Section 3:

Health Status

Chapter 7: Diabetes

Key points

- Diabetes mellitus is a major and increasing health problem in New Zealand.
- Around 1 in 27 adults (3.7%) in the 1996/97 Health Survey reported that they had been diagnosed with diabetes.
- Māori and Pacific people were more than twice as likely to have been diagnosed with diabetes than European/Pākehā people.
- People living in more deprived areas, and those with lower incomes, tended to have higher rates of diagnosed diabetes.
- People with diagnosed diabetes were much more likely to report that their health was only fair or poor.
- Over a third of people with diagnosed diabetes had seen their GP six or more times in the previous year, compared with one in seven non-diabetics. Diabetic people were also significantly more likely to have been admitted to hospital in the previous year.
- The median reported age of diagnosis of diabetes was 50 years. This varied across ethnic groups, with Māori and Pacific people being diagnosed at a younger age than European/Pākehā people.

Introduction

Diabetes mellitus is recognised as a major health problem which can result in a number of serious complications, including heart disease, eye disease, kidney diseases, nerve problems and limb amputations (Simmons 1996a).

Diabetes is characterised by raised blood glucose. There are two main types of diabetes (Expert Committee on the Diagnosis and Classification of Diabetes Mellitus 1997; Alberti et al 1998):

- Type 1 diabetes is caused by the destruction of insulin-producing cells, resulting in insulin deficiency. There are no known modifiable risk factors for this type of diabetes (Ministry of Health 1997).
- Type 2 diabetes is of unknown aetiology but is associated with a combination of insulin resistance and a relative insulin deficit. It is often, but not always, associated with obesity (Ministry of Health 1997). This type of diabetes makes up about 85–90% of all diabetes in developed countries, including New Zealand (WHO 1994). Type 2 diabetes may be asymptomatic for many years and so it is possible for people to be unaware that they have it for long periods prior to diagnosis (Simmons 1996a). Other than obesity, the major risk factors for Type 2 diabetes are increasing age, physical inactivity and nutritional factors such as high intake of saturated fats (Ministry of Health 1997).

It has been estimated that diabetes may cost between $250 and $600 million in health care costs per year (Simmons 1996a). Furthermore, it is likely that the rates of Type 2 diabetes are increasing in most developed countries (Zimmet 1992; WHO 1994). This means that diabetes is likely to become an increasingly important health issue in the future. However, Type 2 diabetes is preventable, and it has been estimated that risk could be reduced by 50% to 75% by controlling obesity and by 30% to 50% by encouraging more physical activity (Manson and Spelsberg 1994). Research has also shown that the rate of complications from diabetes can be substantially reduced if the disease is well controlled (Diabetes Control and Complications Trial Research Group 1993; UK Prospective Diabetes Study Group 1998a, 1998b).

The key questions on diabetes in the 1992/93 and the 1996/97 Health Surveys are very similar, although the earlier survey included children in the prevalence estimate while the 1996/97 survey only included adults 15 years and over. In the 1996/97 survey, people with diagnosed diabetes were also asked about their age at diagnosis and what treatments they receive for their diabetes (see Table 36). It has been estimated that between a third and a half of all diabetes in the community is undiagnosed (Ministry of Health 1997), so prevalence estimates gathered from this survey will under-estimate the true prevalence of diabetes in New Zealand.

Unless otherwise stated, age- and sex-standardised rates, and 95% confidence intervals in parentheses, have been given in the text. Tables at the end of this section show key standardised and unstandardised estimates. More detailed tables related to this section are available on the Ministry of Health website *(www.moh.govt.nz).*

Table 36: Questions on diabetes asked in the 1992/93 Household Health Survey and the 1996/97 New Zealand Health Survey

1992/93 Household Health Survey	• Have you ever been told by a doctor you have diabetes?
1996/97 New Zealand Health Survey	• Have you ever been told by a doctor that you have diabetes (other than during pregnancy)? • (If yes) how old were you when diabetes was first diagnosed? • What treatments do you now have for your diabetes? *(tick all that apply:* no treatment; insulin injections; tablets or capsules; diet; exercise; other)

Results

Prevalence of diabetes

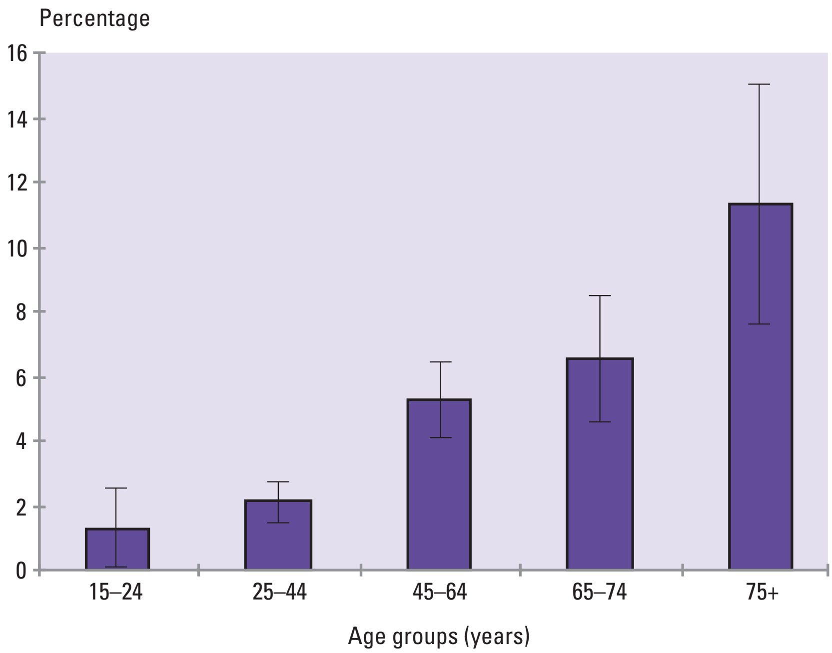
Diabetes by age and sex

There were 350 adult respondents in the 1996/97 Health Survey who reported that they had been diagnosed with diabetes. This is equivalent to an estimated 1 in 27 (3.7%; 3.1–4.3) people aged 15 years or over in the New Zealand population with diagnosed diabetes. In the 1992/93 Health Survey, 1 in 50 people (2%) reported that they had diabetes (Ministry of Health 1994), although

children were included in this 1992/93 analysis. These results suggest that there may have been an important increase in the prevalence of diagnosed diabetes between 1992/93 and 1996/97. However, this conclusion should be treated with some caution. Self-reported diagnosed diabetes is not a highly accurate measure. Moreover, the fact that children were included in the 1992/93 prevalence estimate of diabetes would have lowered the overall prevalence rate compared with 1996/97. Also, the apparent increase in diabetes could be due either to an increase in the true prevalence of diabetes in New Zealand, or to the extent to which diabetes is being diagnosed.

As expected, the results from the 1996/97 Health Survey show that diabetes increases dramatically with age ($p < 0.0001$). Of those aged 75 years or older, one in nine people said they had been diagnosed with diabetes (see Figure 36). Although slightly more men (4.1%; 3.3–4.9) than women (3.3%; 2.7–3.9) reported that they had diabetes in the 1996/97 Health Survey, the difference was not statistically significant. Generally, in other studies men and women have been found to have similar rates of diabetes (Scragg et al 1991; Ministry of Health 1994; McCarty et al 1996; Simmons 1996b).

