at age five years and 26 percent fewer MFT at Form Two than those without access to fluoridated water.
- New Zealand children have better dental health than children in most other OECD countries.

Morbidity

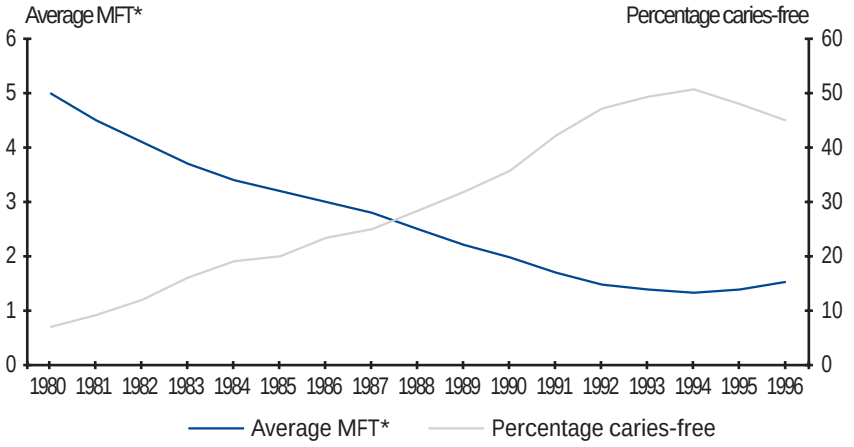
Dental caries (tooth decay) is a chronic, progressive, and largely irreversible disease. At a microscopic level, very early decay of tooth surfaces can be stopped and reversed. However, once cavitation has occurred, treatment and restorative dental procedures are required. Good dental care is essential for health, self-esteem and pain-free living. Poor oral health can lead to problems in eating and talking. Serious and persistent dental problems can disrupt school, work and social life. Untreated caries can result in the need for admission to hospital for acute medical complications.

Information on dental health of children at age five years and in Form Two (approximate 12 years of age) is collected annually by Crown Health Enterprise school dental services. In 1996 (the most recent year for which data are available), the average number of missing or filled primary teeth (mft) in five-year-old children was 1.7 per child. Fifty-five percent of five-year-olds were caries-free. In Form Two children, the average number of missing or filled permanent teeth (MFT) was 1.5 per child, and 45 percent were caries-free.

Changes over time

The dental health of children in New Zealand has been improving steadily for many years. Form Two MFT scores declined at approximately 8 percent per year from 1980 until the early 1990s, then rose slightly (Figure 13.4.1). The same trend is mirrored in the proportion of Form Two children with no caries. This proportion rose steadily from 1980 until the early 1990s, then declined after 1994.

Figure 13.4.1: Dental health of Form Two children, 1980–96



Source of data:
Ministry of Health 1997c.
Note:
** Missing or filled permanent teeth.*

Possible explanations for the recent increase in caries in Form Two children include:

- greater use of radiography, which has enhanced sensitivity for detecting caries, by school dental services (Ministry of Health 1997c)
- increasing socioeconomic marginalisation of substantial sections of New Zealand society resulting in higher levels of disease (Thomson 1997).

International comparisons

As in New Zealand, child oral health has improved in most developed countries over the last quarter century (Newbrun 1992; Bjarnason et al 1993; Li et al 1993; Downer 1995; Nadavosky and Sheiham 1995). Improvements in the prevalence of dental caries in 12-year-old children has been greater in New Zealand than in most OECD countries. In the early 1970s, New Zealand ranked only 10th best out of 11 OECD countries for which data were available. By the early 1990s, New Zealand ranked fourth best out of 26 OECD countries that provided data (OECD 1997).

Risk and protective factors

Water fluoridation

In areas supplied with reticulated drinking water, water fluoridation is the most effective and efficient means of reducing dental caries (WHO 1994). A review of research in New Zealand as well as the United States, Australia, Britain, Canada, and Ireland concluded that water fluoridation:

- reduces dental caries by 30–60 percent in the primary teeth of children
- reduces caries by 20–40 percent in the mixed dentition in ages 8–12 years
- reduces caries by 15–35 percent in adolescents aged 14–17 years (Newbrun 1989).

Caries prevalence increases within a few years in communities where water fluoridation is discontinued (Stephen et al 1987; Attwood and Blinkhorn 1991; Ripa 1993).

In New Zealand, Form Two children who lived in areas supplied with fluoridated water had 26 percent fewer MFT than those in areas without fluoridated water, in 1996. At age five years, the difference was 31 percent. This is an underestimate of the protective effect of fluoride since children whose home water supply is not fluoridated have normally gained at least some degree of protection against dental caries by exposure to fluoride via:

- fluoridated water away from home (for example, at school)
- fluoridated water supplied to a previous home residence
- fluoride toothpaste
- fluoride tablets
- topical fluoride treatment by dentists and dental therapists
- dietary sources of fluoride.

Exposure to fluoride via drinking water has an advantage over other sources in that high fluoride exposure is less likely. High exposure to fluoride can cause dental fluorosis (mottling of tooth enamel).

