PACIFIC CHILD HEALTH
A paper for the PACIFIC HEALTH AND DISABILITY ACTION PLAN REVIEW
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Acknowledgements

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Cover photo courtesy of Hoe Mua Designs Limited.
Foreword

Talofa lava, Malo e lelei, Kia Orana, Taloha Ni, Fakalofa Lahi Atu, Ni Sa Bula Vinaka, Talofa, Kia Ora, Greetings

This is one of a series of papers prepared for the review of the Pacific Health and Disability Action Plan (PHDAP) and represents another step towards the development of a Pacific health evidence base. The Pacific Health Chart Book in 2004 brought together much of the available data and identified indicators that could be used for monitoring Pacific health. Its development also highlighted the comparative inaccessibility of quality information about Pacific health. These papers bring together much of the published information relevant to Pacific health; a more complex picture is emerging about the significant influence of determinants and risk factors on Pacific health, and the role of the health system in addressing Pacific health need. The evidence from the papers confirms the importance of action in two directions to achieve Pacific health gain and reduce inequalities: one, intersectoral action to improve the determinants of health status and two, improved health system responsiveness to Pacific peoples to reduce inequalities.

To improve and protect the health of Pacific children (0–14 years) was the first priority of the PHDAP and the evidence and information presented in this paper reinforces this prioritisation. Respiratory disease in Pacific children is unacceptably high. Pacific children also suffer from high rates of skin disease, oral health and hearing deficits, and overweight and obesity all of which are associated with determinants and risk factors for lifelong poor health. There are successes: Pacific child immunisation rates are now amongst the highest, and the meningococcal B campaign showed how Pacific parents and Pacific communities can be mobilised for health gain. The challenge for the health sector is three fold: to improve the exposure and engagement of Pacific children with the health system; to ensure health promotion reaches Pacific parents and communities; to energise intersectoral action to improve determinants. This paper provides the rationale and evidence for action that focuses on Pacific child health.

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Executive Summary

As a population group the children of Pacific people in New Zealand continue to have poorer health than other New Zealand children. In 2002 the Pacific Health and Disability Action Plan stated that 'Pacific children have a high incidence of risk factors for disease and illness, and there has been little improvement in Pacific child health compared with the rest of the population' (Ministry of Health 2002a). This paper investigates the reasons for this continuing inequality, drawing mainly on published information.

The evidence presented in this paper on the determinants of health points to the significance of socioeconomic factors. Pacific peoples’ comparative poverty – as indicated by lower income, lower-skilled and -status occupations, lower levels of educational attainment, poorer-quality and often overcrowded housing – affects their ability to make healthy choices and prioritise health care for their children. In addition, the effectiveness of health care services for Pacific children emerges as an issue.

Pacific children have greater exposure to the risk factors for disease and illness, in particular poor nutrition, physical inactivity and exposure to smoking. As a consequence of the combined effects of these determinants and risk factors, Pacific children have:

- higher rates of overweight and obesity than other New Zealand children
- much higher rates of acute and chronic respiratory and infectious diseases than other New Zealand children
- high rates of serious skin infections
- higher rates of hearing loss and poorer oral health than other children
- very high rates of ambulatory-sensitive hospital (ASH) admissions, which can be considered an indicator for both the seriousness of disease and illness, and disparities in prevention and care.

Although there is evidence to show that breastfeeding helps develop immunity, reduces the incidence of childhood disease and can help reduce the rates of obesity in young children, Pacific mothers have one of the lowest breastfeeding rates in New Zealand when compared to the total New Zealand population.

Despite the significant health disparities and challenges identified, this paper also suggests some cause for optimism. Pacific child health is improving, but not nearly as fast as that of other New Zealand children. Pacific children have a good birthweight distribution, which means lower rates of premature delivery and intrauterine growth restriction; but Pacific infant and perinatal mortality is still too high compared to the total New Zealand population. Pacific children's ASH rates are decreasing at the same time as relative rates between Pacific and other New Zealanders are increasing. Pacific children are becoming less vulnerable to vaccine-preventable diseases because of improving levels of immunisation in all population groups and Pacific especially. There are signs that health sector initiatives are attempting to become more responsive to Pacific peoples. Improvements in the collection and monitoring of ethnicity data will help this process. The overriding concern is that many Pacific children are not receiving prevention focused, timely and responsive health care.
The conclusions of this paper are that improving Pacific child health remains an important priority, and that intersectoral commitment is required if meaningful progress is to be achieved. Three priority areas are recommended for future health and disability sector action:

- reduce respiratory and infectious diseases including skin diseases among Pacific children
- reduce overweight and obesity in Pacific children through improvements in nutrition and physical activity
- reduce smoking through strategies and programmes that target Pacific children and youth for initiation prevention, Pacific families to reduce second-hand smoke, and Pacific youth and adults for cessation.
1. Introduction

This paper stands alone but also forms part of a series of papers prepared for the review of the Pacific Health and Disability Action Plan, which includes:

- *Pacific Youth Health* (Ministry of Health 2008a)
- *Pacific Peoples’ Experience of Disability* (Ministry of Health 2008b)
- *Pacific Peoples and Mental Health* (Ministry of Health 2008c)
- *Promoting Healthy Lifestyles and Preventing Chronic Diseases Among Pacific Peoples* (Ministry of Health 2008d)
- *Pacific Peoples and Health Services* (Ministry of Health 2008e)
- *Improving Quality of Care for Pacific Peoples* (Ministry of Health 2008f).

A related paper, *Pacific Cultural Competencies: A literature review* (Tiatia 2008) complements the review papers and provides additional information about the significance of cultural competence for Pacific peoples’ health.

This paper considers the Pacific Health and Disability Action Plan priority area ‘To improve and protect the health of Pacific children (0–14 years)’ (Ministry of Health 2002a). It brings together information and evidence from a range of published sources as well as some unpublished data from Ministry of Health collections. Since the Pacific Health and Disability Action Plan was published there have been a number of important developments and initiatives aimed at improving child health in New Zealand, as well as a growing body of research and other studies. Drawing on this information, the paper describes the determinants of Pacific child health, identifies and discusses risk and protective factors influencing Pacific children’s health, and shows how these factors affect child health outcomes.

Background

At the 2006 Census there were 68,448 Pacific children aged under 10 years (12 percent of the total New Zealand age group) and 59,589 Pacific children and youth aged 10 to 19 years (10 percent of the total New Zealand age group). Pacific children and youth under 19 years of age comprise 48 percent of the Pacific population, compared to 29 percent of the total population made up of this age group.

Pacific births are expected to increase from 8600 per year in 2005 to 10,300 in 2021. The Pacific population will continue to have a much younger age than the overall New Zealand population because of continuing higher Pacific birth rates. The number of Pacific children aged 0–14 years is projected to rise steadily, increasing by 36,000 to 136,000 in 2021 (Statistics New Zealand 2007a). Birth registrations for the December 2006 year show that one-half of Pacific babies belonged to multiple ethnic groups, compared with two-thirds of Māori and one-third of European and Asian babies (Statistics New Zealand 2007b).

Available information and evidence indicates that Pacific children experience poorer health than New Zealand children. In 2002 the Pacific Health and Disability Action Plan identified the following specific health problems facing Pacific children:

- vaccine-preventable infectious diseases (eg, measles)

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1 Census 2006 data on the 0–14 years age group was not available.
• other infectious diseases and their complications (eg, meningococcal disease, rheumatic fever, respiratory infections, glue ear and skin infections)
• asthma
• unintentional and intentional injuries
• risk and protective factors for premature illness in later life (eg, nutrition, obesity and inactivity).

_Tupu Ola Moui: Pacific Health Chart Book 2004_ (Ministry of Health and Ministry of Pacific Island Affairs 2004) provided a stocktake of the health needs of the Pacific population within New Zealand. It included indicators for Pacific children that showed similar or better outcomes than the total New Zealand population and indicators that showed a significant inequality between Pacific children and the total New Zealand population (see Appendix). These indicators are summarised in Table 1.

Table 1: Summary of positive and negative health indicators for Pacific children compared to all New Zealand children

<table>
<thead>
<tr>
<th>Positive Pacific child health indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Declining infant mortality rates over recent decades</td>
</tr>
<tr>
<td>• Good birth weight distribution</td>
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<tr>
<td>• Lower rates of both premature delivery and intrauterine growth retardation</td>
</tr>
<tr>
<td>• Good birth weight distribution</td>
</tr>
<tr>
<td>• Reducing rates of hearing loss</td>
</tr>
<tr>
<td>• Lower risk of motor vehicle or other unintentional injury</td>
</tr>
<tr>
<td>• Higher rates of vegetable consumption</td>
</tr>
<tr>
<td>• Higher rates of fruit consumption</td>
</tr>
<tr>
<td>• More Pacific pre-schoolers participating in early childhood education</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Negative Pacific child health indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Higher Pacific infant mortality rates</td>
</tr>
<tr>
<td>• High levels of respiratory tract infections</td>
</tr>
<tr>
<td>• Poorer oral health</td>
</tr>
<tr>
<td>• Higher rates of hearing loss</td>
</tr>
<tr>
<td>• Higher rates of infectious diseases</td>
</tr>
<tr>
<td>• Lower levels of physical activity</td>
</tr>
<tr>
<td>• Higher levels of overweight and obesity</td>
</tr>
<tr>
<td>• Too many children experiencing food insecurity</td>
</tr>
<tr>
<td>• Lower levels of participation in early childhood education in comparison with all children aged 0–4 years</td>
</tr>
</tbody>
</table>

Scope
Pacific children aged 0–14 years are the focus of this paper. There is a separate paper on Pacific youth health spanning the age group 15–24 years (Ministry of Health 2008a). As the available data is often, but not always, disaggregated in these age bands the most appropriate available age breakdown is used. A similar lack of consistency occurs in the collection and presentation of ethnic data, for example, the categories ‘European’ and ‘Other’ may sometimes be synonymous, while on other occasions ‘Other’ represents the non-Pacific, non-Māori proportion of the population, or the non-Pacific, non-Māori, non-Asian proportion of the population. Neither inconsistency is considered a particular problem because the purpose is to expose trends and present evidence about the comparative and relative status of Pacific children compared to other New Zealand children.

Of greater concern to establishing and maintaining reliable trends data is the extent of ‘missing’ Pacific data and analysis from much of the material scanned and consulted. Small sample populations, inadequate ethnicity data collection, and the need to demonstrate statistical significance are often used to explain this lack of coverage.

Given these constraints any attempt to provide as complete as possible a picture of Pacific child health in New Zealand will expose information and evidence gaps that need to be addressed before a better understanding of how much progress is being made in reducing inequalities and improving Pacific health.

Methodology
To provide a structure for the analysis of Pacific child health status in New Zealand, this paper, and the papers Pacific Youth Health (Ministry of Health 2008a) and Promoting Healthy Lifestyles and Preventing Chronic Diseases among Pacific Peoples (Ministry of Health 2008d) adapted a framework from a World Health Organization (WHO) model illustrating intermediate proximal or downstream risk and protective factors for chronic disease (WHO 2005).

Figure 1 depicts the framework and the pattern of cause and effect for poor child health outcomes. Each of the three areas – determinants, risk factors, health outcomes and intervention – is discussed in turn, with reference to the available evidence. Protective factors and other contributions to improving Pacific child health are also identified. It should be noted that the state of current research and data collection on Pacific health means that the available evidence does not necessarily reflect the significance of the health issue. The forthcoming Pacific child health epidemiology report and 2007 New Zealand Health Survey report will provide more comprehensive and up-to-date information about key areas of Pacific child health.

The final section of the paper brings together conclusions from the earlier sections and makes recommendations for Pacific child health goals and objectives. This analysis leads to a number of conclusions and recommendations for future Pacific child health priorities.
Figure 1: Causes of poor child health outcomes in Pacific children aged 0–14 years

**Child Health Outcomes**

<table>
<thead>
<tr>
<th>Determinants</th>
<th>Risk factors</th>
<th>Poor health outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family structure</td>
<td>Parental behaviour</td>
<td>High infant mortality</td>
</tr>
<tr>
<td>Family income</td>
<td>Nutrition</td>
<td>High ASH* rates</td>
</tr>
<tr>
<td>Housing</td>
<td>Physical activity</td>
<td>Respiratory and infectious diseases</td>
</tr>
<tr>
<td>Education</td>
<td>Access to health services</td>
<td>Serious skin infections</td>
</tr>
<tr>
<td>Parental employment and occupation</td>
<td></td>
<td>Ear infections and hearing loss</td>
</tr>
<tr>
<td>Deprivation</td>
<td></td>
<td>Oral health complications</td>
</tr>
<tr>
<td>Social connectedness</td>
<td></td>
<td>Overweight and obesity</td>
</tr>
</tbody>
</table>

**Interventions**

* ASH = ambulatory-sensitive hospitalisation.
2. Determinants

The fundamental determinants of the health status of any population include political, social, cultural and economic factors. These determinants are important influences on child health and predictors of future adult health. The population health approach of the New Zealand Health Strategy seeks to reduce negative impacts, increase associated positive impacts, and thereby reduce health inequalities. It also recognises that the ability of the health sector alone to influence these broader determinants is limited.

Family structure, family income, housing, education, parental employment and occupation, deprivation and social connectedness have been identified as influences on Pacific child health (see Figure 1). Parents and caregivers are important influences, mitigating the effects of adverse determinants and risk factors for child health. The health and disability sector therefore needs to work with other sectors to ensure that parents and caregivers receive appropriate support and advice as part of this process.

Family structure

Extended family living can be a source of support and material assistance, and thereby contribute to better health. However, it can also contribute to crowding, loss of privacy, psychological distress, domestic violence, and a lower material standard of living (through obligations to share the same income across a greater number of people), and so increase risks to the health of at least some family members (Ministry of Health and Ministry of Pacific Island Affairs 2004). As Table 2 shows, Pacific people are more likely to live in multi-family households in New Zealand than members of the wider population.

Table 2: Household composition, total Pacific peoples and total New Zealand, 2006

<table>
<thead>
<tr>
<th>Household composition</th>
<th>Pacific %</th>
<th>New Zealand %</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-family household (with or without other people)</td>
<td>75.4</td>
<td>69.1</td>
</tr>
<tr>
<td>Two-family household (with or without other people)</td>
<td>11.6</td>
<td>2.6</td>
</tr>
<tr>
<td>Three-or-more family household (with or without other people)</td>
<td>1.4</td>
<td>0.2</td>
</tr>
<tr>
<td>Other multi-person household</td>
<td>5.4</td>
<td>5.1</td>
</tr>
<tr>
<td>One-person household</td>
<td>6.2</td>
<td>23.0</td>
</tr>
</tbody>
</table>

Source: Census 2006, Statistics New Zealand 2007c

Pacific children are also more likely to live in larger families. At the 2006 Census, 24 percent of Pacific women had four or more children, compared to 14 percent of the total New Zealand population (Statistics New Zealand 2007c).

Pacific children are also more likely than other New Zealand children to be raised by a single parent, and this trend may be increasing (Ministry of Pacific Island Affairs and Statistics New Zealand 2002). Sole parenting is often associated with poorer health outcomes, almost entirely as a result of lower incomes (Ministry of Health and Ministry of Pacific Island Affairs 2004).

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2 In interpreting this information, it should be noted that living arrangements are in part culturally determined, and that their impacts on health are complex and not necessarily negative (Ministry of Health and Ministry of Pacific Island Affairs 2004).
Sole-parent families are less likely than two-parent families to have either internet access or a telephone, or to have people over for dinner. Sole parents living with children are also more likely to report fear of crime affecting their quality of life (Ministry of Social Development 2007b).

**Family income**

Low family income in childhood, if it is long-lasting, is associated with negative outcomes, such as lower educational attainment and poorer health (Ministry of Social Development 2007b).

The younger age structure of the Pacific population coupled with the lower overall qualification levels of Pacific people and their higher representation in less skilled occupations are reflected in median annual personal incomes and annual household incomes that are relatively low (Statistics New Zealand 2002). The median annual incomes for the Pacific and New Zealand populations in 2006 were $20,500 and $24,400 respectively (Statistics New Zealand 2007c).