Figure 36: Proportion of people with diagnosed diabetes, by age (sex-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

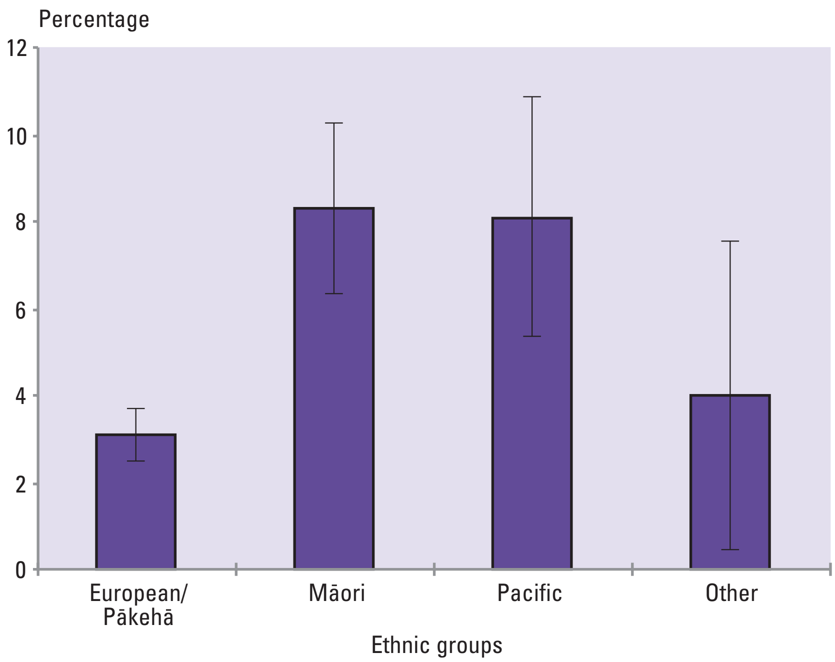
Diabetes by ethnicity

There were statistically significant differences across ethnic groups in rates of diabetes ($p < 0.0001$). Once differences in age and sex were accounted for, Māori and Pacific people were found to be more than twice as likely as European/Pākehā people to have been diagnosed with diabetes (8.3%; 6.3–10.3, 8.1%; 5.4–10.8 and 3.1%; 2.5–3.7 respectively; see Figure 37). A review of studies in New Zealand suggests that the overall prevalence of diabetes is 5–10% for Māori and 4–8% for Pacific people (Ministry of Health 1997). Given that the rates in the 1996/97 Health Survey may underestimate the real prevalence of diabetes (diagnosed plus undiagnosed) by up to a half, the rates estimated from it are higher than expected, particularly for Pacific people.

High rates of Type 2 diabetes have been found in many non-European populations around the world (Simmons 1996b). Many of the highest rates of Type 2 diabetes are found among populations who have changed from 'traditional' to 'westernised/urbanised' life styles (WHO 1994). High rates of diabetes have previously been found among Māori and Pacific people (Prior and Davidson 1966; Brown et al 1984; Ostbye et al 1989; Scragg et al 1991; Ministry of Health 1994; Simmons et al 1996), and diabetes is considered a particularly important health problem in these populations (South Auckland Community Diabetes Planning Group 1992; Kirkwood et al 1997). Although mortality and hospitalisation data under-record diabetes substantially, they suggest that mortality from diabetes among Māori is 4.5 times higher than for non-Māori, and rates of hospitalisation from diabetes is 3.3 times higher (Ministry of Health 1998).

It is thought that the differences in rates of diabetes between ethnic groups may be due, in part, to differences in rates of obesity and other lifestyle factors. For example, a survey carried out in 1989/90 (Russell and Wilson 1991) found that 29% of Māori men were obese compared to 9% of non-Māori men. The figures for women were 27% and 12% respectively. However, even when differences in body mass indices were accounted for in a large workforce study (Scragg et al 1991), Māori and Pacific people still had higher rates of diabetes than European/Pākehā people. It is likely that there are complicated interactions between many factors causing the high rates of diabetes among Māori and Pacific people, including a likely genetic predisposition to diabetes (WHO 1994; Ministry of Health 1997).

Figure 37: Proportion of people with diagnosed diabetes, by ethnicity (age- and sex-standardised)

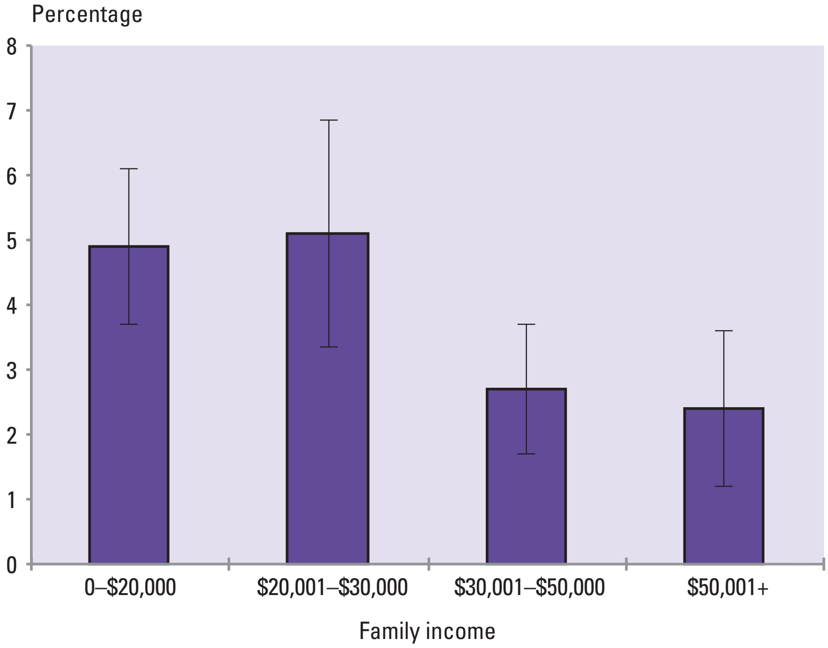


Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

*Diabetes by family income, education and NZDep96 score**

According to the 1996/97 Health Survey, people who live in the more deprived areas of New Zealand and those with lower incomes tended to have higher rates of diagnosed diabetes than those living in less deprived areas or those with higher incomes (both $p < 0.01$; see Figures 38 and 39). There was no statistically significant pattern with education. The findings of this survey are supported by the findings of a large study carried out in the late 1980s which showed an inverse relationship between income and rate of diabetes, which was independent of both age and ethnicity (Scragg et al 1991). It is likely that this relationship is partially explained by differences in rates of obesity across different socioeconomic groups (Russell and Wilson 1991).