Water fluoridation is of greatest benefit to those with poorer dental health, including Māori and lower socioeconomic groups. Thus, water fluoridation contributes to equity of health outcomes (PHC 1994b). The estimated effectiveness of water fluoridation in preventing decayed, missing or filled primary teeth (dmft) in five-year-olds in New Zealand is shown in Table 13.4.1 (Treasure and Dever 1992).

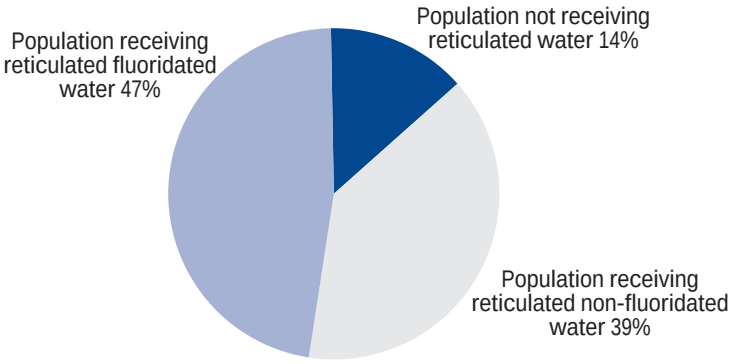
Table 13.4.1: Protective effect of water fluoridation against dental caries in 5-year-old New Zealand children, by socioeconomic group

*Socioeconomic group**	*dmft*** prevented per child*
Groups 1 and 2 (least socioeconomic disadvantage)	0.2
Groups 3 and 4	2.5
Groups 5 and 6 (greatest socioeconomic disadvantage)	3.5

** Determined by parental socioeconomic status (Elley and Irving 1985).*
*** Decayed, missing or filled primary teeth.*
Source of data:
Treasure and Dever 1992.

Nearly half of all New Zealanders were supplied with reticulated fluoridated water in 1996 (Ministry of Health 1997c, Figure 13.4.2).

Figure 13.4.2: Population receiving fluoridated and non-fluoridated reticulated water, and population not receiving reticulated water, 1996



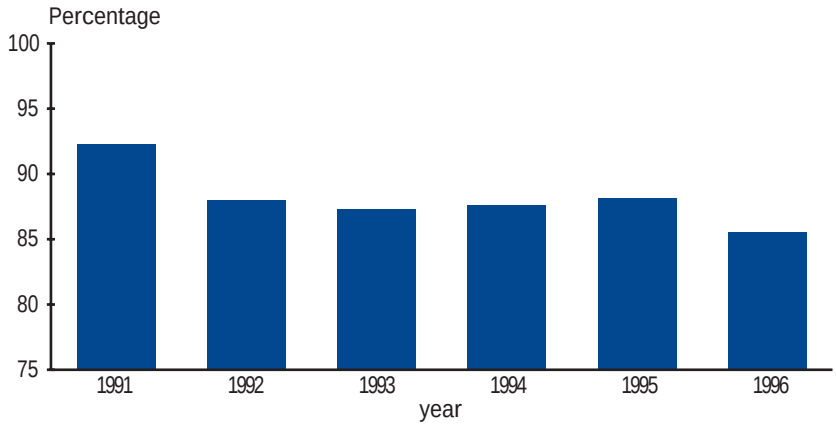
Source of data:
Ministry of Health 1997c.

Fluoride toothpaste

Regular use of fluoride toothpaste is an effective method of reducing dental caries. For people whose drinking water is fluoridated, regular use of fluoride toothpaste provides an additional degree of protection against tooth decay. In non-fluoridated areas, it is the prime method of preventing decay (Murray et al 1991).

The percentage of toothpaste sold that contains fluoride decreased from 92 percent in 1991 to 86 percent in 1996 (Figure 13.4.3).

Figure 13.4.3: Percentage (by weight) of fluoride toothpaste out of all toothpaste sold in New Zealand, 1991–96



Source of data:
Ministry of Health, 1997c.

Other factors

Apart from water fluoridation and fluoride toothpaste, other factors known to be associated with higher prevalence of dental caries include Māori ethnicity, low socioeconomic status (NHMRC 1991; Treasure and Dever 1992), and frequent or high dietary intake of simple sugars (Glinsmann et al 1986).

Separate MFT data for Māori children have been reported for some New Zealand regions (Ministry of Health 1997c). These indicate that Form Two Māori children had, on average, 60 percent more MFT than non-Māori in 1995. A study in the Manawatu-Wanganui Area Health Board showed that at age five years Māori children were one-third as likely to be caries-free as non-Māori, and were three times more likely to have high (five or more MFT) caries experience than non-Māori children (Thomson 1993). Māori children also had higher caries prevalence at Form Two (approximately age 12 years). Prevalence of caries in Pacific children lay between those for Māori and non-Māori children.

Dental caries is a disease with a strong socioeconomic gradient, with those most disadvantaged having greater disease experience. Such a gradient has been found in five out of six Australian studies since 1980 (NHMRC 1991), and also in New Zealand (Treasure and Dever 1992).

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