Wages and salaries were the commonest source of income reported for Pacific people in the Census. In 2006, 62 percent (compared to 47 percent in 2001) of Pacific people and 60 percent (55 percent in 2001) of the national population received income from this source. Twenty-eight percent of Pacific people received income support at the 2006 Census compared to 17 percent of the total New Zealand population (Statistics New Zealand 2007c, 2002).

More Pacific (29 percent) than Māori (22 percent) or European (12 percent) households had net-of-housing-cost household incomes below the 60 percent threshold in 2004 (Ministry of Social Development 2007b). Pacific families also had lower average living standards in 2004 compared with 2000 and were considerably more likely to be in ‘severe hardship’ in 2004 (Ministry of Social Development 2006).

The proportion of Pacific children living in low-income households, below the poverty line, has decreased from the 1999 peak but still remains higher than that for Māori and European children (see Figure 2). The 1991 benefit cuts and very high unemployment rates for Pacific peoples in this period were significant contributors to the growth in child poverty (Ministry of Social Development 2007a).

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3 This includes the unemployment benefit, sickness benefit, domestic purposes benefit, invalids benefit, student allowance, and other government benefits, payments or benefits.

4 Thresholds are set at 50 percent and 60 percent of the 1998 household disposable income median, with 25 percent deducted to allow for average housing costs. Thresholds are adjusted for inflation to keep them fixed in real terms.

5 Because of the relatively small numbers of children of Pacific or Other ethnicity in the Household Economic Survey sample, the two groups have been combined as Other.
The importance of gift giving or remittances in one form or another is a vital part of maintaining expatriate links and connections with family in the Pacific Islands and with the church (Cowley et al 2004). Gift giving and remittances can be considered a form of saving in the long term, but in the short term these practices can have a serious impact on a family’s income and lifestyle. Particular stresses are placed on low-income families struggling to meet living costs while at the same time being under pressures from extended family and community to give generously.

**Housing**

Home ownership brings both material (wealth accumulation) and psychosocial benefits for health. Research shows that Pacific people share the same aspirations for home ownership as other New Zealanders, valuing the security, privacy and opportunity to adapt homes to suit their lifestyle that home ownership offers, but they face particular challenges in achieving this (Koloto et al 2007).

Census 2006 shows Pacific peoples (22 percent) are considerably less likely than the total New Zealand population (53 percent) to own their own homes (Statistics New Zealand 2007c). Their ability to buy is constrained by their relatively low household income, the lack of availability of affordable houses that suit their needs and their desire to live close to other families from their cultural group, which in many cases means they are seeking housing in high cost urban areas (Koloto et al 2007).

Home ownership is associated with long-term residence and can increase the quality of care received from a general practitioner, because the general practitioner–client relationship can be developed over time and continuity of care established (Sundborn et al 2006).

There has been a marked rise between 1991 and 2006 in the proportion of Pacific renter households with private landlords and a corresponding fall in the proportion renting from Housing New Zealand. This fall reflects the historically high proportion of Pacific households in Housing New Zealand tenancies (relative to population and household shares), and the declining proportion of Housing New Zealand dwellings in the overall rental stock, despite substantial additions to the Housing New Zealand rental stock (Koloto et al 2007).
In 2006, the proportion of renting Pacific households paying less than $125 per week was much higher than for non-Pacific households, reflecting the proportion on income related rents (Koloto et al 2007).

Various studies have reported Pacific households experiencing worse housing conditions than Māori or European households (Sundborn et al 2007; Butler et al 2003; Tukuitonga and Finau 1997). Other research has shown that exposure to damp, mouldy and cold housing can significantly increase the risk of a number of respiratory symptoms, including asthma, colds and flu, as well as infectious disease, fatigue, poor concentration, poor educational achievement and mental health problems (Sundborn et al 2007; Gray 2000). It has also been acknowledged that other social and economic deprivation factors are likely to be operating in conjunction with housing issues to contribute to health problems (Butler et al 2003).

Rental accommodation, overcrowded circumstances, damp and cold housing combined with lower incomes also increases the mobility of Pacific households (Sundborn et al 2007). This can further undermine household wellbeing and health, and engagement and participation in social and cultural activities including children’s education.

Research as part of the Pacific Islands Families: First Two Years of Life (PIF) study, in which 1376 mothers were interviewed when their infants were six weeks old, found that 37 percent of mothers reported their homes had dampness and mould problems and 54 percent reported their homes as being cold. Damp and cold housing are significantly associated with large household size, state rental housing, and financial difficulty with housing costs; as well as being significantly related to maternal depression and the incidence of asthma (Butler et al 2003).

Household crowding

Household crowding\(^6\) is one facet of poor housing. The youngest members of the household are the most vulnerable to the negative impacts of crowded living conditions. Infants and young children need space and fresh air if they are to develop strong immune systems and maintain good health. They also need quiet sleeping quarters to support good sleeping patterns. By school age, all children require dedicated quiet space for quality learning while at home. If socioeconomic or other circumstances of the household preclude regular outdoor activity to balance the impact of living in close quarters, the risks associated with crowded living will not be ameliorated (Ministry of Social Development 2003).

Household crowding is associated with a wide range of health conditions in children, including acute lower respiratory tract disease and meningococcal disease (Schluter and Carter et al 2007). At the 2006 Census, 43 percent of Pacific people (compared to 4 percent of Europeans) lived in houses requiring extra bedrooms (Ministry of Social Development 2007b). Pacific people identify overcrowding as a health issue and report finding it difficult to keep a house clean and hygienic because of constant use and the number of people sharing a bathroom (Colmar Brunton 2006).

Cultural attitudes and economic conditions are the two main factors that account for the extreme variation in crowding levels between ethnic groups. The variance in population age structure is also a factor, with Pacific people having a younger age structure than European people (Ministry of Social Development 2007b).

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\(^6\) The meaning and definition of ‘crowding’ may be contested, and caution should be exercised when interpreting ‘crowding’ for Pacific households (Ministry of Health and Ministry of Pacific Island Affairs 2004).
Housing New Zealand has, with mixed success, piloted or implemented a number of primary and supporting initiatives relevant to Pacific people. The Healthy Housing Programme has been particularly successful in improving housing for Pacific families in South Auckland, and the Pacific Peoples’ Home Ownership Programme has also been successful in Wellington (Koloto et al 2007).

**Education**

Education can affect many determinants of health: indirectly by determining occupation and income; but also directly by improving understanding of health protection and providing the confidence to seek the aid of professionals. Mothers who are better educated are more likely to receive health services for their children, including postnatal care, immunisation, use of community nurses, early dental care and early childhood education (Sundborn et al 2007).

Quality early childhood programmes can help narrow the achievement gap between children from low-income families and those from more advantaged families (Minister for Social Development and Employment 2006). Pacific primary school entrants have the lowest prior participation in early childhood education services: 84 percent in 2006, compared to 90 percent of Māori entrants and 98 percent of European entrants. Between 2001 and 2004 participation in early childhood education by Pacific children grew by 15.2 percent, but it has declined slightly between 2004 and 2006 (Ministry of Social Development 2007b). Education and care services’ have the largest share of Pacific enrolments (46 percent), followed by kindergartens (29 percent). Fifteen percent of enrolments are with Pasifika Language Groups (Ministry of Education 2006).

Many early childhood centres have established links with community and other health workers. Projects have also been established under the Pasifika Education Plan to strengthen links between Pasifika families and communities, early childhood education services and primary schools (Ministry of Education 2006).

At primary school Pacific students achieve, on all available benchmarks, at lower levels on average in early literacy and numeracy than other students. The National Education Monitoring Project results for Year 4 and Year 8 students in 2004 showed that Pacific students are generally performing below national means, although the difference has decreased in some subjects, such as Year 4 reading (Ministry of Education 2006). The paper on Pacific youth health (Ministry of Health 2008a) discusses secondary school and tertiary education.

**Parental employment**

The main factor determining income is employment. Employment has been shown to increase general health and wellbeing because it provides many opportunities for social interaction, community participation and the development of social status, and it can increase levels of physical activity (Sundborn et al 2006).

At Census 2006 the labourforce participation and employment rates of Pacific peoples remained lower than those of the total New Zealand rate (see Table 3), but were an improvement on Census 2001 figures (in brackets below).

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7 All-day care, better suited to the changing patterns of employment of parents, is offered by education and care services, in comparison to the sessional programmes of other early childhood education services.
Table 3: Labourforce participation, employment and unemployment, Pacific peoples and total New Zealand population, 2006

<table>
<thead>
<tr>
<th></th>
<th>Pacific peoples %</th>
<th>New Zealand %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labourforce participation</td>
<td>65</td>
<td>69</td>
</tr>
<tr>
<td>Employed</td>
<td>58 (55)</td>
<td>65 (62)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>10.7</td>
<td>5</td>
</tr>
</tbody>
</table>

Source: Statistics New Zealand 2007c

As Table 3 shows unemployment rates among Pacific peoples are double those of the total New Zealand population. Unemployment has been found to be detrimental to both physical and mental health (Sundborn et al 2007).

Pacific people are more likely than others to hold down several jobs at the same time; for example, working full time in a factory during the day and cleaning in an office building at night. Although this contributes to income, it can also have a negative impact on the work-life balance, with less quality time available for interacting with children and detrimental health outcomes for both children and adults (Ministry of Health and Ministry of Pacific Island Affairs 2004).

A higher proportion of Pacific people reported unpaid activities that involved looking after a child who was a member of their household (43 percent) than the total New Zealand population (31.6 percent) (Statistics New Zealand 2007c). Pacific people report similar levels of involvement in unpaid or voluntary work inside and outside of the household (86 percent) to the total New Zealand population (89 percent).

**Parental occupation**

Occupation helps form the basis for the conventional stratification of society into social classes. While the meaning of occupational class may differ across cultures, it remains an important indicator of socioeconomic position or rank and constitutes a powerful determinant of adult and intergenerational health status.

The Pacific workforce is predominantly located in lower-skilled and lower-status occupations, although less so than in the 1980s and 1990s. This is in part a reflection of the limited educational opportunities available to the overseas-born generations. Education, age and birthplace all have a strong influence on the occupational distribution of Pacific people, with the more qualified, younger and New Zealand-born sections of the population more likely to have white-collar occupations (Ministry of Pacific Island Affairs and Statistics New Zealand 2002).

The proportion of Pacific workers employed as trade workers and in technical and professional occupations has been increasing over recent years. At the 2006 Census the most common occupational category for Pacific peoples was plant and machine operators (19 percent), followed by service and sales workers (18 percent), elementary occupations (17 percent), and clerks (12 percent) (Statistics New Zealand 2007d).
**Neighbourhoods**

The proportion of the Pacific population living in deprived neighbourhoods is defined using the NZDep2001 (NZDep) index.8 The Pacific population is highly skewed, with 42 percent living in decile 10 areas instead of the expected 10 percent. (Ministry of Health and Ministry of Pacific Island Affairs 2004). In comparison with decile 1 areas decile 10 areas are relatively economically and socially deprived (relatively low incomes, high dependence on means tested benefits, high unemployment rates, high proportion of single parent families, few households with assets, high prevalence of crowded housing, little home ownership).

Children living in the most deprived neighbourhoods are likely to have fewer material and social resources. Low-decile neighbourhoods have fewer amenities, including playgrounds that are less well equipped, and are more often vandalised. A fuller discussion of environmental issues is included in the paper on *Promoting Healthy Lifestyles and Preventing Chronic Diseases Among Pacific Peoples* (Ministry of Health 2008d).

Having a low living standard limits the ability of children to participate in wider society, curtails their quality of life and can have negative long-term consequences across a wide range of social and economic outcomes (Ministry of Social Development 2003).

Children are also at greater risk of accident and injury in deprived neighbourhoods because of the consequences of poor maintenance and vandalism. Lack of adequate street lighting has also been noted as being more prevalent in poorer neighbourhoods.

The main source of air pollution in New Zealand is from vehicle exhaust emissions. There are serious health risks for children from vehicle exhaust emissions, including increased risk of wheezing under one year, increased chronic cough, and increased asthma symptoms (Asher 2006).

**Social connectedness**

Social connectedness is fostered when family relationships are positive, and when people have the skills and opportunities to make friends and interact constructively with others. The tendency to make connections outside the family varies between cultures and communities, and factors such as language differences, high levels of inequality, and tensions between ethnic groups can create barriers (Ministry of Social Development 2003). Adults are important models and facilitators of social connectedness for children. *The Social Report* (Ministry of Social Development 2007b) findings for people living in families with any Pacific member, in 2004, showed lower levels of social connectedness9 than other New Zealanders. More detail is included in *Improving Quality of Care for Pacific Peoples* (Ministry of Health 2008f).


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8 NZDep2001 is a census-based small area deprivation index derived from nine socioeconomic variables included in the 2001 Census. NZDep scores are usually categorised into tenths (deciles), numbered from 1 (least deprived) to 10 (most deprived).

9 Measures include internet access, telephone access, having people over for a meal, trust in other people, and loneliness.
3. Risk and Protective Factors

Risk and protective factors influence the proximal or ‘downstream’ likelihood of the diseases and injuries that ultimately determine health outcomes. Monitoring exposure of the population to risks is therefore critical for planning health promotion and disease and injury prevention services. More important is encouraging and facilitating protective factors for health and disease prevention in childhood because of their significance for child and lifelong health.

This section considers the available information about the risk and protective factors influencing the health of children: parental behaviour and choices about breastfeeding and immunisation; exposure to tobacco, alcohol consumption and violence; diet, lifestyle and physical activity (see Figure 1). Risk and protective factors experienced in childhood interact with determinants to influence lifelong health and health outcomes.

Parental behaviour

Most parents do the best they can to raise their children in strong, healthy families. Being a parent/caregiver is not always easy and people do not automatically have the skills and knowledge to do it well all the time (Families Commission 2007).

Parental and caregiver behaviour provides the most significant risk factors and greatest protective factors for infants and young children. Parents decide whether the protective factors of breastfeeding and immunisation are available to their infant children. Parents and caregivers also decide whether children will be protected from or exposed to the risk factors associated with smoking, drinking and violence. As children begin to make decisions about diet, physical activity and lifestyle it is within parameters set and behaviours modelled by parents.

Parental behaviour is as the discussion of determinants suggests, often default behaviour, arising from adverse socioeconomic circumstances.

Breastfeeding

Breastfeeding is an unequalled way of providing ideal food for the healthy growth and development of infants and toddlers. Breast milk is safe, clean and contains antibodies that help protect the infant against many common childhood illnesses (Ministry of Health 2007b).

Breastfeeding forms a unique biological and emotional basis for the health of both mother and child and plays an important and central role in protecting the health of the infant and promoting physical, neurological and emotional development both in the short term and long term (Fewtrell 2004; Horta et al 2007). It provides optimum nutrition for infants by meeting the full-term infant’s complete nutritional needs for up to the first six months of life. Benefits to the infant include the transfer of immune factors through breast milk and consequent improved immunity to infections. Breastfeeding promotes the correct development of jaws, teeth and speech patterns, and may have small long-term benefits for child cognitive development and visual acuity. Breastfeeding also decreases the incidence and severity of childhood infections, diseases such as otitis media, acute respiratory infections, diarrhoea and gastroenteritis, especially in less than optimal environments, urinary tract infection, sepsis and meningitis (Brown et al 1998; Ministry of Health 2007b).

There is some evidence that links breastfeeding to reduced risk of chronic diseases such as obesity. The evidence is stronger for a link between breastfeeding and adolescent obesity than childhood obesity (Ministry of Health 2007b).
Breastfeeding rates in New Zealand have changed little between 1997 and 2001, with some overall improvement between 2001 and 2006. As Table 4 shows, Pacific rates remain lower than in the European and Other group. New health sector target indicators have been set for breastfeeding to increase the proportion of all New Zealand infants exclusively and fully breastfed at six weeks to 74 percent or greater; at three months to 57 percent or greater, and at six months to 27 percent or greater (Minister of Health 2007).