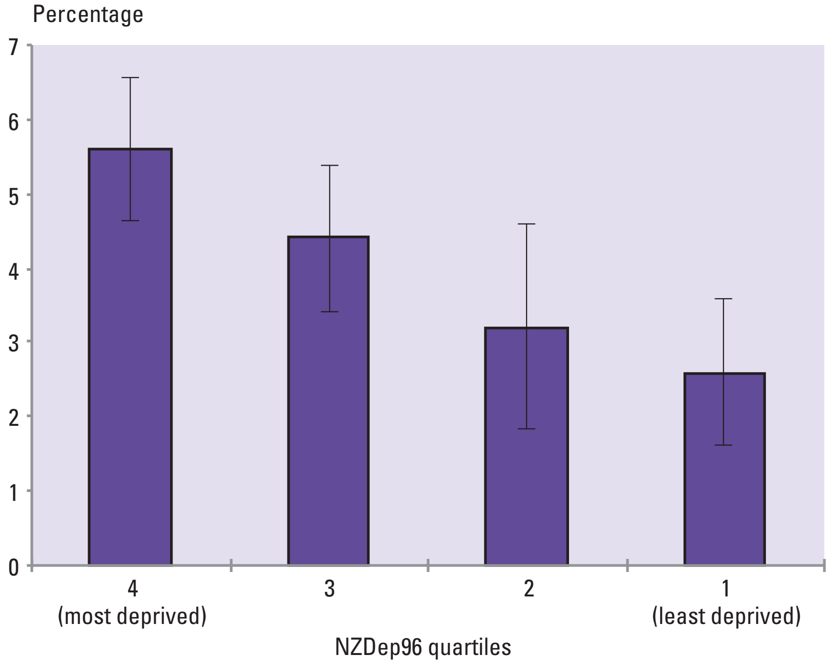
Figure 38: Proportion of people with diagnosed diabetes, by family income (age- and sex-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

* The NZDep96 score measures the level of deprivation in the area in which a person lives, according to a number of census variables, such as the proportion of people in that area who earn low incomes or who receive income support benefits, are unemployed, do not own their own home, have no access to a car, are single-parent families, or have no qualifications. The scores are divided into quartiles from 1 (least deprived) to 4 (most deprived). For more details, see Chapter 1: The Survey.

Figure 39: Proportion of people with diagnosed diabetes, by NZDep96 score (age- and sex-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

People with diabetes who smoke

People with diabetes have a higher risk of cardiovascular disease. At particular risk are those aged 45 years or over and those who smoke (WHO 1994). In the 1996/97 Health Survey, nearly a quarter of people with diabetes aged between 45 and 64 years reported smoking, while around 1 in 17 diabetics aged 65 years or more reported smoking (see Table 37).

Table 37: Proportion of people who are current smokers, by diabetic status and age: percent (95% confidence intervals)

Current Smokers	
Diabetic status	**% (95% CI)**
Yes	
15–24 years	–*
25–44 years	45.3 *(31.0–59.6)*
45–64 years	23.4 *(15.0–31.8)*
65+ years	5.8 *(3.4–8.2)*
No	
15–24 years	27.2 *(23.5–30.9)*
25–44 years	30.2 *(28.0–32.4)*
45–64 years	21.1 *(18.7–23.5)*
65+ years	13.1 *(10.7–15.5)*

* Insufficient numbers to calculate estimate.

Diabetes by self-rated health status

People with diabetes were much more likely than non-diabetics to report that their health was only fair or poor, and less likely to report that it was very good or excellent ($p < 0.0001$; see Table 38).

Table 38: Self-rated health status, by diabetic status: percent (95% confidence intervals)

Diabetic status	Excellent/very good % (95% CI)		Good % (95% CI)		Fair/poor % (95% CI)	
	Unadj	Adj*	Unadj	Adj*	Unadj	Adj*
Yes	24.6 *(18.5–30.7)*	24.3 *(16.5–32.1)*	39.9 *(32.6–47.2)*	42.8 *(31.2–54.4)*	35.4 *(28.0–42.8)*	33.0 *(20.8–45.2)*
No	59.6 *(58.0–61.2)*	59.4 *(57.8–61.0)*	29.0 *(27.4–30.6)*	29.1 *(27.5–30.7)*	11.4 *(10.4–12.4)*	11.5 *(10.5–12.5)*

* Adjusted rates are adjusted for age and sex.
Note: For further explanation of Tables, see Appendix 2: Notes to Figures and Tables.

Diabetes by health service utilisation

After adjustment for age and sex, diabetic people were more than twice as likely to have visited their GP six or more times in the last year than others (34.3%; 25.7–42.9 for diabetics and 14.2%; 13.0–15.4 for non-diabetics). Only 6.2% (2.3–10.1) of diabetics had not visited their GP in the last 12 months compared with over one in five (21.5%; 20.1–22.9) non-diabetics. It is not clear to what extent this high rate of GP consultations among diabetics is due to monitoring and obtaining prescriptions as opposed to actual diabetes-related morbidity.

Nearly one-third of people with diabetes had been admitted to hospital in the last year compared with around one in six without diabetes. These results are not surprising and are consistent with other findings. For example, it is estimated that people with diabetes make up approximately 5% of surgical (Simmons and Laughton 1993) and 15% of inpatient admissions in New Zealand (Bhoopatkar and Simmons 1994).

Age at diagnosis

In the 1996/97 Health Survey, the median age of diagnosis of diabetes was 50 years. Rates of diagnosis of diabetes tended to increase with age from about 40 years. The age at diagnosis also varied across ethnic groups. The median age of diagnosis for European/Pākehā people was 55.5 years, compared with 43 years and 47 years for Māori and Pacific people respectively. The findings are consistent with a large survey of diabetics in South Auckland which found that European/Pākehā people were generally older than Māori and Pacific people at diagnosis of diabetes (Simmons et al 1996).

Treatment of diabetes

People with Type 1 diabetes are dependent on insulin treatment to sustain life. Those with Type 2 diabetes are not dependent on insulin for survival, but may require either insulin or tablets to control their high blood sugar. Both need to follow a careful diet and exercise regimen (McCarty et al 1996).

In this study, 30.3% (22.5–38.1) of all these adult diabetics reported that they were on insulin treatment for their diabetes. Forty-four percent of diabetics reported taking tablets or capsules for treating their disease. Overall, only 45.3% (37.7–52.9) of diabetics reported that they treated their diabetes partially or totally with diet modification, and one-fifth considered exercise a treatment. Fourteen percent reported that they received no treatment for their diabetes.

Table 39: Self-reported diagnosed diabetes, by sociodemographic variables: percent (95% confidence intervals)

	Diagnosed diabetes (self-reported)		
	% (95% CI)		Pop est
	Unadj	Adj*	
Total	3.7 *(3.1–4.3)*		104,446
Sex			
Male	4.0 *(3.2–4.8)*	4.1 *(3.3–4.9)*	55,458
Female	3.4 *(2.8–4.0)*	3.3 *(2.7–3.9)*	48,988
Age			
15–24 years	1.3 *(0.1–2.5)*	1.3 *(0.1–2.5)*	6790
25–44 years	2.1 *(1.5–2.7)*	2.1 *(1.5–2.7)*	24,408
45–64 years	5.3 *(4.1–6.5)*	5.3 *(4.1–6.5)*	39,526
65–74 years	6.5 *(4.7–8.3)*	6.5 *(4.5–8.5)*	15,789
75+ years	11.2 *(7.7–14.7)*	11.3 *(7.6–15.0)*	17,934
Ethnicity			
European/Pākehā	3.4 *(2.8–4.0)*	3.1 *(2.5–3.7)*	75,989
Māori	6.6 *(5.0–8.2)*	8.3 *(6.3–10.3)*	18,435
Pacific	5.0 *(3.2–6.8)*	8.1 *(5.4–10.8)*	6546
Other	2.4 *(0.2–4.6)*	4.0 *(0.5–7.5)*	3477
Family income			
0–$20,000	6.4 *(5.2–7.6)*	4.9 *(3.7–6.1)*	32,292
$20,001–$30,000	5.8 *(4.0–7.6)*	5.1 *(3.3–6.9)*	21,998
$30,001–$50,000	2.4 *(1.6–3.2)*	2.7 *(1.7–3.7)*	12,639
$50,001+	1.6 *(1.0–2.2)*	2.4 *(1.2–3.6)*	14,091
NZDep96 score			
1 (least deprived)	2.4 *(1.4–3.4)*	2.6 *(1.6–3.6)*	19,613
2	3.0 *(1.8–4.2)*	3.2 *(1.8–4.6)*	21,310
3	4.4 *(3.4–5.4)*	4.4 *(3.4–5.4)*	28,220
4 (most deprived)	5.2 *(4.2–6.2)*	5.6 *(4.6–6.6)*	35,303
Education			
No qualification	4.9 *(3.9–5.9)*	4.3 *(3.3–5.3)*	39,605
School or post-school only	3.6 *(2.6–4.6)*	3.8 *(2.8–4.8)*	36,312
School and post-school	2.8 *(2.0–3.6)*	3.1 *(2.1–4.1)*	28,051

