Monitoring the Health of New Zealand Children and Young People

Indicator Handbook

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Cover Artwork by Heidi Baker

Winika cunninghamii is a small native orchid which grows on well lit tree trunks and branches in the New Zealand native bush. It produces delicate pink and white flowers between December and January each year. During each flower's brief life cycle it relies on sustenance drawn from the parent plant, whose strength in turn is based on a secure attachment to a larger tree. From this stable vantage point, the plant is able to draw the moisture and light it requires from the surrounding environment. The tree in turn relies on a well functioning ecosystem, which provides the rain and nutrients it requires to sustain its growth over many years. Each of these connections is vital in allowing a single bud to develop and blossom during the summer months.

Foreword

"*If you don't know where you are going, any road will take you there*." - The Cheshire Cat to Alice in Wonderland - Lewis Caroll

The health and well being of our children and young people reflects the outcomes of very complex ecological interactions with their environment. Outcomes for the current generation of children and young people will determine the future success or failure of the community and society as a whole. The relatively short periods of time which gestation, infancy, childhood and adolescence occupy, have more power to shape the individual than much longer periods of time later in life. Optimizing the ecological contexts in which individuals grow to maturity is a key goal for every community.

For thousands of years we have been defining signs, symptoms and tests that can be used to assess the health and well being of individuals. The summation of these findings guides future care and treatments. Increasingly we are aware that information needs to be gathered about whole communities to guide future investment and audit the effects of changes, planned or otherwise. The process is one of developing appropriate indicators to monitor change, guide direction, promote progress, and benchmark one community or nation against others.

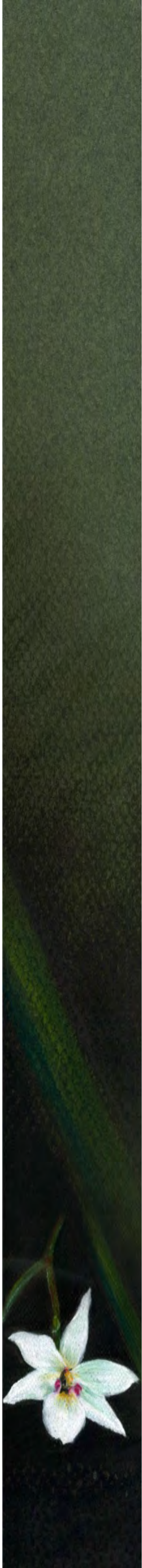
Some indicators have been tracked for generation's e.g. infant mortality. While tracking this alone is valuable it has similarities to the use of canaries in mines. Infants are sensitive markers of the success or failure of our community. We require greater detail to follow and modify causal pathways that lead to adverse outcomes. Investment in health or welfare today may result in major cost saving in justice or increased tax take over 30 years. Good indicators allow the monitoring of important investments and can help justify cost shifting across sectors as well as noting untoward effects of good intentioned action. Evidence based purchasing and planning decisions are dependent on good information on current status to guide targeting and rationing of services. The far reaching impacts that result from the health and wellbeing status of our children and young people mean monitoring and responding to changing indicators must be given a very high priority.

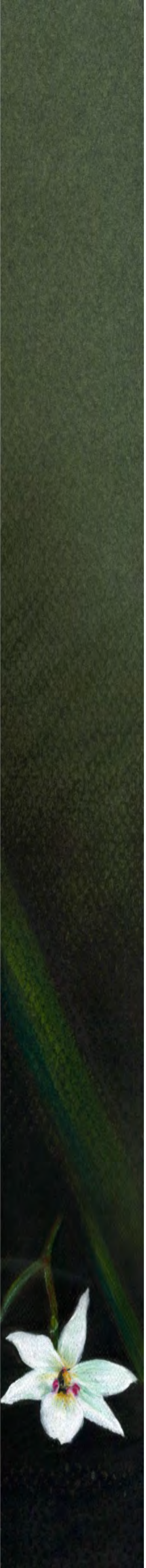
The development of this report has started with the wisdom available from international publications and best practice. Consultation has begun to set an indicator framework within the New Zealand context. These reports will allow wider consultation across the community. Best value from indicators is only obtained when robust processes exist to collect the information, monitor outcomes and develop new pathways and processes in response. Once this current work is completed further substantial challenges lie ahead to maximize the benefits that can ensue.

The true measure of a nation's standing is how well it attends to its children – their health and safety, their material security, their education and socialization, and their sense of being loved, valued, and included in the families and societies into which they are born. [1]

Dr Nick Baker

President, Paediatric Society of New Zealand





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The Child and Youth Health Indicator Project was funded by the Ministry of Health and arose from a contract between Public Health Intelligence and the Paediatric Society of New Zealand. This report was produced by the New Zealand Child & Youth Epidemiology Service (a joint venture between the Paediatric Society of New Zealand and Auckland UniServices).

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The Ministry of Social Development
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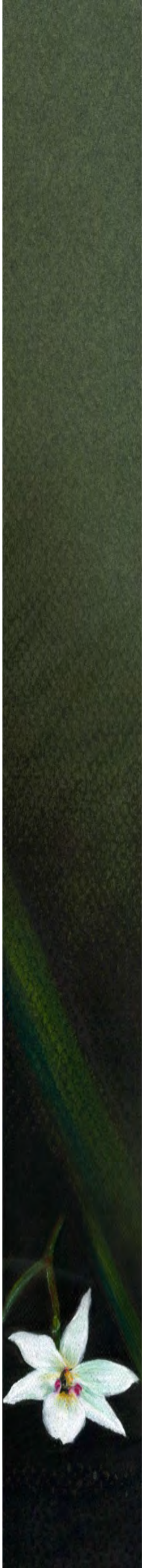
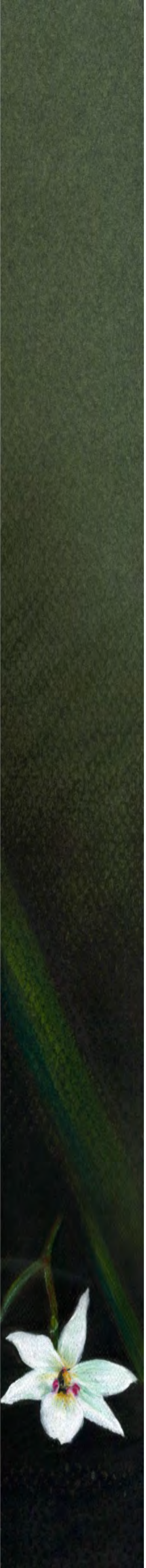
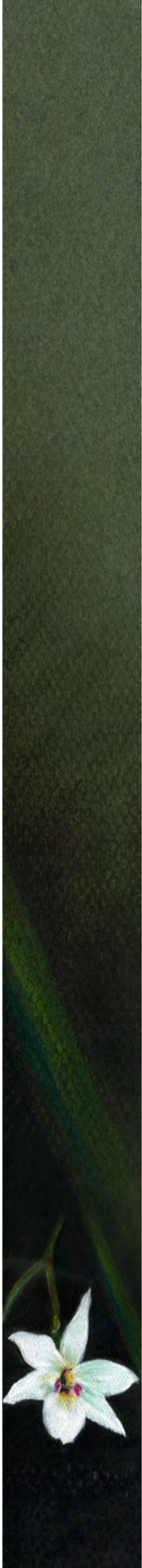
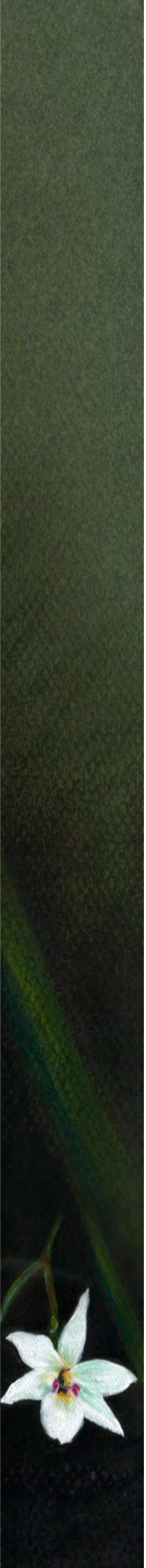
Table of Contents

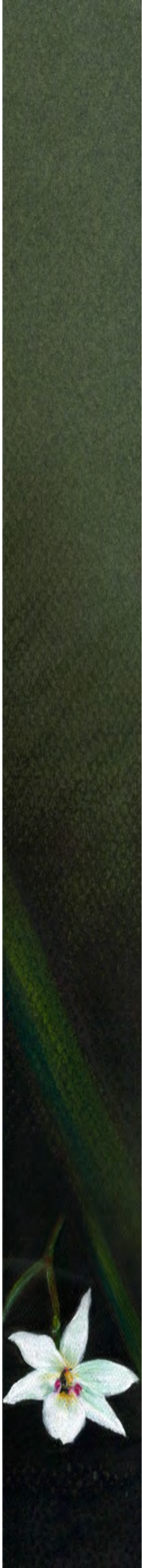


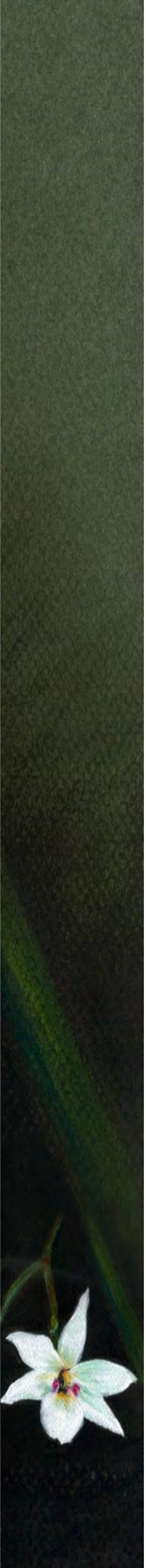


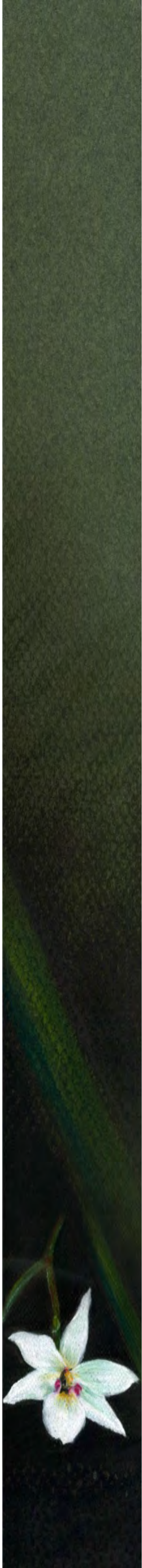


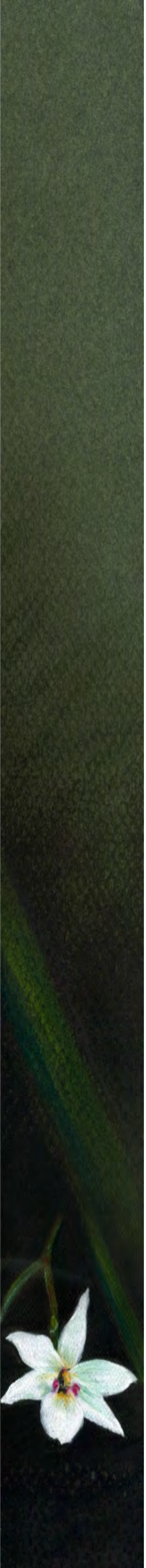


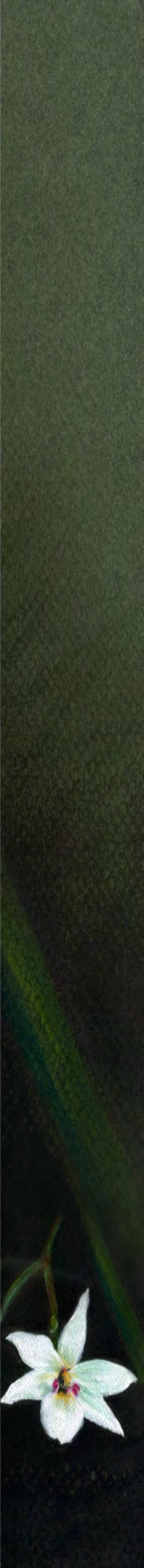
List of Figures

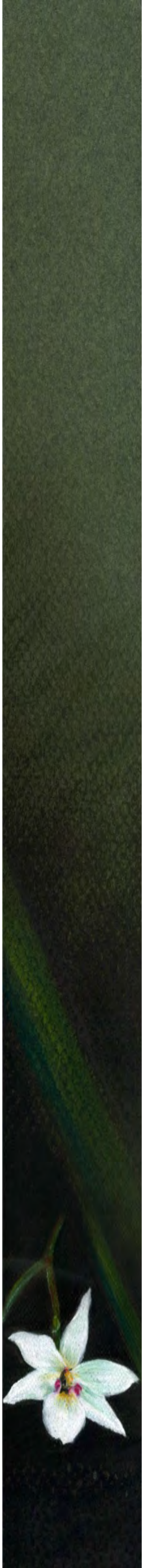




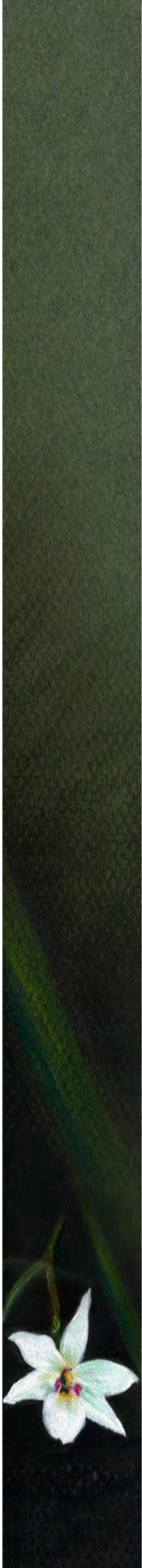


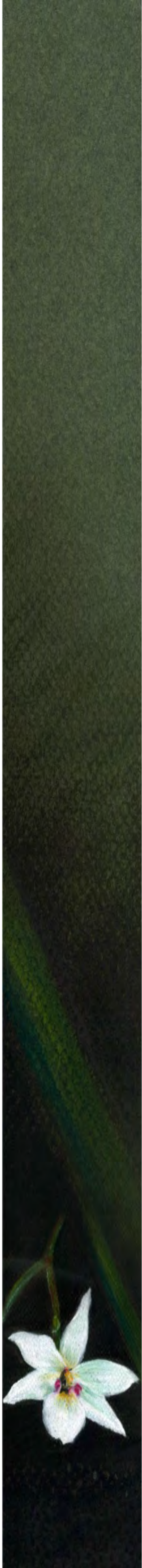


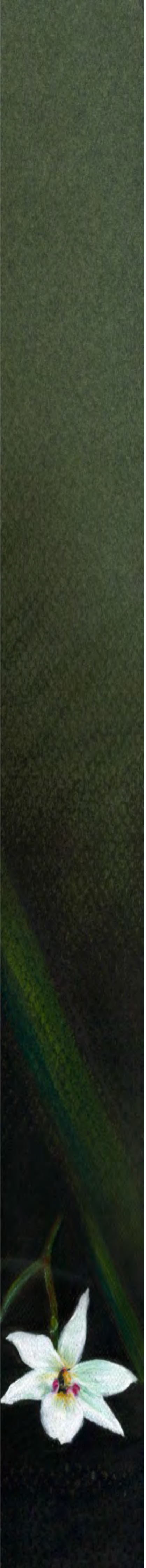


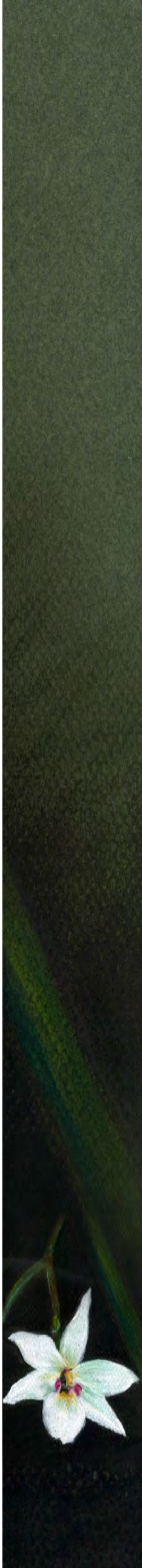


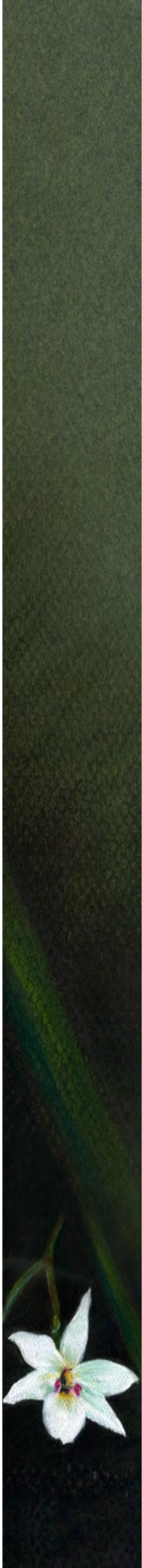
List of Tables











Introduction

Introduction

Children and young people make up a third of New Zealand's population and collectively represent a national taonga or treasure, whose health and wellbeing need to be safeguarded in order to ensure the future prosperity of this country. While the majority of New Zealand children and young people do enjoy good health, some groups experience a disproportionate burden of morbidity and mortality, either as a result of long term health conditions or accidents, or a range of historical and economic factors impacting on the resources available to their families. While New Zealand Government policies in recent years have awarded a high priority to reducing such disparities in health outcome, to do so in any coordinated manner requires in the first instance, that the health status of children and young people be visible.

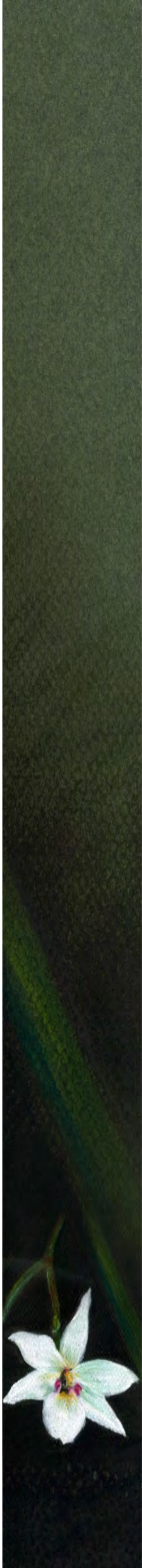
The New Zealand Child and Youth Indicator Project, funded as a result of a contract between the Ministry of Health and the Paediatric Society of New Zealand, arose in response to the perceived need for the greater visibility of children and young people in our national health statistics and for a more coordinated approach to monitoring their health and wellbeing. This report is the second in a two part series arising from this project and fits into the reporting series as follows:

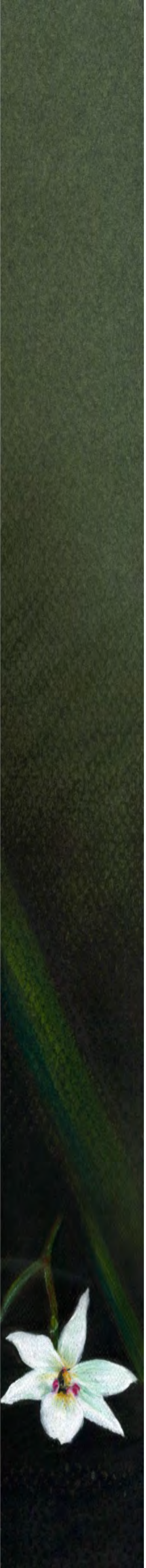
1. *Report 1: Monitoring the Health of New Zealand and Young People: Literature Review and Indicator Framework Development.* This report reviews New Zealand's recent approaches to monitoring child and youth health and highlights the clear need for a more coordinated approach in this area, as well as for a comprehensive framework which assists those working in the health sector to consider all of the issues which need to be taken into account when planning services and strategies to improve the health of children and young people. The report also provides a detailed description of the methodology used to develop the New Zealand Child and Youth Indicator Framework, upon which this Handbook is based.

2. *Report 2: The New Zealand Child and Youth Indicator Framework: Usage Guide and Indicator Handbook.* The current report provides an overview of the monitoring framework developed as a result of this project and considers how it might best be used to achieve health gains for New Zealand's children and young people. It also provides detailed information on each of the indicators contained within the framework, as well as considering some of the limitations of the data sources used in its development.

This report is divided into three main sections which are presented in the order that follows:

1. **Introduction and Guide to Using the Indicator Framework**: This section introduces the New Zealand Child and Youth Indicator Framework, with its four hierarchically arranged domains and the indicators contained within them. Then, using the example of hospital admissions for bronchiolitis in the first year of life, it illustrates how the framework might be used to identify the most appropriate intervention points for particular population health issues. It also briefly introduces the "Top 20", an indicator subset designed specifically to assist DHBs in deciding which indicators might best represent child and youth health in the context of their 3-yearly Health Needs Assessments. The section concludes with a brief overview of the indicator grading system used in this report, which ranks each indicator in the framework on the extent to which it captures the issue it was designed to measure, as well as the quality of its data source(s). This grading system was developed to assist the reader to consider the extent to which data quality issues may have influenced some of the findings presented in this report.





2. **The Indicator Handbook**: This section then serves to catalogue the indicators included in the current version of the New Zealand Child and Youth Indicator Framework. For each indicator a formal definition is provided, along with information on the data sources used in its development, the quality of these data sources and any implications that this may have for the interpretation of the indicator. The public health relevance of each indicator is also briefly discussed, before an analysis of its current distribution by age, ethnicity, and NZ Deprivation Index decile is provided. Thus in addition to serving as a reference manual, it is hoped that this Handbook will also provide the reader with an overview of the current state of child and youth health in this country.
3. **Limitations of the Current Framework and Areas for Future Development**: This section is provided for those with an interest in data quality issues and contains more detailed information on some of the limitations of the data sources used to develop each of the indicators in the framework. It also briefly summarises the feedback received during the course of consultation, as to the additional indicators and data sources which may need to be developed, if we are to be able to more effectively monitor the health of our children and young people in future years. The section concludes with a series of Appendices which outline the datasets used during the course of the framework's development and some of the limitations associated with each.

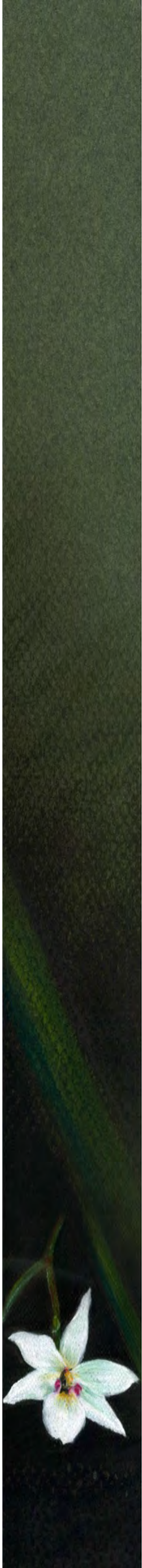
Introduction and Guide to Using the Indicator Framework

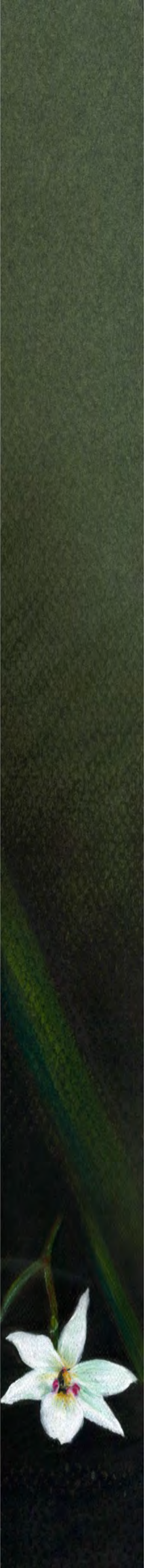
Winika cunninghamii is a small native orchid which grows on well lit tree trunks and branches in the New Zealand native bush. It produces delicate pink and white flowers between December and January each year. During each flower's brief life cycle it relies on sustenance drawn from the parent plant, whose strength in turn is based on a secure attachment to a larger tree. From this stable vantage point, the plant is able to draw the moisture and light it requires from the surrounding environment. The tree in turn relies on a well functioning ecosystem, which provides the rain and nutrients it requires to sustain its growth over many years. Each of these connections is vital in allowing a single bud to develop and blossom during the summer months. In New Zealand, children and young people are both as beautiful and as fragile as our native orchids. While the majority experience good health and go on to realise their full potential, the growth and development of some is impaired for a variety of reasons. As with *Winika cunninghamii*, these reasons may arise at any level, from the child or young person themselves, to risk factors in the child's immediate surroundings, to the wider political and socioeconomic environment which supports the whanau in which they live.

The New Zealand Child and Youth Indicator Framework was developed to assist those working in the health sector to consider all of the issues which need to be taken into account when planning services and strategies to improve the health of children and young people. The indicators included within the framework were selected following an extensive review of the New Zealand and overseas literatures and a two stage consultation process involving the child and youth health workforce. A more detailed description of the methodology used is outlined in *Monitoring the Health of New Zealand and Young People: Literature Review and Framework Development*. This report highlighted New Zealand's currently fragmented approaches to monitoring child and youth health, as well as the need for a comprehensive framework which blends the functions of population health monitoring (i.e. the tracking of a basket of key indicators), with those of Health Needs Assessment (i.e. a broad coverage of all of the major issues, so that prioritisation decisions can be made in an evidence based manner). The report also highlighted the need for a sound theoretical model which governed the types of indicators included within the framework (e.g. health outcomes, risk factors, social determinants, policy), as well as how the relationships between these indicators were portrayed. The end result was the creation of a framework which arranged a comprehensive basket of child and youth health indicators into four vertically orientated domains, which intersected with a horizontal life course dimension (**Figure 1**).These four hierarchically arranged domains, designed to reflect the key steps in the causal pathways linking the wider social and political environment → health outcomes at the population level, were:

1. Historical, Economic and Policy Context
2. Socioeconomic and Cultural Determinants
3. Risk and Protective Factors
4. Individual and Whanau Health and Wellbeing

The sections which follow briefly outline the broad scope of each of these domains in turn, before presenting a single example (hospital admissions for bronchiolitis during the first year of life), to illustrate how the framework might be used to assist those working in the health sector to consider the most appropriate intervention points for particular population health issues.





Domain 1: The Historical, Economic and Policy Context

While much research in recent years has focused on the underlying determinants of health (e.g. education, income, occupation), and how they lead to disparities in health outcome, it is only more recently that consideration has been given to how these determinants themselves have come to be inequitably distributed. In New Zealand, it is likely that three factors have played an important role:

1. Historical Factors: Understanding the current disparities in heath experienced by Māori children and young people cannot occur without an understanding of New Zealand's colonial history and the declines in heath status which occurred following the erosion of the economic and cultural base for Māori whanau and iwi, from the early 1800s onwards. The inclusion of a historical dimension in the higher levels of this framework serves to highlight the fact that initiatives aimed at reducing disparities in health outcome for Māori children and young people may not succeed in the longer term unless broader policies and strategies are put in place which improve the economic base for Māori whanau, hapu and iwi.
2. Policy Factors: In recent years there has been an increasing awareness of the role Government policies play in shaping the distribution of the determinants of health. This is of particular relevance in the New Zealand context, where a period of rapid economic and social policy reform during the 1980s and early 1990s saw income inequalities rise rapidly and large numbers of children, particularly in sole parent, or Māori , or Pacific households falling below the poverty line (net-of-housing-cost-income <60%).
3. Macroeconomic Factors: In addition to Government policies, a range of other factors influence the distribution of health determinants at a population level (e.g. overseas commodity prices and interest rates, the value of the NZ dollar, immigration, unemployment rates). Each of these factors exerts downstream effects on the resources available to families with children and as a consequence, the distribution of health determinants at a population level.

While each of these issues is vital to shaping the current health status of New Zealand children and young people and if left unaddressed, may hinder initiatives to reduce disparities in health outcome, the theoretical and historical nature of these higher level factors does not readily lend itself to monitoring using routinely collected data sources. Instead, within this framework these issues are highlighted by means of guest editorials, which discuss the relevance of these higher level factors to child and youth health. It is intended that these editorials will be updated at least once every three years, in line with the other indicators within this framework.

Domain 2: Socioeconomic and Cultural Determinants

Research over the past decade has highlighted the significant role socioeconomic factors play in shaping child and youth health outcomes, as well as the role a secure cultural identity plays in ensuring their wellbeing. This domain provides coverage of some of the key determinants of health for New Zealand children and young people, and as far as possible has been developed to align with the Ministry of Social Development's 10 domains of social wellbeing. The domain is divided into 4 key streams: Cultural Identity; Economic Standard of Living; Education Knowledge and Skills; and Service Provision, Access and Utilisation, and within each of these streams a number of key indicators are presented, each highlighting a different facet of these key determinants.

Domain 3: Risk and Protective Factors

There is now a large body of literature outlining how risk and protective factors shape health outcomes at the individual level (e.g. exposure to second hand cigarette smoke → hospital admissions for respiratory tract infections). However it is only more recently that attention has been directed towards understanding the ways in which the social determinants of health shape the distribution of these risk factors, as well as the pathways via which this might occur (e.g. social gradients in stress, leading to corresponding social gradients in cigarette smoking; financial constraints leading to a higher fat diet). The placing of this domain between Domain 2 (Socioeconomic and Cultural Determinants) and Domain 4 (Individual and Whanau Health and Wellbeing) is thus intentional, and intended to reflect an intermediate step in the causal pathway(s) linking higher level social and economic factors with individual health outcomes. The inclusion of the individual risk and protective factors within this domain however, was guided by the initial literature review, as well as two separate rounds of consultation within the health sector.

Domain 4: Individual and Whanau Health and Wellbeing

The inclusion of a whanau dimension in the health outcomes domain arose following discussions with staff from the Māori SIDS Programme, who felt that the health and wellbeing of children and young people was inextricably interwoven with the wellbeing of their whanau, and that these two dimensions should be considered together. This domain provides information on a large number of child and youth health outcomes, which are divided into 12 key streams including: Total Morbidity and Mortality; Whanau Wellbeing; Perinatal / Infancy; Well Health; Safety; Injury; Infectious Disease; Respiratory Disease; Chronic Conditions; Disability; Mental Health; Sexual and Reproductive Health. As with the Risk and Protective Factors domain above, the inclusion of individual indicators within each of these streams was guided by the initial literature review, followed by two rounds of consultation within the health sector.

The Lifecourse Dimension

The potential impact of the indicators within each of these four domains needs also to be considered within the context of the lifecourse, which within this framework spans the period 0 → 24 years. While the de-identified nature of the data used to create this framework means it is impossible to track the trajectory of any individual child as they progress from birth to early adulthood, Figure 1 nevertheless highlights the points in the lifecourse at which each indicator might be considered to act. It is hoped that the two dimensional nature of the framework will thus assist the reader in considering the serial consequences that negative exposures have as a child passes from birth → 24 years and the manner in which the wider socioeconomic determinants of health shape the likelihood that it will be the same child who is e.g. born with low birth weight → exposed to second hand cigarette smoke during infancy → admitted to hospital with pneumonia during their preschool years → fails school entry hearing screening → does poorly at school and leaves without formal qualifications. The potential intergenerational effects of these lifecourse trajectories also need to be considered, as young people create a socioeconomic base for their own children in future years.

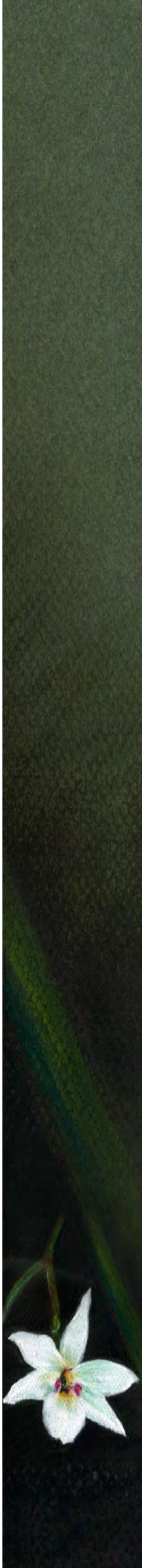
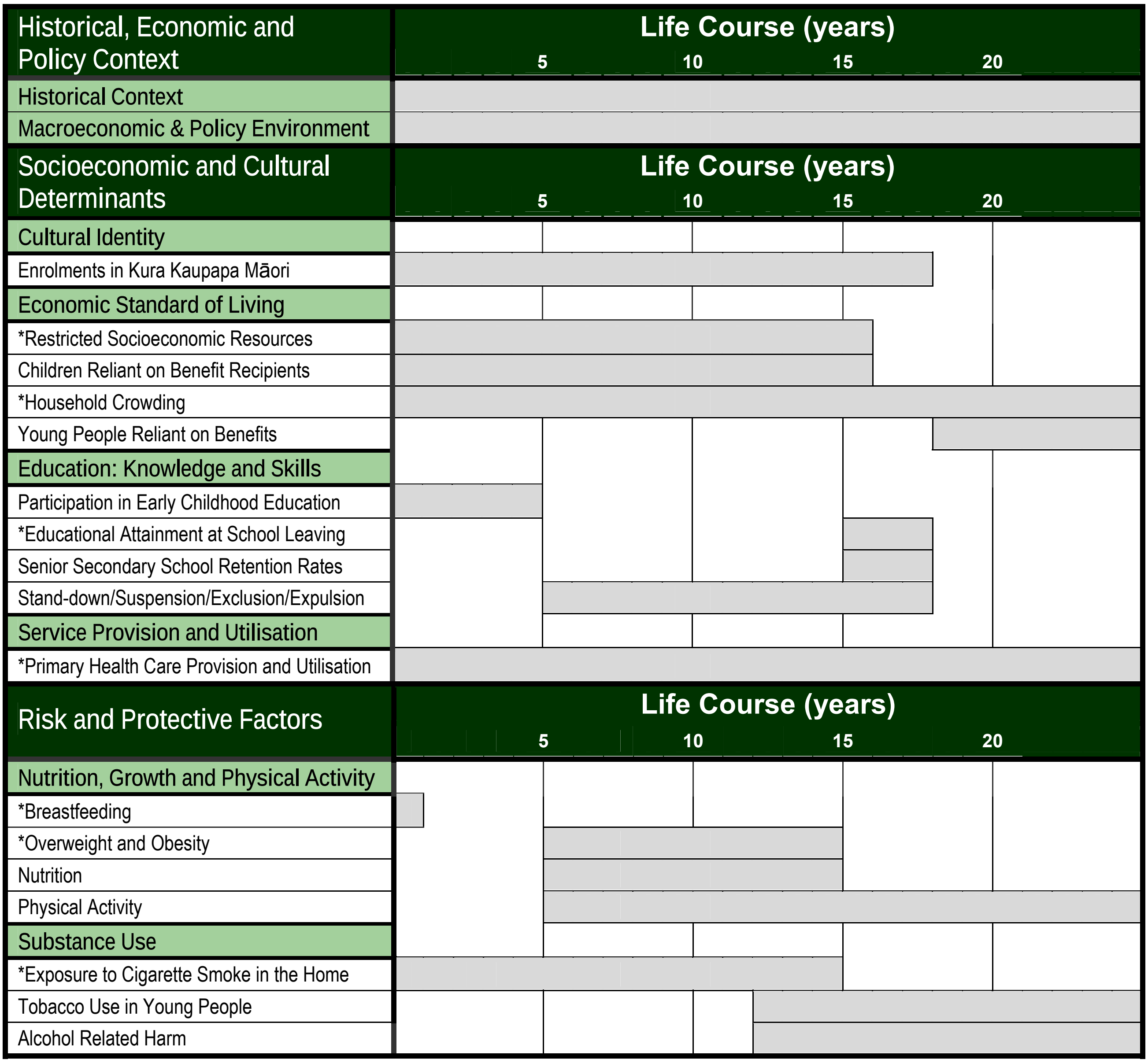
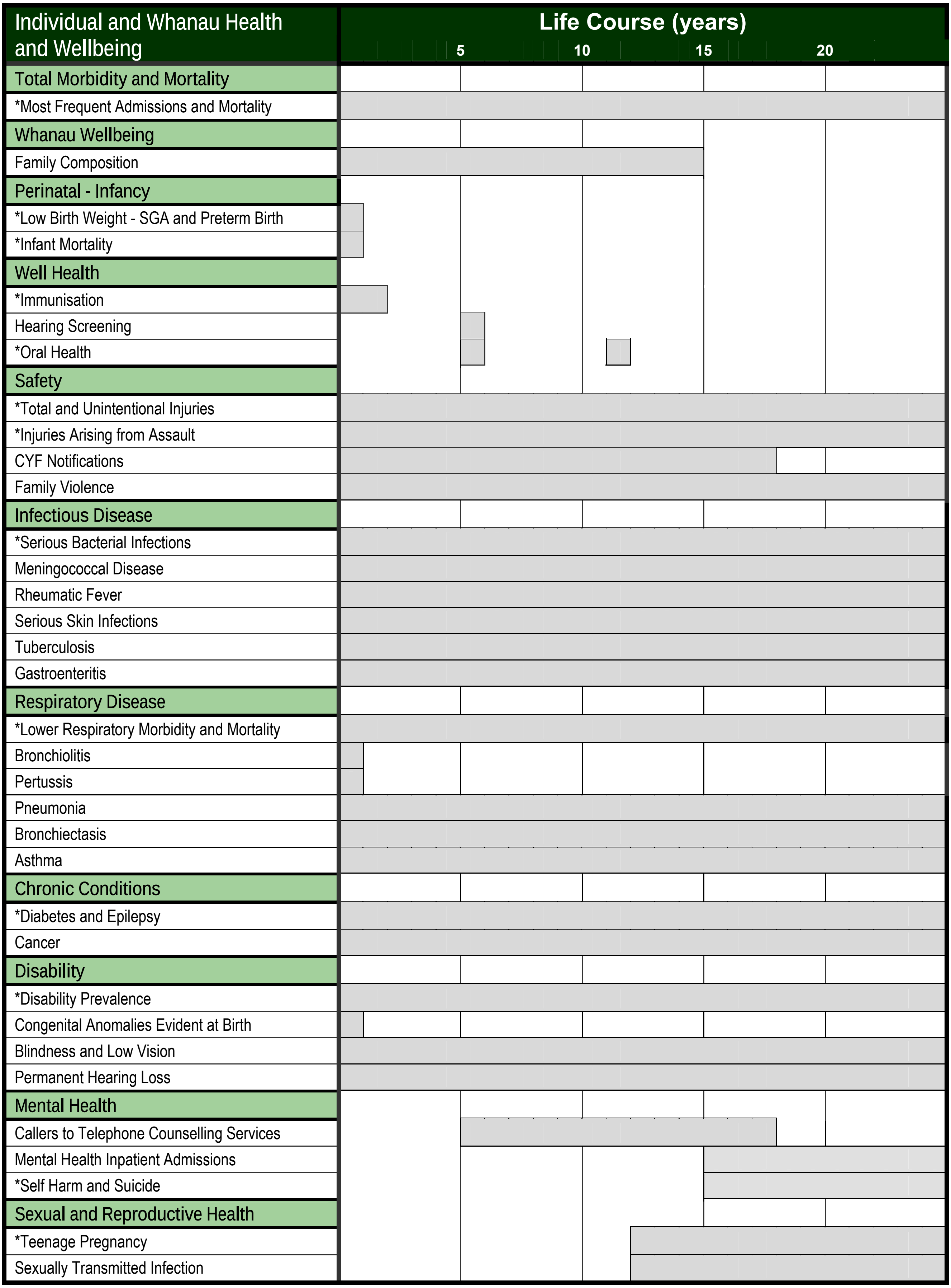


Figure 1. The New Zealand Child and Youth Health Monitoring Framework





Individual and Whanau Health and Wellbeing

Total Morbidity and Mortality
*Most Frequent Admissions and Mortality

Whanau Wellbeing
Family Composition

Perinatal - Infancy
*Low Birth Weight - SGA and Preterm Birth
*Infant Mortality

Well Health
*Immunisation
Hearing Screening
*Oral Health

Safety
*Total and Unintentional Injuries
*Injuries Arising from Assault
CYF Notifications
Family Violence

Infectious Disease
*Serious Bacterial Infections
Meningococcal Disease
Rheumatic Fever
Serious Skin Infections
Tuberculosis
Gastroenteritis

Respiratory Disease
*Lower Respiratory Morbidity and Mortality
Bronchiolitis
Pertussis
Pneumonia
Bronchiectasis
Asthma

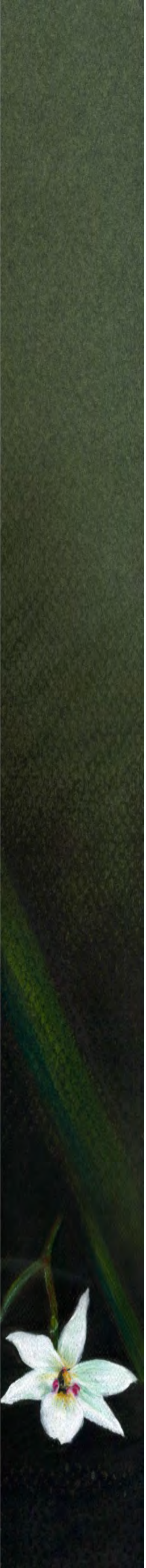
Chronic Conditions
*Diabetes and Epilepsy
Cancer

Disability
*Disability Prevalence
Congenital Anomalies Evident at Birth
Blindness and Low Vision
Permanent Hearing Loss

Mental Health
Callers to Telephone Counselling Services
Mental Health Inpatient Admissions
*Self Harm and Suicide

Sexual and Reproductive Health
*Teenage Pregnancy
Sexually Transmitted Infection

Note: *Indicators included in the Top 20

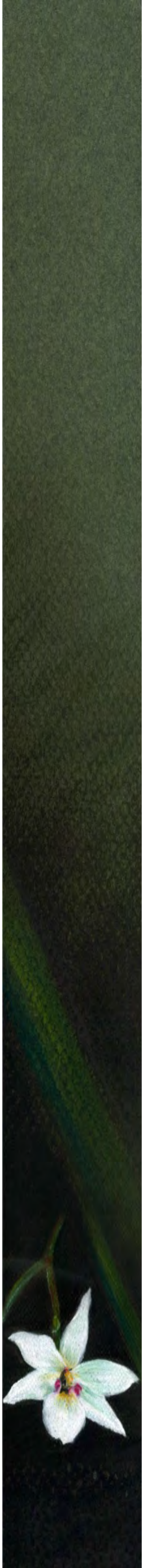


The Top 20 Indicators of Child and Youth Health

While one of the chief aims of the Indicator Project was to develop a framework which provided a comprehensive map of all of the issues which needed to be taken into account when planning services and strategies to improve child and youth health, it was also intended that the framework be used by DHBs when considering which child and youth health issues they should be including in their 3-yearly Health Needs Assessments (HNAs). In this context, the overall size of the framework was seen as being a distinct limitation, with resource constraints meaning it was unlikely that DHBs would include the entire indicator set in their routine HNAs. Thus one of the key tasks of the project team was to create a smaller indicator subset, which was drawn from the underlying framework in a representative manner, and which could be used to represent child and youth health issues in the context of total population health reports. The creation of this indicator subset, (which is described in more detail in the earlier report of this series), involved the input of over 100 health care professionals, who were each asked to select from the full indicator set a subset of 12 indicators which they thought best represented the various age groups and health topics included in the wider framework. From the results of this vote, the Project Steering Committee created the “Top 20” indicator subset, which is outlined in Table 1 below. It is recommended that DHBs consider these indicators first, when deciding on which child and youth health issues should be reported on in their total population HNAs.

Table 1. Recommended "Top 20" Indicators of Child and Youth Health

Individual and Whanau Health and Wellbeing	Socioeconomic and Cultural Determinants	Risk and Protective Factors
• Most Frequent Causes of Hospital Admission and Mortality • Low Birth Weight: Small for Gestational Age, Preterm Birth • Infant Mortality • Oral Health • Injuries Arising from Assault in Children • Total and Unintentional Injuries • Serious Bacterial Infections • Lower Respiratory Morbidity and Mortality in Children • Selected Chronic Conditions: Diabetes and Epilepsy • Disability Prevalence • Self Harm and Suicide • Teenage Pregnancy	• Children in Families with Restricted Socioeconomic Resources • Household Crowding • Educational Attainment at School Leaving • Primary Health Care Provision and Utilisation	• Breastfeeding • Overweight and Obesity • Exposure to Cigarette Smoke in the Home • Immunisation

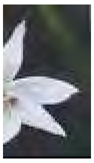


Using the Framework to Guide Public Health Action

While the framework was designed to provide a broad theoretical scaffolding for considering child and youth health, it was also intended that it be used as a practical tool to assist those working in the health sector to select the most appropriate intervention points for particular population health issues. In illustrating how the framework might be used to achieve this aim, the following section tracks a single health issue, hospital admissions for bronchiolitis in the first year of life, up through the various levels of the monitoring framework and in doing so highlights some of the likely reasons for the large socioeconomic and ethnic disparities in bronchiolitis admissions seen in New Zealand today. While the example used is simplistic and only considers at most one or two key determinants in each of the higher level domains, it is nevertheless hoped that this example will serve to illustrate how this framework might be used to plan strategies to address population health issues.

Applied Example: Hospital Admissions for Bronchiolitis in Infancy

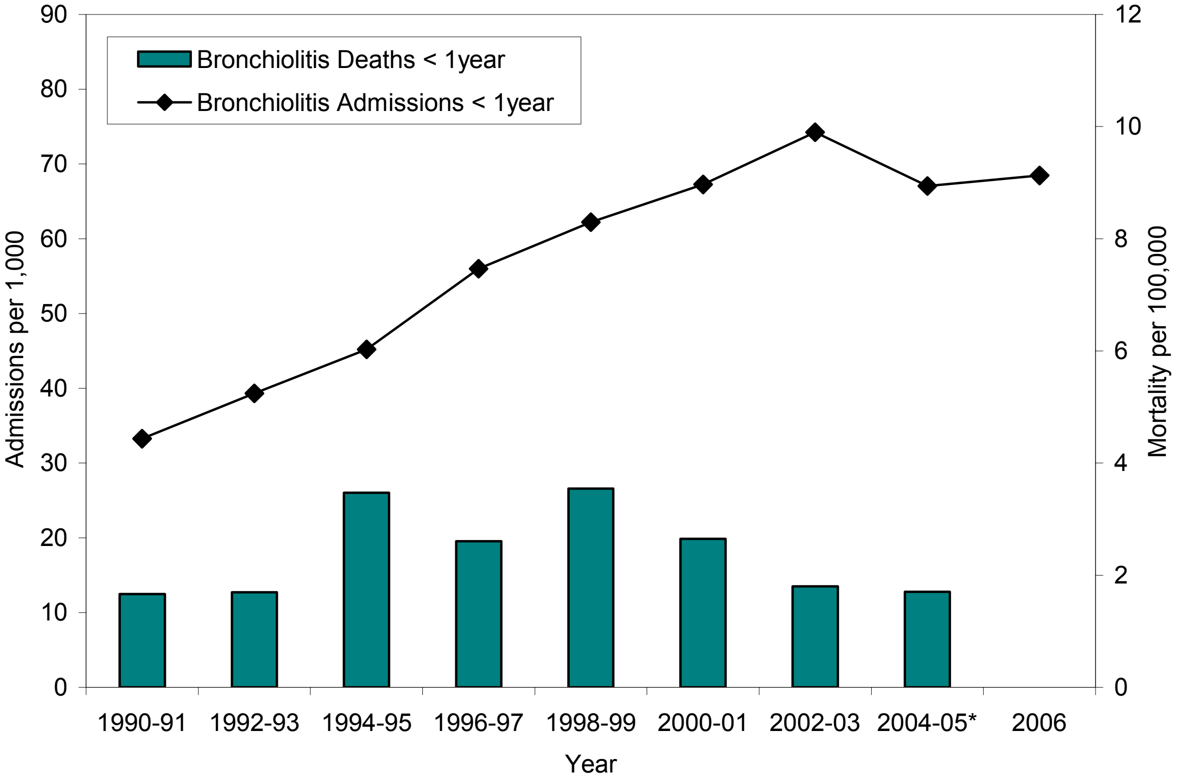
Bronchiolitis is a viral infection of the respiratory tract which commonly affects infants in their first year of life. It is the single most common reason for admission to hospital for a lower respiratory tract infection amongst New Zealand children. Symptoms include coughing, wheezing, rapid breathing and difficulty in feeding and infants often require supplementary oxygen and fluids. Factors which increase the likelihood that an infant will suffer from bronchiolitis include young age (<6 months), household crowding, older brothers and sisters attending day care, socioeconomic disadvantage, maternal smoking and a lack of breastfeeding. At a population level, any intervention which successfully reduced the incidence of bronchiolitis would not only reduce a significant burden of morbidity for New Zealand infants, but would also result in significant reductions in health care expenditure. The following section traces bronchiolitis and its determinants up through the various domains of the Indicator Framework in order to identify not only the extent of the problem, but also some of the factors which may need to be addressed if bronchiolitis admission rates are to be reduced in the medium to longer term.



Domain 4: Individual and Whanau Health and Wellbeing

In New Zealand during 1990-2006, hospital admissions for bronchiolitis increased progressively, reaching a peak of 75.5 per 1,000 in 2002-2003, and thereafter beginning to decline. Mortality however has remained relatively static, at approximately 1-2 deaths per year during the last 14 years for which data was available (**Figure 2)**. Bronchiolitis is predominantly a disease of infancy, with the majority of hospital admissions and deaths occurring during the first year of life, although a small number also occur between 1-2 years of age. In addition to young age, during 2002-2006 hospital admissions for bronchiolitis were higher amongst males, Pacific and Māori infants and those living in the most deprived areas (**Table 2).**

Figure 2. Hospital Admissions and Deaths due to Bronchiolitis in Infants < 1 Year, New Zealand 1990-2006 (Admissions) and 1990-2004 (Deaths)



*Note: Deaths in 2004-05 are for 2004 only

Table 2. Ethnicity, NZ Deprivation Index Decile and Risk of Hospital Admission for Bronchiolitis in New Zealand Infants < 1 Year, 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	24.60	1.00		1-2	26.90	1.00	
2	29.10	1.18	1.05-1.32	3-4	37.20	1.38	1.28-1.48
3	34.70	1.41	1.27-1.57	5-6	49.90	1.85	1.73-1.98
4	39.30	1.60	1.44-1.77	7-8	71.70	2.66	2.50-2.83
5	44.80	1.83	1.65-2.03	9-10	129.40	4.81	4.54-5.10
6	54.10	2.20	2.00-2.42	Ethnicity			
7	66.00	2.69	2.45-2.96	Māori	110.00	2.95	2.86-3.05
8	76.20	3.10	2.83-3.40	Pacific	161.90	4.34	4.18-4.50
9	103.60	4.22	3.86-4.61	European	37.30	1.00	
10	151.70	6.18	5.67-6.74	Asian/Indian	16.60	0.45	0.41-0.50
Gender							
Female	55.00	1.00					
Male	84.50	1.54	1.50-1.58				

Note: Rate per 1,000 per year, RR: Rate Ratios are unadjusted

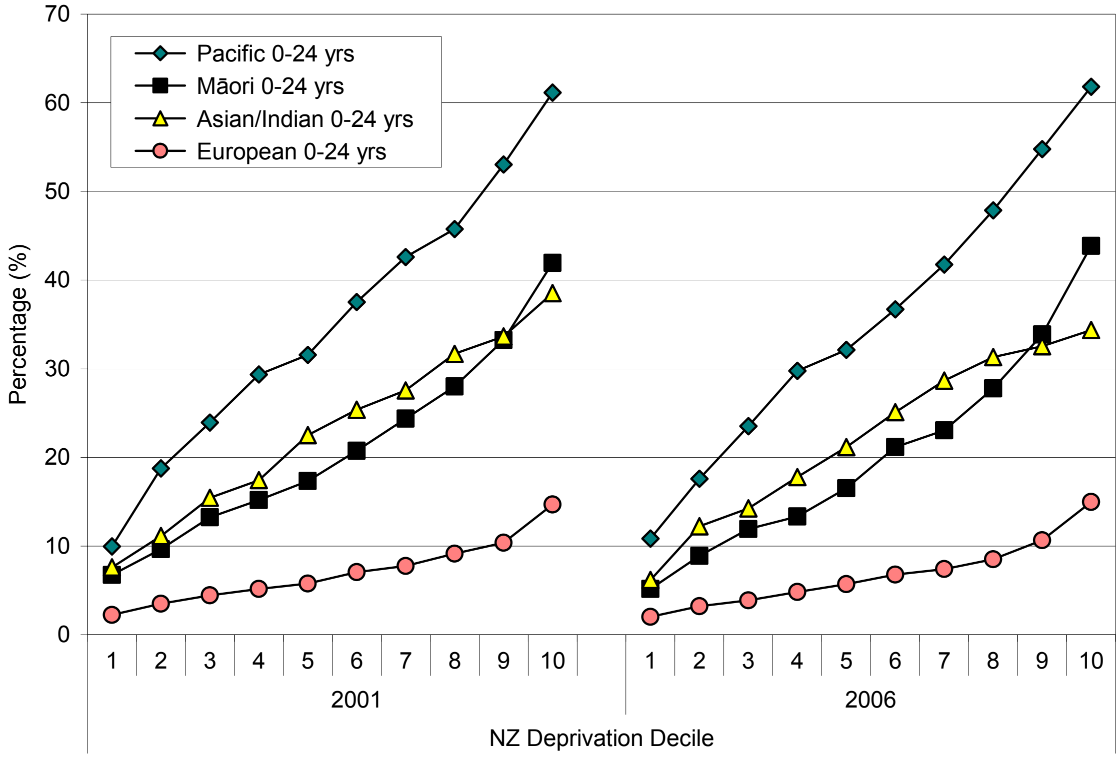
Domains 2 and 3: Risk and Protective Factors; Socioeconomic and Cultural Determinants

The above figures suggest that bronchiolitis is a significant problem for New Zealand infants, and while data for 2004-2006 suggests that the recent large increases in hospital admissions for bronchiolitis may be beginning to taper off, Pacific and Māori infants and those in the most deprived areas still experience a disproportionate burden of morbidity. In order to understand some of the reasons for these disparities however, it may be necessary to consider two factors which sit in the higher levels of this framework, household crowding and exposure to cigarette smoke in the home.

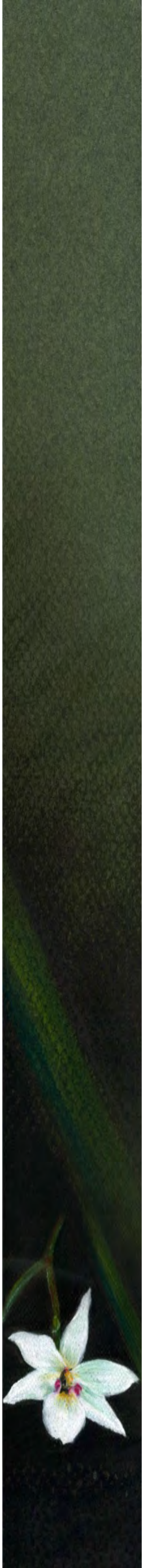
Household Crowding

In New Zealand at both the 2001 and 2006 Censuses there were marked socioeconomic and ethnic disparities in the proportion of children and young people living in crowded households **Figure 3**. These figures are based on the Canadian Crowding Index and reflect the proportion of families with children and young people who required 1 or more additional bedrooms to meet their family's needs. During both periods, while the proportion of children and young people living in crowded households increased in a stepwise manner with each increase in socioeconomic deprivation for all ethnic groups, at any given level of deprivation crowding rates remained higher for Pacific > Asian / Indian and Māori > European households. Thus over 60% of Pacific and 40% of Māori children and young people in the most deprived (Decile 10) areas lived in crowded housing.

Figure 3. Proportion of Children and Young People 0-24 Years Living in Crowded Households by Ethnicity and NZ Deprivation Index Decile, New Zealand Census 2001 and 2006



Note: Only includes those where crowding status is known. Source: Statistics New Zealand



Exposure to Cigarette Smoke in the Home

In New Zealand during 2001-2006, ASH Surveys suggested that there were marked socioeconomic differences in the proportion of Year 10 students whose parents smoked, or who lived in homes with smoking inside, with rates being consistently higher for those attending schools in the most deprived areas (**Figure 4**). Similarly, data from the 2006 Census suggested that the proportion of children living in a household with a smoker increased with increasing NZDep deprivation for each of New Zealand's largest ethnic groups, but that at nearly every level of deprivation, the proportion living in a household with a smoker was higher for Māori > Pacific > European > Asian / Indian children (**Figure 5).**

Figure 4. Proportion of Year 10 Students with Parents Who Smoke, or Who Live in a Home with Smoking Inside by School Socioeconomic Decile, NZ ASH Surveys 2001-2006

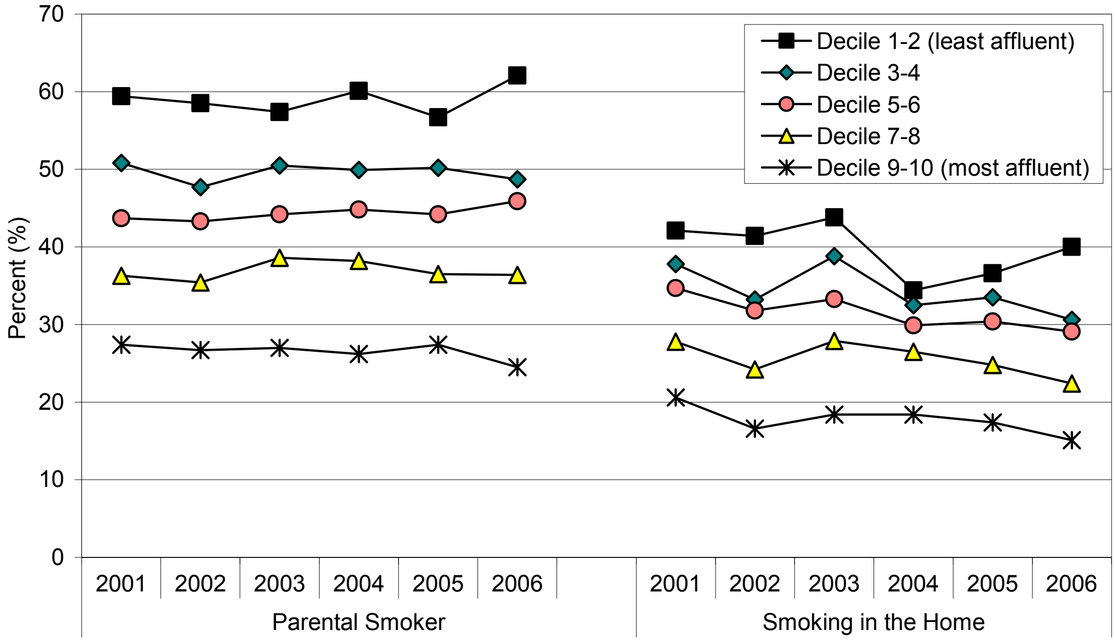
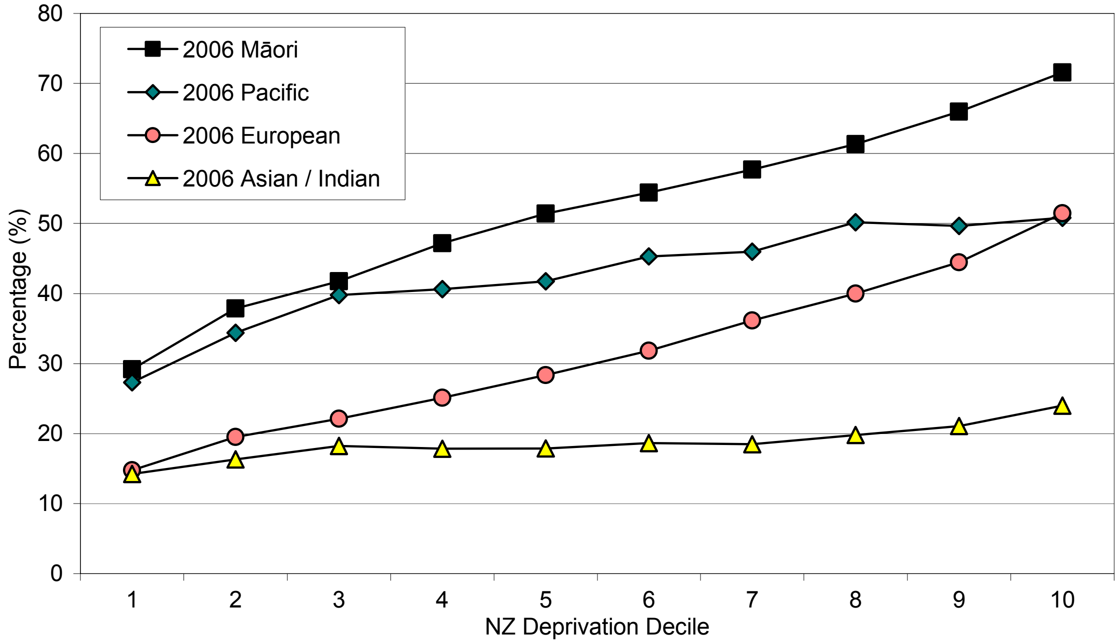


Figure 5. Percentage of Children < 15 Years who Lived in a Household with a Smoker by Ethnicity and NZ Deprivation Index Decile, New Zealand at the 2006 Census



Domain 2: Socioeconomic and Cultural Determinants

A brief review of the above figures suggests that some of the disparities in hospital admission rates for bronchiolitis amongst Māori and Pacific infants and those in the most deprived areas may have arisen from corresponding disparities in common risk factors such as household crowding and exposure to cigarette smoke and that interventions targeting these risk factors may be necessary, if hospital admissions for bronchiolitis are to be reduced in future years. In order to ensure that any interventions developed to address these risk factors result in real long term change however, the reasons for the disparities in their distribution need also to be understood. In this context, the figures above illustrated two other key points:

1. That ethnic differences exist for crowding and exposure to second hand cigarette smoke, even when differences in socioeconomic deprivation are taken into account.
2. That for all ethnic groups, increasing socioeconomic deprivation was associated with higher levels crowding and exposure to second hand cigarette smoke.

While each of these issues could be explored in more detail within the higher levels of this framework, for brevity's sake the following example explores only the role socioeconomic disadvantage plays in shaping infant's exposures to cigarette smoke and crowding in their homes.

The Distribution of Births by New Zealand Deprivation Index Decile

In New Zealand all births are assigned a domicile code, based on the usual residential address of the mother at the time of her baby's birth registration. This allows births to be linked to the NZ Deprivation Index, a small area index of deprivation, which assigns each domicile in New Zealand a decile ranking ranging from 1 (the least deprived 10% of areas) to 10 (the most deprived 10% of areas). Figure 6 summarises the average NZDep Index decile into which New Zealand babies were born during 1980-2006 and illustrates two main points:

1. That on average Pacific and then Māori babies were born into more deprived areas than European / Other babies.
2. That in relative terms, the socioeconomic position of Pacific and Māori babies did not improve appreciably during this 26 year period. (Note: the NZDep Index is a relative scale, comparing those living in e.g. the 10% most and least deprived areas and thus cannot provide any commentary on absolute differences in socioeconomic resources during this period. Thus while incomes for those in the most deprived areas may have increased during this period, if they did not increase at a faster rate than for those in the least deprived areas, then their relative ranking may have stayed the same, even though absolute increases in income may have led to improvements in health status for those in the most deprived areas during this period).

The above findings are particularly relevant to understanding ethnic differences in the distribution of risk factors for bronchiolitis during this period. As the previous section has suggested, for every increase in socioeconomic deprivation, exposure to second hand cigarette smoke and household crowding increased for all ethnic groups. Thus the over representation of Māori and Pacific infants in the most deprived areas may well make a large contribution to their disproportionate exposure to these risk factors during infancy. The fact that all of the ethnic differences were not accounted for by relative socioeconomic disadvantage, however, suggests that other pathways in addition to the one highlighted above may be in operation and thus additional explanations may also need to be sought from other levels within this framework.

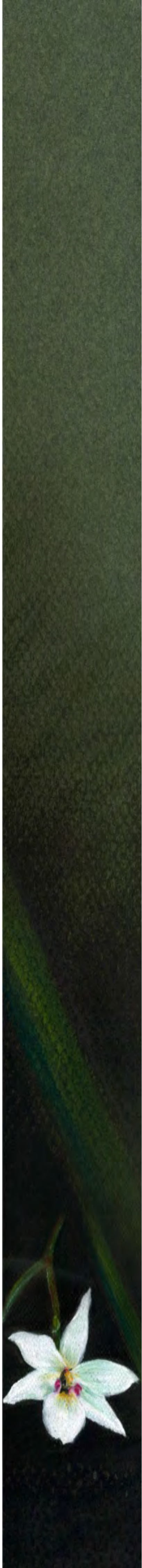
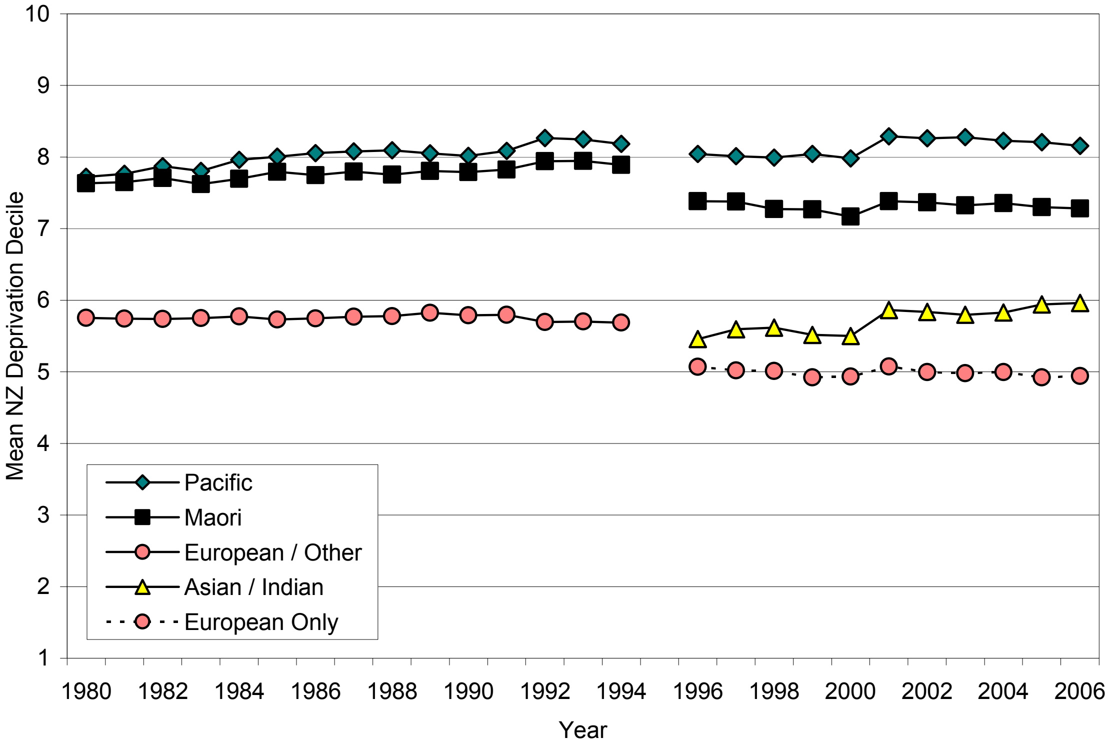


Figure 6. Mean NZ Deprivation Index Decile of Births by Ethnicity, New Zealand 1980-2006

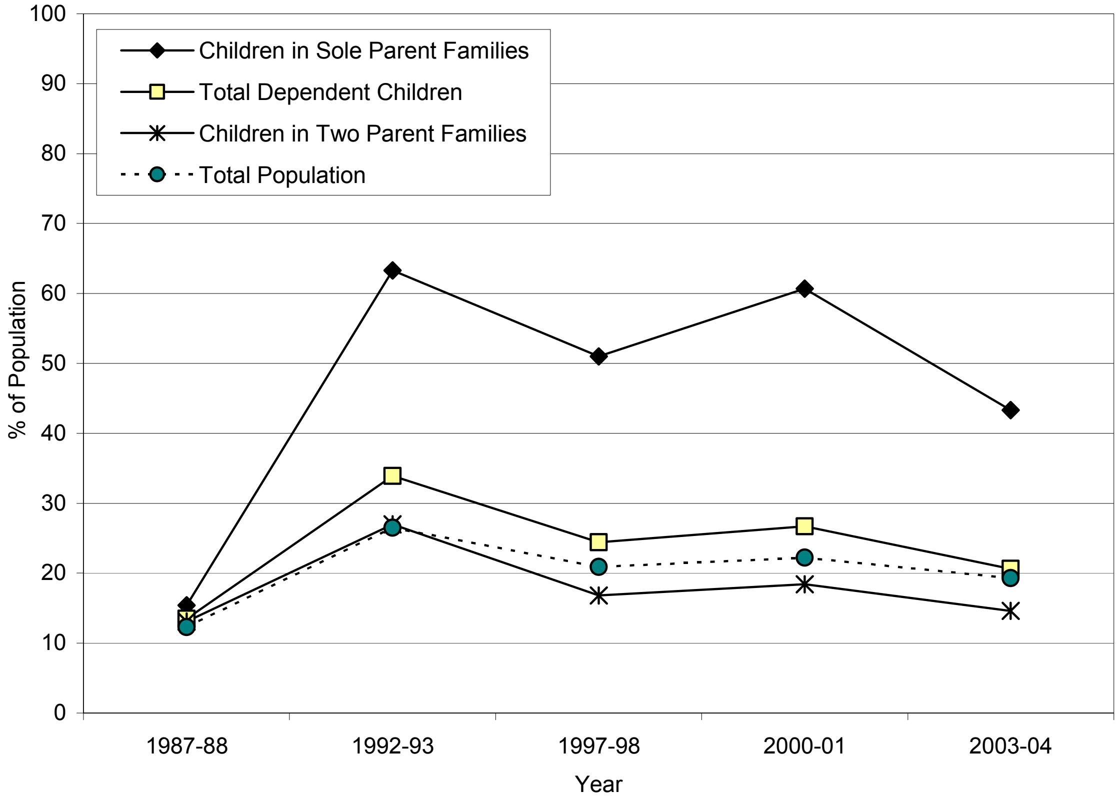


Note: Change in definition of ethnicity between 1994 and 1996

Domain 1: Historical, Economic and Policy Context

While many contemporary analyses of the social determinants of health would accept the socioeconomic differences shown in Figure 6 as the starting point in a cascade which ultimately leads to poorer health outcomes, this monitoring framework highlights the fact that like any other indicator, the relative socioeconomic positions of New Zealand's largest ethnic groups are shaped by factors operating in the domains above. For example, it is possible for the distribution of the underlying determinants of health (e.g. the proportion of families with children living below the poverty line (Net-of-Housing-Cost Income <60 Percent Line)) to change very rapidly in response to changes in the policy environment and prevailing macroeconomic conditions (Figure 7**)**. While it is beyond the scope of this brief example to fully explore the roles that historical, political and wider economic factors have played in shaping the underlying determinants of health, the two guest editorials contained in the Handbook which follows explore these issues in some detail. These editorials suggest that in many cases, these higher level factors may be amenable to change (e.g. policies to improve the level of support available to low income families with children) and while such changes may not result in an immediate reduction in hospital admissions for bronchiolitis, via their impacts on the socioeconomic resources available to families with young children, they may set in place a cascade of events which ultimately dictates their trends in the medium to longer term.

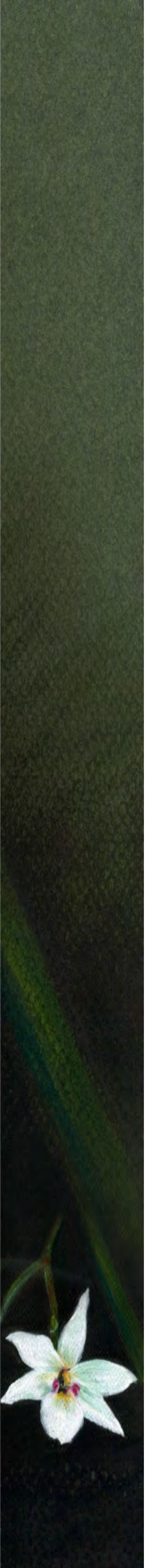
Figure 7. Proportion of Population with Incomes Below the Poverty Line (Net-of-Housing-Cost Income <60 Percent Line Benchmarked to 1998 Median), Selected Years 1988-2004



Source: The Social Report 2006 [2], derived from Statistics NZ's Household Economic Survey (1988-04)

Conclusion

While this brief review is necessarily simplistic and does not take into account many of the complexities in operation in the real world (e.g. parental smoking and crowding are not the only risk factors for bronchiolitis, socioeconomic circumstances are not the only factors contributing to parental smoking, socioeconomic deprivation is not the only factor leading to ethnic disparities in health), it is hoped that this example will nevertheless serve to illustrate how the framework can be used to gain a better understanding of current health status of New Zealand's children and young people, as well as to provide some insights into the most appropriate intervention points for particular child and youth health issues.



Limitations of Current Indicators

One of the central aims of this project was to develop an overall map of all of the issues which needed to be taken into account when planning child and youth health services and strategies at a population level. Yet very early on in the course of consultation it became apparent that adequate data sources were available for only a fraction of the issues that those working in the health sector considered important to child and youth health. In order to ensure that issues for which adequate data was available did not take undue precedence over those for which reliable data was lacking, it was decided early on that a set of indicator selection criteria would be developed, which awarded a high priority to public health importance. Where an issue was deemed to have met these criteria but where routine data sources were lacking, “non-traditional” data sources would then be considered, in order to ensure that the issue did not fall below the public health radar.

Such an approach however, meant that many of the indicators included in the current version of the Handbook may not have met the stricter data quality criteria utilised by other Government agencies. In order to highlight the impacts that such data quality issues may have had on the interpretability of the data, it was felt necessary to grade each indicator on the degree to which it captured the issue it was designed to measure, as well as the quality of its data source. Thus each indicator in this framework was assigned to one of three categories: Ideal, Proxy or Bookmark, and an assessment made as to whether its data sources were Excellent (A), Adequate (B), or whether Further Work (C) was required in order to improve the interpretability of the indicator. These categories are outlined below:

1. Ideal Indicators: An indicator was considered ideal if it offered the potential to measure the total extent of a particular issue e.g. because the birth registration dataset captures >99% of births in New Zealand and information on gestational age is >98% complete, the preterm birth indicator derived from this dataset was considered ideal, in that it allowed conclusions to be drawn about trends in the incidence of preterm birth over time.

2. Proxy Indicators: In many cases, while it was not possible to measure the full extent of an issue, it was possible to assess the number of children and young people attending publicly funded services for its management e.g. while hospital admission data is unable to provide any commentary on the total number of injuries occurring in the community (as many injuries are treated in primary care, or at home), such data is nevertheless useful for assessing the workload such injuries create for secondary and tertiary services. One of the chief limitations of proxy indicators, however, is the variable extent to which they capture the total burden of morbidity (e.g. while nearly all non-fatal cases of meningococcal disease are likely to be captured by hospital admission data, the same datasets are likely to record only a fraction of gastroenteritis cases occurring in the community). While it is generally assumed that if admission thresholds remain constant (i.e. that children with a given level of severity for a condition will be managed in the same way), then such indicators can be used to track trends in the underlying burden of morbidity, in reality such thresholds are very seldom static and vary in ways which are both predictable (e.g. the introduction of pulse oximetry altering admission thresholds for infants with bronchiolitis over time) and unpredictable (e.g. differences in the ways in which DHBs upload their emergency department cases to the National Minimum Dataset). Thus while being of considerable utility in planning for future health service demand, such indicators are less useful for tracking temporal trends in the total burden of morbidity occurring in the community.

3. Bookmark Indicators: In many cases, consultation suggested that there was a need for indicators in areas where no data sources existed e.g. indicators to assess the prevalence of disability amongst New Zealand children by diagnostic category (e.g. autism, cerebral palsy) and by degree of functional impairment (e.g. visual acuity, degree of hearing loss). While more traditional approaches to indicator development might have suggested that such issues should be excluded from the monitoring framework until such time as high quality data sources could be developed, such approaches may also have inadvertently resulted in the needs of children and young people with these conditions slipping below the public health radar, and as a consequence being awarded a lesser priority in resource allocation decisions. Thus it was decided that a number of “Bookmark Indicators” should be created, which served to highlight particular issues until such time as more appropriate data sources could be developed. Where possible, such indicators would use currently available data sources to capture particular facets of the wider issue e.g. the current Mental Health Section contains three indicators – Children Calling Telephone Based Counselling Services, Inpatient Hospital Admissions for Mental Health Issues and Hospital Admissions and Mortality from Self Inflicted Injuries. While it is acknowledged that collectively these indicators fail to capture the full scope of child and youth mental health issues (the majority of which are managed on an outpatient basis and are thus not adequately represented by inpatient hospital admissions), it is nevertheless hoped that these indicators will serve as a “Bookmark” for child and youth mental health issues, until such time as more representative indicators can be developed.

In addition to the categories outlined above, each of the indicators in the framework was assessed on the basis of the quality of its data source and graded as to whether this was Excellent (A), Adequate (B), or whether Further Work (C) was required to ensure the indicator could be interpreted in an appropriate manner (**Table 3)**. The section entitled *Limitations of the Current Framework and Areas for Future Development* goes into these issues in more detail, as well as discussing some of the limitations of the Framework as a whole. It also makes a number of recommendations as to where future work may be required if we are to monitor the health of New Zealand’s children and young people more effectively in future. A more detailed review of each of the data sources used to develop this Framework is also included in a series of Appendices at the back of this report. Readers are urged to be aware of the contents of these Appendices when interpreting the information in this report, and in particular the manner in which the inconsistent uploading of Emergency Department cases to the National Minimum Dataset hinders the interpretation of hospital admission trend data.

Conclusion

The indicators presented in this Handbook, although imperfect, represent the currently available information on the health of children and young people in New Zealand. While much further work will be necessary before we can adequately monitor all of the issues those in the health sector felt were of importance to child and youth health, the information currently available is of sufficient quality to suggest that urgent measures are necessary if we are to reduce the large disparities in health outcomes experienced by New Zealand’s children and young people. In attempting to address these issues it is likely that coordinated action will be required at all levels, from those responsible for higher level Government policies, through to those working with children and young people on a day to day basis. While it is beyond the scope of this document to make any recommendations as to which issues require the most urgent attention, or the interventions which might be most effective, it is hoped that this Handbook, and the Framework upon which it is based, will assist those working in the health sector to consider the potential contributions they might make to ensuring that every child and young person in New Zealand grows up to reach their full potential.

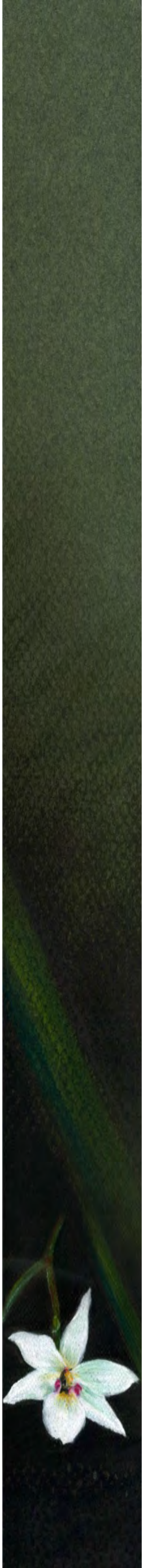
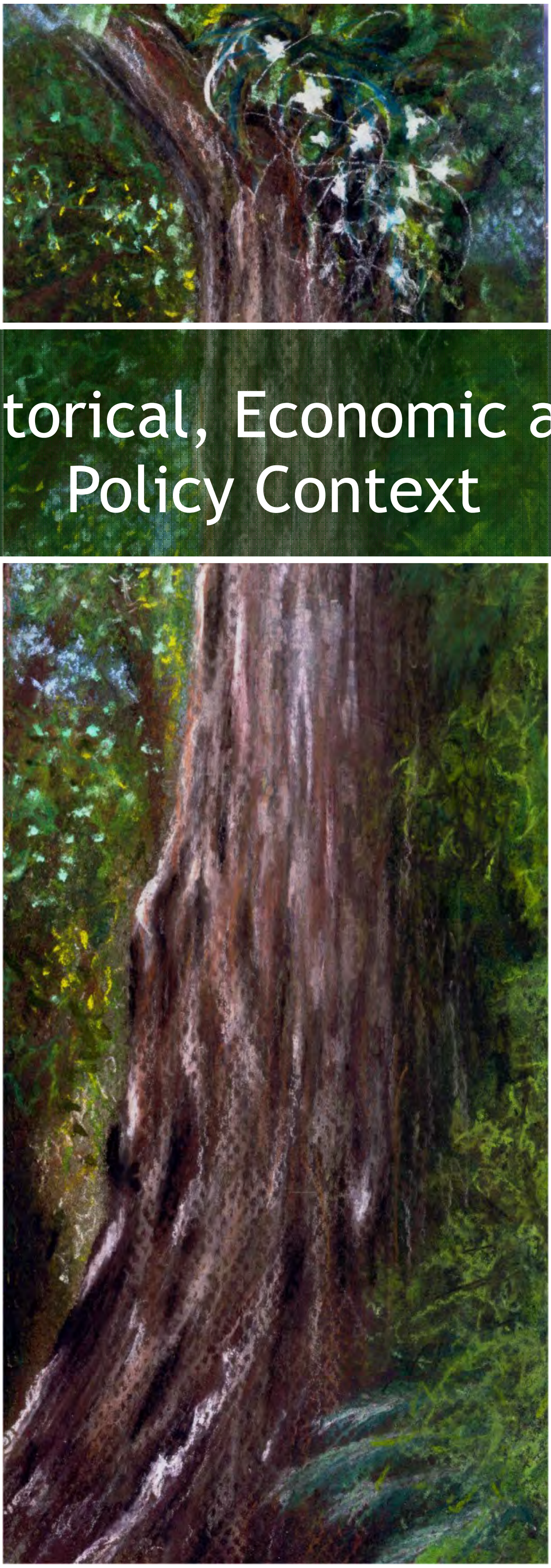


Table 3. Indicator Categories Based on the Type of the Indicator and the Quality of its Data Source

Indicator Type	Data Quality		
	Excellent (A)	Adequate (B)	Further Work Required (C)
Ideal	Measures total extent of an issue and data quality permits appropriate interpretation of trends and population level differences (No NZ indicators currently in this category)	Measures total extent of an issue and data quality permits adequate interpretation of information once the limitations of the datasets have been outlined E.g. Interpretation of trends in highest attainment at school leaving requires an understanding of changes associated with the roll out of the NCEA which began in 2002. While such changes make interpretation of trends difficult, improvements in data quality per se are unlikely to improve this situation	Measures total extent of an issue but data quality limits appropriate interpretation E.g. While theoretically the MOH's two oral health indicators provide near complete coverage of children at 5 and 12 years of age, in reality information is only collected on those who have completed treatment, potentially discounting the poor oral health status of children still undergoing treatment for dental caries at these points in time
Proxy	Measures attendances at publicly funded services for management of an issue and data quality permits appropriate interpretation of trends and population level differences (No NZ indicators currently in this category)	Measures attendances at publicly funded services for management of an issue and data quality permits adequate interpretation once the limitations of the datasets have been outlined E.g. Hospital admission data, when combined with mortality data, provides a reasonable overview of the incidence of invasive meningococcal disease. While a number of data quality issues apply to all indicators derived from these datasets (e.g. accuracy of coding), such limitations are unlikely to significantly hinder the interpretation of the data in this context	Measures attendances at publicly funded services for management of an issue but data quality currently limits appropriate interpretation E.g. Because of the inconsistent manner in which some DHBs have uploaded their emergency department cases to the hospital admission dataset over time, it is difficult to interpret trends in hospital admissions for minor injuries with any certainty. Thus while cross sectional analyses provide an overview of the types if injuries presenting to secondary and tertiary services, interpretation of trend data is significantly impeded by the quality of the datasets
Bookmark	Measures one facet of a wider issue, or provides a brief overview of the literature in an area where no data sources currently exist. Data quality for isolated facets permits appropriate interpretation. (No NZ indicators currently in this category)	Measures one facet of a wider issue, or provides a brief overview of the literature in an area where no data sources currently exist. Data quality for isolated facets permits adequate interpretation once the limitations of the datasets have been outlined E.g. The 2002 Children's Nutrition Survey provides a reasonable snapshot of overweight and obesity amongst New Zealand children at a single point in time. For this isolated snapshot, data quality permits adequate interpretation of the issues covered by this survey	Measures one facet of a wider issue, or provides a brief overview of the literature in an area where no data sources currently exist. Data quality for isolated facets limits appropriate interpretation E.g. In the absence of routine data on the extent of alcohol related harm amongst New Zealand young people, an analysis of hospital admissions with mention of alcohol in any of the first 15 diagnostic codes provides a snapshot of the types of issues presenting to secondary care services. Significant data quality issues however preclude this data being used to make any inferences about trends in alcohol related harm

Historical, Economic and Policy Context



Historical Context

Guest Editorial: The Impact of Historical Factors on Māori Child Health and Potential Ways Forward in the Future

Author: Lorna Dyall

Indicator Category: Bookmark B (**Table 133, Table 134**)

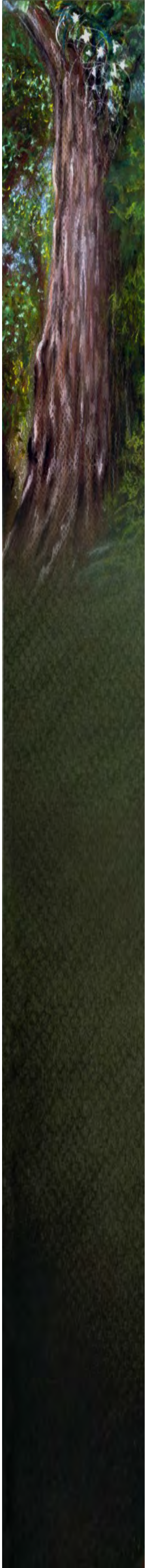
Impact of Historical Factors on the Health of Māori Children

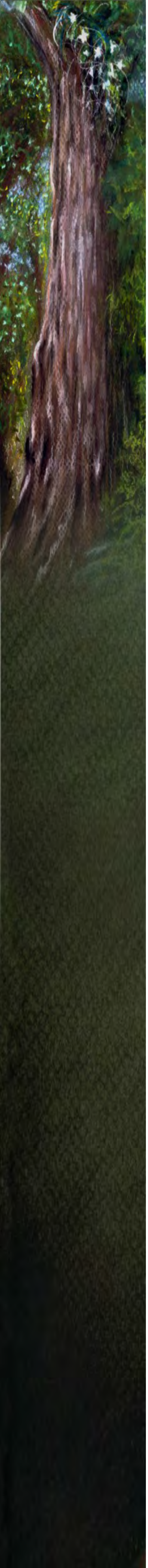
From a Māori worldview all objects, both living and nonliving have their own mauri or life force. Through this energy and the connections that exist between objects, there are interactions and reactions. The health of Māori children today is a reflection of previous and current interactions [3]. Events that have occurred in the past affect the wellbeing of Māori children today. Looking at the past, the health of Māori children was affected by the wellbeing of their whanau, hapu, iwi and the interactions that took place between tribal groups prior to European contact and events that have since taken place since European contact.

From first contact with Europeans, the wellbeing of Māori has been affected. Tribal groups were encouraged to sell or exchange their whenua (land) for different goods and services, to engage in warfare for or against the new settlers, and to adopt new European values and lifestyles (e.g. smoking, gambling, drinking and Christianity) which were detrimental to their wellbeing. In addition, through contact Māori were exposed to many different communicable diseases such as pneumonia, tuberculosis and the flu which were brought by the new settlers. Having had no experience of these diseases, tangata whenua had no resistance to these infectious illnesses with the outcome that many died [4, 5].

In 1840 a number of tribal groups across the country signed Te Tiriti o Waitangi, which established a formal partnership relationship between different tribal groups and representatives of the British Monarchy. Tribal leaders agreed to share the governance of New Zealand on condition that tribes maintained ownership of their land and other properties considered a taonga (treasure) and that Māori as individuals were to be accorded the same rights and privileges as other citizens. In this context, Māori children both then and now were considered a taonga. They are mokopuna, the link to ancestors who have gone before, as well as the living vehicle for whakapapa to continue. Te Tiriti o Waitangi as New Zealand's founding constitutional document accords defined rights to Māori children. They have the right to be protected by the good governance of both elected Governments and tribal entities. They also have the right to develop to their full potential, as both Māori and as New Zealand citizens.

In the 19th and early 20th century, the signing of Te Tiriti o Waitangi did not bring many positive benefits for Māori. It was used by non Māori as a means to achieve political and economic power, to alienate Māori from their land, to erode Māori cultural values, beliefs, language and social institutions and to create an environment where Māori no longer had control over their own destiny. In the late 19th century, it was predicted that the Māori population would become a dying race and therefore no significant interventions were introduced to respond to a rapidly declining population [5]. At the time and in early 20th century Māori had one of highest infant mortality rates of any population on record. The high Māori infant mortality rate however was not reported





internationally, for at the time New Zealand wished to highlight that it had a lower infant mortality rate than other countries. The low infant mortality rate for non Māori was attributed to the services offered through the Plunket Society, which provided a service essentially for non Māori. Child health services for Māori had in the past been largely delivered by the Department of Health through public health nursing services [6].

The state of the health of Māori children has always been priority for Māori, and was recognised as important by Māori health leaders such as Sir Maui Pomare. As a medical trained doctor and appointed later to work as a Medical Officer for the Department of Health, he observed early in the 20th century that less than half of all Māori children born would reach their fourth birthday [6]. Although changes occurred in the 1920s, it was estimated then that Māori had four times the rate of infant mortality of non Māori. Until 1938, access and funding assistance for health and social support was not available to Māori. Health status therefore varied across the country and was influenced by such factors as access to and ownership of land, income, employment and availability of local health, education and social services. Historical and socioeconomic determinants of health therefore have always influenced the health and wellbeing of Māori, especially for children. These historical and social determinants continue to influence and affect the current health status of Māori children in the twenty first century.

Current Health and Wellbeing of Māori Children

Since the 1970s a major renaissance has occurred for Māori, driven by Māori leadership and the support provided by different government agencies e.g. the Department of Māori Affairs which initiated the Tu Tangata programme. This programme sought to change the relationship between Māori and the Department of Māori Affairs, with Māori being actively consulted and invited to develop programmes which would develop and enhance their social, economic and cultural wellbeing [7]. This was a major shift from the Department of Māori Affairs' previous approach and those of other government agencies which in the past had designed programmes which they considered were in the best interest of Māori. Paternalism, colonisation and racism are features which are present in government administration in New Zealand.

From the philosophy of Tu Tangata, a wide range of different programmes were introduced and the most notable was the development of the Kohanga Reo movement. This movement was led by Māori elders, especially women, who were committed to the revival of Te Reo Māori and ensuring that young Māori, especially preschoolers, had the opportunity to learn Te Reo Māori as a first language and in an environment which lived and breathed Māori values, beliefs and Māori knowledge. Since the 1970s the Kohanga Reo movement has grown and is now recognised as a national Māori organisation, receiving government funding for preschool education. At least a third of Māori enrolled in pre school education attend this form of education. Te Kohanga Reo movement is also credited for the birthing of the Kura Kaupapa movement, which has facilitated the development of primary and secondary level schools or classrooms in which Te Reo Māori is the medium in which the national educational curriculum is delivered. It has also pioneered the development of Wananga, which enables students the opportunity to have tertiary education in Te Reo Māori, or from a Māori world view.

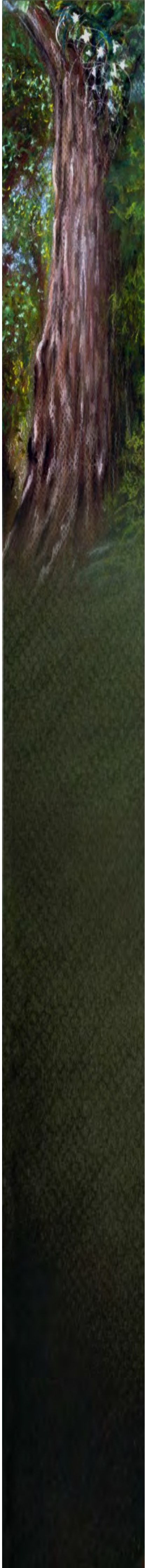
A survey on the health of the Māori language in 2001 found that the language is growing, with just under half (42%) of those surveyed reporting that they could understand and speak some phrases, at least one third reporting they could speak fairly well, and just under 10% reporting they could speak and understand Māori in depth. Fluency in speaking Te Reo Māori is increasing across the country, as more Māori and non Māori learn the language through exposure to Māori television, iwi radio, Māori written media and greater Māori participation in whanau, hapu and iwi cultural events. Proficiency and use of the language varies across the country, with Northland being identified has having the highest concentration of Māori with advanced speaking proficiency skills, with those interviewed who could speak some degree of Māori crediting this opportunity to being able to learn in childhood [8]. A strong sense of cultural identity and connectedness with whanau, hapu, iwi and the wider community are important components of wellbeing for Māori, and Māori medium education has played a major role in supporting young Māori to know their ancestral and cultural links.

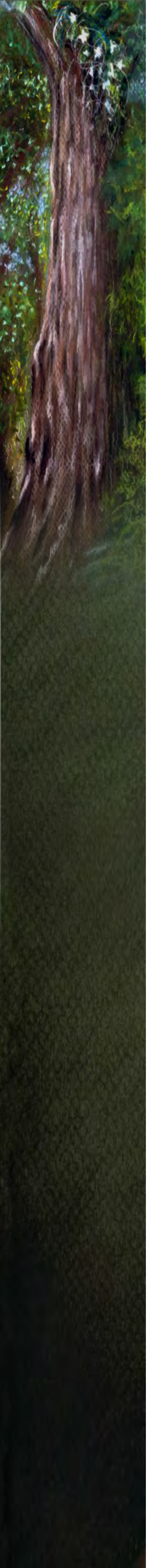
Despite major advances in the development of Māori medium education, the majority of Māori children attend mainstream education and even though considerable research has been undertaken to improve educational outcomes for Māori, education disparities continue to persist between Māori and non Māori students. In 2005 the Education Review Office identified that over one in two Māori boys leave school with no qualifications, with only 9% of Māori boys achieving university entrance and only 47% of Māori school leavers finishing with a qualification higher than NCEA level one, compared to 74% in European and 87% in Asian students. Low educational achievement limits life choices, as it affects further educational opportunities, employment, income and general participation in society[9].

Low education outcomes are related to poor health status as it impacts on all areas of individual, whanau, hapu and iwi wellbeing. Since the 1980s, there has been significant interest by Māori in the organisation and delivery of health, disability and accident related services. Changes in the way health services are arranged has enabled Māori to develop expertise in matters related to policy, purchasing, and delivery of services. Throughout the country there are now over 240 Māori health and disability providers which are contracted nationally by the Ministry of Health, or locally by district health boards or primary health care organisations, to provide a wide range of services both in the community and hospital settings for both Māori and the wider community.

Despite these positive developments, differences in health status between Māori and non Māori (Europeans) persist across all age groups and are related to previous and current socioeconomic determinants of health. When Māori children are born they are more likely than Europeans to have a low birth weight, die at infancy, enter primary school education with poor hearing, have oral health issues, have experienced respiratory problems and may show early signs of future chronic health problems associated with obesity and living in environments which are hazardous to their health. Māori children also have a greater risk of unintentional injuries, often related to motor vehicle accidents [10]. The social and economic environments in which Māori live also impact on the mental health status of Māori children and young adults. Māori children are more likely than Europeans to live in single parent households, live below the relative poverty line, and be exposed at an early age to issues related to alcohol, drug and gambling abuse. Māori children are also likely to experience issues related to domestic, sexual and criminal violence at home and in the community. The unsafe environments that Māori children live in have a major impact on their future lifestyles, values, beliefs, attitudes and behaviour towards parenting, whanau responsibilities and general engagement in areas of New Zealand life, such as interest in registering to vote and casting their vote at a general election [10].

With greater awareness of Māori rights laid down under Te Tiriti o Waitangi, International Human Rights Conventions as the Declaration of Indigenous Peoples' Rights and government legislation, Māori since the late 1970s have been engaged in seeking redress for breaches which have occurred associated with the lack of recognition of Te Tiriti o Waitangi. Claims have been made to the Waitangi Tribunal and to the Government directly for breaches that have occurred and these have often had to be resolved through the judicial system, with the Crown being directed to share assets with different Māori and tribal organisations. Collectively, Māori now own significant economic assets. In 2001, it was estimated that Māori assets were valued over $9 billion and the value of these assets are expected to increase over time [11].





Despite this degree of wealth, Māori organisations have their own development plans, investing for future generations and consider it is the Crown's responsibility through Government to ensure that essential education, health and income support is available to Māori and deliver at least the same outcomes for Māori as non Māori. Socioeconomic determinants of health can be addressed if there is political and community will to support Māori to achieve at least the same outcomes as non Māori (Europeans) in key areas of life as education, health, income, employment and justice.

The Future Health of Māori Children: Potential Ways Forward

Current Māori health status is a reflection of the environments that Māori have been exposed to in past, as well as those we live in today. At present Māori have little influence in changing the nature of the environments in which they live, as these are often politically determined at either a national or local government level. In addressing these environments, greater recognition and commitment must be given to Te Tiriti o Waitangi in our constitutional arrangements, so that Māori have the opportunity to live in New Zealand as Māori, and with non Māori, can shape the environments in which all New Zealanders live. Māori and non Māori need to be supported and encouraged to exercise their political voice in a way which enhances the development of Māori, so that positive benefits may occur for the country as a whole. Further support should be given to Māori and all New Zealanders to become knowledgeable about Te Tiriti o Waitangi, so that there is a shared understanding that the Treaty is a vehicle which unites and does not divide people. There is also a need for New Zealanders to embrace and support the Declaration of Indigenous Peoples' Rights which was recently approved by the United Nations. New Zealand is recognised internationally as a leader in human rights and we should not be afraid of the Māori right to self determination, but should ensure that Māori are now sitting at all tables of governance and decision making, so that there is a shared future in developing the best healthy environment for Māori and non Māori and in particular, for our children and young people.

In considering the best way forward, in 2006 an important hui was held at Orakei Marae in Auckland to discuss the state of Māori child health. Health workers across the country attended the hui and endorsed the concept and philosophy of Mokopuna Ora as a pathway to enhancing the development of Māori child and whanau health. In this respect, Mokopuna Ora was seen as being broad in its coverage, recognising the fact that we are all Mokopuna, irrespective of our age, or whether we have children or not and emphasising the links we have across generations.

Key Themes and Recommendations from the Mokopuna Ora Hui at Orakei Marae in 2006

One of the basic tenets of 'mokopuna ora' is that:

The responsibilities and care of children in Māori society is collective.

As Māori child and whanau health advocates we know there is no single cause or solution to infant mortality but it is unacceptable that more infant deaths occur in Māori communities. Despite the discussions and debates that have ensued over many years amongst child health advocates which have highlighted the importance of child rights, human rights, Māori rights and Indigenous rights, Māori infant mortality persists at higher rates compared to other communities.

Māori children are more likely to die in utero or be born prematurely, suffer from Bronchiolitis, die of SIDS, have TB and get rheumatic fever. Māori children are more likely to be born into families that are deprived due to unemployment, alcohol use, drug use and poverty.

A government wide and community wide approach needs to happen with a view to government divisions working alongside each other in ways that empower communities to protect their children. The fact that children are still dying of known risk factors is incomprehensible.

A key premise of the conference was that the lessons learnt through the effective approaches and interventions utilised by the Māori SIDS programme could have benefits that extend far beyond the prevention of Māori SIDS.

Key recommendations from the hui were:

*That a nationally coordinated service be established so that Māori child health advocates can remain well informed as to the status of Māori children's health.

*That a dataset be established that identified the mortality and morbidity rates for Māori children and infants. 'If you can measure it you can improve it'.

*That an intersectoral approach to addressing Māori child health be adopted.

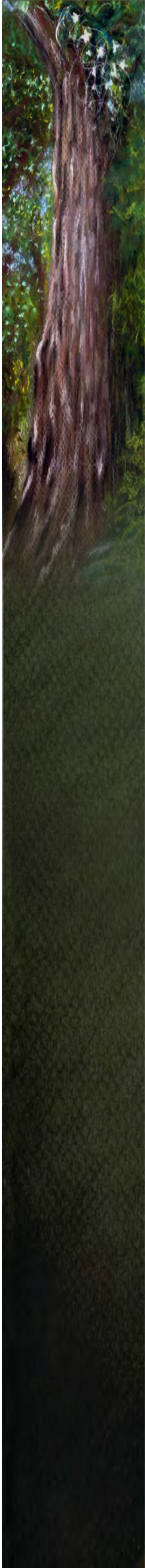
*That a framework be developed with the capacity to assess the current state of children's health and have the capacity to identify where necessary changes need to occur.

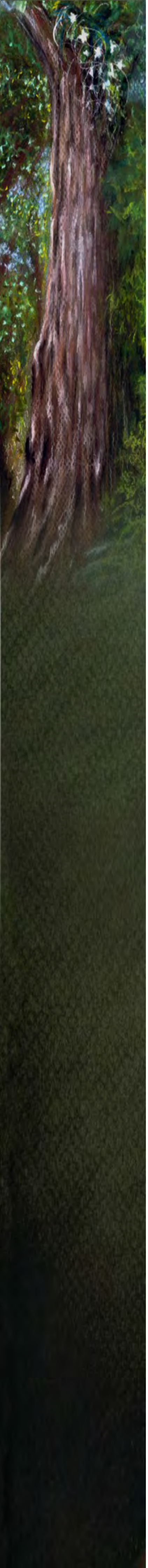
Mokopuna Ora as a strategy links with He Korowai Oranga, the Government's National Māori Health Strategy, in focusing on strengthening and rebuilding Māori whanau, increasing Māori participation in all areas of health decision making, providing effective health services for Māori and a whole of government approach to address the social, economic and cultural determinants of health. Both Mokopuna Ora and He Korowai Oranga embody many of the values and beliefs which are important for connecting people across generations. They encourage sharing of social, economic and cultural wealth and provide a pathway to nurture the current and next generation in an environment which acknowledges their whakapapa and cultural identity [12].

Mokopuna Ora and He Korowai Oranga are supportive of each other in providing pathways for improving the health and wellbeing of Māori children, their whanau and the communities in which they reside. They both recognise that children are our future and they need protection, nurturing and a social, economic and cultural environment which allows them to develop to their full potential, as well as affirming who they are, based on cultural values and knowledge. Both are also unique in that they have been developed with Māori input and provide a pathway forward to rebuild social and cultural capital. Within the philosophy of Mokopuna Ora however, many different educational, health, justice and other related interventions can be developed and offered to support the development and strengthening of Māori whanau, hapu and iwi. A focus on specific health conditions, in isolation from the environment in which Māori live, will achieve little. A holistic approach must be taken which acknowledges the events that have taken place for Māori in the past, previous and current government policies, the ongoing impact of colonisation and the aspirations that Māori now have for their children and grand children, but which are constrained by the environments and social and political situations in which they live. Mokopuna Ora also recognises the need to make children visible and to ensure that their needs are recognised and treated as a high political priority in all areas of life.

The concept and philosophy of Mokopuna Ora should be encouraged, as it has been developed by Māori in response to concerns regarding the state of Māori child and whanau wellbeing and it supports Māori advancement. Further it builds upon successful initiatives which have been developed by Māori for Māori such as the Kohanga Reo Movement. This movement has revitalised and supported the growth of Te Reo Māori throughout our education system and now both Māori and non Māori can participate and enjoy the language in everyday life. Māori developments have benefits for all New Zealanders and they create an environment where other ethnic populations can develop and affirm who they are.

In conclusion, there is an urgent need to address the inequalities that occur in New Zealand society, as these inequalities come at a considerable cost to both Māori and non Māori. At present Māori are not being given the opportunity to develop to their fullest potential due to social, structural and economic barriers which allow certain groups to advance and enjoy privileges at the expense of others. Investment in the positive development of Māori children, especially from conception onwards, will have major spin offs for the total New Zealand population in future years, particularly as a





third of the Māori population in 2006 was under the age of 15 years, in contrast to the non Māori population which is aging. While older people have a special place and role to play in society, and their needs for health and other services must be considered, the health and wellbeing of the older generation in future will be influenced by the vitality and productivity of the younger generation, whose education, employment and aspirations will fund the older generation's future care. Thus we need to be mindful of the intergeneration relationships between young and old and invest in children and young people now, in order to ensure that they are healthy and able to be productive and caring citizens and so that we all can have a secure, healthy and safe future as a nation.

The Macroeconomic and Policy Environment

Guest Editorial: The Role of the Economic Environment and Government Policy in Shaping Child Health Outcomes

Authors: Susan St John and David Craig

Indicator Category: Bookmark B (**Table 133, Table 134**)

A large body of evidence now suggests that the socioeconomic environments in which children live significantly influence their health and wellbeing. Yet it has only been in recent years that the health inequalities debate has begun to focus on the underlying forces which shape the distribution of socioeconomic resources at a population level [13]. In New Zealand there are three aspects of the macroeconomic / policy environment which either have shaped, or may in the future shape the socioeconomic environments in which children live:

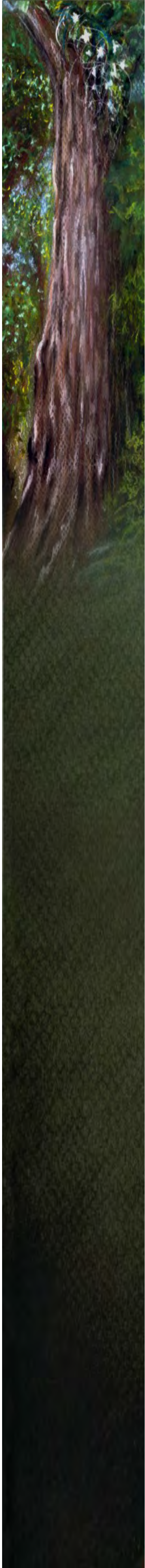
1. Firstly, the effects of New Zealand's major reforms and adjustments to global economic conditions which began in the mid 1980s have been profound and long-lasting, affecting crucial contexts and determinants for child health.
2. Secondly, there remains a risk of a future economic downturn. While such downturns are difficult to predict, and the warning signs can be interpreted in various ways, should such a downturn occur in New Zealand, there would be fallout directly affecting children's health and wellbeing.
3. Thirdly, there has been a changing policy context, which has increasingly placed work as the central element of welfare. This, joined to the shifts in labour markets related to the policy reforms above, has affected and will affect children and their parents' situation in a number of important ways.

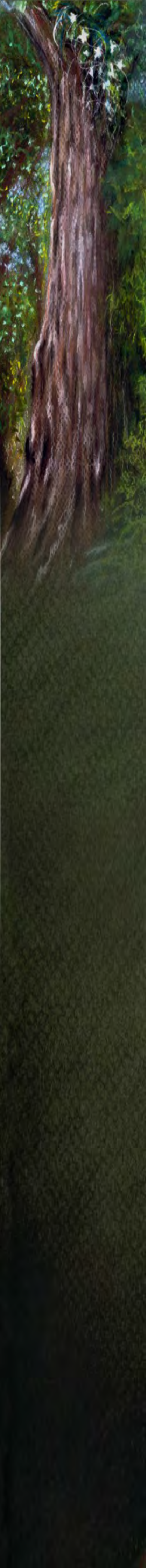
The following sections discuss each of these issues in turn.

New Zealand's Economic Reforms and their Effects on Families with Children

New Zealand began a round of major economic reforms in 1984. These reforms opened up the economy to global competition, and freed price and wage levels from controls, while reducing the role of regulation and state ownership of commercial enterprises. As state support and protection for key sectors of the economy was removed, unemployment increased dramatically. The financial sector was deregulated, and speculation in shares and property drove up asset prices. By the late 1980s both inflation and unemployment were at historically high levels.

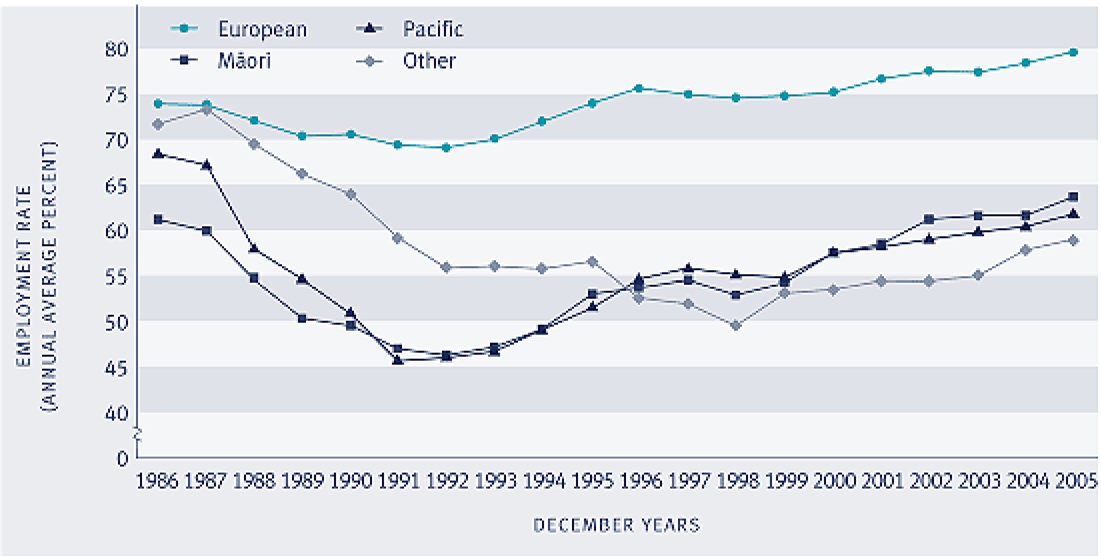
These reforms affected different groups in different ways. Overall, while European unemployment rates shifted little, the impact on jobs held by Māori and Pacific peoples was heavy. In the post-WW2 period, many Māori had moved into both government and manufacturing sector jobs, and these were hardest hit. Overall, Māori participation in paid work fell by a quarter, from 61.2% to 46% [14]. The restructuring of the telecoms branch of the Post Office and the railways, forestry and meat processing sectors had especially severe impacts on rural centres and poorer urban communities. In some places, unemployment affected almost every family.





Labour market reforms of the early 1990s further removed protections for workers, so that in the context of high unemployment, wage rates were subject to downward pressure. This, joined to high inflation, meant that for a large section of the community real incomes declined over a long period up to the early 2000s. Māori incomes fell from 90% of those of European to 78% within 5 years [14]. Poverty among Māori families went from 13% in 1987-8 to 41% in 1992-3 [2]. The Employment Contracts Act in 1991 meant the wages in casual retail and service industries fell relative to the wages in other industries, as well as in real terms [15, 16] The majority of workers in these industries, women, and thus by implication their children, were disproportionately affected. From 1982 to 2001 households in the top decile had an average increase in real income of 35%, while the income of households in the poorest 10% of households fell by about 7% in real terms [17]. In fact 60% of households had falls in real income during the period 1982-2001.

Figure 8. Employment Rates by Ethnic Group, New Zealand 1986–2005



Note: Other includes Asian. Source: The Social Report 2006 [2] derived from Statistics New Zealand's Household Economic Survey

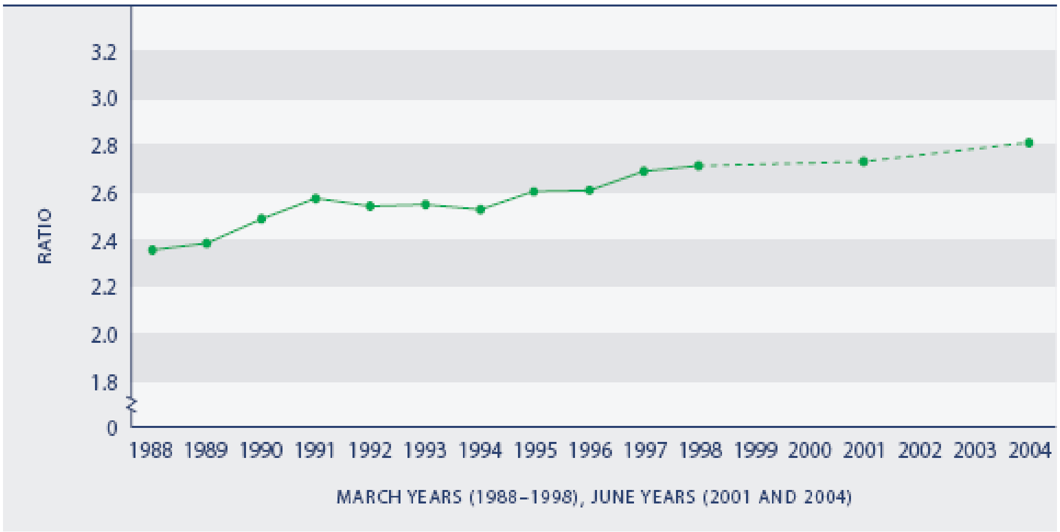
Shifts in labour market policy were matched by shifts in benefit provision. In 1990, unemployment was at record high levels, as was dependence on welfare. In order to cut benefit dependency and create incentives for sole parents and others to get back to work, the government reduced support for those on benefits. Benefits for the unemployed and sole parents were cut by up to $27 per week in 1991. Meanwhile, Family Assistance for children in the form of Family Support lost value as it was not regularly adjusted for inflation [18].

Between these cuts and inflation erosion, sole parents with 2 childrens' core benefit income went from 92% percent of the average wage in 1986 to just 65% in 1991 [19]. These benefit cuts have had significant impact on children. Not linking benefits to wage levels also meant the core benefit / wage relation was eroded even further, to 62% by 1999, and then to 58% in 2004 [19]. Again, the impact on poverty among certain groups was considerable; poverty rates among sole parents went from 15% to 64%, falling only gradually in subsequent years.

By 2000, average incomes had barely recovered to the level of the early 1980s [20]. As wages fell, unemployment also fell, but it has taken a decade and a half to attain similar unemployment levels to 1987. With workers' bargaining power reduced, many now rely on the state to set minimum wages, and to top up incomes through accommodation supplements and tax credits. Many of the new jobs created in the 1990s were in the lowly paid service sector, meaning many families were working more for less, and desperately needed government help to meet housing costs.

The legacies of these reforms has been a large increase in child poverty, as well as rising income inequalities, with New Zealand being identified as having one of the fastest growing income gaps in the OECD during the 80s and 90s [21]. The bottom 50% of households, where approximately 70% of children live [22], have had little or no improvement in real income since 1988 [23]. In spite of improved economic performance in the 2000s, between 2000 and 2004 the proportion of children in severe or significant hardship rose from 18% to 26% [2]. Poverty remains highest among sole parents, dependent on benefits, and their children who number more than 200,000. Māori and Pacific people are also disproportionately represented in both of the hardship categories and in growth in hardship over this period.

Figure 9. Ratio of 80th Percentile of Equivalised Disposable Household Income to 20th Percentile of Equivalised Disposable Household Income, 1988-98, 2001 and 2004



Note: Derived from Statistics New Zealand's Household Economic Survey (1988–2004) by the Ministry of Social Development. Since 1998, the Household Economic Survey has been conducted on a three-yearly basis, rather than annually. This measure adjusts for household size and composition. Source: Ministry of Social Development 2006 [2]

This rise in both wealth and poverty has had an important impact on asset ownership, especially in housing. With tax settings overwhelmingly favouring investment in rental properties, house prices have risen to at least 6 times average wages. Following the return to income-related rents for state housing, and increases to the accommodation supplement , the number of families still paying over 30% of their incomes in rentals has fallen, but it remains high compared to earlier periods. Poorer families are increasingly sorted by real estate markets into more marginal suburbs, where long commutes along struggling public infrastructure routes accentuate their hardship. In the same areas, loan sharks have expanded their operations while gambling outlets such as pokie machines have proliferated. In this context, it remains unclear exactly what the legacy of these reforms is for different parts of the community. The experience of the children of the 1991 benefit cuts however lies plausibly behind many of the changes in health statistics described in this handbook.

Possible Implications of a Future Downturn for Families with Children

As noted above, economic portents are difficult to read. Despite the strength and persistence of the current economic boom, the history of economic cycles suggests the strong likelihood of a downturn in the next few years. This could happen as a result of a global recession, or a specific event affecting New Zealand, such as an outbreak of foot and mouth disease. New Zealand may in such circumstances be especially vulnerable. As a country New Zealand is highly indebted to the rest of the world and continuously spends more than is earned internationally. The country's historically high current account deficit has been sustained by the willingness of foreigners to lend their savings. Anti-inflation policies keep interest rates high, attracting 'hot' foreign money, which in turn helps keep the exchange rate high. The high exchange rate damages the export sector and adds to the Current Account Deficit problem. Any loss of confidence by overseas investors may see a sudden drop in the value of the New Zealand dollar. While ultimately this may correct the imbalances within the economy and allow the export sector to recover, in the short run there could be severe economic pain. Inflation and interest rates and unemployment, redundancies, bankruptcies, and mortgage sales would all rise, perhaps dramatically. Given New Zealand's increased reliance of work as the basis of its welfare, and the ways policies increasingly offer support only to those in work (see below), those losing their jobs would suffer a double blow in loss of income. They would be at greater risk if benefit levels are allowed to erode further, if household debt continues to rise, and if welfare becomes too dependent on fragmented provision or charity.

Implications of Recent Reforms to the Labour Market and Welfare Policy for Families with Children

Unemployment fell from the early 1990s highs for most of the subsequent decade. Since 2000, there have been even more dramatic declines in unemployment, to the point where New Zealand now has one of the lowest rates of unemployment in the OECD. There have certainly been positive aspects to the economic influence on the lives of the poorest New Zealand children. Better employment growth in the last five years has helped many families into work and to better incomes, especially when there are two earners. The building boom has provided well-paid jobs to those with skills in the building and property-related trades. An export boom from 1999 also created jobs in the export sector, but as discussed above, high exchange rates have eroded some of these away. As this Handbook shows, a number of health figures plausibly related to poverty have also turned around in recent years, especially since 2004. This is undoubtedly good news, and has lifted many, though by no means all, children out of poverty.

However, the highest rates of job growth have occurred in the low-paid service and retail sectors which in turn are the most vulnerable in an economic slowdown. In the mid-2000s low income families are not only less secure in the job market but they have also been adversely affected by the actions taken by the Reserve Bank to restrain inflation in a booming economy. Children belonging to those households are most affected by rising interest rates, i.e. younger and poorer families most likely to have mortgages and other consumer debt. These families are least likely to benefit from capital gains, and most likely to be affected when business invests less in jobs because interest rates are high. As the housing market has inflated in New Zealand, house prices have soared beyond the reach of many poor families. Monetary policy alone has been impotent to contain these pressures.

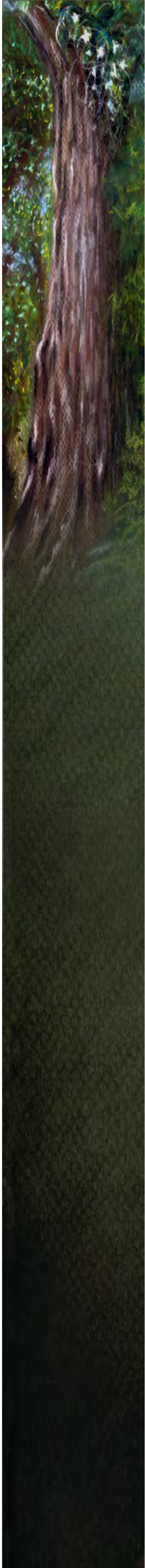
The changed employment environment has led to policy changes. Faced with Labour shortages, and wanting to maximise the numbers of those in either full or part time work, the government has shifted its policy settings to make employment the centrepiece of welfare policy. With core benefits continuing to decline against average wages, work is now presented as the main means by which benefit dependent families can break out of poverty. The government have set out again to create incentives to work, but this time through a combination of measures: letting benefits erode via rising gaps between them and average wages; allowing working beneficiaries to keep more of their part time wages; and creating a substantial incentive to move into fulltime work, by offering families (in work, with children, and earning up to a high threshold) a tax credit worth at least $60 a week: the In Work Payment, and the Family Tax Credit which guarantees a minimum family income. This reform package, called Working for Families, aimed to benefit over 60% of families with dependent children and make inroads into child poverty [24] [25].

Commentators however have pointed to a number of areas where this policy might generate negative effects on children's wellbeing. As indicated above, most of the poorest children currently live in sole parent, benefit dependent families. These families have received only relatively small amounts of increased income from benefits, and their rates of participation in the workforce are relatively low by comparative international standards. While Family Support increased for all children both in 2005 and 2007, it has been accompanied by reductions in hardship provisions, and for families with a second child, a small cut in the core benefit. Sole parents who are not working 20 hours a week cannot access the in work payment, which is a substantial part of overall family assistance. From a child health and wellbeing perspective, policy needs to strike a balance between helping all parents provide and care for their children, and actively enabling them to participate in paid work. At the current point in time, there remains an ongoing debate as to whether policy commitments in this area have got this balance right.

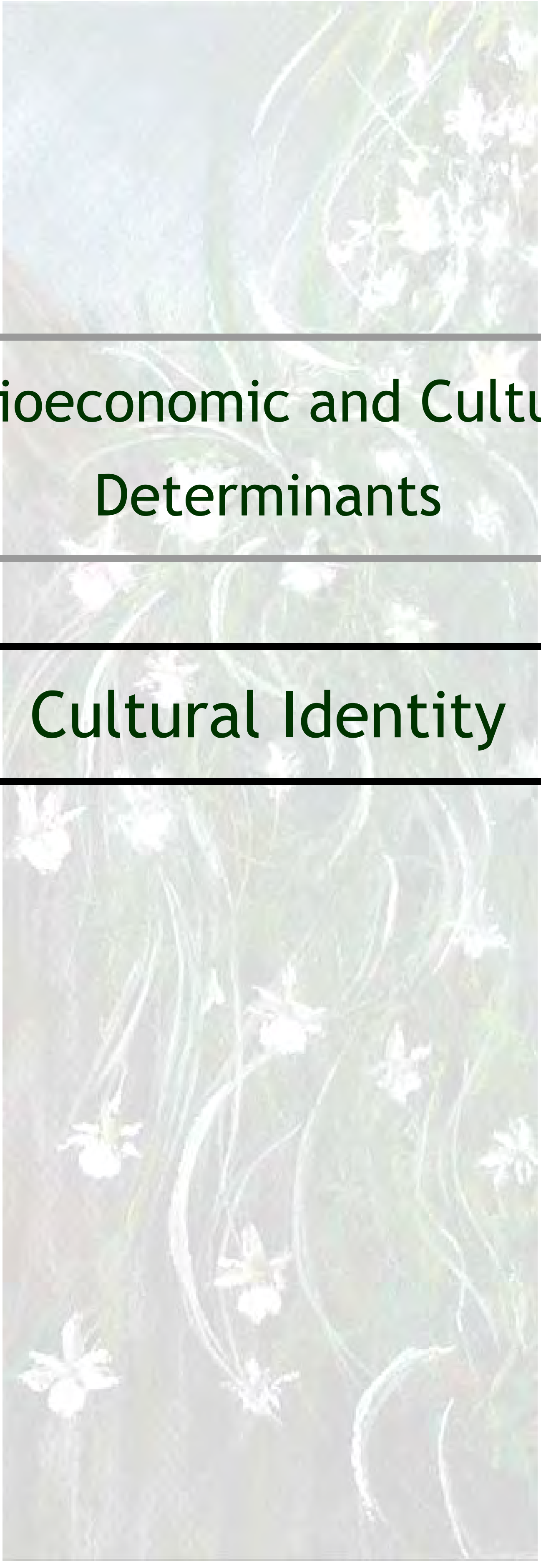
The other area of work related policy shifts affecting children is the increased use of support policies to encourage women (and especially mothers) to maintain their participation in the workforce. These incentives include increased parental leave and subsidised childcare provisions. These new provisions, while relatively small compared to other OECD countries [26], have been welcomed by many as offering more opportunities for paid work, and thus for higher incomes. Whether or not they will be sufficient to enable mothers (and especially sole parents) to both move into more work and maintain their parenting engagements remains to be seen. International evidence suggests quite high levels of such support are needed to enable sole parents to stay in work.

Summary

The above review has highlighted the intertwining roles Government policies and the wider macroeconomic environment play in shaping the resources available to families with children. As the later sections of this Handbook demonstrate, these resources in turn play a significant role in shaping health outcomes at a population level, potentially suggesting that co-ordinated action will be required at all levels, from those responsible for developing higher level Government policies, through to those working with children and young people on a day to day basis, if we are to begin to address the currently poor health status of New Zealand's children and young people.



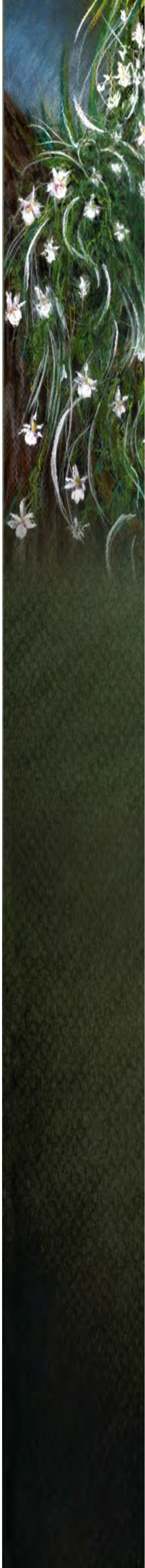
Socioeconomic and Cultural Determinants



Socioeconomic and Cultural Determinants

Cultural Identity

Enrolments in Kura Kaupapa Māori



Introduction

Cultural identity is a critical component of positive Māori development. It has been suggested that if someone identifies as Māori but is unable to access Māori language, custom, land, marae, whanau or community networks then it is unlikely that their cultural identity will be secure. A secure identity in turn is positively linked to health status, educational achievement and emotional and social adjustment [27]. In developing a set of indicators to assess outcomes for Māori, knowledge of whakapapa, use of marae and the practise of Māori values were seen as important cultural elements, but te reo Māori was regarded as fundamental and of sufficient importance to warrant consideration as a separate outcome in its own right. While not all agreed that it was critical for wellbeing, most identified te reo Māori as the single most defining characteristic of being Māori [27].

In New Zealand, Kura Kaupapa Māori schools are total immersion schools designed by Māori for Māori which follow a curriculum that validates Māori knowledge, structures, processes, learning styles and learning practices. They offer a school environment that is immersed holistically in the Māori language and culture. Kura Kaupapa Māori are regarded as a key part of the strategy to assist in revitalising the Māori language and improving the participation and achievement levels of Māori in schooling [28]. Their origins can be traced back to the 1970s, when aspects of Māori language and culture began to be included in mainstream (English-medium) programmes, although they were usually delivered within the context of a westernised curriculum and in the English language. During the 1980s, schools and bilingual units (classes within schools) became established, with the expectation that they would deliver the curriculum in Māori and English. During this period, Kohanga reo (Māori language and culture preschools) also began to emerge, in response to the perceived need to provide for the regeneration of the Māori language and culture, as well as the autonomy to deliver a curriculum along cultural lines. As the number of Kohanga Reo graduates grew, parental demand resulted in the growth of bilingual and Māori immersion units within the primary and secondary school sector [29]. While early Kohanga Reo and Kura Kaupapa Māori were privately funded, Kura Kaupapa Māori were officially recognised as legitimate schools in 1989 when they were incorporated into the state education system and hence eligible for state funding [29]. Today Māori medium education takes place across the educational spectrum from pre-school to tertiary including:

1. Kohanga reo and other bilingual and immersion programmes in the early childhood sector
2. Kura Kaupapa Māori (Years 1-8) and wharekura (Years 1-13)
3. Immersion and other bilingual programmes in mainstream schools
4. Wananga in the tertiary sector

The following section uses Ministry of Education data to explore the number of children and young people enrolled in Māori medium education during 1992-2006. While it is unlikely that monitoring enrolments in Māori medium education captures the full diversity of Māori language proficiency, it is nevertheless hoped that the figures contained in this section will serve as a crude proxy for measuring progress towards improving Māori language proficiency amongst New Zealand’s children and young people.

Data Source and Methods

Definition

Number of enrolments in Ministry of Education funded kura kaupapa Māori and kura teina
Number of enrolments in Māori Medium Education

Data Source

Numerator: Ministry of Education: Number of enrolments in kura kaupapa Māori, kura teina, or other Māori medium education at primary or secondary level
Denominator: Not applicable

Indicator Category

Bookmark C (Table 133, Table 134)

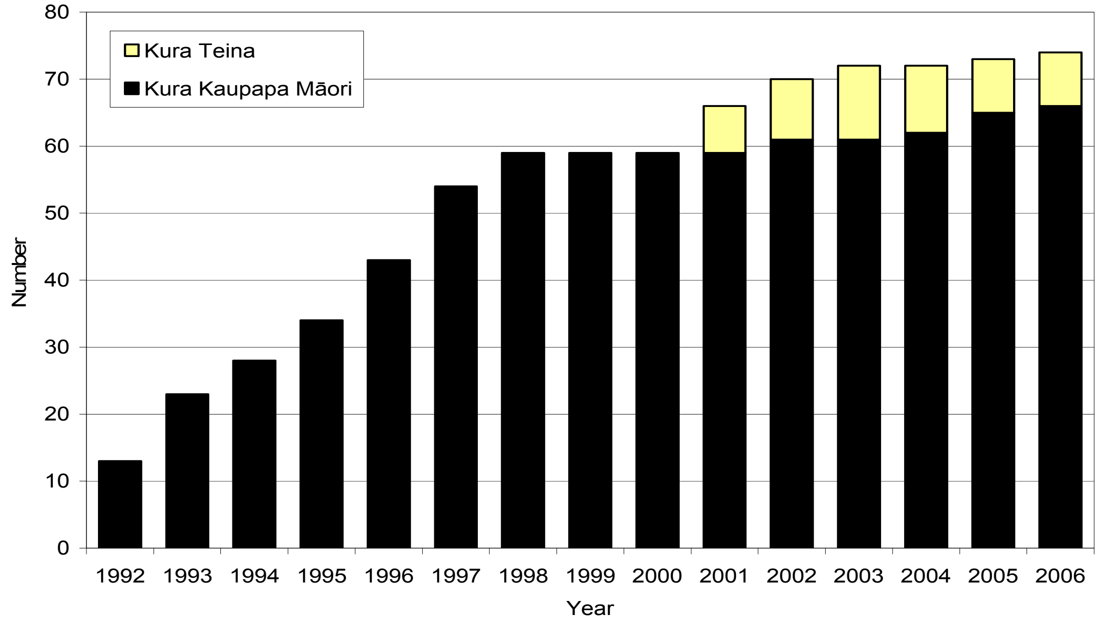
New Zealand Distribution and Trends

Kura Kaupapa Māori and Kura Teina in New Zealand

Kura kaupapa Māori are schools where the teaching is in the Māori language and the school's aims, purposes and objectives reflect the Te Aho Matua philosophy. Kura teina is an initiative by a community which wants to become a kura kaupapa Māori and has prepared a business case and been formally accepted by the Ministry of Education into the establishment process. During this establishment phase, kura teina are attached to and mentored by an established high performing kura kaupapa Māori. Prior to 2001, kura teina were not counted as separate schools [30].

In New Zealand since 1992, there has been a 5.7-fold increase in the number of kura kaupapa Māori and kura teina, from 13 in 1992 to 74 in 2006. The most dramatic increases occurred during the 1990s and since then the rate of growth has slowed, with a 25% increase in the number of schools since 2000 (**Figure 10**). Over the same period, the number of children enrolled in kura kaupapa Māori and kura teina has increased by 24%, from 4,964 in 2000 to 6,160 in 2006. During 2005, Kura kaupapa Māori and kura teina could be found in all but three District Health Board regions (**Table 4**).

Figure 10. Number of Ministry of Education Funded Kura Kaupapa Māori and Kura Teina, New Zealand 1992-2006



Source: Ministry of Education. Note: Prior to 2001 Kura Teina were not counted as separate schools

Table 4. Number of Ministry of Education Funded Kura Kaupapa Māori and Kura Teina by District Health Board, New Zealand 2005

DHB Region	Number of Schools		Number of Students	
	Kura Kaupapa Māori	Kura Teina	Kura Kaupapa Māori	Kura Teina
Northland	8	0	807	0
Waitemata	4	0	379	0
Auckland	2	0	120	0
Counties Manukau	4	2	482	60
Waikato	8	2	921	81
Lakes	4	1	421	28
Bay of Plenty	8	1	634	11
Tairawhiti	6	1	271	51
Taranaki	3	0	151	0
Hawkes Bay	5	0	434	0
MidCentral	3	1	289	20
Whanganui	3	0	243	0
Capital and Coast	1	0	120	0
Hutt	1	0	185	0
Wairarapa	1	0	110	0
Nelson Marlborough	0	0	0	0
West Coast	0	0	0	0
Canterbury	2	0	225	0
South Canterbury	0	0	0	0
Otago	1	0	27	0
Southland	1	0	111	0
New Zealand Total	65	8	5,930	251

Source: Ministry of Education.

Māori Medium Education in New Zealand

While kura kaupapa Māori and kura teina offer a Māori language immersion environment, a number of other New Zealand schools offer some of their curriculum in Māori, with the degree of Māori medium learning often being divided into 4 levels: Level 1: 81-100%; Level 2: 51-80%; Level 3: 31-50%; Level 4(a): up to 30%. Thus a number of New Zealand students also have access to some of their educational curriculum in the Māori language, as a result of attending a bilingual school or an immersion / bilingual class in a primary or secondary school setting (**Table 5** and **Table 6**).

Summary

Cultural identity is a critical component of positive Māori development and has been positively linked to health status, educational achievement and emotional and social adjustment. In New Zealand, kura kaupapa Māori are total immersion schools which follow a curriculum that validates Māori knowledge, processes, learning styles and practices and are regarded as a key part of the strategy to revitalise the Māori language and to improve the participation and achievement levels of Māori in education. Since 1992, there has been a 5.7-fold increase in the number of kura kaupapa Māori and kura teina, with the number of children enrolled increasing from 4,964 in 2000 to 6,160 in 2006. It is hoped that the ongoing growth of kura kaupapa Māori and other schools incorporating Māori language in their teaching will continue to foster the use of Māori language amongst New Zealand children and young people and as a consequence, further enhance positive cultural identity.

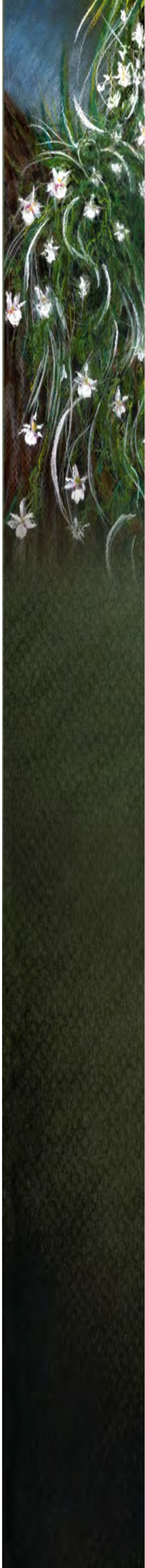


Table 5. Number of Full-time Equivalent students involved in Māori Medium Education by School Sector and Form of Education as at 1 July, New Zealand 2002-2006

Form of Education		2002		2003		2004		2005		2006	
		Total	Māori	Total	Māori	Total	Māori	Total	Māori	Total	Māori
Primary	Immersion School	3,465	3,458	3,624	3,617	3,484	3,475	3,232	3,228	2,996	2,981
	Bilingual School	6,980	5,849	7,398	6,000	7,188	5,852	6,076	5,309	5,736	5,032
	Immersion Class	3,057	3,018	3,218	3,185	3,131	3,080	3,231	3,171	3,101	3,037
	Bilingual Class	7,879	7,008	7,435	6,670	7,205	6,465	7,569	6,268	8,302	6,744
	Total Primary	21,381	19,333	21,675	19,472	21,008	18,872	20,108	17,976	20,135	17,794
Secondary	Immersion School	2,363	2,339	2,734	2,729	3,267	3,252	3,059	3,033	3,005	3,000
	Bilingual School	975	963	741	738	895	890	1,435	1,431	1,362	1,341
	Immersion Class	412	398	547	533	596	581	567	558	577	572
	Bilingual Class	588	554	764	683	588	552	647	618	522	488
	Total Secondary	4,338	4,254	4,786	4,683	5,346	5,275	5,708	5,640	5,466	5,401
Composite	Immersion School					90	89	103	103	115	115
	Bilingual School	147	147	317	316	785	782	478	477	937	931
	Immersion Class	200	196	175	174	110	107	257	252	255	247
	Bilingual Class	1,724	1,649	2,070	1,981	2,187	1,957	2,209	2,086	2,389	1,816
	Total Composite	2,071	1,992	2,562	2,471	3,172	2,935	3,047	2,918	3,696	3,109
Special	Bilingual Class	76	75	59	50	53	45	51	46	44	36
	Total Special	76	75	59	50	53	45	51	46	44	36
TOTAL		27,866	25,654	29,082	26,676	29,579	27,127	28,914	26,580	29,341	26,340

Source: Ministry of Education.

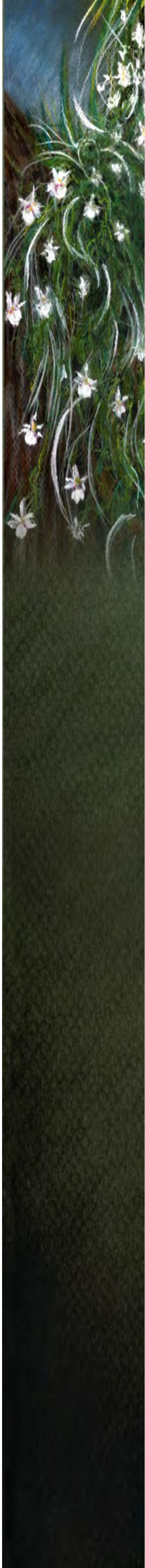
Table 6. Number of Full-Time Equivalent Students in Māori Medium Education by Level of Learning and Region, New Zealand 1st July 2006

Region	Level of Māori Medium Learning								TOTAL	
	Level 1: 81-100%		Level 2: 51-80%		Level 3: 31-50%		Level 4(a): up to 30%			
	Total	Māori	Total	Māori	Total	Māori	Total	Māori	Total	Māori
Northland	1,257	1,251	821	797	773	680	572	490	3,423	3,218
Auckland	1,929	1,893	870	820	1,574	1,419	936	377	5,309	4,509
Waikato	2,089	2,082	503	499	320	301	680	482	3,592	3,364
Bay of Plenty	2,594	2,577	816	810	973	799	2,250	1,481	6,633	5,667
Gisborne Region	726	719	275	270	501	487	250	234	1,752	1,710
Hawkes Bay	698	695	636	624	585	560	531	452	2,450	2,331
Taranaki	196	195	45	45	79	57	139	75	459	372
Manawatu-Whanganui	939	939	533	521	275	236	576	445	2,323	2,141
Wellington Region	1,203	1,198	212	198	70	62	416	300	1,901	1,758
Canterbury	347	322	261	232	272	195	114	36	994	785
Otago	32	32	20	19	0	0	<5	<5	56	55
Southland	149	148	44	39	0	0	0	0	193	187
Tasman	47	46	0	0	5	5	<5	<5	53	52
Nelson Region	29	28	113	106	23	19	0	0	165	153
Marlborough	0	0	38	38	0	0	0	0	38	38
New Zealand	12,235	12,125	5,187	5,018	5,450	4,820	6,469	4,377	29,341	26,340

Source: Ministry of Education.

Socioeconomic and Cultural Determinants

Economic Standard Of Living



Children in Families with Restricted Socioeconomic Resources

Introduction

High rates of child poverty are a cause for concern, as low family income has been associated with a range of negative outcomes including low birth weight, infant mortality, poorer mental health and cognitive development, and hospital admissions from a variety of causes [31]. While there is much debate about the precise pathways via which lower family income leads to adverse outcomes, the relationship appears to be non-linear, with the effects increasing most rapidly across the range from partial to severe deprivation [32].

Family income, however, is only one facet of the complex construct called socioeconomic status, which also encompasses such dimensions as economic ownership, community prestige and access to resources via family background, lifestyle and social networks [33]. This complexity often means that conceptually coherent measures of socioeconomic status are difficult to derive from routine data sources [34] and instead researchers have tended to use a number of crude proxy measures (e.g. family income, parental education and occupation, and area of residence), each of which assesses a slightly different aspect of socioeconomic wellbeing. Despite this, each of these measures has been associated with adverse child health outcomes in a variety of different settings.

In New Zealand, while no single Government or non-Government agency has comprehensively monitored the socioeconomic wellbeing of families with children, a number of agencies have collected information on particular facets, which collectively can be used to create a picture of the wellbeing of New Zealand families. In undertaking this task, the following section brings together information from three different data sources:

1. The distribution of births by NZ Deprivation Index decile, which reflects the degrees of relative deprivation into which New Zealand babies are born each year.
2. The Proportion of Families with Dependent Children who live below the Poverty Line (Net-of-Housing-Cost-Incomes < the 60 % Line), which serves to highlight a group of families whose economic resources may limit their ability to participate in, and belong to, the communities in which they live [2].
3. The Distribution of Families with Dependent Children by the New Zealand Economic Living Standards Index, which serves to identify groups of families who are living in severe or significant hardship [35]

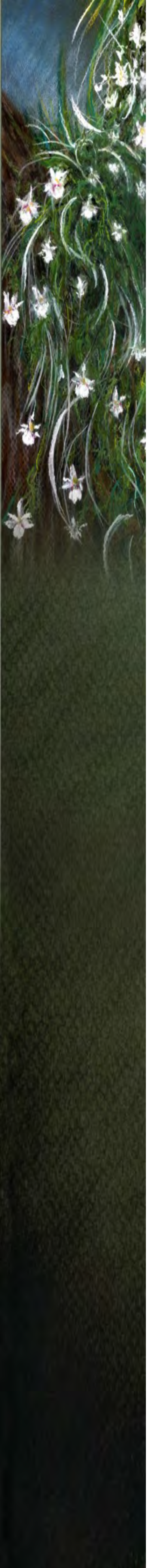
Data Source and Methods

Definition

1. Distribution of Births by NZ Deprivation Index Decile
2. Proportion of Families with Dependent Children with Net-of-Housing-Cost-Incomes < the 60 % Line
3. Distribution of Families with Dependent Children by the NZ Economic Living Standards Index

Indicator Category

Bookmark B (Table 133**,** Table 134**)**



Data Source and Interpretation

1. Distribution of Births by NZ Deprivation Index Decile

Numerator: Birth Registration Dataset (Appendix 2): Number of births registered in New Zealand (by ethnicity and NZ Deprivation Index Decile).

Denominator: Birth Registration Dataset: Total number of births registered in New Zealand

Interpretation: Births are presented by birth registration year rather than year of birth. Ethnicity (of the baby) is that supplied by parents on their child's birth registration form and NZ Deprivation Index decile is based on the domicile code representing the usual residential address of the mother at the time of birth registration (which in this analysis has been mapped to NZDep2001).

2. Proportion of Families with Dependent Children with Net-of-Housing-Cost-Incomes < the 60 % Line

Numerator: The Ministry of Social Development's Social Report: Derived from Statistics New Zealand's Household Economic Survey (1988-2004)

Interpretation: The New Zealand Household Economic Survey is a 3-yearly survey managed by Statistics New Zealand. In 2004 the survey comprised the responses of 2,854 households sampled in a statistically representative fashion. This measure has been constructed by the Ministry of Social Development using economic family units as the base unit for analysis. Under this definition all young adults are considered financially independent at 18 years of age, or at 16-17 years if they are receiving a benefit, or are employed for >30 hours per week. Housing costs were apportioned to economic family units and adjustments for family size by means of a per capita equivalisation based on the 1988 Revised Jensen Equivalence Scale. The resulting amount – the Housing-Adjusted Equivalised Disposable Income (HEDY) can be regarded as an income based proxy measure of standard of living. An income of < 60% of the median HEDY was chosen as the low income threshold in this analysis. A more detailed discussion of the methodology used and limitations of this analysis can be found in the 2006 Social Report [2].

3. Distribution of Families with Dependent Children by the NZ Economic Living Standards Index

Numerator: The Distribution of Living Standards for Families with Dependent Children as Reported by the Ministry of Social Development in its 2004 Living Standards Report [35]

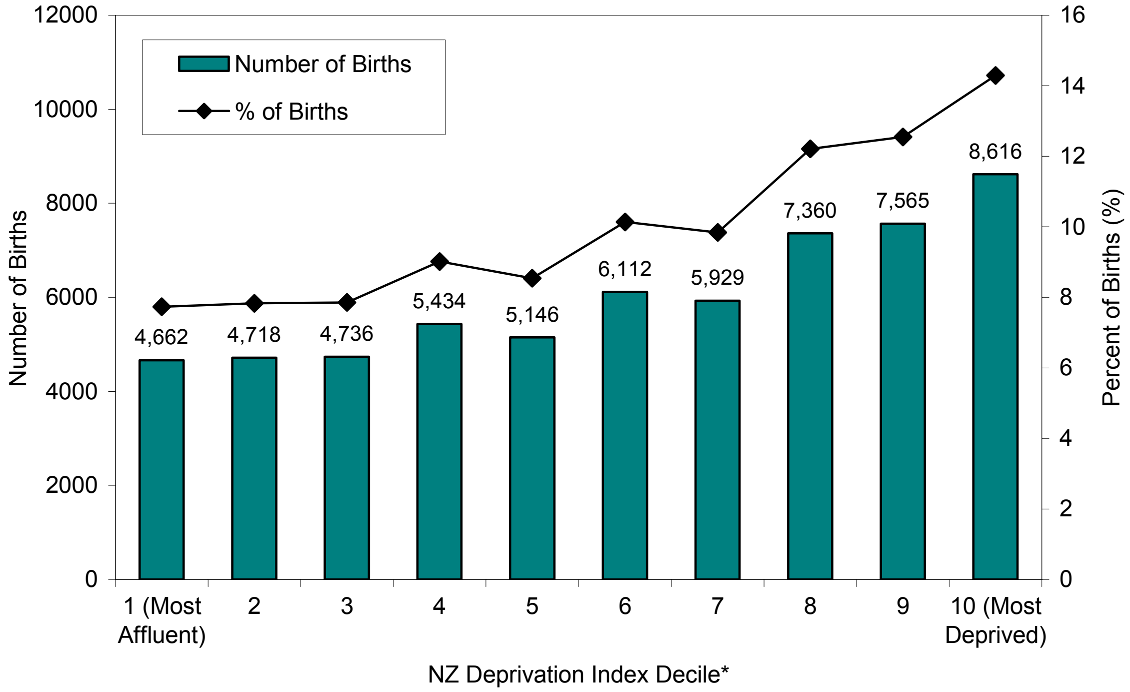
Interpretation: The Economic Living Standard Index (ELSI) uses information on 40 items, which individually have a strong relationship with living standards (e.g. household amenities, personal possessions, access to services, and adequacy of income to meet everyday needs). The 2004 Living Standards Survey used the ELSI to survey a probabilistic sample of New Zealand residents aged 18+ years in March and June 2004. A total of 4,989 respondents answered on behalf of their family units, giving a response rate of 62.2%. The results in this section relate to the living standards of families with dependent children, with the level of analysis being the economic family unit, rather than the individual child. A more detailed discussion of the methodology used and the limitations of this survey can be found in the New Zealand Living Standards 2004 Report [35].

Distribution of Births by the NZ Deprivation Index Decile

In New Zealand during 2006, births were not evenly distributed by NZDep decile, but occurred disproportionately towards the more deprived end of the scale. Only 7.7% of babies were born into the most affluent areas (NZDep Decile 1), as compared to 14.3% of babies who were born into the most deprived areas (NZDep Decile 10). Overall during 2006, a total of 23,541 babies (39.1% of all births) were born into NZDep Decile 8-10 (the more deprived) areas (**Figure 11**).

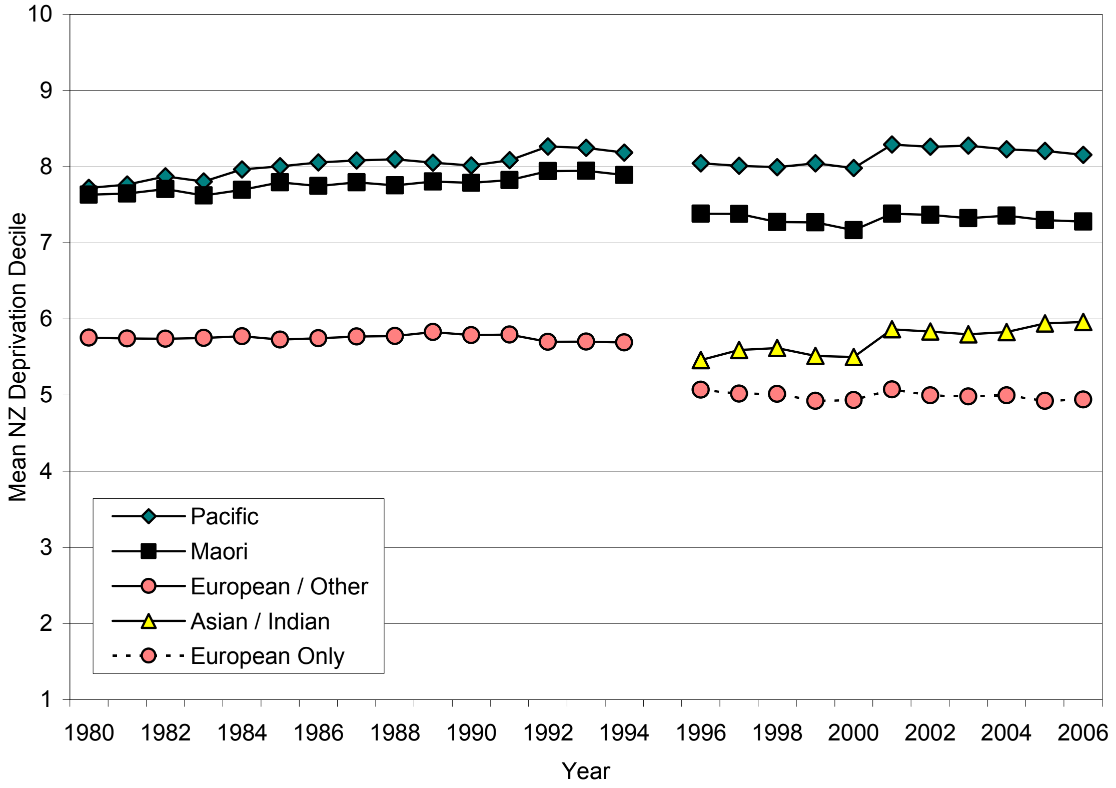
During 1980-2006 the distribution of births by NZ Deprivation Index decile also varied by ethnicity, with Pacific, then Māori babies being significantly more likely than European / Other babies to be born into deprived areas. While the NZDep Index is a relative scale and thus absolute changes in the socioeconomic position may have occurred during this period, in relative terms the socioeconomic positions of New Zealand's largest ethnic groups did not change appreciably during this period (**Figure 12**).

Figure 11. Distribution of Births by NZ Deprivation Index Decile, New Zealand 2006



Note: *NZ Deprivation Index Decile is mapped to NZDep 2001

Figure 12. Distribution of Births by Ethnicity and NZDep Index Decile, New Zealand 1980-2006



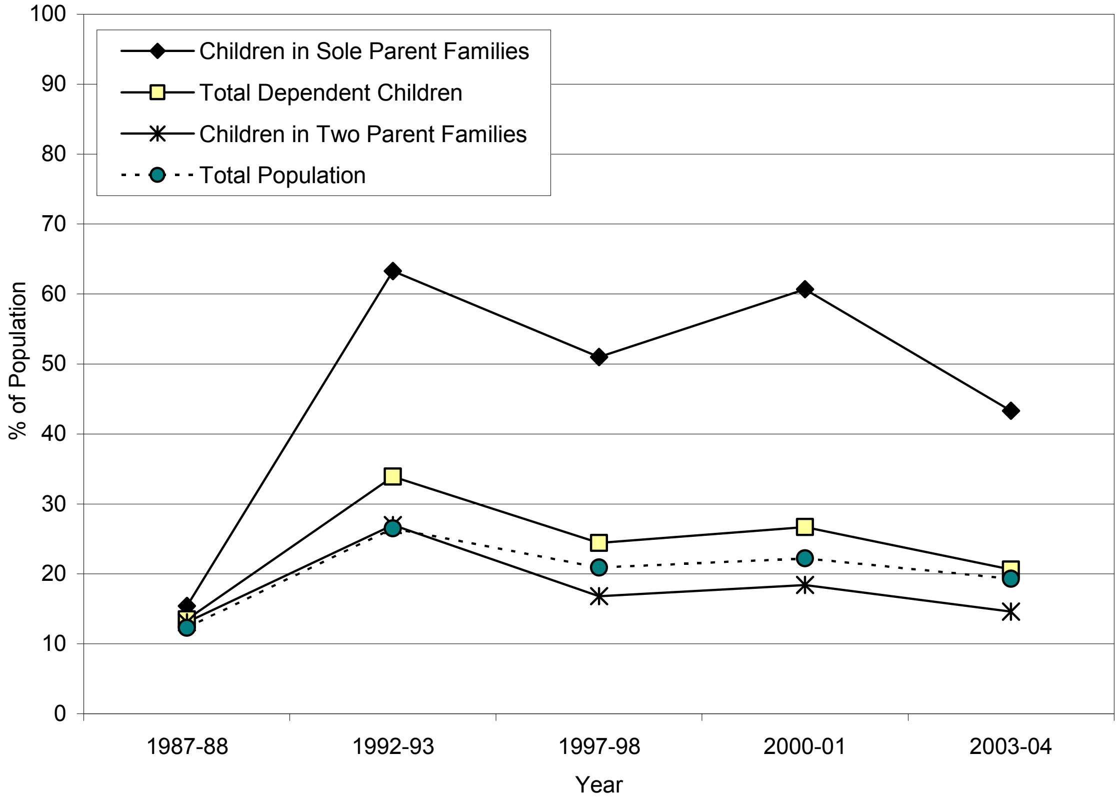
Note: Change in definition of ethnicity between 1994 and 1996

Children in Families with Low Incomes

During 1987-1988, data from the New Zealand Household Economic Survey (NZHES) suggest that 13.5% of dependent children in New Zealand lived below the poverty line (net-of-housing-cost income <60% of the median). During this period, there was very little variation by family type, with 15.4% of children in sole-parent households living below the poverty line, as compared to 13.1% of children in two-parent families. By 1992-1993 however, this distribution had changed markedly, with 63.3% of children in sole-parent families living below the poverty line, as compared to 27.0% of children in two-parent families. Since then, the proportion living below the poverty line has gradually declined for all family types, with 43.3% of children in sole parent families and 14.6% of children in two parent families living below the poverty line in 2003-2004 (**Figure 13**).

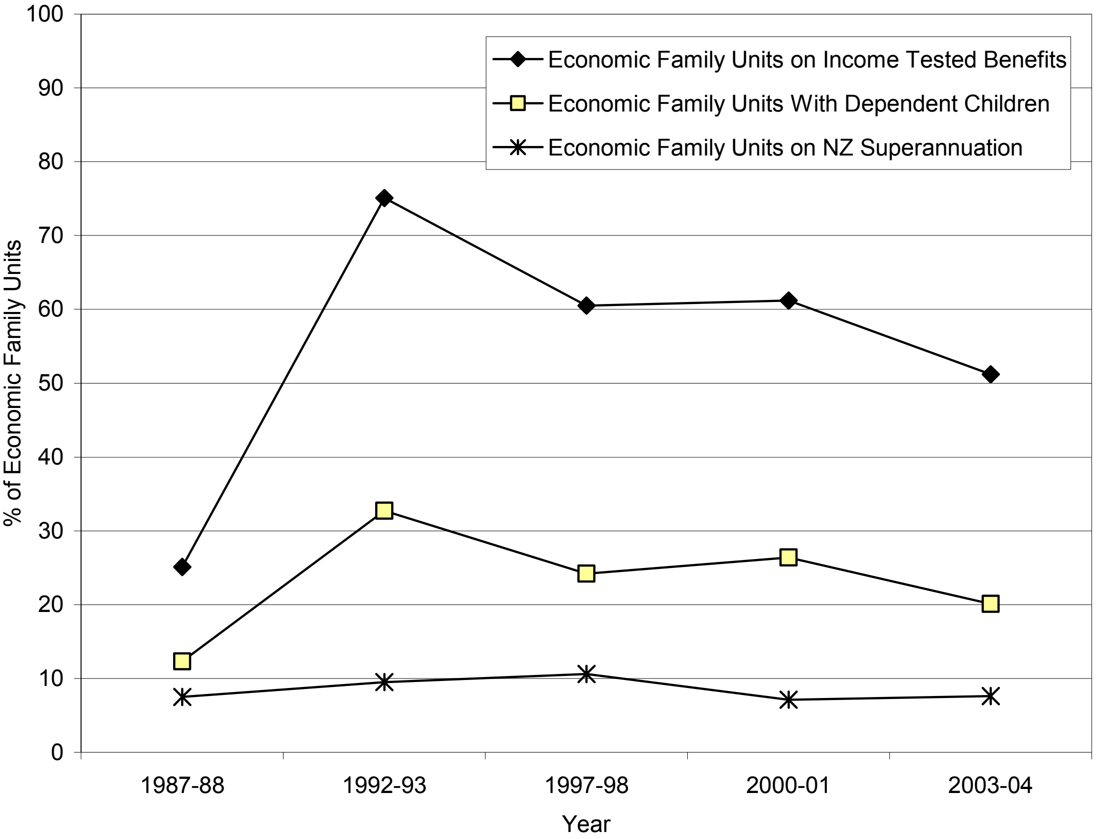
During the same period, the proportion of economic family units living below the poverty line also varied by the family's source of income, with 12.3% of families with dependent children in 1987-1988 living below the poverty line, as compared to 25.1% of (all) families who were reliant on income tested benefits. By 1992-1993, these proportions had increased, with 75.1% of (all) families relying on income tested benefits living below the poverty line, as compared to 32.7% of families with dependent children, and 9.5% of those families relying on NZ Superannuation. By 2003-2004, 51.2% of (all) families on income tested benefits, 20.1% of families with dependent children and 7.6% of families reliant on NZ Superannuation lived below the poverty line (Figure 14).

Figure 13. Proportion of Population with Incomes Below the Poverty Line (Net-of-Housing-Cost Income <60% Line Benchmarked to 1998 Median), Selected Years 1987-2004



Source: The Social Report 2006 [2], derived from Statistics NZ's Household Economic Survey (1988-04)

Figure 14. Proportion of Economic Family Units with Incomes Below Poverty Line (Net of Housing Cost Incomes <60% Line Benchmarked to 1998 median), Selected Years 1987-2004

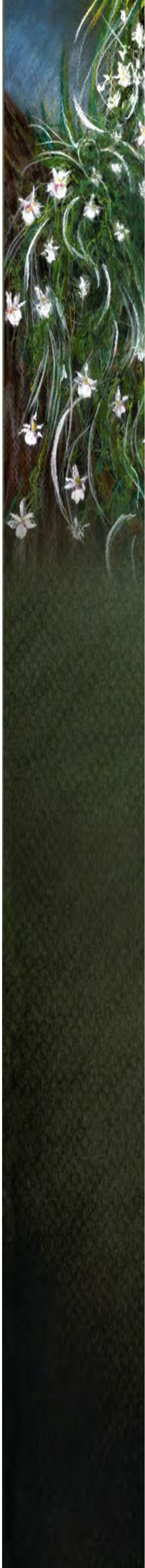


Source: The Social Report 2006 [2], derived from Statistics NZ's Household Economic Survey (1988-2004)

Families with Reduced Living Standards

In the 2004 Living Standards Survey, 30% of all Economic Family Units contained dependent children. While only 10% of family units without children were classified as living in severe or significant hardship, this figure rose to 22% for families with dependent children. The proportion living in severe or significant hardship also varied with family type and income source, with 42% of sole-parent families being classified as living in severe or significant hardship as compared to only 14% of two–parent families. Similarly, 58% of families who relied on income tested benefits were classified as living in severe or significant hardship, as compared to 12% of families receiving their income from market sources. Further analysis however, suggested that the difference in living standards between sole and two-parent families was largely due to the former's greater reliance on benefits as their main source of family income [35] (**Figure 15**).

The Living Standards Survey also explored the constraints placed on children's consumption arising from their family's living standards and noted that of children living in severe hardship, 51% had to go without suitable wet weather gear, 38% were unable to have a friend over for a meal and 34% were unable to have friends over for a birthday party because of the cost. In addition, 46% of parents had postponed a child's doctor's visit and 36% had postponed a child's dentist's visit because of cost, and in 40% of cases children had to share a bed [35].



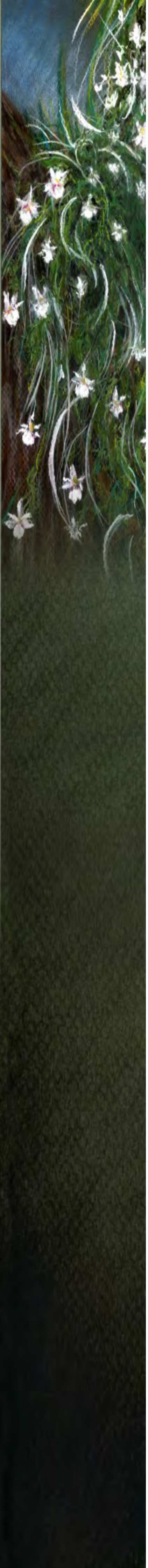
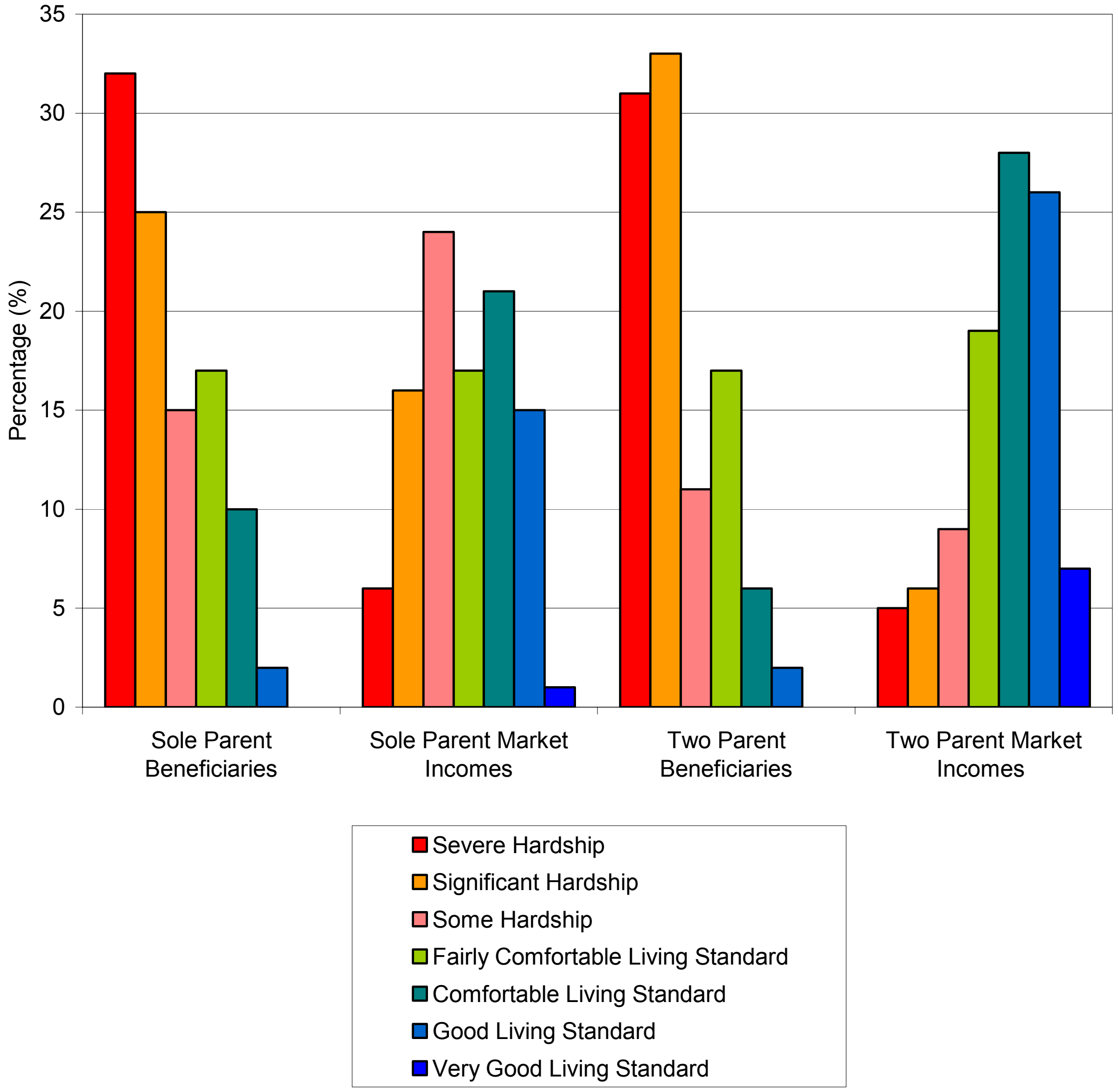


Figure 15. Living Standards Distribution of Families with Dependent Children by Family Type and Income Source, NZ Living Standards Survey 2004



Source: NZ Living Standards Survey [35].

Summary

The above analysis suggests that a significant proportion of New Zealand children and young people are placed at considerable disadvantage as a result of their family's limited socioeconomic resources. During 1988-2004, New Zealand saw large increases in the number of children and young people living below the poverty line and while improvements have occurred during the past decade, the proportion living below the poverty line has not yet recovered to its pre 1987-1988 level. In addition, Māori and Pacific children, those living in sole parent families and those in families reliant on income tested benefits are much more likely to be growing up with restricted socioeconomic resources. While family resources in turn have a profound influence on many of the health outcomes highlighted in this handbook, the distribution of resources available to New Zealand families is also profoundly influenced by the historical, macroeconomic and policy factors which are discussed in the higher levels of this health framework.

Children Reliant on Benefit Recipients

Introduction

In New Zealand, children who are reliant on beneficiaries are a particularly vulnerable group. During 2003-04, 51% of all families (including both those with and without children) relying on benefits as their main source of income were living below the poverty line (housing adjusted equivalent disposable income <60% median) [36]. This proportion has fluctuated markedly over the past two decades, rising from 25% of benefit dependent families in 1987-88, to a peak of 75% in 1992-93 and then gradually falling back again to 61% in 2000-01, with the fluctuations being attributed to 3 main factors: cuts in the level in income support during 1991, growth in unemployment (which peaked at 11% in 1991) and escalating housing costs, particularly for those in rental accommodation [37]. Furthermore, benefit dependent children account for the majority of those living in poverty, with ~60% of children living below the poverty line in 2004 relying on Government benefits as their main source of family income [18].

The vulnerability of benefit dependent children was further highlighted by the 2000 Living Standards Survey, which noted that even once the level of family income was taken into account, families whose main source of income was Government benefits were more likely to be living in severe or significant hardship and as a consequence, more likely to buy cheaper cuts of meat, go without fruit and vegetables, put up with feeling cold to save on heating costs, make do without enough bedrooms, have children share a bed, postpone a child's visit to the doctor or dentist, go without a computer or internet access and limit their child's involvement in school trips, sports and extracurricular activities [37]. The recently released 2004 Living Standards Survey suggests that this picture may have worsened between 2000-04, with the proportion of benefit dependent families living in severe or significant hardship increasing from 39% in 2000 to 58% in 2004 [35] (Fig 4.2 p102).

The following section reviews the number of New Zealand children (<18 years) dependent on core benefit recipients using information available from the Ministry of Social Development. While the number of children reliant on beneficiaries does not precisely correlate with the number living below the poverty line (in 2004 they comprised 60% of those in poverty [18]), and the relationship between benefit dependence and child poverty is sensitive to changes in Government social policy and market forces (e.g. ↓↑ in levels of income support vs. housing and other costs), an awareness of large shifts in the number of benefit dependent children in an area (e.g. due to increased local unemployment rates) is of value in tracking changes in a particularly vulnerable group who well may have higher health needs, as well as for predicting future health service demand.