Table 4: Breastfeeding rates (%), by ethnicity, at six weeks, three months and six months, 2006

<table>
<thead>
<tr>
<th></th>
<th>Pacific %</th>
<th>Māori %</th>
<th>European and Other %</th>
<th>All %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exclusive and full breastfeeding at 6 weeks.</td>
<td>57</td>
<td>59</td>
<td>70</td>
<td>66</td>
</tr>
<tr>
<td>Target 74% or greater</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exclusive and full breastfeeding at 3 months.</td>
<td>48</td>
<td>45</td>
<td>60</td>
<td>55</td>
</tr>
<tr>
<td>Target 57% or greater</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exclusive and full breastfeeding at 6 months.</td>
<td>19</td>
<td>17</td>
<td>29</td>
<td>25</td>
</tr>
<tr>
<td>Target 27% or greater</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


A PIF study of the association between not breastfeeding exclusively among mothers of a cohort of Pacific infants in New Zealand found:

- not exclusively breastfeeding at hospital discharge was associated with smoking, unemployment prior to pregnancy, years in New Zealand, not seeing a midwife during pregnancy, caesarean delivery, and twin birth status
- cessation (before six weeks post-birth) of exclusive breastfeeding (for mothers who initially breastfed exclusively) was associated with smoking, employment prior to pregnancy, being in current employment, high parity, dummy use, not receiving a visit from Plunket, infant not discharged at the same time as the mother, infant not sharing the same room as the parent(s) at night, regular child care, and having a home visit for the infant from a traditional healer (Butler et al 2004).

Many Pacific mothers report experiencing some level of difficulty or challenge during the early stages of learning to breastfeed, with the most common being problems with latching or milk supply problems, sore nipples, the challenges of coping when sleep deprived and/or recovering from the birth process. Other challenges include persistent problems with milk supply and the baby’s weight, infections such as mastitis, pain due to biting, and postnatal depression. Returning to work is a key barrier for many women who wish to continue breastfeeding (Thornley et al 2007).

The PIF study also indicates that while some beliefs, behaviours and experiences about breastfeeding may be common across Pacific communities, many differences also exist (Butler et al 2004). Some studies have suggested that Pacific people are more likely to introduce infants to complementary foods before six months of age than Europeans (Ministry of Health 2007b).

**Immunisation coverage**

Immunisation is one of the most cost-effective and successful preventive health interventions known. Diseases that are preventable by vaccination have a significant effect on the health of children. The burden of vaccine-preventable disease tends to be inequitably distributed, with higher rates among Pacific and Māori populations.
The National Childhood Immunisation Coverage Survey was undertaken between January and March 2005. This survey showed an improvement in immunisation coverage from the last survey undertaken in 1992. Fully immunised coverage for all children at age two years improved from less than 60 percent in 1992 to 77.4 percent in 2005. Pacific children’s immunisation coverage at age two years improved from 53 percent in 1995 (North Health 1995/96 survey cited in Ministry of Health and Ministry of Pacific Island Affairs 2004) to 81 percent in 2005. This is a good improvement for Pacific children and reflects positively on parents, caregivers and health services. Pacific children, however, remain less likely than European children to receive on-time immunisation (Ministry of Health 2007c).

Disease transmission will be prevented in a community only when high immunisation coverage is achieved (90–95 percent of the total population, depending on the disease). Therefore, high coverage levels are needed to effectively prevent disease and the subsequent morbidity and mortality from that disease. Achieving higher immunisation coverage in all children is a priority, particularly for Pacific and Māori children. The health sector target indicators have been set for improving immunisation coverage in the 2007/08 year, as follows:

- 95 percent of two-year-olds are fully immunised
- at least a 4 to 6 percent increase on 2005 National Immunisation Coverage Survey baselines (Minister of Health 2007).

A study of the non-immunisation of Pacific infants using PIF data found 27 percent of mothers had not had their infant immunised at approximately six-weeks of age. Factors significantly associated with non-immunisation were ethnic group, maternal birthplace, parity (more than five children), difficulty with transport, and age of baby at the time of the mother’s interview. The extent of non-immunisation demonstrates the need for education about the importance of immunisation and schedules, together with community resources to support mothers to understand and take up immunisation and infant health care (Paterson et al 2004).

**Meningococcal B**

The meningococcal B immunisation programme (MeNZB™) was launched in July 2004. Roll-out of the programme began in the northern region of New Zealand, in Counties Manukau DHB, where disease rates were highest. The goal of the meningococcal B immunisation programme was to achieve an improvement in health outcomes related to meningococcal disease by immunising 90 percent of the population aged 0–19 years with the three-dose MeNZB™ schedule within two years. The programme was completed on 30 June 2006, targeting a population of 1.18 million and administering a course of three vaccines at six-weekly intervals. A booster dose for newborns was introduced in January 2006. As Table 5 shows Pacific people had the highest coverage at all ages and for all three doses. This is a tribute to the delivery model developed by Pacific leaders who actively fostered cross-community links and enabled very effective mobilisation (across sectors and communities) to promote Pacific MeNZB™ immunisation.
Table 5: MeNZB™ coverage for Pacific peoples, six weeks to 19 years old, as at July 2006

<table>
<thead>
<tr>
<th>Age group</th>
<th>Population</th>
<th>Dose 1 %</th>
<th>Dose 2 %</th>
<th>Dose 3 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pacific peoples</td>
<td>6 w – 4 y</td>
<td>28,759</td>
<td>95.4</td>
<td>89.1</td>
</tr>
<tr>
<td>Pacific peoples</td>
<td>5 y – 17 y</td>
<td>66,540</td>
<td>103.7</td>
<td>101.4</td>
</tr>
<tr>
<td>Pacific peoples</td>
<td>18 y – 19 y</td>
<td>8,350</td>
<td>74.4</td>
<td>68.0</td>
</tr>
<tr>
<td>NZDep 9–10</td>
<td>6 w – 4 y</td>
<td>69,471</td>
<td>94.5</td>
<td>86.8</td>
</tr>
<tr>
<td>All</td>
<td>6 w – 4 y</td>
<td>278,402</td>
<td>88.8</td>
<td>83.2</td>
</tr>
<tr>
<td>All</td>
<td>5 y – 17 y</td>
<td>786,270</td>
<td>90.1</td>
<td>88.5</td>
</tr>
<tr>
<td>All</td>
<td>18 y – 19 y</td>
<td>121,680</td>
<td>62.9</td>
<td>58.6</td>
</tr>
<tr>
<td>Total</td>
<td>6 w – 19 y</td>
<td>1,186,352</td>
<td>87.0</td>
<td>84.2</td>
</tr>
</tbody>
</table>

Source: Unpublished 2006 Ministry of Health

MeNZB™ programme
The MeNZB™ programme made considerable achievements that have gained national and international attention. The programme:

- achieved high immunisation coverage levels, particularly in Pacific, Māori and high-deprivation communities, that have not been achieved before in New Zealand
- heightened awareness of immunisation
- was a successful joint initiative between the health and education sectors
- reinforced the relationship between public health nurses and schools in identifying health issues
- strengthened community/professional consultation and engagement with Primary Health Organisations (PHOs) and DHBs
- increased the number of qualified nurse vaccinators and outreach immunisation services, and

for Pacific peoples

- enabled community leadership and engagement between and across communities
- allowed the development of new and more responsive models of delivery
- provided a success story built on Pacific values applied to New Zealand environments.

Smoking
Smoking is the single greatest cause of preventable premature death in New Zealand. At-risk groups such as Pacific peoples, Māori and low-income New Zealanders bear a disproportionate burden of the adverse health effects of smoking.

Second-hand cigarette smoke is now recognised as a substantial health hazard (Hill et al 2004) and children are more vulnerable to the effects of second-hand smoke. Prenatal maternal smoking and second-hand smoking exposure have been linked to low birthweight, increased risk of pre-term birth, altered vascular function, ear and respiratory infections, sudden infant death syndrome (SIDS), and behavioural and neurocognitive problems in childhood and adolescence.
Maternal cigarette smoking during the last trimester, together with cold housing and residing in New Zealand for over 10 years, are significantly associated with Pacific infant breathing problems in the first six weeks of life (Paterson et al 2006).

The Pacific Islands Families (PIF) study found that many Pacific mothers with infants were smoking around the time of birth (24.5 percent) and continued to smoke a year after giving birth (29.8 percent). Variables associated with maternal smoking at 12 months after birth included: mother’s age, non-Tongan ethnicity, non-partnered or de facto marital status, New Zealand-born, low income, full-time parenting, English fluency, living with other smokers, small house size, and overcrowding. The researchers consider these findings demonstrate the need to explore acculturation issues relating to smoking behaviour and smoking cessation for Pacific women in New Zealand (Erick-Peleti et al 2007). Another study using PIF data found significant associations between maternal smoking and child behaviour problems in a cohort of Pacific two-year-old children in New Zealand (Carter et al 2007).

The 2006 Tobacco Use Survey reported that 36 percent of Pacific people are smokers compared with 20 percent of European/Others. Smoking is more prevalent among Pacific men (39 percent) than Pacific women (33 percent). Almost 46 percent of Pacific people have never smoked and 15 percent are ex-smokers (compared to 53 percent and 22 percent for Europeans, respectively) (Ministry of Health 2007a). Tobacco smoking is a leading cause of preventable deaths for Pacific people, who have a high incidence of cardiovascular disease, chronic obstructive pulmonary disease and other diseases caused by smoking (for more detail, see the paper on Pacific peoples and health services Ministry of Health 2008e).

Parental smoking is a key risk factor for children and young people starting smoking. The 2006 Year 10 Survey showed that students for whom both parents smoke were much more likely to be smokers than if only one or neither parent smokes. In recent years, trends in smoking for both Pacific girls and boys aged 14–15 years suggest that uptake may be declining: 13 percent of Pacific girls and 8.5 percent of Pacific boys smoked daily in 2006, while 42 percent of Pacific girls and 37 percent of Pacific boys had never smoked (Scragg 2007). This is an important development: reducing initiation is more successful than getting existing smokers to quit, as 2006 Census data illustrates.10

**Alcohol consumption**

Parental alcohol consumption has an impact on adult and child health, both acutely and through its contribution to chronic conditions. For children, adverse health conditions associated with alcohol are road traffic injuries, violence, and foetal alcohol syndrome. Children’s social and emotional development is also likely to be negatively impacted on by poor parenting and family functioning arising from alcohol consumption.

Research shows that much of the harm from alcohol results from heavier drinking occasions. Although Pacific people are more likely to abstain from using alcohol than the general population, they have similar hazardous drinking patterns to the population as a whole, with some indication that Pacific adult males may have above average rates of potentially hazardous drinking.

In a study of women living between Taupo and Wellsford, Pacific women were much less likely to drink alcohol than Māori or European women, but those who did were more likely to show binge-drinking-type behaviours before and during pregnancy (Watson and McDonald 1999).

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10 Ashley Bloomfield, personal communication, September 2007.
Exposure to violence

Violence costs the health and disability sector both directly and indirectly, in the short term and over the long term. Victims of abuse seek care from health care providers at far greater rates than individuals who have not experienced abuse, not only for assault-related injuries but also for a range of other health effects (Ministry of Health 2001b).

The relationship between childhood physical or sexual abuse, growing up with a battered mother or witnessing domestic violence in childhood, and the risk of being a victim of intimate partner violence for women, or a perpetrator for men, was studied among 8629 participants in an adverse childhood experiences study in a large United States of America (USA) health organisation. Each of the three violent childhood experiences increased the risk of victimisation or perpetration twofold. Among those who had experienced all three forms of violence during childhood, the risk of victimisation and perpetration was increased 3.5 times for women and 3.8 times for men (Whitfield et al 2003).

Women’s Refuge statistics for 2006 show that of the 16,738 women and 12,107 children using their services, 8 percent were Pacific women and 6 percent were Pacific children (National Collective of Independent Women’s Refuges 2007). As these are reported cases only, they are considered under-representative of the actual prevalence of violence in the population. Indeed there is some anecdotal evidence that Pacific women are reluctant to report abuse or injury, and that when they do, their injuries or situation are usually more severe or urgent (Ministry of Health 2002b).

Hospital discharge rates for assault, neglect and maltreatment of children (0-14 years) are highest among those living in the most deprived NZDep areas, and among Pacific and Māori children.11 Physically abused or maltreated children are up to three times more likely than non-abused children to attempt suicide, experience clinical depression and anxiety disorders, and/or engage in violent behaviour and criminal offending as teenagers. They are also more likely to be repeat victims of physical and sexual assault (Fergusson et al 1996).

The PIF study is providing information about the experience of intimate partner violence (IPV) among Pacific people in New Zealand. Findings from interviews with the parents of 12-month and two-year-old infants were that IPV is common for many Pacific couples and consistent with that reported for other New Zealand groups. Mothers are as likely as fathers to perpetrate and be victims of this violence. Patterns of reporting were different between mothers and fathers and between Pacific ethnic groups (Paterson and Fairbairn-Dunlop et al 2007; Schluter, Paterson, Feehan 2007). Paternal physical abuse is the only statistically significant risk factor from childhood parenting history that is independently associated with severe physical perpetration and victimisation in the mother’s current IPV (Paterson and Feehan et al 2007).

Nutrition

Children’s eating is influenced by exposure to and access to foods, the behaviour of peers and family, the development of food habits, and child-feeding practices. The 2002 Children’s Nutrition Survey found that the general pattern in New Zealand children is for dietary quality and nutrient intake to decline with age. This is paralleled by an increase in overweight and obesity with age. Overall, younger children are more likely to have healthier food intake and be more physically active compared with older children (Ministry of Health 2003a).

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It is recommended that New Zealand children over two years of age eat at least three servings of vegetables and at least two servings of fruit per day (Ministry of Health 2003a). Consumption of fruit and vegetables protects against cardiovascular disease (Law and Morris 1998; Nees and Powles 1997) and some cancers (Cannon 1997).

Food choices
The food choices of Pacific children showed some distinctive features compared with other children. In particular, the lower consumption of breakfast cereals, dairy products and many vegetables, and the higher consumption of foods such as taro, fish and some meats reflect their ethnic backgrounds (Ministry of Health 2003a).

The 2002 Children’s Nutrition Survey found that:
• more Pacific boys (59 percent) and girls (65 percent) consumed the recommended three or more servings of vegetables per day than the national average for boys (55 percent) and girls (58 percent)
• more Pacific boys (51 percent) and girls (50 percent) also consumed the recommended two or more servings of fruit per day than the respective national averages (boys 41 percent and girls 44 percent)
• 90 percent of Pacific children consumed white bread which was the most commonly eaten bread. Over one third used butter on their bread most of the time
• over one half of Pacific children consumed taro at least once a week (Ministry of Health 2003a).

The quality of food choice of Pacific children, as with other ethnic groups, declined with age. Younger Pacific children who consumed a lower proportion of their intake from meat and more from milk, bread, fruit and breakfast cereals than older children had better macro and micronutrient intakes.

Food patterns
The 2002 Children's Nutrition Survey found that:
• over 13 percent of Pacific children bought most of the food they consumed at school from the canteen or tuckshop and this was highest (close to one-quarter) for children aged 11–14 years who also sourced food from shops, dairies, and takeaways (Ministry of Health 2003a)
• over one half of Pacific children usually had something to eat before they left home in the morning for school (Ministry of Health 2003a). Figure 3 demonstrates the extent to which Pacific and Māori children are more likely than European children to skip breakfast and purchase food away from home on the way to school (Utter et al 2006).
Figure 3: Frequency of eating breakfast in New Zealand children, by sex and ethnicity, 2002

NZE0 = New Zealand European and Other

Analysis of the 2002 Children’s Nutrition Survey found that skipping breakfast is significantly associated with higher rates of obesity when demographic and other dietary factors are controlled for (Scragg et al 2004). This is consistent with overseas cross-sectional studies that have demonstrated skipping breakfast is correlated with overweight/obesity and inadequate dietary intakes of vitamins and minerals among children and adolescents (Utter et al 2006).