* Adjusted rates are adjusted for age and sex, except when they are age-specific, in which case they are adjusted only for sex, or when they are sex-specific, in which case they are adjusted only for age.
Note: For further explanation of Tables, see Appendix 2: Notes to Figures and Tables.

Table 40: Self-reported diagnosed diabetes, by age and ethnicity, for males: percent (95% confidence intervals)

Males	Diagnosed diabetes (self-reported)		
	% (95% CI)		Pop est
	Unadj	Adj*	
Total	4.0 *(3.2–4.8)*	4.1 *(3.3–4.9)*	55,458
Age			
15–24 years	1.5 *(0.9–3.9)*		4091
25–44 years	2.1 *(1.1–3.1)*		11,582
45–64 years	6.2 *(4.4–8.0)*		23,284
65–74 years	7.4 *(4.3–10.5)*		8647
75+ years	12.6 *(6.1–19.1)*		7854
Ethnicity			
European/Pākehā	4.1 *(3.1–5.1)*	3.9 *(2.9–4.9)*	45,042
Māori	6.1 *(3.6–8.6)*	7.2 *(4.7–9.7)*	8088
Pacific	3.5 *(1.3–5.7)*	6.0 *(2.5–9.5)*	2328
Other	0.0 *(0.0–0.0)*	0.0 *(0.0–0.0)*	0

* Adjusted rates are adjusted for age.
Note: For further explanation of Tables, see Appendix 2: Notes to Figures and Tables.

Table 41: Self-reported diagnosed diabetes, by age and ethnicity, for females: percent (95% confidence intervals)

Females	Diagnosed diabetes (self-reported)		
	% (95% CI)		Pop est
	Unadj	Adj*	
Total	3.4 *(2.8–4.0)*	3.3 *(2.7–3.9)*	48,988
Age			
15–24 years	1.0 *(0.2–2.2)*		2699
25–44 years	2.2 *(1.4–3.0)*		12,826
45–64 years	4.3 *(2.9–5.7)*		16,242
65–74 years	5.6 *(3.6–7.6)*		7142
75+ years	10.3 *(5.8–14.8)*		10,080
Ethnicity			
European/Pākehā	2.7 *(2.1–3.3)*	2.4 *(1.8–3.0)*	30,946
Māori	7.0 *(4.8–9.2)*	9.4 *(6.5–12.3)*	10,347
Pacific	6.3 *(3.4–9.2)*	10.1 *(5.6–14.6)*	4218
Other	4.7 *(0.4–9.0)*	7.9 *(1.0–14.8)*	3477

* Adjusted rates are adjusted for age.
Note: For further explanation of Tables, see Appendix 2: Notes to Figures and Tables.

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Chapter 8: Asthma

Key points

- There is a high prevalence of asthma symptoms in New Zealand compared with other developed countries, and there is some evidence that the prevalence of asthma is increasing.
- Overall, 15.5% of those aged between 15 and 44 years fulfilled the criteria for probable asthma. More women than men had probable asthma (18.0% and 12.9% respectively).
- The rate of asthma symptoms decreased with age for both men and women.
- Māori adults had the highest prevalence of probable asthma; European/Pākehā people had the next highest prevalence while Pacific people reported the lowest prevalence of probable asthma.
- People with probable asthma were more likely to assess their own health as fair or poor.
- People with asthma were more likely to have seen their GP six or more times and to have been admitted to hospital in the previous year than others.

Introduction

During the 1970s and the 1980s there was an epidemic of asthma-related deaths and hospital admissions in New Zealand (Wickens et al 1998). Since 1989 there has been a decline in both deaths and hospitalisations from asthma. This is likely to be due to changes in management and treatment (especially a reduction in the use of fenoterol), and improved education of both medical professionals and the public (Kolbe et al 1994; Pearce et al 1995; Kemp and Pearce 1997). Despite this decline, there is still a high prevalence of reported asthma symptoms in New Zealand (Pearce et al 1993; Robson et al 1993; Crane et al 1994; Lewis et al 1997). There is also some evidence that the prevalence of asthma may be increasing in New Zealand and other developed countries (Burr 1987; Burney et al 1990; Balfe et al 1996; Sears 1997).

The diagnosis of asthma can be difficult. Ideally it involves a combination of clinical history, physical examination and lung function tests performed over time (Sears 1997). Because of this, there is likely to be a proportion of people in the population who are unaware that they have asthma, meaning it is impossible to ascertain the true absolute prevalence of asthma in the community using only a questionnaire (Fishwick et al 1997). However, survey questions can be used to identify people who are likely to have, or are susceptible to, asthma. This information can be used to give an approximate estimate of the prevalence of asthma, permits comparisons of the prevalence of asthma between population groups, and allows the monitoring of trends over time.

The questions used in the 1996/97 Health Survey were taken from a standard international questionnaire used for identifying adults with asthma (Burney et al 1994). They were different from the questions used in the 1992/93 Health Survey (see Table 42), but had been used successfully in New Zealand previously (Crane et al 1994; Lewis et al 1997). The analysis in this section is restricted to adults aged between 15 and 44 years, who were divided into three 10-year age bands (15–24 years, 25–34 years and 35–44 years). This is because the diagnosis of asthma is most accurate in younger adults as some of the signs and symptoms of asthma (such as shortness of breath at night) can be caused by other diseases which become increasingly common in older people (for example, heart failure, chronic obstructive airways disease).

The operational definition of asthma used for this analysis is a positive response to any of the three asthma-related questions shown in Table 42. This is the same definition used in a study by the Wellington Asthma Research Group (WARG) (Lewis et al 1997). The WARG study, carried out between 1991 and 1993, examined the prevalence of asthma symptoms among over 25,000 New Zealand adults aged between 20 and 44 years. In this chapter, people who fulfil the operational definition of asthma are referred to as having *probable asthma.*

Unless otherwise stated, age- and sex-standardised rates, and 95% confidence intervals in parentheses, are given in the text. Tables at the end of this section show key standardised and unstandardised estimates. More detailed tables related to this section are available on the Ministry of Health website *(www.moh.govt.nz).*

Table 42: Questions on asthma asked in the 1992/93 Household Health Survey and 1996/97 New Zealand Health Survey

1992/93 Household Health Survey	• Have you ever been told by a doctor you have asthma? • (If yes) which of the following do you use? – A peak-flow meter to blow into that shows if your asthma is getting worse? – Medication or drugs taken only when you are having an asthma attack? – Medication or drugs taken every day to help prevent asthma attacks long-term?
1996/97 New Zealand Health Survey	• In the last 12 months, have you been woken by an attack of shortness of breath at any time? • In the last 12 months, have you had an attack of asthma? • Are you currently taking any medicine for asthma, including inhalers, aerosols or tablets?

