THE NEW ZEALAND CHILDREN'S SOCIAL HEALTH MONITOR

2010 UPDATE

Cover Artwork: *Tui and Chicks*, by Kiri Gillespie

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THE CHILDREN'S SOCIAL HEALTH MONITOR: INTRODUCTION

INTRODUCTION TO THE CHILDREN'S SOCIAL HEALTH MONITOR

In New Zealand, there are currently large disparities in child health status, with Māori and Pacific children and those living in more deprived areas experiencing a disproportionate burden of morbidity and mortality [1]. Such disparities have persisted, despite one of the longest periods of economic growth in recent decades, as well as historically low unemployment rates.

During the past 2 ½ years however, New Zealand's economic environment has changed rapidly, with rises in unemployment, and increases in the number of children reliant on benefit recipients. Given that large disparities in health status were evident for socioeconomically vulnerable children, even during periods of economic prosperity, it remains possible that as the downturn progresses, and more families become reliant on Government assistance (e.g. unemployment benefits), some of the adaptations families make in order to meet their basic household needs (e.g. house downsizing / increasing the number of occupants to meet rent payments, deferring heating costs to pay for groceries) may result in unintended health consequences for children (e.g. increases in infectious and respiratory diseases, exposure to family conflict).

The Development of the Children's Social Health Monitor

In response to deteriorating economic conditions in New Zealand and Australia in the late 2000s, a Working Group of health professionals from a range of organisations[1] with an interest in child health was formed in early 2009. Over the course of the year, this Working Group discussed the conceptualisation of an indicator set which could be used to monitor the impact of the recession on child wellbeing, the range of indicators which might be included, and the criteria by which these indicators should be selected (see **Appendix 9** for an overview of the methodology used). As a result, it was proposed that a Children's Social Health Monitor be developed, which comprised:

1. *A Basket of Indicators to Monitor Prevailing Economic Conditions*: Ideally, indicators would capture different facets of economic wellbeing (e.g. in a recession several quarters of negative growth (*GDP*) may precede upswings in *Unemployment Rates*, which in turn will influence the number of *Children Reliant on Benefit Recipients*).
2. *A Basket of Indicators to Monitor Children's Health and Wellbeing*; Ideally indicators would responded relatively quickly (e.g. months-small number of years) to family's adaptations to deteriorating economic conditions (e.g. *Hospital Admissions and Mortality from Conditions with a Social Gradient*) and would provide an overview of family wellbeing from a variety of perspectives.

The Children's Social Health Monitor baseline indicator set was finalised in September 2009, with the Children's Social Health Monitor website http://www.nzchildren.co.nz/ being launched in November of that year. This report provides an update on the Monitor's five economic and three health and wellbeing indicators for the 2010 year, with a view to assessing how New Zealand children are faring in the current economic climate.

The following section briefly lists the indicators updated in the current report, before providing a brief background as to the rationale for monitoring child health during an economic downturn.

[1] The Paediatric Society of New Zealand, the Population Child Health Special Interest Group of the Royal Australasian College of Physicians, the New Zealand Child and Youth Epidemiology Service, TAHA (the Well Pacific Mother and Infant Service), the Maori SIDS Program, the Kia Mataara Well Child Consortium, the New Zealand Council of Christian Social Services, and academics from the Universities of Auckland and Otago

Current NZ Children's Social Health Monitor Indicators

The NZ Children's Social Health Monitor currently comprises five economic and three health and wellbeing indicators as follows:

Economic Indicators:	Gross Domestic Product (GDP) (**Page 11**)
	Income Inequality (**Page 12**)
	Child Poverty and Living Standards (**Page 16**)
	Unemployment Rates (**Page 26**)
	Children Reliant on Benefit Recipients (**Page 32**)
Health and Wellbeing Indicators:	Hospital Admissions and Mortality with a Social Gradient (**Page 39**)
	Infant Mortality (**Page 49**)
	Injuries Arising from the Assault, Neglect or Maltreatment of Children (**Page 53**)

Rationale for Monitoring Child Health During a Recession

In addition to considering the individual indicators outlined above, it is also worthwhile considering the impact of previous economic crises on child health and the potential pathways via which such effects might occur, both in New Zealand and overseas. In addition, it is also important to consider the extent to which New Zealand children were exposed to low family incomes during the last major recession (the 1990s) and the effects this had on their living standards. Such reviews are valuable, as they provide insights into the possible impacts the current downturn might have on child health and wellbeing over the next 2-5 years.

Cross Sectional Associations Between Family Resources and Child Wellbeing

In New Zealand, children and young people living in more deprived areas experience significantly worse health outcomes across a range of measures (e.g. infant mortality, hospital admissions for infectious and respiratory diseases, non-accidental injuries) [1]. Growing up in a low income family also increases the risk of longer term negative outcomes, such as leaving school without formal qualifications and economic inactivity. While adjusting for baseline family characteristics (e.g. maternal age, parental education, sole parent status) weakens these associations somewhat, they do not disappear completely [2]. The relationship between low family income and adverse outcomes also varies with the duration of family poverty, as well as the child's age when the family is poor. In addition, the presence of social safety nets (e.g. free education and healthcare, unemployment benefits and others forms of income support) may buffer the effects of low family income, with social gradients in health being much less marked in countries with robust social security provisions [3].

Yet while a large body of evidence supports the cross-sectional associations between reduced socioeconomic resources and poor childhood outcomes, the potential health consequences of a large increase in the number of low income families (e.g. via rising unemployment in the context of a significant recession) are much less well understood. This is because more enduring measures of family socioeconomic position (e.g. parental education, occupation, access to cultural resources), often remain constant during the course of a typical recession, as do the social safety nets which potentially buffer the impacts of worsening economic conditions on child wellbeing [4].

The literature however, does provide some plausible pathways via which reductions in family income might lead to adverse outcomes for children. In the late 1980s, McLyod [5] noted that a number of studies had linked sudden economic loss (e.g. unemployment) to negative psychological outcomes, although it was often the effects of ongoing chronic poverty (e.g. difficulty paying bills, worrying about money) that had the greatest impact. In her view, the greater the adaptations required to make ends meet (e.g. to reduce consumption, sell possessions, apply for loans, withdraw savings to pay bills), the greater

the psychological distress produced. Further, the making of such difficult choices within the context of inadequate resources often fuelled spousal conflict, which often then spilled over into parenting, with anger against a spouse often being displaced onto a child(ren), particularly if the child aligned themselves with one of the parents (typically the mother) [5].

Similarly in Finland during the 1990s, a severe recession saw unemployment rise from 3.4% in 1990 to 18% in 1994. A study of child mental health during this period found that a quarter of families cut back on children's clothes, while a third cut back on trips, amusements and extra food (e.g. pizzas, hamburgers). Perhaps as a result of Finland's robust social security system however, only 2% cut back on basic food and only 3% moved to cheaper accommodation. Despite this, increased economic pressure was associated with a cascade of associations which linked declines in parental mental health → hostile and non-supportive marital interaction → compromised parenting → children's internalising (e.g. withdrawal, anxiety, depression) and externalising (e.g. aggressive or delinquent behaviour, substance abuse) behaviour [6].

The Impact of Economic Crises on Child Wellbeing: Longitudinal Studies

While such studies provide plausible pathways linking reductions in family income to adverse outcomes for children, the evidence that an increase in the number of low income families in a society leads to population level shifts in child health outcomes is more mixed. In Sweden, a country with a particularly robust social safety net, a significant recession during the early-mid 1990s saw the proportion of children (0-6 years) living in low income families rise from 7.5% in 1991 to 20% in 1996. Despite this, there were no significant increases in infant mortality, low birth weight, abortions or childhood hospital admissions for infectious and respiratory diseases, with the authors concluding that the maintenance of investments in education, social insurance, and universal access to free health care may have mitigated the impacts of the recession on children during this period [4].

In contrast, in Peru an economic crisis during the late 1980s saw GDP fall by almost 30% during 1987-1990, with real wages in Lima falling by 80%. During this period, infant mortality increased by 2.5%, an increase which equated to an additional 17,000 infant deaths. While food purchasing behaviour did not change, families' spending on medicines, healthcare and durable items (e.g. cars) fell dramatically. In addition, public health care expenditure declined by 58%, and while the authors were unable to determine whether it was these cuts, or families' inability to afford co-payments that caused large declines in health service utilisation during this period, they concluded that from a policy perspective increases, rather than decreases, in social expenditure during future economic crises would be the most useful in minimising the impact of recessions on child wellbeing [7].

Paradoxically, in the USA, one study suggested that rising unemployment may actually lead to improvements low birth weight and infant mortality, via its impacts on lowered fertility, cigarette and alcohol consumption, and attendance at antenatal care. The authors noted that less educated single black women tended to opt out of fertility during periods of high unemployment, and that those who became pregnant tended to drink and smoke less, and to attend antenatal care more frequently. For white women however, the pattern was reversed, with fertility for less-educated white women increasing during periods of high unemployment [8]. To add further complexity, studies of child health during other economic crises have found either no differences (e.g. in the USSR during the 1990s there were large increases in adult mortality (particularly from suicide and alcohol) but no increases in child mortality [9]; or a modest deterioration (e.g. a 1.4% increase in infant mortality during Indonesia's 1998 financial crisis [10].

Potential Impacts of Recessions on Children: Lessons from New Zealand's Past

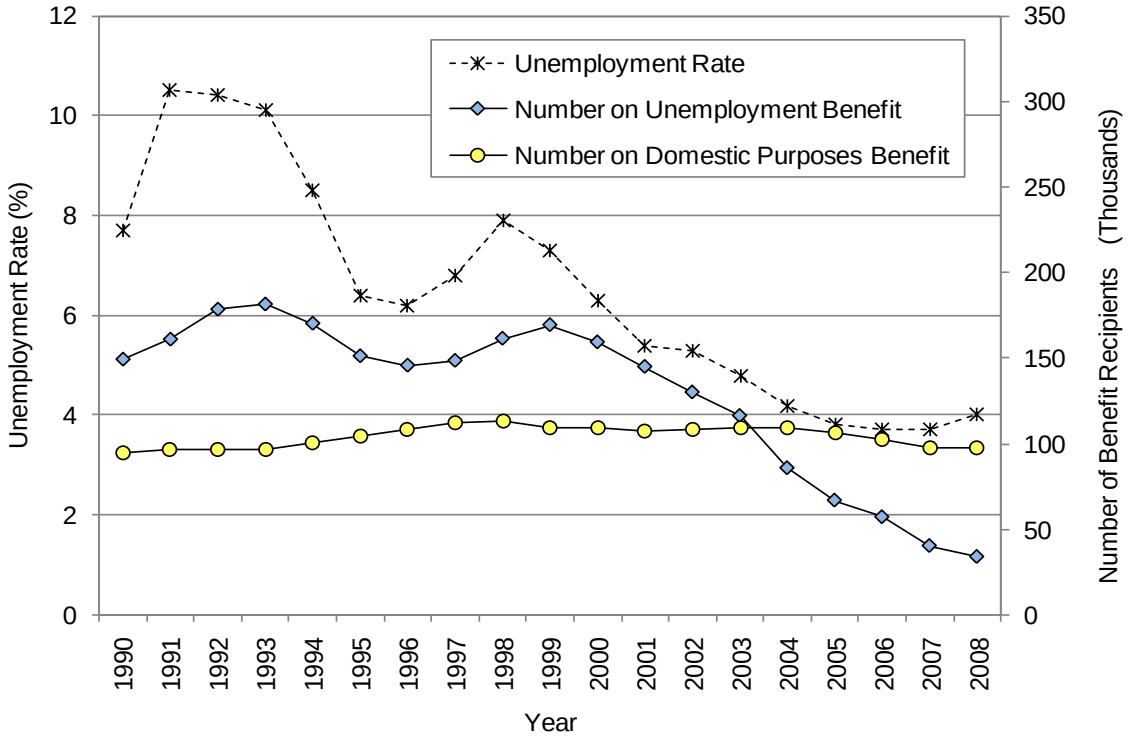
The research above suggests that the impacts of economic crises on child wellbeing may vary, depending on the length and severity of the crisis, the adaptations families make to reduced resources, the availability of social safety nets, and the extent to which Governments preserve, or cut social spending during the course of a recession. For New Zealand, it thus remains unclear what impact the current economic downturn will have on child wellbeing, as while New Zealand's social safety nets are not as comprehensive as those of Finland or Sweden, access to basic health services is unlikely to break down, as it

did in Peru during the 1980s. Further, it is difficult to determine whether families positive adaptations to the recession (e.g. cutting back on takeaways, alcohol, and cigarettes), will outweigh more negative behaviours (e.g. cutting back on clothing, shoes, heating and doctor's visits). Despite this uncertainty it is still possible, using existing research, to estimate the number of New Zealand children who may be exposed to low family incomes, should unemployment reach the levels seen during the mid-1990s, as well as the impact this exposure may have on their living standards.

In terms of the number of children likely to be exposed to low family incomes, one recent study followed the entire cohort of New Zealand children born in 1993 (n=58,866), through to age 7 in 2000 (during this period unemployment was in the 6-8% range, as is expected during the current downturn). Using benefit reliance as a proxy for low household income, the authors found that 53.9% of children had lived with a caregiver who was reliant on a benefit at some point during their first 7 years, with 24.5% having their first contact with a benefit at birth, and 38.7% by one year of age. Of the birth cohort, 20.8% had spent 5+ of their first 7 years with a caregiver reliant on a benefit, with the risk of prolonged benefit contact being increased if the child was reliant on: a benefit recipient from birth; a sole parent; a benefit recipient who was female, Māori, <20 years of age, or on the Domestic Purposes Benefit (DPB). Of those reliant on a benefit from birth, ≈ ¾ remained on a benefit after their 1st year, ≈ ½ remained at 3 years and ≈ ¼ remained for the entire 7 years (6.1% of the entire 1993 cohort spent all of their first 7 years reliant on a benefit recipient) [11].

In interpreting these figures however, it must be remembered that not all children in this cohort were reliant on a beneficiary as the result of prevailing macroeconomic conditions. As **Figure 1** suggests, while the number of people receiving unemployment benefits during this period fluctuated in line with headline unemployment, the number receiving the domestic purposes benefit (DPB) was much less responsive to labour market changes. Thus even in 2007, when seasonally adjusted unemployment rates were at their lowest (range 3.5-3.8%) [12], 15.1% of New Zealand children <18 years remained reliant on a DPB recipient [1]. Such figures potentially suggest that in the context of the current recession, New Zealand is already starting from a relatively high baseline, in terms of the number of children exposed to low family incomes during their crucial early years.

Figure 1. Seasonally Adjusted Unemployment Rates vs. Numbers of Unemployment and Domestic Purposes Benefit Recipients, New Zealand 1990-2008



Source: Seasonally Adjusted Unemployment Rates: Household Labour Force Survey (Quarter 2); Benefit Recipients: Ministry of Social Development for Years Ending June (via Statistics NZ)

In terms of the living standards likely to be experienced by children who become reliant on benefit recipients during the next few years, the New Zealand Living Standards Surveys provide some valuable insights. The 2000 Living Standards Survey, found 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 [13]. The 2004 Living Standards Survey, while replicating many of the findings of the 2000 Survey, suggested that the picture may have worsened during 2000-2004, with the proportion of benefit dependent families living in severe or significant hardship increasing from 39% to 58% [14].

Thus while it is difficult to predict with any certainty the impact the current recession will have on child health outcomes, the available evidence would suggest that one in five New Zealand children (see *Children Reliant on a Beneficiary* section) are already exposed to low family incomes as a result of their parent's benefit status, and that if unemployment reaches the levels seen during the 1990s, a similar number will spend at least 5 of their first 7 years of life reliant on a beneficiary. Further, the Living Standards surveys suggest that New Zealand's current benefit provisions will be unable to protect these children from severe or significant hardship, and that some of the adaptations families make in response to their inadequate resources, may have detrimental health consequences for their children.

THE CHILDREN'S SOCIAL HEALTH MONITOR:
ECONOMIC INDICATORS

GROSS DOMESTIC PRODUCT (GDP)

Introduction

Gross Domestic Product (GDP) is defined as "*the total market value of goods and services produced within a given period, after deducting the cost of goods utilised in the process of production*" [15]. GDP is often used as a measure of the size of the economy, with nominal GDP being expressed in current dollar prices, and real GDP being expressed in constant dollar prices (i.e. the dollar value of a particular year, after adjustment for inflation).

Changes in real GDP are often used as a measure of economic growth, or the strength of the economy [15], with a recession typically being defined as two consecutive quarters of negative growth [16]. Recessions are often characterised by high unemployment, stagnant wages and a fall in retail sales, and though usually not lasting longer than a year [16], they may have significant implications for child wellbeing.

New Zealand entered a recession at the end of June 2008 (after 2 consecutive quarters of negative growth), and technically left the recession at the end of June 2009 (although growth in the June quarter (0.1%) was extremely close to zero [17]). Since that time New Zealand has had five consecutive quarters of positive growth, although in the most recent quarter, this growth was only 0.2% [18].

The following section briefly reviews changes in New Zealand's GDP since June 2006.

Data Source and Methods

Definition

Gross Domestic Product (GDP): Percent Change from Previous Quarter

GDP is the total market value of all final goods and services produced in a country in a given year, equal to total consumer, investment and government spending, plus the value of exports, minus the value of imports. A recession is defined as 2 consecutive quarters of negative growth (as measured by GDP).

Data Source

Statistics New Zealand: The New Zealand System of National Accounts. Produced Quarterly

Indicator Category: Ideal B

Notes on Interpretation

Three approaches can be used to calculate GDP:

• *Production Approach*: This method calculates what each separate producer adds to the value of final output, by deducting intermediate consumption from gross output. Value added is summed for all producers.

• *Income Approach*: This approach measures the incomes received by the owners of the factors of production. These represent the returns to the labour and capital employed such as wages and salaries, and profits.

• *Expenditure Approach*: This method sums the values of all final demands, that is, final consumption expenditures (of households, government and private non-profit institutions serving households), changes in inventories, gross capital formation, and net exports.

Conceptually, both the production and expenditure approaches of measuring GDP are the same. However, as each series uses independent data and estimation techniques, some differences between the alternative measures arise. The expenditure approach series has historically shown more quarterly volatility and is more likely to be subject to timing and valuation problems. For these reasons, the production-based measure is the preferred measure for short-term quarter-on-quarter and annual changes [19]

New Zealand Trends

Production Based Measure of GDP

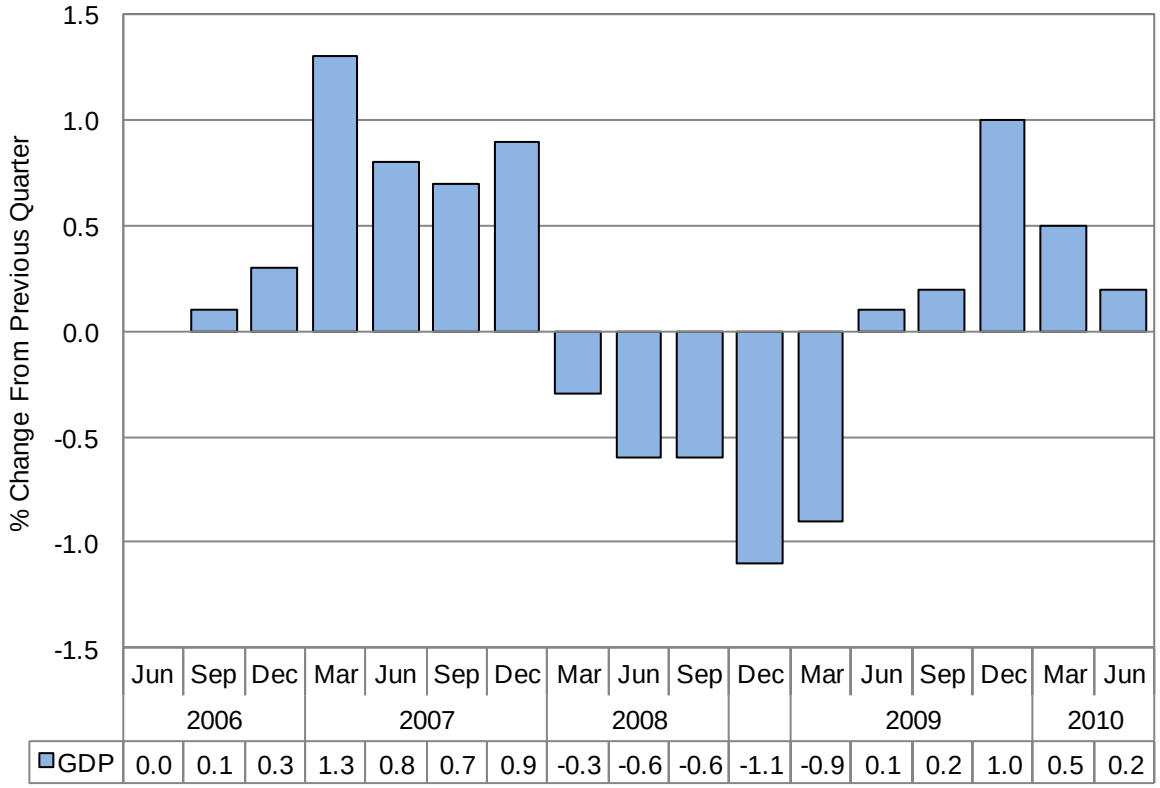
In New Zealand, GDP decreased for 5 consecutive quarters from March 2008-March 2009. GDP has since increased for five consecutive quarters, with economic activity being up 0.2% in the June 2010 quarter, following a 0.5% increase in the March 2010 quarter. Economic activity for the year ending June 2010 was up 0.7% when compared to the year ending June 2009, with this being the first annual increase in economic activity since a 1.5% rise in the year ended September 2008 [18] (**Figure 2**).

During the June 2010 quarter, construction increased by 6.4%, real estate and business services by 0.9%, and retail trade by 1.5%, while manufacturing declined by 4.0% and communication services by 2.6% [18].

Expenditure Based Measure of GDP

The expenditure based measure of GDP, released concurrently with the production based measure, increased by 0.4% in the June 2010 quarter. During this period, household consumption expenditure was flat at 0.0%, with gross fixed capital formation being up 6.2% (mainly from increased investment in residential building), exports being up 1.3% but with inventories being run down by $530 million [18].

Figure 2. Gross Domestic Product (GDP): Percentage Change from Previous Quarter, New Zealand June 2006 to June 2010



	Jun	Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun
	2006			2007				2008				2009				2010	
GDP	0.0	0.1	0.3	1.3	0.8	0.7	0.9	-0.3	-0.6	-0.6	-1.1	-0.9	0.1	0.2	1.0	0.5	0.2

Source: Statistics New Zealand: Seasonally adjusted chain volume series measured in 1995/96 prices

Summary

In New Zealand, GDP decreased for 5 consecutive quarters from March 2008-March 2009. GDP has since increased for five consecutive quarters, with economic activity being up 0.2% in the June 2010 quarter, following a 0.5% increase in the March 2010 quarter. Economic activity for the year ending June 2010 was up 0.7% when compared to the year ending June 2009, with this being the first annual increase in economic activity since a 1.5% rise in the year ended September 2008 [18].

INCOME INEQUALITY

Introduction

There has been much debate in recent years regarding the influence of income inequalities on population health. While it is widely acknowledged that poverty plays a crucial role in shaping health disparities, authors such as Wilkinson and Marmot [20] argue that income inequality itself also plays a role, via its links to psychosocial pathways associated with relative disadvantage. They cite the Whitehall studies of British civil servants, which found that mortality increased in a stepwise manner as relative socioeconomic status decreased, with social gradients being evident even amongst those who were not poor. In addition, they note that while health inequalities exist within societies, there is little association between average income (GDP per capita) and life expectancy across rich countries. Rather, there appears to be a strong correlation between income inequality and mortality. In Wilkinson and Marmot's view, such associations suggest that it is not absolute material deprivation which shapes health at the population level, but rather the effects such inequalities have on psychosocial outcomes such as the degree of control over work, anxiety, depression and social affiliations. In support of this argument, they cite a number of studies which demonstrate social gradients in the lack of control over work, low variety at work and a severe lack of social support, with animal experiments also suggesting that low social status, via its effects on neuroendocrine pathways, leads to atherosclerosis, unfavourable lipid profiles, central obesity, insulin resistance and raised basal cortisol [20].

Others such as Lynch [21] however, would argue that it is not the psychological effects of income inequality which play the greatest role, but rather the lack of material resources (e.g. differentials in access to adequate nutrition, housing and healthcare), coupled with a systematic underinvestment in human, physical, health and social infrastructure (e.g. the types and quality of education, health services, transportation, recreational facilities and public housing available). In Lynch's view, the combination of these negative exposures is particularly important for the health of the most disadvantaged (who have the fewest individual resources), and that in this context, the associations between income inequality and health are not inevitable, but rather are contingent on the level of public infrastructure and resources available. While debate on the precise pathways continues, both sides of the income inequality argument agree, that reducing income inequality by raising incomes for the most disadvantaged, will reduce inequalities and improve population health [22].

The following section explores income inequalities in New Zealand since 1984 using two different measures, the P80/P20 Ratio and the Gini Coefficient.