Meals and snacks based on foods prepared away from home are higher in fat and saturated fat and contain less dietary fibre, calcium, and iron than food prepared at home and consequently can have negative consequences on children’s diets (Guthrie et al 2002).

**Nutrient status**


- Only 37 percent of Pacific boys and 42 percent of Pacific girls met the dietary guideline for percentage of energy derived from fat, and this percentage decreased with older children; less than one third of 11–14 year children met the dietary guideline for proportion of energy from fat. Pies and pasties were a major source of fat.

- Pacific children had low intakes of dietary fibre, vitamin A (retinol and β carotene), riboflavin, folate and calcium.

- Iron status was unsatisfactory for girls who had reached the age of menstruation, but was otherwise generally satisfactory.

- Iodine status indicated mild iodine deficiency among Pacific children, emphasising the need to use iodised salt when using salt (Ministry of Health 2003a).
More positively the 2002 National Children’s Nutrition Survey found:

- Pacific girls had the highest intakes of selenium (reflecting fish intake)
- Pacific children had a lower intake of total sugars than all other children (Ministry of Health 2003a).

Food security
Food security is an internationally recognised term that encompasses the ready availability of nutritionally adequate and safe foods and the assumed ability of people to acquire personally acceptable foods in a socially acceptable way. The 2002 National Children’s Nutrition Survey revealed the extent of food insecurity affecting New Zealand households with children, with marked disparities between ethnicities and socioeconomic areas.

- 54 percent of Pacific, 38 percent of Māori and 13 percent of European and Other households reported that food ran out often or sometimes.
- Households with five or more children were more likely to report food runs out due to lack of money often or sometimes than those with one or two children.
- Households in the NZDep most deprived decile areas were most likely to run out of food due to lack of money than those in the NZDep least deprived deciles.
- Eating less because of lack of money was experienced often or sometimes by 48 percent of Pacific households with children, compared with 31 percent of Māori and 10 percent of European and Other households with children.
- Variety of food was limited by lack of money often or sometimes in 60 percent of Pacific households with five or more children, compared with 45 percent of Māori and 28 percent of European and Other households with children.
- Having to rely on others to provide food and or money for food when they did not have enough money for food was experienced often or sometimes by 29 percent of Pacific households with children, compared with 23 percent of Māori and 6 percent of European and Other households with children.
- Special food grants or foodbanks were used often or sometimes by 19 percent of Pacific and 20 percent of Māori households with children compared to 5 percent of European and Other households with children (Ministry of Health 2003a).

Obesogenic environments
Obesogenic environments are the sum of influences that the surroundings, opportunities or conditions of life have on promoting overweight and obesity in individuals or populations. They refer to such things as energy dense food, serving sizes, marketing campaigns (including food claims, such as high in fibre or low fat, used by the food industry), and labour saving devices, entertainment consoles and screen activities (Swinburn 2006).

The available information on the diets of low-income New Zealand households indicates that they tend not only to be too high in fat, salt and sugar, but also too low in nutritious foods such as fruit, vegetables, lean red meat and dairy products (New Zealand Network Against Food Poverty 1999). The evidence suggests this is due to cost rather than ignorance. New Zealand mothers, including those on very low incomes, have a good understanding of children’s food needs. However, food is a flexible item in the household budget, and high-energy, low-nutrient foods tend to be cheaper than healthier alternatives (New Zealand Network Against Food Poverty 1999; Pollock 2000).
A study based on a self-completion questionnaire of a sample of primary schools was used to measure the obesogenic elements of the school environment and canteen sales of energy-dense food and drinks. The most commonly available foods for sale were pies (79 percent), juice (57 percent) and sausage rolls (55 percent). The ratio of less healthy to more healthy main choices was 5.6 to 1, for snacks 9.3 to 1 and for drinks 1.4 to 1. Less healthy choices dominated food sales by more than 2 to 1 (Carter and Swinburn 2004). The high availability and low cost of relatively unhealthy foods from school food services is not conducive to children making ‘healthy’ food choices (Utter et al 2006).

Changes in the amount and energy density of food consumed by children are also considered to be contributing to the increase in overweight and obese children. There is also evidence that sugary drinks play a role in promoting weight gain in children (Swinburn 2006).

**Physical activity**

Physical activity is endorsed by WHO as a fundamental means of improving the physical and mental health of individuals (SPARC 2003). For children moderate physical activity is defined as the equivalent of a brisk walk, and vigorous activity as one that causes people to ‘huff and puff’; it is recommended that children need at least 60 minutes of moderate to vigorous physical activity per day for improved physical and mental health (Ministry of Education 2007b).

**Benefits**

Although the effects of diet and physical activity on health often interact, particularly in relation to obesity, there are additional health benefits from physical activity that are independent of nutrition and diet. Research shows that the benefits arising from childhood physical activity include:

**Health**

- direct improvement in child health status: evidence is accumulating that more active children generally display healthier cardiovascular profiles, are leaner and develop higher peak bone masses than their less active counterparts (Boreham and Riddoch 2001, WHO 2003a)

**Physical**

- development of fundamental movement skills such as balance, coordination, throwing and catching a ball that build the foundations for activity and participation throughout life

**Social and emotional**

- opportunities for self-expression, development of self-confidence, relief of tension, achievement, interaction, and learning about the spirit of solidarity and fair play
- development of social skills and group membership and leadership skills, attitudes and behaviours
- development of values such as dedication, honesty, courage and fairness
- development of resilience and the potential to excel within the scope of their own abilities (WHO 2003b)

**Mental**

- New Zealand students who engage in regular physical activity and are well nourished are in a better position to benefit from opportunities to learn (Clinton et al 2006)
- overseas studies suggest children who are more physically active demonstrate higher levels of academic achievement
Lifelong

- a biological carry-over effect into adulthood, whereby improved adult health status results from childhood physical activity
- a behavioural carry-over into adulthood, whereby active children are more likely to become more active (healthy) adults (Boreham and Riddoch 2001)
- ongoing regular physical activity can reduce the risk of (or improve outcomes for) many major diseases such as cardiovascular disease, certain cancers (especially colorectal and breast), diabetes, osteoporosis, obesity, depression and falls in older people (WHO 2003a).

Activity levels

The 2002 National Children’s Nutrition Survey found:

- Pacific girls aged 11–14 years were less active than boys during the weekend and after school
- fewer Pacific girls than boys were in the most active of the activity quartiles
- hours spent watching television or videos during the week doubled from the oldest to the youngest groups of Pacific children (Ministry of Health 2003a).

A study of trends in health-related physical fitness of 10–14-year-olds suggests that both health and physical fitness deteriorated during the 1990s. This is consistent with Sport and Recreation New Zealand (SPARC) statistics suggesting declining activity levels among New Zealanders aged 5–17 years (9 percent are sedentary and 22 percent relatively inactive), and that Pacific people aged 5–17 years are much less active (19 percent are sedentary and 48 percent relatively inactive) (SPARC 2003).

Activity behaviours

The 2002 National Children’s Nutrition Survey found:

- Pacific children were more likely to participate in active games that involved running, dance and rugby
- Pacific children were significantly less likely to have been biking/cycling (Utter et al 2006).

A high percentage of all children reported activity during school hours and fewer children reported using an active mode of transport to get to school or activity after school and on weekends. Consequently, Utter et al (2006) considered interventions to promote physical activity might be most beneficial outside of school hours but should reflect how preferred activities and sports differ among different population groups.

SPARC has identified barriers to physical activity for children and young people from lower socio-economic families as including the cost of participating ie, buying equipment or uniforms or paying fees, the family priorities for spending money, and little or no access to transport (SPARC 2007).
4. Health Outcomes

The effects of the determinants of health – especially socioeconomic determinants – and risk factors for child health are reflected in mortality and morbidity disease rates among Pacific children. At birth, Pacific children have a lower life expectancy (4.8 years lower for males and 4.4 years lower for females) than their non-Pacific peers (Ministry of Health and Ministry of Pacific Island Affairs 2004). Pacific children also have high prevalence and incidence rates compared to other New Zealand children for almost all communicable and non-communicable diseases. These rates confirm New Zealand and overseas studies that link determinants and risk factors with disease incidence (Chen 2007).

Mortality

Infant mortality

Infant mortality is defined as the death of a live-born child before their first birthday. The four top causes of infant potentially avoidable mortality nationally in 2001 were low birthweight, SIDS, congenital abnormalities, and other perinatal conditions (Ministry of Health and Ministry of Pacific Island Affairs 2004). Deaths due to congenital abnormalities show no significant ethnic disparity (Paediatric Society of New Zealand 2005). The risk of infant mortality is generally higher among Pacific babies, males and those living in the most deprived NZDep areas. Both Pacific and total infant mortality rates have declined over the past several decades but as Table 6 shows the infant mortality rate of 6.9 per 1000 live births for Pacific peoples in 2002–03 is higher than that of European/Other and Asian New Zealanders.

In the neonatal\(^\text{12}\) period Pacific infants have the highest rate of deaths due to extreme prematurity and other perinatal\(^\text{13}\) conditions (see Table 6 for perinatal mortality rates).

Table 6: Infant and perinatal mortality rates, age standardised by ethnicity, 2002–03

<table>
<thead>
<tr>
<th></th>
<th>Pacific %</th>
<th>Māori %</th>
<th>Asian %</th>
<th>European/Other %</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant mortality, per 1000 live births</td>
<td>6.9 (5.5–8.5)</td>
<td>7.8 (6.9–8.9)</td>
<td>3.7 (2.6–5.2)</td>
<td>4.4 (3.9–4.9)</td>
<td>5.5 (5.1–6.0)</td>
</tr>
<tr>
<td>Perinatal mortality, per 1000 live births</td>
<td>12.5 (10.5–14.6)</td>
<td>9.7 (8.6–10.9)</td>
<td>10.5 (8.6–12.8)</td>
<td>9.1 (8.3–9.9)</td>
<td>9.7 (9.2–10.3)</td>
</tr>
</tbody>
</table>

Source: An Indication of New Zealanders’ Health, Ministry of Health 2007e

The post-neonatal death rate for Pacific peoples is also higher than that for the total New Zealand population: 3.1 per 1000 live births versus 2.3 per 1000 live births, respectively (Ministry of Health and Ministry of Pacific Island Affairs 2004). Deaths due to SIDS are the commonest cause of post-neonatal death. The SIDS rate for Pacific children continues to be higher than the New Zealand European rate, but lower than for Māori infants (Paediatric Society of New Zealand 2005). Data from the PIF study was examined to determine the prevalence of modifiable risk factors for cot death. A positive finding was that most of the infants slept in the same room as their mother, but 50 percent shared the same bed as their mother. Twenty-nine percent of the mothers were smokers. The investigators concluded that mothers needed to receive adequate antenatal advice about safe-sleeping practices and SIDS prevention (Schluter, Paterson, Percival 2007).

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12 Neonatal refers to the newborn neonate and period after birth.
13 Perinatal refers to the time immediately before and after birth.
Infant mortality arising from complications relating to prematurity and the birth process appears to be higher for Pacific women, suggesting a need for better maternity care (Ministry of Health and Ministry of Pacific Island Affairs 2004). Maternity services for Pacific mothers are discussed in the paper on Pacific peoples and health services (Ministry of Health 2008e).

**Child mortality**

The causes of child mortality do not differ markedly between Pacific and other New Zealand children (Ministry of Health and Ministry of Pacific Island Affairs 2004). For all New Zealand children rates of unintentional injury mortality are consistently higher for males (12 per 100,000) than females (9 per 100,000) under 15 years of age. Rates of unintentional injury mortality are higher for children under five years of age. In 2002:

- 17 per 100,000 children under five years of age were fatally injured
- 7 per 100,000 children aged 5–9 years olds were fatally injured
- 9 per 100,000 children aged 10–14 years were fatally injured (Ministry of Social Development 2003).

In the five years to 2000, 49 children under 15 years died as a result of intentional injury. On a population basis, this represented an average of one child per 100,000 each year. The rates of death from intentional injury are higher for children under five years of age than for older children (Ministry of Social Development 2003).

Road deaths of New Zealand children under 15 years of age in 2002 were 4 per 100,000 (Ministry of Social Development 2003). Transport accidents are the leading cause of injury-related mortality for Pacific children, followed by suffocation and drowning. Pacific children aged five to 14 years are over-represented in drownings for this age group compared with children from other ethnicities (Injury Prevention Network 2007).

Table 7 shows the top five causes of death for Pacific girls and boys.

**Table 7: Top five causes of death for Pacific children aged 0–14 years, by sex, 1996–2000**

<table>
<thead>
<tr>
<th>Females</th>
<th>Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia and influenza</td>
<td>Road traffic injury</td>
</tr>
<tr>
<td>Other cardiovascular disease</td>
<td>Brain cancer</td>
</tr>
<tr>
<td>Leukaemia</td>
<td>Pneumonia and influenza</td>
</tr>
<tr>
<td>Road traffic injury</td>
<td>Chronic rheumatic heart disease</td>
</tr>
<tr>
<td>Brain cancer</td>
<td>Leukaemia</td>
</tr>
</tbody>
</table>

Source: New Zealand Health Information Service
**Morbidity**

By contrast with children born to higher income families, children from low income families are more exposed to disease through inadequate sanitation, indoor air pollution, crowding, poor housing conditions and high exposure to disease vectors. They may also have lower resistance to disease (Victora et al 2003).

**Hospital admissions**

**Infant hospital admissions**

Infant admissions to hospital are an indicator of child health in the first year of life (see Table 8). Admission rates are likely to be influenced by factors such as antenatal\(^{14}\) and postnatal\(^{15}\) care, parenting skills, and access to primary health care services.

**Table 8:** Percentage of infants born in 2003 who were admitted to hospital in their first year of life

<table>
<thead>
<tr>
<th></th>
<th>Pacific %</th>
<th>Māori %</th>
<th>Asian %</th>
<th>Other %</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Zealand</td>
<td>28</td>
<td>25</td>
<td>11</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>Counties Manukau DHB</td>
<td>30</td>
<td>27</td>
<td>13</td>
<td>16</td>
<td>22</td>
</tr>
<tr>
<td>Auckland DHB</td>
<td>28</td>
<td>19</td>
<td>10</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>Waitemata DHB</td>
<td>24</td>
<td>21</td>
<td>9</td>
<td>12</td>
<td>14</td>
</tr>
</tbody>
</table>

Source: Table 9.5.1, Counties Manukau Population Health Indicators 2005, 3rd edition

A Counties Manukau DHB study found little change since 2000 in the proportion of infants admitted to hospital in their first year of life, and that Pacific and Māori infants are twice as likely to be admitted to hospital than Other and Asian groups (see Table 8). A large part of this excess is attributed to high rates of infectious disease admissions, including bronchiolitis, pneumonia, gastroenteritis, and ENT (ear, nose and throat) infections (Counties Manukau DHB 2005).

**Child hospital admissions**

The hospitalisation rates for Pacific children aged one to four years is 26 percent higher than the national rate. Burns and unintentional injuries are some of the main causes of these hospital admissions (Lima and Tukuitonga 2000). Table 9 shows that Pacific children had significantly higher rates of burns hospitalisations than Asian and European/Other children.