Results

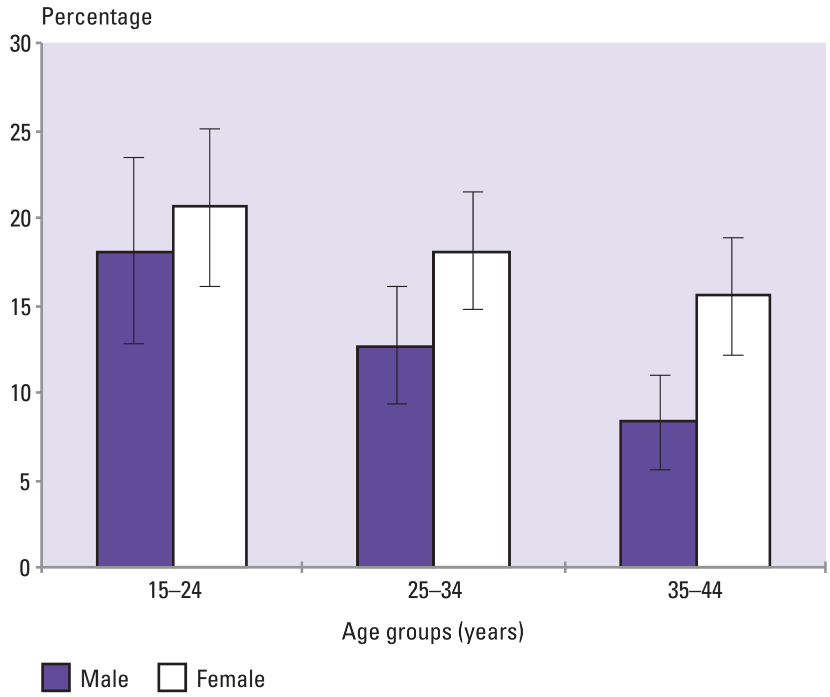
Prevalence of probable asthma

Asthma by age and sex

There were 687 people aged between 15 and 44 years who fulfilled the criteria for probable asthma in the 1996/97 Health Survey. This was equivalent to an estimated 15.5% (13.7–17.3) of the New Zealand population in this age group. More women (18.0%; 15.8–20.2) than men (12.9%; 10.5–15.3) had probable asthma ($p < 0.01$; see Figure 40). The rate of probable asthma decreased significantly with age for both men and women ($p < 0.01$). For example, men aged 15–24 years had more than double the rate of probable asthma compared with men in the 35–44-year-old age group (18.1%; 12.8–23.4 and 8.3%; 5.6–11.0 respectively). The comparable numbers for women were 20.6% (16.1–25.1) in the 15–24-year-old age group and 15.5% (12.2–18.8) in the 35–44-year-old age group.

These results were very similar to those from the WARG study (Lewis et al 1997), which found that 15.2% of New Zealanders aged between 20 and 44 years fulfilled the operational definition for asthma (13.2% of males and 17.0% of females). The reasons for higher prevalence rates of asthma among women are not well understood; however, possible explanations include environmental, genetic or hormonal factors (Crane et al 1994). In contrast, the 1992/93 Health Survey found that approximately equal proportions of males and females had been told by a doctor that they had asthma. This may be because children and older people were included in this analysis.

Figure 40: Probable asthma among those aged 15–44 years, by age and sex



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

In response to the specific questions on asthma, 9.1% (7.9–10.3) of 15–44-year-olds reported that they had been woken at night by shortness of breath (SOB), 9.8% (8.2–11.4) reported that they had had an attack of asthma in the last year, and 9.9% (8.5–11.3) reported that they were currently on medication for asthma. Women were significantly more likely to report an attack of asthma (11.3%; 9.5–13.1; $p < 0.05$) and to be on medication for asthma (12.4%; 10.4–14.4; $p < 0.0001$) than men (8.2%; 6.0–10.4 and 7.2%; 5.4–9.0 respectively). Increasing age was significantly associated with a reduced chance of having an attack of asthma and currently being on medication for asthma (both $p < 0.001$; see Table 43).

In this survey, people met the criteria for probable asthma if they answered any of the asthma questions positively. However, those most likely to have asthma are those who answered all three questions positively (Fishwick et al 1997). Of those who answered yes to any of the asthma questions, 41% (36.3–46.1) responded positively to only one question, 31% (26.3–36.1) to two questions and 28% (22.5–32.7) to all three questions. There were no significant age or sex differences in this pattern of response.

Table 43: Positive responses to specific asthma questions, by age and sex: percent (95% confidence intervals)

People with probable asthma						
Question	**Male** **%** **(95% CI)**	**Female** **%** **(95% CI)**	**15–24 years** **%** **(95% CI)**	**25–34 years** **%** **(95% CI)**	**35–44 years** **%** **(95% CI)**	**Total** **%** **(95% CI)**
Woken by attack of SOB	7.9 *(6.1–9.7)*	10.2 *(8.6–11.8)*	10.3 *(7.8–12.8)*	9.1 *(7.3–10.9)*	7.9 *(5.7–10.1)*	9.1 *(7.9–10.3)*
Asthma attack last 12 months	8.2 *(6.0–10.4)*	11.3 *(9.5–13.1)*	13.1 *(9.8–16.4)*	9.1 *(7.3–10.9)*	7.4 *(5.2–9.6)*	9.8 *(8.2–11.4)*
Current asthma medications	7.2 *(5.4–9.0)*	12.4 *(10.4–14.4)*	13.3 *(10.6–16.0)*	9.7 *(7.7–11.7)*	6.9 *(4.9–8.9)*	9.9 *(8.5–11.3)*
Answered 'yes' to 1 asthma question	44.2 *(35.6–52.8)*	39.1 *(33.0–45.2)*	35.0 *(26.2–43.8)*	46.4 *(38.4–54.4)*	43.6 *(33.0–54.2)*	41.2 *(36.3–46.1)*
Answered 'yes' to 2 asthma questions	30.3 *(20.9–39.7)*	31.8 *(25.9–37.7)*	39.4 *(30.4–48.4)*	25.6 *(19.5–31.7)*	26.2 *(16.4–36.0)*	31.2 *(26.3–36.1)*
Answered 'yes' to 3 asthma questions	25.5 *(17.1–33.9)*	29.1 *(23.2–35.0)*	25.7 *(16.9–34.5)*	28.0 *(20.0–36.0)*	30.2 *(17.7–42.7)*	27.6 *(22.5–32.7)*

Note: Age- and sex-adjusted rates are given. Unadjusted rates are very similar.