Definition
1. *Income Inequality as Measured by the P80/P20 Ratio*
2. Income Inequality as Measured by the Gini Coefficient

Data Source
Statistics New Zealand Household Economic Surveys (NZHES n=2,800-3,500 households per survey) via Perry 2010 [23].
Note: The P80/P20 Ratio and Gini coefficient are monitored by the Ministry of Social Development using NZHES data [23], which was available 2-yearly from 1982-1998, and 3-yearly thereafter. Since 2007, income data has become available annually through the new HES Incomes Survey. The full NZHES (including expenditure data) however remains 3-yearly. For more detail on methodology used see Perry 2010 [23].

Indicator Category Proxy B

Notes on Interpretation
P80/P20 Ratio: When individuals are ranked by equivalised household income and then divided into 100 equal groups, each group is called a percentile. If the ranking starts with the lowest income, then the income at the top of the 20th percentile is denoted P20 and the income at the top of the 80th percentile is called P80. The ratio of the value at the top of the 80th percentile to the value at the top of the 20th percentile is called the P80/20 ratio and is often used as a measure of income inequality (e.g. a P80/20 ratio of 3.0 indicates that those at the top of the 80th percentile have incomes 3.0x higher than those at the top of the 20th percentile). In general, the higher the ratio, the greater is the level of inequality [23].

Gini Coefficient: The Lorenz curve is a graph with the horizontal axis showing the cumulative % of people in a population ranked by their income. The vertical axis shows the corresponding cumulative % of equivalised disposable household income (i.e. the graph shows the income share of any selected cumulative proportion of the population). The diagonal line represents a situation of perfect equality (i.e. all people having the same income). The Gini coefficient is derived from the Lorenz curve and is the ratio of the area between the actual Lorenz curve and the diagonal (or line of equality), compared to the total area under the diagonal. When the Gini coefficient = 0 all people have the same level of income. When it approaches 1, one person receives all the income (i.e. it is an overall measure of income inequality: the higher the number, the greater the level of inequality) [24]. When comparing changes in income distributions over time, the Gini coefficient is more sensitive to changes in the more dense low-to-middle parts of the distribution, than it is to changes towards the ends of the distribution [23].

New Zealand Trends

Income Inequality: P80/P20 Ratio

In New Zealand during 1984-2009, income inequality as measured by the P80/P20 ratio, was higher after adjusting for housing costs than prior to this adjustment. The most rapid rises in income inequality occurred during 1988-1992. While income inequality also rose during 1994-2004, the rate of increase was slower. During 2004-2009, the P80/P20 ratio fell, a decline in income inequality which Perry attributes largely to the Working for Families package [23] (**Figure 3**).

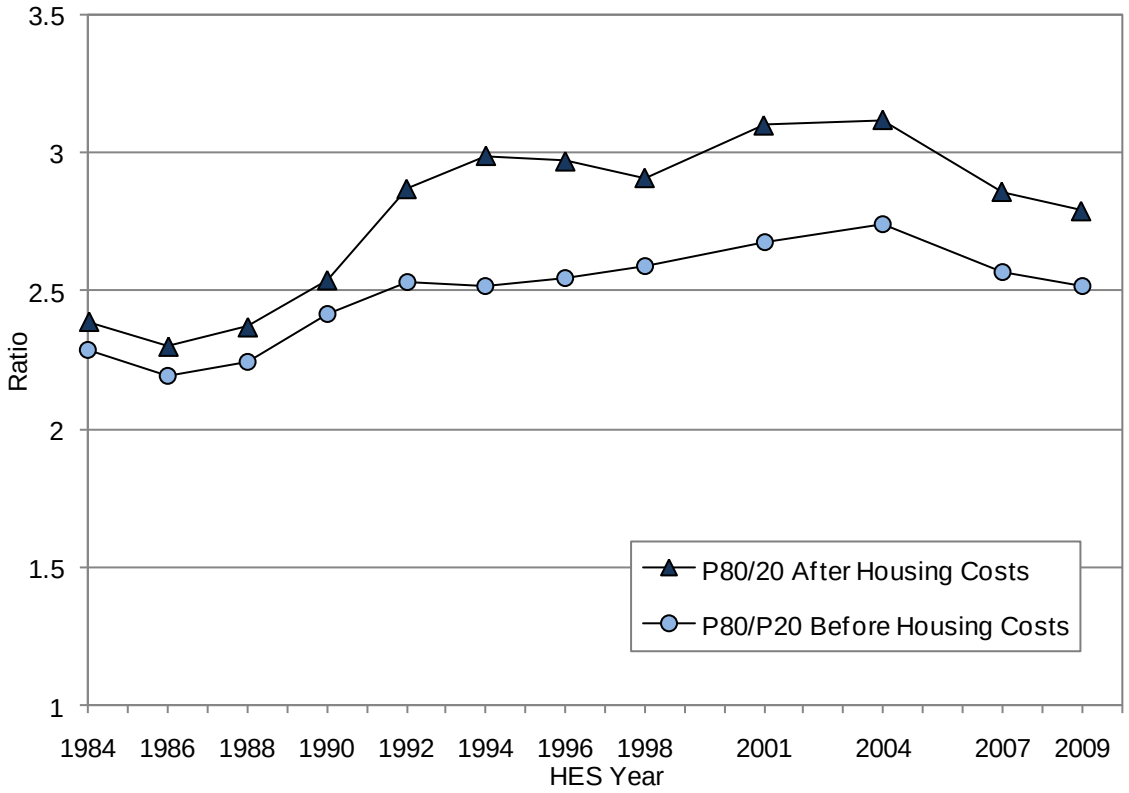
Income Inequality: Gini Coefficient

In New Zealand during 1984-2009, income inequality as measured by the Gini Coefficient, was also higher after adjusting for housing costs than prior to this adjustment. The most rapid rises in income inequality during this period also occurred between the late 1980s and early 1990s. Using both the Before and After Housing Cost measures, the Gini Coefficient declined between 2001-2007, a decline which Perry again attributes to the impact of the Working for Families Package. Perry notes however, that another year's data is required, before it is possible to determine whether the rise in income inequality seen between 2007-2009 is real, or just a statistical fluctuation [23] (**Figure 4**).

Summary

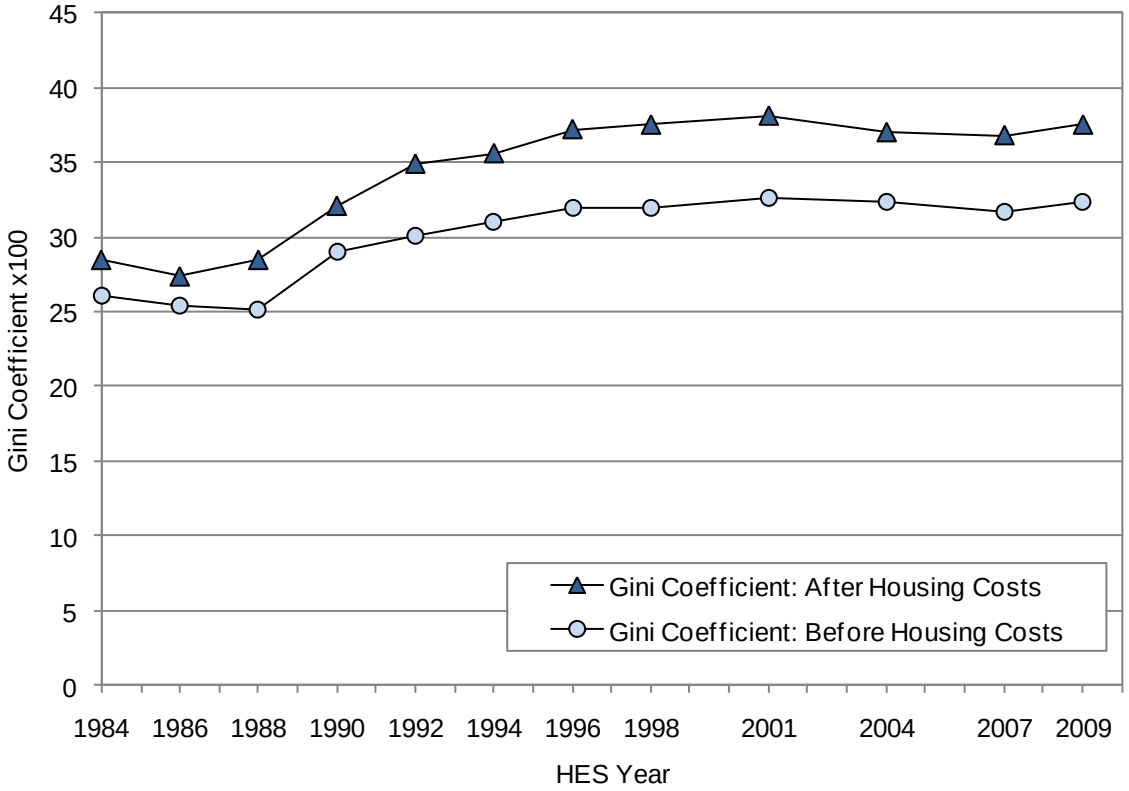
In New Zealand during 1984-2009 income inequality, as measured by the P80/P20 ratio and Gini coefficient, was higher after adjusting for housing costs than prior to this adjustment. The most rapid rises in income inequality occurred between the late 1980s and early 1990s. During the early-mid 2000s however, income inequality declined, a change Perry attributes largely to the Working for Families package. Rises in income inequality were again evident between 2007 and 2009, although another year's data may be required, before it is possible to determine whether this is the beginning of an upward trend, or just a statistical fluctuation [23].

Figure 3. Income Inequality in New Zealand as Assessed by the P80/P20 Ratio for the 1984-2009 HES Years



Source: Perry 2010 [23], derived from Statistics NZ's Household Economic Survey (1984-2009)

Figure 4. Income Inequality in New Zealand as Assessed by the Gini Coefficient for the 1984-2009 HES Years



Source: Perry 2010 [23], derived from Statistics NZ's Household Economic Survey (HES) 1984-2009

CHILD POVERTY AND LIVING STANDARDS

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 [25]. Further, the Christchurch Health and Development Study suggests that exposure to low family income during childhood and early adolescence may increase the risk of leaving school without qualifications, economic inactivity, early parenthood and criminal activity. While adjusting for potentially mediating factors (e.g. parental education, maternal age, and sole parent status) reduces the magnitude of these associations somewhat, they do not disappear completely, suggesting that the pathways linking low family income to long term outcomes are complex, and in part may be mediated by other socioeconomic variables [2]. Yet while there is much debate about the precise pathways involved, there is a general consensus that the relationship between poverty and adverse outcomes is non-linear, with the effects increasing most rapidly across the range from partial to severe deprivation [3].

In New Zealand, the Ministry of Social Development has periodically reviewed the socioeconomic wellbeing of families with children using information from two data sources:

1. The New Zealand Household Economic Survey, which can be used to assess the proportion of families with children who live below the income poverty line [23].
2. The New Zealand Living Standards Survey, which uses the Economic Living Standards Index (NZELSI) to assess the proportion of families with children who live in severe or significant hardship [14]

The following section uses information from these two data sources to assess the proportion of New Zealand children living in poverty, or exposed to severe or significant hardship in recent years.

Children Living in Households Below the Poverty Line

Data Source and Methods

Definition

1. *Proportion of children with equivalised disposable household income < 50% or <60% current median*
2. *Proportion of children with equivalised disposable household income < 50% or <60% 2007 median (adjusted for movements in consumer prices)*

Data Source

Statistics New Zealand Household Economic Survey (NZHES n=2,800-3,500 households per survey) via Perry 2010 [23]. Note: Child Poverty measures are reported on by the Ministry of Social Development using NZHES data [23], which was available 2-yearly from 1982-1998, and 3-yearly thereafter. Since 2007, income data has become available annually through the new HES Incomes Survey. The full NZHES (including expenditure data) however remains 3-yearly. For more detail on methodology used see Perry 2010 [23].

Interpretation

Relative poverty measures set a poverty benchmark that rises and falls with changes in national median incomes (i.e. poverty is defined in relation to the incomes of others in society). Constant-value poverty measures select a median at a set point in time (e.g. 2007) and then adjust forward and back in time for changes in consumer prices (i.e. they seek to maintain a constant buying power for the poverty benchmark over time). Most income poverty measures use equivalised disposable household income (i.e. after tax household income adjusted for family size and composition). Both measures can be calculated before or after taking housing costs into account. For more detail on the methodology used see Perry 2010 [23].

Child Poverty Trends Using Different Poverty Measures

Relative Poverty (Compared to Contemporary Median)

Before Housing Costs: In New Zealand, relative child poverty rose rapidly during 1990-1992, a rise which Perry [23] attributes to rising unemployment and the 1991 Benefit Cuts (which reduced incomes for beneficiaries to a greater extent than the median fell during this period). During 1992-1998, relative child poverty rates then declined, a trend which Perry attributes to falling unemployment, occurring in a context where incomes for those around the poverty line rose more quickly than the median. After 1998 however, as economic conditions improved, median incomes again rose, while incomes for many low-income households with children did not, resulting in a rise in relative child poverty up until 2004. From 2004 to 2007 relative poverty rates again declined, a decline which Perry attributes to the roll out of the Working for Families Package. Before housing cost, relative child poverty rates in 2009 were similar to what they were in the 1980s [23] (**Figure 5**).

After Housing Costs: In New Zealand during 1982-2009, while trends in relative child poverty after adjustment for housing costs (AHC), were broadly similar to before housing cost (BHC) measures, one key difference was evident: that AHC child poverty rates in 2009 remained higher than in the 1980s, while BHC measures (for those <60% threshold) were closer to 1980s levels. In addition, during 2007-2009 using the after housing costs measure, child poverty increased from 22% to 25%. Perry [23] attributes these differences to the fact that housing costs in 2009 accounted for a higher proportion of household expenditure for low-income households, than they did in the 1980s (in 1988 16% of households in the bottom income quintile spent >30% of their income on housing; in 2008 this figure was 33%).

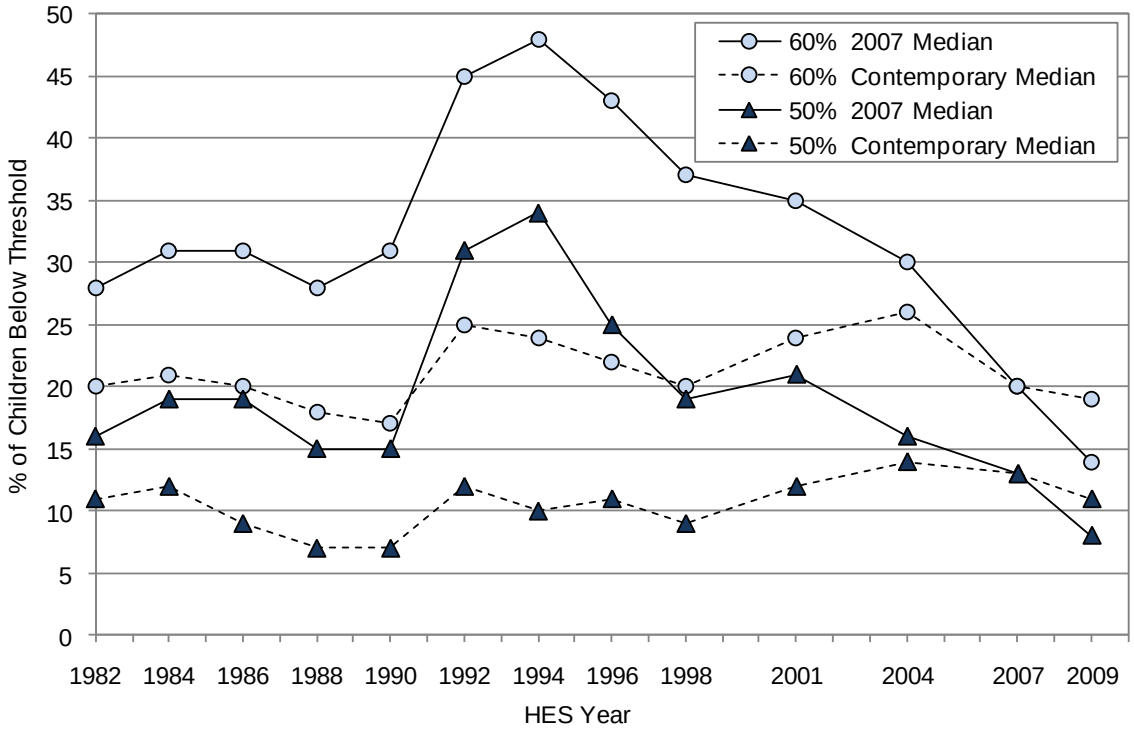
Perry notes however, that the income-related rental policies introduced in 2000, along with later changes to Accommodation Supplements, helped reduce housing expenditure for some low income households, and that these changes contributed to reductions in AHC child poverty during 2001-2007. There were no further policy changes during 2007-2009 however, with maximum rates of assistance remaining fixed, as housing costs continued to increase. As a result, net housing expenditure rose, especially for low income households and this resulted in increases in AHC child poverty rates during 2007-2009 [23] (**Figure 6**).

Fixed Line Poverty (Compared to 2007 Median)

Before Housing Costs: In New Zealand during the late 1980s and early 1990s, fixed line child poverty measures increased markedly, for similar reasons to those outlined above. During 1994-1998 however, child poverty rates declined, a trend which Perry attributes to improving economic conditions and falling unemployment. During 1998-2004, child poverty rates continued to fall, although falls were less rapid for those below the 50% threshold than the 60% threshold. Rates also fell during 2004-2007, although again the rate of decline was less marked for those below the 50% threshold, a difference Perry attributes to greater support from Working For Families for the working poor, than the beneficiary poor [23] (**Figure 5**).

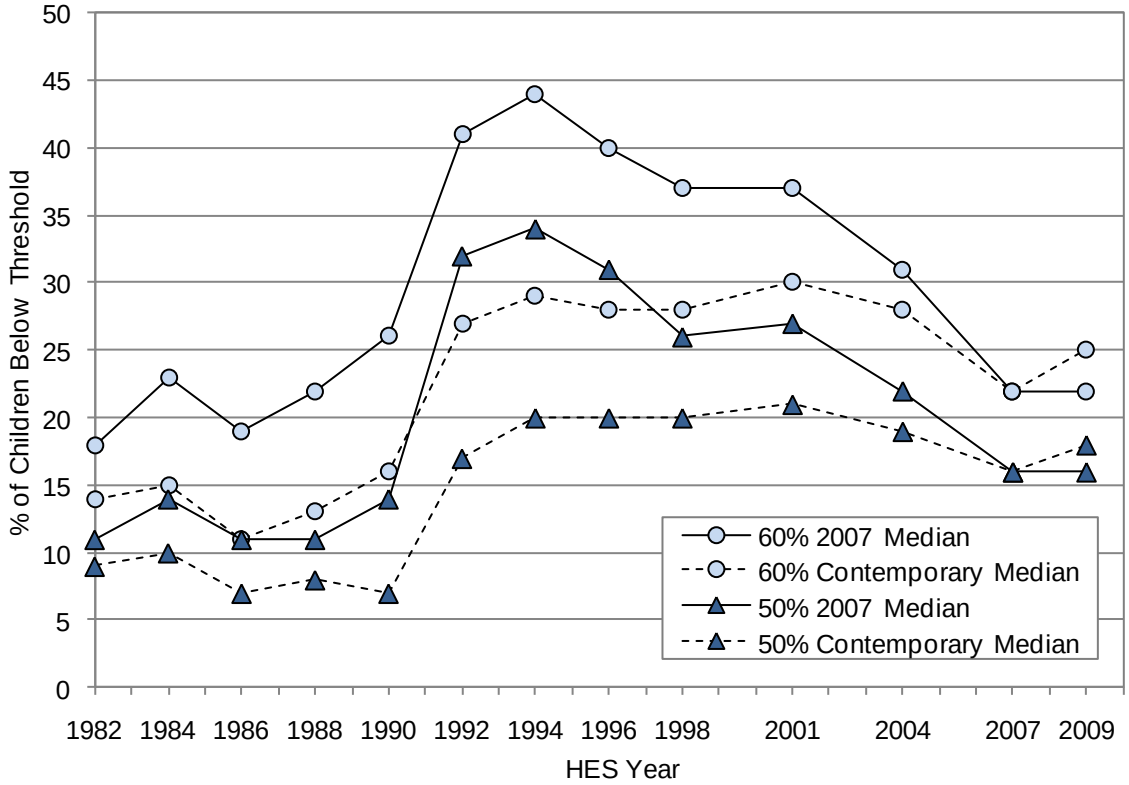
After Housing Costs: In New Zealand during 1982-2008, while trends in fixed line child poverty after adjustment for housing costs (AHC), were broadly similar to before housing cost (BHC) measures, the same key difference seen with relative poverty measures was evident: that AHC child poverty rates in 2009 remained higher than in the 1980s, while BHC measures generally returned to 1980s levels [23] (**Figure 6**).

Figure 5. Proportion of Dependent Children Aged 0-17 Years Living Below the Income Poverty Threshold (Before Housing Costs), New Zealand 1982-2009 HES Years



Source: Perry 2010 [23], derived from Statistics New Zealand, Household Economic Survey (HES) 1982-2009

Figure 6. Proportion of Dependent Children Aged 0-17 Years Living Below the Income Poverty Threshold (After Housing Costs), New Zealand 1982-2009 HES Years



Source: Perry 2010 [23], derived from Statistics New Zealand, Household Economic Survey (HES) 1982-2009

Child Poverty Trends: <60% of 2007 Median, After Housing Costs

Child Poverty by Number of Children in Household and Child's Age

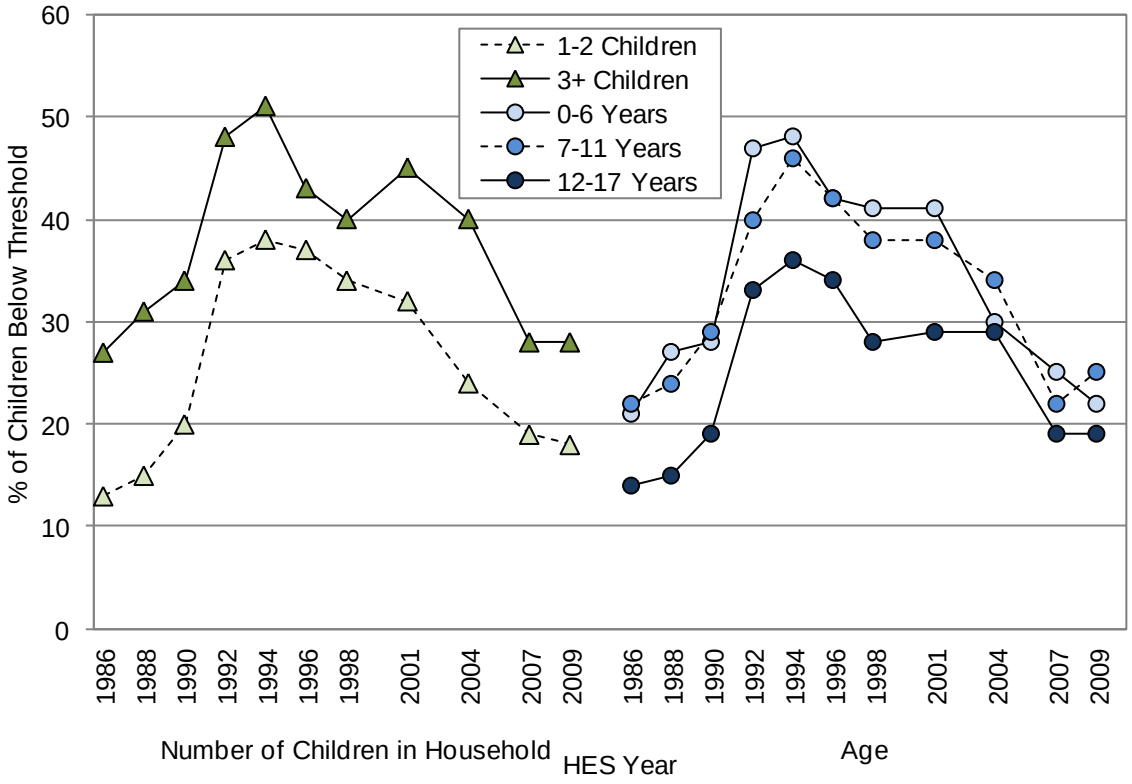
Number of Children: In New Zealand during 1986-2009, child poverty rates for households with 3+ children were consistently higher than for households with 1-2 children (**Figure 7**). (Comment: Perry notes that in 2009, children from these larger households made up 48% of all poor children [23])

Age of Children: In New Zealand during 1986-2001, poverty rates for younger children (0-6 years and 7-11 years) were higher than for older children (12-17 years). Differences after 2001 were less consistent [23] (**Figure 7**).