**Table 9:** Selected hospitalisations, 0–4 years, age specific rate per 100,000 by ethnicity, 2004–05

<table>
<thead>
<tr>
<th></th>
<th>Pacific %</th>
<th>Māori %</th>
<th>Asian %</th>
<th>European/Other %</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Burns</strong></td>
<td>210.8</td>
<td>155.0</td>
<td>73.5</td>
<td>75.1</td>
<td>106.8</td>
</tr>
<tr>
<td></td>
<td>(173.2–254.0)</td>
<td>(134.9–177.3)</td>
<td>(50.0–104.4)</td>
<td>(66.1–84.9)</td>
<td>(98.4–115.6)</td>
</tr>
<tr>
<td><strong>Falls</strong></td>
<td>590.1</td>
<td>576.4</td>
<td>298.8</td>
<td>533.1</td>
<td>531.4</td>
</tr>
<tr>
<td></td>
<td>(526.0–659.8)</td>
<td>(536.9–618.0)</td>
<td>(248.9–355.8)</td>
<td>(508.7–558.4)</td>
<td>(512.6–550.7)</td>
</tr>
<tr>
<td><strong>Poisonings</strong></td>
<td>118.8</td>
<td>166.7</td>
<td>73.5</td>
<td>186.4</td>
<td>167.0</td>
</tr>
<tr>
<td></td>
<td>(91.1–152.3)</td>
<td>(145.8–189.7)</td>
<td>(50.0–104.4)</td>
<td>(172.1–201.6)</td>
<td>(156.6–178.0)</td>
</tr>
</tbody>
</table>

Source: An Indication of New Zealanders’ Health, Ministry of Health 2007

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14 Antenatal refers to pregnancy and the time before birth.
15 Postnatal relates to the period after childbirth.
Potentially avoidable hospitalisations

Potentially avoidable hospitalisations are admissions to hospital that are considered to be avoidable. They comprise:

- preventable hospitalisations resulting from disease that might be prevented through population-based health promotion strategies (eg, diet and physical activity)
- ambulatory-sensitive hospitalisations (ASH) resulting from diseases able to be looked after in a primary health care setting (eg, vaccine-preventable diseases and asthma prevention).

ASH are a subset of hospital inpatient admissions. Pacific peoples experience high rates of ASH relative to the total New Zealand population. ASH data illustrates the burden of disease experienced by Pacific children and suggests persisting inequalities in prevention and care for Pacific children (see Figure 4). Reducing ASH for those aged 0–74 years across all population groups is a 2007/08 health target (Minister of Health 2007).

Figure 4: All ambulatory-sensitive hospitalisations by age group and ethnicity, 2003–2006

Source: Public Health Intelligence, Ministry of Health 2007 unpublished

Respiratory diseases

Respiratory diseases are the leading cause of morbidity or ill health for Pacific children (Percival 2006). Pacific children have higher rates of hospitalisation (approximately 2.5 times higher) for acute and chronic respiratory disease than any other group in New Zealand (Ministry of Health and Ministry of Pacific Island Affairs 2004). When compared with European children, Pacific children have more severe disease when hospitalised with pneumonia, a 50 percent higher hospitalisation rate for asthma, and disproportionately high rates of bronchiectasis.

Acute lower respiratory tract infections are an important cause of morbidity and mortality among children less than five years of age. Infants and younger children have substantially higher rates of hospitalisations for the treatment of lower respiratory tract infections than other age groups. Pacific children’s hospitalisation rates are almost three times that of other children for lower respiratory tract infections (Grant et al 2001, Percival 2006) and see Figure 5. (Pertussis is included in the section on vaccine-preventable diseases because of the excessive disease burden associated with low immunisation and even lower on-time immunisation coverage).
Upper respiratory tract infections are very common, but there appears to be no research published that refers to Pacific children.

**Figure 5: Ambulatory-sensitive hospitalisations for respiratory infections, by age group and ethnicity, 2003–2006**

![Graph showing age-standardised rate (per 100,000) for respiratory infections by age group and ethnicity from 2003 to 2006.](image)

Source: Public Health Intelligence, Ministry of Health 2007 unpublished

**Pneumonia**

Pneumonia refers to a group of acute lower respiratory tract infections that lead to inflammation of the lung tissues. It is a common and serious health problem in both developed and developing countries, although paediatric pneumonia is more common in New Zealand than in other developed countries. New Zealand’s pneumonia hospital admission rate for children aged 0 to 14 years was 4.0 per 1000 in 1998/99 – almost 10 times higher than the USA rate of 0.5 per 1000 in the same age group (Grant and Milne 2006).

Pacific and Māori children have higher hospital admission rates and more severe disease once admitted (Grant 1999; Grant et al 2001). The pneumonia admission rate data for children 0 to 14 years of age at Starship Children’s Hospital in Auckland is 14.0 per 1000 for Pacific, 6.7 per 1000 for Māori and 2.7 per 1000 for European/Other children (Grant et al 1998; Grant and Milne 2006). From 1 June 2008 the pneumococcal conjugate vaccine will be added to the immunisation schedule for all New Zealand babies to protect against pneumococcal disease.

Poor housing (including cold, damp, mould and overcrowding), access to primary health care, and poor nutrition (eg, iron deficiency) have been identified as particularly significant in the New Zealand context (Grant 1999). Longitudinal studies that have followed populations of children through into adult life have demonstrated that having pneumonia as a young child is associated with poorer lung function in adult life. Some children with severe pneumonia are left with damaged lungs, which may lead to chronic lung disease such as bronchiectasis (Grant and Milne 2006).
Bronchiectasis

Bronchiectasis is a type of lung scarring where the airways become dilated and cystic, resulting in mucus pooling and recurrent infection in these damaged areas. Bronchiectasis leads to recurrent pneumonia, which results in increasing morbidity and disability, progression of disease, and ultimately respiratory failure and death. Eighty percent of the children affected are of Pacific and/or Māori descent. Most of the children suffering from the disease were previously healthy and only 10 percent had underlying immune dysfunction (Byrnes 2006a).

The incidence of bronchiectasis is high in New Zealand children – seven times that of Finland, the only other country reporting a childhood national rate (Twiss et al 2005). New Zealand paediatricians were surveyed monthly for new cases of bronchiectasis during 2001 and 2002. Of 65 confirmed cases, an overall incidence of 3.7 per 100,000 under-15-year-old children per year was estimated. Incidence was highest in Pacific children at 17.8, compared with 4.8 in Māori, 1.5 in European, and 2.4 in other children per 100,000 per year. The median age at diagnosis was 5.2 years, and the majority had symptoms for more than two years. Most cases developed disease in early childhood and had delayed diagnosis (Twiss et al 2005).

Thirty percent of the children in the bronchiectasis clinic in Auckland are less than five years of age. The disease at this young age may result in more significant damage to a developing lung with a developing immune system than to a mature lung with a mature immune system. Delay in making a diagnosis is a significant concern, as the onset of a chronic cough took place an average of two years before diagnosis, and the first hospital admission for respiratory disease was, on average, four years before the diagnosis was made (Byrnes 2006a). Two-thirds of children in the bronchiectasis clinic in Auckland lived in the most deprived NZDep areas (deciles 8-10), only 70 percent were appropriately immunised, and 58 percent lived in households where one or more family members smoked (Edwards et al 2003).

Significant mortality from bronchiectasis does not begin until adulthood in New Zealand, but in many cases the disease begins in childhood (Byrnes 2006a).

Bronchiolitis

Bronchiolitis is a virally induced lower respiratory tract infection that results in increased mucus production and narrowed airways. It affects children less than two years of age, with peak incidence occurring at three to six months. More than 3000 infants per year are admitted to hospital for bronchiolitis in New Zealand. A study of potentially avoidable hospitalisations for bronchiolitis per 1000 children in 1999 reported an average of:

- 6.3 per 1000 avoidable admissions nationally for Pacific children compared to 2.8 per 1000 avoidable admissions for all New Zealand children
- 8.4 per 1000 avoidable admissions in South Auckland for Pacific children compared to 4.6 per 1000 avoidable admissions for all children in South Auckland (Graham et al 2001, Byrnes 2006b).

Bronchiolitis is listed as the third cause of preventable hospital admission in both Pacific and Māori communities (Byrnes 2006b).

Research has associated increased risk of bronchiolitis with being male, under six months of age, born during the first half of the respiratory syncytial virus (RSV) season, household overcrowding, presence of siblings, attendance at day care (Simoes 2003), socioeconomic disadvantage, not being breastfed and smoke exposure (Byrnes 2006b; Cooper et al 2003). Bronchiolitis occurs mainly in winter, and the incidence is increasing (Worrall 2006). There is no one effective treatment for bronchiolitis, and as yet there is no effective RSV vaccine (Worrall 2006).
Underlying conditions may increase the risk for both hospitalisation and mortality, including prematurity, chronic lung disease, congenital heart disease, immune compromise and infants less than three months of age.

**Asthma**

Asthma is a chronic inflammatory disorder that causes narrowing of the airways in the lower respiratory tract as a result of bronchial smooth muscle constriction, swelling, inflammation and mucus production. New Zealand has one of the highest recorded asthma prevalence rates in the world. Rates of hospital admissions due to asthma are highest in children, being about double those of adults, with the majority occurring in children under five years of age.

Studies suggest that the greatest difference between ethnic groups is that Pacific and Māori children have more severe symptoms than European children. Also, Pacific children are far more likely to be admitted to hospital for asthma than children of any other ethnicity (Holt and Beasley 2001). Figure 6 confirms this pattern.

Figure 6: Ambulatory-sensitive hospitalisations for asthma, by age group and ethnicity, 2003–2006

![Graph showing hospitalisations for asthma by age group and ethnicity from 2003 to 2006.]

Source: Public Health Intelligence, Ministry of Health 2007 unpublished

High hospitalisation rates can reflect high prevalence, lack of access to primary health care and asthma education, or both (Ministry of Health and Ministry of Pacific Island Affairs 2004).

A marked mismatch between the patient’s perception of asthma control and the actual level of control was reported in one study (Holt et al 2003). This study also found that, of the children whose asthma was not well controlled 71 percent were under treated, and for those markedly out of control 75 percent were under treated. An association between low asthma pharmaceutical use and high asthma hospitalisation rates is consistent with previous studies identifying greater morbidity in Pacific and Māori patients (Shaw 2006).

Pacific and Māori children are statistically less likely to receive the same public health education about asthma and are less likely to be prescribed asthma medication than New Zealanders of European descent (Kaplan-Myth and Smylie 2006). There is a lower use of bronchodilators and
preventer agents in children, especially those in lower socioeconomic groups, despite higher prevalence of reported asthma symptoms (Shaw 2006).

Two studies examined attendance for general practice asthma care by children and teenagers with moderate to severe asthma in Auckland (Buetow et al 2004; Buetow et al 2005). Both studies found that Māori and Pacific children were more likely than other children to receive general practitioner (GP) care for moderate to severe asthma. Non-Māori non-Pacific children were more likely to see a GP 0–2 times a year for asthma, and less likely to attend more than five times (Buetow et al 2004). However, these studies did not distinguish between routine preventive care for asthma and acute care for asthma attacks. The authors of these studies speculated that barriers to child attendance for routine GP asthma care could contribute to poor asthma control, as reflected by exacerbations of, and hospitalisations for, asthma. In particular, this could occur where children lack access to asthma preventers via repeat prescriptions.

Tuberculosis
Tuberculosis (TB) in children usually occurs as a result of contact with an infectious adult. Consequently, the rate of TB in children tends to reflect a similar pattern to that in the adult population. When exposed to TB, young children are more likely to progress from latent infection to disease and are more likely to develop severe disease (Voss 2006).

Over a 10-year period from 1992 to 2001, 401 children were notified with TB in New Zealand. A retrospective study of 269 cases found disproportionately high rates in under-five-year-olds, with an overall rate of 6.2 per 100,000 and a rate in Pacific children under 16 years of 15.2 per 100,000, significantly higher than that in Māori (6.4 per 100,000) and European (0.6 per 100,000). Pacific children remain at higher risk of TB from household contacts who continue to have rates similar to their country of origin (Voss 2006). The paper on Pacific peoples and health services (Ministry of Health 2008e) discusses the sources of TB in New Zealand in more detail.

All children with TB in one study required treatment with a minimum of three drugs for six months, and those with severe disease requiring up to 12 months and often four drugs in the early stages. This is a huge burden of medication for a young child to tolerate and requires intensive community nursing and support. Accordingly the New Zealand BCG16 programme recommends that those children living in households with members from high-risk countries be offered the BCG vaccine (Voss 2006). A recent review of neonatal BCG immunisation in New Zealand indicated a wide variability about how DHBs deliver and monitor the service. Concerns exist in DHBs about the lack of education about TB risk and the inadequate promotion of the service to health providers and parents. The information, albeit limited, about ethnic-specific rates of TB in children and their communities appears to support the ongoing targeting of Pacific babies (Ministry of Health 2007d).

Ear, nose and throat infections

Acute otitis media
Acute otitis media (AOM), or ear infection, is predominantly a disease of children and is the most frequently diagnosed bacterial infection in children. Around 60-85 percent of children have an attack during the first year of life. After five years of age the incidence rate starts to drop rapidly. Complications of AOM, although potentially serious and once moderately common, are now rare in developed countries (Worrall 2006).

16 BCG Bacille Calmette-Guérin vaccine is used in most countries as part of TB control programmes.
Risk factors include young age, attendance at day care, male gender, a history of enlarged adenoids or tonsils, asthma, bottle feeding, use of a dummy, family history of otitis media, and parental smoking.

Influenza vaccination has been shown to reduce otitis media in children. In the USA vaccination is encouraged for children aged 6–23 months, the group considered at risk of influenza-related hospitalisation (Worrall 2006). Pneumococcal infections can also cause otitis media (middle ear infection sometimes leading to deafness) and sinusitis (inflammation of the sinuses). This is likely to be reduced with the introduction of the pneumococcal conjugate vaccine from 1 June 2008 (Ministry of Health 2008g).

Hearing loss in early childhood can interfere with the development of speech and language, socialisation and cognition, and as a result can affect school readiness and school performance. Hearing loss in children is most often caused by recurrent otitis media with effusion (glue ear) (Minister for Social Development 2004). Pacific children are at higher risk of chronic AOM and middle ear disorder (National Audiology Centre 2005). A PIF study found that Pacific children with regular fluid/pus discharge from the ears and/or at least five coughs or colds in the past year were twice as likely to develop otitis media with effusion. The risk of developing otitis media with effusion was higher among Pacific children who snored frequently, who were treated at home for breathing difficulties, and who were exposed to a lot of other children in daycare centres or church (Paterson, Carter et al 2007).

**Hearing screening**

Tympanometry screening is carried out on preschool children – predominantly 3-year-olds, in an attempt to identify chronic middle ear disease so that it can be treated before children start school. New entrant (NE) school children (ie, 5-year-olds) are tested on both pure tone audiometry and tympanometry. Audiometry is a more direct measure of hearing, but it can be less reliable in the noisy test conditions frequently found in schools. The combination of tests ensures more valid identification of children with hearing loss and/or ear disease.

As Figure 7 shows, Pacific children continue to be over-represented in hearing loss statistics, and at both the preschool and new entrant levels Pacific children had the highest failure rates. There has been a drop in Pacific new entrant hearing failure rates in recent years, but the failure rate is still more than double that of European children.

**Figure 7: Hearing failure rates for different measures, by ethnicity, 2005/06**

![Hearing failure rates chart]

Source: National Audiology Centre 2006
The effects of late-diagnosed hearing loss are considerable. Most significant are the effects of lack of exposure to language during early critical periods of language development, which can lead to ongoing problems with cognitive development, communication, and educational and vocational achievement (National Screening Unit 2005). Pacific children experience higher rates of sensorineural hearing loss and this impacts on speech language development and education.

Targeted ear health education and improved access to appropriate follow-up services continues to be implemented across the country. There is significant variability between DHBs and the reasons need investigating (National Audiology Centre 2005).

Other respiratory illnesses that affect Pacific children are described below. As no information was discovered about the prevalence or incidence among Pacific children of croup, sinusitis and tonsillopharyngitis they are not discussed.

**Colds**

Children get six to eight colds a year which are the cause of 30 percent of time off school. Most cases resolve spontaneously, but a small proportion become complicated by bacterial sinusitis, otitis or pneumonia. Infants are one of the groups at highest risk of complications (Worrall 2006).

**Sore throat**

Sore throat is predominantly a disease of youth and the early school years. Viruses cause 95 percent of sore throats in children under five years of age and 70 percent of sore throats in children aged 5-16 years. Viral sore throats will clear themselves (Worrall 2006).

Sore throats can be part of a cold or flu, but they can also be part of more serious conditions such as glandular fever or rheumatic fever (see below). Approximately 20 percent of sore throats are caused by the streptococcus bacteria and need medical attention and treatment with a course of antibiotics.

Figure 8 shows that ASH rates for ear, nose and throat infections are declining among Pacific (and all) children under five years but are still relatively high for Pacific children aged 5–14 years.