Data Source and Methods

Definition

Children Under 18 Years of Age Reliant on Core Benefit Recipients by Benefit Type

Data Source

Numerator: Ministry of Social Development's SWIFTT database

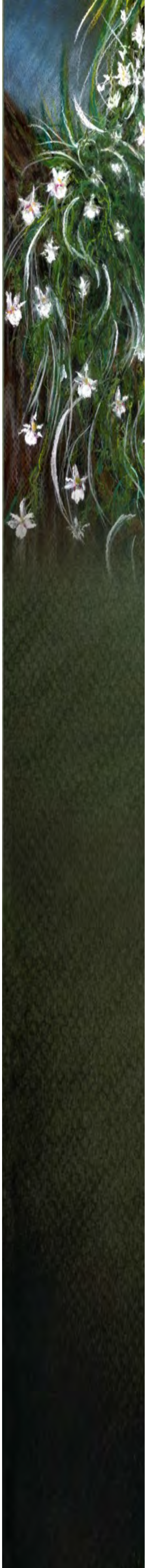
Denominator: Census (with population estimates between census years)

Indicator Category

Ideal B-C (**Table 133, Table 134**)

Notes on Interpretation

Data was provided by the MSD from their SWIFTT database which records information on recipients of financial assistance through Work and Income for 2000-2007. All figures unless stated otherwise, refer to



the number of children who were dependent on benefit recipients as at the end of April and provide no information on those receiving assistance at other times of the year.

To be eligible for a benefit, clients must have insufficient income from all sources to support themselves and any dependents and meet the eligibility criteria for benefits. These are:

Domestic Purposes Benefit – Sole Parent (DPB-SP): This benefit provides income support for sole parents living with their dependent children under 18 years, who meet an income test and are New Zealand citizens or permanent residents. To be eligible, a parent must be 18 years or older OR have been legally married or in a civil union. A 16 or 17 year old sole parent who has never been married may be eligible to receive an Emergency Maintenance Allowance. This emergency benefit can also be paid to sole parents aged 18 and over who do not meet specific criteria for DPB-SP or other benefits.

Unemployment Benefits: Unemployment benefits are available to people who are available for and actively seeking full time work. Clients must be aged 18+ years or 16-17 years and living with a spouse or partner and dependent children. Those receiving unemployment benefits are subject to a full time work test, as are their spouses or partners if they have no dependent children, or if their youngest dependent child is aged 14+ years. Applicants must have continuously lived in New Zealand for 2 years or more. An Unemployment Benefit-Hardship is available to those who do not meet these criteria but who are not successfully able to support themselves through paid employment or by other means.

Sickness Benefit: To be eligible for a Sickness Benefit people need to be 18 years of age, or 16-17 years of age and either 27+ weeks pregnant or living with a partner and children they support. They must have had to stop working or reduce their hours because of sickness, injury, pregnancy or disability OR, if unemployed or working part time, find it hard to look for or do full time work for the same reasons. To qualify, a person's (and their partner's) income must be below a certain level and they must have a medical certificate, the first of which can last for only up to 4 weeks. For pregnant women, payments may continue for up to 13 weeks after the birth of their child. At least 2 years' residence is also required, though a benefit may be granted in cases of hardship.

Invalid's Benefit: To be eligible for an Invalid's Benefit, people need to be 16+ years of age and unable to work 15+ hours a week because of a sickness, injury or disability which is expected to last at least 2 years OR their life expectancy is <2 years and they are unable to regularly work 15+ hours a week OR they are blind with a specified level of visual impairment. A doctor's certificate is required and an applicant must be a New Zealand citizen or permanent resident and have lived in New Zealand for 10 years or more.

New Zealand Distribution and Trends

Total Number of Children Reliant on a Benefit Recipient

In New Zealand during 2000-2007, the number of children who were reliant on a beneficiary fell from 271,446 in 2000 to 205,256 in 2007. A large proportion of this fall resulted from declines in the number of children relying on unemployment benefit recipients, with numbers in this category falling from 49,214 in 2000 to 7,757 in 2007. These declines were only partially offset by increases in the number of children reliant on sickness and illness beneficiaries (**Table 7**).

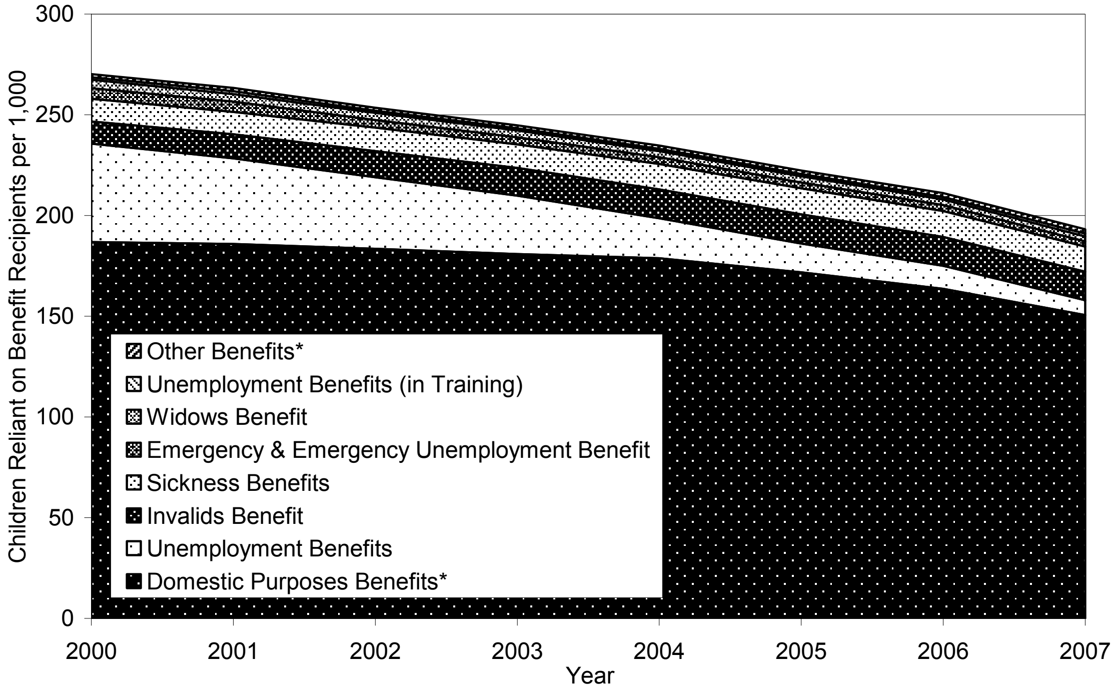
Proportion of All New Zealand Children Reliant on a Benefit Recipient

During 2000-2007, the proportion of all New Zealand children <18 years who were dependent on a benefit recipient fell from 27.0% in 2000 → 19.3% in 2007. A large proportion of this decrease was due to a fall in the number of children relying on unemployment benefit recipients (4.9% of all children in 2000 → to 0.7% in 2007). While the proportion of children reliant on domestic purposes benefit (DPB) recipients also fell (18.7% of all children in 2000 → 15.1% in 2007), more rapid declines in those reliant on unemployment benefits meant that in relative terms, the proportion of benefit dependent children reliant on DPB recipients actually increased, from 69.1% of benefit dependent children in 2000 to 78.0% in 2007 (**Figure 16**).

Age Distribution

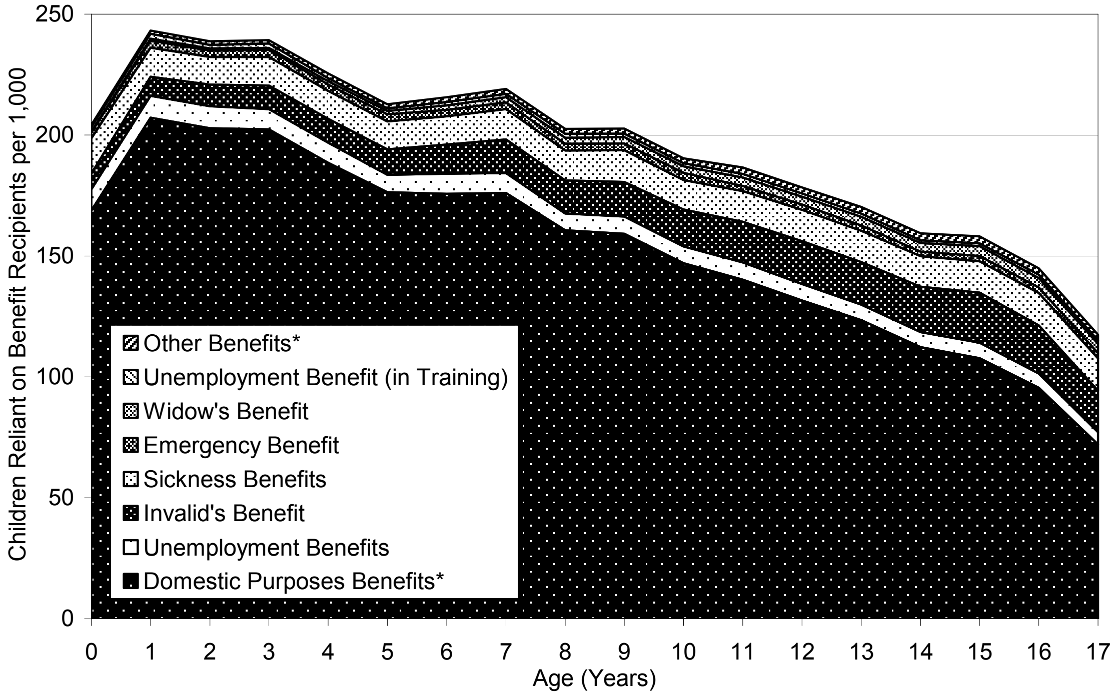
During 2007, the proportion of children reliant on a beneficiary was highest amongst those <6 years of age, with numbers tapering off gradually throughout childhood and then more rapidly after 11 years of age (**Figure 17**). While the proportion of children reliant on benefit recipients declined for all age groups during 2000-2007, these age differences persisted throughout this period.

Figure 16. Proportion of Children Under 18 Years With a Parent Receiving a Main Income-Tested Benefit by Benefit Type, New Zealand 2000-2007

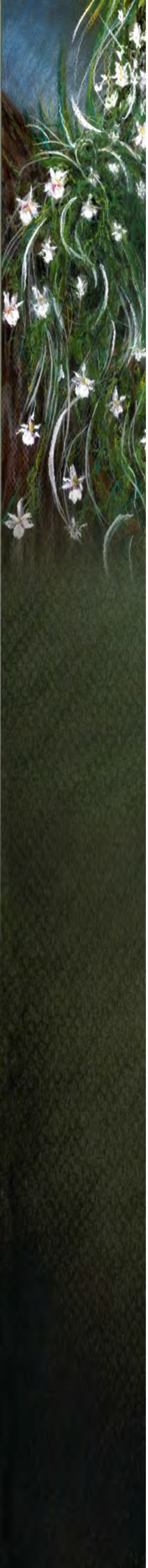


*Note: Domestic Purposes Benefits includes DPB Sole Parent and Emergency Maintenance Allowance. Other Benefits includes DPB Women Alone and DPB Caring for Sick or Infirm, NZ Superannuation, Veterans and Transitional Retirement Benefit, and Unemployment Benefit Student Hardship

Figure 17. Proportion of Children Under 18 Years of Age with a Parent Receiving a Main Income-Tested Benefit by Age, New Zealand 2007



*Note: Domestic Purposes Benefits includes DPB Sole Parent and Emergency Maintenance Allowance. Other Benefits includes DPB Women Alone and DPB Caring for Sick or Infirm, NZ Superannuation, Veterans and Transitional Retirement Benefit, and Unemployment Benefit Student Hardship



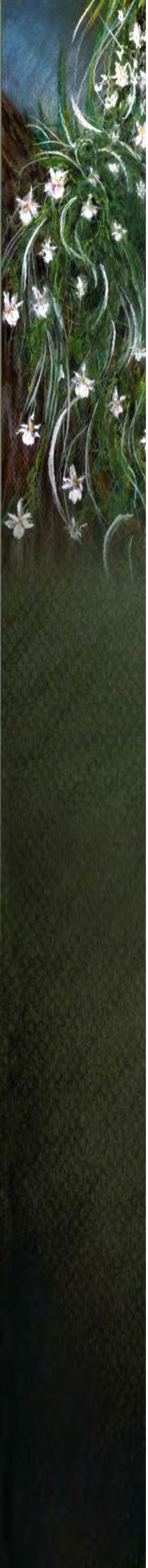
Summary

During 2000-2007, the proportion of all New Zealand children <18 years who were dependent on a benefit recipient fell from 27.0% in 2000 → 19.3% in 2007. A large proportion of this decrease was due to a fall in the number relying on unemployment benefit recipients. While the proportion of children reliant on DPB recipients also fell, more rapid declines in those reliant on unemployment benefits meant that in relative terms, the proportion of benefit dependent children relying on DPB recipients actually increased during this period. In addition, during 2007 it was younger children who were disproportionately reliant on benefit recipients, with rates being highest for those <6 years of age and then tapering off gradually through childhood and more rapidly after 11 years of age. While the number of children reliant on benefit recipients may not correlate precisely with the number living below the poverty line, they do reflect a particularly vulnerable group with higher health and support needs and tracking changes in their distribution over time (e.g. as a result of changes in labour market forces) may be of value in predicting future health service demand.

Table 7. Number of Children <18 Years with A Parent Receiving a Main Income Tested Benefit by Benefit Type, New Zealand 2000-2007

Benefit Type		2000	2001	2002	2003	2004	2005	2006	2007
Domestic Purposes* Benefit	No.	187,685	187,334	186,712	185,649	185,087	179,443	172,349	160,010
	%	69.1	70.6	72.4	73.9	76.2	77.3	77.5	78.0
Unemployment	No.	49,214	42,965	36,111	29,825	20,517	15,028	11,977	7,757
	%	18.1	16.2	14.0	11.9	8.4	6.5	5.4	3.8
Invalids	No.	11,028	12,029	13,110	14,089	14,931	15,083	15,172	15,081
	%	4.1	4.5	5.1	5.6	6.1	6.5	6.8	7.3
Sickness	No.	11,191	11,160	11,896	12,009	13,040	13,503	13,625	13,368
	%	4.1	4.2	4.6	4.8	5.4	5.8	6.1	6.5
Emergency Benefits	No.	5,413	5,171	3,874	3,526	3,392	2,968	3,040	2,659
	%	2.0	1.9	1.5	1.4	1.4	1.3	1.4	1.3
Widows Benefit	No.	4,064	3,806	3,655	3,530	3,272	3,145	2,924	2,585
	%	1.5	1.4	1.4	1.4	1.3	1.4	1.3	1.3
Unemployment (in Training)	No.	1,317	1,353	1,029	979	1,118	1,163	1,265	1,526
	%	0.5	0.5	0.4	0.4	0.5	0.5	0.6	0.7
Other Benefits*	No.	1,534	1,668	1,556	1,655	1,691	1,900	2,057	2,270
	%	0.6	0.6	0.6	0.7	0.7	0.8	0.9	1.1
Total	No.	271,446	265,486	257,943	251,262	243,048	232,233	222,409	205,256

Note: % refers to % of children relying on benefit recipients rather than % of all children. Domestic Purposes includes DPB Sole Parent and Emergency Maintenance Allowance. Other Benefits includes DPB Women Alone and Caring for Sick or Infirm, NZ Superannuation, Veterans and Transitional Retirement Benefit, and Unemployment Benefit Student Hardship



Household Crowding

Introduction

The associations between substandard housing and poor health have been known for several centuries, with reports from as early as the 1830s attributing high rates of infectious disease to overcrowded, damp, and poorly ventilated housing [38]. In New Zealand, crowding is strongly correlated with childhood meningococcal disease, with the risk increasing progressively with the addition of each additional adult into a household [39]. While there is less local information for other infectious diseases, overseas research has also demonstrated correlations between crowding and rheumatic fever, TB, bronchiolitis, croup, childhood pneumonia, hepatitis B, head lice and conjunctivitis [40]. In addition, it has been suggested that crowding impacts negatively on mental health, leading to interpersonal aggression, withdrawal, socially deviant behaviour and psychological distress [41].

While the relationship between crowding and poorer health outcomes has been known for some time, uncertainty still remains about how much of the association is due to crowding itself and how much is due to other factors which often accompany crowding, such as poor quality housing (e.g. damp, mould, temperature extremes), low income, unemployment, fewer material resources, living in run-down neighbourhoods and lack of control over stress [40]. Supporters for a direct role for crowding have proposed a number of pathways including:

For Infectious Diseases [40, 41]:

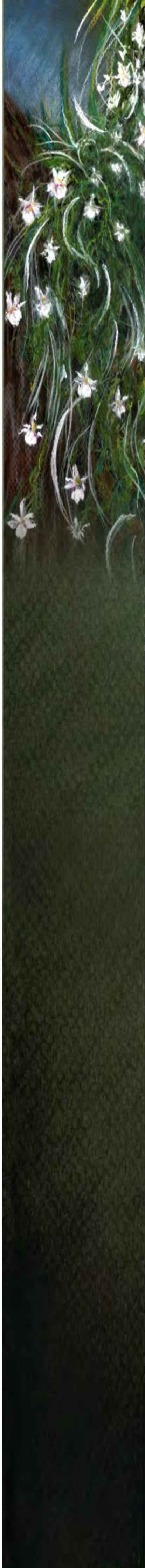
- Increased frequency of contact between children and infectious disease carriers.
- Closer and more prolonged physical contact between children and carriers.
- Increased exposure to second hand tobacco smoke.
- Children sharing a bed or bedroom.
- Lack of ability to adequately care for sick household members.
- Difficulties in maintaining good hygiene practices.

For Poorer Mental Wellbeing [41]:

- An increased number of social contacts and unwanted interactions.
- Decreases in privacy and the ability to achieve simple goals e.g. eating, watching TV
- Reduced ability of parents to monitor children's behaviour.
- The need to co-ordinate activities such as using the bathroom with others.

While there has been a gradual decline in household crowding in New Zealand during the past 40 years, marked disparities remain, with crowding being of particular concern for Māori and Pacific households, those on low incomes, benefits or with no qualifications, those living in rental housing, extended family groups, or with dependent children and those who are recent migrants [42]. That crowding potentially plays a major role in the health and wellbeing of these families was highlighted by participants in the Māori Women's Housing Research Project [43] who, when asked to comment on the role crowding played in their lives noted:

> "…*Crowding and homelessness do not help to provide a stable environment for Māori women and their families...it creates extremely stressful situations that become very volatile and often explode. The result of this can be seen clearly in the number of Māori women and children who become survivors of family violence, which in itself becomes repetitive*".



Data Source and Methods

Definition

The proportion of children and young people 0-24 years living in crowded households, as defined by the Canadian Household Occupancy Index

Data Source

Numerator: Census: The number of children and young people 0-24 years living in households which require one or more additional bedrooms.

Denominator: Census: The total number of children and young people 0-24 years at the Census for whom crowding status was known.

Indicator Category

Ideal B (**Table 133, Table 134**)

Notes on Interpretation

Information is for the usual resident population and relates to the household crowding status of individual children. Thus the number of children reported on will be greater than the number of households on Census night (i.e. with the exception of Figure 18, the unit of reference is the child and thus 2 children from the same household will be counted twice in these statistics).

Canadian Crowding Index

The Canadian National Occupancy Standard (CNOS), developed in Canada in the 1980s, calculates appropriate person-bedroom ratios for households of differing sizes and compositions. It makes judgements on appropriate age limits for bedroom sharing e.g. using the CNOS, children <5 years of different sexes may share a room, while those aged 5-17 years may only share a room if they are of the same sex. The CNOS compares the number of bedrooms in a household with its bedroom requirements based on the age, sex, marital status and relationship of household members to one another. Households are reported as having 2+, 1 or 0 bedrooms spare or as requiring an additional 1 or 2+ bedrooms; those needing 1 or 2+ additional bedrooms are deemed crowded[42].

New Zealand Distribution and Trends

In New Zealand during the past 2 decades, the proportion of crowded households (including those without children) declined, from 6.9% in 1986 to 4.8% in 2001 [42]. While crowding declined for all ethnic groups (with the exception of the “Other” category), in absolute terms declines were greatest for Māori and Pacific households. Despite these declines, crowding rates remained higher for Pacific > Māori and Asian / Indian > European households throughout this period (**Figure 18**).

Ethnic and Socioeconomic Differences

During 2001, 16.2% of children and 15.4% of young people lived in crowded households, with rates being higher for Pacific > Māori > Asian / Indian > European children and young people. By 2006 the situation had changed little, with 16.4% of children and 16.7% of young people living in crowded households and rates again being higher for Pacific > Māori > Asian / Indian > European children and young people (**Figure 19**).

During 2001, there were also marked socioeconomic differences in the proportion of children living in crowded households, with rates rising progressively from 2.7% amongst those living in the most affluent (NZDep Decile 1) areas to 42.5% amongst those living in the most deprived (NZDep Decile 10). By 2006, 2.3% of children in the most affluent areas lived in crowded households, as compared to 43.9% of children in the most deprived areas. Similar disparities were seen for young people aged 15-24 years (**Figure 20**).

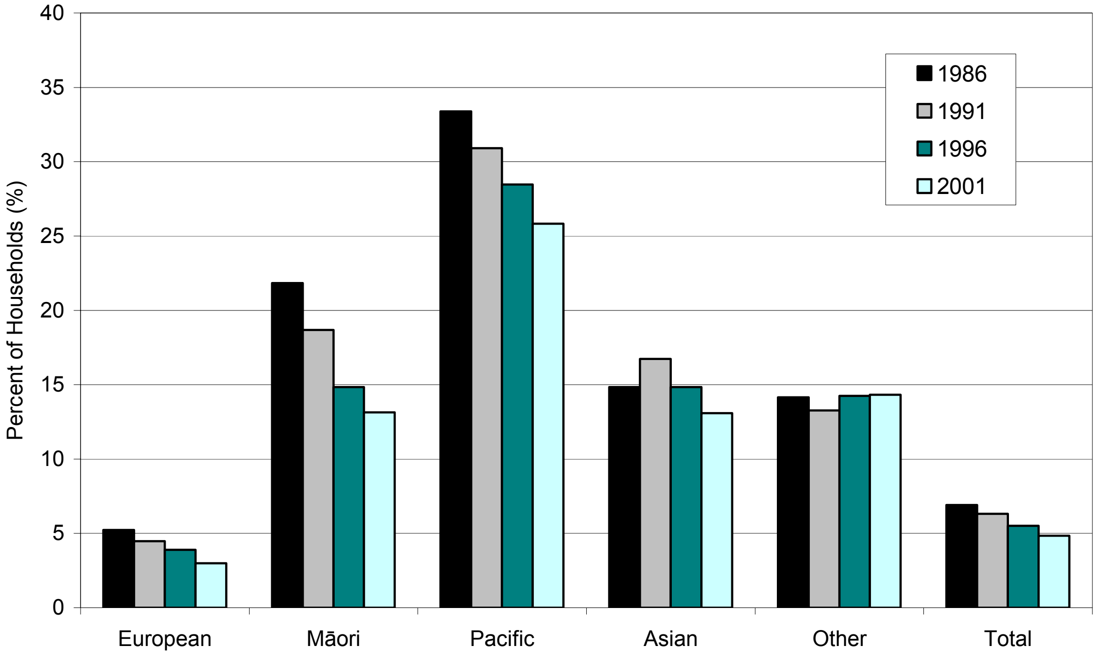
Relationship between Socioeconomic Status and Ethnicity

At both the 2001 and 2006 Censuses an analysis of the relationship between ethnicity and NZDep deprivation suggested that for each of New Zealand’s largest ethnic groups, the proportion of children and young people living in crowded households increased with increasing socioeconomic deprivation, but that at each level of socioeconomic deprivation, crowding rates remained higher for Pacific > Māori and Asian / Indian > European children and young people (**Figure 21**).

Regional Differences

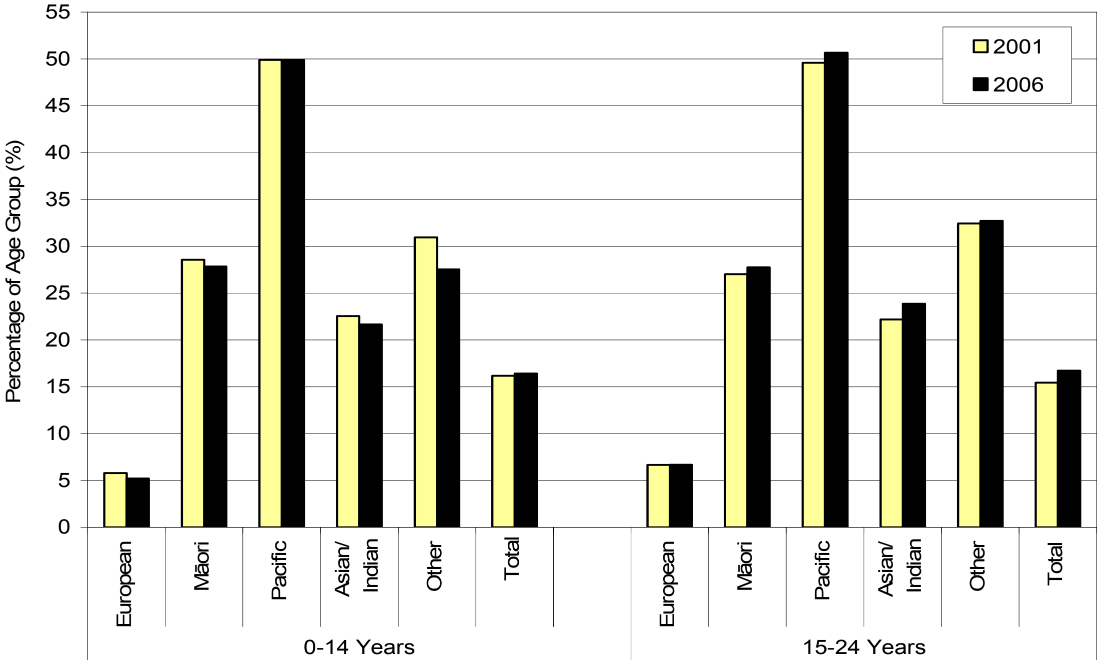
In addition, during 2006 there were large regional differences in the proportion of children and young people living in crowded households, with rates ranging from 5.6 % to 30.3% depending on the region studied. In general, household crowding rates were highest for DHBs in the wider Auckland Region (**Table 8**)

Figure 18. Proportion of Crowded Households (including those without children) by Ethnicity, New Zealand at the 1986, 1991, 1996 and 2001 Censuses



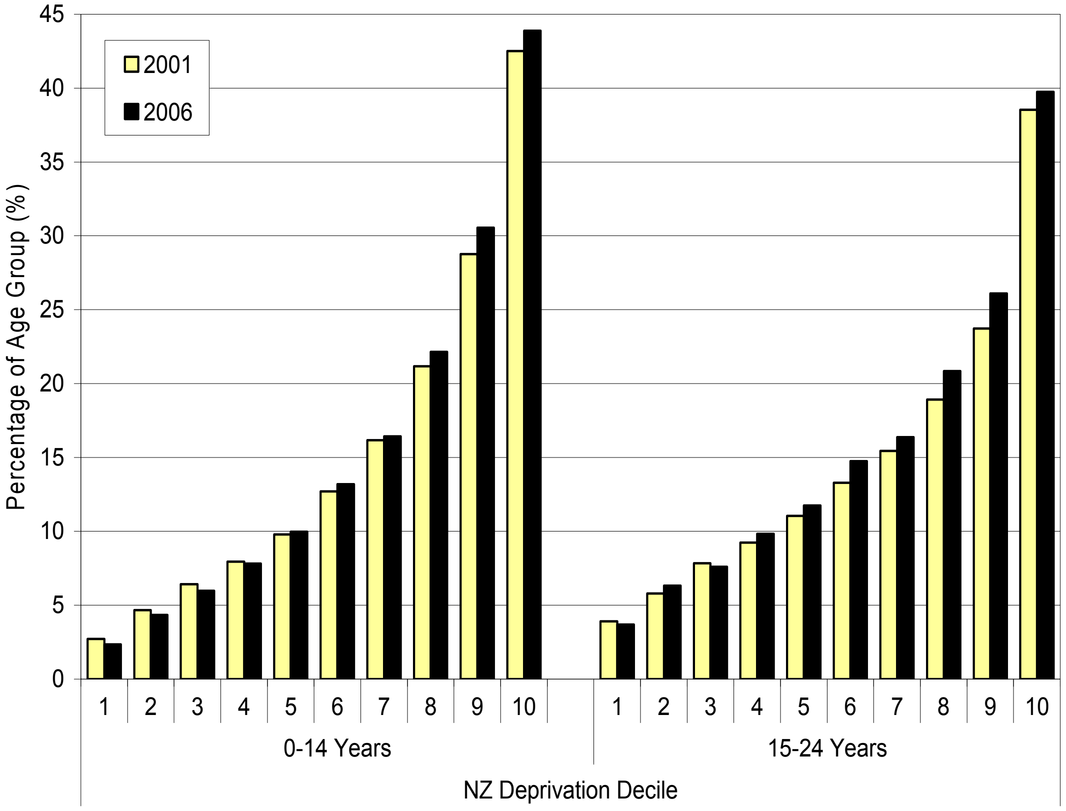
Source: Statistics New Zealand [42]

Figure 19. Proportion of Children and Young People 0-24 Years Living in a Crowded Household by Ethnicity, New Zealand Census 2001, 2006



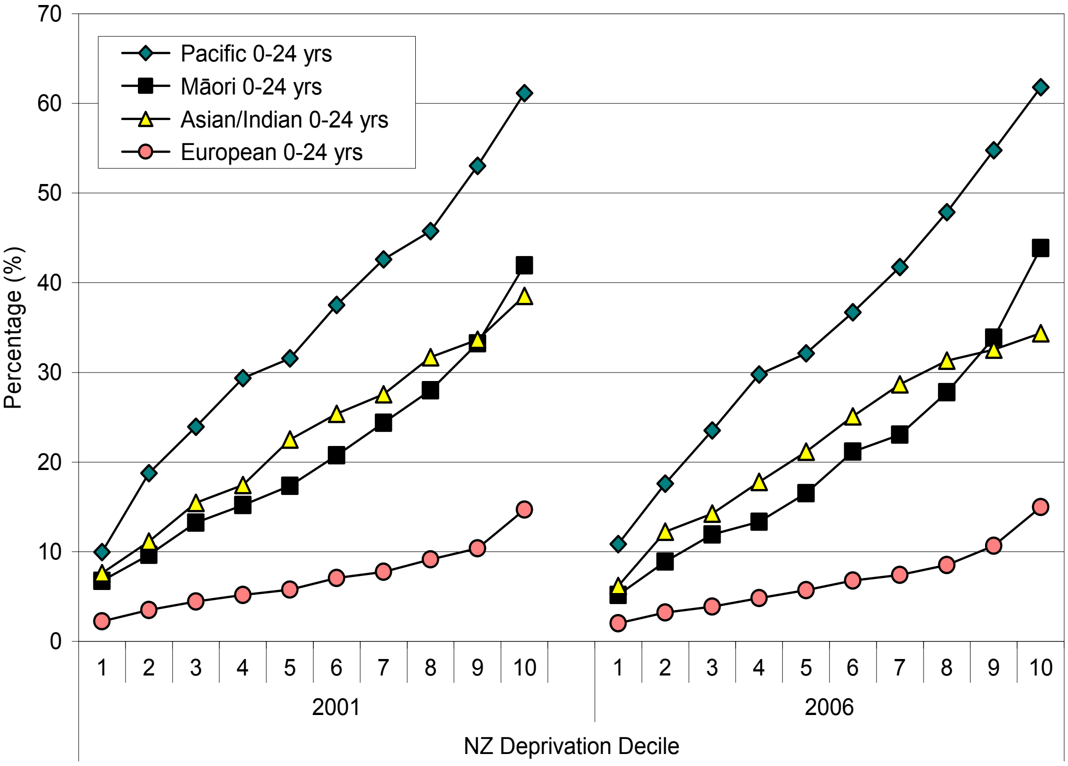
Note: Only includes children and young people where crowding status was known

Figure 20. Proportion of Children and Young People 0-24 Years Living in a Crowded Household by NZ Deprivation Index Decile, New Zealand Census 2001, 2006



Note: Only includes those where crowding status is known

Figure 21. Proportion of Children and Young People 0-24 Years Living in a Crowded Household by Ethnicity and NZ Deprivation Index Decile, New Zealand Census 2001, 2006



Note: Only includes those where crowding status is known

Table 8. Number of Children and Young People 0-24 Years living in Crowded Households by DHB, New Zealand Census 2006

DHB	1 Bedroom Required		2+ Bedrooms Required		Total Crowded
	Number	%	Number	%	%
Northland	5,778	12.8	3,342	7.4	20.3
Waitemata	15,273	9.6	7,350	4.6	14.2
Auckland	19,593	15.4	11,679	9.2	24.6
Counties Manukau	26,454	16.5	21,960	13.7	30.3
Waikato	11,991	10.5	5,808	5.1	15.6
Lakes	4,011	12.4	2,073	6.4	18.8
Bay of Plenty	6,405	10.6	3,447	5.7	16.4
Tairawhiti	2,304	15.3	1,224	8.1	23.4
Taranaki	2,661	8.2	792	2.5	10.7
Hawkes Bay	5,508	11.8	2,808	6.0	17.8
Whanganui	1,815	9.5	735	3.8	13.3
Mid Central	4,317	8.3	1,440	2.8	11.0
Hutt	5,295	11.6	2,325	5.1	16.6
Capital and Coast	8,382	9.8	3,645	4.3	14.1
Wairarapa	864	7.7	234	2.1	9.8
Nelson Marlborough	2,574	6.9	744	2.0	8.9
West Coast	516	6.1	111	1.3	7.5
Canterbury	10,953	7.5	3,396	2.3	9.8
South Canterbury	714	4.7	129	0.9	5.6
Otago	3,345	5.9	618	1.1	7.0
Southland	1,836	5.8	540	1.7	7.4
New Zealand	140,598	10.8	74,400	5.7	16.5

Note: Only includes those where crowding status is known. Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)

Summary

The associations between substandard housing and poor health have been known for several centuries, with reports from as early as the 1830s attributing high rates of infectious disease to overcrowded, damp, and poorly ventilated housing. In New Zealand, crowding is strongly correlated with meningococcal disease, while overseas reports also demonstrate correlations with a number of infectious diseases and mental health issues.

In New Zealand at both the 2001 and 2006 Censuses, a higher proportion of Pacific > Māori > Asian / Indian > European children and young people lived in crowded households, with household crowding also rising progressively as the degree of NZDep deprivation increased. In addition, while socioeconomic gradients in household crowding were evident for each of New Zealand's largest ethnic groups, at each level of deprivation, crowding rates remained higher for Pacific > Māori and Asian / Indian > European children and young people. Finally, during 2006 there were also large regional differences in the proportion of children and young people living in crowded households, with rates ranging from 5.6 % to 30.3% depending on the region studied.

Young People Reliant on Benefits

Introduction

While adolescence is for many young people a time for investing in learning and acquiring new skills, it is also a time of vulnerability. While the majority of young people successfully complete their years of secondary education and continue on to further training and employment, a significant minority are unable to support themselves financially for a variety of reasons. For those who meet certain eligibility criteria, the New Zealand Government offers a range of benefits. Those most commonly used by people 16-24 years are listed below:

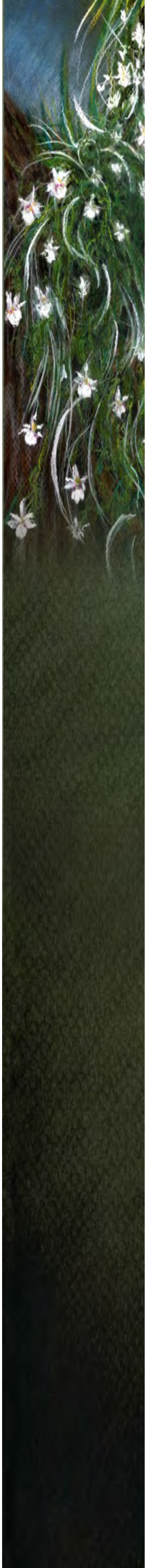
Domestic Purposes Benefit – Sole Parent (DPB-SP): This benefit provides income support for sole parents living with their dependent children under 18 years, who meet an income test and are New Zealand citizens or permanent residents. To be eligible, a parent must be 18 years or older OR have been legally married or in a civil union. A 16 or 17 year old sole parent who has never been married may be eligible to receive an Emergency Maintenance Allowance. This emergency benefit can also be paid to sole parents aged 18 and over who do not meet the criteria for DPB-SP or other benefits.

Unemployment Benefits: Unemployment benefits are available to people who are available for and actively seeking full time work. Clients must be aged 18+ years or 16-17 years and living with a spouse or partner and dependent children. Those receiving unemployment benefits are subject to a full time work test, as are their spouses or partners if they have no dependent children, or if their youngest dependent child is aged 14+ years. Applicants must have continuously lived in New Zealand for 2 years or more. An Unemployment Benefit-Hardship is available to those who do not meet these criteria but who are not successfully able to support themselves through paid employment or by other means.

Sickness Benefit: To be eligible for a Sickness Benefit people need to be 18 years of age, or 16-17 years of age and either 27+ weeks pregnant or living with a partner and children they support. They must have had to stop working or reduce their hours because of sickness, injury, pregnancy or disability OR, if unemployed or working part time, find it hard to look for or do full time work for the same reasons. To qualify, a person's (and their partner's) income must be below a certain level and they must have a medical certificate, the first of which can last for only up to 4 weeks. For pregnant women, payments may continue for up to 13 weeks after the birth of their child. At least 2 years' residence is also required, though a benefit may be granted in cases of hardship.

Invalid's Benefit: To be eligible for an Invalid's Benefit, people need to be 16+ years of age and unable to work 15+ hours a week because of a sickness, injury or disability which is expected to last at least 2 years OR their life expectancy is <2 years and they are unable to regularly work 15+ hours a week OR they are blind with a specified level of visual impairment. A doctor's certificate is required and an applicant must be a New Zealand citizen or permanent resident and have lived in New Zealand for 10 years or more.

While the diversity of the above criteria suggests that young people reliant on benefits form a particularly heterogeneous group, comprising those temporarily out of work, those caring for young children and those unable to participate in the workforce for a variety of medical or other reasons, they may nevertheless share a number of experiences in common with some of the groups highlighted in other sections of this report (e.g. children reliant on beneficiaries, those leaving school early and without qualifications, those with long term disabilities) and as a consequence, may warrant



further consideration in future planning and strategy development. The following section uses data from the Ministry of Social Development's SWIFTT database to explore the number of young people (16-24 years) in New Zealand who were reliant on benefits during 2000-2007.

Data Source and Methods

Definition

Young People Aged 16-24 Years Reliant on a Core Benefit by Benefit Type.

Data Source

Numerator: Ministry of Social Development's SWIFTT database [44]
Denominator: Census

Indicator Category

Ideal B-C (**Table 133, Table 134**)

Notes on Interpretation

Data was provided by the Ministry of Social Development from their SWIFTT database, which records information on the recipients of financial assistance through Work and Income for the period April 2000 – April 2007. All figures, unless stated otherwise, refer to the number of young people aged 16-24 years in receipt of a core benefit at the end of April and thus provide no information on those receiving assistance from Work and Income at other times of the year.

New Zealand Distribution and Trends

Number of New Zealand Young People on Benefits

In New Zealand during 2000-2007 there was a large decline in the number of young people relying on benefits, with overall numbers decreasing from 76,392 in 2000 to 41,064 in 2007. While there were large declines in the number receiving unemployment benefits during this period, the numbers receiving domestic purposes benefits decreased less rapidly and the numbers receiving sickness and invalid's benefits increased. Thus while in 2000, unemployment benefits were the most frequent form of income support received by New Zealand young people, by 2007 domestic purposes benefits were the predominant benefit type received (**Table 9**).

Table 9. Number of Young People 16-24 Years Reliant on Benefits by Type, New Zealand April 2000-2007

Benefit Type		2000	2001	2002	2003	2004	2005	2006	2007
Unemployment Benefits	No.	40,732	35,808	31,310	27,071	18,135	13,257	10,650	5,257
	%	53.3	49.9	47.0	43.2	33.8	27.5	23.0	12.8
Domestic Purposes	No.	19,812	19,645	19,459	19,053	18,830	18,245	18,013	17,647
	%	25.9	27.4	29.2	30.4	35.1	37.8	38.9	43.0
Invalid's	No.	4,866	5,185	5,511	5,755	6,035	6,288	6,424	6,580
	%	6,4	7.2	8.3	9.2	11.2	13.0	13.9	16.0
Sickness	No.	3,892	4,066	4,406	4,940	5,369	5,566	6,234	6,669
	%	5,1	5.7	6.6	7.9	10.0	11.5	13.5	16.2
Independent Youth	No.	3,479	3,680	2,935	2,560	2,190	1,936	1,617	1,179
	%	4.6	5.1	4.4	4.1	4.1	4.0	3.5	2.9
Unemployment Training Related	No.	2,773	2,508	2,227	2,465	2,363	2,219	2,542	2,889
	%	3.6	3.5	3.3	3.9	4.4	4.6	5.5	7.0
Emergency	No.	632	658	503	588	479	429	454	424
	%	0.8	0.9	0.8	0.9	0.9	0.9	1.0	1.0
All Other Benefits	No.	206	239	253	288	304	306	364	419
	%	0.3	0.3	0.4	0.5	0.6	0.6	0.8	1.0
Total	No.	76,392	71,789	66,604	62,720	53,705	48,246	46,298	41,064
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: % refers to % of beneficiaries. Unemployment includes Unemployment Benefit and Unemployment Benefit-Hardship; Domestic Purposes includes DPB Sole Parent and Emergency Maintenance Allowance.

Proportion of New Zealand Young People on Benefits

These changes resulted in a large decline in the proportion of young people reliant on unemployment benefits during this period, with rates falling from 89.1 per 1,000 in 2000 to 10.1 per 1,000 in 2007. In contrast, the proportion of young people reliant on domestic purposes benefits declined more slowly (43.4 per 1,000 in 2000 → 34.0 per 1,000 in 2007), while the proportion on invalids and sickness benefits increased. Overall however, the total proportion of young people relying on core benefits fell during this period, from 167.2 per 1000 in 2000 to 79.2 per 1,000 in 2007 (**Table 10**).

Table 10. Proportion of Young People 16-24 Years Reliant on Benefits by Benefit Type, New Zealand April 2000-2007

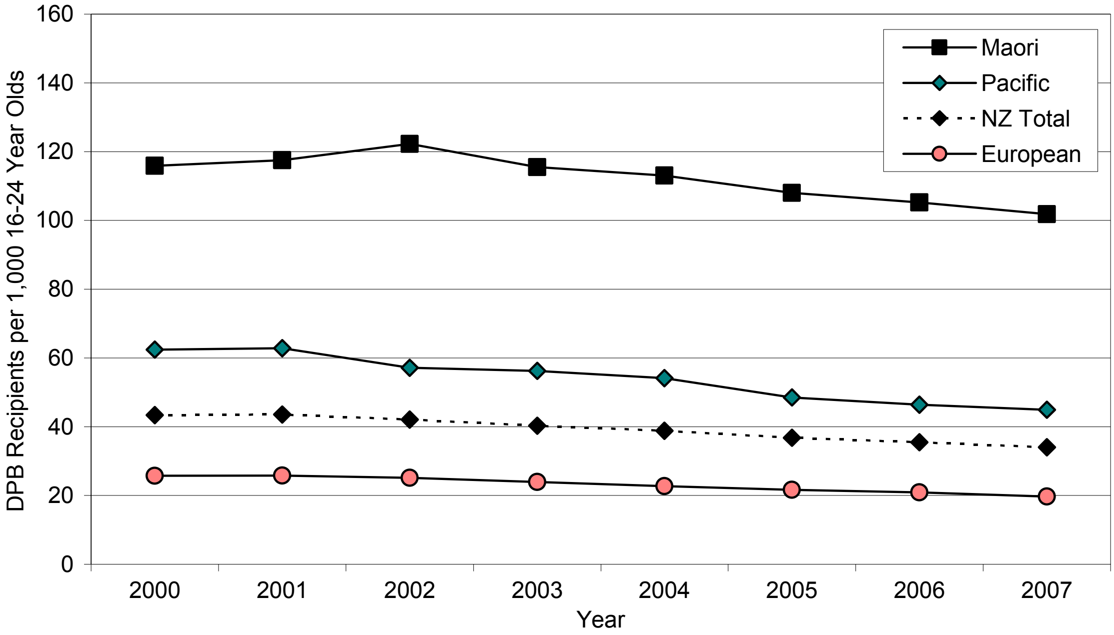
Benefit Type	Rate per 1,000							
	2000	2001	2002	2003	2004	2005	2006	2007
Unemployment	89.1	79.4	67.8	57.2	37.4	26.7	21.0	10.1
Domestic Purposes	43.4	43.6	42.1	40.3	38.9	36.8	35.5	34.0
Invalid's	10.6	11.5	11.9	12.2	12.5	12.7	12.7	12.7
Sickness	8.5	9.0	9.5	10.4	11.1	11.2	12.3	12.9
Independent Youth	7.6	8.2	6.4	5.4	4.5	3.9	3.2	2.3
Unemployment Training Related	6.1	5.6	4.8	5.2	4.9	4.5	5.0	5.6
Emergency	1.4	1.5	1.1	1.2	1.0	0.9	0.9	0.8
All Other Benefits	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.8
Total	167.2	159.2	144.1	132.5	110.8	97.3	91.3	79.2

Note: Unemployment includes Unemployment Benefit and Unemployment Benefit-Hardship; Domestic Purposes includes DPB Sole Parent and Emergency Maintenance Allowance

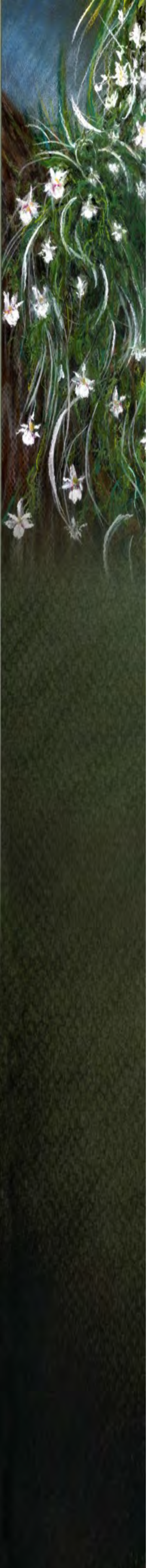
Domestic Purposes Benefit

During 2000-2007, the number of New Zealand young people on a Domestic Purposes Benefit (sole parent) or Emergency Maintenance Allowance fell, from 19,812 in 2000 to 17,647 in 2007, with rates declining from 43.4 per 1,000 in 2000, to 34.0 per 1,000 in 2007. During this time, ethnic disparities in DPB uptake were evident, with rates being consistently higher in Māori > Pacific > European young people (**Figure 22**).

Figure 22. Young People 16-24 Years Receiving a Domestic Purposes Benefit or Emergency Maintenance Allowance by Ethnicity, New Zealand April 2000-2007



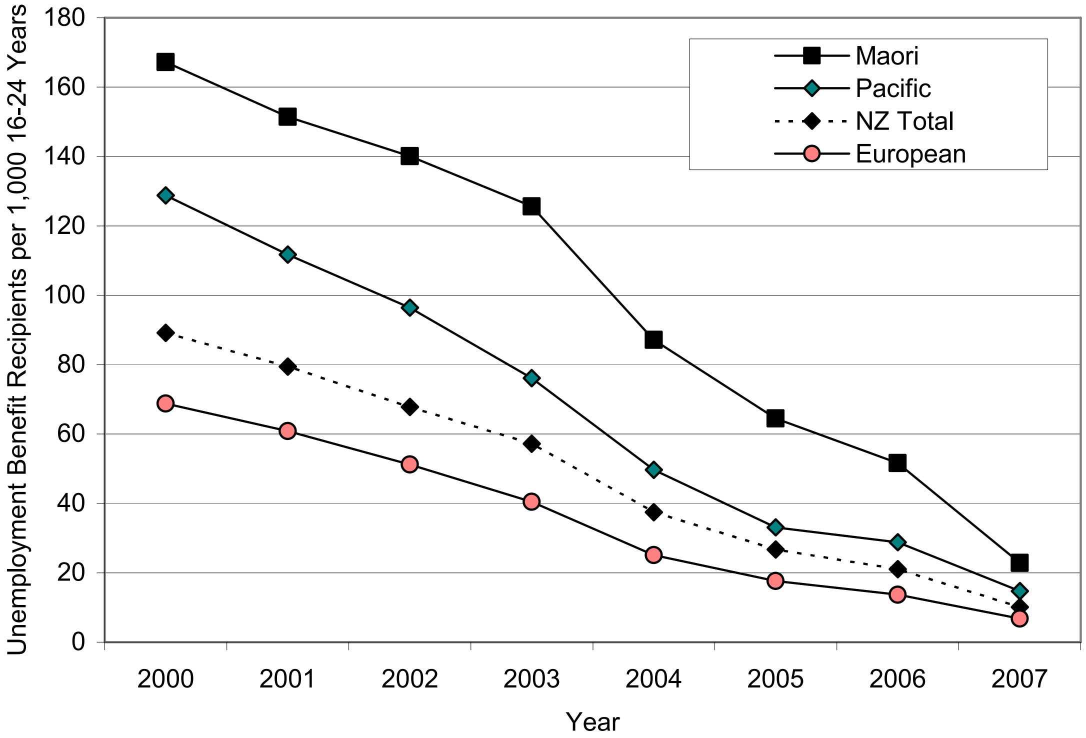
Note: DPB includes DHB Sole Parent and Emergency Maintenance Allowance



Unemployment Benefits

In New Zealand during 2000-2007, the number of young people reliant on unemployment benefits fell, from 40,732 in 2000 to 5,257 in 2007. While unemployment benefit uptake declined for all ethnic groups, marked disparities remained, with uptake rates being higher for Māori > Pacific > European young people (**Figure 23**). While the number of young people on training related unemployment benefits did not decline significantly during this period (2,773 in April 2000 → 2,889 in April 2007), comparisons between these two benefit categories are problematic, as while training related benefits are aimed at assisting young people with training that will aid their transition into the workforce, unemployment benefits are more responsive to labour market changes (e.g. market led job growth). Ethnic disparities were also evident in training related unemployment benefits, with higher uptake for Māori > Pacific > European young people.

Figure 23. Young People 16-24 Years Receiving an Unemployment Benefit by Ethnicity, New Zealand April 2000-2007



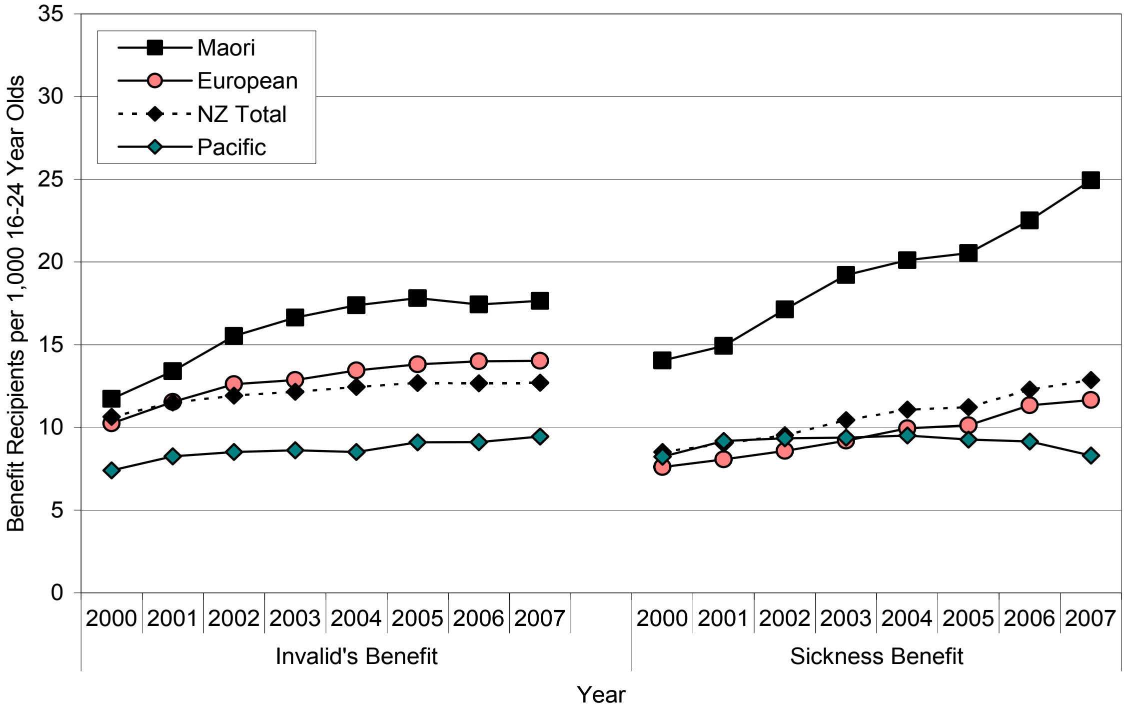
Note: Training Related Unemployment Benefits Excluded

Sickness and Invalid Benefits

In New Zealand during 2000-2007, there was a gradual increase in the number of young people reliant on sickness and invalid's benefits, with the number of sickness beneficiaries increasing from 3,892 in 2000 to 6,669 in 2007 and the number of invalid's benefit recipients increasing from 4,866 to 6,580 during the same period. There were also marked ethnic disparities in the number of young people reliant on sickness and invalids benefits, with rates being higher for Māori young people throughout this period (**Figure 24**).

During April 2007, 46% of young people receiving a sickness benefit required financial support for psychological / psychiatric reasons and 17% required support as the result of a pregnancy. Accidents (7%), substance use (7%) and musculoskeletal problems (6%) also made a significant contribution (**Figure 25**). In contrast, 26% of invalid's benefit recipients required financial support for intellectual disabilities, while 24% required support for psychological / psychiatric reasons. An additional 21% required support as the result of congenital anomalies and 10% as the result of nervous system problems (**Figure 26**).

Figure 24. Young People 16-24 Years Receiving an Invalids or Sickness Benefit by Ethnicity, New Zealand April 2000-2007



Summary

While adolescence is for many young people, a time for investing in learning and acquiring new skills, it is also a time of vulnerability. While the majority of young people successfully complete their years of secondary education and continue on to further training and employment, a significant minority are unable to support themselves financially for a variety of reasons. In New Zealand during 2000-2007, there was a steep decline in the proportion of young people receiving unemployment benefits, while the proportion receiving domestic purposes benefits declined much more slowly and the numbers receiving sickness and invalid’s benefits increased. Such figures potentially suggest that young people receiving income tested benefits are a heterogeneous group, comprising those temporarily out of work, those caring for young children and those unable to participate in the workforce for a variety of medical or other reasons. While reductions in the number of young people reliant on unemployment benefits are encouraging and potentially reflect greater employment and training opportunities for New Zealand young people, those remaining on income tested benefits nevertheless represent a high needs group, who may warrant further consideration in future planning and strategy development.

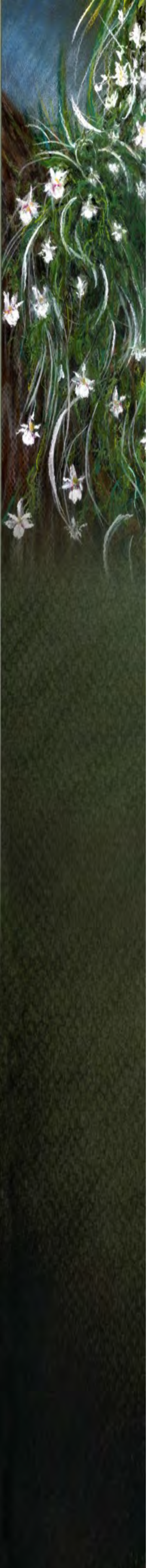


Figure 25. Young People 16-24 Years Receiving a Sickness Benefit by Cause of Incapacity, New Zealand April 2007 (n= 6,669)

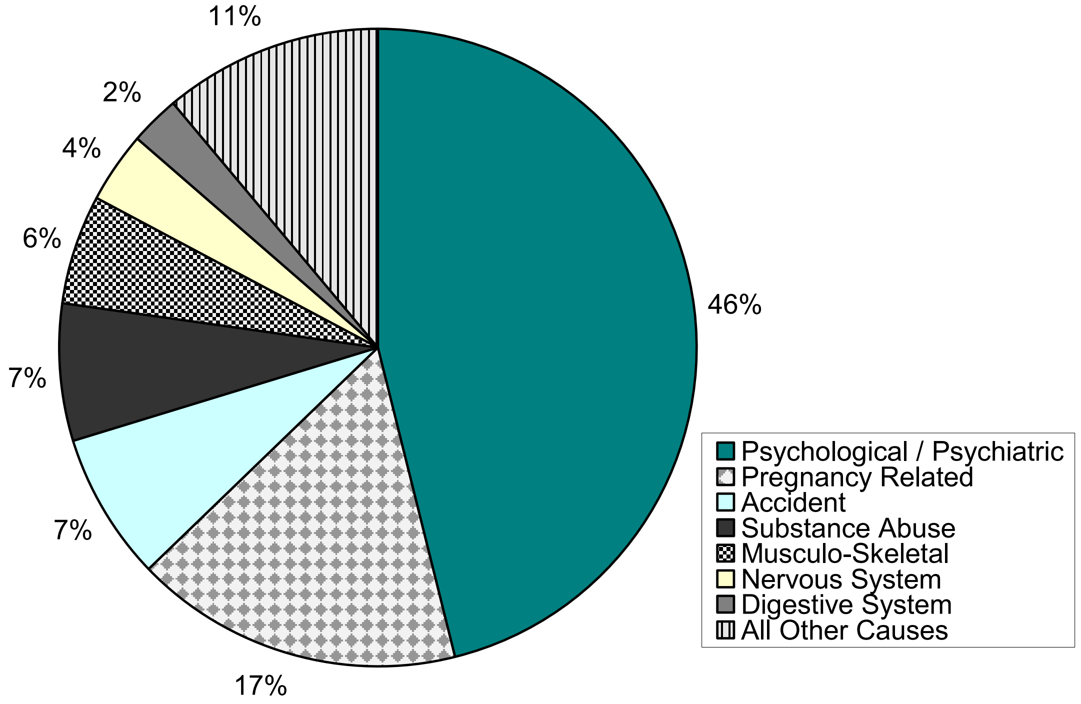
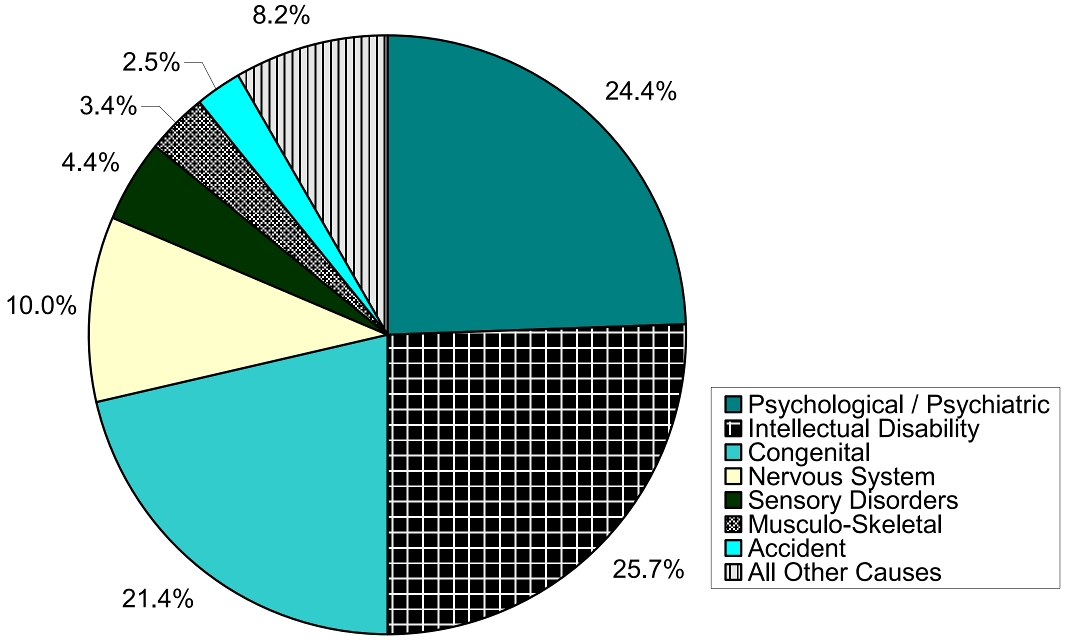
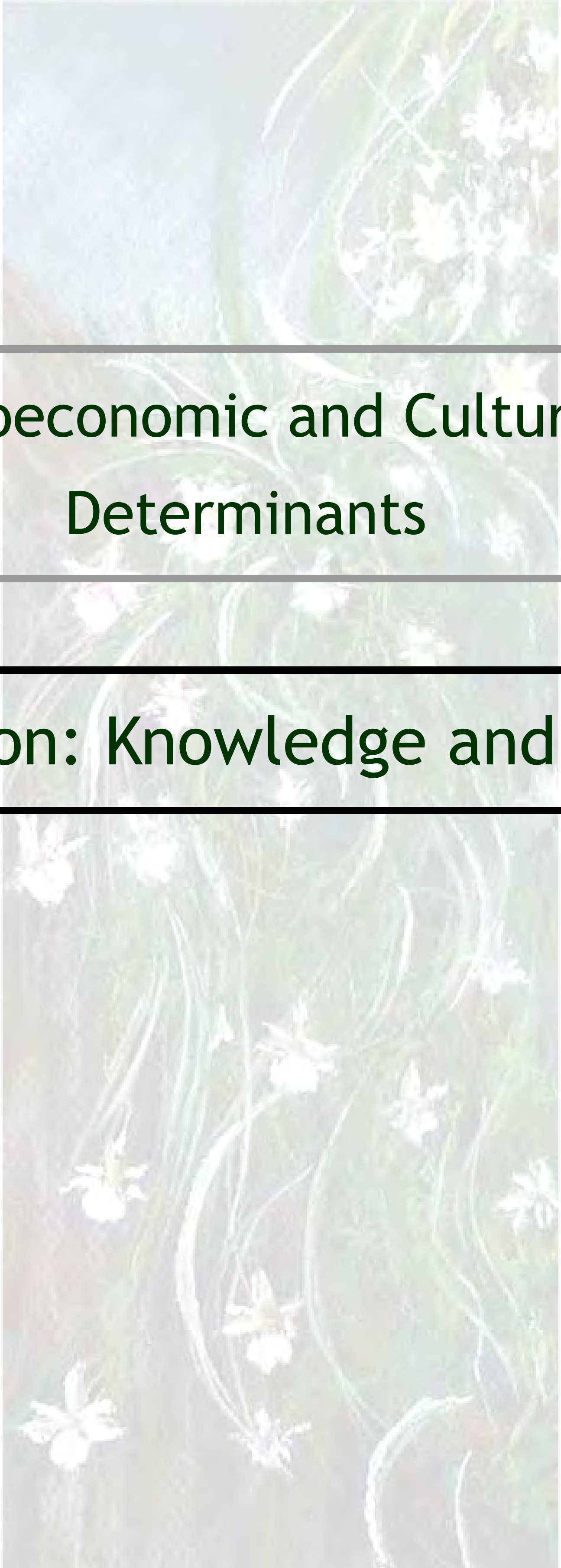


Figure 26. Young People 16-24 Years Receiving an Invalid's Benefit by Cause of Incapacity, New Zealand April 2007 (n= 6,580)





Socioeconomic and Cultural Determinants

Education: Knowledge and Skills

Participation in Early Childhood Education

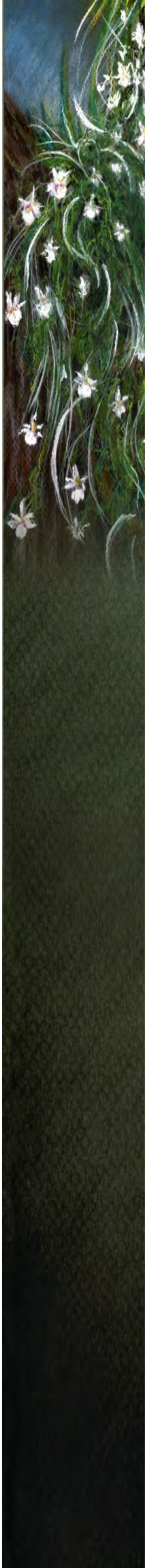
Introduction

Research would suggest that participation in high quality early childhood education (ECE) has significant long term benefits for children's academic performance. While the benefits appear greatest for children from low income families, those who attend ECE regularly and those who have started ECE at a younger age (e.g. 2-3 years), a number of longitudinal studies have suggested that the relationship between ECE and subsequent outcomes may be quite complex and related to the age at which the child starts ECE, the number of hours in ECE each week, the quality of the ECE service and the socioeconomic background from which the child comes [45].

In one US study, children who started ECE between 2-3 years had higher pre-reading and mathematics scores at school entry than those who started earlier or later, but starting ECE at <2 years was associated with lower social development scores. In addition, children experienced greater academic gains if they attended ECE for >15 hours per week, but this was offset by lower social scores, particularly for those who attended for >30 hours per week. Outcomes also varied by socioeconomic status, with children from low income families only experiencing significant academic gains if they attended ECE for >30 hours per week, but for these children attending >30 hours per week had no negative behavioural consequences. In contrast, children from affluent homes experienced no additional academic gains from attending ECE for >30 hours per week, but displayed increasingly negative behaviour the longer they attended ECE [46]

In New Zealand the Competent Children, Competent Learners Study, which followed a cohort of children from preschool to age 14, suggested that differences in the ECE environment continued to influence performance at age 14, with differences between those with the highest or most of a particular aspect of ECE and others being on average 9%. Family factors (income and maternal qualifications) made more of a difference than a child's ECE experience however, although ECE experience continued to make a contribution once these factors had been taken into account. In general, ECE experience made the greatest impact at the time a child started school, but the contribution was still evident at 14 years, even after taking age-5-performance, family income and maternal qualifications into account [45].

In New Zealand, ECE is provided by a variety of different services and in a variety of different settings ranging from the more traditional Kindergartens and Te Kohanga Reo, to services that cater for the needs of working parents (e.g. Education and Care Services, Home Based Services). During 1990-2005, New Zealand's enrolments in ECE increased for all age groups, with the largest increases occurring amongst those <3 years, for whom enrolments doubled. This increase in enrolments was absorbed almost entirely by the Education and Care Services, who offer flexible hours and require little parental involvement and thus are particularly attractive to working parents. While there was also a 6-fold increase in Home Based Services during this period, in absolute terms the numbers of children receiving this type of care were less [47].



Data Source and Methods

Definition

1. Total enrolments in Early Childhood Education (ECE)
2. Proportion of school new entrants (Year 1) reporting regular participation in ECE immediately prior to attending school

Data Source and Interpretation

1. Total enrolments in Early Childhood Education

Numerator: Ministry of Education: Total enrolments in early childhood education

Denominator: Not applicable (see notes below)

Interpretation: Total enrolments tend to overestimate ECE participation as they may double or triple count those children who attend more than one ECE service. The measure however is a useful indicator of patterns of enrolment across different types of ECE.

2. Prior Participation in Early Childhood Education

Numerator: The number of new entrants reporting regular participation in early childhood education immediately prior to attending school

Denominator: The number of new entrants enrolled

Interpretation: The number of new school entrants (Year 1) reporting regular participation in ECE immediately prior to attending school is a useful measure of ECE participation as it overcomes some of the over counting problems associated with other ECE enrolment measures. However no information is provided on the duration of, number of hours in, or the type of ECE attended prior to attending school.

Indicator Category

Proxy C (Table 133, Table 134)

School Socioeconomic Decile: All schools are assigned a decile ranking based on the socioeconomic status of the areas they serve. These rankings are based on Census data from families with school age children in the areas from which the school draws its students, along with school ethnicity data. Census variables used in the ranking procedure include equivalent household income, parent's occupation and educational qualifications, household crowding and income support payments. Using these variables, schools are assigned a decile (10%) ranking, with Decile 1 schools being the 10% of schools with the highest proportion of students from low socioeconomic communities and Decile 10 schools being the 10% of schools with the lowest proportion of these students. Decile ratings are used by the Ministry of Education to allocate targeted funding, as well as for analytical purposes.

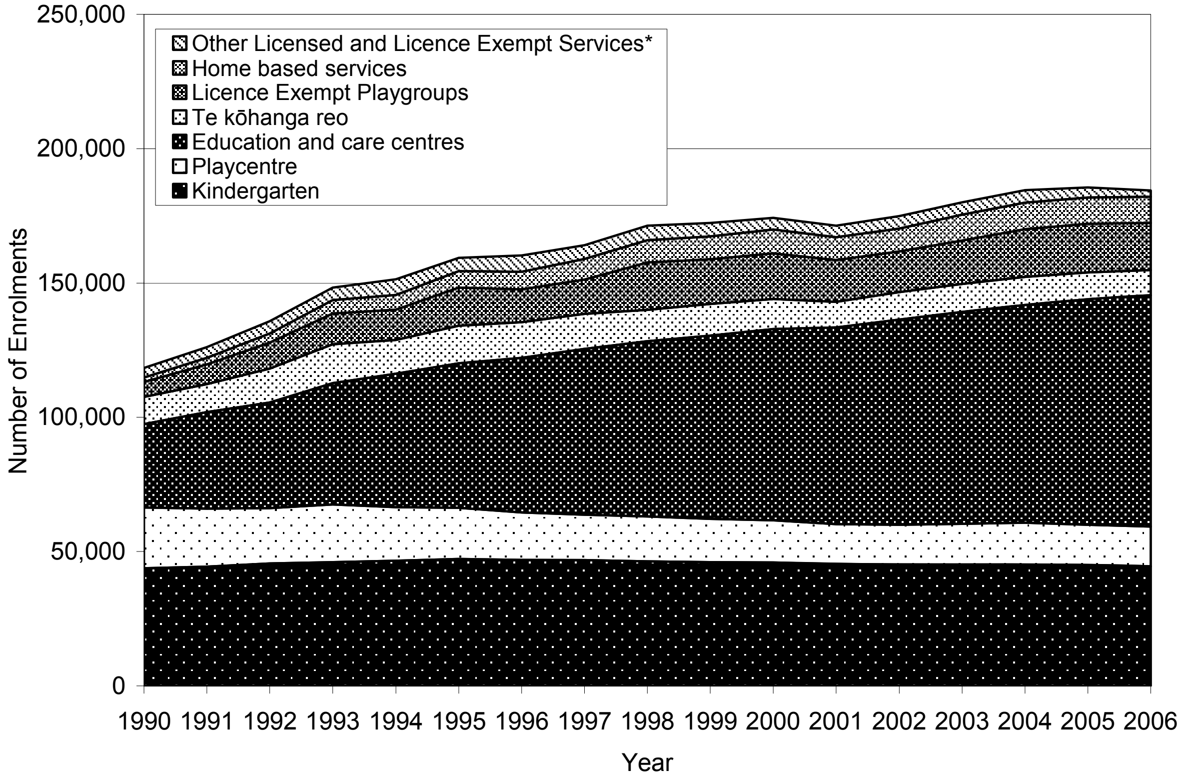
New Zealand Distribution and Trends

Total Enrolments in Early Childhood Education

In New Zealand during 1990-2006, the number of enrolments in Early Childhood Education (ECE) increased by 55.8% (Figure 27). Changes varied markedly by service type however, with enrolments in Education and Care Centres increasing by 177.3%, enrolments in Home Based Networks increasing by 508.4% and enrolments in License Exempt Playgroups increasing by 214.0%. In contrast, enrolments in Kindergartens only increased by 1.5%, while enrolments in Te Kohanga Reo declined by 6.1% and enrolments in Playcentre declined by 34.3%. Thus while in 1990, Kindergarten was the most common source of ECE, by 2006 Education and Care Centres were the most common, with 46.7% of ECE enrolments during 2006 being for this type of Service.

In addition to an increase in ECE enrolments, the number of hours spent in ECE increased progressively during 1996-2006 for all Service types, with the exception of Playcentres and Te Kohanga Reo (Table 11). Children enrolled in Te Kohanga Reo, at 27-30 hours per week, spent the longest amount of time in ECE, followed by those enrolled in Home Based Networks who had the second longest average hours, as well as the largest increases in average hours in ECE during this period [48].

Figure 27. Licensed and License Exempt Early Childhood Education Enrolments by Service Type, New Zealand 1990-2006



Source: Ministry of Education. Note*: Other License and License Exempt Services include Correspondence School, Nga Puna Kohungahunga, License Exempt Playcentres and Kohanga Reo and Pacific Islands EC Groups.

Table 11. Average Number of Hours of Attendance in Early Childhood Education Services by Service Type, New Zealand 1997-2006

Type of Service	Year									
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Kindergarten	10.4	10.7	10.8	11.2	11.5	11.8	12.0	12.5	12.6	12.6
Playcentre	4.4	4.4	4.3	4.4	4.2	4.3	4.3	4.4	4.3	4.4
Education and Care	15.8	15.9	16.4	16.6	17.7	18.3	18.6	19.5	20.3	20.8
Home Based Networks	15.2	15.7	16.1	16.9	18.6	18.1	19.7	21.3	22.4	22.0
Licensed Kohanga Reo*	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5

Source: Ministry of Education. Note:*Estimated - most children are enrolled for 27-30 hours per week.

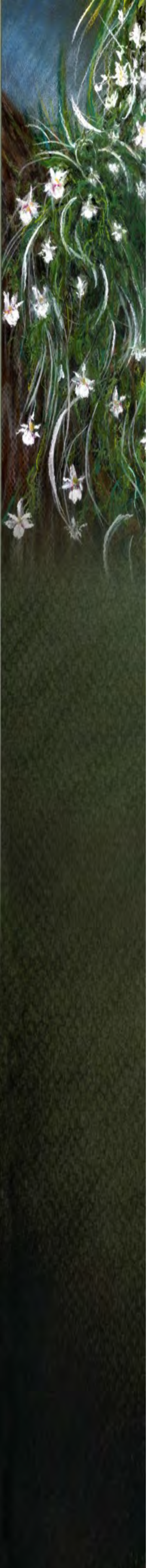


Table 12. Enrolments in Māori Medium Early Childhood Education by Type, New Zealand 1990-2006

Year	Te Kohanga reo*	Nga puna Kohungahunga**	Te Kohanga reo**	Total
1990	10,108	...	…	10,108
1991	10,451	...	…	10,451
1992	12,617	...	…	12,617
1993	14,514	...	…	14,514
1994	12,508	...	1,035	13,543
1995	14,015	...	248	14,263
1996	13,279	...	1,023	14,302
1997	13,104	…	401	13,505
1998	11,689	…	361	12,050
1999	11,859	…	524	12,383
2000	11,138	…	381	11,519
2001	9,594	209	214	10,017
2002	10,389	351	138	10,878
2003	10,319	408	130	10,857
2004	10,418	571	191	11,180
2005	10,070	519	146	10,735
2006	9,493	289	89	9,871

Note: *Licensed, **License Exempt. Source: Ministry of Education

Prior Participation in Early Childhood Education

Trends and Ethnic Differences

In New Zealand during the past 7 years, the percentage of new entrants (Year 1) reporting regular participation in ECE prior to attending school increased, from 91.0% in 2000 to 94.5% in 2006. While prior participation in ECE remained highest amongst European > Asian / Indian > Māori > Pacific children during this period, in absolute terms participation rates for Māori and Pacific children increased more rapidly (Pacific 76.1% in 2000 → 84.2% in 2006; Māori 84.8% in 2000 → 89.9% in 2006) than for European children (95.4% in 2000 → 98.0% in 2006) (**Figure 28**).

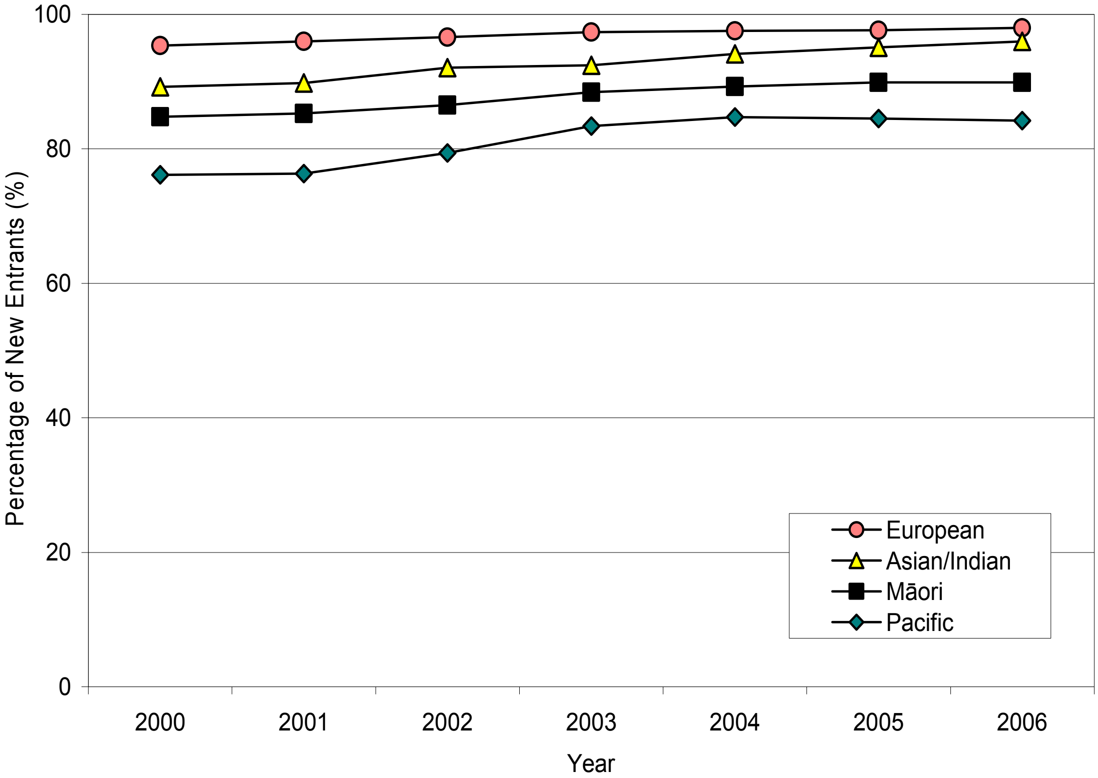
Socioeconomic Differences

In New Zealand during 2006, the percentage of new entrants (Year 1) reporting regular participation in ECE also exhibited a modest socioeconomic gradient, with those attending the least affluent schools being less likely to report prior attendance at ECE. Thus during 2006, 17.2% of children attending the least affluent (Decile 1) schools had not attended ECE immediately prior to school entry, as compared to only 0.9% of children attending the most affluent (Decile 10) schools (**Figure 29**). Nevertheless these figures suggest that on average, 82.8% of children in the least affluent schools had attended some form of ECE immediately prior to school entry.

Regional Differences

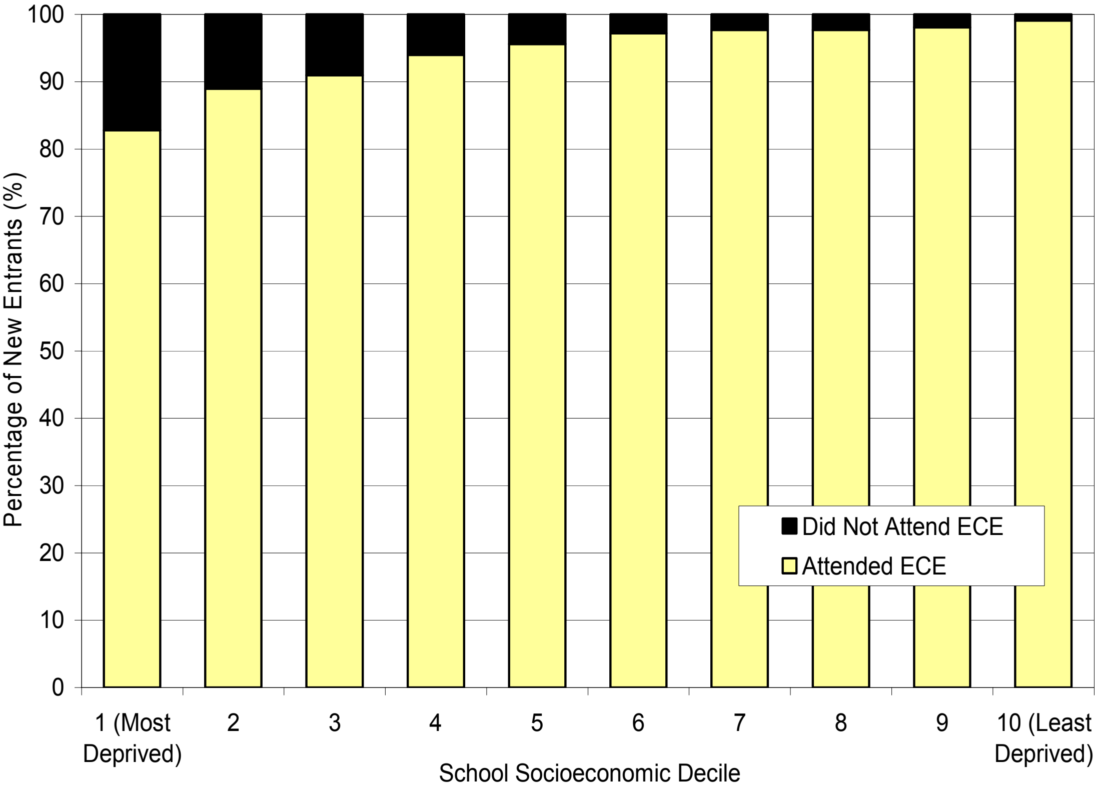
During 2006, there were also regional differences in prior participation in ECE, with rates varying from 87.4% to 97.7% depending on the region studied (**Table 13**).

Figure 28. Proportion of New Entrants Who Had Previously Attended Early Childhood Education by Ethnicity, New Zealand 2000-2006

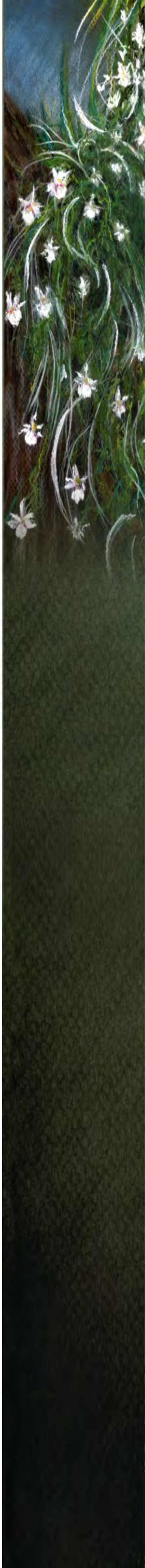


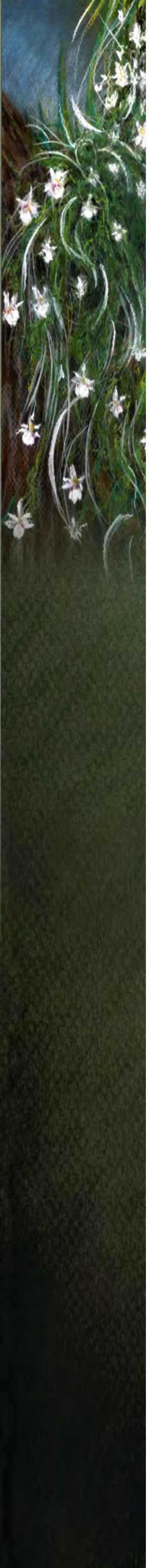
Source: Ministry of Education.

Figure 29. Proportion of New Entrants Who Had Previously Attended Early Childhood Education by School Socioeconomic Decile, New Zealand 2006



Source: Ministry of Education.





Summary

Research suggests that participation in high quality early childhood education (ECE) has significant long term benefits. In New Zealand, ECE is provided in a variety of contexts ranging from the more traditional Kindergartens and Te Kohanga Reo, to services that cater for the needs of working parents. In New Zealand during 1990-2006, the number of children enrolled in ECE increased by 55.8%, with the largest increases being in Education and Care Services, Home Based Services and License Exempt Playgroups. In addition, during 1997-2006 the number of hours children spent in ECE increased for all Service types, with the exception of Playcentres and Te Kohanga Reo. Similarly, in New Zealand during 2000-2006, the percentage of new entrants (Year 1) reporting prior participation in ECE increased from 91.0% to 94.5% and while rates remained higher amongst European > Asian / Indian > Māori > Pacific children and those attending the most affluent schools, in absolute terms rates increased most rapidly for Māori and Pacific children. There were also regional differences in prior participation in ECE during this period.

Table 13. Proportion of New Entrants Who Had Previously Attended Early Childhood Education by DHB, New Zealand 2006

DHB	New Entrants Who Attended ECE (%)					
	Māori	Pacific	European	Asian	Other	Total
Northland	85.4	75.6	94.0	93.1	100.0	89.4
Waitemata	91.8	84.9	98.3	96.2	93.2	95.6
Auckland	87.4	83.2	99.4	95.3	86.1	93.2
Counties Manukau	79.6	79.6	97.0	95.3	94.5	87.4
Waikato	91.3	88.5	97.5	96.5	97.4	95.1
Lakes	84.4	82.5	96.8	92.3	78.6	90.0
Bay of Plenty	89.7	86.0	98.8	95.4	100.0	95.0
Tairawhiti	88.2	94.4	97.7	100.0	s	91.7
Taranaki	94.2	91.3	97.1	96.2	100.0	96.3
Hawkes Bay	93.5	98.0	98.8	97.6	72.7	96.3
MidCentral	95.1	94.7	97.6	95.2	100.0	96.7
Whanganui	97.2	91.7	96.3	93.8	s	96.5
Capital and Coast	95.9	93.5	99.4	97.8	90.5	97.7
Hutt	94.9	90.4	98.8	97.7	92.5	96.9
Wairarapa	90.6	77.8	97.9	100.0	100.0	95.3
Nelson Marlborough	94.1	68.8	97.3	97.4	94.4	96.6
West Coast	93.9	s	94.9	100.0	s	94.9
Canterbury	97.5	94.0	98.8	98.0	92.0	98.4
South Canterbury	97.1	100.0	97.9	100.0	s	97.7
Otago	93.9	96.4	98.4	97.9	85.7	97.7
Southland	95.8	100.0	97.9	96.7	100.0	97.6
New Zealand	89.9	84.2	98.0	96.0	91.7	94.5

Source: Ministry of Education. s: Small numbers preclude rate calculation. Note: Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue).

Educational Attainment at School Leaving

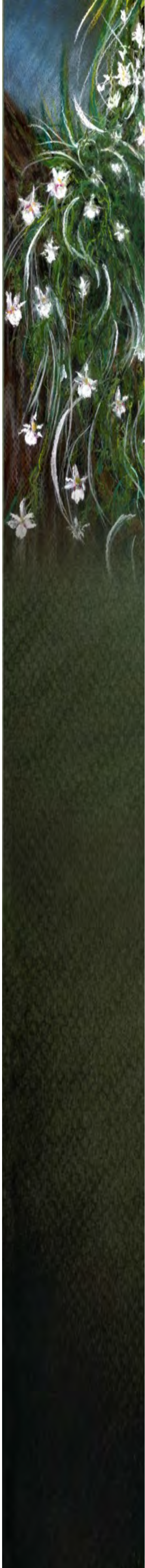
Introduction

In an increasingly knowledge based society, formal school qualifications are crucial in ensuring that young people gain access to tertiary education and entry level jobs [49]. Yet despite this, during 2005 12.9% of school leavers left school with little or no formal attainment. While some of these students may have continued their education through other tertiary providers, it is likely that a significant number would have also attempted to join the workforce, a process made more difficult by their lack of formal qualifications [50].

In attempting to understand why some students leave school with little or no formal attainment, the Ministry of Education (MOE) recently commissioned a literature review on the determinants of children's educational attainment [51]. This review suggested that:

1. There are marked ethnic disparities in children's educational achievement, with European and Asian children consistently achieving at higher levels than Māori and Pacific children, although some of these differences may be due to socioeconomic factors.
2. There are marked socioeconomic disparities in childhood educational achievement, with performance across a variety of subjects (e.g. reading, maths, science) increasing with increasing parental occupational class and school socioeconomic decile. Family income during early childhood (0-5 yrs) also affects educational achievement during primary school, even if income subsequently improves during this time.
3. Children living in families with higher levels of parental (especially maternal) education and which provide study facilities, computers and other resources, have higher achievement levels than those without such resources.
4. Frequent mobility adversely impacts on educational attainment, with those attending 4+ schools by the age of 10 yrs achieving less well on some social and academic measures.
5. Factors positively impacting on educational attainment include parental expectations, social networks (e.g. Pacific church and Māori cultural connections), peer influences (which exert positive and negative effects), access to community institutions (e.g. libraries, medical services), social agencies (e.g. to receive income entitlements) and integrated programmes which enhance the involvement of families in children's education.

While the relationships between each of these factors are necessarily complex, the review highlighted the significant role family socioeconomic position and access to educational resources play in the academic achievements of New Zealand children and young people. Such achievements in turn, are likely to influence the socioeconomic position in which the current generation of New Zealand young people bring up their own families in future years.



The following section, using information available from the Ministry of Education, reviews two key indicators of educational performance:

1. The proportion of school leavers with little or no formal attainment
2. The proportion of school leavers with a University Entrance Standard

These indicators need to be considered within the context of two other MOE (participation) indicators, Stand-Downs, Suspensions, Exclusions and Expulsions and Senior Secondary Retention Rates, which are explored in later sections of this report.

Data Source and Methods

Definition

1. School Leavers with a University Entrance Standard

Relevant qualifications include 42-59 credits at Level 3 or above for NCEA or other National Certificates at Level 3 with University Entrance requirements, Accelerated Christian Education or overseas award at Year 13, University Entrance, National Certificate Level 3, University Bursary (A or B), New Zealand Scholarship or National Certificate Level 4

2. School leavers with Little or no Formal Attainment

Before 2001: Leaving school without any credits towards a qualification in the National Qualifications Framework (NQF) or leaving school with 1-11 credits in a National Certificate;
2002-2004: Leaving school without any credits towards a qualification in the NQF or leaving school with 1-13 credits at NCEA Level 1 and other NQF qualifications;
From 2005: Leaving school without any credits towards a qualification in the NQF or leaving school with 1-13 credits at any NCEA Level and other NQF qualifications.

Data Source

Ministry of Education
Numerator: Students leaving with / without the qualifications outlined above.
Denominator: Number of school leavers in a given year

Indicator Category

Ideal B (**Table 133, Table 134**)

Notes on Interpretation

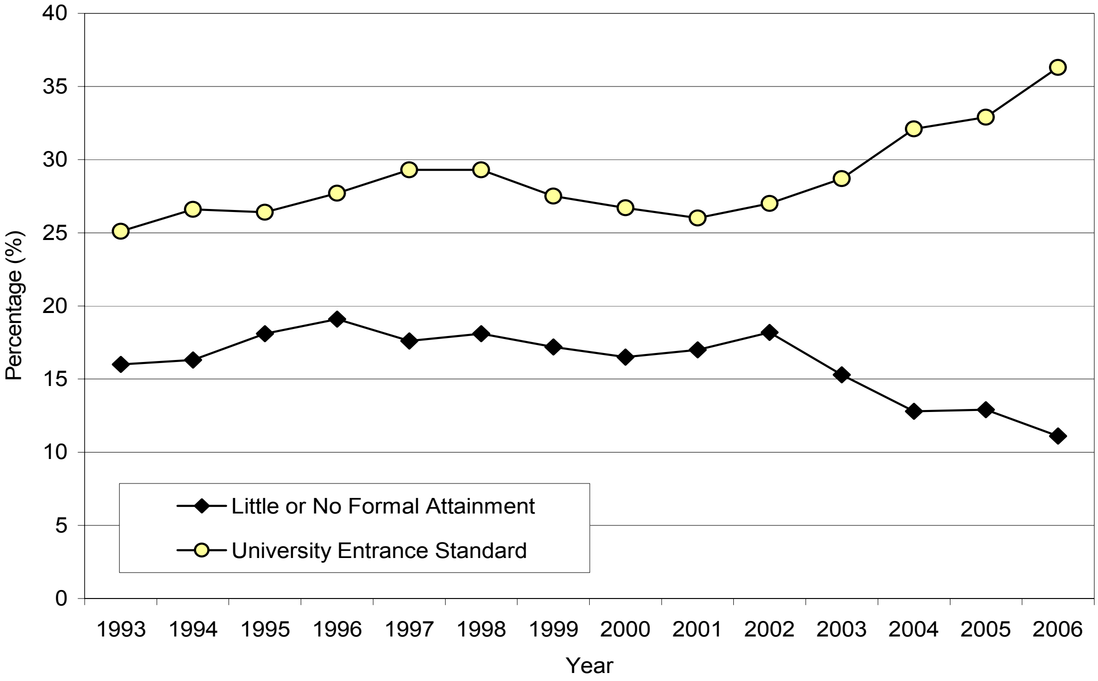
NCEA is part of the National Qualifications Framework and has replaced School Certificate, 6th Form Certificate and University Entrance / Bursaries. In 2002 all schools implemented NCEA Level 1, replacing School Certificate. In 2003, NCEA Level 2 was rolled out, although schools were still able to offer a transitional 6th Form Certificate Programme. From 2004, NCEA Level 3 replaced Higher School Certificate, University Entrance / Bursaries and a new Level 4 qualification, the New Zealand Scholarship was offered. The changes in qualification structure mean that time series information prior to and after 2002 may not be strictly comparable and in addition, the staggered roll out of the new qualification structure may mean that changes over 2002-05 merely reflect this transition.

School Socioeconomic Decile: See page 92

New Zealand Trends and Distribution

In New Zealand, the proportion of secondary school students who left school with a University Entrance Qualification rose during the mid-late 1990s, reached a peak of 29.3% in 1997-1998 and thereafter began to decline. Following the introduction of the NCEA in 2002, the proportion of students with a University Entrance Qualification began to rise again, reaching a peak of 36.3% in 2006. Similarly, the proportion of secondary school students with little or no formal educational attainment rose during the early 1990s, reached a peak of 19.1% in 1996 and thereafter began to decline. This decline became more rapid after the introduction of the NCEA in 2002 (**Figure 30**). Care must be taken when interpreting educational attainment data before and after the introduction of the NCEA in 2002 however, as the qualification structure may not be strictly comparable. In addition the roll out of NCEA occurred over a 3-year period, possibly masking any abrupt transitions within the data.

Figure 30. Highest Educational Attainment of School Leavers, New Zealand 1993-2006



Source: Ministry of Education.

Ethnic Specific Trends

In New Zealand during 1993-2006, higher proportions of Māori > Pacific > European > Asian / Indian students left school with little or no formal attainment. For Māori, the proportion of students with little or no formal attainment reached a peak of 39% in 1996 and thereafter began to decline, with the most rapid declines occurring following the introduction of the NCEA in 2002. For Pacific students, rates reached a peak of 27.4% in 1998 and thereafter declined only very marginally, until the introduction of the NCEA in 2002. In contrast, during the same period higher proportions of Asian / Indian > European > Pacific > Māori students left school with a University Entrance Qualification. While there were some increases in rates for Asian / Indian and European students during the early-mid 1990s, rates for Māori and Pacific students remained fairly static until the introduction of the NCEA in 2002 (Figure 31). (As mentioned above, care must be taken in interpreting these figures, as the staged introduction of the NCEA which began in 2002, means that the qualification structures before and after this date may not be strictly comparable).

School Socioeconomic Decile

During 2006, there were marked socioeconomic differences in educational achievement across all of New Zealand's largest ethnic groups, with the proportion of students leaving school with little or no formal attainment increasing progressively as the socioeconomic deprivation of the school's catchment increased. Similarly, the proportion of students who left school with a University Entrance Qualification declined progressively with increasing socioeconomic deprivation (**Figure 32**).

Regional Differences

In addition, there were also marked regional variations in the proportion of students leaving school with little or no formal attainment, with rates ranging from 6.2% to 19.0% depending on the region studied. Similarly, the proportion of students leaving school with a University Entrance Standard varied from 15.4% to 50.8% in different regions (**Table 14**).

Figure 31. Highest Educational Attainment of School Leavers by Ethnicity, New Zealand 1993-2006

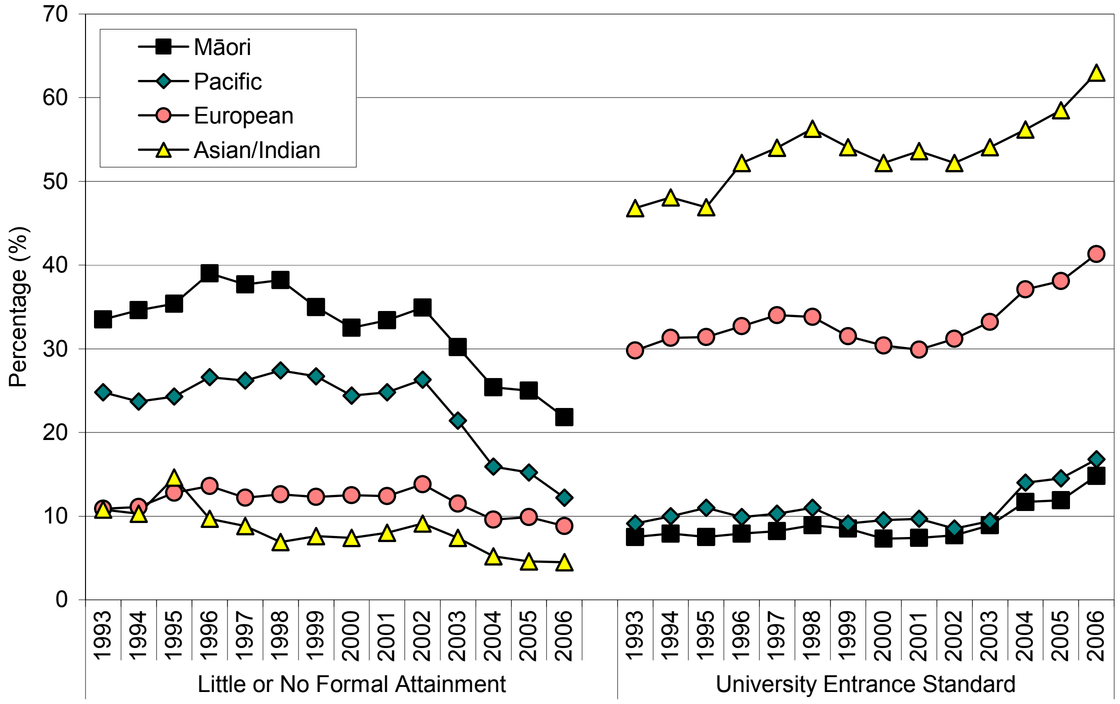
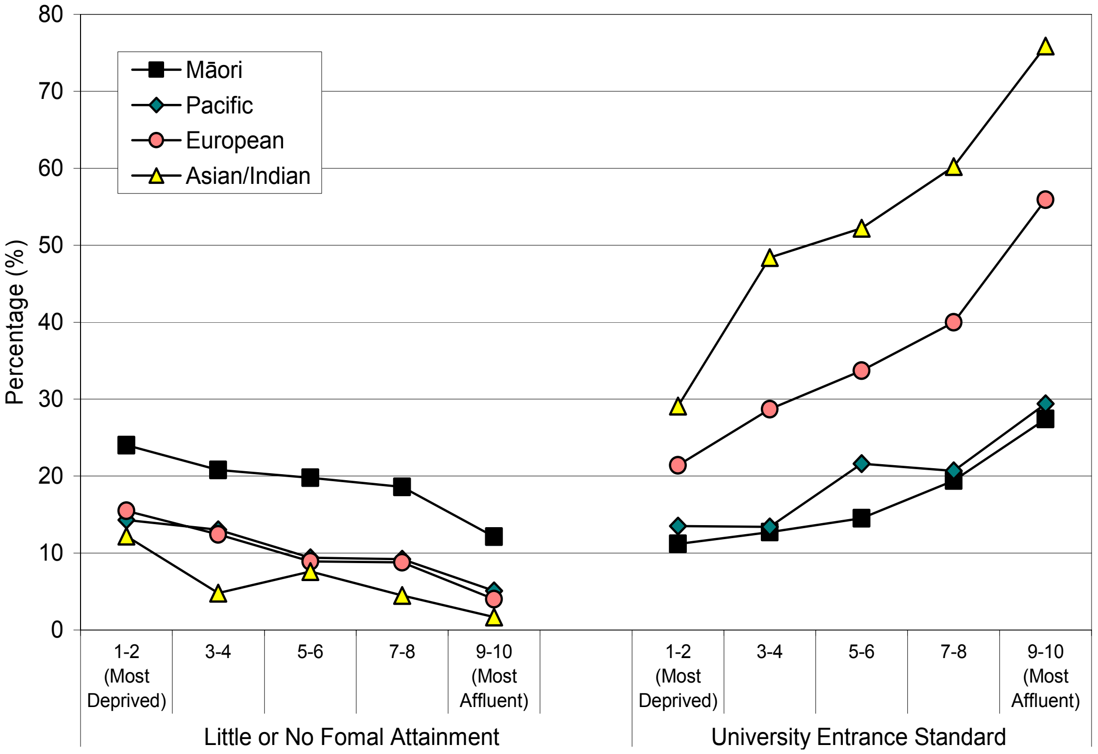


Figure 32. Highest Educational Attainment of School Leavers by Ethnic Group and School Socioeconomic Decile, New Zealand 2006



Source: Ministry of Education.

Summary

In New Zealand during the past decade, educational attainment at school leaving has fluctuated, in part as a result of changes in prevailing labour force conditions and the availability of alternative forms of tertiary education. While there have been marked increases in the proportion of students achieving a University Entrance Standard since the introduction of the NCEA, care must be taken when interpreting these trends, as the old and new qualification structures may not be strictly comparable. While educational attainment improved for all ethnic groups during 1993-2006, the proportion of young people leaving school with little or no formal attainment remained higher for Māori > Pacific > European > Asian / Indian young people and those attending schools in the most deprived areas, while the proportion acquiring a University Entrance Standard remained higher for Asian / Indian > European > Māori and Pacific young people and those in the most affluent areas.

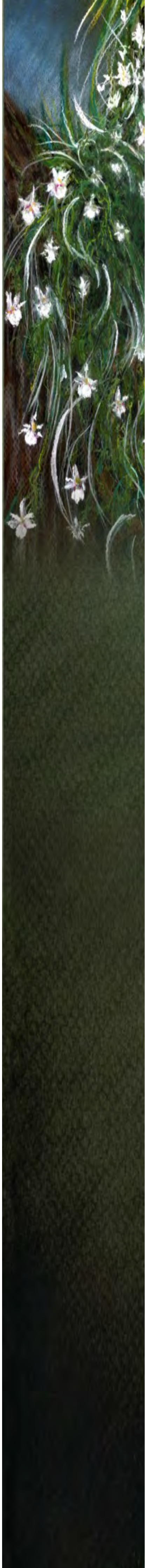


Table 14. Highest Educational Attainment of School Leavers by DHB and Ethnic Group, New Zealand 2006

DHB	Percentage with Little or No Formal Attainment						Percentage with University Entrance Standard					
	Māori	Pacific	European	Asian	Other	Total	Māori	Pacific	European	Asian	Other	Total
Northland	20.8	s	6.6	s	s	12.4	13.2	s	32.9	46.9	33.3	25.0
Waitemata	21.1	13.1	8.4	3.3	7.4	9.5	18.2	18.4	41.9	62.6	48.4	40.2
Auckland	15.7	8.3	4.5	3.7	7.4	6.2	26.2	18.7	62.5	68.4	42.6	50.8
Counties Manukau	23.7	14.4	7.0	4.3	5.6	10.8	10.3	15.2	40.8	59.3	40.2	33.7
Waikato	22.6	16.8	9.3	7.7	9.9	13.0	12.1	13.0	32.3	47.5	28.6	26.9
Lakes	19.1	s	9.4	s	s	13.5	15.2	17.1	36.0	73.0	46.7	27.9
Bay of Plenty	24.8	s	7.0	10.3	s	12.5	11.5	s	35.8	47.1	45.5	28.7
Tairawhiti	16.2	s	5.1	s	s	11.6	12.6	s	44.4	85.7	s	26.0
Taranaki	25.8	s	9.0	s	s	12.3	14.4	s	37.9	69.2	50.0	33.5
Hawkes Bay	13.8	13.2	8.6	s	s	10.2	16.4	8.8	40.7	51.3	s	32.5
MidCentral	14.9	7.5	7.9	s	s	9.4	20.4	19.5	37.4	71.8	63.2	34.7
Whanganui	18.7	s	6.1	s	s	9.7	21.6	44.4	46.4	70.0	s	39.4
Capital and Coast	23.2	12.6	6.4	4.3	13.6	9.8	15.6	16.9	52.1	63.5	25.4	42.3
Hutt	19.6	10.1	8.5	4.2	s	10.5	10.4	12.5	41.4	60.6	28.2	33.4
Wairarapa	18.3	s	5.2	s	s	8.3	17.5	s	42.1	55.6	s	36.9
Nelson Marlborough	23.6	24.0	9.9	s	s	11.8	18.6	s	40.8	32.0	64.7	37.8
West Coast	16.0	s	20.4	s	s	19.0	s	s	15.6	s	s	15.4
Canterbury	23.4	14.3	10.1	6.3	14.6	11.4	14.7	19.3	43.8	69.1	44.5	41.7
South Canterbury	17.9	s	11.8	s	s	12.2	19.6	s	35.3	s	s	33.9
Otago	11.3	13.6	6.3	s	s	6.9	23.6	15.9	43.5	68.3	52.4	41.8
Southland	15.4	s	6.6	s	s	8.2	15.0	38.5	36.3	56.3	s	32.9
New Zealand Total	21.8	12.2	8.8	4.5	9.0	11.1	14.8	16.8	41.3	63.0	40.7	36.3

Source: Ministry of Education.: s: Small numbers preclude rate calculation. Rates have not been adjusted for DHB Demography and it is thus not recommended that they be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue).

Senior Secondary School Retention Rates

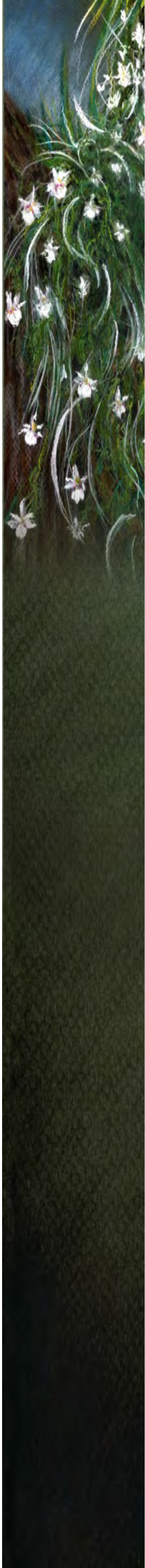
Introduction

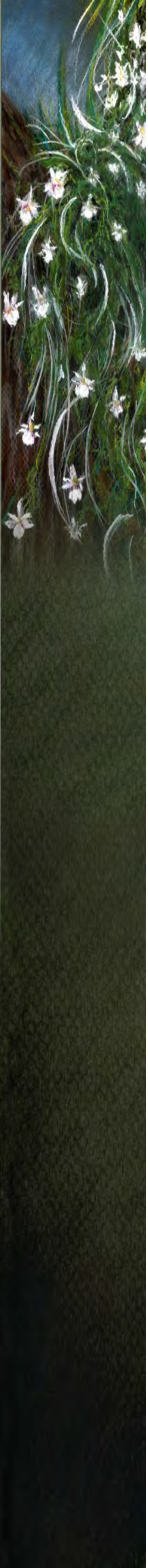
A key factor in ensuring academic achievement at secondary school level is participation. In order to achieve, students must stay at school, experience a sense of belonging and stay interested and engaged in learning. Research suggests that there are strong correlations between early school leaving, unemployment and lower incomes and that these in turn influence later socioeconomic position [52]. One indicator of continuing participation is school retention i.e. the % of students who attend school beyond the age they are legally required to do so [52]. In New Zealand, the minimum school leaving age rose from 15 to 16 years in early 1993 [53], although parents of students aged 15 years are able to apply to the Ministry of Education for an exemption on the basis of educational problems, conduct or the unlikelihood that a student will obtain benefit from attending school. In such cases, parents are required to give details about training programmes or employment that the student will move on to, if the exemption is granted [52].

In understanding trends and disparities in New Zealand's school retention rates over the past two decades, a number of factors must be taken into account:

1. During the past two decades school retention rates have fluctuated, partly in response to prevailing labour market conditions, with the rising retention rates observed during the late 1990s coinciding with increases in unemployment [54].
2. Not all students who leave school <18 years, or without formal qualifications transition directly into the workforce, with many taking part in other forms of tertiary education (e.g. in 2004 of those <18 yrs, 14% of Māori, 10% of European, 8% of Pacific and 4% of Asian / Indian young people were involved in tertiary education, with >80% studying at Certificate 1-3 Level).
3. During 1998-04, there were large increases in the number of students attending tertiary education, with the largest gains being amongst Māori students in Level 1-3 Certificate courses. During 1994-04, there were also steady increases in the number of Māori students undertaking bachelor's degrees. While those <18 yrs made up only a small proportion of this increase (the largest gains were in those 25+ yrs), these figures suggest that for many students, participation in education does not end at school leaving and that this must be taken into account when assessing the impact early school leaving has on long term employment and earning potential.
4. Not all forms of tertiary education have the same impact on future earning potential however, with an analysis of graduate incomes during 2002 suggesting that those completing a Level 1-3 Certificate had a median income of only $25,920, as compared to $40,000 for those completing a bachelors degree [55]. Thus, while a number of school leavers may actively participate in Certificate Level Courses, further training may be required if they are to achieve the same income premiums as those completing a degree.

The following section explores secondary school retention rates in New Zealand using information available from the Ministry of Education. In addition, information on tertiary participation rates is reviewed, in order to provide some context for interpreting ethnic differences in secondary school participation during this period.





Data Source and Methods

Definition
Retention of 16 and 17 year old students in secondary school education

Data Source
Ministry of Education
Numerator: The number of 16 (and 17) year olds on the school roll as at July 1 each year
Denominator: The number of 14 year old students on the roll as at 1 July, 2 (and 3) years previously

Indicator Category
Ideal C (**Table 133, Table 134**)

Notes on Interpretation
Because the retention of individual students cannot be tracked over time, these figures are estimates derived from comparing enrolments by ethnic group in each year, with the numbers in each ethnic group enrolled 2 and 3 years previously. As a result of high migratory inflows, enrolments for some ethnic groups may increase, inflating the observed retention rates and in the case of Asian students, resulting in apparent retention rates of >100%. These issues need to be taken into account when interpreting school retention data, particularly for Asian and Pacific students. School retention rates exclude foreign NZAID and foreign fee paying students.

School Socioeconomic Decile: See page 92

New Zealand Distribution and Trends

Retention Rates by Gender and Age

In New Zealand school retention rates increased markedly during the late 1980s, with fluctuations during the 1990s and early 2000s never taking rates back to their pre 1990 levels. While retention rates declined with age for both genders, gender differences in retention at 16 and 17 years widened during the late 1990s → early 2000s (**Figure 33).**

Retention Rates by Ethnicity

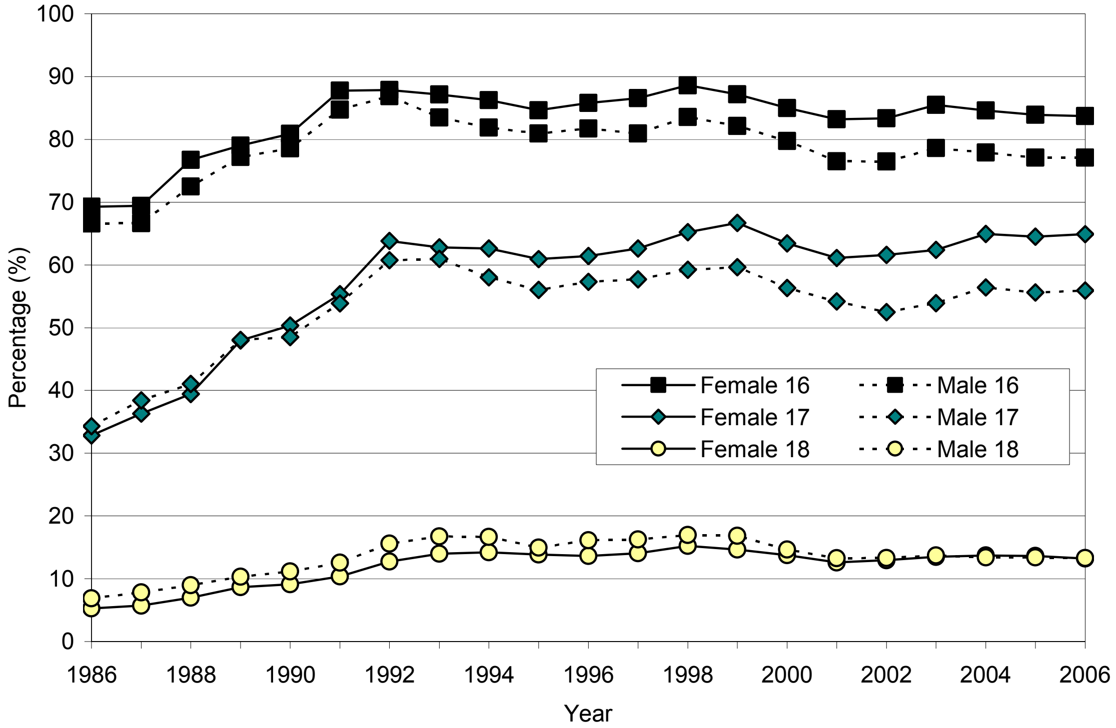
Limited time series information on school retention rates was available by ethnicity for 1995-2006. During this period (**Figure 34**):

1. School retention declined progressively as students moved from 16 → 18 yrs of age.
2. School retention rates at 16, 17 and 18 years were consistently lower for Māori students than for Pacific students or the total population, although the absolute differences became smaller as students reached 18 years of age.
3. Retention rates at 16 and 17 years declined throughout the early 1990s, increased again to reach a peak in 1998-99, and thereafter declined again. The rise in retention rates at 16-17 years in the late 1990s coincided with a peak in unemployment, particularly for those with no qualifications. Similarly, declines in retention in 16-17 year olds must be seen within the context of a 5% increase in the number of 15-17 year olds participating in tertiary alternatives during this period [54].
4. While retention rates were higher for Pacific students throughout this period and it is likely that this reflects real ethnic differences, these figures also must also be interpreted in the light of Pacific migration and the potential effect this may have on inflating retention rates, as discussed in the methods section above.
5. During 2002-2006 when more detailed information was available, school retention rates at 16 and 17 years were higher amongst Asian/Indian > Pacific and European > Māori students. Retention rates in excess of 100% for Asian/Indian students are potentially the result of immigration, as discussed in the methods section above (**Figure 35**).

Retention Rates by School Socioeconomic Decile

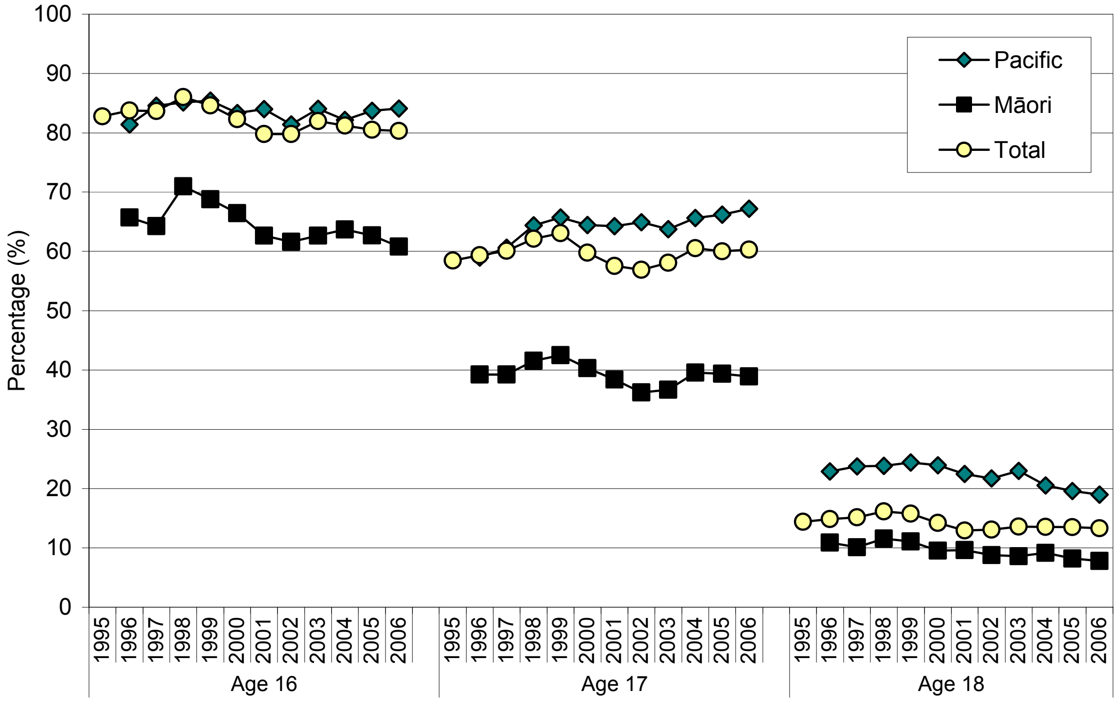
During 2006, modest socioeconomic gradients in school retention rates were apparent at both 16 and 17 years, with the proportion of students remaining at school increasing progressively as the affluence of the school catchment area increased (**Figure 36**).

Figure 33. Apparent Senior Secondary School Retention Rates at 16, 17 and 18 Years by Gender, New Zealand 1986-2006

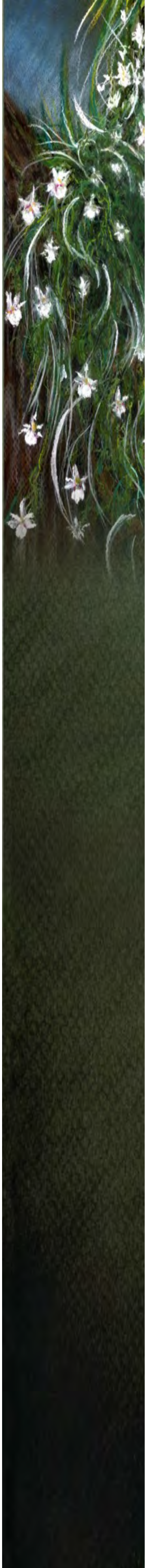


Source: Ministry of Education.

Figure 34. Apparent Senior Secondary School Retention Rates at 16, 17 and 18 Years by Ethnic Group, New Zealand 1995-2006



Source: Ministry of Education.



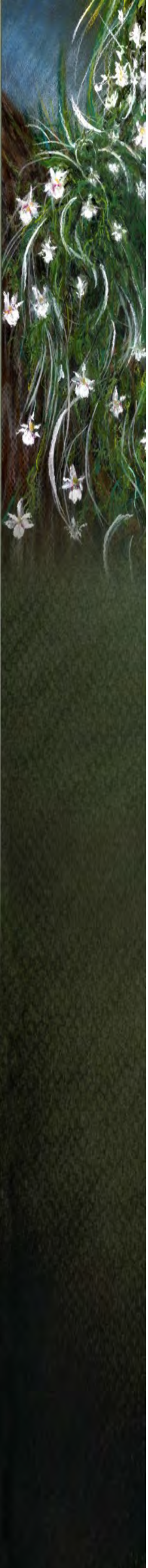
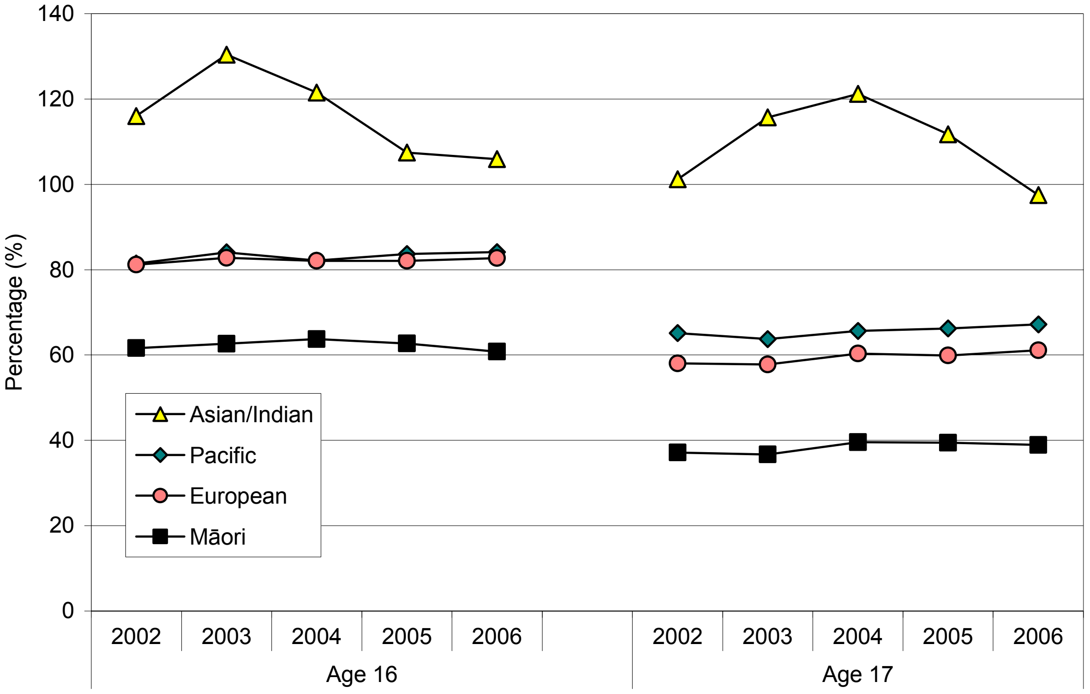
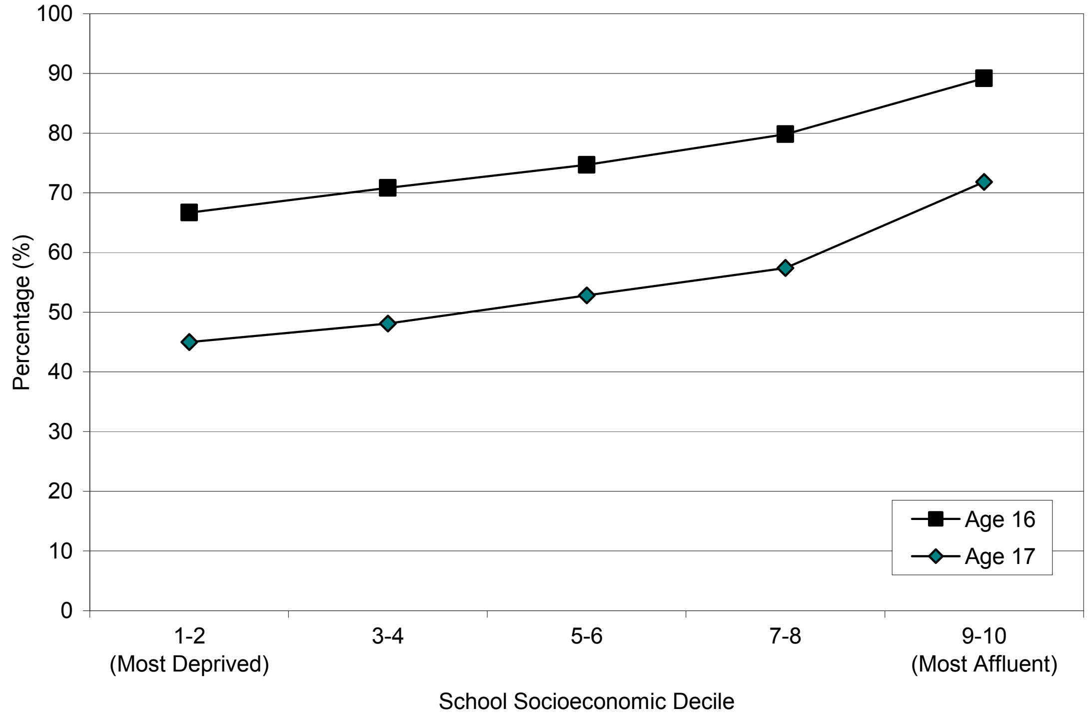


Figure 35. Apparent Senior Secondary School Retention Rates at 16 and 17 Years by Ethnic Group, New Zealand 2002-2006



Note: Due to the high positive net migration, retention rates for Asian students may be over inflated.

Figure 36. Apparent Senior Secondary School Retention Rates at 16 and 17 Years by School Socioeconomic Decile, New Zealand 2006

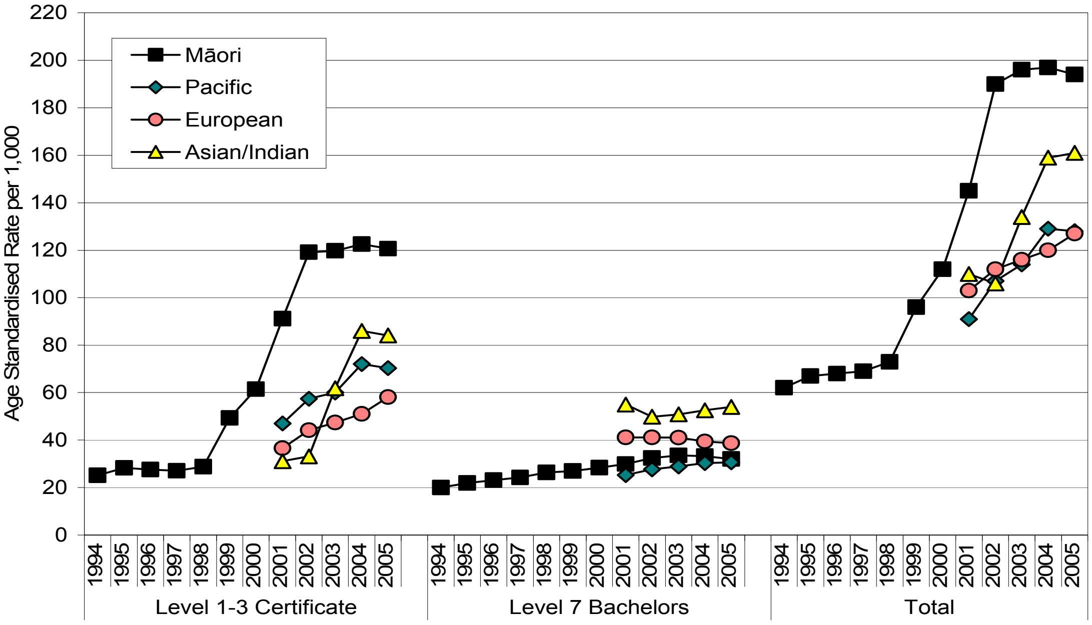


Note: Due to the high positive net migration of Asian students, retention rates in schools with high Asian student populations are erroneously inflated. Given the disproportionately large concentration of Asian students in higher decile schools, the graph above excludes Asian students.

Retention Rates by DHB
During 2006, there were marked regional differences in secondary school retention rates, with retention at 16 years ranging from 65.0% to 92.7% depending on the DHB studied. Similarly, retention rates at 17 years ranged from 30.5% to 77.6% (**Table 15**).

Comparison with Tertiary Participation Rates
Ethnic differences in school retention rates <18 years of age need to be viewed within the context of the alternative educational opportunities available to students. As discussed previously, there were large increases in tertiary participation during 1998-2002, particularly amongst Māori students taking Certificate Level 1-3 courses. There were also steady longer term increases in the proportion of Māori students participating in bachelor level study during 1994-2005 (Figure 37). While the majority of increases were in the 25+ age group, such figures suggest that for many, participation in formal education does not cease at school leaving, although the income premiums achieved for completing various types of study need to be taken into consideration when assessing the longer term impacts of educational participation on economic security.

Figure 37. Age Standardised Tertiary Education Participation Rates by Ethnicity and Type of Qualification, New Zealand 1994-2005 (all age groups)



Source: Ministry of Education.

Summary

While school retention rates for New Zealand young people <18 years have fluctuated over the past decade, marked gender, socioeconomic and ethnic disparities remain, with retention rates being lower for males, Māori students and those attending schools in the most deprived areas. These ethnic differences however, need to be viewed in the context of the alternative educational opportunities available to students, with the 1998-2002 period seeing large increases in tertiary participation rates, particularly amongst Māori students taking Certificate Level 1-3 courses. There were also steady longer term increases in the proportion of Māori students participating in bachelor level study during 1994-2005. While the majority of these increases were in the 25+ age group, such figures suggest that for many, participation in formal education does not cease at school leaving, although the income premiums achieved for completing various types of study need to be taken into consideration when assessing the longer term impacts educational participation has on future socioeconomic security.

Table 15. Apparent Senior Secondary School Retention Rates by DHB at 16 and 17 Years, New Zealand 2006

DHB	Retention to Age 16 Years (%)						Retention to 17 Years (%)					
	Māori	Pacific	European	Asian	Other	Total	Māori	Pacific	European	Asian	Other	Total
Northland	58.3	65.6	76.1	103.7	83.3	67.8	36.0	50.0	51.8	137.0	87.5	45.9
Waitemata	60.0	83.3	82.8	98.6	92.7	82.1	36.8	68.3	61.5	91.7	91.1	63.7
Auckland	71.8	87.7	92.1	107.7	112.9	92.7	53.5	69.8	75.3	101.9	92.8	77.6
Counties Manukau	54.1	80.7	82.1	103.6	102.2	80.2	30.4	61.0	55.4	95.5	95.5	59.2
Waikato	60.5	86.1	78.9	114.6	96.4	75.6	38.4	75.0	55.0	96.1	101.3	52.9
Lakes	56.9	77.1	71.6	120.0	133.3	65.3	33.9	61.0	55.6	97.6	100.0	47.1
Bay of Plenty	59.3	78.1	80.1	116.9	100.0	74.1	32.8	39.3	58.7	113.3	78.3	50.7
Tairawhiti	58.4	57.9	80.3	100.0	100.0	66.7	38.1	100.0	61.9	100.0	s	48.1
Taranaki	53.8	90.9	78.1	143.8	110.0	73.5	36.1	76.9	59.0	100.0	155.6	55.5
Hawkes Bay	64.0	80.0	83.8	95.2	113.3	77.6	38.1	55.2	59.6	80.6	s	52.7
MidCentral	62.2	96.7	77.0	109.1	105.9	75.3	42.5	73.0	53.0	109.4	110.0	53.8
Whanganui	64.3	88.0	81.6	146.2	s	77.0	38.5	61.9	59.7	80.0	85.7	52.5
Capital and Coast	71.2	85.5	90.2	105.5	116.2	88.4	52.9	74.6	69.4	91.9	90.0	69.8
Hutt	61.5	88.2	83.6	98.2	131.6	81.1	43.4	79.4	61.7	84.5	125.0	61.4
Wairarapa	65.4	78.6	80.1	77.8	185.7	78.4	38.4	35.7	65.9	125.0	s	61.3
Nelson Marlborough	60.1	96.0	77.9	91.7	150.0	75.9	39.6	72.7	57.2	88.2	128.6	56.2
West Coast	53.6	s	66.5	s	s	65.0	16.9	s	31.7	s	s	30.5
Canterbury	61.8	83.6	81.7	110.6	112.3	81.4	41.8	68.6	62.7	104.2	112.5	63.5
South Canterbury	76.6	s	77.6	150.0	s	78.1	35.7	100.0	52.2	81.8	s	51.7
Otago	76.3	96.1	84.4	115.1	150.0	85.1	51.7	64.6	65.7	88.0	110.0	65.3
Southland	58.7	65.2	78.8	142.9	75.0	75.9	46.1	47.1	53.4	121.4	s	53.2
New Zealand Total	60.8	84.1	82.7	105.9	110.5	80.3	38.9	67.2	61.1	97.5	102.8	60.3

Source: Ministry of Health. Note: *See methodology section when interpreting these figures. Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue). s: Small numbers preclude calculate rate.

School Stand-Downs, Suspensions, Exclusions and Expulsions

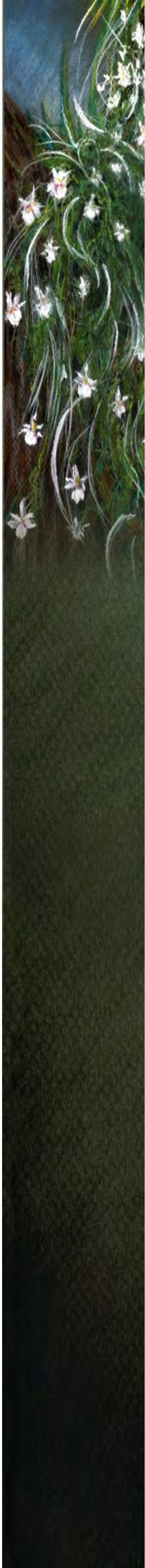
Introduction

Participation in secondary school is vital for academic achievement and factors which cut short or interrupt participation potentially impact on educational outcomes. In New Zealand schools, stand-downs, suspensions, exclusions and expulsions are ways in which the educational system deals with student behaviour that disrupts the learning and wellbeing of other students or staff. These approaches are not used lightly by schools, but are seen as a way of helping students return to productive learning and relationships within the school community [56].

In recent years, the most common reasons for suspensions and exclusions were for issues related to student conduct, including continual disobedience, physical or verbal assaults on staff or other students and for other harmful or dangerous behaviours. In addition, a significant number were suspended or excluded as a result of alcohol, drug use, or cigarette smoking [57]. While for the majority of students a stand-down or suspension was a one off event, with the time spent away from school being fairly limited (e.g. a few days–weeks), both New Zealand and overseas research has suggested that adolescent conduct problems are significantly associated with poorer long term outcomes including educational underachievement (e.g. leaving school early and without qualifications), unemployment and occupational instability during young adulthood [58].

In exploring the determinants of childhood / adolescent conduct problems and how they impact on educational achievement, the Christchurch Longitudinal study noted that [58]:

1. **Determinants of Conduct Problems in Childhood**: Conduct problems in middle childhood were significantly associated with a range of socioeconomic, family and individual factors including young maternal age, lack of maternal qualifications, low parental occupational status, below average living standards, living in a sole parent household or a household with significant conflict, lower IQ and attention problems.
2. **Conduct Problem's Impact on Secondary School Achievement**: In turn, conduct problems during childhood were significantly associated with poorer school achievement in the teenage years (% leaving school <18 yrs with no qualifications). Some, but not all of this association could be explained by the fact that children with conduct problems came from more disadvantaged backgrounds, which in turn was associated with poorer educational performance. Adjusting for these background factors reduced the associations between conduct problems on poorer school achievement from a 4.8 times excess risk to a 1.8 times excess risk (i.e. a significant, albeit reduced risk remained which could not be attributed to these factors).
3. **Conduct Problems and Adolescent Behaviour**: Those with conduct problems in childhood tended to also develop patterns of behaviour during adolescence (e.g. cannabis use, suspension from school and affiliation with peers who used cannabis, tobacco or alcohol, truanted or broke the law) which predisposed to poorer educational outcomes, and once these behavioural patterns were taken also into account, any residual associations between conduct problems and educational achievement disappeared.



The authors thus concluded that while socioeconomic, family and individual factors contributed significantly to the onset of conduct problems during childhood and as a consequence, accounted for a large part of the association between conduct problems and poorer educational achievement in adolescence, a significant amount of the association was also due to the tendency for children with conduct disorders to develop affiliations with delinquent peers and patterns of substance use during adolescence, which reduced their commitment to continuing with their education [58].

The following section, using information from the Ministry of Education, reviews the proportion of students in New Zealand who were stood-down, suspended, excluded or expelled from school during 2000-2006.

Data Source and Methods

Definition

Information in this section is based on two Ministry of Education Student Participation Indicators: Stand-Downs and Suspensions and Exclusions and Expulsions, which are defined as follows:

1. **Stand-Down**: The formal removal of a student from school for a specified period. Stand-downs may not exceed 5 school days in any term or 10 days in any year. Following stand-downs students automatically return to school.
2. **Suspension**: The formal removal of a student from school by the principal until the Board of Trustees decides the outcome at a suspension meeting. Following a suspension, the Board may decide to lift the suspension, with or without conditions, extend the suspension or, in the most serious cases exclude or expel the student.
3. **Exclusion**: The formal removal of a student <16 yrs from school with the requirement that they enrol elsewhere.
4. **Expulsion**: The formal removal of a student 16+ yrs from school. They may enrol at another school.

Data Source

Ministry of Education

Numerator: Stand-Downs, Suspensions, Exclusions and Expulsions, per year of age

Denominator: Number of students on the school roll as at July 1st, per year of age

Indicator Category

Proxy B (**Table 133, Table 134**)

Notes on Interpretation

Data was obtained from the Ministry of Education's Stand-Down and Suspension database, which was developed in July 1999, after the introduction of the Education (Suspension) Rules 1999. Since these regulations introduced stand-downs for the first time, statistics prior to mid-1999 are not comparable. Rates were calculated by dividing the number of stand-downs, suspensions, exclusions or expulsions per individual year of age during the school year / the number of students on the school roll at July 1st, per individual year of age. All figures were then age standardised (by the MOE), so that all subgroups in all years had the same age structure (this was necessary as stand-downs and suspensions are highest amongst those 13-15 years and thus differences in age structure by ethnic group, or over time (e.g. due to differing school retention rates) may have led to artificial differences in rates. As such the standardised rate is an artificial measure, but does provide an estimate of how groups over time might compare if they had the same age distribution [59]. As a number of students were suspended on more than one occasion, the number of individual students suspended may well be less than the number of cases reported in these figures.

School Socioeconomic Decile: See page 92

New Zealand Distribution and Trends

Stand-Downs and Suspensions

In New Zealand during 2005, there were 21,862 stand-downs and 5,154 suspensions, with these events being most likely to occur amongst those aged 13-15 years, males and Māori students. The most common reasons for suspension were the misuse of drugs (29%), continual disobedience (25%) and a physical assault on other students (16%), which together accounted for 69% of all suspension cases (**Table 16**). For most students a stand-down or suspension was a once only event [60].

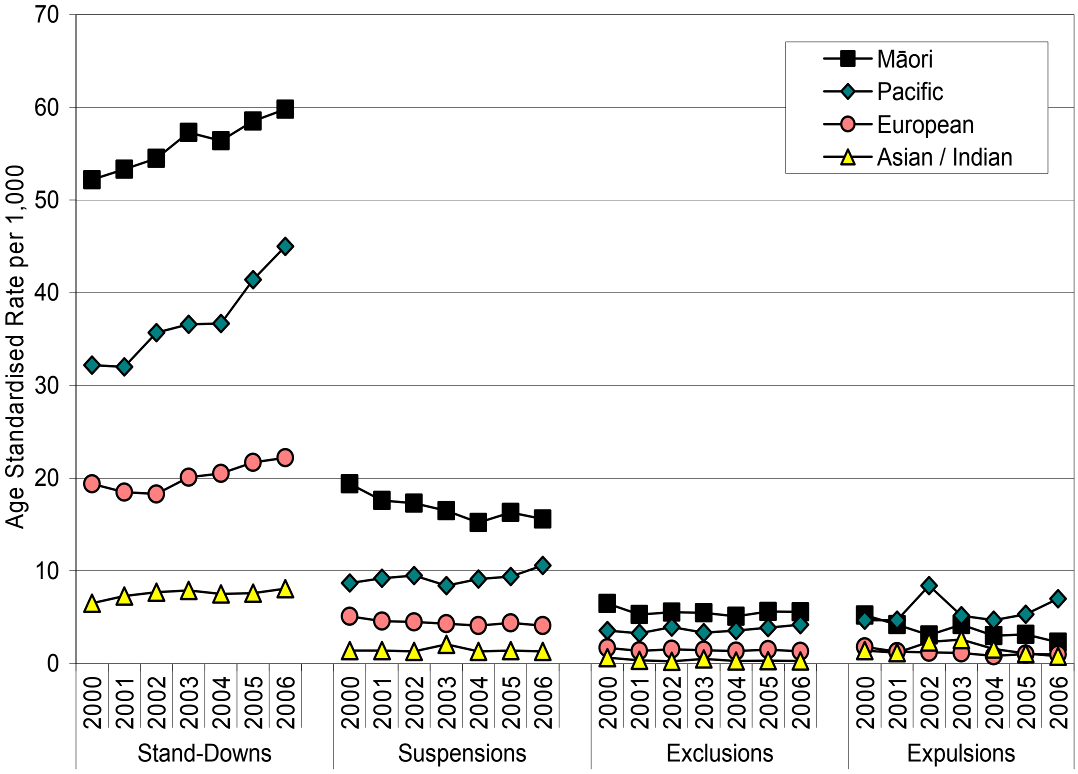
Exclusions and Expulsions

Since 2000, around 30% of suspensions each year have resulted in an exclusion and <3% in an expulsion [60]. During 2005, this resulted in 1,622 exclusions and 141 expulsions, with the main reasons for exclusion being continual disobedience (35.6%), physical assaults on other students or staff (23.0%) and drugs (18.9%). During 2005, exclusions were higher amongst students aged 13-15 years, males, Māori > Pacific > European > Asian students and those in average → more deprived geographic areas

New Zealand Trends

During 2000-2006, the number of suspensions, exclusions and expulsions declined while the number of stand-downs increased. Throughout this period stand-downs, suspensions and exclusions were higher amongst Māori > Pacific > European > Asian/Indian students, while expulsion rates were higher for Pacific > Māori > European and Asian / Indian students (**Figure 38**). The progressive decline in suspension rates for Māori students during this period needs to be seen in the context of a Suspension Reduction Initiative (SRI) which started in 2001. This SRI initially involved working with 86 secondary schools with historically high suspension rates for Māori students, although an additional 24 schools have become involved with the SRI since 2001 and a number of the original schools have left the initiative. It is thought that this SRI may have helped in reducing the overall suspension rate for Māori students by 16% since 2000 [59].

Figure 38. Age Standardised School Stand-Down, Suspension, Exclusion and Expulsion Rates by Ethnicity, NZ 2000-2006



Source: Ministry of Education.

Regional Suspension Rates

In New Zealand during 2006, age standardised suspension rates also varied by region, with rates ranging from 4.7 to 12.6 per 1,000 depending on the region studied (**Table 17**).

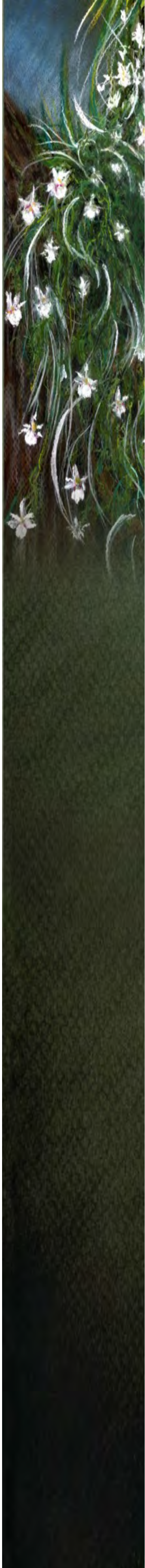


Table 16. Number of Suspensions in State Schools by Type of Behaviour, New Zealand 2005

	Type of Behaviour													
	Alcohol	Arson	Continual Disobedience	Drugs (Including Substance abuse)	Physical Assault[1]	Sexual Harassment Or Misconduct	Smoking	Theft	Vandalism	Verbal Assault[1]	Weapons	Other Harmful or Dangerous Behaviour	Total	Rate per 1,000 students
School Type														
Primary/Special	0	<5	228	106	335	29	9	22	11	80	36	59	918	2
Secondary/Composite	132	41	1,105	1,216	804	49	28	207	97	246	86	223	4,234	15
Gender														
Male	73	39	909	922	861	70	24	178	93	237	107	214	3,727	10
Female	59	5	424	400	278	8	13	51	15	89	15	68	1,425	4
Ethnicity														
Māori	45	16	585	745	554	32	17	93	48	159	52	136	2,482	16
Pacific	11	<5	140	82	181	5	<5	48	28	30	19	31	579	9
European	60	22	550	456	338	37	18	62	29	126	47	98	1,843	4
Asian	9	<5	19	12	22	0	<5	10	<5	<5	<5	3	81	1
Other[2]	7	<5	39	27	44	<5	0	16	<5	10	<5	14	167	12
School Socioeconomic Decile														
1-3 (Most Deprived)	28	14	435	473	407	28	11	58	48	130	60	96	1,788	10
4-7	84	26	707	655	588	35	22	118	38	157	48	146	2,624	9
8-10 (Most Affluent)	20	<5	190	194	144	15	<5	53	22	39	14	40	739	3
Total[3]	132	44	1,333	1,322	1,139	78	37	229	108	326	122	282	5,152	7

Source: Ministry of Education. Note: Suspensions are not age standardised. 1: Assault on students or staff. 2: Rates for students in “Other” ethnic group was anomalously high in 2005 as some schools classify students receiving exclusions as `Other' when on the school roll they appear in another ethnic group. 3: Includes schools with no decile assigned.

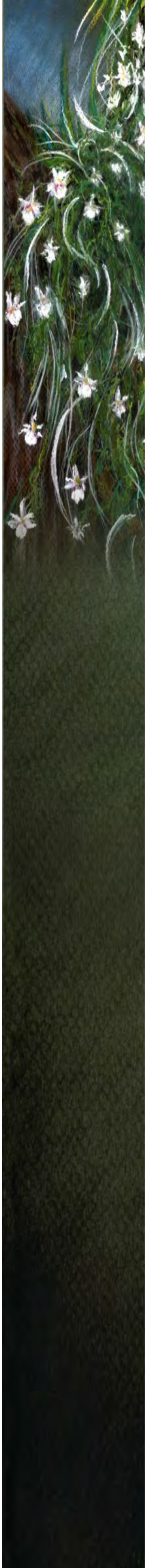
Table 17. Age Standardised School Suspension Rates per 1,000 by DHB and Ethnicity, New Zealand 2006

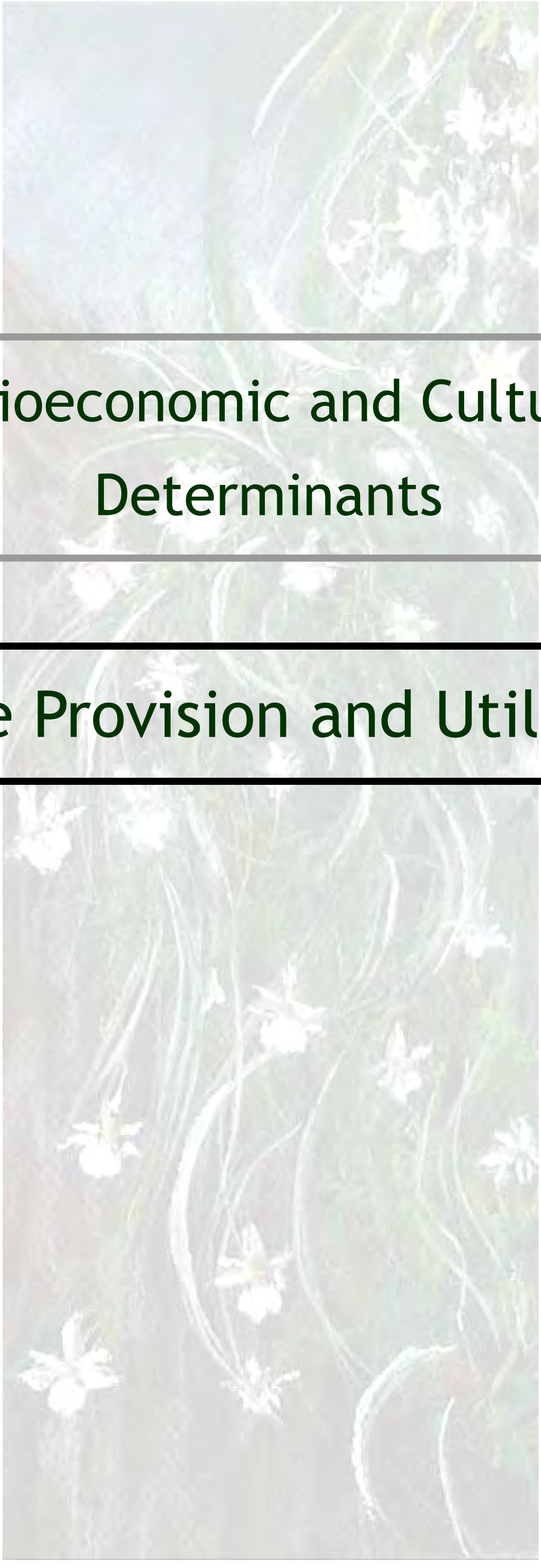
DHB	Māori	Pacific	European	Asian	Total
Northland	15.3	28.1	4.9	s	10.2
Waitemata	15.8	12.6	4.4	0.7	6.3
Auckland	11.4	11.7	3.1	1.0	6.0
Counties Manukau	11.4	9.3	3.3	1.6	6.4
Waikato	14.9	10.4	4.2	s	7.4
Lakes	16.7	20.7	3.2	s	10.0
Bay of Plenty	19.4	12.4	2.4	s	8.4
Tairawhiti	15.3	s	2.7	s	10.6
Taranaki	16.5	s	3.6	s	6.4
Hawkes Bay	12.4	10.7	2.9	s	6.2
Whanganui	21.3	14.7	6.3	s	10.3
MidCentral	26.5	s	4.8	s	12.6
Hutt	12.2	6.3	2.8	s	4.7
Capital and Coast	19.5	12.0	3.8	s	7.8
Wairarapa	27.7	30.3	6.5	s	11.4
Nelson Marlborough	16.4	s	4.6	s	6.3
West Coast	16.2	s	9.3	s	10.7
Canterbury	13.9	9.3	4.3	2.0	5.4
South Canterbury	15.4	s	7.3	s	8.1
Otago	8.2	s	4.7	s	4.9
Southland	18.7	s	4.6	s	6.7
New Zealand Total	15.6	10.6	4.1	1.3	7.0

Note: s: Small numbers preclude rate calculation. Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue). Source: Ministry of Education.

Summary

Participation in secondary school is vital for academic achievement and factors which cut short or interrupt participation potentially impact on educational outcomes. In New Zealand schools, stand-downs, suspensions, exclusions and expulsions are ways in which the educational system deals with student behaviour that disrupts the learning and wellbeing of other students or staff. In New Zealand during 2000-2006, the number of suspensions, exclusions and expulsions has declined, while the number of stand-downs has increased. The main reasons for suspensions and exclusions were continual disobedience, physical assaults on other students or staff and drug use, with higher rates being reported amongst secondary school students, those aged 13-15 years, males and Māori students. In addition, during 2006 there were large variations in suspension rates across regions. In part, some of the decline in suspension rates during 2000-2006 may be due to the Suspension Reduction Initiative, which has operated since 2001 in a number of secondary schools with historically high suspension rates.





Socioeconomic and Cultural Determinants

Service Provision and Utilisation

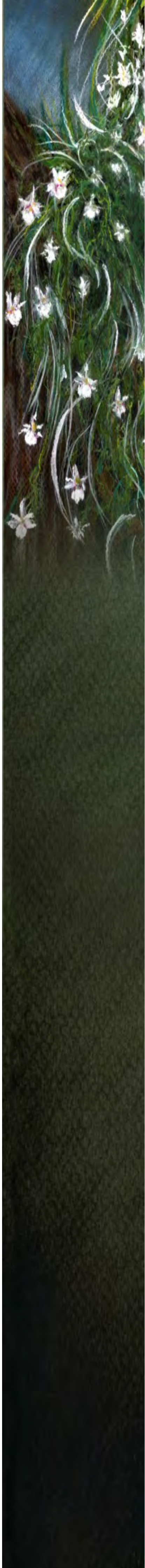
Primary Health Care Provision and Utilisation

Introduction

The Ministry of Health defines primary health care as essential healthcare based on practical, scientifically sound, culturally appropriate and socially acceptable methods that is universally acceptable to people in their communities, involves community participation, is integral to, and a central function of, New Zealand's health system, and is the first level of contact within our health system [61]. Primary health care covers a broad range of services, not all of which are Government funded, and includes: working with community groups to improve the health of the people within communities; health improvement and preventive services such as health education and counselling, disease prevention and screening; generalist first-level services such as general practice, mobile nursing, community health and pharmacy services; and first-level services for conditions such as maternity, family planning and sexual health services, dentistry, physiotherapy, chiropractic and osteopathy services, traditional healers and alternative healers. Access to high quality primary health care is associated with better health outcomes, improved preventive care, and reduction in hospitalisations [62]. In addition to these benefits, continuity of care has been associated with patients who feel more able to take care of themselves in the future, better recognition of problems, less recourse to medication as a first line treatment, and improved compliance with prescribed medication [61]. Provision of primary care has also been associated with lower total health service costs [61, 62].

New Zealand's Primary Health Care Strategy identifies a strong primary health care system as being central to improving the health of New Zealanders and tackling inequalities in health [61]. Its vision is for people to become a part of local primary health care services that improve their health, are easy to get to, and that co-ordinate their ongoing care. This vision involves a new direction for primary health care with a greater emphasis on population health and the role of the community and which includes a shift to funding based on population needs rather than fees for service. Primary Health Organisations (PHOs) form the local structure to achieve this vision and comprise general practitioners, primary care nurses, and other health professionals such as Māori health providers and health promotion workers working together in groups. The first PHOs were formed in mid-2003 and by late 2004 over 95% of New Zealanders were notionally enrolled with a PHO through their general practitioners [63]. Enrolment with a PHO is voluntary however people are encouraged to enrol with a PHO in order to gain the benefits of a population approach to primary care and to improve the continuity and co-ordination of the care they receive.

PHOs are not for profit organisations funded by District Health Boards for the provision of services to those people who are enrolled. They receive a monthly amount per capita for those enrolled with their practice regardless of whether the person is seen or not. Extra funding is available through the care plus programme to provide care for people with chronic disorders, to improve access, and for health promotion [63]. Providers with more than 50% of those enrolled considered high need (defined as Māori and Pacific peoples, or people resident in areas with a NZDep decile of 9 or 10) receive funding under the 'access' capitation formula and offer reduced consultation fees [63, 64]. Providers serving less needy populations receive funding according to an 'interim' formula which includes subsidies which are increasing incrementally by age group to match 'access' funding. This funding strategy was designed to target



increased Government spending on primary health care at higher need populations first. By mid-2007 a single capitation formula will be used for all PHOs.

This section will explore three aspects of primary health care provision and utilisation: enrolment with a PHO, general practitioner (GP) visits foregone, and Well Child Tamariki Ora services.

Data Source and Methods

Definition

1. Primary Health Organisation Enrolment: Children and young people enrolled with a PHO by ethnicity, NZDep, and DHB
2. General Practice Visits Foregone: Children and young people who have foregone a visit with a GP by age group and reason.
3. Well Child Tamariki Ora Scheduled Visits in Children enrolled with Plunket

Data Source

1. *Primary Health Organisation Enrolment*

Numerator: NZHIS PHO Enrolment Collection: Number of children and young people enrolled with a PHO
Denominator: NZ Census 2006: Number of children and young people in New Zealand

2. *General Practice Visits Foregone*

Numerator: New Zealand Health Survey: Children and young people for whom the answer was "Yes" to the following question: "In the last 12 months, has there been any time you need to see a general practitioner but weren't able to".

New Zealand Living Standards Survey: Children for whom the answer was "Yes" to the following question: "In the last 12 months have you postponed or put off visits to the doctor to help keep down costs?"

Interpretation: Note that the questions regarding GP visits foregone differs between the two survey measures, therefore rates will not be directly comparable.

3. *Well Child Tamariki Ora Scheduled Visits in Children enrolled with Plunket*

Numerator: Plunket Client Information System
Denominator: Live Births in 2006 and Children enrolled with Plunket in 2006
Interpretation: In the absence of a national register of Tamariki Ora Well Child contacts, available data for children enrolled with Plunket is reported in this section. Proportion attending visits is the proportion of those enrolled with Plunket and who were old enough to receive a core visit at that age. If children are older than the age specified for a core contact when they attend that visit, then they are not recorded as having had that core visit on the PCIS.

Primary Health Organisation Enrolment

There are currently 81 PHOs in New Zealand. Enrolment of children and young people with a PHO is voluntary. Patients can consult with any general practitioner without enrolling in a PHO but are likely to pay a higher consultation fee. During October-December 2006, 98.2 % of children 0-14 years and 92.9% of young people aged 15-24 years were enrolled with a PHO.

In the last quarter of 2006, children aged <1 year of age had the lowest PHO enrolment rate (75.0%). Enrolment rates were lower in young people than in children, dropping from close to 100% in those aged 1-9 years old, to 91.8-94.8% in 20-24 year old women and 83.9-89.1% in 20-24 year old men. Prior to age 16 years, PHO enrolment rates in males and females were similar (**Figure 39**). In addition, at this time, PHO enrolments were higher in Pacific > European > Māori > Asian/Indian children and young people. Enrolment rates were lowest in Asian/Indian young people 15-24 years (54.4%) (**Figure 40**).

Figure 39. Proportion of Children and Young People 0-24 Years Enrolled with a PHO by Age and Gender, New Zealand October-December 2006

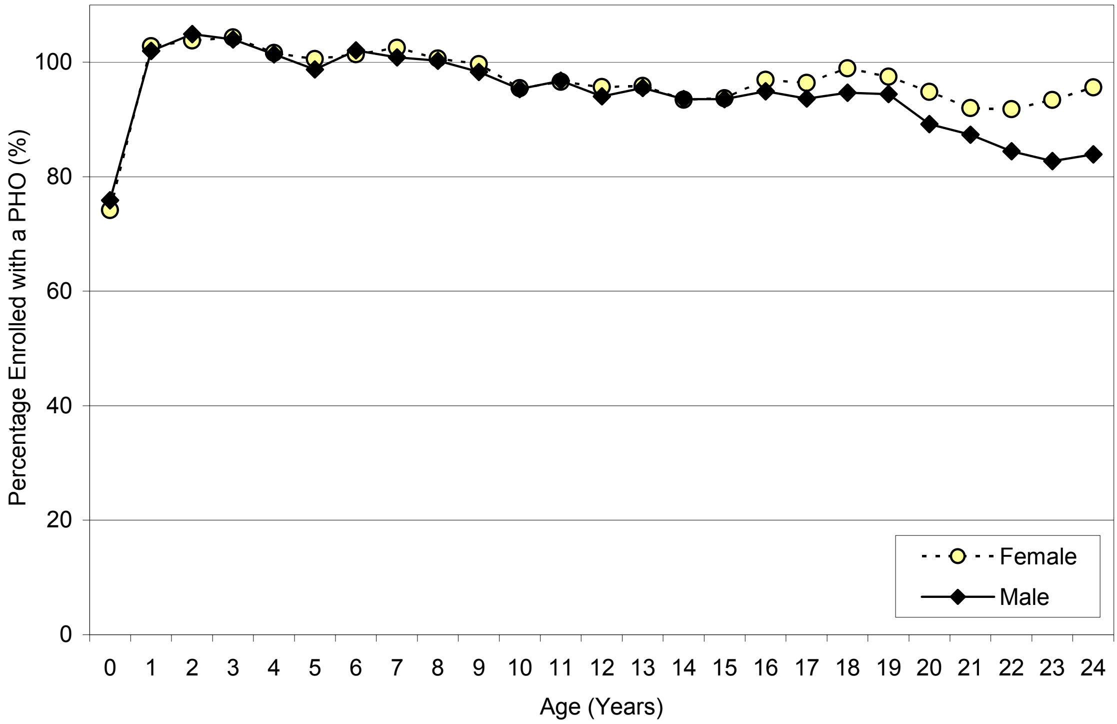
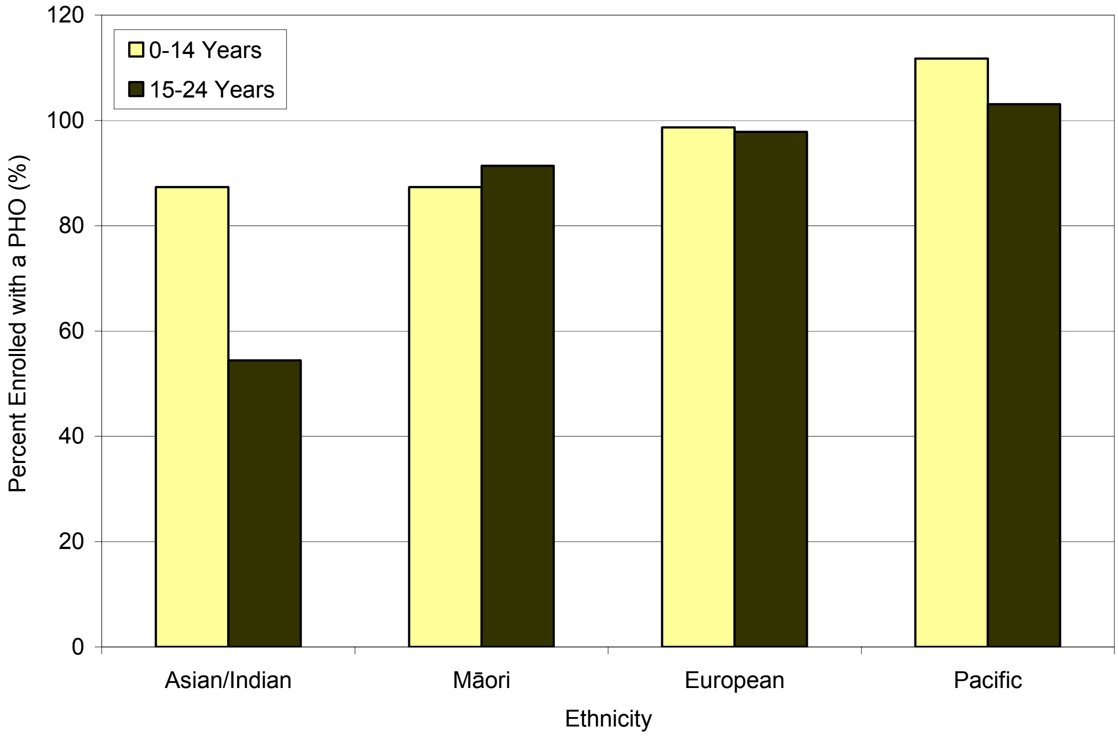
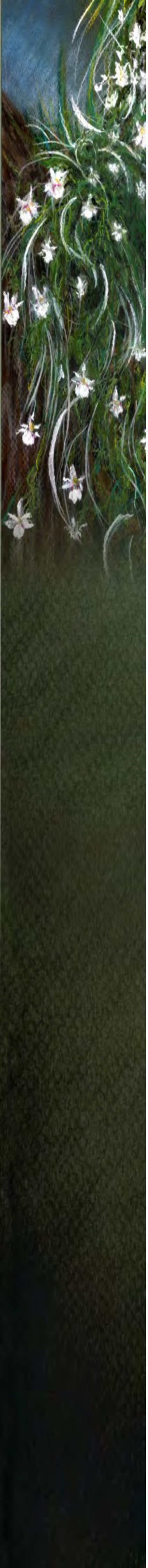


Figure 40. Proportion of Children and Young People 0-24 Years Enrolled with a PHO by Age and Ethnicity, New Zealand 2006





Unmet Need for General Practitioner Services

Survey data on general practice utilisation suggest that people with low incomes or living in deprived areas are more likely to be frequent users of general practitioner services[65, 66]. These same surveys suggest there are barriers to accessing general practitioner care with a higher proportion of Māori and Pacific peoples, people residing in deprived areas, and young people aged 15-24 years reporting a time in the last 12 months when they needed to see a GP but did not. The proportion of those reporting an unmet need for GP services was lowest in the under 15 age group and highest in the 15-24 year old age group [65, 66] (**Table 18**).

The most common single reason caregivers gave for their child not seeing a GP was cost, although a range of other reasons were also important such as lack of transport or inability to get an appointment soon enough or at a suitable time[66]. The most frequently reported reasons for not seeing a GP when needed in young people were cost (53%), could not be bothered (27%) and unable to get an appointment at a suitable time (20%)[65].

Table 18. Unmet need for General Practitioner Services in Children and Young People, New Zealand 1996-2004

	New Zealand Health Survey					
	1996/97 [66]			2002/03 [65]		
Age Group	*Number	%	95% CI	*Number	%	95% CI
Children 0-14 yrs	1,019	6.4	4.2-8.6			
Males 15-24 yrs	NR	16.9	12.2-21.6	NR	13.1	9.0-17.2
Females 15-24 yrs	NR	20.8	15.9-25.7	NR	18.0	13.7-22.3
Total 15-24 yrs	1,050	18.8	15.5-22.1			
	New Zealand Living Standards Survey [67]					
	2000			2004		
Age Group	*Number	%	95% CI	*Number	%	95% CI
Children 0-17 yrs	NR	10	NR	NR	13	NR

Notes: *Number indicates number surveyed. NR: Not Reported. Questions asked by each Survey varied, see methodology section for details.

Well Child Tamariki Ora Services

Well Child care is a term used to describe a screening, surveillance, education and support service offered to all New Zealand children from birth to five years and their family or whanau [68]. Ensuring access to appropriate child health care services including Well Child and family health care and immunisation is one of the 13 population health strategies outlined in the New Zealand Health Strategy [69]. In 2002, in order to achieve this goal, the Ministry of Health developed a Well Child Framework within which Well Child services are provided by general practitioners, registered nurses and community health workers (kaiawhina) with specific training in child health [70]. In 2006 the Ministry of Health commenced a review of the Well Child Framework. The purpose of the review is to evaluate the implementation of the Framework, to consider future directions and to improve linkages with primary health care and other related services.

The current Tamariki Ora Well Child Framework includes 12 health checks, with 8 of these offered to children aged from 4 weeks to 5 years, with the capacity to offer first time parents and families requiring extra support additional contacts (Appendix 10). To date there is no national register of Well Child contacts therefore the proportion of children who receive each scheduled contact is unknown. From birth to 4-6 weeks Well Child services are provided by Lead Maternity Carers, and then by a Well Child Provider from 4-6 weeks to 4½ years of age [71]. This section summarises data on Well Child Tamariki Ora services offered by Plunket.

New Zealand Distribution and Trends

Well Child Scheduled Visits in Children enrolled with Plunket

Plunket is contracted by the Ministry of Health to provide Well Child Services as specified in the Well Child Framework and provides two types of contacts: core and additional contacts. Plunket offer eight core contacts which include clinical assessment, health promotion and parent education and in 2006 were funded to provide an average of 6.5 core visits per child. Additional contacts are also available from Plunket as part of the Well Child Framework for families who live in areas of greater socio-economic deprivation and to all first time parents.

In 2006, 90.3% of infants born in New Zealand were enrolled with Plunket. Enrolment with Plunket occurred more frequently in infants living in more affluent areas (NZ Derivation index Decile 1-4), and in European > Pacific > Māori Infants (**Table 19**).

The proportion of children enrolled with Plunket who attend each Core visit increases from 65% for Core 1, scheduled at <6 weeks, to 90% for Core 4, scheduled at 5 months. However, many infants receive their first Well Child check from their Lead Maternity Carer, at <6 weeks of age, and are not enrolled with Plunket until after this is completed. The proportion of children who attend each Core visit then declines with age to 60% at Core 8 (3 years) (**Figure 41**). Plunket are not currently funded to provide 8 core visits to every child who is enrolled with them, although the number of visits funded has been increased in recent years.

The proportion of Plunket enrolled children who attend the Core visits offered in the first year of life (Core 1-5) is higher in European/Other > Pacific > Māori. A modest social gradient is evident with those living in more deprived areas less frequently attending each visit (**Figure 42**). Despite these trends, over 75% of Māori and Pacific infants enrolled with Plunket attend Core 2 – Core 5 in their first year of life.