Child Poverty Trends by Household Type and Work Status of Adults in Household

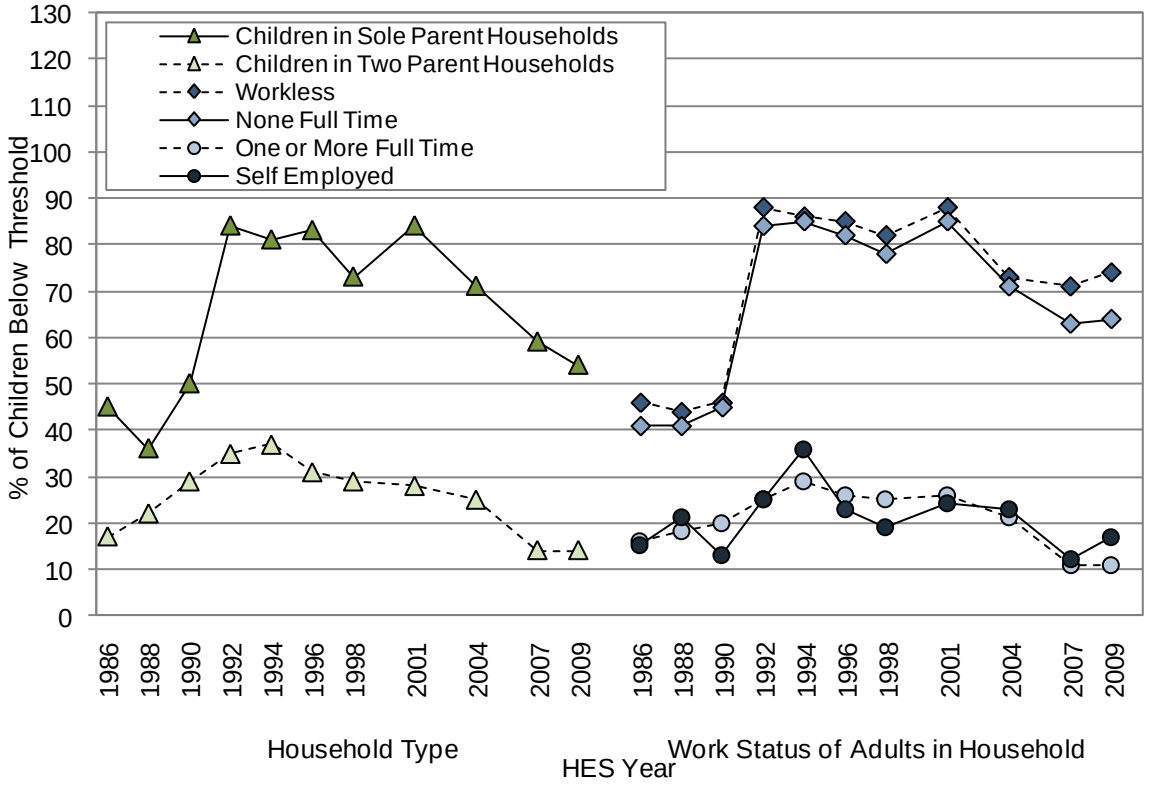
Household Type: In New Zealand, child poverty rates for children in both sole-parent and two-parent households increased rapidly between 1988 and 1992. In absolute terms however, poverty rose most rapidly for children in sole-parent households, with rates reaching a peak of 84% in 1992 (two-parent: rates peaked at 37% in 1994). While rates for both household types declined between 2001 and 2007, during 2007-2009 child poverty rates for those in sole-parent households remained higher than their 1980s levels, while rates for two-parent households were similar (**Figure 8**). (Comment: Perry notes that ≈1/3 sole parent *families* live in wider *households* with other adults, and that children living in these "other" households have significantly lower poverty rates than those living in sole parent households, because of the greater household resources available to them [23]).

Figure 7. Proportion of Dependent Children Living Below the 60% Income Poverty Threshold (2007 Median, After Housing Costs) by Number of Children in Household and Age, New Zealand 1986-2009 HES Years



Source: Perry 2010 [23], derived from Statistics New Zealand, Household Economic Survey (HES) 1986-2009

Figure 8. Proportion of Dependent Children Living Below the 60% Income Poverty Threshold (2007 Median, After Housing Costs) by Household Type and Work Status of Adults in the Household, New Zealand 1986-2009 HES Years



Source: Perry 2010 [23], derived from Statistics New Zealand, Household Economic Survey (HES) 1986-2009

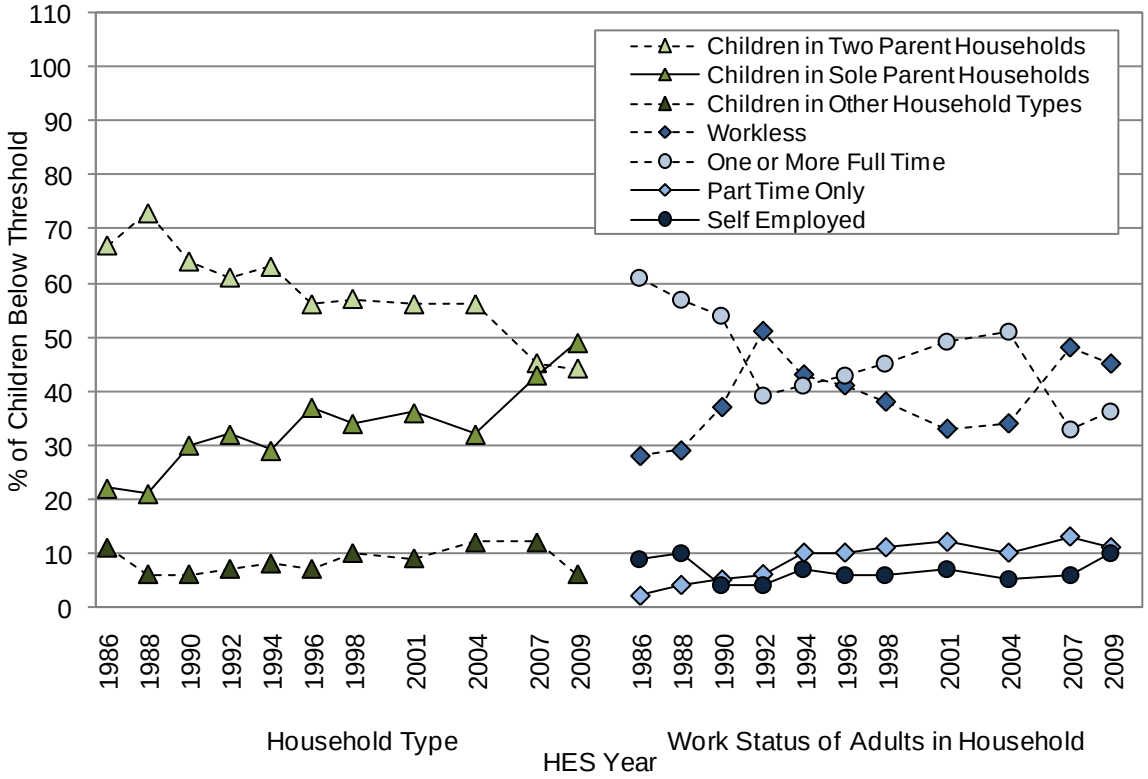
Work Status of Adults in Household: In New Zealand, child poverty rates for children in workless households, or where no adults worked full time, increased rapidly during 1988-1992. Poverty rates for children in these households remained elevated during the 1990s (range 78%-88%), before declining during 2001-2007. Even at their nadir in 2007, poverty rates for children in these households remained much higher than 1980s levels. In contrast, increases in child poverty for households where an adult worked full time, or was self employed, were much less marked, with rates in 2007-2009 being similar to those in the 1980s (**Figure 8**). (Comment: Perry notes that during the 1980s, children in workless households were ≈2x as likely to be in poor households; during 1992-2004 this had risen to ≈ 3-4x higher, and by 2007-2009 it was ≈ 6-7x higher [23]).

Composition of Children Living in Poverty by Household Type and Work Status of Adults in Household

Household Type: In New Zealand during 1988-2009, the proportion of children living in poverty who were from two-parent households declined, while the proportion who were in one-parent households increased. Thus by 2009, 49% of all children living in poverty were in one-parent households, as compared to 21% in 1988 (**Figure 9**).

Work Status of Adults in Household: In New Zealand during 1986, the highest proportion of children living in poverty came from families where at least one adult worked full time. During 1988-1992 however, the proportion of children living in poverty who were from households where at least one adult worked full time declined markedly, while the proportion of children from workless households increased, so that by 1992 children from workless families made the greatest contribution to those living in poverty. During the 1990s however, these trends reversed, so that by 2004 a greater proportion of children living in poverty again came from households where at least one adult worked. Following the introduction of the Working for Families package, these trends reversed yet again. Thus during 2008-2009, the highest proportion of children living in poverty came from workless households (**Figure 9**).

Figure 9. Composition of Dependent Children Living Below the 60% Income Poverty Threshold (2007 Median, After Housing Costs) by Household Type and Work Status of Adults in the Household, New Zealand 1986-2009 HES Years



Source: Perry 2010 [23], derived from Statistics New Zealand, Household Economic Survey (HES) 1986-2009:
Note: Totals in each category sum to 100% of children living below poverty line.

Summary: Child Poverty

In New Zealand during 1988-1992, child poverty rates increased markedly, as a result of rising unemployment and the 1991 Benefit cuts. During 1994-1998 however, rates declined, as economic conditions improved and unemployment fell. During 1998-2004, child poverty trends varied, depending on the measure used, but between 2004 and 2007 they again declined, following the roll out of the Working for Families package. For the majority of this period, child poverty rates were higher for younger children (0-11 vs. 12-17 years), larger households (3+ children vs. 1-2 children), sole parent households and households where the adults were either workless, or where none worked full time.

Families with Reduced Living Standards

The Ministry of Social Development has undertaken 3 Living Standards Surveys, in 2000, 2004 and 2008. At the time of writing some preliminary findings from the 2008 Living Standards Survey are available [26], but the full results are yet to be published. In brief, the preliminary analyses from the 2008 Survey suggested that:

1. The proportion of children living in hardship (ELSI Levels 1-2) had fallen from 26% to 19% between 2004 and 2008
2. Most of these gains were for low to middle income working families, with hardship rates for sole parent beneficiary families remaining steady at around 55%
3. Hardship rates for sole parent families were around 4 times those for two parent families (39% vs. 11%)
4. Beneficiary families with dependent children had hardship rates around 5 times those of working families with children (50% vs. 11%), but as there were many times more working families than beneficiary families, half of children in hardship were from working families and half from beneficiary families

5. Sole parent families in work (20%) had hardship rates well below sole parent beneficiary families (54%)
6. Although hardship rates for children had fallen, children remained significantly over represented in the hardship group

It is anticipated that a full analysis of the 2008 Living Standards Survey will be released in the next few months. In the meantime, the key results of the 2004 Living standards survey, as they relate to families with children, are presented below. When interpreting the data in this section, the reader must bear in mind that these findings may not fully reflect the current situation, with any differences likely to be along the lines of the preliminary findings outlined above.

Data Source and Methods

Definition

Distribution of Families with Dependent Children by the NZ Economic Living Standards Index (NZELSI)

Data Source

The Ministry of Social Development's 2004 Living Standards Report [14]

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 [14].

2004 Living Standards Survey

Living Standards by Family Type and Income Source

In the 2004 Living Standards Survey, 30% of all economic family units contained dependent children. While only 10% of family units without children were 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 [14] (**Figure 10**).

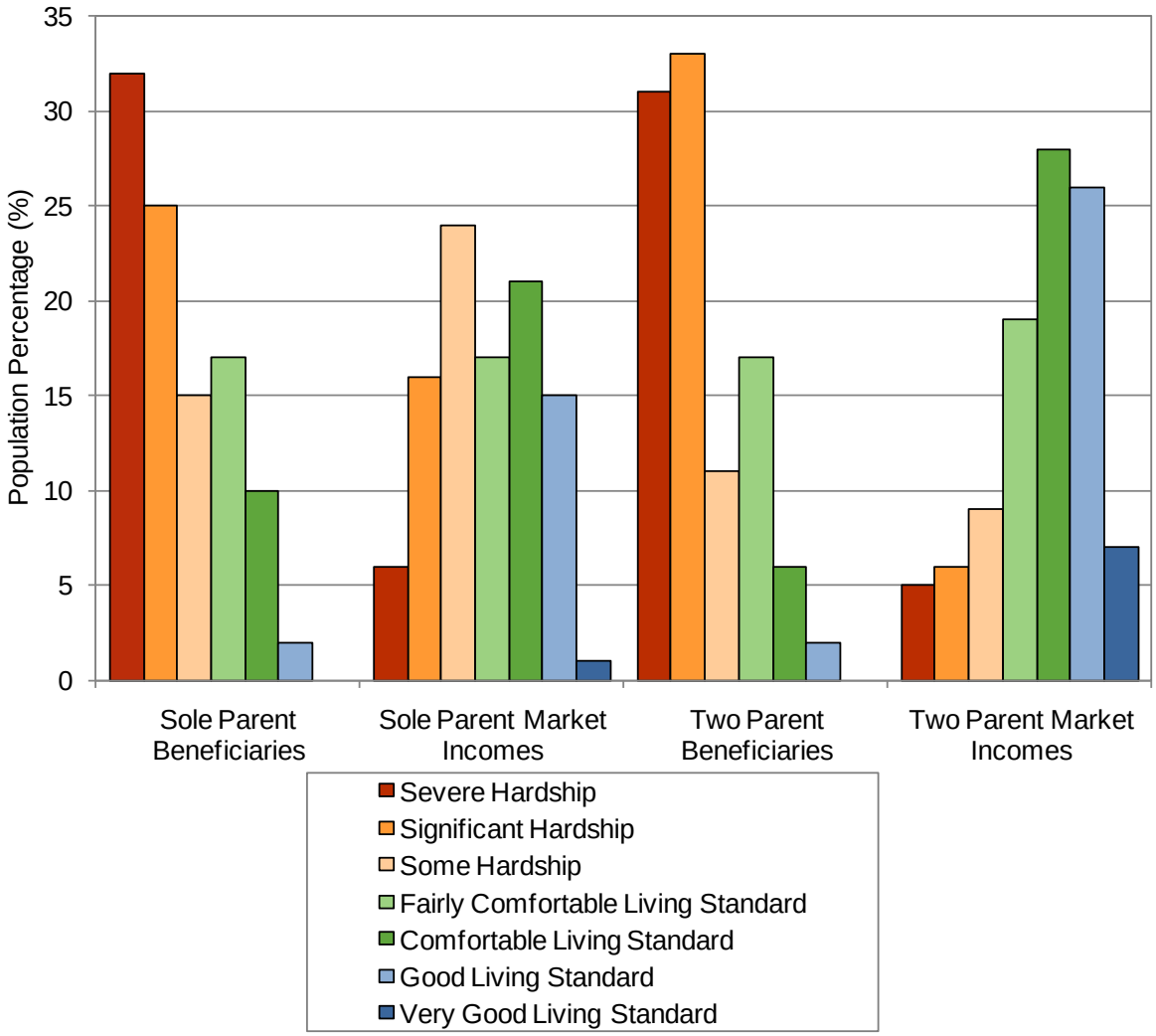
Living Standards by Ethnicity of Family Members

The 2004 Living Standards Survey also noted that European and Other families with dependent children had higher average living standards (37.6 and 38.4 respectively) than Pacific and Māori families with dependent children (25.3 and 31.6 respectively). Of note, 30% of all Pacific families with dependent children in the 2004 Survey reported living in severe hardship, as compared to 20% of Māori families, 8% of European families and 4% of Other families (**Figure 11**).

Constraints Placed on Children's Consumption by their Families Living Standards

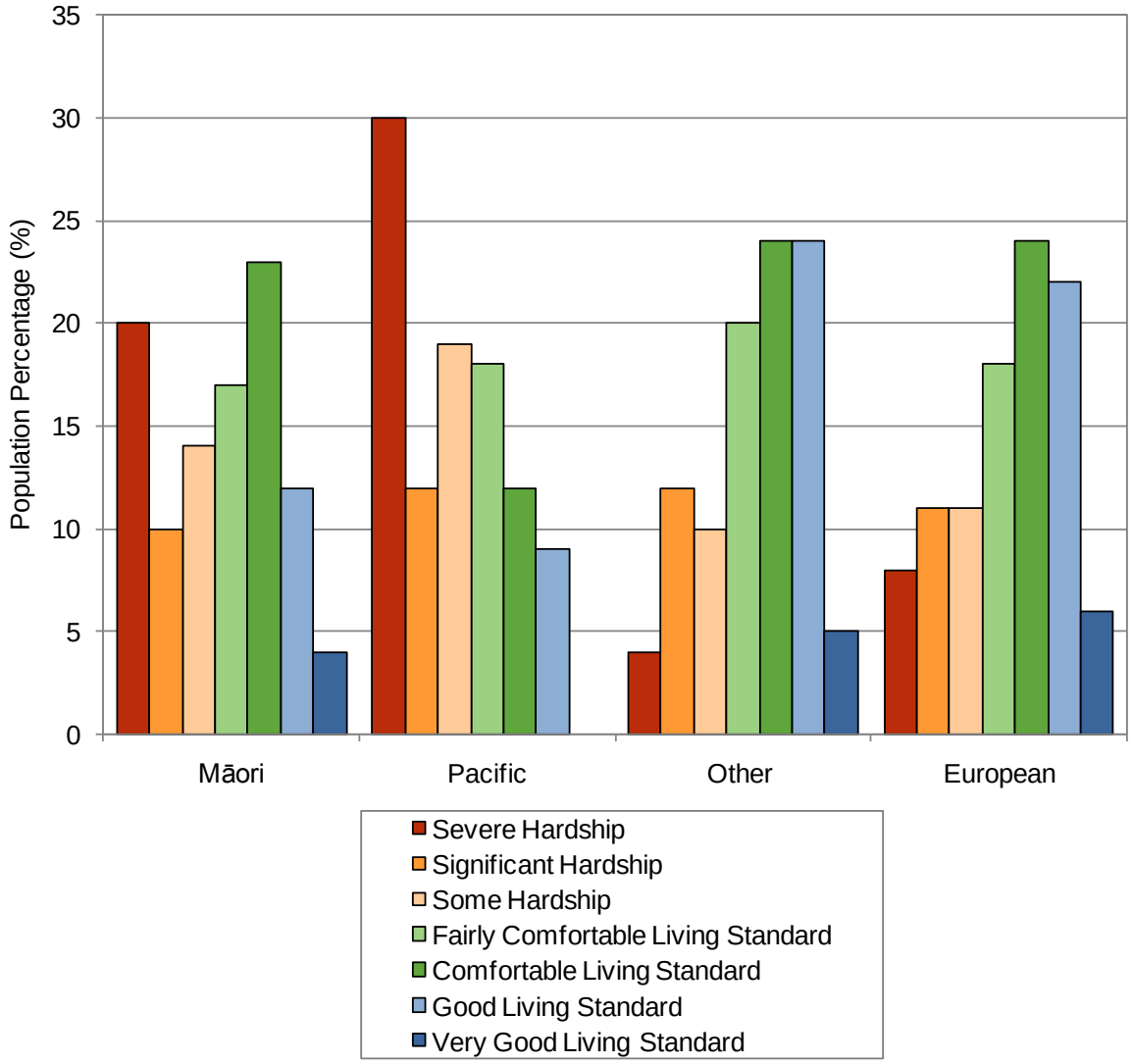
The 2004 Living Standards Survey also explored the constraints placed on children's consumption arising from their families living standards and noted that of children living in severe hardship, 51% had to go without suitable wet weather gear, 38% were unable to have a friend over for a meal, and 34% 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 [14] (**Table 1**).

Figure 10. Living Standards Distribution of Families with Dependent Children by Family Type and Income Source, New Zealand Living Standards Survey 2004



Source: NZ Living Standards Survey [14].

Figure 11**.** Living Standards Distribution of Families with Dependent Children by Family Ethnicity, New Zealand Living Standards Survey 2004



Source: NZ Living Standards Survey [14]; Family Ethnicity is based on total responses to the ethnicity question e.g. if any adult or child specified Pacific as one of their ethnicities, the family is counted as Pacific – thus these ethnic groupings are not mutually exclusive.

Table 1. Constraints on Children's Consumption by their Family's Standard of Living, New Zealand Living Standards Survey 2004

Category	Severe Hardship (Level 1)	Some Hardship (Level 3)	Good / Very Good Living Standards (Level 6 & 7)
Items Not Obtained / Not Participated in Because of Cost (% of Respondents)			
Suitable Wet Weather Clothing for Each Child	51	13	2
A Pair of Shoes in Good Condition	35	5	0
Child's Bike	45	10	1
Play Station or Xbox	37	10	1
Personal Computer	55	23	1
Internet Access'	51	23	0
Pay for Childcare	35	15	2
Have Child's Friends Over for a Meal	38	6	0
Enough Room for Child's Friends to Stay the Night	35	9	0
Have Child's Friends to a Birthday Party	34	11	1
Items of Consumption Cut Back on (a Little or a Lot) Because of Cost (% of Respondents)			
Not Gone on School Outings	66	26	0
Not Brought School Books / Supplies	49	19	0
Not Brought Books for Home	61	33	1
Postponed Child's Visit to Doctor Because of Cost	46	20	1
Postponed Child's Visit to Dentist Because of Cost	36	20	1
Child Went Without Glasses	15	10	0
Child Went Without Cultural Lessons	55	40	4
Child's Involvement in Sports Limited	66	40	1
Child Wore Poorly Fitting Clothes or Shoes	65	33	1
Children Share a Bed	40	7	0
Limited Space for Child to Study or Play	72	34	1

Source: NZ Living Standards Survey [14].

Summary: Living Standards

The Ministry of Social Development has undertaken 3 Living Standards Surveys, in 2000, 2004 and 2008. At the time of writing some preliminary findings from the 2008 Living Standards Survey are available [26], which suggest that:

1. The proportion of children living in hardship (ELSI Levels 1-2) has fallen from 26% to 19% between 2004 and 2008
2. Most of these gains were for low to middle income working families, with hardship rates for sole parent beneficiary families remaining steady at around 55%
3. Hardship rates for sole parent families were around 4 times those for two parent families (39% vs. 11%)
4. Beneficiary families with dependent children had hardship rates around 5 times those of working families with children (50% vs. 11%), with half of children in hardship being from working families and half from beneficiary families
5. Sole parent families in work (20%) had hardship rates well below sole parent beneficiary families (54%)
6. Although hardship rates for children had fallen, children remained significantly over represented in the hardship group

UNEMPLOYMENT RATES

Introduction

In the quarter ending December 2009, seasonally adjusted unemployment rates rose to 7.1%, their eighth consecutive quarterly rise. Since this time rates have fluctuated, with rates falling to 6.0% in March 2010, before increasing to 6.8% in June and then falling again to 6.4% in September 2010 [27]. During this period, unemployment rates have been higher for Māori and Pacific people, young people (particularly those 15-19 years) and those without formal qualifications [28]. Such increases are of concern for New Zealand children and young people two reasons:

Firstly, research suggests that children in families where their parents are unemployed have higher rates of psychosomatic symptoms, chronic illnesses and low wellbeing, and that while the magnitude of these associations is reduced once other potentially mediating factors are taken into account (e.g. parents former occupation, sole parent status, and migrant status), the associations do not disappear completely [29]. Further, research suggests that these negative effects may be mediated via the impact unemployment has on parents mental health, with the mental distress associated with decreased social status, disruption of roles, loss of self esteem and increased financial strain, all impacting negatively on parent's emotional state [29]. This in turn may lead to non-supportive marital interactions, compromised parenting, and children's internalising (e.g. withdrawal, anxiety, depression) and externalising (e.g. aggressive or delinquent behaviour, substance abuse) behaviour [6].

Secondly, for young people research suggests that unemployment leads to a range of negative psychological outcomes including depression, anxiety and low self esteem, which are in turn associated with adverse outcomes such as heavy tobacco, alcohol and drug use; and higher mortality from suicide and accidents [30]. While social support may reduce the psychological distress associated with unemployment, the type of support provided is important (e.g. while positive support from family and friends decreases psychological distress amongst unemployed youth, parental advice may at times increase distress, as it may be perceived as pressure to find a job [30]). On a more positive note, research also suggests that this psychological distress decreases once young people find permanent employment, or return to further education [30].

The following section uses information from Statistics New Zealand's Quarterly Household Labour Force Surveys, to review unemployment rates during the past two decades.

Data Source and Methods

Definition

Unemployment Rate: The number of unemployed people expressed as a percentage of the labour force.

Data Source

Statistics New Zealand, Household Labour Force Survey (n≈15,000 households). Quarterly Since March 1986 and available on Statistics New Zealand's website www.stats.govt.nz

Indicator Category: Proxy B

Notes on Interpretation

Unemployed refers to all people in the working-age population who during the reference week were without a paid job, were available for work and [31]:

(a) had actively sought work in the past four weeks ending with the reference week, or

(b) had a new job to start within four weeks

Note 1: A person whose only job search method in the previous four weeks has been to look at job advertisements in the newspapers is not considered to be actively seeking work.