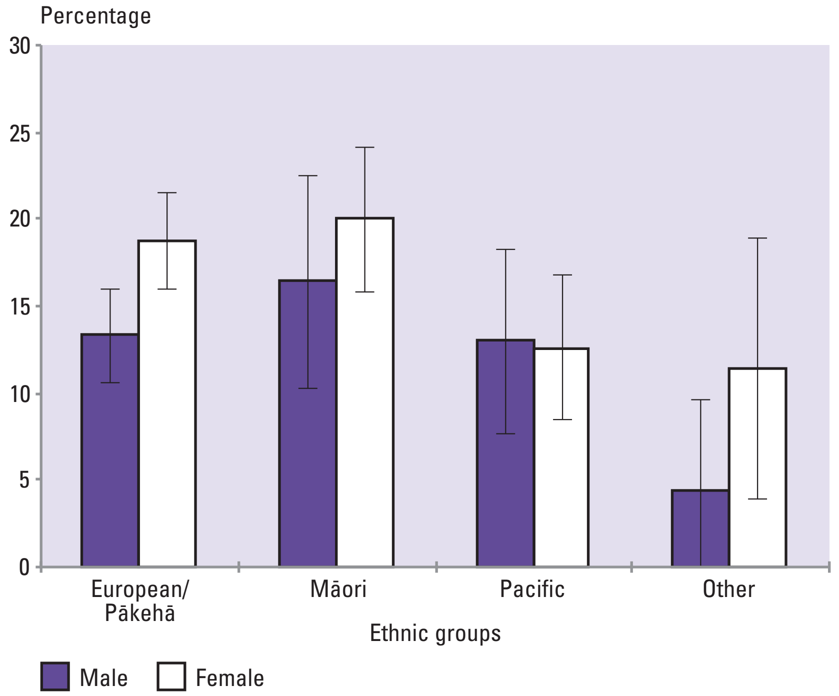
Asthma by ethnicity

In the 1996/97 Health Survey there were statistically significant differences in rates of probable asthma between ethnic groups among those aged 15–44 years ($p < 0.05$). The highest rates were among Māori and European/Pākehā women, one in five of whom had probable asthma (20.0%; 15.9–24.1 and 18.7%; 16.0–21.4 respectively), compared with 12.6% (8.5–16.7) of Pacific women. Around one in six Māori men (16.4%; 10.3–22.5) had probable asthma; with the proportions for European/ Pākehā and Pacific men being 13.3% (10.6–16.0) and 13.0 (7.7–18.3) respectively (see Figure 41).

There were no statistically significant differences across ethnic groups in terms of likelihood of having been woken at night with shortness of breath, or having had an attack of asthma. Pacific people were found to be significantly less likely to report being on medication for asthma (7.5%; 5.0–10.0, $p < 0.05$); with 10.8% (9.0–12.6) of European/Pākehā and 10.0% (7.6–12.4) of Māori

reporting being on asthma medication. There were no statistically significant differences across ethnic groups in terms of whether people who were defined as probable asthmatics responded positively to one, two or all three of the asthma-related questions (see Table 44).

Figure 41: Probable asthma among those aged 15–44 years, by ethnicity and sex (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Table 44: Positive responses to specific asthma questions, by ethnicity: percent (95% confidence intervals)

	People with probable asthma			
Question	**European/Pākehā % (95% CI)**	**Māori % (95% CI)**	**Pacific % (95% CI)**	**Total % (95% CI)**
Woken by attack of SOB	9.0 *(7.4–10.6)*	11.9 *(9.4–14.4)*	7.7 *(5.2–10.2)*	9.1 *(7.7–10.5)*
Asthma attack last 12 months	10.3 *(8.5–12.1)*	9.2 *(6.1–12.3)*	8.3 *(5.6–11.0)*	9.9 *(8.3–11.5)*
Current asthma medications	10.8 *(9.0–12.6)*	10.0 *(7.6–12.4)*	7.5 *(5.0–10.0)*	10.2 *(8.8–11.6)*
Answered 'yes' to 1 asthma question	39.8 *(33.3–46.3)*	52.0 *(40.2–63.8)*	39.4 *(26.3–52.5)*	41.0 *(35.9–46.1)*
Answered 'yes' to 2 asthma questions	31.6 *(25.7–37.5)*	24.1 *(15.9–32.3)*	36.2 *(22.9–49.5)*	31.1 *(26.0–36.2)*
Answered 'yes' to 3 asthma questions	28.5 *(22.0–35.0)*	23.9 *(15.5–32.3)*	24.4 *(12.8–36.0)*	27.9 *(22.6–33.2)*

Note: Age- and sex-adjusted rates are given. Unadjusted rates are very similar.

The results for Pacific people contrast with data from other sources, where Māori and Pacific people have traditionally had higher rates of asthma mortality and hospitalisations than other ethnic groups in New Zealand (Wickens et al 1998; Mitchell 1991). In addition, surveys which have looked at the prevalence of asthma symptoms across ethnic groups have found that Māori and Pacific adults tend to have more asthma symptoms than European/Pākehā adults. For example, the WARG study found that Māori (22.1%) and Pacific people (20.6%) were more likely to meet the operational definition for asthma than people from other ethnic groups (14.3%). In their study, further analysis showed that Māori and Pacific people were no more likely to report having had an attack of asthma in the previous year or to be on asthma medication than people from other ethnic groups, but they were more likely to report symptoms consistent with asthma, such as shortness of breath and wheezing (Crane et al 1994). The 1992/93 Health Survey found that more Māori (16%) reported that they had been told by a doctor that they had asthma than European/Pākehā people (13%).

Interestingly, other studies have shown that the prevalence of asthma among Māori children is similar to that of non-Māori children (Pomare et al 1992), but their asthma seems more serious, both with more complications and a more prolonged course. This means that the prevalence of asthma does not decline with age for Māori as with other ethnic groups. It is likely that this difference is due both to differences in exposure to risk factors for asthma (such as tobacco smoke, viral respiratory infections and other allergens) as well as to poorer access to health services and preventive medications (Garrett et al 1989; Pomare et al 1992).

*Asthma by family income, education and NZDep96 score**

There was a significant difference in the rate of probable asthma between the highest and lowest family income groups (p=0.01). There were no significant differences in rates of probable asthma across education or NZDep96 quartile groups. Previous studies of children in New Zealand have shown no socioeconomic gradient in the prevalence of asthma (Mitchell et al 1989; Sears et al 1996). However, a recent study carried out using the data from the WARG study showed increasing asthma prevalence rates among adults in the most deprived areas of New Zealand, which was not explained by differences in age, sex or ethnic distribution (Salmond et al 1998). Studies from other countries have also shown higher rates of asthma symptoms or asthma-related hospital admissions among adults in lower socioeconomic groups (Littlejohns and Macdonald 1993; Eachus et al 1996; Watson et al 1996).

People with asthma who smoke

It is of concern that around a third (32.3%; 26.6–38.0) of people aged between 15 and 44 years with probable asthma smoke. This is equivalent to nearly 86,000 people in New Zealand.

Asthma by self-rated health status

Less than half (41.8%; 36.3–47.3) of the probable asthmatics in the 15–44 years age group considered their health to be excellent or very good, compared with more than two-thirds (67.1%; 64.9–69.3) of others. One in five (19.8%; 15.3–24.3) probable asthmatics reported that their health was fair or poor, compared with around 1 in 13 (7.5%; 6.1–8.9) others (see Table 45).

* The NZDep96 score measures the level of deprivation in the area in which a person lives, according to a number of census variables, such as the proportion of people in that area who earn low incomes or who receive income support benefits, are unemployed, do not own their own home, have no access to a car, are single-parent families, or have no qualifications. The scores are divided into quartiles from 1 (least deprived) to 4 (most deprived). For more details, see Chapter 1: The Survey.