Table 19. New Baby Enrolments with Plunket, New Zealand 2006

NZ Deprivation Index			Ethnicity		
Decile	Number	% NZ Births		Number	% NZ Births
1-4	19913	102.4	Māori	11832	66.0
5-7	15439	90.5	Pacific	5589	87.2
8-9	11498	77.5	European/Other	34078	94.8
10	6714	78.5	Total	54410	90.3

Of those children enrolled with Plunket who had their first birthday in 2006, 77% had attended 4 or 5 of their scheduled 5 Well Child Core visits, and 98% had attended 2 or more Core visits. A modest social gradient was evident in these children with 94% of those living in the most affluent areas (NZ Deprivation decile 1) attending 3 or more visits compared with 85% of those living in the most deprived areas (NZ Deprivation decile 10) (**Figure 43**). However, those living in the more deprived areas are eligible to receive additional visits and, on average, received a greater total number of Well Child visits (Core and Addition) than those living in the most affluent areas (**Figure 44**).

Figure 41. Proportion of Children Enrolled with Plunket Attending Well Child Visits by Core Visit, Plunket Client Information System as at Dec 2006

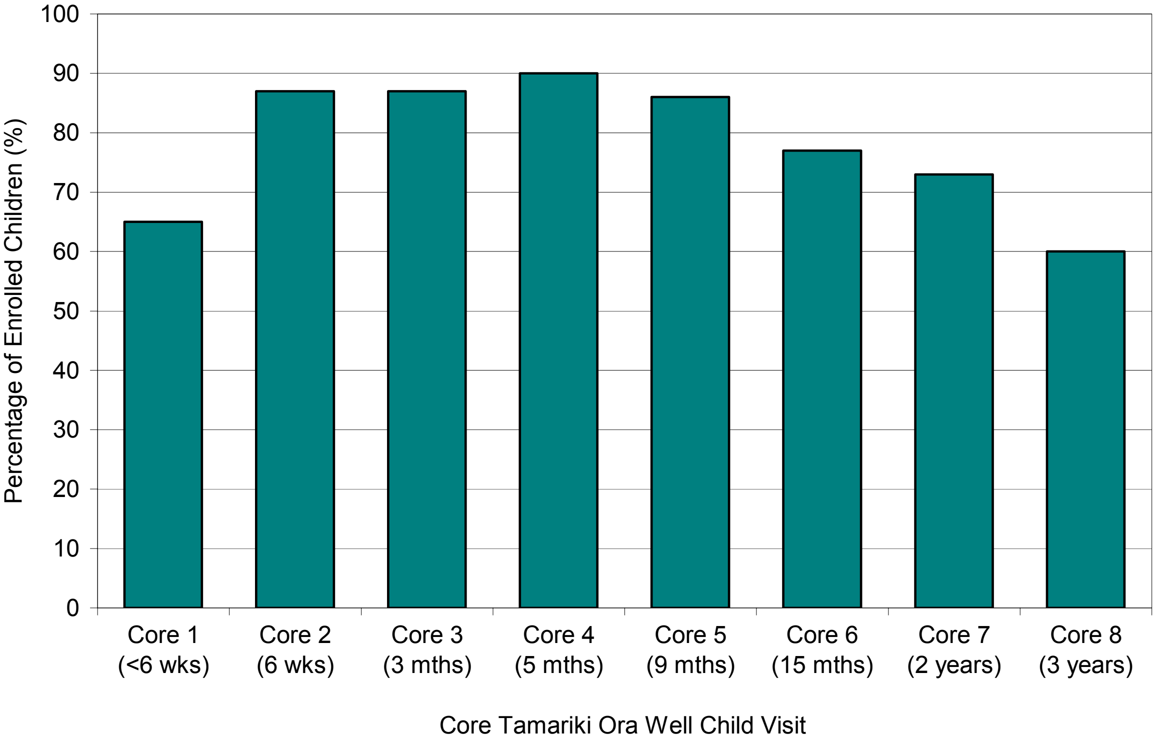


Figure 42. Proportion of Children Enrolled with Plunket Attending Tamariki Ora Well Child Visits 1-5 by Ethnicity and NZ Deprivation Index, Plunket Client Information System 2006

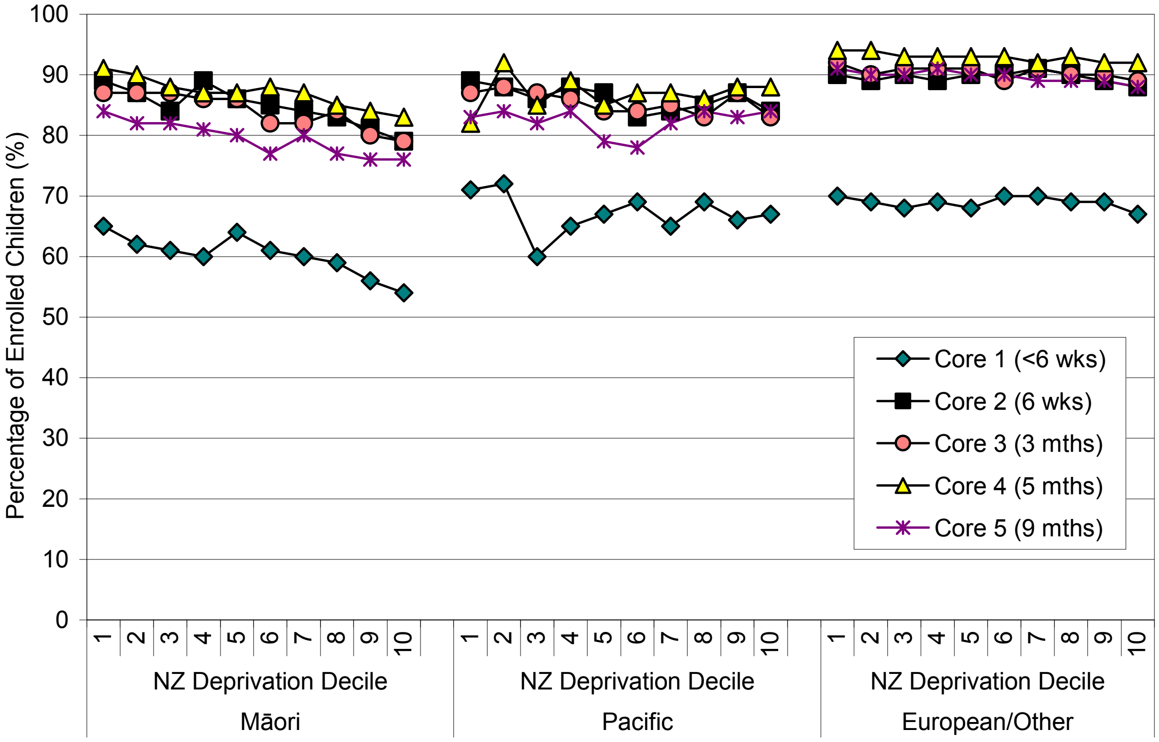
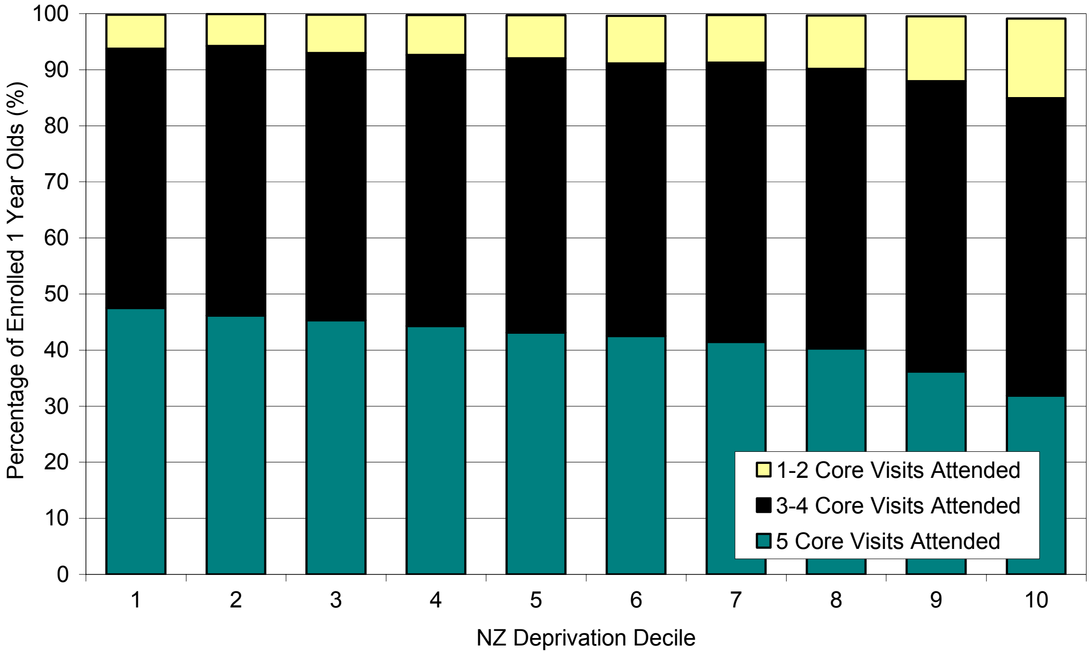
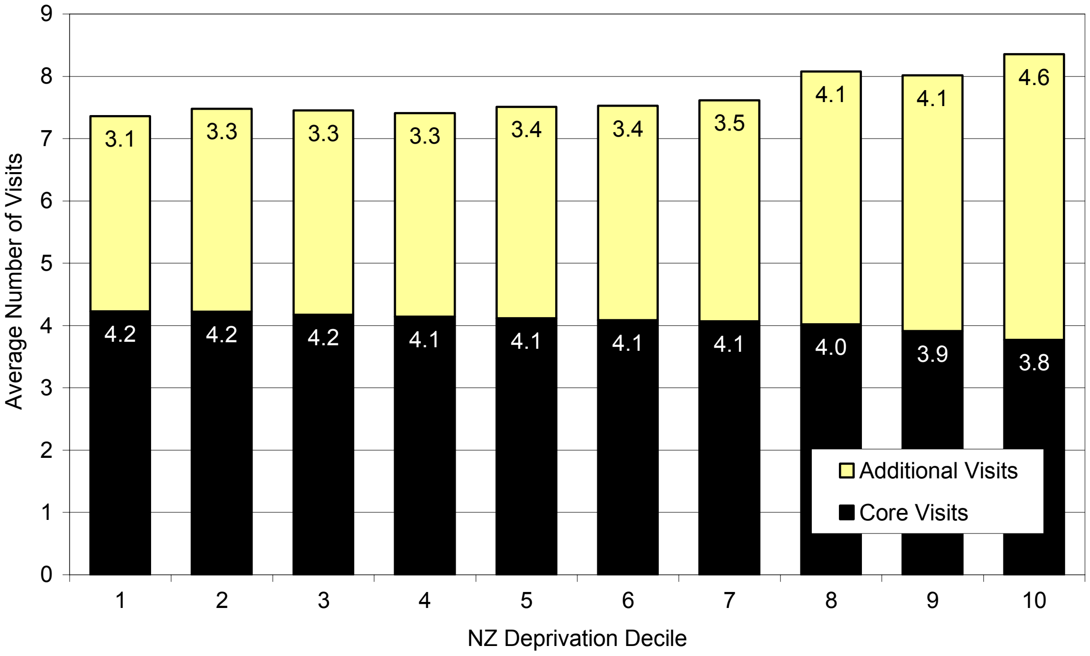


Figure 43. Number of Core Well Child Visits Undertaken by 1 Year Old Children Enrolled with Plunket during 2006 by NZ Deprivation Index Decile, Plunket Client Information System 2006



Note: In the first year of life children are offered 5 Core visits

Figure 44. Average Number of Well Child Core and Additional Visits Undertaken by 1 Year Old Children Enrolled with Plunket during 2006 by NZ Deprivation Index Decile, Plunket Client Information System 2006



Note: Additional visits are available for families who live in areas of greater socio-economic deprivation and to all first time parents

Summary

Access to high quality primary health care is associated with better health outcomes, improved preventive care, and reduction in hospitalisations. In addition to these benefits, continuity of care has been associated with patients who feel more able to take care of themselves in the future, better recognition of problems, less recourse to medication as a first line treatment, and improved compliance with prescribed medication. A strong primary health care system is central to improving the health of New Zealanders and tackling inequalities in health. Primary Health Organisations (PHOs) have become the primary vehicle through which first-level health services are accessed

Enrolment with a PHO is voluntary, however confers the benefits of continuity of care and is likely to be associated with lower consultation costs. In 2006, 98% of children and 93% of young people were enrolled with a PHO. The lowest enrolment rates were seen in children aged <1 year old (75%), and in Asian/Indian young people aged 15-24 years (54%). Survey data regarding the ability to consult with a general practitioner when required suggests that up to 13% of children and 20% of young people have experienced an unmet need. The most common barrier to accessing a GP in children and young people was cost.

Participation in Well Child visits is optional, but recommended by the New Zealand Ministry of Health. No register of Well Child visits exists; therefore the proportion of New Zealand children who attend Well Child visits is unknown. Plunket is the leading Well Child Provider in New Zealand and enrols over 90% of infants born in New Zealand. Of those children enrolled with Plunket, and who turned 1 year old in 2006, 98% had attended at least 2 Core Visits, and 77% had attended 4 or 5 of the 5 Core visits scheduled for their first year of life. Of those children enrolled with Plunket, Māori and Pacific children and those living in the more deprived areas are less likely to attend core Well Child visits, with participation also decreasing with increasing age. Those living in the most deprived areas, however, attend more additional visits, and on average receive a greater total number of Well Child visits than those living in more affluent areas. The Well Child Framework is currently under review with a view to evaluating its implementation, and considering future directions and improvement of linkages with primary health care and other related services.

Risk and Protective Factors

Risk and Protective Factors

Nutrition, Growth and Physical Activity

Breastfeeding

Introduction

Breastfeeding meets a term infant's nutritional needs for the first 4-6 months of life, as well as providing protection against conditions such as diarrhoea, respiratory infections, otitis media, SIDS, diabetes, Crohn's disease, asthma and atopy [72]. The WHO recommends "*exclusive breastfeeding for 6 months, with the introduction of complementary food and continued breastfeeding thereafter"* (WHO 2001).

In 1999 the Ministry of Health adopted the following breastfeeding definitions [73].

Exclusive	The infant has never had, to the mother's knowledge, any water, formula or other liquid or solid food. Only breast milk, from the breast or expressed, and prescribed medicines have been given from birth.
Fully	The infant has taken breast milk only and no other liquids or solids except a minimal amount of water or prescribed medicines, in the past 48 hours (matches WHO exclusive rate indicator)
Partial	The infant has taken some breast milk and some infant formula or other solid food in the past 48 hours.
Artificial	The infant has had no breast milk but has had alternative liquid such as infant formula, with or without solid food in the past 48 hours.

Using these definitions and in line with WHO recommendations, in 2002 the Ministry of Health set the following breastfeeding targets for New Zealand [73]:

1. Increase exclusive/full breastfeeding at 6 weeks to 74% by 2005 and 90% by 2010
2. Increase exclusive/full breastfeeding at 3 months to 57% by 2005 and 70% by 2010
3. Increase exclusive/full breastfeeding at 6 months to 21% by 2005 and 27% by 2010

While to date New Zealand's breastfeeding rates have compared favourably with other OECD countries, they remain below the MOH's 2002 targets and in addition, are consistently lower for Māori and Pacific women [73]. While breastfeeding rates are high at birth they often decline significantly thereafter, with barriers to meeting breastfeeding targets including paternal attitudes, socioeconomic factors, returning to work, lack of workplace support, poor initiation of breastfeeding, and perceived inadequate milk supply [73]. At a DHB level, one of the key initiatives to promote breastfeeding is the "Baby Friendly Hospital Initiative" which aims to encourage hospitals and health care facilities to adopt practices that fully protect, promote and support exclusive breastfeeding from birth.

Data Source and Methods

Definition

1. Exclusive / Full Breastfeeding Rates at <6 weeks, 3 months and 5 months
2. Breastfeeding Rates at 2 weeks of age

Indicator Category

Proxy C (**Table 133, Table 134**)

Data Source and Interpretation

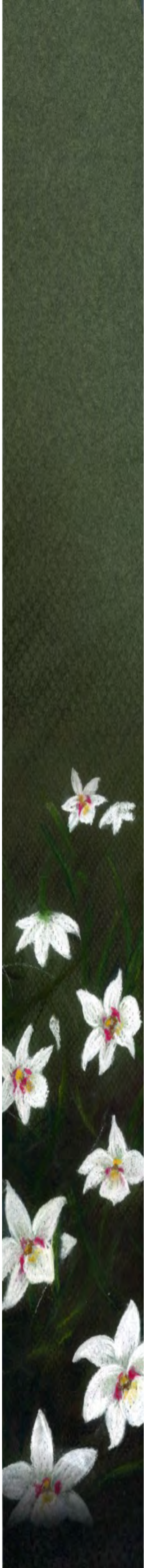
1. Exclusive / Full Breastfeeding Rates at <6 weeks, 3 months and 5 months

Plunket Client Information System

Numerator: The proportion of babies who were exclusively / fully breastfed at <6 wks (2 wks - 5 wks, 6 days), 3 months (10 wks - 15 wks, 6 days) and at 6 months (16 wks - 7 months, 4 wks).

Denominator: The number of babies in contact with Plunket at these ages

Interpretation: Plunket currently enrol more than 88% of the new baby population, although Māori and Pacific mothers may be under-reported in these samples. Plunket have breastfeeding data dating back to 1922, with more detailed information being available in recent years.



2. Breastfeeding Rates at 2 weeks of age
Lead Maternity Carer (LMC) claims data, Maternal and Newborn Information System (MNIS)
Numerator: The number of babies who were breastfed at 2 weeks of age by type of feeding
Denominator: The total number of babies recorded using LMC claims data
Interpretation: The information on breastfeeding at two weeks of age was obtained from the Report on Maternity 2003, which derives its data from the MNIS (via claims submitted to HealthPAC by LMCs). This data should be interpreted with caution due to variations in the total number of babies counted (e.g. due to duplicate records and baby numbers). In addition, during 2003 the breastfeeding status of 15% of babies was unknown)[74].

New Zealand Distribution and Trends: Plunket Data

Breastfeeding rates in New Zealand were high during the 1920s and 1930s. Progressive declines during the 1940s, 1950s and 1960's however, saw rates reach a nadir in the late 1960s. Following a rapid recovery during the 1970s and early 1980s, rates reached a plateau in the late 1990s and thereafter have remained relatively static (**Figure 45**).

During 1999-2006, while the proportion of babies who were exclusively / fully breastfed at < 6 weeks remained relatively static, there were small increases in the proportion of babies still breastfed at 3 and 6 months (**Figure 46**). During June 2005-2006, breastfeeding rates at <6 weeks were highest amongst European / Other women and lowest amongst Asian women. At 3 and 6 months however, breastfeeding rates were highest for European / Other women and lowest for Māori women, with a marked tapering off in exclusive / full breastfeeding rates for all ethnic groups as infants age increased. Thus during 2005-2006, none of New Zealand's largest ethnic groups achieved the MOH's 2005 breastfeeding targets of 74% at 6 weeks, although European / Other women achieved the MOH's target of 57% at 3 months and Asian and European / Other women achieved the target of 21% at 6 months of age (**Figure 47**).

Figure 45. Percentage of Babies Who Were Breastfed (Any Breastfeeding) at the Time of First Contact with Plunket, New Zealand 1922-2006

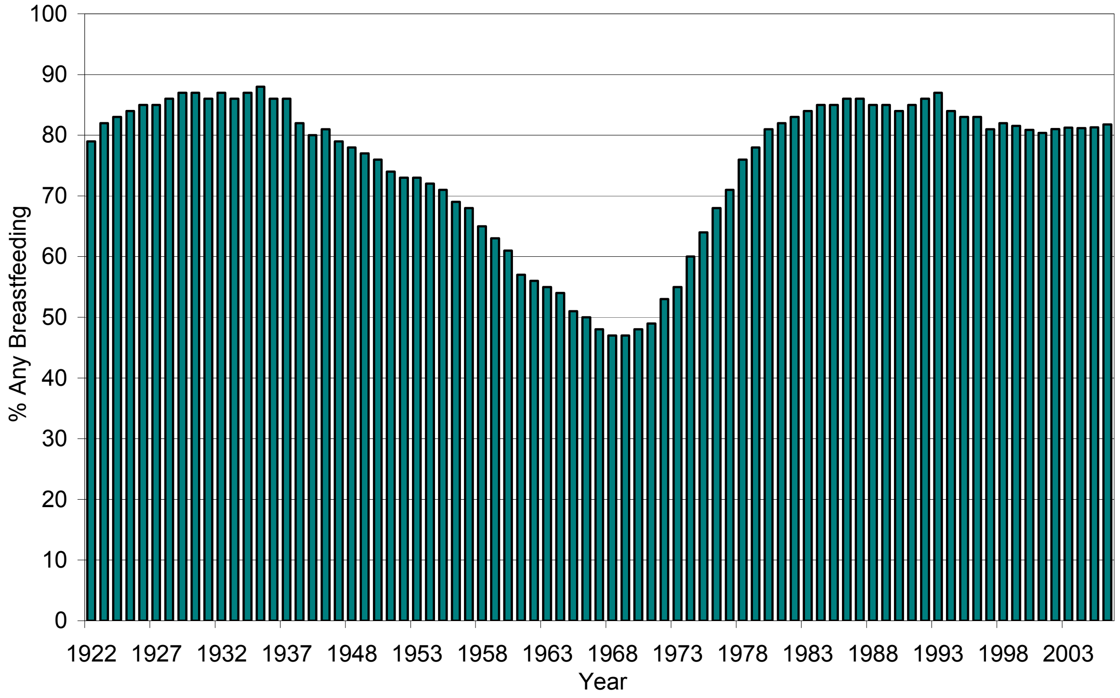


Figure 46. Percentage of Plunket Babies who were Exclusively or Fully Breastfed at <6 Weeks, 3 Months and 6 Months, New Zealand 1999-2006

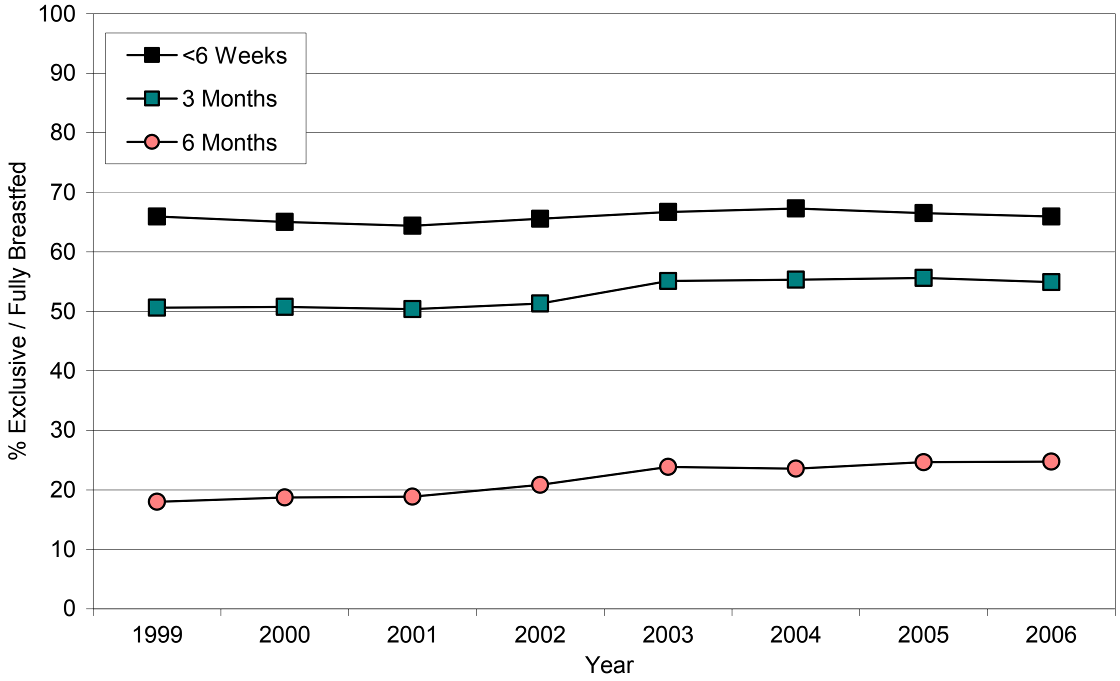
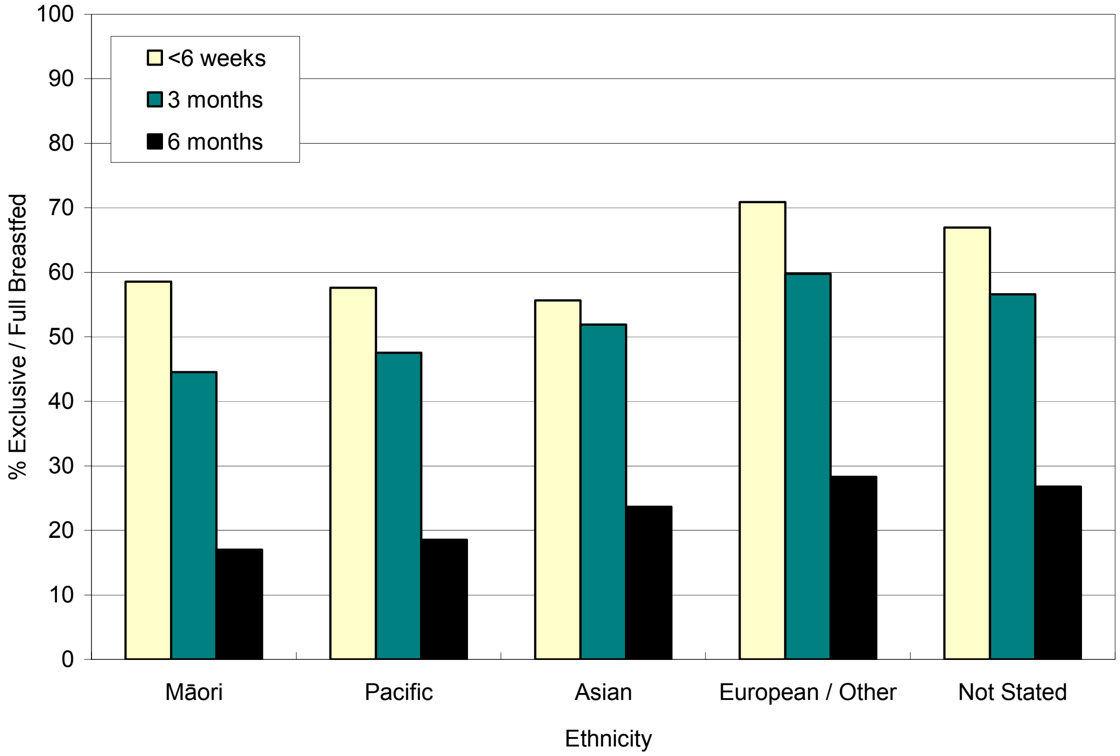


Figure 47. Percentage of Plunket Babies Who Were Exclusively or Fully Breastfed by Age and Ethnicity, New Zealand Year Ending June 2006



In the year ending June 2006, there were marked socioeconomic disparities in the proportion of babies exclusively or fully breastfed, with rates at all three ages being higher for babies living in Decile 1-4 (the most affluent) > Decile 5-7 > Decile 8-9 > Decile 10 (the most deprived) areas (**Figure 48**). In addition, there was considerable regional variation in breastfeeding rates during this period (**Table 20**).

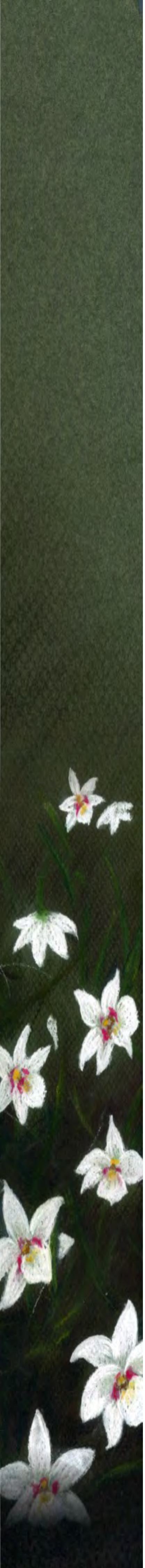


Figure 48. Percentage of Plunket Babies who were Exclusively or Fully Breastfed by Age and NZ Deprivation Index Decile, New Zealand Year ending June 2006

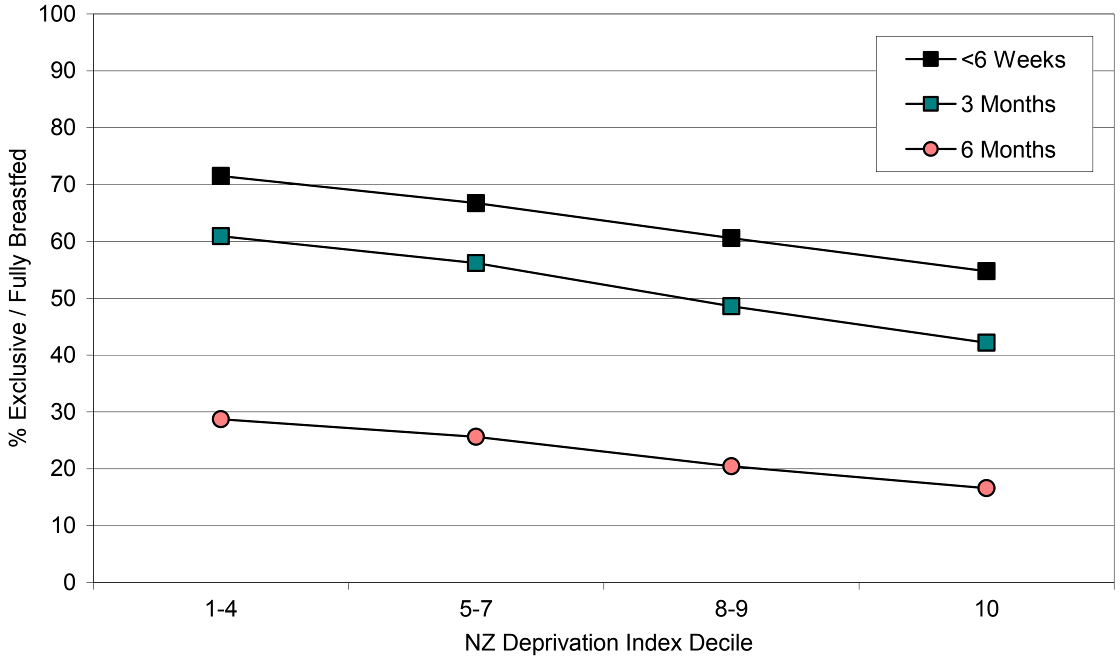


Table 20. Percentage of Plunket Babies Who Were Exclusively or Fully Breastfed at <6 Weeks by Ethnicity and DHB, New Zealand Year Ending June 2006

DHB	Māori	Pacific	European/Other	Asian
Northland	63.2	s	78.0	s
Waitemata	66.3	66.1	71.8	57.4
Auckland	61.6	58.2	76.5	54.9
Counties Manukau	48.5	52.3	65.3	47.5
Waikato	57.4	63.0	75.8	51.7
Lakes	67.6	s	75.9	s
Bay of Plenty	63.7	s	73.2	s
Tairawhiti	61.9	s	78.4	s
Taranaki	59.9	s	67.3	s
Hawkes Bay	60.0	s	75.4	s
Whanganui	52.5	s	62.7	s
MidCentral	62.6	s	63.4	s
Hutt	51.4	52.5	64.0	65.3
Capital and Coast	58.7	59.5	73.7	59.7
Wairarapa	60.7	s	66.8	s
Nelson Marlborough	62.6	s	72.4	s
West Coast	76.3	s	62.9	s
Canterbury	60.0	59.1	69.5	60.4
South Canterbury	58.7	s	67.0	s
Otago	56.1	s	72.4	s
Southland	60.8	s	68.8	s
New Zealand	58.6	57.6	70.9	55.7

Note: Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue). s: Small numbers preclude rate calculation.

Breastfeeding at Two Weeks of Age: LMC Claims Data

Breastfeeding status at two weeks of age has been a mandatory reporting field in Lead Maternity Carer's (LMC's) claim forms since 2002. During 2004, over 2/3's of babies for whom data was collected were either exclusively or fully breastfed at two weeks of age. Exclusive / Full breastfeeding rates varied with maternal age (**Table 21**), region (**Table 24**) and ethnicity during this period, with 74.2% of Māori , 72.0% of Pacific and 70.0% of Asian mothers for whom this information was available either exclusively or fully breastfeeding at 2 weeks of age as, compared to 82.4% of European mothers (**Table 22, Table 23**).

Table 21. Number and Percentage of Babies Breastfed at Two Weeks of Age by Maternal Age Group, New Zealand 2004

Maternal Age (Yrs)		Exclusive	Full	Partial	Artificial	Not Stated	Total
<16	No.	24	<5	8	15	13	63
	%	38.1	s	12.7	23.8	20.6	100.0
16-19	No.	1,022	209	229	398	386	2,244
	%	45.5	9.3	10.2	17.7	17.2	100.0
20-24	No.	3,464	655	581	750	1,186	6,636
	%	52.2	9.9	8.8	11.3	17.9	100.0
25-29	No.	5,326	881	791	783	1,540	9,321
	%	57.1	9.5	8.5	8.4	16.5	100.0
30-34	No.	7,329	1,138	1,077	829	1,897	12,270
	%	59.7	9.3	8.8	6.8	15.5	100.0
35-39	No.	3,993	627	690	437	1,121	6,868
	%	58.1	9.1	10.0	6.4	16.3	100.0
40+	No.	879	175	207	117	300	1,678
	%	52.4	10.4	12.3	7.0	17.9	100.0
Not Stated	No.	3,901	637	583	603	405	6,129
	%	63.6	10.4	9.5	9.8	6.6	100.0
Total	No.	25,938	4,325	4,166	3,932	6,848	45,209
	%	57.4	9.6	9.2	8.7	15.1	100.0

Note: s: small numbers preclude rate calculation. Source: Report on Maternity 2004 [74]

Table 22. Babies who were Breastfed at 2 Weeks of Age by Maternal Ethnic Group (Missing Responses Removed), New Zealand 2004

Maternal Ethnicity	Exclusive / Full		Partial		Artificial		Total Stated
	No.	%*	No.	%*	No.	%*	No.
Māori	5,253	74.2	732	10.3	1,098	15.5	7,083
Pacific	2,273	72.0	520	16.5	362	11.5	3,155
Asian	2,105	70.0	682	22.7	222	7.4	3,009
European	18,705	82.4	1,944	8.6	2,039	9.0	22,688
Other	1,360	80.0	208	12.2	133	7.8	1,701
Not Stated	567	78.2	80	11.0	78	10.8	725
Total	30,263	78.9	4,166	10.9	3,932	10.2	38,361

Note: % refers to percentage of mothers for whom breastfeeding information was available (i.e. missing responses have not been included in the denominator). Source: Report on Maternity 2004 [74].

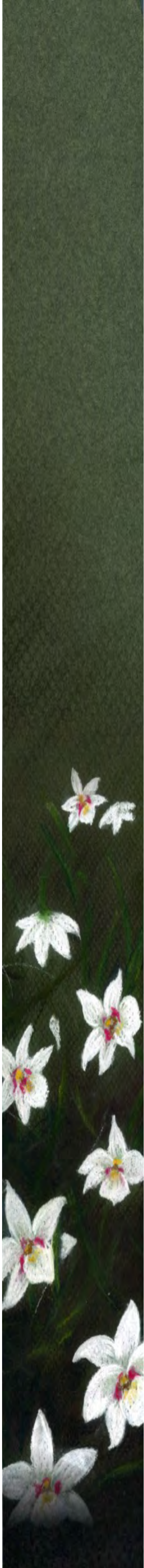


Table 23. Babies who were Breastfed at 2 Weeks of Age by Maternal Ethnic Group (Missing Responses Included), New Zealand 2004

Maternal Ethnicity		Exclusive	Full	Partial	Artificial	Not Stated	Total
Māori	No.	4,417	836	732	1,098	1,320	8,403
	%	52.6	9.9	8.7	13.1	15.7	100.0
Pacific	No.	1,789	484	520	362	1,042	4,197
	%	42.6	11.5	12.4	8.6	24.8	100.0
Asian	No.	1,580	525	682	222	745	3,754
	%	42.1	14.0	18.2	5.9	19.8	100.0
European	No.	16,494	2,211	1,944	2,039	3,407	26,095
	%	63.2	8.5	7.4	7.8	13.1	100.0
Other	No.	1,173	187	208	133	251	1,952
	%	60.1	9.6	10.7	6.8	12.9	100.0
Not Stated	No.	485	82	80	78	83	808
	%	60.0	10.1	9.9	9.7	10.3	100.0
Total	No.	25,938	4,325	4,166	3,932	6,848	45,209
	%	57.4	9.6	9.2	8.7	15.1	100.0

Source: Report on Maternity 2004 [74]

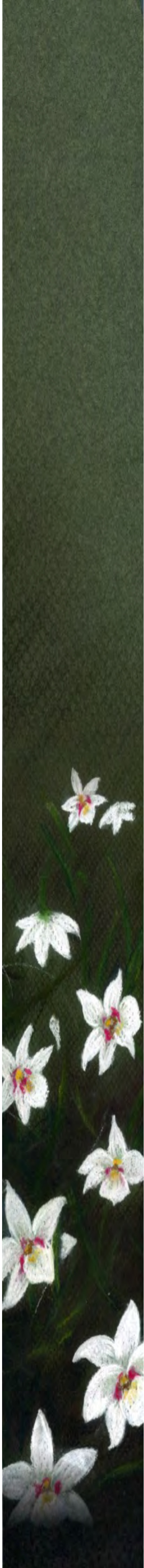
Table 24. Number and Percentage of Babies who were Breastfed at 2 Weeks of Age by DHB, New Zealand 2004

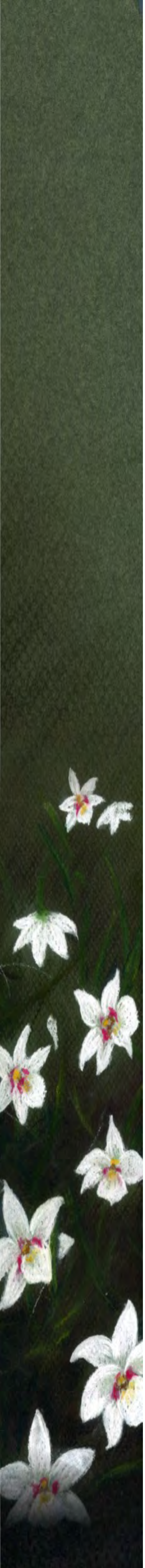
	Exclusive		Full		Partial		Artificial		Not Stated		Total
DHB	No.	%	No.	%	No.	%	No.	%	No.	%	No.
Northland	986	62.8	95	6.1	86	5.5	176	11.2	226	14.4	1,569
Waitemata	3,071	54.7	604	10.7	626	11.1	459	8.2	859	15.3	5,619
Auckland	2,302	46.1	635	12.7	649	13.0	304	6.1	1,100	22.0	4,990
Counties Manukau	2,208	42.2	521	10.0	507	9.7	466	8.9	1,527	29.2	5,229
Waikato	2,636	67.1	294	7.5	315	8.0	371	9.4	315	8.0	3,931
Lakes	814	63.1	174	13.5	87	6.7	82	6.4	134	10.4	1,291
Bay of Plenty	1,266	65.3	160	8.3	195	10.1	188	9.7	129	6.7	1,938
Tairawhiti	374	62.1	43	7.1	65	10.8	60	10.0	60	10.0	602
Hawkes Bay	1,100	61.1	207	11.5	126	7.0	196	10.9	170	9.4	1,799
Taranaki	763	65.6	80	6.9	76	6.5	130	11.2	114	9.8	1,163
MidCentral	1,027	63.5	186	11.5	135	8.3	152	9.4	118	7.3	1,618
Whanganui	334	53.3	55	8.8	42	6.7	70	11.2	126	20.1	627
Capital and Coast	1,868	65.3	222	7.8	323	11.3	164	5.7	283	9.9	2,860
Hutt	991	64.7	105	6.9	143	9.3	160	10.5	132	8.6	1,531
Wairarapa	282	71.8	25	6.4	42	10.7	30	7.6	14	3.6	393
Nelson Marlborough	421	30.3	63	4.5	37	2.7	46	3.3	821	59.1	1,388
West Coast	218	67.5	27	8.4	37	11.5	34	10.5	7	2.2	323
South Canterbury	3,030	62.3	578	11.9	478	9.8	444	9.1	337	6.9	4,867
Canterbury	351	78.3	18	4.0	15	3.3	35	7.8	29	6.5	448
Otago	1,073	65.7	90	5.5	105	6.4	225	13.8	139	8.5	1,632
Southland	568	54.4	120	11.5	57	5.5	128	12.3	171	16.4	1,044
Not Stated	255	73.5	23	6.6	20	5.8	12	3.5	37	10.7	347

Note: Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue). Source: Report on Maternity 2004 [74].

Summary

Breastfeeding meets a term infant’s nutritional needs for the first 4-6 months of life, as well as providing protection against a wide range of infections and non-infectious diseases. In New Zealand breastfeeding rates were high during the 1920s and 1930s, but progressive declines during the 1940s, 1950s and 1960’s, saw rates reach a nadir in the late 1960s. Following a rapid recovery during the 1970s and early 1980s, rates reached a plateau in the late 1990s and thereafter have remained relatively static. During 1999-2006, while the proportion of babies who were exclusively / fully breastfed at < 6 weeks remained relatively static, there were small increases in the proportion of babies still breastfed at 3 and 6 months. During 2006, breastfeeding rates at <6 weeks were highest amongst European / Other women and lowest amongst Asian women. At 3 and 6 months however, breastfeeding rates were highest for European / Other women and lowest for Māori women, with a marked tapering off in exclusive / full breastfeeding rates for all ethnic groups as infants age increased. There were also marked socioeconomic disparities in the proportion of babies exclusively or fully breastfed during this period, with rates at all three ages being higher for babies living in the most affluent areas. In addition, there was considerable regional variation in breastfeeding rates during 2006.





Overweight and Obesity

Introduction

In New Zealand during 1977-2003, the proportion of obese adults increased progressively, from 9% to 20% for males and from 11% to 22% for females. While modest increases in average BMI occurred during this period, the greatest increases were at the upper ends of the BMI distribution i.e. those who were overweight became even more overweight [75]. While no comparable time series data exists for children, during 1989-2000 the risk of being overweight amongst Hawkes Bay 11-12 year olds increased 2.2 fold, while the risk of being obese increased 3.8 fold [76].

Such increases are of concern, as obesity has been associated with a variety of adverse health outcomes including ischaemic heart disease, stroke, diabetes and cancer [77]. Ischaemic heart disease and diabetes are often preceded by a cluster of cardiovascular risk factors known as the “Metabolic Syndrome”, characterised by abdominal adiposity, glucose intolerance, insulin resistance, hypertension and dyslipidaemia [78]. While these adverse risk factor profiles have traditionally been viewed as the domain of adults, recent evidence would suggest that the Metabolic Syndrome and Type II diabetes are increasing amongst adolescents. In Auckland, a recent audit of Adolescent Diabetes Clinic attendees indicated that the proportion of clients with Type II diabetes had risen from 1.8% in 1996, to 11% in 2002, with Type II diabetes accounting for 35.7% of new cases during 2000-01. Amongst those with Type II diabetes, risk factors for cardiovascular disease were common, with the average BMI being 34.6 kg/m2, 85% having dyslipidaemia and 28% having hypertension [79].

When considering the pathways linking childhood obesity to adverse health outcomes, it remains difficult to determine conclusively whether being obese as a child independently increases the risk of later adverse outcomes, once the effects of adult obesity are taken into account [80]. Despite this uncertainty, there remains strong evidence to suggest that being obese as a child increases the risk of adult obesity, and that adult obesity in turn is linked to the adverse outcomes discussed above. While not all obese children become obese adults, the risk increases with increasing age, severity of obesity and whether the child’s parents are also obese. In one recent study, 19% of obese 1-2 year olds were obese as young adults, as compared to 55% of obese at 6-9 year olds and 75% of obese 10-14 year olds, with the risk of remaining obese being elevated nearly 3 fold if either parent was obese [81].

Factors predisposing children to obesity tend to be those which result in a positive energy balance over a relatively long period of time (e.g. a high fat diet, a low level of habitual physical activity and variations in body metabolism and insulin sensitivity). In addition, obesity has been shown to run in families, with genetic predisposition being seen as accounting for a significant proportion familial clustering, once the effects of shared environmental conditions are taken into account [82]. In population health terms, while it remains unclear which of these risk factors has made the greatest contribution to the current obesity epidemic, it is likely that interventions which address both sides of the energy equation (e.g. high fat diets, increased portion sizes vs. reductions in the amount of energy expended on transport, housework and leisure time activities) will be necessary, if the current obesity epidemic is to be addressed.

The following section reviews some of the issues associated with the measurement of overweight and obesity in children and young people, before providing an overview of the distribution of obesity in the New Zealand context. Because there is no routine surveillance of overweight and obesity in New Zealand children and young people at present (a situation which may change with the institution of the New Zealand

Children's Health Survey), the information contained in this section is collated from one off surveys and research project reports.

Data Sources and Methods

Definition

Proportion of New Zealand Children and Young People who are Overweight or Obese

Note: While the methodology used by different studies to measure overweight and obesity varies, a number of measurement issues are common to each. This section highlights some of the issues associated with the measurement of obesity in children at different developmental stages and from different ethnic groups.

Indicator Category Bookmark B **(Table 133, Table 134)**

Obesity

Obesity is defined as an excess in adiposity or body fat mass. Measures of adiposity in current use include weight, weight for height (e.g. BMI), skin fold thickness (e.g. triceps / sub-scapular) and circumferences / diameters (e.g. waist-hip / waist-thigh ratios, mid-upper arm circumferences), each of which has its own reference standards and cut-points [80]. Of these, perhaps the most popular is the Body Mass Index (BMI), as defined below.

BMI

Obesity is often assessed using the Body Mass Index (BMI), calculated using the formula

$$\textbf{BMI = weight (kg) / height (m)}^2$$

Using height and weight to assess adiposity is generally viewed as being reliable, reproducible, non-intrusive and cheap, making BMI one of the most popular measures for obesity, both in New Zealand and overseas. In adults, cut-offs are based on mortality risk or other criteria, with those having a BMI of 25-30 kg/m2 being traditionally classified as overweight and those with a BMI of 30 kg/m2 or over being seen as obese. Using BMI to assess obesity in children however has a number of drawbacks, including the changes in body composition that occur as part of normal growth and with the onset of puberty and ethnic differences in body composition for a given BMI [78]. Each of these issues is discussed in more detail below.

Changes in Body Composition with Age: The Need for BMI Percentile Charts

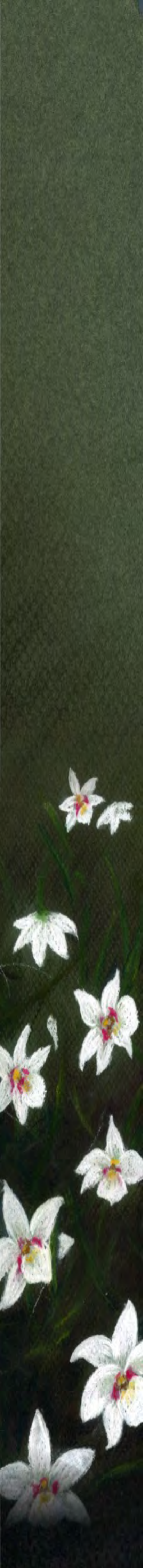
Assessing obesity during childhood and adolescence is more complex than in adults, as both height and body composition change progressively with development. In particular, the proportion of fat mass / total body weight changes significantly during childhood, beginning at around 13-15% in term newborn infants and increasing progressively during the first year of life, to a maximum of 25-26% at 12 months of age. From 12 months to 4-6 years, the proportion of body fat then declines, to a nadir of around 12-16%, before increasing again between the ages of 6-10 years. By early adulthood, the proportion of fat mass is 20-25% for women and 15-20% for men [78]. As a result of these changes, when assessing the level of obesity in an individual child, BMI for age percentile charts are usually used, which extrapolate back the traditional adult cut points of 25-30 kg/m2 and >30 kg/m2, to the same points on the BMI distribution during the childhood years e.g. a male child with a BMI > 19.3 at the age of 5 years, is on the same point in the percentile charts as an 18 year old with a BMI of >30, and thus will be classified as obese [83]. As New Zealand to date has not developed its own BMI percentile charts for children, overseas standards must be used. Of these, the most popular is that developed by Cole [83] using pooled survey data from 6 different countries.

Ethnic Differences in BMI

With no BMI for age percentile charts specifically designed for New Zealand use, there remains a significant amount of debate about the appropriateness of the traditional BMI-for-age cut offs for New Zealand children of different ethnic groups. While a number of studies have suggested that, for a given BMI, Māori and Pacific children have a lower percentage of body fat [84] [85] [86], others have argued that while statistical differences may exist, there are no clinically significant ethnic differences in the relationship between BMI and body composition and that a common standard should be used for children of all ethnic groups [86]. Overseas research also suggests that ethnic differences in body composition may increase during puberty, with differences being much less marked amongst children <8 years of age [87]. Similarly, ethnic differences in the onset of puberty may also make utilisation of a common BMI cut off difficult, with puberty on average, occurring earlier amongst Māori and Pacific groups [88]. Such differences need to be kept in mind when interpreting ethnic specific obesity rates calculated using overseas percentile charts, as they may tend to overestimate obesity rates amongst Māori and Pacific children slightly.

Data Sources

Because New Zealand at present does not routinely monitor the height and weight of its children and young people, the information in the sections which follow was derived from a variety of surveys and research project reports, the details of which are discussed under each of the relevant sections.



New Zealand Distribution and Trends

Time Series Estimates

Hawkes Bay: As part of an asthma prevalence study, data on height, weight and ethnicity were collected from 870 children aged 11-12 years, attending schools in Havelock North or Hastings in 1989 and 2000 [76]. The study found that:

- The % of overweight children increased 2.2 times from 11.0% in 1989 to 20.9% in 2000
- The % of obese children increased 3.8 times from 2.4% in 1989 to 9.1% in 2000.
- The greatest proportional increases occurred amongst European children (overweight 3.0 times higher, obesity 8.3 times higher).

In absolute terms however, the highest obesity rates occurred amongst Māori and Pacific children, with the authors noting that during 2000:

- 35.0% of Pacific children were overweight, while 15.0% were obese.
- 24.7% of Māori children were overweight, while 15.3% were obese.
- 18.2% of European children were overweight, while 5.7% were obese.

The authors concluded that while higher proportions of Māori and Pacific children were overweight or obese, European children were rapidly catching up. They also noted that the statistically significant increases across all ethnic groups were consistent with overseas trends, making childhood obesity a major health problem in New Zealand.

Christchurch: Health and physical activity parameters for 5,579 10-14 year old intermediate school children were collected between 1991 and 2001[89]. During this period:

- Boy's weight increased by 2.9 kg and girls weight increased by 2.1 kg.
- The % of boys who were overweight or obese increased from 4.2% in 1991 to 7.8% in 2000, while the % of girls who were overweight or obese increased from 2.0% to 11.3%.
- The authors also noted that during this period the level of fitness of children deteriorated, with the time to complete a 550m run increasing by 23.6s for boys and 27.0s for girls.

These two studies provide the only available time series data on changes in childhood BMI in New Zealand during the past two decades. While in absolute terms, the proportions of overweight and obesity are not strictly comparable (the Hawkes Bay study used Coles [83] BMI percentile charts, while the Christchurch study used 25 kg/m^2 as a cut off for overweight and obesity), what these two studies do suggest is that over the past two decades the obesity epidemic has progressed relatively rapidly amongst New Zealand children.

The National Children's Nutrition Survey

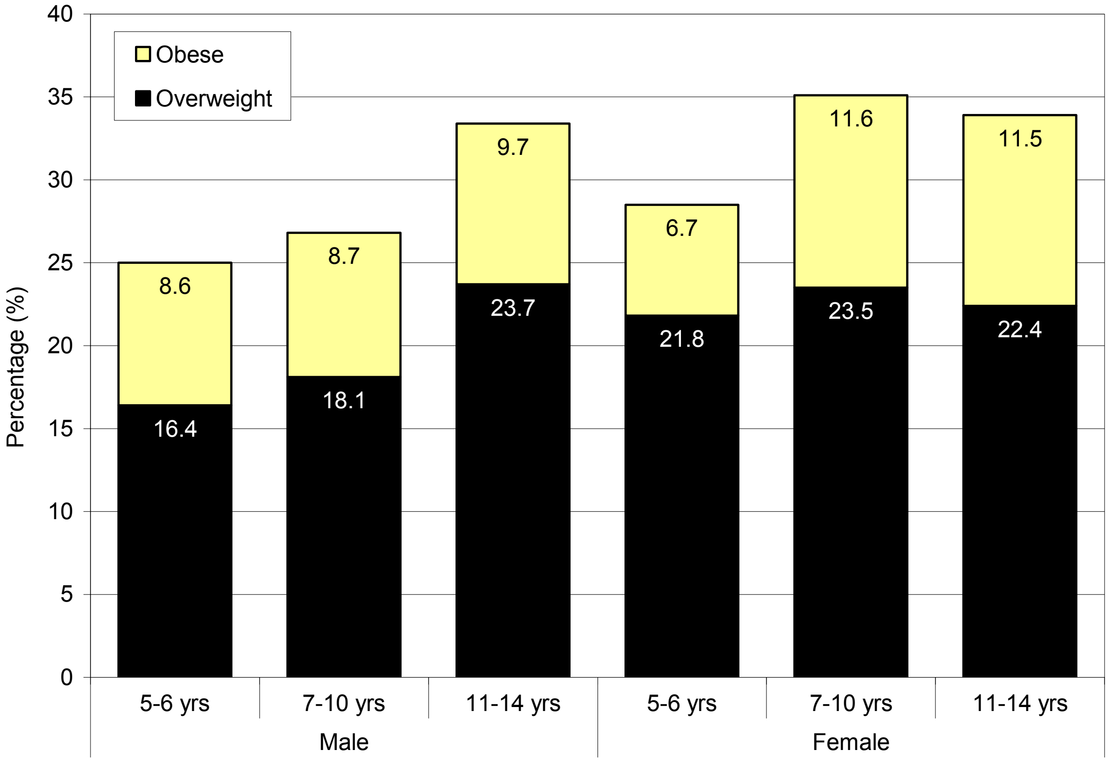
Data Sources and Methods

The 2002 National Children's Survey was a cross sectional survey of 3,275 New Zealand children aged 5-14 years. A nationally representative sample was achieved by randomly selecting schools (of 190 schools identified, 172 (90.5%) agreed to participate) and then within these schools, randomly selecting children (of the 4,728 children selected, 3,275 (69.3%) completed an initial 24-hour Diet Recall Questionnaire and 3,151 (66.6%) had their height and weight measured. Over sampling of Māori and Pacific children also occurred, so that ethnic specific analyses could be undertaken (1,160 Māori, 1,035 Pacific and 956 European / Other children had height and weight measurements taken). These measurements were carried out in the school setting, while the main interview was carried out at home in the presence of a parent or caregiver [88]. Cole's [83] BMI for age percentile charts were used to define overweight and obesity cut-points in the survey.

The 2002 National Children's Survey collected height and weight measurements on a total of 3,275 New Zealand children aged 5-14 years and used Cole's [83] percentile charts to estimate rates of overweight and obesity for children of different ethnic and socioeconomic groups. The main findings of this survey were [88] :

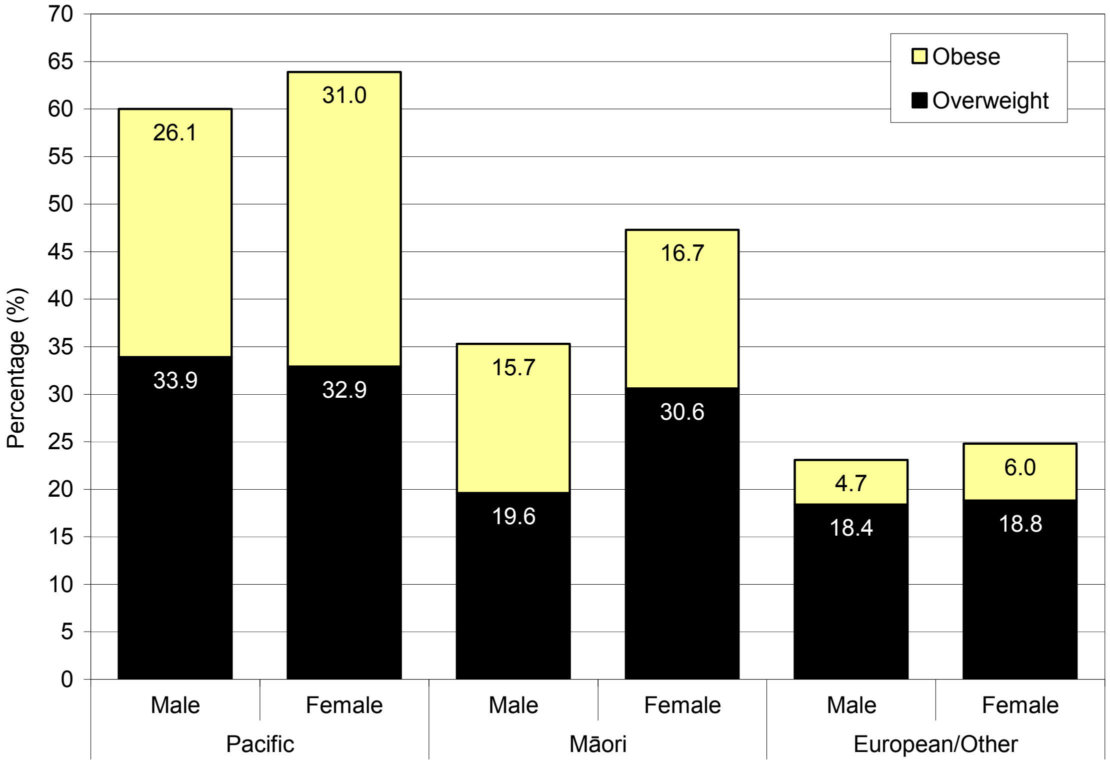
1. 21.3% of New Zealand children were overweight, while 9.8% were obese.
2. Rates of obesity were significantly higher amongst Pacific > Māori > European / Other children, with the highest rates being in Pacific girls (**Figure 50**). The earlier onset of puberty in Māori and Pacific females, as well as the use of internationally derived cut-off values however, needs to be taken into consideration when interpreting these results.
3. Overweight and obesity exhibited a modest socioeconomic gradient, with obesity rates for both males and females being significantly higher amongst those living in the most deprived areas (**Figure 51**).
4. With the exception of overweight in females, rural vs. urban differences in overweight and obesity did not reach statistical significance (**Figure 52**).

Figure 49. Proportion of Children Aged 5-14 Years Who Were Either Overweight or Obese by Gender and Age, New Zealand National Children's Nutrition Survey 2002



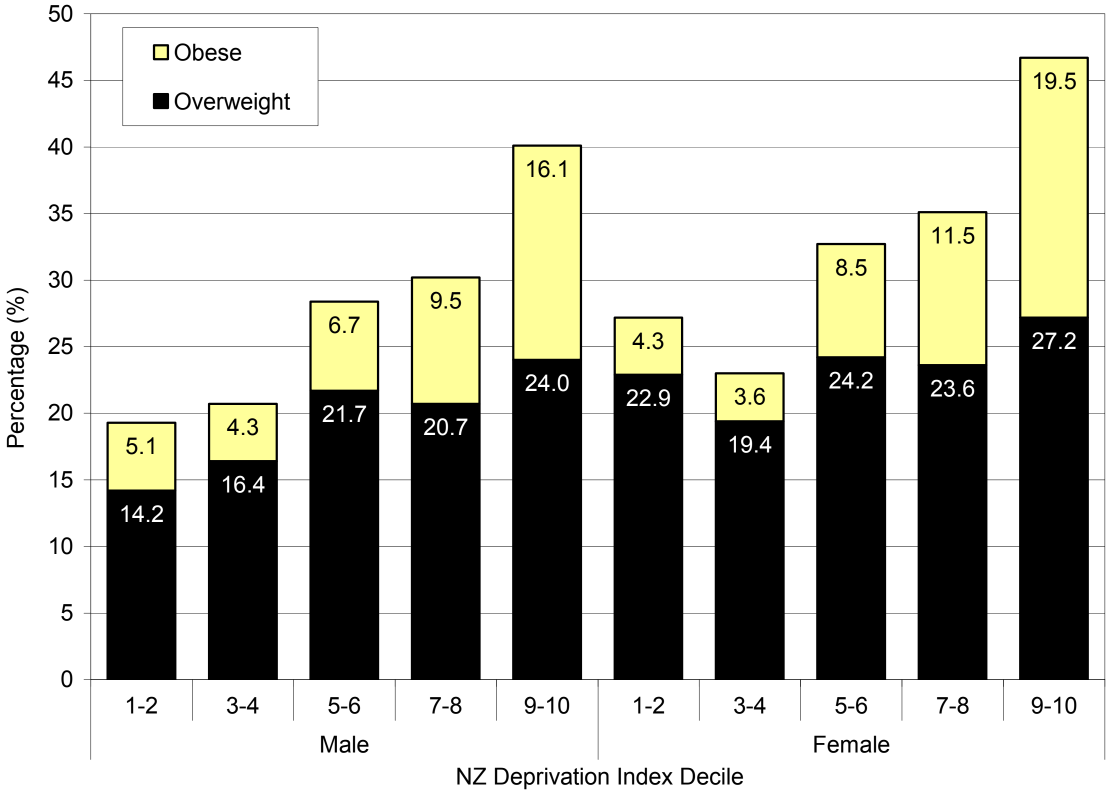
Source: NZ Food, NZ Children: Key Results of the 2002 National Children's Nutrition Survey [88].

Figure 50. Proportion of Children Aged 5-14 Years Who Were Either Overweight or Obese, by Gender & Ethnicity, New Zealand National Children's Nutrition Survey 2002



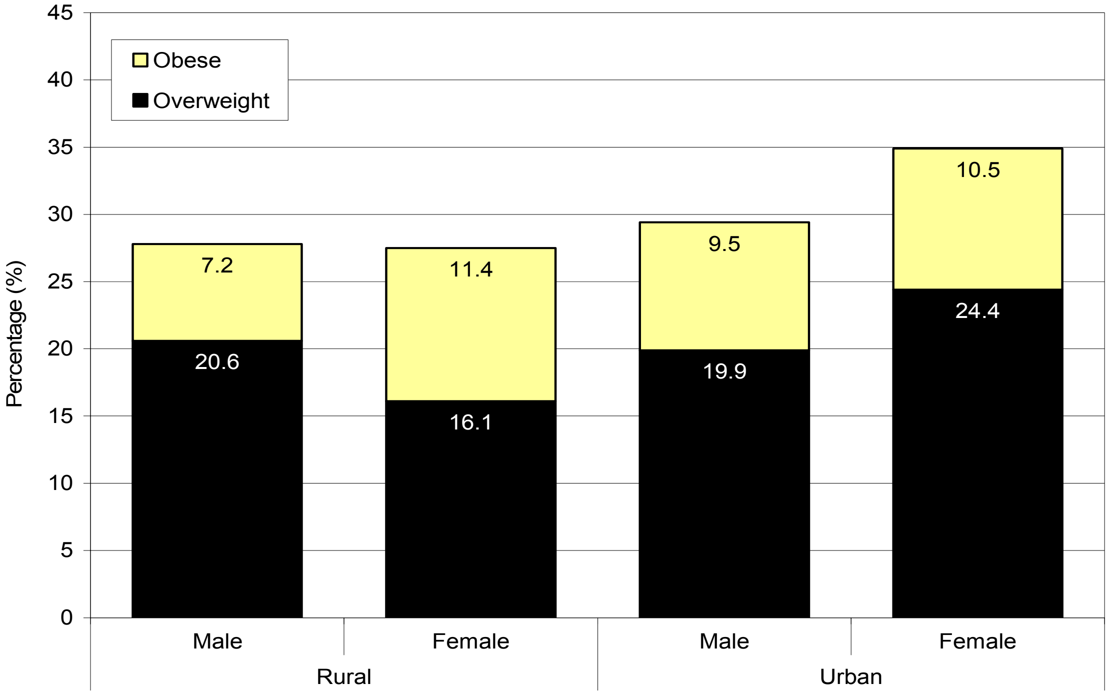
Source: NZ Food, NZ Children: Key Results of the 2002 National Children's Nutrition Survey [88]

Figure 51. Proportion of Children Aged 5-14 Years Who Were Either Overweight or Obese by Gender and NZ Deprivation Index Decile, NZ National Children's Nutrition Survey 2002



Source: NZ Food, NZ Children: Key Results of the 2002 National Children's Nutrition Survey [88]

Figure 52. Proportion of Children Aged 5-14 Years Who Were Either Overweight or Obese by Gender and School Type (Rural / Urban), New Zealand National Children's Nutrition Survey 2002



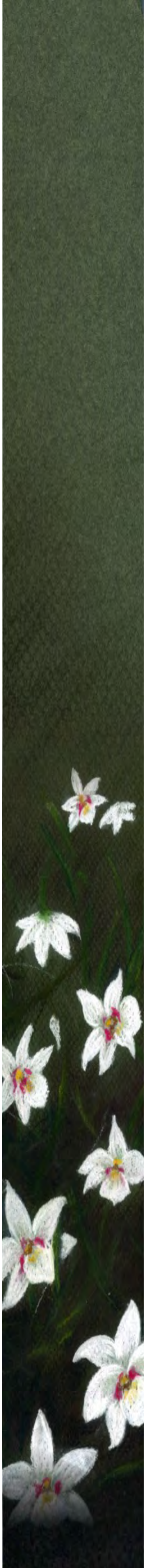
Source: NZ Food, NZ Children: Key Results of the 2002 National Children's Nutrition Survey [88]

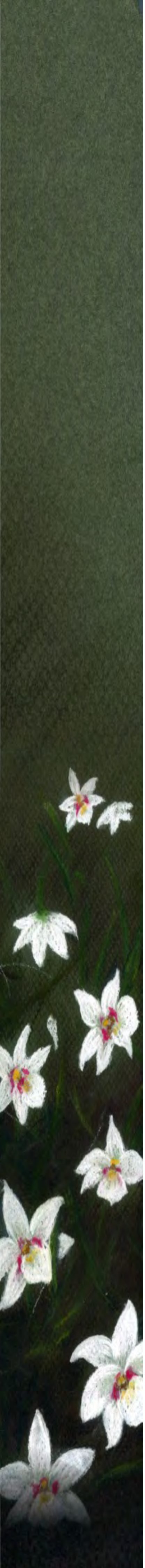
Summary and Policy Implications

The above review of the available New Zealand data sources suggests that:

1. **Prevalence**: While estimates vary from study to study, New Zealand data collected since 2000 suggests that ≈ 20% of NZ children are overweight and ≈10% are obese.
2. **Trends over Time**: Of the 2 studies which have tracked the pace of the obesity epidemic amongst New Zealand children and young people, both suggest that it is progressing relatively rapidly, with the proportion of children who are overweight or obese increasing 2-3 fold over the past decade.
3. **Ethnic Disparities**: All of the New Zealand studies reviewed demonstrated higher rates of overweight and obesity amongst Pacific > Māori > European children and adolescents. These findings must be viewed within the context of an earlier average age of puberty amongst Pacific and Māori girls, as well as ethnic differences in the ability of BMI to approximate total body fat composition. As these factors potentially alter the ability of internationally derived percentile charts to accurately identify overweight and obesity in Māori and Pacific groups, these findings must be viewed with these cautions in mind.
4. **Socioeconomic Disparities**: The New Zealand Children's Nutrition Survey suggests that obesity may exhibit a modest socioeconomic gradient, with rates being higher amongst those in the most deprived areas.

These findings suggest that the current levels of overweight and obesity amongst New Zealand children and adolescents are a significant public health concern and that unless sound policies and strategies are put in place to address this issue, the socioeconomic and ethnic disparities in overweight and obesity seen will lead to disparities in chronic disease burden, as this generation reaches maturity.





Nutrition

Introduction

As rates of childhood obesity have increased attention has turned towards the environments in which children live and the role dietary and lifestyle changes have played in subtly altering the balance between caloric intake and the amount of energy expended on incidental physical activity. While no time series information is available for New Zealand, serial surveys of nutritional intake in the USA between the mid-70s and 90s have demonstrated a number of strong and consistent trends including a 3-fold increase in the consumption of chips / crackers / pretzels, a 2-fold increase in the consumption of soft drink and a shift towards larger portion sizes. While the proportion of energy derived from fat fell during this period, the proportion derived from carbohydrate increased, with the majority of the increase in per capita calorie intake seen since the mid-80s being derived exclusively from carbohydrate. In addition, the proportion of food dollars Americans spent on eating out increased, from 33% in 1970 → 47% in 2001, with researchers noting that food consumed away from home was more energy dense and contained more fats and sugars than food prepared at home. Relative price changes also saw increases in the price of fruit and vegetables, while prices for sugar, sweets, soft drinks and fats fell in relative terms [90].

While no comparable time series data is available in the New Zealand context, information from a number of cross sectional surveys suggests that aspects of the current nutritional environment are not conducive to healthy food choices for New Zealand children. In one recent survey of 200 primary / intermediate schools, 79% of school canteens offered pies, 57% offered juice and 55% offered sausage rolls. In contrast, filled rolls (the most expensive item) were offered by only 47%, while 30% offered sandwiches and 17% offered fruit [91]. The potential implications this has for disparities in childhood nutritional intake were recently highlighted by the National Children's Nutrition Survey, which suggested that Māori and Pacific children were significantly more likely to buy some or most of the food they consumed at school from the school tuckshop and were also more likely to consume pies, hamburgers, and fizzy drinks than European / Other children [92]. The following section thus reviews the distribution and determinants of nutritional intake amongst New Zealand children using information from the 2002 National Children's Nutrition Survey. While the lack of regional data precludes a DHB level analysis, it is nevertheless hoped that information in this section will serve a useful starting point for considering strategies to address the obesity epidemic at a regional level.

Data Source and Methods

Definition

Distribution and Determinants of Nutritional Intake in Children

Data Source

The 2002 National Children's Nutrition Survey [88]

Indicator Category

Bookmark B (**Table 133, Table 134**)

Notes on Interpretation

The 2002 National Children's Survey was a cross sectional survey of 3,275 New Zealand children aged 5-14 years. A nationally representative sample was achieved by randomly selecting schools (of 190 schools identified, 172 (90.5%) participated) and within these schools children were randomly selected Over sampling of Māori and Pacific children occurred so ethnic specific analyses could be undertaken (1,224 Māori, 1,058 Pacific and 993 European/Other children completed the initial 24-hr Diet Recall Questionnaire). Weight and height measurements were carried at school while the main interview was carried out at home in the presence of a parent or caregiver.

Dietary intake was assessed using a 24-hour diet recall with children asked to report their dietary intakes during the 24-hours immediately prior to data collection. The interview was structured in 3 stages to maximise the child's recall with the child initially being asked to supply a "quick list" of all foods, beverages and dietary supplements eaten during the previous 24 hours. The next stage involved a more detailed description of each food item (time eaten, amount eaten, accompanying foods e.g. bread with butter, cooking method, brand and product names, recipes for home prepared foods). Finally the order and types of foods verified ensuring no omissions. Food and beverages were electronically matched to food composition data to calculate nutrient intake.

Eight questions on food security (developed for 1997 National Nutrition Survey) were asked if adult caregivers were present at the time of interview. Data was not collected from households where the child was interviewed without an adult present. Questions focused on dietary restrictions associated with limited financial resources (e.g. amount, variety, running out of food, reliance on food banks, stress associated with inability to provide food) , with respondents being asked to comment on whether the posed situation always, sometimes or never occurred in their household (a 4th category of don't know was also available). In addition, a further section on eating patterns asked children about the source of the food they usually ate at school e.g. whether food was brought from home, a shop / diary / takeaway outlet or the school canteen or tuckshop, with children being asked whether most, some or none (or don't know) of the food they ate at school was sourced from these particular places.

Limitations of the National Children's Nutrition Survey include its "one-off" cross-sectional nature, resulting in an inability to track trends over time, its small sample size prohibiting a statistically meaningful regional analysis and the usual issues associated with a 24-hour dietary recall of a limited sample being used to estimate the usual dietary intakes of the total population. Its strengths however are it's ethnically based sampling frame, meaning that valid ethnic specific analyses can be undertaken, as well as the fact that the 24-hour recall was repeated on a sub-sample of 505 children, allowing adjustments to be made to better reflect the "usual" intakes of the total sample.

New Zealand Distribution and Trends

Average Energy Intake

The 2002 National Children's Nutrition Survey (CNS02) suggested that at all ages, males has significantly higher energy intakes than females and that energy intake increased significantly with increasing age. In addition, Māori children had significantly higher median daily caloric intakes than European children did, although socioeconomic gradients in caloric intake were not marked (significant differences existed only between females in the least and most deprived NZDep quintiles) (**Figure 53**).

Percentage of Energy Intake from Fat

The New Zealand Nutrition Taskforce (1991) guideline recommends that fat provides ≤33.0% of a person's total energy intake [93]. Overall the mean percentage of daily energy intake from fat was similar for males (33.2%) and females (32.9%). When broken down by NZ Deprivation Index Decile, females in the most affluent (Decile 1-2) areas had a significantly lower proportion of their total energy intake derived from fat, than females in the most deprived (Decile 9-10) areas. In addition, the total energy intake from fat was significantly lower for European / Other children than for Māori or Pacific children (**Figure 54**).

Source of Food Consumed at School

The majority of New Zealand children (84.4%) brought most of the food they consumed at school from home, with approximately ¾ not buying any of their food from a shop or takeaway in the past week. The proportion that brought most of their food from home declined significantly with age however, as well as with socioeconomic deprivation, with significantly fewer children in the most deprived (Decile 9-10) areas bringing their food from home. Finally, fewer Māori and Pacific children brought most of their food from home, with more saying that they brought some of their food from a shop / takeaway or canteen / tuck shop (**Figure 55**, **Figure 56**).

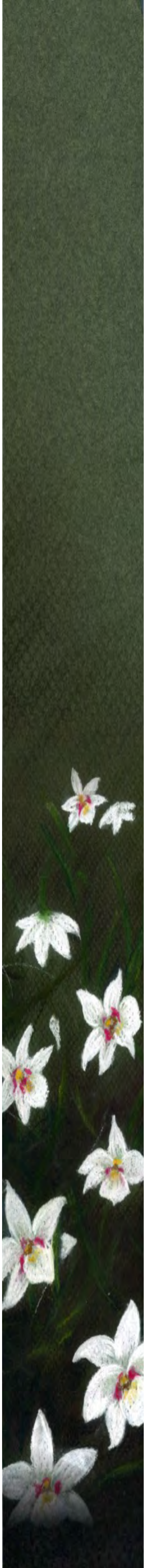
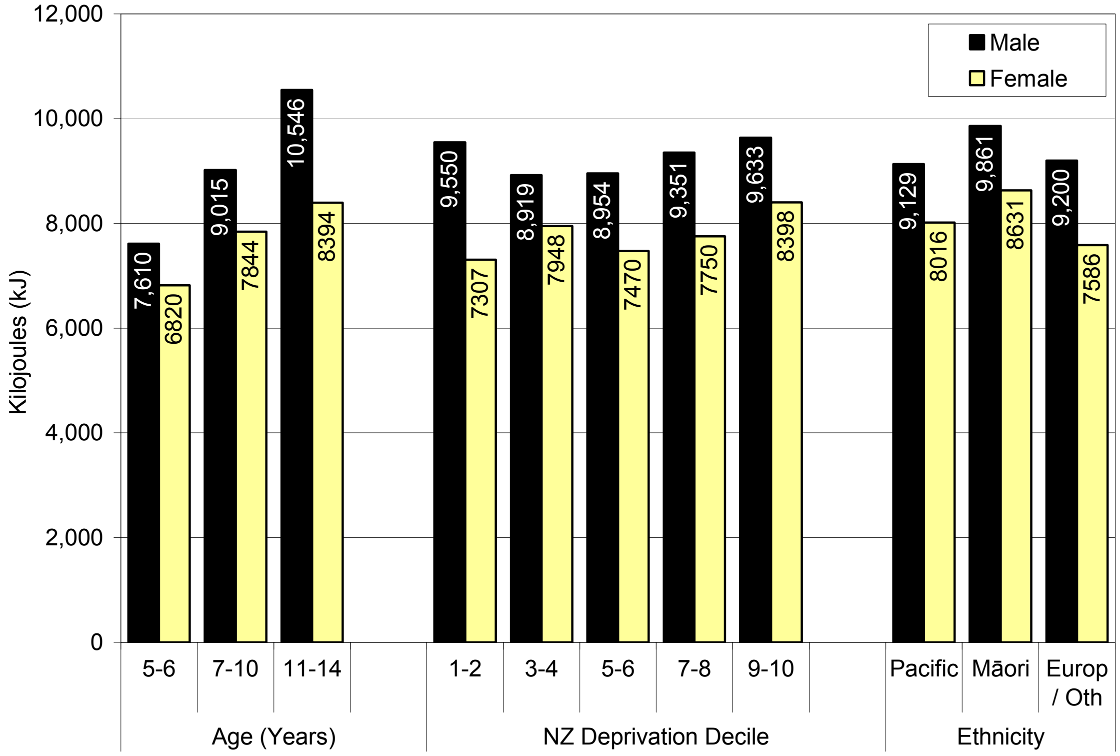
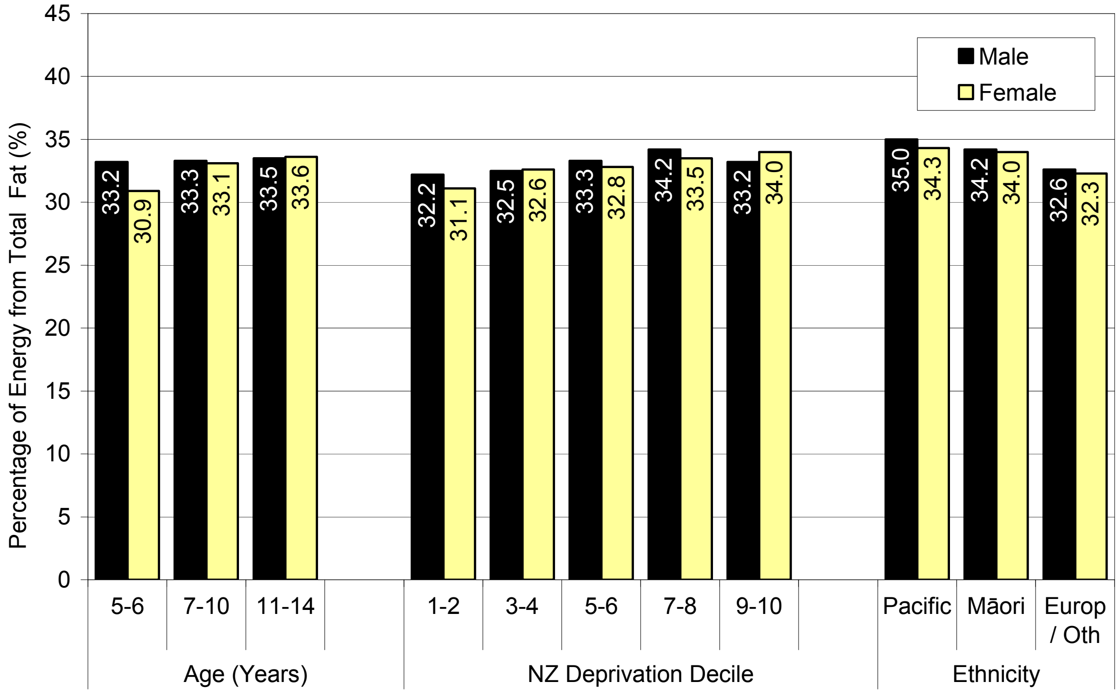


Figure 53. Mean Energy Intake (kJ) for Children 5-14 Years by Gender, Age, NZ Deprivation Index and Ethnicity, New Zealand National Children's Nutrition Survey 2002



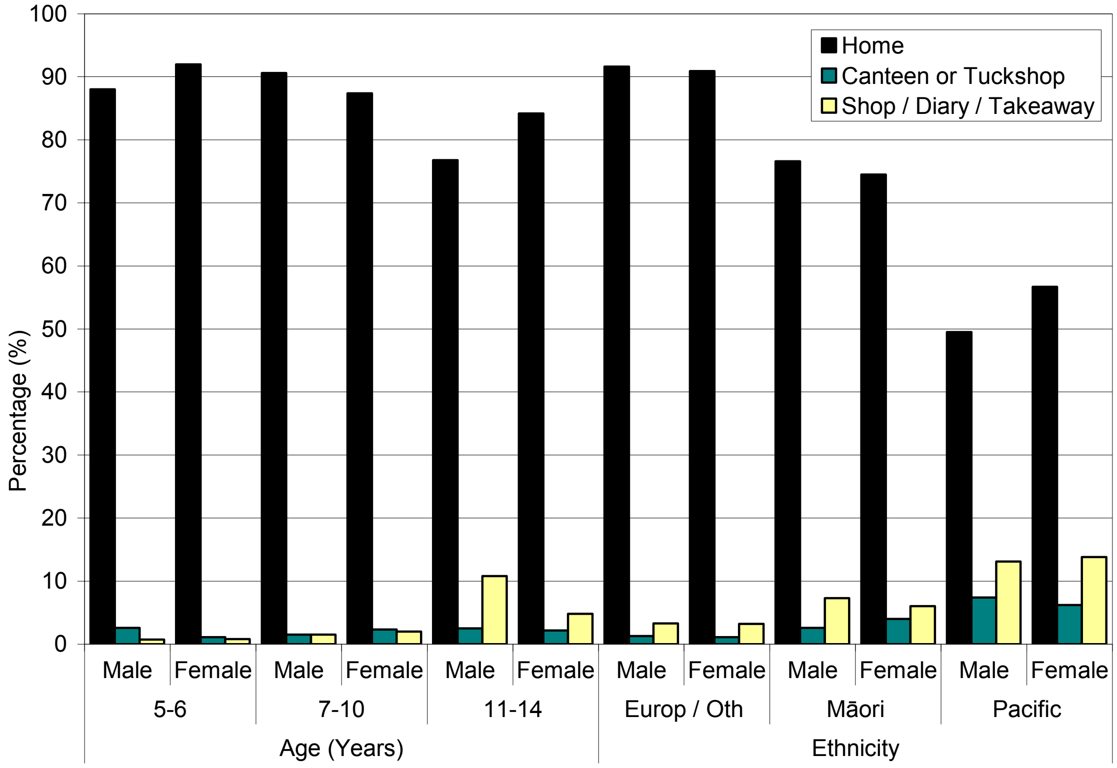
Source: NZ National Children’s Nutrition Survey 2002 [88]

Figure 54. Mean Percentage of Energy Intake from Total Fat in Children 5-14 Years by Gender, Age, NZ Deprivation Index and Ethnicity, New Zealand National Children's Nutrition Survey 2002



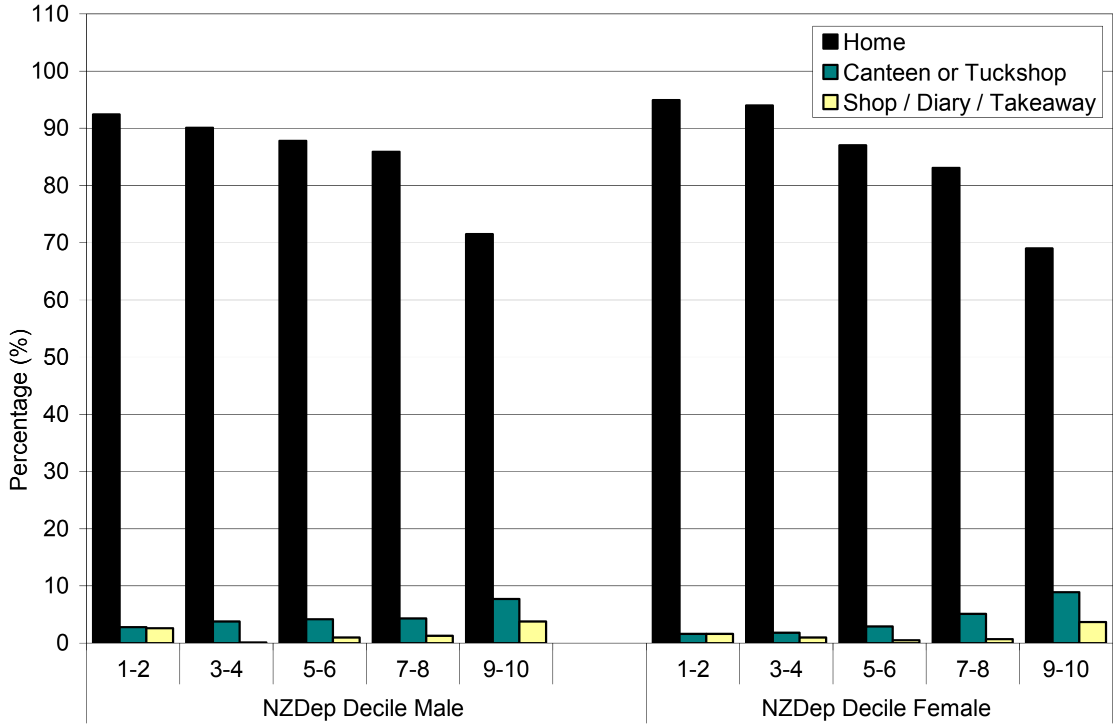
Source: New Zealand National Children’s Nutrition Survey 2002 [88]

Figure 55. Source of Most Food Eaten at School for Children 5-14 Years by Gender, Age, and Ethnicity, New Zealand National Children's Nutrition Survey 2002



Source: New Zealand National Children’s Nutrition Survey 2002 [88]

Figure 56. Source of Most Food Eaten at School for Children 5-14 Years by Gender, and NZ Deprivation Index, New Zealand National Children's Nutrition Survey 2002



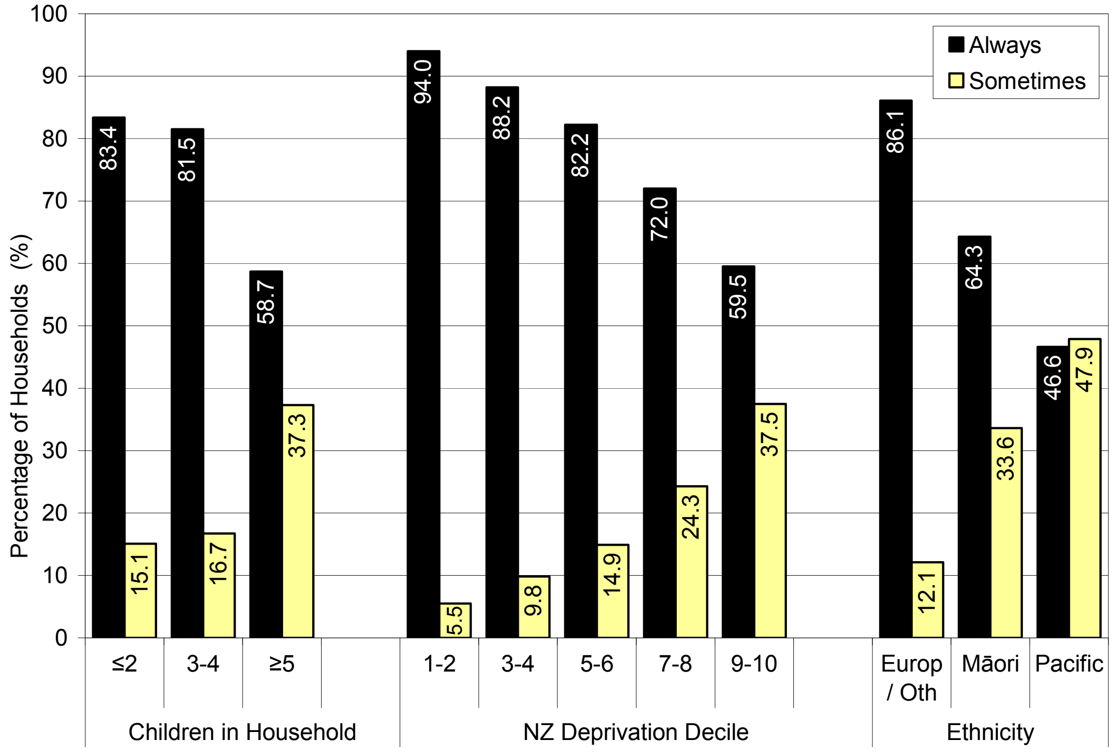
Source: New Zealand National Children’s Nutrition Survey 2002 [88]

Food Security

While 78% of households with children 5-14 years reported that they could always afford to eat properly, 20.1% said they could do so only sometimes. Larger households (with 7+ members or 5+ children) were significantly more likely to report that they could only afford to eat properly sometimes. Households in the most deprived areas (NZDep Decile 9-10) were significantly less likely to always eat properly, when compared to those in more affluent areas (NZDep Deciles 1-7). Finally, Māori and Pacific households were significantly less likely to be able to always eat properly, when compared to European / Other households (**Figure 57**).

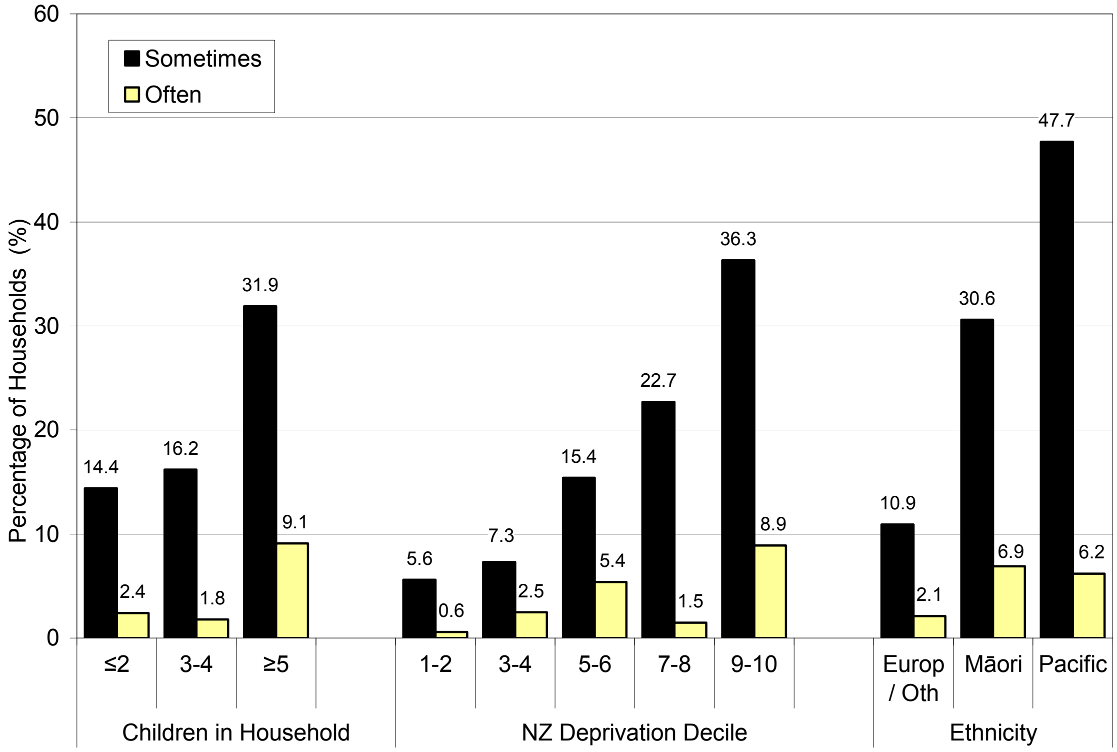
A number of other elements relating to food security were also explored including whether a household ever ran out of food, had to eat less or had to restrict the variety of the food they ate because of a lack of money. Questions were asked about whether the household experienced stress because they had insufficient money for food. While around 22% of households reported that food sometimes or often ran out because of a lack of money, this figure was as high as 40% amongst larger households (with 7+ family members, or 5+ children). In addition, households in the most deprived (NZDep Deciles 9-10) areas were significantly more likely to run out of food that those living in more affluent (NZDep 1-7) areas. Finally Pacific households were significantly more likely to run out of food than Māori or European / Other households (**Figure 58**).

Figure 57. Households with Children 5-14 Years that could Afford to Eat Properly (Always vs. Sometimes) by Children in Household NZ Deprivation Index and Ethnicity, New Zealand National Children's Nutrition Survey 2002



Source: New Zealand National Children's Nutrition Survey 2002 [88]

Figure 58. Proportion of Households with Children 5-14 Yrs who Reported Food Runs Out Often or Sometimes Due to a Lack of Money, New Zealand National Children's Nutrition Survey 2002

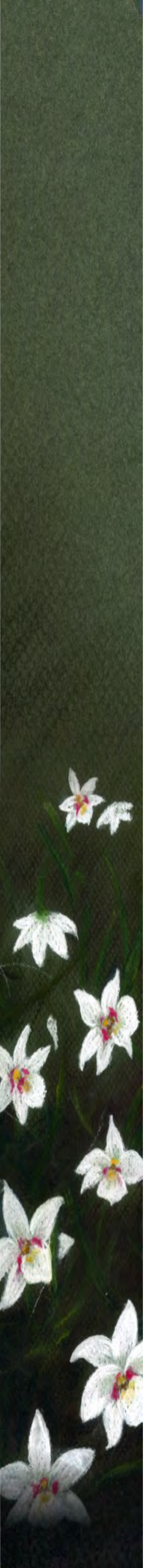


Source: New Zealand National Children's Nutrition Survey 2002 [88]

Summary and Policy Implications

The Children's Nutrition Survey provided a number of insights into the nutritional intake of New Zealand children which may be of value in addressing the current obesity epidemic. These include:

1. On average, males have higher energy intakes than females and energy intakes increase with increasing age. Both findings are consistent with a larger body size and the need to consume more energy to maintain body mass and meet daily exercise requirements.
2. Total energy intake, when broken down by ethnicity and socioeconomic status, did not precisely mirror current ethnic disparities in obesity rates, with Māori children having higher total caloric intakes than European children, yet Pacific children having the highest obesity rates. In addition, while socioeconomic gradients in obesity were prominent, socioeconomic gradients in total caloric intake were not. In contrast, the proportion of the daily intake derived from fat did correspond more closely with ethnic and socioeconomic gradients in obesity, with the % of daily intake from fat being higher amongst Pacific and Māori children and females in the most deprived areas.
3. While the majority of children brought the food they consumed at school from home this declined as children grew older. In addition, the proportion relying on school canteens or local food outlets was higher for Pacific > Māori > European / Other children and those living in the most deprived areas. As indicated above, recent survey data has suggested that many items currently offered in school canteens may not support healthy food choices, thus potentially exposing a larger proportion of Pacific > Māori > European / Other children and those in the more deprived



areas, to a range of unhealthy food choices (e.g. pies, sausage rolls), thereby exacerbating disparities in body mass index.

4. Even in the context of the current obesity epidemic, food security remained an issue for larger families, those living in the most deprived areas and for Pacific and Māori families, with many saying that they could not always afford to eat properly, and that they often or sometimes ran out of food. That those with the greatest food security issues (Pacific > Māori > European / Other, Least Affluent > Most Affluent) also experienced the highest rates of childhood overweight and obesity, suggesting that further research is needed to assess the impact affordability of healthy food options has on the current obesity epidemic.

Thus a multifaceted approach to overweight and obesity may be needed, which takes into account the environments in which children and young people make their food choices (e.g. school canteens, local food outlets), as well as the social and economic constraints (e.g. relative pricing of healthy vs. non healthy food options) which preclude the uptake of healthy food choices for some socioeconomic and ethnic groups.

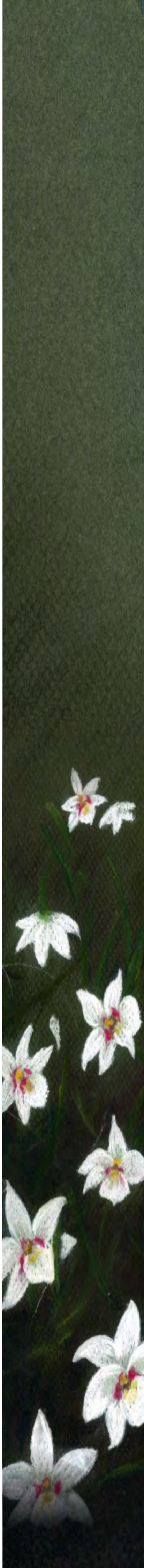
Physical Activity

Introduction

While declines in the amount of time children and young people spend engaged in physical activity are thought to have contributed significantly to the obesity epidemic, the paucity of longitudinal data makes it difficult to quantify the precise role this has played in the New Zealand context. In addition, the lack of standardised physical activity recommendations for children and young people impacts on our ability to define who is inactive and who is active, with different studies focusing on different aspects of physical activity including duration (e.g. 30 minutes per day, 150 minutes per week), intensity (e.g. moderate, vigorous), frequency (e.g. 5 days per week, daily) and type (e.g. incidental, transport or school related, sports) [94]. In addition, each of these aspects can be measured in many different ways, with some relying on subjective measures (e.g. questionnaires, self report, proxy report, interviews) and others using more objective tools [94].

Overseas evidence for declining activity levels comes from a variety of sources including a Swedish study which noted a significant decrease in energy expenditure (particularly occupational and transport) over the 20th century, with a corresponding increase in sedentary leisure activity (e.g. watching TV, reading) [95]. In the UK, USA and New Zealand, declines in the number of children walking or cycling to school since the early 1970s have been attributed to parental perceptions regarding safety and a reluctance to let children cycle on the road [96] [97, 98]. A recent local study also suggested that the fitness levels of New Zealand children may be deteriorating, with the time taken for intermediate school children to run 550 metres increasing by 23.6s for boys and 27.0s for girls between 1991 and 2000 [89]. In addition, participation in organised sport has decreased substantially in a number of countries, while the proportion of leisure time children spend on “electronic entertainment” (e.g. computers, TV) has increased [95]. Not all overseas studies have come to the same conclusion however, with a number of studies exploring leisure time physical activity amongst young people during the 1980s-90s noting either increases in participation in vigorous activity, or no overall change [95]. In understanding the reasons for these differences however, methodological issues need to be taken into consideration, including the emphasis that different studies place on leisure time physical activity (e.g. sport) vs. total energy expenditure (e.g. housework, walking to school), as well as the potential for questions relating to vigorous activities (e.g. that make you “huff and puff’) to become less meaningful as the overall fitness of a population declines.

In New Zealand, the only trend information on children’s physical activity comes from the New Zealand Sport and Physical Activity Surveys (undertaken by the Hilary Commission, reported on by Sports and Recreation New Zealand (SPARC)), which during 1997-01 noted a small decline in the number of children (5-17 yrs) who were active (68.9% in 1997→ 66.5% in 2001) and an increase in the number who were sedentary (no activity in past week 7.9% in 1997→ 12.8% in 2001) [99]. The following section explores the available information on physical activity in New Zealand using information from the 1997-2001 New Zealand Sport and Physical Activity Surveys [99], as well as the limited amount of cross-sectional information provided by the National Child Nutrition Survey [88]. While neither source is able to determine whether increases in total energy intake or decreases in physical activity have played the greatest role in the current obesity epidemic, increasing physical activity remains one of the mainstays of New Zealand’s current Healthy Eating, Healthy Action Strategy and thus an understanding of its determinants is of value in identifying potential intervention points for future strategy development.



Data Sources and Methods

Definition

Physical Activity in Children and Young People

Data Sources

The National Children's Nutrition Survey
The New Zealand Sport and Physical Activity Survey

Indicator Category

Bookmark C (**Table 133, Table 134**)

Notes on Interpretation

National Child Nutrition Survey (CNS02): The 2002 National Children's Survey was a cross sectional survey of 3,275 New Zealand children aged 5-14 years. A nationally representative sample was achieved by randomly selecting schools (190 schools identified, 172 (90.5%) participated) and within these schools, randomly selecting children. Over sampling of Māori and Pacific children occurred so ethnic specific analyses could be undertaken, with 1,160 Māori, 1,035 Pacific and 956 European/Other children having height and weight measurements taken. Measurements were carried out at school while the main interview was carried out at home in the presence of a parent or caregiver [88]

Physical activity measurements were based on the Physical Activity Questionnaire for Children, developed by Crocker et al [100] and adapted for New Zealand use after piloting in the New Zealand context. The scale has demonstrated acceptable internal consistency and validity in a number of overseas studies and is thought to have moderate external validity [88]. The questionnaire asks about activity patterns during the most recent school week, with mean activity ratings being calculated across a range of questions covering participation in sporting activities, transport to and from school and activities during school lunchtimes and breaks, as well as after school. While the majority of interviews were carried out at the child's home in the presence of a parent / caregiver, some interviews for those aged > 9 years were undertaken at school. Perceived limitations of the questionnaire include its inability to estimate total energy expenditure, or the intensity or duration of the activities children reported taking part in and the combining of European and Asian / Indian children in a single category called European / Other. In addition, the focus of the questionnaire is only on activities taking place during the school year [88].

The New Zealand Sport and Physical Activity Surveys (NZSPAS): The information in this section comes from the combined results of the Hillary Commission's (now Sport and Recreation NZ (SPARC)) 1997/98, 1998/99 and 2000/01 New Zealand Sport and Physical Activity Surveys [101]. Unless otherwise specified, the results quoted are based on the combined results of all 3 surveys and are complied from publications available on SPARC's website www.sparc.org.nz. In total, these 3 surveys collected information on 4,000 young peoples (age 5-17 years) who were chosen for the survey at random from 12 Regions covered by 17 Regional Sports Trusts. Interviews took place in each region during each month of the survey years to ensure that seasonal variations could be taken into account. Interviews took place in the young person's home, with questions being answered by an adult household member, although the young person could also help answer the questions if they were present during the interview. Information was collected about all of the sport and active leisure that the young person had taken part in during the past 2 weeks. The time the young person spent on their chosen sports and activities was then added to find how active they had been over the past 2 weeks and was categorised as per **Table 25** below.

While the NZSPAS is the only source of longitudinal and regional information on the participation of New Zealand's young people in sport and active leisure, the surveys are seen as having a number of limitations, particularly that for those aged 5-17 years, activity levels are based on parental report (which in a number of studies has been shown to correlate poorly with direct measures of physical activity). In addition, the NZSPAS survey tool has not been validated for the population under study and the focus has tended to be on sport and active leisure rather than physical activity per se. Finally, the levels of activity required to define a youth as physically active are lower than overseas, possibly over inflating New Zealand's levels of physical activity and making overseas comparisons difficult [94]. Nevertheless, these surveys provide a useful tool for assessing young people's participation in sport and exercise over time, as well as at a regional level. (Note: The methodology for collecting data from children and young people in the NZSPAS is currently being revised and it is likely that many of these issues will be addressed in future surveys).

New Zealand Distribution and Trends

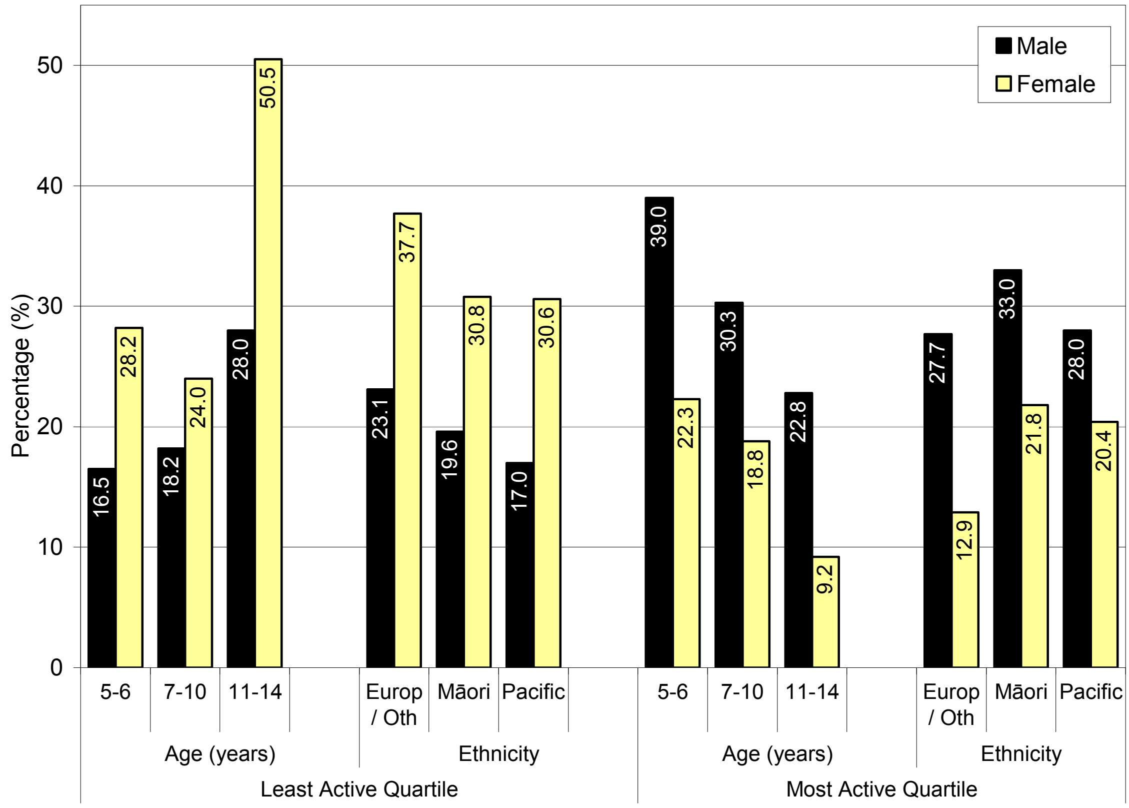
The 2002 National Children's Nutrition Survey

Total Physical Activity Scores

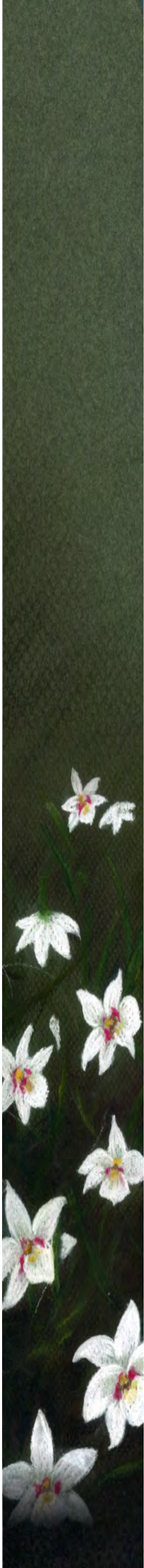
The 2002 National Children's Nutrition Survey (CNS02) measured children's physical activity in a variety of areas (e.g. sporting participation, travel to and from school, amount of time spent in various activities during / after school or at weekends). Each activity was scored on a 5 point scale (1=least active → 5=most active), with the overall activity rating being averaged across all 8 physical activity questions. Overall ratings were then ranked and children were assigned to one of four quartiles, with those in the lowest quartile being the least active and those in the highest quartile being the most active [88]. The main findings of this analysis were (**Figure 59**):

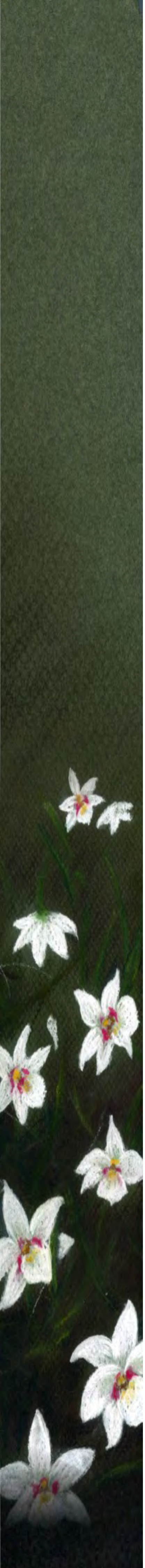
1. Females were more likely to be in the least active quartile, while males were more likely to be in the most active quartile.
2. The proportion in the least active quartile increased with age, while the proportion in the most active quartile decreased with age, for both genders.
3. European / Other children were more likely to be in the least active group and less likely to be in the most active group. Pacific children had the lowest proportion in the least active group, while Māori children had the highest proportion in the most active group.

Figure 59. Proportion of Children 5-14 Years in the Least and Most Active Physical Activity Quartiles by Gender, Age and Ethnicity, New Zealand National Children's Nutrition Survey 2002



Source: New Zealand National Children's Nutrition Survey 2002 [88]





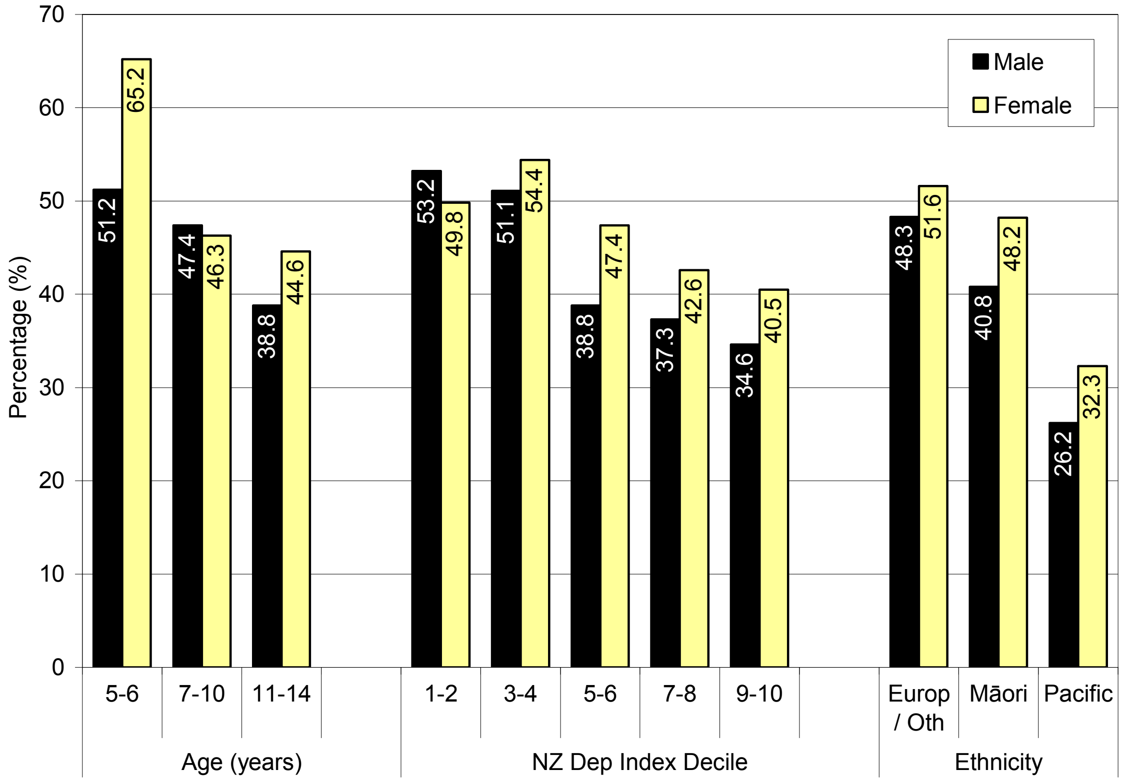
Travel to and From School

Included in the physical activity questions was one which asked, "*How many times during the past week did you walk, bike, skate or scooter to or from school*?" Analysis of those who did not travel to school by active means (e.g. were driven to school by car) suggested that:

1. The proportion of children transported to school decreased significantly with age, for both genders.
2. The proportion of children transported to school decreased with increasing NZDep deprivation, although only for males did differences between those in the most and least deprived NZDep areas reach statistical significance.
3. Pacific children were significantly less likely to be transported to school than European / Other children (Figure 60).

Note: While travel to and from school is only one element of physical activity undertaken by children in their everyday lives, the ability of the CNS02 Survey to capture elements of day-to-day physical activity, over and above those associated with sport or active leisure, may be one of the reasons why the findings of the CNS02 differ in some respects from those of the NZSPAS presented in the section which follows.

Figure 60. Proportion of Children 5-14 Years Who Did Not Travel to School by Active Means by Gender, Age, NZ Deprivation Index and Ethnicity, New Zealand National Children's Nutrition Survey 2002



Source: New Zealand National Children's Nutrition Survey 2002 [88]

The New Zealand Sport and Physical Activity Surveys

During the course of 3 separate surveys (1997/98, 1998/99 and 2000/01) the Hillary Commission (now SPARC) interviewed the caregivers of 4,000 children and young people aged 5-17 years. Questions focused on the amount of time spent on either sport or active leisure during the past 2 weeks, with children being assigned to 1 of 4 groups (sedentary, relatively inactive, relatively active, highly active) based on their parent's responses and the criteria outlined in Table 25.

Table 25. Definitions of Physical Activity used in the New Zealand Sport and Physical Activity Surveys for Children Aged 5-17 Years, 1997-2001

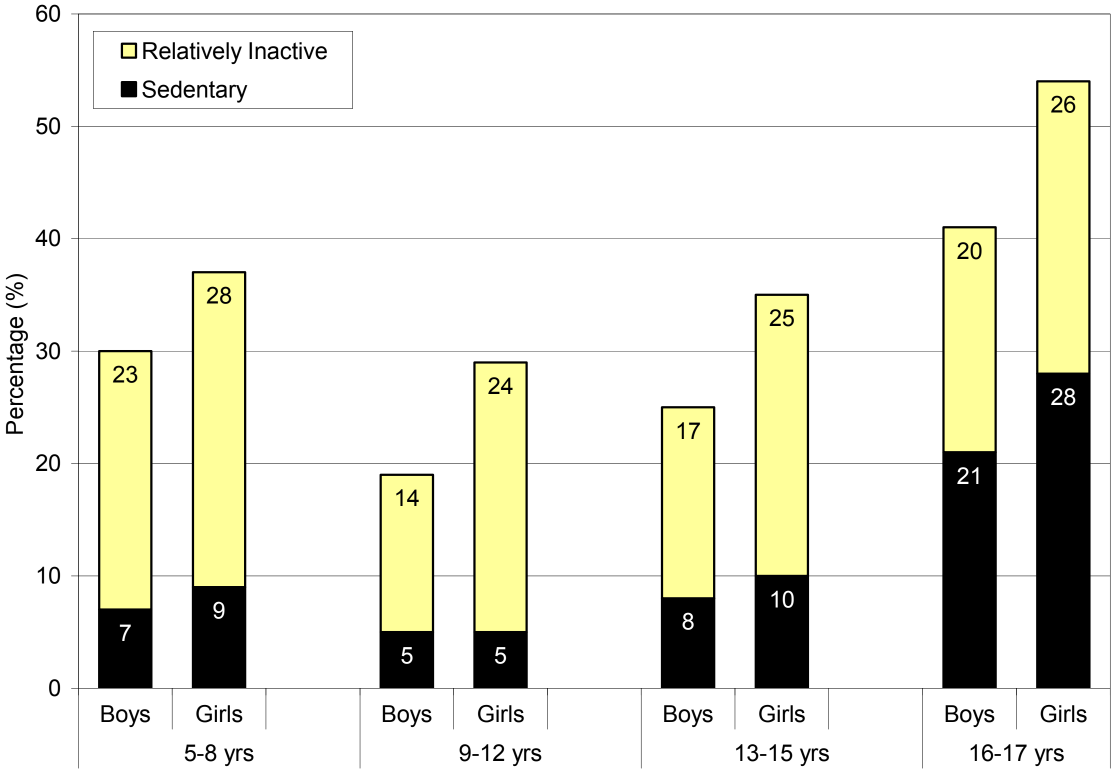
Activity Level	Category	Description
Physically Inactive	Sedentary	No sport / leisure-time physical activities in the 2 weeks before the interview.
	Relatively Inactive	Took part in some leisure time physical activity in the 2 weeks before the interview (but not necessarily in the past 7 days) and all those who took part in <2.5 hours in the 7 days before the interview.
Physically Active	Relatively Active	Took part in at least 2.5 hours, but less than 5 hours of sport / leisure time physical activity in the 7 days before the interview.
	Highly Active	Took part in 5 hours or more of sport / leisure time physical activity in the 7 days before the interview.

Source: Sport and Recreation NZ [101]

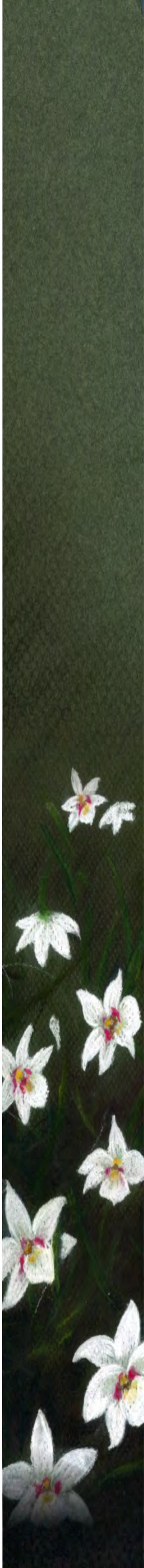
A combined analysis of these 3 surveys suggested that:

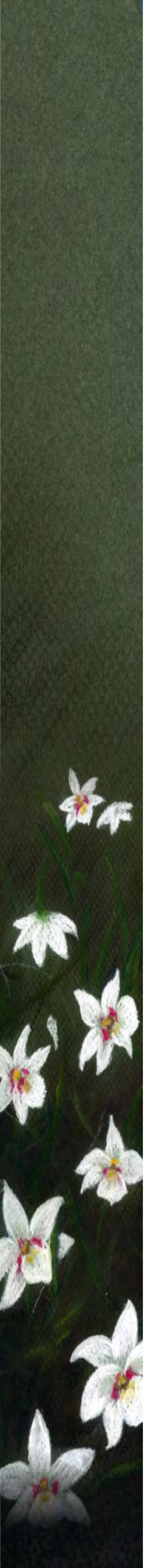
1. On average, 32% of children and young people 5-17 years were inactive (< 2.5 hours sport or active leisure in past 7 days).
2. At every age, females were more likely to be inactive than males (Figure 61).
3. The proportion of children who were inactive increased progressively from late childhood to adolescence (Figure 61).
4. Levels of inactivity were higher for Pacific and Other children and young people than they were for Māori and European children and young people (Figure 62)

Figure 61. Children and Young People 5-17 Years Who Were Sedentary or Relatively Inactive by Gender and Age, NZ Sport and Physical Activity Surveys 1997-2001



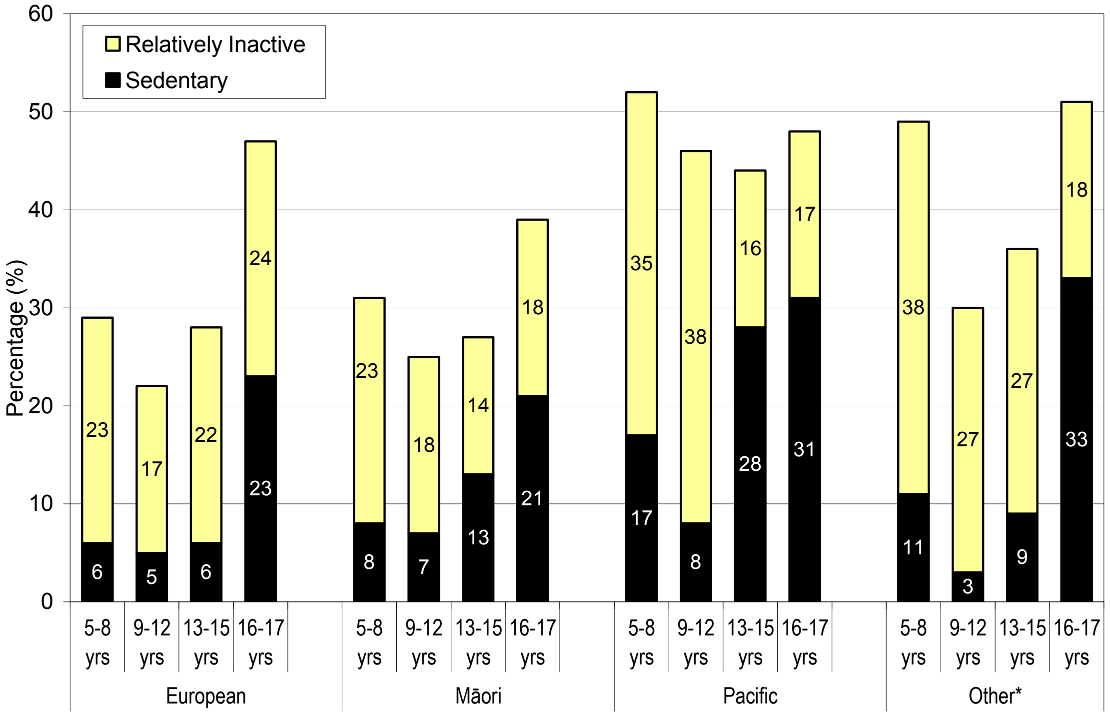
Source: Sport and Recreation NZ [101]





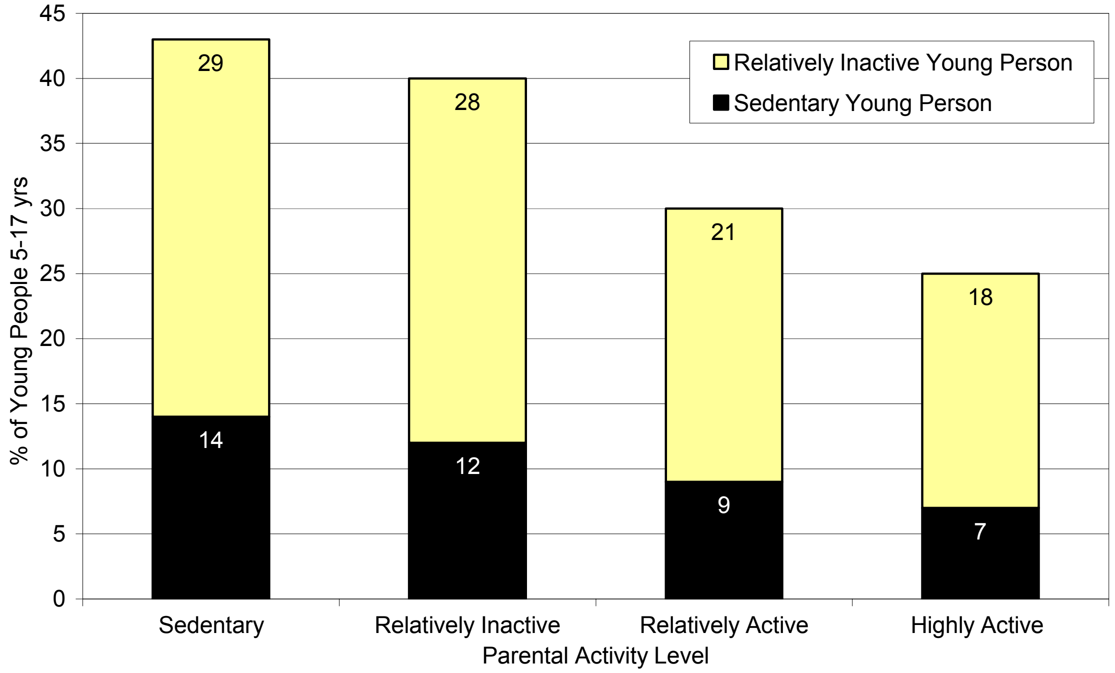
5. Young people's activity levels were influenced by their parent's activity levels, with only 25% of young people being inactive if their parents were highly active, as opposed to 43% being inactive if their parents were sedentary (Figure 63).
6. There were regional variations in the proportion of children and young people who were inactive, with rates ranging from 22% to 42% depending on the region studied (Table 26).

Figure 62. Children and Young People 5-17 Years Who Were Sedentary or Relatively Inactive by Age and Ethnicity, NZ Sport and Physical Activity Surveys 1997-2001



Source: Sport and Recreation NZ [102-105]. Note:*Other includes Asian, African and Middle Eastern.

Figure 63. Children and Young People 5-17 Years Who Were Sedentary or Relatively Inactive by Parental Activity Level, NZ Sport and Physical Activity Surveys 1997-2001



Source: Sport and Recreation NZ [101].

Table 26 Activity Levels of Children and Young People 5-17 Years by Regional Sports Trust, NZ Sport and Physical Activity Surveys 1997-2001

Regional Sports Trust	% Active	% Inactive
Northland	67	33
North Harbour and Waitakere	71	29
Auckland	63	37
Counties Manukau	58	42
Waikato	73	27
Bay of Plenty	67	33
Hawkes Bay and Gisborne	68	32
Taranaki, Whanganui and Manawatu	69	31
Wellington	70	30
Tasman	78	22
Canterbury and Westland	71	29
Otago and Southland	72	28
New Zealand	68	32

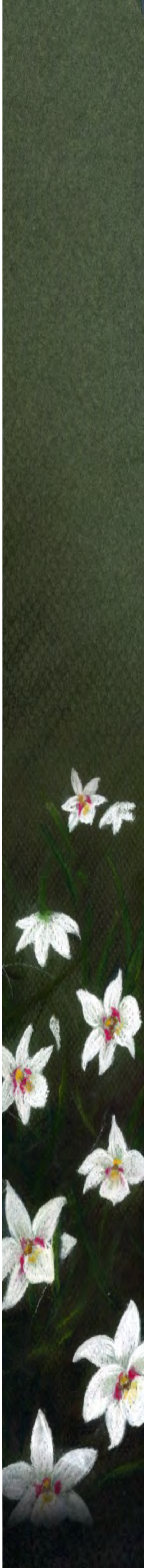
Note: Rates have not been adjusted for regional demography and it is not recommended that they be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion). Source: Sport and Recreation NZ [106]

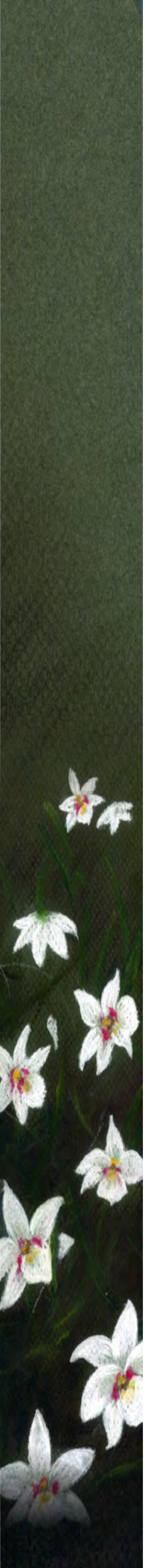
Summary and Policy Implications

While data limitations make it difficult to determine whether increases in total energy intake or decreases in physical activity have played the greatest role in the current obesity epidemic, increasing physical activity remains one of the mainstays of New Zealand's current Healthy Eating, Healthy Action Strategy and thus an understanding of its determinants is of value in identifying potential intervention points for future strategy development. The New Zealand Children's Nutrition Survey provides limited information on physical activity in children, while the New Zealand Sport and Physical Activity Surveys have monitored children's participation in active sport and leisure since 1997. While methodological differences mean that the findings of these two surveys cannot be directly compared, a number of themes emerged from these surveys, including:

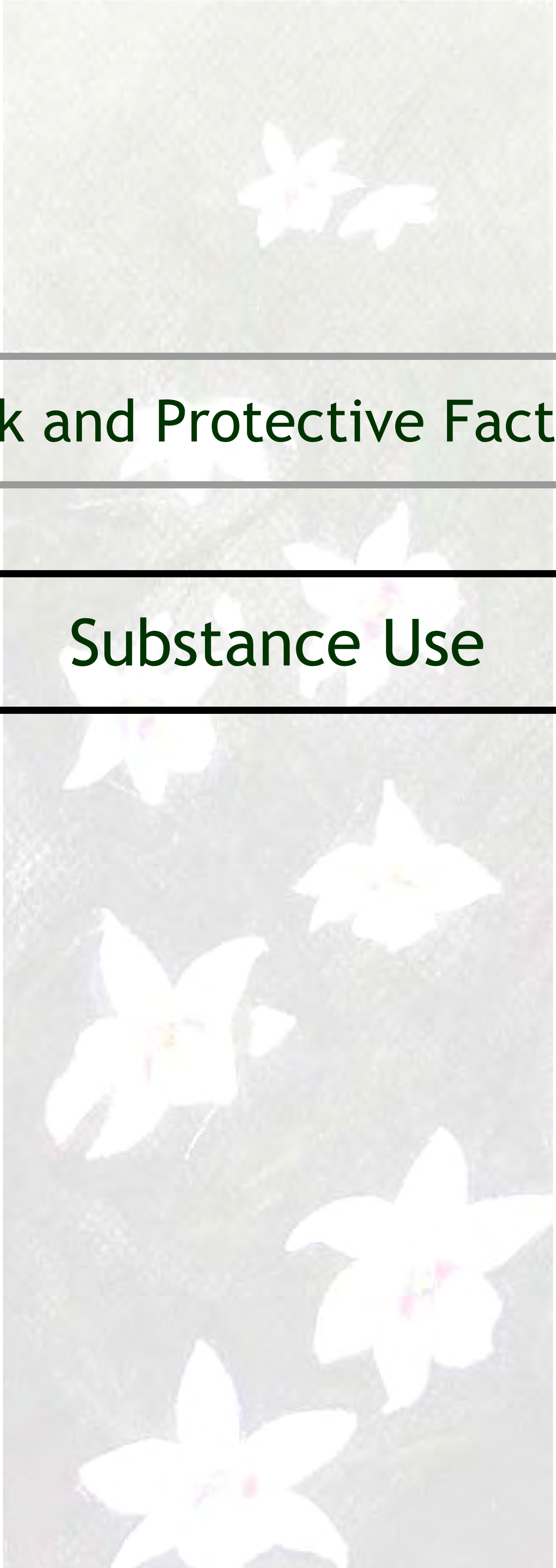
1. Approximately 32% of New Zealand children 5-17 years are inactive (NZSPAS).
2. Girls are more likely to be inactive than boys (NZSPAS and CNS02).
3. The proportion of children and young people who are inactive increases with age (NZSPAS and CNS02).
4. The physical activity levels of children and young people are influenced by the activity levels of their parents (NZSPAS).
5. During 1997-2001, the overall physical activity levels of New Zealand children and young people may have declined (NZSPAS).

In addition, an apparent contradiction between the two surveys emerged related to ethnic differences in physical activity. While the CNS02 suggested that European/Other children were the most inactive group, the NZSPAS suggested that Pacific children were at greatest risk. In interpreting these findings it must be remembered that these surveys used different methodologies. While the CNS02 interviewed children about both their daily activity levels and incidental physical activity (e.g. travel to school), NZSPAS was based on parental report and focused on participation in sports and active leisure. It is possible that the CNS02 thus more readily captured elements of children's day to day activity, while the NZSPAS emphasised those elements relating to organised sport. In addition, the CNS02 combined European and Asian children into a





single group, whereas the NZSPAS suggested that these two groups were quite different. Despite these limitations, these findings suggest that at least a third of New Zealand children and young people are either sedentary or relatively inactive and that there is significant potential to achieve gains in physical activity within the context of the current obesity epidemic.



Risk and Protective Factors

Substance Use

Exposure to Cigarette Smoke in the Home

Introduction

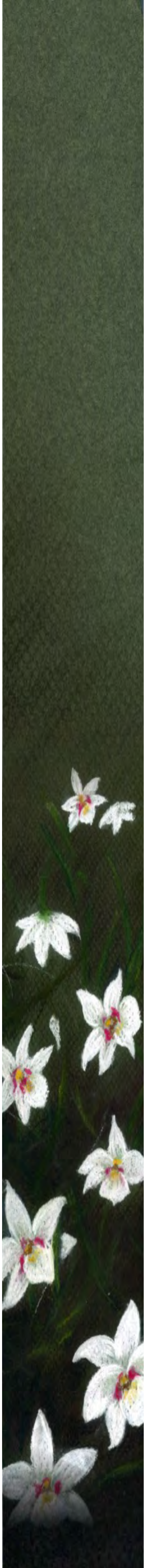
In New Zealand each year, it has been estimated that exposure to second hand smoke results in:

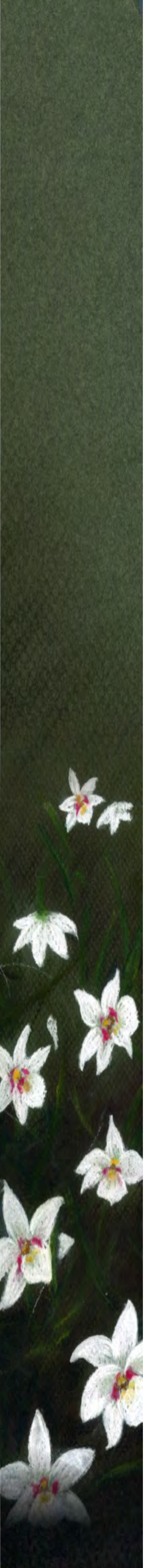
- 500 hospital admissions for chest infections in children <2 years
- 15,000 episodes of childhood asthma
- 27,000 GP consultations for asthma and respiratory problems
- 1,500 operations to treat glue ear
- 50 cases of meningococcal disease [107]

In addition, in utero exposure to cigarette smoke has been associated with a number of adverse outcomes including intrauterine growth restriction, sudden infant death syndrome, impaired cognitive development and childhood behavioural problems [108]. Furthermore, it has been suggested that the financial costs of smoking impact disproportionately on children in low income families, with up to 14% of non-housing related income in one study being spent on the purchase of tobacco related products [109]. Finally, parental smoking significantly increases the likelihood that children will smoke during their adolescent years [110], which if continued, increases their risk of outcomes such as ischaemic heart disease, lung cancer and chronic obstructive respiratory disease in later life.

Estimates of the proportion of New Zealand children exposed to cigarette smoke in their homes vary, from as high as 26.5% amongst 14-15 year olds in a recent ASH Survey [111], to as low as 9.5% (daily exposure) in a recent research report [112]. The same report also suggests that while 19.6% of the general population smokes, only 47% of smokers smoke inside their homes. Reasons given for outdoor smoking policies included not wanting to expose others to second hand smoke and setting a good example for children [112]. The extent to which such outdoor smoking policies protect children from passive smoke exposure remains unclear however, with one recent New Zealand study suggesting that hair nicotine levels in children were significantly elevated in smoking households irrespective of whether family members smoked inside or outside their homes [113]. In contrast, another study (using different exposure measures) suggested that while environmental tobacco smoke and its contaminants (e.g. dust and surface contamination) were 5-7 times higher in households where smokers tried to protect their infants by smoking outside, such exposures were 3-8 times higher again amongst those who continued to smoke indoors i.e. outside smoking policies, while not being able to confer full protection, nevertheless did reduce the amount of exposure infants and young children had to tobacco smoke and its contaminants within the home [114].

The following section reviews the exposure of New Zealand children to cigarette smoke within their homes using two different data sources: the percentage of Year 10 students reporting exposure to cigarette smoke in their homes in ASH's annual surveys and the percentage of children <15 years living in a household with a smoker at the 1996 and 2006 Censuses.





Data Source and Methods

Definition

1. Proportion of Year 10 students with parents who smoke or who live in a home with smoking inside
2. Proportion of Children <15 years who Live in a Household with a Smoker (Census)

Data Source and Interpretation

1. Proportion of Year 10 students with parents who smoke or who live in a home with smoking inside

ASH Surveys

Numerator: Number of year 10 students who report that one or both parents smoke or who live in a house where smoking is allowed inside

Denominator: Number of Year 10 Students surveyed

Interpretation: Action on Smoking and Health (ASH) was established in 1982 with the aim of reducing smoking and smoking related premature deaths. While the Ministry of Health provides funding for the annual national Year 10 Smoking Survey, ASH manages the data collection and oversees its analysis [111]. Since 1997, ASH has conducted annual surveys of smoking behaviour in Year 10 (14-15 yrs) students since 1999, collecting information from >30,000 students annually. In 2000 and 2001, >70% of schools in New Zealand participated, and of these 70% of enrolled students took part [110]. Questionnaires are self administered and cover demographic variables as well as smoking related issues. Survey forms with instructions are mailed to all secondary schools and teachers supervise the completion of the questionnaires by students. It has been suggested that such a design means it is not always clear how the sample has been selected and how consistently the survey has been administered, however, the large sample size and annual frequency makes the survey useful for monitoring smoking behaviour of Year 10 students in New Zealand, and a useful tool for understanding trends and risk factors for smoking initiation [115].

2. Proportion of Children <15 years who Live in a Household with a Smoker

Census

Numerator: Number of children 0-14 yrs who live in a household with someone who answered yes to the Census question "*Do you smoke cigarettes regularly (that is one or more per day)?"*

Denominator: The number of children 0-14 years at the Census

Interpretation: Census data categorises those >15 years into two groups: smokers and non smokers, with missing responses being assigned to the non-smoking category. Thus Census data may underestimate the proportion of smokers, as the number with missing information is unspecified. In addition, because at the time of writing the NZDep2006 Index had not been released, 2006 Census meshblocks have been back mapped to their NZDep scores at the 2001 Census, with new meshblocks taking on the NZDep2001 score of the largest of the meshblocks from which they were derived. Differences in the way in which ethnicity questions were structured between the two Censuses also mean that information on ethnicity between 1996 and 2006 may not be strictly comparable. These issues must be borne in mind when interpreting the figures in the section which follows.

Indicator Category

Proxy B (**Table 133, Table 134**)

New Zealand Data and Trends

Exposure to Cigarette Smoke in the Home: ASH Survey Data

Since 2001, ASH's annual surveys of the smoking behaviour of Year 10 students have included a question on parental smoking ("*Which of these people smoke? (tick one or more that apply), mother, father, older brother or sister, best friend, none of these"),* as well as a question on exposure to cigarette smoke within the home (*"Do people smoke inside your house?"*) [110]. The following section uses ASH Survey data to explore trends in parental smoking behaviour and exposure to cigarette smoke within the home for young people aged 14-15 years during 2001-2006.

Trends in Parental and Household Smoking Behaviour

In New Zealand during 2001-2006, the proportion of Year 10 students with a parent(s) who smoked changed little, being 40.3% in 2001 and 39.9% in 2006. In contrast, the proportion of students who lived in homes where smoking was permitted inside declined, from 30.5% in 2001 to 25.0% in 2006 **(Figure 64**).

Ethnic Differences in Parental and Household Smoking Behaviour

In New Zealand during 2001-2006, there were no significant changes in parental smoking rates for Māori (2001 66.0% → 2006 65.1%) and Pacific (2001 50.0% → 49.2%) students, although parental smoking rates for European / Other (2001 34.1% →

32.9%) and Asian (2001 29.9% → 2006 25.7%) students did decline significantly. Throughout this period, marked ethnic disparities remained, with parental smoking rates remaining higher for Māori > Pacific > European / Other > Asian students. While ethnic disparities were also evident for exposure to cigarette smoke in the home, exposure rates were lower than parental smoking rates might predict, potentially suggesting the presence of in-house non-smoking policies in families of all ethnic groups. In contrast to parental smoking rates, during 2001-2006 the proportion of 14-15 year olds exposed to smoking in their homes declined significantly for all ethnic groups, with rates falling from 47.4% → 39.8% for Māori, from 34.6% → 27.4% for Pacific, from 27.1% → 21.6% for European / Other and from 20.0% → 15.2% for Asian students (**Figure 65**).

Socioeconomic Differences in Parental and Household Smoking Behaviour

Similarly, with the exception of students attending schools in the most affluent areas, parental smoking rates by school socioeconomic (SES) decile did not change significantly during 2001-2006, with the proportion of Year 10 students reporting at least one parent smoking remaining persistently elevated amongst those attending schools in the most deprived areas. Exposure to smoking within the home also exhibited a marked socioeconomic gradient (school decile 1-2 > 3-4 > 5-6 > 7-8 > 9-10), although exposures were much lower than parental smoking rates might predict, again suggesting the presence of in house non-smoking policies across all socioeconomic groups. In contrast to parental smoking rates however, exposure to smoking within the home declined significantly for all socioeconomic groups, with rates decreasing from 42.1% → 40.0% for those attending schools in the most deprived (decile 1-2) areas, from 34.7% → 29.1% for those attending schools in average (decile 5-6) areas and from 20.6% → 15.1% for those attending schools in the most affluent (decile 9-10) areas (**Figure 66**).

Figure 64. Proportion of Year 10 Students with Parents who Smoke or who Live in a Home with Smoking Inside, New Zealand ASH Surveys 2001-2006

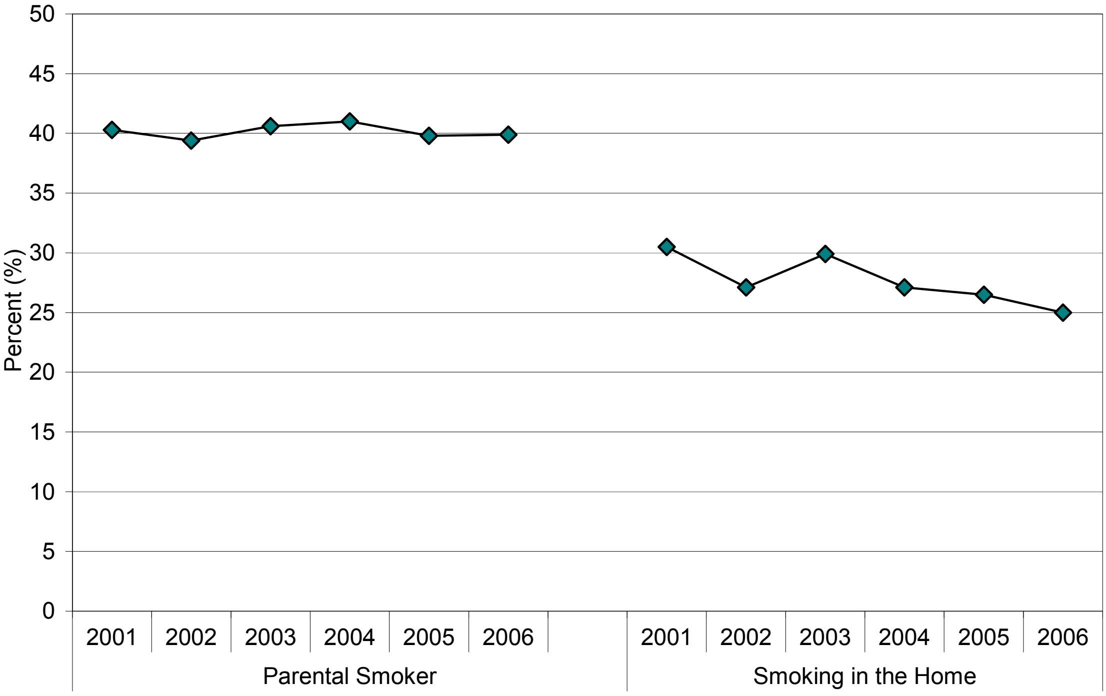


Figure 65. Proportion of Year 10 Students with Parents Who Smoke or Who Live in a Home with Smoking inside by Ethnicity, New Zealand ASH Surveys 2001-2006

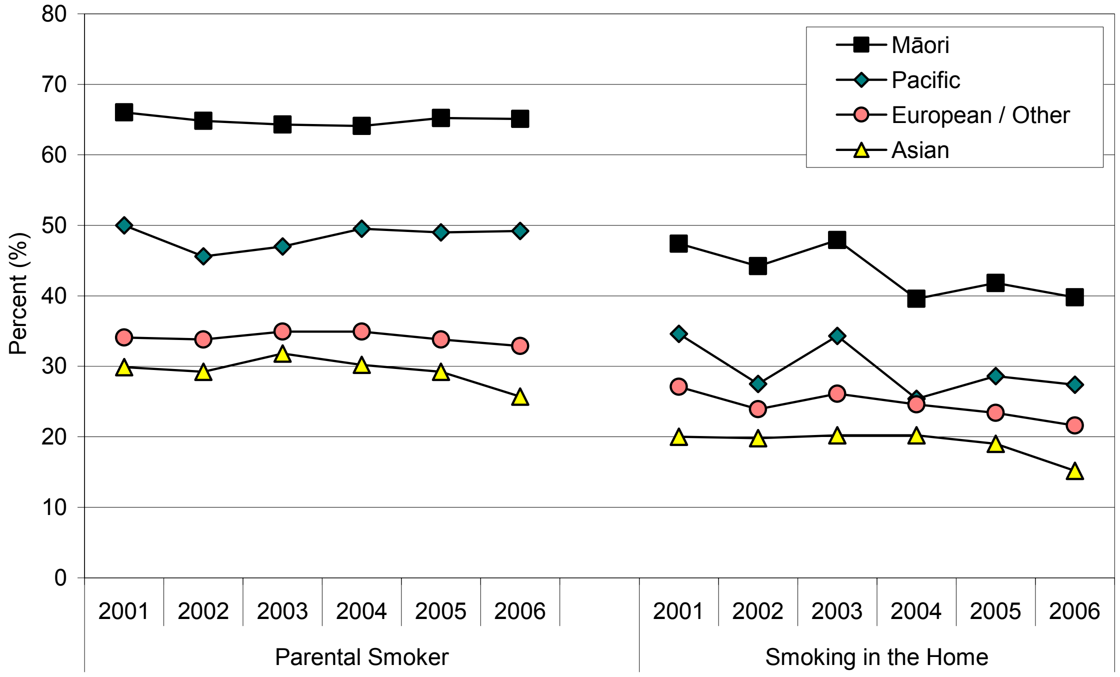
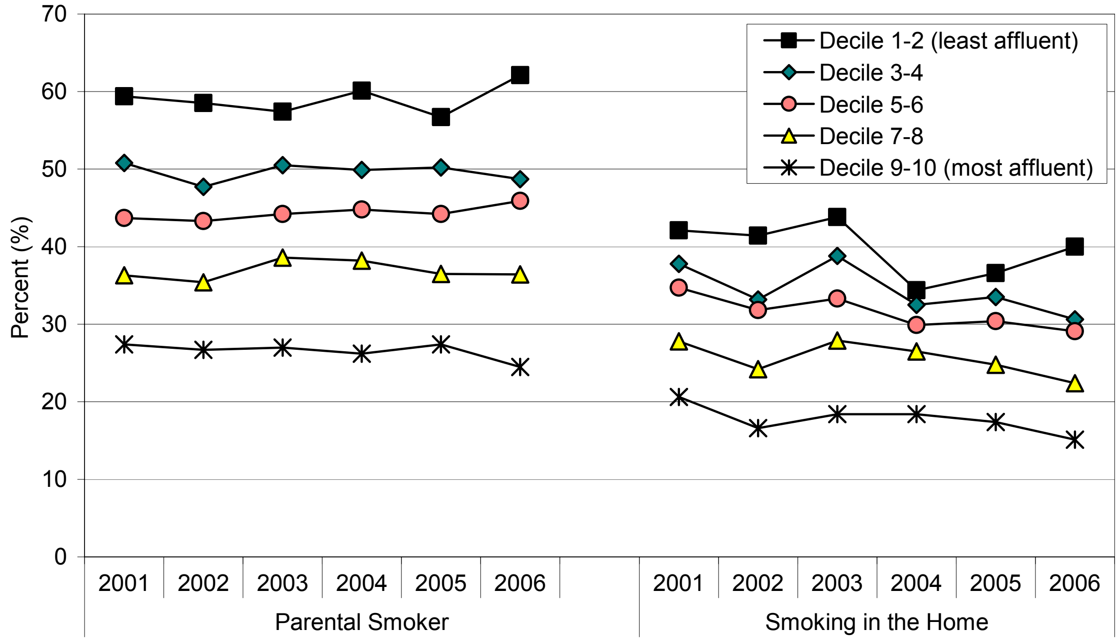


Figure 66. Proportion of Year 10 Students with Parents Who Smoke or Who Live in a Home with Smoking Inside by School Socioeconomic Decile, New Zealand ASH Surveys 2001-2006



Regional Differences in Parental and Household Smoking Behaviour

During 2006 there were also marked regional differences in parental and household smoking behaviour, with the proportion of Year 10 students with parents who smoked ranging from 29.6% to 53.6% depending on the region studied. Similarly, the proportion that lived in households which permitted smoking inside ranged from 18.5% to 35.8% (**Table 27**).

Table 27. Proportion of Year 10 Students with Parents Who Smoke and Who Live in a Home with Smoking Inside by DHB, New Zealand ASH Survey 2006

DHB	Parental Smoking (%)	Smoking in the Home (%)
Northland	53.6	35.8
Waitemata	33.5	21.5
Auckland	29.6	18.5
Counties Manukau	41.9	26.5
Waikato	40.8	26.2
Lakes	49.9	30.1
Bay of Plenty	42.7	24.4
Tairawhiti	53.4	29.3
Taranaki	44.8	31.4
Hawkes Bay	46.5	28.2
Whanganui	50.7	35.8
MidCentral	51.7	35.8
Hutt	41.4	25.0
Capital and Coast	34.7	19.7
Wairarapa	45.7	30.4
Nelson Marlborough	35.7	22.6
West Coast	47.4	38.4
Canterbury	36.8	21.1
South Canterbury	42.8	26.9
Otago	38.9	23.1
Southland	38.2	27.8
New Zealand	39.9	25.0

Note: Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)

Exposure to Cigarette Smoke in the Home: Census Data

Total Smoking Exposure and Ethnic Differences

In New Zealand during 1996, 40.2% of children (0-14 yrs) lived in a household with a smoker. Marked ethnic disparities were also evident during this period, with 62.7% of Māori and 49.5% of Pacific children living in a household with a smoker, as compared to 32.9% of European and 22.2% of Asian / Indian children. While by 2006 this figure had fallen 35.3%, ethnic disparities remained, with 59.3% of Māori and 48.1% of Pacific children living in a household with a smoker, as compared to 27.5% of European and 18.5% of Asian / Indian children (**Figure 67**).

Socioeconomic Differences

There were also socioeconomic differences in the proportion of New Zealand children living in households with a smoker during 1996, with rates rising progressively from 20.8% amongst those living in the most affluent (Decile 1) areas, to 59.7% amongst those living in the most deprived (Decile 10) areas. While by 2006 rates had declined for all socioeconomic groups, socioeconomic differences still remained, with the proportion of children living in a household with a smoker rising from 15.8% amongst those living in the most affluent areas to 56.6% amongst those in the most deprived areas (**Figure 68**).

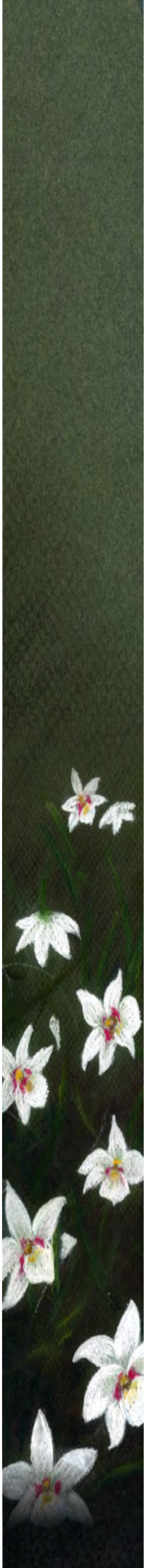


Figure 67. Proportion of Children 0-14 Years Living in a Household with a Smoker by Ethnicity, New Zealand at the 1996 and 2006 Censuses

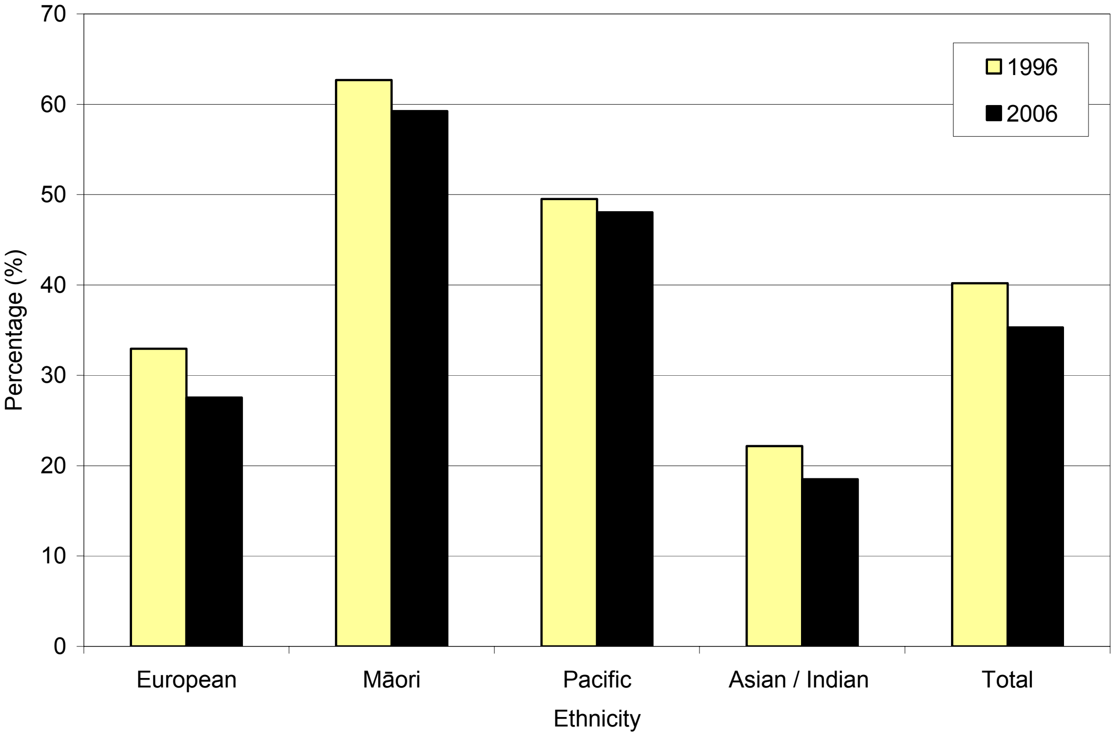
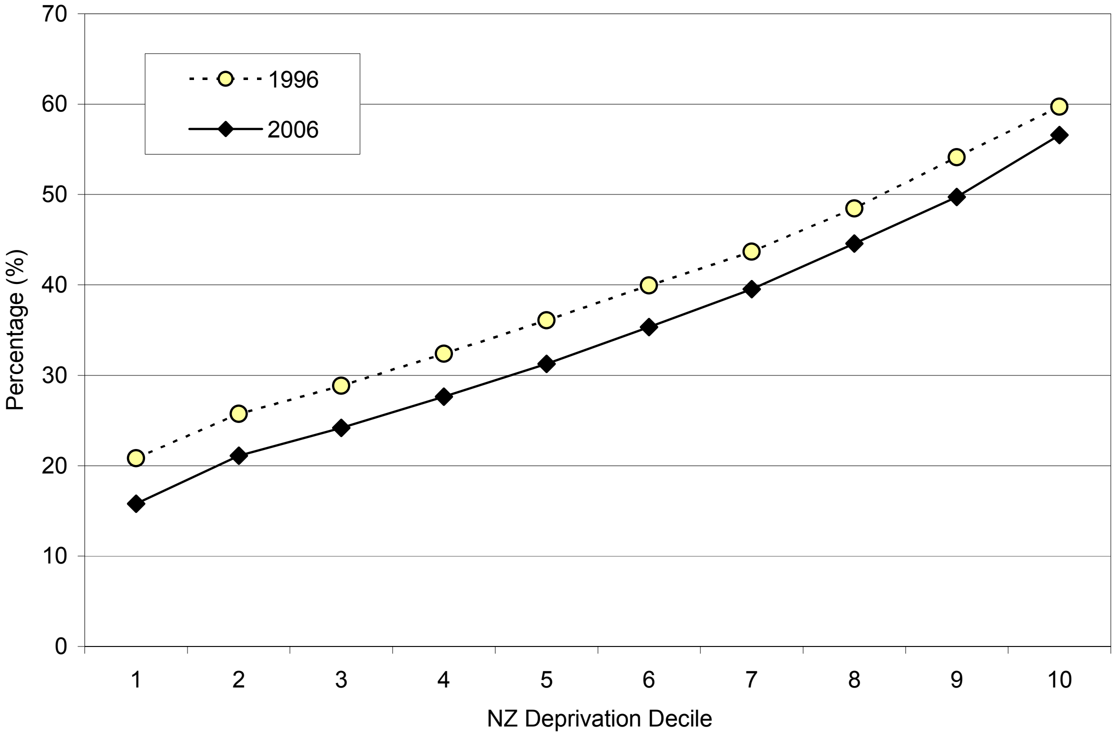


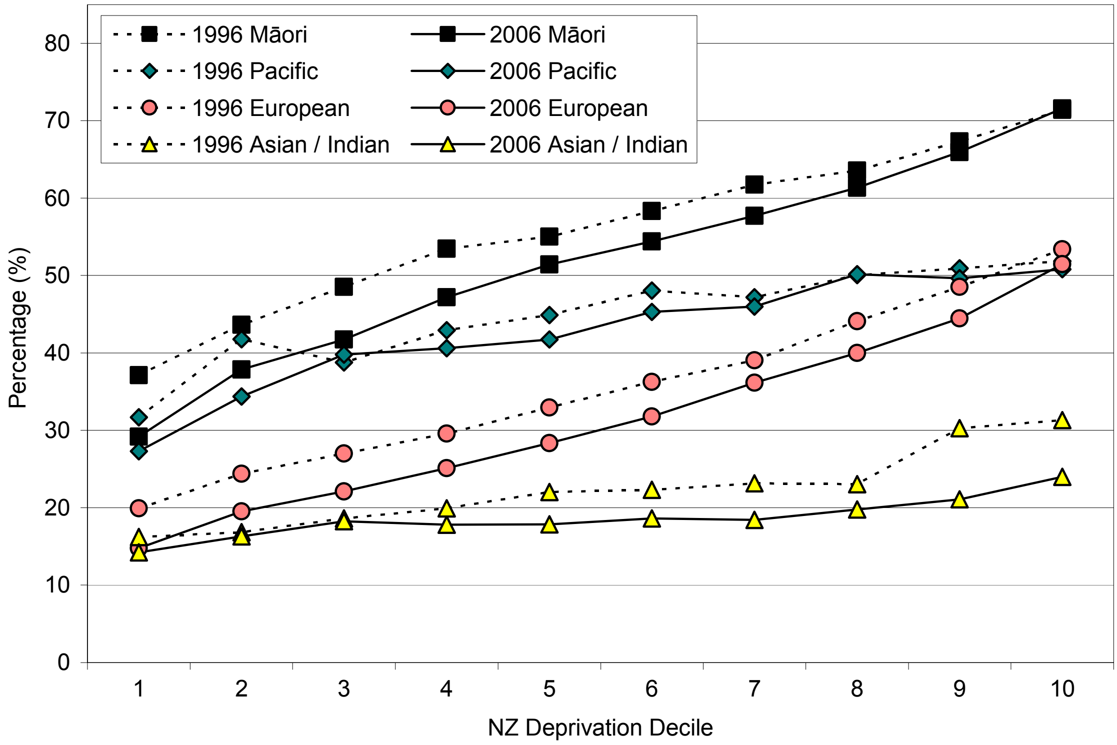
Figure 68. Proportion of Children 0-14 Years Living in a Household with a Smoker by NZ Deprivation Index Decile, New Zealand at the 1996 and 2006 Censuses



Relationship between Socioeconomic Status and Ethnicity

In addition, at both the 1996 and 2006 Censuses, while the proportion of children living in a household with a smoker increased with increasing socioeconomic deprivation for each of New Zealand's largest ethnic groups, at nearly every level of socioeconomic deprivation, household smoking rates remained higher for Māori > Pacific > European > Asian / Indian children (**Figure 69**).

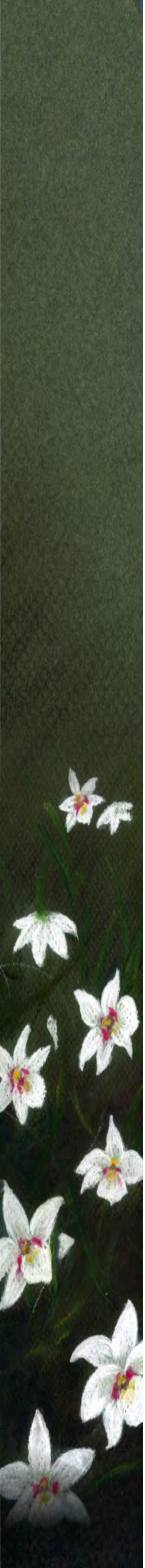
Figure 69. Proportion of Children 0-14 Years Living in a Household with a Smoker by Ethnicity and NZ Deprivation Index Decile, New Zealand at the 1996 and 2006 Censuses



Summary

Exposure to second hand cigarette smoke is responsible for a large number of general practice visits and hospital admissions during childhood. In addition, exposure in utero has been associated with intrauterine growth restriction, sudden infant death syndrome, impaired cognitive development and childhood behavioural problems. Parental smoking is also thought to increase the likelihood that children will take up smoking during adolescence, which if continued, increases the risk of adverse health outcomes in later life.

In New Zealand during 2006, ASH Surveys suggested that 39.9% of Year 10 students had a parent that smoked and that parental smoking rates were higher amongst Māori > Pacific > European / Other > Asian students and those attending schools in the most deprived areas. While socioeconomic and ethnic disparities were also observed for exposure to smoke in the home, exposures were lower than parental smoking rates might predict, potentially suggesting the presence of in-house non-smoking policies among families of all socioeconomic and ethnic groups. Data from the 2006 Census painted a similar picture, with 35.3% of New Zealand children 0-14 years living in a household with a smoker and exposures being higher for Māori >Pacific >European >Asian / Indian children and those living in the most deprived areas. Given the significant associations between passive smoking and outcomes such as SIDS, bronchiolitis, and pneumonia during childhood, it is likely that exposure to second hand cigarette smoke made a significant contribution to disparities in child health outcomes during this period.



Tobacco Use in Young People

Introduction

ASH Surveys suggest that in New Zealand during 2006, 14.2% of young people aged 14-15 years smoked at least monthly, with 8.2% smoking on a daily basis [116]. Factors associated with higher smoking rates included gender (female > male), ethnicity (Māori > Pacific> European > Asian), relative socioeconomic deprivation (school decile: least affluent > more affluent), parental smoking (both parents > one parent > neither parent) [116], pocket money (larger amounts > smaller amounts) [117] and peer smoking behaviour [118].

The disparities highlighted by this survey are a cause of concern, as the Christchurch Longitudinal Study has shown that amongst adolescents, the transition from non-smoking to smoking is a one way process that accelerates with age and that once teenagers graduate to a given smoking status, return to earlier stages is uncommon [119]. These findings are also supported by overseas research, which suggests that 33-50% of young people who try smoking (even a few cigarettes), become regular smokers, with the transition taking on average 2-3 years. Once smoking regularly, the well documented signs of nicotine dependence and withdrawal become as evident amongst adolescents, as they do in the adult population [120]. As a consequence, adolescent smoking is one of the key predictors of adult smoking behaviour, with ¾ of adult smokers trying their first cigarettes and becoming daily smokers before the age of 18 years. Early onset smoking in turn, has been associated with an increased risk of heavy smoking and smoking related diseases [120], including coronary heart disease, stroke, lung cancer and chronic obstructive lung disease and in the context of passive smoking, childhood respiratory disease, fetal growth restriction and SIDS [107]. Thus any initiatives which reduce the uptake of smoking amongst adolescents will have far reaching effects, not only for the current generation of New Zealand young people as they reach adulthood, but also for the next generation of New Zealand children who, as a result of their parent's smoking, are likely to be exposed to cigarette smoke in utero and during their early years.

The following section reviews information on youth smoking behaviour in New Zealand using data from two different sources. The first is the annual ASH Year 10 Surveys, which collect information on the smoking behaviour of >30,000 14-15 year old secondary school students in New Zealand each year, while the second is the New Zealand Census (1996 and 2006), which collects information on the number of young people aged >15 years who smoke on a regular basis.

Data Source and Methods

Definition

1. Proportion of Year 10 Students who are Daily Smokers
2. Proportion of Young People 15-24 years who are Regular Smokers

Data Source and Interpretation

1. Proportion of Year 10 Students who are Daily Smokers

ASH Surveys

Numerator: Number of Year 10 Students who are regular smokers (ASH Year 10 Survey)

Denominator: Number of Year 10 Students surveyed (ASH Year 10 Survey)

Interpretation: Action on Smoking and Health (ASH) was established in 1982 with the aim of reducing smoking and smoking related premature deaths. While the Ministry of Health provides funding for the annual national Year 10 Smoking Survey, ASH manages the data collection and oversees its analysis [111]. Since 1997, ASH has conducted annual surveys of smoking behaviour in Year 10 (14-15 yrs) students since 1999, collecting information from >30,000 students annually. In 2000 and 2001, >70% of schools in New Zealand participated, and of these 70% of enrolled students took part [110]. Questionnaires are self administered and cover demographic variables as well as smoking related issues.

Survey forms with instructions are mailed to all secondary schools and teachers supervise the students' completion of the questionnaires. It has been suggested that such a design means it is not always clear how the sample has been selected and how consistently the survey has been administered, however, the large sample size and annual frequency makes the survey useful for monitoring smoking behaviour of Year 10 students in New Zealand, and a useful tool for understanding trends and risk factors for smoking initiation [115].

2. Proportion of Young People 15-24 years who are Regular Smokers
Census
Numerator: The number of young people aged 15-24 yrs who answered yes to the Census question "Do you smoke cigarettes regularly (that is one or more per day)?"
Denominator: The number of young people 15-24 years at the Census
Interpretation: Census data categorises those >15 years into two groups: smokers and non smokers, with missing responses being assigned to the non-smoking category. Thus Census data may underestimate the proportion of smokers, as the number with missing information is unspecified. In addition, because at the time of writing the NZDep2006 Index had not been released, 2006 Census meshblocks have been back mapped to their NZDep scores at the 2001 Census, with new meshblocks taking on the NZDep2001 score of the largest of the meshblocks from which they were derived. Differences in the way in which ethnicity questions were structured between the two Censuses also mean that information on ethnicity between 1996 and 2006 may not be strictly comparable. These issues must be borne in mind when interpreting the figures in the section which follows.

Indicator Category
Ideal B (**Table 133, Table 134**)

New Zealand Distribution and Trends

ASH Survey Data

Since 1999, ASH has conducted surveys of >30,000 Year 10 students annually, with >70% of schools in New Zealand participating, and >70% of students taking part [110]. The results reflect the smoking behaviour of 14-15 year old secondary school students in New Zealand and are useful in understanding trends and risk factors for smoking initiation in this country.

New Zealand Trends

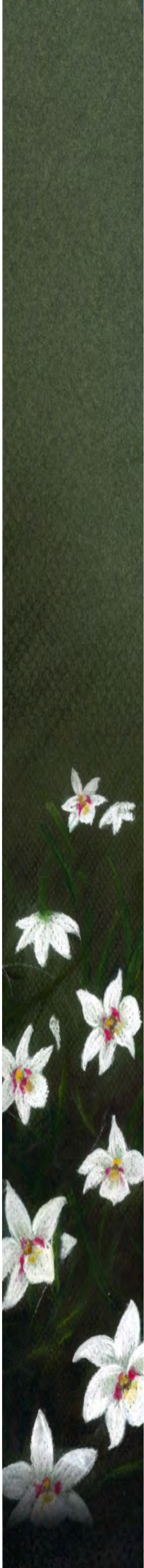
In New Zealand during 1999-2006 the proportion of Year 10 students who were daily smokers declined, from 15.6% in 1999 to 8.2% in 2006. Similarly, the proportion who had never smoked increased, from 31.6% in 1999 to 53.8% in 2006 (**Figure 70**).

Gender and Ethnicity

During 1999-2006, while daily smoking rates for Māori and Pacific students were higher amongst females; daily smoking rates for Asian students were higher amongst males. There were also marked ethnic differences in daily smoking rates, with rates being higher for Māori > Pacific > European / Other > Asian students. During this period however, daily smoking rates declined for all ethnic groups (Māori female -29%; Māori Male -38%; Pacific female -44%; Pacific male -46%; Asian female -66%; Asian male -54%; European / Other female -51%; European / Other male -66%) (**Figure 71**).

Socioeconomic Status

During 1999-2006, there were marked socioeconomic (SES) differences in daily smoking rates amongst Year 10 students, with rates being highest for those attending schools in the least affluent areas. While gender differences were again evident, these diminished as the level of affluence increased, with the marked female predominance evident in schools in the least affluent areas virtually disappearing in the most affluent schools. Again, daily smoking rates declined for all school SES deciles, although in relative terms, once adjusted for ethnicity, these declines were greatest for those attending the most affluent schools (Decile 1-2 (least affluent) females -22%, males -26%; Decile 5-6 (average) females -36%, males -58%; Decile 9-10 (most affluent) females -62%, males -69%) (**Figure 72**).