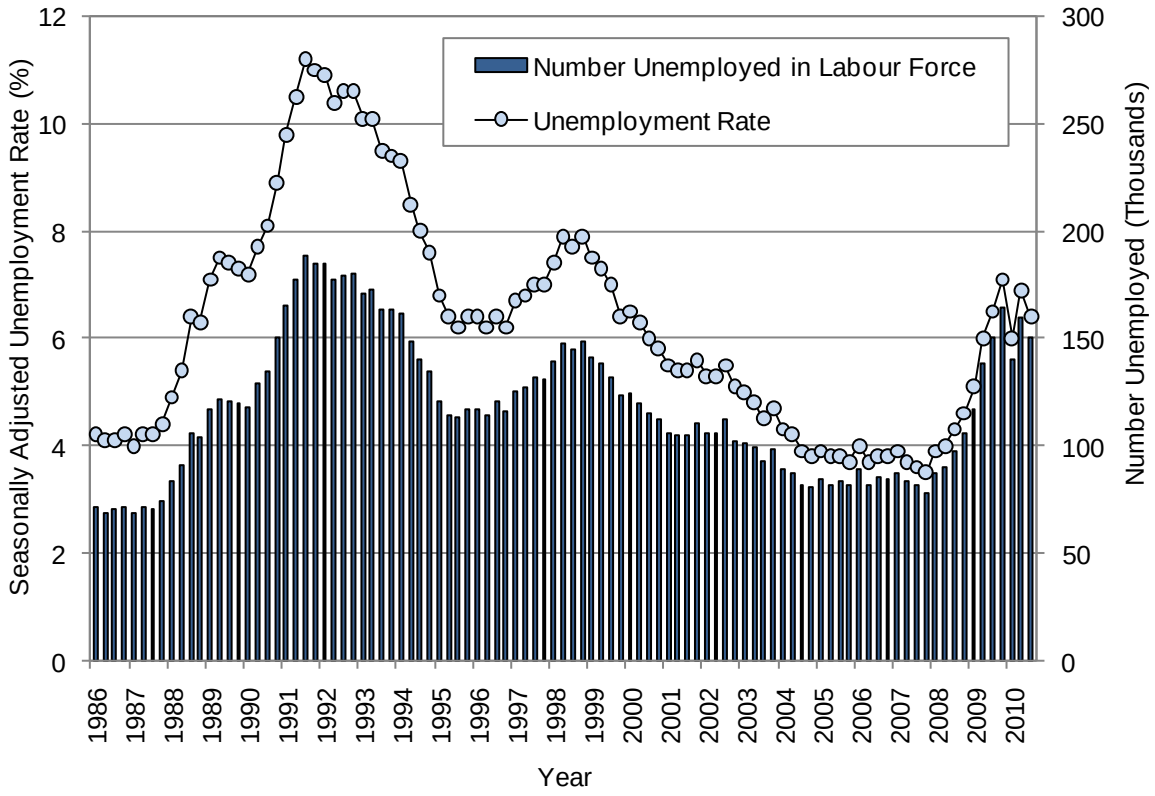
Note 2: Seasonal adjustment makes data for adjacent quarters more comparable by smoothing out the effects of any regular seasonal events. This ensures the underlying movements in time series are more visible. Each quarter, the seasonal adjustment process is applied to the latest and all previous quarters. This means that seasonally adjusted estimates for previously published quarters may change slightly [31].

New Zealand Distribution and Trends

Seasonally Adjusted Unemployment Rates

In the quarter ending September 2010, the seasonally adjusted unemployment rate fell to 6.4%, with seasonally adjusted unemployment numbers decreasing by 10,000 to 150,000 (**Figure 12**). The number of people employed increased by 23,000, with a larger increase being seen for males (1.9%) than for females (0.1%) [27].

Figure 12. Seasonally Adjusted Unemployment Rates, New Zealand Quarter 1 (March) 1986 to Quarter 3 (September) 2010



Source: Statistics New Zealand, Household Labour Force Survey; Rates Have Been Seasonally Adjusted

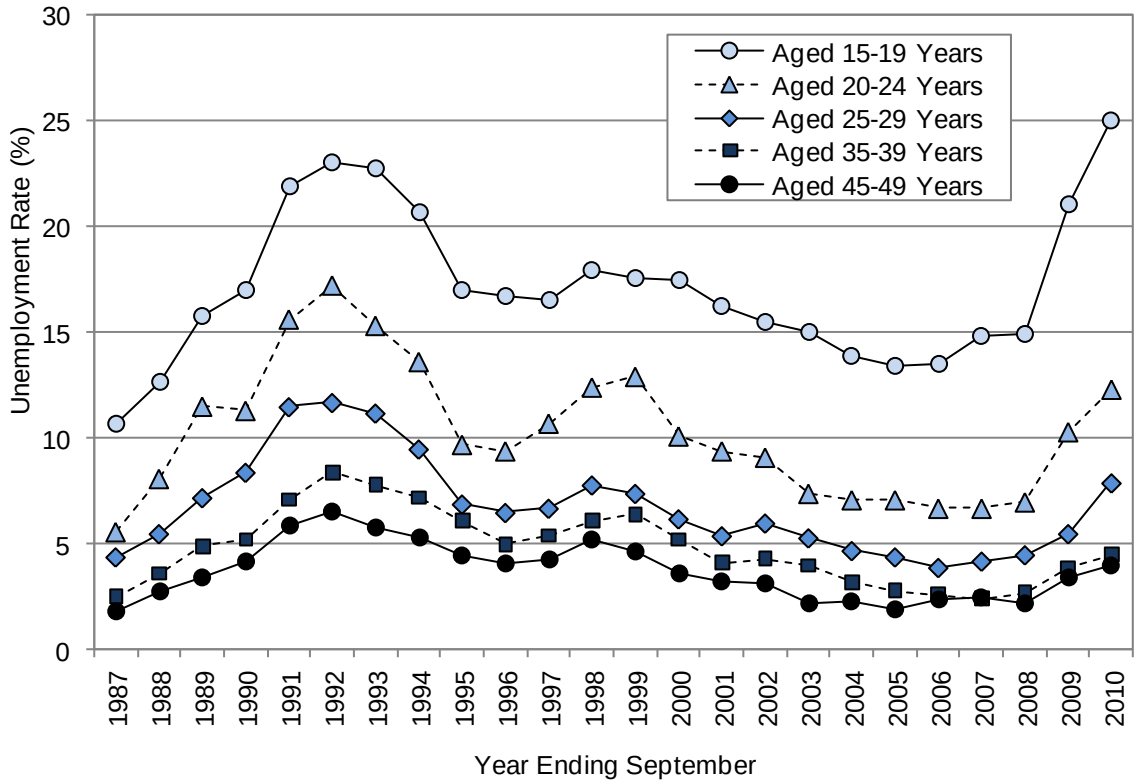
Unemployment Rates by Age

In New Zealand during September 1987-2010, unemployment rates were consistently higher for younger people (15-19 years > 20-24 years > 25-29 years > 35-39 years and 45-49 years). During the year ending September 2010, annual unemployment rates rose to 25.0% for those aged 15-19 years and to 12.3% for those aged 20-24 years (**Figure 13**).

Unemployment Rates by Age and Gender

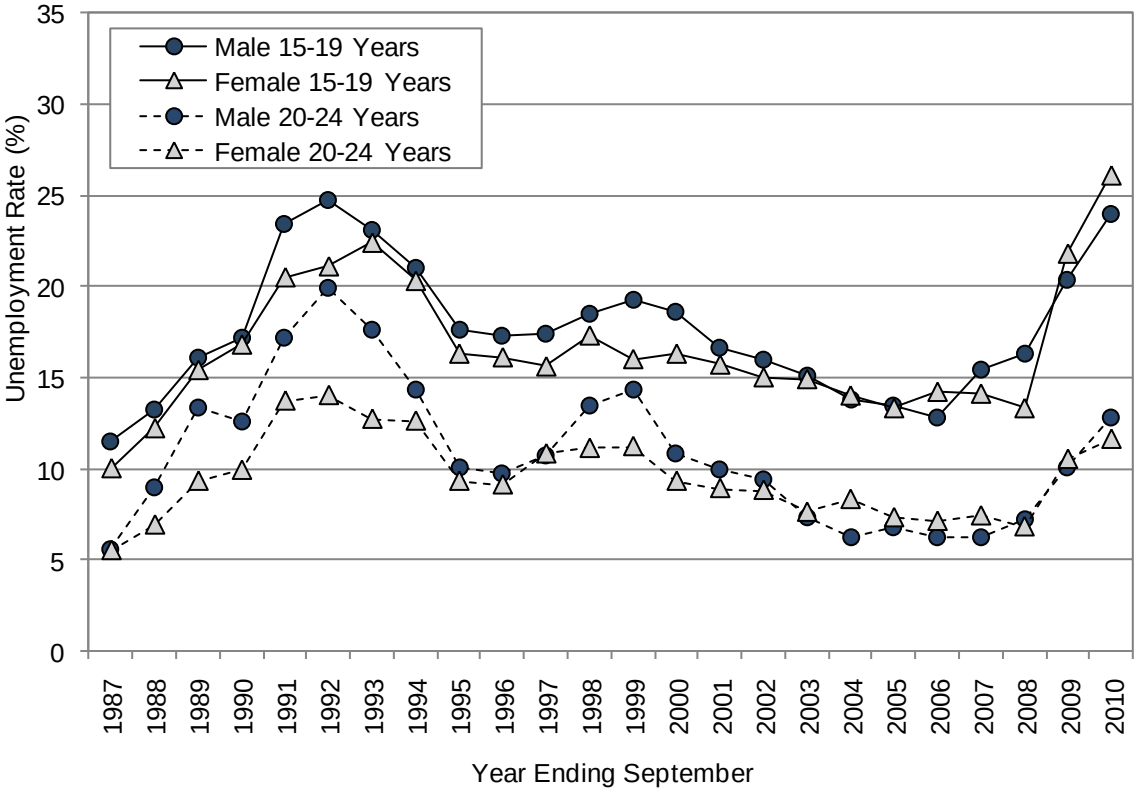
In New Zealand during 1987-2010, there were no consistent gender differences in annual unemployment rates amongst young people aged 15-24 years. During the year ending September 2010, unemployment rates for those aged 15-19 years were 26.1% for females and 24.0% for males, while for those aged 20-24 years, rates were 11.6% for females and 12.8% for males (**Figure 14**).

Figure 13. Annual Unemployment Rates by Age (Selected Age Groups), New Zealand September 1987-2010



Source: Statistics New Zealand Household Labour Force Survey.

Figure 14. Annual Unemployment Rates by Age and Gender in New Zealand Young People Aged 15-24 Years, September 1987-2010



Source: Statistics New Zealand Household Labour Force Survey.

Unemployment Rates by Ethnicity

In New Zealand during 2007(Q4)-2010(Q3) unemployment rates were consistently higher for Māori and Pacific > Asian > European people. While unemployment rates increased for all ethnic groups, in absolute terms, increases were greatest for Māori and Pacific people. Thus by 2010(Q3), unemployment rates were 13.4% for Māori, 13.8% for Pacific, 8.2% for Asian and 4.7% for European people (**Figure 15**).

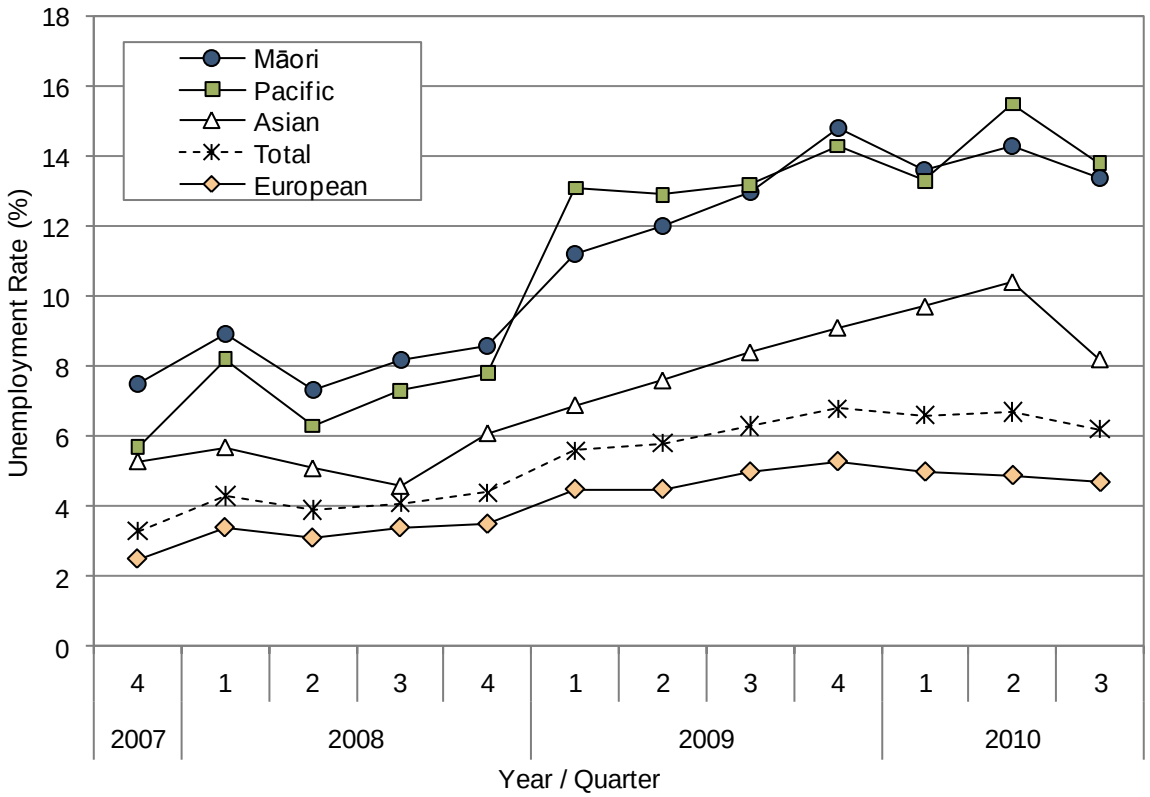
Unemployment Rates by Qualification

In New Zealand during the years ending September 1987-2010, unemployment rates were higher for those with no qualifications > school qualifications, or post school but no school qualifications > both post school and school qualifications. In the year ending September 2010, unemployment rates were 10.6% for those with no qualifications, 8.0% for those with a school qualification, 7.5% for those with post school but no school qualifications and 4.4% for those with both post school and school qualifications (**Figure 16**).

Duration of Unemployment

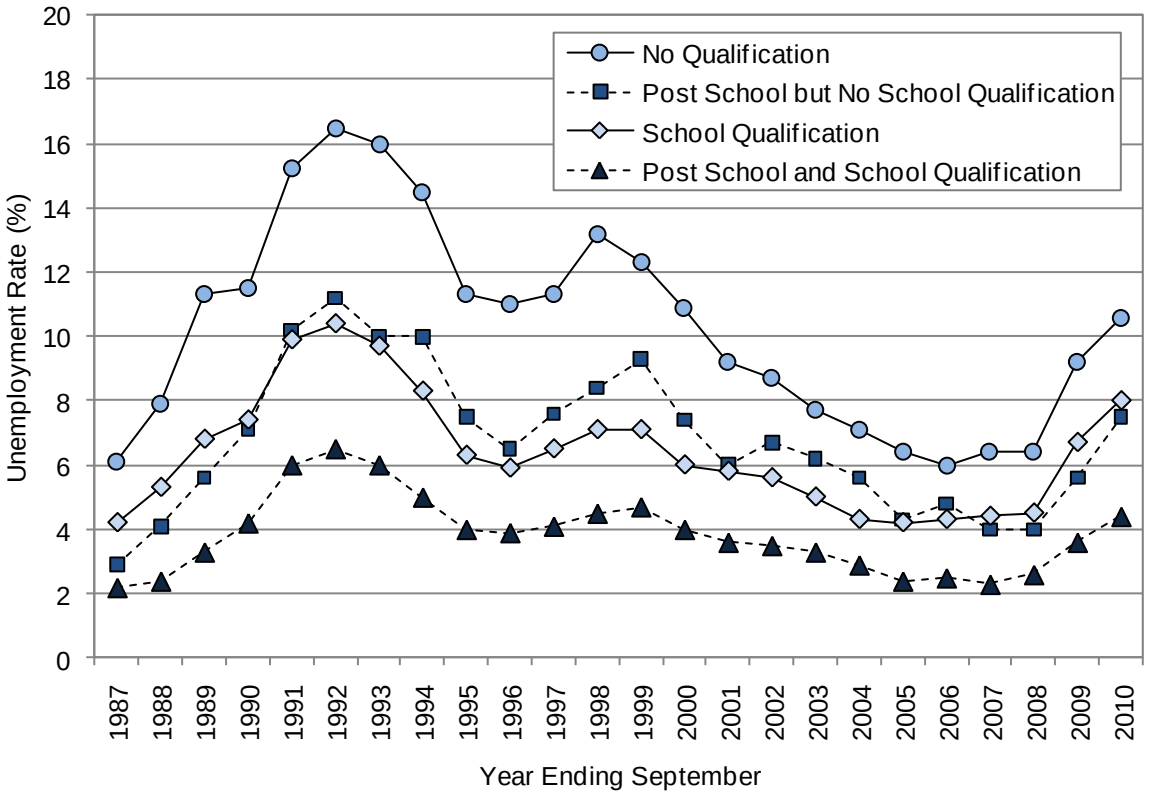
In New Zealand during the years ending September 1987-2010, duration of unemployment varied markedly, and in a manner consistent with prevailing unemployment rates. Thus the highest proportion of people unemployed for 53+ weeks occurred during the early / mid 1990s, when unemployment rates were at their peak, while the highest proportion unemployed for only 1-4 weeks occurred in the mid-2000s, when unemployment rates were at their lowest (**Figure 17**).

Figure 15. Quarterly Unemployment Rates by Total Response Ethnicity, New Zealand Quarter 4 (December) 2007 to Quarter 3 (September) 2010



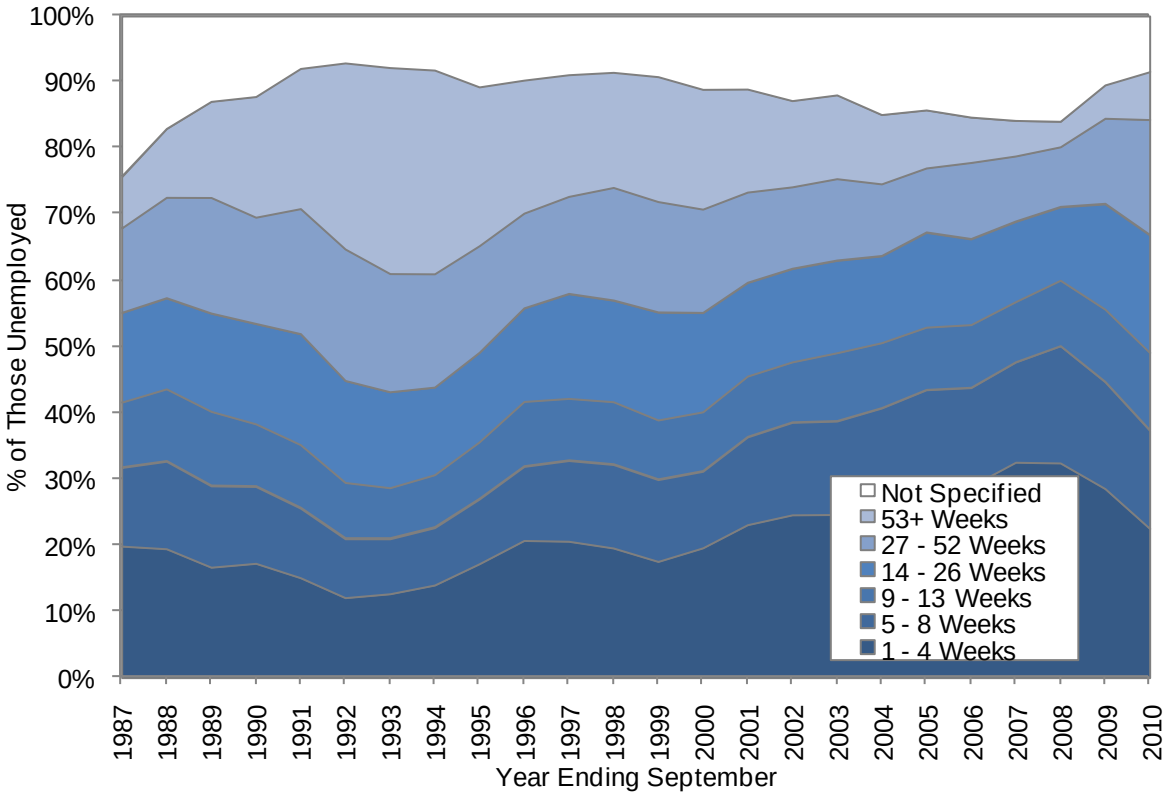
Source: Statistics New Zealand Household Labour Force Survey. Note: Ethnicity is Total Response.

Figure 16. Annual Unemployment Rates by Qualification, New Zealand September 1987-2010



Source: Statistics New Zealand Household Labour Force Survey

Figure 17. Proportion of those Unemployed by Duration of Unemployment, New Zealand September 1987-2010



Source: Statistics New Zealand Household Labour Force Survey

Summary

In New Zealand in the quarter ending September 2010, seasonally adjusted unemployment fell to 6.4%, with seasonally adjusted unemployment numbers decreasing by 10,000 to 150,000. During September 1987-2010, unemployment rates were higher for younger people (15-19 years > 20-24 years > 25-29 years > 35-39 years and 45-49 years) and those with no qualifications > school qualifications, or post school but no school qualifications > both post school and school qualifications, although there were no consistent gender differences for young people 15-24 years. During 2007(Q4)-2010(Q3) unemployment rates were higher for Māori and Pacific > Asian > European people. While unemployment rates increased for all ethnic groups, in absolute terms, increases were greatest for Māori and Pacific people.

CHILDREN RELIANT ON BENEFIT RECIPIENTS

Introduction

In New Zealand, children who are reliant on benefit recipients are a particularly vulnerable group. During 2009, 75% of all households (including those with and without children) relying on income-tested benefits as their main source of income were living below the poverty line (housing adjusted equivalent disposable income <60% of 2007 median) [32]. This proportion has increased over the past two decades, rising from 39% of benefit dependent households in 1990, to a peak of 76% in 1994, and then remaining in the low-mid 70s ever since [32], with these trends being attributed to three 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 [13].

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 [13]. The 2004 Living Standards Survey suggested that the picture may have worsened between 2000 and 2004, with the proportion of benefit dependent families living in severe or significant hardship increasing from 39% in 2000 to 58% in 2004 [14].

The following section reviews the number of children aged 0-18 years who were dependent on benefit recipients during April 2000-2010, using information from the Ministry of Social Development's SWIFTT database. While the number of children reliant on benefit recipients does not correlate precisely with the number living below the poverty line (in 2004 they comprised 60% of those in poverty [33]), in the context of New Zealand's recent rise in unemployment rates, they nevertheless reflect a particularly vulnerable group, who may have higher health needs, and as a consequence, may impact increasingly on future health service demand.

Data Source and Methods

Definition

Children Reliant on a Benefit or a Benefit Recipient by Benefit Type

Data Source

Numerator: Number of Children Aged 0-18 years who were reliant on a Benefit or Benefit Recipient as recorded in the Ministry of Social Development's SWIFTT database

Denominator: NZ Statistics NZ Estimated Resident Population

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 2000-2010. All figures unless stated otherwise, refer to the number of children who were dependent on a benefit or benefit recipient as at the end of April and provide no information on those receiving assistance at other times of the year. Note: New Zealand level trend data is for children 0-18 years, whereas Service Centre Data may also include a very small number (n=5 in 2010) who are aged 19+ years.

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) and Emergency Maintenance Allowance: 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 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.

Other Benefits: In this section, Other Benefits includes DPB Women Alone and Caring for Sick or Infirm, NZ Superannuation, Veterans and Transitional Retirement Benefit, Emergency Benefits and Widows Benefit, Independent Youth Benefit, Unemployment Benefit Training and Unemployment Benefit Training Hardship, Unemployment Benefit Student Hardship, Orphan's Benefit and Unsupported Child's Benefit.

Indicator Category Ideal B-C

New Zealand Distribution and Trends

Total Number of Children Reliant on a Benefit or Benefit Recipient

In New Zealand, the number of children aged 0-18 years who were reliant on a benefit, or benefit recipient, fell from 280,025 in April 2000, to 211,609 in April 2008, before increasing again to 243,884 in April 2010. A large proportion of this variation was due to changes in the number of in children relying on unemployment benefit recipients, with numbers in this category falling from 49,499 in April 2000, to 5,289 in April 2008, before increasing again to 16,380 in April 2010. Similarly the number of children reliant on DPB recipients fell from 188,216 in April 2000, to 158,173 in April 2008, before increasing again to 177,226 in April 2010 (**Table 2**).