Table 45: Self-rated health status, by asthma status, for those aged 15–44 years: percent (95% confidence intervals)

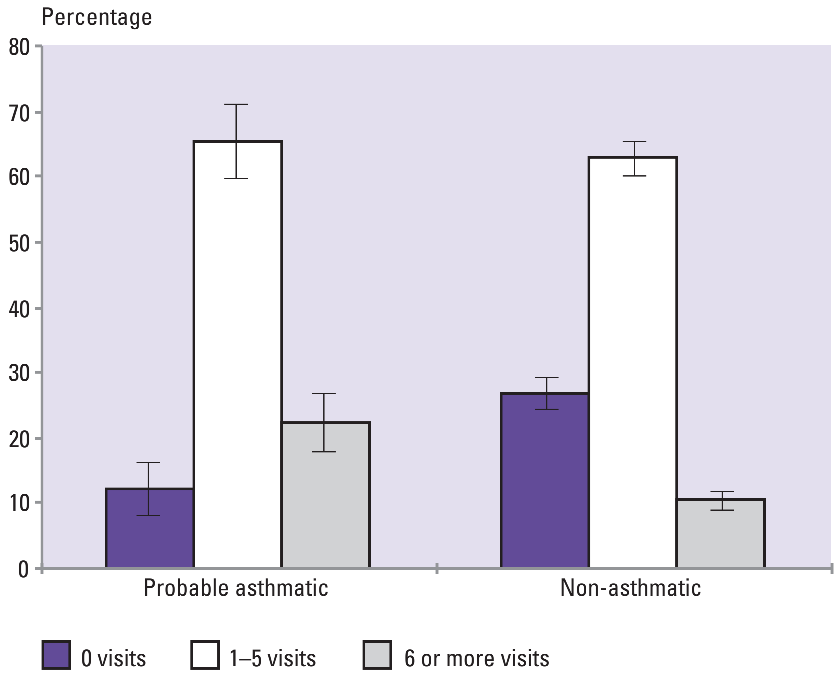
	Excellent/very good % (95% CI)		Good % (95% CI)		Fair/poor % (95% CI)	
	Unadj	Adj*	Unadj	Adj*	Unadj	Adj*
Probable asthmatic	42.4 *(36.9–47.9)*	41.8 *(36.3–47.3)*	37.5 *(32.0–43.0)*	38.4 *(32.3–44.5)*	20.0 *(15.5–24.5)*	19.8 *(15.3–24.3)*
Non -asthmatic	67.1 *(64.9–69.3)*	67.1 *(64.9–69.3)*	25.4 *(23.2–27.6)*	25.5 *(23.3–27.7)*	7.5 *(6.1–8.9)*	7.5 *(6.1–8.9)*

* Adjusted rates are adjusted for age and sex.
Note: For further explanation of Tables, see Appendix 2: Notes to Figures and Tables.

Asthma by health service utilisation

People aged 15–44 years with probable asthma were more than twice as likely to have seen their GP six or more times in the last year than people without (22.3%; 18.0–26.6 and 10.5%; 9.1–11.9 respectively). Only 12.2% (8.3–16.1) of people with probable asthma had not seen their GP in the last 12 months compared with 26.7% (24.3–29.1) of people in this 15–44-year-old age group without asthma (see Figure 42). It is not clear to what extent the high rate of GP consultations amongst those with asthma reflects monitoring and obtaining repeat prescriptions, or asthma-related morbidity itself. People with probable asthma were also more likely to have been admitted to hospital in the last year (18.5%; 12.8–24.2) than those without asthma (12.2%; 10.6–13.8).

Figure 42: Number of GP visits in last year among 15–44-year-olds, with and without asthma (age- and sex-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Table 46: Probable asthma among those aged 15–44 years, by sociodemographic variables: percent (95% confidence intervals)

	Probable asthma		
	% (95% CI)		Pop est
	Unadj	Adj*	
Total	15.5 *(13.7–17.3)*		256,408
Sex			
Male	12.9 *(10.5–15.3)*	12.9 *(10.5–15.3)*	105,086
Female	18.0 *(15.8–20.2)*	18.0 *(15.8–20.2)*	151,332
Age			
15–24 years	19.4 *(15.7–23.1)*	19.4 *(15.7–23.1)*	100,970
25–34 years	15.4 *(13.0–17.8)*	15.4 *(13.0–17.8)*	88,545
35–44 years	12.0 *(9.6–14.4)*	12.0 *(9.6–14.4)*	66,892
Ethnicity			
European/Pākehā	15.9 *(13.7–18.1)*	16.1 *(13.9–18.3)*	194,099
Māori	18.6 *(14.9–22.3)*	18.2 *(14.7–21.7)*	38,850
Pacific	12.6 *(9.3–15.9)*	12.8 *(9.5–16.1)*	12,975
Other	8.6 *(3.3–13.9)*	8.0 *(3.3–12.7)*	10,483
Family income			
0–$20,000	21.8 *(17.9–25.7)*	21.7 *(17.4–26.0)*	40,501
$20,001–$30,000	15.8 *(11.9–19.7)*	16.2 *(11.9–20.5)*	28,418
$30,001–$50,000	15.8 *(12.7–18.9)*	16.3 *(13.0–19.6)*	54,897
$50,001+	13.5 *(9.8–17.2)*	14.2 *(10.1–18.3)*	76,731
NZDep96 score			
1 (least deprived)	16.5 *(11.4–21.6)*	16.1 *(11.4–20.8)*	74,020
2	13.3 *(10.6–16.0)*	13.7 *(10.8–16.6)*	52,684
3	15.9 *(13.0–18.8)*	15.6 *(12.7–18.5)*	60,977
4 (most deprived)	16.1 *(13.7–18.5)*	15.8 *(13.6–18.0)*	68,727
Smoking status			
Current smoker	17.5 *(14.6–20.4)*	17.9 *(15.0–20.8)*	85,734
Ex-smoker	15.1 *(10.6–19.6)*	13.9 *(9.6–18.2)*	42,588
Never smoked	14.5 *(12.1–16.9)*	14.2 *(12.0–16.4)*	127,531
Education			
No qualification	17.2 *(13.9–20.5)*	16.8 *(13.7–19.9)*	64,157
School or post-school only	15.6 *(13.1–18.1)*	15.3 *(12.8–17.8)*	99,312
School and post-school	14.4 *(11.7–17.1)*	14.9 *(12.0–17.8)*	91,593

* Adjusted rates are adjusted for age and sex, except when they are age-specific, in which case they are adjusted only for sex, or when they are sex-specific, in which case they are adjusted only for age.
Note: For further explanation of Tables, see Appendix 2: Notes to Figures and Tables.

Table 47: Probable asthma among males aged 15–44 years, by age and ethnicity: percent (95% confidence intervals)

Males	Probable asthma % (95% CI) Unadj	Probable asthma % (95% CI) Adj*	Pop est
Total	12.9 *(10.5–15.3)*	12.9 *(10.5–15.3)*	105,086
Age			
15–24 years	18.1 *(12.8–23.4)*		47,154
25–34 years	12.7 *(9.4–16.0)*		35,079
35–44 years	8.3 *(5.6–11.0)*		22,853
Ethnicity			
European/Pākehā	13.1 *(10.4–15.8)*	13.3 *(10.6–16.0)*	79,121
Māori	16.7 *(10.0–23.4)*	16.4 *(10.3–22.5)*	16,062
Pacific	12.8 *(7.3–18.3)*	13.0 *(7.7–18.3)*	6559
Other	5.4 *(0.0–12.3)*	4.4 *(0.0–9.7)*	3343

* Adjusted rates are adjusted for age.
Note: For further explanation of Tables, see Appendix 2: Notes to Figures and Tables.