**Figure 8: Ambulatory-sensitive hospitalisations for ENT infections, by age group and ethnicity, 2003–2006**

Source: Public Health Intelligence, Ministry of Health 2007 unpublished
**Gastroenteritis**

Gastroenteritis comprises a variety of communicable diseases and infections produced by a variety of viral, bacterial and parasitic organisms. In New Zealand, gastroenteritis is one of the top 10 causes of hospital admissions among children, with admissions peaking during the winter months. Young age (the highest risk is under two years), Pacific or Māori ethnicity, a lack of breastfeeding, attendance at day care settings, and living in the most deprived NZDep areas are all factors associated with hospital admission for gastroenteritis (Ardern-Holmes et al 1999). The ASH rates in Figure 9 confirm findings about the risk for all children under five years and Pacific children especially.

**Figure 9: Ambulatory-sensitive hospitalisations for gastroenteritis, by age group and ethnicity, 2003–2006**

Neuwelt and Simmons (2006) found the greatest impact of paediatric gastroenteritis in the Auckland region is on Pacific children, especially those under the age of five years, and that there appears to be an association between relative socioeconomic deprivation and severe paediatric gastroenteritis. The large majority of paediatric gastroenteritis hospital admissions in the Auckland region were caused by rotavirus gastroenteritis, a seasonal illness with winter peaks. Viral gastroenteritis accounts for double the hospitalisation burden of bacterial gastroenteritis.

**Skin infections**

Serious skin infections include – but are not limited to – cellulitis, impetigo and abscesses of the skin and subcutaneous tissue, all of which are largely caused by bacterial infection. Cellulitis is a diffuse inflammation of the skin, soft tissue or connective tissue due to infection, which can appear as red and swollen skin. Impetigo, or ‘school sores’, is characterised by small infectious blisters, which later develop a honey-coloured, scab-like crust, and is contagious. It often starts at the site of a minor skin injury such as a graze, an insect bite or scratched eczema. An abscess is a cavity containing pus, which may also have surrounding cellulitis.

Skin infections can lead to serious consequences, including:

- deeper abscesses within the body (eg, lungs, kidneys, joints, muscle, bone, brain)
• lymphangitis – inflammation of the lymphatic vessels (filariasis)
• sepsis – infection of the bloodstream by micro-organisms
• osteomyelitis – inflammation of the bone and the marrow, and septic arthritis (infection of the joint)
• acute glomerulonephritis – bilateral inflammatory changes of the glomeruli that are the result of renal disease rather than infection.

New Zealand hospital admission rates for childhood skin infections have increased in recent years and are double those of the USA and Australia. Admissions are highest during summer, for Pacific and Māori children and those living in the most deprived NZDep areas (Hunt 2004).

Hunt (2004) identified factors that appear important and need addressing as:
• determinants – access to first-aid supplies and medical care, linen and towels, washing machines and hot water; overcrowding, nutrition and favourable insect breeding conditions
• disruption to the normal skin barrier – abrasions, lacerations, insect infestations and bites and chronic skin conditions, especially eczema
• micro-organisms – bacterial resistance and virulence
• health care – barriers to access, service links, eczema management and gaps in treatment guidelines.

Figure 10 indicates that cellulitis is a serious problem for Pacific children especially for those aged under five years.

Figure 10: Ambulatory-sensitive hospitalisations for cellulitis, by age group and ethnicity, 2003–2006

Age-standardised rate (per 100,000)

Source: Public Health Intelligence, Ministry of Health 2007 unpublished
Rheumatic fever
Rheumatic fever is an auto-immune disease that follows repeated group A streptococcal infection of the throat. A serious complication of rheumatic fever is damage to the valves of the heart (rheumatic heart disease).

In 2006, 103 initial attack cases were notified, at a population rate of 2.5 per 100,000, higher than the 2005 rate of 1.9 per 100,000. The majority (89.2 percent) of cases were aged less than 20 years and the highest rates were in the 10 to 14 years age group (16.1 per 100,000, or 49 cases). Pacific people comprised a third of cases where ethnicity was recorded (30 cases) and Māori 62 percent (55 cases). Regionally the highest rates were reported in Northland (8.7 per 100,000, 13 cases) and Counties Manukau (7.9 per 100,000, 35 cases) (ESR17 2007).

Crowding, poverty and lack of access to primary health care increase the chance of developing rheumatic fever (Ministry of Health and Ministry of Pacific Island Affairs 2004). Rates of hospital admission for acute rheumatic fever in New Zealand children and young people (aged 0–24 years) were higher in residents of the most deprived NZDep areas and among Pacific peoples (Paediatric Society of New Zealand 2005). ASH rates in Figure 11 indicate the severity of rheumatic fever among Pacific children aged 5–14 years.

Figure 11: Ambulatory-sensitive hospitalisations for rheumatic fever, by age group and ethnicity, 2003-2006

Source: Public Health Intelligence, Ministry of Health 2007 unpublished

Kidney and urinary infections
Urinary tract infection (UTI) is fairly common. It has been estimated that by age five around 8 percent of girls and 2 percent of boys will have contracted a UTI. A UTI in a child needs proper examination and early detection and treatment. Left untreated, UTIs can lead to serious kidney problems. Figure 12 shows that the ASH rates for Pacific children are higher than those of other children and those of children under five years of age are more than twice those of other under five-year-olds, suggesting that kidney and urinary infections are a particular problem for some Pacific children.

17 Institute of Environmental Science and Research
Figure 12: Ambulatory-sensitive hospitalisations for kidney/urinary infection, by age group and ethnicity, 2003–2006

Source: Public Health Intelligence, Ministry of Health 2007 unpublished

Vaccine-preventable diseases

Hospitalisation rates for children with vaccine-preventable diseases remain high for Pacific and Māori infants and those living in the most deprived NZDep areas. Children aged under one year and those children who are not immunised are the most vulnerable. Research findings are that improving on-time delivery of immunisation to children during the first year of life could be expected to significantly decrease hospital admission rates (Grant et al 2003). The ASH rates for young children reinforce this finding as Figure 13 shows. The decline in ASH rates for all groups from 2004 is likely to be a reflection of improved immunisation coverage.

Figure 13: Ambulatory-sensitive hospitalisations for immunisation-preventable diseases, by age group and ethnicity, 2003-2006

Source: Public Health Intelligence, Ministry of Health 2007 unpublished
Pertussis
Pertussis (whooping cough) is a vaccine-preventable disease caused by the bacteria bordetella pertussis, with epidemics at four- to five-year intervals. Pertussis is highly contagious and its impact is most severe in children aged less than one year. The majority of hospital admissions and deaths occur in this age group. Hospital admission rates appear to be higher for Pacific children under one year than for children from other groups. Higher hospital admission rates are also associated with living in the most deprived areas.

The pertussis incidence rate in New Zealand is higher than that in most other Pacific nations, and is 5 to 10 times greater than in the United Kingdom or the USA (Grant 2006). In 2006 there were 1122 pertussis cases notified (27.1 cases per 100,000 population). This was a significant decrease from 2004 (3485 cases notified, 93.3 per 100,000 population), during the latter part of which New Zealand experienced an epidemic of pertussis. The highest age-specific rates in 2006 were for cases aged under one year (66.5 per 100,000 population, or 123 cases) (ESR 2007).

Childhood vaccination has been routine in New Zealand since 1960, and the disease has been notifiable since 1996. The recommended immunisation schedule for pertussis is at six weeks, three months and five months of age, followed by boosters at four years and since 2006, 11 years of age. Coverage is reported as low with even lower on-time immunisation coverage (Grant 2006).

Haemophilus influenzae type b (Hib)
Hib rates have fallen by more than 90 percent since the introduction of the Hib vaccine in 1994. Three doses of the vaccine are recommended at six weeks, three months and 15 months. In 2006 there were nine cases of invasive Hib disease in children aged under five years, and only one case was confirmed as immunised (ESR 2007).

Measles, mumps and rubella
Epidemics of measles occurred every two years and mumps every three years before immunisation was introduced in New Zealand. The last epidemic of measles was in 1997, mumps in 1994 and rubella in 1995. Two doses of measles, mumps and rubella vaccine (MMR) at ages 15 months and four years are recommended and expected to prevent further epidemics. Of measles, mumps and rubella cases notified in 2006, the majority were reported as not vaccinated or as receiving at least one dose of MMR (ESR 2007). Ethnicity data is not always recorded or reported.

Meningococcal B
A total of 160 cases of meningococcal disease were notified in 2006, giving a rate of 4.3 per 100,000 population. This is a significant decrease from 2004 (9.2 per 100,000, 342 cases), yet is still four times higher than the rate of 1.5 per 100,000 occurring in the immediate pre-epidemic years, 1989/90 (ESR 2007).

In 2006 just under 30 percent of cases occurred in those aged under five years. As Table 10 shows, the highest age-specific rates occurred in the under-one age group (62.2 per 100,000), followed by the one to four years age group (13.0 per 100,000). Pacific infants under one year comprised 29 percent of the under-one-year cases and Pacific one-to-four-year-olds comprised 21 percent of all cases aged one to four years. There were no cases among Pacific five-to-nine-year-olds and only one among 10-to-14-year-olds (ESR 2007). The reduction in Pacific cases is attributed to the coverage achieved by the meningococcal B immunisation programme and the disappearance of the disease from the New Zealand community.
Table 10: Numbers and crude incidence rates for cases of meningococcal disease, by age group and ethnicity, 2006

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Pacific</th>
<th>Māori</th>
<th>European</th>
<th>Other</th>
<th>Unknown</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>Rate*</td>
<td>No.</td>
<td>Rate*</td>
<td>No.</td>
<td>Rate*</td>
</tr>
<tr>
<td>&lt; 1</td>
<td>10</td>
<td>193.9</td>
<td>15</td>
<td>107.2</td>
<td>9</td>
<td>30.3</td>
</tr>
<tr>
<td>1–4</td>
<td>6</td>
<td>31.3</td>
<td>16</td>
<td>29.9</td>
<td>6</td>
<td>4.9</td>
</tr>
<tr>
<td>5–9</td>
<td>0</td>
<td>0.0</td>
<td>4</td>
<td>6.0</td>
<td>3</td>
<td>1.8</td>
</tr>
<tr>
<td>10–14</td>
<td>1</td>
<td>4.6</td>
<td>2</td>
<td>3.2</td>
<td>2</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Source: Ministry of Health 2007
* Crude rate per 100,000 population based on 2001 Census data.

**Hepatitis B**

Following the introduction of the hepatitis B immunisation programme in 1985, annual hepatitis B infection notifications have fallen from about 600 to approximately 50 per year (Ministry of Health 2006a). The higher prevalence of hepatitis B among Pacific people is discussed in the paper on Pacific peoples and health services (Ministry of Health 2008e). Infant immunisation is considered to be the mainstay of the hepatitis B control strategy (Robinson et al 2005).

**Injuries**

Childhood injuries are a major cause of death, and children are developmentally more vulnerable to injury than adults. Children are dependent on adults for their safety, and often their environment has been designed to meet the needs of adults rather than those of children (D’Souza and Wood 2003). Most injuries in childhood are to some extent preventable through public health measures, environmental safety and safe parenting practices (Ministry of Social Development 2003).

**Unintentional Injuries**

Pacific children make up 7.6 percent of New Zealand’s child population but account for 8.4 percent of children hospitalised for an unintentional injury. Pacific children have an increased risk for some injuries, including hot water scalds and motor vehicle injuries (Injury Prevention Network 2007). Of all injuries where Pacific infants and children aged zero to four years have been hospitalised, burns make up 14 percent, falls 24 percent and motor vehicle and road traffic injuries 11 percent (Lima and Tukuitonga 2000).

Pacific children are 14 times more likely to be injured as a passenger in a vehicle than European children, and seven times more likely to be injured as pedestrians. Children of Pacific and Māori descent are markedly over-represented in home driveway accidents in the Auckland region (Injury Prevention Network 2007).

Findings from a PIF study about high non-fatal injury and injury incidence rates among Pacific infants found ethnically mixed families, where the father was Pacific and the mother was non-Pacific were at increased relative risk of injury and might benefit from specific injury prevention targeting. Given the high injury incidence levels Schluter et al (2006) advocate investigation and targeting of culturally appropriate prevention strategies for all Pacific families with young children to reduce injury rates for Pacific infants in New Zealand.
Intentional injuries

Society as a whole pays a high price for the maltreatment, injury or death of children. Beyond the costs of medical and ongoing care, law enforcement and administration of criminal justice, the physical and emotional damage or impairment inflicted on children undermines the very quality of future society. Protecting the lives and health of children by reducing child abuse is a critical component of improving social wellbeing in New Zealand (Ministry of Social Development 2003).

There is little difference in rates of abuse among New Zealand children under 10 years old but at age 11–16 years females are more likely to be abused than males (Ministry of Social Development 2003). Conservative estimates suggest that 17 percent of girls and 4 percent of boys will have experienced sexual abuse by the age of 16 (Fergusson et al 1996). Pacific children accounted for 12 percent of children assessed as abused in 2003, about the same representation as they have in the child population (Ministry of Social Development 2003).

Hospital admission data for injuries sustained as a result of assault, neglect or maltreatment suggests that Pacific children’s admissions are intermediate between those of European and Māori.

Oral health

Inequalities in oral health mirror those in general health, and evidence shows that lower socioeconomic groups tend to have poorer oral health than their higher social status counterparts (Watt 2007; Armfield 2007). Oral health in childhood is also a strong predictor of adult oral health (Thomson et al 2002; Ministry of Health 2006a). The most dramatic and consistent inequalities in oral health status are those between children in fluoridated and non-fluoridated areas as oral health indicators for year 8 children in Table 11 show.

Table 11: Oral health indicators, age standardised rates, by ethnicity, 2004

<table>
<thead>
<tr>
<th>Category</th>
<th>Pacific % (95% CI)</th>
<th>Māori % (95% CI)</th>
<th>European/Other % (95% CI)</th>
<th>Total % (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caries-free teeth (fluoridated supply), school year 8, age specific percent</td>
<td>47.6 (45.8–49.5)</td>
<td>37.8 (36.3–39.3)</td>
<td>54.0 (53.3–54.8)</td>
<td>50.7 (50.1–51.3)</td>
</tr>
<tr>
<td>Caries-free teeth (non-fluoridated supply), school year 8, age specific percent</td>
<td>35.1 (30.7–39.5)</td>
<td>29.1 (27.9–30.3)</td>
<td>43.9 (43.1–44.6)</td>
<td>40.4 (39.8–41.0)</td>
</tr>
<tr>
<td>Mean number decayed, missing or filled teeth (fluoridated supply), school year 8, age specific</td>
<td>1.5</td>
<td>1.9</td>
<td>1.1</td>
<td>1.3</td>
</tr>
<tr>
<td>Mean number decayed, missing or filled teeth (non-fluoridated supply), school year 8, age specific</td>
<td>2.2</td>
<td>2.7</td>
<td>1.6</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Source: An Indication of New Zealanders’ Health, Ministry of Health 2007e

The average missing or filled permanent teeth score\(^\text{18}\) is higher for Pacific children, both at school entry and at year 8, than the all-New Zealand average. In 2006, 32 percent of Pacific five-year-old children were caries free compared to 62 percent of European and Other five-year-old children (Ministry of Health unpublished data).

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\(^{18}\) The MFT (missing or filled permanent teeth) score is a ‘treatment outcome’ index and records the sum of the number of teeth that are missing or filled because of decay.
Findings from the PIF study on maternal interviews about the oral health of four-year-old Pacific children from South Auckland were that many mothers and their Pacific children had poor basic oral hygiene and dietary practices that increase the risk of poor oral health in their children. The researchers concluded that culturally appropriate and targeted strategies aimed at these modifiable practices need to be widely promoted so that the oral health burden carried by Pacific children can be reduced (Schluter and Durward et al 2007). Poor maternal oral health was also linked to poor child health by the Public Health Advisory Committee (2003).