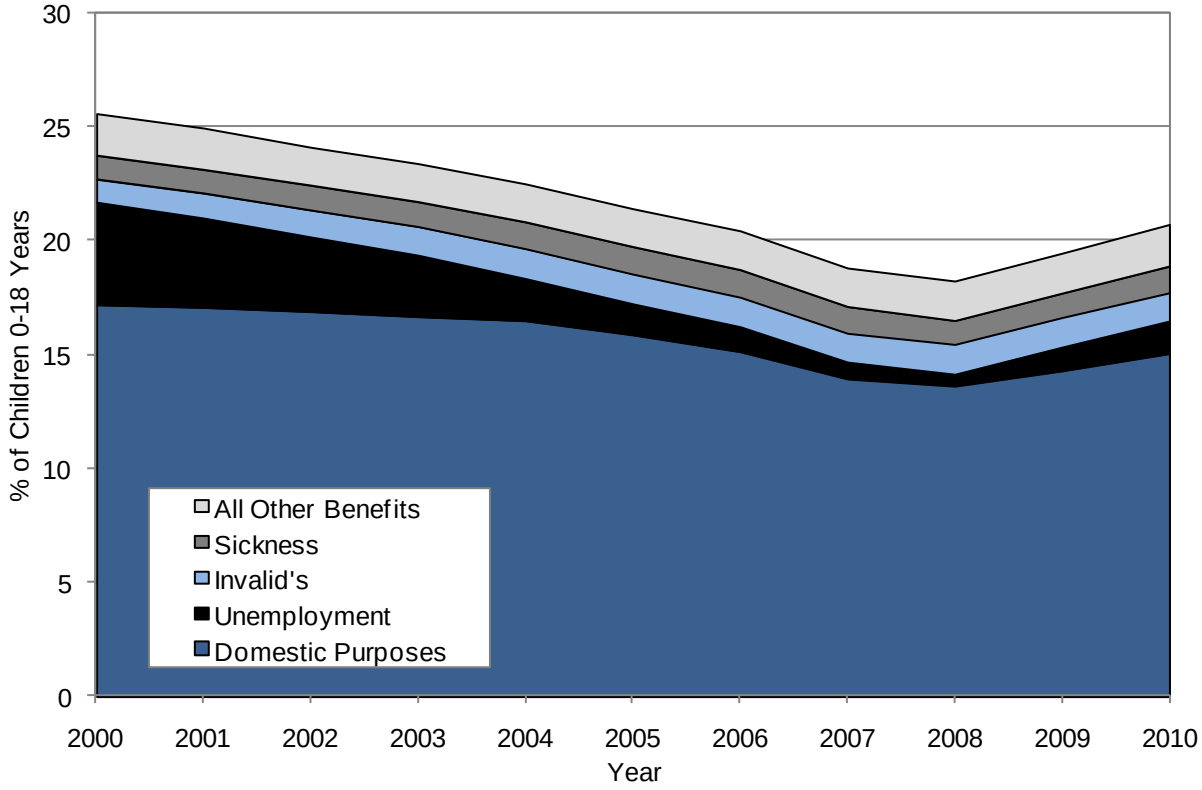
Proportion of All New Zealand Children Reliant on a Benefit Recipient

In New Zealand the proportion of children aged 0-18 years who were reliant on a benefit, or benefit recipient, fell from 25.6% in April 2000 to 18.3% in April 2008, before increasing again to 20.7% in April 2010. A large proportion of the initial decline was due to a fall in the number of children reliant on unemployment benefit recipients (from 4.5% of children in 2000 to 0.5% in April 2008 → to 1.4% in April 2010). While the proportion of children reliant on DPB recipients also fell (17.2% of children in April 2000, to 13.6% in April 2008, to 15.1% in April 2010) (**Figure 18**), the rate of decline was much slower than for unemployment benefits, meaning that in relative terms, the proportion of benefit dependent children reliant on DPB recipients actually increased, from 67.2% of all benefit dependent children in April 2000, to 72.7% in April 2010 (**Table 2**).

Age Distribution

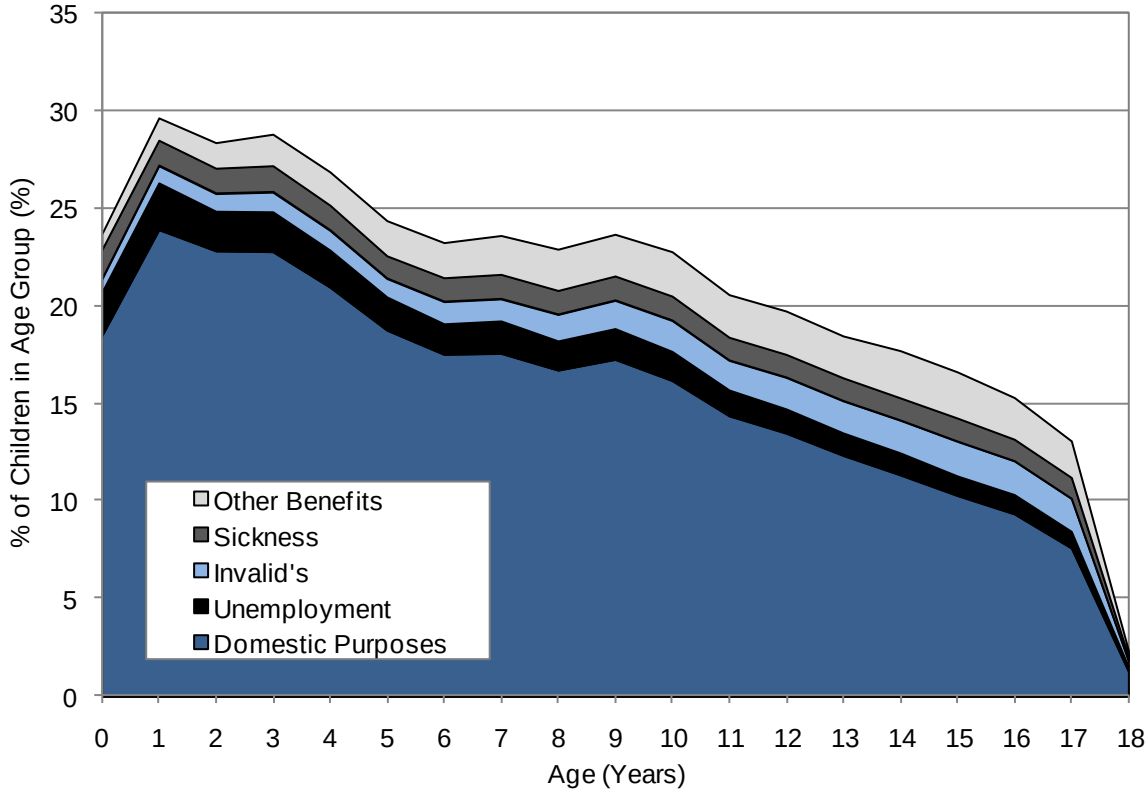
During April 2010, the proportion of children reliant on a benefit, or benefit recipient, was highest amongst those 0-4 years of age. Rates then tapered off rapidly, reaching a plateau in middle childhood (6-9 years). After 10 years of age however, rates again declined, reaching their lowest point at 18 years of age (**Figure 19**).

Figure 18. Proportion of All Children Aged 0-18 Years Who Were Reliant on a Benefit or Benefit Recipient by Benefit Type, New Zealand April 2000-2010



Source: Numerator: Ministry of Social Development; Denominator: Statistics NZ Estimated Resident Population; For Composition of Other Benefits, see Methods Section; Non Benefit Assistance not included.

Figure 19. Proportion of All Children Aged 0-18 Years Who Were Reliant on a Benefit or Benefit Recipient by Age and Benefit Type, New Zealand April 2010



Source: Numerator: Ministry of Social Development; Denominator: Statistics NZ Estimated Resident Population; For Composition of Other Benefits, see Methods Section; Non Benefit Assistance not included.

Table 2. Number of Children Aged 0-18 Years Who Were Reliant on a Benefit or Benefit Recipient by Benefit Type, New Zealand April 2000-2010

Year	Domestic Purposes		Unemployment		Invalids		Sickness		All Other Benefits		Total
	Number	%	Number	%	Number	%	Number	%	Number	%	Number
2000	188,216	67.2	49,499	17.7	11,120	4.0	11,295	4.0	19,895	7.1	280,025
2001	187,791	68.5	43,245	15.8	12,122	4.4	11,253	4.1	19,893	7.3	274,304
2002	187,207	70.1	36,342	13.6	13,219	4.9	11,983	4.5	18,346	6.9	267,097
2003	186,184	71.3	30,067	11.5	14,225	5.4	12,119	4.6	18,579	7.1	261,174
2004	185,610	73.3	20,663	8.2	15,053	5.9	13,182	5.2	18,696	7.4	253,204
2005	180,035	74.1	15,134	6.2	15,214	6.3	13,636	5.6	18,783	7.7	242,802
2006	172,995	74.1	12,069	5.2	15,332	6.6	13,797	5.9	19,384	8.3	233,577
2007	160,634	74.2	7,819	3.6	15,247	7.0	13,515	6.2	19,396	9.0	216,611
2008	158,173	74.7	5,289	2.5	15,962	7.5	12,128	5.7	20,057	9.5	211,609
2009	167,142	73.5	11,581	5.1	15,800	6.9	12,482	5.5	20,404	9.0	227,409
2010	177,226	72.7	16,380	6.7	15,116	6.2	13,752	5.6	21,410	8.8	243,884

Source: Ministry of Social Development; *Note: % refers to % of children relying on benefit recipients, rather than % of all children. For Composition of Other Benefits, see Methods Section; Non Benefit Assistance not included.

Summary

In New Zealand the proportion of children aged 0-18 years who were reliant on a benefit, or benefit recipient, fell from 25.6% in April 2000 to 18.3% in April 2008, before increasing again to 20.7% in April 2010. A large proportion of the initial decline was due to a fall in the number of children reliant on unemployment benefit recipients (from 4.5% of children in 2000 to 0.5% in April 2008 → to 1.4% in April 2010). While the proportion of children reliant on DPB recipients also fell (17.2% of children in April 2000, to 13.6% in April 2008, to 15.1% in April 2010), the rate of decline was much slower than for unemployment benefits, meaning that in relative terms, the proportion of benefit dependent children reliant on DPB recipients actually increased, from 67.2% of all benefit dependent children in April 2000, to 72.7% in April 2010.

THE CHILDREN'S SOCIAL HEALTH MONITOR: HEALTH AND WELLBEING INDICATORS

HOSPITAL ADMISSIONS AND MORTALITY WITH A SOCIAL GRADIENT IN CHILDREN

In New Zealand, many child health outcomes exhibit a social gradient, with hospital admissions and mortality from socioeconomically sensitive conditions being several times higher for Māori and Pacific children, and those living in the most deprived areas [1]. Such disparities have persisted, despite one of the longest periods of economic growth in recent decades, as well as historically low unemployment rates.

As earlier sections of this report have demonstrated, New Zealand's macroeconomic environment has changed markedly over the past two years, with rises in unemployment and increases in the number of children reliant on benefit recipients. The impact these changes will have on socially sensitive health outcomes remains unclear however, as international evidence suggests that the effects may vary, not only with the magnitude and duration of any economic downturn, but also as a result of the Government's social policy responses, and the extent to which New Zealand can maintain an effective social safety net (e.g. in housing, health, education, income support) for those most affected. Further, the adaptations families make to their economic circumstances (e.g. cutting back on heating and doctor's visits vs. reductions in cigarettes and takeaways), are also important, with the net impact of such positive / negative adaptations on health outcomes for children being difficult to predict (for a more detailed review of these issues see last year's report).

As predicting the impact of the current economic downturn on child wellbeing is difficult, it would instead seem prudent to monitor a basket of key child health outcomes over time, in order to ensure that any impacts on child health and wellbeing can be identified early, and so that proactive and co-ordinated responses can be put in place, should the need arise. The following section thus uses data from the National Minimum Dataset and the National Mortality collection to review hospital admissions for, and mortality from, the basket of socially sensitive conditions which were presented for the first time in last year's Monitor.

Data Source and Methods

Definition

1. Hospital Admissions for Medical Conditions with a Social Gradient in Children Aged 0-14 Years
2. Injury Admissions with a Social Gradient in Children Aged 0-14 Years
3. Mortality with a Social Gradient in Children Aged 0-14 Years

Data Source

For details of the methodology used to derive these indicators see **Appendix 9**

Numerator:

Hospital Admissions for Medical Conditions with a Social Gradient: Acute and Arranged Hospital Admissions (Waiting List, ACC Cases and neonates <29 days excluded) in children aged 0-14 years with the following ICD-10-AM primary diagnoses: A00-A09 or R11 (Gastroenteritis); A15-A19 (Tuberculosis); A33, A34, A35, A36, A37, A80, B05, B06, B16, B26, B18.0, B18.1, P35.0 or M01.4 (Vaccine Preventable Diseases); A39 (Meningococcal Disease); B34 (Viral Infection of Unspecified Site); E40-E64 or D50-D53 (Nutritional Deficiencies / Anaemias); J00-J03 or J06 (Acute Upper Respiratory Infections); J04 (Croup / Laryngitis / Tracheitis / Epiglottitis); J12, J10.0 or J11.0 (Viral Pneumonia); J13-J16 or J18 (Bacterial / Non-Viral Pneumonia); J21 (Acute Bronchiolitis); J45 or J46 (Asthma); J47 (Bronchiectasis); G00 or G01 (Bacterial Meningitis); A87, G02 or G03 (Viral / Other / NOS Meningitis); G40 or G41 (Epilepsy/ Status Epilepticus); H65, H66 or H67 (Otitis Media); I00-I09 (Rheumatic Fever/Heart Disease); K40 (Inguinal Hernia); L00-L08, H00.0, H01.0, J34.0 or L98.0 (Skin Infections); L20-L30 (Dermatitis and Eczema); M86 (Osteomyelitis); N10, N12, N13.6, N30.0, N30.9 or N39.0 (Urinary Tract Infection); R56.0 (Febrile Convulsions).

Injury Admissions with a Social Gradient: Hospital admissions (emergency department cases, neonates <29 days excluded) in children 0-14 years, with a primary diagnosis of injury (ICD-10-AM S00-T79) and an ICD-10-AM primary external cause code in the following range: V01-V09 (Transport: Pedestrian); V10-V19 (Transport: Cyclist); V40-V79 (Transport: Vehicle Occupant); W00-W19 (Falls); W20-W49 (Mechanical Forces: Inanimate); W50-W64 (Mechanical Forces: Animate); W85-X19 (Electricity / Fire / Burns); X40-X49 (Accidental Poisoning); In order to ensure comparability over time, all injury cases with an Emergency Department Specialty Code (M05-M08) on discharge were excluded.

Mortality with a Social Gradient: All deaths in children 0-14 years, (neonates <29 days excluded) with a main underlying cause of death in the ICD-10-AM medical and injury categories outlined above. In addition post-

neonatal Sudden Unexpected Deaths in Infancy (SUDI) were included, if the child was aged between 29 days and 1 year and their main underlying cause of death was SUDI (ICD-10-AM R95, W75, R99).

Denominator: NZ Statistics NZ Estimated Resident Population

Indicator Category Proxy B-C

Notes on Interpretation (For Further Detail See **Appendix 9**)

Note 1: Hospital admissions in neonates (<29 days) were excluded from both indicators, as these admissions are more likely to reflect issues arising prior to / at the time of birth, (e.g. preterm infants may register multiple admissions as they transition from intensive care (NICU), through special care nurseries (SCBU) to the postnatal ward), and respiratory infections / other medical conditions arising in these contexts are likely to differ in their aetiology from those arising in the community.

Note 2: For medical conditions, only acute and arranged admissions have been included, as Waiting List admissions tend to reflect service capacity, rather than actual health need (e.g. inclusion of these admissions would result in a large number of children with otitis media with effusion (OME) and chronic tonsillitis being included (for grommets and tonsillectomies), whose demographic profile is very different from children attending hospital acutely for similar diseases). For injury admissions however, filtering by admission type could not occur, as a number of DHBs admitted injury cases under (now discontinued) ACC admission codes, making it difficult to distinguish between acute and waiting list admissions in this context. As with other injury data in these reports however, all injury cases with an Emergency Department Specialty Code (M05-M08) on discharge were excluded (see **Appendix 4** for rationale).

Note 3: Hospital admissions were considered to have a social gradient if rates for those in the most deprived (NZDep Decile 9-10) areas were ≥1.8 times higher than for those in the least deprived (NZDep Decile 1-2) areas, or where ethnic differences (Māori, Pacific or Asian vs. European children) met these criteria. In addition, a small number of conditions were included where rates were ≥1.5 times higher, they demonstrated a consistent social gradient, and the association was biologically plausible.

Note 4: When considering the magnitude of social gradients between medical and injury admissions, it must be remembered that these differences are not strictly comparable, as for technical reasons emergency department cases have been removed from injury admissions (and social differences in attendance at the Emergency Department vs. primary care for minor medical conditions may have accounted for some (but not all) of the social gradients in medical admission seen). No such differential filtering occurred for mortality data however, and thus the magnitude of the social differences seen is more readily comparable.

Note 5: 95% confidence intervals have been provided for the rate ratios in this section and where appropriate, the terms significant or not significant have been used to communicate the significance of the observed associations. Tests of statistical significance have not been applied to other data in this section, and thus (unless the terms *significant* or *non-significant* are specifically used) the associations described do not imply statistical significance or non-significance (see **Appendix 1** for further discussion of this issue).

Note 6: SUDI rates are traditionally calculated per 1,000 live births. For this analysis rates for those aged 0-14 years have been calculated, so that the relative contribution SUDI makes to mortality in this age group (as compared to other causes of death) is more readily appreciated. As a result, the SUDI rates in this section are not readily comparable to traditional SUDI mortality rates for those <1 year.

New Zealand Distribution and Trends

Distribution by Cause

Hospital Admissions: In New Zealand during 2005-2009, bronchiolitis, asthma and gastroenteritis made the largest individual contributions to hospitalisations for medical conditions with a social gradient, although infectious and respiratory diseases collectively were responsible for the majority of admissions. Similarly falls, followed by inanimate mechanical forces were the leading causes of injury admissions with a social gradient, although transport accidents as a group also made a significant contribution (**Table 3**).

Mortality: In New Zealand during 2003-2007, SUDI made the single largest contribution to mortality with a social gradient in children aged 0-14 years. This occurred despite the fact that, by definition, all of these deaths occurred during the first year of life. Vehicle occupant related deaths made the second largest contribution, followed by pedestrian injuries and drowning, while bacterial / non viral pneumonia was the leading cause of mortality from medical conditions (**Table 4**).

Table 3. Hospital Admissions for Conditions with a Social Gradient in Children Aged 0-14 Years (excluding Neonates) by Cause, New Zealand 2005-2009

Diagnosis	New Zealand			
	Number: Total 2005-2009	Number: Annual Average	Rate per 1,000	% of Total
Medical Conditions				
Acute Bronchiolitis	24,808	4,961.6	5.57	14.63
Asthma	23,802	4,760.4	5.35	14.03
Gastroenteritis	21,610	4,322.0	4.85	12.74
Acute Upper Respiratory Infections Excl Croup	18,566	3,713.2	4.17	10.95
Viral Infection of Unspecified Site	17,084	3,416.8	3.84	10.07
Bacterial/Non-Viral Pneumonia	15,207	3,041.4	3.42	8.97
Skin Infections	14,401	2,880.2	3.23	8.49
Urinary Tract Infection	6,246	1,249.2	1.40	3.68
Croup/Laryngitis/Tracheitis/Epiglottitis	5,269	1,053.8	1.18	3.11
Epilepsy/ Status	3,932	786.4	0.88	2.32
Otitis Media	3,700	740.0	0.83	2.18
Febrile Convulsions	3,686	737.2	0.83	2.17
Dermatitis and Eczema	2,854	570.8	0.64	1.68
Viral Pneumonia	1,796	359.2	0.40	1.06
Inguinal Hernia	1,548	309.6	0.35	0.91
Osteomyelitis	1,168	233.6	0.26	0.69
Rheumatic Fever/Heart Disease	881	176.2	0.20	0.52
Bronchiectasis	763	152.6	0.17	0.45
Viral / Other / NOS Meningitis	698	139.6	0.16	0.41
Meningococcal Disease	533	106.6	0.12	0.31
Vaccine Preventable Diseases	440	88.0	0.10	0.26
Nutritional Deficiencies/Anaemias	291	58.2	0.07	0.17
Bacterial Meningitis	245	49.0	0.06	0.14
Tuberculosis	72	14.4	0.02	0.04
New Zealand Total	169,600	33,920.0	38.09	100.00
Injury Admissions				
Falls	23,454	4,690.8	5.27	48.05
Mechanical Forces: Inanimate	14,171	2,834.2	3.18	29.03
Transport: Cyclist	3,080	616.0	0.69	6.31
Accidental Poisoning	2,497	499.4	0.56	5.12
Electricity / Fire / Burns	2,026	405.2	0.46	4.15
Transport: Vehicle Occupant	1,294	258.8	0.29	2.65
Mechanical Forces: Animate	1,092	218.4	0.25	2.24
Transport: Pedestrian	1,023	204.6	0.23	2.10
Drowning / Submersion	179	35.8	0.04	0.37
New Zealand Total	48,816	9,763.2	10.96	100.00

Source: Numerator: National Minimum Dataset (Neonates Removed); Denominator: Statistics NZ Estimated Resident Population. Medical Conditions: Acute and Arranged Admissions only; Injury Admissions: Emergency Department Cases removed.

Table 4. Mortality from Conditions with a Social Gradient in Children Aged 0-14 Years (excluding Neonates) by Cause, New Zealand 2003-2007

Diagnosis	New Zealand			
	Number: Total 2003-2007	Number: Annual Average	Rate per 100,000	% of Total
Medical Conditions				
Bacterial/Non-Viral Pneumonia	43	8.6	0.97	29.5
Epilepsy/ Status	18	3.6	0.41	12.3
Meningococcal Disease	17	3.4	0.38	11.6
Viral Pneumonia	14	2.8	0.32	9.6
Bacterial Meningitis	12	2.4	0.27	8.2
Asthma	10	2.0	0.23	6.8
Gastroenteritis	7	1.4	0.16	4.8
Acute Bronchiolitis	6	1.2	0.14	4.1
Other Medical Conditions	19	3.8	0.43	13.0
Total Medical Conditions	146	29.2	3.30	100.0
Injuries				
Transport: Vehicle Occupant	82	16.4	1.85	32.5
Transport: Pedestrian	55	11.0	1.24	21.8
Drowning / Submersion	49	9.8	1.11	19.4
Electricity / Fire / Burns	22	4.4	0.50	8.7
Transport: Cyclist	12	2.4	0.27	4.8
Falls	12	2.4	0.27	4.8
Mechanical Forces: Inanimate	11	2.2	0.25	4.4
Accidental Poisoning	6	1.2	0.14	2.4
Mechanical Forces: Animate	<5	s	s	s
Total Injuries	252	50.4	5.69	100.0
Post Neonatal SUDI				
Post Neonatal SUDI	267	53.4	6.03	100.0
Total	665	133.0	15.01	100.0

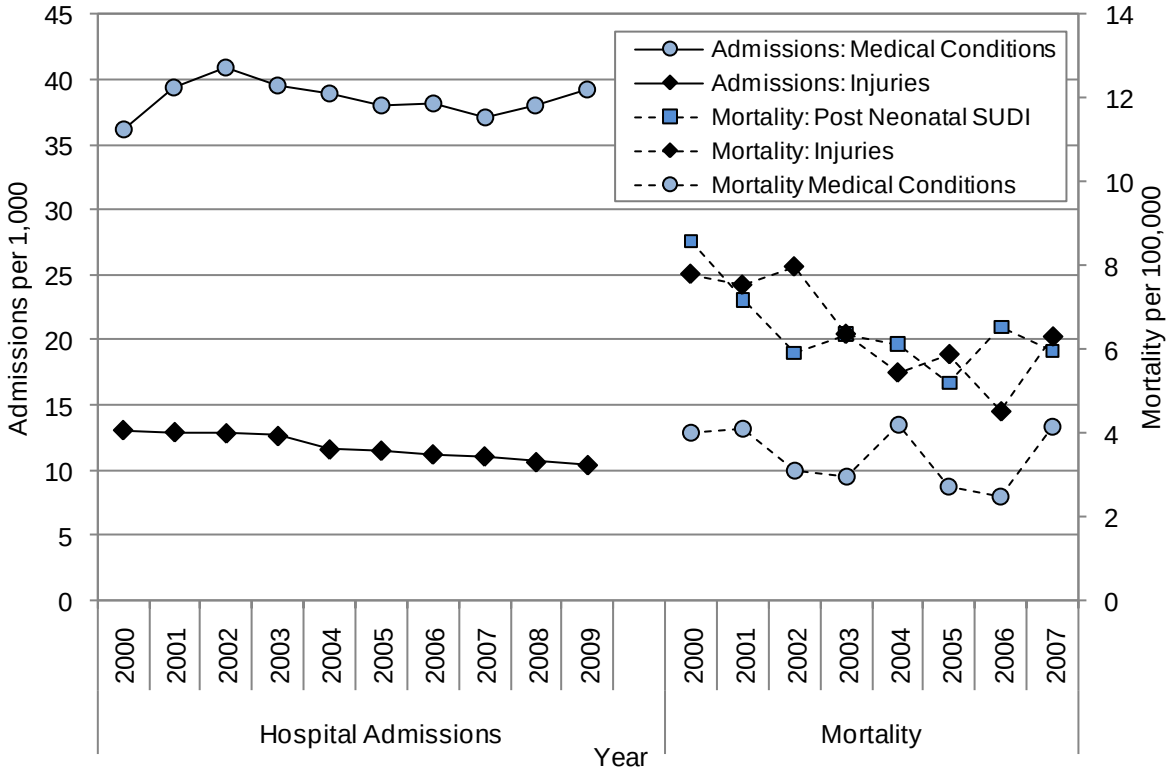
Source: Numerator: National Mortality Collection (Neonates removed); Denominator: Statistics NZ Estimated Resident Population. Note SUDI deaths are for infants aged 29-364 days only.