Parental Smoking

During 2001-2006, daily smoking rates were highest amongst students for whom both parents smoked > one parent smoked > neither parent smoked. While daily smoking rates declined for all 3 groups, once relative changes had been adjusted for age, sex and ethnicity, smoking rates declined more slowly amongst those with two smoking parents (both parents smoking -27%; one parent smoking -40%; neither parent smoking -55%) (**Figure 73**).

Figure 70. Daily vs. Never Smoking Rates in Year 10 Students, New Zealand ASH Surveys 1999-2006

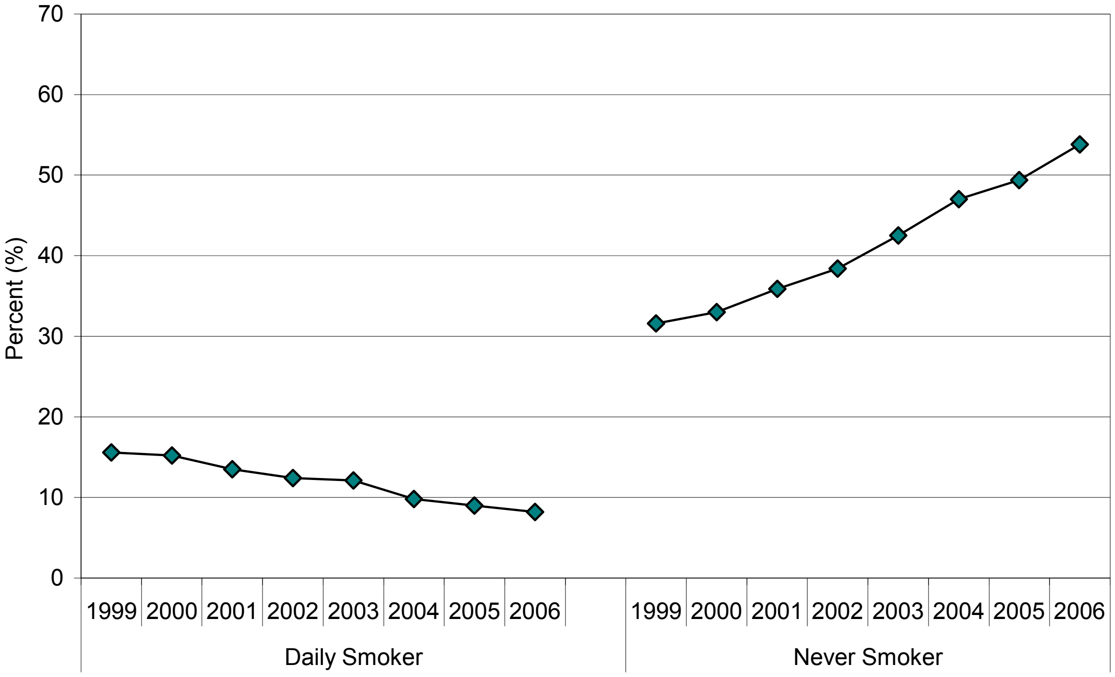


Figure 71. Daily Smoking Rates in Year 10 Students by Gender and Ethnicity, New Zealand ASH Surveys 1999-2006

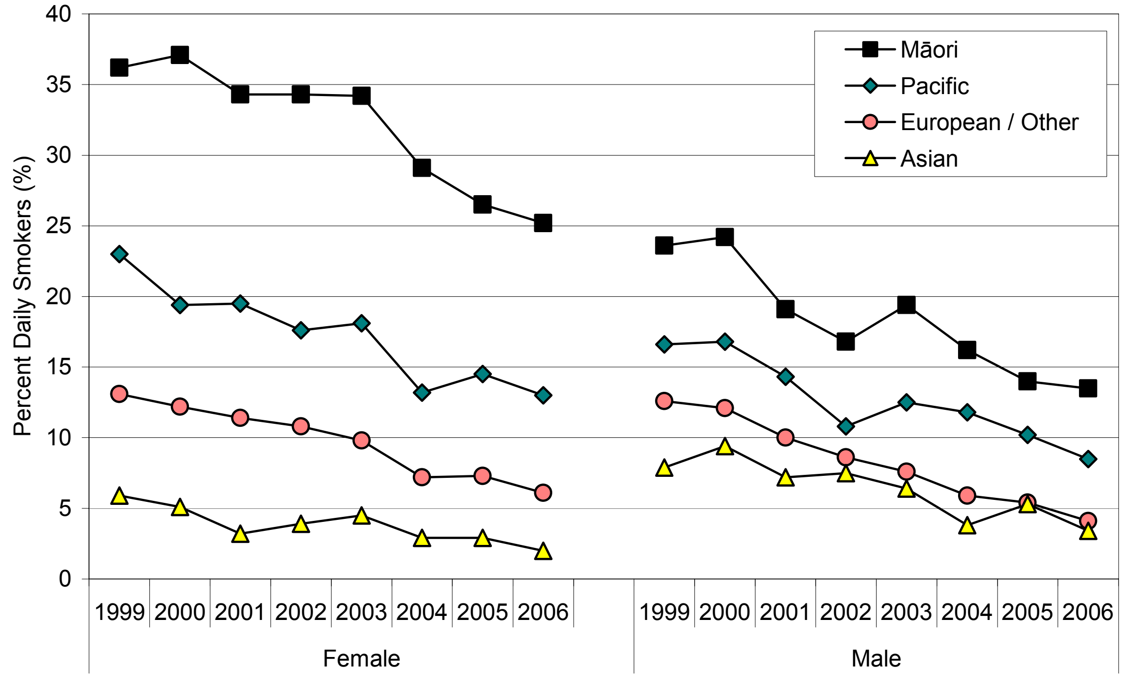


Figure 72. Daily Smoking Rates in Year 10 Students by Gender and School Socioeconomic Decile, New Zealand ASH Surveys 1999-2006

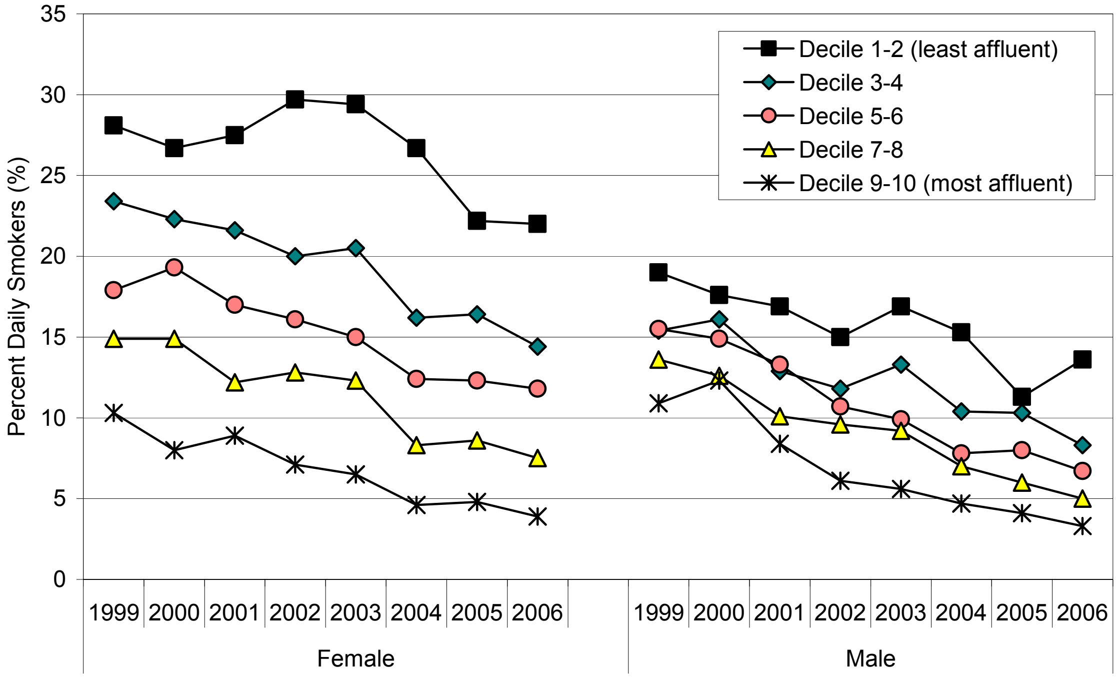
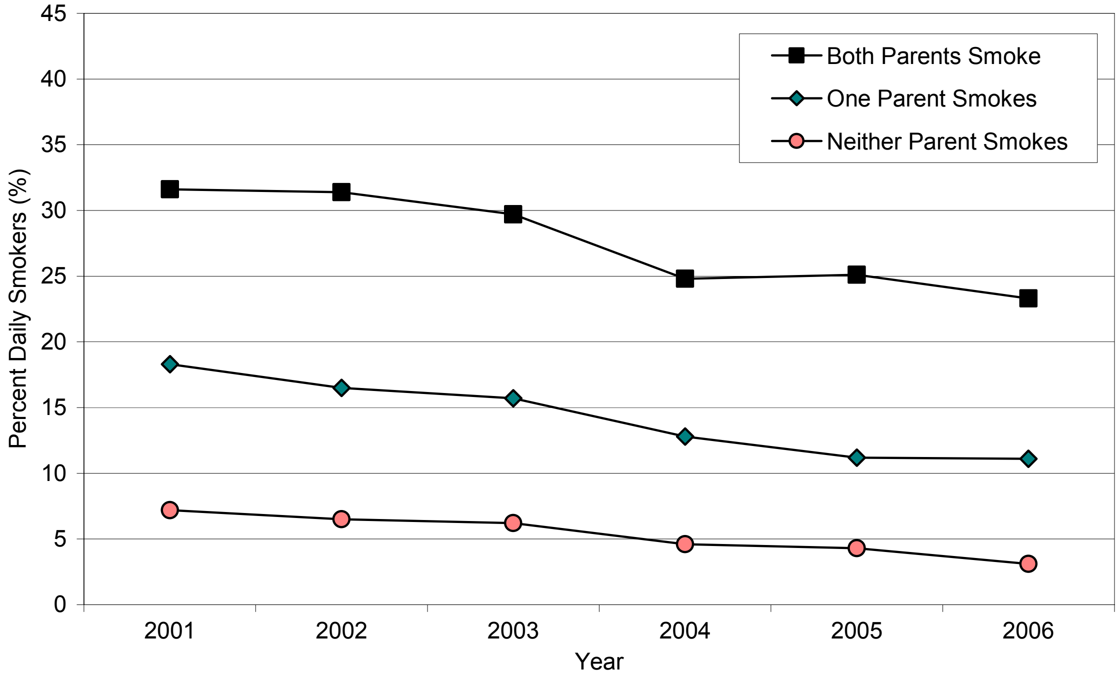


Figure 73. Daily Smoking Rates in Year 10 Students by Parents Smoking Status, New Zealand ASH Surveys 2001-2006



Regional Differences

During 2006 there were also marked regional differences in the proportion of Year 10 students who were daily smokers, with rates varying from 3.2% to 17.5% depending on the region studied. Similarly, the proportion of Year 10 students who had never smoked ranged from 41.8% to 65.4% (**Table 28**).

Table 28. Proportion of Year 10 Students Who Smoke Daily or Who Have Never Smoked by Region, New Zealand 2006

DHB	Daily Smoking (%)	Never Smoked (%)
Northland	12.2	44.2
Waitemata	6.2	59.6
Auckland	3.2	65.4
Counties Manukau	9.0	53.4
Waikato	8.2	54.8
Lakes	15.6	41.8
Bay of Plenty	9.5	49.5
Tairawhiti	12.7	43.7
Taranaki	7.2	55.0
Hawkes Bay	9.7	46.2
Whanganui	17.5	45.2
MidCentral	13.4	43.1
Hutt	9.8	49.3
Capital and Coast	7.2	58.9
Wairarapa	6.2	46.0
Nelson Marlborough	7.6	51.8
West Coast	8.8	49.9
Canterbury	6.6	55.8
South Canterbury	5.8	54.7
Otago	8.1	54.0
Southland	9.6	45.8
New Zealand	8.2	53.8

Note: Rates have not been adjusted for DHB Demography and it is not recommended that they be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)

Smoking in Young People 15-24 Years at the 1996 and 2006 Censuses

At both the 1996 and 2006 Censuses all respondents aged ≥15 years were asked, "*Do you smoke cigarettes regularly (that is one or more per day)?*" The figures in this section refer to the number of young people aged 15-2 4 years who answered yes to this question.

Regional and Ethnic Differences

In New Zealand during 1996, 24.5% of young people (15-24 yrs) reported smoking cigarettes regularly. During this period marked ethnic disparities were also evident, with 39.8% of Māori and 23.5% of Pacific young people being regular smokers, as compared to 23.3% of European and 8.2% of Asian / Indian young people. By 2006 this figure had fallen to 21.8%, with 39.4% of Māori and 24.6% of Pacific young people reporting they were regular smokers, as compared to 20.3% of European and 10.0% of Asian / Indian young people (**Figure 74**). Care must be taken when interpreting ethnic differences in smoking rates between Censuses however, as the questions relating to ethnicity differed slightly in these two periods.

Socioeconomic Differences

During 1996 there were also marked socioeconomic disparities in the proportion of young people who were regular smokers, with rates rising progressively from 14.9% amongst those living in the most affluent (Decile 1) areas, to 33.8% amongst those living in the most deprived (Decile 10) areas. By 2006, while smoking rates had declined for all socioeconomic groups, marked disparities remained, with rates increasing from 12.1% amongst those living in the most affluent areas, to 31.3% amongst those in the most deprived areas (**Figure 75**).

Figure 74. Proportion of Young People 15-24 Years who were Regular Smokers by Ethnicity, New Zealand at the 1996 and 2006 Censuses

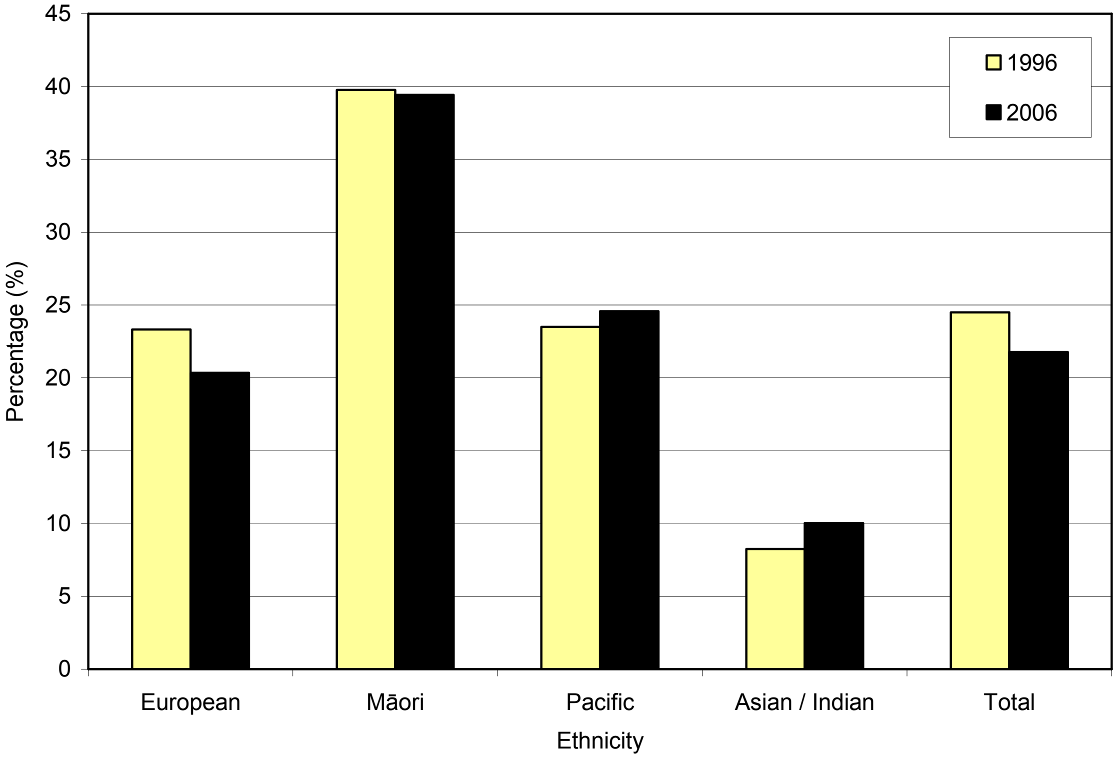
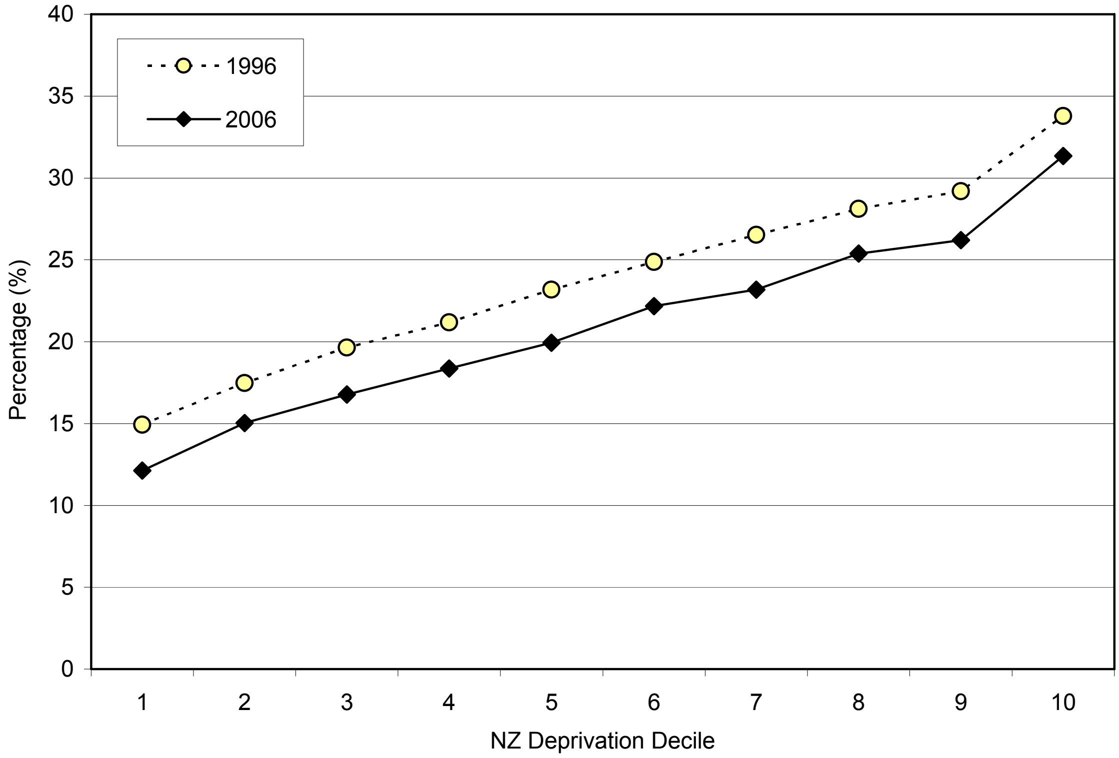


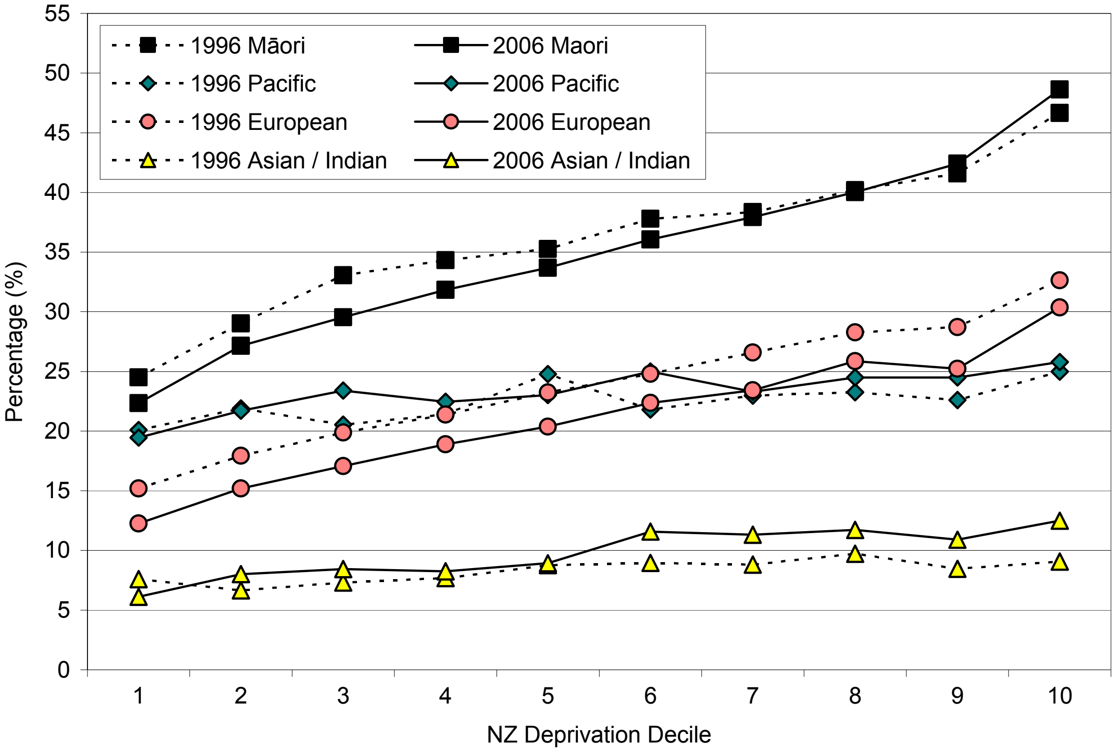
Figure 75. Proportion of Young People 15-24 Years who were Regular Smokers by NZ Deprivation Index Decile, New Zealand at the 1996 and 2006 Censuses



Relationship between Socioeconomic Status and Ethnicity

At both the 1996 and 2006 Censuses, analysis of the relationship between ethnicity and socioeconomic deprivation suggested that for each of New Zealand's largest ethnic groups, the proportion of young people who were regular smokers increased with increasing socioeconomic deprivation, but that at nearly every level of deprivation, smoking rates remained higher for Māori > Pacific and European > Asian / Indian young people (**Figure 76**).

Figure 76. Proportion of Young People 15-24 yrs who were Regular Smokers by Ethnicity and NZ Deprivation Index Decile, New Zealand at the 1996 and 2006 Censuses



Summary

High youth smoking rates are a cause for concern, as research suggests that 33-50% of young people who try smoking become regular smokers, with the transition taking on average 2-3 years. Once smoking regularly, the well documented signs of nicotine dependence and withdrawal become evident, as they do in the adult population. In New Zealand, the Censuses (1996 and 2006) and ASH collect information on youth smoking. ASH Surveys suggest that in New Zealand during 1999-2006, daily smoking rates among Year 10 students were highest amongst females, Māori > Pacific > European / Other > Asian young people, those in the most deprived areas and those for whom one or both parents smoked. While during 1999-2006, daily smoking rates declined for all ethnic and socioeconomic groups, declines were less rapid for students for attending schools in the more deprived areas and for those for whom both parents smoked. Data from the 2006 Censuses suggested that 21.8% of young people (15-24 yrs) were regular smokers, with rates being higher for Māori > Pacific > European > Asian / Indian young people and those living in the most deprived areas. Such disparities are of concern, as if left unaddressed they potentially signal ongoing disparities in later adult health outcomes (e.g. respiratory and ischaemic heart disease), as well in-utero and early childhood exposures as the current generation of young people begin their own families in future years.

Alcohol Related Harm

Introduction

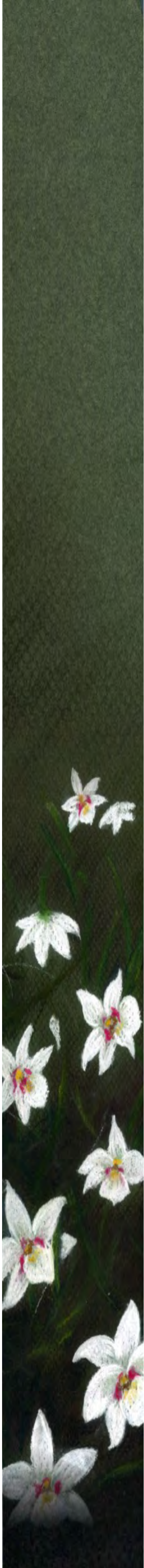
The Alcohol Advisory Council (ALAC)'s annual survey estimated that in New Zealand during 2005, 80% of young people aged 12-17 years had tried alcohol, 53% were current drinkers and that 22% drank at least once a week. In addition, 44% of males and 30% of females reported binge drinking (≥5 drinks) on their last drinking occasion [121]. Using this information, ALAC grouped young people into 4 main categories:

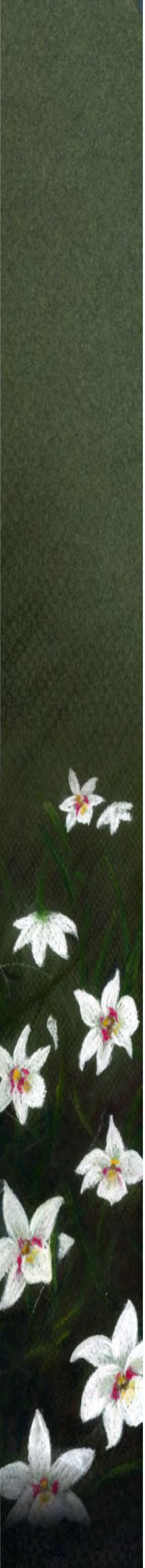
1. **Non-Drinkers**: 48% of young people, usually <13 years of age and / or attending church.
2. **Supervised Drinkers**: 21% of young people, usually 14+ years of age, at school and drinking fortnightly, monthly or less, typically at home with their parents / whanau. Supervised drinkers tended to consume ≤2 drinks per occasion and to be concerned about the short term (e.g. behaviour, hangovers) and long term (e.g. health, weight) effects of alcohol.
3. **Social Binge Drinkers**: 16% of young people. This group tended to drink regularly (≥every two weeks) and to binge (52% drank ≥5 drinks on the last occasion), mainly with their friends on weekends or holidays. Social binge drinkers tended to be 16+ years of age, at school and to drink for the social benefits (e.g. comradeship, sense of belonging, confidence) and because everyone else was drinking.
4. **Uncontrolled Binge Drinkers**: 16% of young people. This group were typically male, drank ≥once a week and binge drank (54% drank ≥5 drinks on the last occasion). Uncontrolled binge drinkers were generally ≥16 years of age, less likely to be at school (~1/3 were in employment) and frequently drank to enjoy the physical "buzz", or with the intention of getting drunk [121].

While these figures suggest that many New Zealand young people are either non-drinkers or drink infrequently under the supervision of their parents / whanau, the high number of binge drinkers has potential public health consequences, with the Youth 2000 Survey (a survey of 9,699 secondary school students [122]), noting that of those who had ever drunk alcohol:

1. 28% had got into trouble
2. 26% done something they would not normally do (e.g. breaking rules / law)
3. 14% had got into a fight
4. 13% had had an injury or accident
5. 12% had had sex while drunk and later regretted it
6. 27% had ridden in a car driven by someone potentially drunk in the last month
7. 8% had driven a car while potentially drunk in the last month

Such adverse outcomes are of particular relevance in the context of the recent debate on the minimum age for purchasing alcohol in New Zealand, which in 1999 was lowered from 20 to 18 years. Since that time a number of studies have suggested possible negative health consequences in the areas of emergency department attendances and hospital admissions for injuries, traffic crashes and intoxication [123] [124] [125]. But while initiatives aimed at reducing the availability of alcohol to under-age young people are seen as one way of reducing the burden of alcohol related harm [122], the 2001 National Alcohol Strategy suggests that such supply based strategies are most effective when adopted in conjunction with demand reduction strategies (e.g. education, labelling, advertising) and problem limitation initiatives (e.g. host responsibility in licensed premises and private venues) [126].





The following section explores the potential impact of alcohol on (non-emergency department) hospital admissions in young people 15-24 years. Because alcohol is often seen as only a contributory cause (e.g. in an alcohol related traffic crash, alcohol will only be listed after the primary diagnosis (e.g. fractured femur) and external causes (e.g. vehicle occupant in transport accident) have been recorded), the following section includes all (non-emergency department) admissions in which alcohol was listed in the first 15 diagnoses, or the first 10 external causes (injury admissions) of the National Minimum Dataset.

While it is likely that such an approach will be subject to significant undercounting, as it relies on the thoroughness of hospital staff in documenting all relevant contributory causes (see Methods Section for estimate of undercount), it is nevertheless hoped that such an approach will serve to identify "the tip of the iceberg" in terms of the contribution alcohol use makes to hospital admissions in this age group.

Data Source and Methods

Definition

Hospital Admissions in Young People 15-24 Years Where Alcohol Was Mentioned in the First 15 Diagnostic Codes, or the First 10 External Cause Codes in the Case of an Injury

Data Source

Numerator: National Minimum Dataset: Alcohol related hospital admissions included those with any mention of an alcohol related condition in the first 15 diagnostic codes, or the first 10 external cause codes (ICD-10 F10 Mental and Behavioural Disorders Due to Alcohol; T51 Toxic Effects of Alcohol; ICD-10 E codes X45 Accidental Poisoning by and Exposure to Alcohol; X65 Intentional Self Poisoning by and Exposure to Alcohol; Y15 Poisoning by and Exposure to Alcohol of Undetermined Intent; Y90-91 Evidence of Alcohol Involvement Determined by Blood Alcohol Level or Level of Intoxication.

Denominator: Census

Indicator Category

Bookmark C (**Table 133, Table 134**)

Notes on Interpretation

All cross sectional analyses for were undertaken using ICD-10 coding. Time series analysis have not been provided for this indicator, as it remains unclear whether differences in the degree to which contributory diagnoses such as alcohol use may have been recorded, both over time and across regions may have influenced temporal and regional variations in this indicator.

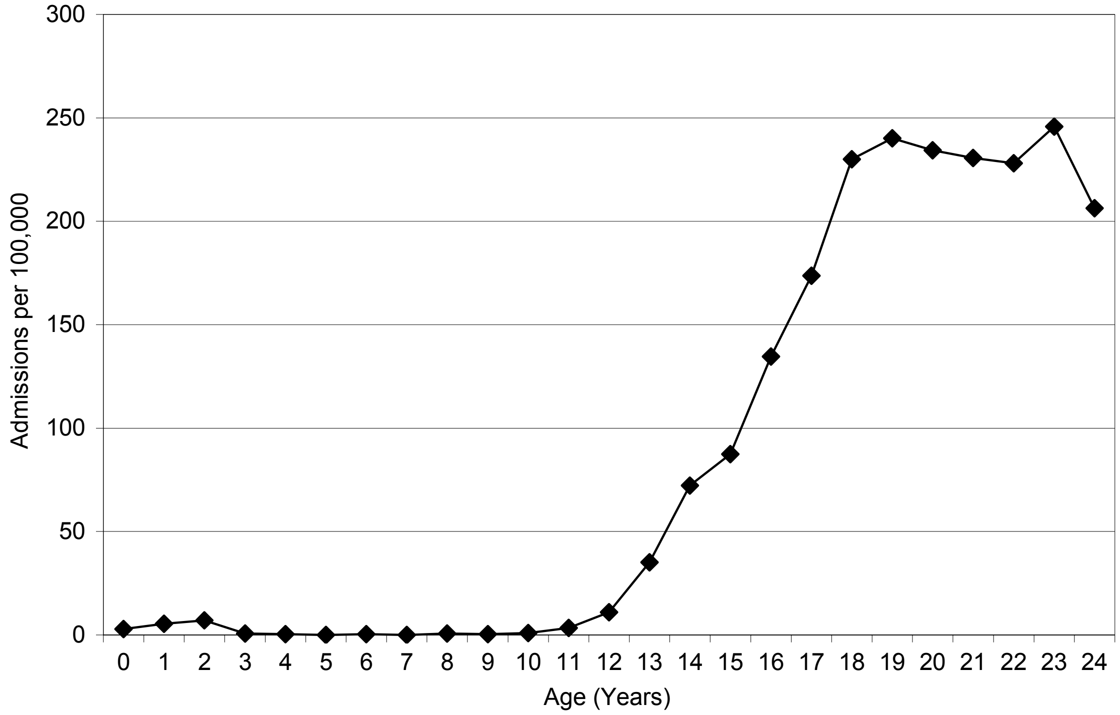
Extent of Undercounting: A 2000 study of the role alcohol played in injury attendances at an Auckland emergency department noted 35% of injured patients had consumed alcohol prior to their injury, a figure considerably higher than the usual 10-18% reported overseas [127]. An analysis of New Zealand emergency department cases for the period 2000-05 using the methodology described above (age 15-24 yrs in the NMDS), found that 10.3% of injury cases had a mention of alcohol, while only 4.5% of injury cases admitted beyond the emergency department setting (the group reviewed in this section) had alcohol as a listed cause. As a result, the figures contained in this section are likely to underestimate the burden of alcohol related morbidity amongst the youth population and when interpreting the data contained in this section, this must be borne in mind.

New Zealand Admissions and Trends

Age, Ethnicity and NZ Deprivation Index Decile

In New Zealand during 2002-2006, alcohol related hospital admissions were relatively infrequent in children, but rose rapidly amongst those in their early teens, reaching a plateau in the late teens / early 20s (**Figure 77**). Alcohol related admissions were also higher amongst males, Māori and European young people and those living in the most deprived areas (**Table 29**).

Figure 77. Alcohol Related Hospital Admissions in Children and Young People 0-24 Years by Age, New Zealand 2002-2006



Note: Admissions with any mention of alcohol in first 15 diagnostic codes or first 10 external cause codes; Emergency Department discharges removed

Table 29. Risk of Alcohol Related Hospital Admission in Young People 15-24 Years by Ethnicity and NZDep Index Decile, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	86.26	1.00		1-2	99.75	1.00	
2	112.82	1.31	1.09-1.57	3-4	138.88	1.39	1.24-1.56
3	129.84	1.51	1.27-1.80	5-6	179.77	1.80	1.61-2.01
4	148.02	1.72	1.45-2.04	7-8	241.77	2.42	2.18-2.69
5	162.73	1.89	1.60-2.24	9-10	282.69	2.83	2.56-3.13
6	195.88	2.27	1.93-2.67	Ethnicity			
7	238.53	2.77	2.37-3.24	Māori	383.46	2.08	1.96-2.20
8	244.83	2.84	2.43-3.32	Pacific	156.51	0.85	0.76-0.96
9	284.74	3.30	2.83-3.84	European	184.04	1.00	
10	280.58	3.25	2.79-3.79	Asian/Indian	23.20	0.13	0.10-0.16
Gender							
Female	134.31	1.00					
Male	262.33	1.95	1.84-2.06				

Note: *Rates are per 100,000 per year, RR: Rate Ratios are unadjusted; Admissions with alcohol mentioned in first 15 diagnostic codes or first 10 external cause codes included; Emergency Department discharges removed.

Nature of Alcohol Related Admissions

Alcohol was listed as a contributory cause in a large number of the hospital admissions for young people during 2002-2006. Analysis of the primary diagnosis for each of these admissions suggested that only 11.2% had acute intoxication or poisoning by alcohol listed as the primary diagnosis. In 34.7% of cases an injury was the primary diagnosis, with head injuries and injuries of the upper limbs playing a particularly prominent role.

In addition, a further 28.3% of admissions had a mental health condition listed as the primary diagnosis, with schizophrenia making up the single largest diagnostic category in this group. Finally 10.9% of admissions had poisoning by other drugs or substances listed as their primary reason for admission (**Table 30**). In interpreting these figures however, it must be remembered that as a result of inconsistent uploading of emergency department cases to the National Minimum Dataset emergency department cases have been removed (**Appendix 1**). These figures thus potentially reflect the more severe end of spectrum, as it is likely that many cases of intoxication or minor alcohol related injuries are dealt with and discharged in the emergency department setting. In addition, it is likely that these figures represent an undercount, as they rely on hospital staff at the time of discharge listing alcohol use as a contributory cause, something which may be reported inconsistently over time and across the country.

Table 30. Alcohol Related Hospital Admissions in Young People 15-24 Years by Primary Diagnosis, New Zealand 2002-2006

ICD-10	Condition	Number 2002-06	Rate per 100,000	% of Total
Mental and Behavioural Disorder Codes				
F100	Alcohol Intoxication	486	17.8	9.0
F102	Alcohol Dependence	130	4.8	2.4
F101 F103-F109	Other Mental/Behavioural Disorder due to Alcohol	99	3.6	1.8
F20	Schizophrenia	510	18.7	9.4
F21-F29	Other Schizotypal and Delusional Disorders	246	9.0	4.5
F31	Bipolar Affective Disorder	128	4.7	2.4
F32-F33	Depression/Recurrent Depressive Disorder	190	7.0	3.5
F43	Reaction to Stress/Adjustment Disorders	142	5.2	2.6
F00-F99*	Other Mental and Behavioural Disorders	317	11.6	5.9
Digestive System Codes				
K226 K292 K920	Upper Gastrointestinal Bleeding/Gastritis	97	3.6	1.8
K00-K99*	Other Gastrointestinal Conditions	77	2.8	1.4
Injury and Poisoning Codes				
T51	Toxic Effect of Alcohol	120	4.4	2.2
T36-50	Poisoning*	589	21.6	10.9
S00-S09	Head Injuries	838	30.8	15.5
S42 S52 S62	Upper Limb Fractures	105	3.9	1.9
S50-51 S53-59	Other Elbow and Forearm Injuries	171	6.3	3.2
S60-61 S63-69	Other Wrist and Hand Injuries	257	9.4	4.7
S72 S82 S92	Lower Limb Fractures	156	5.7	2.9
S10-T79*	Other Injuries	351	12.9	6.5
All Other Diagnostic Codes				
Other	Other Conditions	404	14.8	7.5
Total		5413	198.7	100.0

Note: Admissions with any mention of alcohol in first 15 diagnostic codes or first 10 external cause codes; Emergency Department discharges removed; Rate per 100,000 per year.;*Poisoning includes drugs, medicines, biological substances.

Injury Admissions with Alcohol as a Contributory Cause

An analysis of those who were admitted with a primary diagnosis of injury and alcohol use listed as a contributory cause found that 21.0% of these injuries were associated with episodes of self harm, 19.0% were sustained as a result of an assault and a further 13.8% were sustained while the young person was the occupant of a vehicle. Of note, a large proportion of vehicle accidents were not with other vehicles, but arose as a result of the car crashing into a stationary object, or in a non-collision situation (e.g. vehicle overturning). Finally 13.6% of injuries resulted from a fall and a further 11.4% from contact with sharp glass (**Table 31**).

Table 31. Primary Cause of Alcohol Related Admissions Resulting in Injury in Young People 15-24 Years by Cause of Injury, New Zealand 2002-2006

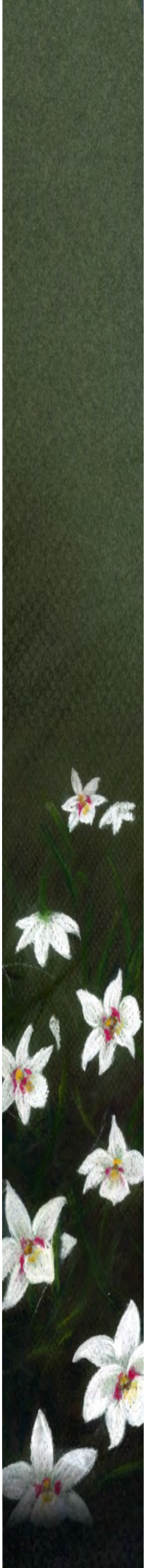
Cause of Injury	Number 2002-2006	Rate per 100,000	% of Total
Pedestrian or Cyclist in Transport Accident	94	3.5	3.5
Vehicle Occupant: Collision with Stationery Object	184	6.8	6.9
Vehicle Occupant: Non-Collision e.g. Overturning	128	4.7	4.8
Vehicle Occupant: Other Transport Accident	57	2.1	2.1
Other Land Transport Accident	64	2.3	2.4
Falls	360	13.2	13.6
Contact with Sharp Glass	303	11.1	11.4
Accidental Poisoning	164	6.0	6.2
Intentional Self Harm	558	20.5	21.0
Assault by Bodily Force	288	10.6	10.9
Other Assault	214	7.9	8.1
Other Causes	238	8.7	9.0
Total	2,652	97.4	100.0

Note: Admissions with any mention of alcohol in the 2nd- 15th diagnostic codes or 1st-10th external cause codes and with an injury as a primary diagnosis. Emergency Department discharges removed.

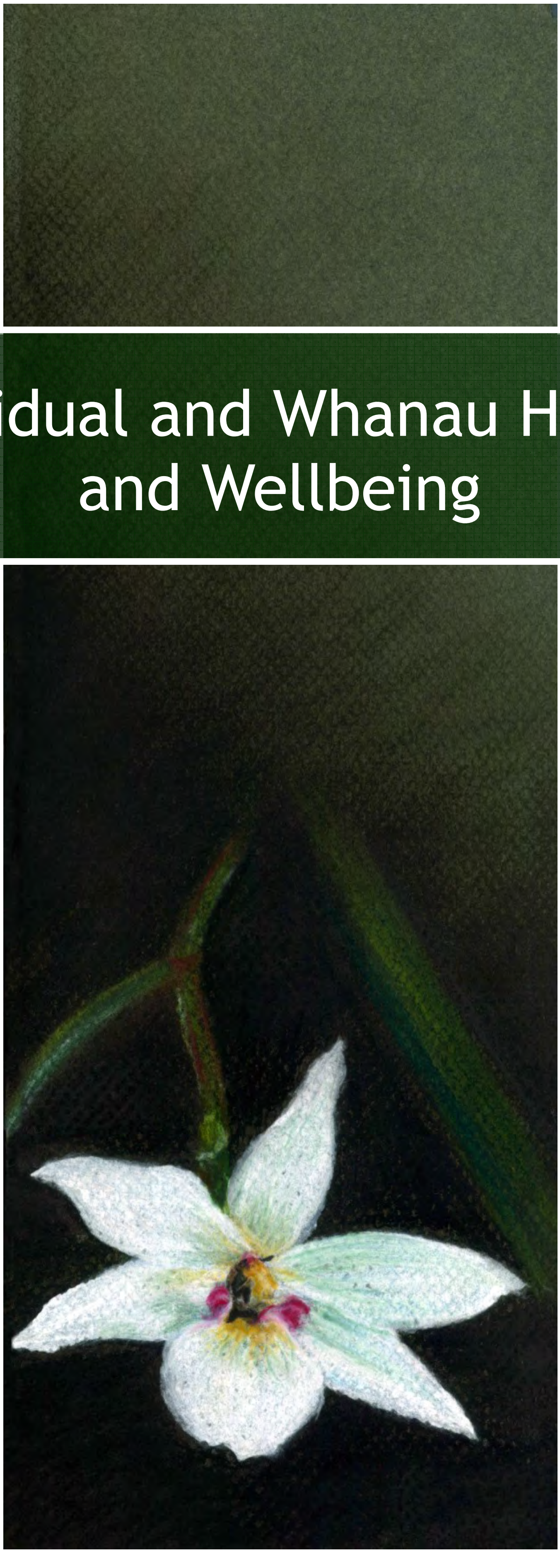
Summary

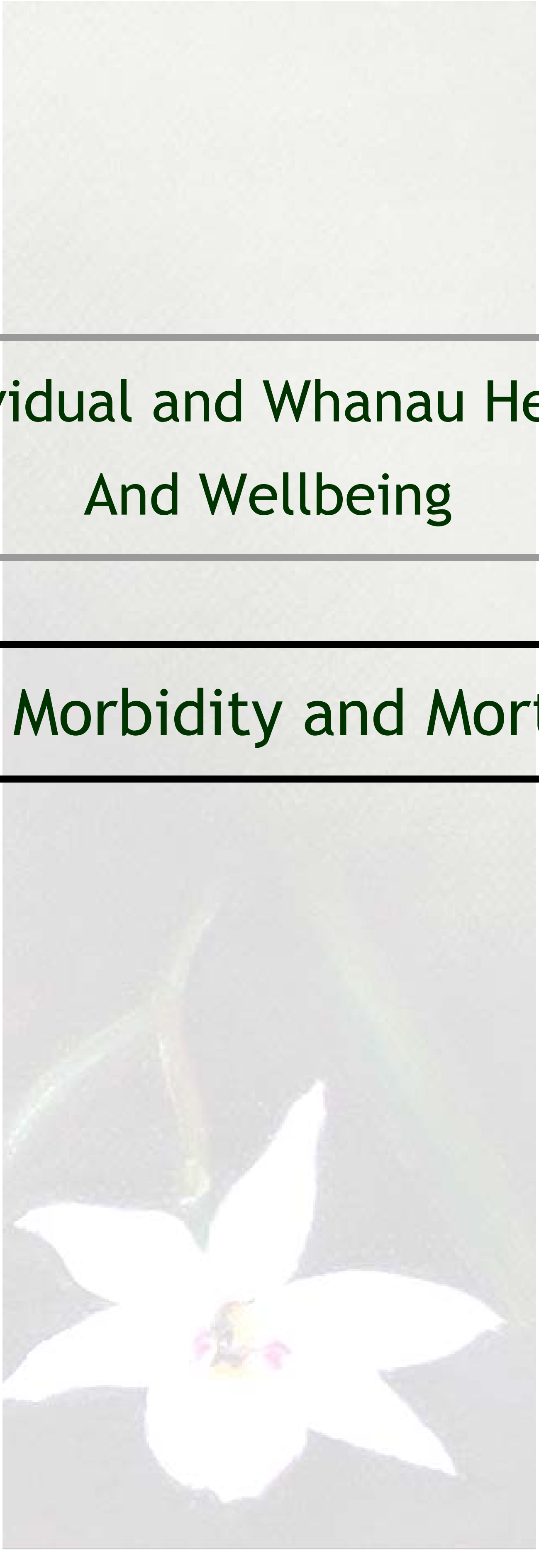
The Alcohol Advisory Council (ALAC)'s 2005 survey suggested that 80% of young people 12-17 years had tried alcohol, 53% were current drinkers and that 44% of males and 30% of females binge drank (≥5 drinks) on their last drinking occasion. The high proportion of binge drinkers has significant public health consequences, with the Youth 2000 Survey suggesting that of secondary school students who had ever drunk alcohol, a significant minority had got into trouble or fights, had an injury or accident, driven while potentially drunk or had sex while drunk and later regretted it.

During 2002-2006, alcohol related hospital admissions were highest for those in their late teens / early 20s, for Māori young people and for those living in the most deprived areas. Reasons for admission included acute intoxication, mental health issues and injuries, with the latter commonly arising from episodes of self harm, assault or motor vehicle accidents. Significant methodological constraints however must be taken into consideration when interpreting these findings, as with the removal of emergency department cases, these figures reflect the more severe end of the spectrum. In addition, it is likely that these figures represent an undercount, as they rely on hospital staff at the time of discharge listing alcohol use as a contributory cause, something which may be reported inconsistently over time and across the country. Nevertheless it is hoped that the figures presented in this section can act as a starting point when considering the range and extent of alcohol related harm amongst young people in New Zealand in recent years.



Individual and Whanau Health and Wellbeing





Individual and Whanau Health And Wellbeing

Total Morbidity and Mortality

Most Frequent Causes of Hospital Admissions and Mortality

Introduction

Before considering any of the more detailed analyses of child and youth health outcomes which follow, it is worthwhile briefly reviewing the most frequent causes of hospital admission and mortality amongst New Zealand children and young people during the past five years. It is hoped that the brief summary tables presented below will provide the reader with an overall context, within which to consider the relative importance of the various issues facing New Zealand children and young people.

Data Source and Methods

Definition

1. Mortality in Children and Young People: Mortality in Infants (29-364 Days), Children 1-14 Years and Young People 15-24 Years by most frequent cause
2. Hospital Admissions in Children and Young People: Hospital Admissions in Children 0-14 Years and Young People 15-24 Years by most frequent cause

Data Sources and Interpretation

1. Mortality in Children and Young People

Numerator: National Mortality Collection: Deaths in Infants (post-neonatal 29-364 days), Children 1-14 years and Young People 15-24 years, by cause.

Denominator: Census: Number of children and young people

2. Hospital Admissions in Children and Young People

Numerator: National Minimum Dataset: Hospital admissions for children after the neonatal period (29 days -14 years) and for young people 15-24 years, by primary diagnosis. For acute and arranged admissions, the reason for the admission was derived from the primary diagnosis (ICD-10 code) as recorded in the NMDS, while for waiting list admissions the reason for the admission was derived from the primary procedure code. To maintain consistency with the figures in the injury and mental health sections, injury and mental health inpatient admissions with an Emergency Medicine specialty code (M05-M08) on discharge were excluded from this analysis (see discussion in Appendix 1 for the rationale for this).

Denominator: Census: Children and young people at the 2001 Census

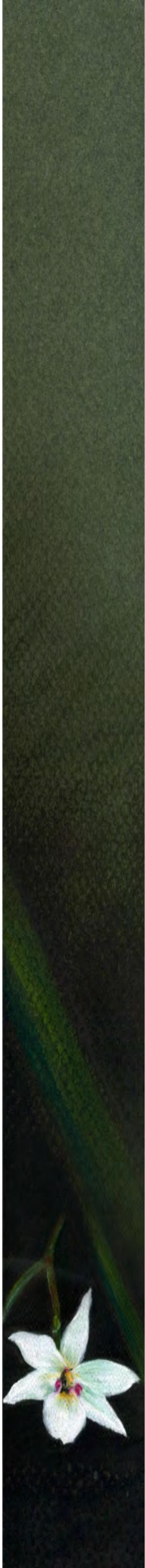
Interpretation: Because admissions for pregnancy and childbirth varied in the way in which they were admitted by DHB (acute / arranged / waiting list), for the purposes of this analysis they were treated as a separate category of admission. NMDS coverage of therapeutic abortions is partial, so figures may not accurately reflect the total number of terminations undertaken during this period. There are also variations in the extent to which children and young people are admitted under ACC across the country.

Indicator Category (Table 133, Table 134)

Admissions: Proxy B-C; Mortality: Ideal B

New Zealand Distribution

In New Zealand during 2000-2004, SIDS was the leading cause of mortality in the post-neonatal period, while injuries were the leading causes of death for both children and young people (**Table 32**). For children during 2002-2006, the most frequent reasons for acute hospital admission were injury / poisoning, gastroenteritis and asthma, while for arranged admissions the most frequent reasons were cancer / chemotherapy and dental conditions. The most frequent reasons for a waiting list admission were for insertion of grommets, followed by dental procedures and surgery on the tonsils and adenoids (**Table 33**). For young people during 2002-2006, pregnancy and childbirth were the leading causes of hospital admission. In terms of other hospital admissions, injuries followed by abdominal / pelvic pain were the leading causes of acute admissions, while injuries followed by dialysis were the leading reasons for arranged admission. Surgery on the tonsils and adenoids followed by procedures on the skin and subcutaneous tissue were the leading causes of waiting list admissions for those 15-24 years (**Table 34**).



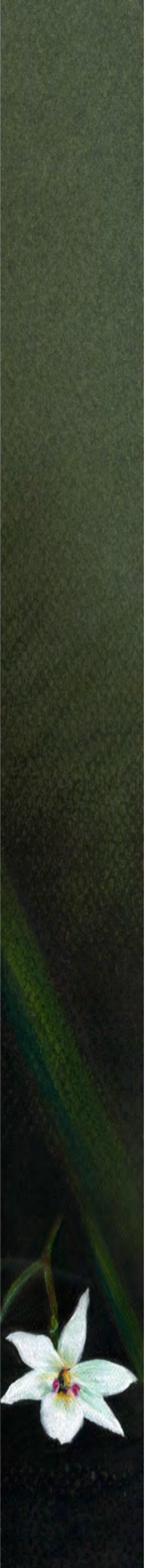


Table 32. Most Frequent Causes of Mortality Outside the Neonatal Period in Children and Young People 0-24 Years, New Zealand 2000-2004

Cause of Death	Number 2000-04	Annual Average	Rate per 100,000	% Deaths in Group
Post-Neonatal (29-364 Days)				
SIDS	221	44.2	78.1	33.3
Suffocation / Strangulation in Bed	54	10.8	19.1	8.1
Unspecified	29	5.8	10.2	4.4
Congenital Anomalies: CVS	46	9.2	16.3	6.9
Congenital Anomalies: CNS	22	4.4	7.8	3.3
Congenital Anomalies: Other	53	10.6	18.7	8.0
Injury / Poisoning	37	7.4	13.1	5.6
Other Perinatal Conditions	58	7.4	20.5	8.7
Other Causes	144	7.4	50.9	21.7
Total	664	132.8	234.6	100.0
Children 1-14 Years				
Injury / Poisoning	369	73.8	9.3	41.6
Neoplasm	144	28.8	3.6	16.3
Congenital Anomalies	108	21.6	2.7	12.2
Meningococcal Disease	23	4.6	0.6	2.6
Intentional Self Harm	18	3.6	0.5	2.0
Pneumonia	14	2.8	0.4	1.6
Asthma	8	1.6	0.2	0.9
SIDS	7	1.4	0.2	0.8
Other Causes	195	39.0	4.9	22.0
Total	886	177.2	22.2	100.0
Young People 15 - 24 Years				
Injury / Poisoning	938	187.6	35.9	47.9
Suicide	512	102.4	19.6	26.1
Neoplasm	154	30.8	5.9	7.9
Congenital Anomalies	63	12.6	2.4	3.2
Meningococcal Disease	19	3.8	0.7	1.0
Asthma	17	3.4	0.7	0.9
Pneumonia	6	1.2	0.2	0.3
Rheumatic Heart Disease	5	1.0	0.2	0.3
Other Causes	246	49.2	9.4	12.6
Total	1,960	392.0	75.1	100.0

Table 33. Post-Neonatal Hospital Admissions in Children 0-14 yrs, New Zealand 2002-2006

Primary Diagnosis / Procedure	Number 2002-06	Rate per 1,000	% of Type	% of Total
Acute Admissions (by Primary Diagnosis)				
Injury / Poisoning	47,127	11.0	15.3	9.4
Gastroenteritis	24,199	5.6	7.9	4.8
Asthma	22,517	5.2	7.3	4.5
Bronchiolitis	21,699	5.0	7.1	4.3
Viral Infections NOS	18,363	4.3	6.0	3.7
Pneumonia	16,385	3.8	5.3	3.3
Acute URTI NOS	14,902	3.5	4.9	3.0
Skin Infections	12,362	2.9	4.0	2.5
Abdominal/Pelvic Pain	8,397	2.0	2.7	1.7
Urinary Tract Infections	5,802	1.3	1.9	1.2
Other Diagnoses	115,447	26.9	37.6	23.1
Total	307,200	71.5	100.0	61.6
Arranged Admissions (by Primary Diagnosis)				
Neoplasm / Chemotherapy	9,221	2.1	16.3	1.8
Dental Conditions	6,078	1.4	10.8	1.2
Injury / Poisoning	3,858	0.9	6.8	0.8
Metabolic Disorders	1,209	0.3	2.1	0.2
Immune Disorders	1,036	0.2	1.8	0.2
Other Diagnoses	35,027	8.1	62.1	7.0
Total	56,429	13.1	100.0	11.3
Waiting List Admissions (by Primary Procedure)				
Grommets	29,227	6.8	23.6	5.9
Dental Procedures	19,281	4.5	15.6	3.9
Procedures on Tonsils and Adenoids	13,554	3.2	11.0	2.7
Skin/Subcutaneous Tissue Procedures	4,209	1.0	3.4	0.8
Inguinal Hernia Repair	3,972	0.9	3.2	0.8
No Procedure Listed	5,160	1.2	4.2	1.0
Other Procedures	48,348	11.2	39.1	9.7
Total	123,751	28.8	100.0	24.8
ACC Admissions				
Total ACC Admissions	11,681	2.7	100.0	2.3
Total	499,061	116.1	100.0	100.0

Note: Injury and Mental Health Emergency Department Cases Removed (See Appendix 1 for Rationale).

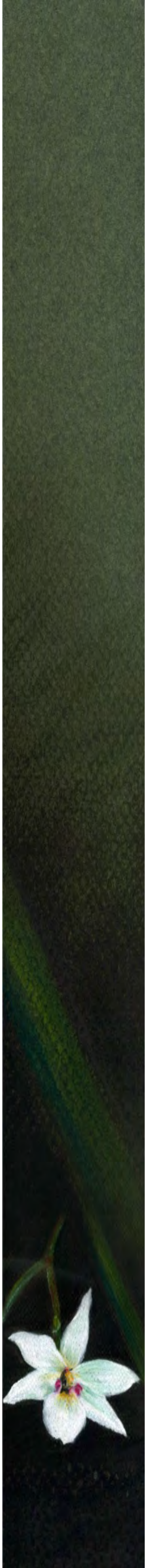
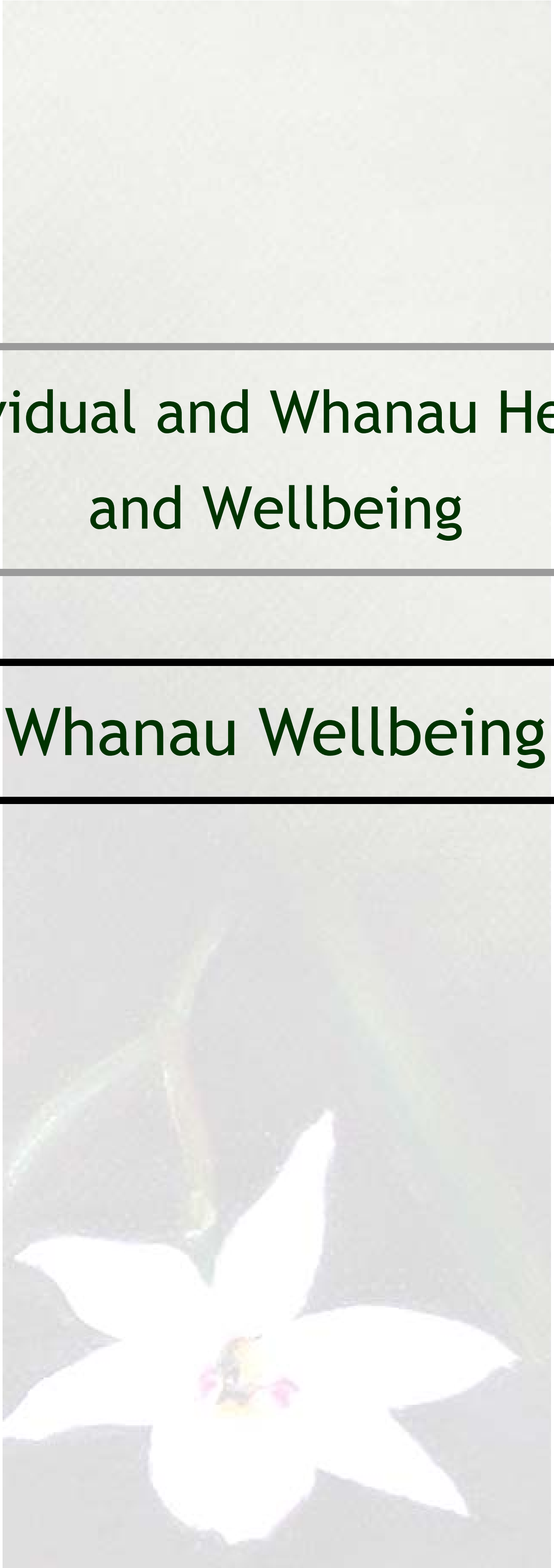


Table 34. Hospital Admissions in Young People 15-24 Years, New Zealand 2002-2006

Primary Diagnosis / Procedure	Number 2002-06	Rate per 1,000	% of Type	% of Total
Reproductive Admissions (By Diagnosis)				
Pregnancy and Delivery	100,826	74.5	77.8	26.6
Therapeutic Abortion	19,516	14.4	15.1	5.2
Early Pregnancy Loss	9,249	6.8	7.1	2.4
Total	129,591	95.7	100.0	34.2
Acute Admissions (by Primary Diagnosis)				
Injury/Poisoning	35,730	13.1	22.3	9.4
Abdominal/Pelvic Pain	12,693	4.7	7.9	3.4
Mental Health	11,924	4.4	7.4	3.1
Skin Infections	8,236	3.0	5.1	2.2
Appendicitis	6,686	2.5	4.2	1.8
Gastroenteritis	5,686	2.1	3.5	1.5
Urinary Tract Infections	4,646	1.7	2.9	1.2
Asthma	4,099	1.5	2.6	1.1
STIs/Pelvic Inflammatory Disease	2,935	1.1	1.8	0.8
Pneumonia	1,912	0.7	1.2	0.5
Other Diagnoses	65,743	24.1	41.0	17.4
Total	160,290	58.9	100.0	42.3
Arranged Admissions (by Primary Diagnosis)				
Injury/Poisoning	4,358	1.6	10.7	1.2
Dialysis	3,574	1.3	8.8	0.9
Neoplasm / Chemotherapy	3,164	1.2	7.8	0.8
Mental Health	2,022	0.7	5.0	0.5
Other Diagnoses	27,436	10.1	67.7	7.2
Total	40,554	14.9	100.0	10.7
Waiting List Admissions (by Primary Procedure)				
Procedures on Tonsils and Adenoids	3,827	1.4	9.6	1.0
Skin/Subcutaneous Tissue Procedures	3,710	1.4	9.3	1.0
Dental Procedures	2,703	1.0	6.8	0.7
Diagnostic Procedures on Intestine	2,218	0.8	5.6	0.6
No Procedure Listed	1,862	0.7	4.7	0.5
Other Procedures	25,581	9.4	64.1	6.8
Total	39,901	14.6	100.0	10.5
ACC Admissions				
Total ACC Admissions	8,438	3.1	100.0	2.2
Total	378,774		100.0	100.0

Note: Injury and Mental Health Emergency Department Cases Removed (See Appendix 1 for Rationale). NMDS coverage of therapeutic abortions is partial, so figure may not accurately reflect the number of terminations during this period.



Individual and Whanau Health and Wellbeing

Whanau Wellbeing

Family Composition

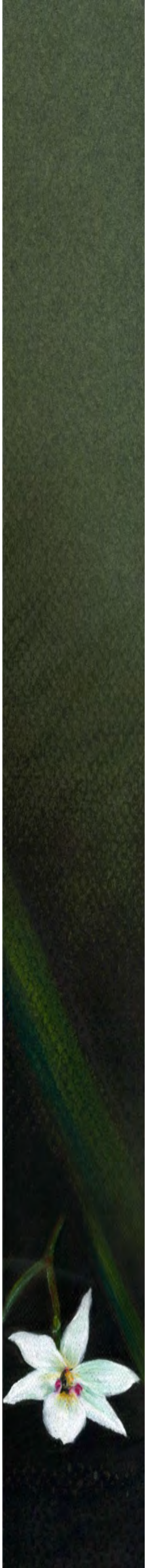
Introduction

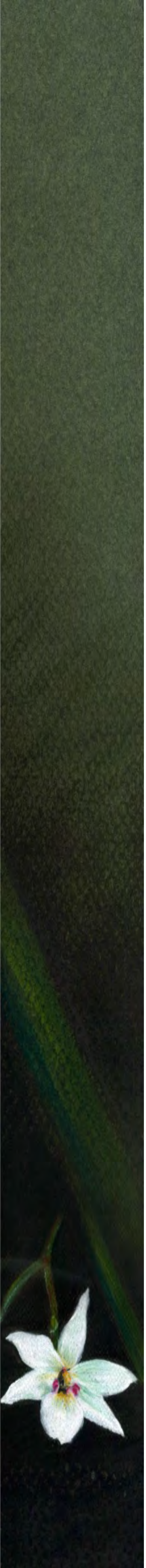
In New Zealand during the past 25 years, there has been a marked shift away from two-parent families, with an increase in the proportion of families headed by single parents. While the majority of single parent families are headed by women (84% in 2001), Census data suggests that sole parents are not a homogeneous group, but reflect a diversity of experience including those who have never been married (more commonly in their teens-20s), those who are separated or divorced (more commonly in their 30s-40s), those who are widowed (more commonly in their 50s-60s) and those who remain married but who do not live together for a variety of reasons (e.g. partner living overseas). In addition, for many children in sole parent families, both parents maintain an active parenting role through shared custody arrangements [128].

Family composition and the number of children growing up in sole parent families are important for a number of reasons. Firstly, the role family composition plays in the socioeconomic resources available to dependent children was recently highlighted by the 2004 Living Standards Survey, which suggested that 42% of sole parent families lived in significant or severe hardship, as compared to only 14% of two parent families [35]. Such hardship resulted in families postponing children's doctors or dentists visits, children sharing a bed, wearing poorly fitting clothes or shoes, or going without wet weather clothing. In addition, the survey noted that sole parent families were more likely to be reliant on Benefits (sole-parent 62% vs. two-parent 6%) and that much of the differences in living standards between sole and two parent families was due to the formers greater reliance on benefits as their primary source of income [35].

Secondly, for a significant number of children, living in a sole-parent family has arisen out of parental separation. A large body of literature now suggests that children who experience parental separation during childhood do less well across a range of outcomes (e.g. educational attainment, mental and emotional health, social conduct, substance use, early onset sexual behaviour) [129] [130]. Others would argue however, that the magnitude of these differences is not large and that many children are not adversely affected [130], with those who are adversely affected being influenced by other exacerbating factors (e.g. a decline in family income, declines in the mental health of custodial parents, exposure to interparental conflict and compromised parenting). It is likely that many of these factors interact to influence children's wellbeing (e.g. income declines following separation → increased risk of material and economic deprivation → negative impacts on parent's mental health → compromised parenting behaviours).

In addition, the associations are not always straight forward, with a number of studies suggesting that where parental relationships are highly conflicted and children are drawn into the conflict, or where a child's relationship with a parent is poor, children may actually benefit from parental separation [129] [130]. Further adding to this complexity is the finding that in situations where a sole parent remarries, the outcome for their children often differs little from those remaining in a sole parent family, even if their socioeconomic circumstances improve [130]. As a consequence, not only do sole-parent families reflect a diversity of experience, but the impacts that changes in family composition have on children's physical and psychological wellbeing may also vary, depending on individual family circumstances and the impact parental separation has on their socioeconomic position.





Data Source and Methods

Definition

Proportion of Children <15 Years Living in One and Two Parent Households

Data Source

Numerator: NZ Census: Number of children living in one and two parent households, where the dependent child was home on Census night.

Denominator: NZ Census: Total number of children <15 years who were home on Census night

Indicator Category

Proxy C (**Table 133, Table 134**)

Notes on Interpretation

The breakdown into "Couple with Children" and "One Parent with Children" is made without regard to the relationship between the child and caregiver (e.g. a couple with children may refer to a de-facto couple, a married couple, grandparents caring for a dependent grandchild, a mother living with a partner who is not the child's biological parent) and thus may underestimate the proportion of children who have experienced parental separation, as well as the proportion living in blended family settings.

New Zealand Distribution and Trends

During 1976-2001, the proportion of sole-parent families with dependent children in New Zealand increased progressively, from 10.4% of families in 1976 to 29.2% in 2001. Similarly the proportion of two-parent families declined, from 89.6% in 1976 to 70.8% in 2001 (**Figure 78**).

Ethnic Differences

In New Zealand during 2001, 26.4% of children <15 years of age lived in sole parent households, while 73.6% lived in two parent households. There were marked ethnic differences during this period, with higher proportions of Māori > Pacific > European > Asian / Indian children living in sole parent households (**Figure 79**).

Socioeconomic Differences

There were also marked socioeconomic differences in the proportion of New Zealand children living in sole parent households during 2001, with rates rising progressively from 7.9% amongst those living in the most affluent (Decile 1) areas, to 46.2% amongst those living in the most deprived (Decile 10) areas (**Figure 80**).

Relationship between Socioeconomic Status and Ethnicity

During 2001, while the proportion of children living in sole parent households increased with increasing NZDep deprivation for each of New Zealand's largest ethnic groups, at each level of deprivation, ethnic differences remained, with the proportion living in sole parent households being higher for Māori > European and Pacific ≥ Asian children (**Figure 81**).

Regional Differences

During 2001, there were also large regional differences in the proportion of children living in sole parent households, with rates ranging from 20.5% to 35.9% depending on the region studied (**Table 35**).

Figure 78. Families with Dependent Children by Family Type, New Zealand Census 1976-2001

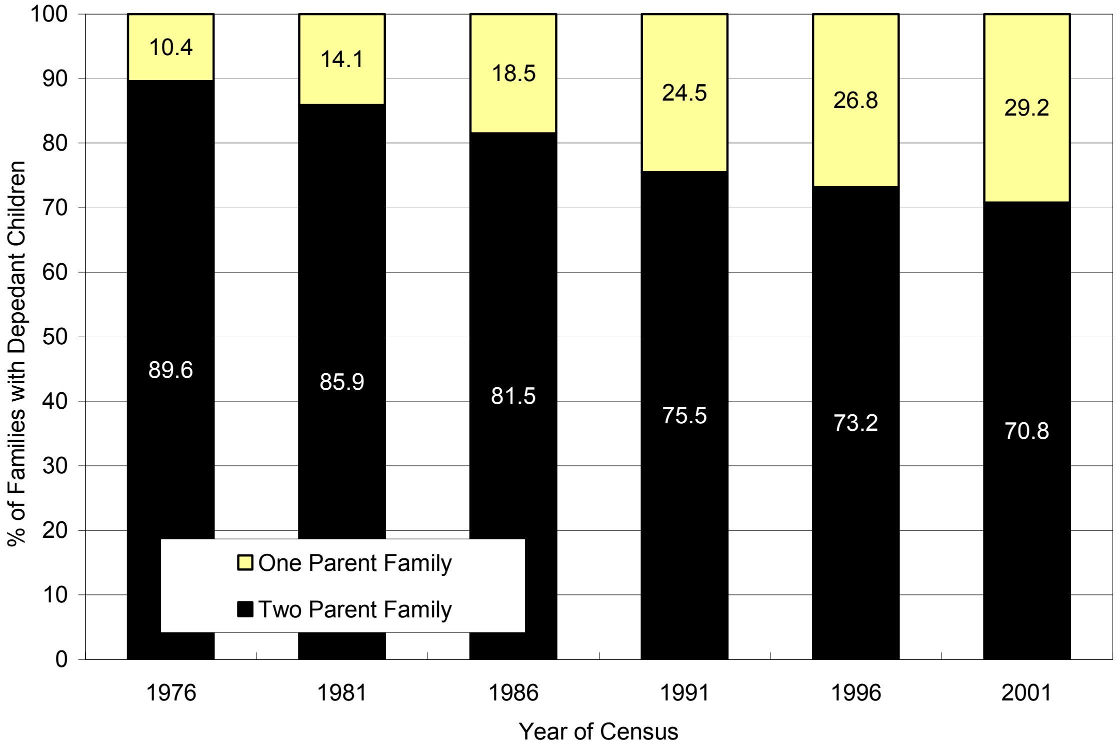
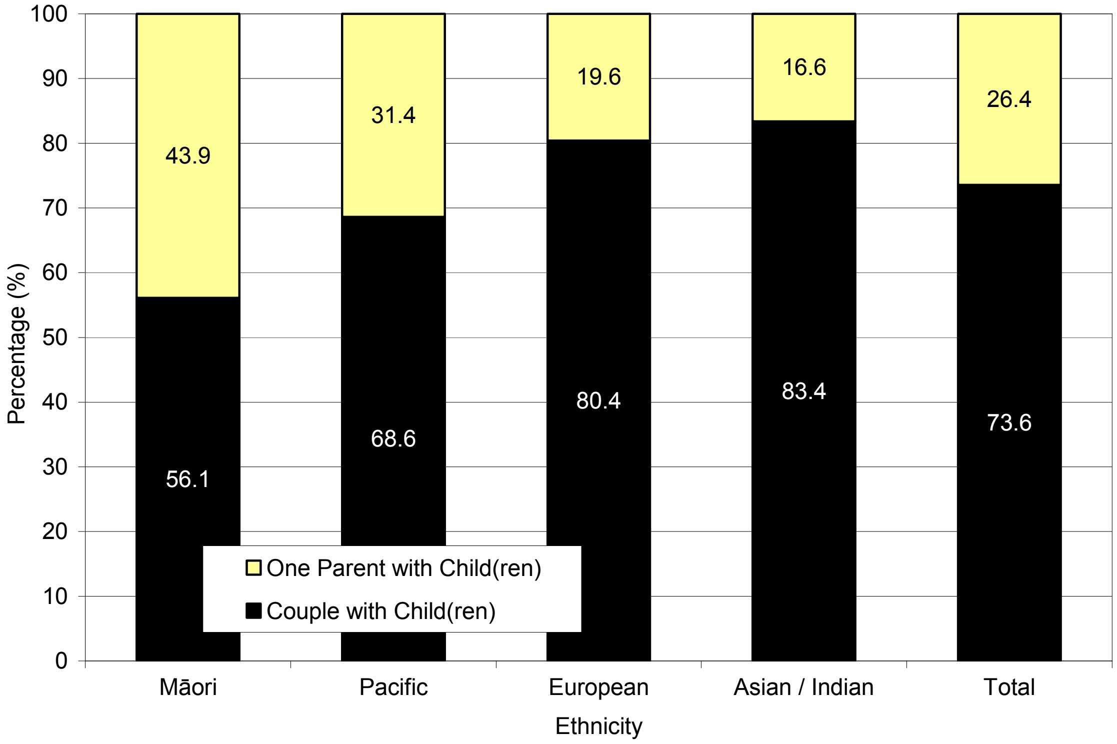


Figure 79. Proportion of Children <15 Years Living in One and Two Parent Households by Ethnicity, New Zealand Census 2001



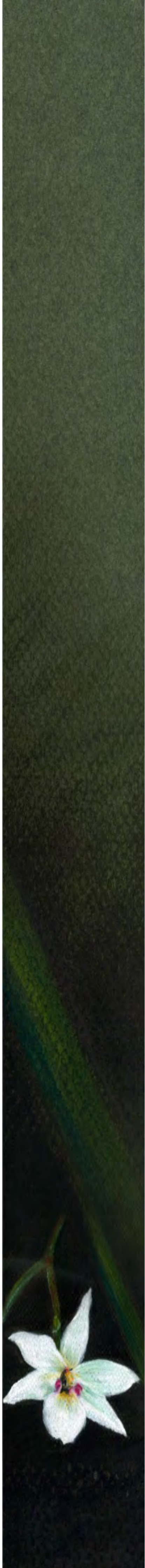


Figure 80. Proportion of Children <15 Years Living in One and Two Parent Households by NZ Deprivation Index Decile, New Zealand Census 2001

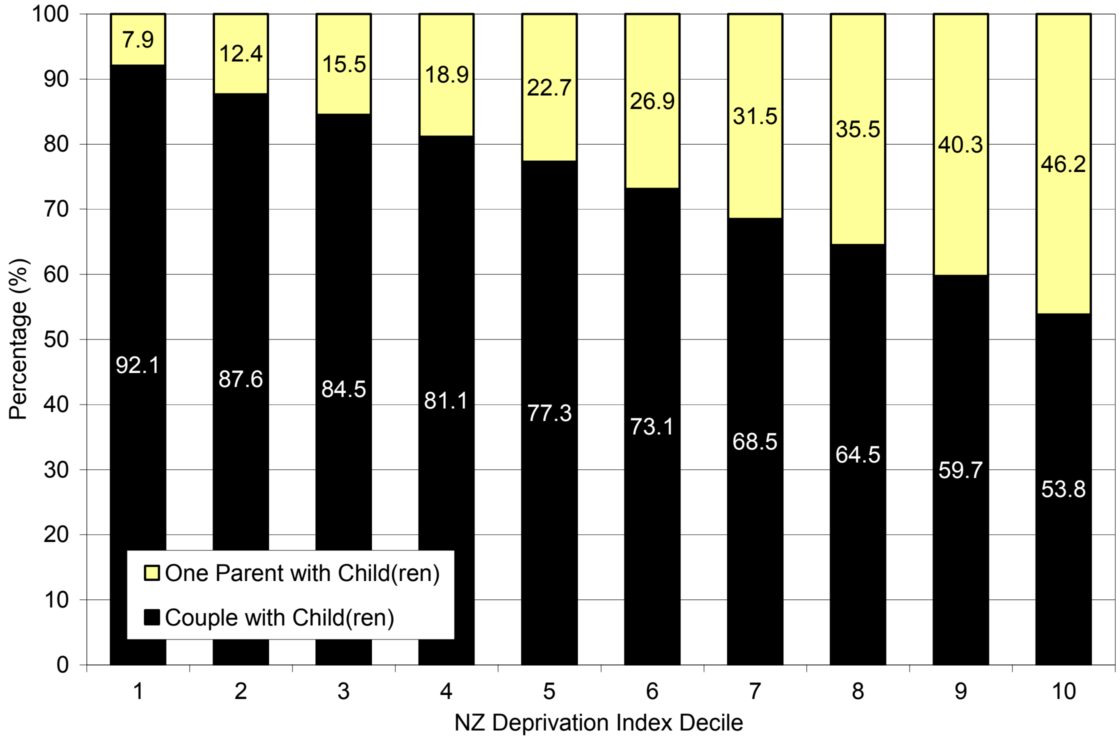


Figure 81. Proportion of Children <15 Years Living in One and Two Parent Households by Ethnicity and NZ Deprivation Index Decile, New Zealand Census 2001

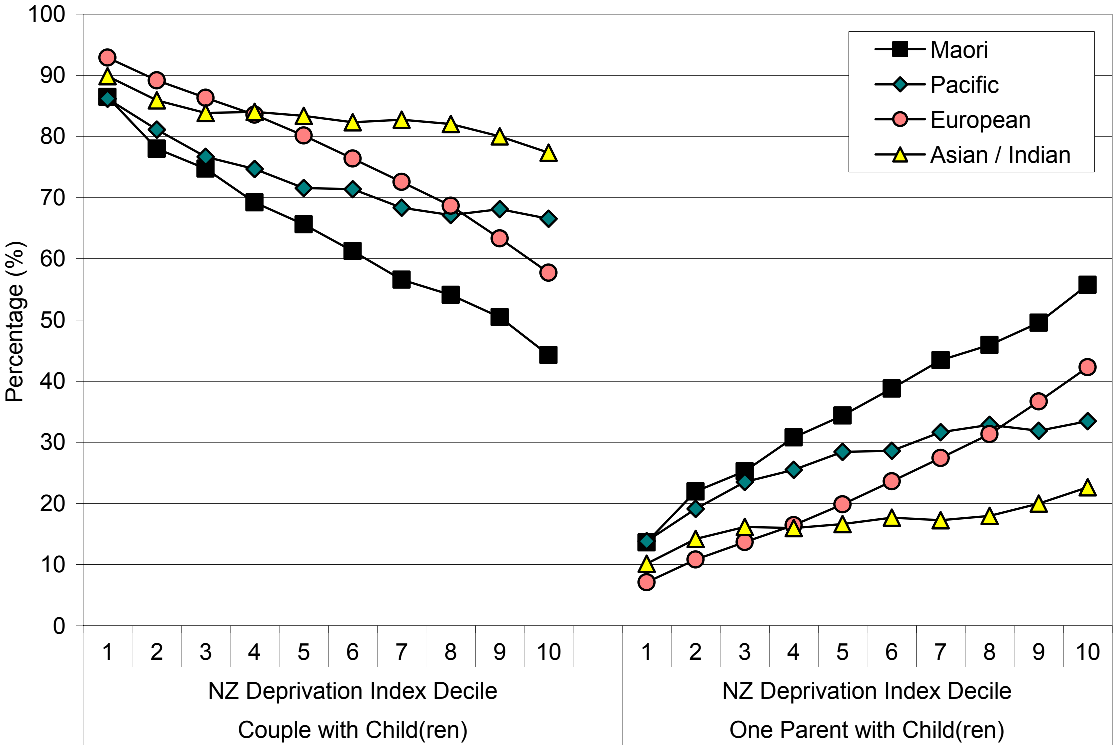


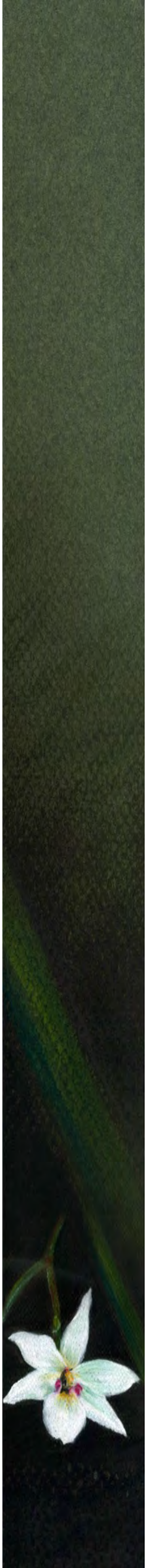
Table 35. Proportion of Children <15 Years Living in One and Two Parent Households by DHB, New Zealand Census 2001

DHB	Couple with Child(ren)		One Parent with Child(ren)	
	Number	%	Number	%
Northland	22,257	68.9	10,053	31.1
Waitemata	70,176	76.7	21,312	23.3
Auckland	50,619	75.9	16,041	24.1
Counties Manukau	66,321	71.5	26,460	28.5
Waikato	51,771	72.2	19,965	27.8
Lakes	14,979	67.3	7,272	32.7
Bay of Plenty	27,546	68.7	12,555	31.3
Tairawhiti	7,155	64.1	4,005	35.9
Taranaki	16,866	73.8	6,003	26.2
Hawkes Bay	21,903	67.7	10,458	32.3
Whanganui	9,741	68.0	4,575	32.0
MidCentral	23,868	71.9	9,339	28.1
Hutt	22,218	74.3	7,704	25.7
Capital and Coast	36,657	76.9	11,013	23.1
Wairarapa	6,261	74.9	2,100	25.1
Nelson Marlborough	18,942	76.4	5,856	23.6
West Coast	4,842	77.7	1,392	22.3
Canterbury	62,175	76.2	19,428	23.8
South Canterbury	8,307	79.3	2,169	20.7
Otago	23,883	77.2	7,056	22.8
Southland	16,686	77.6	4,806	22.4
New Zealand	583,179	73.6	209,562	26.4

Note: Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)

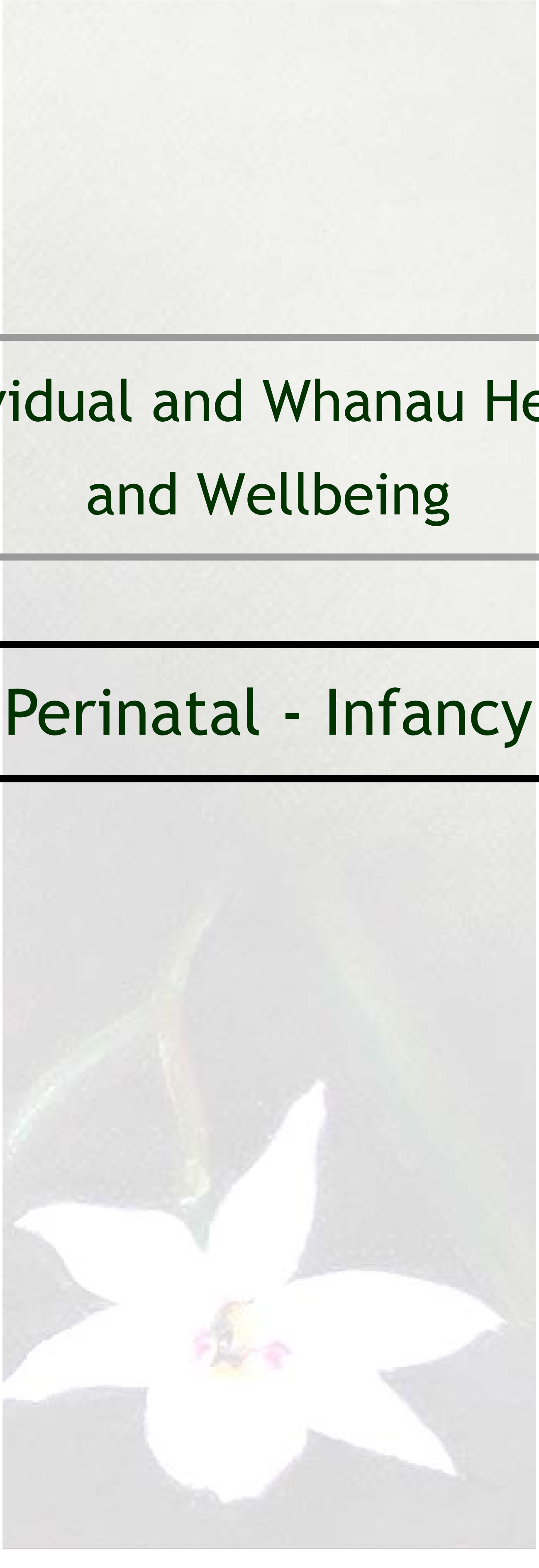
Summary

In New Zealand during the past 25 years, there has been a marked shift away from two-parent families, with the proportion of single parent families increasing from 10.4% in 1976 to 29.2% in 2001. During 2001, 26.4% of children <15 years of age lived in a sole parent household, with higher proportions of Māori > Pacific > European > Asian / Indian children living in households headed by sole parents. There were also marked socioeconomic differences in the proportion of children living in sole parent households, with rates rising progressively from 7.9% amongst those living in the most affluent areas, to 46.2% amongst those living in the most deprived areas. While the proportion living in sole parent households increased with increasing NZDep deprivation for each of New Zealand's largest ethnic groups, at each level of deprivation, ethnic differences remained, with the proportion living in sole parent households being higher for Māori > European and Pacific ≥ Asian children. During 2001, there were also large regional differences in the proportion of children living in sole parent households, with rates ranging from 20.5% to 35.9% depending on the region studied.



Individual and Whanau Health and Wellbeing

Perinatal - Infancy



Low Birth Weight: Small for Gestational Age and Preterm Birth

Introduction

Low Birth Weight (LBW) defined as a birth weight <2,500g, is determined by two factors, the duration of gestation and fetal growth. Babies are born LBW either because they are preterm (<37 weeks) or because they have failed to grow adequately in utero. LBW is a frequently used perinatal indicator in developing countries as it predicts neonatal morbidity and mortality, is easy to measure, and requires no knowledge of pregnancy duration. In developed countries however, where access to ultrasound scanning and antenatal care is readily available, it has been suggested that combining preterm birth and fetal growth restriction into a single indicator hinders preventative interventions, as the causes of the two conditions differ [131]. Thus fetal growth restriction and preterm birth are considered separately in the sections which follow.

Small for Gestational Age

Intrauterine growth restriction (IUGR) refers to a baby who has failed to reach its full in-utero growth potential. Because a baby's growth potential is often unknown, small for gestational age (SGA: birth weight <10th percentile for gestational age), is often used as a proxy for IUGR in statistical reports. In New Zealand, SGA rates have decreased in recent years, with the largest decreases occurring amongst Pacific and Māori women. Using New Zealand population percentile charts, SGA rates are highest amongst Indian>Asian>Māori>European>Pacific women and are significantly elevated amongst those living in the most deprived areas [132]. Other known risk factors for SGA include maternal smoking and poor nutritional status [133]. While New Zealand's SGA rates are decreasing, socioeconomic disparities in SGA are not. This is of concern as SGA has been associated with higher neonatal morbidity and mortality and it has been suggested that babies who are growth restricted at birth have a greater risk of coronary heart disease and diabetes in later life [134].

Preterm Birth

During the past two decades New Zealand's preterm birth rates have increased, with the largest increases occurring amongst those living in the most affluent areas and (during 1980-1994) amongst European / Other women [132, 135]. In recent years, preterm birth rates have been highest amongst Indian >Māori >European >Asian >Pacific women and those in the most deprived areas [132]. While infants born prematurely have higher neonatal mortality and morbidity, it is difficult to determine whether New Zealand's rising preterm rates will have detrimental impacts, as it remains unclear whether increases are due to increasing obstetric intervention and the selective delivery of high risk babies (as is occurring overseas), or whether they reflect a true rise in spontaneous preterm birth [136].

Data Source and Methods

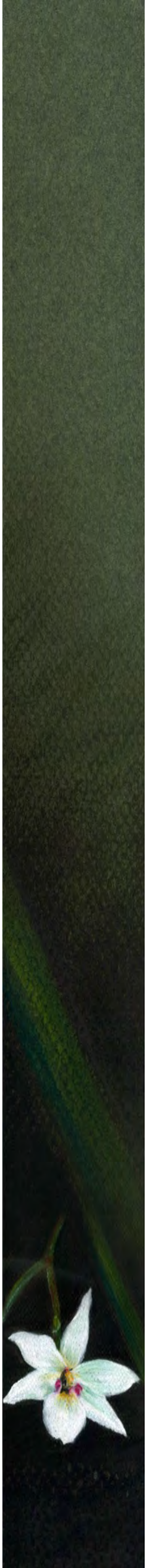
Definition

1. Small for Gestational Age: Infants with a birth weight below the 10th percentile for their gestational age.
2. Preterm Birth: Infants born at less than 37 weeks gestation

Data Source

1. *Small for Gestational Age*

Numerator: Birth Registration Dataset (Appendix 2): Singleton live born babies whose birth weight was below the 10% percentile for gestational age. Because NZ Birth Weight Percentile Charts were only available for babies 24-44 weeks gestation, babies with gestations outside these ages were excluded.
Denominator: Birth Registration Dataset: All singleton live born babies registered 22-44 weeks gestation.



2. *Preterm Birth*
Numerator: Birth Registration Dataset (Appendix 2): All singleton live born babies 20-36 weeks gestation
Denominator: Birth Registration Dataset: All singleton live born babies registered 20+ weeks gestation

Indicator Category
Ideal B-C (**Table 133, Table 134**)

Notes on Interpretation
The infant's ethnicity was that supplied by parents on the birth registration form; NZDep Index decile is based on the usual residential address at the time of birth registration (mapped to NZDep2001). SGA rates were calculated using birth weight percentile charts derived from New Zealand birth registration data for the years 1990-1991 [137]. Because of rising birth weights, SGA rates in later years may be lower than the conventional 10%. Total population charts have been used, rather than ethnic specific charts to highlight ethnic differences, although it is acknowledged that this may underestimate SGA rates for Pacific babies and overestimate SGA rates for Asian and Indian babies.

New Zealand Distribution and Trends

In New Zealand during 1980-2006, rates of preterm birth increased and then reached a plateau, while rates of small for gestational age (SGA) declined. In contrast, rates of low birth weight remained relatively static during this period (**Figure 82**). During 2002-2006, rates of SGA were highest among Asian / Indian and Māori babies and those living in the most deprived areas (**Table 36**, **Figure 83**), while rates of preterm birth were highest among Māori babies, males and those in the most deprived areas (**Table 37**, **Figure 84**). During 2002-2006, there were regional variations in SGA and preterm birth rates, with rates ranging from 5.2% to 7.2% for SGA and from 5.0% to 6.9% for preterm birth, depending on the region studied (**Table 38**), (**Table 39**).

Figure 82. Rates of Small for Gestational Age, Preterm Birth and Low Birth Weight, New Zealand Singleton Live Births 1980-2006

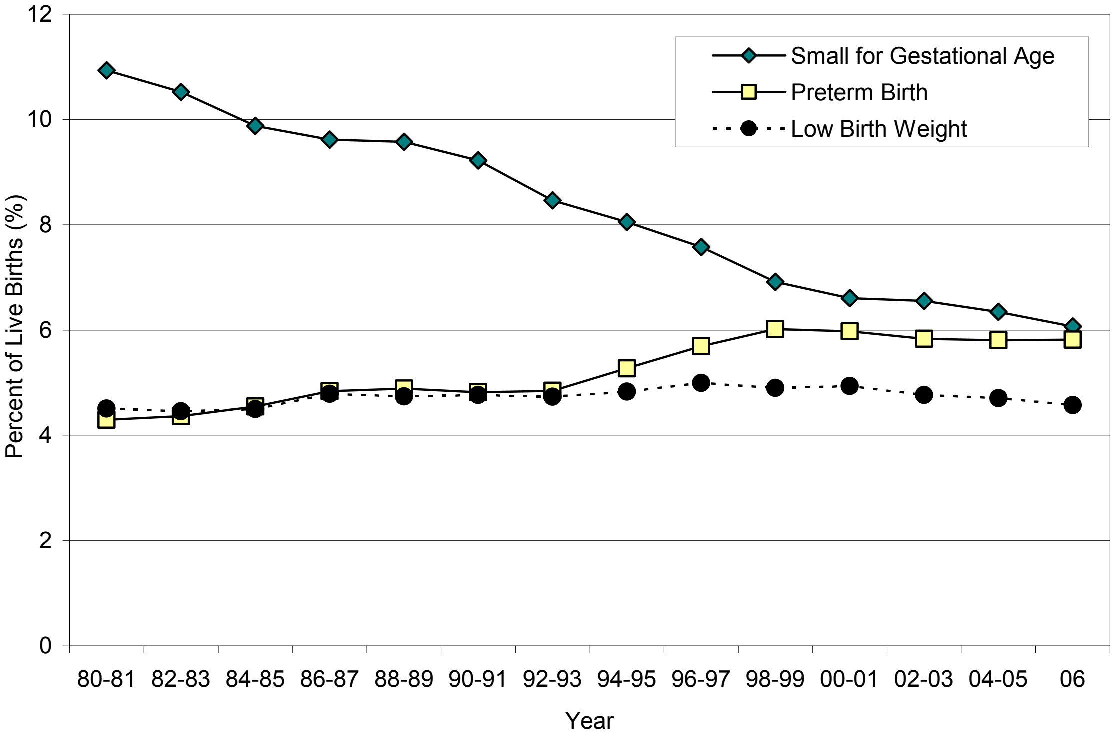
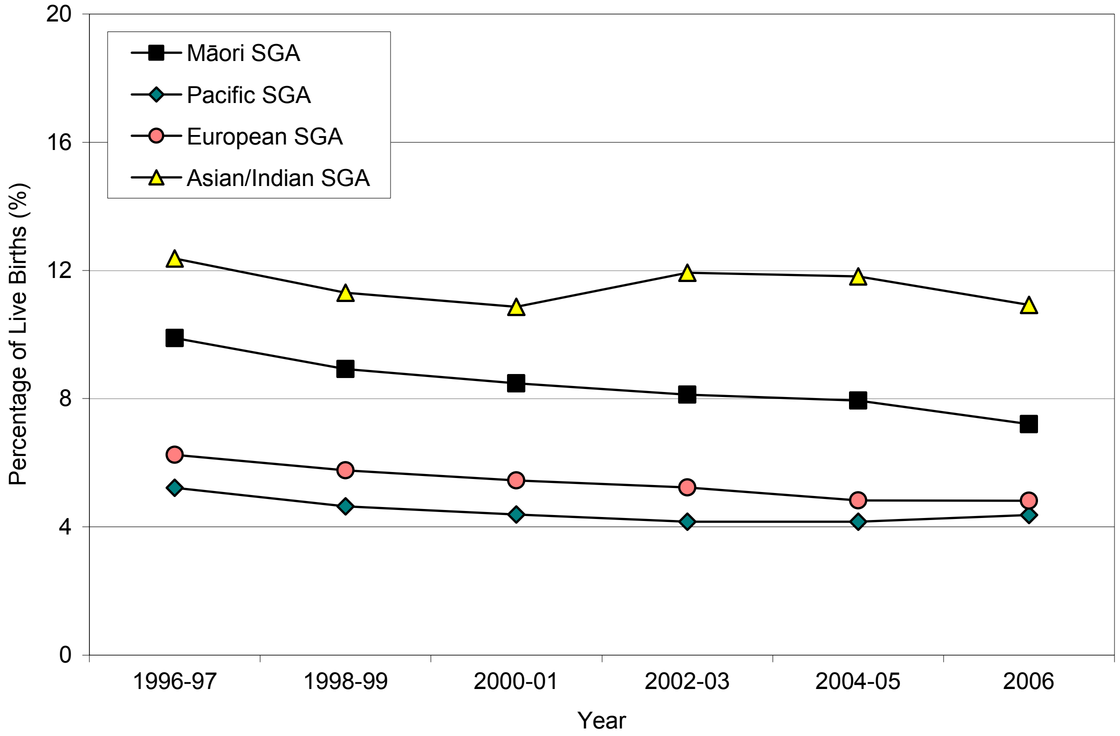


Table 36. Risk Factors for Small for Gestational Age, New Zealand Singleton Live Births 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	4.68	1.00		1-2	4.86	1.00	
2	5.04	1.08	0.99-1.17	3-4	5.38	1.11	1.05-1.17
3	5.28	1.13	1.04-1.23	5-6	5.82	1.20	1.14-1.27
4	5.47	1.17	1.08-1.27	7-8	6.91	1.42	1.35-1.49
5	5.40	1.16	1.07-1.26	9-10	7.73	1.59	1.51-1.67
6	6.17	1.32	1.22-1.42	Ethnicity			
7	6.53	1.40	1.30-1.51	Māori	7.85	1.57	1.52-1.62
8	7.22	1.54	1.43-1.66	Pacific	4.20	0.84	0.79-0.89
9	7.60	1.62	1.51-1.74	European	4.99	1.00	
10	7.84	1.68	1.57-1.80	Asian/Indian	11.67	2.34	2.25-2.44
Gender							
Female	6.23	1.00					
Male	6.49	1.04	1.01-1.07				

Note: Rate per 100 live births per year; RR: Rate Ratios are unadjusted

Figure 83. Rates of Small for Gestational Age by Infant's Ethnic Group, New Zealand Singleton Live Births 1996-2006



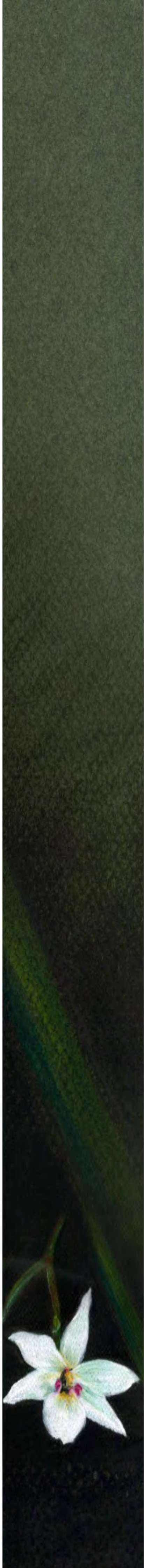


Table 37. Risk Factors for Preterm Birth, New Zealand Singleton Live Births 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	5.30	1.00		1-2	5.306	1.00	
2	5.31	1.00	0.92-1.08	3-4	5.312	1.00	0.95-1.06
3	5.09	0.96	0.89-1.04	5-6	5.865	1.11	1.05-1.17
4	5.50	1.04	0.96-1.12	7-8	6.007	1.13	1.07-1.19
5	5.85	1.10	1.02-1.19	9-10	6.239	1.18	1.12-1.24
6	5.88	1.11	1.03-1.20	Ethnicity			
7	6.17	1.16	1.08-1.25	Māori	6.346	1.14	1.1-1.18
8	5.87	1.11	1.03-1.19	Pacific	5.492	0.98	0.93-1.03
9	6.10	1.15	1.07-1.23	European	5.583	1.00	
10	6.36	1.20	1.12-1.29	Asian/Indian	5.883	1.05	1.00-1.11
Gender							
Female	5.47	1.00					
Male	6.15	1.12	1.09-1.15				

Note: Rate per 100 live births per year; RR: Rate Ratios are unadjusted.

Figure 84. Rates of Preterm Birth by Baby's Ethnic Group, New Zealand Singleton Live Births 1996-2006

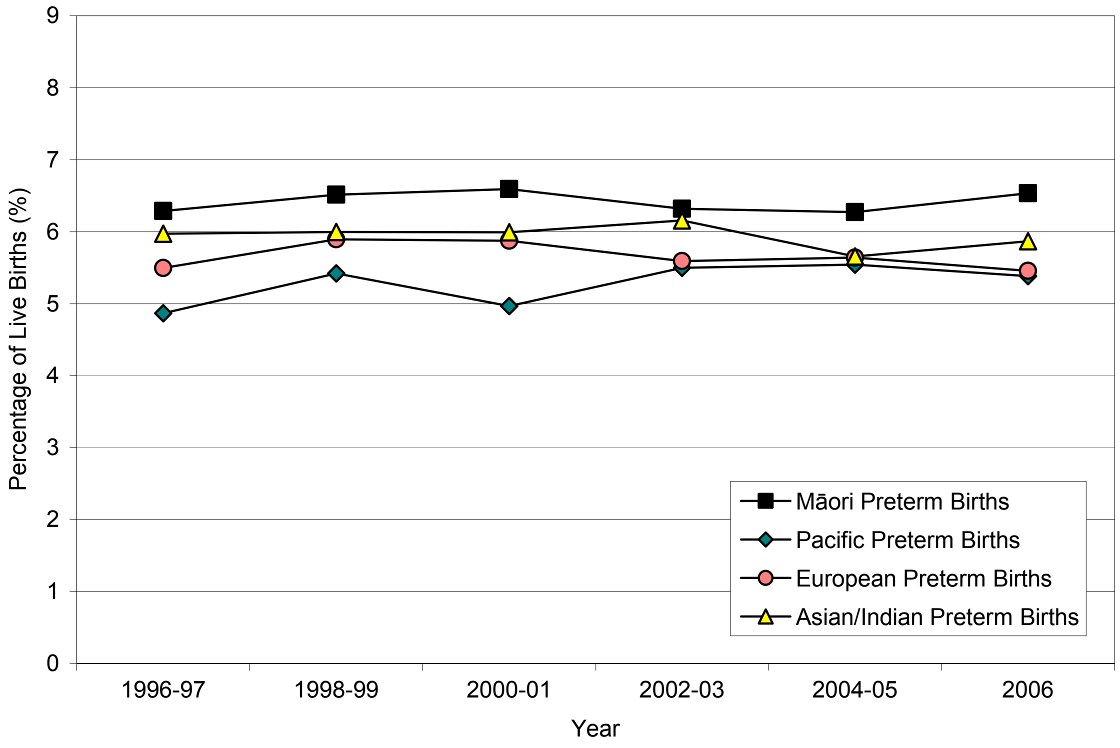


Table 38. Rates of Small for Gestational Age by DHB, NZ Singleton Live Births 2002-2006

DHB	Number: Total 2002-2006	Number: Annual Average	SGA Rate (% of live births)	% of NZ SGA Births
Northland	705	141.0	6.9	4.0
Waitemata	1,919	383.8	5.7	10.8
Auckland	1,901	380.2	6.4	10.7
Counties Manukau	2,598	519.6	6.9	14.6
Waikato	1,705	341.0	7.2	9.6
Lakes	535	107.0	7.0	3.0
Bay of Plenty	896	179.2	6.9	5.0
Tairawhiti	227	45.4	6.2	1.3
Taranaki	433	86.6	6.5	2.4
Hawkes Bay	730	146.0	7.1	4.1
Whanganui	291	58.2	7.1	1.6
MidCentral	653	130.6	6.4	3.7
Hutt	660	132.0	6.8	3.7
Capital and Coast	998	199.6	5.5	5.6
Wairarapa	122	24.4	5.3	0.7
Nelson Marlborough	420	84.0	5.7	2.4
West Coast	110	22.0	6.4	0.6
Canterbury	1,546	309.2	5.5	8.7
South Canterbury	223	44.6	7.9	1.3
Otago	492	98.4	5.2	2.8
Southland	417	83.4	6.1	2.3
New Zealand	17,749*	3549.8	6.4	100.0

Note: *NZ Total includes 168 SGA births where DHB was not stated: Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)

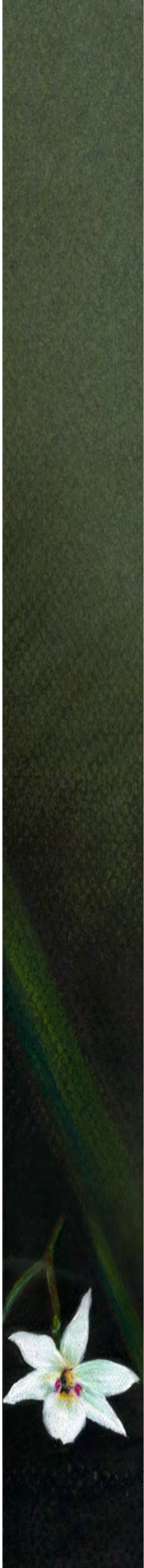


Table 39. Rates of Preterm Birth by DHB, NZ Singleton Live Births 2002-2006

DHB	Number: Total 2002-2006	Number: Annual Average	Preterm Rate (% of live births)	% of NZ Preterm Births
Northland	552	110.4	5.4	3.4
Waitemata	1,947	389.4	5.8	12.0
Auckland	1,546	309.2	5.2	9.5
Counties Manukau	2,261	452.2	6.0	13.9
Waikato	1,338	267.6	5.6	8.2
Lakes	466	93.2	6.1	2.9
Bay of Plenty	829	165.8	6.3	5.1
Tairawhiti	243	48.6	6.6	1.5
Taranaki	402	80.4	6.0	2.5
Hawkes Bay	654	130.8	6.3	4.0
Whanganui	240	48.0	5.9	1.5
MidCentral	579	115.8	5.6	3.6
Hutt	592	118.4	6.1	3.6
Capital and Coast	1,027	205.4	5.7	6.3
Wairarapa	137	27.4	5.9	0.8
Nelson Marlborough	400	80.0	5.4	2.5
West Coast	101	20.2	5.9	0.6
Canterbury	1618	323.6	5.7	10.0
South Canterbury	140	28.0	5.0	0.9
Otago	648	129.6	6.9	4.0
Southland	413	82.6	6.0	2.5
New Zealand	16,260*	3,252	5.8	100.0

Note: *NZ Total includes 127 preterm births where DHB was not stated: Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)

Summary

Low Birth Weight (LBW) defined as a birth weight <2,500g, is determined by two factors, the duration of gestation and fetal growth. Babies are born LBW either because they are preterm (<37 weeks) or because they have failed to grow adequately in utero. In New Zealand during 1980-2006, rates of preterm birth increased and then reached a plateau, while rates of small for gestational age (SGA) declined. In contrast, rates of low birth weight remained relatively static during this period. During 1996-2006, rates of preterm birth were highest amongst Māori babies, males and those in the most deprived areas, while rates of SGA were highest amongst Asian / Indian and Māori babies and those in the most deprived areas. While infants born with a low birth weight have higher neonatal mortality and morbidity, it is difficult to determine whether New Zealand's recent rise in preterm rates will have detrimental impacts, as it remains unclear whether these increases were due to increasing obstetric intervention and the selective delivery of high risk babies (as has occurred overseas), or whether they reflected a true rise in spontaneous preterm birth.

Infant Mortality

Introduction

Mortality during the first year of life is higher than at any other point during childhood or adolescence. Infant mortality in New Zealand has been declining since the 1930s [138] with the most recent decreases being attributed to a fall in Sudden Infant Death Syndrome (SIDS) [139]. Declines, however, have not been equal for all ethnic groups, with higher SIDS rates amongst Māori since the National Cot Death Campaign began being attributed to differing risk factor profiles within the Māori community [140]. While risk of total infant mortality is generally higher amongst, Pacific>Māori>European/Other babies, males, and those living in the most deprived areas [138], analyses of total infant mortality may be of limited utility, if evidence based prevention strategies are to be developed which will reduce infant mortality in New Zealand in future years. This is because, while in the neonatal period many of the causes of mortality have their origins in the perinatal period (e.g. extreme prematurity, congenital anomalies), in the post-neonatal period issues such as SIDS, pneumonia and injuries play a much greater role.

Data Source and Methods

Definition

Total Infant Mortality: Death of a live born infant prior to their first birthday
Neonatal Mortality: Death of a live born infant during the first 28 days of life
Post-Neonatal Mortality: Death of a live born infant >28 days but <365 days of life

Data Sources

Numerator: National Mortality Collection (Appendix 3): All deaths in the first year of life, using the definitions for total, neonatal and post neonatal mortality outlined above. Cause of death was derived from the main underlying cause of death (clinical code) using ICD-D 10 codes as follows: Extreme prematurity (ICD-9 765.0; ICD-10 P072), Congenital anomalies (ICD-9 740-759; ICD-10 Q00-Q99), Perinatal conditions (ICD-9 760-779; ICD-10 P00-P96), and Sudden Infant Death Syndrome (SIDS) (ICD-9 798.0; ICD-10 R95)

Denominator: Birth Registration Dataset: All live births 20+ weeks gestation.

Indicator Category

Ideal B (**Table 133, Table 134**)

Notes on Interpretation

For birth registration data, the infant's ethnicity was that supplied by parents on the birth registration form; NZDep Index decile was based on the usual residential address at the time of birth or death registration

New Zealand Distribution and Trends

Total Infant Mortality

In New Zealand during the past 17 years, deaths due to SIDS and congenital anomalies have continued to decline, while deaths due to extreme prematurity and other perinatal conditions, after declining initially, have seen small increases during the past 3-4 years (**Figure 85**). As a result, while post neonatal mortality has continued to decline (with the exception of the 2004 year); neonatal mortality has been more static during the past 5 years (**Figure 86**).

During 1996-2004 there were also marked ethnic disparities in infant mortality rates, with neonatal mortality being higher for Pacific and Māori > European > Asian / Indian infants and post-neonatal mortality being higher for Māori > Pacific > European > Asian / Indian infants (**Figure 87**).

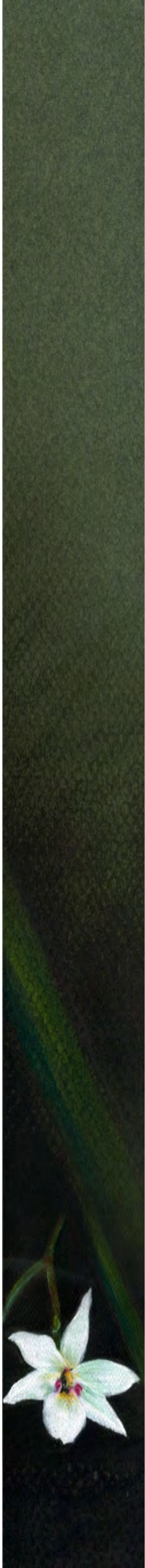


Figure 85. Infant Mortality by Cause, New Zealand 1988-2004

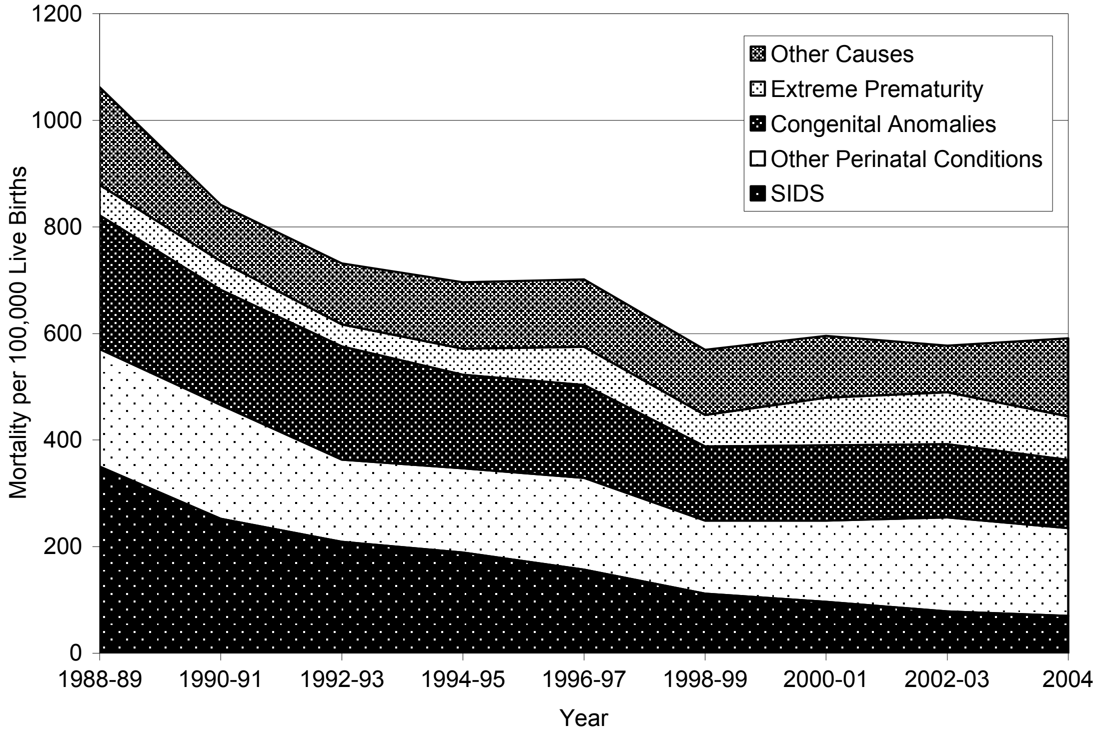


Figure 86. Total, Neonatal and Post-Neonatal Mortality in New Zealand 1988-2004

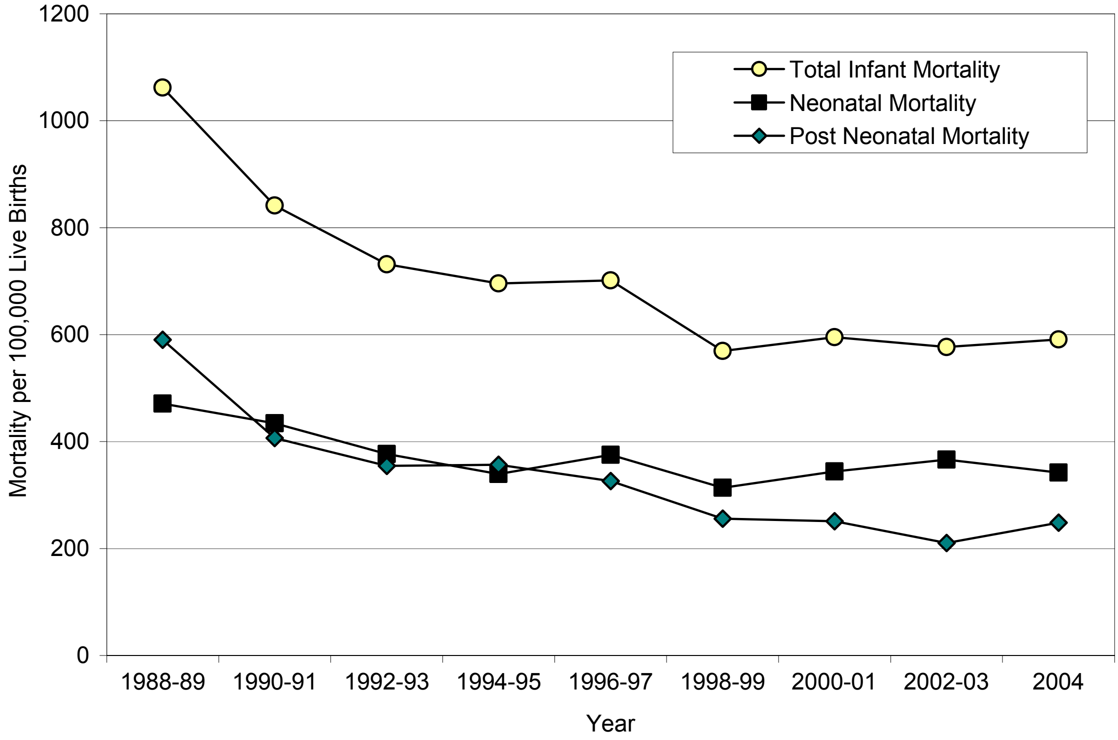
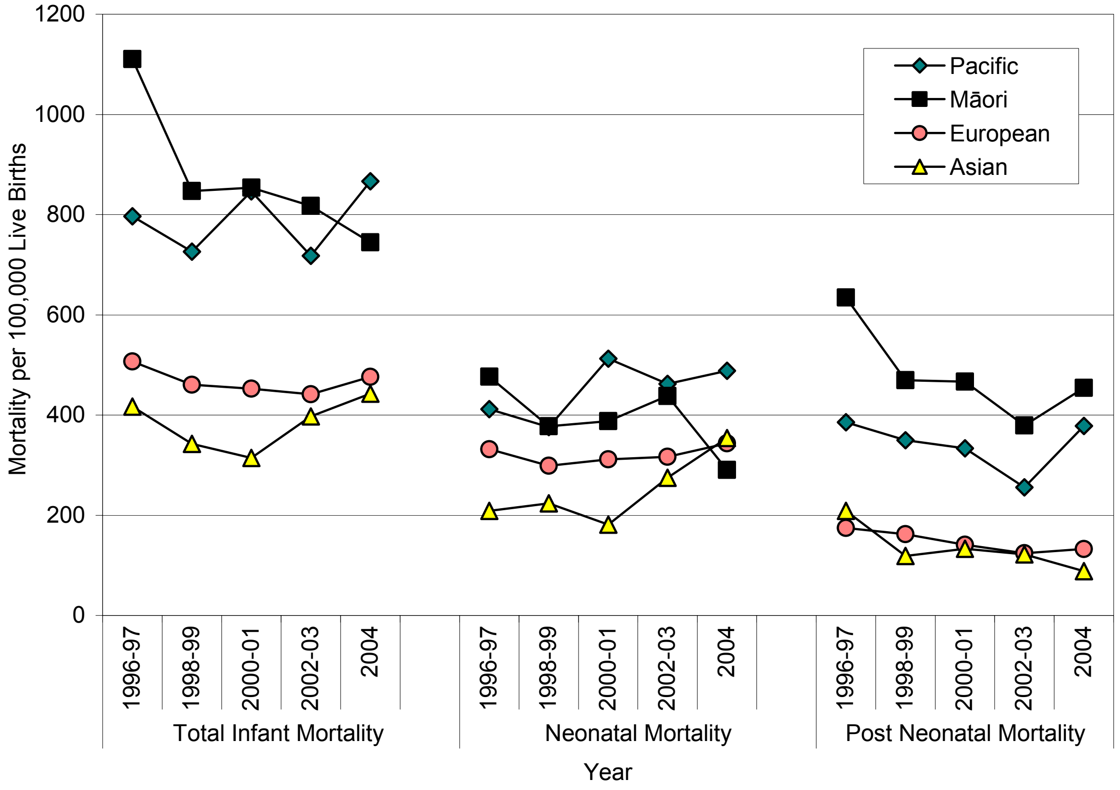


Figure 87. Total, Neonatal and Post Neonatal Mortality Rates by Ethnicity, New Zealand 1996-2004



Neonatal Mortality

In New Zealand during 2000-2004, the most frequent causes of neonatal mortality were extreme prematurity and congenital anomalies, with anomalies of the cardiovascular and central nervous system playing a particularly prominent role. Birth asphyxia however, was also a relatively important cause of neonatal death (**Table 40**). For all categories of death (with the exception of SUDI), mortality was higher during the first week of life than at any other point during infancy (**Figure 88**). During this period, risk of mortality from congenital anomalies was higher for Pacific infants and those living in the most deprived areas (**Table 41**), while risk of mortality from extreme prematurity / perinatal conditions was higher for males, Māori and Pacific infants and those living in the most deprived areas (**Table 42**).

Table 40. Most Frequent Causes of Neonatal Mortality (0-28 days), New Zealand 2000-2004

Cause of Death	Number: Total 2000-2004		Number: Annual Average		Rate per 100,000 Live Births		% of Deaths	
Extreme Prematurity	253		50.6		89.4		25.4	
Congenital Anomalies: CVS*	76	255	15.2	51.0	26.9	90.1	7.6	25.6
Congenital Anomalies: CNS*	34		6.8		12.0		3.4	
Congenital Anomalies: Other	145		29.0		51.2		14.5	
Intrauterine / Birth Asphyxia	57		11.4		20.1		5.7	
SIDS	16		3.2		5.7		1.6	
Suffocation / Strangulation in Bed	10		2.0		3.5		1.0	
Other Causes	407		81.4		143.8		40.8	
Total	998		199.6		352.6		100.0	

*CVS: cardiovascular system; CNS: central nervous system.

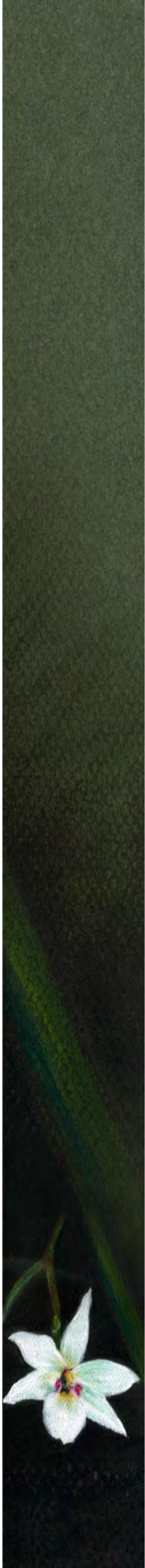
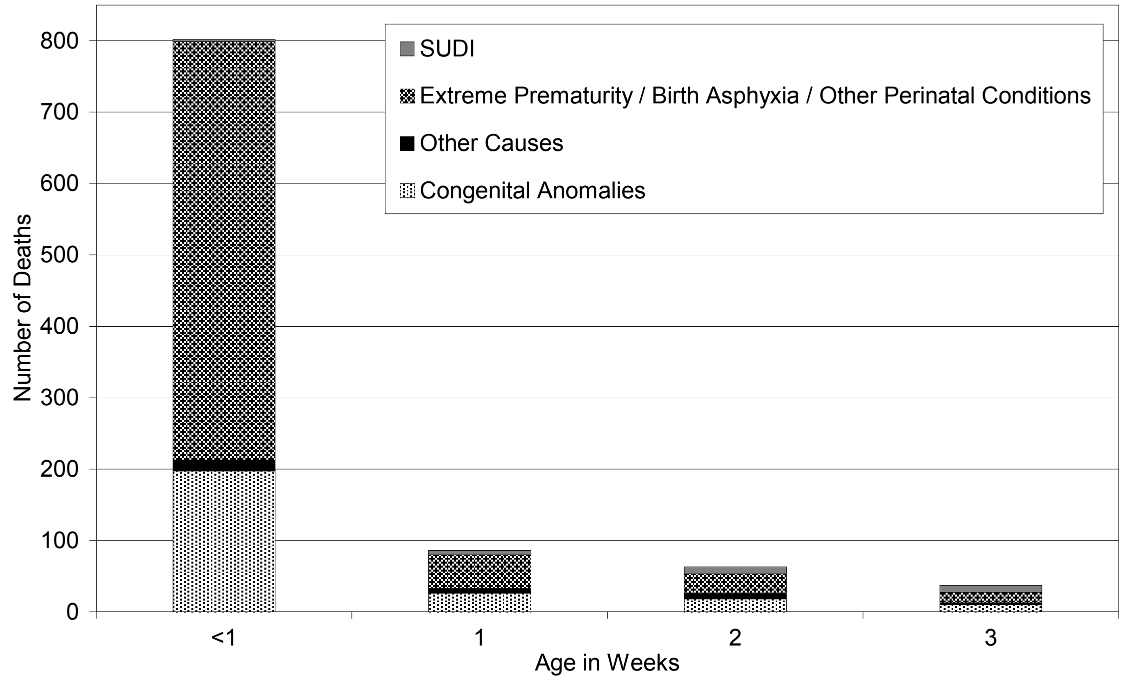


Figure 88. Neonatal Mortality* (0-28 days) by Age and Cause, New Zealand 2000-2004



Note: Numbers are per 5 year period. SUDI: deaths from SIDS, suffocation in bed, and unspecified causes

Table 41. Risk Factors for Infant Mortality due to Congenital Anomalies, New Zealand 2000-2004

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Quintile				Ethnicity			
1-2	103.99	1.00		Māori	118.0	0.90	0.70-1.15
3-4	108.04	1.04	0.70-1.55	Pacific	185.3	1.42	1.06-1.91
5-6	129.92	1.25	0.86-1.82	European	130.7	1.00	
7-8	132.52	1.27	0.88-1.82	Asian/Indian	130.6	1.00	0.68-1.46
9-10	163.47	1.57	1.12-2.20				
Gender							
Female	123.8	1.00					
Male	140.8	1.14	0.93-1.4				

Note: Rate per 100,000 live births per year and based on all infants <1 year; RR: Rate Ratios are unadjusted.

Table 42. Risk Factors for Infant Mortality due to Extreme Prematurity and Other Perinatal Conditions, New Zealand 2000-2004

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Quintile				Ethnicity			
1-2	203.5	1.00		Māori	281.6	1.21	1.02-1.43
3-4	218.2	1.07	0.81-1.42	Pacific	386.9	1.66	1.35-2.04
5-6	233.1	1.15	0.88-1.51	European	233.3	1.00	
7-8	240.5	1.18	0.91-1.53	Asian/Indian	177.0	0.76	0.55-1.05
9-10	356.4	1.75	1.38-2.22				
Gender							
Female	237.4	1.00					
Male	281.6	1.19	1.03-1.38				

Note: Rate per 100,000 live births per year and based on all infants < 1 year; RR: Rate Ratios are unadjusted.

Post-Neonatal Mortality

In New Zealand during 2000-2004, the most frequent causes of post-neonatal mortality were SIDS, followed by congenital anomalies and injury, although conditions arising during the perinatal period still also played a role. In addition, a large number of babies were identified as dying as a result of suffocation or strangulation in bed, although it is possible that some of these may have been coded as SIDS cases in previous years (**Table 43**). Mortality was greatest during the first 6 months of life, with progressively fewer deaths occurring as infants approached 1 year of age (**Figure 89**). During the same period, risk of SUDI was significantly higher for Māori and Pacific infants and those living in the most deprived NZDep areas (**Table 44**).

Regional Differences in Infant Mortality

In addition, during 2000-2004 there were marked regional variations in infant mortality rates, although care should be taken in interpreting regional differences, due to the small number of cases involved (**Table 45**).

Table 43. Causes of Post-Neonatal Mortality (29-364 days), New Zealand 2000-2004

Cause of Death	Number: Total 2000-2004		Number: Annual Average		Rate per 100,000 Live Births		% of Deaths	
SIDS	221		44.2		78.1		33.3	
Suffocation/Strangulation in Bed	54		10.8		19.1		8.1	
Unspecified Causes	29		5.8		10.2		4.4	
Congenital Anomalies: CVS	46	121	9.2	24.2	16.3	42.8	6.9	18.2
Congenital Anomalies: CNS	22		4.4		7.8		3.3	
Congenital Anomalies: Other	53		10.6		18.7		8.0	
Injury and Poisoning	37		7.4		13.1		5.6	
Other Perinatal Conditions	58		11.6		20.5		8.7	
Other Specified Causes	144		28.8		50.9		21.7	
Total	664		132.8		234.6		100.0	

Note: CVS: cardiovascular system; CNS: central nervous system

Table 44. Risk Factors for Infant Mortality due to Sudden Unexpected Death in Infancy, New Zealand 2000-2004

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Quintile				Ethnicity			
1-2	22.6	1.00		Māori	289.2	6.31	4.81-8.28
3-4	79.0	3.49	1.74-7.00	Pacific	110.5	2.41	1.60-3.64
5-6	63.1	2.79	1.38-5.66	European	45.8	1.00	
7-8	122.7	5.43	2.81-10.50	Asian/Indian	21.1	0.46	0.19-1.14
9-10	239.8	10.61	5.61-20.06				
Gender							
Female	105.7	1.00					
Male	130.4	1.23	0.99-1.53				

Note: Rate per 100,000 live births per year and based on all infants <1 year; RR: Rate Ratios are unadjusted.

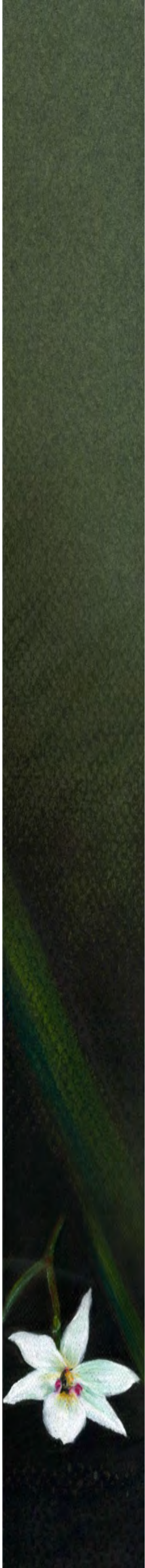
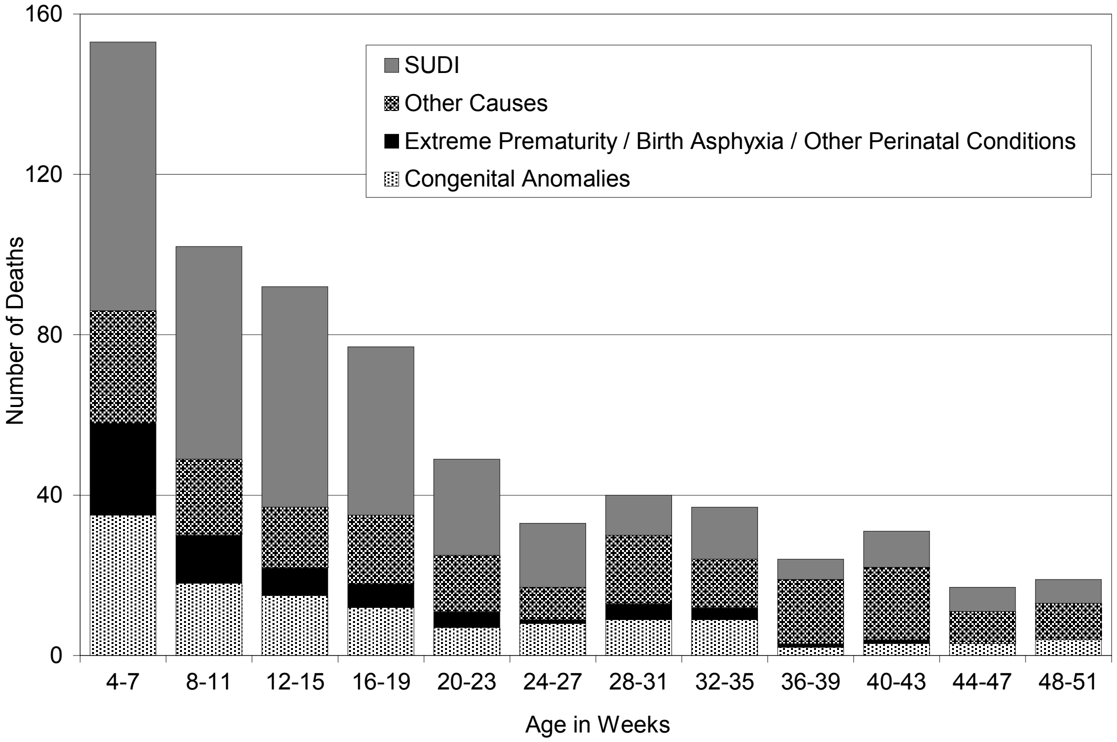


Figure 89. Post-Neonatal Mortality (29-365 days) by Age and Cause, New Zealand 2000-2004



Note: Numbers are per 5 year period. SUDI: deaths from SIDS, suffocation in bed, and unspecified causes

Summary

In New Zealand during the past 17 years, deaths due to SIDS and congenital anomalies have continued to decline, while deaths due to extreme prematurity and other perinatal conditions have increased during the past 3-4 years. During 2000-2004, the most frequent causes of neonatal mortality were extreme prematurity and congenital anomalies, with mortality being higher during the first week of life than at any other point during infancy. Mortality from congenital anomalies was higher for Pacific infants and those living in the most deprived areas, while mortality from extreme prematurity / perinatal conditions was higher for males, Māori and Pacific infants and those living in the most deprived areas.

In contrast, the most frequent causes of post-neonatal mortality were SIDS, followed by congenital anomalies and injury. In addition, a large number of babies died as a result of suffocation or strangulation in bed, although it is possible that some of these deaths may have been coded as SIDS cases in previous years. Mortality was greatest during the first 6 months of life, with progressively fewer deaths occurring as infants approached 1 year of age. Risk of SIDS was significantly higher amongst Māori and Pacific infants and those living in the most deprived NZDep areas and there were also marked regional variations in infant mortality rates, although care should be taken when interpreting these differences, due to the small number of cases involved.

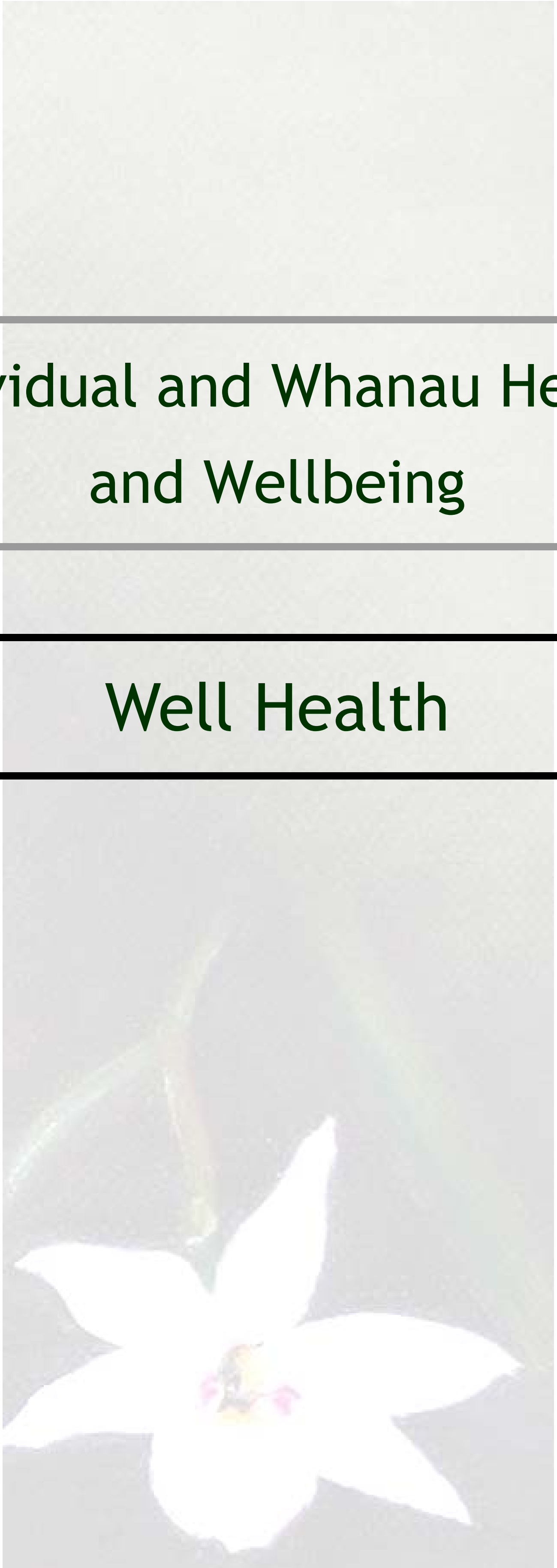
Table 45. Neonatal, Post Neonatal and Total Infant Mortality Rates by Region, New Zealand 2000-2004

DHB	Neonatal Mortality			Post Neonatal Mortality			Total Infant Mortality		
	Number: Total 2000-2004	Number: Annual Average	Rate per 100,000 Live Births	Number: Total 2000-2004	Number: Annual Average	Rate per 100,000 Live Births	Number: Total 2000-2004	Number: Annual Average	Rate per 100,000 Live Births
Northland	38	7.6	374.6	41	8.2	404.1	79	15.8	778.7
Waitemata	95	19.0	284.3	69	13.8	206.5	164	32.8	490.7
Auckland	120	24.0	397.7	55	11.0	182.3	175	35.0	579.9
Counties Manukau	164	32.8	440.9	118	23.6	317.2	282	56.4	758.1
Waikato	79	15.8	328.5	52	10.4	216.2	131	26.2	544.7
Lakes	35	7.0	448.1	24	4.8	307.3	59	11.8	755.3
Bay of Plenty	54	10.8	410.4	40	8.0	304.0	94	18.8	714.4
Tairawhiti	12	2.4	319.1	12	2.4	319.1	24	4.8	638.1
Taranaki	31	6.2	454.6	23	4.6	337.3	54	10.8	791.9
Hawkes Bay	43	8.6	402.4	25	5.0	234.0	68	13.6	636.3
Whanganui	22	4.4	498.2	17	3.4	385.0	39	7.8	883.2
MidCentral	23	4.6	218.6	25	5.0	237.6	48	9.6	456.1
Hutt	28	5.6	273.8	28	5.6	273.8	56	11.2	547.6
Capital and Coast	53	10.6	286.3	27	5.4	145.8	80	16.0	432.1
Wairarapa	12	2.4	497.3	<5	s	s	16	3.2	663.1
Nelson Marlborough	28	5.6	367.6	8	1.6	105.0	36	7.2	472.6
West Coast	7	1.4	384.6	<5	s	s	10	2.0	549.5
Canterbury	81	16.2	287.1	43	8.6	152.4	124	24.8	439.4
South Canterbury	15	3.0	513.0	6	1.2	205.2	21	4.2	718.2
Otago	30	6.0	308.0	18	3.6	184.8	48	9.6	492.8
Southland	21	4.2	300.4	19	3.8	271.8	40	8.0	572.2
New Zealand	998	199.6	352.6	664	132.8	234.6	1662*	332.4	587.2

Note: New Zealand Total includes 14 deaths where DHB was not state; s: Small numbers preclude rate calculations; Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue). In addition, care must be taken when comparing regional rates due to the often small number of cases involved.

Individual and Whanau Health and Wellbeing

Well Health



Immunisation

Introduction

Immunisation is among the most successful and cost-effective public health interventions [141, 142]. There are many celebrated successes including the eradication of smallpox in 1977, a worldwide decrease in poliomyelitis by 99% since 1988, and the elimination of measles from many parts of the world [141, 143]. Immunisation not only protects individuals, but through the effect of 'herd immunity' benefits the whole community. A major benefit from immunisation is the potential to reduce socioeconomic disparities which are evident in vaccine preventable disease.

The New Zealand Childhood Immunisation Schedule offers free immunisations protecting against nine vaccine preventable diseases; Diphtheria, Tetanus, Pertussis (whooping cough), Poliomyelitis, Hepatitis B, Haemophilus influenzae type b, Measles, Mumps and Rubella. In addition, the Schedule offers publicly funded immunisation to those at risk of influenza, tuberculosis, and pneumococcal disease. Epidemic strain Meningococcal B immunisation is offered as a special programme (**Table 46**).

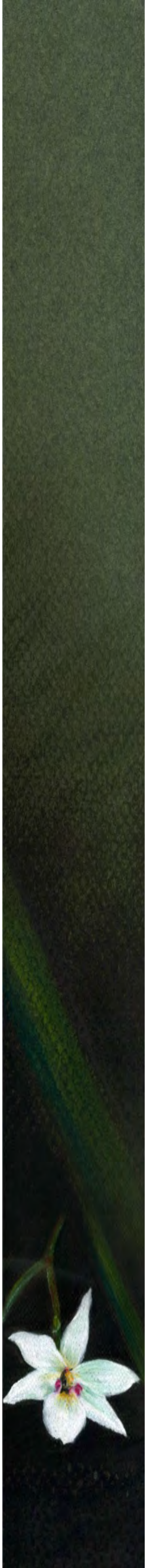
Table 46. Immunisation Schedule for Children Aged 0-11 Years, New Zealand 2006

Age	Immunisation given						Special programme
	DTaP-IPV	Hib-Hep B	Hep B	Hib	MMR	dTap-IPV*	MeNZB
6 weeks	•	•					•
3 months	•	•					•
5 months	•		•				•
10 months							•
15 months				•	•		
4 years	•				•		
11 years						•	

Key: D: diphtheria, d: adult diphtheria; T: tetanus; aP: acellular Pertussis, ap: adult acellular Pertussis; Hib: *Haemophilus influenzae* type b; Hep B: hepatitis B, IPV: inactivated polio vaccine; MMR: measles, mumps, rubella; MeNZB: meningococcal B vaccine. *dTap-IPV will be given in 2006–7 so children complete four doses of polio vaccine. Source: Ministry of Health[144].

The Ministry of Health includes childhood immunisation amongst the 13 priority population health objectives in the New Zealand Health Strategy and has set a target of 95% coverage in children which has not yet been met [145]. Compared with other developed countries our immunisation coverage at age two years is low and New Zealand rates of vaccine-preventable disease are consequently higher[145]. Recent changes to the immunisation programme have been instituted in order to improve immunisation in New Zealand children including[144]:

1. **Outreach immunisation services** which have been established in 16 DHBs for the follow-up of missed of delayed immunisations
2. **National Immunisation Register (NIR):** Implemented in 2004 the NIR collected immunisation information for the MeNZB programme, and in 2005 began collecting immunisation information on all individuals born after a specified date. The NIR aims to benefit individuals by facilitating the delivery of immunisation services and providing an accurate immunisation history. In the future it will provide valuable national and regional immunisation coverage information.



The following section summarises available information on immunisation coverage in children and the occurrence of selected vaccine preventable diseases in New Zealand. This section concentrates on those immunisations which are offered in the Immunisation Schedule for all New Zealand children and does not include Meningococcal Disease (page 270) which is part of a special immunisation programme, and Tuberculosis (page 283) which is not universally recommended. Pertussis in children < 1 year of age is covered in more detail on page 302 (**Table 46**).

Data Source and Methods

Definition

1. Immunisation Coverage: Proportion of children who are fully immunised at 2 years of age
2. Immunisation Coverage: Proportion of Children Fully Immunised by Milestone Age (6 months, 12 months, 18 months)
3. Hospital Admissions for Vaccine Preventable Diseases(VPD): VPD’s immunised for in the New Zealand Immunisation Schedule
4. Notifications for Vaccine Preventable Diseases(VPD): VPD’s immunised for in the New Zealand Immunisation Schedule

Data Source and Interpretation

1. Immunisation Coverage at 2 Years

National Immunisation Coverage Surveys

Numerator: Children who are fully immunised at 2 years old

Interpretation: National Immunisation Surveys were conducted in 1992 and 2005, with a survey conducted in the Northern Region in 1996 utilising methods developed by the World Health Organisation.

2. Immunisation Coverage by Milestone Age

National Immunisation Register (NIR)

Numerator: Children on the NIR who reach the Milestone Age within the specified time period and who are fully immunised

Denominator: All children on the NIR who reach the Milestone Age within the specified time period

Interpretation: The NIR is a computerised information system that records immunisation details for New Zealand children. Information is collected on all children born after a specified date, the birth cohort. This date varies by DHB as NIR implementation was rolled out during 2005 starting with Counties Manukau and Waitemata in April and culminating with Nelson Marlborough in December 2005. Babies born in maternity facilities have their details sent directly to the NIR from discharge data. For babies born at home, LMCs are requested to send information to the NIR. Migrant children and children born to New Zealand citizens overseas, whose date of birth falls within the birth cohort, are registered at their first point of contact with primary health care services. After an immunisation event, immunisation information is sent to the NIR by the provider electronically or via paper/fax. An individual or parent/caregiver may choose not to have any further health information collected on the NIR (i.e., they opt-off). When an individual chooses to opt-off the NIR, their NHI, date of birth, DHB, date of opting off and immunisation events recorded prior to opting-off is retained in order to provide an accurate denominator for coverage calculations [146].

3. Hospital Admissions for Vaccine Preventable Diseases

National Minimum Dataset

Numerator: Hospital admissions for children and young people 0-24 years with a primary diagnosis of Diphtheria (ICD10 A36), Tetanus (ICD10 A33-A35), Pertussis ((A37), Poliomyelitis(A80), Hepatitis B (B16, B181, B180), Measles (B05), Mumps (B26) and Rubella (B06).

Denominator: NZ Census projected usual resident population

Interpretation: Note that Haemophilus influenzae type b cannot be identified via ICD-10 coding. The age range for hospital admissions differs for that used for notifications for VPD.

4. Notifications for Vaccine Preventable Diseases

The Institute of Environmental Science and Research (ESR)

Numerator: Notifications of Diphtheria, Tetanus, Pertussis, Poliomyelitis, Hepatitis B, Haemophilus influenzae type b, Measles, Mumps and Rubella in children and young people aged 0-19 years.

Denominator: 2001 Census usual resident population

Interpretation: Please note that the age range for notifications differs for that used for hospital admissions for VPD. All of the infectious diseases immunised against in New Zealand are notifiable under the Health Act 1956 and the Tuberculosis Act 1948. Notification data are recorded on a computerised database (EpiSurv) that sends data weekly to the ESR. Additional data is collected for some notifiable disease from laboratory-based surveillance and the NZ Paediatric Surveillance Unit (polio and congenital rubella). An assessment of sensitivity was made in 2003 using reporting on meningococcal disease which showed the sensitivity of meningococcal surveillance to be probably in excess of 87%. The system is inherently less sensitive for surveillance of chronic infection, notably hepatitis B infection[147].

Indicator Category

Ideal B-C (Table 133, Table 134)

New Zealand Distribution and Trends

Immunisation Coverage: National Immunisation Surveys

Immunisation coverage surveys were undertaken in 1991/92, 1996 (Northern Region only) and 2005 using methodology developed by the World Health Organisation. A gradual improvement in the number of children fully immunised at two years of age has been demonstrated with <60% of children fully immunised in 1991/92 compared with 77.4% in 2005 (**Table 47**). Immunisation rates in all regions have improved.

Table 47. Proportion of Children Fully Immunised at 2 Years of Age, New Zealand 1991/92, 1996, 2005

Year	Region					
	n	Northern	Central-Northern	Central-Southern	Southern	Total
1991/92[1]	706	55.4% (47.7-62.9)	54.5% (46.9-61.9)	58.4% (50.8-65.7)	57.1% (49.4-64.5)	NR
1996[2]	775	63.1% (59.1-67.1)				
2005[3]	1,563	75.8% (72.0–79.6)	76.6% (70.4–82.8)	76.9% (72.4–81.3)	82.3% (77.1–87.6)	77.4% (75.3–79.5)

Notes: Regions in 1991/96 correspond to Regional Health Authorities. Regions in 2005: Northern includes Northland, Waitemata, Auckland, and Counties Manukau DHB's; Central–Northern includes Bay of Plenty, Lakes, Tairawhiti, Taranaki and Waikato DHB's, Central–Southern includes Capital and Coast, Hawkes Bay, Hutt, MidCentral, Nelson Marlborough, Wairarapa and Whanganui DHB's; Southern includes Canterbury, Otago, South Canterbury, Southland and West Coast DHB's. NR: not reported. Percentages are followed by 95% Confidence Intervals. Sources: [1]Communicable Disease NZ [148]; [2]North Health [149]; [3]Ministry of Health [150].

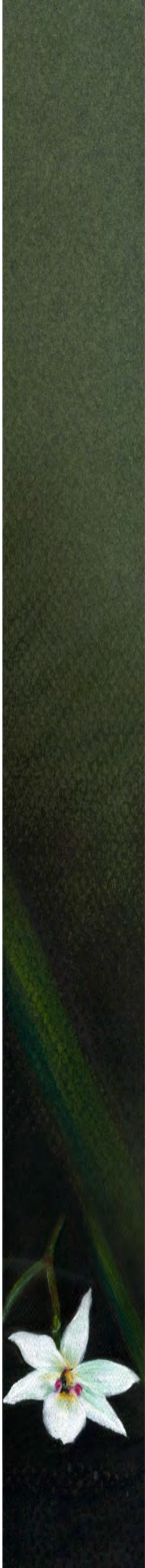
Ethnicity

In 1996 the proportion of children fully immunised at 2 years in the Northern Region was lower in Māori < Pacific < European/Other children. By 2005, improvements in the number of children fully immunised at 2 years was apparent in all ethnic groups, with the greatest absolute gains seen in Pacific and Māori children (**Table 48**).

Table 48. Number of Children Fully Immunised at 2 Years of Age by Ethnicity, New Zealand 1996, 2005

Ethnicity	North Health Regional Survey[1]		National Survey[2]	
	1996 (n=775)		2005 (n=1563)	
	%	95% CI	%	95% CI
Māori	44.6	35.5-53.7	69	63.7–74.3
Pacific	53.1	43.7-62.5	80.7	73.7–87.6
European/Other	72.3	67.5-77.1	80.1	77.4–82.9
Asian			79.8	71.4–88.2
Total	63.1	59.1-67.1	77.4	75.3–79.5

Sources: [1]North Health [149]; [2]Ministry of Health [150]. The North Health Region included Northland and North, West Central and South Auckland.



Immunisation Coverage: National Immunisation Register

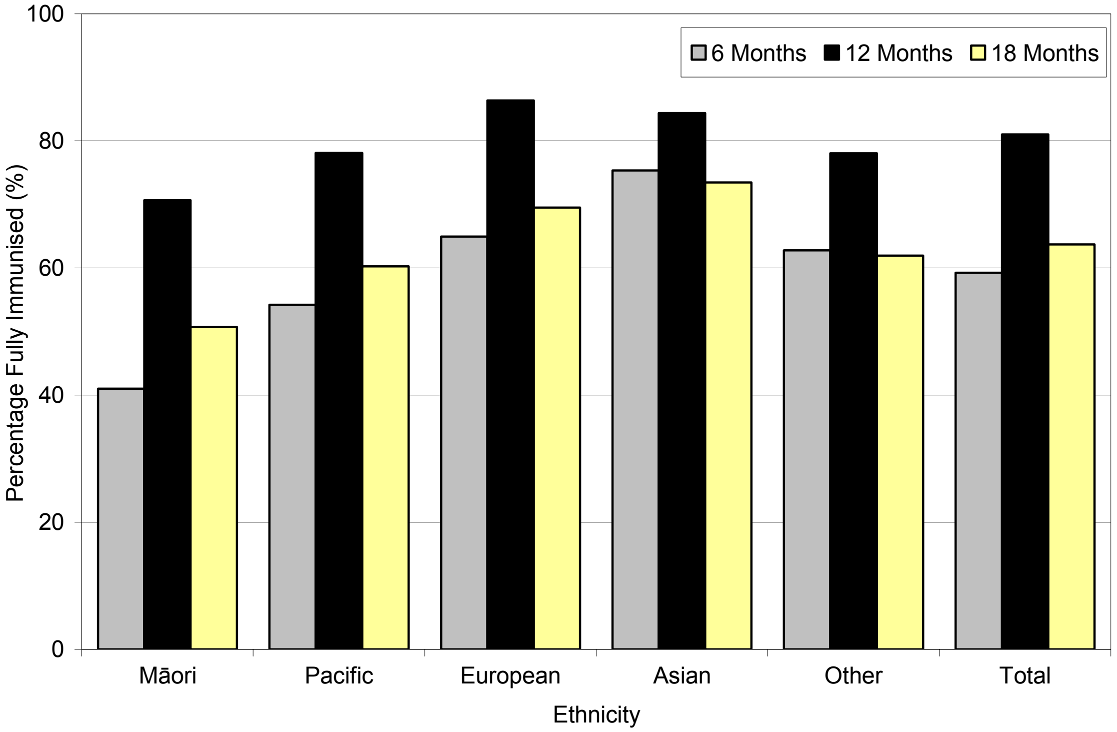
Immunisation coverage is measured at the ‘milestone ages’ of 6 months, 12 months, 18 months, 24 months, 5 years and 12 years old. If a child has received all of their age appropriate immunisations by the time they have reached the milestone age they are fully immunised (**Table 46**). The National Immunisation Register began collecting data in 2005, so data is only available for the 6, 12 and 18 month milestone ages.

During the second quarter of 2007 (1 April - 1 July), 59.3% of 6 month old children were fully immunised with lower rates seen in Māori and Pacific infants (**Figure 90**). Immunisation rates for children living in the most deprived areas were similar to national rates, whilst the lowest immunisation rates were seen in children living in areas with a NZ Deprivation index decile of 3-6. Because the 6 month milestone occurs shortly after the 5 month immunisation event is due, those fully immunised at 6 months represent children who received their first three immunisations on time.

Between 6 and 12 months of age, no extra immunisations are scheduled; therefore, there is time for a child to 'catch up' and receive their 6 week, 3 or 5 month immunisations before turning 12 months old. Consequently, 81% of children who turned 12 months old during the second quarter of 2007 were fully immunised, with similar ethnic trends seen (**Figure 90**).

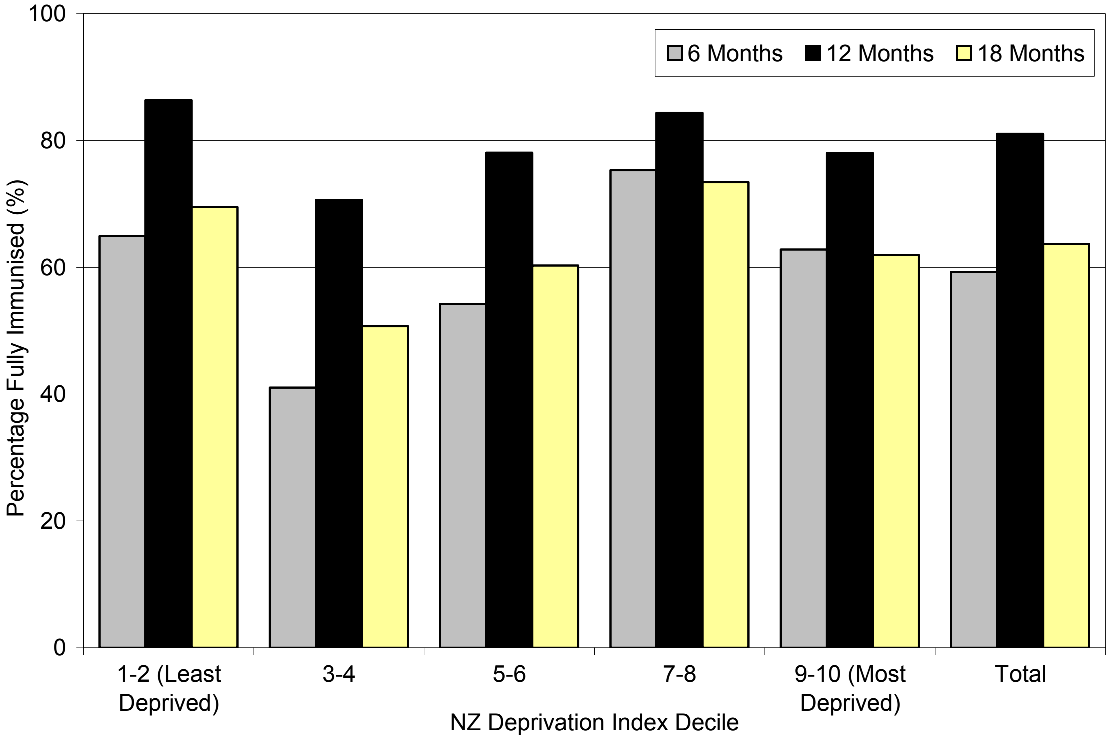
The rate of children who were fully immunised at the 18 month milestone, 63.7%, was similar to that seen at 6 months, with similar ethnic and socioeconomic trends seen. The drop in the proportion who are fully immunised at the 18 month milestone compared to at 12 months occurs as a result of children who were fully immunised at 12 months not receiving their 15 month immunisations prior to turning 18 months old.

Figure 90. Immunisation Coverage for Children Enrolled on the National Immunisation Register by Milestone Age and Ethnicity, New Zealand 1 April - 1 July 2007



Note: Includes children enrolled on the NIR, who turned the milestone age within the quarter and who had received all of their age appropriate immunisations (6 months n=15,790; 12 months n=14,923; 18 months n=13,437). MeNZB immunisations are not included. Source: Ministry of Health [151].

Figure 91. Immunisation Coverage for Children Enrolled on the National Immunisation Register by Milestone Age and NZ Deprivation Index, New Zealand 1 April - 1 July 2007



Note: Includes children enrolled on the NIR, who turned the milestone age within the quarter and who had received all of their age appropriate immunisations (6 months n=15,790; 12 months n=14,923; 18 months n=13,437). MeNZB immunisations excluded. Source: Ministry of Health [151].

Regional differences

In addition during the second quarter of 2007 there were regional differences in the proportion of children fully immunised at 6 months (42.8% - 71.7%), 12 months (68.2% - 93.1%), and 18 months (51.1% - 80.9%), however the degree to which this represents differences in demography, and the impact of local immunisation outreach programmes is unknown (**Table 49**).

Vaccine Preventable Disease

There were 836 hospital admissions in children and young people aged 0-24 years for vaccine preventable diseases during 2002-2006, 79% of which were due to Pertussis infection (**Table 50**). Hospital admissions for vaccine preventable diseases (VPD) most likely represent more severe presentations, and are likely to under represent the burden of VPD in children and young people.

During 2002-06, 5389 cases of VPD were notified in New Zealand children aged 0-19 Years (**Table 51**). The number of cases notified was 6.4 times higher than the number of children and young people (0-24 years) hospitalised for the same collection of VPD's during the same period. Pertussis was the most frequently notified VPD followed by mumps, measles, and rubella.

Table 49. Immunisation Coverage for Children Enrolled on the National Immunisation Register by Milestone Age and DHB, New Zealand 1 April 2007 - 1 July 2007

DHB	Fully Immunised at Milestone Age					
	6 Months		12 Months		18 Months	
	*Number	%	*Number	%	*Number	%
Northland	240	42.8	417	69.4	330	56.6
Waitemata	1,103	59.3	1,518	82.9	1,229	66.0
Auckland	1,049	63.2	1,222	80.9	1,039	65.9
Counties Manukau	1,263	56.2	1,595	77.7	1,268	60.4
Waikato	709	51.8	973	76.9	799	60.7
Lakes	221	51.2	297	73.5	237	56.2
Bay of Plenty	356	46.5	440	68.2	356	51.1
Tairawhiti	107	52.2	150	75.8	130	61.3
Taranaki	203	53.0	306	84.8	244	67.4
Hawkes Bay	357	58.1	449	81.0	362	65.7
Whanganui	130	55.3	209	83.9	144	70.2
MidCentral	319	56.5	431	75.2	339	58.4
Hutt	330	61.3	446	85.4	320	63.4
Capital and Coast	718	68.8	850	86.0	568	67.5
Wairarapa	92	65.7	131	86.8	70	66.7
Nelson Marlborough	283	70.9	321	83.4	76	65.0
West Coast	66	71.7	86	89.6	31	68.9
Canterbury	1,089	66.4	1,317	87.9	522	74.7
South Canterbury	109	71.2	135	93.1	69	67.6
Otago	348	70.4	464	91.0	235	73.4
Southland	264	67.9	334	88.6	191	80.9
New Zealand	9,356	59.0	12,093	81.0	8,559	64.0

Note: *Number refers to the number fully immunised. Rates have not been adjusted for DHB Demography and it is thus not recommended that they be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue). Source: Ministry of Health [151].

Table 50. Hospital Admissions for Selected Vaccine Preventable Diseases in Children and Young People 0-24 Years, New Zealand 2002-2006

Vaccine Preventable Disease (VPD)	Number: Total 2002-2006	Number: Annual Average	Rate per 100,000 per yr	% of VPD Admissions
Pertussis	659	131.8	9.4	78.8
Chronic Hepatitis B	87	17.4	1.2	10.4
Acute Hepatitis B	30	6	0.4	3.6
Mumps	29	5.8	0.4	3.5
Measles	20	4	0.3	2.4
Rubella	8	1.6	0.1	1.0
Tetanus	3	0.6	0.0	0.4
Total	836	167.2	11.9	100.0

Note: Vaccine Preventable Diseases include only those on the Routine Immunisation Schedule. During 2001-05 there were no admissions for Diphtheria or Polio. *Haemophilus Influenzae* type b cannot be identified via ICD-10 coding.

Table 51. Notifications of Selected Vaccine Preventable Diseases in Children and Young People 0-19 Years, New Zealand 2002-2006

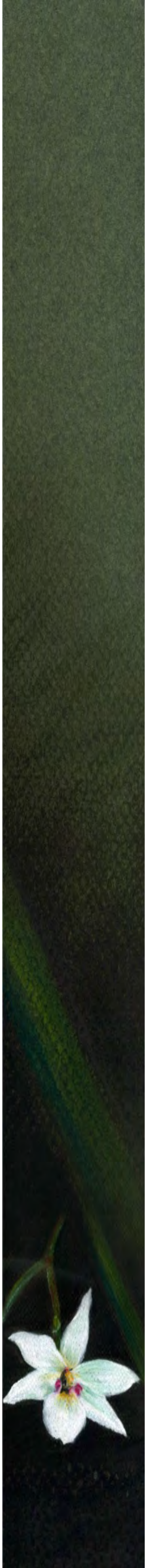
Vaccine Preventable Disease (VPD)	2002	2003	2004	2005	2006	Number: Total 2002-2006	Number: Annual Average	Rate
Pertussis	818	433	2065	1236	354	4906	981.2	85.6
Mumps	48	40	31	45	34	198	39.6	3.5
Measles	19	60	29	19	19	146	29.2	2.5
Rubella	32	24	23	13	7	99	19.8	1.7
Hib	0	8	<5	<5	7	21	4.2	0.4
Acute Hepatitis B	<5	5	<5	5	5	17	3.4	0.3
Tetanus	0	0	0	0	<5	<5	s	s
Diphtheria	<5	0	0	0	0	<5	s	s
Total	919	570	2151	1322	427	5389	1077.8	94.1

Note: VPDs listed are those on the Routine Immunisation Schedule. Rate is per 100,000 per year. Hib: *Haemophilus influenzae* type b. No cases of poliomyelitis occurred during 2002-2006. Source: Institute of Environmental Science and Research (ESR) [152].

Summary

Immunisation is among the most successful and cost-effective public health interventions and access to immunisation is a priority population objective of the New Zealand Health Strategy. Improvements in immunisation coverage have been demonstrated with an increase in the proportion of children fully immunised at 2 years of age increasing from <60% in 1991/92 to 77% in 2005. Immunisation programme initiatives including the formation of immunisation outreach services in many DHBs and the implementation of a National Immunisation Register are likely to result in continued improvements and are necessary, as the Ministry of Health target of 95% of children fully immunised at 2 years has not yet been met. Further concerns are highlighted by data which is now available from the National Immunisation Register which showed that in the second quarter of 2007 only 59% of infants aged 6 months old were fully immunised. Although the proportion fully immunised increased to 81% at 12 months of age a significant proportion of infants are not receiving their 6 week, 3 month, and 5 month immunisations on time.

Vaccine preventable diseases continue to occur in New Zealand at rates that are higher than other developed countries. Hospital admissions for VPD are likely to represent only the most severe presentations of disease. While notifications are 6.4 times higher than hospital admissions they are likely to under represent the incidence of VPD as many cases may be mild and not come to the attention of a health professional (e.g. acquisition of hepatitis B may occur without any associated illness) and many cases are not notified especially if there is any uncertainty about the diagnosis. Continued high levels of Pertussis accounts for the majority of hospital admissions and notifications for VPD and are effected by incomplete or delayed immunisation.



Hearing Screening

Introduction

Hearing in infants and young children is essential for speech and language development and its loss during early life may lead to disability, the extent of which depending on the severity and timing of the loss [153]. Hearing loss is often divided into two categories: sensorineural hearing loss, arising from problems in the cochlear or auditory nerve (often due to inherited conditions, congenital anomalies, extreme prematurity or in-utero infections[153]) and conductive hearing loss arising from problems in the middle or external ear (often the result of chronic otitis media with effusion).

New Zealand's Well Child Tamariki Ora National Schedule outlines the following timeframe for the screening and surveillance of young children for hearing loss:

1. Newborn (0-5 days): LMC / paediatricians screen children for risk factors of sensorineural hearing loss e.g. severe neonatal jaundice, extreme prematurity, in-utero infections, cranio-facial anomalies, family history of congenital hearing loss. Where risk factors are present children are referred to an audiologist for diagnostic assessment.
2. Hearing Surveillance and Surveillance for Otitis Media with Effusion by Well Child Provider at 6 week, 3, 5, 10, 15 and 24 month visits and referral if hearing impairment or otitis media with effusion suspected.
3. Age 3 Years: Screening at registered pre-school venues using tympanometry to detect chronic middle ear effusion. Immediate referral if evidence of obstruction or perforation, otherwise referral following 2 failed tympanometry tests with a 10-16 week test-retest interval.
4. Age 5 Years: Screening of all school new entrants with audiometry and tympanometry to detect undiagnosed hearing loss or persistent middle ear disorder. Immediate referral if hearing loss is marked, otherwise referral following 2 failed tests with a 10-16 week test-retest interval.

Despite this comprehensive schedule, evidence would suggest that the screening of newborn infants for "risk criteria" has not led to a reduction in the age of detection of hearing loss, with the average age at detection during 1991-2000 being 28.6 months and "risk factor" approaches only picking up 40% of children [154]. The following section reviews the results of screening for hearing loss at school entry in New Zealand.

Data Source and Methods

Definition

1. New Entrant Hearing Screening Coverage: Number of new entrant children screened, divided by the number enrolled in each school region at the beginning of July.
2. Failure of Pure Tone Audiometry: At least two thresholds 45dB or greater (this result is an immediate referral to audiology services if tympanometry is normal, or to the GP or specialist ear nurse if the tympanometry is abnormal). At least one threshold exceeding the screening levels of 30dB (500Hz) or 20dB (1000-4000Hz)- this results in the child being scheduled for a retest at the next visit (**in 10-16 weeks time)**

Data Source

New Zealand Hearing Screening Reports produced by the National Audiology Centre

Indicator Category

Proxy B-C (**Table 133, Table 134**)

Notes on Interpretation
Hearing screening information in this section was obtained from the National Audiology Centre's annual reports for the period 2005-06. The National Audiology centre in turn receives this information from Vision Hearing Technicians and Public Health Nurses employed by DHBs and Health Trusts throughout NZ.

New Zealand Distribution and Trends

Coverage

Nationally, coverage for screening at school entry during the year ending July 2006 was 99% (**Table 52**).

Table 52. New Entrant Hearing Screening Coverage Rates at 5 Years, New Zealand Years Ending June 2005-06

	July 04-June 05	July 05-June 06
New Zealand	89%	99%

Source National Audiology Centre

Audiometry Failure Rates at School Entry

In New Zealand during 1993-2006 there was a gradual decline in audiometry failure rates at school entry, with overall rates falling from 9.7% in 1993, to 6.6% in 2006 (**Figure 92**). Despite these declines, large ethnic disparities remained, with rates being persistently higher for Pacific and Māori children than for European / Other and Asian children during this period (**Figure 93**).

There were large regional variations in audiometry failure rates at school entry, with rates during 2006 ranging from 1.0% to 10.8%, depending on the region. The National Audiology Centre however, suggests that rates below 3% are likely to be invalid and thus have not used these rates when calculating national averages (**Table 54**).