Data from the 2002 National Children’s Nutrition Survey showed:

- irregular dental attendance was associated with children who were 11–14 years, Pacific, had not always lived in New Zealand, lived in rented accommodation, frequently watched television, consumed breakfast on the way to school, purchased lunch, consumed sugar-containing products or had food security issues
- tooth restoration was associated with children who were 11–14 years, Māori, from households with low income and with four plus children, regularly watched television, consumed breakfast on the way to school, purchased lunch, consumed sugar-containing products, had food security issues, experienced dental pain at night, and had received dental care under a general anaesthetic
- tooth extraction was associated with Pacific ethnicity, low household income, disability, purchased lunch, consumed sugar-containing products, had food security issues, experienced dental pain at night, and had received dental care under a general anaesthetic (Jamieson and Koopu 2007).

This analysis links both determinants and risk factors to Pacific children’s higher levels of irregular dental attendance and teeth extraction. Pacific children and families need more information about dental health and encouragement to make use of dental health services on a regular basis, as well as better diet and nutrition information.

As Figure 14 shows ASH rates for dental conditions are high among Pacific children aged 0–4 years and are increasing among children aged 5–14-years.

Figure 14: Ambulatory-sensitive hospitalisations for dental conditions, by age group and ethnicity, 2003–2006

![Chart showing ASH rates for dental conditions by age group and ethnicity, 2003–2006](chart.png)

Source: Public Health Intelligence, Ministry of Health 2007 unpublished
**Overweight and obesity**

Pacific peoples are considered to be the most overweight people in the world (Coyne 2000; Streib 2007). The obesity and overweight rates for Pacific children are 200 percent and 50 percent higher, respectively, than for other New Zealand children.

The 2002 National Children’s Nutrition Survey found (see Figure 15):

- one third of Pacific boys and girls were overweight and a further 26 percent of boys and 31 percent of girls were obese. Figure 17 shows the greater overweight and obesity of Pacific children compared to Māori children and European and Other children
- 71 percent of Pacific girls aged 11–14 years were overweight or obese (Ministry of Health 2003a)
- Pacific children’s levels of overweight and obesity were 62 percent, compared to 41 percent for Māori, and 24 percent for others.19

Figure 15: Overweight and obesity rates for children, by sex and ethnicity, 2002

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19 The appropriateness of the Cole cut-offs for Pacific children are not established, so the difference may be exaggerated.
Deprivation and obesity
The prevalence of obesity increases with increasing deprivation for both children and adults as Figure 16 illustrates. Over half of all Pacific people live in the quintile (NZDep5 of Figure 17) with the most overweight and obese people.

Figure 16: Overweight and obesity rates for New Zealanders, by sex and NZDep2001, 2002/03

Source: 2002/03 New Zealand Health Survey, Minister of Health 2004a

Higher socioeconomic status and better educational attainment are associated with a lower prevalence of obesity (Eriksson et al 2003).

Prenatal experience
The prenatal period and early nutritional experiences have also been identified as important to the priming of offspring to subsequent obesity and other health risks (Raman 2002). Certain differences in the intake of various nutrients have been found between ethnic groups of New Zealand women who are of childbearing age, breast feeding or pregnant. Of particular concern is the increased prevalence of ill-health and inadequate nutrition likely in some population groups, including Pacific people. Inadequate diets before pregnancy are likely to have consequences on the health of the mother and baby if these practices are continued during pregnancy and breastfeeding (Ministry of Health 2006b).

Recent nutritional surveys show that Pacific women are more likely than New Zealand European/Other women to experience inadequate nutrient intakes (Ministry of Health 2003a). Adolescent and young adult women and women from a low socioeconomic background are also more likely to experience inadequate nutrition (Ministry of Health 2003a). Pacific women are likely to be included in all three of the groups experiencing inadequate nutritional intake (Ministry of Health 2006b).

Pre-pregnancy maternal weight and body mass index (BMI), and maternal weight gain during pregnancy, have been independently associated with increased risk of childhood obesity and associated conditions (Velasquez-Mieyer et al 2005).
Birthweight
A relationship has been demonstrated – particularly in minority populations – between small-for-gestational-age infants and the development of obesity, cardiovascular complications and type 2 diabetes. Although Pacific children have the lowest proportion of low-weight births in New Zealand, this proportion appears to be rising slowly. Smoking is one of the main determinants of low weight for gestational age, giving rise to speculation of a link between the higher rate of smoking among young Pacific women and a rising proportion of low birthweight babies.

Pacific people have the highest rate of high birthweight (more than 4000g at birth) in New Zealand. Infants weighing more than 4000g have increased risk of adverse outcome of delivery (death and birth difficulties and a higher risk of childhood morbidity) and increased risk for obesity and type 2 diabetes in later life (Ministry of Health 2006b).

Infant weight gain
A pattern of rapid weight gain during the first four months of life has also been associated with an increased risk of overweight status at age seven years, independent of birthweight and weight attained at age one year. The prevalence of obesity in children who were never breastfed is 4.5 percent compared to 2.8 percent in breastfed children, and a clear time response effect has been identified for the duration of breastfeeding on the decline in prevalence of obesity (Velasquez-Mieyer et al 2005).

Childhood obesity
Research indicates that obesity tracks from early life into adult life, and that childhood BMI is a stronger predictor of obesity than body size at birth (Eriksson et al 2003). The probability of an overweight or obese child becoming an overweight or obese adult is between 66 and 80 percent (USA Preventive Services Task Force 2005). Persistence of obesity from childhood or adolescence into adulthood has been consistently demonstrated in all populations in which it has been studied. Childhood and adolescent obesity have a significant impact on later mortality and morbidity in adulthood. Many of the metabolic and cardiovascular complications and some forms of cancer associated with adult obesity have their onset in childhood (Micic 2001). This risk may exist independently of obesity in adult life.

Morbidity
Research literature associating childhood obesity with negative health outcomes can be summarised as follows:

- a high incidence of additional cardiovascular risk factors (such as elevated blood pressure, hyperlipidaemia and insulin resistance)
- increased risk of type 2 diabetes in adolescents or adults
- adverse effects on glucose metabolism evident in early childhood
- physical and psychological morbidity, including low self-esteem, which impair current wellbeing
- orthopaedic problems (obese children are more likely to suffer from low bone mass, leading to more fractures)
- obstructive sleep apnoea (the obstructive sleep apnoea associated with obesity independently contributes to increased insulin resistance and hypertension)
- asthma
- hepatic steatosis
• gastro-oesophageal reflux

Although there is evidence of tracking of obesity and other cardiovascular risk factors from childhood to adulthood, these factors may be reversible, and supports use of effective interventions. Also, the fact that this tracking generally increases in strength with increasing age suggests that interventions should begin in early life (Nelson 2005).

**Parental influence**

High-fat diets in parents are associated with their children's eating patterns and obesity, which indicates that the entire family should be targeted (Gidding et al 1996). Parental obesity more than doubles the risk of adult obesity among both obese and non-obese children under 10 years of age (Whitaker et al 1997).

In the treatment of obese children, the inclusion of parents in the treatment programme results in better weight change patterns in children at five and ten years of age (Raman 2002).
5. Interventions

Interventions to improve child health are a valued and accepted tradition in New Zealand. In the case of determinants, interventions may have explicit health related objectives e.g., Healthy Housing, or be more indirect in terms of their effect on child health e.g., the Pasifika Education Plan. Health sector led initiatives tend to be directed at reducing the impact of risk factors and/or increasing protective factors for child health.

The following section canvasses some recent interventions for improving child health. It is noted that there are a number of DHB led regional initiatives for improving child health. As most interventions are developed for all New Zealand children the question about the most appropriate implementation strategies and delivery mechanisms for ensuring Pacific children and families receive the same service is not always sufficiently addressed.

Well Child Services

The Well Child Tamariki Ora Framework covers screening, education and support services offered free to all New Zealand children, from birth to five years, and their families/whānau. Well Child services encompass health education and promotion, health protection and clinical assessment, and family/whanau support. They also ensure that parents are linked to other early childhood services such as Early Childhood Education and social support services if required.

Under the current Well Child Schedule, 12 health checks are offered to children from 0 to 5 years, eight of these offered between the ages of six weeks and five years. Additional services are also offered to first time parents and to families who are identified as needing more support.

The primary objective of the Well Child Tamariki Ora Framework is to support families/whānau to maximise their child’s developmental potential and health status from birth to five years, establishing a strong foundation for ongoing healthy development. Providers of Well Child services include registered nurses and community health workers/kaiawhina who have specific training in child health.

The Ministry of Health is reviewing the Well Child Tamariki Ora Framework. Phase one of the review was completed in 2007, and looked at the content of the Framework. Stakeholders were consulted, and recommendations for changes to the content of the Framework as a result of this part of the review. Phase two of the review will start in 2008, and will focus on how the quality of Well Child Tamariki Ora services can be improved.

B4 School Checks

B4 School Checks for four to five year olds will roll out during 2008. Checks will include height and weight, oral health, vision, screening, immunisation, development and behaviour. Referral pathways will be provided for children requiring further assessment and support.

Universal Newborn Hearing Screening

The Universal Newborn Hearing Screening Programme being phased in over three years from July 2007 will identify early any sensorineural hearing loss and put in place supports to avoid delays in language development and learning.
Outreach immunisation services

Outreach immunisation services are part of a broader strategy to improve immunisation coverage among Pacific peoples, Māori and other priority groups with high rates of vaccine-preventable disease and low rates of immunisation. These services follow up families who have missed immunisation events, after routine follow-up procedures used by primary health care providers have not been successful in bringing the family/whānau into the primary health care service for immunisation. The National Immunisation Register is assisting in following up children and in improving immunisation coverage.

Clearing the Smoke

*Clearing the Smoke: A five year plan for tobacco control in New Zealand 2004–2009* (Ministry of Health 2004b) includes goals to:

- significantly reduce levels of tobacco consumption and smoking prevalence
- reduce inequalities in health outcomes
- reduce exposure to second-hand smoke for all New Zealanders.

Pacific Smoking Cessation Services are available in Wellington, Christchurch, Hamilton and from mid-2008 the Auckland region to Pacific people ready to quit smoking.

Violence prevention

The Taskforce for Action on Violence within Families was set up to improve the way society responds to family violence and achieve a better future for New Zealand families. The Taskforce’s programme of action is building on the initiatives put in place under Te Rito: New Zealand’s Family Violence Prevention Strategy through actions focused on:

- leadership
- changing attitudes and behaviour
- safety and accountability
- effective support services.

Te Rito includes objectives to ensure that approaches to family violence prevention are culturally relevant and effective for Pacific peoples. The Ministry of Health collaborates across agencies to progress programmes to minimise family violence, child abuse and neglect, and to reduce violence in interpersonal relationships, families, schools and communities.

Two Pacific-specific violence prevention programmes among young families, children and youth have been implemented through Pacific churches: Peaceful Waves in the Samoan community, and Matangi Malie in the Tongan community.

Improving nutrition, increasing physical activity, reducing obesity

The Healthy Eating – Healthy Action (HEHA) Strategy is the Government’s multi-faceted, integrated response to improving nutrition, increasing physical activity, and achieving healthy weight for all New Zealanders.
Healthy Eating – Healthy Action

The Healthy Eating – Healthy Action: Oranga Kai – Oranga Pumau: A strategic framework (Ministry of Health 2003b) encompasses a whole-of-government approach and a strong intersectoral focus. The HEHA Implementation Plan (Ministry of Health 2004a) includes a number of initiatives for Pacific peoples, including:

- the development and implementation of nutrition and physical activity policies in settings such as schools, preschools (including Pacific Island early childhood centres), churches, hospitals and health services, and tertiary institutions
- supporting communities to develop nutrition and physical activity programmes in key settings of significance to Pacific peoples
- the development and implementation of a strategy to increase the capacity and capability of trained Pacific health professionals and community health workers (Ministry of Health 2004a).

HEHA is also discussed in the paper on promoting healthy lifestyles and preventing chronic disease among Pacific peoples (Ministry of Health 2008d).

Breastfeeding

A National Breastfeeding Promotion Campaign to increase environmental support to initiate and maintain breastfeeding and increase the proportion of infants being exclusively breastfed to six months, and the proportion of infants partially breastfed beyond six months is being introduced in 2008 by the Ministry of Health. Pacific people and Māori have been identified as the key priority.

The Baby Friendly Hospital Initiative (BFHI) is a United Nations Children’s Fund (UNICEF)/WHO programme to improve breastfeeding in hospitals and maternity facilities. It is recognised for its positive contribution to promoting successful breastfeeding during perinatal care. BFHI is being implemented in New Zealand by the New Zealand Breastfeeding Authority. Of the 87 maternity facilities in New Zealand, 13 are now accredited.

Resources to support breastfeeding, infant nutrition and infant health are available from the Ministry of Health’s website http://www.moh.govt.nz. Some are available in Pacific languages.

Food and Nutrition Guidelines

The Ministry of Health has a series of background papers about healthy infants and toddlers, children, adolescents, adults, older people, and pregnant and breastfeeding women to:

- provide evidence-based, up-to-date policy advice on nutrition and physical activity for achieving and maintaining the best possible health
- provide reliable, consistent information to use as a basis for programmes and education to support families and children
- guide and support health practitioners
- provide nutrition and physical activity advice so that education and support can be targeted to reduce health inequalities.

The Ministry of Education’s Food and Nutrition Guidelines to promote a healthy food environment in schools and early childhood education services were released in March 2007. These guidelines provide advice on how early childhood education services and schools can make changes to the in-school environment so that the school and early childhood education environment support healthy eating/nutrition.
Fruit in Schools
The Fruit in Schools (FIS) programme provides a free piece of fruit each school day to students in participating low-decile schools. Schools are encouraged to use a Health Promoting Schools approach to address four health priority areas: healthy eating; physical activity; sun protection; and smokefree.

Fruit in Schools was rolled out in three phases from late 2005, and approximately 56,000 children in 270 schools are participating. Of these 17,713 (32 percent) were Pacific children in 2007.

Evaluation findings to date show that FIS is raising the profile of health and wellbeing in schools and better connections are being made with health agencies. Health agencies were strongly supportive of FIS for improving interagency communication and co-ordination of services to schools.

Findings from the FIS Year 4 student surveys of statistically significant changes likely to be related to FIS were:

- increased awareness of the importance of healthy eating and knowledge about options
- an increase in the numbers who ate fruit and vegetables and the amount they ate
- increased awareness of the importance of physical activity, and enjoyment of it
- an increase in physical activity and a decrease in TV watching and playing computer games (Boyd et al 2007).

The few significant differences by ethnicity showed Pacific students:

- had more positive attitudes towards eating vegetables and exercise than other students prior to FIS
- reported doing significantly more mild to moderate physical activity in the day before the survey
- scored higher than their peers on the healthy eating knowledge questions at the end of 2006
- were more likely to eat food on the way to school than their peers at the end of 2006
- were less likely than Māori or European to eat dinner at the end of 2006 (Boyd et al 2007).

The evaluation also suggested that FIS could be strengthened by exploring further ways to work with Pacific stakeholders at the school, regional and national level (Boyd et al 2007).

Physical activity guidelines
New Zealand children and young people should:

- throughout each day, do 60 minutes or more of moderate to vigorous physical activity
- be active in as many ways as possible, for example, through play, cultural activities, dance, sport and recreation, jobs and going from place to place
- be active with friends and whānau, at home, school, and in their communities
- spend less than two hours a day (out of school time) in front of the television, computers and game consoles.

Guidelines agreed by SPARC, the Ministry of Health, and the Ministry of Education in consultation with the Ministry of Youth Development for children and young people (aged 5–18 years).
**Kids in Action**

Kids in Action is a multidisciplinary intervention programme for obese children in South Auckland. The programme began in 2003 and consists of a combined weekly paediatric and dietician clinic, nurse home visits, weekly group support and physical activity sessions in the Otara gym, and a Mangere walking group for parents and children, as well as education sessions.

Obese children are referred to the programme by GPs, school nurses and Starship Hospital. In some cases their families enrol them. The focus of the programme has shifted from just the child to include the entire family.

A total of 139 children were referred to the programme in 2004/05 (Minister of Health 2006). In 2005, two-thirds of children remaining in the programme for a year lost or maintained weight.