New Zealand Trends

Hospital Admissions: In New Zealand, medical admissions with a social gradient increased during the early 2000s, reached peak in 2002 and then declined, with an upswing in rates again being evident during 2007-2009. In contrast, injury admissions with a social gradient declined throughout 2000-2009 (**Figure 20**).

Mortality: In New Zealand, injury mortality with a social gradient declined during 2000-2006, with a small upswing in rates being evident in 2007. Mortality from medical conditions with a social gradient exhibited a fluctuating downward trend during 2000-2006, with an upswing in rates also being evident in 2007 (in both cases, it remains unclear whether this upswing reflects normal year to year variation, or the beginning of an upward trend, with 1-2 years more data being required to determine this). In contrast, post-neonatal SUDI declined during 2000-2002, and thereafter remained relatively static (**Figure 20**).

Figure 20. Hospital Admissions (2000-2009) and Mortality (2000-2007) from Conditions with a Social Gradient in New Zealand Children Aged 0-14 Years (excluding Neonates)



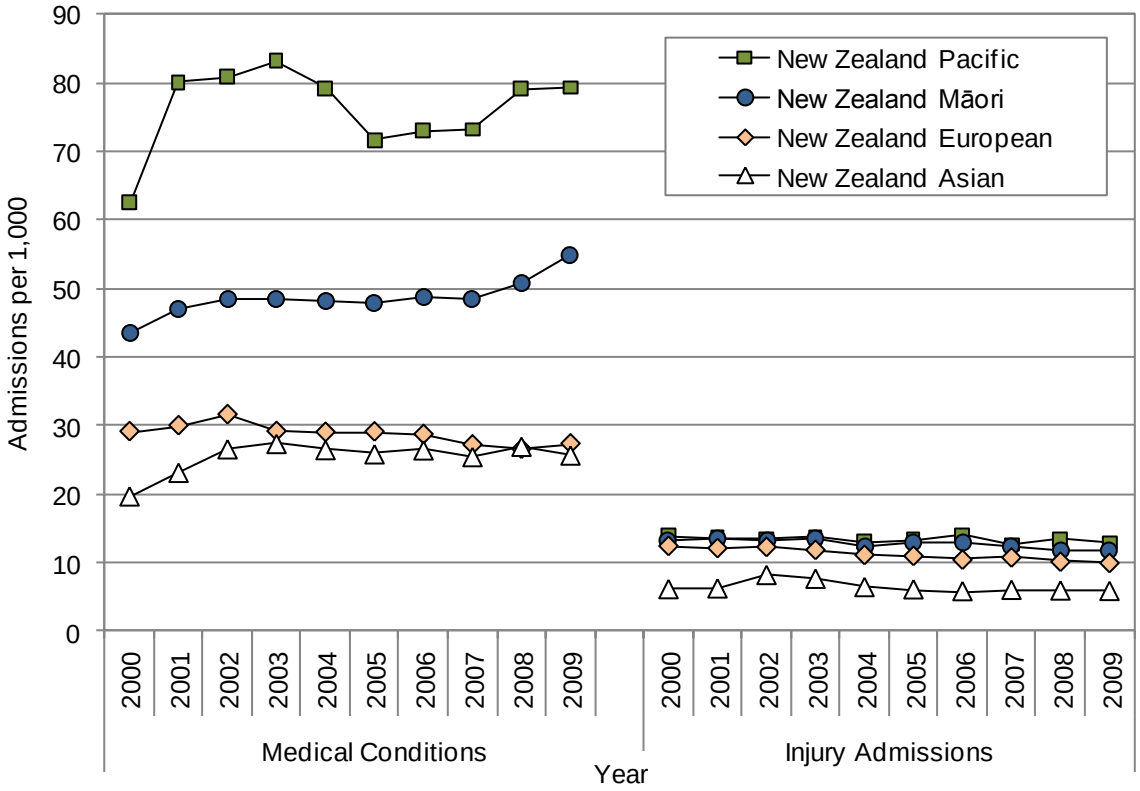
Source: Numerator Admissions: National Minimum Dataset (Neonates Removed); Numerator Mortality: National Mortality Collection (Neonates Removed); Denominator: Statistics NZ Estimated Resident Population. Medical Conditions Admissions: Acute and Arranged Admissions Only; Injury Admissions: Emergency Department Cases Removed.

Trends by Ethnicity

Hospital Admissions: In New Zealand during 2000-2009, hospitalisations for medical conditions with a social gradient were consistently higher for Pacific > Māori > European and Asian children. For Pacific children, admissions increased during the early 2000s, reached a peak in 2003 and then declined, with an upswing in rates again being evident during 2007-2009. For Māori children, rates were static during the early-mid 2000s, but began to increase after 2007, while for Asian children rates during 2002-2009 remained relatively static. In contrast, for European children rates declined gradually during 2002-2009. Injury admissions with a social gradient were also higher for Pacific and Māori > European > Asian children, and while in absolute terms the magnitude of these differences appeared to be less marked than for medical conditions, for technical reasons, comparisons between these categories is not strictly possible (see Note 4 in Methods section) (**Figure 21**).

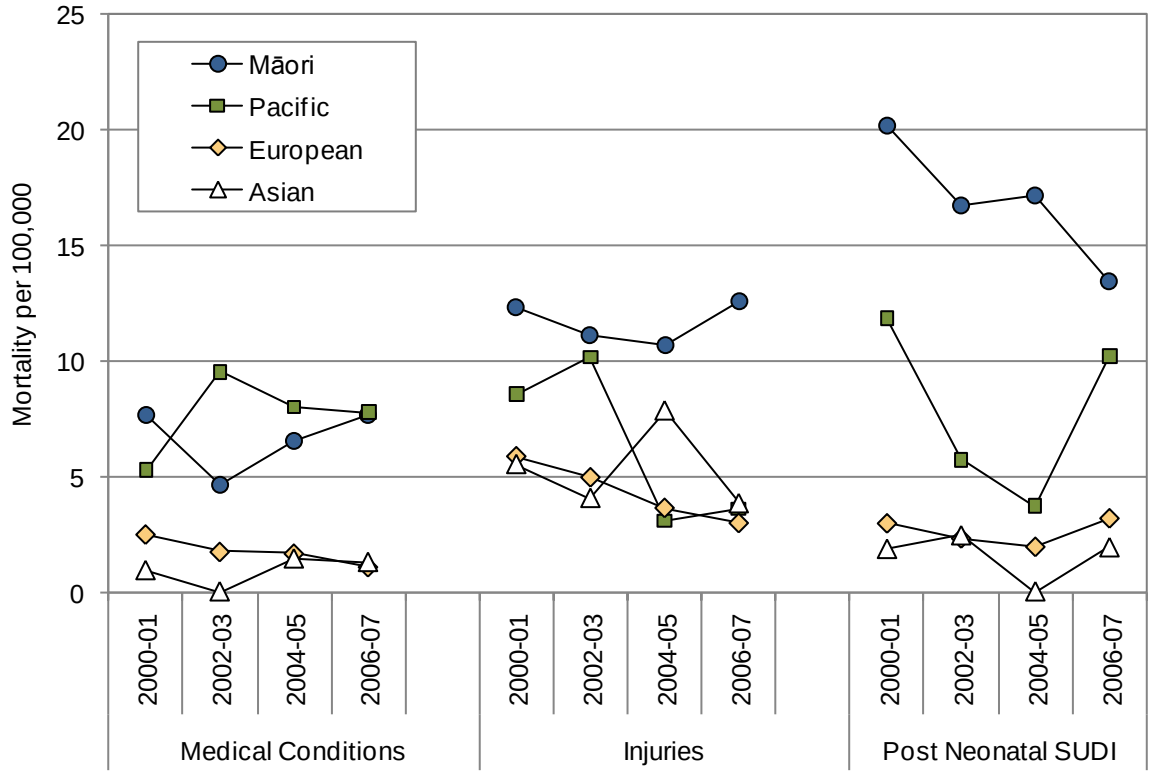
Mortality: In New Zealand during 2000-2007, SUDI mortality was consistently higher for Māori > Pacific > European and Asian infants, while mortality from medical conditions with a social gradient was generally higher for Māori and Pacific > European and Asian children. While mortality from injuries with a social gradient was also consistently higher for Māori than for European and Asian children, rates for Pacific children were more variable (**Figure 22**).

Figure 21. Hospital Admissions for Conditions with a Social Gradient in Children Aged 0-14 Years by Ethnicity, New Zealand 2000-2009



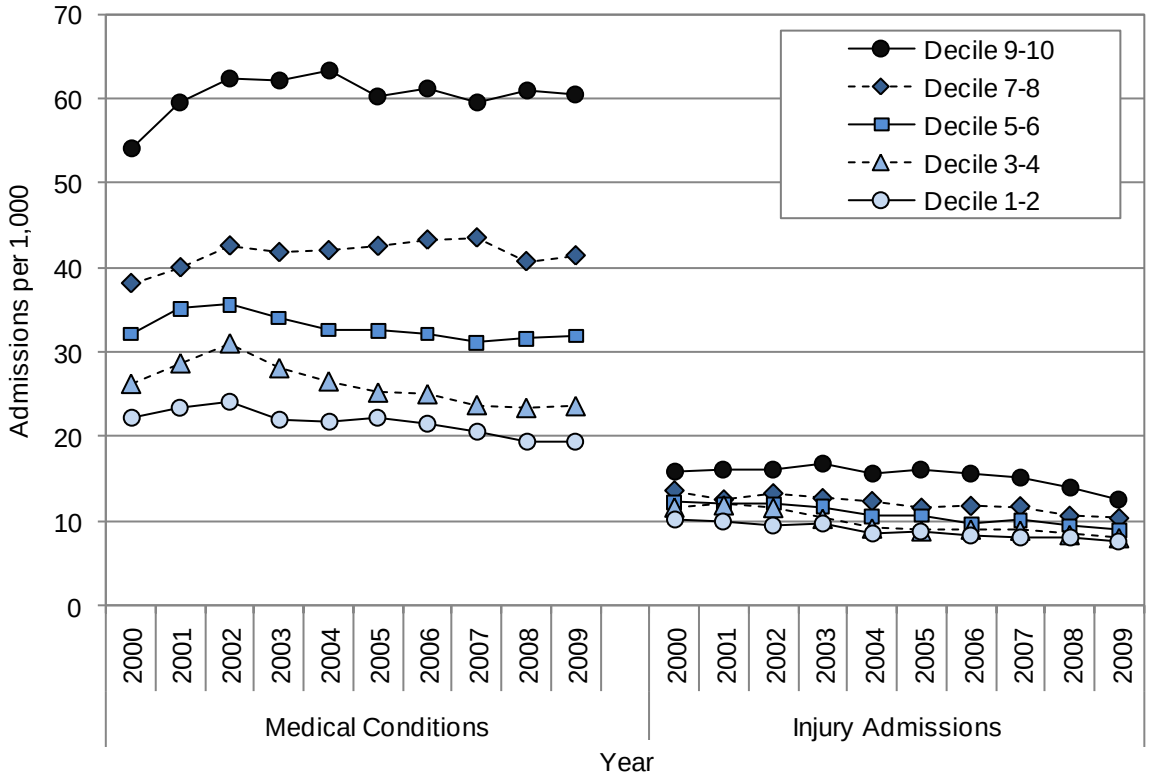
Source: Numerator: National Minimum Dataset (Neonates Removed); Denominator: Statistics NZ Estimated Resident Population. Medical Conditions: Acute and Arranged Admissions only; Injury Admissions: Emergency Department Cases removed. Ethnicity is Level 1 Prioritised.

Figure 22. Mortality from Conditions with a Social Gradient in Children Aged 0-14 Years (excluding Neonates) by Ethnicity, New Zealand 2000-2007



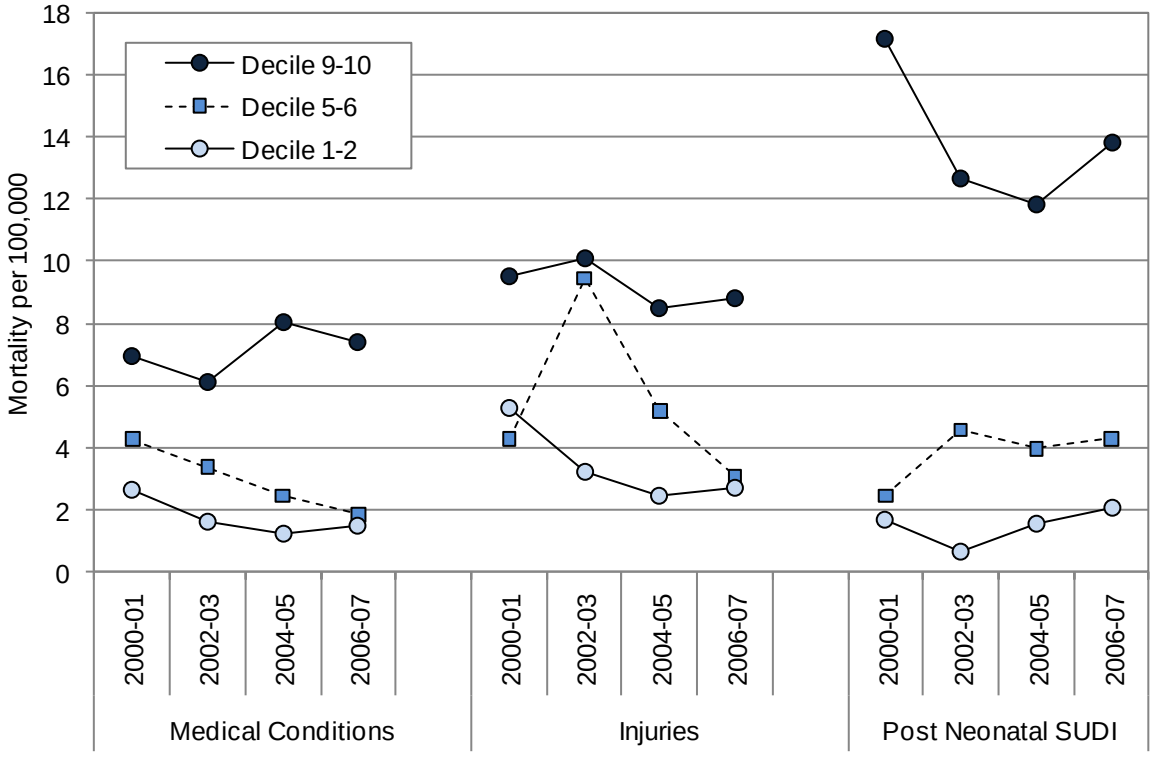
Source: Numerator: National Mortality Collection (Neonates Removed); Denominator: Statistics NZ Estimated Resident Population. Ethnicity is Level 1 Prioritised. Note: SUDI deaths are for infants aged 29-364 days only.

Figure 23. Hospital Admissions for Conditions with a Social Gradient in Children Aged 0-14 Years by NZ Deprivation Index Decile, New Zealand 2000-2009



Source: Numerator: National Minimum Dataset (Neonates Removed); Denominator: Statistics NZ Estimated Resident Population. Medical Conditions: Acute and Arranged Admissions only; Injury Admissions: Emergency Department Cases removed.

Figure 24. Mortality from Conditions with a Social Gradient in Children Aged 0-14 Years (excluding Neonates) by NZ Deprivation Index Decile, New Zealand 2000-2007



Source: Numerator: National Mortality Collection (Neonates Removed); Denominator: Statistics NZ Estimated Resident Population. Note: SUDI deaths are for infants aged 29-364 days only.

Trends by NZ Deprivation Index Decile

Hospital Admissions: In New Zealand during 2000-2009, medical admissions with a social gradient were consistently higher for those living in Decile 9-10 > Decile 7-8 > Decile 5-6 > Decile 3-4 > Decile 1-2 areas. Injury admissions with a social gradient also demonstrated a consistent socioeconomic gradient over time, and while in absolute terms these differences were less marked than for medical conditions, for technical reasons comparisons between these admission categories is not strictly possible (see Note 4 in Methods section) (**Figure 23**).

Mortality: In New Zealand during 2000-2007, medical conditions and injuries with a social gradient, and post neonatal SUDI were all consistently higher for those in the most deprived (Decile 9-10) areas, than for those in the least deprived (Decile 1-2) areas, with the greatest absolute differences being seen for post neonatal SUDI (**Figure 24**).

Table 5. Risk Factors for Hospital Admissions with a Social Gradient in Children Aged 0-14 Years, New Zealand 2005-2009

Medical Conditions							
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZ Deprivation Index Decile				NZ Deprivation Index Quintile			
Decile 1	20.9	1.00		Decile 1-2	20.6	1.00	
Decile 2	20.2	0.97	0.94 - 1.00	Decile 3-4	24.2	1.18	1.15 - 1.20
Decile 3	23.3	1.11	1.08 - 1.15	Decile 5-6	31.9	1.55	1.52 - 1.58
Decile 4	25.0	1.19	1.16 - 1.23	Decile 7-8	42.3	2.05	2.02 - 2.09
Decile 5	29.9	1.43	1.39 - 1.47	Decile 9-10	60.4	2.94	2.89 - 2.98
Decile 6	33.5	1.60	1.56 - 1.64	Ethnicity			
Decile 7	38.3	1.83	1.78 - 1.88	Asian	26.1	0.94	0.92 - 0.96
Decile 8	45.7	2.18	2.13 - 2.24	European	27.8	1.00	
Decile 9	56.3	2.69	2.63 - 2.75	Māori	50.2	1.81	1.79 - 1.83
Decile 10	63.9	3.05	2.99 - 3.12	Pacific	75.3	2.71	2.68 - 2.75
Gender							
Female	34.4	1.00		Male	41.6	1.21	1.20 - 1.22
Injuries							
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZ Deprivation Index Decile				NZ Deprivation Index Quintile			
Decile 1	8.4	1.00		Decile 1-2	8.1	1.00	
Decile 2	7.9	0.93	0.89 - 0.98	Decile 3-4	8.7	1.07	1.03 - 1.10
Decile 3	8.5	1.01	0.96 - 1.06	Decile 5-6	9.8	1.20	1.16 - 1.24
Decile 4	8.9	1.06	1.01 - 1.10	Decile 7-8	11.2	1.37	1.33 - 1.42
Decile 5	9.6	1.15	1.10 - 1.20	Decile 9-10	14.7	1.80	1.75 - 1.85
Decile 6	9.9	1.17	1.12 - 1.22	Ethnicity			
Decile 7	10.6	1.26	1.21 - 1.32	Asian	5.9	0.56	0.54 - 0.59
Decile 8	11.7	1.39	1.33 - 1.45	European	10.5	1.00	
Decile 9	14.8	1.75	1.69 - 1.83	Māori	12.4	1.18	1.15 - 1.20
Decile 10	14.6	1.73	1.67 - 1.80	Pacific	13.3	1.26	1.23 - 1.30
Gender							
Female	8.8	1.00		Male	13.0	1.48	1.45 - 1.50

Source: Numerator: National Minimum Dataset (Neonates Removed); Denominator: Statistics NZ Estimated Resident Population. Medical Conditions: Acute and Arranged Admissions only; Injury Admissions: Emergency Department Cases removed. Rates are per 1,000, Rate Ratios are unadjusted; Ethnicity is Level 1 Prioritised.

Distribution by Ethnicity, Gender and NZDep Deprivation

Hospital Admissions: In New Zealand during 2005-2009, hospital admissions for medical conditions with a social gradient were *significantly* higher for Pacific > Māori > European > Asian children, males and those in average-more deprived (NZDep decile 3-10) areas. Similarly, injury admissions with a social gradient were *significantly* higher for Pacific > Māori > European > Asian children, males and those in average-more deprived (NZDep decile 4-10) areas. While the magnitude of the social differences appeared smaller for injury admissions, it must be remembered that that for technical reasons (See Note 4 in Methods Section) these categories are not strictly comparable (**Table 5**).

Mortality: In New Zealand during 2003-2007, mortality from medical conditions with a social gradient was *significantly* higher for Pacific and Māori > European and Asian children, and those in more deprived (Decile 7-10) areas. Similarly mortality from injuries with a social gradient was *significantly* higher for Māori > Asian, Pacific and European children, males and those in more deprived (Decile 7-10) areas (**Table 6**). Differences in SUDI mortality are considered in the Infant Mortality section.

Table 6. Risk Factors for Mortality with a Social Gradient in Children Aged 0-14 Years, New Zealand 2003-2007

Medical Conditions							
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZ Deprivation Index Decile				Prioritised Ethnicity			
Decile 1-2	1.34	1.00		Asian	1.11	0.83	0.29 - 2.33
Decile 3-4	0.97	0.73	0.29 - 1.81	European	1.34	1.00	
Decile 5-6	2.44	1.82	0.87 - 3.80	Māori	6.59	4.92	3.27 - 7.41
Decile 7-8	2.85	2.13	1.05 - 4.31	Pacific	8.80	6.57	4.11 - 10.50
Decile 9-10	7.58	5.66	3.01 - 10.62	Gender			
				Female	2.92	1.00	
				Male	3.66	1.25	0.90 - 1.74
Injuries							
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZ Deprivation Index Decile				Prioritised Ethnicity			
Decile 1-2	2.80	1.00		Asian	4.98	1.44	0.86 - 2.38
Decile 3-4	4.63	1.65	0.98 - 2.77	European	3.47	1.00	
Decile 5-6	4.27	1.52	0.90 - 2.58	Māori	11.79	3.40	2.59 - 4.46
Decile 7-8	5.59	2.00	1.22 - 3.27	Pacific	4.16	1.20	0.71 - 2.02
Decile 9-10	9.29	3.31	2.10 - 5.22	Gender			
				Female	4.68	1.00	
				Male	6.65	1.42	1.11 - 1.83
SUDI: See Infant Mortality Section							

Source: Numerator: National Mortality Collection; Denominator Statistics NZ Estimated Resident Population; Rates are per 100,000; Rate Ratios are unadjusted; Ethnicity is Level 1 Prioritised.

Summary

Medical admissions with a social gradient in children increased during the early 2000s, reached peak in 2002 and then declined, with an upswing in rates again being evident during 2007-2009. In contrast, injury admissions with a social gradient declined throughout 2000-2009. Medical admissions for Pacific children increased during the early 2000s, reached a peak in 2003 and then declined, with an upswing in rates again being evident during 2007-2009. For Māori children, rates were static during the early-mid 2000s, but increased after 2007, while for Asian children rates during 2002-2009 were static. Rates for European children declined gradually during 2002-2009.

During 2005-2009, infectious and respiratory diseases were responsible for the majority of hospitalisations for medical conditions with a social gradient, while falls, followed by inanimate mechanical forces were the leading causes of injury admissions. In contrast, during 2003-2007 SUDI made the single largest contribution to mortality with a social gradient. Vehicle occupant deaths were the second leading cause, followed by pedestrian injuries and drowning, while bacterial / non viral pneumonia was the leading cause of death from medical conditions.

INFANT MORTALITY

Introduction

Infant mortality is often used as a barometer of the social wellbeing of a country [34]. New Zealand's infant mortality rates are middling by international standards, being lower than those of the USA and some Eastern European countries, but higher than those of Central and Northern Europe [35]. Despite this, mortality during the first year of life in New Zealand remains much higher than at any other point during childhood or adolescence. In the year to March 2008, a total of 330 New Zealand infants died prior to their first birthday [36].

Despite these relatively high numbers, New Zealand's infant mortality rates have declined during the past 40 years, with rates falling from 18.2 per 1,000 in 1968, to 5.3 per 1,000 in March 2008 [36]. While infant mortality rates are generally higher for Pacific > Māori > European / Other babies, males, and those in the most deprived areas [37], total infant mortality rates are of limited utility in guiding population health interventions, as the causes of mortality differ markedly with the age of the infant. During the neonatal period (birth-28 days) extreme prematurity, congenital anomalies and intrauterine / birth asphyxia are the leading causes of mortality, while in the post neonatal period (29-364 days) SIDS and congenital anomalies make the greatest contribution [1]. Thus any interventions aimed at reducing New Zealand's infant mortality rates must, in the first instance, be based on an understanding of their component causes.

The following section uses information from the National Mortality Collection to review neonatal, post neonatal and total infant mortality since 1990.

Data Source and Methods

Definition

1. Total Infant Mortality: Death of a live born infant prior to 365 days of life
2. Neonatal Mortality: Death of a live born infant in the first 28 days of life
3. Post-Neonatal Mortality: Death of a live born infant after 28 days but prior to 365 days of life
4. Sudden Unexpected Death in Infancy (SUDI): Death of a live born infant <365 days of life, where the cause of death is attributed to SIDS, Accidental Suffocation / Strangulation in Bed or Ill-Defined/Unspecified Causes

Data Sources

Numerator: National Mortality Collection: 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) as follows: Extreme Prematurity (ICD-10 P072), Congenital Anomalies (ICD-10 Q00-Q99), Perinatal Conditions (ICD-10 P00-P96); SIDS (ICD-10 R95); SUDI (ICD-10 R95, W75, R99).
Denominator: Birth Registration Dataset: All live births 20+ weeks gestation.