Figure 92. Audiometry Failure Rates at School Entry (5 yrs), New Zealand Year Ending June 1993-2006

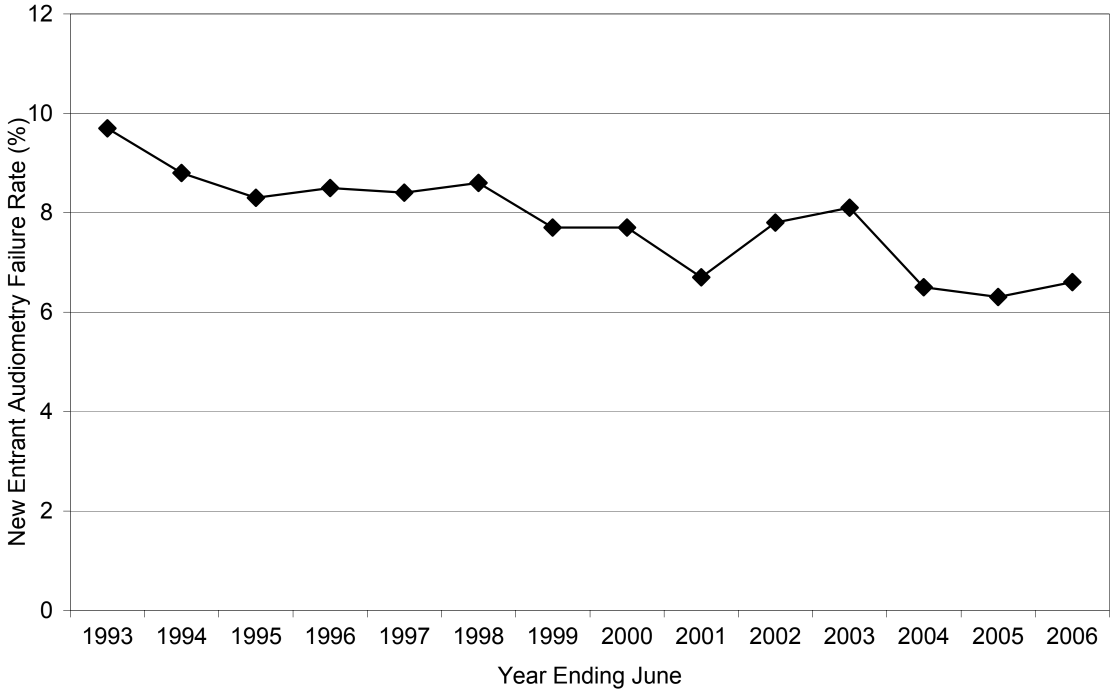
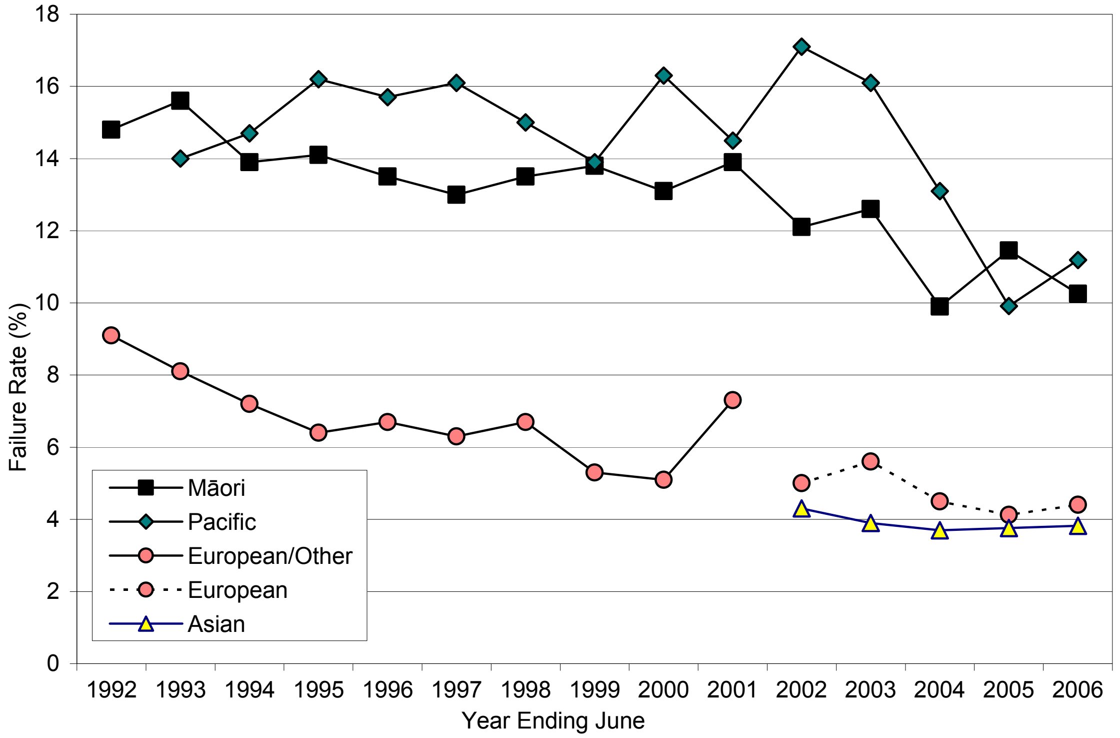


Figure 93. New Entrant Audiometry Failure Rates at 5 Years by Ethnicity, New Zealand Years Ending June 1992-2006



Source: National Audiology Centre (via Greville Consulting)

Table 53. New Entrant Audiometry Failure Rates at 5 Years by Ethnicity, New Zealand Years Ending June 1993-2006

Year Ending June	Pacific (%)	Māori (%)	European / Other (%)	European (%)	Asian (%)
1993	14.0	15.6	8.1		
1994	14.7	13.9	7.2		
1995	16.2	14.1	6.4		
1996	15.7	13.5	6.7		
1997	16.1	13.0	6.3		
1998	15.0	13.5	6.7		
1999	13.9	13.8	5.3		
2000	16.3	13.1	5.1		
2001	14.5	13.9	7.3		
2002	17.1	12.1		5.0	4.3
2003	16.1	12.6		5.6	3.9
2004	13.1	9.9		4.5	3.7
2005	9.9	11.5		4.1	3.8
2006	11.2	10.3		4.4	3.8

Source: National Audiology Centre (via Greville Consulting)

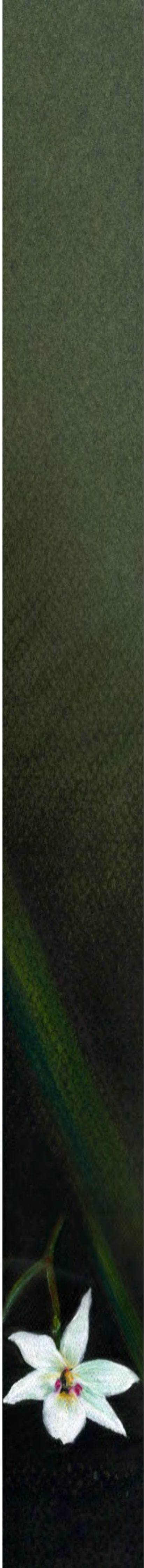
Table 54. New Entrant Audiometry Failure Rates at 5 Years by Health Region, New Zealand Year Ending June 2006

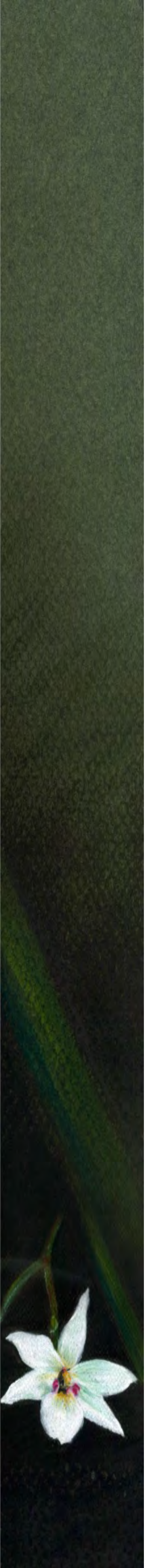
DHB	Tested	Failed	Failure Rate (%)
Northland	2,209	183	8.3
Waitemata	6,530	655	10.0
Auckland	6,284	313	5.0
Counties Manukau	8,565	523	6.1
Waikato	5,041	348	6.9
Bay of Plenty	3,326	84	2.5
Lakes	1,366	24	1.8
Tairawhiti	861	46	5.3
Hawkes Bay	2,455	264	10.8
Taranaki	1,667	59	3.5
MidCentral	2,399	174	7.3
Whanganui	783	17	2.2
Wairarapa	519	8	1.5
Hutt/Capital and Coast	5,858	56	1.0
Nelson Marlborough	1,667	65	3.9
West Coast	373	23	6.2
Canterbury	6,135	331	5.4
South Canterbury	619	55	8.9
Otago	2,160	80	3.7
Southland	1,277	59	4.6
New Zealand	59,575	3,367	6.6

Source: National Audiology Centre. Rates have not been adjusted for DHB Demography and it is thus not recommended that they be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)

Summary

Hearing in infants and young children is essential for speech and language development and its loss during early life may lead to disability, the extent of which depending on the severity and timing of the loss. While there has been a gradual decline in the proportion of New Zealand children failing their school entry audiometry tests during the past 14 years, large regional and ethnic disparities remain. Adequate referral and follow up for children failing their audiometry tests is essential, in order to ensure that they reach their full potential during their early years of education.





Oral Health

Introduction

While up until the early 1990s, dental caries rates amongst New Zealand children were gradually declining, in more recent years rates have become static or even increased slightly. Large ethnic, socioeconomic and regional disparities also remain, with Māori and Pacific children and those living in socioeconomic disadvantage being consistently more likely to experience poorer oral health outcomes [155]. In addition, while water fluoridation has been shown to reduce dental decay by up to 50%, and to be particularly effective in reducing socioeconomic and ethnic disparities in dental caries [156], during 2005 only 50.7% of New Zealand's 5 year olds lived in communities with fluoridated water supplies.

The School Dental Service was established in 1921 and currently provides basic preventative and restorative dental care for preschoolers and primary and intermediate school children via its team of dental therapists. While enrolment of preschool age children was only 56% in 1997, enrolment of school age children is high (>95%) [156]. Children are seen annually, unless deemed to be at high risk of dental disease, when 6-monthly visits are indicated. After Year 8 (Form 2), adolescents are eligible for dental care under the General Dental Benefit system up until the age of 18 years. This care is provided by private dentists working under contract with local DHBs. In addition, since 1988, dental caries data has been collected and reported on annually by the School Dental Service.

Data Sources and Methods

Definition

1. Percentage of Children Caries Free at 5 years
2. Mean DMFT Score at 12 Years (Year 8)
3. Proportion of 5 year old and Year 8 children who completed dental treatment

Data Sources

1. Percentage of Children Caries Free at 5 Years

Numerator: The total number of children aged 5 years whose deciduous teeth are caries free on completion of treatment with the school dental service

Denominator: The total number of 5 year olds who completed treatment with the school dental service

2. Mean DMFT Scores at 12 Years (Year 8)

Numerator: The total number of permanent teeth of children aged around 12 years old that are decayed, missing (due to caries) or filled on completion of treatment in Year 8 prior to leaving the School Dental Service

Denominator: The total number of Year 8 children who have completed treatment with the school dental service

3. Proportion of 5 and 12 Year Old Children who Completed Treatment

Numerator: The number of 5 year old children who completed treatment prior to turning 6 years old, and the number of Year 8 children (aged ~12 years) that completed treatment in Year 8

Denominator: The number of 5 and 12 year old children at the 2006 Census

Indicator Category

Ideal C (**Table 133, Table 134**)

Notes on Interpretation

The oral health data used in this section were obtained from the Ministry of Health, which has collated information from the School Dental Service for the period 1990-2006. Once children are enrolled with the dental service they are seen, assessed and have appropriate treatment prescribed. Upon completion of set treatment, dental health status data is collected on 5 year olds and children in Year 8 (aged approximately 12 years). Therefore, unless treatment is completed prior to a child turning 6 years old or prior to discharge from the dental service in Year 8, a child's dental status is not recorded in the national dataset. In regions where the proportion completing treatment is less than 100% it is likely that the oral health status of children is worse than reported because children with no dental caries will have data collected on assessment. In this section, fluoridation status refers to the water supply of the school which the student attended, rather than the fluoridation status of the area in which they resided.

New Zealand Distribution and Trends

Fluoridation Status

During 2006, School Dental Service data indicate that only 50.6% of New Zealand children aged 5 years had access to fluoridated drinking water. This information is based on the fluoridation status of the child's school however, rather than the area in which they lived.

New Zealand Trends

During 1990-2006, the percentage of New Zealand children who were caries free at 5 years was consistently higher for those attending schools with fluoridated water supplies. Similarly, mean DMFT scores were consistently higher for children attending schools without access to fluoridated water (**Figure 94**).

Ethnic Differences

During 2002-2006, marked ethnic differences were also evident, with a lower proportion of Māori and Pacific children being caries free at 5 years, in both fluoridated and non-fluoridated areas (**Figure 95**). Māori and Pacific children also had higher mean DMFT scores at 12 years, in both fluoridated and non-fluoridated areas (**Figure 96**).

Regional Differences

Information on dental health status is only collected on 5 year old children and those in Year 8 (~12 years) who have been assessed and completed treatment. If a new entrant is not seen prior to turning 6, then their data will not be recorded. Similarly, if a prescribed course of treatment is not completed prior to a child turning 6, or prior to the completion of Year 8, then no data is collected on that child. In 2005, the proportion of children who had completed treatment at 5 years and thus contributed data was 69%. This figure varied considerably by DHB (range 45% → 107%). The proportion completing treatment and thus contributing data in Year 8 was higher however (80%) (**Table 55**). (Note: Oral health status in regions where treatment completion rates are low is likely to be poorer than reported below, as children with little or no dental decay are more likely to complete their treatment in a timely manner).

Figure 94. Percentage of Children Caries Free at 5 Years and Mean DMFT Scores at 12 Years by School Water Fluoridation Status, New Zealand 1990-2006

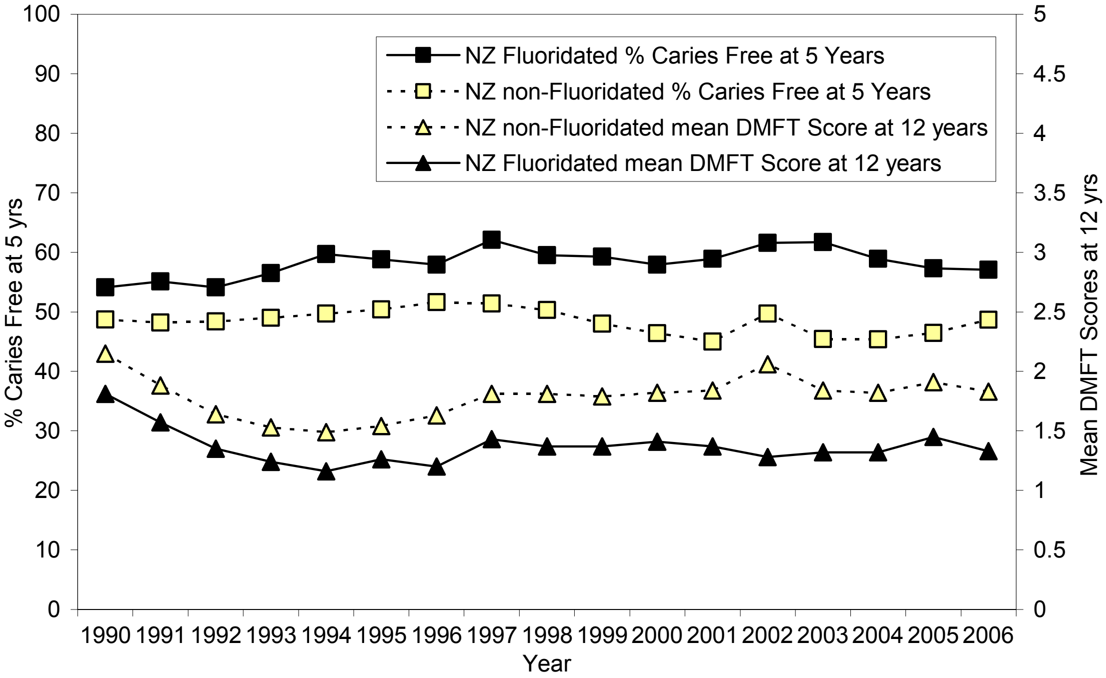


Figure 95. Percentage of Children Caries Free at 5 Years by Ethnicity and the Fluoridation Status of their School's Water Supply, New Zealand 2002-2006

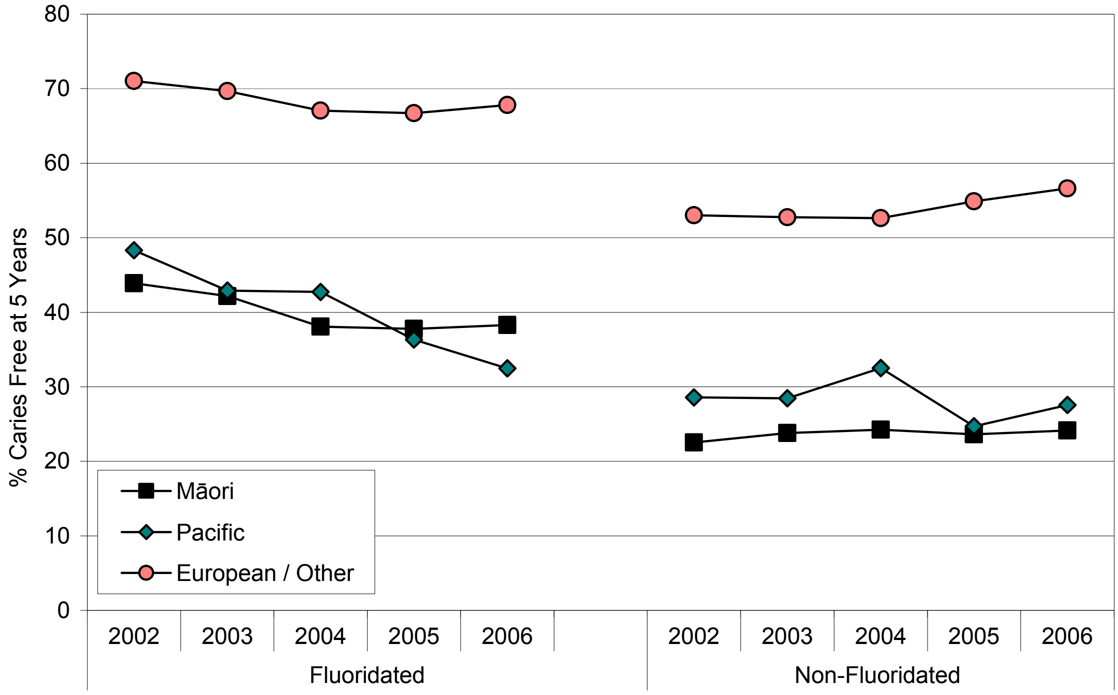
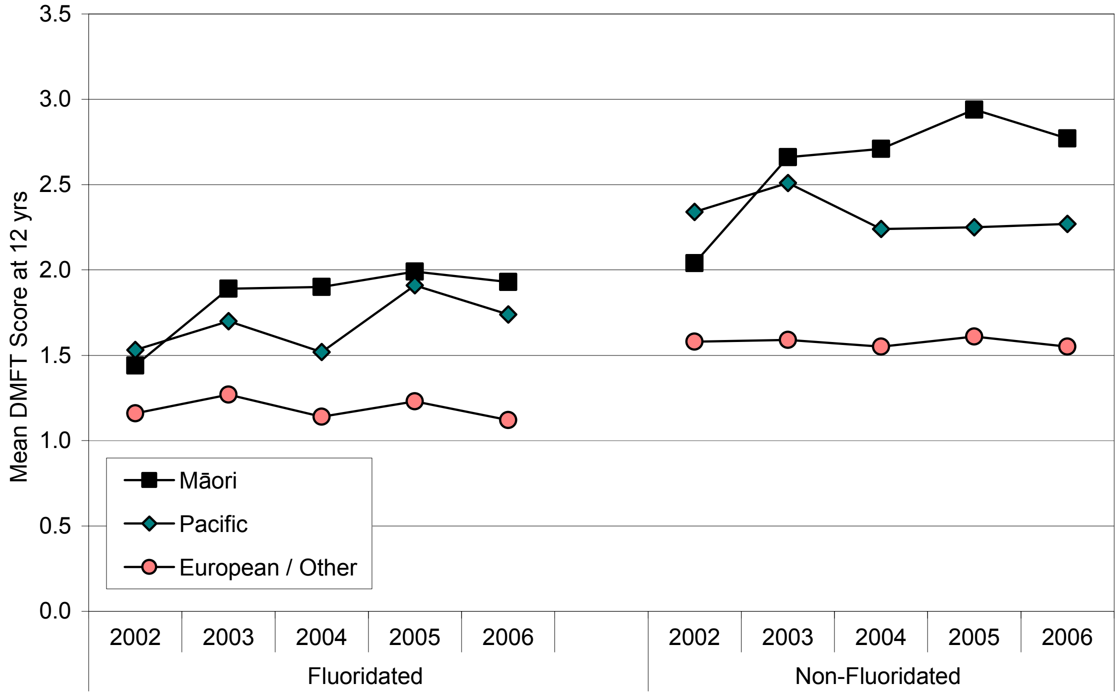


Figure 96. Mean DMFT Scores at 12 Years by Ethnicity and the Fluoridation Status of the School's Water Supply, New Zealand 2002-2006



Summary

During 2006, School Dental Service statistics indicate that only 50.6% of New Zealand children aged 5 years had access to fluoridated school drinking water. This information is based on the fluoridation status of the child's school however, rather than the area in which they lived. This is of concern, as during 1990-2006 the percentage of children who were caries free at 5 years was consistently lower, and the mean DMFT score at 12 years was consistently higher for those attending schools without a fluoridated water supply. Marked ethnic disparities were also evident, with lower proportions of Māori and Pacific children being caries free at 5 years, and mean DMFT scores at 12 years being higher than for European / Other children. Marked regional disparities were also evident, even when the fluoridation status of the school's water supply was taken into account.

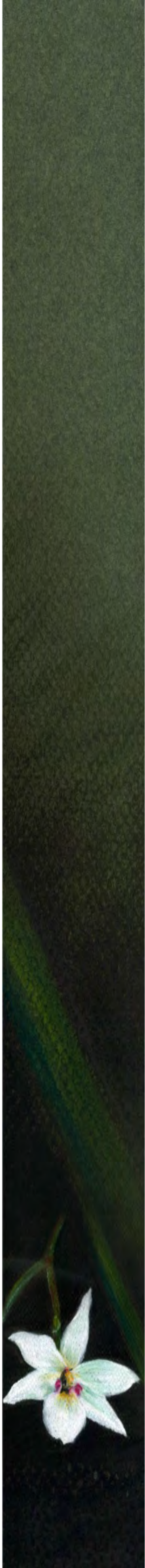


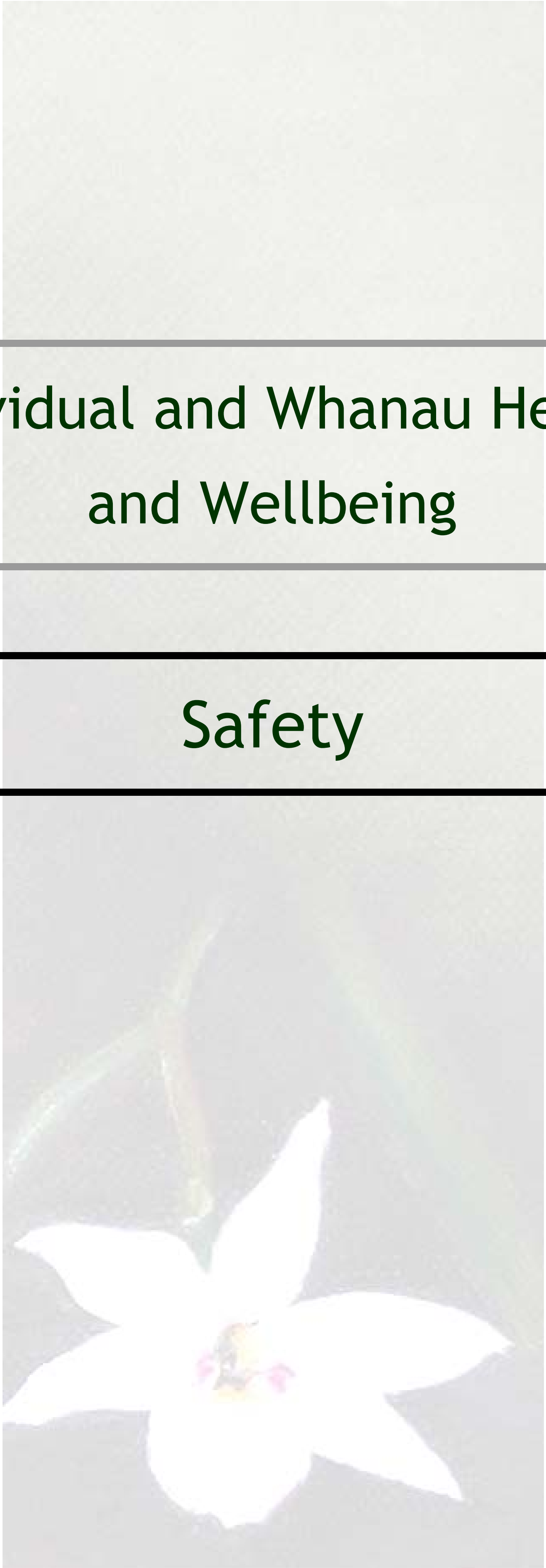
Table 55. Percent of Children Caries Free at 5 Years, Mean DMFT Score at 12 Years, and Treatment Completion Rates by DHB, New Zealand 2006

DHB	Oral Health Status in 5 Year Olds			Oral Health Status in 12 Year Olds		
	Completed Treatment (%)	% Caries Free		Completed Treatment (%)	Mean DMFT Score	
		Fluoridated	Non-Fluoridated		Fluoridated	Non-Fluoridated
Northland	44.5	n/a	35.6	71.4	n/a	2.4
Waitemata	55.8	64.9	54.2	67.9	1.2	1.5
Auckland	61.3	59.7	57.4	81.6	1.0	1.0
Counties Manukau	54.9	51.7	48.7	74.7	1.4	1.3
Waikato	73.1	44.1	46.3	78.1	2.0	1.9
Lakes	51.4	46.1	32.8	78.6	1.6	1.9
Bay of Plenty	67.9	34.9	40.2	74.2	2.4	2.5
Tairawhiti	74.9	40.2	31.2	91.6	1.5	1.8
Taranaki	97.5	54.7	45.4	96.3	1.5	2.0
Hawkes Bay	72.9	46.3	40.3	92.6	1.5	2.2
MidCentral	85.0	56.6	49.2	87.0	1.7	1.6
Whanganui	82.4	n/a	45.0	98.7	n/a	1.7
Hutt	47.1	68.0	37.0	31.8	0.9	1.9
Capital and Coast	64.1	62.6	66.7	78.2	0.8	0.4
Wairarapa	74.0	46.3	46.7	86.4	1.3	1.3
Nelson Marlborough	91.5	n/a	53.8	99.7	n/a	1.3
West Coast	107.3	n/a	46.3	168.7	n/a	1.8
Canterbury	80.2	n/a	56.0	84.3	n/a	1.6
South Canterbury	88.0	n/a	51.0	102.5	n/a	1.7
Otago	93.2	66.4	58.2	95.7	1.4	1.9
Southland	105.2	55.4	52.2	88.2	1.8	1.8
New Zealand	68.6	57.1	48.6	79.9	1.3	1.8

Note: n/a: Region not fluoridated. Rates have not been adjusted for DHB Demography and it is not recommended that they be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)

Individual and Whanau Health and Wellbeing

Safety



Total and Unintentional Injuries

Introduction

Outside of the perinatal period, injury is the leading cause of mortality for New Zealand children aged 0-14 years, with motor vehicle accidents being the leading cause of injury related death [157, 158] and falls being the leading cause of injury related hospital admission [159]. While males are over represented in nearly all injury categories, the type of injury also varies significantly with the developmental stage of the child (e.g. deaths due to choking are highest amongst infants, while drowning deaths are highest amongst children 1-4 years [157]). In terms of interventions aimed at addressing the high rates of injury amongst New Zealand children, a number of existing prevention strategies have shown promise (e.g. child restraints, traffic calming), while some remain inadequately implemented (e.g. pool fencing) and others (e.g. interventions to reduce child non-traffic (e.g. driveway) deaths) remain to be developed and tested [157].

Injuries are also the leading cause of hospital admission and death amongst young people 15-24 years, with motor vehicle accidents being the single most frequent cause in both categories [158, 160]. Non-accidental injuries also make a significant contribution, with self inflicted injuries and those arising from assault both being higher amongst young people than children 0-14 years [157-160]. Risk factors for injury related death include gender, ethnicity and age, with rates being highest amongst males, Māori young people and those in their late teens and early 20's [161]. Injury related hospital admissions show a similar pattern, although admissions due to falls, sport injuries and non-road traffic injuries have been lower amongst Māori than non-Māori in recent years [161].

The following section explores injury related hospital admissions and mortality from all causes, before reviewing two injury categories in more detail: Unintentional Non-Transport Related Injuries and Injuries arising from Land Transport Accidents. While injuries sustained as the result of an assault are reviewed in a later section of this Stream, self inflicted injuries are considered in the section on Suicide and Self Harm in the Mental Health Stream.

Data Source and Methods

Definition

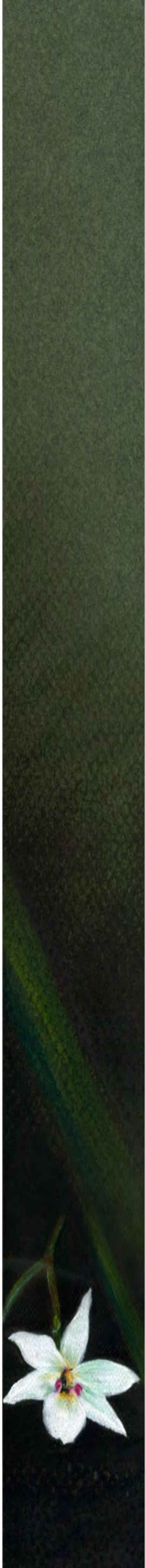
Hospital Admissions and Deaths from Injury in Children 0-14 Years and Young People 15-24 Years

Data Source

Admissions Numerator: National Minimum Dataset: Hospital admissions for children and young people 0-24 years with a primary diagnosis of injury (ICD-9 800-995: ICD-10 S00-T79). Causes of injury were assigned using the external cause code (E code). The following were excluded: 1) Those with an E code ICD-9 E870-879: ICD-10 Y40-Y84 (complications of medical/surgical care), ICD-9 E930-949 (adverse effects of drugs in therapeutic use) and ICD-9 E929, E969, E959 (late effects (>1 year) of injury); 2) Inpatient admissions with an Emergency Medicine Specialty code (M05-M08) on discharge (see Appendix 1);

Deaths Numerator: National Mortality Collection: Deaths of children and young people 0-24 years with a clinical code (cause of death) attributed to injury (ICD-9 E800-995: ICD-10 V01-Y36). Excluded were deaths with an E code ICD-9 E870-879: ICD-10 Y40-Y84 (complications of medical/surgical care), ICD-9 E930-949 (adverse effects of drugs in therapeutic use) and ICD-9 E929, E969, E959 (late effects (>1 year) of injury).

Causes of Injury Numerator: Causes of injury were assigned using the first E code in ICD10 as follows: Transport Accidents, Pedestrian (V01-V09), Cyclist (V10-V19), Motorbike (V20-29), 3-Wheeler (V30-39), Vehicle Occupant (V40-79), Other Land Transport (V80-89, V98-99); Falls (W00-W19), Mechanical Forces: Inanimate (W20-W49), Mechanical Forces: Animate (W50-64), Drowning/Submersion (W65-74), Accidental Threat to Breathing (W75-W84), Electricity/Fire/Burns (W85-X19), Accidental Poisoning (X40-X49), Intentional Self Harm (X60-84), Assault (X85-Y09), Undetermined Intent (Y10-Y34).



Broader Categories included Transport Accidents (V01-V89, V98-V99) and Unintentional Non-Transport Injuries (W00-W74, W85-X49). Transport accidents were assigned to traffic or non-traffic related categories based on the fourth digit of the External Cause code as outlined in the ICD-10 Tabular List of Diseases. For time series analyses broader diagnostic categories (as well as those relating to accidental threats to breathing, assault and self inflicted injuries) were also back mapped to ICD-9 (with coding for each of these categories available on request).

Denominator: NZ Census

Indicator Category (Table 133, Table 134)
Admissions: Proxy C; Mortality: Ideal B

Notes on Interpretation
The limitations of the National Minimum Dataset are discussed at length in Appendix 1. The reader is urged to review this Appendix before interpreting any trends based on hospital admission data, particularly those which relate to injuries.

All Injuries

Most Frequent Causes of Injury Related Hospital Admission and Mortality

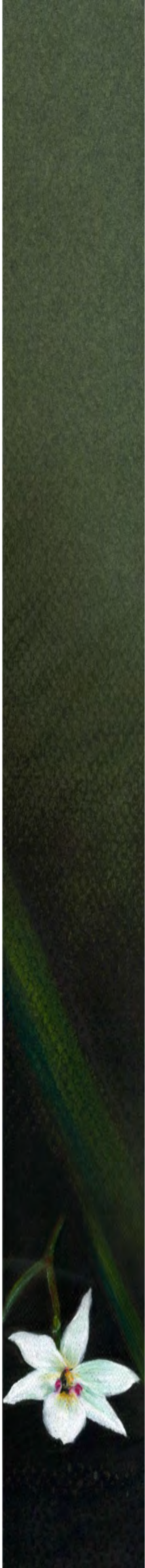
In New Zealand during 2002-2006, falls followed by inanimate mechanical forces were the leading causes of injury related hospital admission for children 0-14 years, while the order was reversed for young people aged 15-24 years. Transport related injuries as a group however made a significant contribution in both age groups. While assault and intentional self harm also featured prominently amongst those aged 15-24 years, both categories of injury were less frequent amongst those 0-14 years (**Table 57**). In contrast, during 2000-2004, accidental threats to breathing followed by transport accidents were the leading causes of injury related mortality amongst children aged 0-14 years. Care must be taken when interpreting these figures however, as there may be some cross over between accidental threats to breathing and SIDS, with the majority of deaths in this category occurring in infants < 1 year whilst they were in bed. In young people 15-24 years, transport accidents (particularly those involving vehicle occupants), followed by suicide were the leading causes of injury related mortality (**Table 56**).

Trends in Injury Mortality

During 1990-2004, injury related mortality for children 0-14 years gradually declined, with the largest absolute declines being in the land transport accident category (where rates fell from 8.3 per 100,000 in 1990-91 to 3.0 per 100,000 in 2004) (**Figure 97**). In contrast, while injury related mortality for those aged 15-24 years also declined during 1990-2001, upswings in land transport and unintentional non-transport related injury deaths during 2002-2004 resulted in a small increase in overall mortality rates during this period (**Figure 98**).

Table 56. Most Frequent Causes of Injury Related Mortality in Children and Young People 0-24 Years, New Zealand 2000-2004

Mode of Injury	Number: Total 2000-2004	Number: Annual Average	Rate per 100,000	% NZ Deaths
Children 0-14 Years				
Accidental Threat to Breathing	90	18.0	2.1	18.4
Transport: Vehicle Occupant	81	16.2	1.9	16.5
Transport: Pedestrian	71	14.2	1.7	14.5
Transport: Cyclist	20	4.0	0.5	4.1
Transport: Other Land Transport	16	3.2	0.4	3.3
Transport: Motorbike	6	1.2	0.1	1.2
Drowning / Submersion	75	15.0	1.8	15.3
Assault	37	7.4	0.9	7.6
Electricity / Fire / Burns	33	6.6	0.8	6.7
Suicide	18	3.6	0.4	3.7
Falls	12	2.4	0.3	2.4
Mechanical Forces	12	2.4	0.3	2.4
Accidental Poisoning	6	1.2	0.1	1.2
Other Causes	13	2.6	0.3	2.7
Total	490	98.0	11.5	100.0
Young People 15-24 Years				
Transport: Vehicle Occupant	525	105.0	20.1	36.2
Transport: Pedestrian	50	10.0	1.9	3.4
Transport: Motorbike	43	8.6	1.6	3.0
Transport: Other Land Transport	14	2.8	0.5	1.0
Transport: Cyclist	10	2.0	0.4	0.7
Suicide	512	102.4	19.6	35.3
Assault	64	12.8	2.5	4.4
Accidental Poisoning	45	9.0	1.7	3.1
Drowning / Submersion	40	8.0	1.5	2.8
Falls	38	7.6	1.5	2.6
Undetermined Intent	34	6.8	1.3	2.3
Electricity / Fire / Burns	17	3.4	0.7	1.2
Mechanical Forces	18	3.6	0.7	1.2
Accidental Threat to Breathing	7	1.4	0.3	0.5
Other Causes	33	6.6	1.3	2.3
Total	1,450	290.0	55.5	100.0



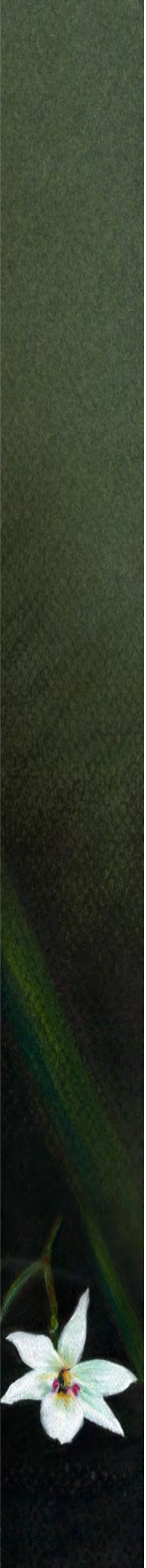


Table 57. Most Frequent Causes of Injury Related Hospital Admission for Children and Young People 0-24 Years, New Zealand 2002-2006

Mode of Injury	Number: Total 2002-2006	Number: Annual Average	Rate per 100,000	% of Total
Children 0-14 Years				
Falls	27,655	5,531.0	643.4	44.8
Mechanical Forces: Inanimate	12,987	2,597.4	302.1	21.0
Transport: Cyclist	3,437	687.4	80.0	5.6
Transport: Vehicle Occupant	1,394	278.8	32.4	2.3
Transport: Other Land Transport	1,280	256.0	29.8	2.1
Transport: Pedestrian	1,254	250.8	29.2	2.0
Transport: Motorbike	1,123	224.6	26.1	1.8
Transport: 3 Wheeler	6	1.2	0.1	0.0
Mechanical Forces: Animate	2,888	577.6	67.2	4.7
Accidental Poisoning	2,770	554.0	64.4	4.5
Electricity / Fire / Burns	2,162	432.4	50.3	3.5
Assault	834	166.8	19.4	1.4
Intentional Self Harm	458	91.6	10.7	0.7
Accidental Threat to Breathing	348	69.6	8.1	0.6
Drowning / Submersion	216	43.2	5.0	0.3
Undetermined Intent	118	23.6	2.7	0.2
No External Cause Listed	21	4.2	0.5	0.0
Other Causes	2,818	563.6	65.6	4.6
Total	61,769	12,353.8	1437.1	100.0
Young People 15-24 Years				
Mechanical Forces: Inanimate	10,533	2,106.6	386.7	22.4
Falls	8,556	1,711.2	314.1	18.2
Transport: Vehicle Occupant	5,711	1,142.2	209.7	12.2
Transport: Motorbike	2,263	452.6	83.1	4.8
Transport: Other Land Transport	1,193	238.6	43.8	2.5
Transport: Cyclist	1,112	222.4	40.8	2.4
Transport: 3 Wheeler	6	1.2	0.2	0.0
Transport: Pedestrian	650	130.0	23.9	1.4
Assault	5,040	1,008.0	185.0	10.7
Intentional Self Harm	3,378	675.6	124.0	7.2
Mechanical Forces: Animate	3,074	614.8	112.9	6.5
Electricity / Fire / Burns	779	155.8	28.6	1.7
Accidental Poisoning	689	137.8	25.3	1.5
Drowning / Submersion	51	10.2	1.9	0.1
Accidental Threat to Breathing	28	5.6	1.0	0.1
Undetermined Intent	316	63.2	11.6	0.7
No External Cause Listed	22	4.4	0.8	0.0
Other Causes	3,591	718.2	131.8	7.6
Total	46,992	9,398.4	1725.3	100.0

*Mechanical Forces: Inanimate includes being accidentally struck/crushed/injured by an object/implement

Figure 97. Trends in Injury Mortality for Children 0-14 Yrs, New Zealand 1990-2004

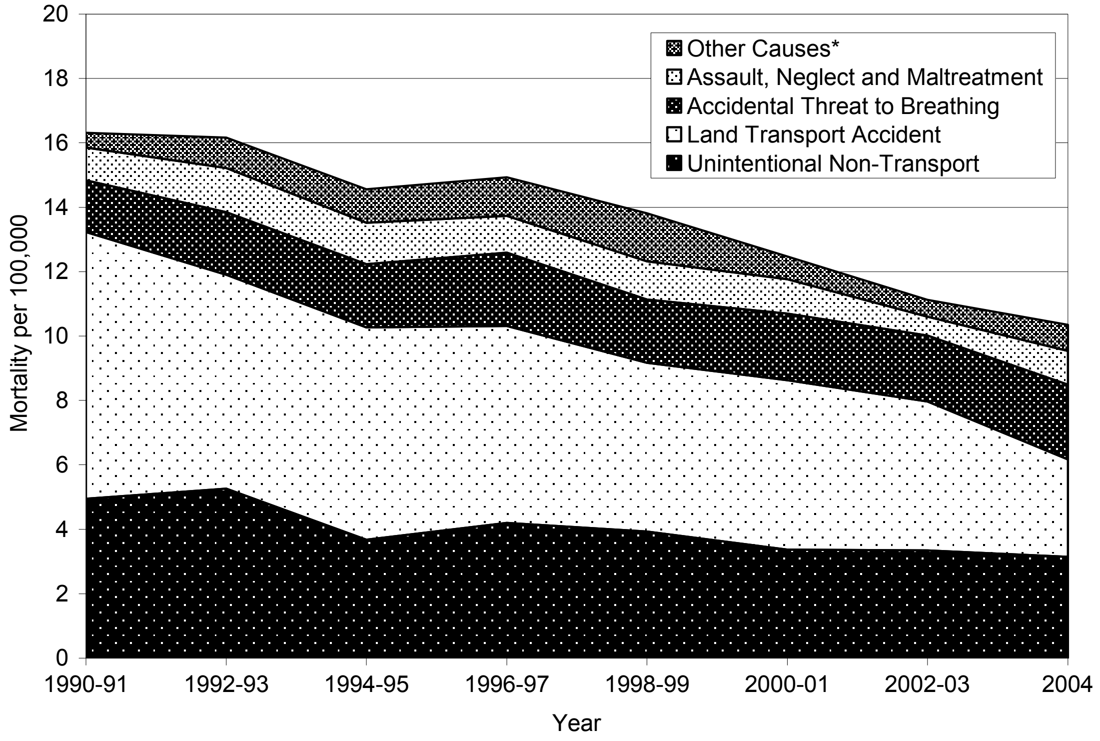
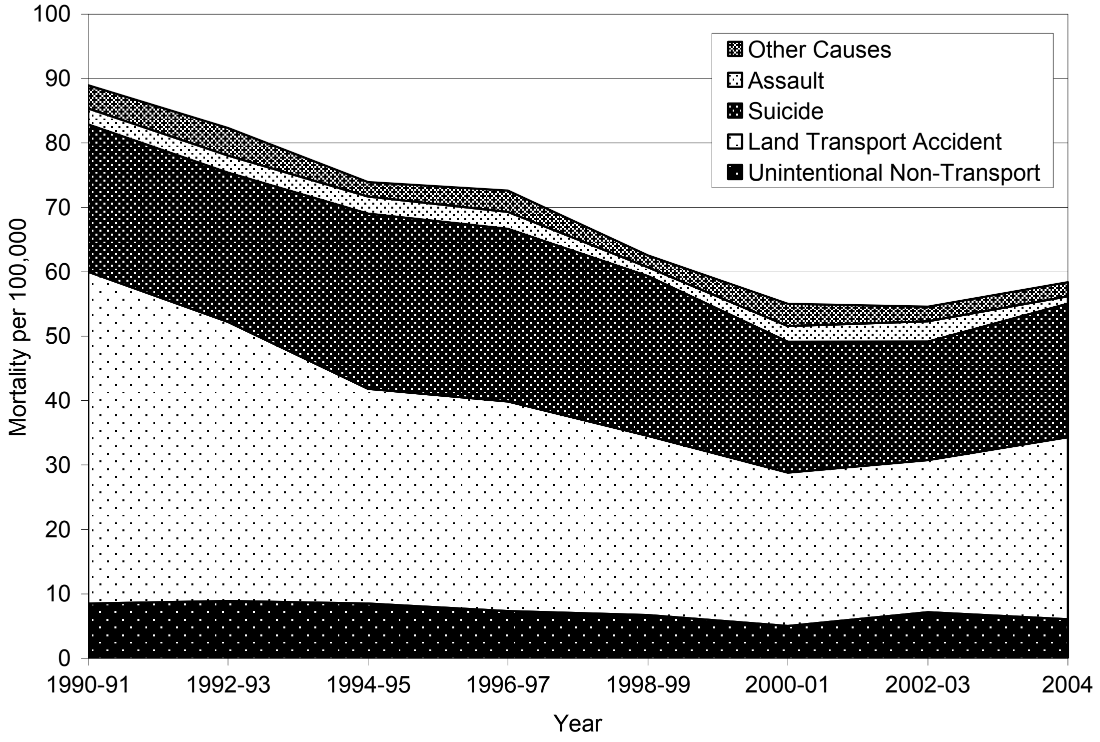
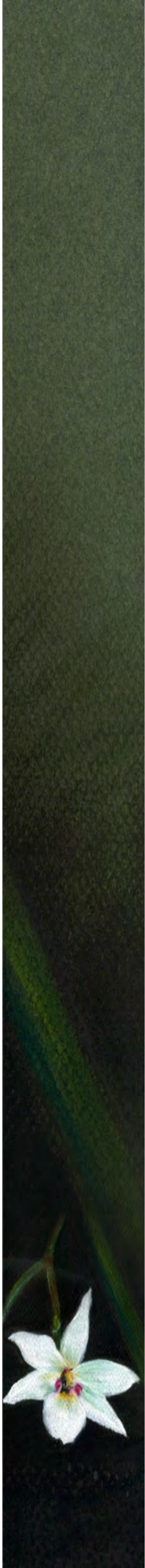


Figure 98. Trends in Injury Mortality for Young People 15-24 Yrs, New Zealand 1990-2004





Unintentional Non-Transport Related Injuries

Trends in Mortality

In New Zealand during 1990-2004, unintentional non-transport related injury deaths (e.g. due to falls, mechanical forces, drowning, burns, poisoning) in children gradually declined. While rates also declined for young people during 1990-2001, an upswing in rates was evident during 2002-2004 (**Figure 99**).

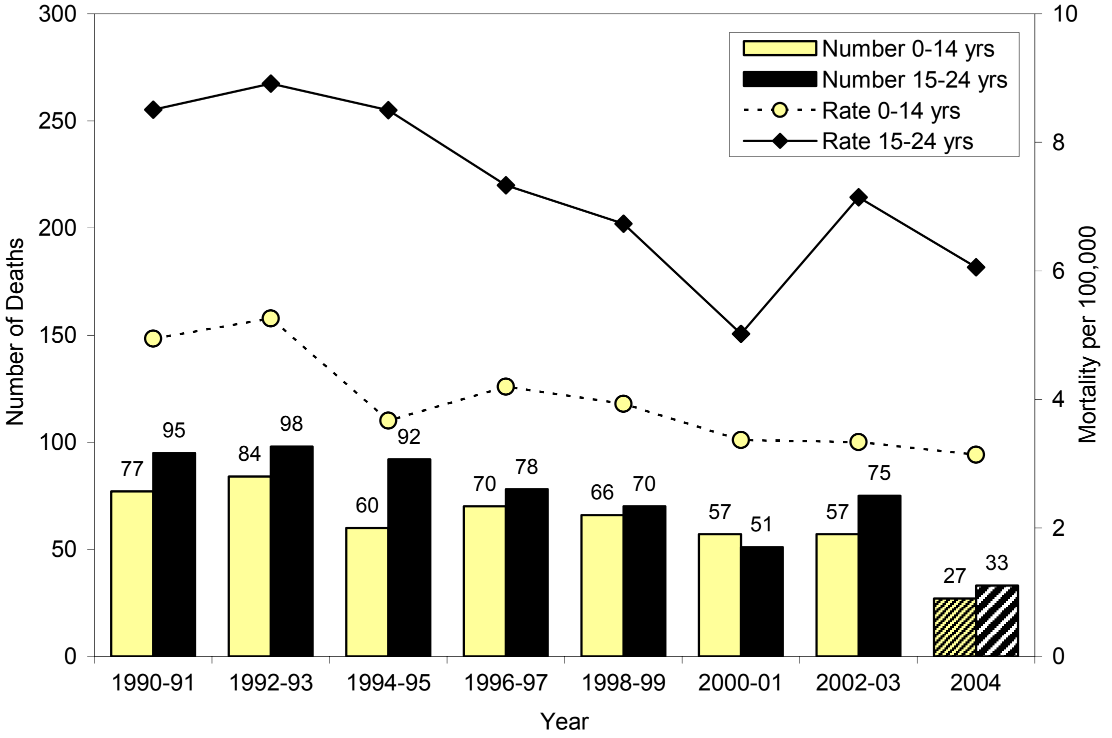
Gender and Age Differences

When broken down by age, unintentional non-transport related injury admissions were lowest amongst those <1 year, but then rose rapidly to peak between one and two years of age. While for females, rates declined throughout childhood and were lowest amongst those in their late teens and early 20s, for males this decline was much less marked, with admission rates amongst males in their late teens and early 20s being much higher than for females. With the exception of infants aged 1 year, a similar gender imbalance was seen for mortality (**Figure 100**). When broken down by cause, admissions for falls peaked in those aged 5 years, while accidental poisoning, inanimate mechanical forces and exposure to electricity / fire / burns were highest amongst those aged 1-2 years (**Figure 101**).

Ethnic, Socioeconomic and Regional Differences

During 1996-2004 mortality from unintentional non-transport related injuries was generally higher amongst Māori children and young people (**Figure 102**). Hospital admissions during 2002-2006 were higher for Pacific and Māori children and young people, males and those in living in the more deprived areas. While gender differences (male > female) were seen in both age groups, the male predominance was more marked in 15-24 year olds (**Table 58**, **Table 59**). In addition, during 2000-2004 there were regional variations in unintentional non-transport injury mortality, with rates ranging from 2.0-9.6 per 100,000 depending on the region. However, care should be taken when interpreting these differences due to the small number of cases (**Table 60**).

Figure 99. Deaths from Unintentional Non-Transport Injuries in Children and Young People 0-24 Years, New Zealand 1990-2004



Note: Deaths for 1990-2003 are per 2 year period. Deaths for 2004 are for single year only.

Figure 100. Hospital Admissions and Deaths due to Unintentional Non-Transport Injuries in Children and Young People 0-24 Years by Age and Gender, New Zealand 2002-2006 (Admissions) and 2000-2004 (Deaths)

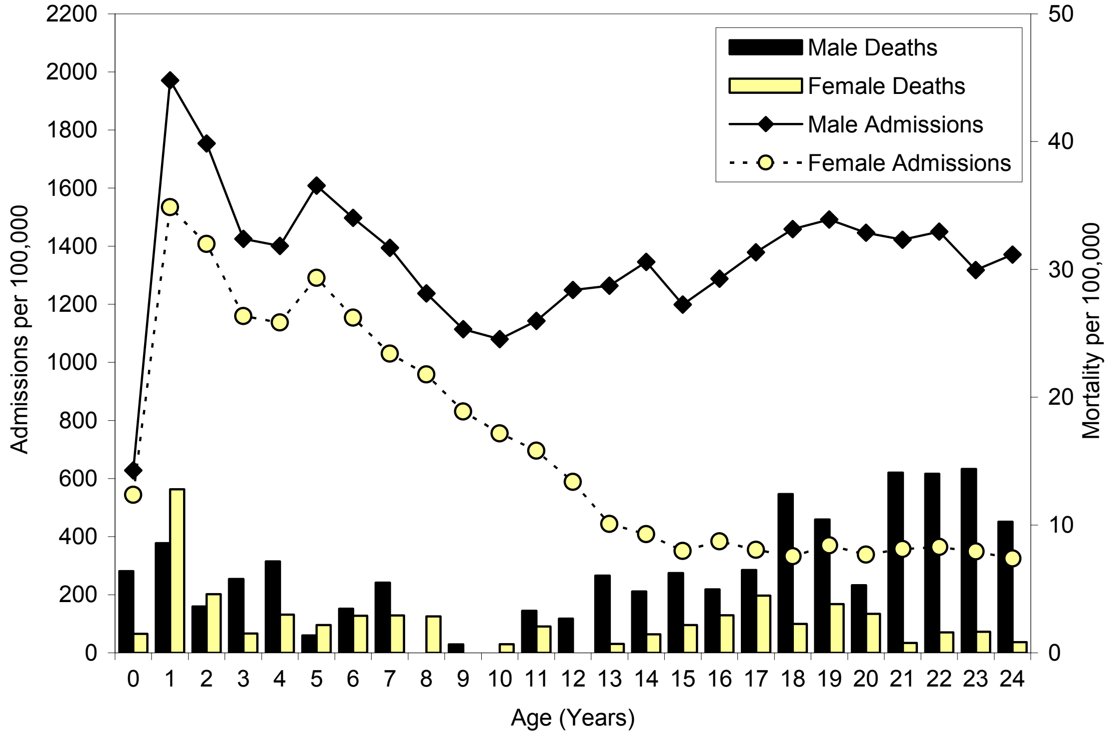


Figure 101. Hospital Admissions due to Unintentional Non-Transport Injuries in Children and Young People 0-24 Years by Age and Cause, New Zealand 2002-2006

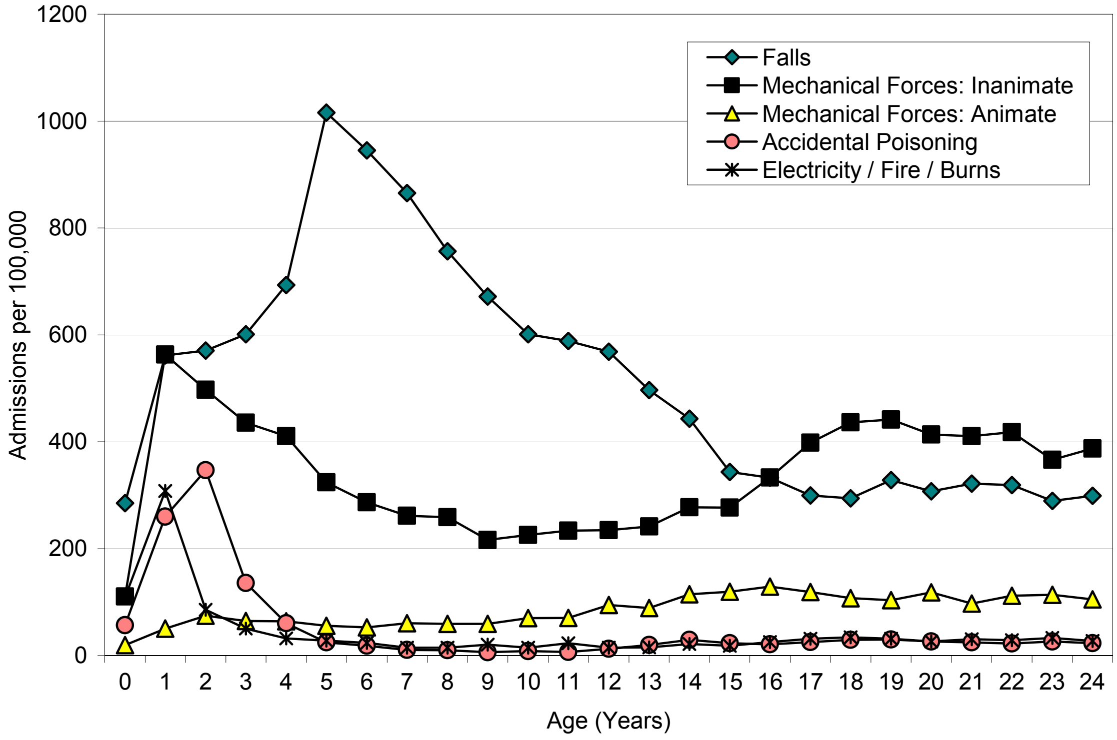


Figure 102. Deaths due to Unintentional Non-Transport Injuries in Children and Young People 0-24 Years by Ethnicity, New Zealand 1996-2004

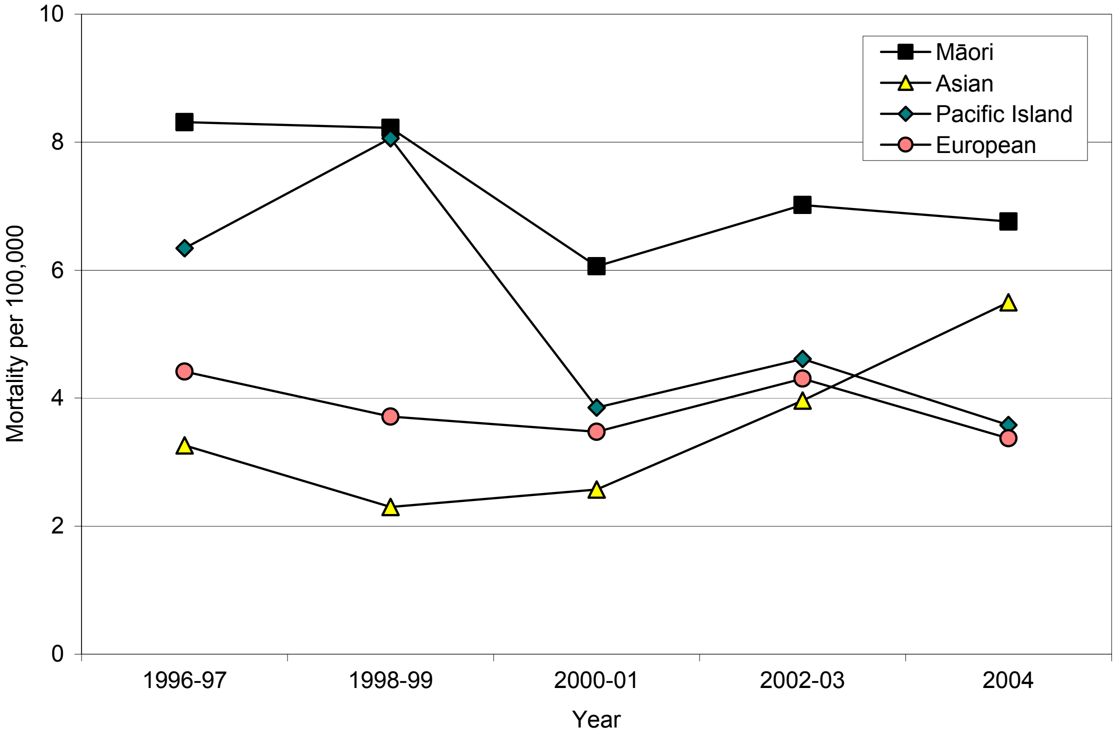


Table 58. Risk Factors for Hospital Admission due to Unintentional Non-Transport Related Injury in Children 0-14 Years, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	789.28	1.00		1-2	789.53	1.00	
2	789.78	1.00	0.95-1.05	3-4	915.89	1.16	1.12-1.20
3	838.63	1.06	1.01-1.11	5-6	1052.88	1.33	1.29-1.37
4	995.01	1.26	1.20-1.32	7-8	1281.30	1.62	1.57-1.67
5	987.72	1.25	1.19-1.31	9-10	1504.32	1.91	1.86-1.97
6	1118.11	1.42	1.36-1.48	Ethnicity			
7	1200.03	1.52	1.46-1.59	Māori	1270.47	1.14	1.12-1.16
8	1359.01	1.72	1.65-1.79	Pacific	1375.56	1.23	1.19-1.27
9	1524.63	1.93	1.85-2.01	European	1116.82	1.00	
10	1487.55	1.88	1.81-1.96	Asian/Indian	684.86	0.61	0.58-0.64
Gender							
Female	919.08	1.00					
Male	1335.65	1.45	1.42-1.48				

Note: Rate per 100,000 per year. RR: Rate Ratios are unadjusted.

Table 59. Risk Factors for Hospital Admission due to Unintentional Non-Transport Related Injury in Young People 15-24 Years, New Zealand 2002-2006

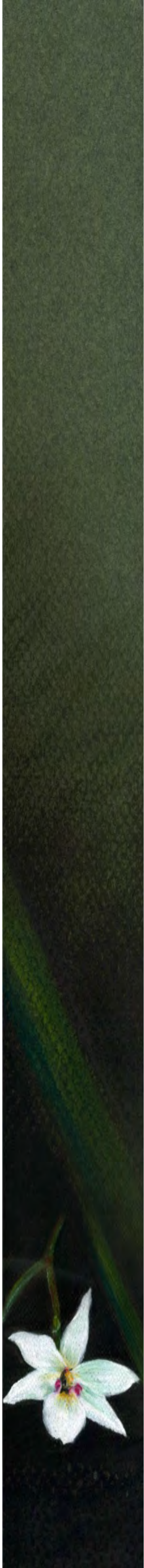
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	594.77	1.00		1-2	632.05	1.00	
2	668.16	1.12	1.04-1.20	3-4	753.78	1.19	1.13-1.25
3	735.34	1.24	1.16-1.33	5-6	775.80	1.23	1.17-1.29
4	772.43	1.30	1.21-1.39	7-8	887.82	1.40	1.34-1.46
5	740.13	1.24	1.16-1.33	9-10	1105.97	1.75	1.68-1.83
6	809.54	1.36	1.27-1.45	Ethnicity			
7	813.87	1.37	1.28-1.46	Māori	1134.17	1.33	1.29-1.37
8	957.64	1.61	1.51-1.72	Pacific	1210.63	1.42	1.36-1.48
9	1075.84	1.81	1.70-1.93	European	853.85	1.00	
10	1137.07	1.91	1.80-2.03	Asian/Indian	292.06	0.34	0.32-0.36
Gender							
Female	352.76	1.00					
Male	1379.88	3.91	3.79-4.04				

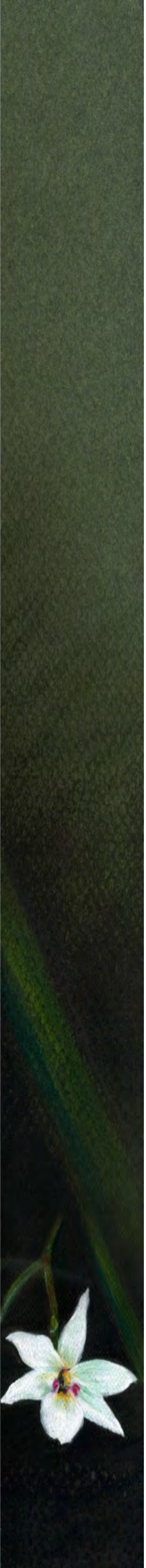
Note: Rate per 100,000 per year. RR: Rate Ratios are unadjusted.

Table 60. Deaths due to Unintentional Non-Transport Injuries in Children and Young People 0-24 Years by DHB, New Zealand 2000-2004

DHB	Number: Total 2000-2004	Number: Annual Average	Rate per 100,000	% of NZ Deaths
Northland	15	3.0	5.9	5.1
Waitemata	27	5.4	3.4	9.1
Auckland	27	5.4	4.1	9.1
Counties Manukau	34	6.8	4.3	11.5
Waikato	28	5.6	4.6	9.5
Lakes	8	1.6	4.4	2.7
Bay of Plenty	17	3.4	5.4	5.7
Tairawhiti	5	1.0	5.7	1.7
Taranaki	11	2.2	6.0	3.7
Hawkes Bay	10	2.0	3.8	3.4
Whanganui	<5	s	s	s
MidCentral	9	1.8	3.1	3.0
Hutt	5	1.0	2.0	1.7
Capital and Coast	12	2.4	2.7	4.1
Wairarapa	<5	s	s	s
Nelson Marlborough	9	1.8	4.5	3.0
West Coast	<5	s	s	s
Canterbury	32	6.4	4.3	10.8
South Canterbury	8	1.6	9.6	2.7
Otago	9	1.8	2.9	3.0
Southland	9	1.8	5.0	3.0
New Zealand	296*	59.2	4.3	100.0

Note: NZ Total includes 12 deaths where DHB was not stated. s: Small numbers preclude rate calculation. Care should be taken when interpreting regional differences due to the small number of cases. In addition, rates have not been adjusted for DHB Demography and it is not recommended that they be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)





Injuries from Land Transport Accidents

Traffic vs. Non-Traffic Related Land Transport Admissions

In New Zealand during 2002-2006, the majority of hospital admissions for injuries sustained while children and young people were the occupants of motor vehicles were traffic related (90.7%). In contrast, only 67.3% of pedestrian injuries, 43.9% of cyclist injuries and 37.1% of motorbike injuries were related to traffic accidents (**Table 61**).

Trends in Land Transport Mortality

During 1990-2004, while land transport related mortality for children continued to decline, there was a small upswing in rates for young people during 2004 (**Figure 103**).

Differences by Age and Gender

During 2002-2006, hospital admissions for land transport accidents increased with age, peaking in the late teens/early twenties and thereafter declining. With the exception of during the first two years of life, admissions were higher for males than females at all ages. Mortality was also higher for those in their late teens/early 20s, with males again being overrepresented (**Figure 104**). When examined by cause, however, pedestrian related injury admissions were highest for 1 year olds, while cycle related injuries were higher during late childhood/early adolescence and both motorbike and vehicle occupant injuries were highest during late adolescence/the early 20's (**Figure 105**).

Ethnic, Socioeconomic and Regional Differences

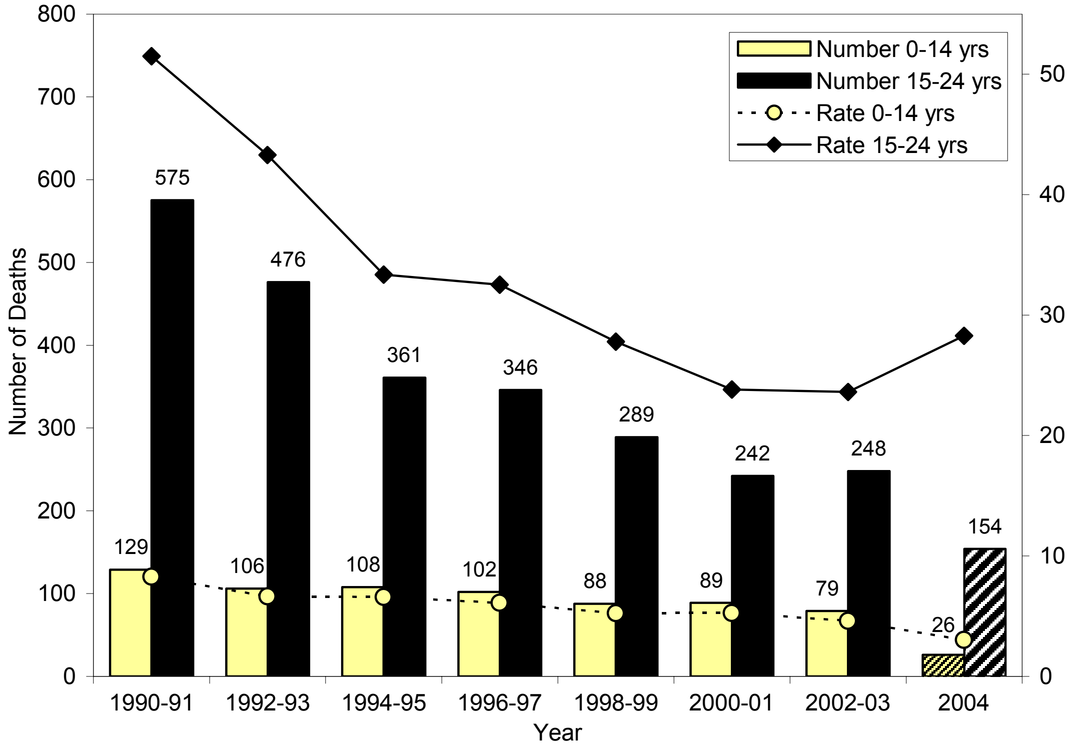
During 1996-2004 land transport related mortality was consistently higher amongst Māori children and young people (**Figure 106**). During 2002-2006 land transport related hospital admissions were also higher amongst Māori children and young people, males and those living in the most deprived areas. Admission rates for Pacific and Asian / Indian children and young people were lower than the European average (**Table 62**, **Table 63**). During 2000-2004 land transport related mortality for children and young people also varied by region, with rates ranging from 6.3 to 27.1 per 100,000 depending on the region studied. While small numbers make precise interpretation of regional differences difficult, in general terms rates were higher in regional areas and lower in large urban centres (**Table 64**).

Table 61. Hospital Admissions for Land Transport Injuries in Children and Young People 0-24 Years by Type, New Zealand 2002-2006

Type		Boarding or Alighting	Non-Traffic Accident	Traffic Accident	Unspecified Accident	Total
Vehicle Occupant	No.	118	432	6,444	111	7,105
	%	1.7	6.1	90.7	1.6	100.0
Motorbike	No.	<5	2,036	1,255	92	3,386
	%	0.1	60.1	37.1	2.7	100.0
Cyclist	No.	8	2,443	1,997	101	4,549
	%	0.2	53.7	43.9	2.2	100.0
Pedestrian	No.	0	525	1,281	98	1,904
	%	0.0	27.6	67.3	5.1	100.0
3 Wheeler	No.	0	10	<5	0	12
	%	0.0	83.3	16.7	0.0	100.0
Other Land Transport	No.	10	744	174	1,539	2,467
	%	0.4	30.2	7.1	62.4	100.0
Total	No.	139	6,190	11,153	1,941	19,423
	%	0.7	31.9	57.4	10.0	100.0

Note: A 'Traffic Accident' is any vehicle accident occurring on a public road. A 'Non-Traffic Accident' is any vehicle accident occurring entirely in any place other than a public road (i.e. occurring off-road). 'Boarding of Alighting' accidents are those which occur during the process of getting on/in or off/out of a vehicle.

Figure 103. Deaths from Land Transport Injuries in Children and Young People 0-24 Years, New Zealand 1990-2004



Note: Deaths for 1990-2003 are per 2 year period. Deaths for 2004 are for single year only.

Figure 104. Hospital Admissions and Deaths due to Land Transport Injuries in Children and Young People by Age and Gender, New Zealand 2002-06 (Admissions) and 2000-04 (Deaths)

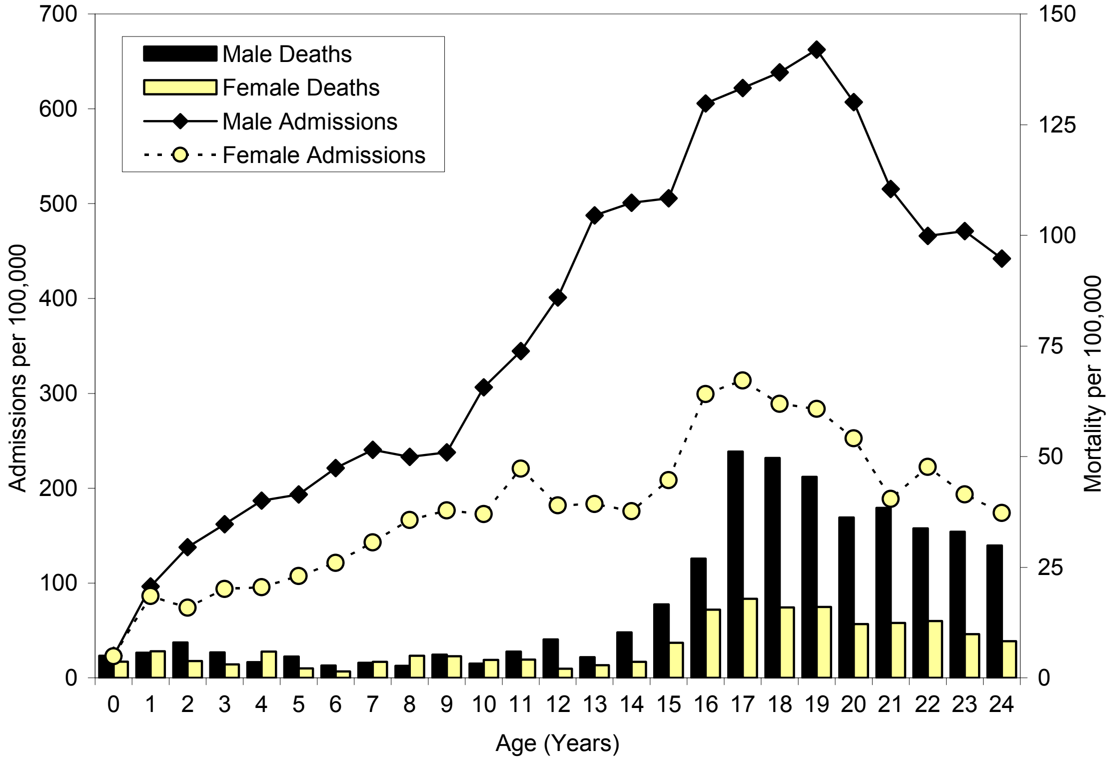


Figure 105. Hospital Admissions for Land Transport Injuries in Children and Young People 0-24 Years by Age and Type, New Zealand 2002-2006

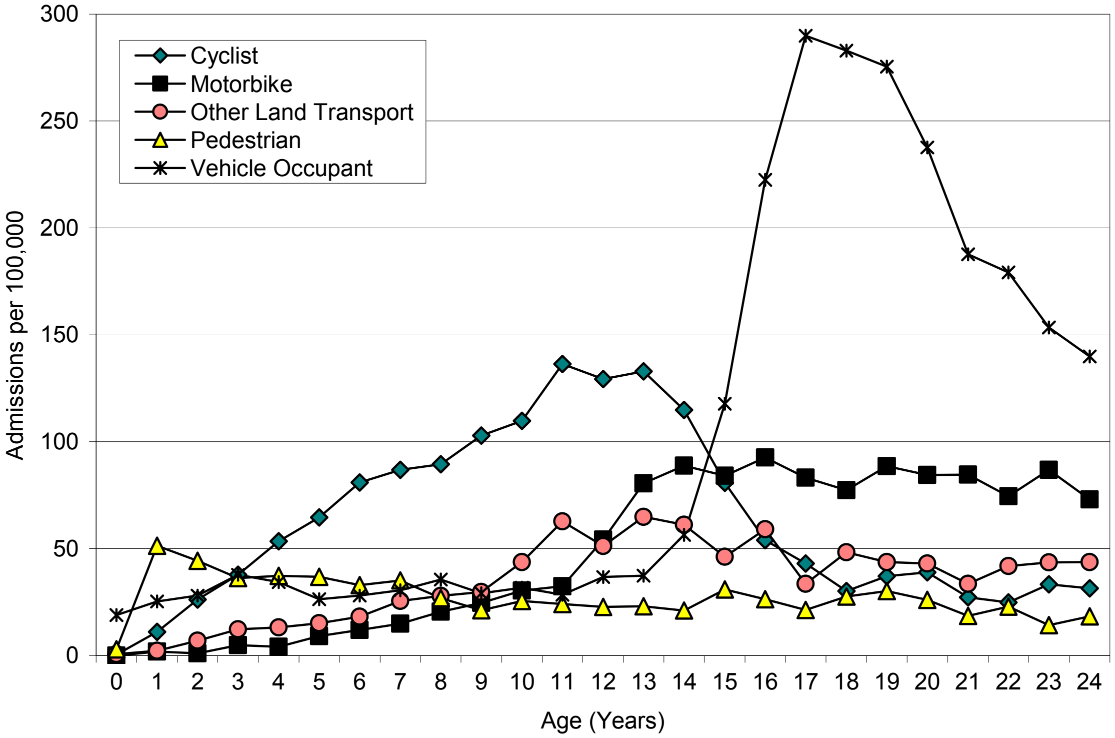


Figure 106. Deaths due to Land Transport Injuries in Children and Young People 0-24 Years by Ethnicity, New Zealand 1996-2004

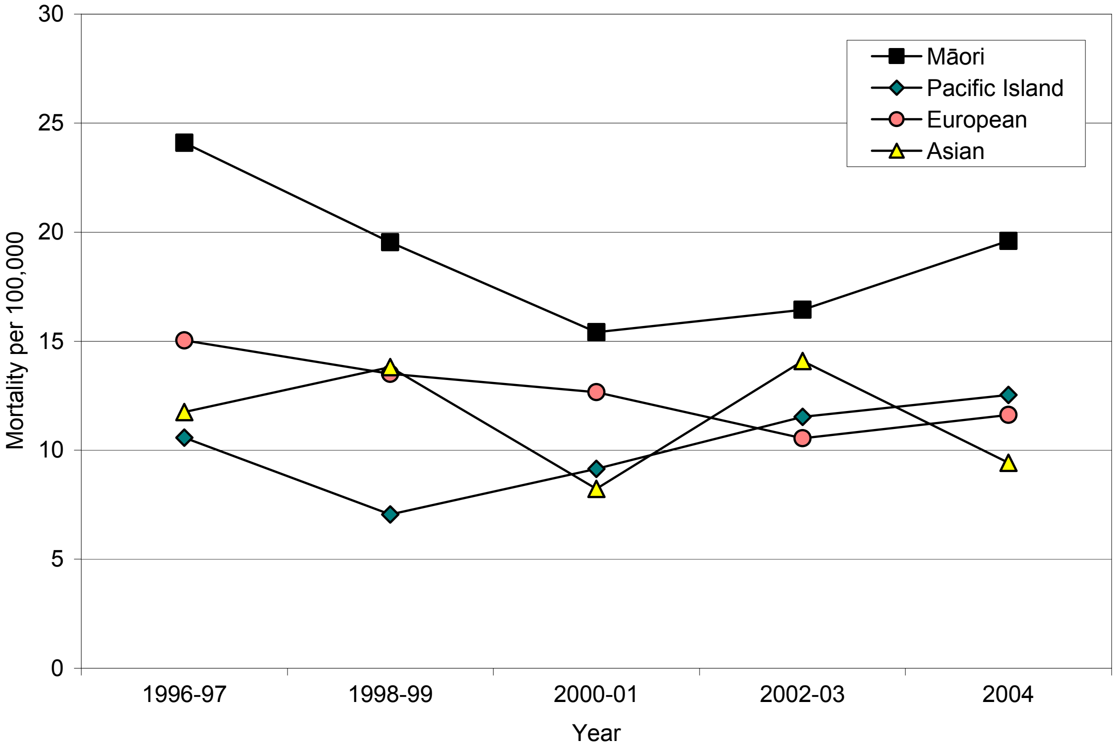


Table 62. Risk Factors for Hospital Admission due to Land Transport Injuries in Children 0-14 Years, New Zealand 2002-2006

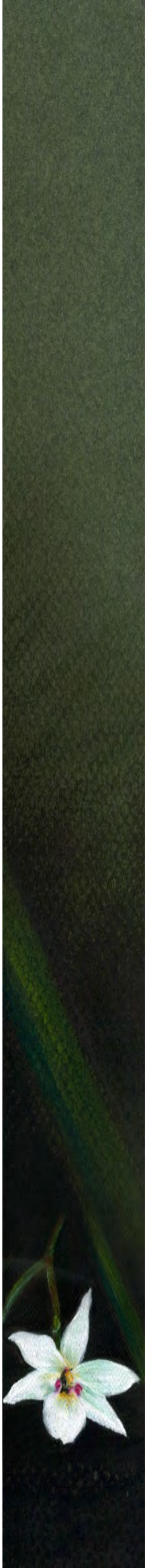
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	128.51	1.00		1-2	132.92	1.00	
2	137.52	1.07	0.95-1.20	3-4	168.02	1.26	1.16-1.36
3	148.36	1.15	1.03-1.29	5-6	186.71	1.40	1.30-1.51
4	188.14	1.46	1.31-1.63	7-8	217.06	1.63	1.51-1.76
5	166.44	1.30	1.16-1.45	9-10	262.98	1.98	1.85-2.12
6	207.01	1.61	1.45-1.79	Ethnicity			
7	210.26	1.64	1.47-1.82	Māori	242.57	1.20	1.14-1.26
8	223.55	1.74	1.57-1.93	Pacific	156.64	0.78	0.72-0.85
9	265.23	2.06	1.86-2.28	European	201.66	1.00	
10	261.12	2.03	1.84-2.24	Asian/Indian	82.34	0.41	0.36-0.46
Gender							
Female	136.35	1.00					
Male	255.92	1.88	1.80-1.97				

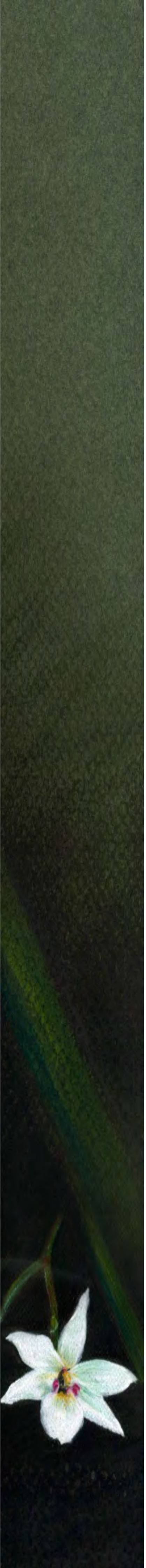
Note: Rate per 100,000 per year. RR: Rate Ratios are unadjusted.

Table 63. Risk Factors for Hospital Admission due to Land Transport Injuries in Young People 15-24 Years, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	271.72	1.00		1-2	311.57	1.00	
2	350.17	1.29	1.16-1.43	3-4	360.12	1.16	1.08-1.24
3	325.60	1.20	1.08-1.33	5-6	382.07	1.23	1.15-1.32
4	395.00	1.45	1.31-1.60	7-8	397.67	1.28	1.20-1.37
5	355.32	1.31	1.18-1.45	9-10	473.58	1.52	1.43-1.62
6	407.37	1.50	1.36-1.65	Ethnicity			
7	409.98	1.51	1.37-1.66	Māori	487.74	1.10	1.05-1.15
8	386.04	1.42	1.29-1.56	Pacific	249.28	0.56	0.51-0.61
9	482.82	1.78	1.62-1.95	European	443.48	1.00	
10	464.05	1.71	1.56-1.88	Asian/Indian	135.82	0.31	0.28-0.34
Gender							
Female	243.94	1.00					
Male	556.99	2.28	2.19-2.37				

Note: Rate per 100,000 per year. RR: Rate Ratios are unadjusted.





Summary

All Injuries: In New Zealand during 2002-2006, falls followed by inanimate mechanical forces were the leading causes of injury related hospital admission for children, while the order was reversed for young people. Transport related injuries as a group however made a significant contribution in both age groups. In contrast, during 2000-2004, accidental threats to breathing followed by transport accidents were the leading causes of injury related mortality for children, while transport accidents followed by suicide were the leading causes of injury related mortality for young people. During 1990-2004, injury related mortality for children 0-14 years gradually declined, with the largest absolute declines being in the land transport accident category. While injury related mortality for young people also declined during 1990-2001, small upswings in land transport and unintentional non-transport related injury deaths during 2002-2004 resulted in a small increase in overall mortality during this later period.

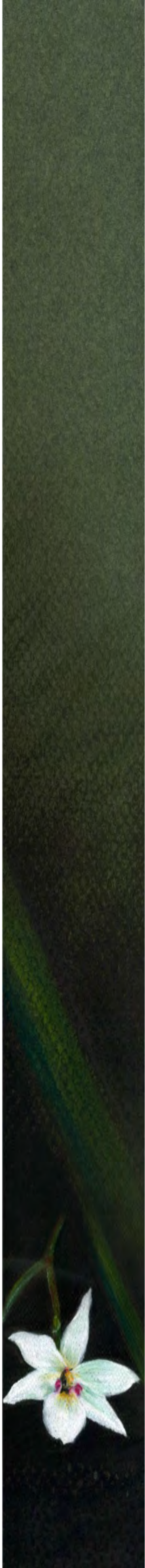
Unintentional Non-Transport Related Injuries: When broken down by age, unintentional non-transport related injury admissions (e.g. falls, mechanical forces, drowning, burns, poisoning) were highest for those between one and two years of age, with males being overrepresented in both admissions and mortality, particularly during their late teens and early 20s. When broken down by cause, admissions for falls peaked amongst those aged 5 years, while accidental poisoning, inanimate mechanical forces and exposure to electricity / fire / burns were highest for those 1-2 years of age. Hospital admissions were also higher for Pacific and Māori children and young people, males and those in living in the more deprived areas.

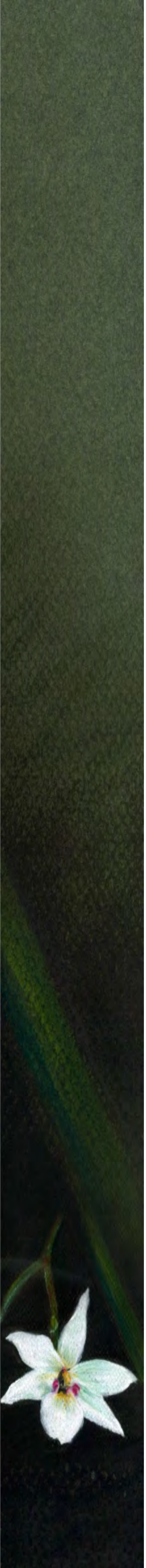
Land Transport Accidents: During 2002-2006, the majority of hospital admissions for injuries sustained whilst children and young people were the occupants of vehicles were classified as being traffic related (90.7%). In contrast, only 67.3% of pedestrian injuries, 43.9% of cyclist injuries and 37.1% of motorbike injuries were considered traffic related. When broken down by age, hospital admissions for land transport accidents increased throughout childhood, reaching a peak in the late teens / early twenties and thereafter declining. With the exception of the first two years of life, admissions were higher for males than for females. Mortality was also higher for those in their late teens / early 20s, and demonstrated a similar male predominance. When broken down by injury type pedestrian admissions were highest for those aged 1 year, while cycle related injuries were higher during late childhood and early adolescence and both motorbike and vehicle occupant injuries were highest during late adolescence / the early 20's. As a group, land transport related admissions were also higher amongst Māori children and young people, males and those living in the most deprived areas, while admissions for Pacific and Asian / Indian children and young people were lower than the European average.

Table 64. Deaths due to Land Transport Injuries in Children and Young People 0-24 Years by DHB, New Zealand 2000-2004

DHB	Number: Total 2000-2004	Number: Annual Average	Rate per 100,000	% of NZ Deaths
Northland	51	10.2	20.0	6.1
Waitemata	55	11.0	6.9	6.6
Auckland	56	11.2	8.5	6.7
Counties Manukau	83	16.6	10.4	9.9
Waikato	85	17.0	13.8	10.2
Lakes	44	8.8	24.0	5.3
Bay of Plenty	60	12.0	18.9	7.2
Tairawhiti	5	1.0	5.7	0.6
Taranaki	26	5.2	14.2	3.1
Hawkes Bay	38	7.6	14.5	4.5
Whanganui	31	6.2	27.1	3.7
MidCentral	40	8.0	13.8	4.8
Hutt	19	3.8	7.8	2.3
Capital and Coast	28	5.6	6.3	3.3
Wairarapa	14	2.8	21.8	1.7
Nelson Marlborough	36	7.2	17.9	4.3
West Coast	9	1.8	18.1	1.1
Canterbury	73	14.6	9.8	8.7
South Canterbury	10	2.0	12.1	1.2
Otago	23	4.6	7.5	2.8
Southland	30	6.0	16.7	3.6
New Zealand	836*	167.2	12.2	100.0

Note: NZ Total includes 20 deaths where DHB was not stated. Care should be taken when interpreting regional differences due to the small number of cases involved. In addition, rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)





Injuries Arising from Assault

Introduction

Injuries Arising from Assault, Neglect and Maltreatment in Children

Longitudinal studies suggest that 4-10% of New Zealand children experience physical abuse and 11-20% experience sexual abuse during childhood and that the long term consequences for these children are significant [162]. During the 1990s, New Zealand ranked 3rd highest amongst rich nations for its child maltreatment death rates, with 49 children under the age of 15 years dying as a result of maltreatment between 1996 and 2000. This situation does not appear to have improved over time, with mortality rates almost doubling during the late 1980s and changing very little since then [163]. Mortality represents the tip of the iceberg however, with the number of notifications to the Department of Child Youth and Family (CYF) for possible abuse or neglect increasing each year. In 2005, a total of 59,313 notifications were recorded by CYF and of these, 78.7% were deemed to require further action. In 1999-2000, of those cases requiring further action, 50% were found to involve substantiated abuse, neglect or behavioural / relationship problems [164]. This is of concern, as in addition to the physical effects, research has shown that survivors of childhood abuse often suffer long term psychological sequelae including depression, post-traumatic stress disorder, substance abuse, suicide / suicide attempts and high risk sexual behaviour [165].

Injuries Arising from Assault in Young People

In addition, data from Christchurch Longitudinal Health and Development study noted that 23% of males and 14% of females reported an assault between the ages of 16 and 18 years. While gender specific rates differed, the study noted that the risk factors for assault were similar for males and females, and included childhood measures of behavioral disturbance and parental dysfunction, in addition to measures of adolescent participation in such factors as violent offending and the misuse of alcohol[166].

The following section explores hospital admissions and mortality from injuries arising from the assault, neglect or maltreatment of New Zealand children (0-14 years), or from the assault of young people (15-24 years). Because it is likely that the contexts in which such injuries occur differ with age, data for children and young people are presented separately in the section which follows.

Data Source and Methods

Definition

1. Hospital Admissions for Injuries Sustained as the Result of Assault / Neglect / Maltreatment of Children Aged 0-14 Years, or as the Result of an Assault on a Young Person Aged 15-24 Years
2. Deaths from Injuries Sustained as the Result of Assault / Neglect / Maltreatment of Children Aged 0-14 Years, or as the Result of an Assault on a Young Person Aged 15-24 Years

Data Source and Interpretation

1. Hospital Admissions

Numerator: Admissions: National Minimum Dataset: Hospital admissions of children (0-14 years) and young people (15-24 years) with a primary diagnosis of injury (ICD9 800-995: ICD 10 S00-T79) and an external cause code of intentional injury (ICD-9 E960-968; ICD-10 X85-Y09) in any of the first 10 External Cause codes.

Denominator: NZ Census

Interpretation: As outlined in Appendix 1, in order to ensure comparability over time, all cases with an Emergency Department Specialty Code (M05-M08) on discharge were excluded

2. Mortality

Numerator: National Mortality Collection: Deaths in children (0-14 years) and young people (15-24 years) with a clinical code (cause of death) of Intentional Injury (ICD-9 E960-968; ICD-10 X85-Y09).

Denominator: NZ Census

Interpretation: The limitations of the National Minimum Dataset are discussed at length in Appendix 1. The reader is urged to review this Appendix before interpreting any trends based on hospital admission data, particularly those which relate to injuries.

Indicator Category (Table 133, Table 134)

Admissions: Proxy C; Mortality: Ideal B

Injuries Arising from the Assault, Neglect or Maltreatment of Children 0-14 Years

Trends in Mortality

Amongst New Zealand children during 1990-2001, there was a gradual decline in mortality from injuries sustained as the result of the assault, neglect or maltreatment, although rates during the past 3 years have been more variable. Despite this downward trend, during 2004 a total of 9 New Zealand children died as the result of an assault (**Figure 107**).

Distribution by Age and Gender

During 2002-2006, hospital admissions for injuries arising from the assault, neglect or maltreatment of children exhibited a U-shaped distribution by age, with rates being highest amongst those < 2 years and those > 11 years of age. In contrast, mortality was highest amongst children < 1 year. While the gender balance was relatively even during infancy and early childhood, admissions amongst males became more predominant as adolescence approached (**Figure 108**). In addition, during 2002-2006 admission rates were highest amongst males, Māori and Pacific children, and those living in the most deprived areas (**Table 65**).

Nature of the Injury Sustained

During 2002-2006, the type of intentional injury leading to hospital admission varied by the age of the child, with those in the 0-4 year age bracket tending to be assigned an ICD-10 Y07 “Maltreatment” code (including mental cruelty, physical abuse, sexual abuse or torture) while those in the 10-14 year age bracket were more likely to be assigned to ICD-10 Y04 “Assault by Bodily Force” (including unarmed brawl or fight). While it is tempting to speculate that this reflected to a transition away from assaults occurring within the family environment as age increased, the ICD-10 5th digit (describing the relationship of the victim to the perpetrator) was most frequently 9 (unspecified person), making such hypotheses difficult to substantiate. During 2001-2005, the most common types of injury for children 0-4 years hospitalised for assault / maltreatment were superficial head injuries, followed by subdural haematomas and fractures of the face, femur and upper limbs. For children 10-14 years, nasal fractures followed by upper limb fractures predominated (**Table 66**).

Table 65. Risk Factors for Hospital Admission due to Injuries Arising from the Assault, Neglect or Maltreatment in Children 0-14 Years, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Quintile				Ethnicity			
1	6.86	1.00		Māori	35.76	2.88	2.47-3.36
2	10.90	1.59	1.14-2.21	Pacific	35.81	2.88	2.35-3.54
3	17.14	2.50	1.84-3.39	European	12.42	1.00	
4	22.78	3.32	2.48-4.45	Asian/Indian	9.57	0.77	0.53-1.12
5	37.51	5.47	4.16-7.19				
Gender							
Female	14.16	1.00					
Male	25.35	1.79	1.55-2.06				

Note: Rate per 100,000 per year; RR: Rate Ratios are unadjusted.

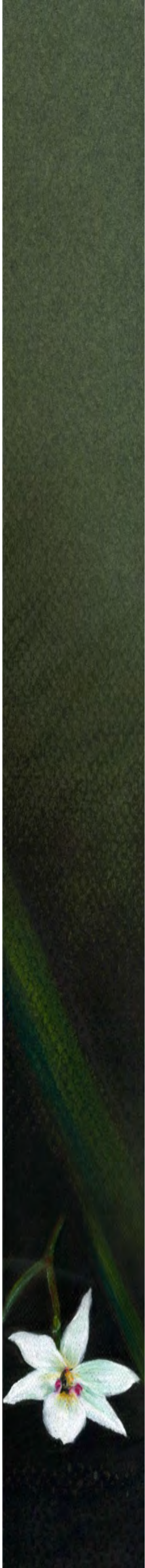
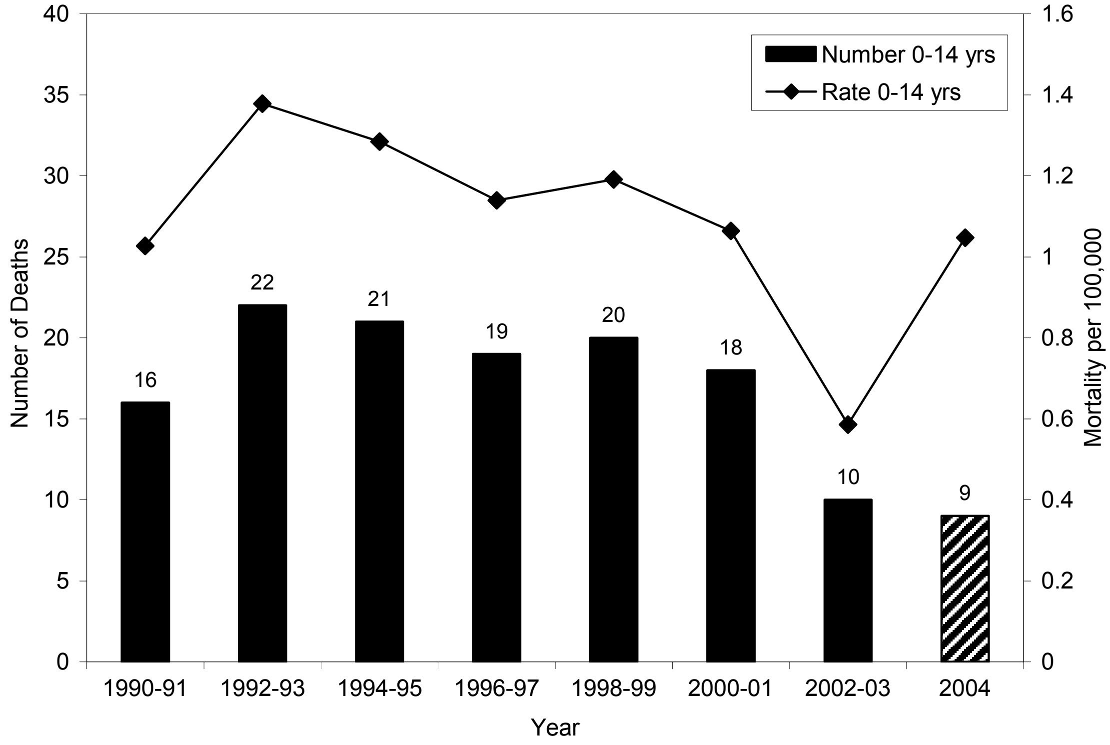


Figure 107. Mortality due to Injuries Arising from the Assault, Neglect or Maltreatment of Children 0-14 Years, New Zealand 1990-2004



Note: Deaths for 1990-2003 are per 2 year period. Deaths for 2004 are for single year only.

Figure 108. Hospital Admissions and Deaths due to Injuries Arising from the Assault, Neglect or Maltreatment of Children by Age, New Zealand 2002-06 (Admissions) and 2000-04 (Deaths)

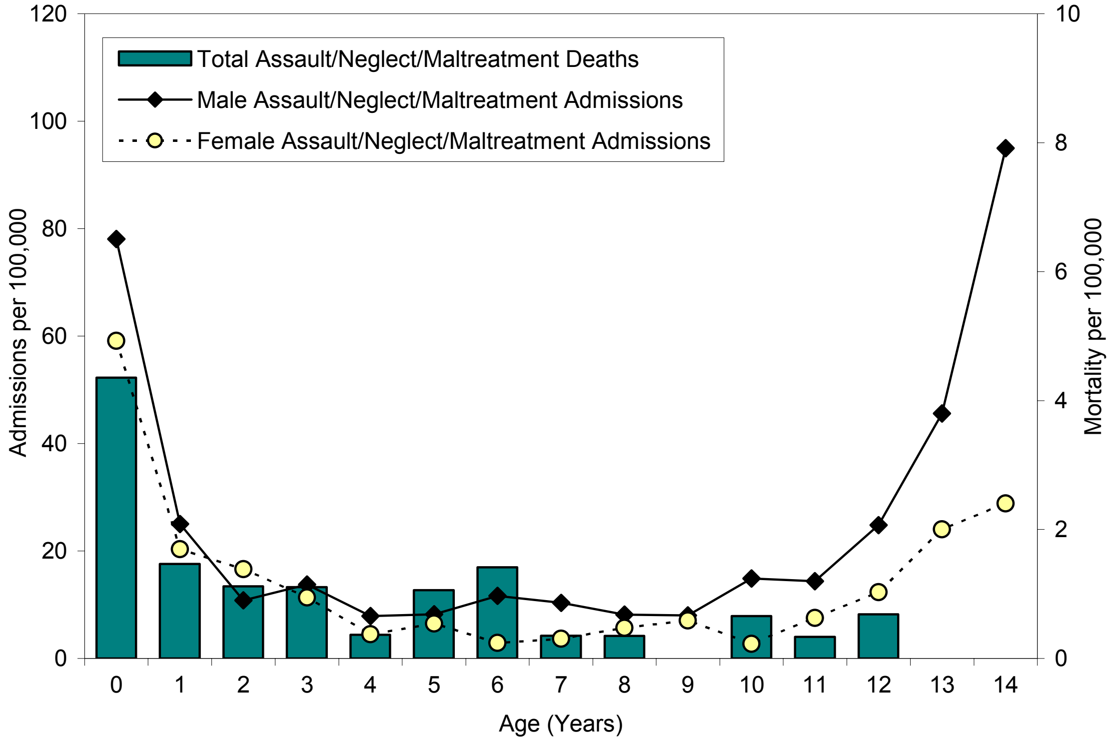


Table 66. Nature of Injury Arising from Assault, Neglect and Maltreatment in Hospitalised Children 0-14 Years by Age Group, New Zealand 2001-2005

Nature of Injury	New Zealand	
	Number	%
Age 0-4 years		
Superficial Head Injury	63	18.6
Subdural Haemorrhage	61	18.0
Fractured Femur	25	7.4
Upper Limb Fracture	24	7.1
Skull / Face Fracture	22	6.5
Other Injuries	143	42.3
Total	338	100.0
Age 5-9 years		
Superficial Head Injury	17	15.3
Upper Limb Fracture	12	10.8
Open Head Wound	10	9.0
Skull / Face Fracture	5	4.5
Other Injuries	67	60.4
Total	111	100.0
Age 10-14 years		
Fractured Nasal Bones	66	15.8
Upper Limb Fracture	53	12.7
Concussion	38	9.1
Superficial Head Injury	18	4.3
Other Injuries	243	58.1
Total	418	100.0

Injuries Arising from Assault in Young People 15-24 Years

Trends in Mortality

In New Zealand during the past 7 years, assault mortality in young people has fluctuated markedly. On average during the past 5 years however, 13 young people each year died as the result of an assault (**Figure 109**).

Age and Gender Differences

During 2002-2006, hospital admissions for assault in young men increased with age, reaching a peak in the mid-late teens and thereafter declining. In contrast, admissions for young women varied much less with age, and in addition were lower than for young men at all ages from 15-24 years (**Figure 110**).

Ethnic and Socioeconomic Differences

During 2002-2006, hospital admissions for assault were also higher amongst Māori and Pacific young people and those living in the most deprived areas. In addition, admissions were 6.76 times higher for young men than for young women during this period (**Table 67**).

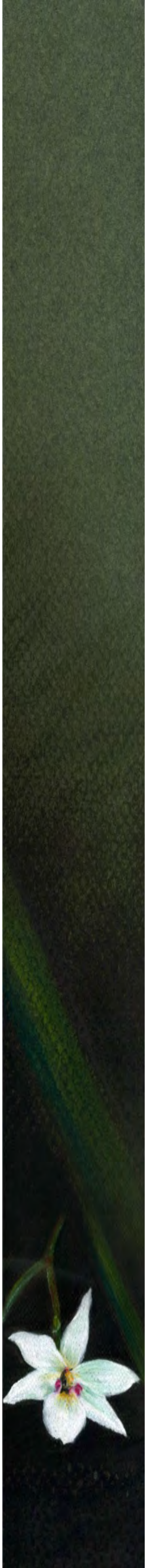
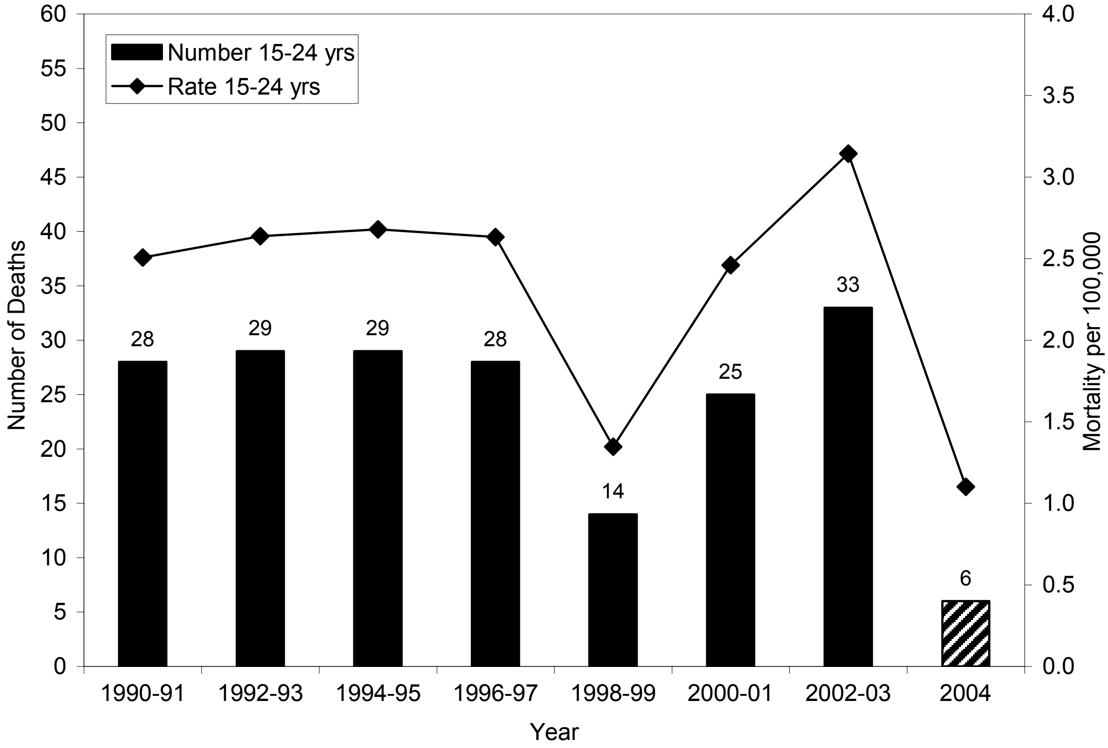


Figure 109. Deaths from Assault in Young People 15-24 Years, New Zealand 1990-2004



Note: Deaths for 1990-2003 are per 2 year period. Deaths for 2004 are for single year only.

Figure 110. Hospital Admissions and Deaths due to Assault in Young People 15-24 Years by Age and Gender, New Zealand 2002-2006 (Admissions) and 2000-2004 (Deaths)

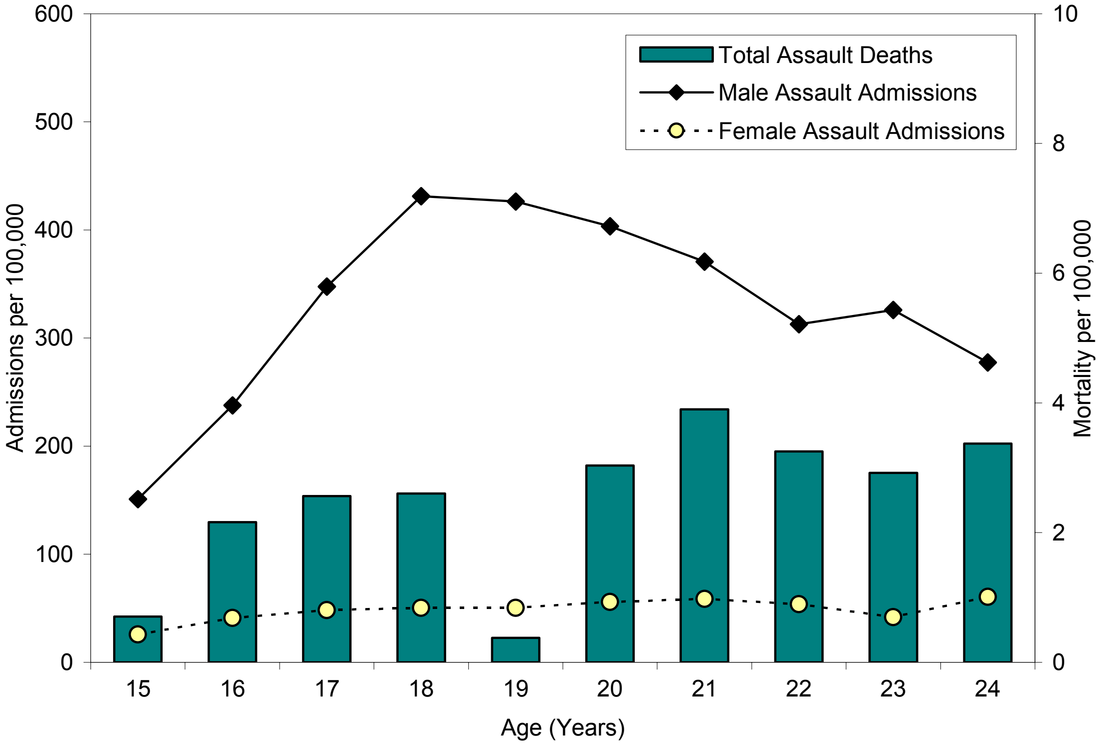


Table 67. Risk Factors for Hospital Admission due to Injuries Arising from Assault in Young People 15-24 Years, New Zealand 2002-2006

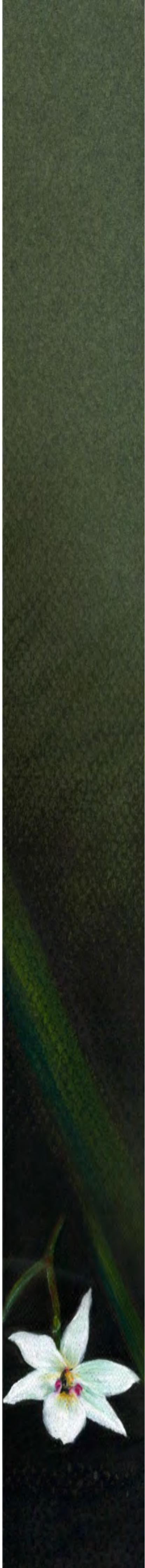
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	91.87	1.00		1-2	101.45	1.00	
2	110.73	1.21	1.01-1.45	3-4	126.88	1.25	1.11-1.41
3	116.49	1.27	1.06-1.52	5-6	148.63	1.47	1.31-1.65
4	137.39	1.50	1.26-1.78	7-8	213.55	2.10	1.89-2.33
5	136.39	1.48	1.25-1.76	9-10	298.43	2.94	2.66-3.25
6	160.20	1.74	1.48-2.05	Ethnicity			
7	191.54	2.08	1.77-2.44	Māori	345.28	2.27	2.13-2.42
8	234.33	2.55	2.19-2.97	Pacific	317.69	2.09	1.91-2.28
9	256.45	2.79	2.40-3.24	European	152.07	1.00	
10	341.74	3.72	3.21-4.31	Asian/Indian	45.79	0.30	0.25-0.35
Gender							
Female	48.32	1.00					
Male	326.56	6.76	6.23-7.34				

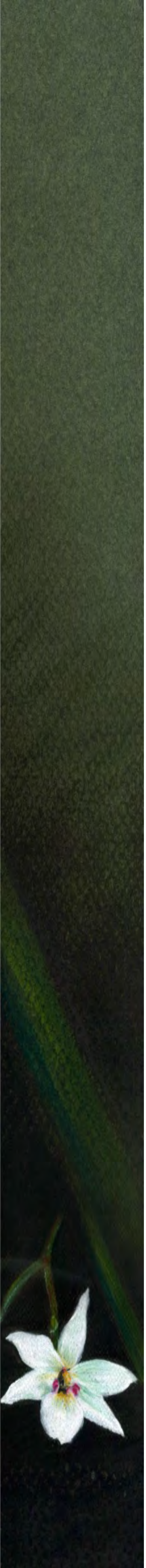
Note: Rate per 100,000 per year. RR: Rate Ratios are unadjusted.

Summary

Children 0-14 Years: Longitudinal studies suggest that 4-10% of New Zealand children experience physical abuse and 11-20% experience sexual abuse during childhood and that the long term consequences for these children are significant. Amongst New Zealand children during 1990-2001, there was a gradual decline in mortality from injuries sustained as the result of the assault, neglect or maltreatment, although rates during the past 3 years have been more variable. Despite this downward trend, during 2004 a total of 9 New Zealand children died as the result of an assault. When broken down by age, hospital admissions during 2002-2006 exhibited a U-shaped distribution, with rates being highest amongst those < 2 years and those > 11 years of age. In contrast, mortality was highest amongst children < 1 year. While the gender balance was relatively even during infancy and early childhood, admissions amongst males became more predominant as adolescence approached. In addition, admissions were also higher amongst males, Māori and Pacific children, and those living in the most deprived areas.

Young People 15-24 Years: Data from the Christchurch Longitudinal Health and Development study noted that 23% of males and 14% of females reported an assault between the ages of 16 and 18 years. While gender specific rates differed, the study noted that the risk factors for assault were similar for males and females, and included childhood measures of behavioral disturbance and parental dysfunction, in addition to measures of adolescent participation in violent offending and the misuse of alcohol. In New Zealand during the past 7 years mortality from assaults in young people has fluctuated markedly. On average during the past 5 years, 13 young people each year have died as the result of an assault. During 2002-2006, hospital admissions for assault in young men increased with age, reaching a peak in the mid-late teens and thereafter declining. In contrast, admission rates for young women varied less with age and in addition, were lower than for males at all ages from 15-24 years. Overall during 2002-2006, hospital admissions for assault were higher amongst males, Māori and Pacific young people and those living in the most deprived areas.





CYF Notifications

Introduction

During the 1990s New Zealand ranked 3rd highest amongst rich nations for its child maltreatment death rates. Between 1996 and 2000, 49 children under the age of 15 years died as a result of maltreatment, with the highest rates being amongst those <5 years of age [163]. In New Zealand, Child Youth and Family (CYF) hold the statutory responsibility for protecting children from recurrent abuse and receive notifications from a variety of sources including the police, the education and health sectors, families / whanau and the general public. The appropriate handling of these notifications is crucial as failing to respond to a legitimate concern may, in the worst case scenario, lead to an avoidable death, while over-reacting to a non-substantiated concern may result in significant trauma for a child's whanau [167].

Since 2001, notifications recorded by CYF have doubled and while it is often assumed that this reflects an increase in the underlying rate of child abuse, recent research would suggest that changes in the behaviour of the child protection system have also played a significant role [167]. In understanding these changes, knowledge of the current child protection referral process is crucial, as during 2004 it was estimated that of the 1 million phone calls and faxes to CYF, only 140,000 (14%) were forwarded to intake social workers for further review. Of these, only ≈35,000 resulted in a formal notification being lodged and as many notifications were for >1 child, this resulted in a total of 63,000 client notifications for 2004. At each point in this pathway, the notifier, telephone operator and intake social worker had to make a decision about whether to escalate the concern further, with these decisions often being made in the context of insufficient or conflicting information, time pressures and an increasing intolerance within the wider community for the consequences of child abuse. That increases in CYF notifications over the past 6 years have resulted, at least in part, from changes within the system itself is suggested by a number of observations including [167]:

- Correlations between high profile media events and spikes in notifications
- A 300% rise in fax concerns following the introduction of after hours fax lodgement
- An increase in the average number of siblings per notification
- Exponential growth in Police Family Violence (POL400) referrals as a result of new processes and behaviours
- A sudden surge in demand relating to the roll out of a Call Centre

While to a certain extent, the increase in notifications has been accompanied by a decline in the percentage requiring investigation (86% required further investigation in 2000, as compared to 79% in 2005), recent evidence suggests that only 20% of avoidable child deaths in New Zealand are known to CYF [167]. In addition, while the new Police referral system (which refers children as a result of family violence (POL400) attendances) appears to be uncovering softer concerns, the uptake of the system is variable across the country and in many cases the system has served to identify new concerns of a similar level of severity to previous notifications [167]. As a consequence, while a large proportion of the increase in CYF notifications in recent years may have been due to changes within the system itself [167], it is likely that many of the victims of child abuse who present to health care settings in NZ each year remain undetected and that further effort is required to ensure that the health and safety needs of these children are met [168]. In this context, the recently released Family Violence Intervention Guidelines recommend taking a thorough history for child abuse from high risk groups, the provision of emotional support for victims and the following of risk assessment, safety planning and referral pathways in clinical practice [168].

Data Source and Methods

Definition
The number of notifications about children and young people recorded by Child, Youth and Family (CYF)

Data Source
Numerator: Notifications recorded by CYF
Denominator: Not applicable (see notes below)

Indicator Category
Proxy C (**Table 133**, **Table 134**)

Notes on Interpretation
The number of notifications and further assessments required does not represent the number of distinct clients, as some clients had multiple notifications and assessments during the year. Similarly, the total number of assessment findings does not represent the number of client investigations, as some clients had multiple investigation records during the year. In addition, as some clients have more than one type of finding during an investigation, they may appear across several categories depending on the type of finding. Finally the number of assessments in a year does not directly relate to the number of notifications or further assessments, as there is a time lag between a further assessment being required and the investigation being completed. As a consequence, the figures presented in this section may overestimate the number of children referred to CYF, or the total number found to have experienced abuse in any given year.

NZ Distribution and Trends

Notifications and Numbers Requiring Further Investigation

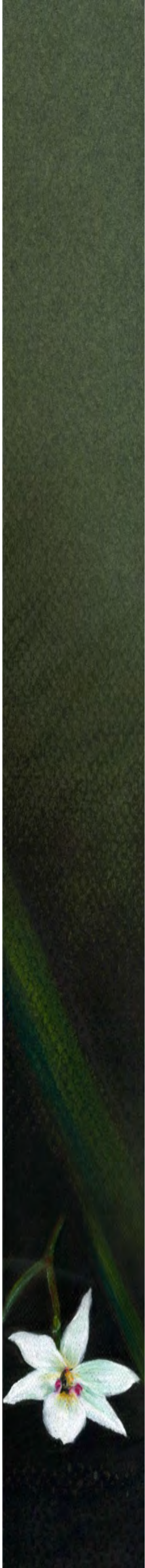
During 2006 there were a total of 68,681 notifications recorded by CYF Offices, with 65.6% of these being thought to require further investigation. While these figures reflect a progressive increase in notifications since 2001, when 28,012 notifications were recorded, the proportion requiring further investigation declined during this period (86.9% required further investigation in 2001). Nevertheless, in absolute terms the number of notifications requiring further investigation increased, from 24,335 in 2001 to 45,041 in 2006 (**Table 68**). In interpreting these figures, it must be born in mind that a single child may have been the subject of multiple notifications and that there were also significant changes to the notification system during this period.

Table 68. Number of Notifications recorded by Child Youth and Family, New Zealand 2001-2006

Year	Notifications	Number Requiring Further Action	Percentage Requiring Further Action (%)
2001	28,012	24,335	86.9
2002	31,784	27,171	85.5
2003	39,008	32,856	84.2
2004	49,585	40,711	82.1
2005	59,313	46,706	78.7
2006	68,681	45,041	65.6

Assessment Findings for Cases Requiring Further Investigation

Of those notifications which were investigated further during 2001-2006, a large proportion resulted in no abuse being found, with the numbers in this category increasing progressively as the period progressed. Where abuse was found however, emotional abuse, neglect and behavioural / relationship difficulties were particularly prominent, followed by physical abuse (**Table 69**). Because of the nature of the



reporting system however, and the fact that a single case may appear in a number of different categories, it is difficult to determine from these figures what proportion of cases related predominantly to a particular type of abuse (e.g. physical, emotional, sexual).

Table 69. Outcome of Assessment for Children Notified to Child Youth and Family, New Zealand 2001-2006

Year	Emotional Abuse	Physical Abuse	Sexual Abuse	Neglect	Behavioural / Relationship Difficulties	Self Harm / Suicidal	Abuse Not Found
2001	1,987	1,912	1,144	2,838	3,427	88	15,572
2002	2,115	1,967	1,228	2,980	3,406	100	13,974
2003	2,346	1,895	1,228	2,862	3,193	95	15,024
2004	3,806	2,331	1,405	3,820	4,278	180	21,515
2005	5,691	2,370	1,306	4,459	4,661	157	24,916
2006	11,146	2,698	1,323	5,949	5,591	167	26,328

Summary

During the 1990s New Zealand ranked 3rd highest amongst rich nations for its child maltreatment death rates. Between 1996 and 2000, 49 children under the age of 15 years died as a result of maltreatment, with the highest rates being amongst those <5 years of age. In New Zealand, the agency with the statutory responsibility for protecting children from recurrent abuse is Child Youth and Family (CYF), who receive notifications from a variety of sources including the police, the education and health sectors, families / whanau and the general public. Since 2001, notifications recorded by CYF have doubled and while it is often assumed that this reflects an increase in the rate of child abuse, recent research suggests that changes in the behaviour of the child protection system itself may also have played a role. During 2006, there were 68,681 notifications recorded by CYF, with 65.6% requiring further investigation. While these figures reflect a progressive increase since 2001, when 28,012 notifications were recorded, the proportion requiring further investigation has declined. Nevertheless, the absolute number of notifications requiring further investigation has increased, from 24,335 in 2001 to 45,041 in 2006. Of the notifications investigated further during 2001-2006, a large proportion resulted in no abuse being found, with the numbers in this category increasing as the period progressed. Nevertheless, recent evidence would suggest that only 20% of avoidable child deaths in New Zealand are known to CYF and it is likely that many of the victims of child abuse presenting to health care settings in New Zealand each year remain undetected. Further effort is thus required to ensure that the health and safety needs of these children are met.

Family Violence

Introduction

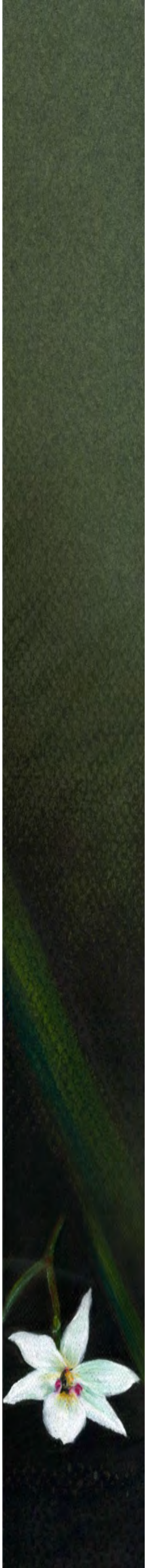
Te Rito: The NZ Family Violence Prevention Strategy [169] defines family violence as:

"*a broad range of controlling behaviours commonly of a physical, sexual and / or psychological nature which typically involve fear, intimidation and emotional deprivation. It occurs within close interpersonal relationships*"

Research has shown that witnessing family violence can have significant and long term impacts on children [170]. The Dunedin Longitudinal Study, in following a cohort of 980 children to 26 years noted that 24% reported violence or threats of violence directed from one parent to another and of these, 6% reported threats, 9% reported 1-4 incidents of physical violence and 10% reported ≥5 incidents. Regardless of who carried out the violence, 64% of young people witnessing family violence described themselves as being upset "a lot" or "extremely" and a further 23% reported being "a bit" upset [171]. Similarly, the Christchurch Longitudinal Study followed a cohort of 1,265 children to 18 years and noted that ~38% reported exposure to interparental violence, with violence varying from verbal assaults (35%) to more infrequent physical attacks (slap, hit or punch partner 6%). After adjusting for known confounders, exposure to interparental violence was associated with an increased risk of anxiety, conduct disorder and property crime (father initiated violence) and alcohol abuse / dependence (mother initiated violence) [172].

In terms of the determinants of family violence, the Christchurch Longitudinal Study noted that violence was initiated with equal frequency by mothers and fathers [172]. In contrast, the Dunedin Longitudinal Study noted that 55% of violence was by fathers only, 28% was by both partners and 16% was by mothers only [171]. Other estimates suggest that between 15-35% of women are hit or forced to have sex by their partners at least once in their lifetime, while only 7% of men report a similar type of abuse [168]. Exposure to interparental violence has also been found to be higher amongst those living in difficult socioeconomic circumstances, both in New Zealand [173] and overseas [174], with the Christchurch Longitudinal Study reporting that family violence was 2.8 times higher if a child's mother was <20 yrs at their birth, was 2.4 times higher if a child's mother was without formal qualifications and was 3.1 times higher if the family was in the lowest quartile for living standards [173]. Potential pathways for these associations include higher levels of stress and financial constraints that mitigate against leaving unsatisfactory relationships [174].

In developing regional responses, identifying children exposed to family violence needs to be given a high priority, not only because of the long term effects such exposures have on children's psychological wellbeing, but also because of the potential overlaps between the occurrence of child abuse and partner abuse in families. While the actual figures are the subject of debate [175] [176], some estimates suggest that up to 30-60% of families who report one type of abuse, also experience the other type of abuse, with the likelihood of child abuse increasing with increasing partner abuse [168]. In this context, the recently released Family Violence Intervention Guidelines, which integrate child and partner abuse strategies into a single document, suggest some starting points at the service delivery level including screening all females ≥16 years, or those with signs and symptoms of abuse using a validated screening tool, supporting and empowering those identified as being the victims of abuse and following appropriate risk assessment, safety planning and referral pathways in clinical settings [168]. Similar guidelines for children are outlined in the CYF Notifications section of this Report.



In an attempt to highlight the extent to which family violence is an issue for children and young people in New Zealand the following section reviews Police POL400 attendances at family violence incidents. While it has been suggested that the Police are only involved in ~10% of the family violence incidents occurring in New Zealand each year [168] and that trend data may be sensitive to changes in the way in which the Police recognise and record family violence incidents (see Methods Section), it is nevertheless hoped that these figures will provide some insights into the context within which family violence is occurring, as well as to identify the "tip of the iceberg" in terms prevalence.

Data Source and Methods

Definition

Police attendance at family violence incidents, as recorded by the Police POL400 Form

Police policy defines family violence as "violence which is physical, emotional, psychological and sexual and includes intimidation or threats of violence". The term "family" includes parents, children, extended family members, whanau, or any other person involved in a relationship (e.g. partners, caregivers, boarders and flatmates), but does not include neighbours. The POL400 form is used whether or not an arrest is made, to report all Family Violence Offences, incidents and breaches of domestic protection orders. The nature of the incidents reported can vary from no offence being recorded, to the most serious forms of violence. Not all police attendances at this type of incident lead to charges being laid and situations can be resolved in a number of different ways.

Data Source

Numerator: Police (POL400) attendances at family violence incidents

Indicator Category

Proxy C (**Table 133**, **Table 134**)

Notes on Interpretation

The information contained in this section relates to all Police POL400 attendances, irrespective of whether a child was present. In addition, the information relates to the total number of POL400 attendances rather than the number of families involved i.e. each separate attendance at a family violence incident results in a new POL400 record, making it possible for a single household to generate multiple POL400 attendances during the same year. In addition, as Police have increasingly focused on domestic violence over recent years, it is likely that more offences have been recognised and recorded as being domestic violence related than in earlier years. Additionally, the Police replaced their crime recording IT system in 2005 which made it easier for staff to record an offence as being domestic violence related. The combined effect of these changes is that they are likely to produce increases in recorded domestic violence over time, with a particularly steep increase in mid-2005. As a result, Police statistics for recorded domestic violence cannot be used to make inferences about trends in the underlying incidence of domestic violence over time.

New Zealand Distribution and Trends

Presence of Children

Of the 61,743 family violence attendances in New Zealand during 2006 in which this information was recorded, children were present at 51.5% (**Table 70**).

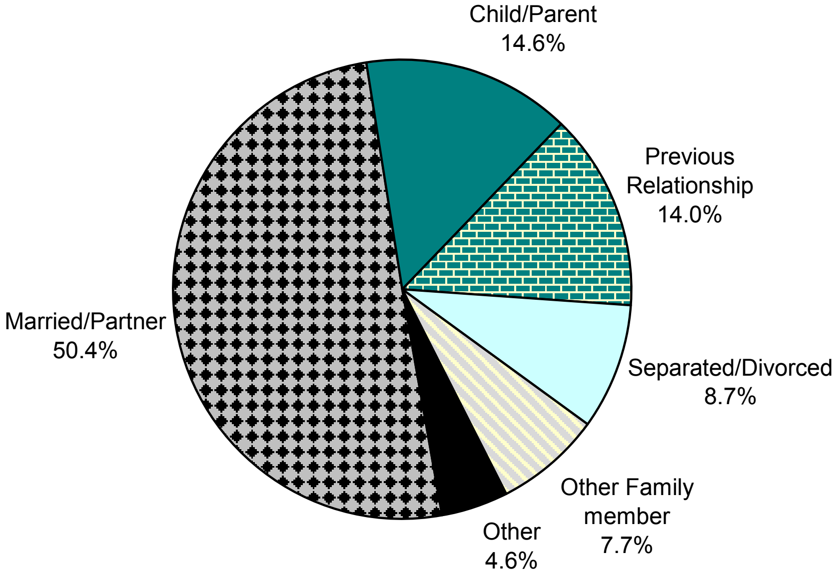
Table 70. Police (POL400) Attendances at Family Violence Incidents, New Zealand 2006

	Number of POL400 Attendances	% POL400 Attendances
Children Present	31,769	51.5
Children Not Present	29,974	48.5
Total	61,743	100.0

Relationship between Victim and Offender

Of the 39,770 family violence attendances in which the relationship between the victim and the offender was recorded during 2006, in 50.4% of cases the victim was the spouse / partner of the offender, with a further 22.7% having been in a previous relationship (separated / divorced / past relationship) and in 14.6% of cases, the conflict was between a parent and child (**Figure 111**).

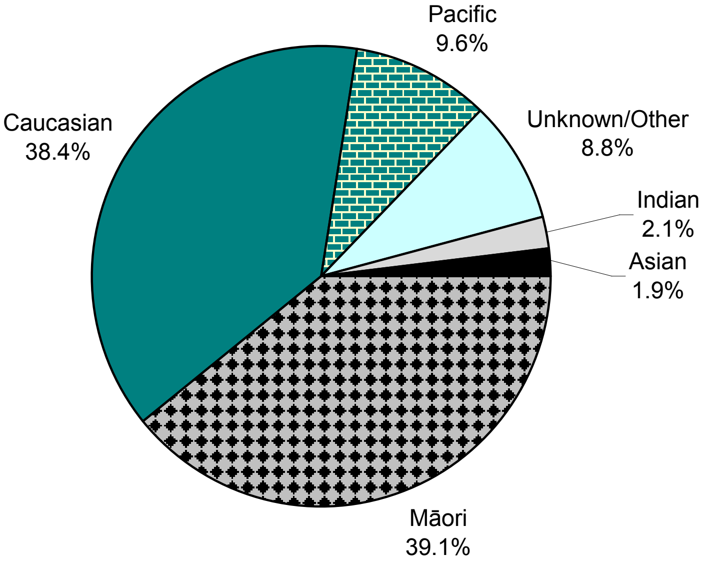
Figure 111. Relationship between the Victim and Offender at Police Attendances for Family Violence Incidents, New Zealand 2006



Ethnicity of Victim

Of the 40,907 family violence attendances during 2006 where the ethnicity of the victim was recorded, 39.1% of victims were Māori, 38.4% were Caucasian, 9.6% were Pacific, 1.9% were Asian and 2.1% were Indian respectively (**Figure 112**).

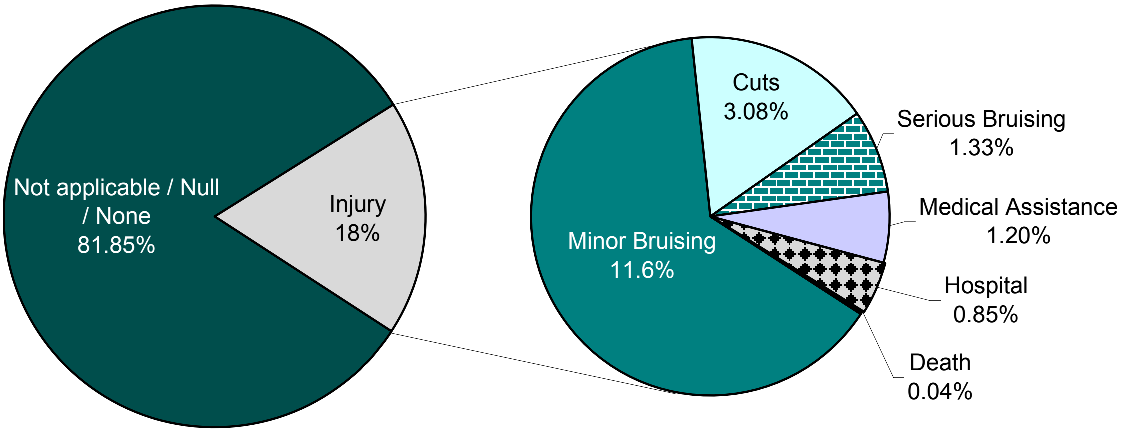
Figure 112. Ethnicity of the Victim at Police Attendances for Family Violence Incidents, New Zealand 2006



Injuries Reported at Family Violence Attendances

Of the 61,741 family violence attendances during 2006 for which this information was recorded, in 81.9% of cases injuries were not reported. While the most common injuries were minor bruising (11.6%), cuts (3.1%) and serious bruising (1.3%), in 526 cases (0.85%) a hospital attendance was required and in 23 cases (0.04%) the incident resulted in a death (**Figure 113**).

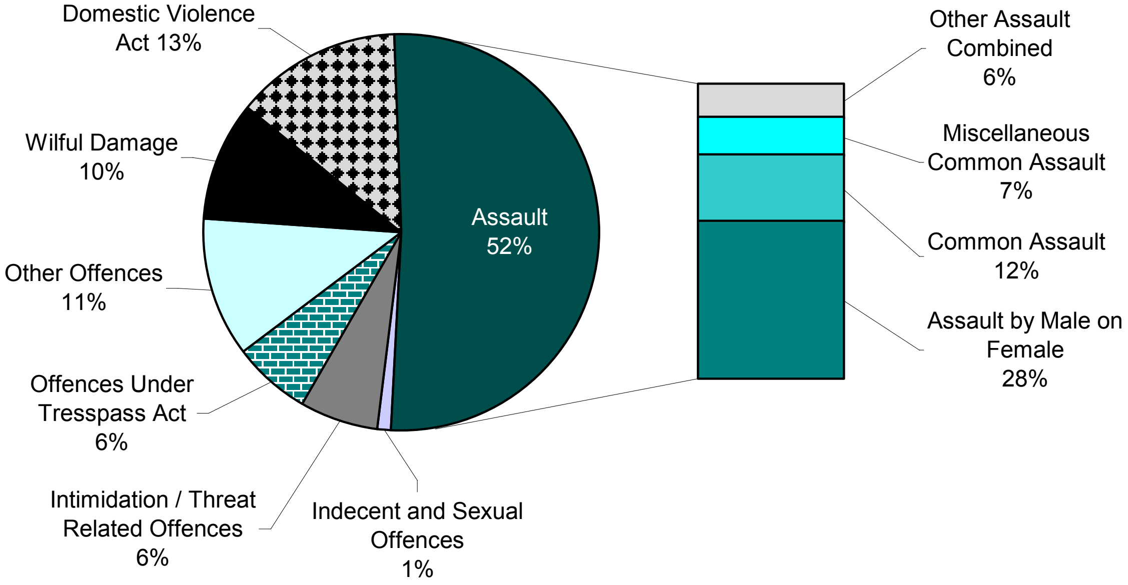
Figure 113. Police Attendances for Family Violence Incidents where Injuries were Reported by Injury Type, New Zealand 2006



Attendances Where an Offence was Disclosed

Police attendances at family violence incidents during 2006 resulted in a total of 24,820 offences being disclosed. While not all family violence attendances resulted in the disclosure of an offence and some attendances resulted in more than one offence, the nature of offences disclosed during this period gives some indication of the types of incidents occurring. Overall, 52% of the offences disclosed during 2005 related to assaults, with “assault by male on female” being the most common in this category (28% of all offences). In addition 13% of offences related to the Domestic Violence Act and a further 6% related to threats or intimidation (**Figure 114**).

Figure 114. Police Attendances for Family Violence Incidents where an Offence was Disclosed by Offence Type, New Zealand 2006



Family Violence Attendances by Police Area
Table 71 summarises the number of police attendances a family violence incidents by Police area for the period 1995-2006. While it is difficult to comment on trends in family violence during this period, these figures nevertheless suggest that family violence is an issue for a significant minority of New Zealand children and young people.

Summary

For children, exposure to family violence is of particular concern, not only because of the long term consequences such exposures have for their psychological wellbeing, but also because of the potential overlaps between the occurrence of child abuse and partner abuse in families. In New Zealand during 2006, children were present at 51.5% of the family violence incidents attended by Police. In 50% of cases, the victim was the spouse / partner of the offender, with a further 23% having been in a previous relationship and in 15% of cases the conflict was between a parent and child. Overall, 39% of victims were Māori, 38% were Caucasian, 10% were Pacific and 2% were Asian and Indian respectively. While in 82% of cases injuries were not reported, in 526 cases (0.85%) a hospital attendance was required and in 23 cases (0.04%) the incident resulted in a death. While it is difficult to use Police data to comment on trends in the prevalence of family violence due to changes in the way in which the Police have recognised and recorded family violence over time, what Police data does suggest is that a large number of family violence incidents are occurring in New Zealand each year and that children are likely to be present at a large proportion of these.

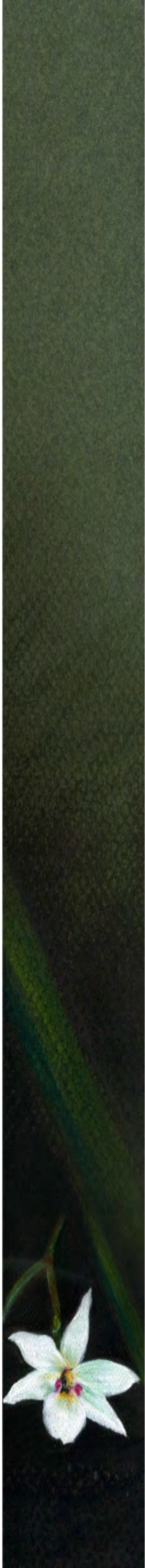
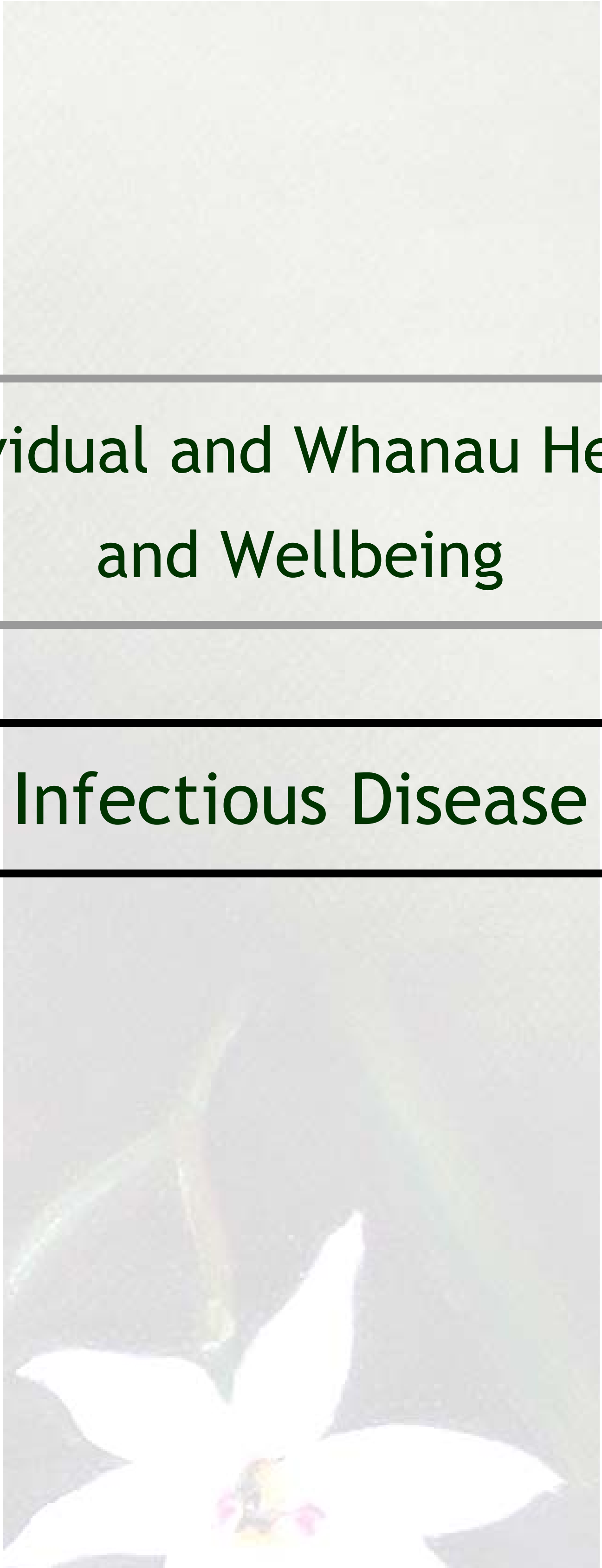


Table 71. Police Attendances at Family Violence Incidents by Police Area and Year, New Zealand 1995-2006

Police Area	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Auckland City Central Area	372	292	297	305	415	619	695	713	654	657	770	955
Auckland City Eastern Area	1,210	1,176	1,030	1,020	1,283	1,342	1,715	1,498	1,579	1,594	2,110	1,762
Auckland City Western Area	1,245	1,206	949	1,017	1,254	1,327	1,886	1,676	1,623	1,562	1,679	1,638
Auckland Motorways	<5	0	0	<5	0	5	5	11	13	25	16	25
Christchurch Central	1,202	1,217	973	1,362	1,646	1,594	1,664	1,721	1,772	1,753	1,807	1,998
Counties Manukau Central	503	634	797	878	1,090	1,413	1,640	1,836	1,837	1,980	2,959	2,816
Counties Manukau East	911	932	1,094	569	656	897	1,143	1,232	1,103	1,362	1,865	2,394
Counties Manukau South	946	1,015	1,057	853	884	1,108	1,242	1,407	1,444	1,574	2,293	2,452
Counties Manukau West	1,489	1,831	1,706	1,162	1,371	1,754	1,959	1,982	2,139	2,432	3,187	3,112
Dunedin	543	656	643	776	743	761	715	833	887	1,070	1,207	1,395
Eastern Bay of Plenty	274	317	298	382	376	465	474	572	574	568	630	668
Far North	256	250	226	265	315	330	471	539	566	600	750	860
Gisborne	700	638	651	783	759	784	841	957	924	935	1,194	1,494
Hamilton City	1,096	1,213	1,163	1,329	1,531	1,748	1,814	1,695	1,772	1,716	2,728	3,446
Hastings	900	832	877	986	853	982	1,098	1,108	1,105	1,200	1,284	1,522
Kapiti-Mana	666	663	734	713	787	973	1,020	1,007	823	1,066	1,602	1,894
Lower Hutt	918	885	801	979	1,009	1,224	1,273	1,203	1,325	1,365	1,544	1,638
Marlborough	162	194	191	265	254	210	235	243	320	342	394	422
Mid South Canterbury	369	527	530	659	585	589	573	617	673	644	774	824
Napier	626	662	634	741	646	626	826	858	829	865	1,076	1,206
Nelson Bays	367	445	422	524	538	546	459	545	654	796	861	936
New Plymouth	553	560	654	633	644	595	713	724	743	650	944	1,018
Northern Canterbury	1,311	1,608	1,752	1,992	1,854	1,992	2,070	2,163	2,286	2,318	2,738	2,991
North Shore	776	1,059	959	962	1,198	1,433	1,634	1,623	1,638	1,708	1,790	1,922
Not Specified (area)	560	440	1,357	2,629	2,168	2,210	1,607	1,546	1,661	1,199	89	0
Otago Rural	158	157	142	148	178	177	186	212	242	344	358	388
Palmerston North City	658	791	859	744	699	709	728	756	736	804	949	1,100

Police Area	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Palmerston North Rural	648	704	672	714	635	752	701	676	765	752	908	1,112
Rodney	145	161	165	343	447	421	491	532	663	831	863	994
Rotorua	503	556	681	730	641	835	835	1,093	1,205	1,106	1,220	1,308
Ruapehu	180	196	206	190	224	221	245	232	216	221	312	376
Southern Canterbury	823	952	1,214	1,245	1,132	1,228	1,300	1,293	1,207	1,434	1,582	1,724
Southland	549	637	731	865	797	805	897	1,016	899	914	1,035	1,201
Taranaki Rural	255	272	263	314	259	273	242	245	279	245	262	279
Taupo	357	397	468	542	545	515	527	603	755	841	864	998
Upper Hutt	290	301	246	253	270	323	377	398	424	428	543	571
Waikato East	277	312	314	336	316	387	376	432	491	556	700	866
Waikato West	515	543	586	583	629	670	707	768	901	943	1,105	1,190
Wairarapa	198	215	270	363	382	393	410	441	467	513	586	674
Waitakere	1,562	1,650	1,673	1,531	1,862	2,140	2,504	2,862	3,225	3,174	3,584	3,493
Whanganui	388	720	865	899	904	793	907	1,102	1,138	1,129	1,029	1,148
Wellington	580	751	587	478	601	693	925	977	1,018	1,122	1,388	1,559
West Coast	111	159	173	143	131	128	182	191	219	246	281	261
Western Bay of Plenty	493	647	827	856	819	884	1,059	1,075	1,245	1,352	1,534	1,846
Whangarei	542	497	442	545	747	823	821	836	1,035	1,026	1,171	1,240
New Zealand Total	27,188	29,870	31,179	33,607	35,077	38,697	42,192	44,049	46,074	47,962	56,565	61,716



Individual and Whanau Health and Wellbeing

Infectious Disease

Serious Bacterial Infections

Introduction

A recent review of infectious disease control in New Zealand suggested that while well organised government-run infectious disease programmes had eliminated several zoonoses in the past (e.g. *Brucella abortis*, hydatids), more recently infectious disease control had been mixed. Rates for many conditions associated with poverty and overcrowding, such as rheumatic fever, tuberculosis and meningococcal disease are high by international standards and marked ethnic disparities remain, with rates for many of these conditions being higher for Māori and Pacific children and young people [177]. While a number of the infectious diseases of relevance to New Zealand children and young people are explored in the sections which follow, this section considers serious bacterial infections collectively, in order to provide a broad overview of the impact these infections have on the health of children and young people in this country.

Data Source and Methods

Definition

Hospital Admissions and Deaths due to Serious Bacterial Infections in those aged 0-24 years

Data Source

Admissions Numerator: National Minimum Dataset: Hospital admissions of children and young people (0-24 years) with a primary diagnosis of Meningococcal Disease (ICD-9 036; ICD-10 A39), Acute Rheumatic Fever or Rheumatic Heart Disease (ICD-9 390-398, ICD-10 I00-I02, I05-I09), Tuberculosis (ICD-9 010-018, ICD-10 A15-A19), Skin Infections (ICD-9 680-686, ICD-10 L00-L08), Bacterial or Unspecified Meningitis (ICD-9 320, 322, ICD-10 G00-G01, G039), Septic Arthritis (ICD-9 7110, 7119, ICD-10 M00-M01), Osteomyelitis (ICD-9 730, ICD-10 M86) or Mastoiditis (ICD-9 383, ICD-10 H70)

Deaths Numerator: National Mortality Collection: Deaths in children and young people (0-24 years) with serious bacterial infections as coded above

Denominator: NZ Census

Indicator Category (Table 133, Table 134)

Admissions: Proxy B; Mortality: Ideal B

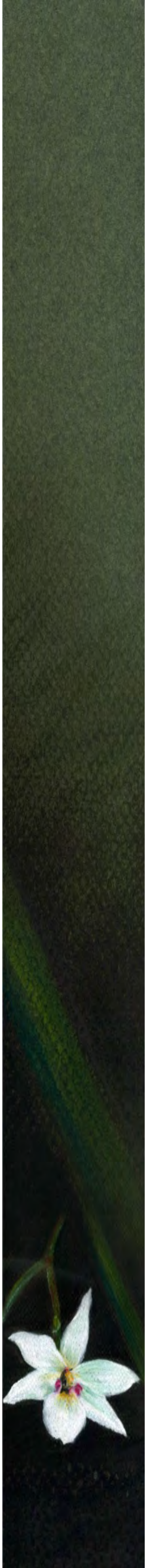
Notes on Interpretation

The limitations of the National Minimum Dataset are discussed at length in Appendix 1. The reader is urged to review this Appendix before interpreting any trends based on hospital admission data.

New Zealand Distribution and Trends

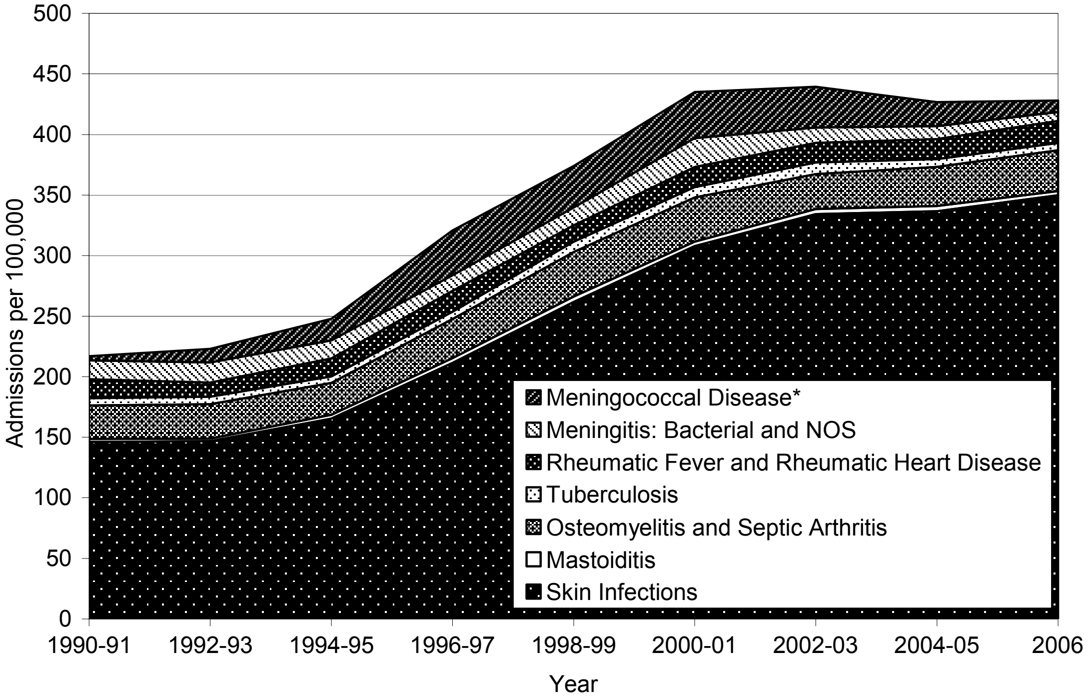
In New Zealand during 1990-2006, there were large increases in the number of children and young people admitted to hospital with serious bacterial infections. In absolute terms, the majority of these increases were attributable to the large rise in admissions for serious skin infections. Admissions for all other serious bacterial infections either remained static or increased, with the exception of meningococcal disease and meningitis, which both exhibited a downward trend during the early-mid 2000s (**Figure 115**). During 2002-2006, the most common reason for admission was skin infection, accounting for 78.8% of admissions in this category. However, meningococcal disease accounted for 68.7% of deaths during 2000-2004 (**Table 72**).

During 2002-2006, admission rates for serious bacterial infections varied considerably with age, with admissions for meningitis being highest <1 year, admissions for osteomyelitis being more common during the childhood years and admissions for septic arthritis and mastoiditis being more common <5 years of age (**Figure 116**). During 1996-2006, hospital admissions were also consistently higher amongst Pacific > Māori > European > Asian / Indian children and young people (**Figure 117**), while during 2002-2006 admissions for serious bacterial infections were also higher amongst males and those living in the most deprived NZDep areas (**Table 73**). In addition there



were marked regional variations, with admission rates ranging from 152.2 to 684.7 per 100,000 depending on the region studied (**Table 74**).

Figure 115. Hospital Admissions for Serious Bacterial Infections in Children and Young People 0-24 Years, New Zealand 1990-2006



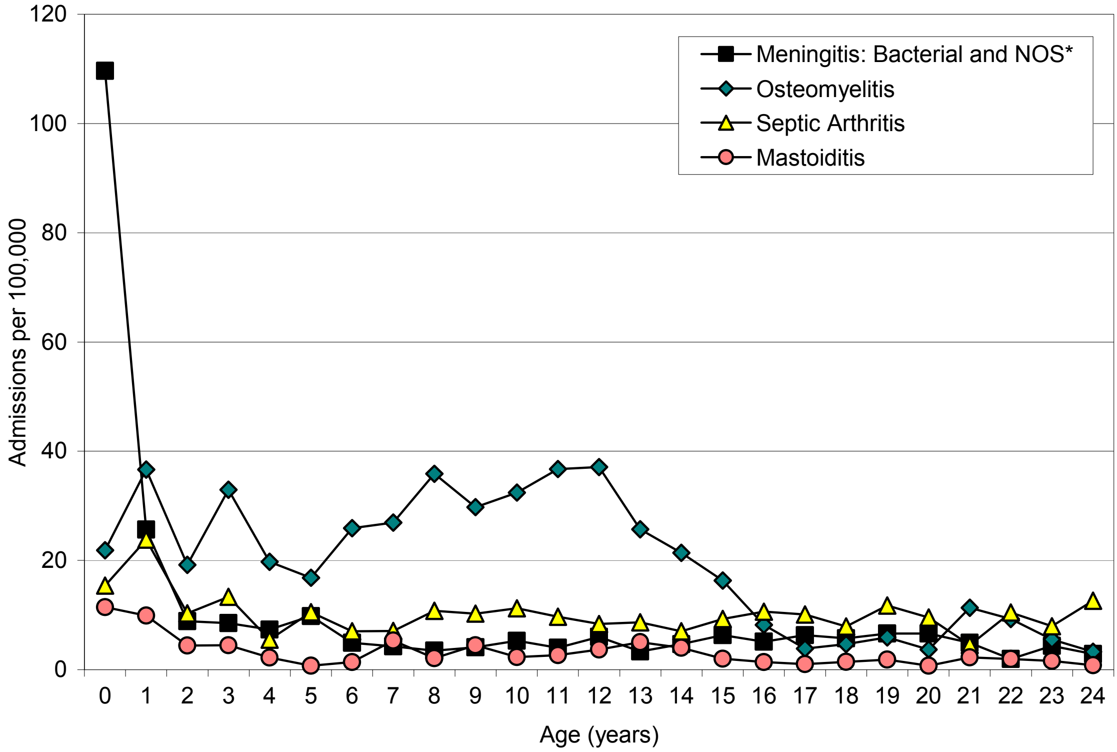
Note: *Meningococcal Disease also includes Meningococcal Meningitis

Table 72. Hospital Admissions and Mortality from Serious Bacterial Infections in Children and Young People 0-24 Years, New Zealand 2002-2006 (Admissions), 2000-2004 (Deaths)

Diagnosis	Number: Total	Number: Annual Average	Rate per 100,000	% of Total
Hospital Admissions (2002-2006)				
Skin Sepsis	23,733	4,746.6	338.0	78.8
Meningococcal Disease*	1,624	324.8	23.1	5.4
Osteomyelitis	1,403	280.6	20.0	4.7
Acute Rheumatic Fever	864	172.8	12.3	2.9
Septic Arthritis	711	142.2	10.1	2.4
Tuberculosis	534	106.8	7.6	1.8
Bacterial Meningitis*	404	80.8	5.8	1.3
Meningitis NOS	325	65.0	4.6	1.1
Rheumatic Heart Disease	301	60.2	4.3	1.0
Mastoiditis	223	44.6	3.2	0.7
Total	30,122	6,024.4	429.0	100.0
Mortality (2000-2004)				
Meningococcal Disease*	57	11.4	0.8	68.7
Meningitis: Bacterial and NOS*	16	3.2	0.2	19.3
Rheumatic Fever/Heart Disease	7	1.4	0.1	8.4
Other Bacterial Infections*	<5	s	s	s
Total	83	16.6	1.2	100.0

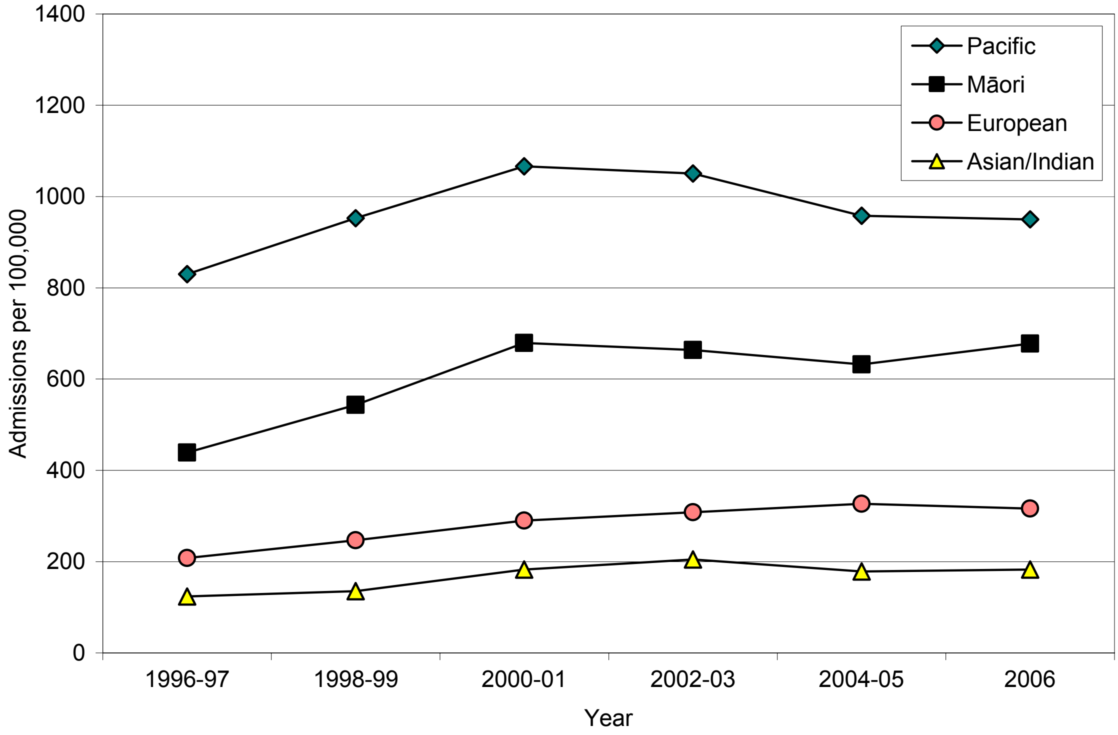
Note: *Meningococcal Disease includes Meningococcal Meningitis; Other Bacterial Infections includes Osteomyelitis, Septic Arthritis, and Tuberculosis.

Figure 116. Hospital Admissions for Selected Serious Bacterial Infections in Children and Young People 0-24 Years by Age, New Zealand 2002-2006



Note: Meningococcal Meningitis is included in Meningococcal Disease rather than in Bacterial Meningitis; For an analysis of Meningococcal Disease, Rheumatic Fever, Serious Skin Infection and Tuberculosis admissions by age, see relevant sections.

Figure 117. Hospital Admissions for Serious Bacterial Infections in Children and Young People 0-24 Years by Ethnicity, New Zealand 1996-2006



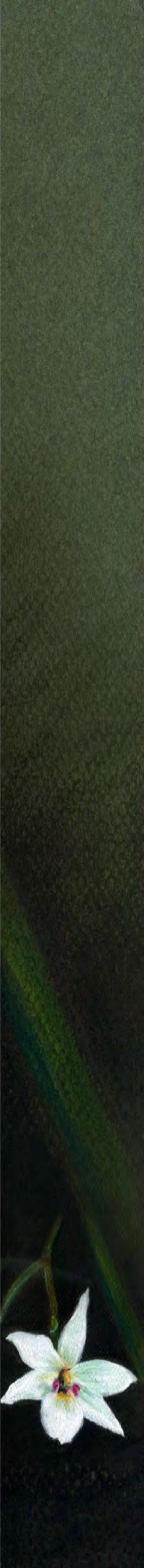


Table 73. Risk Factors for Hospital Admissions due to Serious Bacterial Infections in Children and Young People 0-24 Years, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	204.25	1.00		1-2	217.22	1.00	
2	230.38	1.13	1.05-1.22	3-4	285.85	1.32	1.26-1.39
3	255.60	1.25	1.16-1.34	5-6	343.56	1.58	1.51-1.66
4	316.68	1.55	1.45-1.66	7-8	475.57	2.19	2.10-2.29
5	303.14	1.48	1.38-1.59	9-10	723.86	3.33	3.20-3.47
6	383.11	1.88	1.76-2.01	Ethnicity			
7	412.61	2.02	1.89-2.15	Māori	651.67	2.08	2.03-2.14
8	535.46	2.62	2.46-2.79	Pacific	988.91	3.15	3.05-3.25
9	636.75	3.12	2.94-3.31	European	313.83	1.00	
10	802.39	3.93	3.71-4.16	Asian/Indian	188.97	0.60	0.57-0.64
Gender							
Female	360.69	1.00					
Male	494.94	1.37	1.34-1.40				

Note: Rate per 100,000 per year; RR: Rate Ratios are unadjusted.

Table 74. Hospital Admissions for Serious Bacterial Infections in Children and Young People 0-24 Years by DHB, New Zealand 2002-2006

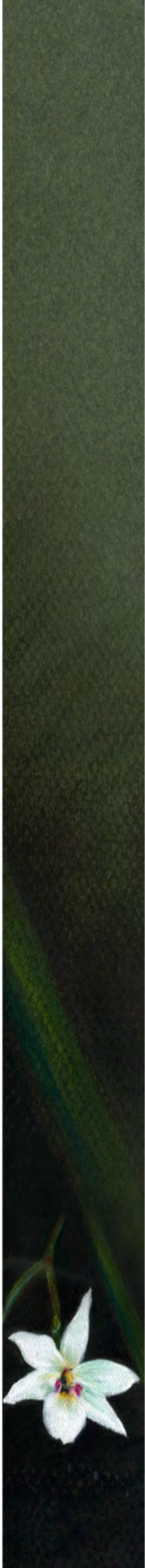
DHB	Number: Total 2002-2006	Number: Annual Average	Rate per 100,000	% of NZ Admissions
Northland	1,615	323.0	628.4	5.4
Waitemata	3,813	762.6	461.7	12.7
Auckland	3,410	682.0	496.2	11.3
Counties Manukau	5,214	1,042.8	621.4	17.3
Waikato	2,350	470.0	378.0	7.8
Lakes	952	190.4	522.5	3.2
Bay of Plenty	1,749	349.8	540.1	5.8
Tairawhiti	598	119.6	684.7	2.0
Taranaki	589	117.8	325.3	2.0
Hawkes Bay	1,160	232.0	444.1	3.9
Whanganui	579	115.8	520.4	1.9
MidCentral	1,045	209.0	361.0	3.5
Hutt	1,242	248.4	506.1	4.1
Capital and Coast	1,566	313.2	342.5	5.2
Wairarapa	221	44.2	350.8	0.7
Nelson Marlborough	588	117.6	291.6	2.0
West Coast	170	34.0	345.6	0.6
Canterbury	1,743	348.6	227.9	5.8
South Canterbury	125	25.0	152.2	0.4
Otago	762	152.4	243.9	2.5
Southland	457	91.4	256.4	1.5
New Zealand	30,122*	6,024.4	429.0	100.0

Note: *NZ Total includes 174 admissions where DHB was not stated; Rates have not been adjusted for DHB Demography and it is not recommended that they be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)

Summary

While in the past, well organised government-run infectious disease programs have eliminated several zoonoses, more recently infectious disease control in New Zealand has been mixed, with rates for many conditions associated with poverty and overcrowding being high by international standards. In New Zealand during 1990-2006, there were large increases in the number of children and young people admitted to hospital with serious bacterial infections. In absolute terms, the majority of these increases were attributable to the large rise in hospital admissions for serious skin infections which occurred during this period. Admissions for all other serious bacterial infections remained either static or increased, with the exceptions of meningococcal disease and meningitis, which both exhibited a downward trend during the early-mid 2000s.

During 2002-2006, the most common reason for an admission with a serious bacterial infection was for a skin infection, with skin infections accounting for 78.8% of admissions in this category. In contrast, meningococcal disease accounted for 68.7% of deaths during 2000-2004. Admission rates also varied with age, with admissions for meningitis being highest <1 year, admissions for osteomyelitis being more common during the childhood years and admissions for septic arthritis and mastoiditis being more common <5 years of age. Hospital admissions were also higher for Pacific > Māori > European > Asian / Indian children and young people, males and those living in the most deprived areas. In addition there were also marked regional variations, with admission rates ranging from 152.2 to 684.7 per 100,000 depending on the region studied.



Meningococcal Disease

Introduction

Neisseria meningitidis is a non-motile gram-negative diplococcus (bacteria) frequently found in the nose and throat of asymptomatic carriers. Symptoms of invasive disease include fever, headache, drowsiness, irritability, vomiting and a petechial rash. Without appropriate antibiotic treatment, death from septicaemia or meningitis may occur within a relatively short period of time (hours). While meningococcal infections are only moderately communicable, crowded conditions concentrate the number of carriers and may reduce individual resistance to the organism [178].

New Zealand has been in the midst of an epidemic of serogroup B meningococcal disease since mid-1991, with earlier Ministry of Health prevention strategies focusing on epidemiological surveillance, public awareness campaigns, contact tracing and the offering of prophylactic antibiotics. Clinical trails of a tailor-made meningococcal B vaccine began in 2002 and following regulatory approval in July 2004, roll out of the MeNZB Vaccine Campaign occurred across the country (for those 6 months-19 years) during 2004-2005 [179]. While at the time of writing it is too early to fully evaluate the impact of this campaign, as the tables and figures in the section which follow will indicate, it is likely that it has already made a significant impact on the number of cases of invasive meningococcal disease amongst New Zealand children and young people in the past 1-2 years.

Data Source and Methods

Definition

Hospital Admissions and Deaths due to Meningococcal Disease in those aged 0-24 years

Data Source

Admissions Numerator: National Minimum Dataset: Hospital admissions of children and young people (0-24 years) with a primary diagnosis of Meningococcal Disease (ICD-9 036; ICD-10 A39)

Deaths Numerator: National Mortality Collection: Deaths in children and young people (0-24 years) with a clinical code (cause of death) attributed to Meningococcal Disease (ICD-9 036; ICD-10 A39)

Denominator: NZ Census

Indicator Category (Table 133, Table 134)

Admissions: Proxy B; Mortality: Ideal B

Notes on Interpretation

The limitations of the National Minimum Dataset are discussed at length in Appendix 1. The reader is urged to review this Appendix before interpreting any trends based on hospital admission data.

New Zealand Distribution and Trends

During the 1990s New Zealand experienced a large increase in the number of hospital admissions and deaths from meningococcal disease, although numbers have tapered off markedly since 2002-2003 (**Figure 118**). During the past 5 years both admissions and mortality were highest amongst children <5 years of age, although a smaller peak also occurred amongst those in their mid to late teens (**Figure 119**).

During 1996-2006, while hospital admissions for meningococcal disease declined for all ethnic groups, in absolute terms declines were greatest for Pacific children and young people (**Figure 119**). Despite this, during 2002-2006 hospital admissions for meningococcal disease were higher for Pacific and Māori children and young people, males and those in the most deprived areas (**Table 75**).

During 2002-2006 there were also large regional differences in hospital admission rates for meningococcal disease, with rates varying from 6.0 to 43.0 per 100,000 depending on the region studied (**Table 76**).

Figure 118. Hospital Admissions and Deaths due to Meningococcal Disease in Children and Young People 0-24 Years, New Zealand 1990-2006 (Admissions) and 1990-2004 (Deaths)

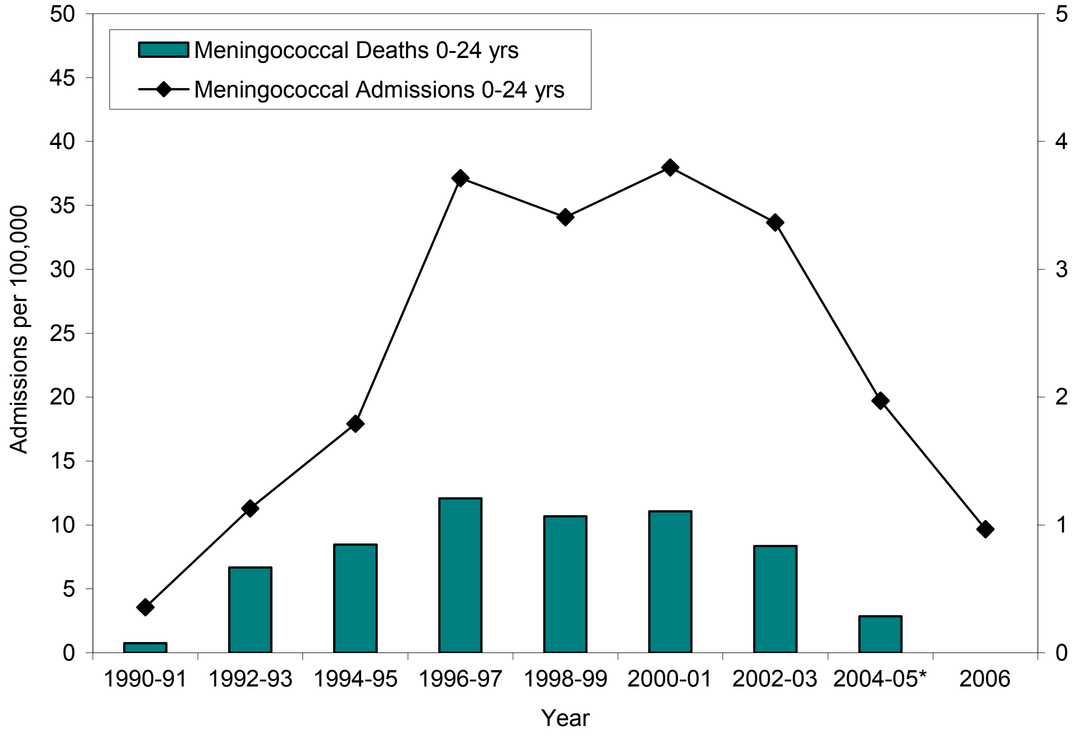


Figure 119. Hospital Admissions and Deaths due to Meningococcal Disease in Children and Young People 0-24 Years by Age, New Zealand 2002-06 (Admissions) and 2000-04 (Deaths)

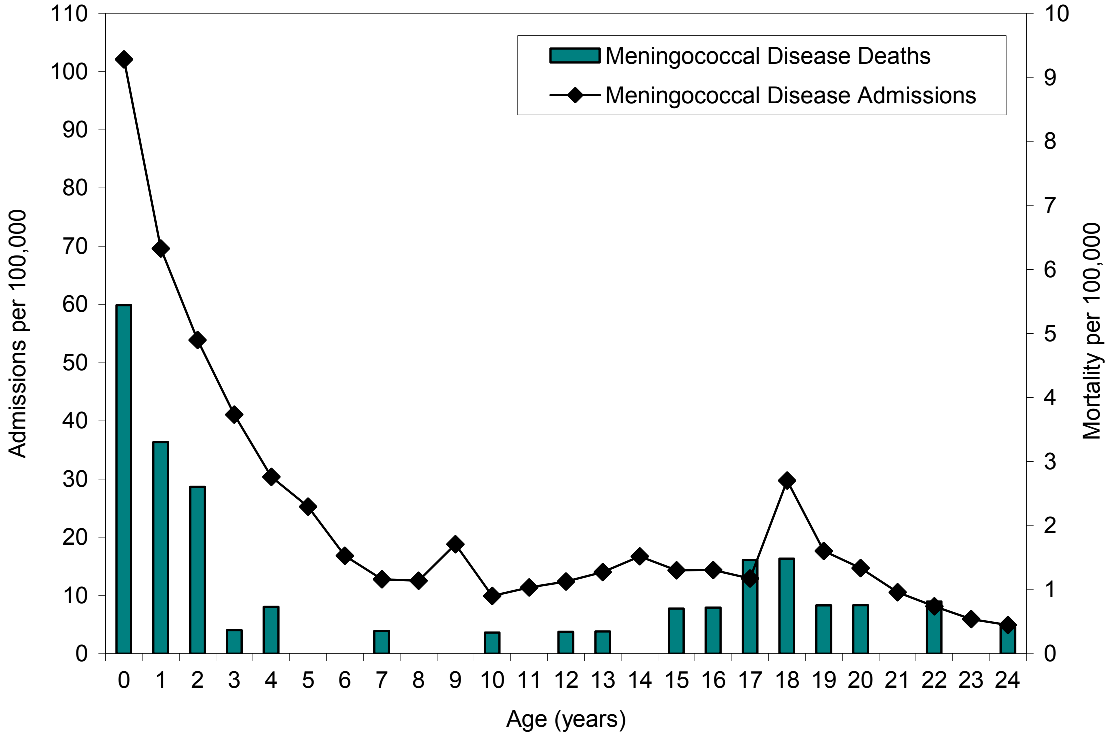


Table 75. Risk Factors for Hospital Admission due to Meningococcal Disease in Children and Young People 0-24 Years, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	10.44	1.00		1-2	9.84	1.00	
2	9.23	0.88	0.62-1.24	3-4	13.38	1.36	1.08-1.71
3	10.30	0.99	0.71-1.38	5-6	15.86	1.61	1.29-2.00
4	16.51	1.58	1.17-2.14	7-8	27.07	2.75	2.25-3.36
5	17.89	1.71	1.27-2.30	9-10	43.09	4.38	3.64-5.28
6	13.88	1.33	0.97-1.81	Ethnicity			
7	23.01	2.21	1.67-2.93	Māori	34.60	2.13	1.90-2.39
8	30.92	2.96	2.26-3.87	Pacific	65.90	4.05	3.56-4.60
9	33.80	3.24	2.49-4.21	European	16.30	1.00	
10	51.46	4.93	3.83-6.34	Asian/Indian	5.00	0.31	0.22-0.44
Gender							
Female	20.60	1.00					
Male	25.50	1.24	1.12-1.37				

Note: Rate per 100,000; RR: Rate Ratios are unadjusted.