**Mission On**

Mission On is a package of 10 initiatives aimed at improving the lifestyles of young New Zealanders by targeting improved nutrition and increased physical activity. The outcomes sought are improved health, high educational achievement and a valued ‘Kiwi lifestyle.’ The campaign was launched in September 2006 and is led by SPARC. It is aimed at children and young people aged 0–24 years and contributes to achieving the goals of HEHA.

**Oral health**

*Good Oral Health for All, for Life* (2006) is the strategic vision for oral health in New Zealand and its initial focus is on the oral health of children and young people. The publicly funded Community Oral Health Service will replace the School Dental Service and be delivered from a wide range of community and outreach facilities including PHOs and Pacific health providers. It also recommends that children from Pacific backgrounds be enrolled in oral health services at age one (Ministry of Health 2006c).

**Healthy Housing**

Healthy Housing is a joint initiative between Housing New Zealand and DHBs. It began in 2001 to improve the welfare of Housing New Zealand tenants, many of whom are Pacific Island families.

The Auckland UniServices evaluation indicates that Healthy Housing:

- significantly reduced the risk and rate of housing-related diseases (asthma, respiratory diseases, rheumatic fever, cellulitis, and meningitis), injuries (falls and burns), addressed conditions (obesity and reduced mobility) and improved wellbeing
- achieves positive outcomes for families – a view shared by households, providers and key stakeholders
- collaborative and flexible interagency relationships between Housing New Zealand and DHBs led to programme sustainability (Housing New Zealand Corporation 2008).
Pasifika Education Plan

The Pasifika Education Plan provides the Ministry of Education with strategic direction for improving education outcomes for Pacific peoples in New Zealand. The 2001–2005 Plan saw significant progress in meeting participation targets, but making gains on achievement targets proved challenging. The 2006–2010 Plan sets goals and targets for accelerating change in the education system for Pacific students. In early childhood education the focus will be on getting more Pacific children participating in quality early childhood education. In schools there will be an increased focus on getting students engaged in learning and staying at school (Ministry of Education 2007a).
6. Conclusion

Determinants

The determinants of child health are much less favourable for Pacific children than for children of non-Pacific, non-Māori New Zealanders. Although many Pacific children benefit from the care and support provided as part of extended family living and strong family and community networks Pacific families are more likely to live in poorer-quality and over-crowded housing in more deprived neighbourhoods with fewer amenities. Pacific parents are generally less well educated and qualified, and more likely to work in lower-skilled, lower-status and lower-paid occupations for longer hours than other New Zealand parents. This has implications for the health and wellbeing of children arising from a poorer standard of living. It also means that many parents are not able to support their children’s education and development needs to the extent generally considered desirable and many Pacific children have fewer opportunities to participate in education, sport and recreation activities.

The unequal distribution of socioeconomic resources between ethnic groups is part of the reason for ethnic disparities. Redressing socioeconomic inequalities is therefore a strategy to reduce ethnic inequalities in health (Blakely et al 2006). Influencing the determinants of Pacific child health requires intersectoral engagement and collaboration, across a range of areas. Intersectoral initiatives and projects need to be supported by agency processes that facilitate activity, including the development of better systems for implementing successful pilots and exemplars more widely; and for identifying and disseminating success factors more generally and for Pacific especially.

As this paper and others in this series confirm, the determinants ensure Pacific children experience more barriers to timely and quality health care (and this includes health promotion and prevention services). The health sector has an important role in supporting action to improve determinants but a more critical role is ensuring that services are accessible to all Pacific children, and especially those likely to be in greatest need of quality health care.

Risk and protective factors

The Pacific Health and Disability Action Plan noted that Pacific children have a high incidence of risk factors for disease and illness. This paper has described the most influential risk factors for poor health among Pacific children and established the consequential link with poor health outcomes. The risk factors identified – parental choices about breastfeeding and immunisation, and exposure to tobacco smoke, alcohol, violence, as well as poor diet, sedentary lifestyle and physical inactivity – are all amenable to change. Protective factors such as breastfeeding and immunisation of infants, good nutrition and physical activity, need to be encouraged and supported as part of strategies to reduce risk factors.

Determinants have a critical role in enabling risk factors and undermining protective factors. This means that effective and sustainable change and ongoing health improvement are likely to be a result of targeting risk factors and improving determinants, especially socioeconomic circumstances, so Pacific families can make positive choices that benefit their children’s health, education and social, physical and emotional development.
Outcomes
Although Pacific infant mortality rates have fallen, they are still too high when compared to the total New Zealand population. Optimal foetal development requires a healthy in utero environment. This reflects maternal wellbeing, which includes physical and mental health, and social and financial security. Pacific women are more likely to have more children and have high adolescent pregnancy and birth rates, and attend later at antenatal classes (Ministry of Health 2006a and 2008e). Pacific child health requires better engagement with Pacific women, and ideally this should begin from their earlier years and build on positive experiences with health workers.

Pacific children continue to be more likely than New Zealand European children to be admitted to hospital with acute and chronic respiratory and infectious diseases, including skin diseases, than any other group in New Zealand. The ASH evidence about the higher admission rates of Pacific children compared to non-Pacific, non-Māori children confirms the burden of disease among Pacific children – respiratory diseases 2.5 times higher, asthma 3 times higher, cellulitis 5.5 times higher, gastroenteritis 1.3 times higher, dental conditions 3 times higher, kidney and urinary infections more than 2 times higher – and is a sobering reminder of continuing inequalities in prevention and care in child health, and the need for an effective health sector response.

The evidence for the role of smoking in undermining child health, and in particular the development of respiratory disease, increasing the risk of cardiovascular disease and other diseases as adults (Ministry of Health 2008d), reinforces the need for more and better outreach efforts into Pacific communities to prevent smoking initiation, promote initiatives to encourage tobacco cessation and discourage second-hand smoking.

Pacific children are overweight and obese to a much greater extent than their cohort. Obesity prevalence has very serious implications for Pacific children’s future health and wellbeing, as it increases the risk of developing cardiovascular disease and type 2 diabetes as adults. As there is evidence that these risk factors may be reversible, effective interventions are possible and likely to be more effective if they begin early in childhood. Pacific communities are, from the available information, indicating a general receptiveness to HEHA initiatives and there seems to be considerable potential to build on and expand HEHA activities specifically for Pacific children, given the nutrition and physical activity challenges they face.

Interventions
A number of national and local initiatives to promote health and wellbeing of children, improve diet and nutrition, promote physical activity, reduce tobacco and alcohol consumption, increase health sector responsiveness to violence and abuse, increase access to health services are in place, and inclusive of Pacific people. Although there is an increasing awareness of Pacific needs being reflected in programme design, development and delivery options there are only limited indications that the needs of Pacific children and their families are sufficiently understood. It is this understanding that is vital to real responsiveness. The papers in this series and evaluations of existing initiatives are all contributing to a better and more accessible knowledge base.

Better monitoring and data collection, reporting and analysis are needed to help assess the effectiveness of interventions. It is time that a better understanding was developed of why and how some health sector interventions are more effective. The perspective of Pacific parents and caregivers is also important, what they think is needed, and how it is best supplied, and by whom.
Future priorities
The evidence in this paper suggests the following priority areas for improving and protecting the health of Pacific children in the context of health services working with families to enhance quality of care and the protective factors available from a supportive family environment:

- reducing respiratory disease, infectious disease and skin disease among Pacific children through strategies and programmes that improve housing and hygiene, reduce smoking and improve quality of care
- reducing overweight and obesity in Pacific children through improvements in nutrition and physical activity and working with affected families and communities
- reducing smoking through strategies and programmes that target Pacific children and youth for initiation prevention, Pacific families to reduce second-hand smoke, and Pacific youth and adults for cessation.

During 2008 more evidence about child health will become available from the 2007 New Zealand Health Survey and a Pacific Child Health epidemiology report. This evidence will help shape and refine the priority areas and options for future work that are proposed below.

Looking forward
The following goals are proposed as a basis for further consideration and discussion in determining future action. There are a wide range of potentially useful actions that can be associated with any one of these key areas. All will benefit from actions focussed on the determinants and from health sector initiatives to improve quality of care.

1. Reduce respiratory, infectious and skin diseases among Pacific children.
2. Prevent and reduce overweight and obesity in Pacific children and families.
3. Reduce smoking among Pacific peoples and eliminate Pacific infants and children’s exposure to secondhand smoke.
4. Support DHB and Pacific health provider local initiatives to improve the health of Pacific children and families.
5. Support intersectoral initiatives aimed at improving the determinants of health.
Appendix 1: Health Indicators for Pacific Children and Total New Zealand Children in *Tupu Ola Moui: Pacific Health Chart Book 2004* showing inequalities

The Chart Book indicators are presented as rates and 95 percent confidence intervals, calculated by conventional parametric techniques – shown where possible. For many indicators confidence intervals for the Pacific population estimate are in fact very wide, reflecting small numbers. The total New Zealand rate was provided in the Chart Book alongside the Pacific rate to provide a context for interpreting the Pacific rate. If their respective 95 percent confidence intervals do not overlap, the difference is likely to be statistically significant. Inequalities between the respective populations are flagged in column 4.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Pacific population</th>
<th>Total New Zealand population</th>
<th>Inequality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant mortality, 1997–2001, rate per 1000 live births</td>
<td>7.1 (6.2–8.0)</td>
<td>5.1 (4.8–5.3)</td>
<td>Inequality</td>
</tr>
<tr>
<td>Neonatal mortality, 1997–2001, rate per 1000 live births</td>
<td>4.0 (3.3–4.7)</td>
<td>2.8 (2.6–3.0)</td>
<td>Inequality</td>
</tr>
<tr>
<td>Post-neonatal mortality, 1997–2001, rate per 1000 live births</td>
<td>3.1 (2.5–3.7)</td>
<td>2.3 (2.1–2.4)</td>
<td>Inequality</td>
</tr>
<tr>
<td>Prematurity complications</td>
<td>1.3 (0.9–1.7)</td>
<td>0.8 (0.7–0.9)</td>
<td></td>
</tr>
<tr>
<td>Birth complications</td>
<td>0.3 (0.1–0.5)</td>
<td>0.4 (0.4–0.5)</td>
<td></td>
</tr>
<tr>
<td>SIDs</td>
<td>0.7 (0.4–1.0)</td>
<td>0.9 (0.8–1.1)</td>
<td></td>
</tr>
<tr>
<td>Birth defects</td>
<td>0.6 (0.4–0.9)</td>
<td>0.4 (0.4–0.5)</td>
<td></td>
</tr>
<tr>
<td>Low birthweight, 2001, rate per 100 live births</td>
<td>4.5</td>
<td>6.5</td>
<td></td>
</tr>
<tr>
<td>Hearing failure at school entry, 2001/02, percent</td>
<td>18.1 (16.7–19.5)</td>
<td>8.4 (8.1–8.7)</td>
<td>Inequality</td>
</tr>
<tr>
<td>Mean number of missing or filled teeth at Year 8, 2002</td>
<td>Fluoridated 1.53</td>
<td>Fluoridated 1.28</td>
<td>Inequality</td>
</tr>
<tr>
<td></td>
<td>Non-fluoridated 2.34</td>
<td>Non-fluoridated 2.06</td>
<td></td>
</tr>
<tr>
<td>Mean number of missing or filled teeth at school entry, 2002</td>
<td>Fluoridated 2.55</td>
<td>Fluoridated 1.36</td>
<td>Inequality</td>
</tr>
<tr>
<td></td>
<td>Non-fluoridated 3.93</td>
<td>Non-fluoridated 2.34</td>
<td></td>
</tr>
<tr>
<td>Asthma hospitalisations, ASR per 100,000 children</td>
<td>748 (719–777)</td>
<td>491 (485–498)</td>
<td>Inequality</td>
</tr>
<tr>
<td>Meningococcal disease notifications, ASR per 100,000 children</td>
<td>21.8</td>
<td>8.6</td>
<td>Inequality</td>
</tr>
</tbody>
</table>

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20 ASR stands for Age Standardised Rate.
<table>
<thead>
<tr>
<th>Indicator</th>
<th>Pacific population</th>
<th>Total New Zealand population</th>
<th>Inequality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rheumatic fever notifications, ASR per 100,000 children</td>
<td>7.0</td>
<td>1.4</td>
<td>Inequality</td>
</tr>
<tr>
<td>Tuberculosis notifications, ASR per 100,000 children</td>
<td>6.1</td>
<td>1.0</td>
<td>Inequality</td>
</tr>
<tr>
<td>Lower respiratory tract infection hospitalisations, ASR per 100,000 children</td>
<td>1523 (1483–1564)</td>
<td>590 (583–598)</td>
<td>Inequality</td>
</tr>
<tr>
<td>Access to needs assessment for children by people with a disability, 2001, percent</td>
<td>11</td>
<td>15</td>
<td>Inequality</td>
</tr>
<tr>
<td>Proportion of children fully immunised at 2 years, 1996, Northern RHA region, percent</td>
<td>53</td>
<td>63</td>
<td>Inequality</td>
</tr>
<tr>
<td>Physically active children (5–17 years, 1997–2000, percent</td>
<td>52 (43–61)</td>
<td>68 (66–70)</td>
<td>Inequality</td>
</tr>
<tr>
<td>Mean percent energy from total fat, children (5-14 years), 1997, percent</td>
<td>35 (M) (33.9–36.1)</td>
<td>33.2 (M) (32.7–33.7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>34.3 (F) (33.3–35.3)</td>
<td>32.9 (F) (32.3–33.5)</td>
<td></td>
</tr>
<tr>
<td>Consumption of at least 3 servings of vegetables per day, children (5–14 years), 2002, rate per 100 children</td>
<td>59 (M)</td>
<td>55 (M)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>65 (F)</td>
<td>58 (F)</td>
<td></td>
</tr>
<tr>
<td>Consumption of at least 2 servings of fruit per day children (5–14 years), 2002, rate per 100 children</td>
<td>51 (M)</td>
<td>41 (M)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>50 (F)</td>
<td>44 (F)</td>
<td></td>
</tr>
<tr>
<td>Households with children (5–14 years) that can afford to eat properly sometimes, 2002, percent</td>
<td>47.9</td>
<td>20.1</td>
<td>Inequality</td>
</tr>
<tr>
<td>Households with children (5–14 years) that use food banks often, 2002, percent</td>
<td>1.2</td>
<td>0.8</td>
<td>Inequality</td>
</tr>
<tr>
<td>Households with children (5–14 years) that use food banks sometimes, 2002, percent</td>
<td>18.1</td>
<td>8.6</td>
<td></td>
</tr>
<tr>
<td>Full breastfeeding at 3 months, percent, 2002/03</td>
<td>50.1</td>
<td>55.2</td>
<td>Inequality</td>
</tr>
<tr>
<td>Overweight children (5–14 years), 2002, rate per 100 children</td>
<td>33.9 (M)</td>
<td>20.0 (M)</td>
<td>Inequality</td>
</tr>
<tr>
<td></td>
<td>32.9 (F)</td>
<td>22.8 (F)</td>
<td>Inequality</td>
</tr>
<tr>
<td>Obese children (5–14 years), 2002, rate per 100 children</td>
<td>26.1 (M)</td>
<td>9.0 (M)</td>
<td>Inequality</td>
</tr>
<tr>
<td></td>
<td>31.0 (F)</td>
<td>10.7 (F)</td>
<td>Inequality</td>
</tr>
<tr>
<td>Participation in early childhood education, 0–4 years, 2001, percent</td>
<td>33</td>
<td>63</td>
<td>Inequality</td>
</tr>
</tbody>
</table>

Source: Ministry of Health and Ministry of Pacific Island Affairs 2004
References


URL: http://www.stats.govt.nz/cmsapp/templates/system/migration.aspx?NRMODE=Published&NRORIGINALURL=%2fproducts-and-services%2fArticles%2fPac-ple-emp-income-Dec02%2etheftm&NRNODEGUID=%7b5700CC41-7546-4A59-A35A-C944FC37FB2D%7d&NRCACHEHINT=NoModIfyGuest#p