Notes on Interpretation

Note 1: See **Appendix 5** for an overview of the dataset used.
Note 2: 95% confidence intervals have been provided for the rate ratios in this section and where appropriate, the terms significant or not significant have been used to communicate the significance of the observed associations. Tests of statistical significance have not been applied to other data in this section, and thus (unless the terms *significant* or *non-significant* are specifically used) the associations described do not imply statistical significance or non-significance (see **Appendix 1** for further discussion of this issue).

Indicator Category Ideal B

New Zealand Distribution and Trends

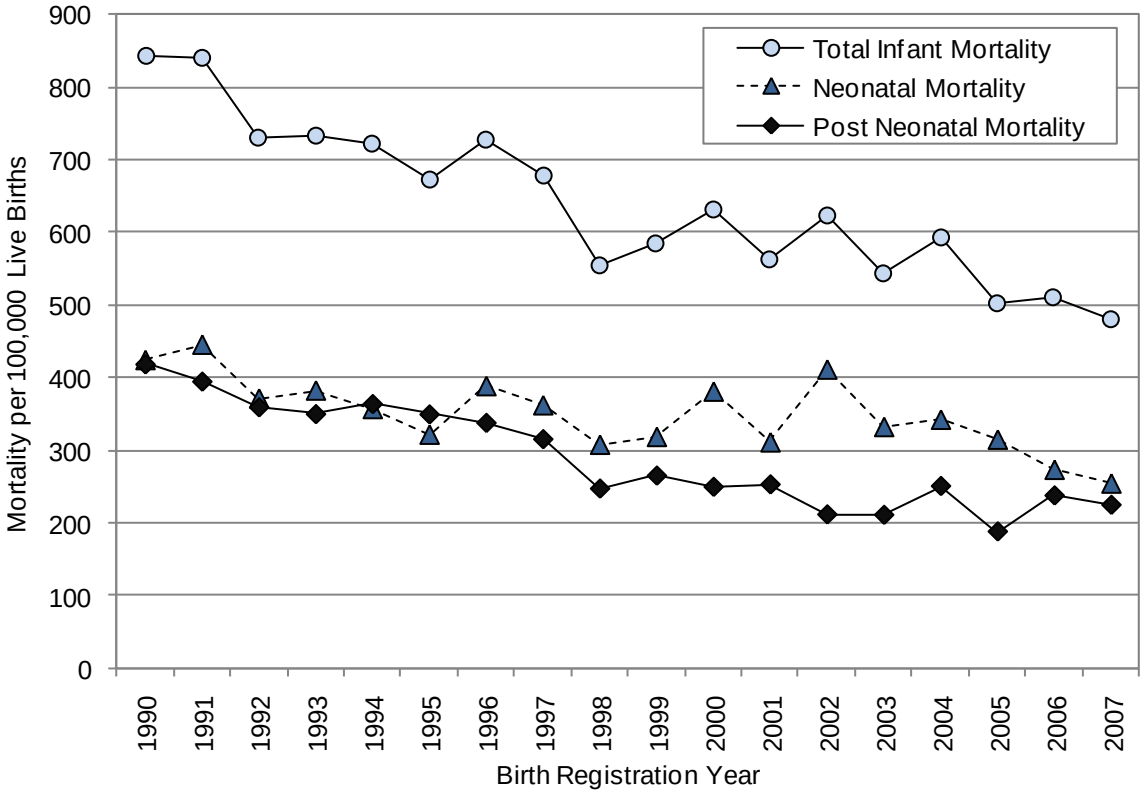
New Zealand Trends

In New Zealand during 1990-2007, neonatal and post neonatal mortality both declined, with neonatal mortality exceeding post neonatal mortality during the 2000s (**Figure 25**).

New Zealand Trends by Ethnicity

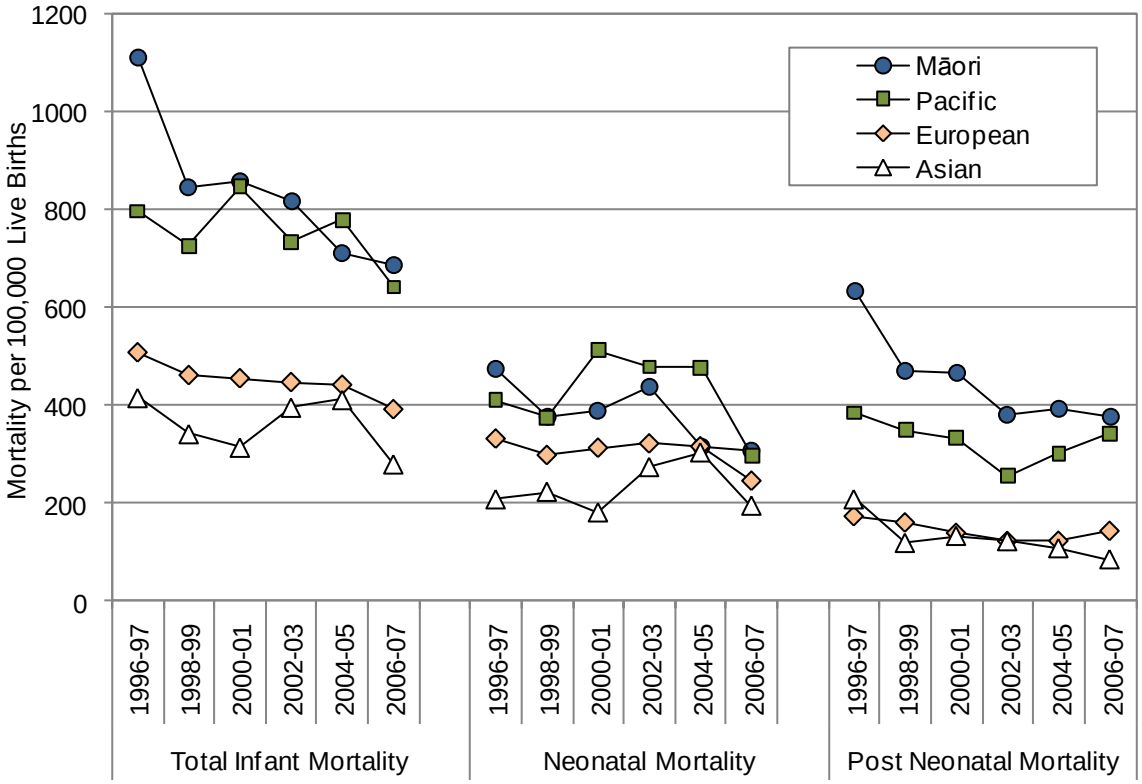
In New Zealand during the late 1990s, neonatal mortality was generally higher for Pacific and Māori > European > Asian infants, although ethnic differences were less consistent during the 2000s. In contrast, post neonatal mortality was higher for Māori > Pacific > European and Asian infants throughout 1996-2007 (**Figure 26**).

Figure 25. Total, Neonatal and Post Neonatal Mortality, New Zealand 1990-2007



Source: Numerator: National Mortality Collection; Denominator: Birth Registration Dataset

Figure 26. Total, Neonatal and Post Neonatal Mortality by Ethnicity, New Zealand 1996-2007



Source: Numerator: National Mortality Collection; Denominator: Birth Registration Dataset. Ethnicity is Level 1 Prioritised

Distribution by Cause

In New Zealand during 2003-2007, extreme prematurity and congenital anomalies were the leading causes of neonatal mortality, although intrauterine / birth asphyxia also made a significant contribution. In contrast, SUDI was the leading cause of post-neonatal mortality, followed by congenital anomalies (**Table 7**).

Table 7. Neonatal and Post Neonatal Mortality by Cause, New Zealand 2003–2007

Cause of Death	Number: Total 2003-2007	Number: Annual Average	Rate per 100,000	Percent of Deaths
Neonatal Mortality				
Extreme Prematurity	215	43.0	71.8	23.8
Congenital Anomalies: CVS	56	11.2	18.7	6.2
Congenital Anomalies: CNS	31	6.2	10.4	3.4
Congenital Anomalies: Other	135	27.0	45.1	14.9
Intrauterine / Birth Asphyxia	47	9.4	15.7	5.2
Other Perinatal Conditions	342	68.4	114.2	37.8
SUDI: Suffocation / Strangulation in Bed	20	4.0	6.7	2.2
SUDI: SIDS or Unspecified	18	3.6	6.0	2.0
Injury / Poisoning	9	1.8	3.0	1.0
Other Causes	32	6.4	10.7	3.5
Total Neonatal Mortality	905	181.0	302.3	100.0
Post Neonatal Mortality				
SUDI: SIDS	189	37.8	63.1	28.4
SUDI: Suffocation / Strangulation in Bed	68	13.6	22.7	10.2
SUDI: Unspecified	10	2.0	3.3	1.5
Congenital Anomalies: CVS	52	10.4	17.4	7.8
Congenital Anomalies: CNS	10	2.0	3.3	1.5
Congenital Anomalies: Other	63	12.6	21.0	9.5
Other Perinatal Conditions	56	11.2	18.7	8.4
Injury / Poisoning	30	6.0	10.0	4.5
Other Causes	187	37.4	62.5	28.1
Total Post Neonatal Mortality	665	133.0	222.1	100.0
New Zealand Total	1,570	314.0	524.3	100.0

Source: Numerator: National Mortality Collection; Denominator: Birth Registration Dataset

Distribution by Ethnicity, Gender and NZDep Deprivation

In New Zealand during 2003-2007, neonatal mortality was *significantly* higher for Pacific > Māori, European and Asian infants, males and those in more deprived areas, while post neonatal mortality was *significantly* higher for Māori and Pacific > European and Asian infants, males and those in more deprived areas. SUDI was *significantly* higher for Māori > Pacific > European > Asian infants, and those in average to more deprived areas (**Table 8**).

Table 8. Risk Factors for Neonatal and Post Neonatal Mortality, and Sudden Unexpected Death in Infancy (SUDI), New Zealand 2003–2007

Neonatal Mortality							
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZ Deprivation Index Decile				Ethnicity			
Decile 1-2	225.9	1.00		Asian	255.9	0.90	0.70 - 1.16
Decile 3-4	227.3	1.01	0.77 - 1.31	European	283.8	1.00	
Decile 5-6	270.1	1.20	0.93 - 1.53	Māori	319.2	1.12	0.97 - 1.31
Decile 7-8	329.1	1.46	1.15 - 1.84	Pacific	404.5	1.42	1.17 - 1.73
Decile 9-10	396.2	1.75	1.41 - 2.19	Gender			
				Female	277.0	1.00	
				Male	326.2	1.18	1.03 - 1.34
Post Neonatal Mortality							
Variable	Rate	RR	95% CI	Variable	Rate	RR	95% CI
NZ Deprivation Index Decile				Ethnicity			
Decile 1-2	107.6	1.00		Asian	106.6	0.80	0.54 - 1.17
Decile 3-4	130.5	1.21	0.84 - 1.75	European	133.8	1.00	
Decile 5-6	166.8	1.55	1.10 - 2.19	Māori	388.5	2.90	2.44 - 3.46
Decile 7-8	219.4	2.04	1.48 - 2.81	Pacific	295.6	2.21	1.73 - 2.82
Decile 9-10	386.1	3.59	2.66 - 4.84	Gender			
				Female	190.6	1.00	
				Male	252.0	1.32	1.13 - 1.54
Sudden Unexpected Death in Infancy (SUDI)							
Variable	Rate	RR	95% CI	Variable	Rate	RR	
NZ Deprivation Index Decile				Ethnicity			
Decile 1-2	32.3	1.00		Asian	14.2	0.29	0.11 - 0.80
Decile 3-4	69.2	2.14	1.17 - 3.93	European	48.9	1.00	
Decile 5-6	68.9	2.14	1.17 - 3.88	Māori	227.8	4.66	3.56 - 6.10
Decile 7-8	88.4	2.74	1.55 - 4.83	Pacific	96.4	1.97	1.30 - 3.01
Decile 9-10	200.0	6.20	3.65 - 10.52	Gender			
				Female	93.3	1.00	
				Male	110.0	1.18	0.94 - 1.48

Source: Numerator: National Mortality Collection; Denominator: Birth Registration Dataset; Rates are per 100,000, Rate Ratios are Unadjusted, Ethnicity is Level 1 Prioritised. SUDI is neonatal AND post neonatal.

Summary

In New Zealand during 1990-2007, neonatal and post neonatal mortality both declined, with neonatal mortality exceeding post neonatal mortality during the 2000s. When broken down by ethnicity, neonatal mortality was higher for Pacific and Māori > European > Asian infants during the late 1990s, although ethnic differences were less consistent during the 2000s. In contrast, post neonatal mortality was higher for Māori > Pacific > European and Asian infants throughout 1996-2007.

When broken down by cause, extreme prematurity and congenital anomalies were the leading causes of neonatal mortality in New Zealand during 2003-2007. In contrast, SUDI was the leading cause of post-neonatal mortality, followed by congenital anomalies. During this period, neonatal mortality was *significantly* higher for Pacific > Māori, European and Asian infants, males and those in more deprived areas, while post neonatal mortality was *significantly* higher for Māori and Pacific > European and Asian infants, males and those in more deprived areas. SUDI was *significantly* higher for Māori > Pacific > European > Asian infants, and those in average to more deprived areas.

INJURIES ARISING FROM THE ASSAULT, NEGLECT OR MALTREATMENT OF CHILDREN

Introduction

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 [38]. During the 1990s, New Zealand ranked 3rd highest amongst rich nations for its child maltreatment death rates [39], with 49 children <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 [40]. Mortality represents the tip of the iceberg however, with the number of notifications to Child Youth and Family (CYF) for possible abuse or neglect increasing each year. In 2008, a total of 104,181 notifications were recorded by CYF and of these, 48,957 were deemed to require further action (see last year's report). 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 [41].

The following section explores hospital admissions and mortality from injuries arising from the assault, neglect or maltreatment of children aged 0-14 years using information from the National Minimum Dataset and the National Mortality Collection.

Data Source and Methods

Definition

1. Hospitalisations for Injuries Arising From the Assault / Neglect / Maltreatment of Children Aged 0-14 Years
2. Deaths from Injuries Arising from the Assault / Neglect / Maltreatment of Children Aged 0-14 Years

Data Source

1. Hospital Admissions
Numerator: National Minimum Dataset: Hospital admissions of children (0-14 years) with a primary diagnosis of injury (ICD-10-AM S00-T79) and an external cause code of intentional injury (ICD-10-AM X85-Y09) in any of the first 10 External Cause codes. As outlined in Appendix 4, 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) with a clinical code (cause of death) of Intentional Injury (ICD-10-AM X85-Y09).
Denominator: NZ Statistics NZ Estimated Resident Population

Interpretation

The limitations of the National Minimum Dataset are discussed at length in **Appendix 4**. The reader is urged to review this Appendix before interpreting any trends based on hospital admission data.

Indicator Category Admissions Proxy C; Mortality Ideal B

New Zealand Distribution and Trends

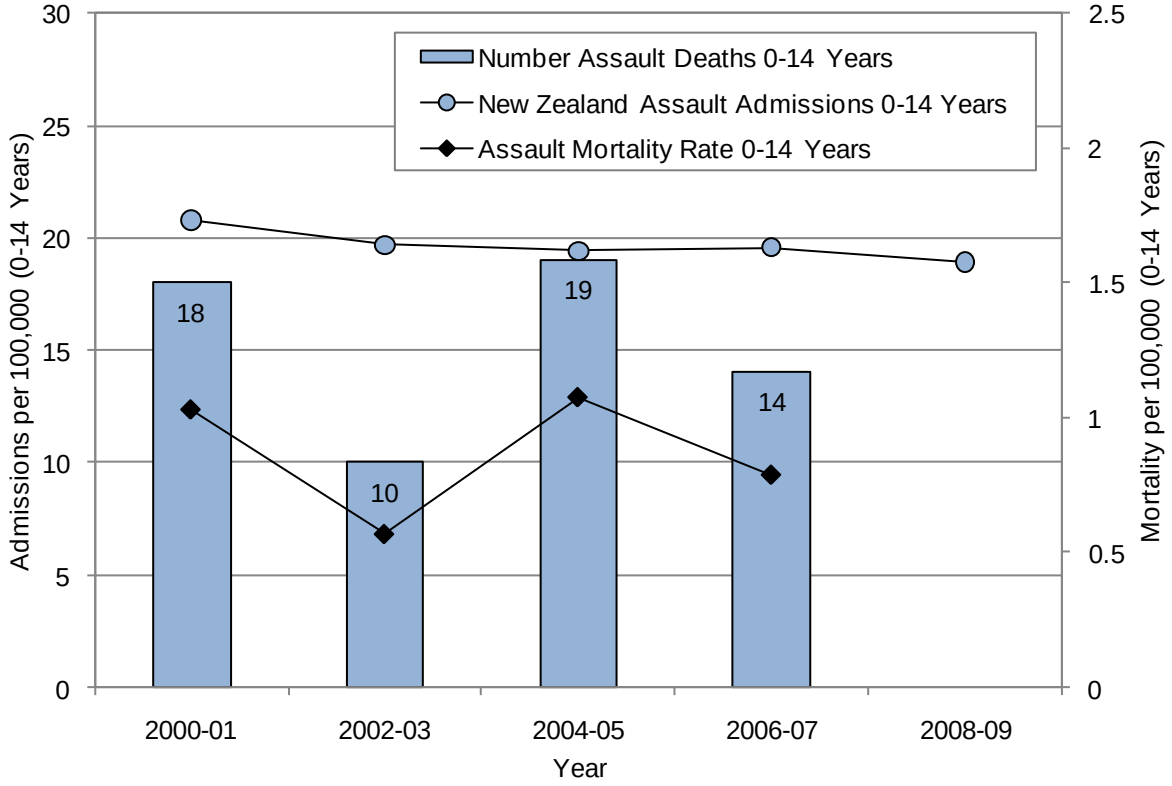
New Zealand Trends

In New Zealand during 2000-2007, mortality from injuries arising from the assault, neglect or maltreatment of children remained relatively static, with deaths averaging 8 per year during this period. Similarly admissions for the assault, neglect or maltreatment of children declined only marginally during 2000-2009 (**Figure 27**).

New Zealand Distribution by Age and Gender

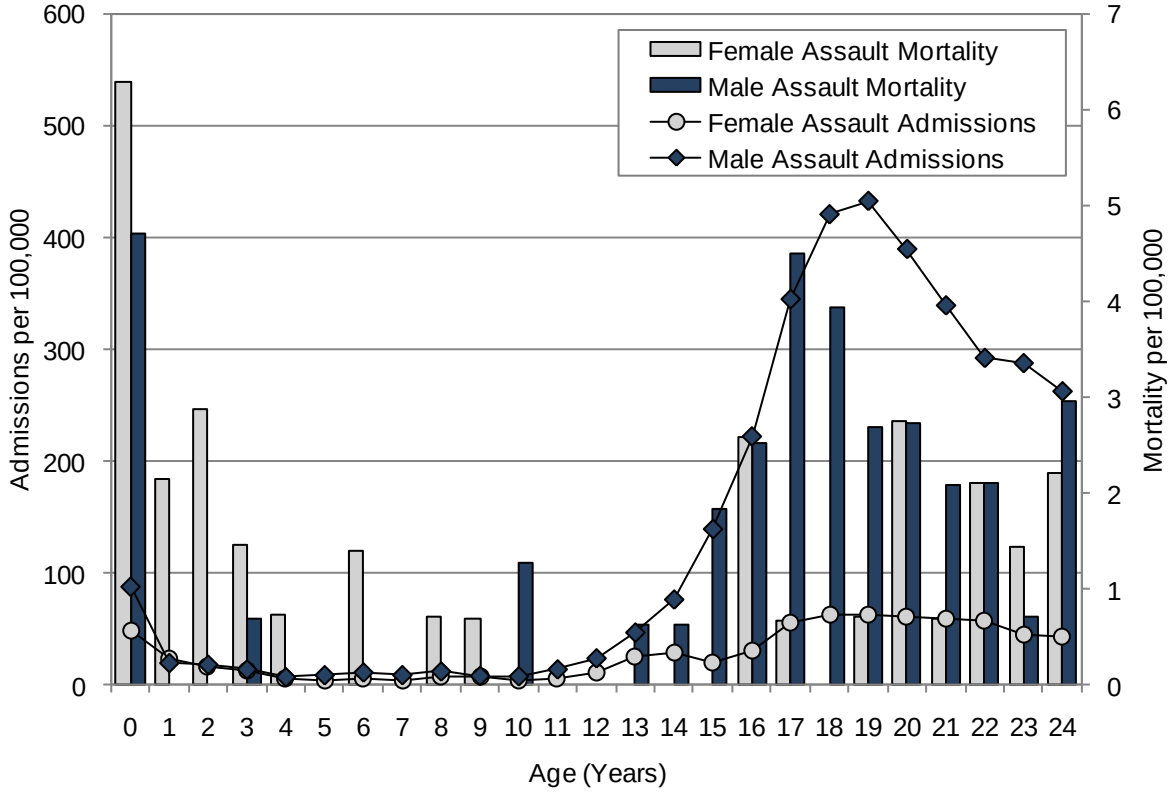
In New Zealand during 2005-2009, hospital admissions for injuries arising from the assault, neglect or maltreatment of children exhibited a J-shaped distribution with age, with rates being higher for infants <1 year and those > 11 years of age. In contrast, mortality was highest for infants < 1 year. While the gender balance for admissions was relatively even during infancy and early childhood, admissions for males became more predominant as adolescence approached (**Figure 28**).

Figure 27. Hospital Admissions (2000-2009) and Deaths (2000-2007) due to Injuries Arising from the Assault, Neglect or Maltreatment of New Zealand Children 0-14 Years



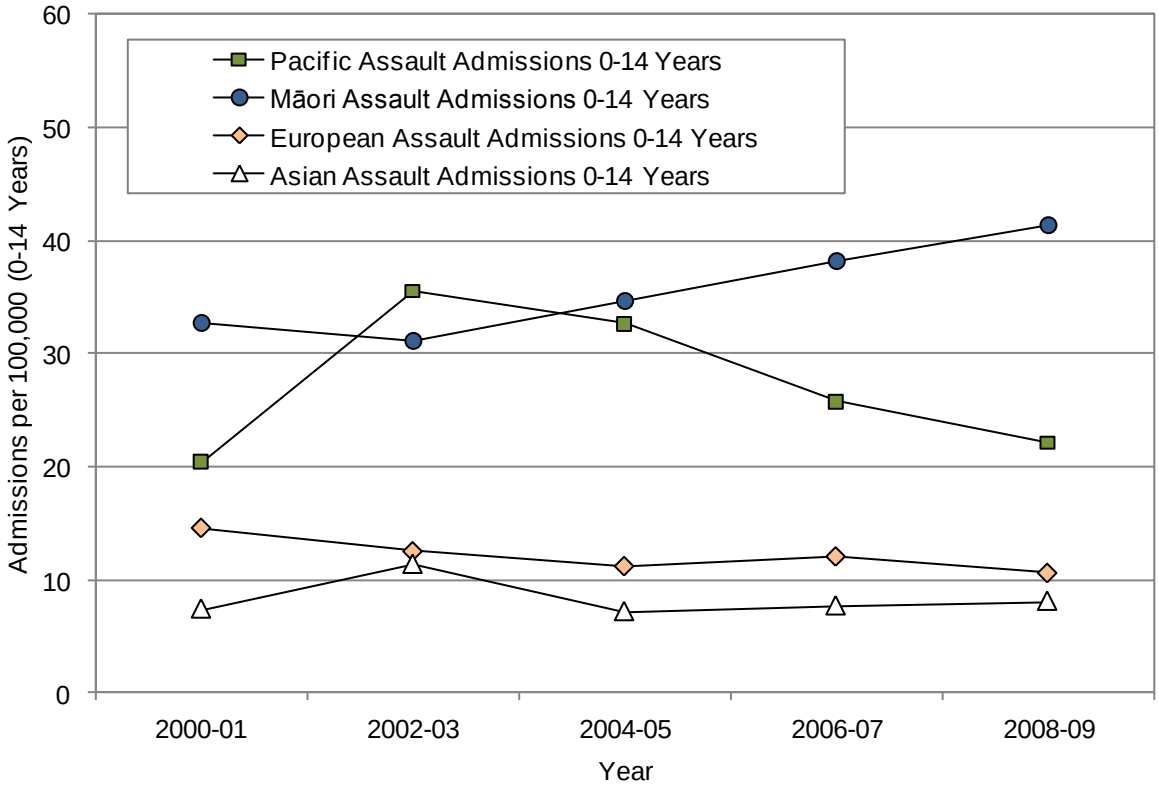
Source: Numerator Admissions: National Minimum Dataset, Numerator Mortality: National Mortality Collection; Denominator: Statistics NZ Estimated Resident Population.

Figure 28. Hospital Admissions (2005-2009) and Deaths (2003-2007) due to Injuries Arising from the Assault, Neglect or Maltreatment of New Zealand Children and Young People by Age and Gender



Source: Numerator Admissions: National Minimum Dataset, Numerator Mortality: National Mortality Collection; Denominator: Statistics NZ Estimated Resident Population

Figure 29. Hospital Admissions due to Injuries Arising from the Assault, Neglect or Maltreatment of Children 0-14 Years by Ethnicity, New Zealand 2000-2009



Source: Numerator: National Minimum Dataset; Denominator: Statistics NZ Estimated Resident Population. Ethnicity is Level 1 Prioritised.