Figure 120. Hospital Admissions due to Meningococcal Disease in Children and Young People 0-24 Years by Ethnicity, New Zealand 1996-2006

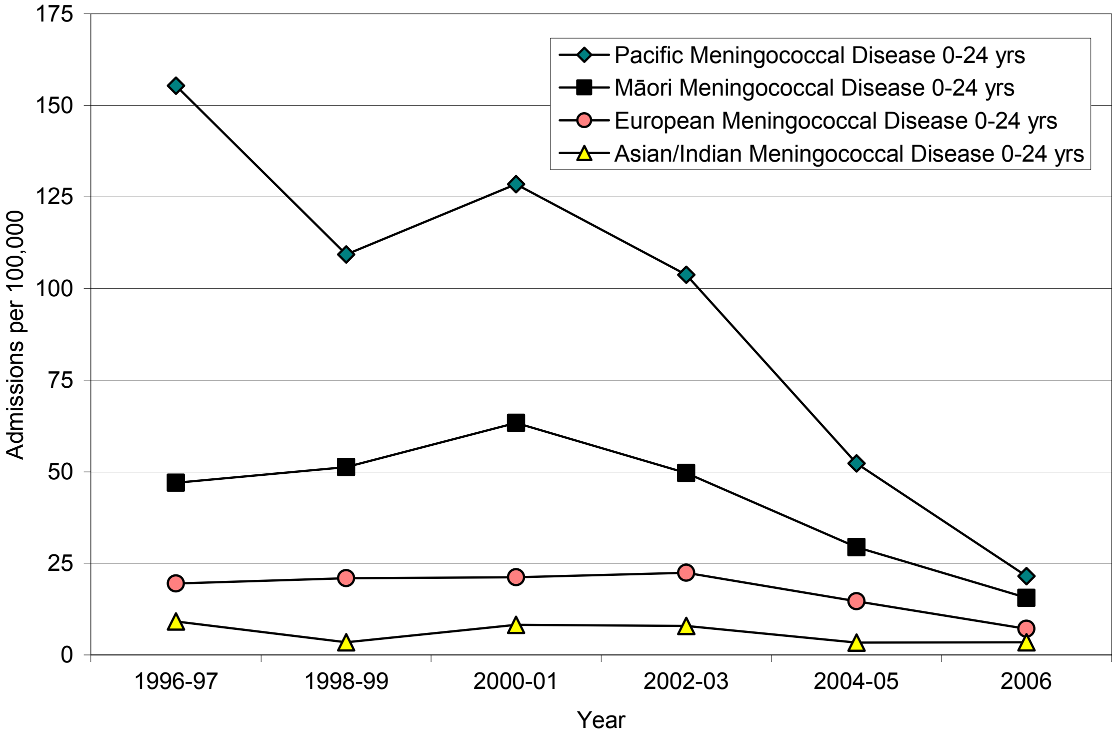


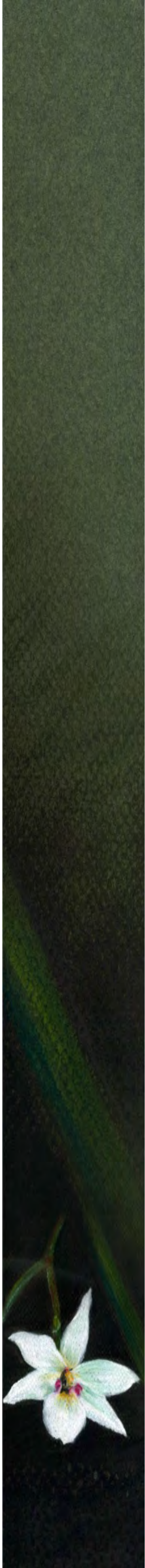
Table 76. Hospital Admissions due to Meningococcal Disease in Children and Young People 0-24 Years by DHB, New Zealand 2002-2006

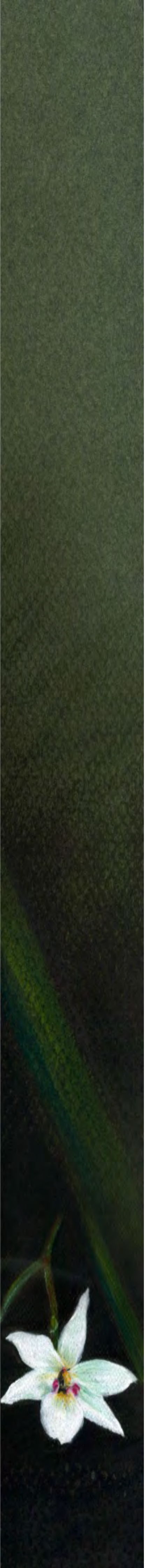
DHB	Number: Total 2002-2006	Number: Annual Average	Rate per 100,000	% of NZ Admissions
Northland	110	22.0	42.8	6.8
Waitemata	148	29.6	17.9	9.1
Auckland	169	33.8	24.6	10.4
Counties Manukau	361	72.2	43.0	22.2
Waikato	124	24.8	19.9	7.6
Lakes	75	15.0	41.2	4.6
Bay of Plenty	64	12.8	19.8	3.9
Tairawhiti	22	4.4	25.2	1.4
Taranaki	29	5.8	16.0	1.8
Hawkes Bay	84	16.8	32.2	5.2
Whanganui	34	6.8	30.6	2.1
MidCentral	55	11.0	19.0	3.4
Hutt	24	4.8	9.8	1.5
Capital and Coast	52	10.4	11.4	3.2
Wairarapa	8	1.6	12.7	0.5
Nelson Marlborough	12	2.4	6.0	0.7
West Coast	17	3.4	34.6	1.0
Canterbury	95	19.0	12.4	5.8
South Canterbury	10	2.0	12.2	0.6
Otago	87	17.4	27.8	5.4
Southland	38	7.6	21.3	2.3
New Zealand	1,624*	324.8	23.1	100.0

Note: *NZ Total includes 6 admissions where DHB was not stated; Rates have not been adjusted for regional demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)

Summary

During the 1990s New Zealand experienced a large increase in the number of hospital admissions and deaths from meningococcal disease, although numbers have tapered off markedly since 2002-2003. During 1996-2006, while hospital admissions for meningococcal disease declined for all ethnic groups, in absolute terms reductions were greatest for Pacific children and young people. Despite this, during 2002-2006 hospital admissions for meningococcal disease were higher for Pacific and Māori children and young people, males and those in the most deprived areas. In addition, admissions and mortality were also higher amongst children <5 years of age, although a smaller peak also occurred amongst those in their mid to late teens. While at the time of writing it is too early to fully evaluate the impact of the MeNZB Campaign, it is likely that it has already made a significant impact on the number of cases of invasive meningococcal disease amongst New Zealand children and young people in the past 1-2 years.





Rheumatic Fever

Introduction

Acute rheumatic fever is a delayed inflammatory reaction which develops in response to an inadequately treated group A streptococcal throat infection. It usually occurs in school-age children and may affect the brain, heart, joints, skin or subcutaneous tissue [178]. Recurrent episodes of rheumatic fever may result in the development of rheumatic heart disease, a progressive condition leading to damage, scarring and deformities of the heart valves and chordae tendineae [178]. While New Zealand’s rheumatic fever rates have declined significantly during the past 30 years, they still remain higher than those of many other developed countries. Risk factors include age (school age children), ethnicity (Pacific>>Māori>>European), socioeconomic disadvantage and overcrowding [180]. Primary prevention focuses on the adequate treatment of streptococcal throat infections, while secondary prevention aims to ensure that those previously diagnosed with rheumatic fever receive monthly antibiotic prophylaxis, either for 10 years from their first diagnosis or until 21 years of age [180].

Data Source and Methods

Definition

Hospital Admissions and Deaths due to Acute Rheumatic Fever and Rheumatic Heart Disease in those aged 0-24 years

Data Source

Admissions Numerator: National Minimum Dataset: Hospital admissions of children and young people (0-24 years) with a primary diagnosis of either acute rheumatic fever (ICD-9 390-392; ICD-10 I00-I02) or rheumatic heart disease (ICD-9 393-398: ICD-10 I05-I09)

Deaths Numerator: National Mortality Collection: Deaths in children and young people (0-24 years) with a clinical code (cause of death) attributed to either acute rheumatic fever (ICD-9 390-392; ICD-10 I00-I02) or rheumatic heart disease (ICD-9 393-398: ICD-10 I05-I09)

Denominator: NZ Census

Indicator Category (Table 133, Table 134)

Admissions: Proxy B

Mortality: Ideal B

Notes on Interpretation

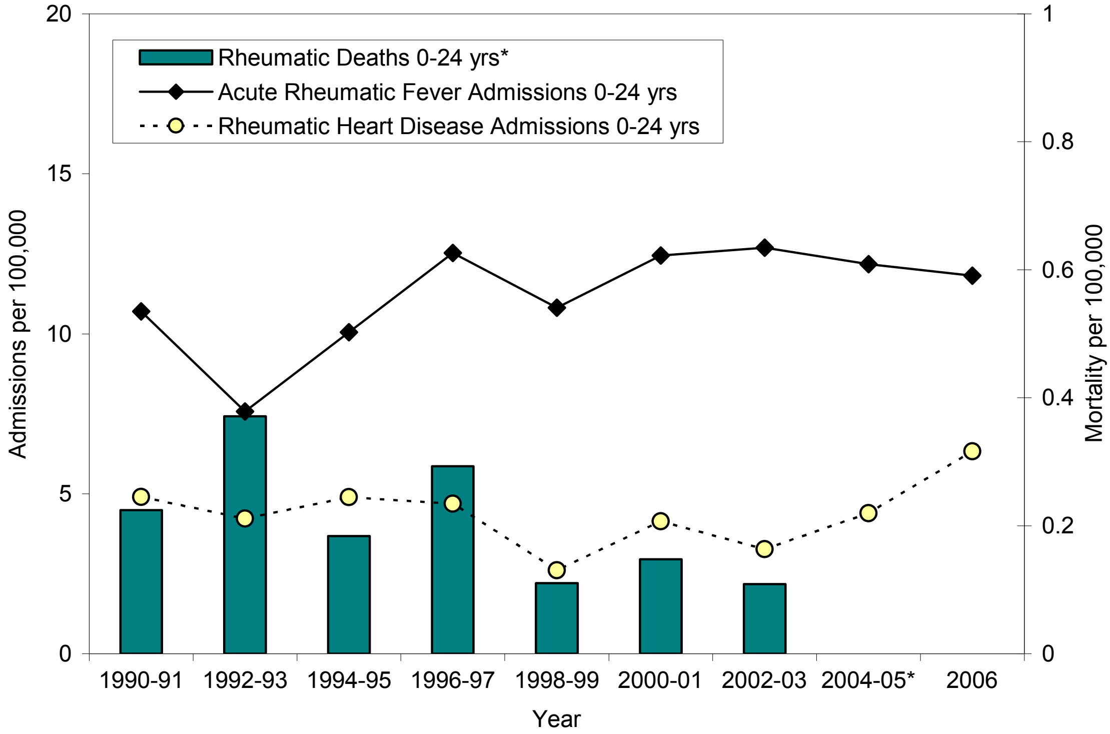
The limitations of the National Minimum Dataset are discussed at length in Appendix 1. The reader is urged to review this Appendix before interpreting any trends based on hospital admission data.

New Zealand Distribution and Trends

Hospital admissions due to acute rheumatic fever and rheumatic heart disease have remained relatively static in New Zealand during the past 10 years, while deaths have averaged 1-3 per year during the same period (**Figure 121**). During 2002-2006, hospital admissions for acute rheumatic fever peaked in late childhood and early adolescence, while admissions for rheumatic heart disease were relatively constant (albeit at a low level) after 5 years of age. In contrast, deaths due to acute rheumatic fever and rheumatic heart disease were most frequent during the teenage years (**Figure 122**). During the same period, admissions for acute rheumatic fever were higher amongst Pacific and Māori children and young people, males and those living in the most deprived areas (**Table 77**).

Analysis of trend data during 1996-2006 again highlight the marked ethnic disparities in hospital admissions for acute rheumatic fever, with rates being higher for Pacific >> Māori >> European and Asian / Indian children and young people throughout this period (**Figure 123**). During 2002-2006 there were also marked regional variations in hospital admissions for acute rheumatic fever, with rates ranging from 0 to 33.1 per 100,000 depending on the region studied (**Table 78**).

Figure 121. Hospital Admissions and Deaths from Acute Rheumatic Fever and Rheumatic Heart Disease in Children and Young People 0-24 Yrs, New Zealand 1990-06 (Admissions) and 1990-04 (Deaths)



Note: Rheumatic Deaths include both Acute Rheumatic Fever and Rheumatic Heart Disease deaths; No deaths occurred in 2004.

Figure 122. Hospital Admissions due to Acute Rheumatic Fever and Rheumatic Heart Disease in Children and Young People 0-24 Years by Age, New Zealand 2002-2006

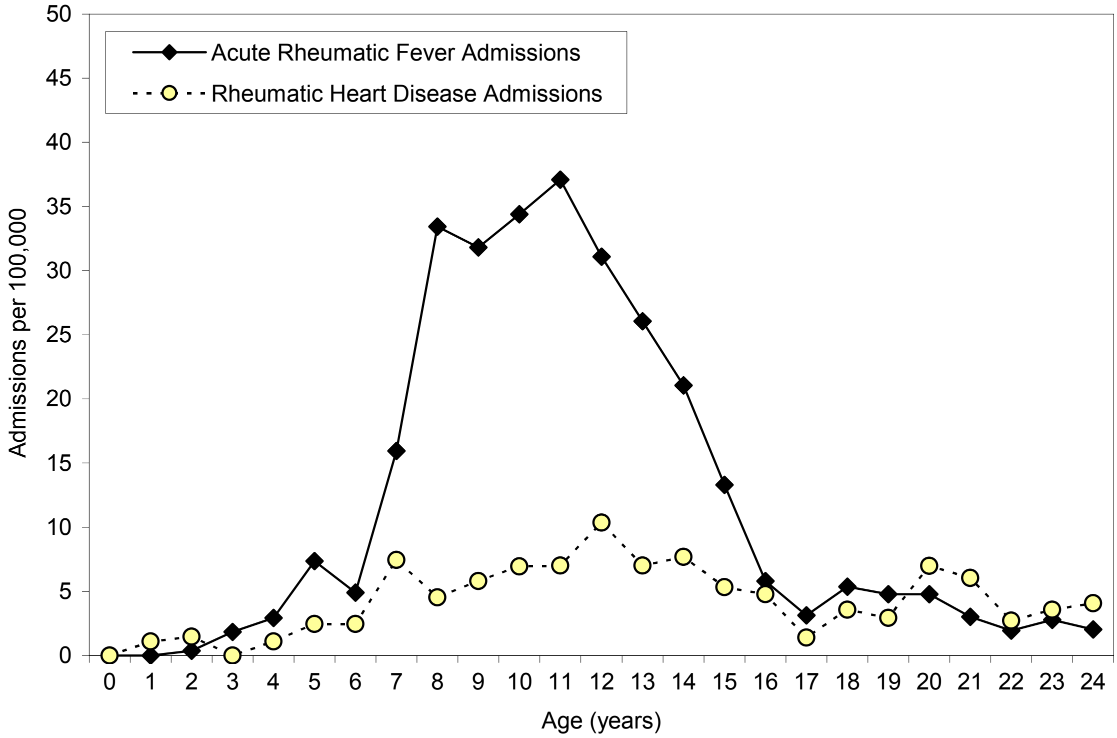


Table 77. Risk Factors for Hospital Admission due to Acute Rheumatic Fever in Children and Young People 0-24 Years, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				Ethnicity			
1-2	1.20	1.00		Māori	29.26	22.97	17.18-30.70
3-4	3.29	2.74	1.54-4.86	Pacific	61.92	48.62	36.24-65.24
5-6	6.63	5.52	3.24-9.41	European	1.27	1.00	
7-8	9.41	7.83	4.66-13.16	Asian/Indian	1.26	0.99	0.47-2.09
9-10	34.42	28.65	17.43-47.08				
Gender							
Female	9.80	1.00					
Male	14.73	1.50	1.31-1.72				

Note: Rate per 100,000 per year, RR: Rate Ratios are unadjusted

Figure 123. Hospital Admissions due to Acute Rheumatic Fever and Rheumatic Heart Disease in Children and Young People 0-24 Years by Ethnicity, New Zealand 1996-2006

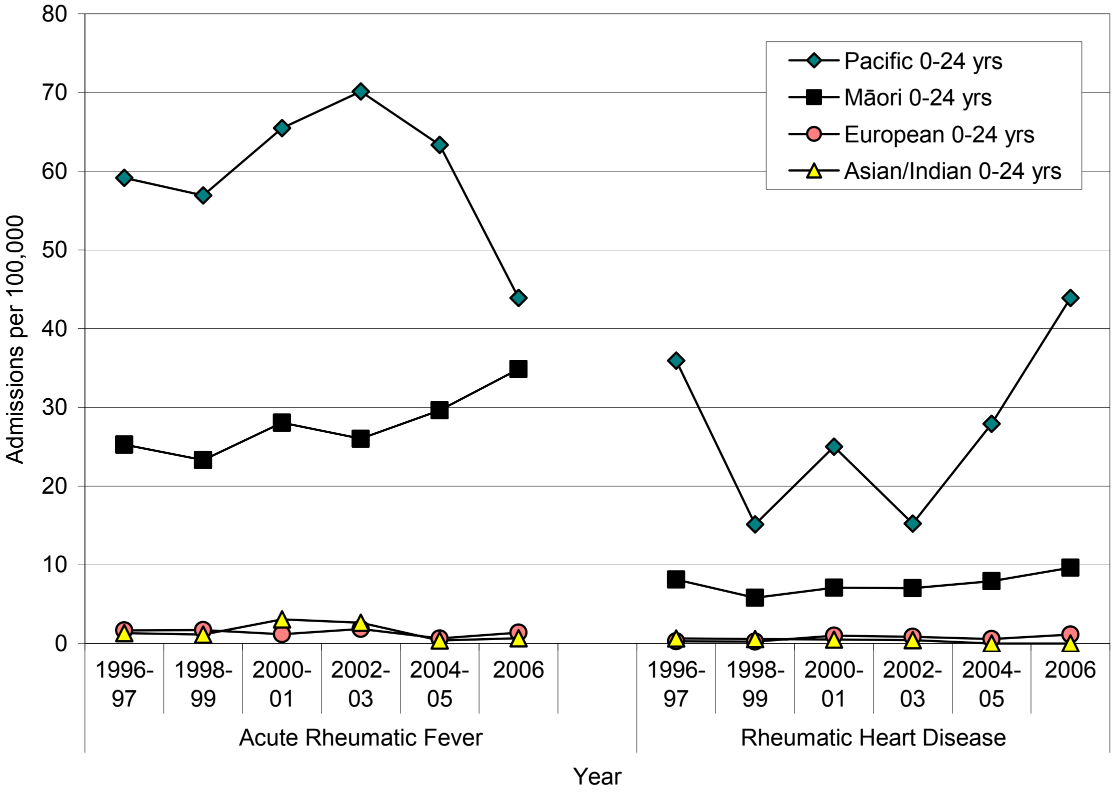


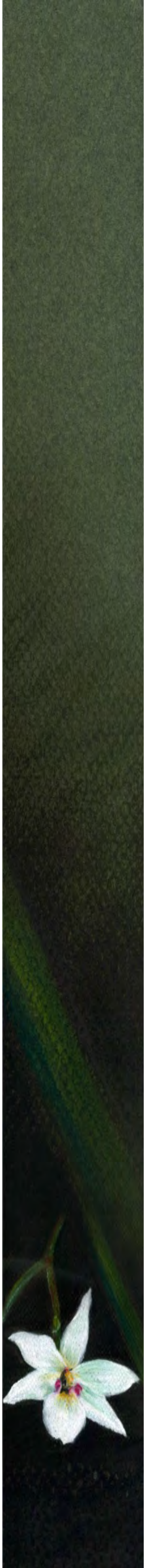
Table 78. Hospital Admissions due to Acute Rheumatic Fever by DHB in Children and Young People 0-24 Years, New Zealand 2002-2006

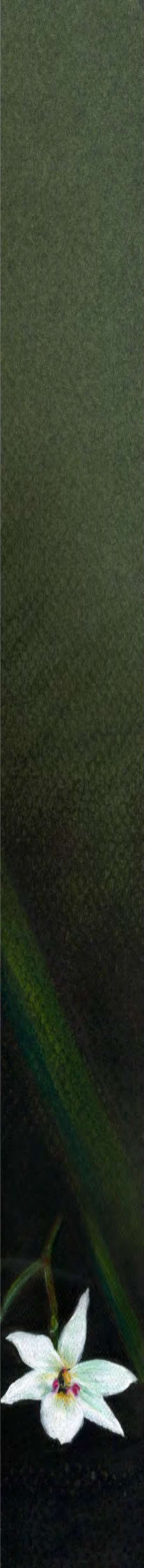
DHB	Number: Total 2002-2006	Number: Annual Average	Rate per 100,000	% of NZ Admissions
Northland	77	15.4	30.0	8.9
Waitemata	73	14.6	8.8	8.4
Auckland	141	28.2	20.5	16.3
Counties Manukau	278	55.6	33.1	32.2
Waikato	55	11.0	8.8	6.4
Lakes	31	6.2	17.0	3.6
Bay of Plenty	64	12.8	19.8	7.4
Tairawhiti	14	2.8	16.0	1.6
Taranaki	<5	S	s	s
Hawkes Bay	36	7.2	13.8	4.2
Whanganui	10	2.0	9.0	1.2
MidCentral	12	2.4	4.1	1.4
Hutt	9	1.8	3.7	1.0
Capital and Coast	36	7.2	7.9	4.2
Wairarapa	<5	s	s	s
Nelson Marlborough	<5	s	s	s
West Coast	0	0	0.0	0.0
Canterbury	6	1.2	0.8	0.7
South Canterbury	<5	s	s	s
Otago	<5	s	s	s
Southland	<5	s	s	s
New Zealand	864*	172.8	12.3	100.0

Note: *NZ Total includes 6 admissions where DHB was not stated; Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)

Summary

Acute rheumatic fever is a delayed inflammatory reaction which develops in response to an inadequately treated group A streptococcal throat infection. In New Zealand during the past 10 years, hospital admissions due to acute rheumatic fever and rheumatic heart disease have remained relatively static, while deaths have averaged 1-3 per year during the same period. During 2002-2006, hospital admissions for acute rheumatic fever peaked in late childhood and early adolescence, while admissions for rheumatic heart disease were relatively constant after 5 years of age. In contrast, deaths due to acute rheumatic fever and rheumatic heart disease were most frequent during the teenage years. During the same period, admissions for acute rheumatic fever were also higher amongst Pacific and Māori children and young people, males and those living in the most deprived areas. During 2002-2006 there were also marked regional variations in hospital admissions for acute rheumatic fever, with rates ranging from 0 to 33.1 per 100,000 depending on the region studied.





Serious Skin Infection

Introduction

Bacterial skin infections are a common cause of hospitalisation in children, with the most frequently implicated organisms being *Staphylococcus aureus* and *Streptococcus pyogenes* [181]. Common clinical presentations include:

Cellulitis: A diffuse infection of the skin and subcutaneous tissue characterised by local heat, redness, pain, swelling and occasionally fever, malaise, chills and headache. Infection is more likely to develop in the presence of damaged skin and abscesses / tissue destruction may occur if antibiotics are not taken. [178].

Furuncles and Carbuncles: Commonly known as an abscess or boil, furuncles form tender, red, firm / fluctuant masses of walled off purulent material. They arise from infections of the hair follicle (usually involving *S. aureus*), which then enlarge and eventually open to the skin surface, allowing the purulent contents to drain. Carbuncles are an aggregate of infected hair follicles that form a broad, swollen, red and painful mass that usually opens and drains through multiple tracts. Associated symptoms may include fever and malaise [182].

New Zealand's hospital admission rates for childhood skin infection have increased in recent years and are currently double those of the USA and Australia [183]). Admissions are highest during the summer months and are also higher for Māori and Pacific children and those living in the most deprived areas [183]. In developing interventions to reduce childhood skin infections, issues such as overcrowding, access to washing machines and first aid kits, exposure to insect bites, the cleaning and covering wounds and access to primary health care may all need to be addressed simultaneously (see Hunt 2004 [183] for a range of options at a DHB level).

Data Source and Methods

Definition

Hospital Admissions and Deaths due to Serious Skin Infections in those aged 0-24 years.

Serious skin infections include: staphylococcal scaled skin syndrome, impetigo, cutaneous abscess, furuncle and carbuncle, cellulitis (excluding peri-orbital cellulitis), acute lymphadenitis (excluding mesenteric adenitis), pilonidal cysts, and other local infections of the skin and subcutaneous tissue.

Data Source

Admissions Numerator: National Minimum Dataset: Hospital admissions of children and young people (0-24 years) with a primary diagnosis of a serious skin infection (ICD-9 680-686; ICD-10 L00-L08)
Deaths Numerator: National Mortality Collection: Deaths in children and young people (0-24 years) with a clinical code (cause of death) attributed to a serious skin infection (ICD-9 680-686; ICD-10 L00-L08)
Denominator: NZ Census

Indicator Category (Table 133, Table 134)

Admissions: Proxy B-C; Mortality: Ideal B

Notes on Interpretation

The limitations of the National Minimum Dataset are discussed at length in Appendix 1. The reader is urged to review this Appendix before interpreting any trends based on hospital admission data.

New Zealand Distribution and Trends

During the past decade, New Zealand's hospital admission rates for serious skin infection have risen progressively, with the most rapid increases amongst children occurring during the mid-late 1990s (**Figure 124**). During this period however, only one death was attributed to a serious skin infection in this age group. During 2002-2006, hospital admissions for serious skin infection had a bi-modal distribution, with the highest rates occurring amongst children <5 years of age, followed by young people in their late teens and early 20s (**Figure 125**). Rates were also higher for Māori and

Pacific children and young people, males and those living in the most deprived areas (**Table 79**, **Table 80**).

Figure 124. Hospital Admissions due to Serious Skin Infections in Children and Young People 0-24 Years, New Zealand 1990-2006

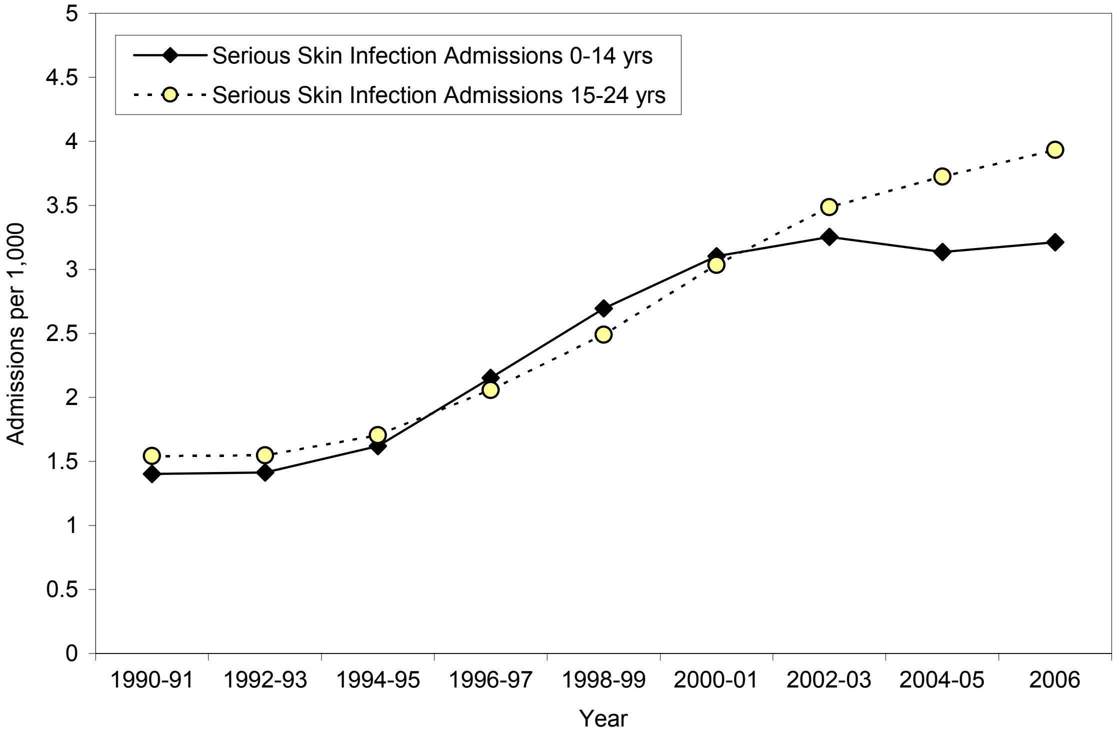


Figure 125. Hospital Admissions due to Serious Skin Infection in Children and Young People 0-24 Years by Age, New Zealand 2002-2006

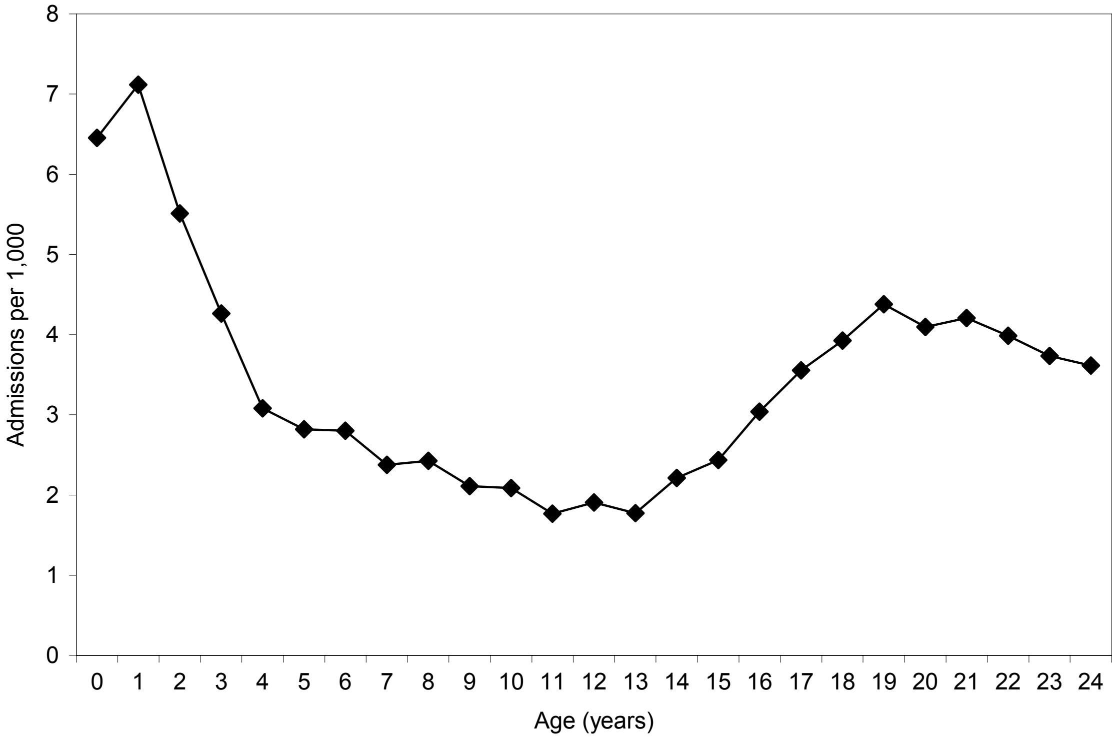


Table 79. Risk Factors for Hospital Admission due to Serious Skin Infection in Children 0-14 Years, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	1.29	1.00		1-2	1.38	1.00	
2	1.46	1.13	1.01-1.27	3-4	1.93	1.41	1.31-1.52
3	1.76	1.36	1.22-1.52	5-6	2.31	1.68	1.56-1.81
4	2.12	1.64	1.48-1.82	7-8	3.66	2.66	2.49-2.85
5	1.84	1.43	1.28-1.60	9-10	6.00	4.36	4.10-4.64
6	2.78	2.15	1.94-2.38	Ethnicity			
7	3.00	2.32	2.10-2.56	Māori	5.24	2.77	2.66-2.88
8	4.30	3.32	3.02-3.65	Pacific	8.46	4.47	4.27-4.68
9	5.17	4.00	3.65-4.38	European	1.89	1.00	
10	6.68	5.16	4.72-5.64	Asian/Indian	1.66	0.88	0.80-0.96
Gender							
Female	3.00	1.00					
Male	3.39	1.13	1.09-1.17				

Note: Rate per 1,000 per year. RR: Rate Ratios are unadjusted.

Table 80. Risk Factors for Hospital Admission due to Serious Skin Infection in Young People 15-24 Years, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	2.33	1.00		1-2	2.45	1.00	
2	2.57	1.11	0.99-1.25	3-4	2.94	1.20	1.11-1.30
3	2.59	1.11	0.99-1.24	5-6	3.52	1.44	1.34-1.55
4	3.30	1.42	1.27-1.58	7-8	4.06	1.65	1.54-1.77
5	3.30	1.42	1.27-1.58	9-10	4.78	1.95	1.82-2.09
6	3.74	1.60	1.44-1.78	Ethnicity			
7	3.86	1.66	1.50-1.84	Māori	4.77	1.29	1.23-1.35
8	4.24	1.82	1.65-2.01	Pacific	4.87	1.31	1.22-1.40
9	4.69	2.01	1.82-2.22	European	3.72	1.00	
10	4.87	2.09	1.90-2.30	Asian/Indian	0.99	0.27	0.24-0.30
Gender							
Female	2.63	1.00					
Male	4.71	1.79	1.72-1.86				

Note: Rate per 1,000 per year. RR: Rate Ratios are unadjusted.

Ethnic Trends and Regional Differences

During 1996-2006, while hospital admissions for serious skin infections increased for all ethnic groups, rates remained persistently higher for Pacific > Māori > European > Asian / Indian children and young people (**Figure 126**). In addition, during 2002-2006 there were marked regional variations in hospital admissions for serious skin infections, with rates ranging from 0.6 to 5.3 per 1,000 for children and 2.1 to 6.4 per 1,000 for young people depending on the region studied (**Table 81**).

Figure 126. Hospital Admissions due to Serious Skin infections in Children and Young People 0-24 years by Ethnicity, New Zealand 1996-2006

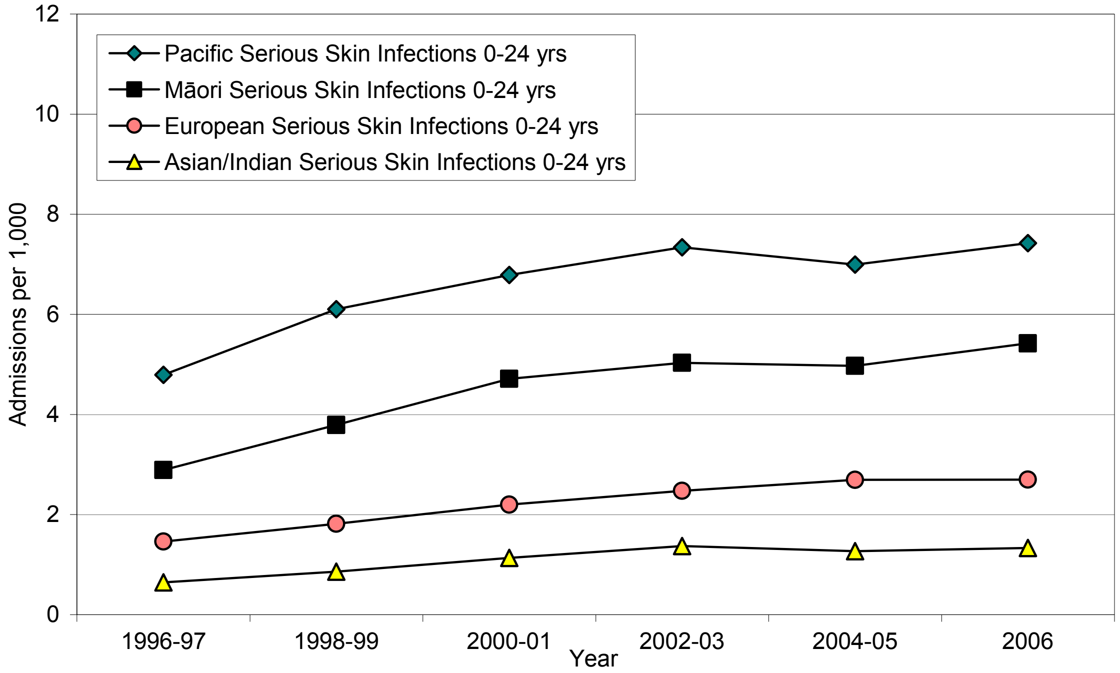
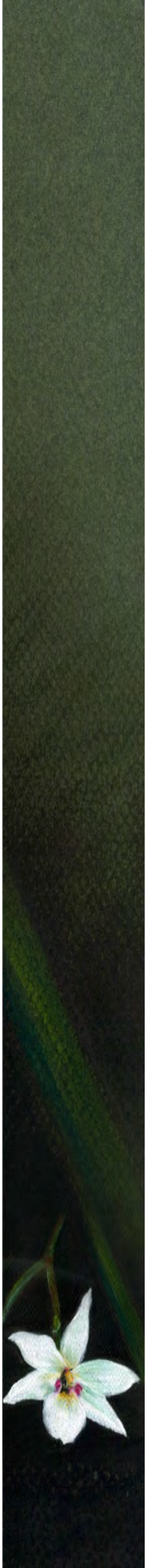


Table 81. Hospital Admissions for Serious Skin Infection in Children 0-14 Years by DHB, New Zealand 2002-2006

DHB	Number: Total 2002-2006	Number: Annual Average	Rate per 1,000	% of NZ Admissions
Northland	770	154	4.4	5.6
Waitemata	1,782	356.4	3.5	13.0
Auckland	1,654	330.8	4.4	12.0
Counties Manukau	2,689	537.8	5.0	19.6
Waikato	1,074	214.8	2.8	7.8
Lakes	451	90.2	3.8	3.3
Bay of Plenty	790	158	3.7	5.7
Tairawhiti	314	62.8	5.3	2.3
Taranaki	246	49.2	2.1	1.8
Hawkes Bay	578	115.6	3.4	4.2
Whanganui	220	44	3.0	1.6
MidCentral	422	84.4	2.5	3.1
Hutt	640	128	4.1	4.7
Capital and Coast	742	148.4	2.9	5.4
Wairarapa	86	17.2	2.0	0.6
Nelson Marlborough	188	37.6	1.4	1.4
West Coast	57	11.4	1.7	0.4
Canterbury	614	122.8	1.4	4.5
South Canterbury	31	6.2	0.6	0.2
Otago	188	37.6	1.2	1.4
Southland	165	33	1.5	1.2
New Zealand	13,744*	2,748.8	3.2	100.0

Note: *NZ Total includes 43 admissions where DHB was not stated; Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)



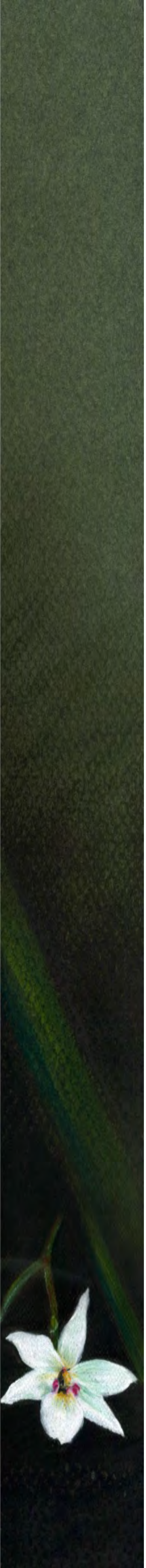


Table 82. Hospital Admissions for Serious Skin Infection in Young People 15-24 Years by DHB, New Zealand 2002-2006

DHB	Number: Total 2002-2006	Number: Annual Average	Rate per 1,000	% of NZ Admissions
Northland	437	87.4	5.3	4.4
Waitemata	1,277	255.4	4.0	12.8
Auckland	987	197.4	3.1	9.9
Counties Manukau	1,170	234	3.9	11.7
Waikato	778	155.6	3.3	7.8
Lakes	255	51	4.1	2.5
Bay of Plenty	616	123.2	5.7	6.2
Tairawhiti	154	30.8	5.5	1.5
Taranaki	229	45.8	3.6	2.3
Hawkes Bay	323	64.6	3.6	3.2
Whanganui	249	49.8	6.4	2.5
MidCentral	464	92.8	4.0	4.6
Hutt	484	96.8	5.4	4.8
Capital and Coast	586	117.2	2.9	5.9
Wairarapa	101	20.2	4.8	1.0
Nelson Marlborough	323	64.6	4.5	3.2
West Coast	75	15	4.6	0.7
Canterbury	789	157.8	2.5	7.9
South Canterbury	60	12	2.1	0.6
Otago	402	80.4	2.7	4.0
Southland	188	37.6	2.8	1.9
New Zealand	10,014*	2,002.8	3.7	100.0

Note: *NZ Total includes 67 admissions where DHB was not stated; Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)

Summary

During the past decade, New Zealand's hospital admission rates for serious skin infection have risen progressively, with the most rapid increases occurring during the mid-late 1990s. During this period however, only one death was attributed to a serious skin infection in this age group. During 2002-2006, hospital admissions for serious skin infection had a bi-modal distribution, with the highest rates occurring amongst children <5 years of age, followed by young people in their late teens and early 20s. Rates were also higher for Māori and Pacific children and young people, males and those living in the most deprived areas. In addition, during 2002-2006 there were also marked regional variations in hospital admission rates for serious skin infections.

Tuberculosis

Introduction

Tuberculosis (TB) is caused by *Mycobacterium tuberculosis,* an organism transmitted by the inhalation or ingestion of infected droplets. The disease usually affects the lungs, although infection of multiple organ systems can occur. Initial infection often goes unnoticed, with most infected individuals entering a latent phase. Progression to active TB occurs in about 5-15% of cases, with the risk of progression being influenced by the size of the infecting dose and the immunity of the individual exposed [184]. Persons with immunodeficiency e.g. those with HIV, may progress to disseminated forms of the disease, involving multiple organs such as the liver, lungs, spleen, bone marrow and lymph nodes [178].

New Zealand's TB rates fell progressively during the first half of last century reaching a nadir of 295 cases in 1988 and thereafter remaining static at approximately 300-500 cases per year. Childhood TB has followed a similar pattern, although a clear resurgence in TB in children was evident during 1992-2001 [185]. In one recent review, New Zealand's childhood TB rates were highest amongst those <5 years of age, those living in the most deprived areas and those of African>Pacific Island>Māori>Asian>European ethnic origins. Most cases were identified by contact tracing or immigrant screening and the majority were thought to originate either as part of a local outbreak, or as a consequence of migration from high risk countries [185]. From a public health perspective, the mainstays of controlling TB infection remain the vaccination (BCG) of high risk neonates, case finding and treatment of active and latent infections, contact tracing and the selective screening of high risk groups [184].

Data Source and Methods

Definition

Hospital Admissions and Deaths due to Tuberculosis in those aged 0-24 years

Data Source

Admissions Numerator: National Minimum Dataset: Hospital admissions of children and young people (0-24 years) with a primary diagnosis of tuberculosis (ICD-9 010-018; ICD-10 A15-A19)

Deaths Numerator: National Mortality Collection: Deaths in children and young people (0-24 years) with a clinical code (cause of death) attributed to tuberculosis (ICD-9 010-018; ICD-10 A15-A19)

Denominator: NZ Census

Indicator Category (Table 133, Table 134)

Admissions: Proxy B-C; Mortality: Ideal B

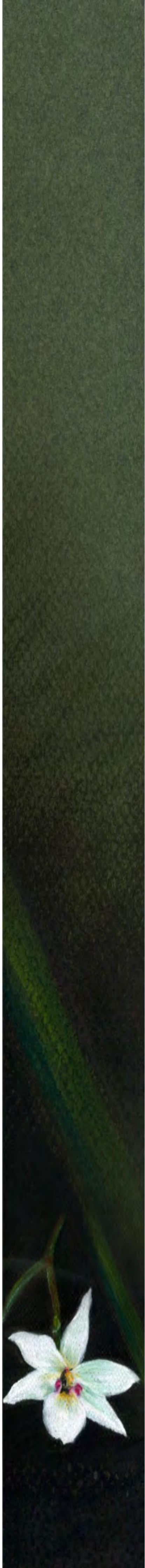
Notes on Interpretation

The limitations of the National Minimum Dataset are discussed at length in Appendix 1. The reader is urged to review this Appendix before interpreting any trends based on hospital admission data.

New Zealand Distribution and Trends

In New Zealand during the late 1990s-early 2000s, hospital admissions for TB gradually increased, although data for 2004-2006 suggest that admission rates may be beginning to taper off. In addition, during 1990-2004, three New Zealand children / young people died as a result of TB (**Figure 127**). During 2002-2006, while there was a small peak amongst children <4 years of age, TB admissions were highest amongst young people in their late teens and early twenties (**Figure 128**), those living in the most deprived areas, females and those of non-European ethnic origin (**Table 83**).

During 1996-2006, while small numbers make precise interpretation of trends difficult, hospital admissions for tuberculosis remained higher amongst Pacific and Asian / Indian children and young people (**Figure 129**). In addition, during 2002-2006 there



were marked regional disparities in hospital admission rates for TB, with rates ranging from 0 to 18.2 per 100,000 depending on the region studied (**Table 84**).

Figure 127. Hospital Admissions due to Tuberculosis in Children and Young People 0-24 Years, New Zealand 1990-2006

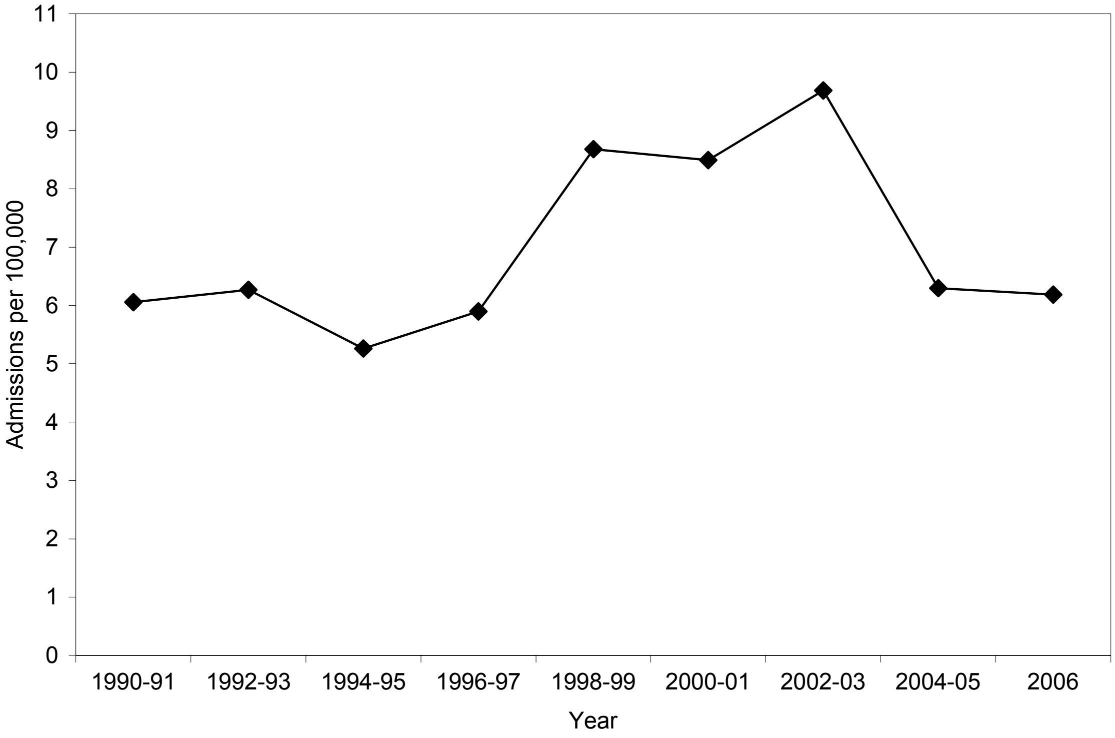


Figure 128. Hospital Admissions due to Tuberculosis in Children and Young People 0-24 Years by Age, New Zealand 2002-2006

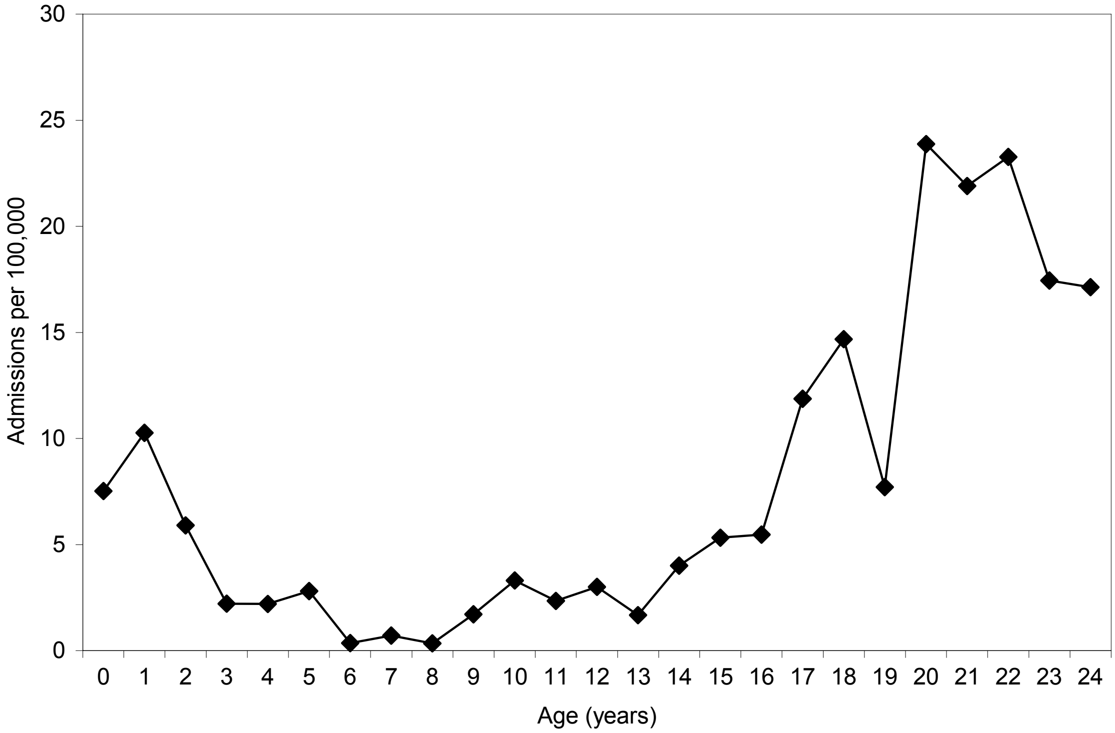
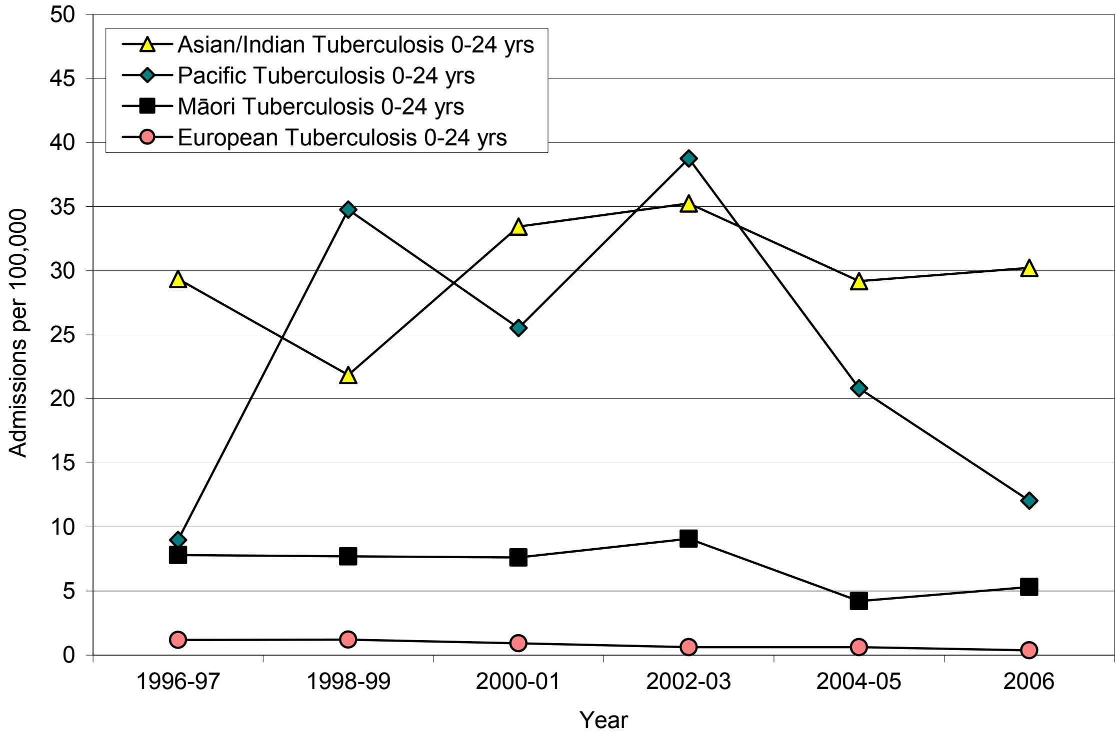


Table 83. Risk Factors for Hospital Admissions due to Tuberculosis in Children and Young People 0-24 Years, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Quintile				Ethnicity			
1-2	3.00	1.00		Māori	6.35	11.10	7.01-17.50
3-4	3.59	1.20	0.79-1.83	Pacific	25.95	45.18	29.1-70.10
5-6	6.79	2.26	1.56-3.28	European	0.57	1.00	
7-8	7.17	2.39	1.66-3.45	Asian/Indian	31.58	54.98	35.70-84.60
9-10	15.19	5.06	3.63-7.06				
Gender							
Female	8.32	1.00					
Male	6.92	0.83	0.70-0.98				

Note: Rate per 100,000 per year, RR: Rate Ratios are unadjusted

Figure 129. Hospital Admissions due to Tuberculosis in Children and Young People 0-24 Years by Ethnicity, New Zealand 1996-2006



Summary

Tuberculosis (TB) is caused by *Mycobacterium tuberculosis,* an organism transmitted by the inhalation or ingestion of infected droplets. In New Zealand during the late 1990s-early 2000s, hospital admissions for TB gradually increased, although data for 2004-2006 suggest that admission rates may be beginning to taper off. In addition, during 1990-2004, three New Zealand children / young people died as a result of TB. During 2002-2006, TB admissions were highest amongst young people in their late teens and early twenties, those living in the most deprived areas, females and those of non-European ethnic origin. During 2002-2006 there were also marked regional differences in hospital admission rates for TB, with rates ranging from 0 to 18.2 per 100,000 depending on the region studied.

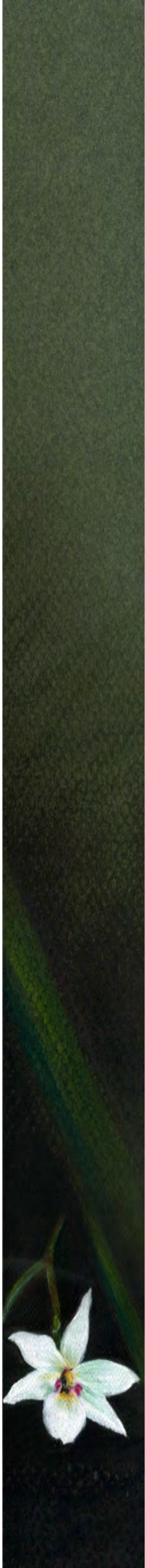


Table 84. Hospital Admissions due to Tuberculosis in Children and Young People 0-24 Years by DHB, New Zealand 2002-2006

DHB	Number: Total 2002-2006	Number: Annual Average	Rate per 100,000	% of NZ Admissions
Northland	25	5.0	9.7	4.7
Waitemata	102	20.4	12.4	19.1
Auckland	125	25.0	18.2	23.4
Counties Manukau	150	30.0	17.9	28.1
Waikato	18	3.6	2.9	3.4
Lakes	6	1.2	3.3	1.1
Bay of Plenty	5	1.0	1.5	0.9
Tairawhiti	<5	S	s	s
Taranaki	6	1.2	3.3	1.1
Hawkes Bay	15	3.0	5.7	2.8
Whanganui	<5	S	s	s
MidCentral	15	3.0	5.2	2.8
Hutt	5	1.0	2.0	0.9
Capital and Coast	18	3.6	3.9	3.4
Wairarapa	5	1.0	7.9	0.9
Nelson Marlborough	<5	s	s	s
West Coast	<5	s	s	s
Canterbury	26	5.2	3.4	4.9
South Canterbury	0	0	0.0	0.0
Otago	6	1.2	1.9	1.1
Southland	0	0	0.0	0.0
New Zealand	534*	106.8	7.6	100.0

Note: *NZ Total includes 2 admissions where DHB was not stated. Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)

Gastroenteritis

Introduction

Acute gastroenteritis is a clinical syndrome produced by a variety of viral, bacterial and parasitic organisms. It results in inflammation of the stomach and intestines, leading to anorexia, nausea, vomiting, diarrhoea, fever, and abdominal discomfort. Onset is often abrupt and may result in the rapid loss of fluids and electrolytes [178]. Transmission is generally by the faecal-oral route, with the incubation period varying depending on the causative organism. In terms of aetiology, in one recent New Zealand study, 56% of hospital admissions with gastroenteritis (< 5 years of age) were of unknown aetiology, 41% were attributed to viruses and the remaining 3% to bacterial or parasitic causes [186].

In New Zealand gastroenteritis is one of the top 10 causes of hospital admissions amongst children, with admissions peaking during the winter months. [186]. Risk factors include young age (highest <2 years), Māori and Pacific ethnicity [186], a lack of breastfeeding, and attendance at day care settings [187]. In terms of reducing the burden of disease, it has been suggested that up to 60% of hospital admissions for gastroenteritis <5 years may be attributable to rotavirus infection [186], with one recent study estimating that 1 in 52 New Zealand children are hospitalised with rotavirus before they reach 3 years of age [188]. While an expensive rotavirus vaccine is currently available in the USA, it is hoped that the cost per dose will decrease as production increases, potentially offering an avenue for prevention in future years. In the meantime, improved access to oral rehydration solutions in the primary care setting and initiatives to promote breastfeeding may be of value in reducing admission rates at a population level.

Data Source and Methods

Definition

Hospital Admissions and Deaths due to Gastroenteritis in those aged 0-24 years

Data Source

Admissions Numerator: National Minimum Dataset: Hospital admissions of children and young people (0-24 years) with a primary diagnosis of gastroenteritis (ICD-9 001-009, 558.9, 787.0; ICD-10 A00-A09, K52, R11)

Deaths Numerator: National Mortality Collection: Deaths in children and young people (0-24 years) with a clinical code (cause of death) attributed to gastroenteritis (ICD-9 001-009, 558.9, 787.0; ICD-10 A00-A09, K52, R11)

Denominator: NZ Census

Indicator Category (Table 133, Table 134)

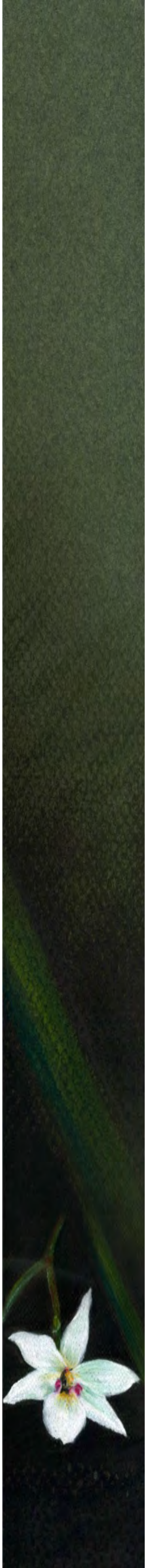
Admissions: Proxy C; Mortality: Ideal B

Notes on Interpretation

The limitations of the National Minimum Dataset are discussed at length in Appendix 1. The reader is urged to review this Appendix before interpreting any trends based on hospital admission data.

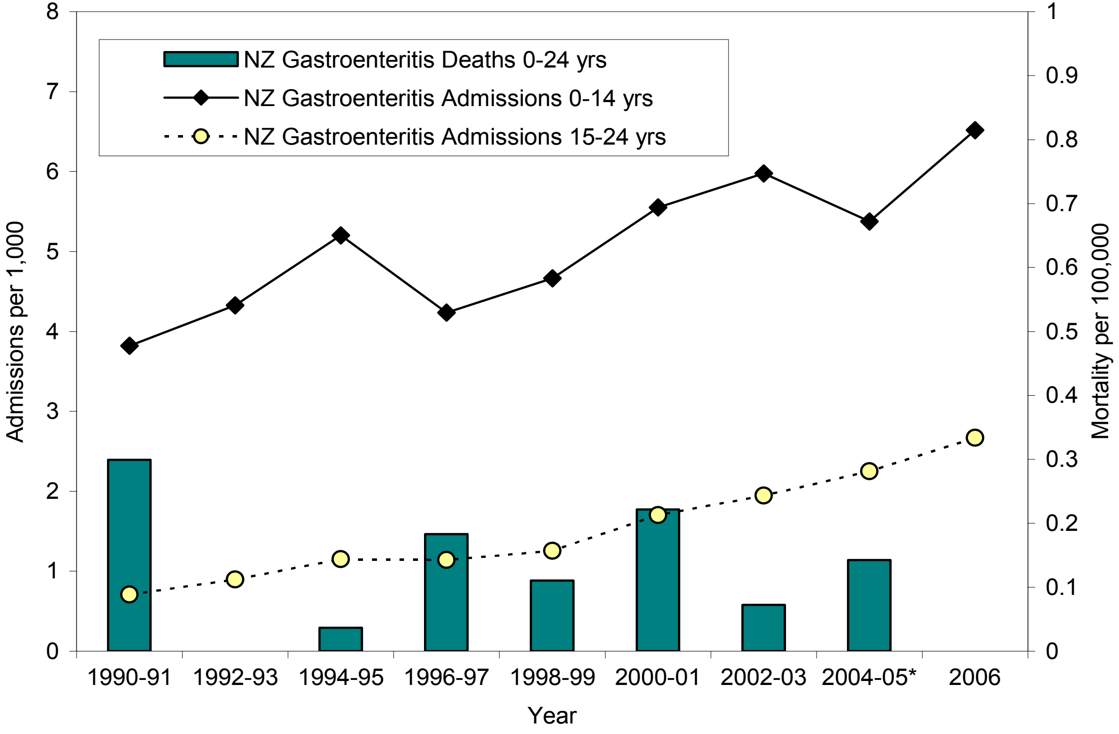
New Zealand Distribution and Trends

Hospital admissions for gastroenteritis amongst New Zealand children and young people have been increasing in recent years, while deaths have remained static at around 1-2 cases per year (**Figure 130**). During 2002-2006, admission rates for gastroenteritis were highest amongst children during their first year of life and tapered off rapidly thereafter. Mortality during 2000-2004 followed a similar pattern (**Figure 131**). Admissions for children 0-14 years were also higher amongst those living in the most deprived areas and Pacific and Asian / Indian children (**Table 85**), with admissions for those 0-24 aged years increasing for all ethnic groups during 1996-2006 (**Figure 132**). In addition, during 2002-2006 there were also marked regional variations



in hospital admissions for gastroenteritis, with rates ranging from 3.5 to 8.0 per 1,000 depending on the region studied (**Table 86**).

Figure 130. Hospital Admissions and Deaths due to Gastroenteritis in Children and Young People 0-24 Years, New Zealand 1990-2006 (Admissions) and 1990-2004 (Deaths)



Note: *Mortality is for 2004 year only

Figure 131. Hospital Admissions and Deaths due to Gastroenteritis by Age in Children and Young People 0-24 Years, New Zealand 2002-2006 (Admissions) and 2000-2004 (Deaths)

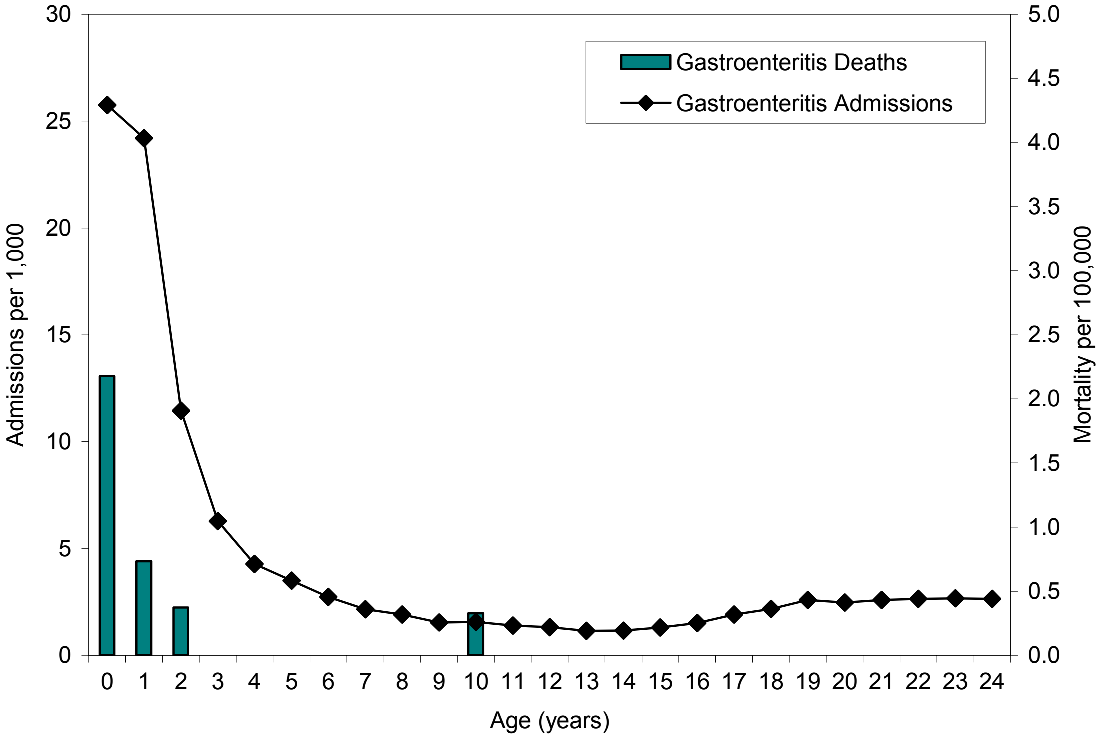
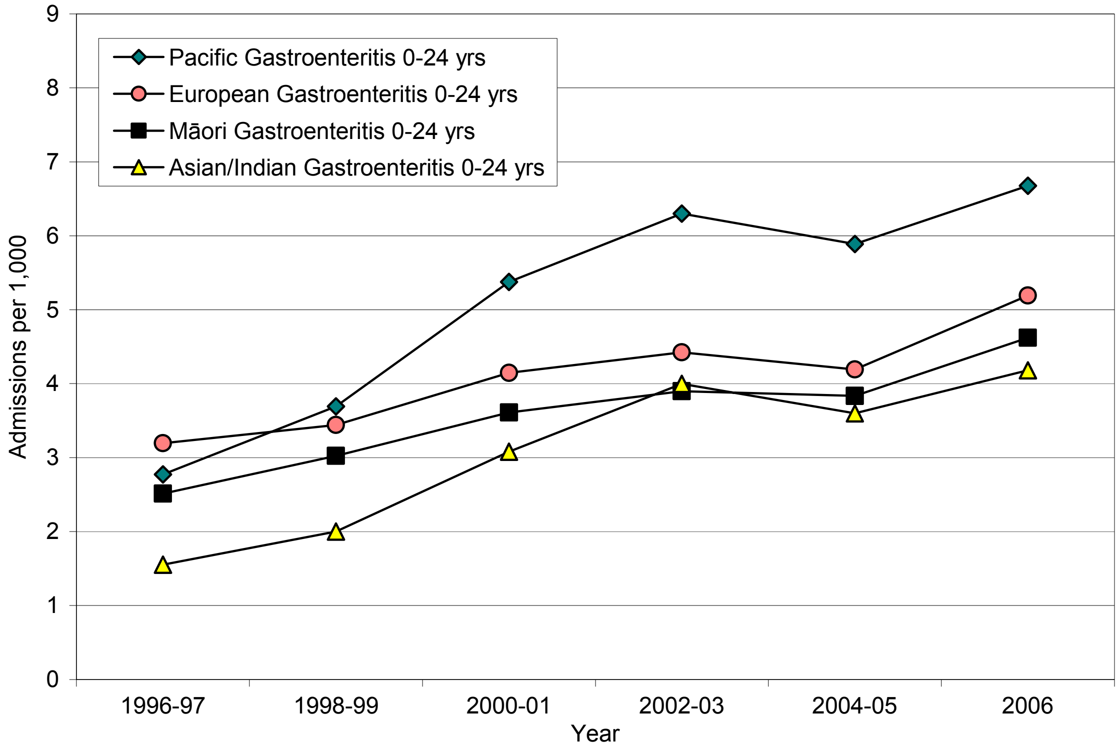


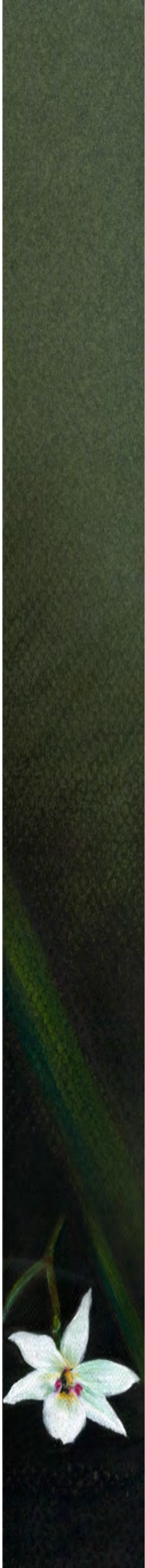
Table 85. Risk Factors for Hospital Admissions due to Gastroenteritis in Children 0-14 Years, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	3.71	1.00		1-2	3.72	1.00	
2	3.73	1.01	0.94-1.08	3-4	4.57	1.23	1.17-1.29
3	4.18	1.13	1.06-1.21	5-6	5.66	1.52	1.45-1.59
4	4.97	1.34	1.26-1.43	7-8	7.02	1.88	1.80-1.96
5	5.16	1.39	1.30-1.48	9-10	7.68	2.06	1.98-2.15
6	6.16	1.66	1.56-1.77	Ethnicity			
7	6.12	1.65	1.55-1.76	Māori	5.06	0.88	0.85-0.91
8	7.88	2.12	2.00-2.25	Pacific	8.37	1.45	1.39-1.51
9	7.98	2.15	2.03-2.28	European	5.78	1.00	
10	7.44	2.00	1.89-2.12	Asian/Indian	6.37	1.10	1.05-1.15
Gender							
Female	5.67	1.00					
Male	6.01	1.06	1.03-1.09				

Note: Rate per 1,000 per year; RR: Rate Ratios are unadjusted.

Figure 132. Hospital Admissions due to Gastroenteritis in Children and Young People 0-24 Years by Ethnicity, New Zealand 1996-2006





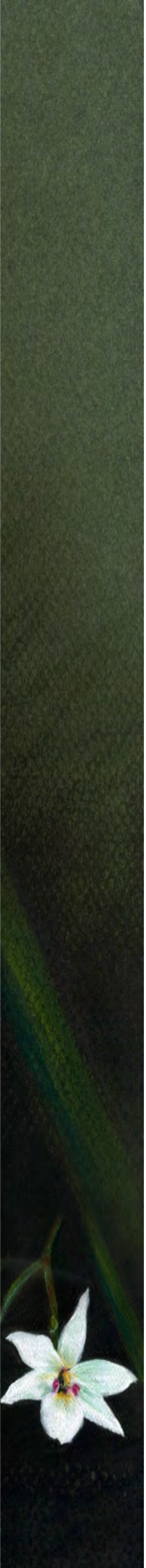


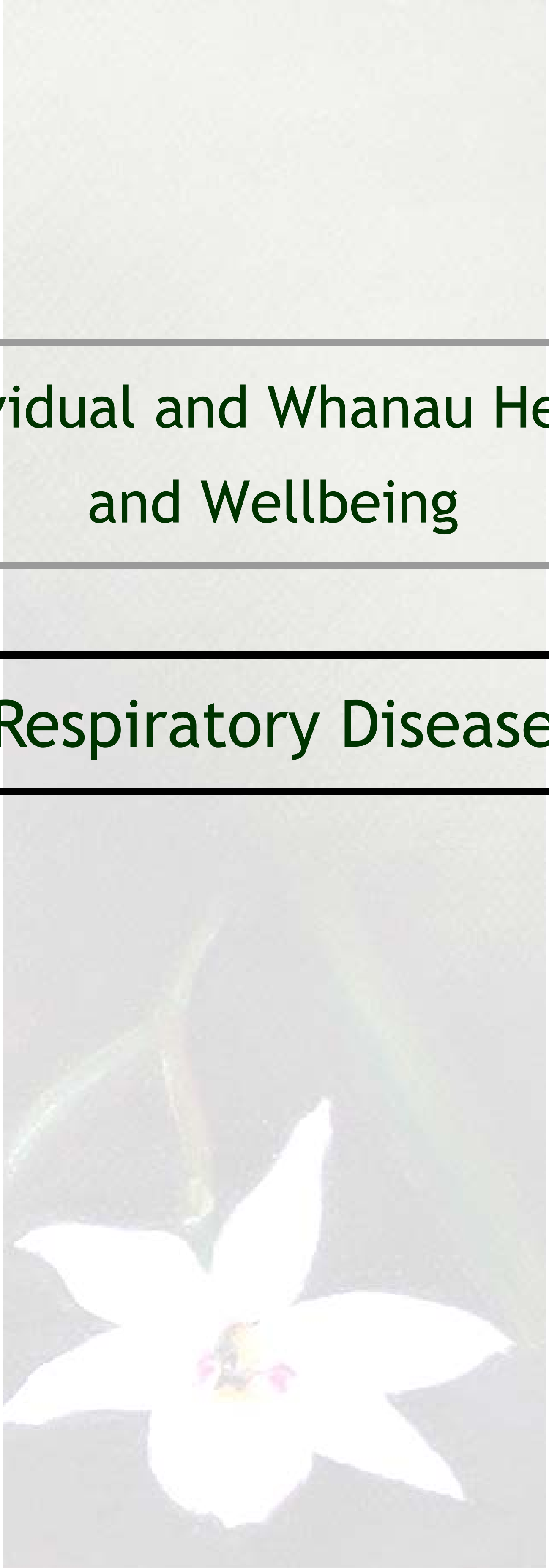
Table 86. Hospital Admissions due to Gastroenteritis in Children 0-14 Years by DHB, New Zealand 2002-2006

DHB	Number: Total 2002-2006	Number: Annual Average	Rate per 1,000	% of NZ Admissions
Northland	954	190.8	5.5	3.8
Waitemata	2,854	570.8	5.6	11.4
Auckland	2,760	552.0	7.4	11.0
Counties Manukau	3,880	776.0	7.2	15.4
Waikato	1,656	331.2	4.3	6.6
Lakes	701	140.2	5.8	2.8
Bay of Plenty	1,682	336.4	7.8	6.7
Tairawhiti	471	94.2	8.0	1.9
Taranaki	542	108.4	4.6	2.2
Hawkes Bay	824	164.8	4.8	3.3
Whanganui	396	79.2	5.5	1.6
MidCentral	666	133.2	3.9	2.7
Hutt	1,200	240.0	7.7	4.8
Capital and Coast	1,122	224.4	4.4	4.5
Wairarapa	313	62.6	7.4	1.2
Nelson Marlborough	457	91.4	3.5	1.8
West Coast	207	41.4	6.3	0.8
Canterbury	2,738	547.6	6.1	10.9
South Canterbury	266	53.2	5.0	1.1
Otago	776	155.2	4.8	3.1
Southland	520	104.0	4.7	2.1
New Zealand	25,120*	5,024	5.8	100.0

Note: *NZ Total includes 135 admissions where DHB was not stated. Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)

Summary

Acute gastroenteritis is a clinical syndrome produced by a variety of viral, bacterial and parasitic organisms. In New Zealand hospital admissions for gastroenteritis amongst children and young people have been increasing in recent years, while deaths have remained static at around 1-2 cases per year. During 2002-2006, admissions for gastroenteritis were highest amongst children during their first year of life and tapered off rapidly thereafter, while mortality during 2000-2004 followed a similar pattern. Admissions for children 0-14 years were also higher amongst those living in the most deprived areas and Pacific and Asian / Indian children, with hospital admissions for those 0-24 aged years increasing for all ethnic groups during 1996-2006. In addition, there were also marked regional variations in hospital admissions for gastroenteritis, with rates ranging from 3.5 to 8.0 per 1,000 depending on the region studied.



Individual and Whanau Health and Wellbeing

Respiratory Disease

Lower Respiratory Tract Morbidity and Mortality in Children

Introduction

In New Zealand, a recent review has suggested that a large burden of avoidable morbidity and mortality in childhood can be attributed to respiratory diseases, with conditions such as whooping cough, pneumonia, bronchiolitis, TB and smoking related illnesses all being of major concern for New Zealand children and young people. In addition, the same review highlighted the significant contribution poor housing, poverty, poor nutrition, issues with access to primary, secondary and tertiary care, smoking and air pollution make to the burden of childhood respiratory disease in this country [189]. While a number of respiratory conditions of relevance to New Zealand children and young people are explored in more detail in the sections which follow, the current section considers the collective impact lower respiratory tract conditions (Asthma and Lower Respiratory Tract Infections) have on the health of children and young people in this country.

Data Sources and Methods

Definition

Hospital Admissions and Deaths due to Asthma and Lower Respiratory Tract Infections in Children 0-14 Years

Data Sources

Admissions Numerator: National Minimum Dataset: Hospital admissions for children (0-14 years) with a primary diagnosis of Asthma (ICD-9 493, ICD-10 J45-46), Acute Unspecified Lower Respiratory Tract Infection (ICD-10 J22), Acute Bronchitis (ICD-9 466.0, ICD-10 J20), Bronchiolitis (ICD-9 466.1, ICD-10 J21), Pertussis (ICD-9 033, ICD-10 A37), Lung Abscesses and Pyothorax (ICD-9 510, 513, ICD-10 J85-86) or Pneumonia (ICD-9 480-486, 487.0, ICD-10 J12-18, J100, J110)

Deaths Numerator: National Mortality Collection: Deaths in children 0-14 years with any of the respiratory diagnoses listed above.

Denominator: NZ Census

Indicator Category

Admissions: Proxy B-C; Mortality: Ideal B **(Table 133, Table 134)**

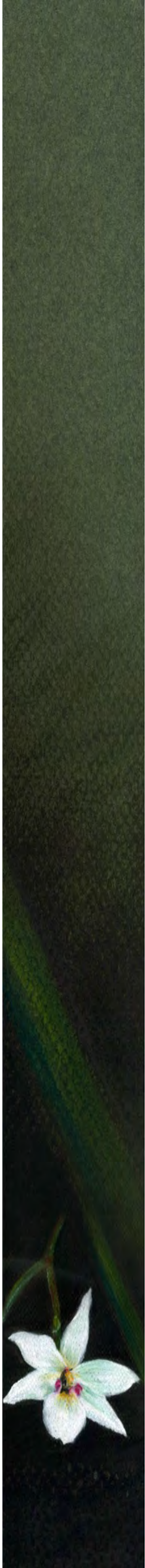
Notes on Interpretation

The limitations of the National Minimum Dataset are discussed at length in Appendix 1. The reader is urged to review this Appendix before interpreting any trends based on hospital admission data.

New Zealand Distribution and Trends

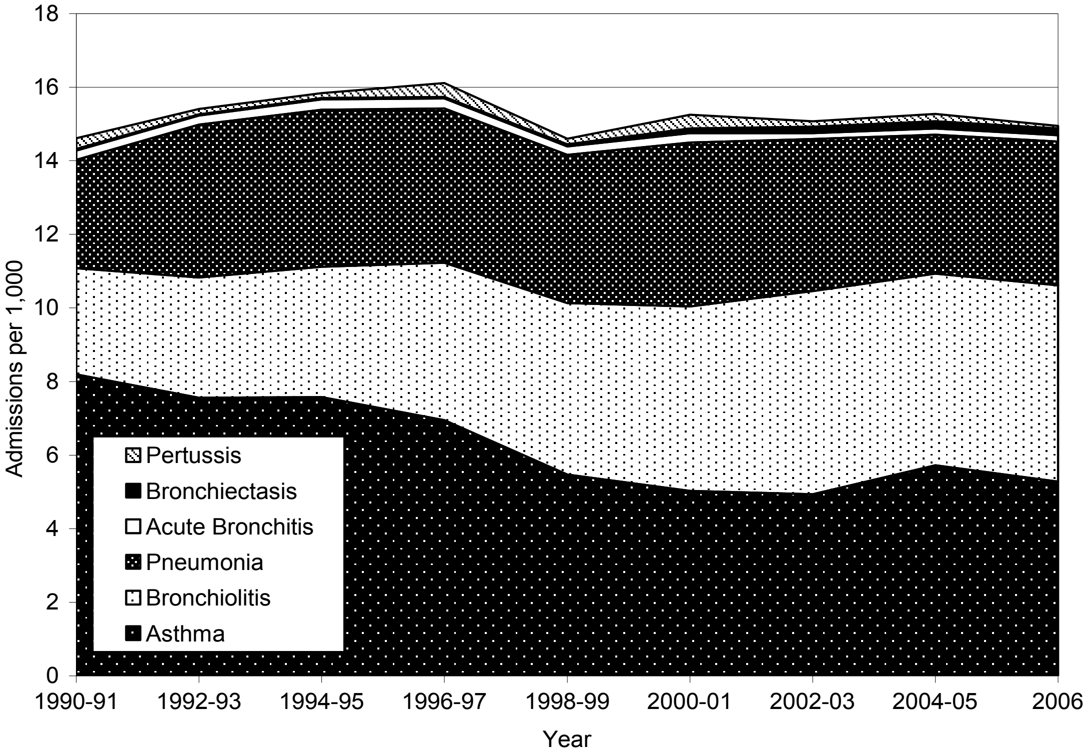
In New Zealand during 1990-2006, hospital admissions for lower respiratory tract conditions remained relatively static, with large declines in admissions for asthma being offset by correspondingly large increases in admissions for bronchiolitis (asthma and bronchiolitis admission rates combined, 11.1 per 1,000 in 1990-91 → 10.6 per 1,000 in 2006) (**Figure 133**). During 2002-2006, these two conditions were the leading causes of a lower respiratory tract admission amongst New Zealand children, and together accounted for 65.7% of lower respiratory admissions during this period. In contrast, pneumonia accounted for 63.6% of all lower respiratory tract deaths during 2000-2004 (**Table 87**).

During 2002-2006, hospital admissions for lower respiratory tract conditions were highest amongst those under 5 years of age, with the greatest burden of morbidity being due to bronchiolitis admissions in those under 1 year (**Figure 134**). In addition, admissions for lower respiratory tract infections were higher for Pacific and Māori children (**Figure 135**) and those living in the most deprived areas (asthma risk factors are considered separately in the Asthma Section) (**Table 88**). There were also marked



regional variations in admissions for lower respiratory tract infections, with rates ranging from 3.3 to 18.3 per 1,000 depending on the region studied (asthma admissions are considered separately in the Asthma section) (**Table 89**).

Figure 133. Hospital Admissions for Lower Respiratory Tract Infection and Asthma in Children 0-14 Years, New Zealand 1990-2006



Note: Trend graphs and cross sectional tables differ slightly as trend graphs utilise ICD-9 coding and cross sectional tables utilise ICD-10 coding (which includes the category Acute Unspecified LRTI).

Table 87. Hospital Admissions and Deaths due to Lower Respiratory Tract Infections and Asthma in Children 0-14 Years by Diagnosis, New Zealand 2002-2006 (Admissions) and Deaths (2000-2004)

Diagnosis	Number: Total	Number: Annual Average	Rate per 1,000	% of Total
Admissions (2002-2006)				
Bronchiolitis	23,052	4,610.4	5.4	33.0
Asthma	22,869	4,573.8	5.3	32.7
Pneumonia	16,967	3,393.4	3.9	24.3
Acute Unspecified LRTI	4,723	944.6	1.1	6.8
Bronchiectasis	791	158.2	0.2	1.1
Acute Bronchitis	733	146.6	0.2	1.0
Pertussis	651	130.2	0.2	0.9
Lung Abscesses/Pyothorax	98	19.6	<0.1	0.1
Total	69,884	13,976.8	16.3	100.0
Deaths (2000-2004)				
Pneumonia	42	8.4	1.0	63.6
Asthma	8	1.6	0.2	12.1
Bronchiolitis	7	1.4	0.2	10.6
Other LRTI	9	1.8	0.2	13.6
Total	66	13.2	1.5	100.0

Note: Other LRTI includes Pertussis, Acute Unspecified LRTI, Bronchiectasis, Lung Abscess & Pyothorax

Figure 134. Hospital Admissions due to Selected Lower Respiratory Tract Infections and Asthma in Children 0-14 Years by Age, New Zealand 2002-2006

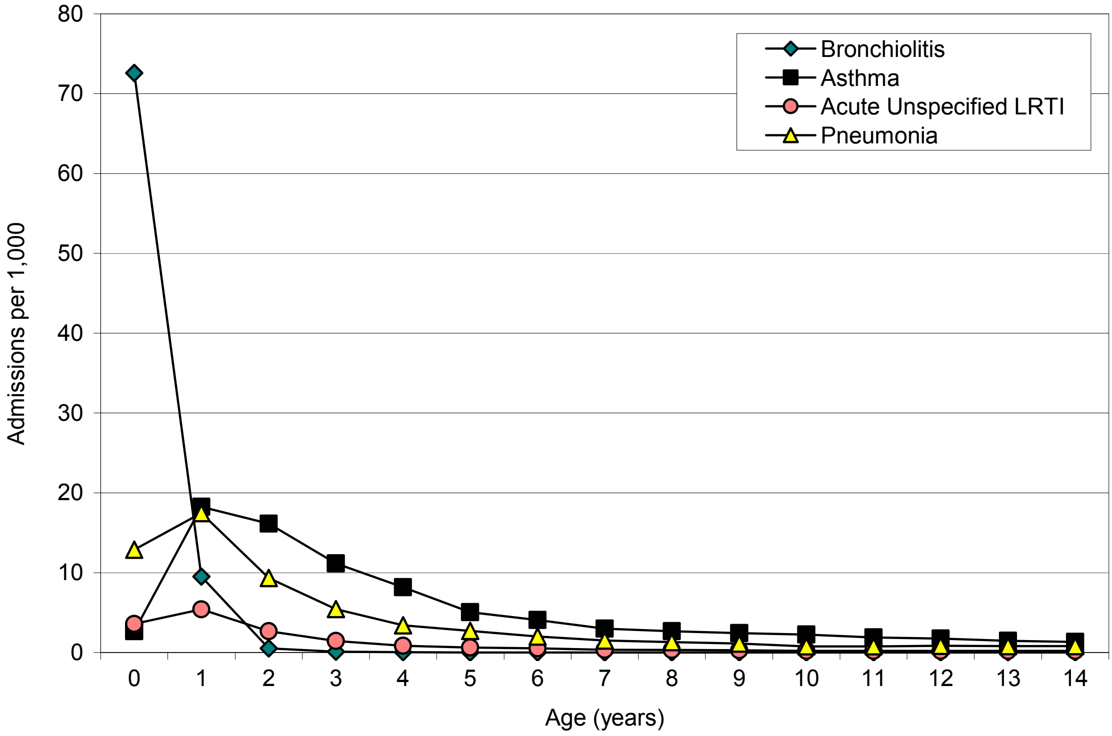
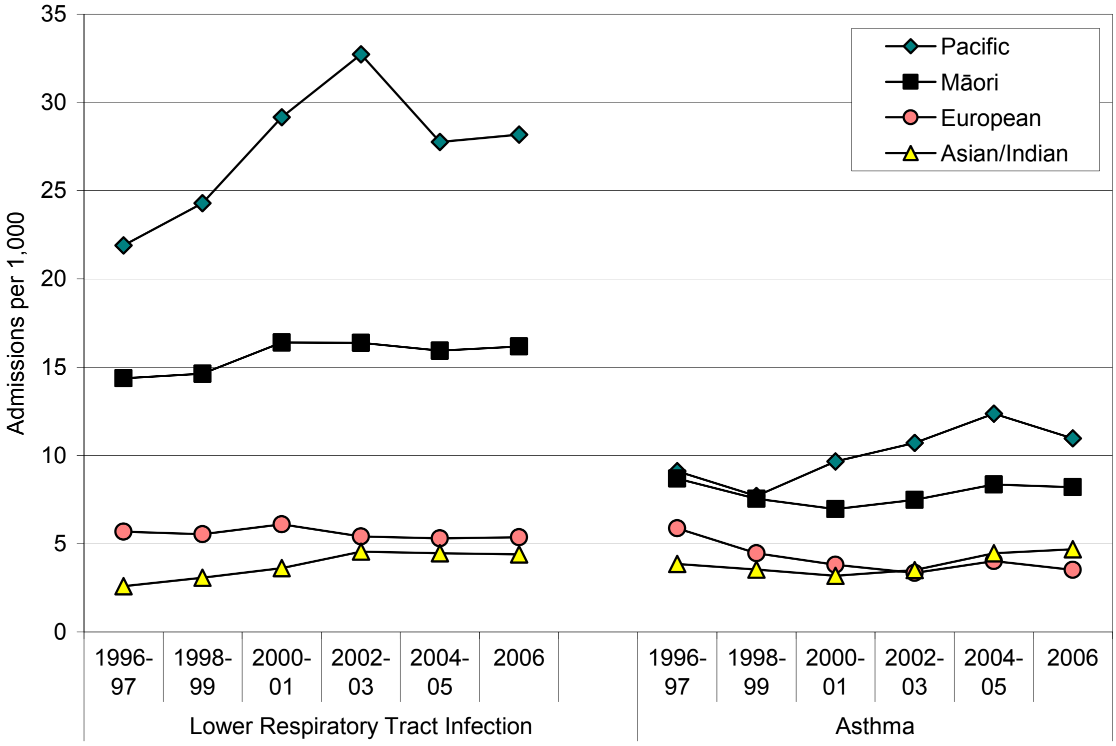


Figure 135. Hospital Admissions due to Lower Respiratory Tract Infection and Asthma in Children 0-14 Years by Ethnicity, New Zealand 1996-2006



Note: Trend graphs and cross sectional tables differ slightly as trend graphs utilise ICD-9 coding and cross sectional tables utilise ICD-10 coding (which includes the category Acute Unspecified LRTI).

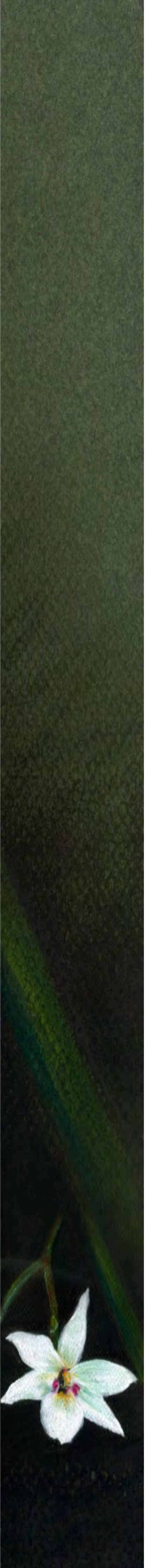


Table 88. Risk Factors for Hospital Admission due to Lower Respiratory Tract Infections (excluding Asthma) in Children 0-14 Years, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	3.93	1.00		1-2	4.28	1.00	
2	4.65	1.18	1.11-1.26	3-4	6.00	1.40	1.34-1.46
3	5.33	1.36	1.28-1.45	5-6	8.43	1.97	1.89-2.05
4	6.69	1.70	1.60-1.81	7-8	12.54	2.93	2.82-3.04
5	7.19	1.83	1.72-1.94	9-10	20.87	4.87	4.70-5.04
6	9.67	2.46	2.32-2.60	Ethnicity			
7	10.36	2.64	2.50-2.79	Māori	17.67	2.85	2.79-2.91
8	14.63	3.73	3.54-3.93	Pacific	32.05	5.17	5.05-5.29
9	17.50	4.46	4.23-4.70	European	6.20	1.00	
10	23.65	6.02	5.73-6.33	Asian/Indian	5.19	0.84	0.80-0.88
Gender							
Female	9.54	1.00					
Male	12.27	1.29	1.27-1.31				

Note: See Asthma section for rates. Rates are per 1,000 per year. RR: Rate Ratios are unadjusted.

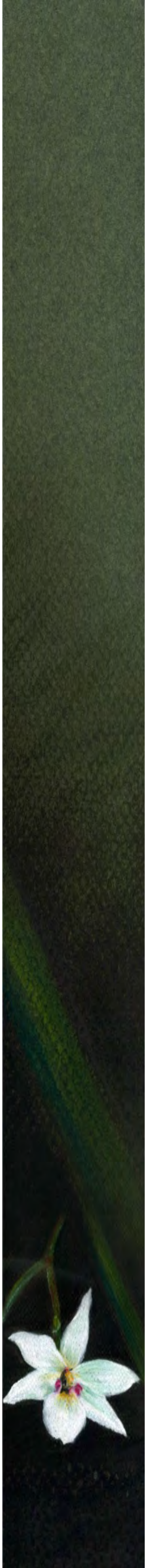
Table 89. Hospital Admissions due to Lower Respiratory Tract Infections (excluding Asthma and Unspecified LRTI) in Children 0-14 Years by DHB, New Zealand 2002-06

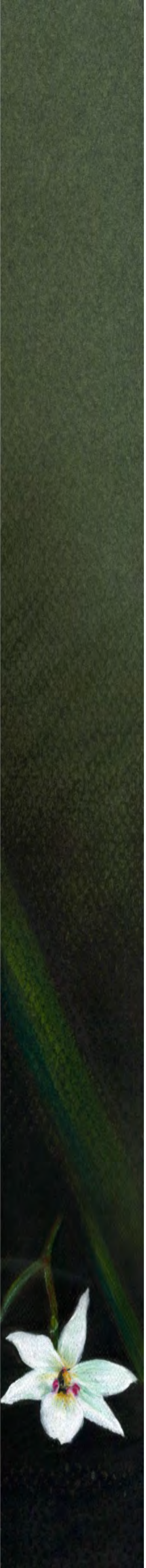
DHB	Number: Total 2002-2006	Number: Annual Average	Rate per 1,000	% of NZ Admissions
Northland	2,426	485.2	13.9	5.2
Waitemata	4,877	975.4	9.6	10.4
Auckland	4,799	959.8	12.9	10.2
Counties Manukau	9,808	1,961.6	18.3	20.9
Waikato	3,704	740.8	9.6	7.9
Lakes	1,884	376.8	15.7	4.0
Bay of Plenty	2,762	552.4	12.8	5.9
Tairawhiti	935	187.0	15.8	2.0
Taranaki	1,000	200.0	8.6	2.1
Hawkes Bay	1,794	358.8	10.4	3.8
Whanganui	772	154.4	10.7	1.6
MidCentral	1,322	264.4	7.7	2.8
Hutt	2,213	442.6	14.2	4.7
Capital and Coast	1,861	372.2	7.2	4.0
Wairarapa	388	77.6	9.2	0.8
Nelson Marlborough	599	119.8	4.6	1.3
West Coast	220	44.0	6.7	0.5
Canterbury	3,581	716.2	8.0	7.6
South Canterbury	176	35.2	3.3	0.4
Otago	919	183.8	5.7	2.0
Southland	849	169.8	7.6	1.8
New Zealand	47,015*	9,403.0	10.9	100.0

Note: *NZ Total includes 126 admissions where DHB was not stated. Asthma Admissions Excluded; Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue).

Summary

In New Zealand, a large burden of avoidable morbidity and mortality during childhood can be attributed to respiratory diseases, with conditions such as whooping cough, pneumonia, and bronchiolitis being issues of concern for New Zealand children and young people. In addition poor housing, poverty, poor nutrition, issues with access to primary, secondary and tertiary care, smoking and air pollution all make a significant contribution to the burden of childhood respiratory disease in this country. In New Zealand during 1990-2006, hospital admissions for lower respiratory conditions in childhood remained relatively static, with large declines in admissions for asthma being offset by correspondingly large increases in admissions for bronchiolitis. During 2002-2006, these two conditions were the leading causes of a lower respiratory tract admission amongst New Zealand children, and together accounted for 65.7% of lower respiratory admissions during this period. In contrast, pneumonia accounted for 63.6% of lower respiratory tract deaths during 2000-2004. During 2002-2006, admissions for lower respiratory conditions were higher amongst those under 5 years, with the greatest burden of morbidity being due to bronchiolitis in infants < 1 year. In addition, admissions for lower respiratory tract infections were higher for Pacific and Māori children and those living in the most deprived areas. There were also marked regional variations in admissions for lower respiratory tract infections, with rates ranging from 3.3 to 18.3 per 1,000 depending on the region studied.





Bronchiolitis

Introduction

Bronchiolitis is an acute viral infection of the lower respiratory tract commonly caused by the respiratory syncitial virus (RSV), although parainfluenza, influenza and other viruses have also been implicated. RSV is transmitted by contact with infected nasal secretions and less frequently, by aerosol spread. Its incubation period is 2-8 days, and following a prodromal phase, acute illness usually lasts 3-7 days, with gradual recovery over a 1-2 week period. Symptoms include runny nose, cough, low grade fever, expiratory wheeze and respiratory distress. Treatment is usually supportive, with severely affected infants being admitted to hospital for oxygen and fluid supplementation [190].

RSV is common, with overseas estimates suggesting >50% of infants are infected during the first year of life and >80% by the age of 2 years. Epidemics occur during winter months, and although there are only 2 major RSV strains (A and B), numerous genotypes, subtypes and frequent shifts in the dominant strain mean that infants may remain susceptible to reinfection from year to year, or even within the same season. Of those infected, 1-2% require hospital admission [190], with the case fatality rate of those admitted being around 2% [191]. Risk of hospital admission is increased by factors such as male sex, young age (<6 months), birth during the first 1/2 of the RSV season, overcrowding, the presence of siblings and attendance at day care [192]. In addition, socioeconomic disadvantage, lack of breastfeeding and maternal smoking have been implicated in a number of studies [191].

Data Source and Methods

Definition

Hospital Admissions and Deaths due to Bronchiolitis in Infants < 1 Year of Age

Data Source

Admissions Numerator: National Minimum Dataset: Hospital admissions of infants < 1 year of age with a primary diagnosis of Bronchiolitis (ICD-9 466.1; ICD-10 J21)
Deaths Numerator: National Mortality Collection: Deaths in infants < 1 year of age with a clinical code (cause of death) attributed to Bronchiolitis (ICD-9 466.1; ICD-10 J21).
Denominator: NZ Census

Indicator Category

Admissions: Proxy B-C; Mortality: Ideal B (Table 133, Table 134)

Notes on Interpretation

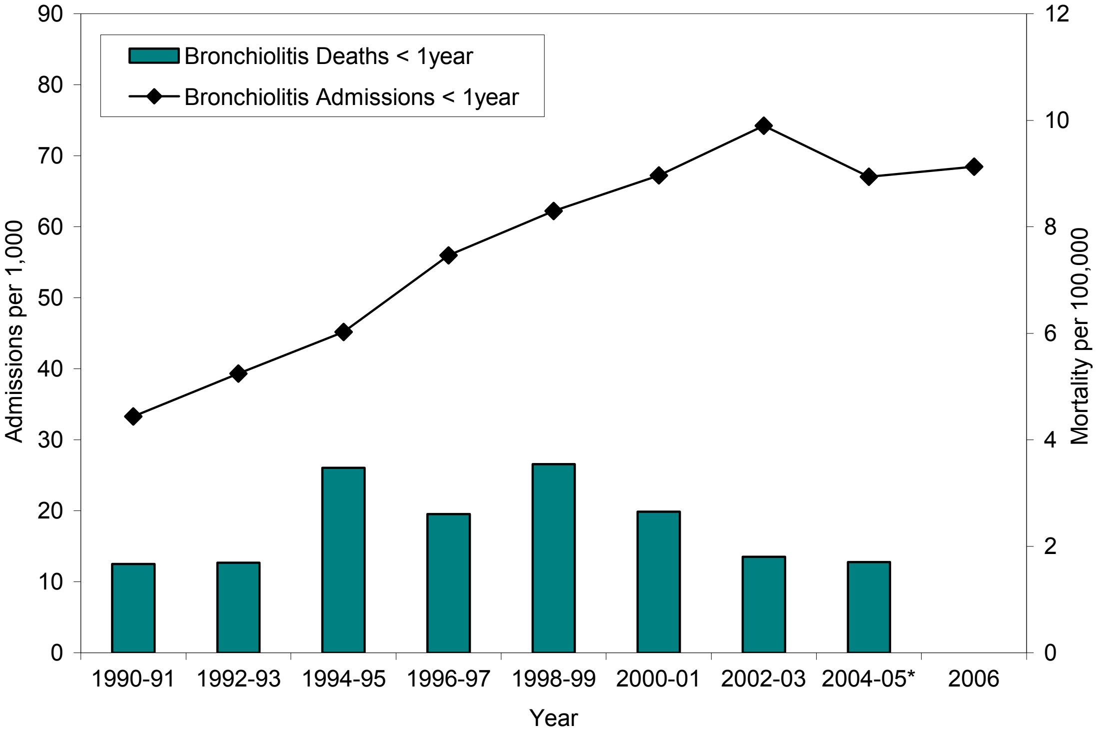
The limitations of the National Minimum Dataset are discussed at length in Appendix 1. The reader is urged to review this Appendix before interpreting any trends based on hospital admission data.

New Zealand Distribution and Trends

New Zealand's hospital admission rates for bronchiolitis in infants <1 year rose steadily during the 1990s and early 2000s, although data for 2004-2006 suggest that rates may be beginning to taper off. In contrast mortality, which initially decreased during the early 1990s, has remained relatively static at 1-2 deaths per year, during the last 12 years for which data was available (**Figure 136**).

Bronchiolitis is predominantly a disease of infancy, with the majority of hospital admissions and deaths occurring during the first year of life, although a small number also occur between 1-2 years of age (**Figure 137**). In addition to young age, during 2002-2006 hospital admissions for bronchiolitis were higher for Pacific and Māori infants, males and those living in the most deprived areas (**Table 90**). Similar ethnic differences were seen throughout 1996-2006 (**Figure 138**). During 2002-2006 there were marked regional variations in hospital admissions for bronchiolitis, with rates ranging from 26.2 to 112.7 per 1,000 depending on the region studied (**Table 91**).

Figure 136. Hospital Admissions and Deaths due to Bronchiolitis in Infants <1 Year, New Zealand 1990-2006 (Admissions) and 1990-2004 (Deaths)



Note: *Mortality is for 2004 year only

Figure 137. Hospital Admissions and Deaths due to Bronchiolitis in Children 0-5 Years by Age, New Zealand 2002-2006 (Admissions) and 2000-2004 (Deaths)

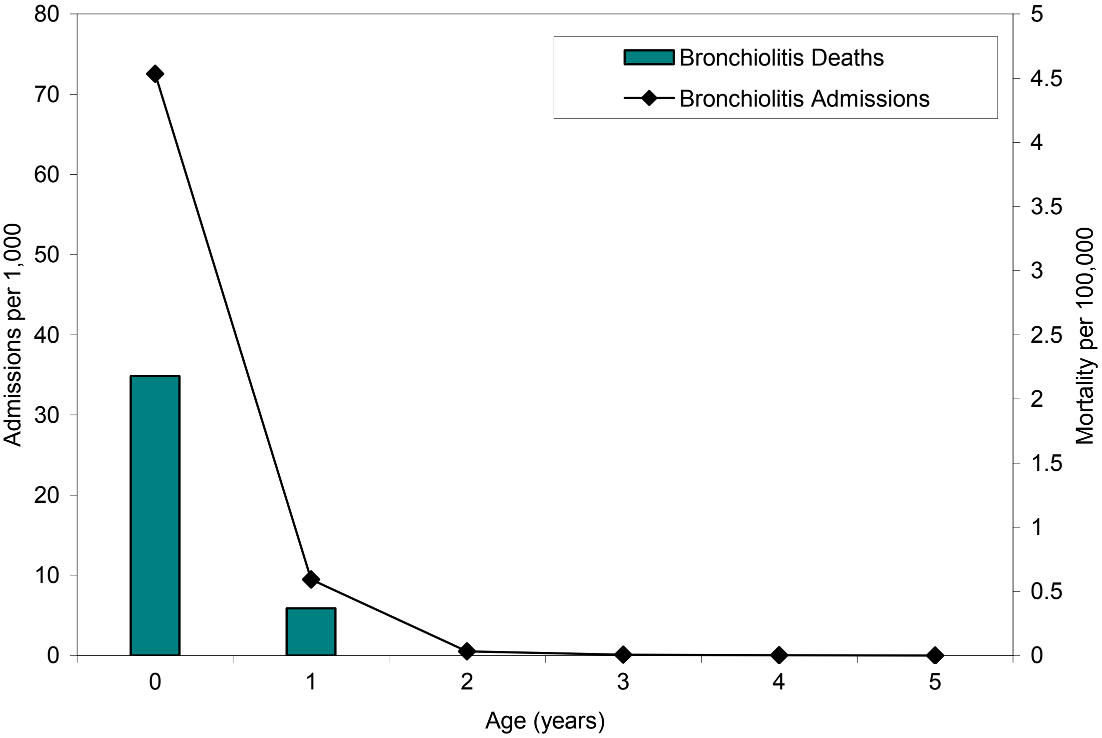


Table 90. Risk Factors for Hospital Admissions due to Bronchiolitis in Infants <1 Year, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	24.60	1.00		1-2	26.90	1.00	
2	29.10	1.18	1.05-1.32	3-4	37.20	1.38	1.28-1.48
3	34.70	1.41	1.27-1.57	5-6	49.90	1.85	1.73-1.98
4	39.30	1.60	1.44-1.77	7-8	71.70	2.66	2.50-2.83
5	44.80	1.83	1.65-2.03	9-10	129.40	4.81	4.54-5.10
6	54.10	2.20	2.00-2.42	Ethnicity			
7	66.00	2.69	2.45-2.96	Māori	110.00	2.95	2.86-3.05
8	76.20	3.10	2.83-3.40	Pacific	161.90	4.34	4.18-4.50
9	103.60	4.22	3.86-4.61	European	37.30	1.00	
10	151.70	6.18	5.67-6.74	Asian/Indian	16.60	0.45	0.41-0.50
Gender							
Female	55.00	1.00					
Male	84.50	1.54	1.50-1.58				

Note: Rate per 1,000 per year, RR: Rate Ratios are unadjusted

Figure 138. Hospital Admissions due to Bronchiolitis in Infants <1 Year by Ethnicity, New Zealand 1996-2006

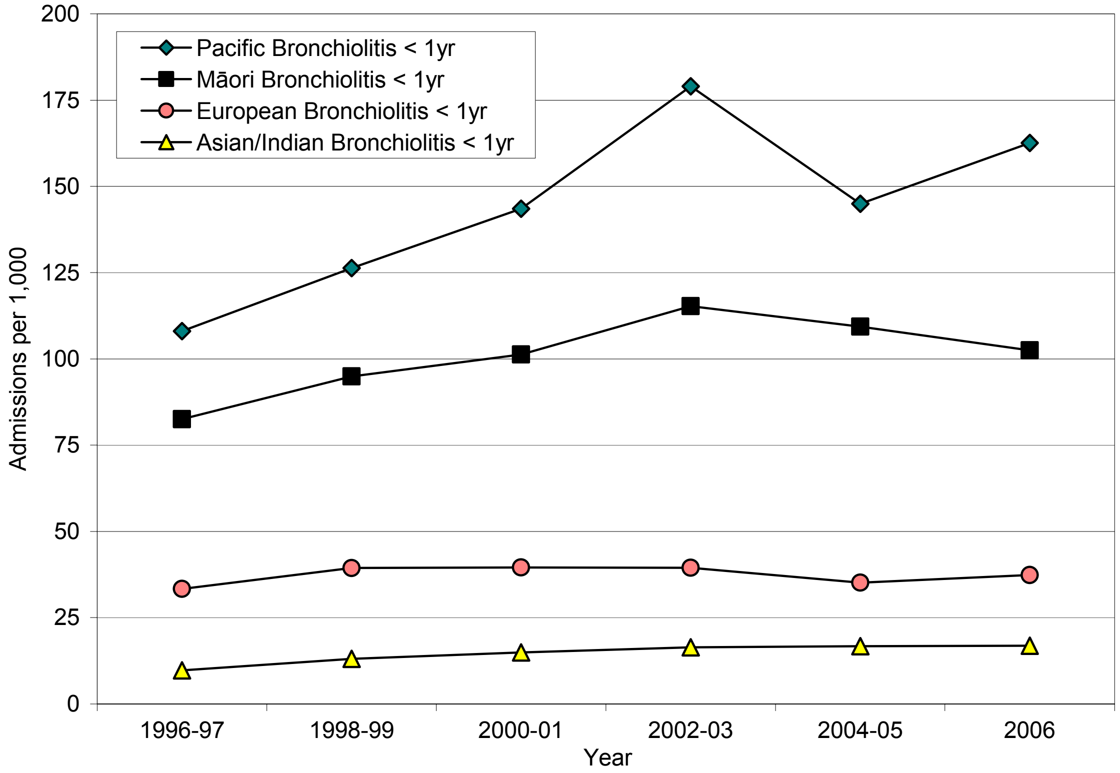


Table 91. Hospital Admissions for Bronchiolitis in Infants < 1 Year by DHB, New Zealand 2002-2006

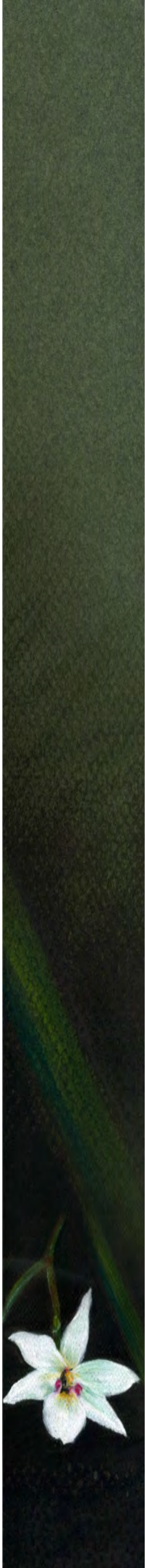
DHB	Number: Total 2002-2006	Number: Annual Average	Rate per 1,000	% of NZ Admissions
Northland	1,099	219.8	105.0	5.4
Waitemata	1,931	386.2	55.7	9.5
Auckland	1,834	366.8	59.7	9.1
Counties Manukau	4,395	879.0	112.7	21.7
Waikato	1,719	343.8	70.1	8.5
Lakes	867	173.4	109.5	4.3
Bay of Plenty	1,194	238.8	88.2	5.9
Tairawhiti	421	84.2	111.7	2.1
Taranaki	444	88.8	64.0	2.2
Hawkes Bay	980	196.0	91.3	4.8
Whanganui	326	65.2	76.9	1.6
MidCentral	528	105.6	49.8	2.6
Hutt	829	165.8	83.0	4.1
Capital and Coast	786	157.2	42.1	3.9
Wairarapa	175	35.0	72.4	0.9
Nelson Marlborough	226	45.2	29.5	1.1
West Coast	81	16.2	45.0	0.4
Canterbury	1,579	315.8	53.9	7.8
South Canterbury	76	15.2	26.2	0.4
Otago	402	80.4	41.0	2.0
Southland	309	61.8	43.5	1.5
New Zealand	20,250*	4,050	70.1	100.0

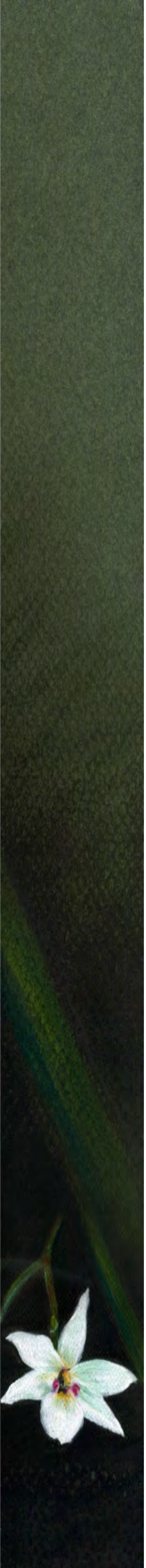
Note: *NZ Total includes 49 admissions where DHB was not stated; Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)

Summary

Bronchiolitis is an acute viral infection of the lower respiratory tract commonly caused by the respiratory syncitial virus (RSV). In New Zealand, hospital admissions for bronchiolitis in infants <1 year rose steadily during the 1990s and early 2000s, although data for 2004-2006 suggest that rates may be beginning to taper off. In contrast mortality, which initially decreased during the early 1990s, has remained relatively static at 1-2 deaths per year, during the last 12 years for which data was available.

Bronchiolitis is predominantly a disease of infancy, with the majority of hospital admissions and deaths occurring during the first year of life. In addition to young age, hospital admissions for bronchiolitis are higher for Pacific and Māori infants, males and those living in the most deprived areas. During 2002-2006 there were also marked regional variations in hospital admissions for bronchiolitis, with rates ranging from 26.2 to 112.7 per 1,000 depending on the region studied.





Pertussis

Introduction

Pertussis is a highly contagious, bacterial respiratory infection caused by the organism *Bordetella Pertussis*. Infection is droplet spread and occurs most commonly in unimmunised infants and children <4 years of age. The incubation period of 7-14 days is followed by 6-8 weeks of illness divided into 3 distinct stages: a catarrhal stage (10-14 days) associated with runny nose, sneezing and dry cough; a paroxysmal stage (4-6 weeks) associated with a paroxysmal cough often ending in an inspiratory whoop; and a convalescent stage (1-2 weeks) [178]. Pertussis is of particular concern if acquired during the first year of life, when mortality rates are at their highest [193]. While in New Zealand mortality has been low in recent years (0-1 deaths per year), morbidity remains high, with hospitalised infants often requiring oxygen, suction, (+/-) intubation during the paroxysmal phase [194].

Routine pertussis vaccination began in New Zealand in 1960, with the current schedule recommending vaccination at 6 weeks, 3 months and 5 months of age. Booster doses are recommended at 15 months and 4 years [193]. Yet, despite the widespread availability of vaccine, NZ's hospital admission rates for pertussis are 5-10 times higher than those of England / Wales and the USA [194] and epidemics occur at regular 4-5 year intervals, the most recent beginning in late 2004 [195]. In terms of reducing the burden of disease, evidence would suggest that improving on-time delivery of immunisation to children during the first year of life could be expected to significantly decrease hospital admission rates in NZ [194].

Data Source and Methods

Definition

Hospital Admissions and Deaths due to Pertussis in Infants < 1 Year of Age

Data Source

Admissions Numerator: National Minimum Dataset: Hospital admissions for infants < 1 year of age with a primary diagnosis of Pertussis (ICD-9 033; ICD-10 A37)

Deaths Numerator: National Mortality Collection: Deaths in infants < 1 year of age with a clinical code (cause of death) attributed to Pertussis (ICD-9 033; ICD-10 A37)

Denominator: NZ Census

Indicator Category

Admissions: Proxy B-C; Mortality: Ideal B (Table 133, Table 134)

Notes on Interpretation

The limitations of the National Minimum Dataset are discussed at length in Appendix 1. The reader is urged to review this Appendix before interpreting any trends based on hospital admission data.

New Zealand Distribution and Trends

During the past 17 years, pertussis epidemics have occurred in New Zealand at regular 3-5 year intervals, with hospital admissions for children <1 year following a similar pattern. In addition, during the past 5 years for which data was available, a total of 4 deaths were attributed to pertussis (**Figure 139**). While pertussis may affect any age group, it is amongst children <1 year of age that the disease is most severe, with the majority of hospital admissions and all recent deaths occurring in this age group (**Figure 140**). In addition, during 2002-2006 hospital admissions for pertussis were highest amongst Pacific and Māori infants and those living in the most deprived areas (**Table 92**).

During 1996-2006, hospital admissions for pertussis were higher amongst Pacific > Māori > European > Asian / Indian children, although interpretation of trends was difficult due to the presence of episodic outbreaks (**Figure 141**). During 2002-2006 there were also marked regional variations in hospital admissions for pertussis, with rates ranging from 0.8 to 4.5 per 1,000 depending on the region studied (**Table 93**).

Figure 139. Hospital Admissions for Pertussis in Infants <1 Year, New Zealand 1990-2006

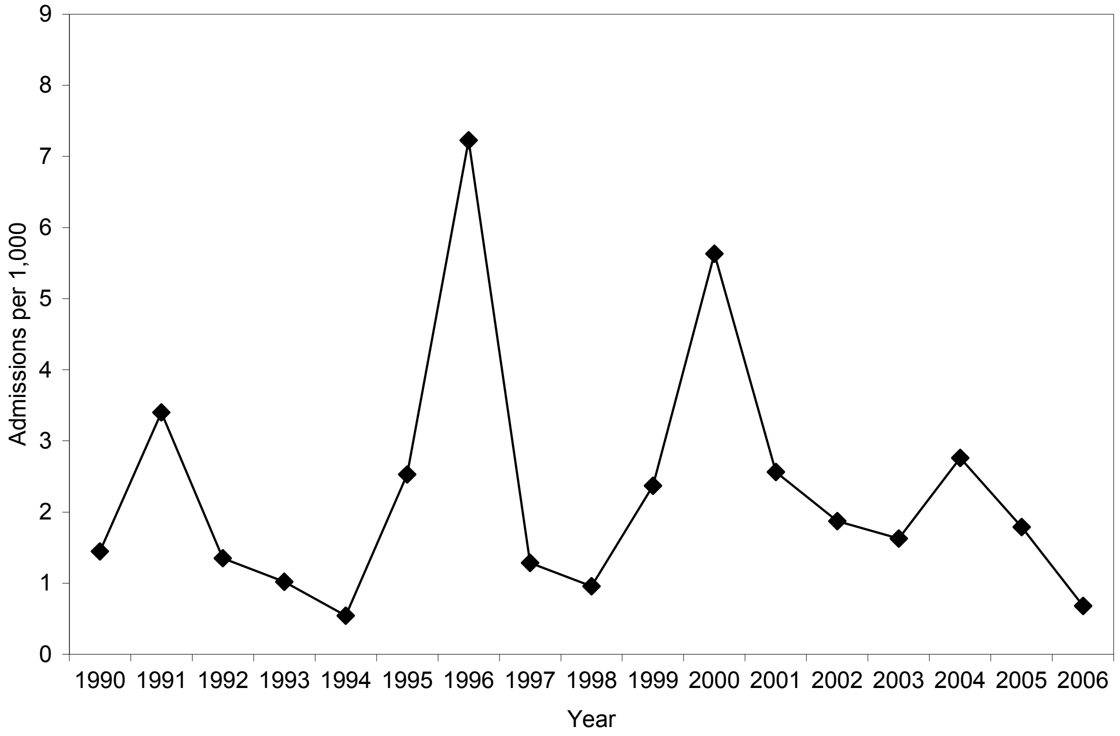
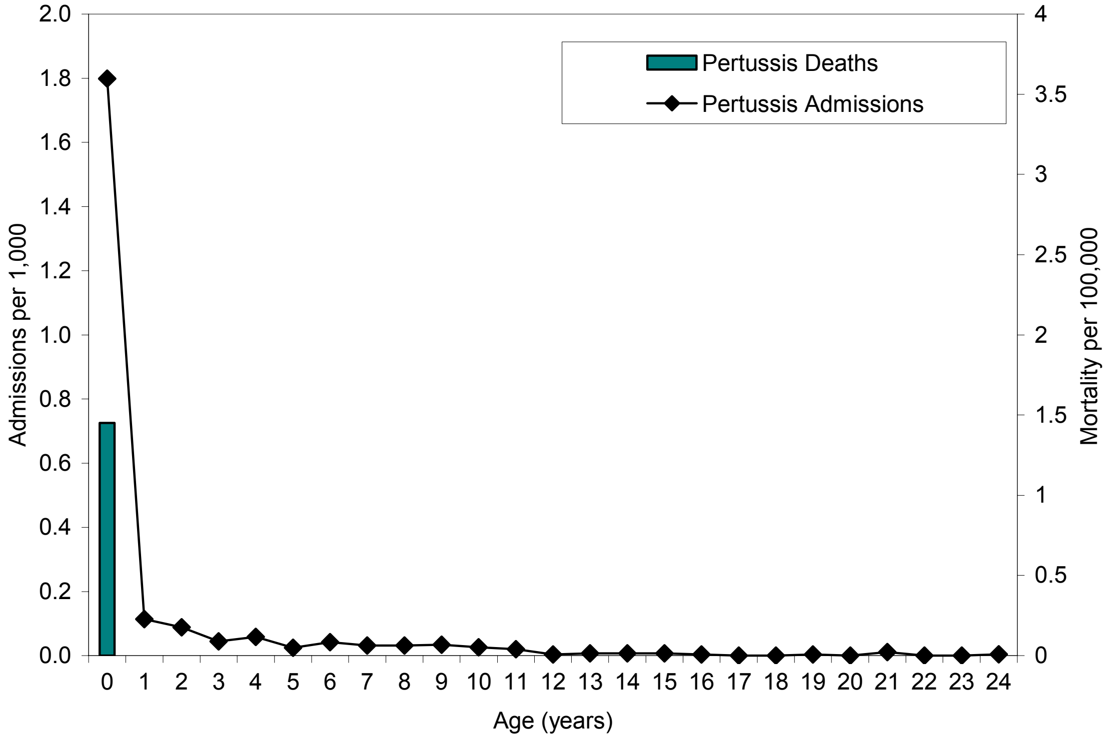


Figure 140. Hospital Admissions and Deaths for Pertussis in Children and Young People 0-24 Years by Age, New Zealand 2002-2006 (Admissions) and 2000-2004 (Deaths)



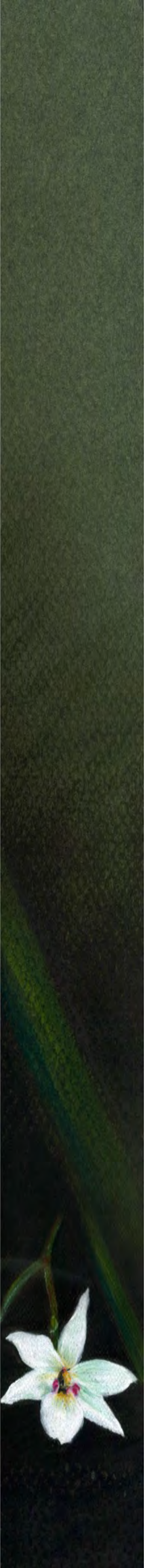


Table 92. Risk Factors for Hospital Admissions due to Pertussis in Infants <1 Year, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Quintile				Ethnicity			
1-2	0.84	1.00		Māori	2.61	2.25	1.84-2.75
3-4	1.07	1.26	0.83-1.91	Pacific	3.21	2.77	2.16-3.55
5-6	1.41	1.67	1.13-2.47	European	1.16	1.00	
7-8	1.53	1.81	1.24-2.63	Asian/Indian	0.34	0.29	0.15-0.57
9-10	3.13	3.70	2.63-5.21				
Gender							
Female	1.83	1.00					
Male	1.65	0.90	0.76-1.07				

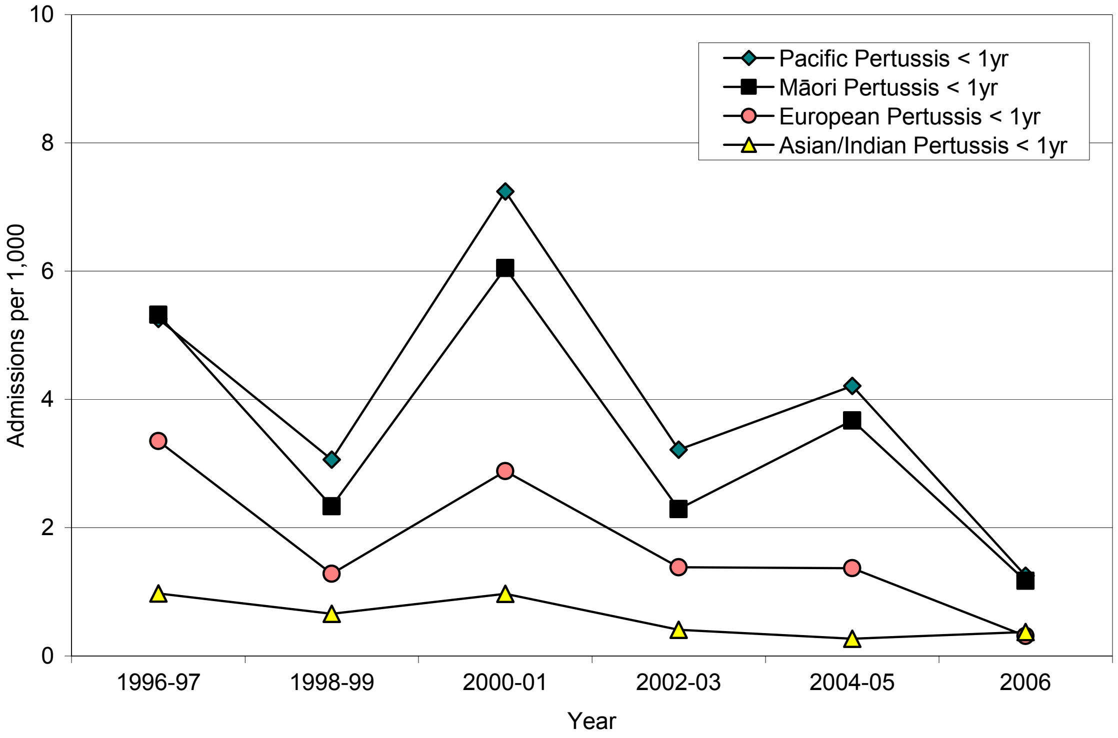
Note: Rate per 1,000 per year, RR: Rate Ratios are unadjusted

Table 93. Hospital Admissions for Pertussis in Infants < 1 Year by DHB, NZ 2002-2006

DHB	Number: Total 2002-2006	Number: Annual Average	Rate per 1,000	% of NZ Admissions
Northland	33	6.6	3.2	6.6
Waitemata	49	9.8	1.4	9.8
Auckland	38	7.6	1.2	7.6
Counties Manukau	75	15.0	1.9	14.9
Waikato	47	9.4	1.9	9.4
Lakes	14	2.8	1.8	2.8
Bay of Plenty	30	6.0	2.2	6.0
Tairawhiti	17	3.4	4.5	3.4
Taranaki	8	1.6	1.2	1.6
Hawkes Bay	35	7.0	3.3	7.0
Whanganui	14	2.8	3.3	2.8
MidCentral	20	4.0	1.9	4.0
Hutt	14	2.8	1.4	2.8
Capital and Coast	25	5.0	1.3	5.0
Wairarapa	6	1.2	2.5	1.2
Nelson Marlborough	12	2.4	1.6	2.4
West Coast	6	1.2	3.3	1.2
Canterbury	38	7.6	1.3	7.6
South Canterbury	<5	S	s	s
Otago	11	2.2	1.1	2.2
Southland	6	1.2	0.8	1.2
New Zealand	502*	100.4	1.7	100.0

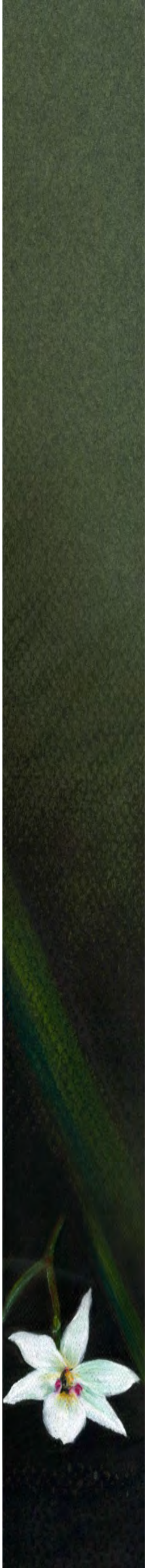
Note:*NZ Total includes 5 admissions where DHB was not stated: Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)

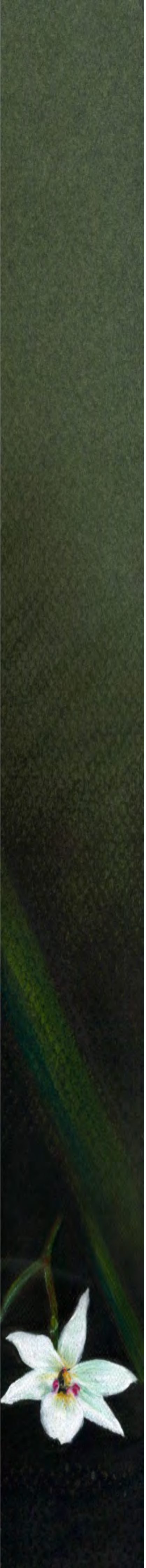
Figure 141. Hospital Admissions due to Pertussis in Infants <1 Year by Ethnicity, New Zealand 1996-2006



Summary

Pertussis is a highly contagious, bacterial respiratory infection caused by the organism *Bordetella Pertussis*. Infection is droplet spread and occurs most commonly in unimmunised infants and children <4 years of age. During the past 17 years, pertussis epidemics have occurred in New Zealand at regular 3-5 year intervals, with hospital admissions for children <1 year following a similar pattern. In addition, during the past 5 years for which data was available, a total of 4 deaths were attributed to pertussis. While pertussis may affect any age group, it is amongst children <1 year of age that the disease is most severe, with the majority of hospital admissions and all recent deaths occurring in this age group. In addition, during 2002-2006 hospital admissions for pertussis were highest amongst Pacific and Māori infants and those living in the most deprived areas. During 2002-2006, there were also marked regional variations in hospital admissions for pertussis, with rates ranging from 0.8 to 4.5 per 1,000 depending on the region studied.





Pneumonia

Introduction

The term pneumonia refers to a group of acute lower respiratory tract infections which lead to inflammation of the lung tissue. They are usually caused by inhaled micro-organisms from the upper respiratory tract, with the causative agent varying with the age of the child. In neonates, organisms from the mother's birth canal are the most common cause, while in infants > 4 months and preschool children viruses are a frequent cause, with the respiratory syncitial virus (RSV) being of particular importance. The most common bacterial cause after the neonatal period is *S. pneumoniae*, although *Chlamydia pneumoniae* and *Mycoplasma pneumoniae* have also been implicated, particularly in older children and adolescents [196]. Clinical manifestations include chills, fever, rapid pulse, high respiratory rates, cough, purulent sputum, chest pain and abdominal distension [178].

By international standards, New Zealand's pneumonia admission rates are high. New Zealand's rates also vary significantly by ethnicity, with Pacific and Māori children having both higher hospital admission rates [197] and more severe disease once admitted, than European children [198]. While risk factors for pneumonia overseas have included low socioeconomic status, poor nutrition, low birth weight, lack of breastfeeding, crowding and indoor smoke, it has been suggested that factors such as poor housing (cold, damp, mould, overcrowding), access to primary healthcare and poor nutrition (e.g. iron deficiency) are of particular importance in the New Zealand context [197].

Data Source and Methods

Definition

Hospital Admissions and Deaths due to Pneumonia in those aged 0-24 years

Data Source

Admissions Numerator: National Minimum Dataset: Hospital admissions of children and young people (0-24 years) with a primary diagnosis of Pneumonia (ICD-9 480-486, 487.0; ICD-10 J12-J18, J10.0 J11.0)

Deaths Numerator: National Mortality Collection: Deaths in children and young people (0-24 years) with a clinical code (cause of death) attributed to Pneumonia (ICD-9 480-486, 487.0; ICD-10 J12-J18, J10.0 J11.0)

Denominator: NZ Census

Indicator Category

Admissions: Proxy B-C; Mortality: Ideal B (Table 133, Table 134)

Notes on Interpretation

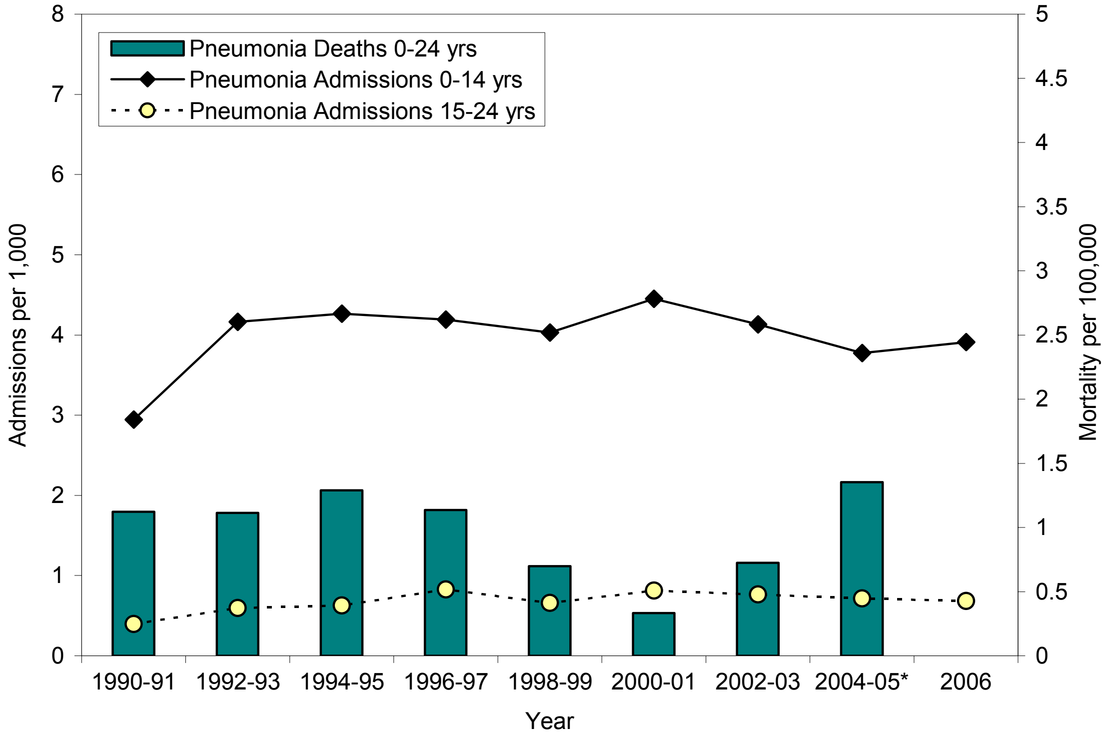
The limitations of the National Minimum Dataset are discussed at length in Appendix 1. The reader is urged to review this Appendix before interpreting any trends based on hospital admission data.

New Zealand Distribution and Trends

In New Zealand during the past 16 years, both pneumonia admissions and mortality have remained relatively static (**Figure 142**). During 2002-2006, pneumonia admissions were highest amongst infants and children 1-2 years of age (**Figure 143**), Pacific and Māori children, males and those living in the most deprived areas (**Table 94**). Mortality was highest for those <1 year of age.

During 1996-2006, marked ethnic disparities in pneumonia admission rates were evident, with rates being higher for Pacific > Māori > European and Asian / Indian children and young people throughout this period (**Figure 144**). During 2002-2006 marked regional variations were also evident, with pneumonia admissions in children and young people ranging from 0.9 to 6.8 per 1,000 depending on the region studied (**Table 95**).

Figure 142. Hospital Admissions and Deaths due to Pneumonia in Children and Young People 0-24 Years, New Zealand 1990-2006 (Admissions) and 1990-2004 (Deaths)



Note: Deaths for 2004-05 are for 2004 only

Figure 143. Hospital Admission and Deaths due to Pneumonia in Children and Young People 0-24 Years by Age, New Zealand 2002-2006 (Admissions) and 2000-2004 (Deaths)

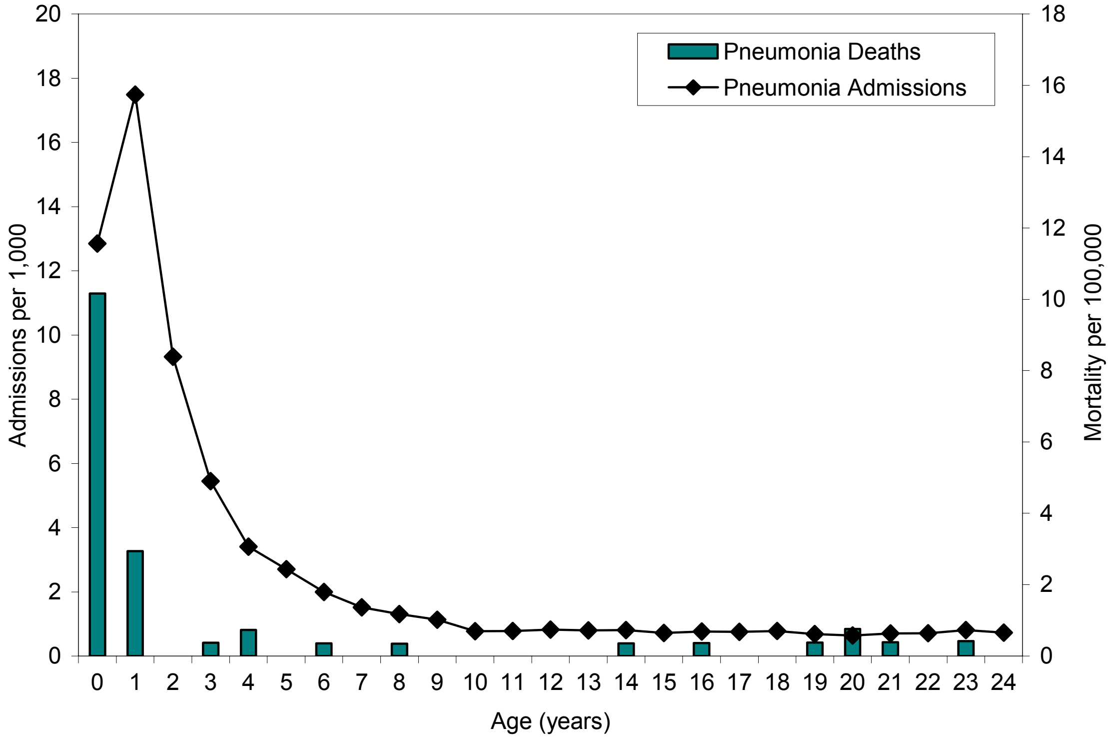


Table 94. Risk Factors for Hospital Admissions due to Pneumonia in Children 0-14 years, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	1.81	1.00		1-2	1.85	1.00	
2	1.88	1.04	0.94-1.15	3-4	2.48	1.34	1.25-1.43
3	2.28	1.26	1.15-1.38	5-6	3.09	1.67	1.57-1.78
4	2.68	1.48	1.35-1.62	7-8	4.32	2.34	2.21-2.48
5	2.76	1.52	1.39-1.67	9-10	7.12	3.85	3.65-4.06
6	3.42	1.89	1.73-2.06	Ethnicity			
7	3.51	1.94	1.78-2.12	Māori	5.07	2.04	1.97-2.12
8	5.10	2.81	2.59-3.05	Pacific	12.62	5.07	4.88-5.27
9	5.94	3.28	3.03-3.55	European	2.49	1.00	
10	8.10	4.47	4.15-4.82	Asian/Indian	2.62	1.05	0.98-1.13
Gender							
Female	3.71	1.00					
Male	4.17	1.13	1.10-1.16				

Note: Rate per 1,000 per year; RR: Rate Ratios are unadjusted.

Figure 144. Hospital Admissions due to Pneumonia in Children and Young People 0-24 Years by Ethnicity, New Zealand 1996-2006

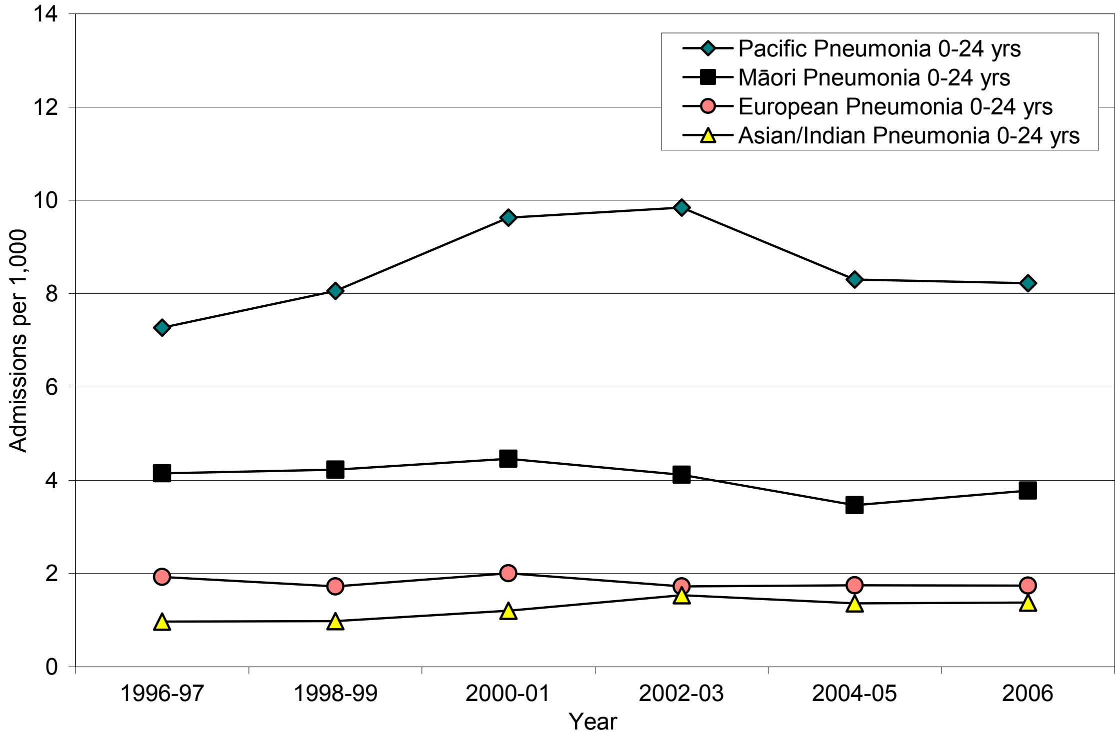


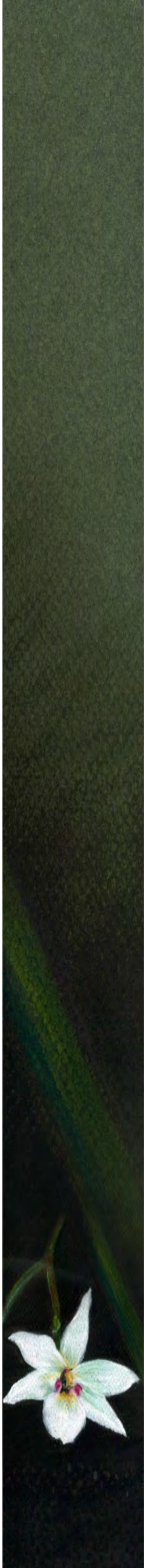
Table 95. Hospital Admissions due to Pneumonia in Children 0-14 Years by DHB, New Zealand 2002-2006

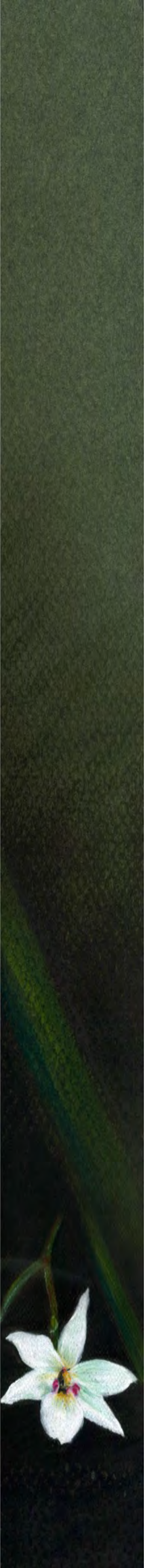
DHB	Number: Total 2002-2006	Number: Annual Average	Rate per 1,000	% of NZ Admissions
Northland	825	165.0	4.7	4.9
Waitemata	2,133	426.6	4.2	12.6
Auckland	2,182	436.4	5.8	12.9
Counties Manukau	3,644	728.8	6.8	21.5
Waikato	930	186.0	2.4	5.5
Lakes	631	126.2	5.2	3.7
Bay of Plenty	982	196.4	4.5	5.8
Tairawhiti	299	59.8	5.1	1.8
Taranaki	291	58.2	2.5	1.7
Hawkes Bay	503	100.6	2.9	3.0
Whanganui	225	45.0	3.1	1.3
MidCentral	498	99.6	2.9	2.9
Hutt	928	185.6	6.0	5.5
Capital and Coast	813	162.6	3.2	4.8
Wairarapa	131	26.2	3.1	0.8
Nelson Marlborough	245	49.0	1.9	1.4
West Coast	74	14.8	2.3	0.4
Canterbury	1,033	206.6	2.3	6.1
South Canterbury	47	9.4	0.9	0.3
Otago	286	57.2	1.8	1.7
Southland	201	40.2	1.8	1.2
New Zealand	16,951*	3,390.2	3.9	100.0

Note: *NZ Total includes 50 admissions where DHB was not stated: Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)

Summary

The term pneumonia refers to a group of acute lower respiratory tract infections which lead to inflammation of the lung tissue. They are usually caused by inhaled micro-organisms from the upper respiratory tract, with the causative agent varying with the age of the child. In New Zealand during the past 16 years, both pneumonia admissions and mortality have remained relatively static. During 2002-2006, pneumonia admissions were highest amongst infants and children 1-2 years of age, Pacific and Māori children, males and those living in the most deprived areas. Mortality was highest for those <1 year of age. During 2002-2006 marked regional variations were also evident, with pneumonia admissions for children and young people ranging from 0.9 to 6.8 per 1,000 depending on the region studied.





Bronchiectasis

Introduction

The term bronchiectasis originates from Greek, literally meaning ‘stretching of the windpipe’. Bronchiectasis is usually a progressive disease characterised by bronchial dilatation, with or without associated damage to the bronchial wall and lung parenchyma, and is usually accompanied by pus in the bronchial lumen. Clinically, bronchiectasis results in a persistent wet cough, with purulent sputum production in the older child and recurrent respiratory exacerbations. The symptoms result in significant morbidity, with lost schooldays and multiple absences from work for parents of affected children. Children with extensive bronchiectasis also have a reduced exercise capacity, may have slower growth [199], with finger clubbing and persistent coarse crackles on examination. Continued problems with untreated / extensive disease may progress to respiratory failure and premature death [200].

The estimated prevalence for New Zealand children is 7 times higher than the only country (Finland) for which comparable incidence figures are available [201]. By their 15th birthday, 1:1700 New Zealand children will be diagnosed with Bronchiectasis, with the incidence being 3 times higher for Māori and 12 times higher for Pacific children [201]. Bronchiectasis also demonstrates a marked socioeconomic gradient, with 67% of children in one study living in NZDep deciles 8-10 (the most deprived 30% of areas) and 58% living in households where one or more family members smoked [202]. Yet despite recent advances in the diagnosis of Bronchiectasis, its aetiology often remains unclear, with 50% of paediatric cases in one New Zealand study having an unknown aetiology (although 37% had a history of recurrent lower respiratory tract infection and a further 25% were presumed secondary to severe pneumonia [202]).

Data Source and Methods

Definition

Hospital Admissions and Mortality from Bronchiectasis where Cystic Fibrosis is not listed as a Co-Morbidity

Data Source

Admissions Numerator: National Minimum Dataset: Hospital admissions of children and young people (0-24 years) with a diagnosis of Bronchiectasis (ICD-9 494; ICD-10 J47) in any of the first 10 diagnostic codes. Cases where cystic fibrosis was mentioned in the first 10 diagnostic codes were excluded.

Deaths Numerator: National Mortality Collection: Deaths in children and young people (0-24 years) with a clinical code (cause of death) attributed to Bronchiectasis (ICD-9 494; ICD-10 J47) where Cystic fibrosis was not listed as a co-morbidity.

Denominator: NZ Census

Indicator Category

Admissions: Proxy B-C; Mortality: Ideal B (Table 133, Table 134)

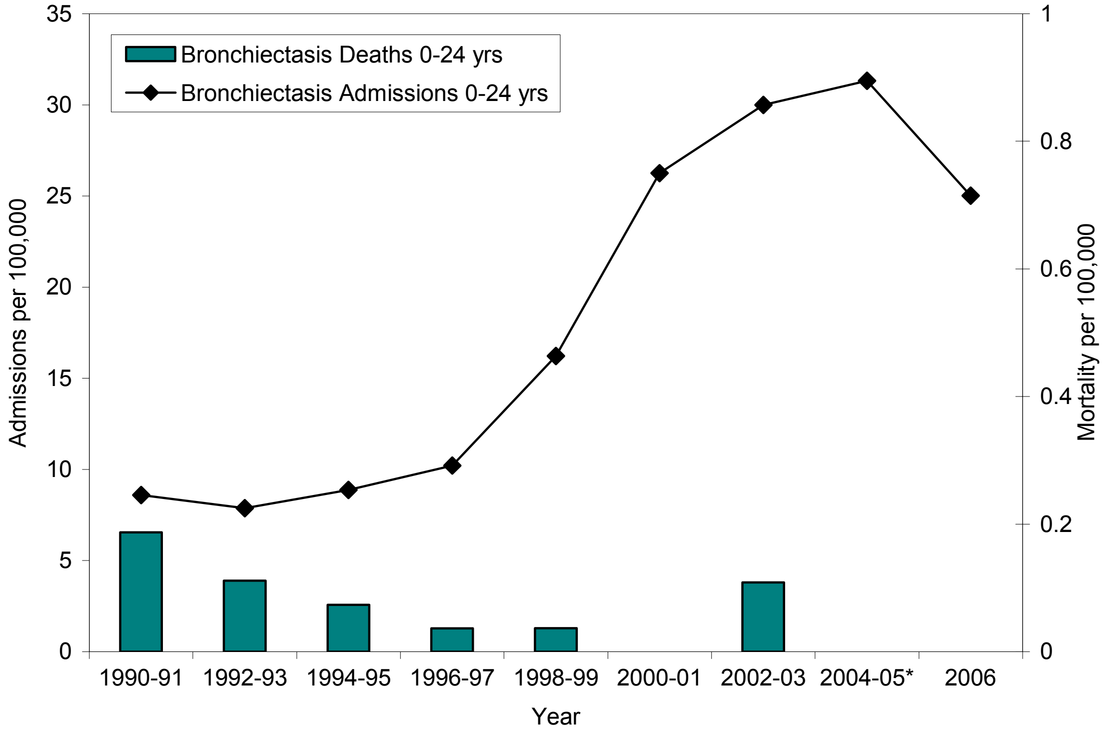
Notes on Interpretation

Because children and young people with cystic fibrosis may also develop bronchiectasis over time, and because the epidemiology of cystic fibrosis and non-cystic fibrosis bronchiectasis are likely to differ considerably, cases where cystic fibrosis was mentioned as a co-morbidity have been removed from this analysis. In addition, care must be taken when interpreting trends in bronchiectasis admissions over time, as it remains unclear whether they represent an increase in the underlying burden of disease, an increase in access to hospitalisation, or an increase in the use of High Resolution CT to diagnose bronchiectasis in this population. Other limitations of the National Minimum Dataset are discussed at length in Appendix 1. The reader is urged to review this Appendix before interpreting any trends based on hospital admission data.

New Zealand Distribution and Trends

Hospital admissions for bronchiectasis have increased dramatically in New Zealand during the past decade, while deaths have remained more static. Care must be taken when interpreting these trends however, as it remains unclear whether they represent an increase in the underlying burden of disease, an increase in access to hospitalisation, or an increase in the use of High Resolution CT to diagnose bronchiectasis in this population. (**Figure 145**). During 2002-2006, hospital admissions were highest amongst children 0-14 years (**Figure 146**), Pacific and Māori children and young people and those living in the most deprived areas (**Table 97**). While in absolute terms, hospital admissions for bronchiectasis since 1996 have increased most rapidly for Pacific and then Māori children and young people, data for 2006 suggest that these increases may be beginning to taper off (**Figure 147**). During 2002-2006, there were also marked regional variations in bronchiectasis admissions, with rates ranging from 6.5 to 84.7 per 100,000 depending on the region studied (**Table 97**).

Figure 145. Hospital Admissions and Deaths due to Bronchiectasis in Children and Young People 0-24 Years, New Zealand 1990-2006 (Admissions) and 1990-2004 (Deaths)



*Note: Deaths in 2004-05 are for 2004 only.

Figure 146. Hospital Admissions due to Bronchiectasis in Children and Young People 0-24 Years by Age, New Zealand 2002-2006

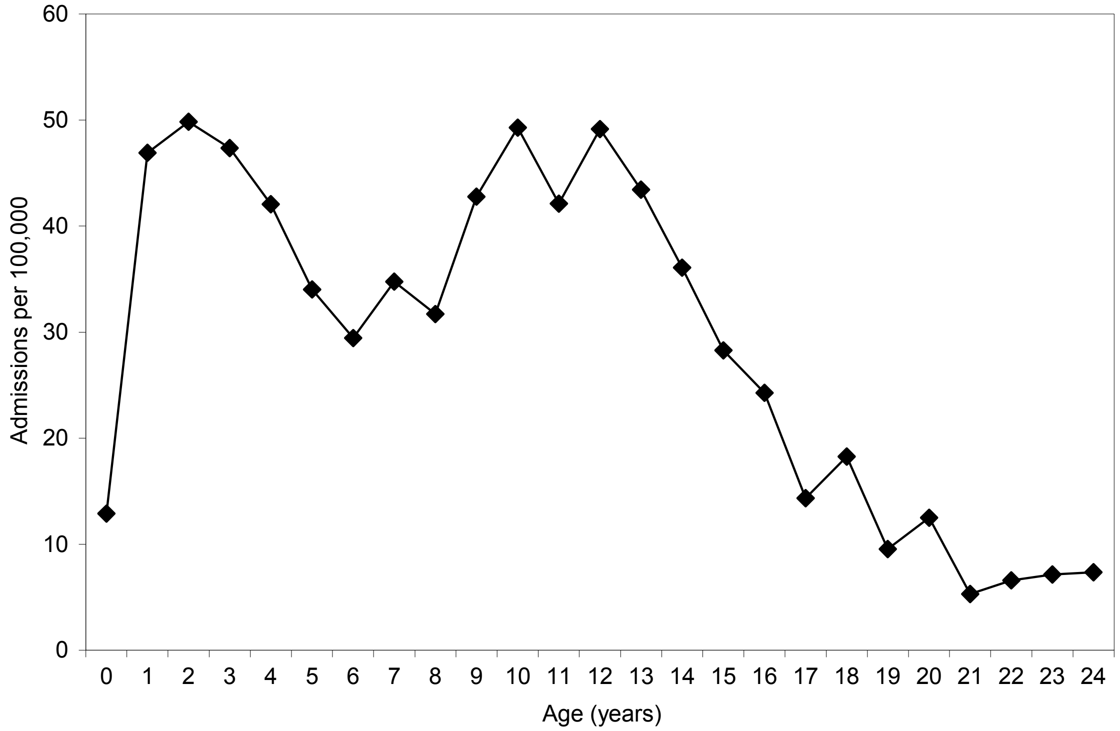


Figure 147. Hospital Admissions due to Bronchiectasis in Children and Young People 0-24 Years by Ethnicity, New Zealand 1996-2006

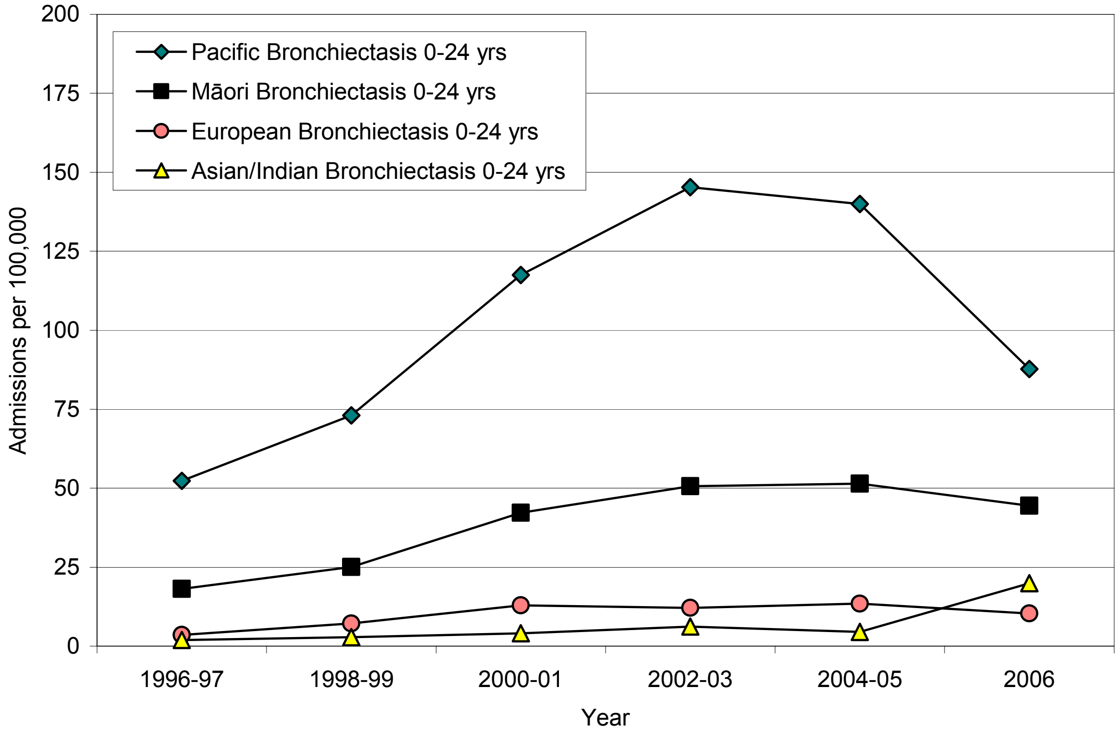


Table 96. Risk Factors for Hospital Admission due to Bronchiectasis in Children and Young People 0-24 Years, New Zealand 2002-2006

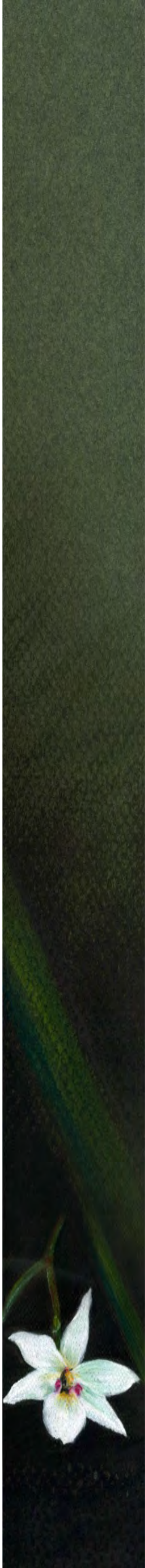
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	5.07	1.00		1-2	6.83	1.00	
2	8.62	1.70	1.11-2.60	3-4	12.76	1.87	1.45-2.41
3	16.96	3.35	2.28-4.92	5-6	22.34	3.27	2.58-4.14
4	8.49	1.67	1.09-2.56	7-8	28.59	4.18	3.33-5.25
5	21.59	4.26	2.93-6.20	9-10	66.36	9.71	7.84-12.02
6	23.09	4.55	3.14-6.60	Ethnicity			
7	18.71	3.69	2.53-5.39	Māori	49.73	4.03	3.60-4.52
8	37.98	7.49	5.24-10.70	Pacific	131.18	10.63	9.48-11.91
9	52.33	10.32	7.28-14.64	European	12.34	1.00	
10	79.00	15.58	11.04-21.98	Asian/Indian	8.64	0.70	0.53-0.92
Gender							
Female	30.14	1.00					
Male	28.90	0.96	0.88-1.05				

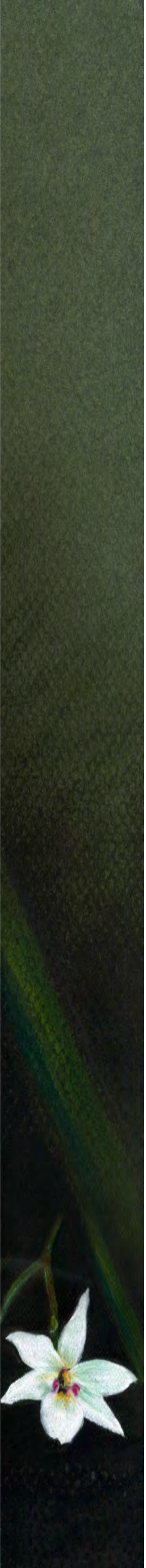
Note: Rate per 100,000 per year, RR: Rate Ratios are unadjusted

Table 97. Hospital Admissions for Bronchiectasis in Children and Young People 0-24 Years by DHB, New Zealand 2002-2006

DHB	Number: Total 2002-2006	Number: Annual Average	Rate per 100,000	% of NZ Admissions
Northland	78	15.6	30.4	3.8
Waitemata	233	46.6	28.2	11.2
Auckland	348	69.6	50.6	16.8
Counties Manukau	711	142.2	84.7	34.3
Waikato	122	24.4	19.6	5.9
Lakes	85	17.0	46.7	4.1
Bay of Plenty	68	13.6	21.0	3.3
Tairawhiti	43	8.6	49.2	2.1
Taranaki	23	4.6	12.7	1.1
Hawkes Bay	33	6.6	12.6	1.6
Whanganui	16	3.2	14.4	0.8
MidCentral	38	7.6	13.1	1.8
Hutt	27	5.4	11.0	1.3
Capital and Coast	92	18.4	20.1	4.4
Wairarapa	<5	s	s	s
Nelson Marlborough	36	7.2	17.9	1.7
West Coast	<5	s	s	s
Canterbury	50	10.0	6.5	2.4
South Canterbury	<5	s	s	s
Otago	27	5.4	8.6	1.3
Southland	30	6.0	16.8	1.4
New Zealand	2,072*	414.4	29.5	100.0

Note: NZ Total includes 4 admissions where DHB was not stated: Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)





Summary

Bronchiectasis is a progressive disease characterised by bronchial dilatation, with or without associated damage to the bronchial wall and lung parenchyma. In New Zealand hospital admissions for bronchiectasis have increased dramatically during the past decade, while deaths have remained more static. Care must be taken when interpreting these trends however, as it remains unclear whether they represent an increase in the underlying burden of disease, an increase in access to hospitalisation, or an increase in the use of High Resolution CT to diagnose bronchiectasis in this population. During 2002-2006, hospital admissions were highest amongst children 0-14 years, Pacific and Māori children and young people and those living in the most deprived areas. While in absolute terms, hospital admissions for bronchiectasis since 1996 have increased most rapidly for Pacific and then Māori children and young people, data for 2006 suggest that these increases may be beginning to taper off. During 2002-2006, there were also marked regional variations in bronchiectasis admission rates, with rates ranging from 6.5 to 84.7 per 100,000 depending on the region studied.

Asthma

Introduction

Asthma is a chronic inflammatory disorder, which causes narrowing of the airways in the lower respiratory tract as a result of bronchial smooth muscle constriction, swelling, inflammation and mucus production. Episodic airflow obstruction leads to symptoms such as shortness of breath, wheezing, prolonged expiration and an irritative cough. Attacks in children are most commonly triggered by viral infections, but may also be associated with hypersensitivity to substances such as pollen, mould, house dust mite, foods, animal dander, cigarette smoke, chemicals or drugs. Asthma may also be triggered by exercise, exposure to cold air, or psychological stress [178].

New Zealand has one of the highest reported prevalences of asthma in the world [203], with 25% of children aged 6-7 years and 30% of adolescents 13-14 years reporting asthma symptoms in one recent survey [204]. While asthma prevalence is thought to be highest amongst Māori > European > Pacific children, symptom severity is highest amongst Māori and Pacific children [205]. Ethnic disparities have also been reported in hospital admission rates, with admissions for Māori children being higher than for non-Māori children, particularly in rural areas [206]. While from a public health perspective, addressing issues such as exposure to tobacco smoke, use of preventer medication and access to primary health care may assist in reducing disparities in the severity of asthma symptoms / hospital admission rates [205], it remains unclear what population level interventions will be of value in reducing the underlying prevalence of asthma in New Zealand's children and young people.

Data Source and Methods

Definition

Hospital Admissions and Deaths due to Asthma in those aged 0-24 years

Data Source

Admissions Numerator: National Minimum Dataset: Hospital admissions of children and young people (0-24 years) with a primary diagnosis of Asthma (ICD-9 493; ICD-10 J45-46)

Deaths Numerator: National Mortality Collection: Deaths in children and young people (0-24 years) with a clinical code (cause of death) attributed to Asthma (ICD-9 493; ICD-10 J45-46)

Denominator: NZ Census

Indicator Category

Admissions: Proxy B-C; Mortality: Ideal B (Table 133, Table 134)

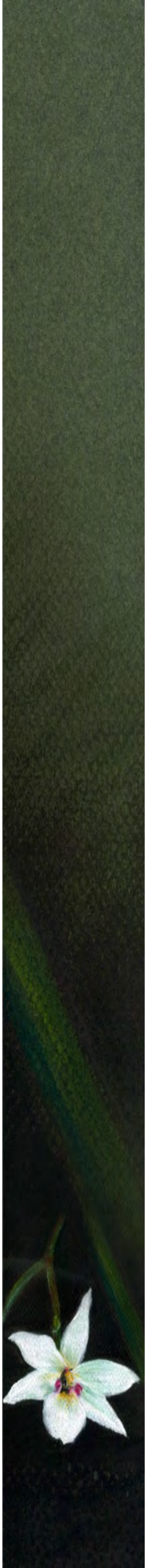
Notes on Interpretation

The limitations of the National Minimum Dataset are discussed at length in Appendix 1. The reader is urged to review this Appendix before interpreting any trends based on hospital admission data.

New Zealand Distribution and Trends

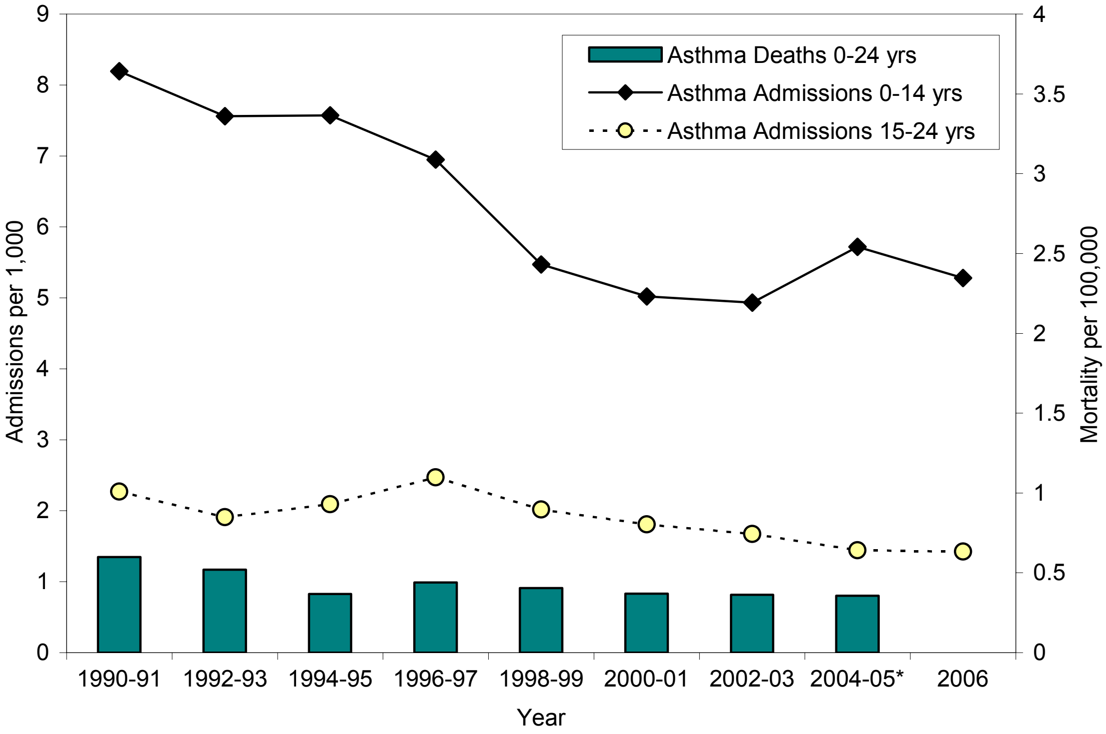
In New Zealand during the past decade asthma admissions amongst children and young people have gradually declined, although 2004-2006 saw an increase in admissions amongst children 0-14 years. In contrast, mortality remained relatively static during this period (**Figure 148**). While hospital admissions during 2002-2006 were highest amongst children <5 years of age, mortality during 2000-2004 was highest amongst adolescents and those in their early 20s (**Figure 149**). Hospital admissions were also higher for children living in the most deprived areas, males, Pacific, Māori and Asian / Indian children (**Table 98**).

During 1996-2006, there were marked ethnic differences in hospital admissions for asthma, with rates being higher for Pacific and Māori > European and Asian / Indian children and young people. In addition, all ethnic groups (to a varying extent) experienced an upswing in admission rates during 2004-2006 (**Figure 150**). There



were also marked regional variations in asthma admission rates for children and young people during 2002-2006, with rates ranging from 3.1 to 7.6 per 1,000 depending on the region studied (**Table 99**).

Figure 148. Hospital Admissions and Deaths due to Asthma in Children and Young People 0-24 Years, New Zealand 1990-2006 (Admissions) and 1990-2004 (Deaths)



Note: *Mortality in 2004-05 is for 2004 year only

Figure 149. Hospital Admissions and Deaths due to Asthma in Children and Young People 0-24 Years by Age, New Zealand 2002-2006 (Admissions) and 2000-2004 (Deaths)

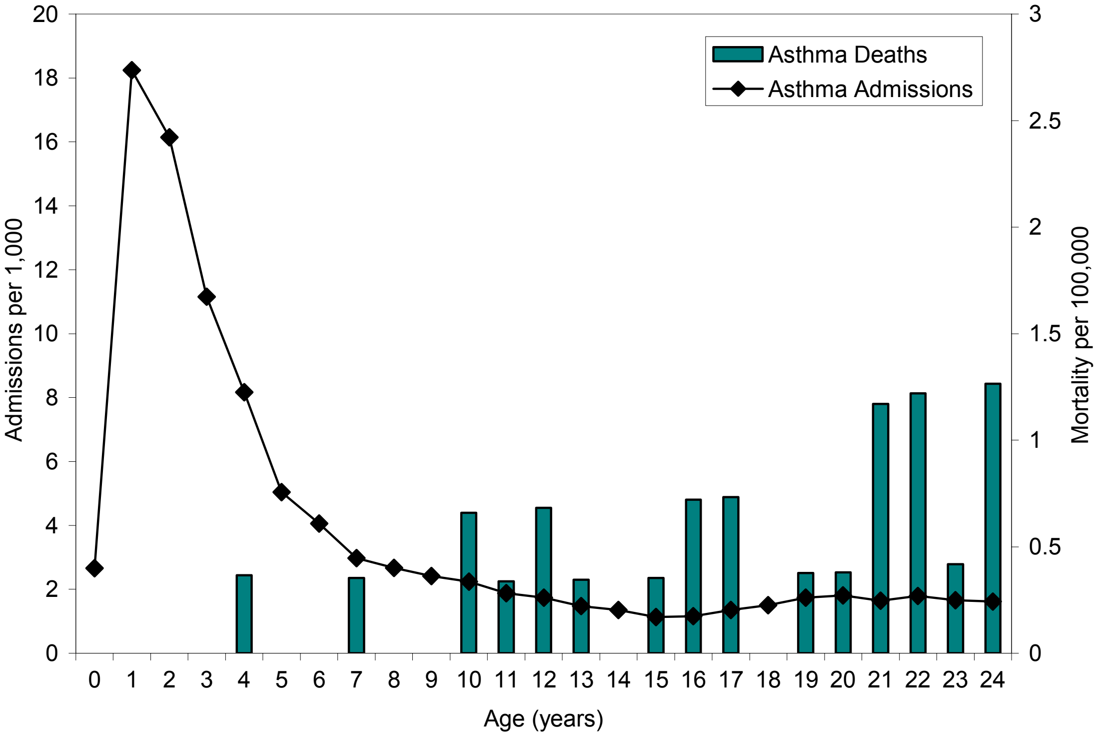
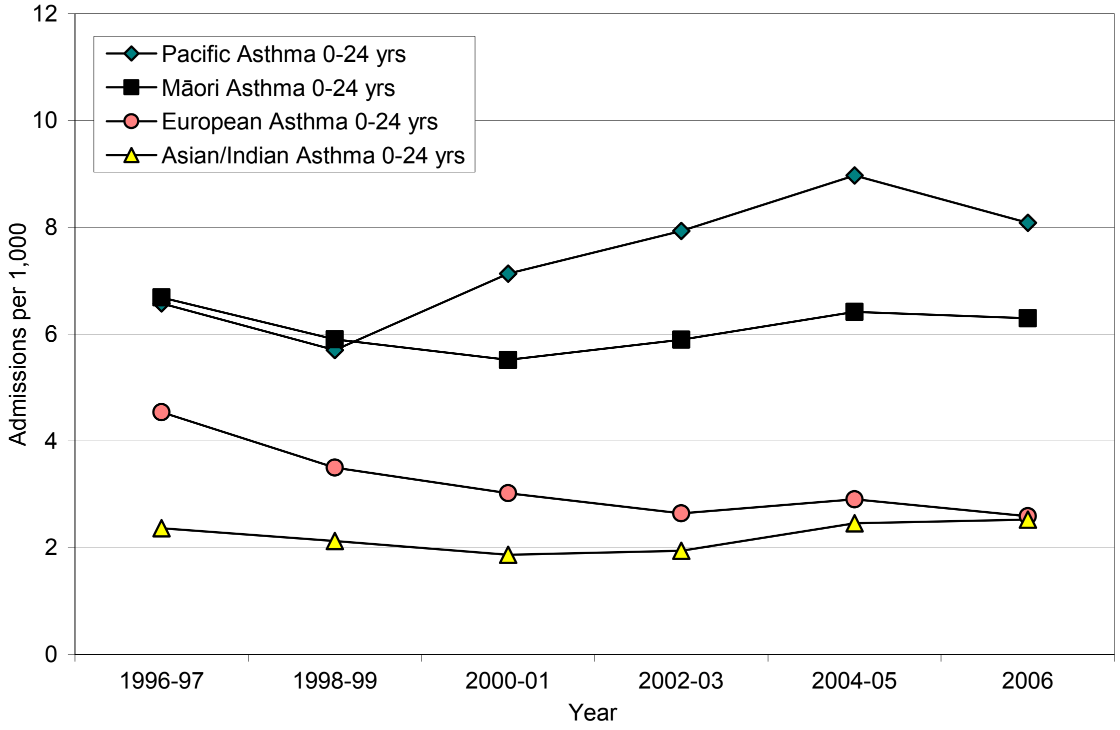


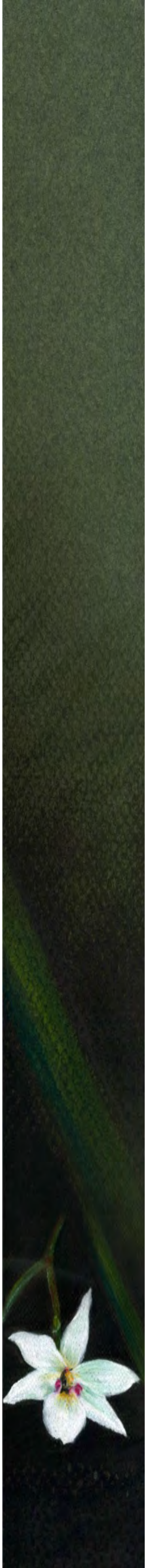
Table 98. Risk Factors for Hospital Admissions due to Asthma in Children 0-14 Years, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	2.52	1.00		1-2	2.59	1.00	
2	2.66	1.05	0.97-1.14	3-4	3.46	1.33	1.26-1.41
3	3.03	1.20	1.11-1.30	5-6	4.76	1.84	1.75-1.94
4	3.89	1.54	1.43-1.66	7-8	6.75	2.60	2.48-2.73
5	4.18	1.65	1.53-1.78	9-10	8.30	3.20	3.05-3.35
6	5.34	2.12	1.97-2.28	Ethnicity			
7	5.95	2.36	2.20-2.53	Māori	7.97	2.19	2.12-2.26
8	7.52	2.98	2.78-3.19	Pacific	11.43	3.14	3.03-3.26
9	8.11	3.21	3.00-3.43	European	3.64	1.00	
10	8.45	3.35	3.14-3.58	Asian/Indian	4.16	1.14	1.08-1.21
Gender							
Female	4.48	1.00					
Male	6.12	1.37	1.33-1.41				

Note: Rate per 1,000 per year. RR: Rate Ratios are unadjusted

Figure 150. Hospital Admissions due to Asthma in Children and Young People 0-24 Years by Ethnicity, New Zealand 1996-2006





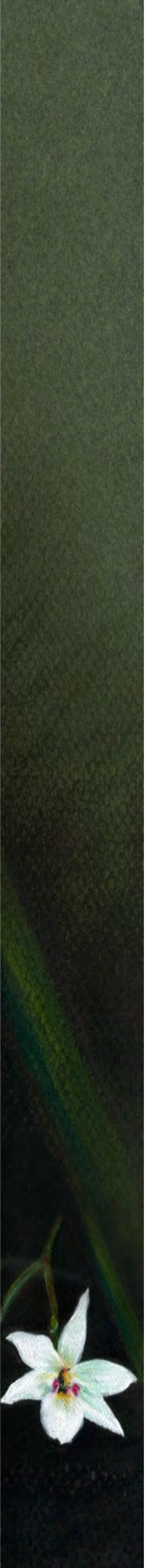


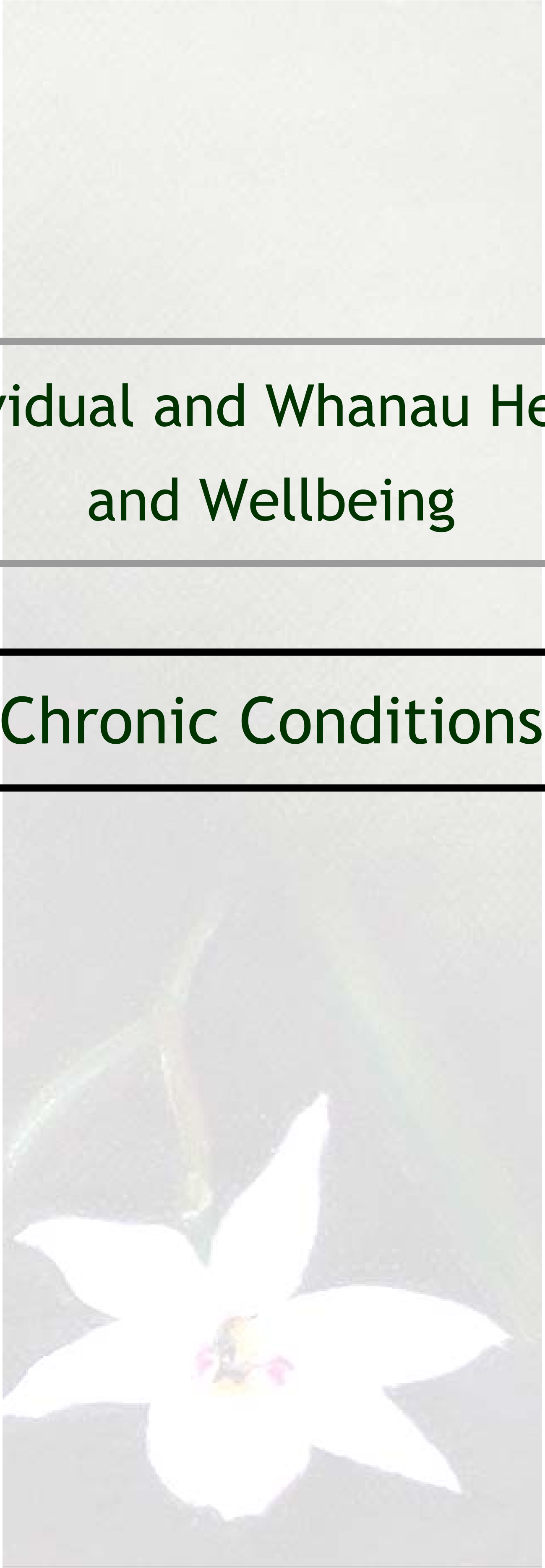
Table 99. Hospital Admissions due to Asthma in Children 0-14 Years by DHB, New Zealand 2002-2006

DHB	Number: Total 2002-2006	Number: Annual Average	Rate per 1,000	% of NZ Admissions
Northland	986	197.2	5.6	4.3
Waitemata	2,757	551.4	5.4	12.1
Auckland	2,709	541.8	7.3	11.8
Counties Manukau	3,655	731.0	6.8	16.0
Waikato	1,532	306.4	4.0	6.7
Lakes	778	155.6	6.5	3.4
Bay of Plenty	1,304	260.8	6.0	5.7
Tairawhiti	448	89.6	7.6	2.0
Taranaki	612	122.4	5.2	2.7
Hawke's Bay	959	191.8	5.6	4.2
Whanganui	388	77.6	5.4	1.7
MidCentral	765	153.0	4.4	3.3
Hutt	933	186.6	6.0	4.1
Capital and Coast	915	183.0	3.6	4.0
Wairarapa	191	38.2	4.5	0.8
Nelson Marlborough	408	81.6	3.1	1.8
West Coast	144	28.8	4.4	0.6
Canterbury	2,140	428.0	4.8	9.4
South Canterbury	185	37.0	3.4	0.8
Otago	564	112.8	3.5	2.5
Southland	412	82.4	3.7	1.8
New Zealand	22,861*	4,572.2	5.3	100.0

Note: *NZ Total includes 76 admissions where DHB was not stated: Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)

Summary

Asthma is a chronic inflammatory disorder, which causes narrowing of the airways in the lower respiratory tract as a result of bronchial smooth muscle constriction, swelling, inflammation and mucus production. In New Zealand during the past decade asthma admissions amongst children and young people have gradually declined, although 2004-2006 saw an increase in admissions amongst children 0-14 years. In contrast, mortality remained relatively static during this period. While hospital admissions during 2002-2006 were highest amongst children <5 years of age, mortality during 2000-2004 was highest amongst adolescents and those in their early 20s. Hospital admissions were also higher for children living in the most deprived areas, males and Pacific, Māori and Asian / Indian children. There were also marked regional variations in asthma admissions for children and young people during 2002-2006, with rates ranging from 3.1 to 7.6 per 1,000 depending on the region studied.



Individual and Whanau Health and Wellbeing

Chronic Conditions

Diabetes and Epilepsy

In New Zealand a range of chronic conditions affect the wellbeing of children and young people, but because many of these conditions are managed in primary care, or by specialist outpatient clinics, they are often not adequately captured in routine statistics. This lack of visibility should not preclude the needs of children and young people with chronic conditions being taken into consideration in prioritisation and strategy development. In an attempt to address this issue, the following sections bring together the available data on two conditions which have significant resource implications for the New Zealand health sector. These are:

1. Insulin Dependent (Type 1) Diabetes Mellitus
2. Epilepsy

Caution is urged when interpreting the information in the sections which follow, which by necessity are based on hospital inpatient and mortality data, as the majority of children and young people with these conditions are managed on an outpatient basis, with hospital admissions being reserved for those who require stabilisation immediately following diagnosis, who are experiencing complications, or who remain poorly controlled despite maximal outpatient management. It is thus likely that these figures are biased towards those at the more severe end of the spectrum, and thus reflect the “tip of the iceberg” in terms the burden of morbidity associated with these conditions. Nevertheless, it hoped that an analysis of hospital inpatient data will serve to highlight the needs of a group of children and young people who might otherwise not appear in routine health statistics.

Data Source and Methods

Definition

1. Hospital Admissions due to Insulin Dependent Diabetes Mellitus in children and young people 0-24 years
2. Hospital Admissions due to Epilepsy and Status Epilepticus in children and young people 0-24 years

Data Source

1. Insulin Dependent Diabetes Mellitus

Admissions Numerator: National Minimum Dataset: Hospital admissions of children and young people (0-24 years) with a primary diagnosis of Insulin Dependent Diabetes Mellitus (ICD-10 E10)

Deaths Numerator: National Mortality Collection: Deaths in children and young people (0-24 years) with a clinical code (cause of death) attributed to Insulin Dependent Diabetes Mellitus (ICD-10 E10)

Denominator: NZ Census

2. Epilepsy and Status Epilepticus

Admissions Numerator: National Minimum Dataset: Hospital admissions of children and young people (0-24 years) with a primary diagnosis of Epilepsy (ICD-10 G40) or Status Epilepticus (ICD-10 G41). Epilepsy types were coded using ICD-9 subcategories

Deaths Numerator: National Mortality Collection: Deaths in children and young people (0-24 years) with a clinical code (cause of death) attributed to Epilepsy (ICD-10 G40) or Status Epilepticus (ICD-10 G41)

Denominator: NZ Census

Indicator Category

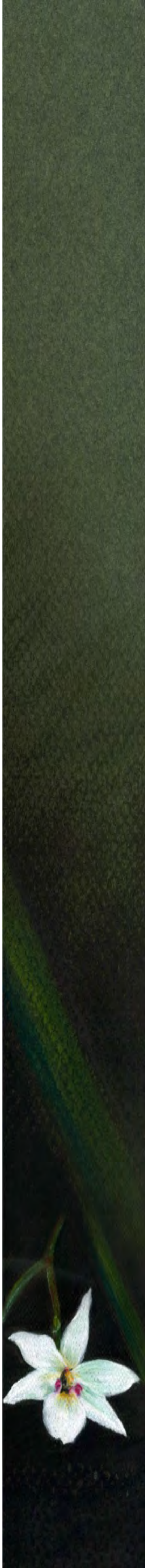
Bookmark C (**Table 133**, **Table 134**)

Notes on Interpretation

The limitations of the National Minimum Dataset are discussed at length in Appendix 1. The reader is urged to review this Appendix before interpreting any trends based on hospital admission data.

Type 1 Diabetes

Overseas research suggests that the incidence of Type I diabetes is increasing in the under 15 age group [207]. National and regional incidence studies during the past three decades also indicate that similar trends may be occurring in New Zealand. During 1968-72, a review of hospital admission data suggested an annual incidence (new



cases per year) of 8.9 per 100,000 for those 0-15 years [208]. In Auckland during 1977-84, registry data suggested rates of 9.3 per 100,000 [209], while a Canterbury audit during 1982-90 suggested rates of 12.8 per 100,000 [210]. In contrast, active national surveillance over a two year period during 1999-00 found an annual incidence of 17.9 per 100,000, with rates being 4.5 times higher amongst European children. The same review also noted that while the incidence of Type 1 diabetes had doubled in New Zealand during the past three decades, the geographical (South Island > North Island) and ethnic (European > Māori) differences highlighted in previous reports had persisted [207]. In contrast, prevalence estimates (existing cases at a single point in time) based on a recent Christchurch review suggested that 227 per 100,000 of those aged 0-24 years had Type 1 diabetes, with rates being 274 per 100,000 Europeans and 81 per 100,000 for Māori. The same report also noted a two to threefold rise in the prevalence of Type 1 diabetes since similar estimates were made in 1988 [211].

Active surveillance during 1999-00 also suggested a number of risk factors for Type 1 Diabetes including [207]:

1. Age: 21% of new Type 1 diabetics were <5 years of age, with a median age of diagnosis of 9.5 years for males and 9.0 years for females and the peak incidence being between 9-11 years.
2. Ethnicity: Māori, Pacific and Asian children all had significantly lower rates of Type 1 diabetes than European children, with the incidence for Māori being 5.6 per 100,000, as compared to 21.7% for non-Māori children.
3. Family History: While there were no significant differences in diabetes incidence by gender, 8.8% of cases had a first degree relative with Type I diabetes.

At a population level, increases in the number of children and young people with Type 1 diabetes have significant implications for service delivery, with optimal long term outcomes requiring intensive management by the patient, their family and their health professional team [211]. It has been suggested that if the increases highlighted above continue at their current pace, new models of service delivery may be required in both paediatric and adult secondary care services [211]. In addition, with estimates of 1:500 school children having Type 1 diabetes, this has implications for health policy planning in schools as well, with most secondary schools likely to have at least one child with diabetes [211]. In the longer term, such increases may also signal increases in microvascular (e.g. retinopathy and nephropathy) and macrovascular disease (e.g. coronary heart disease, stroke and peripheral vascular disease) as the current generation of children and young people with Type 1 diabetes reach adulthood [212].

Hospital Admissions for Type 1 Diabetes

While changes in the way in which diabetes was coded over time precluded an accurate time series analysis, a cross sectional analysis of hospital admissions was possible for 2002-2006. During this period, hospital admissions for Type 1 diabetes were higher amongst European >> Māori and Pacific >> Asian / Indian children and young people. A modest socioeconomic gradient was evident with increased rates in children and young people living in more deprived areas (**Table 101**). Hospital admissions increased progressively with age, reaching a peak in adolescence and thereafter declining (**Figure 151**). In addition, there were five deaths attributed to Type 1 diabetes amongst children and young people 0-24 years during 2000-2004.

During 2002-2006 there were also marked regional variations in hospital admissions for Type 1 diabetes, with rates varying from 22.9 to 146.0 per 100,000 depending on the region studied (**Table 102**).

Table 100. Hospital Admissions for Diabetes in Children and Young People 0-24 Years by Diagnosis, New Zealand 2002-2006

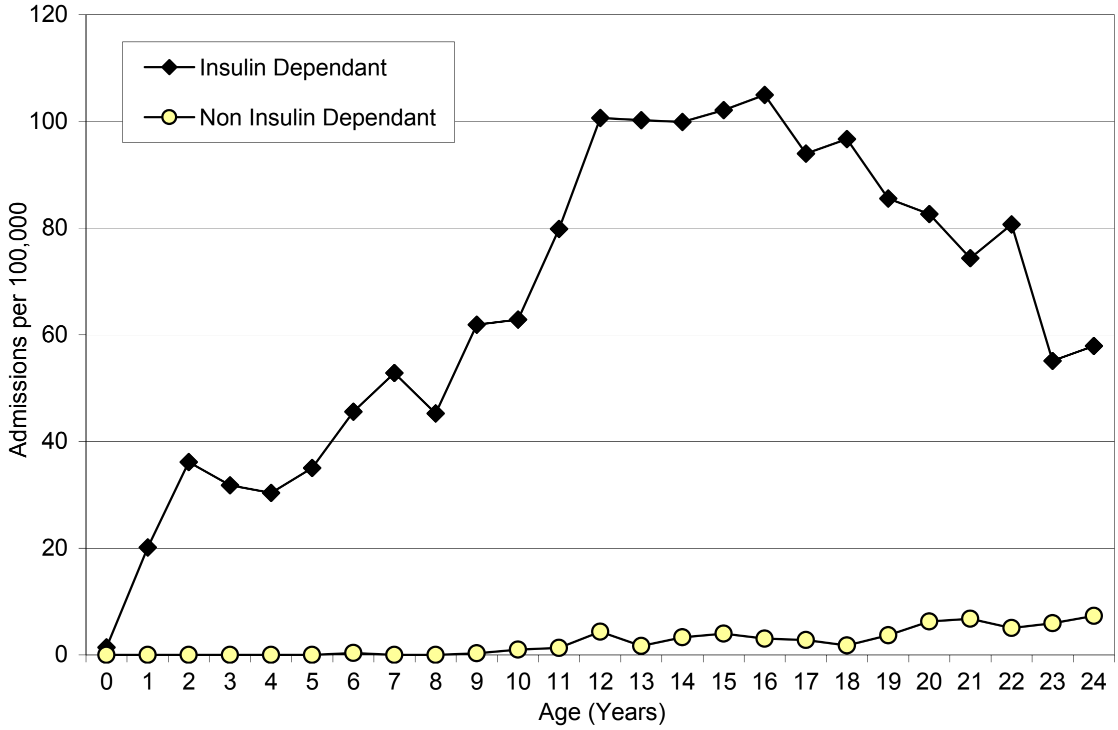
Diagnosis	Number: Total 2002-2006	Number: Annual Average	Rate per 100,000	% of Total
Insulin Dependant Diabetes	4642	928.4	66.1	95.4
Non Insulin Dependant	162	32.4	2.3	3.3
Other & Unspecified Diabetes	61	12.2	0.9	1.3
Total	4865	973.0	69.3	100.0

Table 101. Risk Factors for Hospital Admission for Insulin Dependant Diabetes in Children and Young People 0-24 Years, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	50.39	1.00		1-2	47.38	1.00	
2	44.32	0.88	0.75-1.03	3-4	56.71	1.20	1.08-1.33
3	53.15	1.05	0.90-1.22	5-6	73.82	1.56	1.41-1.72
4	60.34	1.20	1.04-1.39	7-8	84.03	1.77	1.61-1.95
5	76.17	1.51	1.31-1.73	9-10	66.71	1.41	1.28-1.55
6	71.52	1.42	1.24-1.63	Ethnicity			
7	84.93	1.69	1.48-1.93	Māori	42.03	0.48	0.44-0.52
8	83.17	1.65	1.44-1.89	Pacific	41.70	0.47	0.41-0.54
9	74.74	1.48	1.30-1.69	European	87.85	1.00	
10	59.47	1.18	1.03-1.35	Asian/Indian	11.78	0.13	0.10-0.16
Gender							
Female	74.63	1.00					
Male	57.87	0.78	0.74-0.83				

Note: Rate per 100,000 per year. RR: Rate Ratios are unadjusted.

Figure 151. Hospital Admissions for Diabetes in Children and Young People 0-24 Years by Age and Type, New Zealand 2002-2006



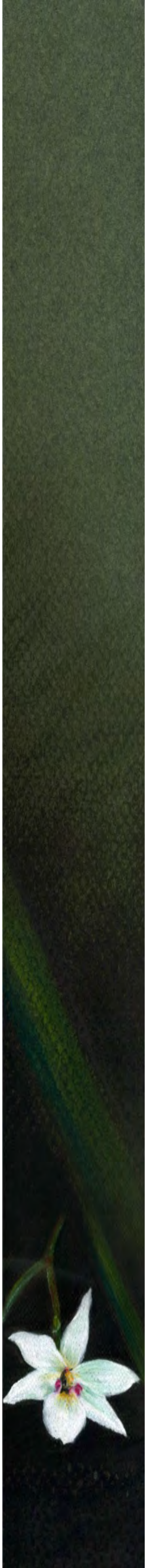


Table 102. Hospital Admissions due to Insulin Dependant Diabetes in Children and Young People 0-24 Years by DHB, New Zealand 2002-2006

DHB	Number: Total 2002-2006	Number: Annual Average	Rate per 100,000	% of NZ Admissions
Northland	196	39.2	76.3	4.2
Waitemata	460	92.0	55.7	9.9
Auckland	259	51.8	37.7	5.6
Counties Manukau	432	86.4	51.5	9.3
Waikato	546	109.2	87.8	11.8
Lakes	146	29.2	80.1	3.1
Bay of Plenty	165	33.0	51.0	3.6
Tairawhiti	20	4.0	22.9	0.4
Taranaki	141	28.2	77.9	3.0
Hawkes Bay	263	52.6	100.7	5.7
Whanganui	61	12.2	54.8	1.3
MidCentral	185	37.0	63.9	4.0
Hutt	156	31.2	63.6	3.4
Capital and Coast	130	26.0	28.4	2.8
Wairarapa	92	18.4	146.0	2.0
Nelson Marlborough	120	24.0	59.5	2.6
West Coast	25	5.0	50.8	0.5
Canterbury	624	124.8	81.6	13.4
South Canterbury	98	19.6	119.3	2.1
Otago	293	58.6	93.8	6.3
Southland	216	43.2	121.2	4.7
New Zealand	4642*	928.4	66.1	100.0

Note: *NZ Total includes 14 admissions where DHB was not stated. Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)

Epilepsy and Status Epilepticus

Epilepsy is the most common serious neurological illness in children and young people. It is a cause of significant morbidity for those affected and has significant resource implications for the health care system. In developed countries, it is generally accepted that the incidence (number of new cases) of epilepsy is 50 per 100,000 per year, while the prevalence (existing cases at any point in time) is 5-10 per 1,000 [213]. In the year ending June 2006, PHARMAC estimated that the New Zealand health sector spent $24.6 million on anti-epilepsy medications [214].

Despite its significant impact, epilepsy is not an entity in itself, but rather a symptom complex arising from a variety of different processes. Causes vary with age, with congenital, developmental and genetic conditions being most commonly associated with the development of epilepsy in childhood, while head trauma, central nervous system infections and tumours may lead to epilepsy at any age [213]. In addition, in a proportion of cases, the underlying cause for the epilepsy is unknown [215]. In developed countries, it had been consistently shown that despite an overall good prognosis for seizure control, those with epilepsy have a 2-3 fold increase in risk of mortality compared to those without epilepsy, with most deaths being directly related to the epilepsy itself [216]. In addition, a recent audit of epilepsy related deaths in the UK found that 59% of deaths during childhood could have potentially or probably been avoided given sufficient attention to appropriate drug management, access to specialist care or adequate investigations [216].

Hospital Admissions for Epilepsy

During 2002-2006, the most common reason for a hospital admission with epilepsy was for a generalized convulsion, followed by those for whom type of epilepsy was not specified (**Table 103**). During 2002-2006, while ethnic disparities in hospital admissions for epilepsy and status epilepticus were not marked, a modest socioeconomic gradient existed, with admission rates being higher amongst those living in more deprived areas (**Table 104**).

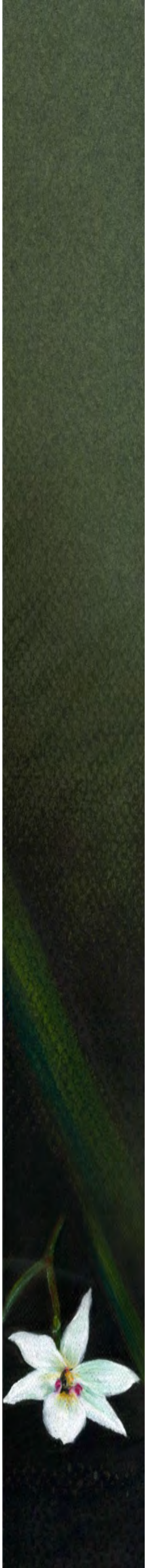
Table 103. Hospital Admissions for Epilepsy in Children and Young People 0-24 Years by Diagnosis, New Zealand 2002-2006

Diagnosis	Number: Total 2002-2006	Number: Annual Average	Rate per 100,000	% of Total
Generalised: Idiopathic	1826	365.2	26.0	29.7
Grand Mal Seizures NOS	443	88.6	6.3	7.2
Generalised: Other	281	56.2	4.0	4.6
Status Epilepticus	681	136.2	9.7	11.1
Partial Seizures: Complex	499	99.8	7.1	8.1
Partial Seizures: Simple	320	64.0	4.6	5.2
Partial Seizures: Localised Onset	32	6.4	0.5	0.5
Petit Mal NOS	15	3.0	0.2	0.2
Special Epileptic Syndromes	9	1.8	0.1	0.1
Unspecified Epilepsy	1881	376.2	26.8	30.6
Other Epilepsy	153	30.6	2.2	2.5
Total	6140	1228.0	87.4	100.0

Table 104. Risk Factors for Hospital Admission for Epilepsy and Status Epilepticus in Children and Young People 0-24 Years, New Zealand 2002-2006

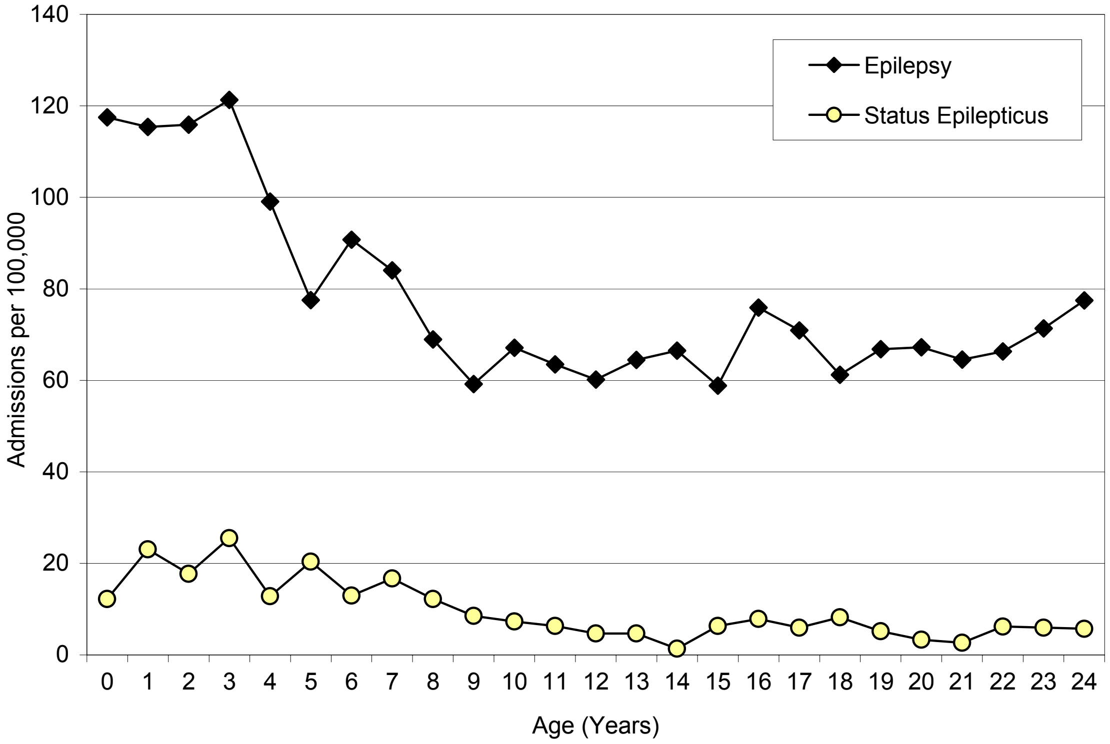
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	53.52	1.00		1-2	55.71	1.00	
2	57.94	1.08	0.94-1.25	3-4	79.41	1.43	1.30-1.57
3	74.50	1.39	1.21-1.59	5-6	67.95	1.22	1.11-1.34
4	84.42	1.58	1.38-1.80	7-8	111.17	2.00	1.83-2.18
5	59.05	1.10	0.95-1.27	9-10	112.59	2.02	1.86-2.20
6	76.65	1.43	1.25-1.64	Ethnicity			
7	107.35	2.01	1.77-2.28	Māori	97.85	1.04	0.98-1.10
8	114.80	2.14	1.89-2.42	Pacific	95.74	1.01	0.92-1.11
9	121.94	2.28	2.02-2.57	European	94.50	1.00	
10	104.16	1.95	1.73-2.20	Asian/Indian	29.22	0.31	0.27-0.36
Gender							
Female	82.66	1.00					
Male	92.06	1.11	1.06-1.17				

Note: Rate per 100,000 per year. RR: Rate Ratios are unadjusted.



During the same period, hospital admissions for epilepsy and status epilepticus were highest amongst those under 5 years, with epilepsy admission rates decreasing through childhood, before increasing slightly again amongst young people in their early 20s (**Figure 152**). During 2000-2004 there were 59 deaths attributed to epilepsy or status epilepticus amongst children and young people 0-24 years. In addition, there were marked regional variations in admission rates for epilepsy and status epilepticus during 2003-05, with rates ranging from 52.9 to 197.7 per 100,000 depending on the region studied (**Table 105**).

Figure 152. Hospital Admissions for Epilepsy in Children and Young People 0-24 Years by Age, New Zealand 2002-2006



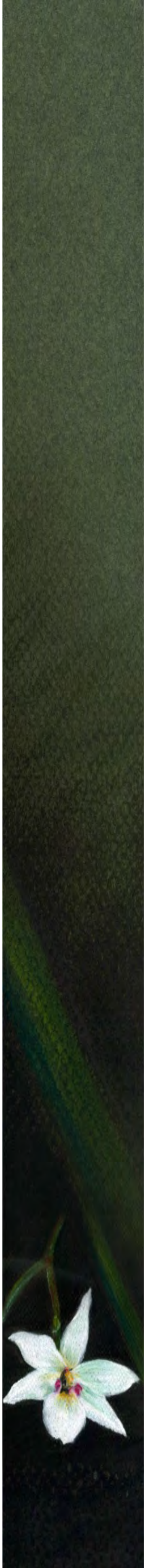
Summary

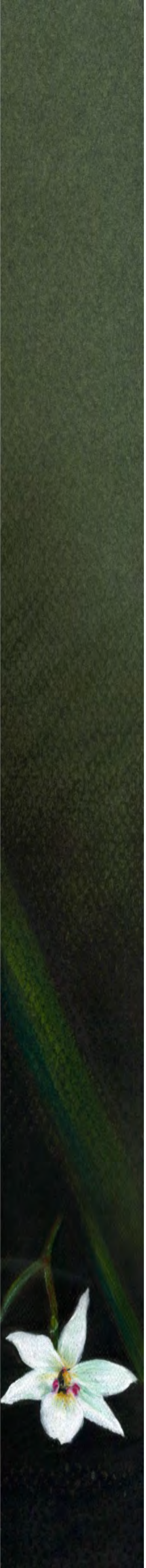
Type 1 diabetes and epilepsy are two conditions which impact significantly on the health and wellbeing of New Zealand children and young people. They also have significant implications for health care resourcing. In New Zealand during the past two decades, the available evidence would suggest that the incidence of Type 1 diabetes is increasing, and while less time series information is available for epilepsy, analysis of mortality data during 2000-2004 suggests that it a significant cause of mortality in this age group. It is thus important that the needs of children with chronic conditions be kept in mind, when making prioritisation and resource allocation decisions in the area of child and youth health.

Table 105. Hospital Admissions due to Epilepsy and Status Epilepticus in Children and Young People 0-24 Years by DHB, New Zealand 2002-2006

DHB	Number: Total 2002-2006	Number: Annual Average	Rate per 100,000	% of NZ Admissions
Northland	328	65.6	127.6	5.3
Waitemata	563	112.6	68.2	9.2
Auckland	427	85.4	62.1	7.0
Counties Manukau	764	152.8	91.0	12.4
Waikato	484	96.8	77.9	7.9
Lakes	201	40.2	110.3	3.3
Bay of Plenty	291	58.2	89.9	4.7
Tairawhiti	81	16.2	92.7	1.3
Taranaki	164	32.8	90.6	2.7
Hawkes Bay	286	57.2	109.5	4.7
Whanganui	220	44.0	197.7	3.6
MidCentral	153	30.6	52.9	2.5
Hutt	252	50.4	102.7	4.1
Capital and Coast	356	71.2	77.9	5.8
Wairarapa	122	24.4	193.7	2.0
Nelson Marlborough	161	32.2	79.8	2.6
West Coast	54	10.8	109.8	0.9
Canterbury	774	154.8	101.2	12.6
South Canterbury	65	13.0	79.1	1.1
Otago	208	41.6	66.6	3.4
Southland	156	31.2	87.5	2.5
New Zealand	6140*	1228.0	87.4	100.0

Note: *NZ Total includes 30 admissions where DHB was not stated. Note: Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)





Cancer

Introduction

Cancer in New Zealand children is relatively rare, with just over 1/3 of cases being attributed to leukaemia. Other types, in descending order of frequency are brain, bone and connective tissue, non-Hodgkin's lymphoma and kidney. These 5 sites account for >80% of childhood cancer registrations and >70% of childhood cancer deaths [217]. Since 1956, the incidence of childhood cancer in New Zealand has increased (for males, from 13 per 100,000 in 1956 to 17 per 100,000 in the early 1980s and thereafter has remained stable; for females, from 10 per 100,000 in 1956 to 15 per 100,000 in 1996, although the rate of increase has slowed during the past 15 years). In contrast, cancer mortality has declined steadily, from 8 (males) / 7 (females) per 100,000 in 1956 to 5 (males) / 4 (females) per 100,000 in 1997. Projections suggest that these opposing trends in incidence (increasing) and mortality (decreasing) will continue into the near future [217].

In terms of known risk factors, a wide range of familial and genetic syndromes have been associated with childhood cancer overseas. Studies on the links between genetic factors and the environment however have been more inconsistent. In addition, few solely environmental risk factors have been established, although ionising radiation and infective agents have been implicated in a number of specific situations [218]. Thus, from a population health point of view, further research is necessary before sound evidence based primary prevention strategies can be developed which address the incidence of childhood cancer in this country. In terms of reducing the impact of childhood cancer once it has developed however, while treatment is very successful in preventing death in the majority of cases, families of children newly diagnosed with cancer can still expect multiple hospital admissions, treatments with severe side effects, and a great disruption to many aspects of their everyday life [219]. Thus ensuring the equitable access to specialist health services, family support and the reimbursement of travel / associated costs remains of considerable importance in reducing the burden cancer places on the families of children and young people in this country.

Data Source and Methods

Definition

1. Notifications to the New Zealand Cancer Registry for Children and Young People 0-24 Years
2. Deaths due to Cancer in Children and Young People 0-24 Years

Data Sources

1. Cancer Notifications

Numerator: The New Zealand Cancer Registry: Notifications for children and young people 0-24 years. Cancer site was assigned using the following ICD-10 Codes: myeloid leukaemia C29; lymphoid leukaemia C91; Hodgkin's lymphoma C81; other lymphomas C82-C85; brain C71; testis C62; melanoma C43; bone and cartilage C40-41; kidney C64; adrenal C74; ovary C56; thyroid C73; cervix 53; and carcinoma in situ of cervix D06.

Denominator: NZ Census

2. Cancer Deaths

Numerator: National Mortality Collection: Deaths in children and young people (0-24 years) attributed to cancer with the site assigned according to the ICD-10 codes above

Denominator: NZ Census

Indicator Category

Ideal B (**Table 133**, **Table 134**)

Notes on Interpretation

Because of differences in the coding between ICD-9 and ICD-10, only information for 2000-04 was utilised.

New Zealand Distribution

Children Aged 0-14 Years

In New Zealand during 2000-2004, the cancer most frequently notified to the New Zealand Cancer Registry for children 0-14 years was lymphoid leukaemia, followed by tumours of the brain (**Table 106**). The most frequent causes of death were cancers of the brain, followed by lymphoid leukaemia (**Table 107**).

Table 106. Cancer Registrations in Children 0-14 Years, New Zealand 2000-2004

Site of Cancer	Number: Total 2000-2004	Number: Annual Average	Rate per 100,000	% of Total
Leukaemia: Lymphoid	184	36.8	4.3	26.9
Leukaemia: Myeloid	37	7.4	0.9	5.4
Lymphoma: Hodgkins	16	3.2	0.4	2.3
Lymphoma: Other	32	6.4	0.8	4.7
Brain	106	21.2	2.5	15.5
Kidney	45	9.0	1.1	6.6
Bone and Cartilage	38	7.6	0.9	5.5
Adrenal	26	5.2	0.6	3.8
Testis	12	2.4	0.5	1.8
Ovary	9	1.8	0.4	1.3
Melanoma: In Situ	11	2.2	0.3	1.6
Melanoma: Malignant (Skin)	5	1.0	0.1	0.7
Thyroid	5	1.0	0.1	0.7
Neoplasm of Uncertain Behaviour	7	1.4	0.2	1.0
Other Malignancies	152	30.4	3.6	22.2
Total	685	137.0	16.1	100.0

Table 107. Cancer Deaths in Children 0-14 Years, New Zealand 2000-2004

Site of Cancer	Number: Total 2000-2004	Number: Annual Average	Rate per 100,000	% of Total
Brain	53	10.6	1.2	34.9
Leukaemia: Lymphoid	26	5.2	0.6	17.1
Leukaemia: Myeloid	10	2.0	0.2	6.6
Bone and Cartilage	12	2.4	0.3	7.9
Adrenal	10	2.0	0.2	6.6
Other Malignancies	41	8.2	1.0	27.0
Total	152	30.4	3.6	100.0

Young People Aged 15-24 Years

In New Zealand during 2000-2004, cervical carcinoma in situ was the leading cause of notification to the New Zealand Cancer Registry for young people 15-24 yrs, although melanoma was the leading form of invasive disease (**Table 108**). The most frequent causes of death were cancers of tumours of bone and cartilage, followed tumours of the brain and lymphoid leukaemia (**Table 109**).

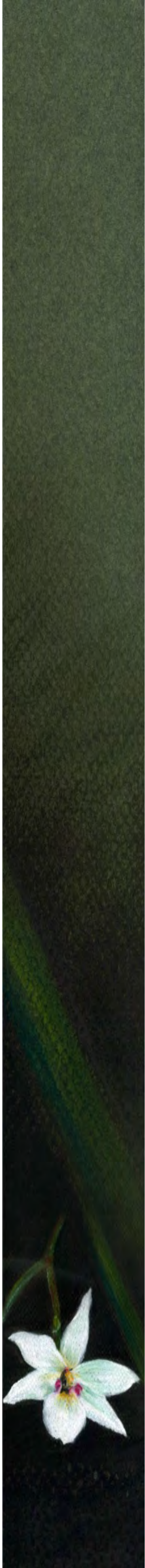


Table 108. Cancer Registrations in Young People 15-24 Years, New Zealand 2000-2004

Site of Cancer	Number: Total 2000-2004	Number: Annual Average	Rate per 100,000	% of Total
Cervix: Carcinoma in Situ	2,600	520.0	200.2	74.4
Cervix: Malignant	16	3.2	1.2	0.5
Melanoma: Malignant (Skin)	169	33.8	6.5	4.8
Melanoma: In Situ	64	12.8	2.5	1.8
Testis	84	16.8	6.4	2.4
Ovary	33	6.6	2.5	0.9
Lymphoma: Hodgkins	66	13.2	2.5	1.9
Lymphoma: Other	35	7.0	1.3	1.0
Leukaemia: Lymphoid	41	8.2	1.6	1.2
Leukaemia: Myeloid	34	6.8	1.3	1.0
Bone and Cartilage	49	9.8	1.9	1.4
Thyroid	48	9.6	1.8	1.4
Brain	46	9.2	1.8	1.3
Kidney	7	1.4	0.3	0.2
Other In Situ Neoplasm	28	5.6	1.1	0.8
Neoplasm of Uncertain Behaviour	10	2.0	0.4	0.3
Other Malignancies	166	33.2	6.4	4.7
Total	3,496	699.2	133.9	100.0

Note: Rates for cancers of reproductive organs are gender specific.

Table 109. Cancer Deaths in Young People 15-24 Years, New Zealand 2000-2004

Site of Cancer	Number: Total 2000-2004	Number: Annual Average	Rate per 100,000	% of Total
Bone and Cartilage	24	4.8	0.9	15.6
Brain	22	4.4	0.8	14.3
Leukaemia: Lymphoid	19	3.8	0.7	12.3
Leukaemia: Myeloid	8	1.6	0.3	5.2
Lymphoma	13	2.6	0.5	8.4
Melanoma: Malignant (Skin)	9	1.8	0.3	5.8
Testis	6	1.2	0.5	3.9
Other Malignancies	53	10.6	2.0	34.4
Total	154	30.8	5.9	100.0

Note: Rates for cancers of reproductive organs are gender specific.

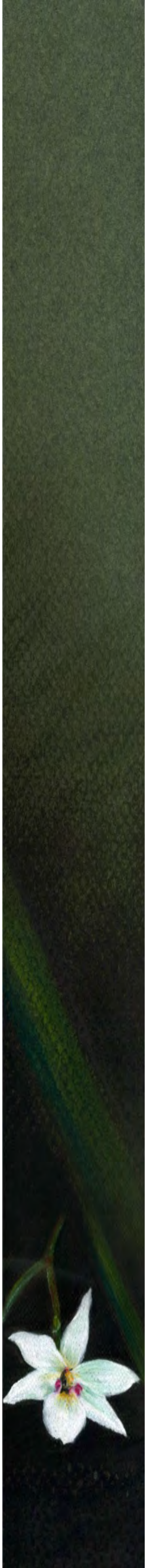
Ethnic Specific and Regional Rates

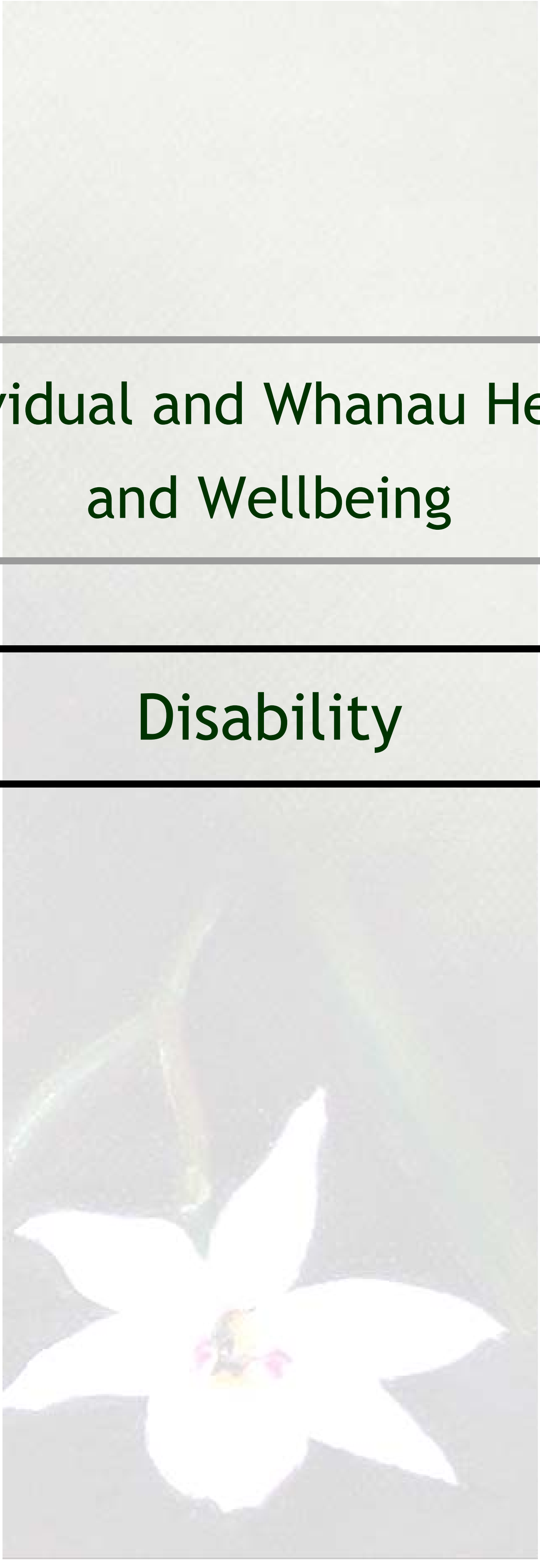
Small numbers and the heterogeneous nature of many of the cancers diagnosed in children and young people precluded a more detailed analysis of cancer notifications by ethnicity or region and thus regional estimates need to be extrapolated from national figures.

Summary

Cancer in New Zealand children is relatively rare, with just over 1/3 of cases being attributed to leukaemia. Other types, in descending order of frequency are brain, bone and connective tissue, non-Hodgkin's lymphoma and kidney. These 5 sites account for >80% of childhood cancer registrations and >70% of childhood cancer deaths. In New Zealand during 2000-04, the cancer most frequently notified to the New Zealand Cancer Registry in children 0-14 years was lymphoid leukaemia, followed by tumours of the brain. The most frequent causes of death were cancers of the brain, followed by lymphoid leukaemia. In the 15-24 year age group, cervical carcinoma in situ was the leading cause of notification to the New Zealand Cancer Registry, while melanoma was the leading form of malignancy. The most frequent causes of death were cancers of bone and cartilage, followed by cancers of the brain and lymphoid leukaemia.

From a population health point of view, while further research is necessary before sound evidence based primary prevention strategies can be developed which address the incidence of childhood cancer in this country, ensuring the equitable access to specialist health services, family support and the reimbursement of travel / associated costs remains of considerable importance in reducing the burden cancer places on the families of children and young people.





Individual and Whanau Health and Wellbeing

Disability

Disability Prevalence

Introduction

In 1995, a report on the Health Status of Infants and Children in the Midland Region noted:

> "*There is a dearth of information on people who have disabilities living in Midland, as well as NZ*" and that "*the dearth of useful information on disabilities and people with disabilities, is a serious impediment to rational and effective service planning and delivery*" *[220].*

Since the time of this report, little has changed and it remains very difficult to access useful regional information on the nature and prevalence of disabilities amongst New Zealand children and young people. Nevertheless, the provision of health and disability support services remains a key role of those working at a regional level and it is undesirable that a lack of local level data should preclude the coverage of disability issues in this report. The following sections thus bring together some of the available data on disabilities amongst New Zealand children and young people. Where local data is readily available (e.g. congenital anomalies evident at birth, deafness notification data, children receiving services for visual impairment) this is included in the sections which follow. Where local data is not available, but an issue is nevertheless perceived to be important, estimates of its prevalence are made based on extrapolations from overseas figures. In this way, it is hoped that some of the key issues for children and young people with disabilities can be highlighted, even in the absence of local level data.

In presenting this information, this section begins with a review of some of the issues which are common to many children and young people with disabilities, irrespective of the nature of their disability. This is followed by prevalence estimates for a number of conditions for which there is no routinely available data (Intellectual Disability, Autism, and Cerebral Palsy). It is intended that this section be read in conjunction with other sections in the disability stream, which explore the available data in the following areas:

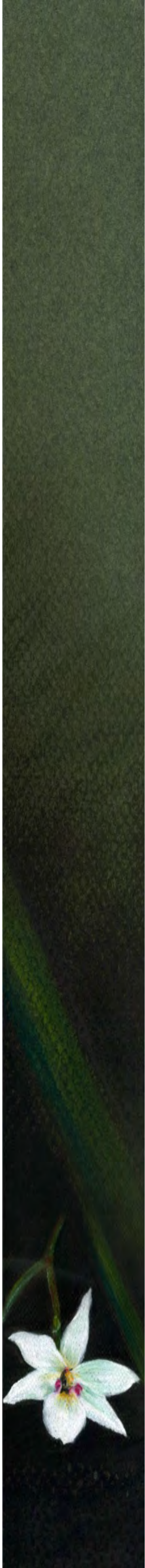
1. Congenital Anomalies Evident at Birth: Down Syndrome and Neural Tube Defects.
2. Permanent Hearing Loss: Notifications to the New Zealand Deafness Database.
3. Visual Impairment: Children Referred to BLENNZ Services.

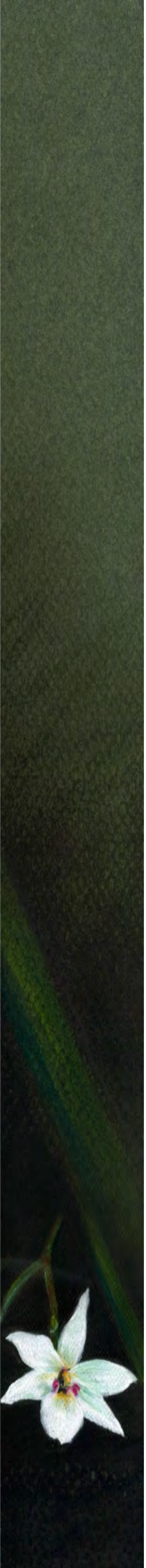
In addition, for a review of the numbers of young people (16-24 yrs) on Sickness and Invalid's Benefits and the reasons for their uptake, the reader is referred to the section on Young People Reliant on Benefits, in the earlier section of this report.

Issues Common to Many Children with Disabilities

In 2001, the Household Disability Survey estimated that 11% of New Zealand children (0-14 yrs) had a disability. While little information was available on the precise nature of these disabilities, in general terms they included chronic health problems, sensory impairments, psychiatric or psychological problems, intellectual disabilities, speech, learning and developmental problems and the need for special education or technical equipment. Of those with a disability, 41% had existed from birth, 33% were caused by a disease / illness and 3% resulted from an injury [221].

In order to assist families in caring for children and young people with disabilities, the Ministry of Health funds a number of disability support services. Access to almost all of these services is via Needs Assessment and Service Co-ordination (NASC) Agencies, who accept children with significant intellectual, physical or sensory disabilities, or with autism spectrum disorders. NASC Agencies work on the basis of assessed need and





the equitable sharing of available resources, with needs assessments being designed to identify the disability support needs of children and young people and their caregivers. The need for support services is usually reviewed annually (or more often at parental request) and if there is a significant change in needs (e.g. school entry) a new needs assessment is carried out. Some of the services available via NASC include in-home support, respite care in specialist facilities, special equipment and housing alterations. Unfortunately not all types of support service are available in all regions and entitlements may vary with the age of the child [222]. Additionally, not all children with a disability will qualify for a NASC assessment.

Access to appropriate support services is crucial however, if those caring for children and young people with disabilities are to be able to cope with the demands placed on them in their care giving roles. In New Zealand as in many other developed countries, there has been a move away from institutional care during the past 2-3 decades, with the majority of disabled children now living in households and care becoming increasingly the domain of family members [223]. Such shifts have significant resource implications however, if the transition to home based care is to be sustainable for families caring for disabled children and young people. In this context it is perhaps concerning that a recent Australian review of the area noted that [223]:

1. **Family Structure**: Higher proportions of disabled children and young people live in single parent families. While the reasons for this remain unclear, some have attributed this to the stresses associated with the raising of a disabled child, although others have suggested that once socioeconomic factors are taken into account, rates of divorce are not significantly different between couples with and without disabled children.
2. **Family Socioeconomic Position**: Higher proportions of disabled children live in low income families. While some suggest that families living in financial hardship have a higher number of risk factors for childhood disability, other research indicates that families with disabled children have significant out-of-pocket costs which are directly related to their children's special needs, as well as the more indirect time costs associated with caring for their children. Such costs are particularly significant for families with medium to low incomes and for single parents, whose care commitments may prevent them from taking up or staying in employment.
3. **Effects on Parents**: For many parents, caring for a child with a disability can be stressful, with a number of studies noting that mothers caring for children with conditions such as autism, physical and learning disabilities and Asperger's syndrome, had higher rates of stress and depression. Sole parents may be particularly vulnerable to stress, as a result of their dual role as primary caregiver and primary bread-winner.
4. **Role of Social and Material Support**: In explaining why some parents experience less stress than others when caring for children and young people with disabilities, it has been suggested that the availability of socioeconomic resources plays a crucial role. In addition, the presence of social and material support (e.g. emotional support, access to services, early interventions, respite care, equipment services and family support programmes) are thought to be crucial in ensuring parental wellbeing.
5. **Effects on Siblings**: Evidence of the effects that childhood disability has on siblings is mixed. At the positive end of the spectrum, some siblings report enhanced self-esteem, empathy, maturity and a sense of responsibility, while others view having to take on higher levels of caregiver and household responsibility (particularly if financial resources or family size are limited), less

attention from parents and the restrictions a disabled family member places on their social life, in more negative terms.

6. **Positive Effects**: In contrast, there has been much less research into the more positive effects caring for a disabled child has on families e.g. strengthening family relationships and the positive emotional bonds parents develop with their children.

While the majority of these findings were based on research in Australia or other developed countries, a recent New Zealand report on the reasons why families with children with high disability support needs sought permanent 'out of family' care [224] suggests that many of the issues highlighted by the Australian review, are also of relevance in the New Zealand context. As a consequence, a range of disability support services, including access to in-home support, out of home respite care and multidisciplinary early intervention services are required by the families of children and young people with disabilities, irrespective of the precise origins of their disability and at a regional level, ensuring families have adequate access to such services is likely to significantly enhance their health and wellbeing.

Prevalence Estimates for Common Conditions

Indicator Category Ideal B (**Table 133**, **Table 134**)

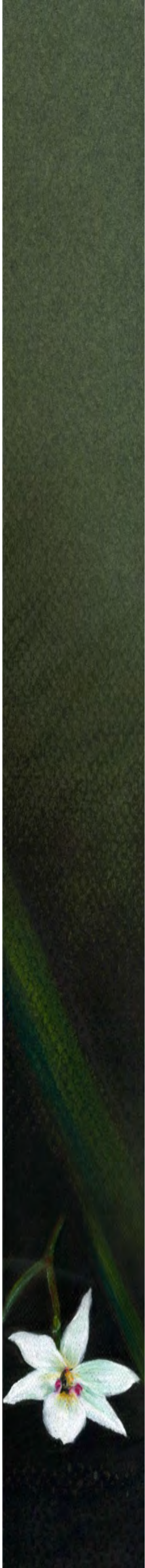
While many conditions leading to disability are evident at the time of birth a number of others, while still having their origins in utero or the first weeks of life, may not become evident until children fail to reach developmental milestones in later life. In many cases, children with these disabilities are managed predominantly in the primary care / outpatient setting, with little information on them being captured in New Zealand's national datasets. As a consequence, while children with autism, intellectual disabilities, developmental delay, cerebral palsy and behavioural problems make up a large part of the workload of developmental paediatricians, little data are available with which to estimate the prevalence of these conditions, or their trends over time. The lack of available data should not preclude consideration of the needs of these children in national strategy development and thus the following section briefly reviews 3 conditions commonly seen in children's outpatient clinics. These are:

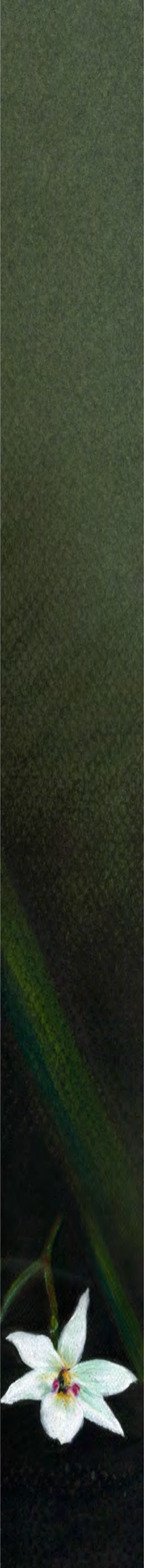
1. Autism and Autism Spectrum Disorders
2. Cerebral Palsy
3. Intellectual Disabilities

For each condition, a brief overview is presented, followed by a summary of the types of health and disability support services likely to be required at the regional level. The number of children likely to be affected at a national level is then estimated, using extrapolations from overseas research.

Autism and Autism Spectrum Disorders

Pervasive Developmental Disorders comprise a group of developmental disorders characterised by poor or absent communication, social isolation and unusual behaviours. They include Autism, Asperger Syndrome, Pervasive Developmental Disorder NOS, Rett Syndrome and Childhood Disintegrative Disorder. Of these, autism is most studied and is characterised by severe difficulties with social interaction and communication and with behaviours and interests that are restricted or stereotyped. Onset is usually <3 years, with delayed language development being a common reason for presentation. Many children with autism never speak, or if they do so their language often has unusual intonation, echolalia (a repetition of what is said) or pronoun reversal. Other features include impaired eye gaze, a lack of social reciprocity, limited or absent peer relationships and difficulties in developing imaginative play. Children are often pre-occupied with non-functional features of





objects, such as taste or smell and stereotyped movements are often present (e.g. hand flapping or finger flicking) [225].

Early intervention improves outcomes for children with autism. Management is primarily educational. While programmes vary in nature, the overall aims of treatment are usually to foster growth in areas of communication, cognition and self help skills, as well as to reduce problem behaviours which interfere with learning. Programmes often draw on procedures from special education and behavioural psychology. Occasionally pharmacological treatments are used to manage problem behaviours and to enhance children’s participation in educational programmes. Over time a large number of alternative treatments have also been put forward, although evidence for the efficacy of many is often limited or non-existent [225].

At present the cause of autism remains unknown, although higher rates of seizures, persistent primitive reflexes and cognitive disability suggest central nervous system involvement. A genetic basis is also likely, as recurrence rates in families are high, but the mode of transmission remains unknown [225]. While there have been reports of large increases in Autism Spectrum Disorders over the past 40 years (estimates in the 1960s of ~4 per 10,000 contrast with more recent estimates of 30-60 per 10,000), some of these differences are likely due to increased ascertainment and a broadening of the diagnostic concept to include a greater number of children with normal IQs [226].

At present there is no routine information on the prevalence of Autism or Asperger Syndrome in New Zealand, although a recent estimate from the Statistics NZ Household Disability survey suggested that 2,100 New Zealand children may have Autism or Asperger Syndrome (personal communication Phillipa Clark 2006) giving a prevalence of 24.8 per 10,000. Similarly, a recent estimate from the Nelson Marlborough Region suggested a prevalence of 46 per 10,000, with 56% having Autism, 30% having Asperger Syndrome and 14% having a non specified Pervasive Developmental Disorder [227]. Using these estimates, as well as those from overseas research **Table 110** extrapolates prevalence to the New Zealand population at the time of the 2006 Census.

Table 110. Estimated Number of Children and Young People 2-24 Years with Autism in New Zealand During 2006

Disorder	Overseas Estimates per 10, 000	New Zealand Estimate (No. Aged 2-24 yrs)
Autism	7.1 [228] 7.2 [229]	Range 942-956
Autism Spectrum Disorders	24.8* 46 [227] 30-60 [226]	Range 3,292-7,965

*Personal communication Phillipa Clarke based on Statistics New Zealand Household Survey

Cerebral Palsy

Cerebral palsy refers to a group of disorders of movement or posture arising from a non-progressive insult to the central nervous system during early development. The insult may occur prior to, during or shortly after birth and while being non-progressive, its physical consequences can evolve over time [230]. The clinical presentation may also vary, with one recent Australian study [230] noting that of children with cerebral palsy in one cohort, ~ 84% had predominantly spastic cerebral palsy (characterised by weakness, increased muscle tone, overactive reflexes and a tendency to contractures), 8.3% had predominantly dyskinetic cerebral palsy (characterised by involuntary movements which disappear during sleep) and 6.6% had predominantly ataxic cerebral palsy (characterised by problems with coordination, gait and rapid movements of the distal extremities) [231]. In addition, while cerebral palsy refers solely to the motor impairment, features such as seizures, intellectual impairment and learning disabilities are also common [231].

Depending on their degree of motor impairment, children and young people with cerebral palsy require a variety of personal health care and disability support services, with the overall aim being to ensure the highest possible functioning within the family and community contexts. Physical and occupational therapy are beneficial in the management of motor impairments, with proper positioning and handling being necessary to minimise the difficulties associated with posture, trunk control and feeding. Passive and active exercises to stretch tight tendons may also be necessary to maintain normal alignment of bone, joint and soft tissue and to prevent contractures. Medical and surgical procedures may be necessary to correct contractures that do not respond to physiotherapy and to re-establish motor balance between opposing muscle groups, with innovations in this area evolving rapidly. In addition, a variety of equipment (e.g. walkers and standing frames, motorised wheel chairs, feeding tubes, computers to augment communication) and additional supports (e.g. speech therapy, medications, ophthalmology referrals, tailored educational programmes, respite care) may be required to meet the needs of children and their caregivers.

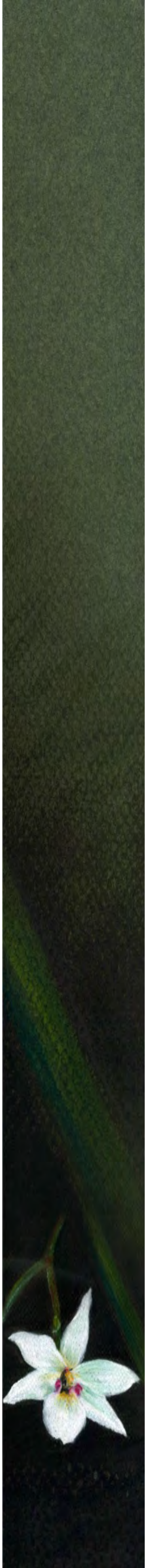
While maturity at birth is the strongest single predictor of cerebral palsy, advances in neonatal care and the enhanced survival of very premature infants have not led to a large increase in prevalence, with research suggesting that after initial increases following the introduction of neonatal intensive care, rates fell away again as experience in neonatal care grew [230]. In addition, with ½ of all cerebral palsy cases occurring in infants of normal birth weight and with asphyxiation at birth accounting for only a small percentage of cases, research has now turned to other exposures during pregnancy and immediately after birth (e.g. intrauterine infection / inflammation and perinatal coagulation disorders) as possible causes [232]. While there is no routinely collected data on the prevalence on cerebral palsy in New Zealand, numerous overseas studies have estimated the prevalence to be 2-3 per 1,000 live births, with very little change since the mid-50s, despite marked improvements in obstetric and perinatal care. **Table 111** extrapolates prevalence estimates from 2 overseas studies to the New Zealand population at the time of the 2006 Census.

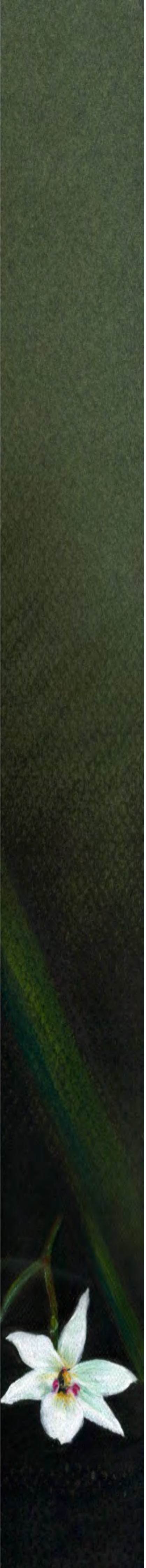
Table 111. Estimated Number of Children and Young People 2-24 Years with Cerebral Palsy in New Zealand During 2006

Condition	Overseas Estimates (per 10, 000 live births)	New Zealand Estimate (No. Aged 2-24 yrs)
Cerebral Palsy	10-30 [230] 20 [231]	Range 1,327-3,982

Intellectual Disabilities

Intellectual disabilities in children have a variety of causes including genetic conditions (e.g. inborn errors of metabolism), chromosomal anomalies (e.g. Down Syndrome) congenital anomalies (e.g. neural tube defects), conditions arising before, during or shortly after birth (e.g. intrauterine infections, hypoxia, extreme prematurity) or during childhood and adolescence (e.g. meningitis, head injury). Over time a number of different classification systems have been used to gauge the severity of intellectual disability. While earlier systems used cognitive ability, as measured by IQ (**Table 112**) as the only diagnostic criteria, more recent classification systems have also included an assessment of children's adaptive behaviour, as well as the level of support they require to function on their everyday environment. The American Association of Mental Retardation (AAMR) revised its official classification system in 1992 to reflect this transition, with their definition of intellectual disability now including those with:





> *"significant subaverage intellectual functioning (defined as an IQ score of below 70 to 75) existing concurrently with related limitations in two or more of the following applicable adaptive skill areas: communication, self care, home living, social skills, community use, self direction, health and safety, functional academics, leisure and work" [233].*

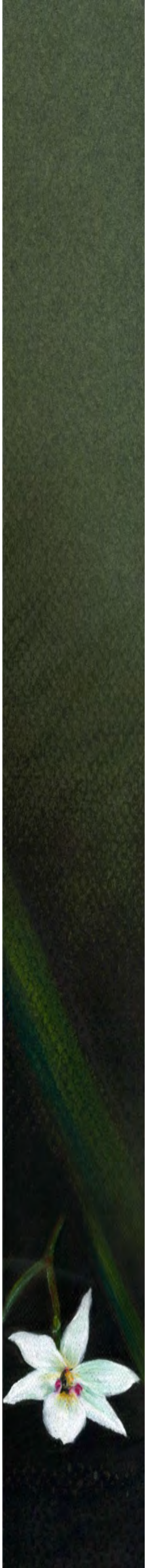
Table 112. Classification of Intellectual Disability Based on Severity and IQ Score

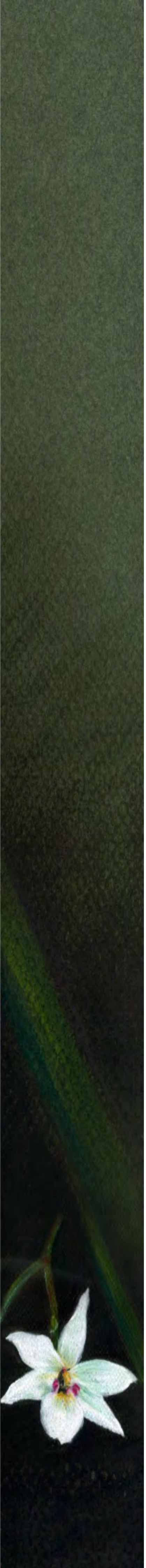
Level of Severity	IQ Levels		Level of Functional Impairment [234]	Prevalence Estimate (Overseas Studies) Estimates for 2006*
	ICD-9 CM	DSM-IV		
Any	IQ <70		See Below	3 per 100 [235] NZ Estimate 2-24 Years n= 39,823
Mild	50-70	50-55 to 70	Includes ~90% of children with mental retardation. Most need at least some special class placement and some can achieve primary school reading levels. Those with well developed adaptive skills may be able to function independently as adults.	
Moderate	35-49	35-40 to 50-55	Educational goals focus on gaining maximal self care +/- some academic skills. Those with good adaptive skills may function semi-independently in supervised living and sheltered workshop settings.	3.8 per 1,000 [236] NZ Estimate 2-24 Years n= 5,044
Severe	20-34	20-25 to 35-40	Children can learn minimal self-care and simple conversational skills. Much supervision is needed throughout their lives.	
Profound	<20	<20 or 25	Children require total supervision. Very minimal self care skills possible and few are toilet trained. Language development generally minimal.	

Source: Murphy et al [235] *NZ Estimates are based on extrapolating overseas rates to the NZ child and youth population at the time of the 2006 Census

At a regional level, children and young people with intellectual disabilities require a variety of personal health and disability support services. Personal health needs include routine well child care (e.g. immunisation, monitoring of growth and development), as well as the management of conditions more common in children with intellectual disabilities (e.g. seizure disorders, orthopaedic problems and vision and hearing problems). Early intervention programmes for infants and toddlers assist in nurturing children's development, while tailored educational programmes during the preschool and school years may facilitate learning, positive self-esteem, social competence and adaptive living skills [231]. During adolescence, issues related to sexuality, vocational training and community living become more prominent [234].

While there is no data routinely collected on the prevalence on intellectual disability in New Zealand, a range of overseas estimates are available. While estimates vary widely depending on the definition used and the population surveyed, it is usually assumed that ~ 3% of the population have an IQ of <68, with 80-90% of these being classified as having mild mental retardation and 5% being severely or profoundly impaired [234]. Other estimates suggest that 3-4 per 1,000 have an IQ in the <50 range [236].





Congenital Anomalies Evident at Birth

The 2001 Household Disability Survey estimated that of the 11% of children (0-14 yrs) with a disability, 41% had existed from the time of birth [221]. Of these, a significant proportion are likely to be congenital anomalies, with overseas estimates suggesting that ~2-3% of births are associated with a major congenital anomaly [237]. While in New Zealand minor congenital anomalies of the musculoskeletal, genitourinary and cardiovascular systems are frequently mentioned in hospital discharge data, it is likely that many of these are either of little functional significance, or readily corrected during the first years of life (e.g. cleft palate, undescended testis). In contrast, a number of less common but more serious anomalies can lead to a significant degree of disability and a variable requirement for disability support services (although some may not become evident until children fail to reach developmental milestones in later childhood). Two conditions which are usually readily identifiable at the time of birth and which can lead to a significant degree of disability, however, are Down Syndrome and Neural Tube Defects, which will be reviewed in the section that follows.

Down Syndrome

Down Syndrome is the most common (non sex-linked) chromosomal anomaly in live born babies and diagnosis is usually made in-utero or at the time of birth. Children with Down Syndrome have a range of clinical features including reduced growth (height ~ 3rd percentile), slow cognitive development, low muscle tone and joint laxity and an increased risk of a number of medical conditions (e.g. congenital heart disease, thyroid dysfunction, otitis media, cataracts, hearing problems), which may affect their quality of life [222]. Approximately 95% of children with Down Syndrome have an extra chromosome 21 (trisomy 21), with the remaining 5% having either translocations (3%) or mosaicism (2%). In mosaicism, some cells have 46 chromosomes and some have 47, leading to a milder clinical presentation and intelligence often approaching the normal range [238].

On average, 50 babies in New Zealand each year are born with Down Syndrome and at a regional level it is necessary to ensure that the health, developmental, educational and psychosocial needs of these children and their families are identified and met. The MOH Guidelines on the clinical assessment and management of children and young people with Down Syndrome [222] outline a range of clinical and support services children and young people require at different stages of their development. These include:

1. Parental counselling at the time of birth and ongoing support thereafter.
2. Lactation consultant / speech-language therapist support with the establishment of breastfeeding, as well as the ongoing monitoring of feeding, nutrition and growth.
3. Identification and management of other congenital anomalies and related medical conditions (e.g. CVS defects, cataracts, hearing problems, obesity), with ongoing coordination of care and anticipatory monitoring (e.g. thyroid function, ongoing hearing and vision screening).
4. Access to early intervention and disability support services (e.g. physiotherapists, speech-language, occupational and neurodevelopmental therapists, Child Disability Allowance) and Specialist Education Services.

Neural Tube Defects (Anencephaly, Encephalocele, Spina Bifida)

Neural Tube Defects (NTDs) are congenital malformations which result from abnormal closure of the neural tube between the 3rd and 4th week of gestation. They can result in structural defects anywhere along the neuroaxis, from the developing brain to the sacrum. NTDs are generally divided into two groups:

1. Those affecting cranial structures i.e. anencephaly and encephalocele.
2. Those affecting spinal structures i.e. spina bifida.

Cranial malformations are generally the most clinically obvious and are often incompatible with life. In contrast, spina bifida can range from a severe open defect leading to muscle weakness, loss of skin sensation and problems with bowel and bladder control, to defects that are less easily detected [239]. Associated central nervous system anomalies and hydrocephalus, as well as later scoliosis or kyphosis may further complicate the clinical presentation. While advances in neurosurgical, urologic and medical care have allowed many children with spina bifida to survive with virtually intact cognitive skills, specialised medical and surgical care is necessary to ensure that children achieve independent mobility. For younger children, the ability to walk is usually influenced by the degree of paralysis arising from the spinal cord lesion, although as children get older, the amount of energy required for walking and the slow speeds achieved may lead to an increasing reliance on a wheelchair for day to day mobility [231].

The aetiology of NTDs is complex and generally thought to be a combination of genetic and environmental factors. While a number of chromosomal / genetic disorders have been associated with NTDs, many result in in-utero death, making their overall contribution to defects evident at the time of birth less than might otherwise be expected. In contrast to Down Syndrome, the effect of maternal age on NTDs is thought to be small, although a number of studies have suggested that folic acid supplementation prior to / at conception may reduce the risk of NTDs and their associated costs at a regional level. As a consequence a number of groups have recently advocated for the mandatory supplementation of New Zealand's food supply with folic acid [240].

Data Source and Methods

Definition

Babies identified as having Down Syndrome or a Neural Tube defect at the time of Birth

Data Source

National Minimum Dataset

Numerator: All admissions identified as a birth event (Admission Type BT), with a diagnosis of Down Syndrome (ICD-10 Q90) or Neural Tube Defects (Anencephaly ICD-10 Q00, Encephalocele ICD-10 Q01, Spina Bifida ICD-10 Q05) in the first 15 diagnostic codes. Total congenital anomaly counts were calculated by summing the number of congenital anomalies (ICD-10 Q00-Q99) mentioned in the first 15 diagnostic codes of the births dataset, while the number with cardiovascular anomalies was assessed by summing the number of births with a cardiovascular anomaly (Q20-28) mentioned in the first 15 diagnostic codes.

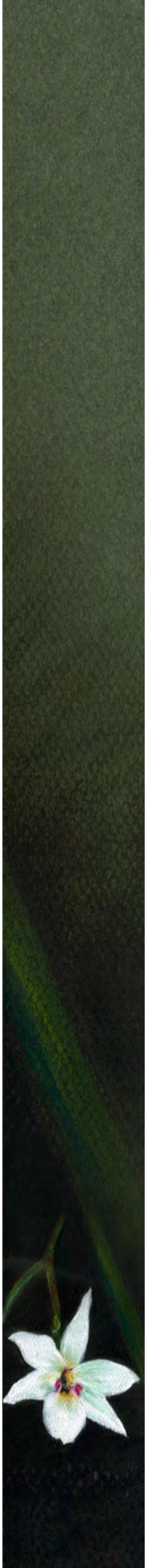
Denominator: All admissions identified as a birth event.

Indicator Category

Proxy B-C (**Table 133**, **Table 134**)

Notes on Interpretation

See text for guidance on interpreting the information contained in this section



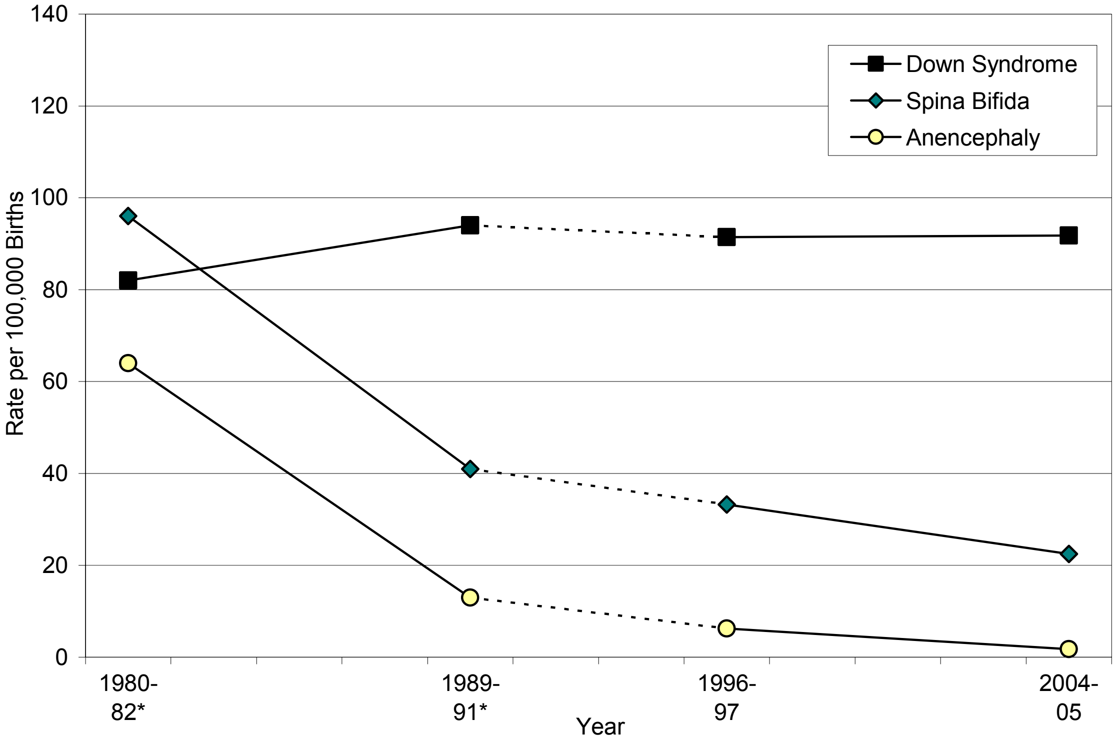
New Zealand Distribution and Trends

Down Syndrome

In New Zealand the prevalence of Down Syndrome at the time of birth has been static in recent years, with earlier estimates of 0.82 per 1,000 in 1980-82 and 0.94 per 1,000 in 1989-91 [241] being very similar to the estimates of 0.92 per 1,000 in 2004-05 derived from the birth admission dataset (**Figure 153**). Static rates may well mask large underlying shifts in the true incidence however, as one of the key risk factors for Down Syndrome is higher maternal age (particularly >35 years), with the number of women giving birth in this age group increasing significantly in New Zealand in recent years. It is likely that such changes have been offset however, by increases in prenatal diagnosis and the selective termination of pregnancy, which overseas have resulted in significant reductions in the number of babies being born with congenital anomalies [242].

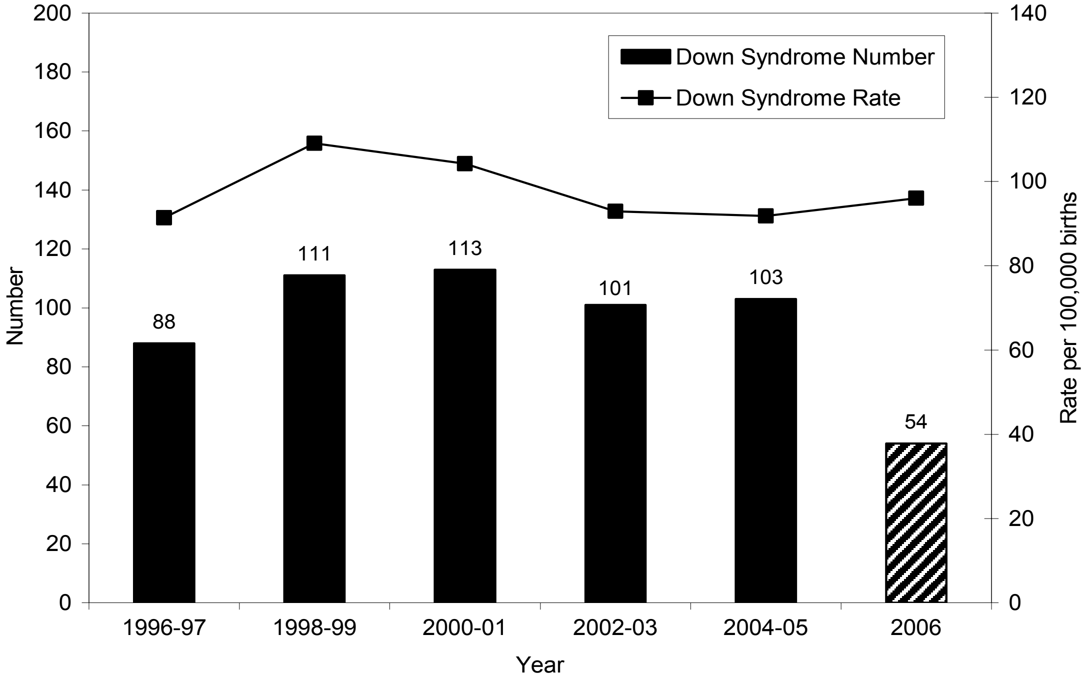
In New Zealand during the past 10 years, approximately 52 babies per year were identified as having Down Syndrome at the time of birth (**Figure 154**). During 2002-2006, 56.6% of babies born with Down Syndrome had one or more additional congenital anomalies listed at the time of birth, with 48.8% of babies having at least one anomaly of the cardiovascular system (**Table 113**).

Figure 153. Infants with Down Syndrome or Neural Tube Defects Identified at Birth, New Zealand 1980-2005



Note: *Estimates for 1980-82 and 1989-91 are from the NZ Birth Defects Monitoring Programme [241] while estimates for 1996-97 and 2004-05 are from the National Minimum Dataset

Figure 154. Infants Identified with Down Syndrome at Birth, New Zealand 1996-2006



Note: Numbers for 2006 are for single year only

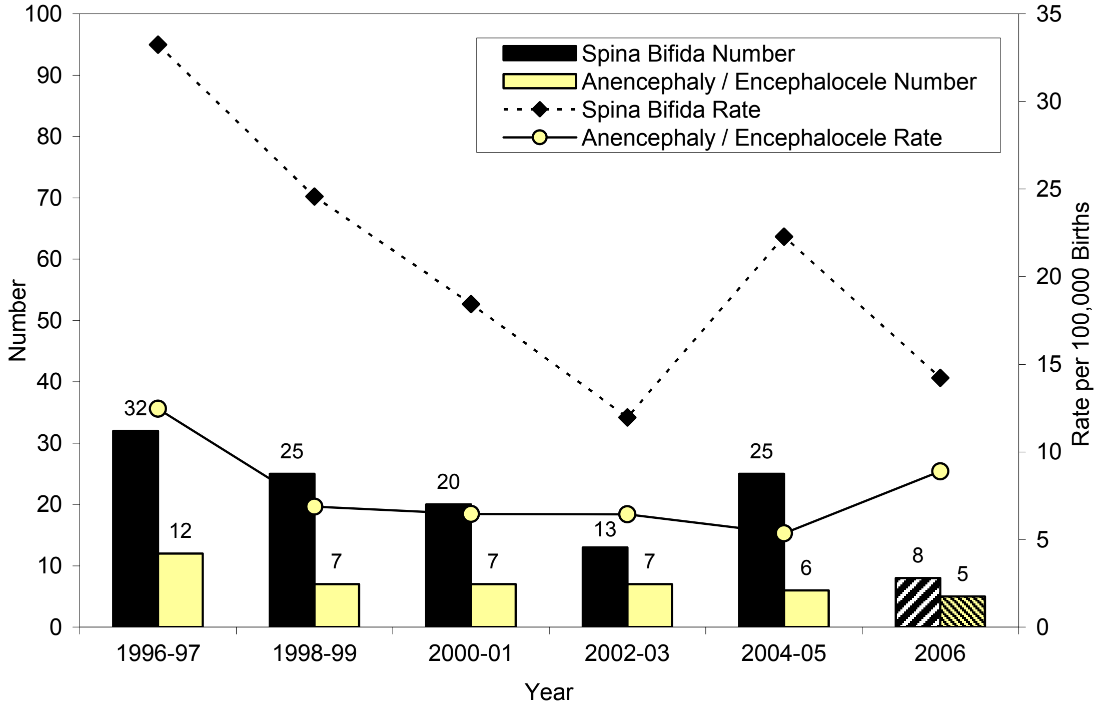
Table 113. Number of Other Congenital Anomalies Listed at the Time of Birth in Infants with Down Syndrome, New Zealand 2002-2006

Number of Other Anomalies Evident at Birth	Number of Infants: 2002-2006	% of Infants with Down Syndrome
All Congenital Anomalies		
Nil	112	43.4
1	60	23.3
2	43	16.7
3	28	10.9
4	10	3.9
>4	5	1.9
Total	258	100.0
Cardiovascular Anomalies		
No CVS Anomaly Present	132	51.2
CVS Anomaly Present	126	48.8
Total	258	100.0

Spina Bifida

In contrast, NTDs are generally thought to be unrelated to maternal age, meaning that any increases in obstetric surveillance may not have been offset by opposing changes in maternal age. As a consequence the time series information presented in (**Figure 153**), which suggests a dramatic decline in the rates of NTDs but static rates for Down Syndrome likely reflects the complex interplay between opposing factors including access to prenatal diagnosis, the personal choices of parents and population level shifts in known (e.g. maternal age) and unknown risk factors [241]. In New Zealand during the past 10 years, ~12 babies each year were identified as having spina bifida and 4 as having either anencephaly or an encephalocele at the time of birth, although the general downward trend meant that the numbers in the latter part of this period may have been slightly lower (**Figure 155**).

Figure 155. Infants Identified with Neural Tube Defects at Birth, New Zealand 1996-2006



Note: Numbers for 2006 are for single year only

Summary

It has been estimated that of the 11% of New Zealand children <15 years with a disability, 41% were present from the time of birth. Of these a significant proportion are likely to be congenital anomalies, with overseas estimates suggesting that ~2-3% of births are associated with a major congenital anomaly. In New Zealand, while a large number of the minor congenital anomalies documented at the time of birth are likely to be either of little functional consequence, or readily repaired during the early years of life, a significant minority may lead to long term disability and a variable need for disability support services. In New Zealand the number of children born with Down Syndrome has remained relatively static during the past 25 years, while the number with Neural Tube Defects has declined dramatically. In reality, both trends reflect the complex interplay between opposing factors including access to prenatal diagnosis and the selective termination of pregnancy, the personal choices of parents and population level shifts in known (e.g. maternal age) and unknown risk factors. While it is likely that prenatal diagnosis has also reduced the number of children being born with other major congenital anomalies, nationally a small number of children are still born each year with these anomalies, and these children require an integrated approach to their health and disability support needs, if they are to reach their full potential.

Blindness and Low Vision

Introduction

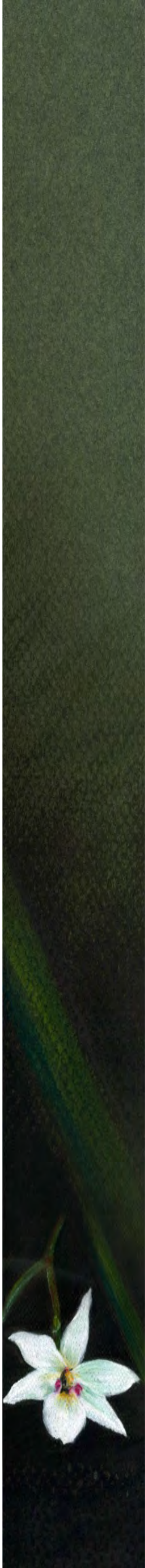
It is difficult to precisely estimate the number of children and young people who have visual impairments in New Zealand, although a recent review of the available evidence for adults noted that that the figure varied significantly depending on the data source used, with figures ranging from as low as 11,293 if estimates were based on membership of the Royal New Zealand Foundation of the Blind, to as high as 98,400 if the New Zealand Disability Survey is used [243]. Similarly for children, extrapolations from the 2001 Disability Survey suggest that in 2004 there were 460 blind and 1,380 visually impaired children (0-15 yrs) in New Zealand. In contrast the Vision Education Agency, which records information on blind and low vision children receiving educational supports, noted that of the 1,323 children who were enrolled with the Blind and Low Vision Education Network NZ (BLENNZ) during 2006, 147 were blind, 27 were deafblind (dual sensory loss), 870 were low vision, 54 had cortical visual impairments, and 225 had an unspecified level of visual impairment.

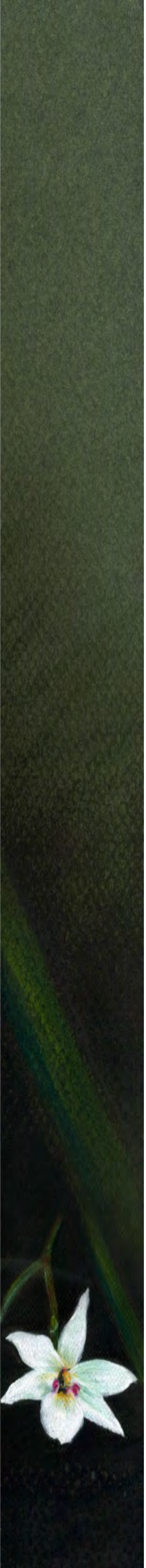
While in New Zealand there is no routinely available information on the reasons for blindness and low vision amongst children and young people, information from overseas registers would suggest that in developed counties the most common causes are retinal disorders, optic atrophy and lesions of the higher visual pathways. Retinal causes frequently include hereditary retinal dystrophies and retinopathy of prematurity, while lesions of the higher visual pathways are often associated with other disabilities, arising from problems in the central nervous system. In about a third of cases, the underlying cause of the eye malformation or anomaly is unknown [244]. Irrespective of the underlying cause however, children who are blind or have low vision require a range of education, health and disability support services, in order to ensure that they reach their full developmental potential.

In New Zealand the Blind and Low Vision Education Network (BLENNZ) offers a range of services to blind and low vision children. Children are eligible for BLENNZ services if they have a visual impairment and meet a number of criteria. A visual impairment is defined as "*a disorder of the structure or function of the eye, the visual pathways or the cortex, that even with the best correction and treatment, interferes with learning*". Eligibility criteria include:

Medical: There is a written report from an ophthalmologist, optometrist or other relevant medical specialist identifying vision impairment, manifest by at least one of the following:

1. A visual acuity of 6/18 or less in the better eye after correction.
2. A visual field so restricted that it affects functional ability in an educational setting.
3. A progressive loss of vision which affects functional ability in an educational setting.
4. For children 0-5 years, bilateral lack of central vision with an estimated visual acuity of 6/18 or less after correction, or a documented eye condition as above.
5. A cerebral vision impairment which affects functional ability in an educational setting.





Educational: A functional vision assessment conducted by an educational professional with expertise in blindness education identifies impaired processing of information via visual pathways and this impairment reduces the child's ability to use regular print resources, black / white boards / other educational resources and necessitates the use of ≥1 of the following:

1. Adaptation of the environment or of teaching and learning approaches.
2. Access to assistive technology or materials in other formats e.g. collage, Braille.
3. Access to the Expanded Core Curriculum or adaptation of the regular curriculum.

Eligible children are offered a range of teaching and assessment services based at the Homai Campus and regionally located Visual Resource Centres including:

1. The Homai Campus School, Immersion and Residential Services
2. A National Assessment Team based at the Homai Campus
3. Regional Visual Resource Centres in Auckland (covering the Homai Campus in South Auckland, the Marlborough Resource Unit on the North Shore, the Northland Resource Centre in Whangarei), Hamilton, Tauranga, Gisborne, Napier, New Plymouth (Welbourn), Palmerston North, Wellington (Kelburn), Nelson, Christchurch (Elmwood), South Canterbury (Timaru), Otago (Dunedin) and Southland (Invercargill).

Services offered include assessment and evaluation, early childhood services (centre or home based programmes to assist young children acquire essential skills), teaching and learning programmes in the Expanded Core Curriculum, professional development for teachers, teacher aids and education support workers and the provision of accessible format materials, resources and equipment.

The following section uses information on the number of children enrolled with BLENNZ to estimate the number of children with significant visual impairments in New Zealand during 2006. While enrolment data is provided for all children, more detailed information on the nature of children's visual impairments and the communication modalities used is only provided for the 87% of children on the Visual Education Agency's Database as at June 2006.

Data Source and Methods

Definition

Number of children and young people enrolled with BLENNZ

Data Source

Numerator: Number of Children Enrolled with BLENNZ
Denominator: Not applicable

Indicator Category

Ideal B-C (**Table 133**, **Table 134**)

Notes on Interpretation

The Vision Education Agency collects information about the educational needs of blind and vision impaired students. It collects basic enrolment data on all students who receive services from BLENNZ and more detailed information on demographic, communication and resourcing for each student. An opt off system means that while basic enrolment information is available on all students (i.e. the number enrolled with the various Visual Resource Centres around the country), more detailed information was only available for the 87% of learners during 2006 who did not opt out of having their information recorded in the National Database for Learners.

New Zealand Distribution and Trends

Enrolments at BLENNZ Visual Resource Centres in New Zealand

During June 2006, a total of 1,323 children and young people were enrolled with BLENNZ, with enrolments being spread across the educational spectrum from early childhood to secondary school level (**Table 114**). Of the 1,153 (87%) students who had their information recorded on the national database, 75% had low vision, 13% were blind, 2% were deaf-blind and 5% were noted as having cortical visual impairment (although the latter category was inconsistently reported by different Resource Centres across the country) (**Figure 156**). In addition, 60.4% of those on the national database were listed as having other disabilities, the consequences of which ranged from minor→ major impacts on their functioning.

Communication Modalities

Of the 1,153 (87%) students who had their information recorded on the national database in June 2006, 101 were Braille users, with a further 33 identified as potential Braille users. Of the print users identified, 542 used large print and 298 used regular print, although a large proportion of these children also used visual aids, making numbers in **Figure 157** sum to >100%. In addition, children also used a range of other communication modalities including augmentative communication and signing systems.

Summary

While it is difficult to precisely estimate the number of New Zealand children and young people who are blind or have low vision, estimates from the Vision Education Agency suggest that in 2006 1,323 children and young people in New Zealand required educational support as a result of a visual impairment. These students had a variety of visual impairments, ranging from low vision → blindness → deaf-blindness → cortical visual impairments and used a variety of communication modalities including large print, visual aids, Braille and signing systems. In addition, 60.4% had other disabilities which had minor→ major impacts on their functional ability. Irrespective of the underlying cause of their visual impairment however, children and young people with visual impairments require a range of education, health and disability support services, the coordination of which is vital to ensuring they reach their full developmental potential.

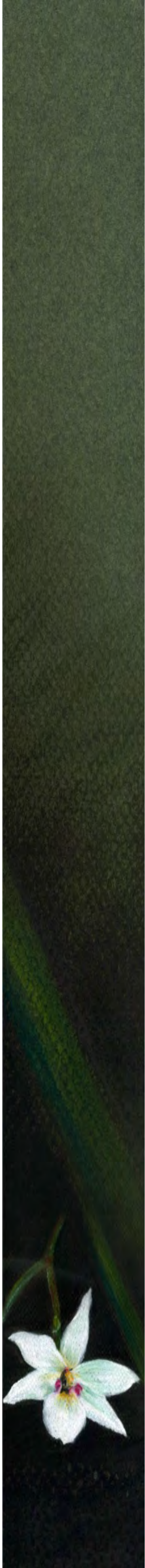
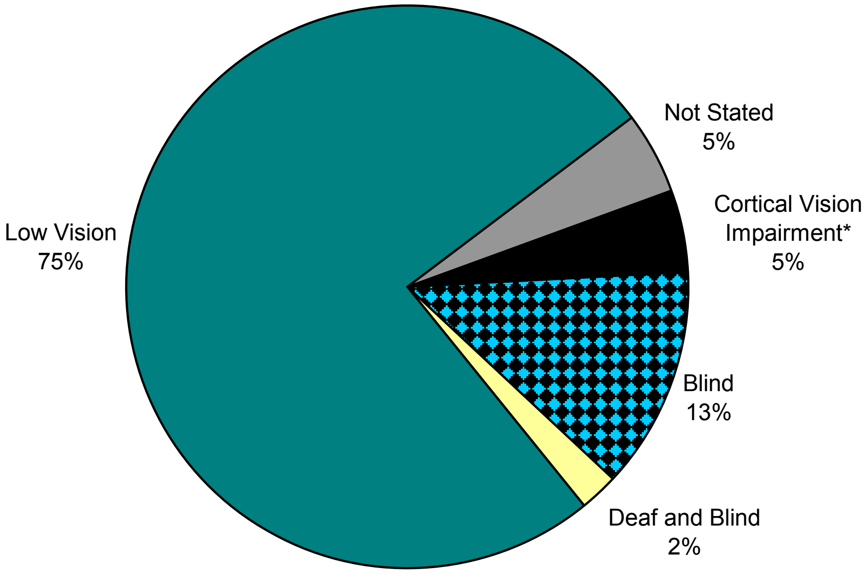
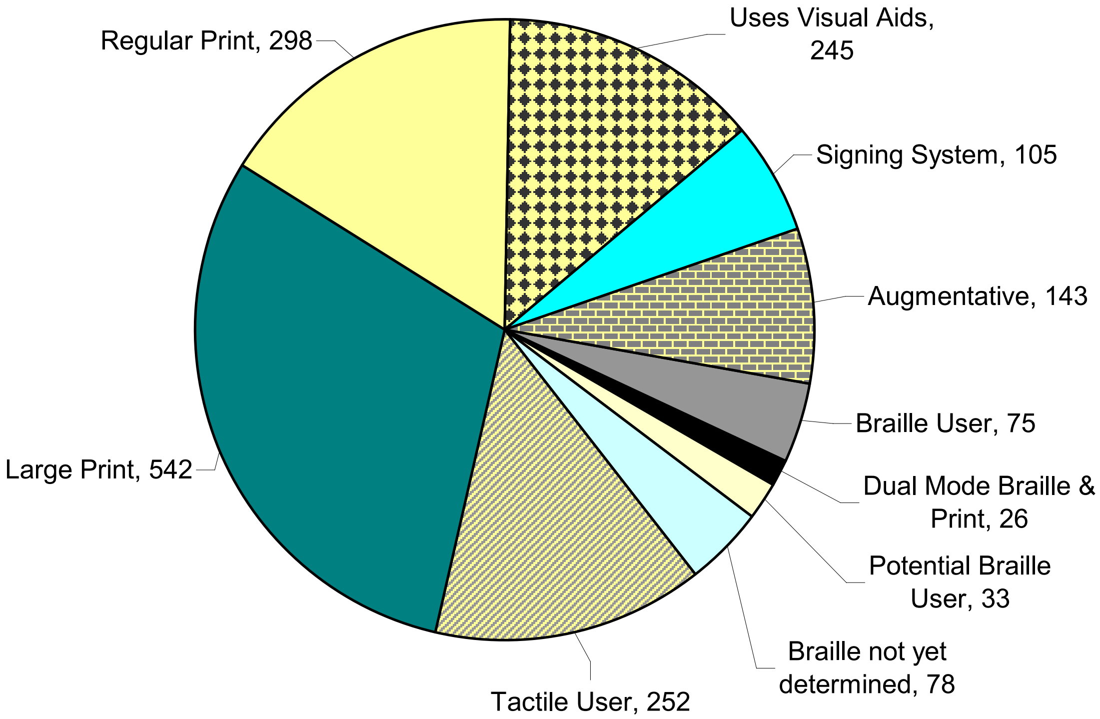


Figure 156. Visual Status of Blind and Low Vision Learners Receiving Education Services and Enrolled on the National Database, New Zealand June 2006 (n=1,153)



Note: Reporting of Cortical Vision Impairment may be inconsistent across the country.

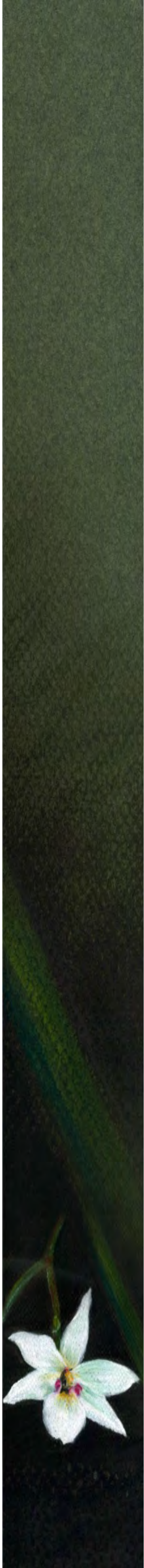
Figure 157. Communication Modes of Blind and Low Vision Learners Receiving Education Services and Enrolled on the National Database, New Zealand June 2006 (n=1,153)

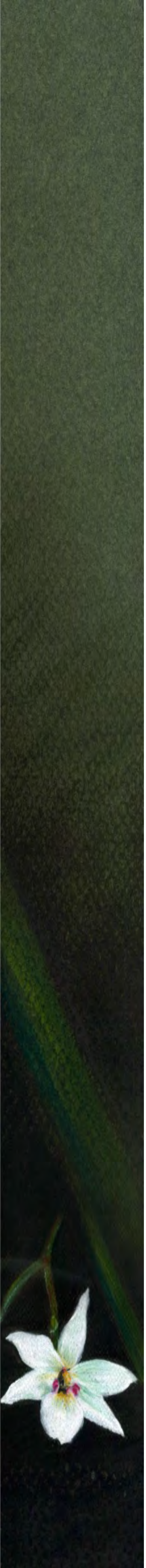


Note: 112 of learners identified as using regular print also used visual aids and 255 of learners identified as using large print also used visual aids so totals add up to >100% of sample size.

Table 114. Number of Blind and Low Vision Learners Receiving Education Services by Region, New Zealand June 2006

Region	Visual Resource Centre Enrolments	Educational Level	Roll No.	2006 Referrals
Auckland / Northland	Auckland VRC	Early Childhood	88	41
	403	Primary	217	
	Manurewa High	Secondary	98	
	17	Manurewa High	17	
Homai Campus School	Homai CS	Primary	18	N/A
	39	Secondary	21	
Waikato / Thames / Coromandel / King Country	Hamilton VRC	Early Childhood	24	20
	108	Primary	61	
		Secondary	23	
Bay of Plenty	Tauranga VRC	Early Childhood	7	3
	40	Primary	23	
		Secondary	10	
Gisborne / East Cape	Gisborne VRC	Early Childhood	6	23
	40	Primary	23	
		Secondary	11	
Hawkes Bay	Napier VRC	Early Childhood	5	4
	48	Primary	26	
		Secondary	17	
Taranaki	Welbourn VRC	Early Childhood	7	1
	45	Primary	29	
		Secondary	9	
Horewhenua Manawatu	Palmerston North SRC	Early Childhood	20	11
	76	Primary	40	
		Secondary	16	
Wellington	Kelburn VRC	Early Childhood	26	27
	142	Primary	69	
		Secondary	47	
Nelson / Buller / Marlborough	Nelson VRC	Early Childhood	11	2
	47	Primary	21	
		Secondary	15	
Canterbury / West Coast	Elmwood VRC	Early Childhood	20	21
	240	Primary	146	
		Secondary	74	
Otago	Otago VRC	Early Childhood	4	5
	43	Primary	21	
		Secondary	18	
Southland	Southland VRC	Early Childhood	8	7
	35	Primary	18	
		Secondary	9	
Total			1323	165





Permanent Hearing Loss

Introduction

Sensorineural hearing loss is a permanent condition which occurs when the functioning of the inner ear, the auditory nerve and / or its connections to the brain are impaired. Between 135-170 babies (2-3 /1000) in New Zealand each year are identified as having a permanent congenital hearing loss [245] and until recently, New Zealand has relied on a “risk factor” approach to identification, with children with any of the factors listed below being referred to an Audiologist for further assessment:

1. A Family History of Hearing Loss
2. Jaundice Requiring Exchange Transfusion
3. Craniofacial Abnormalities
4. Ototoxic Drugs
5. Mechanical Ventilation Lasting 5+ Days
6. Low APGAR Scores (0-4 at 1 Minute, 0-6 at 5 Minutes)
7. Birth Weight <1500g
8. Bacterial Meningitis
9. Infections (e.g. Rubella, Herpes, Toxoplasmosis) Associated with Hearing Loss.

Unfortunately, such “high risk” approaches have not led to an earlier age of diagnosis, with the average age of confirmation for moderate / higher degrees of hearing loss being ~ 45 months in 2004 [246]. Such delays are of concern, as hearing impairment during the early years of life may prevent / delay speech and language development and in the longer term, impact negatively on cognitive development, academic performance, social wellbeing and subsequent career choice [247]. In mediating these impacts, 4 key variables are thought to play a role:

1. **Age of Onset**: Children born with permanent hearing loss often have limited exposure to sound during a critical period of brain development, leading to poorer development of the central auditory system and a reduced ability to acquire language. As a result, the greatest benefits from auditory interventions are achieved within the first 3 years of life.
2. **Severity of the Loss**: There are varying degrees of hearing loss and associated functional impairment (**Table** 118). Lower degrees of hearing loss can still have negative impacts, as they are often detected later, allowing time for deficits in speech and language to develop.
3. **Intervention Delay**: The internationally recommended age for identification of hearing loss is 3 months, with intervention commencing by 6 months of age [248]. These recommendations are based on evidence suggesting that infants whose hearing loss is detected early and who receive appropriate assistance, have significantly better spoken language and subsequent educational outcomes than later detected peers [247]. Available interventions include hearing aids, speech language therapy, the teaching of sign language, other educational supports and cochlear implants.
4. **Presence of Other Disabilities**: Analysis of New Zealand Deafness Notification Data suggests that approximately ¼ of hearing impaired children have other disabilities, including Downs Syndrome, brain injury, developmental delay and metabolic disorders, which may themselves impact on children’s learning and cognitive development [246].

In response to concerns regarding the late age of detection of congenital hearing loss, the Government in its May 2006 Budget, announced a funding package of $16 million over the next four years to establish a Universal Newborn Hearing Screening Programme for New Zealand. Since this announcement, work has focused on programme design and models for a national information system. In addition, the Universal Newborn Hearing Screening Advisory Group has highlighted a number of areas where further work is necessary if the programme is to be implemented effectively (e.g. national workforce development; creation of a national lead agency, funding agreements and data systems; quality improvement, monitoring and evaluation) [245]. It is likely that significant further policy work will be required before the final roll out of the national programme, and in the meantime the majority of DHBs will still need to rely on the “at risk” identification system.

While awaiting the roll out of a universal screening programme, two data sources provide information on the number of children and young people with permanent hearing loss in New Zealand. These are the New Zealand Deafness Database, which collects information on children diagnosed with a permanent hearing loss who meet a number of specific criteria and the National Minimum Dataset, which collects information on the number of children and young people admitted to hospital for cochlear implant surgery each year. The following sections review each of these in turn.

Data Source and Methods

Definition

1. Children notified to the New Zealand Deafness Database
2. Hospital Admission for Cochlear Implant in Children and Young People (0-24 yrs)

Data Source and Interpretation

1. *Children notified to the New Zealand Deafness Database*

NZ Deafness Notification Data Reports produced by the National Audiology Centre

Numerator: Children notified to the New Zealand Deafness Notification Database who meet the appropriate criteria (see below).

Denominator: Not applicable

Interpretation: The data is presented by year of notification, rather than year at first identification, with the degree of hearing loss assessed using the dBHL ranges outlined in Table 118. As notification is not mandatory, these statistics may undercount the number of children with permanent hearing loss. A recent data matching exercise with the Children’s Hearing Aid Fund, which has mandatory form completion, revealed 157 children over an 11 year period who had not been reported to the Deafness Database, but who had been fitted with hearing aids. Similar processes have been carried out at intervals in the past (44 retrospective cases were added during 2001). In addition, because of the generally late age at first diagnosis, it is not possible to be certain of the aetiology or time of onset of the reported hearing loss. Thus although most cases are likely to be congenital, it is still not possible to rule out the possibility that the hearing loss was acquired, or that the degree of loss had changed between birth and identification.

2. *Hospital Admission for Cochlear Implant in Children and Young People (0-24 yrs)*

National Minimum Dataset

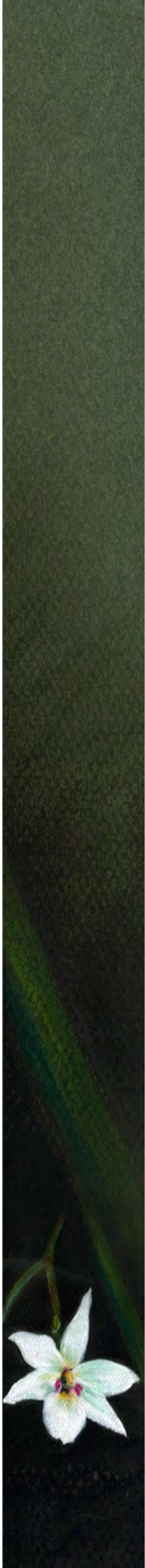
Numerator: Children and young people admitted to hospital with Implantation or Replacement of Cochlear Prosthetic Device (ICD-09 20.96-20.98) as primary or secondary procedure.

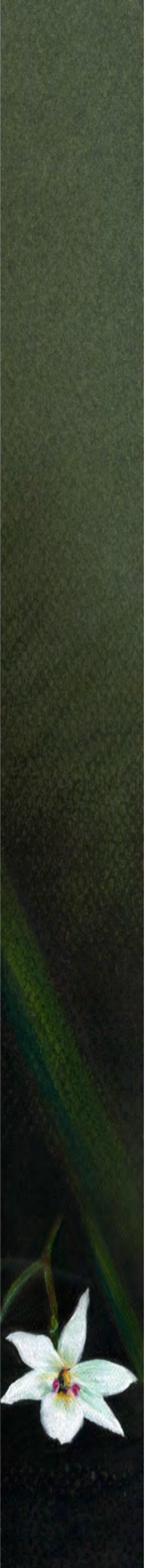
Denominator: Not Applicable

Interpretation: Because ICD-9 coding does not differentiate between implantation and replacement of a cochlear implant, it is possible that some of the cases listed in this section represent the replacement of a cochlear implant in a previously implanted individual.

Indicator Category

Ideal C (**Table 133**, **Table 134**)





New Zealand Distribution and Trends

Notifications to the New Zealand Deafness Database

The New Zealand Deafness Notification database is managed by the National Audiology Centre and collects information on children meeting the following criteria:

1. Children must be <18 years of age, with congenital hearing losses or any hearing loss not remediable by medical or surgical means which requires hearing aids and / or surgical intervention.
2. Children must have an average bilateral hearing loss (over 4 audiometric frequencies 500-4000 Hz) of >26 dBHL in the better ear*";*
3. Children are excluded if their hearing loss is <26 dBHL, unilateral, acquired or they were born overseas.

In New Zealand during 1998-2004, an average of 123 children per year met the inclusion criteria for the Deafness Notification Database. The large number of notifications in 2001 and 2004 reflect a number of retrospective notifications which were overlooked in previous years (**Table 115**).

Table 115. Number of Notifications Meeting the Criteria for Inclusion in Deafness Notification Database by Region of Residence, New Zealand 1998-2004

Region of Residence	Notification Year						
	1998	1999	2000	2001*	2002	2003	2004*
Northland	10	8	11	10	5	7	10
Auckland Region	21	35	40	74	36	52	37
Waikato	7	13	9	19	10	9	15
Lakeland	3	2	0	3	3	3	6
Bay of Plenty	10	6	4	21	6	12	9
Tairawhiti	3	0	1	3	2	1	5
Taranaki	2	2	1	1	3	3	8
Hawkes Bay	1	2	2	31	5	4	5
Manawatu	3	3	0	12	7	12	24
Wellington	3	10	5	8	12	17	5
Nelson Marlborough	2	3	2	1	3	4	4
West Coast	0	0	0	0	1	1	1
Canterbury	0	3	7	10	12	9	10
South Canterbury	0	1	1	4	1	3	3
Otago	0	1	8	5	5	3	7
Southland	1	3	2	0	3	4	6
New Zealand Total	65	90	92	202	113	144	155

*Note: 2001 figures include 44 retrospective notifications. During 2004, an additional 157 retrospective cases which had not been notified over an 11-year period were added to the database, but are not included in this total

Age at Identification of Hearing Loss

The average age at confirmation of hearing loss is calculated for children with at least a moderate loss (>40 dBHL). The age at detection for mild losses is often much later and until recently the effects on educational performance were thought to be less marked. In recent years, the average age at identification of at least a moderate loss has varied by year of notification (**Table 116**) and by region (**Table 117**). In addition, significant delays between the time of first suspicion and final confirmation (range 6.5-13.5 months) may have further delayed the age at which effective interventions began. It is hoped that with the roll out of a Universal Newborn Hearing Programme in New Zealand over the next few years, the age of confirmation will decline significantly.

Table 116. Age at Suspicion and Confirmation of Moderate or Greater Hearing Loss, New Zealand 2001-2004

Year	Mean Age Suspected (months)	Mean Age Confirmed (months)	Time Taken (months)
2001	28.1	33.7	6.5
2002	24.4	35.1	10.7
2003	35.3	46.1	10.8
2004	31.8	45.3	13.5

Table 117. Average Age of Identification of Moderate or Greater Hearing Loss by Region, New Zealand 1998-2004

Region of Residence	Average Age of Identification (months)	% of Total Notifications	Number of Notifications
Northland	48.5	9.6	70
Auckland	48.2	33.8	246
Waikato	42.7	5.5	40
Lakeland	49.6	2.6	19
Bay of Plenty	52.1	7.0	51
Tairawhiti	32.6	1.9	14
Taranaki	25.1	2.1	15
Hawkes Bay	24.5	5.0	36
Manawatu	45.3	7.2	52
Wellington	49.6	7.3	53
Nelson Marlborough	26.2	2.1	15
Canterbury	39.1	9.1	66
South Canterbury	27.6	0.7	5
Otago	51.6	2.8	20
Southland	33.8	3.4	25
New Zealand Total		100.0	727

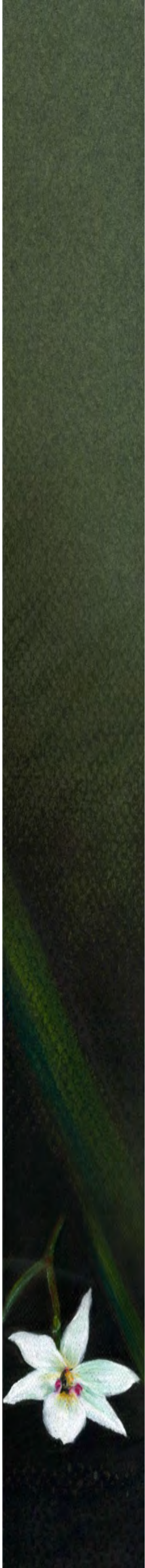
Degree of Hearing Loss

The New Zealand Deafness Database classifies the degree of hearing loss in the better hearing ear using the dBHL ranges outlined in **Table** 118, which also summarises the degree of deafness of the 155 children notified to the database in 2004.

Other Disabilities

During 2004, a number of children who met the criteria for inclusion in the NZ Deafness Database also had other disabilities. These included (n=155):

• No Other Disability	77.4%
• Multiple Disabilities	8.4%
• Other Syndromes	3.9%
• Asthma	1.9%
• IHC	1.9%
• Down Syndrome	0.6%
• Other Disabilities	4.5%
• Unknown	1.3%



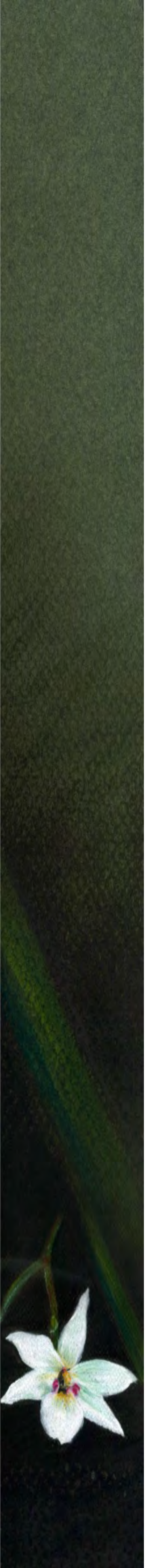


Table 118. Degrees of Hearing Loss and Associated Functional Impairment in Children Notified to a New Zealand Database, New Zealand 2004

Degree of Loss	Functional Impairment Likely at this Level of Loss [247]	% of 2004 notifications
Mild 26-40 dBHL	Some difficulties in hearing soft speech and conversations (persons sound as if they are mumbling) but can often manage in quiet situations with clear voices. Speech and language usually develop normally if child is fitted early with hearing aids.	59%
Moderate 41-65 dBHL	Difficulty understanding conversational speech, particularly in the presence of background noise. Volume of TV and Radio needs to be turned up to be heard. Speech and language generally affected if hearing aid is not provided early. A hearing aid will assist most hearing difficulties if speech discrimination is good and listening environment is not too noisy.	29%
Severe 66-95 dBHL	Normal conversational speech is inaudible and only raised voices at close distance can be understood. Speech and language will not develop spontaneously in children with severe hearing loss. Hearing aids will amplify many speech sounds and will greatly assist children in developing speech, although speech quality is likely to be affected. Some children may benefit from a cochlear implant.	7%
Profound 96+ dBHL	Learning to speak without significant support is very difficult, although there is individual variation. Greater inconsistency in the benefit derived from hearing aids: some can understand clear speech in quiet conditions when wearing a hearing aid, while others derive little benefit. This group should be considered for cochlear implants, with benefits being evident, especially if implanted at a young age.	5%

Cause of Hearing Loss

During 2004, in half of cases the cause of the hearing loss was unknown. While a family history is quoted in 32% of cases, this is higher than for Australian figures and very few children undergo genetic testing for hearing loss. Causes during 2004 included (n=155):

Unknown	50%
Family History	32%
Multiple Causes	6%
Asphyxia	3%
Low Birth Weight	2%
Facial Malformation	1%
Other Causes	6%

Hospital Admissions for a Cochlear Implant

Cochlear implants are devices which provide hearing sensations for severely and profoundly deaf individuals. They consist of two parts, an electrode array which is implanted into the cochlear and a speech processor which is worn externally (either behind the ear or on the body). Once it has been established that no significant benefit is being obtained from a hearing aid, a cochlear implant should be considered as soon as possible, although congenitally deaf children who are 3+ years of age need to have been fitted with hearing aids and started to develop speech and language, in order to benefit from an implant. Following successful implantation, the degree of benefit varies depending on the age of onset of the deafness, the child's previous experience with hearing and the duration of the loss [249].

In New Zealand during 1988-2005, there were a total of 238 hospital admissions for cochlear implant surgery in the 0-24 age group, involving a total of 222 children. While it is likely that the majority of admission were for the implantation of a cochlear prosthetic device, a small number may have been admitted for repair / replacement surgery (differentiation between the two is difficult using current ICD coding). Between 1990 and 2005 the number of children receiving cochlear implant surgery gradually increased, from ~4 cases per year during the first 4 years, to ~21 cases per year during the last 4 years for which data was available (**Table 119**).

Table 119. Number of Admissions for Cochlear Implant Surgery in Children and Young People 0-24 Years, New Zealand 1990-2005

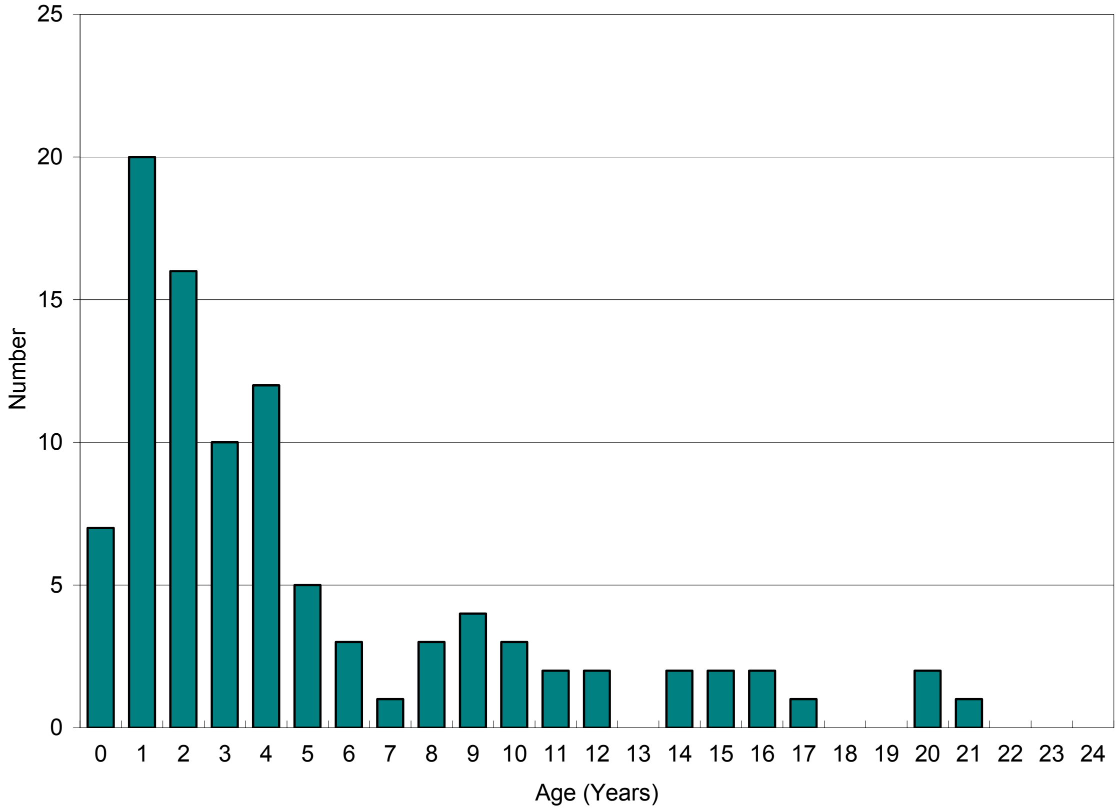
New Zealand	1990-91	1992-93	1994-95	1996-97	1998-99	2000-01	2002-03	2004-05
Total	3	13	18	28	40	48	46	37

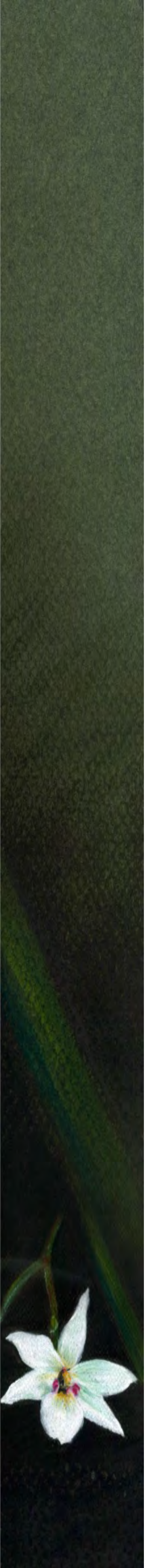
Note: Numbers are per 2 year period and may include those undergoing repair / replacement of a cochlear implant.

Cochlear Implants by Age

In New Zealand during the past 5 years, 43.9% of cochlear implant surgery in the 0-24 age group occurred before the age of 3 years and 66.3% occurred before the 5 years of age. A small number of implants occurred after the age of 5 years, although the possibility of repair / replacement surgery could not be ruled out in these cases (**Figure 158**).

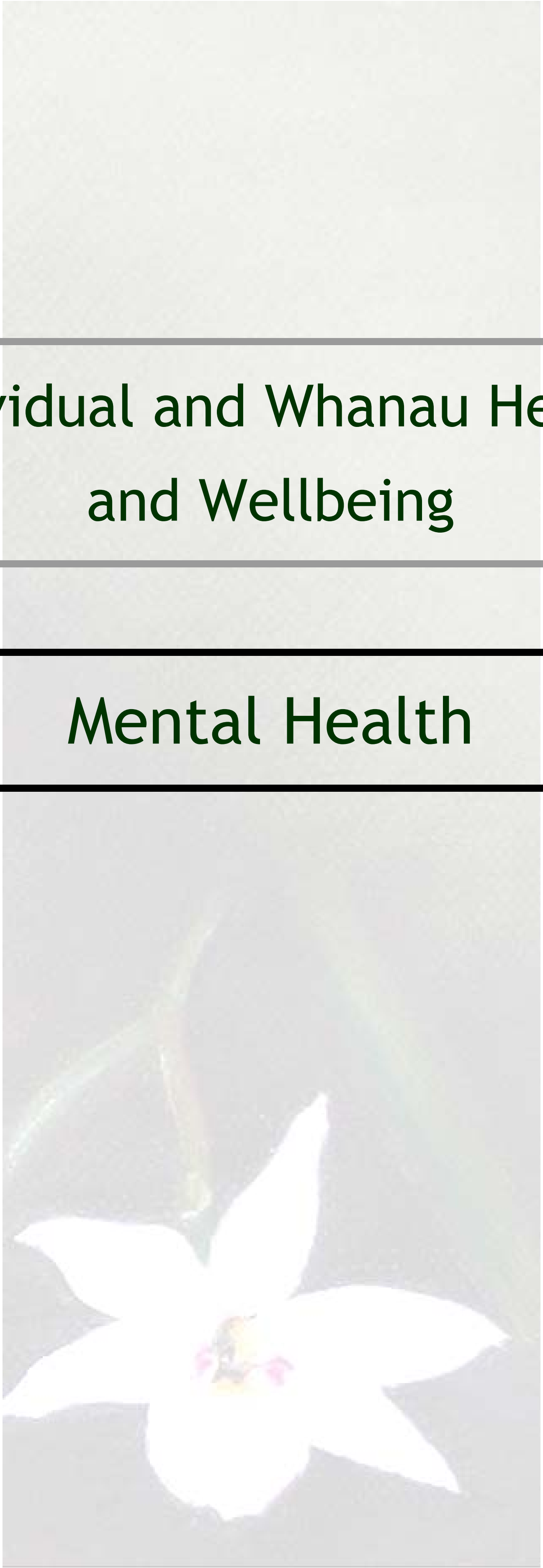
Figure 158. Hospital Admissions for Cochlear Implant Surgery in Children and Young People 0-24 Years by Age, New Zealand 2001-2005





Summary

Hearing loss during the early years of life is of significant concern, as delays in intervention may lead to impaired language development and long term, may impact negatively on cognitive development, academic performance and subsequent career choice. In New Zealand each year, approximately 120 children meet the inclusion criteria for the Deafness Notification Database and 20 are admitted to hospital for cochlear implant surgery. Evidence would suggest however, that New Zealand's current high risk approach to detection is resulting in significant delays, with the average age of detection of moderate or greater loss in 2004 being 45.3 months. It is hoped that the roll out of a Universal Newborn Hearing Programme over the next few years, will lead to a reduction in the age at first detection of hearing loss, and as a consequence to significantly earlier intervention for these children.



Individual and Whanau Health and Wellbeing

Mental Health

Issues Experienced by Callers to Telephone Counselling Services

Introduction

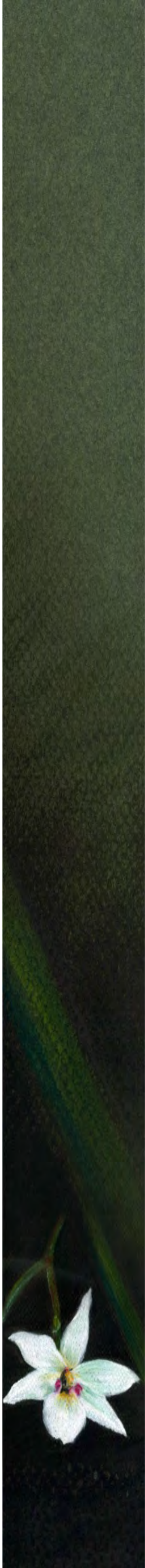
Good empirical evidence suggests that investment in early intervention and prevention programmes in child and youth mental health can be effective [250]. The potential for mental health problems to have long term disabling effects on the normal development and well-being of children and young people suggests that the costs of early intervention and prevention can be easily offset by longitudinal savings from reduced treatment costs and improved occupational achievements.

In New Zealand, the need for child and youth mental health services can be seen as spanning a continuum, with the types of issues being dealt with by child and youth telephone counselling services, at one end of this continuum potentially reflecting the everyday issues and concerns being experienced by many New Zealand children and young people. Analysis of calls received by both the What's Up telephone counselling service and Youthline's Youth Help Line Service in recent years suggest that many of these concerns relate to issues such as peer relationships and bullying, although relationships with family and partners (girlfriends and boyfriends) also feature prominently [251].

Supporting children and young people in dealing with these issues is vital, as it has been suggested that peer relationships contribute substantially to social and cognitive development, and to the effectiveness with which we function as adults, with some authors suggesting that the single best childhood predictor of adult adaptation is the adequacy with which a child gets along with their peers. In this context, children who are generally disliked, who are aggressive or disruptive, who are unable to sustain close relationships with other children, or who cannot establish a place for themselves in their peer culture, are seen as being seriously at risk [252].

A number of studies also suggest that being victimised by peers is significantly related to low levels of psychological wellbeing and social adjustment, and to high levels of psychological distress and adverse physical health symptoms. Evidence from retrospective and longitudinal studies suggests that these associations may be causal [253]. Conversely, it has been suggested that young people with high self esteem, a sense of purpose, resilience, interpersonal skills, support from parents, family and community, and a connectedness with their peers are at a much lower risk of adverse outcomes, such as suicide [254].

In attempting to assess some of the more common issues affecting the mental wellbeing of New Zealand children and young people, the following section explores the most frequent reasons for calling the 0800WHATSUP telephone counselling service and Youthline's Youth Help Line Service during 2006. While limits on the number of calls which can be answered, as well as the inability to identify individual callers in these statistics, preclude the extrapolation of rates from this data, these figures nevertheless highlight a range of issues which New Zealand children and young people identify as their main concerns. In addition, the large number calls which are unable to be answered (73% of calls to 0800WHATSUP were unable to be answered during 2006) potentially suggest that there is a large amount of unmet need in this area.



Data Source and Methods

Definition

1. Telephone calls made by children and young people to 0800WHATSUP
2. Telephone calls made by children and young people to Youthline

Data Sources and Interpretation

1. The 0800WHATSUP Telephone-Based Counselling Service

0800WHATSUP is a free, professional telephone counselling service that is available from noon to midnight every day of the year to New Zealand children and young people aged between 5 and 18 years. 0800WHATSUP is provided by The Kids Help Foundation Trust, an incorporated charity. It became available to children and young people in September 2001.

2. Youthline's Youth Help Line Service

Youthline is a charitable organisation, established in 1970 to provide a first point of contact for young people requiring confidential support and counselling. It provides a number of clinical services including family therapy, email counselling, pregnancy counselling and crisis support, as well as an on-site school, youth information including the inter-departmental on-line initiative Urge/Whakamanawa, (www.urge.co.nz), community facilities and youth development programmes. While the range of face to face services varies from region to region, its Youth Help Line counselling service is available nationwide, with approximately 24,000 calls annually being received by its 0800 free-call number. The information presented in this section was collected by Youthline telephone counsellors at the time of client contact. The anonymous nature of the service means that while it is usually possible to obtain relatively complete information on the nature of the presenting issue, it is not always appropriate to collect additional information (e.g. age, ethnicity, area of residence) and thus in many cases information of this nature is incomplete. Thus further analysis by age, ethnicity and NZDep Index decile is not possible using Youthline Helpline data.

Indicator Category

Bookmark / Proxy C (**Table 133**, **Table 134**)

Calls to the 0800WHATSUP Telephone Counselling Service

During 2006, on average 1,721 calls were made to 0800WHATSUP each day. 0800WHATSUP counsellors answered 27% of these calls, averaging 429 calls daily. Males made up 49% of callers and females 51%, with the average age being 13 years (38% of callers were <13 years and 85% were <16 years, with callers >18 years being referred to more age-appropriate services where possible). Approximately 10% of calls were from children and young people seeking help with a particular problem. 0800WHATSUP counsellor's record non-identifying details on all calls answered, providing a pool of valuable information on the issues of concern to the young people who phone the service.

Calls from children and young people during 2006 were categorised into one of eleven problem categories as outlined in **Table 120**. These categories were further divided into 35 sub-problems, with the ten main problems for which children and young people phoned What's Up in 2006 being outlined in (**Figure 159**). Within these categories, the top 5 reasons for calling were issues relating to peer relationships, bullying, relationships with family, relationships with partners, and pregnancy.

Relationships

By far the most common reason for calling 0800WHATSUP during 2006 was to discuss relationship issues, with almost half of all counselling calls involving concerns about relationships with others. Thirty five percent of those calling about peer relationship issues reported ongoing problems in peer relationships, including difficulties in maintaining relationships. Of those calling about family relationships, 49% reported experiencing frequent family conflict, or family breakdown such as separation or divorce. Finally, relationships with partners (girlfriends / boyfriends) were the main concern for teenage callers, with 37% of calls about partner relationships reporting significant difficulties, or relationship breakdown. In addition, thirty-three percent said they wanted to establish a relationship.

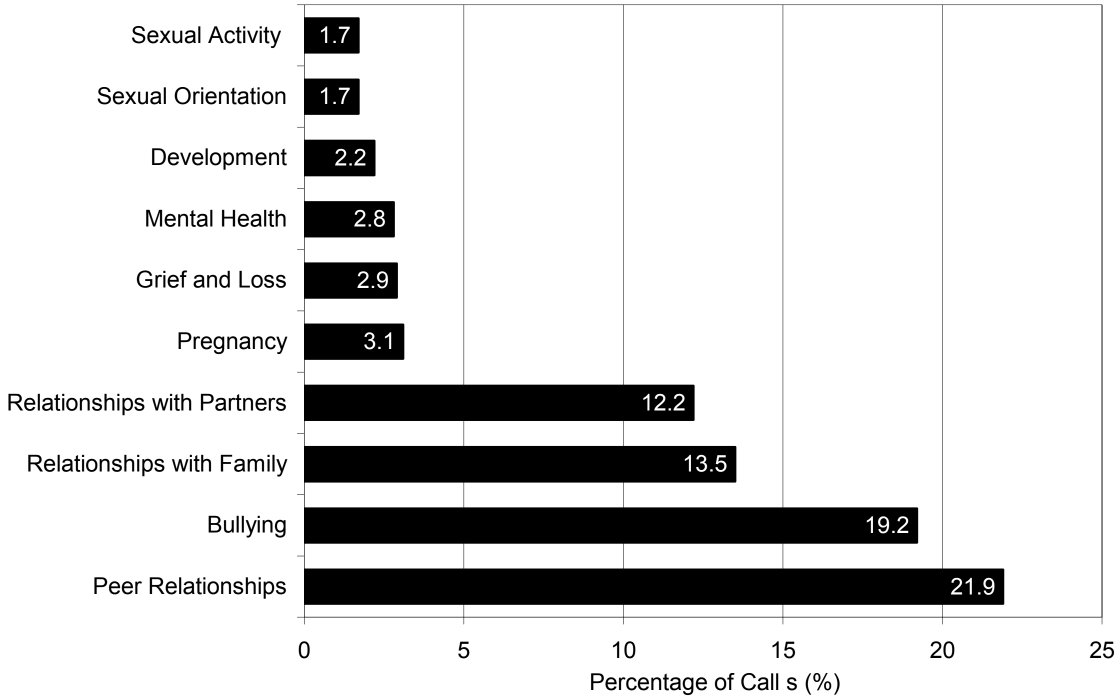
School Related Problems and Bullying

Bullying was the second most frequent reason for children and young people calling 0800WHATSUP, although its significance diminished with age. Nearly 40% of calls about bullying concerned frequent incidents or continual harassment, with the proportion of calls relating to bullying increasing since 2003 (14.9% of calls in 2003 vs. 19.2% of calls in 2006).

Table 120. Number and Percentage of Calls to the 0800WHATSUP Telephone Counselling Service by Category, New Zealand 2006

Problem Category	Number of Calls	% of Calls
Relationships	7,373	48.6
School Related	3,228	21.3
Sex	895	5.9
Emotional	838	5.5
Health	802	5.3
Self Concept	689	4.5
Practical	496	3.3
Drug and Alcohol	381	2.5
Child Abuse	259	1.7
Violence	212	1.4
Cults/Sects	5	0.0
Total	15,178	100.0

Figure 159. Ten Most Frequent Reasons for Calling the 0800WHATSUP Telephone Counselling Service, New Zealand 2006



Gender and Age Differences

During 2006, while both males and females were principally concerned with relationship problems, the relative importance of different types of relationships varied, with peer relationships followed by bullying being the main reasons for calling 0800WHATSUP for females, while this order was reversed for males. In addition, while relationships with peers followed by bullying were the main reasons for calling for those aged 5-12 years, relationships with partners, followed by relationships with family were the top reasons for calling for those aged 13-18 years (**Table 121**).

Table 121. The Top 5 Reasons for Calling the 0800WHATSUP Telephone Counselling Service by Gender and Age, New Zealand 2006

Females	Males	Aged 5-12 Years	Aged 13-18 Years
Peer Relationships	Bullying	Peer Relationships	Partner Relationships
Bullying	Peer Relationships	Bullying	Family Relationships
Family Relationships	Partner Relationships	Family Relationships	Peer Relationships
Partner Relationships	Family Relationships	Partner Relationships	Bullying
Pregnancy	Sexual Orientation	Development	Pregnancy

Calls to the Youthline’s Youth Help Line Service

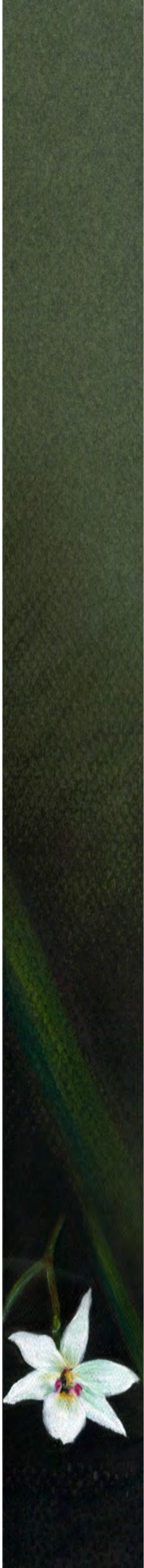
During the year ending September 2006, a total of 34,981 calls were taken by Youthline’s Youth Help Line Service. While differences in the way in which What’s Up and Youthline categorise the reasons for calling meant that comparisons cannot be made across these two services, in general terms the types of issues young people called for were similar, with relationships being a major area of concern. Issues of isolation and loneliness also played a major role for a large proportion of young people calling Youthline, with depression and anger also making a significant contribution (**Table 122**).

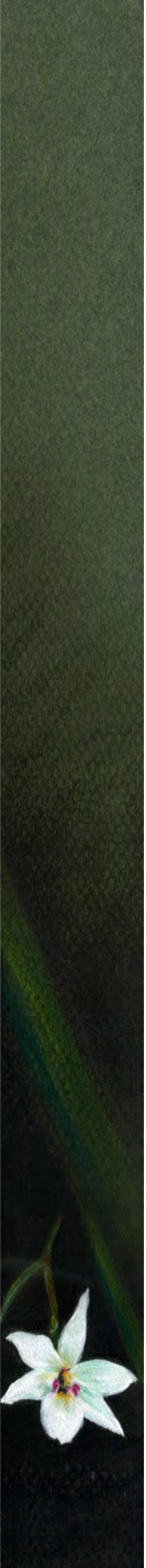
Summary

Good empirical evidence suggests that investment in early intervention and prevention programmes in child and youth mental health can be effective. In New Zealand, the need for child and youth mental health services can be seen as spanning a continuum, with the types of issues being dealt with by child and youth telephone counselling services, at one end of this continuum potentially reflecting the everyday issues and concerns experienced by many New Zealand children and young people. Analysis of the calls received by both the 0800WHATSUP telephone counselling service and Youthline’s Youth Help Line Service during 2006 suggests that many of these concerns relate to issues with peer relationships and bullying, although relationships with family and partners (girlfriends and boyfriends) also feature prominently. Supporting children and young people in dealing with these issues is vital, as it has been suggested that peer relationships contribute substantially to social and cognitive development. A number of studies also suggest that being victimised by peers is significantly related to low levels of psychological wellbeing and social adjustment, and to high levels of psychological distress. The large number of calls which are unable to be answered by these telephone counselling services also potentially suggest that there may be a large amount of unmet need in this area.

Table 122. Calls to Youthline's Youth Help Line by Reason, New Zealand Sept. 2005 - 2006

Main Issue Related to Call	Number	Percent of Calls
Contact / Isolation	10,157	29.0
Relationships	3,727	10.7
Emotional Support	2,788	8.0
Depression	2,688	7.7
Anger	1,443	4.1
Family / Children	1,186	3.4
Family / Parents	1,073	3.1
Loneliness	1,053	3.0
Health / Sexual Issues	1,038	3.0
Abusive Caller	1,008	2.9
Anxiety	991	2.8
Referral	876	2.5
Suicide	804	2.3
Grief	644	1.8
Mental Illness	574	1.6
Stress	542	1.5
Pregnancy	499	1.4
Sexual Abuse (Rape)	417	1.2
Substance Abuse / Addiction	404	1.2
Bullying	362	1.0
Self Harm	349	1.0
Couple Issues	275	0.8
Accommodation	267	0.8
Sexual Orientation	255	0.7
Financial Stress / Unemployment	215	0.6
Miscarriage Support	212	0.6
Violence / Physical Abuse	192	0.5
Family Violence	180	0.5
Employment Relations / Issues	165	0.5
Eating Disorder	155	0.4
School	127	0.4
Custody / Access issues	97	0.3
Emotional Abuse	92	0.3
Psychological Abuse	42	0.1
Gambling	27	0.1
Incest	27	0.1
Supervision	22	0.1
Child Prostitution	8	0.0
Total	34,981	100.0





Mental Health Inpatient Admissions

Introduction

Mental health problems become more common as young people move through adolescence, with the Dunedin Multidisciplinary Health and Development Study suggesting that the prevalence of mental health problems increases from about 17.6% at age 11, through 22% at age 15, to 36.6% at 18 years of age [255]. Mental health conditions commonly diagnosed amongst this age group include anxiety disorders, depression, conduct disorders and alcohol and substance use disorders. In addition, suicide rates amongst New Zealand young people remain high by international standards [161].

The type of mental health problem diagnosed varies by age and gender, with males tending to have higher rates of conduct disorder and alcohol and substance use and females higher rates of anxiety and depression. More limited information also suggests that mental health problems vary with ethnicity, with higher rates of admission and readmission to psychiatric facilities amongst Māori males 15-19 years [161]. In terms of risk factors for mental health problems, multiple disadvantages during childhood appear to place young people at higher risk of poorer mental health outcomes. Known resiliency / protective factors include intelligence and problem solving abilities; interests outside the home; a caring relationship with an adult outside the family; warm, nurturing and supportive relationships with a parent; easy temperament; positive peer relationships; and low levels of novelty seeking [161].

In New Zealand, while the vast majority of child and youth mental health issues are dealt with on an outpatient basis, data constraints (e.g. the recording of diagnoses for mental health outpatient contacts has only recently been introduced) mean that much of the workload of child and youth mental health services is only now beginning to be captured at a national level. More complete information however, is available on mental health inpatient admissions for New Zealand young people, and it is these admissions which are the subject of the section which follows. The reader is urged to bear in mind however, that these admissions represent the tip of the iceberg in terms of the mental health issues experienced by New Zealand young people, and that the type of mental health issue dealt with on an inpatient basis will not be representative of the issues dealt with in the outpatient setting.

Data Source and Methods

Definition

Hospital Admissions for Mental Health Issues in Young People Aged 15-24 Years

Data Source

Numerator: National Minimum Dataset: Hospital admissions for young people 15-24 years with a primary diagnosis of a Mental or Behavioural Disorder (ICD-10 F00-F99). Risk factors for schizophrenia (ICD-10 F20), depression (ICD-10 F32-F33), bipolar affective disorder (F31) and eating disorders (F50) were explored in more detail. Inpatient admissions with an Emergency Medicine specialty code in the range M05-M08 on discharge were excluded in order to ensure consistency over time (see discussion Appendix 1).

Denominator: NZ Census

Indicator Category

Bookmark / Proxy C (Table 133**,** Table 134**)**

Notes on Interpretation

The limitations of the National Minimum Dataset are discussed at length in Appendix 1. The reader is urged to review this Appendix before interpreting any trends based on hospital admission data. In addition, the change over from the ICD-9 to the ICD-10 coding system during 1999 made comparisons with earlier years difficult.

New Zealand Distribution and Trends

In New Zealand during 2002-2006, the most common reasons for hospital admissions with mental health issues in young people were for schizophrenia, followed by depression and bipolar affective disorder. Composite categories including schizotypal and delusional disorders and drug and alcohol related conditions also made a significant contribution (**Table 123**). While admissions for schizophrenia and bipolar affective disorder increased with age, admissions for eating disorders were more frequent amongst those in their teenage years (**Figure 160**). The use of these figures to estimate population prevalence is not recommended however as many mental health services in New Zealand are offered on an outpatient basis, and thus access to inpatient facilities may fail to accurately reflect the true burden of illness, or access to mental health services in an ambulatory care setting.

During 2002-2006, the risk factor profiles of a number of the more common mental health inpatient diagnoses varied markedly, with hospital admissions for schizophrenia being more common amongst males, Māori and Pacific young people and those in the most deprived areas (**Table 124**). In contrast, hospital admissions for depression were more common amongst females, European young people and those in the more deprived areas (**Table 125**). While there were no gender differences in hospital admissions for bipolar affective disorder, rates were higher for Māori and European young people and those in the more deprived areas (**Table 126**). Finally, hospital admissions for eating disorders were more common amongst females, European young people and, in contrast to other mental health inpatient admissions, were significantly lower amongst those living in the most deprived areas (**Table 127**).

Table 123. The Most Frequent Reasons for a Hospital Admission with a Mental Health Issue in Young People 15-24 yrs, New Zealand 2002-2006

Diagnosis	Number: Total 2002-2006	Number: Annual Average	Rate per 100,000	% of Total
Schizophrenia	3,406	681.2	125.1	24.2
Schizotypal/Delusional Disorders	1,882	376.4	69.1	13.4
Depression	1,936	387.2	71.1	13.8
Bipolar Affective Disorder	1,216	243.2	44.6	8.6
Other Mood Disorders	376	75.2	13.8	2.7
Alcohol/Drug Mental Health Effects	1,707	341.4	62.7	12.1
Stress Reaction/Adjustment Disorder	1,135	227.0	41.7	8.1
Personality Disorders	863	172.6	31.7	6.1
Eating Disorders	308	61.6	11.3	2.2
Other Mental Health Issues	1,246	249.2	45.7	8.9
Total	14,075	2,815.0	516.8	100.0

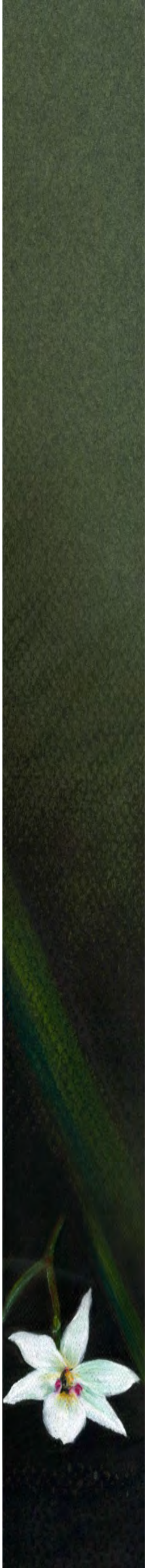


Figure 160. Hospital Admission Rates for Mental Health Issues in Young People 15-24 yrs by Age and Diagnosis, New Zealand 2002-2006

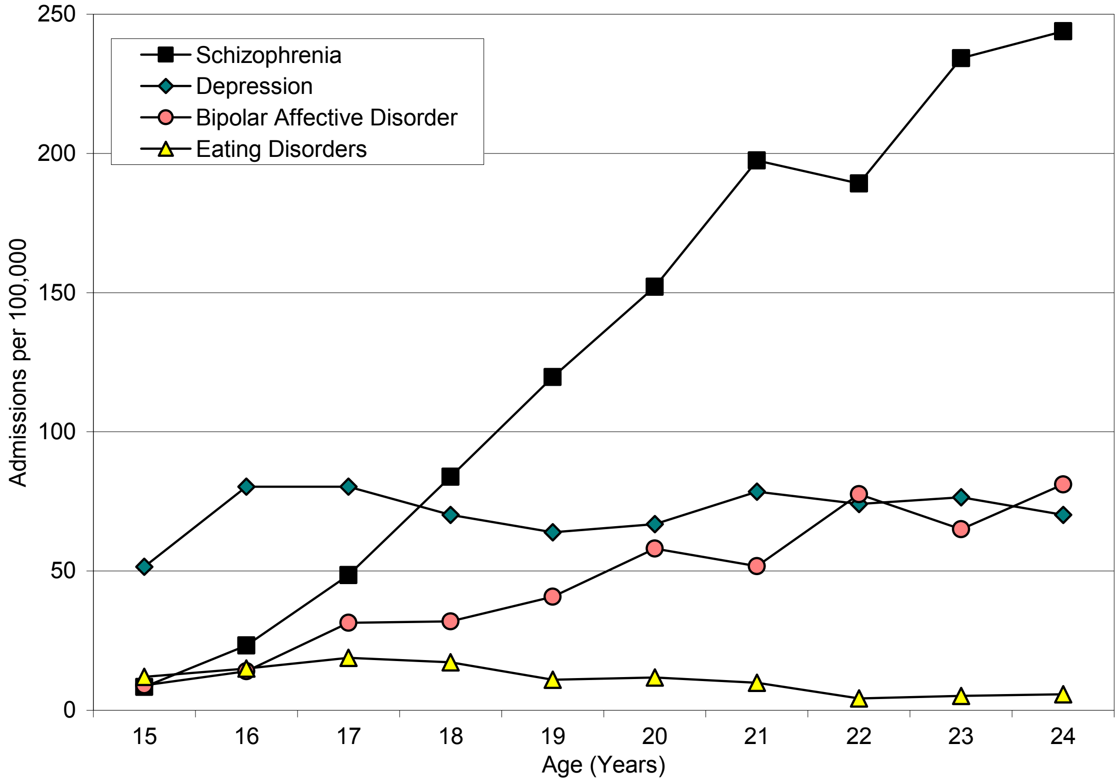


Table 124. Risk of Hospital Admission for Schizophrenia in Young People 15-24 Years by Ethnicity, Gender and NZ Deprivation Index Decile, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	41.41	1.00		1-2	43.08	1.00	
2	44.71	1.08	0.82-1.42	3-4	57.34	1.33	1.11-1.59
3	38.83	0.94	0.71-1.25	5-6	90.36	2.10	1.78-2.48
4	76.06	1.84	1.44-2.35	7-8	158.51	3.68	3.16-4.28
5	87.65	2.12	1.67-2.69	9-10	227.03	5.27	4.55-6.10
6	92.92	2.24	1.77-2.83	Ethnicity			
7	111.19	2.69	2.14-3.38	Māori	381.20	5.78	5.36-6.24
8	203.18	4.91	3.96-6.09	Pacific	145.11	2.20	1.93-2.51
9	178.71	4.32	3.48-5.36	European	65.93	1.00	
10	276.89	6.69	5.42-8.26	Asian/Indian	29.08	0.44	0.36-0.54
Gender							
Female	54.15	1.00					
Male	195.10	3.60	3.32-3.91				

Note: Rate per 100,000 per year, RR: Rate Ratios are unadjusted

Table 125. Risk of Hospital Admission for Depression in Young People 15-24 Years by Ethnicity, Gender and NZ Deprivation Index Decile, New Zealand 2002-2006

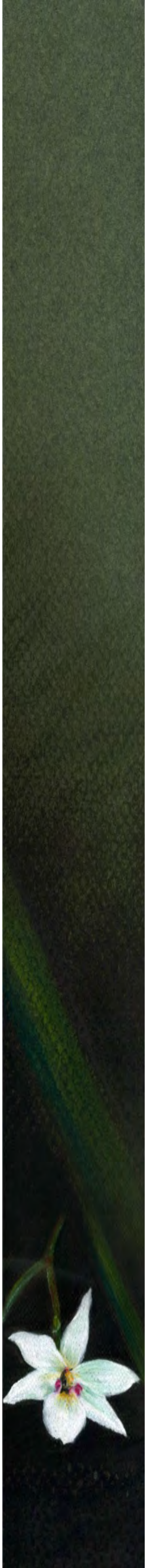
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	45.29	1.00		1-2	49.03	1.00	
2	52.65	1.16	0.90-1.50	3-4	66.70	1.36	1.15-1.61
3	56.22	1.24	0.96-1.60	5-6	73.93	1.51	1.28-1.78
4	77.28	1.71	1.35-2.17	7-8	89.18	1.82	1.56-2.13
5	73.90	1.63	1.28-2.07	9-10	70.64	1.44	1.23-1.69
6	73.97	1.63	1.29-2.06	Ethnicity			
7	82.86	1.83	1.45-2.30	Māori	59.74	0.65	0.57-0.74
8	95.15	2.10	1.68-2.63	Pacific	27.47	0.30	0.23-0.39
9	85.48	1.89	1.51-2.36	European	91.61	1.00	
10	55.32	1.22	0.96-1.55	Asian/Indian	13.92	0.15	0.11-0.20
Gender							
Female	90.35	1.00					
Male	52.04	0.58	0.53-0.64				

Note: Rate per 100,000 per year, RR: Rate Ratios are unadjusted

Table 126. Risk of Hospital Admission for Bipolar Affective Disorder in Young People 15-24 Years by Ethnicity, Gender and NZ Deprivation Index Decile, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	28.47	1.00		1-2	28.86	1.00	
2	29.25	1.03	0.74-1.44	3-4	35.99	1.25	1.00-1.56
3	27.50	0.97	0.69-1.36	5-6	36.87	1.28	1.03-1.59
4	44.57	1.57	1.16-2.13	7-8	52.26	1.81	1.48-2.22
5	38.91	1.37	1.00-1.87	9-10	60.65	2.10	1.73-2.55
6	34.94	1.23	0.90-1.68	Ethnicity			
7	44.12	1.55	1.15-2.09	Māori	72.26	1.68	1.48-1.91
8	59.94	2.11	1.59-2.80	Pacific	27.99	0.65	0.49-0.86
9	77.74	2.73	2.08-3.58	European	42.91	1.00	
10	43.02	1.51	1.13-2.02	Asian/Indian	17.33	0.40	0.30-0.53
Gender							
Female	44.84	1.00					
Male	44.45	0.99	0.88-1.11				

Note: Rate per 100,000 per year, RR: Rate Ratios are unadjusted



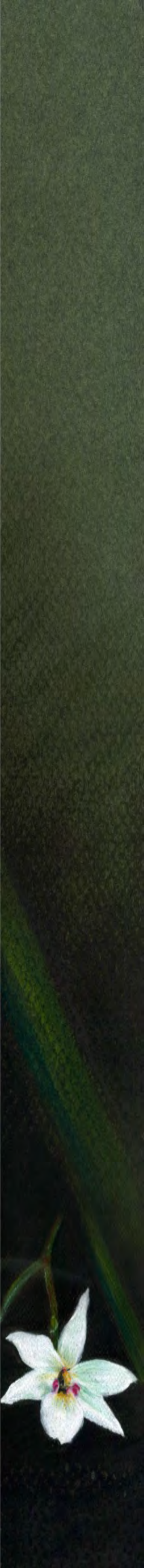


Table 127. Risk of Hospital Admission for Eating Disorders in Young People 15-24 Years by Ethnicity, Gender and NZ Deprivation Index Quintile, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Quintile				Ethnicity			
1-2	15.49	1.00		Māori	1.03	0.06	0.02-0.15
3-4	12.81	0.83	0.59-1.16	Pacific	0.52	0.03	0.00-0.21
5-6	9.93	0.64	0.45-0.91	European	18.31	1.00	
7-8	11.50	0.74	0.53-1.03	Asian/Indian	1.86	0.10	0.04-0.22
9-10	8.02	0.52	0.37-0.74				
Gender							
Female	22.31	1.00					
Male	0.44	0.02	0.01-0.04				

Note: Rate per 100,000 per year, RR: Rate Ratios are unadjusted

Summary

In New Zealand during 2002-2006, the most common reasons for hospital admissions with mental health issues in young people were for schizophrenia, followed by depression and bipolar affective disorder. Composite categories including schizotypal and delusional disorders also made a significant contribution. During this period, the risk factor profiles of the most common inpatient mental health diagnoses varied markedly, and while the majority of admissions were higher amongst those living in the most deprived areas, admissions for schizophrenia were also higher amongst males and Māori and Pacific young people. In contrast, hospital admissions for depression were higher amongst females and European young people, while admissions for bipolar affective disorder were higher amongst Māori and European young people. Hospital admissions for eating disorders however, while being higher for females and European young people, were significantly lower amongst those living in the most deprived areas. The use of these figures to estimate population prevalence is not recommended however as many mental health services in New Zealand are offered on an outpatient basis, and thus access to inpatient facilities may fail to accurately reflect the true burden of illness, or access to mental health services in an ambulatory care setting.

Self-Harm and Suicide

Introduction

While New Zealand's youth suicide rates had been increasing steadily since the early 1970s, it was not until the late 1980s / early 1990s that the most dramatic increases began to occur. Youth suicide rates reached a peak in 1996 and since then have begun to decline. Risk factors for suicide include male gender, ethnicity (Māori males >non-Māori males >Māori females >non-Māori females) and age. While much recent interest has focused on teenage suicides, recent data would suggest that the majority of youth deaths actually occur amongst those aged 19-24 years [256]. In 1998, the New Zealand Government launched a Youth Suicide Prevention Strategy, to provide a framework for understanding suicide prevention and to highlight some steps government agencies, communities, services, hapu and iwi could take to reduce suicide rates in the 15-24 year age group [257].

Data Source and Methods

Definition

Hospital Admissions due to Self-Inflicted Injuries and Deaths Due to Suicide in Young People Aged 15-24 Years

Data Source

Admissions Numerator: National Minimum Dataset: Hospital admissions for young people 15-24 years with a primary diagnosis of injury (ICD-9 800-995: ICD-10 S00-T79) and an external cause code (E code) of intentional self harm (ICD-9 E950-E958 or ICD-10 X60-X84); The following admissions were excluded: 1) Inpatient admissions with an Emergency Medicine Specialty code (M05-M08) on discharge (see Appendix 1);

Deaths Numerator: National Mortality Collection: Deaths of young people aged 15-24 years with a clinical code (cause of death) attributed to intentional self harm (ICD-9 E950-E958 or ICD-10 X60-X84)

Denominator: NZ Census

Indicator Category

Admissions: Proxy B-C; Mortality: Ideal B (Table 133, Table 134)

Notes on Interpretation

The limitations of the National Minimum Dataset are discussed at length in Appendix 1. The reader is urged to review this Appendix before interpreting any trends based on hospital admission data, particularly those which relate to injuries.

New Zealand Distribution and Trends

Suicide rates amongst New Zealand young people increased rapidly during the early 1990s reaching a peak in 1996, and thereafter declining. During 2004 however, there was again an increase in suicide mortality in this age group (**Figure 161**). While suicide rates during 2000-2004 were highest amongst young men in their early 20s, hospital admissions for self-inflicted injuries during 2002-2006 were highest amongst young women in their mid to late teens (**Figure 162**). In addition, self inflicted injury admissions were also higher amongst European and Māori young people, females and those living in the more deprived areas (**Table 128**). In contrast, during 2000-2004, suicide mortality rates were higher amongst Māori young people, males and those living in the more deprived areas (**Table 129**).

During 1996-2006, suicide mortality was higher for Māori young people and lower for Asian / Indian young people than for European or Pacific young people (**Figure 163**). During 2000-2004, there were also regional variations in suicide mortality, with rates ranging from 12.6 to 32.9 per 100,000 depending on the region studied. Care should be taken when interpreting regional differences however, due to the small number of cases involved (**Table 130**).