New Zealand Distribution by Gender, Ethnicity and NZ Deprivation Index Decile

In New Zealand during 2005-2009, hospital admissions for injuries arising from the assault, neglect or maltreatment of children were significantly higher for males, Māori > Pacific > European and Asian children, and those living in the more deprived areas (**Table 9**).

In New Zealand during 2000-2009, hospital admissions for injuries arising from the assault, neglect or maltreatment of children were consistently higher for Māori and Pacific > European > Asian children, with rates also being higher for Māori than for Pacific children during the last 4 years (**Figure 29**).

Nature of the Injury Sustained

During 2005-2009, the type of intentional injury leading to hospital admission varied with 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 older children (particularly males aged 13-14 years) 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 reflects a transition towards assaults occurring in non-family contexts as children approach adolescence, 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. As a result of this likely transition however, the tables below consider only pre-school (0-4 years) and primary school (5-12 years) age children, with information on older children (13+ years) being considered in the youth assault section in last year's report.

During 2005-2009, the most common types of injury sustained as the result of the assault, neglect or maltreatment of children aged 0-4 years were subdural haemorrhages and superficial scalp injuries, followed by fractures of the skull and face and fractures of the femur. For children aged 5-12 years, head and upper limb injuries predominated, with superficial scalp injuries and fractures of the skull and facial bones being amongst the most common injuries (**Table 10**).

Table 9. Distribution of Hospital Admissions due to Injuries Arising from the Assault, Neglect or Maltreatment of Children 0-14 Years by Ethnicity, NZ Deprivation Index Decile and Gender, New Zealand 2005-2009

Variable	Number: Total 2005-2009	Rate per 100,000	RR	95% CI
NZ Deprivation Index Decile				
Decile 1	23	5.3	1.00	
Decile 2	35	8.4	1.57	0.93 - 2.65
Decile 3	33	8.3	1.56	0.92 - 2.66
Decile 4	44	10.1	1.90	1.15 - 3.15
Decile 5	57	15.1	2.83	1.74 - 4.60
Decile 6	73	16.6	3.10	1.94 - 4.96
Decile 7	77	18.3	3.44	2.16 - 5.48
Decile 8	122	25.1	4.70	3.01 - 7.34
Decile 9	164	34.2	6.42	4.15 - 9.94
Decile 10	199	35.1	6.59	4.28 - 10.15
NZ Deprivation Index Quintile				
Decile 1-2	58	6.8	1.00	
Decile 3-4	77	9.3	1.36	0.97 - 1.91
Decile 5-6	130	15.9	2.33	1.71 - 3.17
Decile 7-8	199	22.0	3.22	2.40 - 4.31
Decile 9-10	363	34.7	5.09	3.86 - 6.71
Gender				
Female	291	13.4	1.00	
Male	555	24.3	1.82	1.58 - 2.10
Prioritised Ethnicity				
Asian	32	7.9	0.72	0.50 - 1.03
European	277	11.1	1.00	
Māori	408	37.9	3.43	2.94 - 3.99
Pacific	109	25.9	2.34	1.88 - 2.92

Source: Numerator: National Minimum Dataset; Denominator: Statistics NZ Estimated Resident Population. Rate is per 100,000 per year; Ethnicity is Level 1 Prioritised; RR: Rate Ratios are unadjusted

Table 10. Nature of Injury Arising from Assault, Neglect or Maltreatment in Hospitalised Children 0-12 Years by Age Group, New Zealand 2005-2009

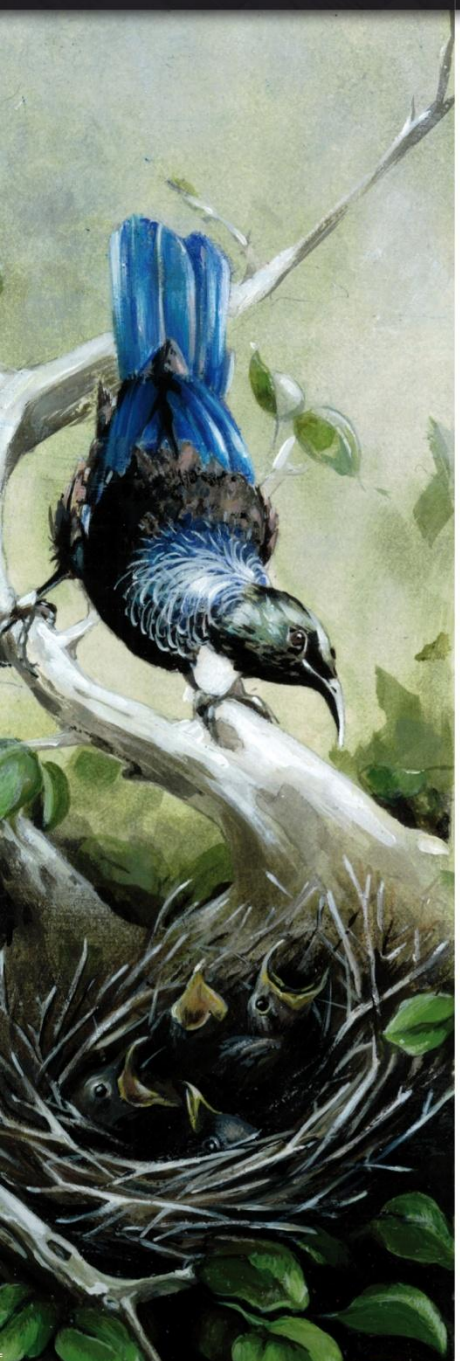
Nature of Injury	Total Number 2005-2009	% of Injuries to Age Group
Children 0-4 Years		
Traumatic Subdural Haemorrhage (S065)	105	29.0
Superficial Scalp Injury (S000)	55	15.2
Fracture Skull or Facial Bones (S02)	18	5.0
Other Head Injuries (Remainder S00-S09)	44	12.2
Injuries to Abdomen, Spine and Pelvis (S30-S39)	18	5.0
Injuries to Thorax (Including Rib Fractures) (S20-S29)	15	4.1
Injuries to Upper Limb (S40-S69)	24	6.6
Fracture of Femur (S72)	15	4.1
Other Injuries to Lower Limb (S70-S99)	16	4.4
Maltreatment Unspecified (T749)	38	10.5
Other Injuries	14	3.9
Total	362	100.0
Children 5-12 Years		
Superficial Scalp Injury (S000)	26	13.1
Fracture Skull or Facial Bones (S02)	18	9.1
Concussion (S060)	14	7.1
Other Head Injuries (Remainder S00-S09)	41	20.7
Injuries to Abdomen, Spine and Pelvis (S30-S39)	16	8.1
Injuries to Thorax (Including Rib Fractures) (S20-S29)	13	6.6
Injuries to Upper Limb (S40-S69)	36	18.2
Injuries to Lower Limb (S70-S99)	11	5.6
Maltreatment Unspecified (T749)	10	5.1
Other Injuries	13	6.6
Total	198	100.0

Source: National Minimum Dataset

Summary

In New Zealand during 2000-2007, mortality from injuries arising from the assault, neglect or maltreatment of children remained relatively static, with deaths averaging 8 per year during this period. Similarly admissions for the assault, neglect or maltreatment of children declined only marginally during 2000-2009. During 2005-2009, hospital admissions for injuries sustained as the result of the assault, neglect or maltreatment of children exhibited a J-shaped distribution with age, with rates being highest for infants < 1 year, and those > 11 years of age. In contrast, mortality was highest for infants < 1 year. While the gender balance for admissions was relatively even during infancy and early childhood, hospital admissions for males became more predominant as adolescence approached. In addition, admissions were also significantly higher for males, Māori > Pacific > European and Asian children, and those in the most deprived areas.

APPENDICES AND REFERENCES



APPENDIX 1: STATISTICAL SIGNIFICANCE TESTING AND ITS USE IN THIS REPORT

Understanding Statistical Significance Testing

Inferential statistics are used when a researcher wishes to use a sample to draw conclusions about the population as a whole (e.g. weighing a class of 10 year old boys, in order to estimate the average weight of all 10 year old boys in New Zealand). Any measurements based on a sample however, even if drawn at random, will always differ from that of the population as a whole, simply because of chance. Similarly, when a researcher wishes to determine whether the risk of a particular condition (e.g. lung cancer) is truly different between two groups (smokers and non-smokers), they must also consider the possibility that the differences observed arose from chance variations in the populations sampled.

Over time, statisticians have developed a range of measures to quantify the uncertainty associated with random sampling error (i.e. to quantify the level of confidence we can have that the average weight of boys in our sample reflects the true weight of all 10 year old boys, or that the rates of lung cancer in smokers are really different to those in non-smokers). Of these measures, two of the most frequently used are:

P values: The p value from a statistical test tells us the probability that we would have seen a difference at least as large as the one observed, if there were no real differences between the groups studied (e.g. if statistical testing of the difference in lung cancer rates between smokers and non-smokers resulted in a p value of 0.01, this tells us that the probability of such a difference occurring if the two groups were identical is 0.01 or 1%. Traditionally, results are considered to be statistically significant (i.e. unlikely to be due to chance) if the probability is <0.05 (i.e. less than 5%) [42].

Confidence Intervals: A 95% Confidence Interval suggests that if you were to repeat the sampling process 100 times, 95 times out of 100 the confidence interval would include the true value. In general terms, if the 95% confidence intervals of two samples overlap, there is no significant difference between them (i.e. the p value would be ≥0.05), whereas if they do not overlap, they can be assumed to be statistically different at the 95% confidence level (i.e. the p value would be <0.05) [42].

The Use of Statistical Significance Testing in this Report

In the preparation of this report a large range of data sources were used. For the purposes of statistical significance testing however, these data sources can be considered as belonging of one of two groups: Population Surveys and Routine Administrative Datasets. The relevance of statistical testing to each of these data sources is described separately below:

Population Surveys: A number of indicators in this report utilise data derived from national surveys (e.g.2006/07 New Zealand Health Survey), where information from a sample has been used to make inferences about the population as a whole. In this context statistical significance testing is appropriate, and where such information is available in published reports, it has been incorporated into the text accompanying each graph or table (i.e. the words significant, or not significant in italics are used to imply that a test of statistical significance has been applied to the data and that the significance of the associations are as indicated). In a small number of cases however information on statistical significance was not available in published reports, and in such cases any associations described do not imply statistical significance.

Numbers and Rates Derived from Routine Administrative Data: A large number of the indicators in this report are based on data derived from New Zealand's administrative datasets (e.g. National Minimum Dataset, National Mortality Collection), which capture

information on all of the events occurring in a particular category. Such datasets can thus be viewed as providing information on the entire population, rather than a sample and as a consequence, 95% confidence intervals are not required to quantify the precision of the estimate (e.g. the number of leukaemia deaths in 2003-2007, although small is not an estimate, but rather reflects the total number of deaths during this period). As a consequence, 95% confidence intervals have not been provided for any of the descriptive data (numbers, proportions, rates) presented in this report, on the basis that the numbers presented are derived from the total population under study.

Rate Ratios Derived from Routine Administrative Data: In considering whether statistical significance testing is ever required when using total population data Rothman [43] notes that if one wishes only to consider descriptive information (e.g. rates) relating to the population in question (e.g. New Zealand), then statistical significance testing is probably not required (as per the argument above). If however, one wishes to use total population data to explore biological phenomena more generally, then the same population can also be considered to be a sample of a larger super-population, for which statistical significance testing may be required (e.g. the fact that SIDS in New Zealand is 10 times higher in the most deprived NZDep areas might be used to make inferences about the impact of the socioeconomic environment on SIDS mortality more generally (i.e. outside of New Zealand, or the 5 year period concerned)). Similarly, in the local context the strength of observed associations is likely to vary with the time period under study (e.g. in updating 5-year asthma admission data from 2004-2008 to 2005-2009, rate ratios for Pacific children are likely to change due to random fluctuations in annual rates, even though the data utilised includes all admissions recorded for that particular 5-year period). Thus in this report, whenever measures of association (i.e. rate ratios) are presented, 95% confidence intervals have been provided on the assumption that the reader may wish to use such measures to infer wider relationships between the variables under study [43].

The Signalling of Statistical Significance in this Report

In order to assist the reader to identify whether tests of statistical significance have been applied in a particular section, the significance of the associations presented has been signalled in the text with the words *significant*, or *not significant* in italics. Where the words *significant* or *non-significant* do not appear in the text, then the associations described do not imply statistical significance or non-significance.

APPENDIX 4: 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 Ministry of Health. 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 [44]. 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 [45].

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 [45]. 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 [46].

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 [46]. 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 NZ population and whose residents have access to specialist Paediatric Emergency Departments) was compared to the rest of NZ. 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 NZ. 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 NZ. (These findings occurred despite Auckland having a similar proportion of children living in the most deprived NZDep small areas as the rest of NZ).

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 NZ. 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

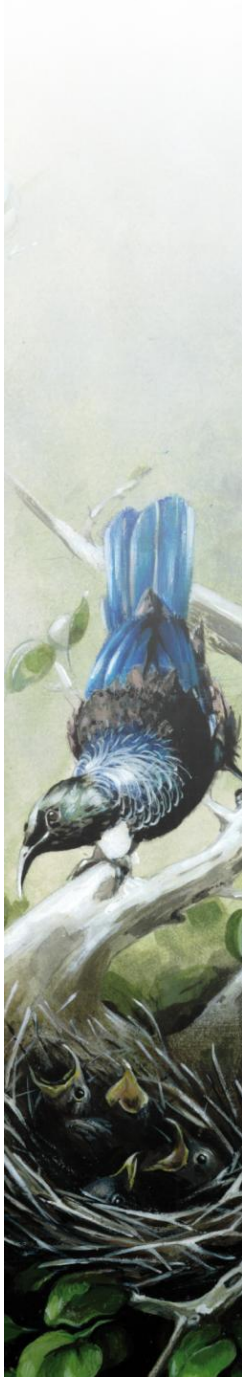
From 1988 until June 1999, clinical information in the NMDS was coded using versions of the ICD-9 classification system (ICD-9 CM until June 1995, then ICD-9-CM-A until June 1999). From July 1999 onwards, the ICD-10-AM classification system has been used, although for time series analysis, back and forward mapping between the two classification systems is possible fusing pre-defined algorithms [44].

The introduction of ICD-10-AM 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-AM 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 [47]. 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 Ministry of Health 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 [48]. 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 5: NATIONAL MORTALITY COLLECTION

Mode of Data Collection

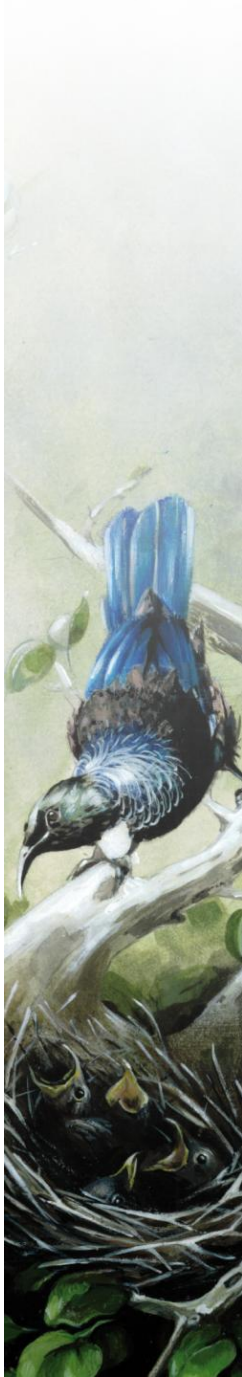
The National Mortality Collection is a dataset managed by the Ministry of Health, which contains information on the underlying cause(s) of death, as well as basic demographic data, for all deaths registered in New Zealand since 1988. Foetal and infant data is a subset of the Mortality Collection, with cases in this subset having additional information on factors such as birth weight and gestational age [49].

Each month Births, Deaths and Marriages send the Ministry of Health 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 NZ 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-10-AM) is assigned by MoH staff using the World Health Organisation's rules and guidelines for mortality coding [49].

Data Quality Issues Relating to the National Mortality Collection

Unlike the NMDS, where information on the principal diagnosis is coded at the hospital level and then forwarded electronically to the MoH, in the National Mortality Collection each of the approximately 28,000 deaths occurring in New Zealand each year is coded manually by MoH staff. 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, NZ Cancer Registry, LSTA, Police, Water Safety NZ and ESR [50]. 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 National 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 9: METHODS USED TO DEVELOP THE CHILDREN'S SOCIAL HEALTH MONITOR

Introduction

In response to deteriorating economic conditions in New Zealand and Australia in the late 2000s, a Working Group of health professionals from a range of organisations[2] with an interest in child health was formed in early 2009. Over the course of the year, this Working Group discussed the conceptualisation of an indicator set to monitor the impact of the recession on child wellbeing, the types of indicators which might be included, and the criteria by which individual indicators should be selected. As a result of these discussions, it was proposed that a Children's Social Health Monitor be developed, which comprised the following:

1. *A Basket of Indicators to Monitor Prevailing Economic Conditions:* Ideally, indicators would capture different facets of economic wellbeing (e.g. in a recession several quarters of negative growth (*GDP*) may precede upswings in *Unemployment Rates*, which in turn will influence the number of *Children Reliant on Benefit Recipients*.
2. *A Basket of Indicators to Monitor Children's Wellbeing:* Ideally indicators would respond relatively quickly (e.g. months - small number of years) to family's adaptations to deteriorating economic conditions (e.g. hospitalisations for poverty related conditions) and would provide an overview of family wellbeing from a variety of different perspectives.

Indicator Selection Criteria

In selecting these indicators, it was decided that only routinely collected data sources which were of good quality, and which provided complete population coverage would be used, in order to ensure the indicator set was methodologically robust and could be consistently monitored over time. In order to achieve this aim, the Working Group developed a set of selection criteria, against which candidate indicators were scored. These selection criteria included:

Conceptual Criteria

Criteria for Indicators to Monitor Prevailing Macroeconomic Conditions

1. Internationally recognised and reported measure of economic performance / wellbeing
2. Should impact on at least one facet of children's wellbeing (i.e. the pathway(s) via which it impacts on children's wellbeing should be relatively well understood, or an association between the indicator and wellbeing documented in the literature).
3. Likely to change in response to a recession (i.e. months-small number of years)

Criteria for Indicators to Monitor Children's Health and Wellbeing

1. The condition is likely to be influenced by family's physical adaptations to worsening economic conditions (e.g. saving on heating to pay for food, moving in with family to save on rent).

[2] The Paediatric Society of New Zealand, the Population Child Health Special Interest Group of the Royal Australasian College of Physicians, the New Zealand Child and Youth Epidemiology Service, TAHA (the Well Pacific Mother and Infant Service), the Māori SIDS Programme, the Kia Mataara Well Child Consortium, the New Zealand Council of Christian Social Services, and academics from the Universities of Auckland and Otago

2. The condition is likely to be influenced by family's psychological adaptations to worsening economic conditions (e.g. increased family conflict in response to financial stress).
3. The condition exhibits a socioeconomic gradient (e.g. rates are higher in more deprived areas)
4. The condition is likely to respond to changing economic conditions in the short to medium term (e.g. months to 1-2 years)

Data Quality Criteria

Data Quality Criteria (for either of the above indicator categories)

1. Needs to be routinely collected
2. Available at the national level i.e. complete coverage of target population
3. Updated at least annually (although quarterly preferable)
4. Availability of consistent time series data going back several years (i.e. standard and stable method of data collection)
5. Distribution can be broken down by e.g. ethnicity, socioeconomic status, region

Selection of the Baseline Indicator Set

In mid-2009 a long list of candidate indicators (selected by means of a scan of the available literature, email consultation with child health networks, and the suggestions of Working Group members) were then scored against each of these criteria by Working Group members and other health professionals (n=20). Those scoring the indicators were also asked to select a Top 5 Economic and Top 5 Health and Wellbeing Indicators for inclusion in the Children's Social Health Monitor. The resulting Top 5 Economic and Wellbeing indicators (as determined both by criteria scoring and priority ranking) were:

Economic Indicators:

Gross Domestic Product
Income Inequality
Child Poverty
Unemployment Rates
The Number of Children Reliant on Benefit Recipients

Child Health and Wellbeing Indicators:

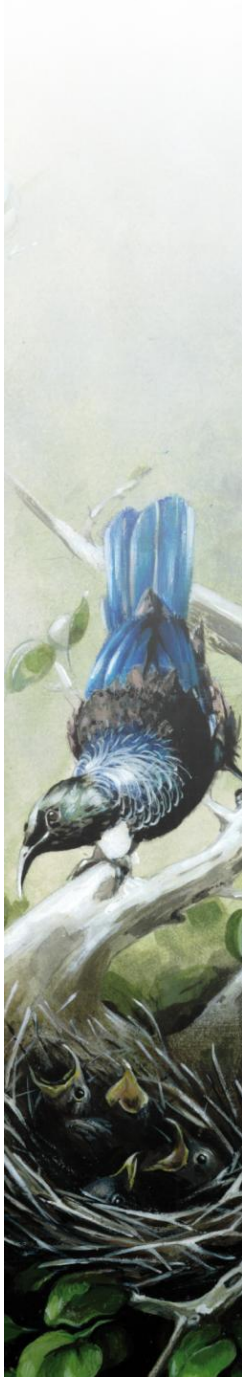
Hospital Admissions with a Social Gradient
Mortality with a Social Gradient
Infant Mortality
Hospital Admissions and Mortality from Non-Accidental Injury
Ambulatory Sensitive Hospital Admissions

Methodology for Developing the Hospital Admissions and Mortality with a Social Gradient Indicator

While all of the Top 5 Economic Indicators, and a number of the Child Health and Wellbeing indicators already had established methodologies, the hospital admissions and mortality with a social gradient indicator had to be developed specifically for the Children's Social Health Monitor. The methodology used to develop this indicator is outlined below:

Hospital Admissions

In considering which conditions should be included in the analysis of hospital admissions with a social gradient, the 40 most frequent causes of hospital admission in children aged 0-14 years (excluding neonates) were reviewed, and those exhibiting a social gradient (a rate ratio of ≥1.8 for NZDep Decile 9-10 vs. Decile 1-2; or for Māori, Pacific or Asian vs.



European children) were selected. A small number of conditions with rate ratios in the 1.5-1.8 range were also included, if they demonstrated a consistent social gradient (i.e. rates increased in a stepwise manner with increasing NZDep deprivation) and the association was biologically plausible (the plausibility of the association was debated by Working Group members).

Inclusion and Exclusion Criteria

Neonatal hospital admissions (<29 days) were excluded on the basis that these admissions are more likely to reflect issues arising prior to / at the time of birth (e.g. preterm infants may register multiple admissions as they transition from intensive care (NICU) → special care nurseries (SCBU) → the postnatal ward), and respiratory infections / other medical conditions arising in these contexts are likely to differ in their aetiology from those arising in the community.

For medical conditions, only acute and arranged hospital admissions were included, as Waiting List admissions are likely to reflect service capacity, rather than the burden of health need (e.g. the inclusion of Waiting List admissions would result in a large number of children with otitis media and chronic tonsillitis (who were being admitted for grommets and tonsillectomies) being included, and the demographic profile of these children may be very different from children attending hospital acutely for the same conditions).

For injury admissions, filtering by admission type was not possible, as a number of DHBs admitted injury cases under (now discontinued) ACC admission codes, making it difficult to distinguish between acute and waiting list admissions in this context. As with other NZCYES reports, all injury cases with an Emergency Department Specialty Code (M05-M08) on discharge were excluded as a result of inconsistent uploading of Emergency Department cases across DHBs (see **Appendix 4** for further detail). This differential filtering however means that it is not possible to accurately compare the magnitude of the social gradients between the medical condition and injury categories, as they were derived using different methodologies (and social differences in Emergency Department vs. primary care attendances for minor medical conditions may have accounted for some of the social gradients seen). No such differential filtering occurred for mortality data however (see below), and thus the magnitude of the social differences seen in this context is more readily comparable.

Mortality

In the case of mortality, because in many instances, the number of deaths from a particular condition was insufficient to calculate reliable rate ratios by NZDep and ethnicity, the rate ratios derived from the analysis of hospital admission data were used to denote category membership. The most frequent causes of mortality in those 0-14 years (excluding neonates) were reviewed however, in order to ensure that no additional conditions making a large contribution to mortality had been missed by the analysis of hospital admission data. This indentified two further conditions (which by analysis of mortality of data met rate ratio criteria); deaths from drowning and Sudden Unexpected Death in Infancy, which were then included in the coding algorithms (for both hospital admissions and mortality data). A number of deaths were also identified, which were attributed to issues arising in the perinatal period (e.g. extreme prematurity, congenital anomalies), but in order to preserve consistency with previous exclusion criteria (i.e. the exclusion of conditions arising in the perinatal period), these were not included in coding algorithms.

In Conclusion

While it is hoped that over time this indicator set will be expanded and further refined, it is intended that the NZ Child and Youth Epidemiology Service will monitor this core minimum indicator set on an annual basis, until the economic position of New Zealand children improves appreciably.

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