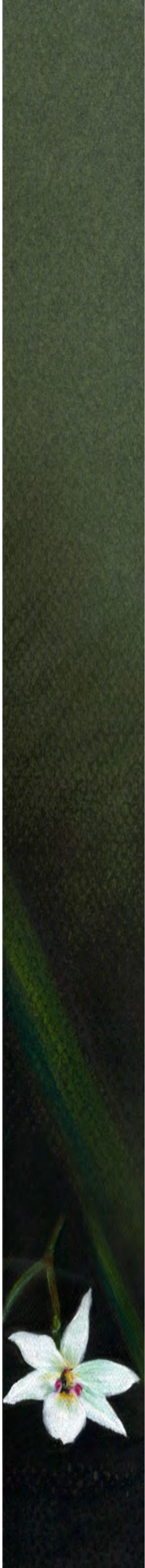
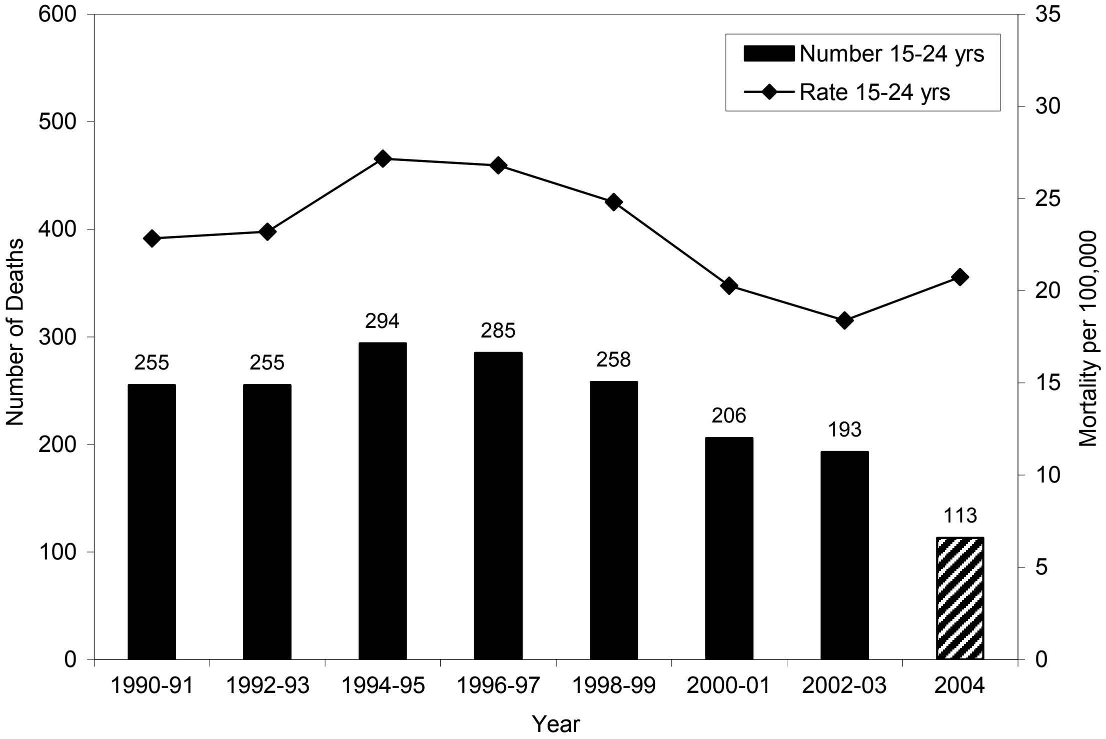


Figure 161. Suicide Mortality in Young People 15-24 Years, New Zealand 1990-2004



Note: Deaths for 1990-2003 are per 2 year period. Deaths for 2004 are for single year only.

Figure 162. Hospital Admissions due to Self Inflicted Injury and Deaths due to Suicide in Children and Young People by Age and Gender, New Zealand 2002-06 (Admissions) and 2000-2004 (Deaths)

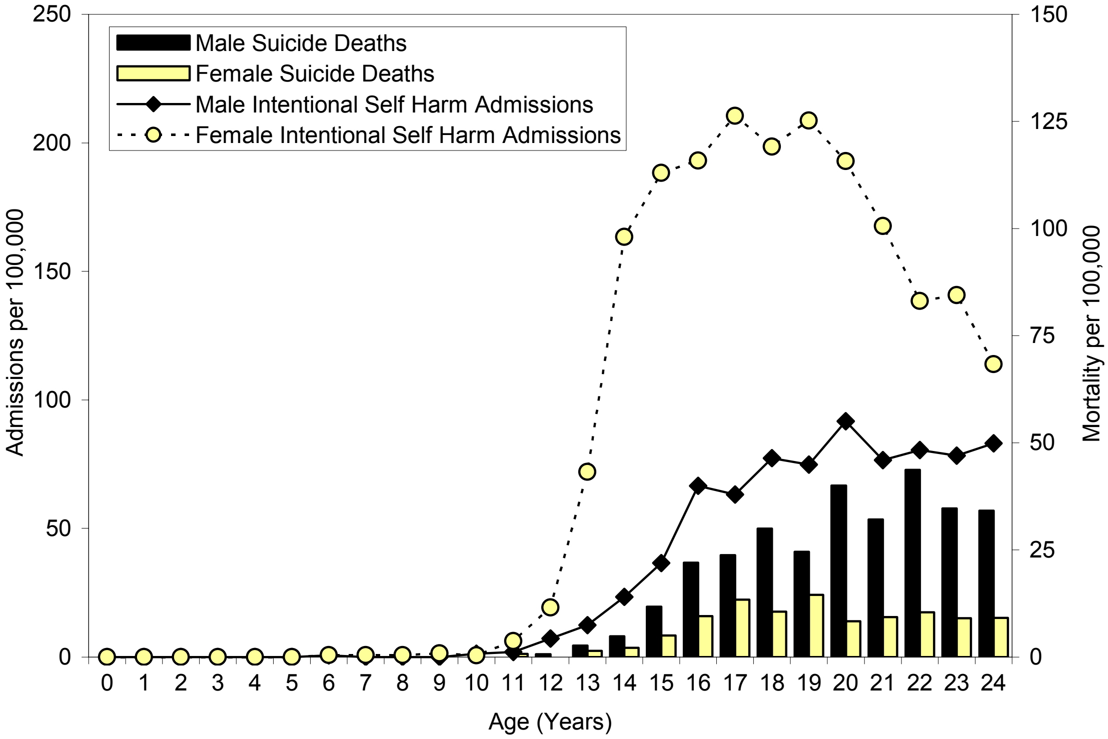


Table 128. Risk Factors for Hospital Admission due to Self-Harm Related Injuries in Young People 15-24 Years, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	94.46	1.00		1-2	90.63	1.00	
2	86.92	0.92	0.76-1.11	3-4	97.81	1.08	0.95-1.23
3	88.58	0.94	0.78-1.13	5-6	130.86	1.44	1.28-1.62
4	107.13	1.13	0.94-1.35	7-8	148.75	1.64	1.46-1.84
5	124.60	1.32	1.11-1.57	9-10	137.64	1.52	1.35-1.71
6	136.78	1.45	1.23-1.71	Ethnicity			
7	142.76	1.51	1.28-1.78	Māori	139.18	0.97	0.89-1.06
8	154.42	1.63	1.39-1.91	Pacific	72.56	0.51	0.43-0.60
9	155.48	1.65	1.41-1.93	European	143.04	1.00	
10	119.24	1.26	1.07-1.49	Asian/Indian	48.26	0.34	0.29-0.40
Gender							
Female	176.57	1.00					
Male	72.11	0.41	0.38-0.44				

Note: Rate per 100,000 per year. RR: Rate Ratios are unadjusted.

Table 129. Risk Factors for Suicide in Young People 15-24 Years, New Zealand 2000-2004

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Quintile				Ethnicity			
1-2	12.75	1.00		Māori	34.38	1.91	1.57-2.32
3-4	17.03	1.34	0.96-1.87	Pacific	19.69	1.09	0.77-1.54
5-6	17.62	1.38	0.99-1.92	European	18.03	1.00	
7-8	21.74	1.71	1.25-2.34	Asian/Indian	11.00	0.61	0.42-0.89
9-10	25.86	2.03	1.51-2.74				
Gender							
Female	9.94	1.00					
Male	29.19	2.94	2.41-3.59				

Note: Rate per 100,000 per year. RR: Rate Ratios are unadjusted.

Summary

Suicide rates amongst New Zealand young people increased rapidly during the early 1990s, reached a peak in 1996, and thereafter began to decline. During 2004 however, there was again an increase in suicide mortality in this age group. While suicide rates during 2000-2004 were highest amongst young men in their early 20s, hospital admissions for self-inflicted injuries during 2002-2006 were highest amongst young women in their mid to late teens. In addition, self inflicted injury admissions were also higher amongst European and Māori young people, females and those living in the more deprived areas. In contrast, during 2000-2004 suicide mortality rates were higher amongst Māori young people, males and those living in the more deprived areas. Regional variations in suicide mortality were also evident during this period, with rates ranging from 12.6 to 32.9 per 100,000 depending on the region studied. Care should be taken when interpreting regional differences however, due to the small number of cases involved.

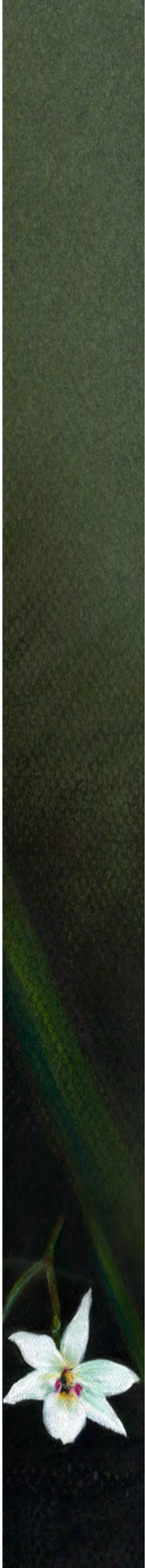


Figure 163. Suicide Mortality in Young People 15-24 yrs by Ethnicity, New Zealand 1996-04

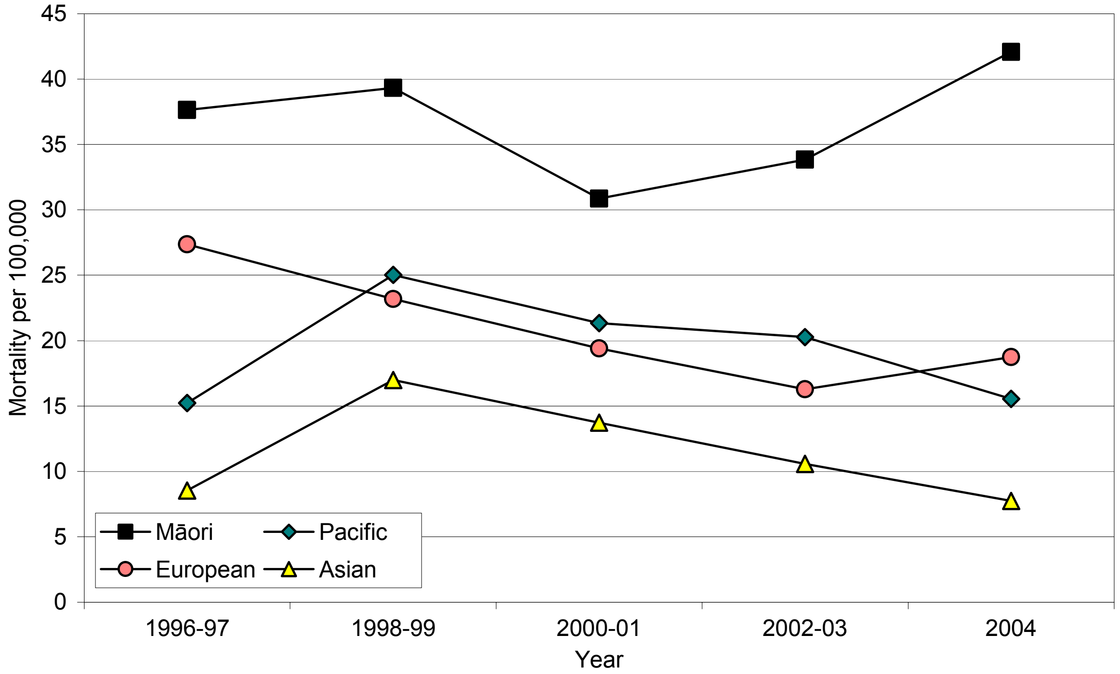


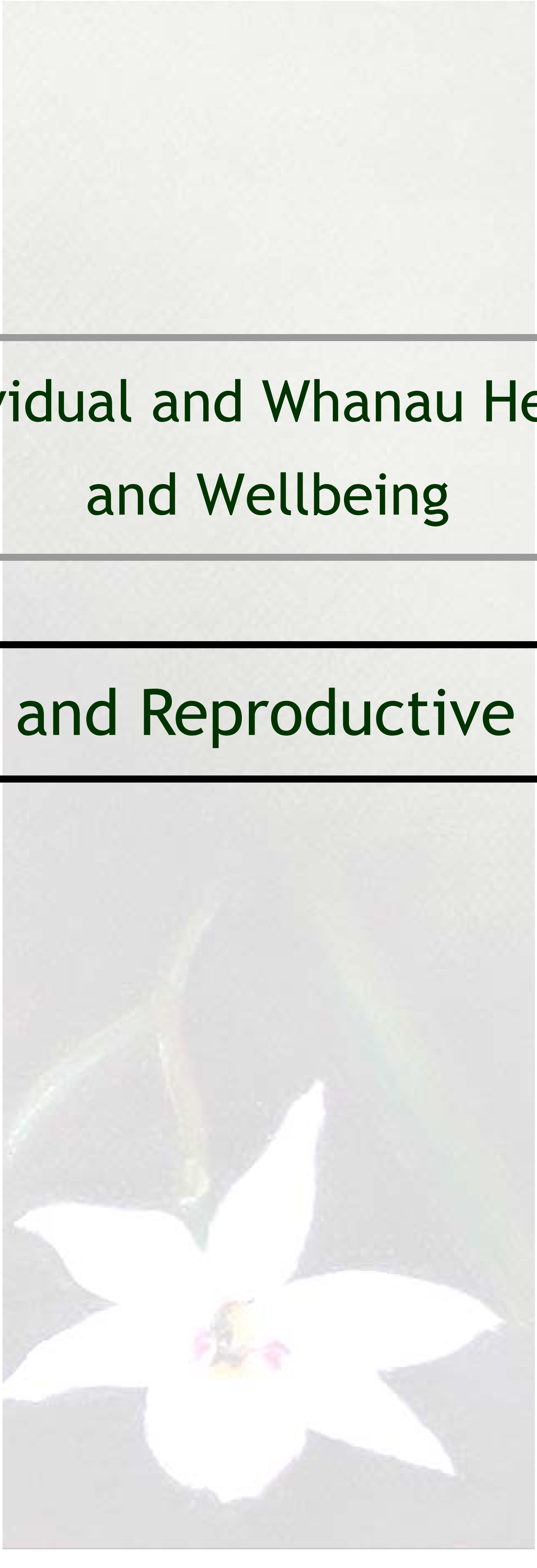
Table 130. Deaths due to Suicide by Region in Young People 15-24 Years, New Zealand 2000-2004

DHB	Number: Total 2000-2004	Number: Annual Average	Rate per 100,000	% of NZ Total
Northland	13	2.6	16.4	2.6
Waitemata	56	11.2	18.7	11.0
Auckland	42	8.4	14.3	8.3
Counties Manukau	71	14.2	25.1	13.9
Waikato	45	9.0	19.7	8.8
Lakes	14	2.8	22.6	2.8
Bay of Plenty	25	5.0	24.3	4.9
Tairawhiti	5	1.0	17.9	1.0
Taranaki	8	1.6	12.6	1.6
Hawkes Bay	29	5.8	32.9	5.7
Whanganui	10	2.0	25.6	2.0
MidCentral	17	3.4	14.7	3.3
Hutt	21	4.2	23.8	4.1
Capital and Coast	36	7.2	19.0	7.1
Wairarapa	<5	S	s	s
Nelson Marlborough	17	3.4	24.3	3.3
West Coast	<5	S	s	s
Canterbury	58	11.6	19.0	11.4
South Canterbury	<5	S	s	s
Otago	18	3.6	12.4	3.5
Southland	14	2.8	21.1	2.8
New Zealand	512*	102.4	19.6	100.0

Note: *NZ Total includes 3 deaths where DHB wasn't stated; Care should be taken when interpreting regional differences due to small numbers. Rates have not been adjusted for DHB Demography and it is not recommended that they be used for benchmarking purposes (see Demography Section page 387)

Individual and Whanau Health and Wellbeing

Sexual and Reproductive Health



Teenage Pregnancy

Introduction

Teenage pregnancy encompasses three distinct outcomes: births, terminations of pregnancy and spontaneous miscarriages amongst women <20 years of age. While New Zealand's teenage birth rates have declined in recent years, the number of therapeutic abortions has increased steadily, resulting in a small overall increase in teenage pregnancy rates. Teenage birth rates are highest amongst Māori > Pacific > European women, and although abortion rates are slightly higher amongst Māori, Māori women who do become pregnant in their teenage years are less likely to seek a therapeutic abortion [258].

High teenage pregnancy rates are a cause for concern, as young maternal age has been associated with a number of adverse birth outcomes [259]. In New Zealand, teenage pregnancy increases the risk of both preterm birth and small for gestational age [132]. There is currently debate however, as to whether it is the social or biological factors that play the greatest role, with risk of preterm birth amongst teens disappearing in a number of different studies, once the effects of socioeconomic disadvantage had been taken into account [259]. In addition to its biological effects, teenage pregnancy may also impact on educational attainment, not only of the young women themselves, but also the aspirations and opportunities available to their children [260].

Data Source and Methods

Definition
Births to Women < 20 Years of Age

Data Source
Numerator: Birth Registration Dataset: All births to women <20 years of age
Denominator: NZ Census: All women aged 15-19 years

Indicator Category
Ideal B (**Table 133**, **Table 134**)

Notes on Interpretation
In the analysis of total teenage pregnancy rates, information on terminations was obtained from the Abortion Supervisory Committee and miscarriage rates were estimated at 10% of induced abortions and 20% of live births [258].

New Zealand Distribution and Trends

While New Zealand's teenage birth rates declined during 1980-2006, teenage pregnancies did not, with a gradual increase in the number of teenagers seeking therapeutic abortion. Thus by 2003, for every woman giving birth in her teenage years, there was one corresponding therapeutic abortion (**Figure 164**).

During 2002-2006, teenage birth rates in New Zealand were highest amongst Māori and Pacific women and those living in the most deprived areas (**Table 131**). Higher teenage birth rates amongst Māori and Pacific women resulted from both a shift to the left in the maternal age distribution (i.e. towards birth at a younger age), as well as from higher overall fertility rates amongst Māori and Pacific women (**Figure 165**). During 1996-2006, teenage births rates were consistently higher for Māori > Pacific > European > Asian / Indian women (**Figure 166**). In addition, during 2002-2006 there were also marked regional differences in teenage birth rates, with rates varying from 13.5 to 59.4 per 1,000 depending on the region studied (**Table 132**).

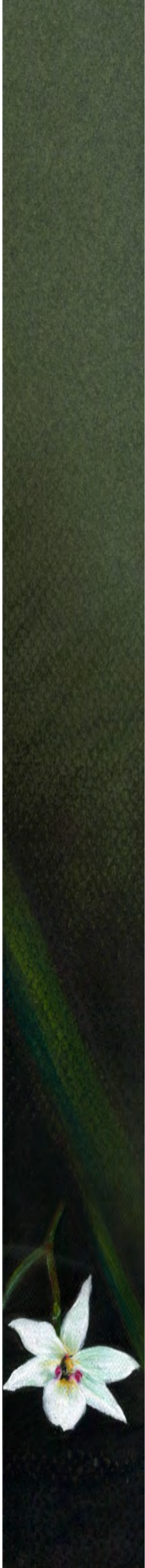


Figure 164. New Zealand's Teenage Pregnancy Rates, 1980-2006

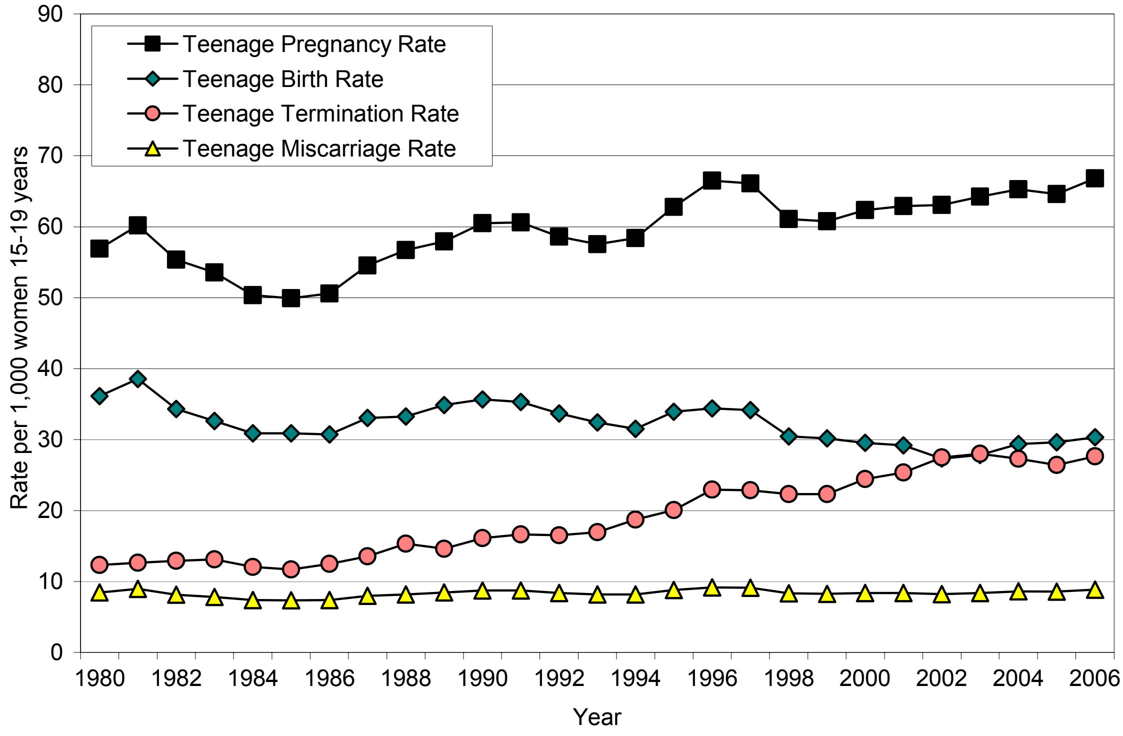


Figure 165. Birth Rates by Maternal Age and Ethnicity, New Zealand 2000-2004

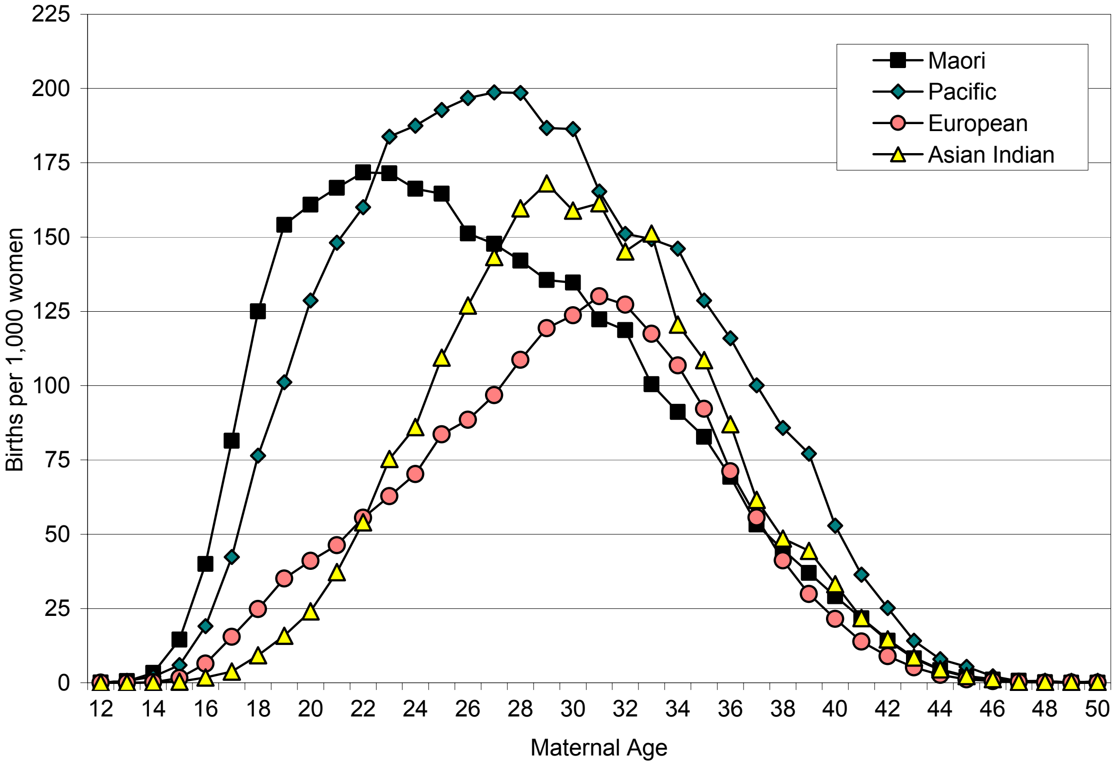
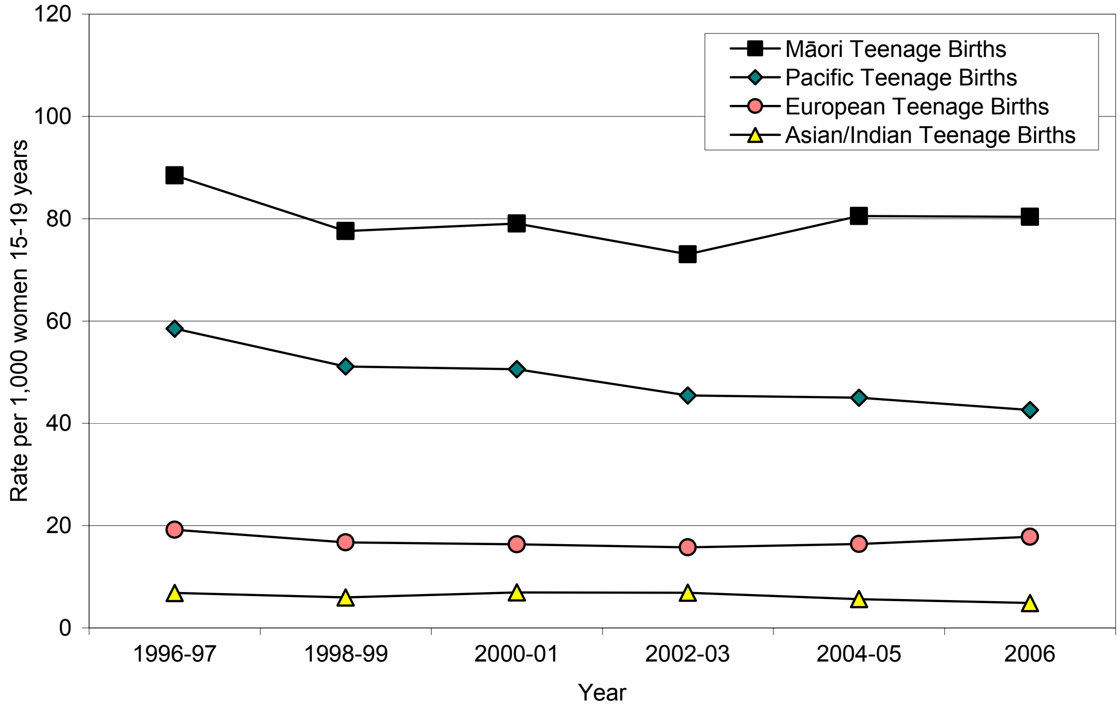


Table 131 Teenage Birth Rates by Ethnicity and NZ Deprivation Index Decile, New Zealand 2002-2006

Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZDep Index Decile				NZDep Index Quintile			
1	6.56	1.00		1-2	7.97	1.00	
2	9.45	1.44	1.28-1.62	3-4	15.47	1.94	1.80-2.09
3	12.57	1.92	1.71-2.15	5-6	24.00	3.01	2.81-3.23
4	18.48	2.82	2.53-3.14	7-8	37.16	4.66	4.37-4.97
5	20.01	3.05	2.74-3.39	9-10	51.82	6.50	6.10-6.92
6	27.89	4.25	3.84-4.71	Ethnicity			
7	33.32	5.08	4.59-5.62	Māori	77.64	4.72	4.58-4.86
8	40.80	6.22	5.64-6.86	Pacific	44.65	2.72	2.60-2.85
9	42.96	6.55	5.94-7.22	European	16.43	1.00	
10	60.49	9.23	8.39-10.16	Asian/Indian	5.94	0.36	0.33-0.40

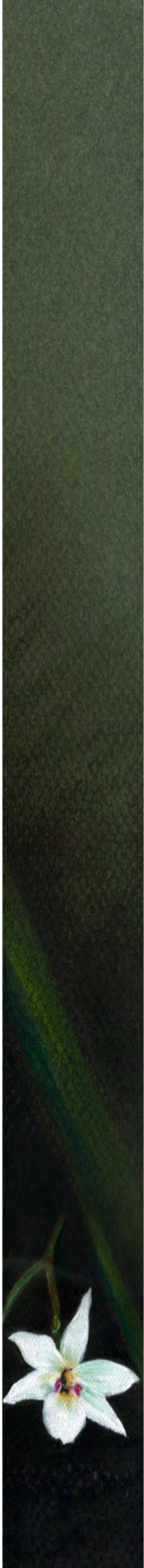
Note: Rate per 1,000 women aged 15-19 yrs per year; RR: Rate Ratios are unadjusted

Figure 166. Teenage Birth Rates by Maternal Ethnic Group, New Zealand 1996-2006



Summary

Teenage pregnancy encompasses three distinct outcomes: births, terminations of pregnancy and spontaneous miscarriages amongst women <20 years of age. While New Zealand's teenage birth rates declined during 1980-2004, teenage pregnancies did not, with a gradual increase in the number of teenagers seeking therapeutic abortion. Thus by 2003, for every woman giving birth in her teenage years, there was one corresponding therapeutic abortion. During 2002-2006, teenage birth rates in New Zealand were highest amongst Māori and Pacific women and those living in the most deprived areas. Higher teenage birth rates amongst Māori and Pacific women resulted from both a shift to the left in the maternal age distribution (i.e. towards birth at a younger age), as well as from higher overall fertility rates amongst Māori and Pacific



women. During 2002-2006 there were also marked regional differences in teenage birth rates, with rates varying from 13.5 to 59.4 per 1,000 depending on the region studied.

Table 132. Teenage Birth Rates by DHB, New Zealand 2002-2006

DHB	Number: Total 2002-2006	Number: Annual Average	Rate per 1,000	% of NZ Teen Births
Northland	1,139	227.8	47.5	5.6
Waitemata	1,661	332.2	20.0	8.2
Auckland	1,195	239.0	17.6	5.9
Counties Manukau	3,141	628.2	38.6	15.4
Waikato	2,214	442.8	35.7	10.9
Lakes	901	180.2	52.9	4.4
Bay of Plenty	1,238	247.6	40.2	6.1
Tairawhiti	486	97.2	59.4	2.4
Taranaki	640	128.0	35.9	3.1
Hawkes Bay	1,068	213.6	42.2	5.2
Whanganui	524	104.8	47.8	2.6
MidCentral	928	185.6	30.1	4.6
Hutt	713	142.6	29.8	3.5
Capital and Coast	810	162.0	17.3	4.0
Wairarapa	204	40.8	33.6	1.0
Nelson Marlborough	482	96.4	24.2	2.4
West Coast	136	27.2	31.2	0.7
Canterbury	1,579	315.8	20.0	7.8
South Canterbury	196	39.2	23.6	1.0
Otago	527	105.4	13.5	2.6
Southland	508	101.6	29.6	2.5
New Zealand	20,374*	4,074.8	28.9	100.0

Note: NZ Total includes 84 births to teenage mothers where DHB was not stated; Rates have not been adjusted for DHB Demography and it is thus not recommended that they should be used for benchmarking purposes (see Demography Section page 387 for a more detailed discussion of this issue)

Sexually Transmitted Infection

Introduction

Research would indicate that 10-30% of New Zealand young people have had sexual intercourse by the time they reach 15 years of age, with the figure increasing to over 50% by 16-17 years [161]. Factors associated with early sexual intercourse include female gender, a background of socioeconomic disadvantage, sexual abuse in childhood and alcohol misuse in early adolescence [161]. Sexually transmitted infections (STI) are relatively common amongst those 15-24 years, with chlamydia being the most frequently diagnosed STI, followed by genital warts, non specific urethritis, genital herpes and gonorrhoea [261]. While chlamydia and gonorrhoea are more common amongst Māori and Pacific groups, viral conditions such as genital warts and genital herpes are more common amongst Europeans [161].

While changes in STI surveillance in recent years make precise time series analysis difficult, rates of both chlamydia and gonorrhoea appear to have increased during the past 5 years [261]. This is of concern, as STIs can lead to the development of serious sequelae such as pelvic inflammatory disease, ectopic pregnancy and infertility, as well as facilitating the transmission of HIV [261]. The following section briefly describes the characteristics of the commonest STIs occurring in 15-24 year olds, before reviewing the available data on the distribution of chlamydia and gonorrhoea at a regional level.

Chlamydia: Caused by the organism *Chlamydia trachomatis.* Infection may be asymptomatic in 70% of females and 50% of males. Untreated, chlamydia can lead to pelvic inflammatory disease (PID), ectopic pregnancy and infertility in females and urethritis, epididymo-orchitis, arthritis and infertility in males. Infection can also be transmitted to infants at the time of birth, leading to conjunctivitis and pneumonia [262].

Gonorrhoea: Caused by the organism *Neisseria gonorrhoea*. Infection may be asymptomatic in 50% of females and 10% of males. Untreated, gonorrhoea can lead to PID in females, epididymo-orchitis in males and severe conjunctivitis in neonates [262].

Genital Herpes: Caused by *Herpes simplex* virus (HSV) Type 1 or 2. Infections are associated with painful vesicular eruptions/ulcerations of genital skin and mucus membranes, which may become recurrent. Vaginal delivery in pregnant women with active infection may lead to infection of the newborn, resulting in severe systemic disease [262].

Genital Warts: Caused by infection with the human papillomavirus (HPV), which leads to the formation of small, soft, pink growths on the genitals which may become pedunculated. Warts may be solitary or cauliflower like and are generally painless [178]. Infection may be with types 6 and 11, or with the more high risk types 16 and 18, which are associated with a higher risk of cervical cancer [262].

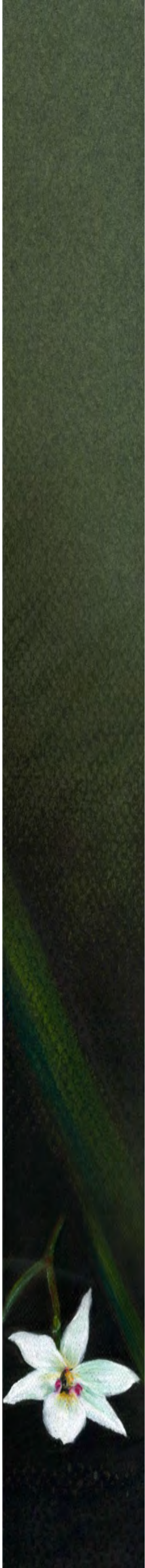
Data Source and Methods

Definition

Laboratory Based Notifications for Chlamydia and Gonorrhoea in Young People < 25 Years.

Data Source and Interpretation

The information on sexually transmitted infections (STIs) in this analysis was obtained from the ESR's Annual Surveillance Reports (Appendix 4) and is based on information from their laboratory based surveillance systems. While a number of sexual health and family planning clinics also report voluntarily to ESR regarding the numbers of STIs seen, a lack of a clearly defined denominator means that it is impossible to estimate population prevalence from the information provided. In addition, because other practitioners within the primary care setting also treat young people for STIs, the figures given cannot be taken as representative of the total population. Laboratory based reporting however is also undertaken in a



number of regions (Auckland, Waikato, Bay of Plenty), and because these laboratory's have clearly defined catchment areas, it is possible to estimate rates for chlamydia and gonorrhoea for these particular populations.

Indicator Category
Bookmark C (**Table 133**, **Table 134**)

New Zealand Distribution and Trends

Laboratory notification data from the Auckland, Waikato and Bay of Plenty regions during 2001-2006 suggested that chlamydia infections in these regions were more common amongst females than males. While for females, chlamydia was more common in the 15-19 year old age group, for males infections were more common amongst those aged 20-24 years. In addition, while there were large regional variations in chlamydia notifications during this period, in two out of the three regions studied, notifications exhibited a general upward trend (**Figure 167**). During the same period, while gonorrhoea infections were much less common than chlamydia amongst those aged <25 years, in two out of the three regions studied gonorrhoea rates also exhibited a general upwards trend. Gender and age differences however, were much less marked than they were for chlamydia (**Figure 168**).

Summary

While no rate data was able to be extrapolated from Sexual Health and Family Planning Clinic data, laboratory based surveillance during 2001-2006 suggested that chlamydia and gonorrhoea were both relatively common infections amongst those aged <25 years and that rates for both conditions were exhibiting a general upward trend. This is of concern, as STIs can lead to the development of serious sequelae such as pelvic inflammatory disease, ectopic pregnancy and infertility, as well as facilitating the transmission of HIV.

Figure 167. Laboratory Notifications for Chlamydia in Young People 15-24 Years, Selected New Zealand Regions 2001-2006

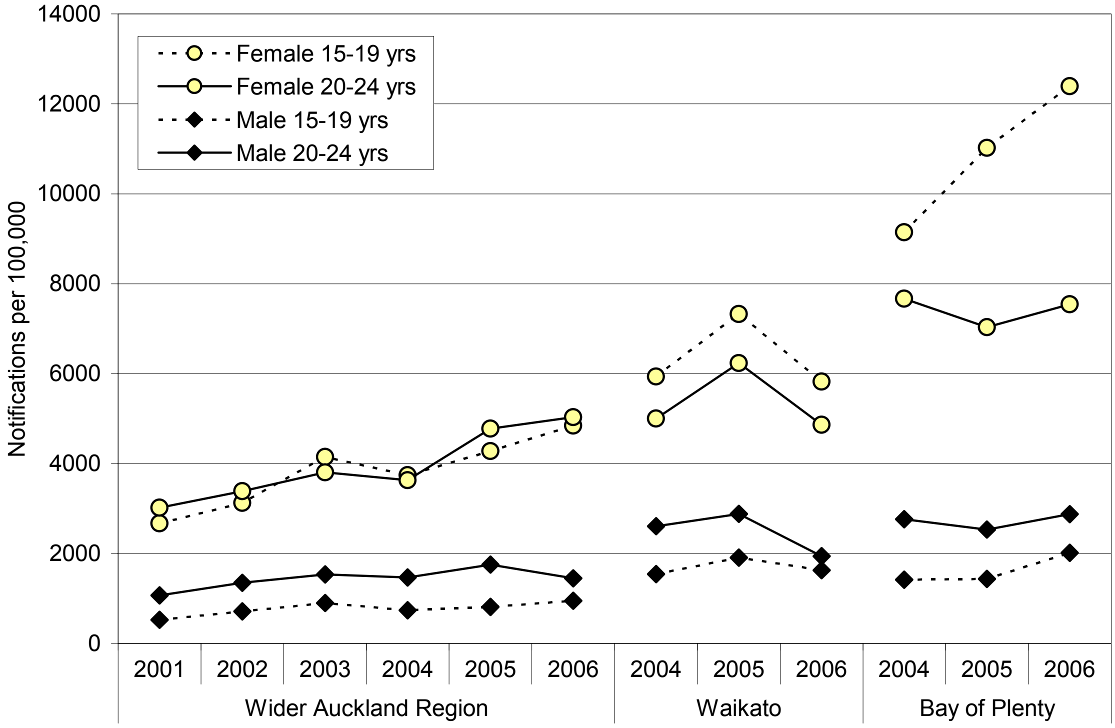
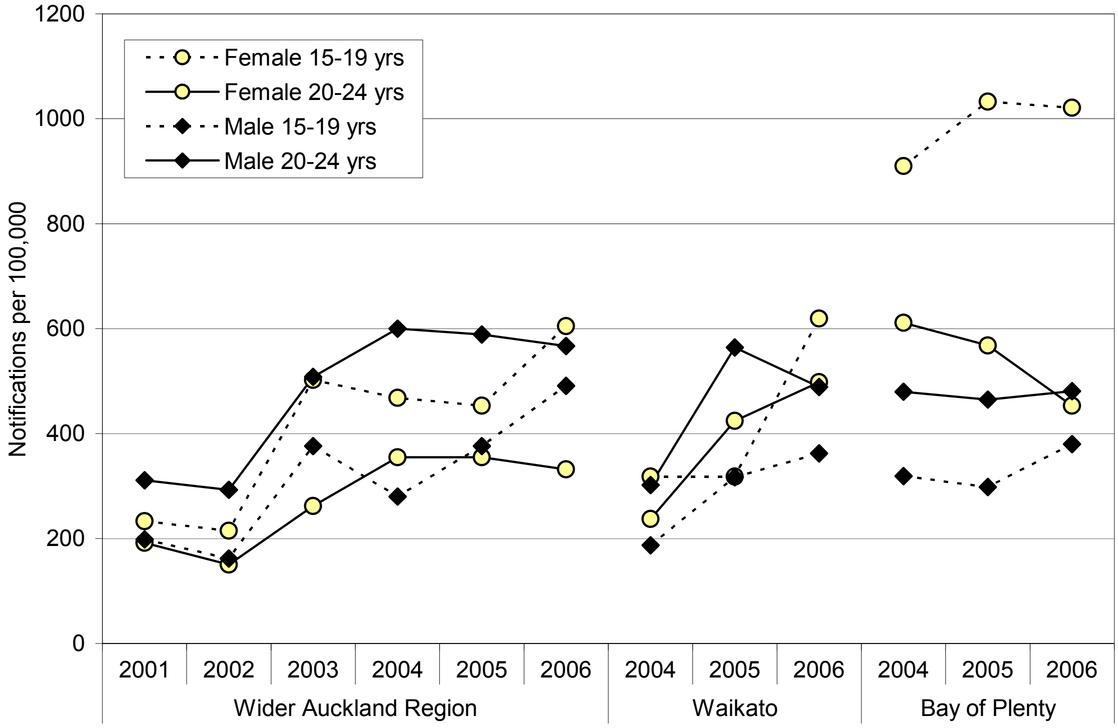


Figure 168. Laboratory Notifications for Gonorrhoea in Young People 15-24 Years, Selected New Zealand Regions 2001-2006

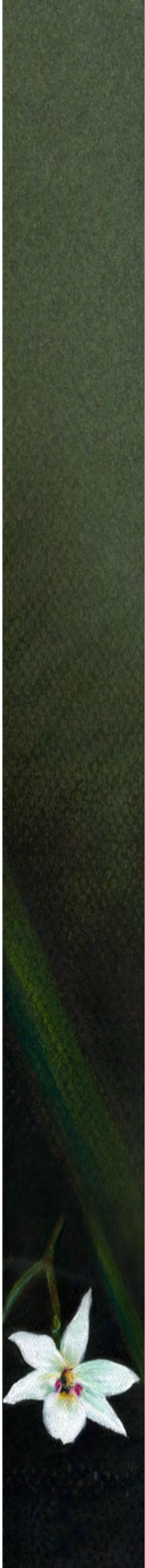


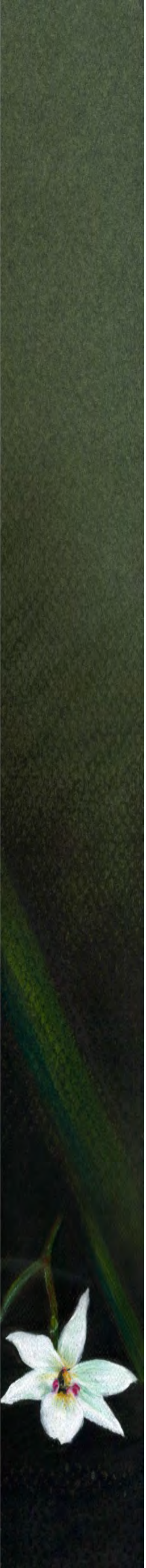
Limitations of Framework and Areas for Future Development

Introduction

As previously discussed, one of the central aims of this project was to develop a map of all of the issues which needed to be taken into account when planning population health strategies and services for children and young people. Yet very early on in the course of framework development it became apparent that adequate data sources were available for only a fraction of the issues those working in the health sector considered important to child and youth health. A decision thus needed to be made as to whether a framework would be developed which provided robust information on a limited range of child and youth health issues, or whether a broader approach would be taken, but one which necessitated a greater deal of explanation as to the quality of the data sources used. As the scope of this framework suggests, the Project Team chose the latter approach, but in doing so felt it was necessary to provide sufficient information on the quality of the data sources used to develop the framework, so that the reader would be able to weigh the strength of the evidence presented in each of the sections of this Handbook. The sections which follow are designed to fulfil this objective, and are presented in the order which follows:

1. Limitations of Current Framework and Areas for Future Development: This section provides a brief recap of the indicator quality grading system introduced at the beginning of this report, before presenting a series of tables which rank each indicator within the framework against this set of criteria. The same tables also provide additional information on the limitations of the data sources used, as well as a brief summary of the feedback received during the 2 formal rounds of consultation, as to the additional work which might be required, in order to improve indicator quality in each of these areas.
2. Regional Demography: A regional breakdown of rates is presented for many of the indicators contained in this Handbook. These rates are not intended to be used for benchmarking purposes however, but rather to provide an overview of the way in which particular issues are distributed around the country. For those wishing for a more detailed understanding of regional differences, knowledge of regional demography is required and this section thus provides a breakdown of each of New Zealand's DHB populations by age, ethnicity and NZ Deprivation Index decile, so that regional rates can be interpreted with these differences in mind.
3. Appendices: For those with a more in depth interest in data quality issues, this section concludes with a series of Appendices which outline the various national datasets used in the preparation of this report and some of the problems associated with each. At a minimum, the reader is urged to read the section on the National Minimum Dataset before interpreting any of the trends in hospital admissions presented in this report.





Limitations of Current Framework and Areas for Future Development

As discussed previously, a decision was made early on that a set of indicator selection criteria would be used which awarded a high priority to public health importance, and that where an issue was deemed to have met these criteria, but where routine data sources were lacking, "non-traditional" data sources would be considered, so that an issue did not fall below the public health radar. Such an approach, however, meant that many of the indicators contained in this Framework may not have met the stricter data quality criteria of other Government agencies. In order to provide some insights into the extent to which these data quality issues might have influenced the interpretability of the data, each indicator in the framework was graded on the degree to which it captured the issue it was designed to measure, as well as the quality of its data sources. Using this classification system, all indicators were considered as falling into one of the three categories below:

1. Ideal Indicators: An indicator was considered ideal if it offered the potential to measure the total extent of a particular issue (e.g. because the birth registration dataset captures >99% of births in New Zealand and information on gestational age is >98% complete, the preterm birth indicator is considered ideal, in that it allows conclusions to be drawn about trends in preterm birth over time).
2. Proxy Indicators: In many cases, while it was not possible to measure the full extent of an issue, it was possible to assess the number of children or young people attending publicly funded services for its management (e.g. while hospital admission data is unable to provide any commentary on the total number of injuries occurring in the community, as many injuries are treated in the primary care setting or at home, such data is nevertheless useful for assessing the workload such injuries create for secondary and tertiary services).
3. Bookmark Indicators: In many cases, consultation suggested that there was a need for indicators in areas where no data sources existed (e.g. indicators to assess the prevalence of disability amongst New Zealand children). While more traditional approaches might have suggested that such issues should be excluded from the monitoring framework until such time as high quality data sources could be developed, such approaches may also have inadvertently resulted in these issues slipping below the public health radar. Thus a number of "Bookmark Indicators" were created, which served to highlight particular issues until such time as more appropriate data sources could be developed.

In addition, each of the indicators in the framework was assessed on the basis of the quality of its data source and graded as to whether this was Excellent (A) or Adequate (B), or whether Further Work (C) was required in order to ensure that the indicator could be interpreted in an appropriate manner. **Table 133** briefly reviews how each of these categories was defined, while **Table 134** outlines how each of the indicators within the Framework was categorised based on these criteria. In addition, the table also highlights some of the more major issues associated with data quality, as well as the feedback received during the two rounds of consultation as to additional measures which might be required in order to improve indicator quality in each of these areas.

While many of the recommendations in **Table 134** pertain to specific indicators (e.g. more appropriate measures for reporting on existing oral health data), a number of underlying themes also emerged during the course of the consultation which related to:

1. The paucity of data on children and young people with chronic conditions whose health needs were not captured by routine hospital admission or mortality data. This included those with long term disabilities, mental health issues, or with chronic conditions which were traditionally managed in the primary care / outpatient setting (e.g. diabetes, epilepsy, chronic renal failure). The general consensus was that the needs of these children and young people had not been adequately highlighted by the monitoring approaches used to date and that additional work was necessary (e.g. coding of hospital outpatient data, exploring the possibility of a disability register, surveys of child and youth mental health issues), to ensure that their needs became more visible in future years.
2. Similarly it was felt that traditional data sources failed to adequately capture issues of cultural identity, or the role this played in health and wellbeing. While the current Indicator Framework was seen as being adequate for exploring issues in the context of total population health, it was thought that additional work would be necessary if the framework was to be used for reports focusing specifically on the needs of Māori and Pacific children and young people (e.g. new Governance groups would need to be established, additional indicators would need to be created and resources would need to be allocated to ensuring that information was interpreted within the context of Māori and Pacific world views). While it is beyond the scope of this project to fully implement these recommendations, the current health status of Māori and Pacific children and young people suggests that such approaches may be necessary, if the disparities in health status highlighted by this report are to be reduced in future years.

Thus the indicators presented in this Handbook should not be viewed as the final set, but rather as a starting point for ongoing indicator development. While it is beyond the scope of this project to address any of the issues highlighted above, or presented in the Tables and Appendices which follow, it is strongly recommended that the Ministry of Health considers how it might begin to address these issues, so that we are better able to monitor the heath needs of our children and young people in future years. In addition, while it is anticipated that incremental changes will be made to the Indicator Framework as data sources improve and new types of information become available, it is also strongly recommended that an exercise similar to that used to develop this framework be undertaken at least once every 10 years, so that our monitoring approaches remain attuned to the health needs of our children and young people.

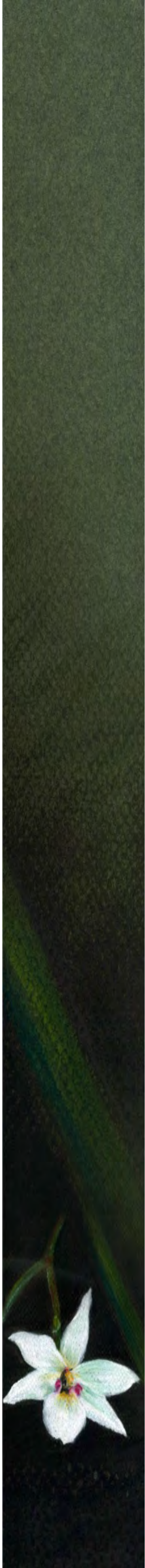


Table 133. Indicator Categories Based on the Type of the Indicator and the Quality of its Data Source

Indicator Type	Data Quality		
	Excellent (A)	Adequate (B)	Further Work Required (C)
Ideal	Measures total extent of an issue and data quality permits appropriate interpretation of trends and population level differences (No NZ indicators currently in this category)	Measures total extent of an issue and data quality permits adequate interpretation of information once the limitations of the datasets have been outlined E.g. Interpretation of trends in highest attainment at school leaving requires an understanding of changes associated with the roll out of the NCEA which began in 2002. While such changes make interpretation of trends difficult, improvements in data quality per se are unlikely to improve this situation	Measures total extent of an issue but data quality limits appropriate interpretation E.g. While theoretically the MOH's two oral health indicators provide near complete coverage of children at 5 and 12 years of age, in reality information is only collected on those who have completed treatment, potentially discounting the poor oral health status of children still undergoing treatment for dental caries at these points in time
Proxy	Measures attendances at publicly funded services for management of an issue and data quality permits appropriate interpretation of trends and population level differences (No NZ indicators currently in this category)	Measures attendances at publicly funded services for management of an issue and data quality permits adequate interpretation once the limitations of the datasets have been outlined E.g. Hospital admission data, when combined with mortality data, provides a reasonable overview of the incidence of invasive meningococcal disease. While a number of data quality issues apply to all indicators derived from these datasets (e.g. accuracy of coding), such limitations are unlikely to significantly hinder the interpretation of the data in this context	Measures attendances at publicly funded services for management of an issue but data quality currently limits appropriate interpretation E.g. Because of the inconsistent manner in which some DHBs have uploaded their emergency department cases to the hospital admission dataset over time, it is difficult to interpret trends in hospital admissions for minor injuries with any certainty. Thus while cross sectional analyses provide an overview of the types if injuries presenting to secondary and tertiary services, interpretation of trend data is significantly impeded by the quality of the datasets
Bookmark	Measures one facet of a wider issue, or provides a brief overview of the literature in an area where no data sources currently exist. Data quality for isolated facets permits appropriate interpretation. (No NZ indicators currently in this category)	Measures one facet of a wider issue, or provides a brief overview of the literature in an area where no data sources currently exist. Data quality for isolated facets permits adequate interpretation once the limitations of the datasets have been outlined E.g. The 2002 Children's Nutrition Survey provides a reasonable snapshot of overweight and obesity amongst NZ children at a single point in time. For this isolated snapshot, data quality permits adequate interpretation of the issues covered by this survey	Measures one facet of a wider issue, or provides a brief overview of the literature in an area where no data sources currently exist. Data quality for isolated facets limits appropriate interpretation E.g. In the absence of routine data on the extent of alcohol related harm amongst NZ young people, an analysis of hospital admissions with mention of alcohol in any of the first 15 diagnostic codes provides a snapshot of the types of issues presenting to secondary care services. Significant data quality issues however preclude this data being used to make any inferences about trends in alcohol related harm

Table 134. Limitations of Indicators Currently in the Framework and Recommendations for Future Development

Stream	Current Indicators: Type & Data Quality	Limitations of Current Indicators	Indicators Suggested in Consultation & Work Required to Develop These or Improve Quality of Existing Indicators
Historical, Economic and Policy Context			
Historical Context	Guest Editorial (Bookmark B)	Impact of historical factors difficult to monitor using routinely collected data, so guest editorial highlighting their role thought appropriate. Impact of historical factors also indirectly assessed by reviewing extent of ethnic disparities for other indicators in framework.	
Macro-economic and Policy Environment	Guest Editorial (Bookmark B)	Impact of Government policies and wider macroeconomic environment difficult to monitor using routinely collected data, so guest editorial highlighting their role thought more appropriate. Impact also indirectly assessed by *Children in Families with Restricted Socioeconomic Resources* indicator, as well as extent of socioeconomic disparities for other indicators in framework.	Implementation of Health Impact Assessment tool developed by National Health Committee (to assess health impacts of new Government policies) may potentially increase the amount of policy relevant information available to health sector.
Socioeconomic and Cultural Determinants			
Cultural Identity	Enrolments in Kura Kaupapa Māori (Bookmark C)	Current indicators fail to adequately capture cultural identity, or its role in health and wellbeing. While language is an important part of cultural identity, enrolments in Māori medium education only provide a proxy for the number of children and young people fluent in Te Reo Māori.	Further work is required to develop indicators highlighting aspects of cultural identity for children and young people. Separate reporting formats may also need to be developed which explore the health needs of Māori , Pacific and Asian / Indian children and young people from different cultural vantage points
Economic Standard of Living	Children in Families with Restricted Socioeconomic Resources (Bookmark B)	Family socioeconomic position is a multidimensional construct only partially captured by NZ's current data sources. This indicator pulls together information from a number of national surveys, each of which captures a particular facet of socioeconomic wellbeing.	All measures of family socioeconomic position currently have major limitations (e.g. based on intermittent surveys, many with small sample size). While the need for better ongoing measures of family socioeconomic position was highlighted, it was felt that further review was necessary before making a firm recommendation in this area It was also suggested that an indicator assessing housing costs relative to income for those in the lower income brackets should be developed, in order to better quantify the effects rising housing costs have had on low income families.
	Children Reliant on Benefit Recipients (Ideal B-C) Young People Reliant on Benefits (Ideal B-C)	While Work and Income data provides near complete coverage of children and young people reliant on income tested benefits, the unavailability of geocoding means it is difficult to calculate rates at a DHB level. In addition, the current database structure precludes an analysis by ethnicity for children reliant on benefit recipients. It is hoped that with improvements to the SWIFFT database, some of these issues may be addressed in the future.	

Stream	Current Indicators: Type & Data Quality	Limitations of Current Indicators	Indicators Suggested in Consultation & Work Required to Develop These or Improve Quality of Existing Indicators
Economic Standard of Living	Household Crowding (Ideal B)	While this indicator provides information on the number of children and young people living in crowded households, little other routinely collected data is available on housing quality (e.g. exposure to cold, damp, state of repair)	
Education: Knowledge and Skills	Prior Participation in Early Childhood Education (Proxy C)	Issues with children attending >1 form of early childhood education mean overall participation rates are difficult to estimate. While the measurement of prior participation in ECE at school entry gets over the issue of double counting, the duration, nature and quality of ECE is not captured by this indicator.	Overall, the Ministry of Education provides a wealth of information on educational outcomes which have relevance in the health context. The only additional indicator suggested during consultation which was not available on the MOE's website was school roll turnover, which was seen as an indirect marker which might also reflect transience in other areas (e.g. areas with a high school roll turnover may also have high turnovers in PHO enrolments and housing).
	Educational Attainment at School Leaving (Ideal B)	As a result of the staged roll out of the NCEA which began in 2002, trends in educational attainment at school leaving have been difficult to interpret in recent years. It is hoped that over time a new baseline will be established, which will permit a more robust interpretation of trends.	
	Senior Secondary School Retention (Ideal C)	School retention rates are created by dividing the number of 16 and 17 year old students by the number of 14 year olds enrolled 2 and 3 years previously. They thus overestimate retention in areas or ethnic groups with high migratory inflows and underestimate retention in areas with high migratory outflows.	
	Stand-downs, Suspensions, Exclusions and Expulsions (Proxy B)	Regional and temporal differences in suspension, exclusion and expulsion rates may reflect differences in the implementation of educational policies, as well as the extent to which conduct problems interfere with students participation in formal education	
Service Provision and Utilisation	Primary Health Care Provision and Utilisation (Bookmark C)	All of the currently available measures (e.g. PHO enrolments, surveys of unmet need, attendance at Plunket Well Child visits) fail to adequately assess whether children and young people are able to access primary health care in a timely or affordable fashion.	The general consensus amongst those consulted was that this was an area which needed further development, with better measures being needed to assess e.g. regional differences in the number of children not enrolled with a PHO, or the number of GP visits foregone and the reasons for these.

Stream	Current Indicators: Type & Data Quality	Limitations of Current Indicators	Indicators Suggested in Consultation & Work Required to Develop These or Improve Quality of Existing Indicators
Risk and Protective Factors			
Nutrition, Growth and Physical Activity	Breastfeeding (Proxy C)	Plunket is the only national data source for breastfeeding trends and rates at different ages, so coverage is restricted to those utilising Plunket's services. While LMC claims data provides more complete coverage, data is limited to babies aged 2 weeks and until it became mandatory in 2002, reporting was very incomplete.	While to date there has been no routine surveillance of rates of overweight or obesity amongst NZ children, the new 2006/07 Children's Health Survey is currently measuring height and weight in children ≥2 years, and the waist circumference of children 5 years and over. Results from this survey will be available in mid-2008. In addition, it is anticipated that the NZ Child Nutrition Survey will be repeated in 2012, and thereafter once every 10 years. This timing is based on overseas consensus which suggests that nutrition surveys should not be repeated at more than 10 year intervals as nutritional intake does not change quickly. SPARC is currently reviewing the manner in which it collects information on the physical activity levels of NZ children and it is likely that this will result in significant improvements in the quality of the data available.
	Overweight and Obesity (Bookmark B)	As there is no routine national surveillance of the proportion of NZ children and young people who are overweight or obese, the current indicator is reliant on one-off surveys and research project reports.	
	Nutrition (Bookmark B)	Similarly as there is no routine surveillance of nutrition in childhood, the information contained in this section is largely derived from the 2002 Children's Nutrition Survey	
	Physical Activity (Bookmark C)	SPARC Surveys provide the only longitudinal (3 surveys during 1997-2001) information on physical activity amongst NZ children. Significant methodological concerns (e.g. based on parent report, focused on sport and active leisure) limit this data's usefulness at present.	
Substance Use	Exposure to Cigarette Smoke in the Home (Proxy B) Tobacco Use in Young People (Ideal B)	ASH Survey data provides data on Year 10 students who smoke, or who are exposed to cigarette smoke in the home. However, these surveys fail to provide information on cigarette smoke exposure at other ages, or in utero. While census data provides more complete information on the number of children who live in a household with a smoker, this information is a crude proxy for exposure and is collected only once every 10 years.	It was suggested that an indicator assessing the proportion of babies exposed to cigarette smoke in utero should be developed. In addition, while national surveys provide an indication of overall smoking rates, at the DHB level the best source of detailed smoking information is the Census. The utility of this information would be greatly enhanced if collected at every Census, rather than once every 10 years.
	Alcohol Related Harm (Bookmark C)	Hospital admissions which record the use of alcohol as the main or a contributing reason for admission are likely to significantly undercount the number of admissions arising from alcohol in young people. The indicator nevertheless serves to highlight the tip of the iceberg in terms of alcohol related harm in this age group.	The 2007 Youth Health Survey will collect information on alcohol use, with binge drinking and risky behaviour as a result of alcohol use (e.g. riding with potentially drunk driver, having sex while intoxicated) seen as useful measures. It is also suggested that NZHIS develops guidelines which encourage the more complete documentation and coding of alcohol as a contributory cause in hospital admission data.

Stream	Current Indicators: Type & Data Quality	Limitations of Current Indicators	Indicators Suggested in Consultation & Work Required to Develop These or Improve Quality of Existing Indicators
Individual and Whanau Health and Wellbeing			
Total Morbidity and Mortality	Most Frequent Causes of Hospital Admission (Proxy B-C) and Mortality (Ideal B)	There are inconsistencies in the way in which different DHBs upload emergency department cases to the hospital admission dataset which result in regional and temporal artefacts in hospital admission rates. While it is likely that the majority of admissions for serious conditions (e.g. meningitis) are minimally affected by these inconsistencies, less serious conditions (e.g. gastroenteritis) which are commonly managed in the A & E setting are likely to be more profoundly affected.	It is STRONGLY recommended that the NZHIS undertakes an audit of the ways in which DHBs upload their emergency department cases to the national minimum dataset and then develops detailed guidelines for DHBs in this area. While such inconsistencies persist, there remains the potential for regional differences in hospital admission rates and trends over time to be to be partially attributable to these factors (see appendices for a more detailed discussion of this issue)
Whanau Wellbeing	Family Composition (Proxy C)	Statistics NZ divides families with children into two categories: "Couple with Children" and "One Parent with Children", with no distinction being made as to the relationship between the child and caregiver (e.g. a couple with children may refer to a married couple, grandparents caring for a grandchild, a mother living with a partner who is not the child's parent) and may underestimate how many children are living in blended family settings, or have experienced parental separation.	
Perinatal-Infancy	Low Birth Weight: SGA and Preterm Birth (Ideal B-C)	The completeness of the birth registration dataset means that trends in SGA and preterm birth can be accurately assessed. The limited number of variables in the dataset however, limits its utility for exploring causal relationships (e.g. maternal smoking or reason for preterm delivery not collected). There are also issues with the determination of SGA at a population level. Ethnic specific percentile charts assign a SGA rate of 10% to all groups precluding analysis of ethnic disparities and total population charts based on NZ data are 15 years old.	It is recommended that New Zealand updates its total population birth weight percentile charts and that a consensus view be developed on the use of ethnic specific percentile charts for assessing ethnic differences in SGA at a population level. In addition, if the use of ethnic specific percentile charts is to be recommended for this purpose, then new ethnic specific percentile charts will need to be developed for use with routine data (current charts require information on a number of maternal characteristics unavailable in routine datasets).
Perinatal-Infancy	Infant Mortality (Ideal B)	The national mortality collection provides comprehensive coverage of all deaths registered in NZ. Issues with coding (e.g. ascertainment of ethnicity, the main underlying cause of death) occur in all datasets of this type and must be taken into account when interpreting trends and ethnic differences in cause specific mortality.	

Stream	Current Indicators: Type & Data Quality	Limitations of Current Indicators	Indicators Suggested in Consultation & Work Required to Develop These or Improve Quality of Existing Indicators
Well Health	Immunisation (Proxy B-C)	Until the roll out of the National Immunisation Register in 2005, information on immunisation coverage was based on intermittent surveys, many of which were of small sample size. At the time of writing NIR coverage data at 6 and 12 months is available, with coverage at 18 months being available for a smaller number of DHBs. To date, the limitations of the NIR have not been fully explored, so it is difficult to assess the extent to which data quality issues influence the interpretation of the data.	It is hoped that with time, more complete and reliable information on immunisation coverage rates will become available from the NIR. In the meantime the results of the 2005 Immunisation Coverage Survey may provide insights into immunisation coverage amongst New Zealand children and young people
	Hearing Screening (Ideal C)	While coverage of hearing screening at school entry is high, there is little discussion of data quality issues in the National Audiology Centre's reports. Large regional and year to year variations in referral rates however, potentially suggest that data quality issues may be significant and that further work may be necessary in order to improve the quality of this indicator.	It is likely that with the roll out of the Newborn Hearing Screening Programme, the quality of information on children with congenital or neonatally acquired hearing losses will improve. Neonatal screening however, is unlikely to improve the quality of information on children whose hearing losses were acquired at later ages.
	Oral Health (Ideal C)	While theoretically these indicators provide complete coverage at 5 and 12 years, in reality they are based on the oral health status of those who have completed treatment i.e. they significantly undercount those with poor oral health status who are still undergoing treatment at the time of data collection. In addition, water fluoridation status is currently determined by the fluoridation status of the school dental clinic which the child attends, potentially leading to inaccuracies in the measurement of individual fluoride exposure. *Note: the WHO recommends a national DMFT target of ≤3.0 at 12 years. Once this target has been reached, it recommends using the Significant Caries Index (SiC DMFT), which represents the average DMFT of the 30% who have the highest DMFT scores, with the goal being firstly to achieve a SiC DMFT of 3.0 nationally and then to target high risk groups and regions whose SiC DMFT scores exceed 3.0. At present New Zealand does use this indicator when reporting its oral health statistics.	Consultation suggested a clearer picture of oral health status might be obtained if the following measures were reported on: *Preschool*: Enrolment Rate, % Caries Free, Mean DMFT *School Entry (5 yrs)*: % Caries Free, Mean DMFT *Year 8 (12 Years)*: % Caries Free, Mean DMFT and SiC DMFT, Fissure Sealant Use *Total Population:* Water Fluoridation Status In addition it was recommended that: • data on oral health status be collected at the beginning of treatment rather than the end in order to improve coverage • until more accurate fluoride exposure measures can be developed, that fluoride exposure be measured only at a population level (i.e. the % of the population living in areas with fluoridated water should be measured, but oral health outcomes should not be broken down by fluoridation status). • the MOH consider the adoption of the SiC DMFT measure in addition to the mean DMFT score at 12 years

Stream	Current Indicators: Type & Data Quality	Limitations of Current Indicators	Indicators Suggested in Consultation & Work Required to Develop These or Improve Quality of Existing Indicators
Safety	Total and Unintentional Injuries (Admissions Proxy C Mortality Ideal B)	Hospital admission rates for minor injuries are profoundly influenced by inconsistencies in the way in which different DHBs upload their emergency department cases to the national minimum dataset. These inconsistencies significantly reduce the usefulness of the hospital admission dataset for exploring regional differences in injury rates, or for monitoring injury trends over time. Mortality data however is not subject to such limitations	The reliability of these indicators would be significantly enhanced if the recommendations outlined above in relation to the uploading of emergency department cases to the hospital admission dataset were implemented It was also suggested that the number of children and young people with serious head injuries be considered as an indicator. While time and space constraints prevented the inclusion of this indicator in the current edition of the Handbook, it is suggested that this indicator be explored further in the future.
	Injuries Arising from Assault (Admissions Proxy C) (Mortality Ideal B)	It is likely that hospital admission data significantly undercounts the number of admissions arising from assault, neglect or maltreatment of children (e.g. due to under identification by clinicians, or at the coding stage).	None of the currently available indicators adequately captures the full extent of (non-fatal) assault, neglect or maltreatment of children and young people. In order to improve this situation, it is recommended that an audit be undertaken to assess the extent to which the hospital admission dataset undercounts the number of children admitted with a non-accidental injuries. Improvements in the capture of this information may enhance NZ's ability to monitor the burden of non-accidental injuries. In addition it was suggested that the number of sex offences against children be considered as an indicator. While time and space constraints prevented its inclusion in this edition of the Handbook, it is suggested that this indicator be explored further in the future.
	CYF Notifications (Proxy C)	While CYF notifications have increased dramatically in recent years, interpretation of trends is difficult, as much of this increase may potentially be due to changes in referral procedures and investigation thresholds, in the context of increasing public intolerance of the consequences of child abuse	
	Family Violence (Proxy C)	While Police attendances at family violence incidents have increased dramatically in recent years, interpretation of trends is difficult, as much of this increase may potentially be due to changes in referral procedures and investigation thresholds, in the context of increasing public intolerance of the consequences of family violence	

Stream	Current Indicators: Type & Data Quality	Limitations of Current Indicators	Indicators Suggested in Consultation & Work Required to Develop These or Improve Quality of Existing Indicators
Infectious Diseases	Serious Bacterial Infections Meningococcal Disease Rheumatic Fever (Proxy B) Skin Infections Tuberculosis (Proxy B-C) Gastroenteritis (Proxy C) Mortality (Ideal B)	All of the infectious disease indicators in this Handbook rely heavily on hospital admission data. Anomalies in the way in which different DHBs upload their emergency department cases to the hospital admission dataset mean that regional and temporal differences may be influenced by local practices in this area. While it is likely that the majority of admissions for serious conditions (e.g. meningococcal disease) are minimally affected by these inconsistencies, less serious conditions (e.g. gastroenteritis) which are commonly managed in the emergency department setting may be more profoundly affected.	The reliability of these indicators would be significantly enhanced if the recommendations outlined above in relation to the uploading of emergency department cases to the national minimum dataset were implemented.
Respiratory Disease	Lower Respiratory Morbidity & Mortality Bronchiolitis Pertussis Pneumonia Bronchiectasis Asthma (Proxy B-C) Mortality (Ideal B)	In addition to the issues associated with hospital admission data outlined above, it is likely that diagnostic transfer has significantly influenced admission rates for bronchiolitis and asthma (with large increases in hospital admissions for bronchiolitis in infants <1 year being partially offset by corresponding falls in asthma admissions in this age group). Not all of the increases in bronchiolitis admissions during the past decade can be attributed to this effect however	It is likely that the reliability of these indicators would be significantly enhanced if the recommendations outlined above in relation to the uploading of emergency department cases to the national minimum dataset were implemented.
Chronic Conditions	Diabetes & Epilepsy (Bookmark C)	At present there is little routinely collected data on the number of children with chronic health problems in NZ. While this section uses hospital admission data to highlight the issues of diabetes and epilepsy, the majority of children and young people with these conditions are managed on an outpatient basis, with hospital admissions being reserved for those requiring stabilisation immediately following diagnosis, experiencing complications, or who are poorly controlled despite maximal outpatient management. Thus these figures reflect the "tip of the iceberg" in terms the burden of morbidity associated with these conditions	It was suggested that the number of children and young people with chronic renal failure (or as a proxy measure, those receiving dialysis) be considered as an indicator. While time and space constraints prevented the inclusion of this indicator in the current edition of the Handbook, it is suggested that this be explored further in the future. It is also recommended that the MOH explores the possibility of coding (by diagnosis) and then uploading outpatient data to a national outpatient dataset. This would capture a large amount of the workload of secondary and tertiary services, which manage children and young people with chronic conditions on an outpatient basis.

Stream	Current Indicators: Type & Data Quality	Limitations of Current Indicators	Indicators Suggested in Consultation & Work Required to Develop These or Improve Quality of Existing Indicators
Chronic Conditions	Cancer (Ideal B)	Audits suggest that the Cancer Registry captures the majority of cancers diagnosed in children and young people and is thus able to provide a reasonable estimate of trends in this age group. The small numbers of cases diagnosed however, limits a more detailed analysis of risk factors for any particular diagnostic sub-category.	
Disability	Disability Prevalence (Bookmark B-C)	At present there is little data on the prevalence of different types of disability amongst NZ children and young people. Thus overseas estimates must be extrapolated to the NZ population.	Consultation highlighted the need for indicators which monitored the incidence / prevalence of disability amongst NZ children and young people, both by diagnostic category (e.g. autism) and by degree of functional impairment (e.g. requires walking frame for mobility). At present there are no reliable data sources upon which to base these indicators, although it is hoped that with the creation of a national database for NASC Agency data (currently underway), information on the number of children and young people being assessed for disability support services will become more readily available. In the medium term, the coding (by diagnosis) and uploading of outpatient data to a national dataset would capture a large amount of the workload of developmental and other paediatricians and provide estimates of the number of children requiring secondary and tertiary services for the management of chronic disabilities. In the longer term, it is recommended that the MOH explores the possibility of establishing a national disability register which centralises the management of information on children and young people with disabilities.
	Congenital Anomalies Evident at Birth (Proxy B-C)	Monitoring the prevalence of Down Syndrome and Neural Tube defects at birth fails to provide information on incidence, as a large number of babies with these conditions are terminated prior to 20 weeks gestation and thus do not appear in the hospital admissions dataset.	
	Blindness and Low Vision (Ideal B-C)	BLENNZ data provides a reasonable estimate of the number of students receiving educational support for visual impairments, although it provides very limited information on the reasons for these impairments.	
	Permanent Hearing Loss (Ideal C)	It is likely that deafness notification data significantly undercounts the number of children with permanent hearing loss.	
Mental Health	Issues Experienced by Callers to Telephone Counselling Services (Bookmark / Proxy C)	While a review of the issues which lead children and young people to call Telephone Counselling Services provides insights into the types of concerns experienced by this age group, funding constraints mean that a large proportion of these calls go unanswered. As a result, such data cannot be used to make inferences about the total number of children and young people experiencing these issues, or to track their prevalence over time in any reliable manner.	

Stream	Current Indicators: Type & Data Quality	Limitations of Current Indicators	Indicators Suggested in Consultation & Work Required to Develop These or Improve Quality of Existing Indicators
Mental Health	Mental Health Inpatient Admissions (Bookmark / Proxy C)	While inpatient admission data provides information on the number of young people admitted with serious mental health conditions, such admissions are unlikely to be representative of the types of issues managed in the outpatient or primary care setting. They thus represent the "tip of the iceberg" in terms of numbers, as well as the nature and severity of the conditions treated.	Consultation highlighted the current paucity of routinely collected information in the area of child and youth mental health. While the Mental Health Information National Collection (MHINC) collects information on outpatient attendances, it was only in 2005 that diagnosis became a mandatory reporting requirement. In addition, while most services use DSMIV for diagnostic coding (which is then converted to ICD-10) the view of those consulted was that DSMIV did not adequately capture mental health issues experienced by children and that diagnoses for young people often evolved with time. It is hoped that as the completeness and accuracy of the MHINC improves, more information will become available on the number of children and young people seeking services for the management of mental health issues. In addition, it was suggested that a regular epidemiological survey of the mental health issues experienced by those 0-19 years be considered, in order address the current paucity of information in this age group.
	Self Harm and Suicide (Admissions Proxy B-C Mortality Ideal B)	Mortality data (although subject to the coding constraints of any mortality collection) provides reasonably complete coverage of deaths arising from self inflicted injuries and is thus useful for tracking suicide trends over time. Analysis of the demographic profile of those admitted to hospital vs. those dying from self inflicted injuries however suggests that these two measures should not be used interchangeably in this age group.	
Sexual and Reproductive Health	Teenage Pregnancy (Ideal B)	While information on teenage births is available at a DHB level, information on the number of women seeking a termination is only available nationally (or by institution). Thus it is difficult for DHBs to assess the total number of teenage pregnancies occurring in their regions	Ideally total teenage pregnancy rates (i.e. births + miscarriages + terminations) should be assessed, rather than the currently available measure of teenage births. It is thus recommended that in addition to national level reporting, the Abortion Supervisory Committee report on termination rates by DHB (with DHB being assigned using the residential address of the woman at the time of her termination)
	Sexually Transmitted Infections (Bookmark C)	Sexual health and family planning clinic data only provide information on the number of young people attending these services. The lack of a clear denominator, as well as the possibility that many young people attend other services, means that rate data cannot be calculated from clinic notifications. While laboratory notifications for chlamydia and gonorrhoea occur in a number of regions (allowing for a more complete ascertainment of cases and the calculation of rates), no national level data is available on the incidence of STIs in NZ young people.	In order to provide more complete coverage of STIs in young people, it is recommended that the current laboratory based notification system for gonorrhoea and chlamydia be extended to all regions, so that more complete national and regional surveillance can occur for these conditions.

Demography: A Key to Interpreting Regional Differences in Health

While often not being explicitly stated, much of the interest in health status assessment in recent years has been on benchmarking, and the ability to assess a DHB's performance based on a basket of key indicators. The ability to undertake such analyses in a robust manner and in a way that takes into account regional differences in age, ethnic composition and socioeconomic deprivation, while not being impossible, is rendered technically difficult as a result of the fragmented nature of New Zealand's national datasets and the lack of appropriate denominators in electronic format. In addition, at a DHB level what is often needed is not an adjusted analysis, but rather an overview of a region's crude rates, accompanied by an explanation as to why they appear to differ from the national average.

While a regional breakdown of rates (where possible) has been provided for each of the indicators in this Handbook, it is not intended that these rates be used for the purposes of benchmarking, particularly as none have been adjusted for age, ethnicity, NZ Deprivation Index or rural / urban composition. Rather, when interpreting regional differences, the reader is urged to consider the answers to the following questions:

1. What are the characteristics of the region's child and youth population in terms of age structure, ethnicity and exposure to socioeconomic disadvantage?
2. Given knowledge of the ways in which these factors influence the distribution of health outcomes at a population level, what is the likelihood that regional rates for a particular outcome will be above or below the national average?
3. What are the region's actual rates for the health outcome in question and do they differ in any way from those predicted by an analysis of regional demography?

In order to assist the reader to answer each of these key questions, the following section provides information on the breakdown of each DHB's child and youth population by age, ethnicity and NZ Deprivation Index decile at the time of the 2006 Census. Similar information is also provided for births using information from the Birth Registration Dataset.

Data Source and Methods

Definition

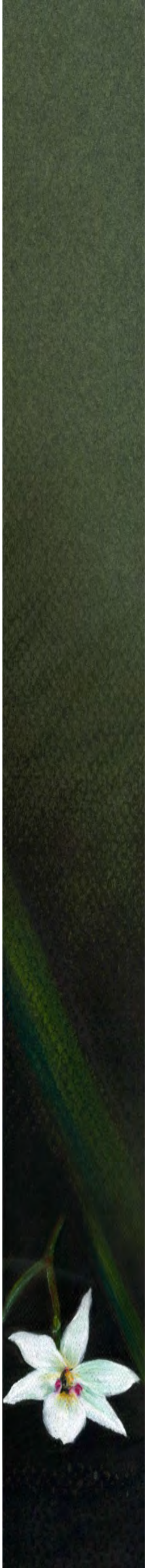
Distribution of New Zealand child and youth population by age, ethnicity, NZ Deprivation Index decile and DHB

Data Source

2006 Census, Birth Registration Dataset

Notes on Interpretation of Data

New Zealand's national health datasets have traditionally continued to use the previous Censuses' domicile codes until 1-2 years after any new Census, meaning that all of the information derived from the Birth Registration dataset is based on 2001 domicile codes and the NZDep2001 Index. In addition, prioritised ethnicity has been used throughout this section, with the ethnicity of children and young people reporting multiple ethnic affiliations being prioritised in the following order: Māori > Pacific > Asian > Other > European, with those identifying as "New Zealander's" in the 2006 Census being allocated to the NZ European ethnic group.



Births in New Zealand

Table 135. Annual Number of Births by Infant's Ethnic Group, New Zealand 1996-2006

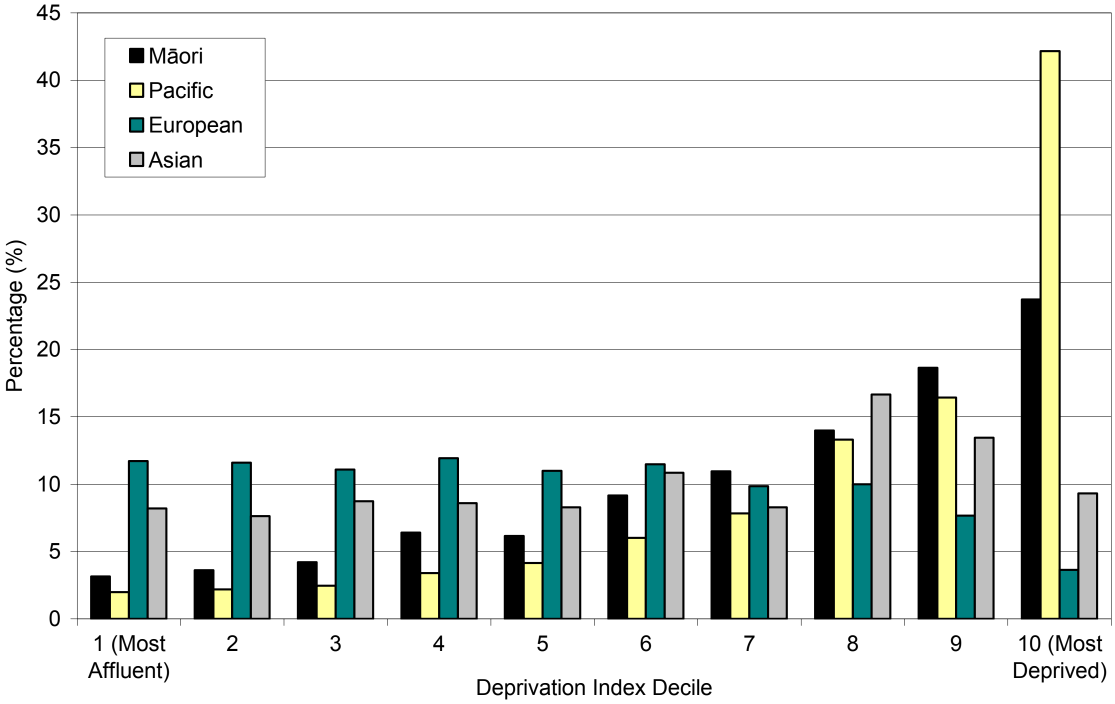
Year of Birth Registration	Māori		Pacific		European		Asian		Other		Total
	No.	%	No.	%	No.	%	No.	%	No.	%	No.
1996	16,128	28.1	5,760	10.0	31,738	55.3	3394	5.9	401	0.7	57,438
1997	16,411	28.3	5,740	9.9	31,613	54.5	3802	6.5	421	0.7	58,008
1998	14,513	27.6	5,251	10.0	28,769	54.7	3610	6.5	466	0.9	52,632
1999	16,134	27.9	6,284	10.9	30,823	53.4	3980	6.9	506	0.9	57,753
2000	15,953	27.8	6,190	10.8	30,324	52.9	4222	7.4	565	1.0	57,288
2001	15,963	28.3	6,164	10.9	29,696	52.6	4041	7.1	603	1.1	56,495
2002	14,991	27.4	6,031	11.0	28,562	52.1	4599	8.4	599	1.1	54,807
2003	15,768	27.7	6,187	10.9	28,910	50.8	5223	9.2	736	1.3	56,871
2004	16,647	28.1	6,421	10.9	29,617	50.1	5647	9.5	767	1.3	59,163
2005	17,094	29.0	6,278	10.6	29,273	49.6	5495	9.3	827	1.4	59,012
2006	18,031	29.7	6,461	10.7	29,199	48.1	5389	8.9	1,542	2.5	60,666

Table 136. Distribution of Births by Ethnicity and DHB, New Zealand 2006

DHB	Māori		Pacific		European		Asian		Other		Total
	Number	% DHB	Number	% DHB	Number	% DHB	Number	% DHB	Number	% DHB	Number
Northland	1,313	56.7	51	2.2	878	37.9	38	1.6	35	1.5	2,315
Waitemata	1,524	20.7	921	12.5	3,647	49.5	1054	14.3	221	3.0	7,367
Auckland	965	15.3	1269	20.1	2523	39.9	1355	21.4	212	3.4	6,324
Counties Manukau	2,623	31.5	2,468	29.7	1,935	23.3	1158	13.9	138	1.7	8,322
Waikato	2040	40.0	181	3.6	2503	49.1	251	4.9	123	2.4	5,098
Lakes	927	56.5	45	2.7	601	36.6	47	2.9	22	1.3	1,642
Bay of Plenty	1,296	45.7	54	1.9	1,317	46.4	125	4.4	44	1.6	2,836
Tairawhiti	539	71.8	16	2.1	183	24.4	8	1.1	5	0.7	751
Taranaki	489	32.8	28	1.9	909	61.0	32	2.1	31	2.1	1,489
Hawkes Bay	1,053	47.2	110	4.9	943	42.2	70	3.1	57	2.6	2,233
Whanganui	427	47.4	14	1.6	425	47.2	24	2.7	10	1.1	900
MidCentral	856	37.6	96	4.2	1187	52.1	86	3.8	54	2.4	2,279
Hutt	638	31.6	233	11.5	949	47.0	151	7.5	47	2.3	2,018
Capital and Coast	810	20.7	446	11.4	2147	54.8	391	10.0	126	3.2	3,920
Wairarapa	169	32.1	17	3.2	320	60.8	10	1.9	10	1.9	526
Nelson Marlborough	288	18.2	38	2.4	1152	72.9	44	2.8	58	3.7	1,580
West Coast	69	17.3	6	1.5	306	76.9	7	1.8	10	2.5	398
Canterbury	1125	18.0	247	4.0	4272	68.5	387	6.2	202	3.2	6,233
South Canterbury	105	17.3	8	1.3	466	76.9	12	2.0	15	2.5	606
Otago	341	17.2	81	4.1	1447	72.8	61	3.1	58	2.9	1,988
Southland	346	23.3	35	2.4	1029	69.4	29	2.0	43	2.9	1,482
New Zealand	18,031	29.7	6,461	10.7	29,199	48.1	5389	8.9	1,542	2.5	60,666

Note: New Zealand Total includes 359 births where DHB was not stated

Figure 169. Distribution of Births by Ethnicity and NZ Deprivation Index Decile, New Zealand 2006



The Child and Youth Population at the 2006 Census

Table 137. Distribution of Children and Young People 0-24 Years by Ethnicity, New Zealand Census 2006

	Number	%
	Children 0-14 Years	
European	479,418	55.3
Māori	199,914	23.0
Pacific	75,528	8.7
Asian / Indian	70,479	8.1
Other	8,652	1.0
Not Stated	33,555	3.9
Total	867,573	100.0
	Young People 15-24 Years	
European	320,736	56.2
Māori	101,298	17.7
Pacific	40,707	7.1
Asian / Indian	75,180	13.2
Other	6,630	1.2
Not Stated	26,619	4.7
Total	571,182	100.0
	Total 0-24 Years	
Total	1,438,755	100.0

Table 138. Distribution of Children and Young People 0-24 Years by DHB, New Zealand Census 2006

DHB	Children 0-14 Years		Young People 15-24 Years	
	Number	% of Age Group	Number	% of Age Group
Northland	34,776	4.0	17,163	3.0
Waitemata	104,547	12.1	67,710	11.9
Auckland	76,101	8.8	67,254	11.8
Counties Manukau	112,107	12.9	65,118	11.4
Waikato	77,358	8.9	48,921	8.6
Lakes	23,865	2.8	12,456	2.2
Bay of Plenty	43,614	5.0	22,608	4.0
Tairawhiti	11,652	1.3	5,751	1.0
Taranaki	22,707	2.6	13,080	2.3
Hawkes Bay	34,098	3.9	18,213	3.2
Whanganui	13,788	1.6	7,851	1.4
MidCentral	33,930	3.9	24,087	4.2
Hutt	30,846	3.6	18,480	3.2
Capital and Coast	51,912	6.0	42,360	7.4
Wairarapa	8,163	0.9	4,221	0.7
Nelson Marlborough	25,767	3.0	14,691	2.6
West Coast	6,393	0.7	3,387	0.6
Canterbury	91,686	10.6	66,513	11.6
South Canterbury	10,494	1.2	5,811	1.0
Otago	31,908	3.7	31,731	5.6
Southland	21,807	2.5	13,737	2.4
New Zealand Total	867,576	100.0	571,173	100.0

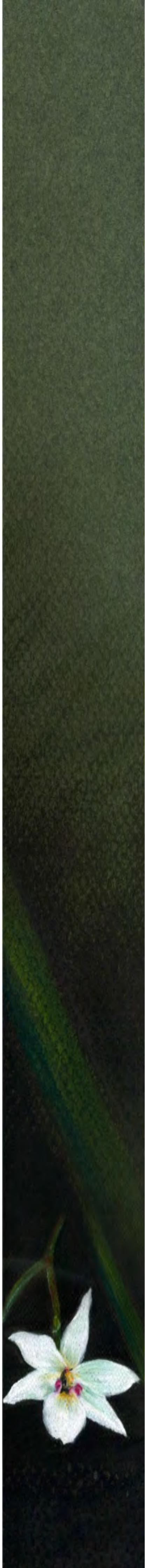


Table 139. Distribution of Children and Young People 0-24 Years by Ethnicity and DHB, New Zealand Census 2006

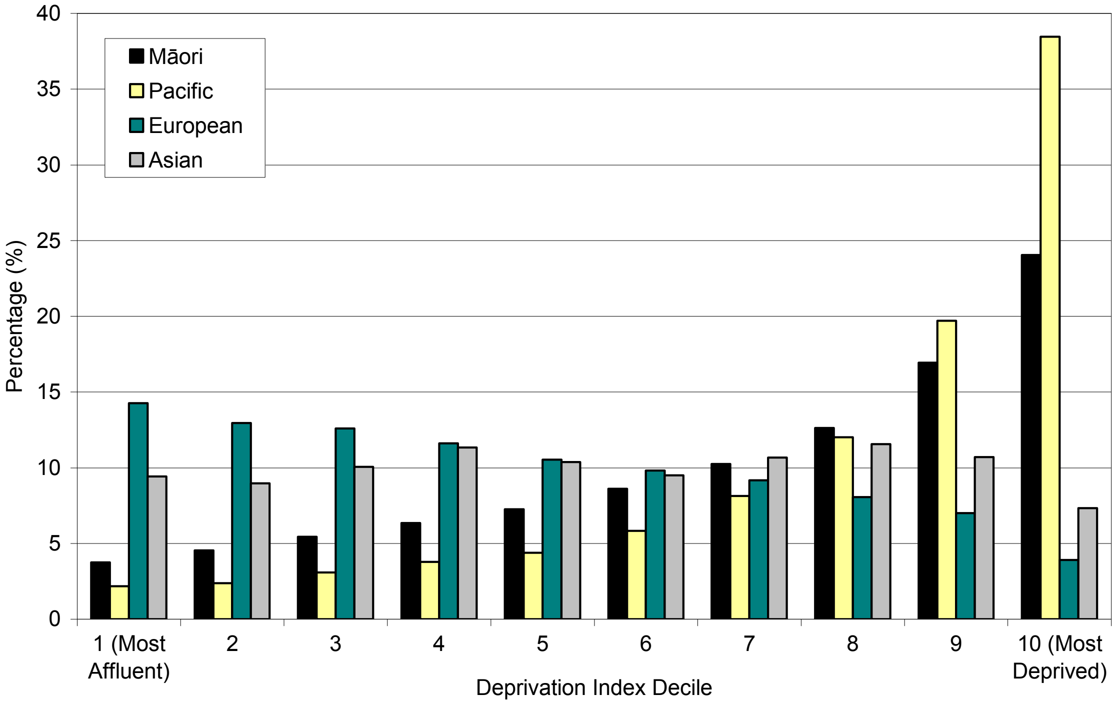
DHB	Māori			Pacific			European			Asian / Indian			Other		
	Number	% of Ethnic Group	% of DHB	Number	% of Ethnic Group	% of DHB	Number	% of Ethnic Group	% of DHB	Number	% of Ethnic Group	% of DHB	Number	% of Ethnic Group	% of DHB
Northland	21507	7.5	42.5	843	0.8	1.7	23772	3.0	47.0	696	0.7	1.4	107	1.0	0.2
Auckland	14595	5.1	11.3	21960	20.9	17.1	57012	7.1	44.3	26748	26.8	20.8	2277	21.2	1.8
Waitemata	21948	7.6	14.2	13872	13.2	9.0	92910	11.6	60.1	18138	18.2	11.7	1950	18.2	1.3
Counties Manukau	34752	12.1	22.6	37443	35.7	24.4	55128	6.9	35.9	18315	18.4	11.9	1515	14.1	1.0
Waikato	35886	12.5	29.6	3510	3.3	2.9	72504	9.0	59.7	5109	5.1	4.2	825	7.7	0.7
Bay of Plenty	22848	7.9	36.5	903	0.9	1.4	35220	4.4	56.3	1185	1.2	1.9	105	1.0	0.2
Lakes	16467	5.7	44.9	1023	1.0	2.8	16560	2.1	45.1	873	0.9	2.4	75	0.7	0.2
Hawkes Bay	17784	6.2	34.1	1917	1.8	3.7	29586	3.7	56.7	1023	1.0	2.0	102	1.0	0.2
Tairawhiti	9954	3.5	56.6	303	0.3	1.7	6312	0.8	35.9	186	0.2	1.1	27	0.3	0.2
Taranaki	8145	2.8	22.1	357	0.3	1.0	26436	3.3	71.8	645	0.6	1.8	90	0.8	0.2
MidCentral	13467	4.7	23.3	1689	1.6	2.9	38274	4.8	66.3	2451	2.5	4.2	267	2.5	0.5
Whanganui	7683	2.7	33.2	414	0.4	1.8	13830	1.7	59.7	348	0.3	1.5	48	0.4	0.2
Wairarapa	3057	1.1	23.6	312	0.3	2.4	9072	1.1	70.1	198	0.2	1.5	30	0.3	0.2
Hutt	10848	3.8	22.3	4572	4.4	9.4	28950	3.6	59.5	2895	2.9	5.9	375	3.5	0.8
Capital and Coast	12972	4.5	14.9	9387	8.9	10.8	53061	6.6	60.8	7728	7.7	8.9	1236	11.5	1.4
Nelson Marlborough	5451	1.9	13.6	540	0.5	1.3	32121	4.0	80.0	708	0.7	1.8	87	0.8	0.2
Canterbury	15948	5.5	11.0	3918	3.7	2.7	111957	14.0	77.1	8751	8.8	6.0	1089	10.1	0.8
South Canterbury	1620	0.6	9.8	162	0.2	1.0	14199	1.8	85.5	285	0.3	1.7	33	0.3	0.2
West Coast	1401	0.5	14.1	51	0.0	0.5	7992	1.0	80.6	87	0.1	0.9	21	0.2	0.2
Otago	5733	2.0	9.4	1281	1.2	2.1	49176	6.1	81.0	2907	2.9	4.8	399	3.7	0.7
Southland	6018	2.1	16.8	555	0.5	1.6	27915	3.5	78.0	513	0.5	1.4	72	0.7	0.2
New Zealand	288084	100.0	21.3	105012	100.0	7.8	801987	100.0	59.3	99789	100.0	7.4	10730	100.0	0.8

Table 140. Distribution of Children and Young People 0-24 Years by NZ Deprivation Index Decile and Region, New Zealand Census 2006

DHB	New Zealand Deprivation Index Decile																			
	1		2		3		4		5		6		7		8		9		10	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Northland	1,539	3.0	2,430	4.7	2,832	5.5	3,399	6.5	4,386	8.4	5,208	10.0	5,517	10.6	6,567	12.6	8,616	16.6	11,433	22.0
Waitemata	20,505	11.9	22,707	13.2	22,311	13.0	19,692	11.4	18,399	10.7	19,146	11.1	17,238	10.0	15,483	9.0	11,973	7.0	4,788	2.8
Auckland	13,881	9.7	13,089	9.1	13,281	9.3	13,068	9.1	12,483	8.7	12,816	8.9	15,183	10.6	13,443	9.4	13,848	9.7	22,182	15.5
Counties Manukau	13,359	7.5	15,129	8.5	13,875	7.8	11,361	6.4	11,289	6.4	10,215	5.8	9,858	5.6	18,744	10.6	27,420	15.5	45,978	25.9
Waikato	8,955	7.1	8,829	7.0	9,738	7.7	12,870	10.2	11,301	8.9	13,194	10.4	13,812	10.9	13,269	10.5	17,874	14.2	16,428	13.0
Lakes	2,076	5.7	3,588	9.9	2,373	6.5	2,805	7.7	2,220	6.1	2,604	7.2	3,513	9.7	4,107	11.3	5,637	15.5	7,380	20.3
Bay of Plenty	3,300	5.0	4,521	6.8	6,159	9.3	4,956	7.5	6,267	9.5	7,137	10.8	6,498	9.8	7,671	11.6	9,417	14.2	10,275	15.5
Tairawhiti	549	3.2	780	4.5	1,056	6.1	774	4.4	1,023	5.9	942	5.4	1,410	8.1	1,815	10.4	2,550	14.7	6,501	37.4
Taranaki	1,938	5.4	2,172	6.1	4,089	11.4	3,396	9.5	4,659	13.0	4,527	12.6	4,659	13.0	3,825	10.7	3,465	9.7	3,069	8.6
Hawkes Bay	3,432	6.6	3,474	6.6	3,663	7.0	3,900	7.5	4,128	7.9	5,814	11.1	6,192	11.8	4,899	9.4	6,234	11.9	10,566	20.2
Whanganui	975	4.5	855	4.0	1,203	5.6	1,623	7.5	2,376	11.0	1,995	9.2	2,178	10.1	2,319	10.7	4,119	19.0	4,008	18.5
MidCentral	4,041	7.0	4,377	7.5	4,461	7.7	4,473	7.7	6,354	11.0	7,116	12.3	6,537	11.3	7,311	12.6	7,551	13.0	5,790	10.0
Hutt	6,915	14.0	4,836	9.8	3,207	6.5	3,672	7.4	3,990	8.1	4,539	9.2	4,968	10.1	5,208	10.6	6,036	12.2	5,952	12.1
Capital and Coast	17,700	18.8	9,801	10.4	9,096	9.6	9,495	10.1	8,358	8.9	8,361	8.9	7,128	7.6	6,741	7.2	6,306	6.7	11,220	11.9
Wairarapa	1,038	8.4	1,230	9.9	1,440	11.6	729	5.9	924	7.5	1,158	9.4	1,728	14.0	1,905	15.4	1,209	9.8	1,014	8.2
Nelson Marlborough	3,306	8.2	3,828	9.5	5,115	12.6	5,037	12.4	5,079	12.6	4,302	10.6	5,850	14.5	4,560	11.3	2,544	6.3	813	2.0
West Coast	270	2.8	609	6.2	342	3.5	1,737	17.7	966	9.9	984	10.1	1,338	13.7	1,998	20.4	1,062	10.8	483	4.9
Canterbury	22,329	14.1	18,444	11.7	16,863	10.7	17,358	11.0	16,311	10.3	16,485	10.4	13,575	8.6	14,247	9.0	14,145	8.9	8,442	5.3
South Canterbury	1,167	7.2	1,611	9.9	2,049	12.6	2,466	15.1	2,139	13.1	1,740	10.7	1,674	10.3	1,791	11.0	1,206	7.4	462	2.8
Otago	5,748	9.0	6,444	10.1	6,408	10.1	6,426	10.1	6,807	10.7	5,943	9.3	6,051	9.5	6,015	9.5	10,104	15.9	3,687	5.8
Southland	4,458	12.5	5,616	15.8	4,833	13.6	3,282	9.2	3,318	9.3	2,427	6.8	3,279	9.2	3,396	9.6	3,120	8.8	1,761	5.0
New Zealand	137,487	9.6	134,370	9.3	134,385	9.3	132,522	9.2	132,777	9.2	136,653	9.5	138,186	9.6	145,311	10.1	164,439	11.4	182,226	12.7

Note: % is percent of the DHB Total.

Figure 170. Distribution of Children and Young People 0-24 Years by Ethnicity and NZ Deprivation Index Decile, New Zealand Census 2006



Appendix 1: The National Minimum Dataset

Mode of Data Collection

The National Minimum Dataset (NMDS) is New Zealand's national hospital discharge data collection and is maintained by the New Zealand Health Information Service (NZHIS). The information contained in the dataset has been submitted by public hospitals in a pre-agreed electronic format since 1993. Private hospital discharges for publicly funded events (e.g. births, geriatric care) have been submitted since 1997. The original NMDS was implemented in 1993, with public hospital information back loaded to 1988 [263]. Information contained in the NMDS includes principal and additional diagnoses, procedures, external causes of injury, length of stay and sub-specialty code and demographic information such as age, ethnicity and usual area of residence.

Dataset Quality and Changes in Coding Over Time

There are a number of key issues which must be taken into account when interpreting information from the NMDS. Many of these issues arise as a result of regional differences in the way in which data is coded and uploaded to the NMDS. These include

1. Inconsistencies in the way in which different providers upload day cases to the NMDS, and how this has changed over time.
2. The changeover from the ICD-9 to ICD-10 coding system, and irregularities in the way in which diagnoses and procedures are allocated ICD codes.
3. Changes in the way in which ethnicity information has been collected over time and across regions (Appendix 6).

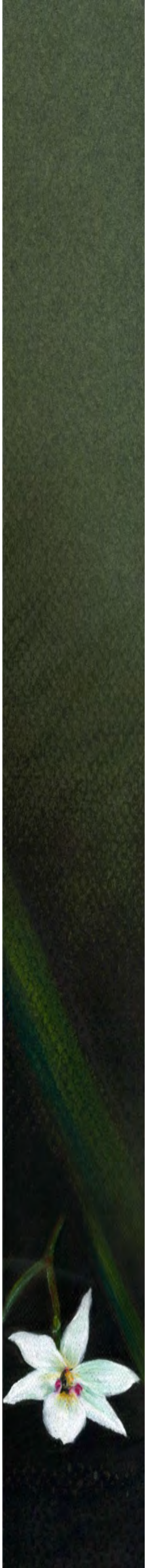
The following sections discuss the first two if these issues, while the third is discussed in Appendix 6, which reviews the way in which ethnicity information is collected and coded within the health sector.

1. Inconsistencies in the Uploading of Day-Cases to the NMDS

One of the key issues with time series analysis using hospital discharge data is the variability with which different providers upload day cases to the NMDS. Day cases are defined as cases that are admitted and discharged on the same day, with the "three hour rule" (treatment time >3 hours) traditionally being utilised to define an admission event. In contrast patients who spend at least one (mid)night in hospital are classified as inpatients irrespective of their length of stay [264].

In the past, there have been significant regional variations in the way in which different providers have uploaded their day cases to the NMDS, leading to problems with both time series analysis and regional comparisons. These inconsistencies have included

1. During the mid 1990's, a number of providers began to include A&E events as day cases if the total time in the Emergency Department (including waiting time) exceeded 3 hours, rather than uploading only those whose actual treatment time exceeded 3 hours [264]. NZHIS provided feedback which rectified this anomaly and since January 1995 the correct procedure has been used (these additional cases were coded using medical and surgical sub-specialty codes and are thus difficult to filter out using traditional Emergency sub-specialty filters).



2. Over time, a number of providers have become more efficient at recording the time of first treatment within the Emergency Department (rather than time of attendance) and thus during the late 1990s and early 2000s have become more efficient in identifying emergency department cases which meet the 3-hour treatment rule and are thus eligible to be uploaded to the NMDS. This has resulted in a large number of additional cases being uploaded to the NMDS, particularly in the upper North Island.
3. In addition, some providers admit cases to their short stay observation units while other providers do not, leading to regional variations in the appearance of day cases in the NMDS [265].

Previous Attempts to Address Inconsistent Uploading at the Analytical Stage

When producing their annual Hospital Throughput reports, the Ministry of Health has adopted the following filter to ensure regional and time series comparability with respect to day patient admissions [265]. In its analyses it excludes all cases where:

1. the admission and discharge date are the same (length of stay = 0)
2. and the patient was discharged alive
3. and the health specialty code on discharge is that of Emergency Medicine (M05, M06, M07, and M08).

While this coding filter succeeds in ensuring a degree of comparability between regions and across time (although it fails to correct the anomalies occurring during the mid 1990s when A&E cases were uploaded using medical sub-specialty codes), the exclusion of emergency day cases from time series analysis has a number of limitations including:

1. Exclusion of only those with a length of stay of 0 days means that those emergency cases who begin their treatment late at night and are discharged in the early hours of the following morning (up ¼ of emergency cases have a length of stay of 1 day in some DHBs) are included as genuine hospital admissions, whereas those who begin their treatment early in the morning and are discharged late in the afternoon or the evening of the same day are excluded.
2. With a move towards the development of specialist paediatric emergency departments in larger urban centres (e.g. Auckland), there remains the possibility that some larger DHBs are now seeing and treating a number of acute medical patients within the emergency setting, while in regional centres similar patients continue to be assessed on the paediatric medical ward / assessment unit and thus receive a paediatric medical specialty code. The exclusion of all emergency presentations from time series and sub-regional analysis may thus differentially exclude a large portion of the workload occurring in large urban centres where access to specialist advice and treatment is available within the Emergency Department setting.

The potential impact of inconsistent uploading of day cases to the NMDS is likely to be greatest for those conditions most commonly treated in the emergency department setting. Analysis of 2001-2003 hospital admission data suggests that >1/3 of NMDS emergency department discharges for those 0-24 years were due to injury, with another 1/3 were due to ambulatory sensitive conditions (e.g. asthma, gastroenteritis, respiratory infections). In contrast, only 2% of those presenting with bacterial meningitis and 4% of those with septic arthritis were discharged with an emergency sub-specialty code.

Further sub-analysis of these two admission categories however demonstrated that inclusion / exclusion of emergency department admissions had quite different effects depending on the category of admission under study (injury vs. ambulatory sensitive admissions) and whether the region had access to a specialist Paediatric Emergency Department. In this analysis the Wider Auckland Region, (comprising 1/3 of the New Zealand population and whose residents have access to specialist Paediatric Emergency Departments) was compared to the rest of New Zealand. For ambulatory sensitive admissions, exclusion of emergency department cases resulted in Auckland's admission rates being consistently lower than in the rest of New Zealand. It was only when emergency cases were included in this analysis that Auckland's admission rates began to approximate those of the rest of New Zealand. In contrast for injuries, inclusion of emergency department cases resulted in hospital admissions in the Auckland Region consistently exceeding the rest of New Zealand. It was only when emergency cases were excluded from the analysis that Auckland's injury admission rates began to approximate those of the rest of New Zealand. (These findings occurred despite Auckland having a similar proportion of children living in the most deprived NZDep small areas as the rest of New Zealand).

Loosely interpreted, the findings of this analysis suggest that the workload of large specialist paediatric emergency departments must not be discounted when examining trends in ambulatory sensitive or other medical admissions, as it is only when emergency cases are included in the analysis that the admission rates of the Wider Auckland Region (with its access to Specialist Paediatric Emergency care) begin to approximate the rest of New Zealand. In contrast, it is possible that specialist paediatric emergency departments have much less of an influence on admission thresholds for injury, with these being handled in a similar manner by different emergency departments across the country. Thus for injury data, the greater tendency for some emergency departments to upload their cases to the NMDS must be taken into account in any analysis.

Implications for Interpreting Time Series Analyses in these Reports

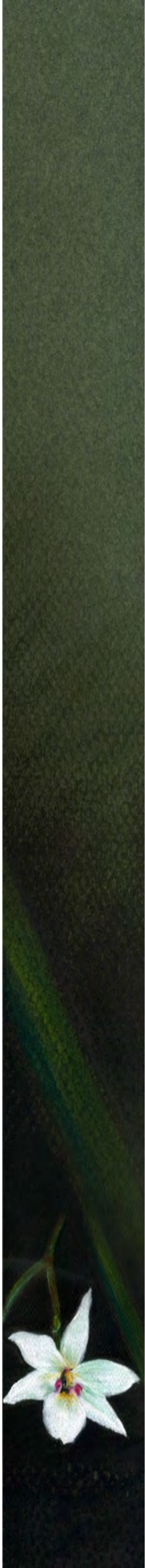
Throughout this report, analysis of time series and other information has been undertaken using unfiltered hospital admission data, with the exception of the injury and poisoning sections. Here emergency department discharges have been filtered out of the dataset, in an attempt to address some of the inconsistencies discussed above. Despite such an approach, there remains the potential for the inconsistent uploading of day cases to significantly influence the time series analyses presented in this report. In particular, such practices may lead to an over estimate of the number of medical admissions commonly treated in the emergency department setting (e.g. asthma, skin infections, respiratory tract infections), while at the same time the filtering out of injury/poisoning emergency cases may lead to undercounting for a number of more minor types of injury. Nevertheless, the filtering process utilised in this report are thought to provide the best balance when considering hospital admissions amongst those 0-24 years. Despite this, the reader must bear in mind that a potential for significant residual bias remains, when interpreting the time series analyses presented in this report.

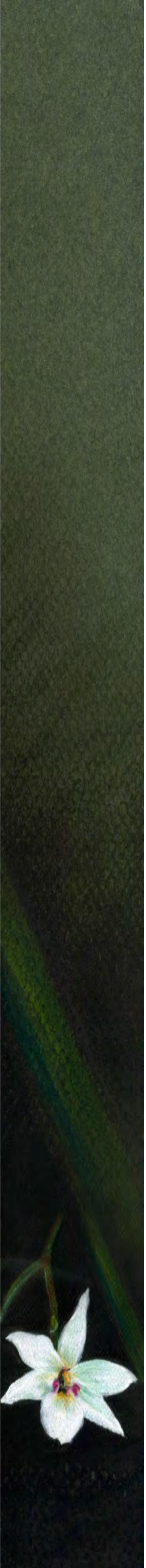
2. Data Quality and Coding Changes over Time (ICD-9 and ICD-10)

Change Over from ICD-9 to ICD-10 Coding

From 1988 until June 1999, clinical information in the NMDS was coded using variants of the ICD-9 classification system (ICD-9 CM until June 1995, then ICD-9-CM-A until June 1999). From July 1999 onwards, the ICD-10 classification system has been used, although for time series analysis, back and forward mapping between the two classification systems is possible fusing pre-defined algorithms [263].

The introduction of ICD-10 represents the most significant change in the International Classification of Diseases (ICD) in over 50 years and uses an alphanumeric coding





system for diseases in which the first character of the code is always a letter followed by several numbers. This has allowed for the expansion of the number of codes to provide for recently recognised conditions and to provide greater specificity about common diseases (there are about 8,000 categories in ICD-10 as compared to 5,000 in ICD-9). While for most conditions there is a reasonable 1:1 correspondence between ICD-9 and ICD-10 codes, for some this may lead to some irregularities in time series analysis [266]. Where possible such irregularities will be highlighted in the text, although care should still be taken when interpreting time series analysis across the 1999-2000 period as some conditions may not be directly comparable between the two coding systems.

Accuracy of ICD Coding

In recent years the NZHIS has undertaken a number of reviews of the quality of ICD coding in the NMDS. In the latest audit 2708 events were audited over 10 sites during a 3 month period during 2001/2002. Overall the audit found that 22% of events required a change in coding, although this also included changes at the fourth and fifth character level. The average ICD code change was 16%, with changes to the principal diagnosis being 11%, to additional diagnoses being 23% and to procedure coding being 11%. There were 1625 external causes of injury codes, of which 15% were re-coded differently [267]. These findings were similar to an audit undertaken a year previously.

While the potential for such coding errors must be taken into consideration when interpreting the findings of this report, it may be that the 16% error rate is an overestimate, as in the majority of the analyses undertaken in this report, only the principal diagnosis (with an error rate of 11%) is used to describe the reason for admission. In addition, for most admissions the diagnostic category (e.g. lower respiratory tract infections) is assigned using information at the 3 digit level (with the 16% error rate also including issues with coding at the 4th or 5th digit level).

3. Ethnicity Information in the NMDS

The reader is referred to Appendix 6 for a discussion of this issue.

Conclusion

In general the inconsistencies outlined above tend to make time series and (regional) comparative analyses based on the NMDS less reliable than those based on Mortality or Birth Registration data (where legislation dictates inclusion criteria and the type of information collected). While hospital discharge data still remains a valuable and reasonably reliable proxy for measuring the health outcomes of children and young people in this country, the reader is cautioned to take into consideration the biases discussed above, when interpreting the findings outlined in this report.

Appendix 2: The Birth Registration Dataset

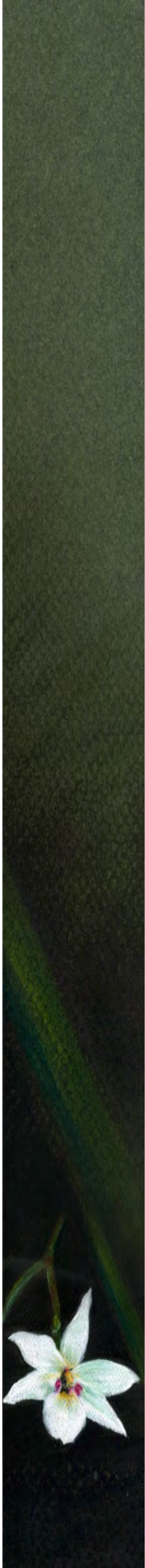
Mode of Data Collection

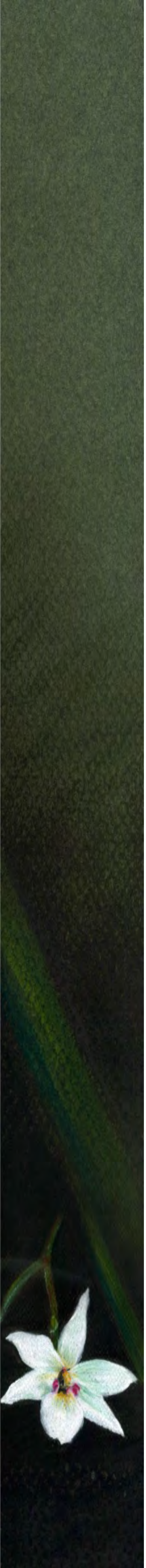
Since 1995 all New Zealand hospitals / delivering midwives have been required to notify Internal Affairs (within 5 working day of delivery), of the birth of a live / stillborn baby 20+ weeks gestation or weighting >400g. Prior to 1995, only stillborn babies reaching 28+ weeks of gestation required birth notification. Information on the hospital's notification form includes maternal age, ethnicity, multiple birth status, and baby's sex, birth weight and gestational age. In addition parents must complete a Birth Registration Form within 2 years of delivery, duplicating the above information, with the exception of birth weight and gestational age, which are supplied only on hospital notification forms. Once both forms are received by Internal Affairs, the information is merged into a single entry. This 2-stage process it is thought to capture 99.9% of births occurring in New Zealand and cross checking at the receipting stage allows for the verification of birth detail [268].

Issues to Take into Account When Interpreting Information Derived from the Birth Registration Dataset

Because of the 2-stage birth registration process, the majority of variables contained within the birth registration dataset are >98% complete, and cross checking at the receipting stage (with the exception of birth weight and gestational age) allows for the verification of birth details. In addition, the way in which ethnicity is collected in this dataset confers a number of advantages, with maternal ethnicity being derived from the information supplied by parents on their baby's birth registration form. This has the advantage of avoiding some of the ambiguities associated with hospital and mortality data, which at times have been reported by third parties. Changes in the way ethnicity was defined in 1995 however make information collected prior to this date incomparable with that collected afterwards. For births prior to 1995, maternal ethnicity was defined by ancestry, with those having half or more Māori or Pacific blood meeting ethnic group criteria, resulting in three ethnic groups, Māori, Pacific and non-Māori non-Pacific. For births after 1995 maternal ethnicity was self identified, with an expanded number of ethnic categories being available and parents being asked to tick as many options as required to show which ethnic group(s) they belonged to. For those reporting multiple ethnic affiliations a priority rating system was introduced, as discussed Appendix 6 of this report.

Because this dataset captures 99.9% of births occurring in New Zealand, is >98% complete for most variables, collects self reported ethnicity in a standard manner and is collated and coded by a single agency, information derived from this dataset is likely to be of higher quality than that derived from many of New Zealand's other data sources. Limitations however include the relatively restricted number of variables contained within the dataset (e.g. it lacks information on maternal smoking, BMI or obstetric interventions) and the lack of cross checking for birth weight and gestational age (which is supplied only on the hospital notification form). The change over in ethnicity definition during 1995 also prohibits time series analysis by ethnicity over the medium to long term. Each of these factors must thus be taken into account when interpreting information in this report that has been derived from the Birth Registration Dataset.





Appendix 3: National Mortality Collection

Mode of Data Collection

The Mortality Collection is a dataset managed by the New Zealand Health Information Service (NZHIS), which classifies the underlying cause, for all deaths registered in New Zealand since 1988. Fetal and infant data is a subset of the Mortality Collection and contains extra information on factors such as birth weight and gestational age [269].

Each month Births, Deaths and Marriages send NZHIS electronic death registration information, Medical Certificates of Cause of Death and Coroner's reports. Additional information on the cause of death is obtained from the National Minimum Dataset (NMDS), private hospital discharge returns, the New Zealand Cancer Registry (NZCR), the Department of Courts, the Police, the Land Transport Authority, Water Safety NZ, Media Search and from writing letters to certifying doctors, coroners and medical records officers in public hospitals. Using information from these data sources, an underlying cause of death (ICD-9 and ICD-10) is assigned by NZHIS staff according to the World Health Organisation's rules and guidelines for mortality coding [269].

Data Quality Issues Relating to the Mortality Collection

Unlike the NMDS, where information on the principal diagnosis is coded at the hospital level and then forwarded electronically to the NZHIS, for the Mortality Collection each of the approximately 28,000 deaths occurring in New Zealand each year is coded manually within NZHIS. For most deaths the Medical Certificate of Cause of Death provides the information required, although coders also have access to the information contained in the NMDS, New Zealand Cancer Registry, LSTA, Police, Water Safety NZ and ESR [270]. As a consequence, while coding is still reliant on the accuracy of the death certificate and other supporting information, there remains the capacity for a uniform approach to the coding which is not possible for hospital admission data.

While there are few published accounts of the quality of coding information contained in the Mortality Collection, the dataset lacks some of the inconsistencies associated with the NMDS, as the process of death registration is mandated by law and there are few ambiguities as to the inclusion of cases over time. As a consequence, time series analyses derived from this dataset are likely to be more reliable than that provided by the NMDS. One issue that may affect the quality of information derived from this dataset however is the collection of ethnicity data, which is discussed in more detail in Appendix 6 of this report.

Appendix 4: ESR Sexual Health Data

Mode of Data Collection

Under the Health Act 1956 and the Tuberculosis Act 1948, health professionals are required to notify their local Medical Officer of Health of any notifiable disease that they suspect or diagnose. Notification data are recorded on a computerised database (EpiSurv) and forwarded weekly to the Institute of Environmental Science and Research (ESR) where the information is collated and analysed on behalf of the Ministry of Health [195].

While Sexually Transmitted Infections (STIs) are not notifiable diseases in New Zealand, data on STIs of public importance (Chlamydia, gonorrhoea, genital herpes, genital warts, syphilis, and non-specific urethritis) are submitted voluntarily to ESR by a number of sexual health clinics, family planning clinics and student and youth health clinics. In addition, laboratory based surveillance data is submitted by laboratories in Auckland, Waikato, and the Bay of Plenty (Chlamydia and gonorrhoea) [195].

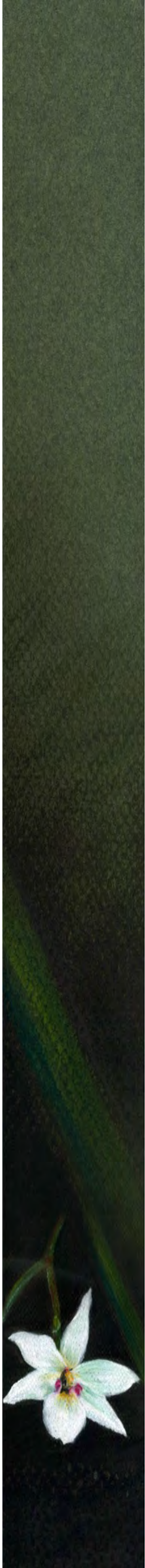
Data Quality and Completeness: Sexual Health Data

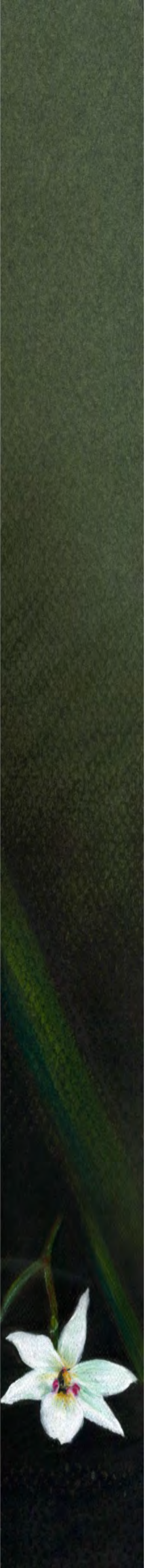
Currently, surveillance of sexually transmitted infections (STIs) in New Zealand is voluntary, with information provided by a number of Sexual Health Clinics (SHCs), Family Planning Clinics (FPCs) and Student Youth Health Clinics (SYHCs) nationally, as well as by laboratories in the Auckland, Waikato and Bay of Plenty Regions.

In general, clinic based surveillance systems tend to underestimate the overall burden of STIs in New Zealand, as a large percentage of these infections are diagnosed by other practitioners in the primary care setting. Laboratories however tend to receive specimens from all providers, making them a useful complimentary source of information in areas where laboratory based surveillance is operating (notification however is limited to Chlamydia and gonorrhoea). In areas where both SHC and laboratory surveillance data is available, estimates suggest that the real rates of Chlamydia are 3x higher and rates of gonorrhoea 2x higher than notifications by SHCs would suggest.

In terms of the information contained in this report, SHC data is probably most useful for highlighting the relative proportions of different types of STI in the primary care setting, as lacking a geographically defined population denominator SHC data is reported as the number of cases per 100 clinic attendees. In contrast, laboratory based surveillance data, which tends to have a more clearly defined geographic denominator, is of greater utility in estimating the overall burden of disease. Because of the patchy coverage however, neither surveillance system is able to provide a reliable estimates of the national burden of disease in this country [262].

Note: While parts of this material are based on data and information provided by the Institute of Environmental Science and Research Ltd on behalf of the Ministry of Health, the analyses, conclusions, opinions and statements expressed herein are those of the authors and not necessarily those of the Institute of Environmental Science and Research Ltd or the Ministry of Health.





Appendix 5: New Zealand Cancer Registry

Mode of Data Collection

The New Zealand Cancer Registry (NZCR) is a population based register established in 1948 to collect information on all primary malignant diseases diagnosed in New Zealand. The term “primary” refers to tumours which originate in a primary site and are thus neither extensions nor recurrences of pre-existing tumours. Cancers are registered once, in the year of their first known diagnosis and only one tumour is recognised per organ / pair, unless the second tumour is of a different histology. Incidence thus reflects the number of primary tumours diagnosed, rather than the number of individuals with cancer in any one year. (Squamous cell and basal cell skin cancers have traditionally been excluded from the Register, as have in-situ cancers since 1985) [271].

When the register was set up in 1948, it primarily used information sent by public hospitals to the National Minimum Dataset (NMDS). With the introduction of the Cancer Registration Act and the Cancer Registry Regulations during 1993 / 1994 however, it became a legal requirement for all New Zealand laboratories to report newly diagnosed cancers to the New Zealand Health Information Service (NZHIS) for inclusion in the NZCR. Notification data is then supplemented with that contained in the New Zealand death certificate and hospital admission databases. To ensure a high standard of data quality, NZCR staff screen all records when adding them to the Register and cancer deaths are reconciled to cancer registrations as they occur [266]. Since the advent of laboratory based reporting, the quality and the completeness of the data have improved significantly, meaning that data collected since 1995 cannot be directly compared with that collected in previous years [271].

In the NZCR, ethnicity is based on the concept of self-identification and utilises the same classification system employed in the 1996 census, with the Statistics NZ prioritisation system being employed for those reporting multiple ethnic affiliations (see Appendix 6). The ethnicity recorded in the Register is taken from hospital discharge information, the National Health Index (NHI) database or the mortality collection. Because an increasing number of registrations are now based on laboratory reports, where ethnicity is not always specified, there has been an increase in the number of cases for which ethnicity is unknown. Because these cases tend to be by default allocated to the non-Māori category, there remains the potential for undercounting of Māori in this situation.

Since November 2001 all cancer registrations have been coded using ICD-10-AM for the topographical site of the cancer and the International Classification of Diseases for Oncology (ICD-O-2) for the morphological type of the tumour. Prior to this date ICD-9-CM-A was used as far back as 1995 [266]. Data in the Cancer Registry is subject to small changes over time as late reports about cancer registrations are received. Thus information reported at an earlier time may differ slightly from that reported later [271].

Appendix 6: Measurement of Ethnicity

All of the rates calculated in this report have relied on the division of numerators (e.g. hospital admissions, mortality data) by Statistics New Zealand Census denominators. Calculation of accurate ethic specific rates relies on the assumption that information on ethnicity is collected in a similar manner in both the numerator and denominator datasets and that a single child will be identified similarly in each. In New Zealand this has not always been the case, and in addition the manner of collecting information on ethnicity has varied significantly over time. Since 1996 however, there has been a move to ensure that ethnicity information is collected in a similar manner across all administrative datasets in New Zealand (Census, Hospital Admission, Mortality, Births). The following section briefly reviews how information on ethnicity has been collected in national data collections since the early 1980s and the implications of this for the information contained in this report.

1981 Census and Health Sector Definitions

Earlier definitions of ethnicity in official statistics relied on the concept of fractions of descent, with the 1981 census asking people to decide whether they were fully of one ethnic origin (e.g. Full Pacific, Full Māori) or if of more than one origin, what fraction of that ethnic group they identified with (e.g. 7/8 Pacific + 1/8 Māori). When prioritisation was required, those with >50% of Pacific or Māori blood were deemed to meet the ethnic group criteria of the time [272]. A similar approach was used to recording ethnicity in health sector statistics, with birth and death registration forms asking the degree of Pacific or Māori blood of the parents of a newborn baby / deceased individual. For hospital admissions, ancestry based definitions were also used during the early 80s, with admission officers often assuming ethnicity, or leaving the question blank [273].

1986 Census and Health Sector Definitions

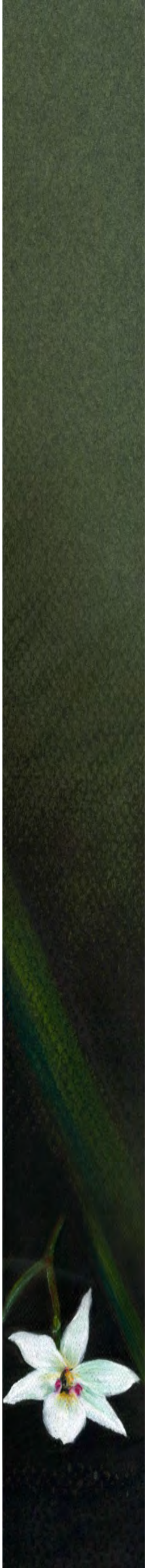
Following a review expressing concern at the relevance of basing ethnicity on fractions of descent, a recommendation was made to move towards self-identified cultural affiliation. Thus the 1986 Census asked the question “What is your ethnic origin?” and people were asked to tick the box(s) that applied to them. Birth and death registration forms however, continued to use the “fractions of blood” question until 1995, making comparable numerator and denominator data difficult to obtain [272]. For hospital admissions, the move from an ancestry based to a self-identified definition of ethnicity began in the mid-80s, although non-standard forms were used and typically allowed a single ethnicity only [273].

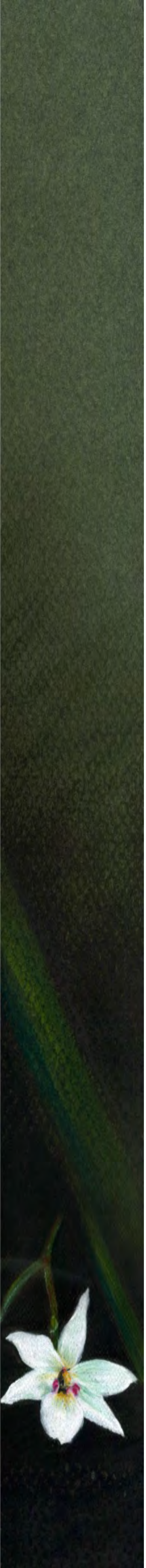
1991 Census and Health Sector Definitions

A review suggested that the 1986 ethnicity question was unclear as to whether it was measuring ancestry or cultural affiliation, so the 1991 Census asked two questions:

1. Which ethnic group do you belong to? (tick the box or boxes which apply to you)
2. Have you any NZ Māori ancestry? (if yes, what iwi do you belong to?)

As indicated above however, birth and death registrations continued with ancestry based definitions of ethnicity during this period, while a number of hospitals were beginning to use self-identified definitions in a non standard manner [273].





1996 Census and Health Sector Definitions

While the concepts and definitions remained the same as for the 1991 census, the ethnicity question in the 1996 Census differed in that:

1. The NZ Māori category was moved to the top of the ethnic categories
2. The 1996 question made it more explicit that people could tick more than 1 box.
3. There was a new "Other European" category with 6 sub groups

As a result of these changes, there was a large increase in the number of multiple responses, as well as an increase in the Māori ethnic group in the 1996 Census [272]. Within the health sector however, there were much larger changes in the way in which ethnicity information was collected. From late 1995, birth and death registration forms incorporated a new ethnicity question identical to that in the 1996 Census, allowing for an expansion of the number of ethnic groups counted (previously only Māori and Pacific) and resulting in a large increase in the proportion of Pacific and Māori births and deaths. From July 1996 onwards, all hospitals were also required to inquire about ethnicity in a standardised way, with a question that was compatible with the 1996 Census and that allowed multiple ethnic affiliations [273]. A random audit of hospital admission forms conducted by Statistics NZ in 1999 however, indicated that the standard ethnicity question had not yet been implemented by many hospitals. In addition, an assessment of hospital admissions by ethnicity over time showed no large increases in the proportions of Māori and Pacific admissions after the 1996 "change over", as had occurred for birth and death statistics, potentially suggesting that the change to a standard form allowing for multiple ethnic affiliations in fact did not occur. Similarities in the number of people reporting a "sole" ethnic group pre and post 1996 also suggest that the way in which information on multiple ethnic affiliations was collected did not change either. Thus while the quality of information available since 1996 has been much greater than that previously, there remains some concern that hospitals continue to undercount multiple ethnic identifications and as a result, may continue to undercount Pacific and Māori peoples [273].

2001 Census and Health Sector Definitions

The 2001 Census reverted back to the wording used in the 1991 Census after a review showed that this question provided a better measure of ethnicity based on the current statistical standard [272]. The health sector also continued to use self-identified definitions of ethnicity during this period, with the *Ethnicity Data Protocols for the Health and Disability Sector* providing guidelines which ensured that the information collected across the sector was consistent with the wording of the 2001 Census (i.e. *Which ethnic groups do you belong to (Mark the space or spaces that apply to you)?)*

2006 Census Questions

The 2006 Census used identical wording to the 2001 Census. Within the "Other" ethnic group however, a new category was created which allowed for the responses of those identifying as a "New Zealander". In previous years this sub-category had been assigned to the European ethnic group. At the 2006 Census, a total of 429,429 individuals (10.6% of the New Zealand population) identified themselves as a New Zealander, a large increase from previous years and a trend, which if continued, poses a serious threat to the availability of valid population denominators for use with health sector data. As yet the consequences of this change have not been fully addressed by the health sector and in this report, where prioritised ethnicity has been used, 2006 Census data has combined the New Zealander category with the European category, as per the protocol in previous censuses.

The Current Recording of Ethnicity in New Zealand's National Datasets

In New Zealand at present, only 3 ethnic groups are currently stored electronically in the National Minimum Dataset (Hospital Admission Dataset) and Mortality Collections, with Statistics New Zealand's prioritisation algorithms being used if more than 3 ethnic groups are identified [263]. These datasets also use Statistics New Zealand's Hierarchical Ethnicity Classification, which has 4 levels, each providing greater detail:

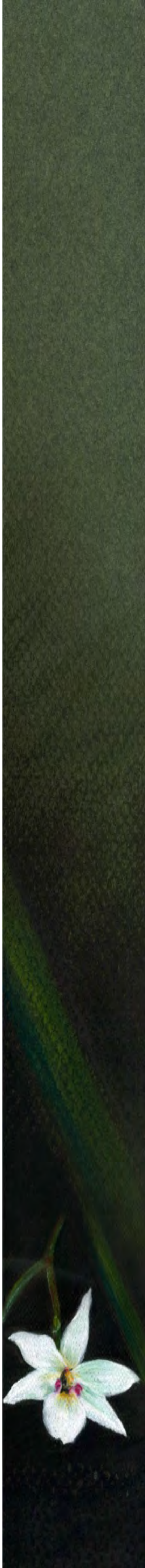
1. Level 1 (least detailed level) e.g. code 1 is European
2. Level 2 e.g. code 12 is Other European
3. Level 3 e.g. code 121 is British and Irish
4. Level 4 (most detailed level) e.g. code 12111 is Celtic

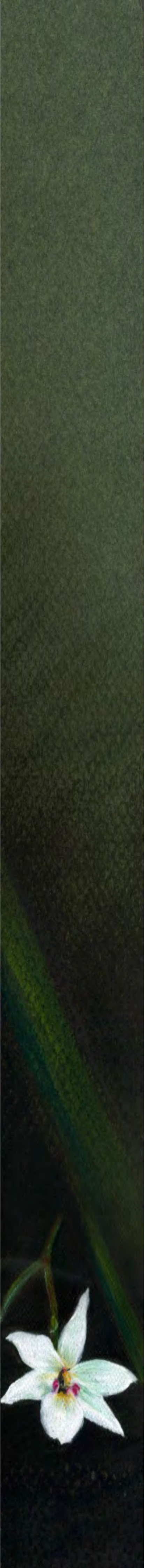
For those reporting multiple ethnic affiliations, information may also be prioritised according to Statistics New Zealand's protocols, with Māori ethnicity taking precedence over Pacific >Asian >Other >European ethnic groups [274]. This ensures that each individual is counted only once and that the sum of the ethnic group sub-populations equals the total New Zealand population [273]. The implications of prioritisation for Pacific Island groups however are that the outcomes of those identifying as both Māori and Pacific (12.2% of Pacific births during the past 5 years) are only recorded under the Māori ethnic group.

Ethnicity Classifications Utilised in this Report and Implications for Interpretation of Results.

Because of inconsistencies in the manner in which ethnicity information was collected prior to 1996, all ethnic specific analysis presented in this report are for the 1996 year onwards. The information thus reflects self-identified concepts of ethnicity, with Statistics NZ's Leve1 Ethnicity Classification being used, which recognise 5 ethnic groups: European, Māori, Pacific Island, Asian (including Indian) and Other Ethnic Groups. In order to ensure that each health event is only counted once, prioritised ethnic group has been used throughout.

Caution however must be taken when interpreting the ethnic specific information contained in these reports, as while the quality of information available since 1996 has been much greater than that previously, there remains some concern as to the way in which ethnicity information is collected within the health sector. Recent analysis of post 1996 data has suggested that hospitals continue to undercount multiple ethnic identifications and as a result, recent admission rates may continue to undercount Māori and Pacific peoples [273]. Similarly a linked analysis of the ethnicity information provided on census forms and death certificates suggests that during the 1996-1999 period, death certificate data tended to undercount Māori by about 7% [275]. Thus the ethnic specific rates presented in this report must be interpreted with these cautions in mind.





Appendix 7: NZ Deprivation Index

The New Zealand Deprivation Index (NZDep) is a small area index of deprivation, which has been used as a proxy for socioeconomic status in this report. The main concept underpinning small area indexes of deprivation is that the socioeconomic environment in which a person lives can confer risks / benefits which may be independent of their own social position within a community [276]. They are thus aggregate measures, providing information about the wider socioeconomic environment in which a person lives, rather than about their individual socioeconomic status.

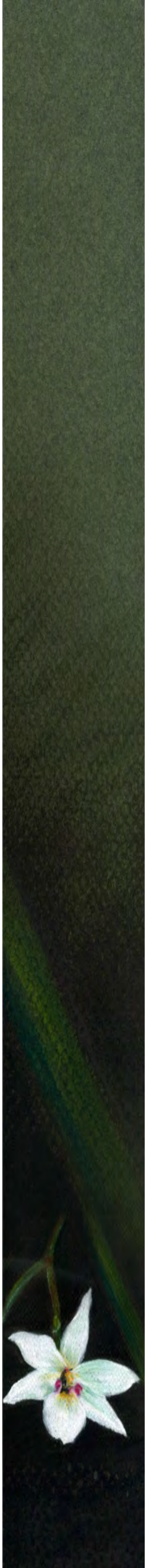
The NZDep was first created using information from the 1991 census, but has since been updated following each census. The NZDep2006 combines 9 variables from the 2006 census which reflect 8 dimensions of deprivation (**Table 141**). Each variable represents a standardised proportion of people living in an area who lack a defined material or social resource (e.g. access to a car, income below a particular threshold), with all 9 variables being combined to give a score representing the average degree of deprivation experienced by people in that area. While the NZDep provides deprivation scores at meshblock level (Statistics NZ areas containing approx 90 people), for the purposes of mapping to national datasets, these are aggregated to Census Area Unit level (≈1,000-2,000 people). Individual area scores are then ranked and placed on an ordinal scale from 1 to 10, with decile 1 representing the least deprived 10% of small areas and decile 10 representing the most deprived 10% of small areas [277].

Table 141. Variables used in the NZDep2006 Index of Deprivation[278]

No.	Factor	Variable in Order of Decreasing Weight in the Index
1	Income	People aged 18-64 receiving means tested benefit
2	Employment	People aged 18-64 unemployed
3	Income	People living in households with income below an income threshold
4	Communication	People with no access to a telephone
5	Transport	People with no access to a car
6	Support	People aged <65 living in a single parent family
7	Qualifications	People aged 18-64 without any qualifications
8	Owned Home	People not living in own home
9	Living Space	People living in households below a bedroom occupancy threshold

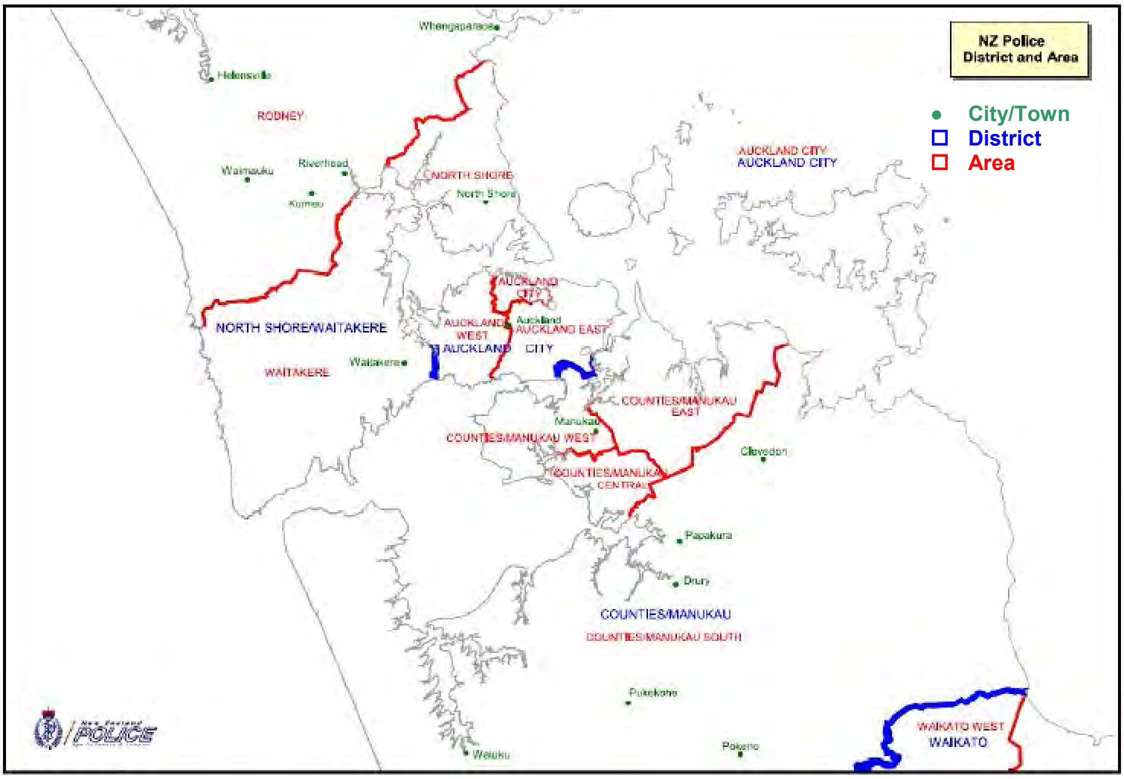
The advantage of NZDep is its ability to assign measures of socioeconomic status to the elderly, the unemployed and to children (where income and occupational measures often don't apply), as well as to provide proxy measures of socioeconomic status for large datasets when other demographic information is lacking. Small area indexes have limitations however, as not all individuals in a particular area are accurately represented by their area's aggregate score. While this may be less of a problem for very affluent or very deprived neighbourhoods, in average areas, aggregate measures may be much less predictive of individual socioeconomic status [276]. Despite these limitations however, the NZDep has been shown to be predictive of mortality and morbidity from a number of diseases in New Zealand.

Note: As New Zealand's national datasets have traditionally continued to use the previous Censuses' domicile codes for 1-2 years after any new Census, all of the numerators (e.g. numbers of hospital admissions, deaths) in the previous analyses used NZDep2001 deciles. Because it was necessary to account for population growth between 2001 and 2006 however, denominators were created using both NZDep2001 and NZDep2006 deciles, with linear extrapolation used to create denominators for inter-Census years.



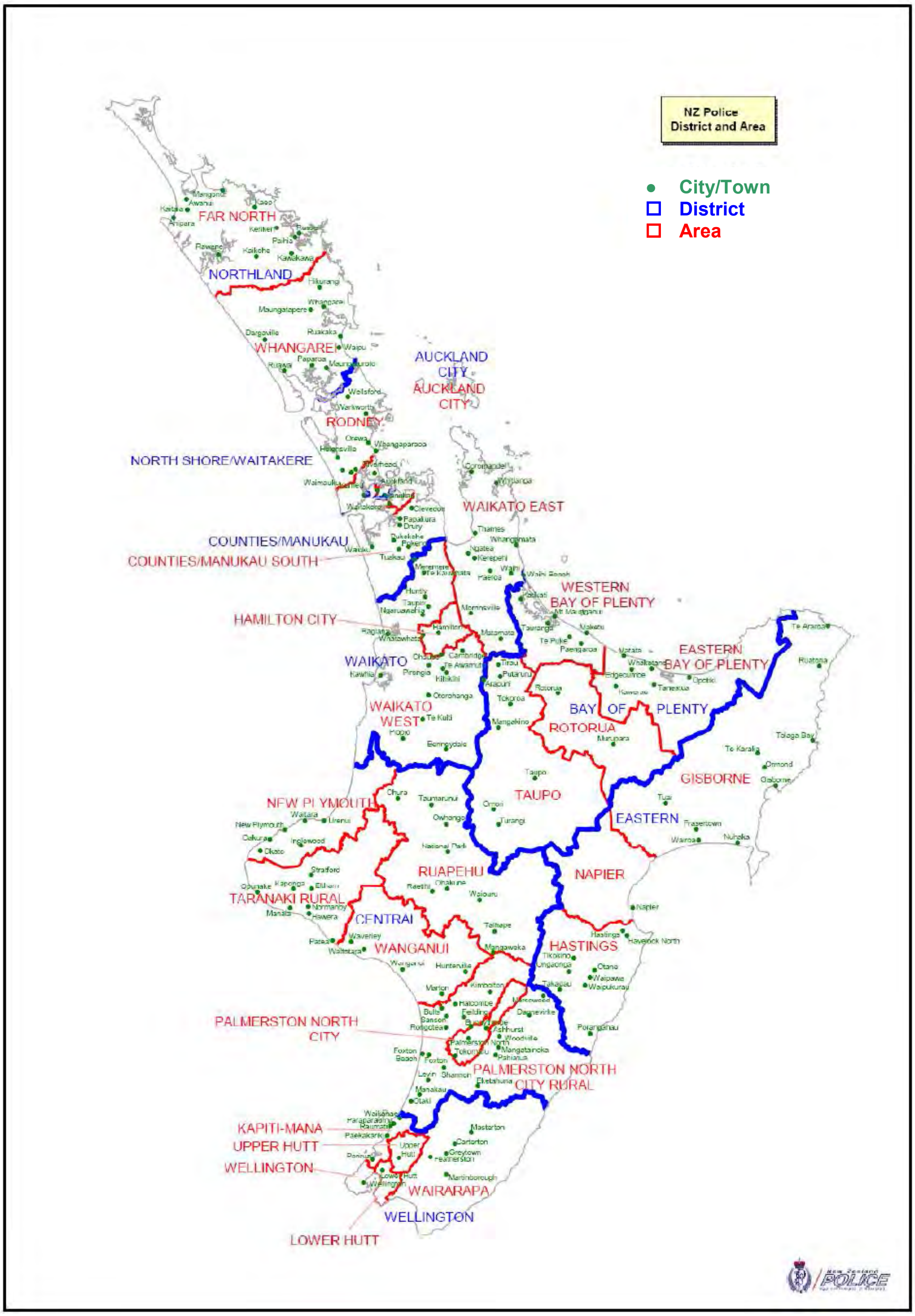
Appendix 8: Police Boundaries

Figure 171. New Zealand Police Area Boundaries in the Auckland Region



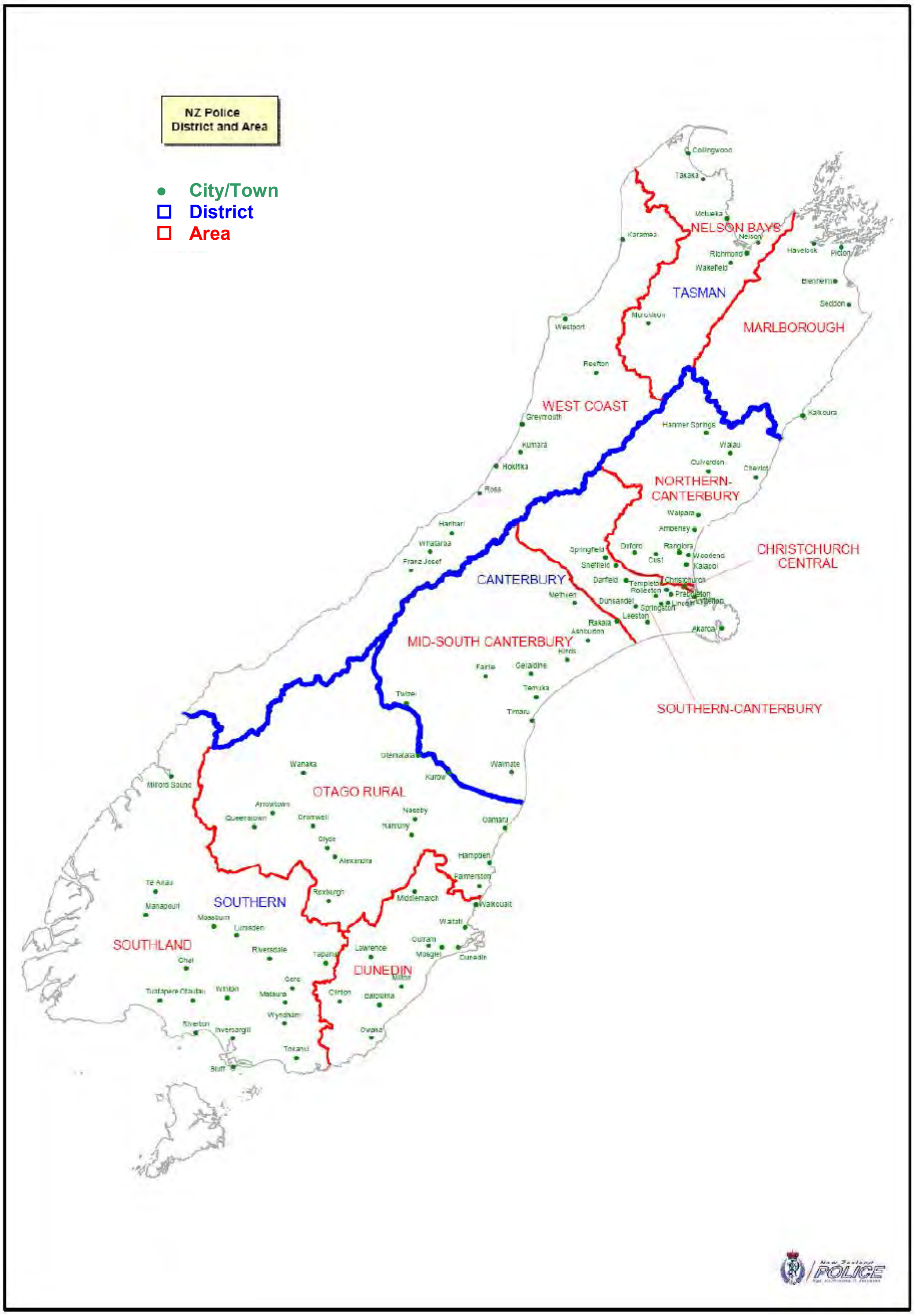
Source: http://www.stats.govt.nz/products-and-services/table-builder/crime-tables/maps.htm

Figure 172. Police Area Boundaries in the North Island



Source: http://www.stats.govt.nz/products-and-services/table-builder/crime-tables/maps.htm

Figure 173. Police Area Boundaries in the South Island

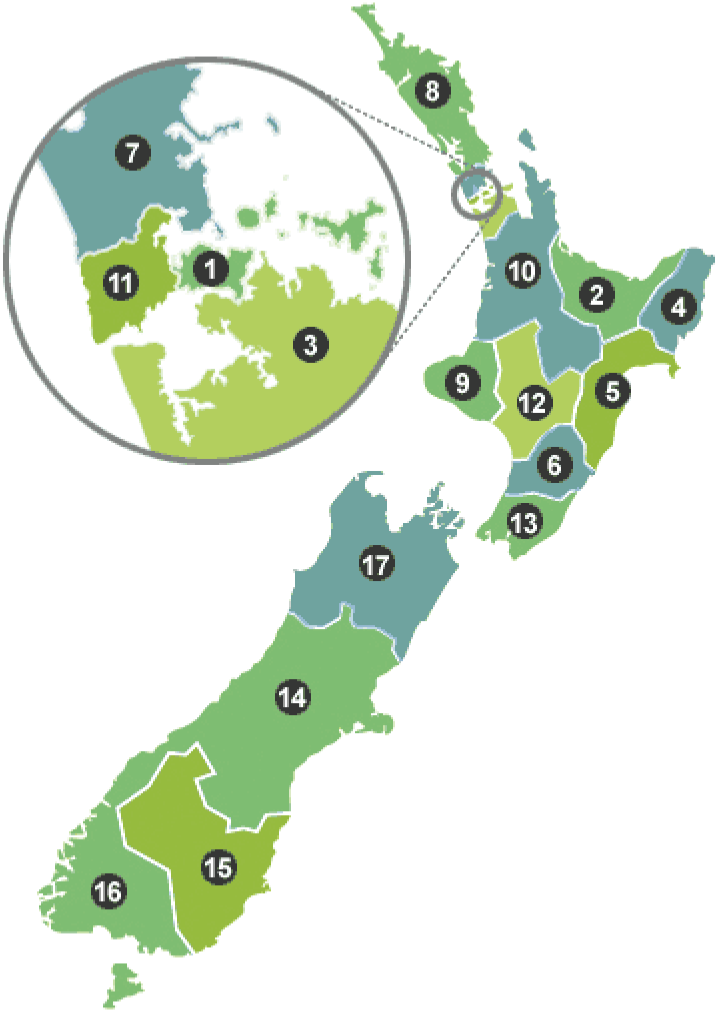


Source: http://www.stats.govt.nz/products-and-services/table-builder/crime-tables/maps.htm

Appendix 9: SPARC Regional Sports Trusts

SPARC is a crown entity that provides support through investment to a wide range of organisations that make sport happen. This includes 17 regional sports trusts who promote sport and physical activity to people of all ages in the community. The trusts are independent organisations, which receive money from SPARC according to their size and the population they serve. The location of these sports trusts is shown below.

Figure 174. SPARC Regional Sports Trusts



North Island

1. Auckland
2. Bay of Plenty
3. Counties Manukau
4. Gisborne
5. Hawkes Bay
6. Manawatu
7. North Harbour
8. Northland
9. Taranaki
10. Waikato
11. Waitakere
12. Whanganui
13. Wellington Region

South Island

14. Canterbury/Westland
15. Otago
16. Southland
17. Tasman

Source: http://www.sparc.org.nz

Appendix 10: National Well Child Tamariki Ora Schedule

Table 142. Well Child - Tamariki Ora National Schedule from Birth to 12 Months

Health Education and Promotion	Health Protection and Clinical Assessment	Family or Whanau Care and Support
Key topics to include: Recognition of illness Management of minor illnesses including colic, crying, minor skin complaints, fever Breastfeeding promotion - support and supervision of early postnatal breastfeeding Advice on maternal nutrition Support of infant feeding - instructions as necessary Contact plan for emergencies - include local agencies list plus 24 hour advice contact numbers SIDS prevention, including: • sleep position • smokefree environment and bedsharing • breastfeeding promotion CPR information/education Promotion of parenting skills, including: • behaviour in first six weeks and other development stages • dealing with temperament • healthy sleep patterns • understanding why babies cry • feeding • infant/toddler behaviour management strategies • clothing, nappies • bedding, room temperature • ear health Education and promotion of infants' developmental needs Promotion of immunisations: culturally appropriate explanation sessions on immunisation and screening process for all parents or whanau Promotion of smokefree environment Dealing with caregiver stress and fatigue Contraceptive advice for mother/parents Community networking with other well child care providers Promotion of safe environment • car seats • fire safety • prevention of falls • hot water • sun exposure • lead exposure • poison, drugs etc • ensure safe and appropriate child care Promotion of appropriate nutritional needs: • introduction of solids • prevention of iron deficiency etc Recognise rights of the child Ensure resources are: • culturally and socially appropriate • delivered in a culturally and educationally appropriate manner Collaboration with other providers	**BIRTH** Brief clinical assessment, including Apgar Score Initial breastfeed Vitamin K (IM) **WITHIN 24 HOURS** ****See Note 1 re Vitamin K*** Full clinical examination including: • observe infant • weight • head circumference • hips • cardiovascular system • eyes Hepatitis B vaccine and immunoglobulin for infants of hepatitis B antigen +ve mothers BCG if indicated, per national TB guidelines Assessment of risk of sensorineural hearing loss or blindness and referral if necessary **5 DAYS** ****See Note 1 re Vitamin K*** Review: • antenatal and family history • birth events Full clinical examination including: • observe infant • weight • head circumference • hips • cardiovascular system • eyes Metabolic screening ('Guthrie') test must be done by 5 days, can be taken 48 hrs after feeding introduced **2 – 4 WEEKS** ****See Note 2 re additional services*** Growth/weight and nutritional assessment (includes maternal nutrition) Observe infant **6 WEEKS** ****See Note 1 re Vitamin K*** Informed consent to Immunisation Programme Fill in Immunisation Certificate if non consent Immunisation (as per Immunisation Schedule) Clinical examination including: • observe infant • weight • head circumference • hips • cardiovascular system • eyes • testicular descent Developmental assessment • observation and questioning Questioning on hearing and vision (Audiology check for infants assessed at birth as at risk of hearing loss; and/or ophthalmology check if assessed risk of blindness) Ongoing review of growth and nutrition **3 MONTHS** Immunisation (as per Immunisation Schedule) Nutritional assessment/weight Questioning of hearing and vision Developmental assessment - observation and questioning **5 MONTHS** Immunisation (as per Immunisation Schedule) Nutritional assessment/weight Questioning of hearing and vision Developmental assessment - observation and questioning **8 – 10 MONTHS** Check immunisations Nutritional assessment/weight Questioning on hearing and vision Check for squint Developmental assessment - observation and questioning Tympanometry (in line with Preventing Child Hearing Loss, PHC 1995)	***Key elements:*** Support person with mother at birth Opportunity to discuss parental or whanau concerns at all contacts Listen and respond to family or whanau concerns Review of psychosocial and environmental circumstances including cultural support Assessment of risk/presence of postnatal depression; ensure appropriate referral/management Promote family or whanau support Assessment of need for additional support for families in difficult circumstances or infants at higher risk of adverse health outcomes Crisis intervention if needed Promotion of community networking Assessment of parental relationship with child Mutually agreed plan of services between provider and family or whanau Contact numbers for: Crisis support and intervention e.g. • GP/Midwife • NZ Children and Young Persons' Service • Public Health/rural District Nurse Support groups such as: • La Leche • Karitane Unit • Home Help • Pregnancy Help • play groups • coffee clubs Provision of care activities, and link with culturally safe support networks, and/or referral as necessary Support for families in their contact with agencies such as NZ Income Support Service for child care subsidies etc

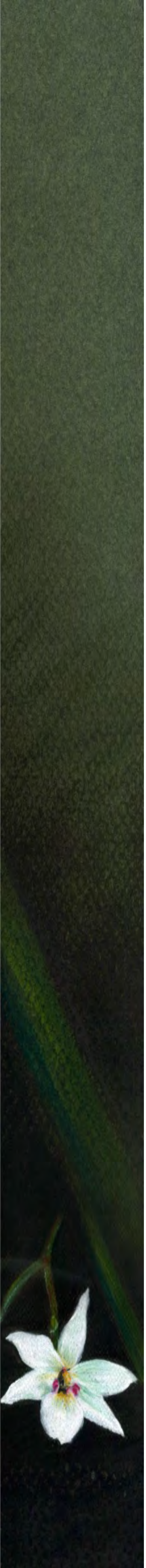
Note 1 If IM Vitamin K is not given then a total of 3 oral doses of Vitamin K are to be given/offered at intervals marked with an *

Note 2 Additional discretionary services may be purchased and used as needed in the early weeks, or later.
Source: Ministry of Health [279]

Table 143. Well Child - Tamariki Ora National Schedule from 15 Months to School New Entrant

Health Education and Promotion	Health Protection and Clinical Assessment	Family or Whanau Care and Support
Key topics to include: Education on the management of common childhood illness Promotion of home and environmental safety: • home hazards • water • medicines, poisons • hot water • car seat • road • sun • safe home/neighbourhood • safe playgrounds • water safety/pool fencing etc Education about and promotion of developmental needs of young children: • play • language • appropriate nutrition etc Promotion of dental health and enrolment with dental service Promotion of parenting skills, including: • behaviour management • toileting • sleeping • socialisation with others • eating • minor illness management etc Promotion of 'Keeping Yourself Safe' Discussion and promotion of preschool education facilities, Kohanga Reo, PAFT etc	**15 MONTHS** Immunisation (as per Immunisation Schedule) Sign Immunisation Certificate for completed early childhood immunisations Weight Questions on hearing and vision Check for squint Developmental assessment – observation/questioning (including language, mobility, behaviour) Tympanometry (in line with Preventing Child Hearing Loss, PHC 1995) **21 – 24 MONTHS** Questions on hearing and vision Check for squint Weight/Height Developmental assessment – observation/questioning (including language, mobility, behaviour) Review immunisation Dental assessment/enrolment **3 YEARS** Questions on hearing and vision Weight/Height Developmental assessment – observation/questioning (including language, mobility, behaviour) Tympanometry Visual acuity and check for squint Dental enrolment/assessment if not done earlier Review immunisation **SCHOOL NEW ENTRANT** Review immunisation Review child's history with parents/caregiver and school, taking regard of Privacy legislation Effective hand-over between well child care providers If indicated, physical/psychosocial/developmental assessment Dental assessment Tympanometry and audiology assessment Test eyes for acuity and squint	**Key elements:** Listen and respond to family or whanau concerns Review of psychosocial and environmental circumstances Assessment of need for additional support for families or whanau in difficult circumstances, and provide support, link with community resources/support groups, and referral to other agencies if necessary Support for families or whanau in their contact with agencies such as NZ Income Support Service for child care subsidies etc Mutually agreed plan of services between provider and family or whanau Facilitate involvement in child's preschool, Kura Kaupapa Māori activities Promote family or whanau support, community development issues that relate to child health Facilitation of community networking

Source: Ministry of Health [279]



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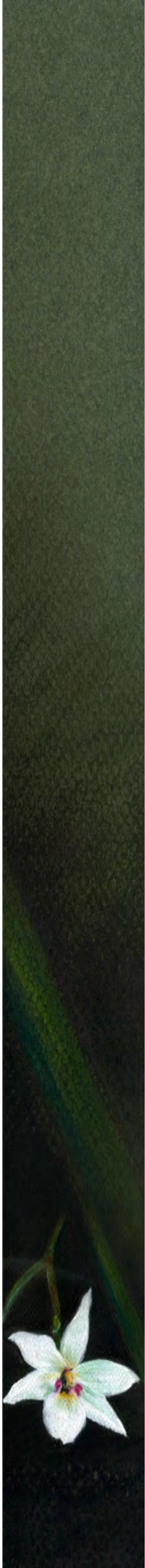

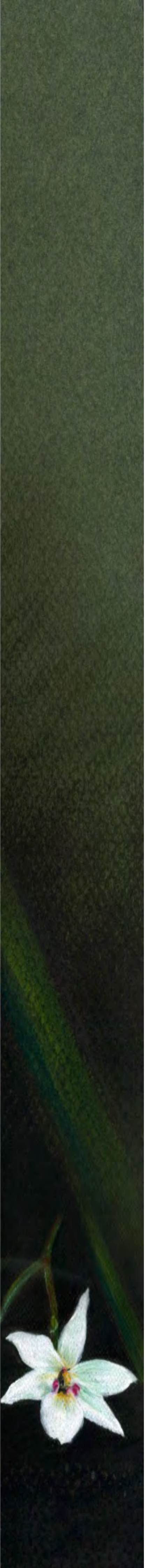

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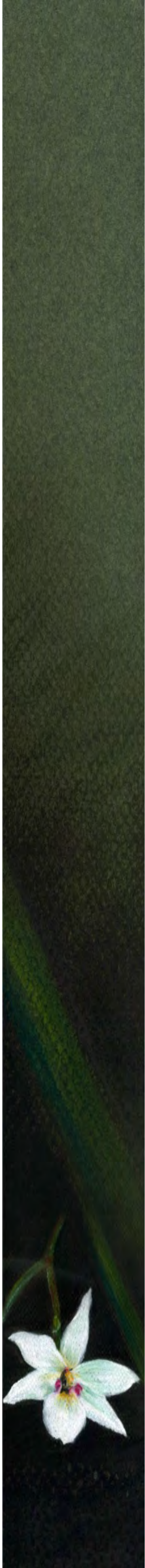

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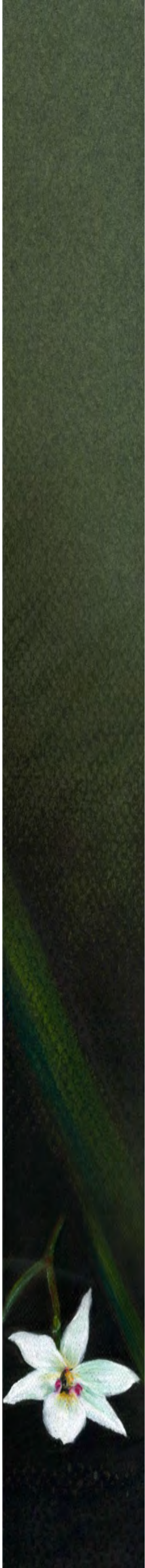

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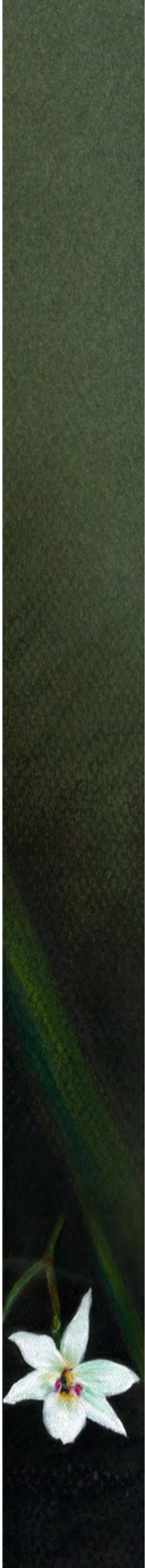

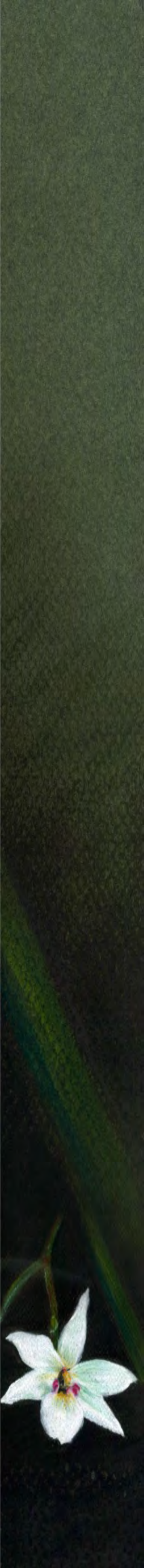

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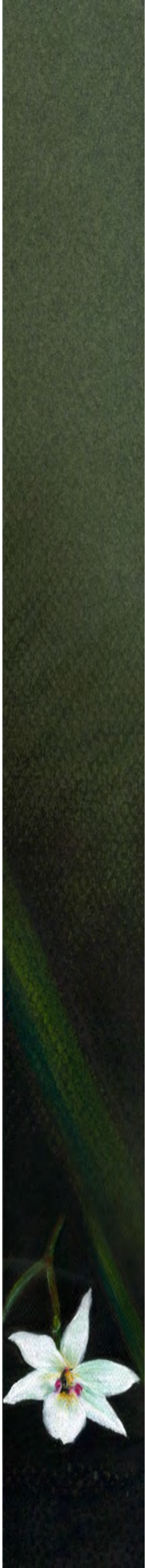

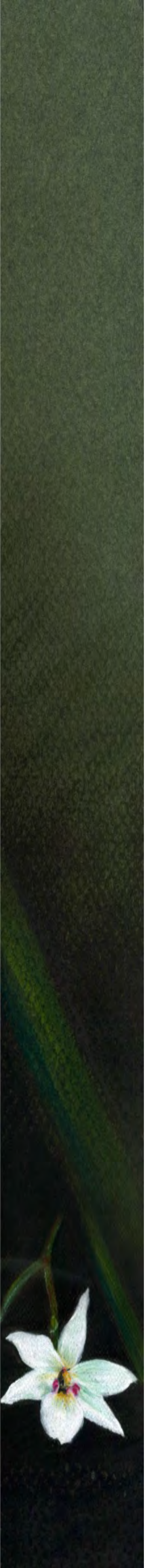

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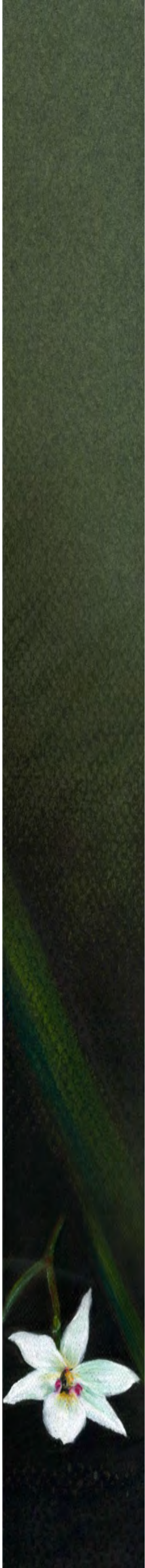

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