Table 48: Probable asthma among females aged 15–44 years, by age and ethnicity: percent (95% confidence intervals)

Females	Probable asthma % (95% CI) Unadj	Probable asthma % (95% CI) Adj*	Pop est
Total	18.0 *(15.8–20.2)*	18.0 *(15.8–20.2)*	151,322
Age			
15–24 years	20.6 *(16.1–25.1)*		53,816
25–34 years	18.1 *(14.8–21.4)*		53,466
35–44 years	15.5 *(12.2–18.8)*		44,040
Ethnicity			
European/Pākehā	18.6 *(15.9–21.3)*	18.7 *(16.0–21.4)*	114,978
Māori	20.2 *(16.1–24.31)*	20.0 *(15.9–24.1)*	22,788
Pacific	12.3 *(8.4–16.2)*	12.6 *(8.5–16.7)*	6416
Other	11.9 *(3.9–19.9)*	11.4 *(4.0–18.8)*	7140

* Adjusted rates are adjusted for age.
Note: For further explanation of Tables, see Appendix 2: Notes to Figures and Tables.

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Chapter 9: Injuries

Key points

- Injuries requiring medical attention are common, and place a substantial burden on the community.
- A quarter of all adults and children in the 1996/97 Health Survey reported suffering an injury or poisoning requiring medical attention in the previous year.
- Injuries and poisonings were more common among men, especially those aged 15–24 years.
- European/Pākehā and Māori people reported higher injury rates than Pacific people and people from the Other ethnic group.
- People with higher family incomes and higher educational qualifications reported more injuries and poisonings requiring medical attention.
- Injuries were most commonly caused by sports or games, followed by falls.
- People aged under 65 years, particularly men, were more likely to report injuries or poisoning occurring at work; while women and those 65 years or over were more likely to report injuries occurring at home.
- GPs were the most common health professional to provide medical treatment after an injury or poisoning, followed by accident and emergency staff and physiotherapists.

Introduction

According to the most recent mortality data, 1735 people died as the result of intentional (suicide and homicide) and unintentional injury or poisoning in 1996 (NZHIS 1998). During 1997 there were more than 66,000 injury- or poisoning-related admissions to New Zealand public hospitals (provisional data, NZHIS 1998). Furthermore, many more people who are not admitted to hospital suffer an injury of sufficient severity to seek medical attention every year. For example, it has been estimated that around 1 in 12 GP consultations are for injury-related conditions (McAvoy et al 1994). Injuries, therefore, place a substantial burden on the community, yet there is relatively little information available on injuries dealt with outside the hospital system. Such information is important because the characteristics of injuries of different severities are likely to be different. For example, while motor vehicle crashes and suicide account for the majority of injury deaths, falls are the leading cause of injury hospitalisations (NZHIS 1998).

In the 1996/97 Health Survey, questions were introduced to explore this issue. The questions are shown in Table 49. The caregivers of a random selection of children under the age of 15 years were asked similar questions relating to their child. The children's results are also included in this section.

The numbers given in this section refer to the number of people injured in the year prior to interview, rather than the number of injuries sustained in that time. Unless otherwise stated, age- and sex-standardised rates, and 95% confidence intervals in parentheses, are given in the text. Tables at the end of this section show key standardised and unstandardised estimates. More detailed tables related to this section are available on the Ministry of Health website *(www.moh.govt.nz).*

Table 49: Questions on injuries and poisoning asked in the 1996/97 Health Survey

1996/97 Health Survey	• In the last 12 months, have you had an injury for which you received medical treatment? • Did any of the injuries that you received medical treatment for: *(select all that apply)* – involve a car, bus, motorbike, pushbike, boat or other form of transport? – involve you getting burnt or scalded? – happen because you fell? – happen because someone meant to hurt you at the time? – happen while you were taking part in a sport or game? • In the last 12 months, have you consumed or been exposed to poison for which you received medical treatment? • Did any of the injuries or poisonings happen at work? At home? *(select all that apply)* • Who did you get medical treatment from for the injuries or poisonings? *(select all that apply)* – accident and emergency staff – GP or family doctor – nurse (not at a hospital) – physiotherapist – pharmacist/chemist – St John's ambulance / first aid • Were you admitted to hospital for any of the injuries or poisonings?

Results

Injuries and poisonings: adults

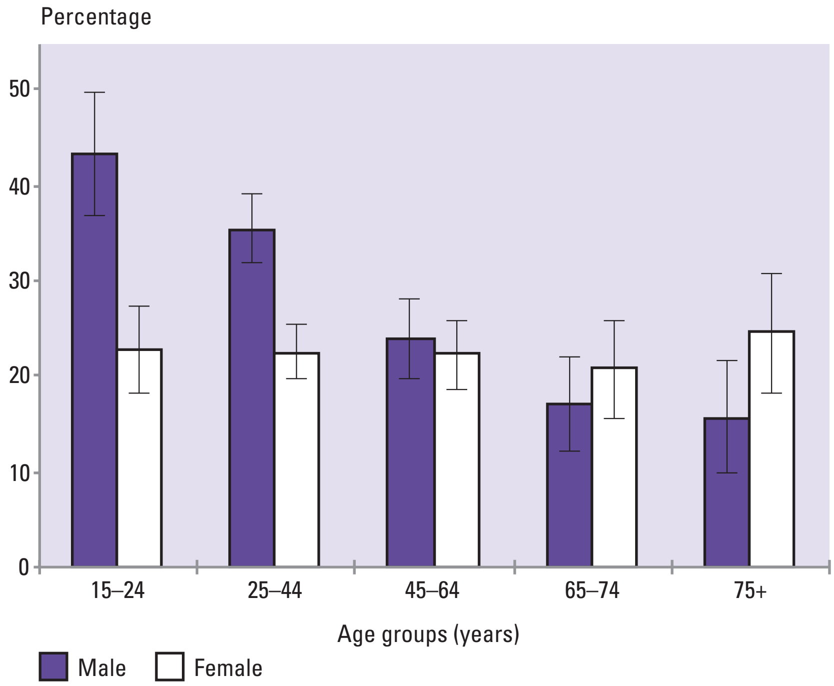
Incidence of injuries

Injuries and poisonings, by age and sex

More than a quarter (26.8%; 25.4–28.2) of all adults in the 1996/97 Health Survey reported that they had suffered an injury or poisoning for which they required medical treatment in the previous year. Overall, significantly more men than women reported being injured or poisoned in that time ($p < 0.0001$). Nearly a third (31.2%; 29.0–33.4) of the men in the sample reported an injury or poisoning, compared with just over one in five women (22.4%; 20.6–24.2).

There was a clear relationship between experiencing an injury or poisoning and age ($p < 0.0001$). For women, the rates of injury remained reasonably constant over different age groups, while for men the injury rate dropped consistently with increasing age. Young men experienced high rates of injury, with nearly double the proportion of men aged 15–24 years having an injury or poisoning compared with women of the same age (43.4%; 36.9–49.9 and 22.8%; 18.3–27.3 respectively). By age 45–64 years men and women reported similar rates of injury (24.0%; 19.9–28.1 and 22.2%; 18.7–25.7 respectively), while for those aged over 65 years, women had higher rates of injury (see Figure 43).

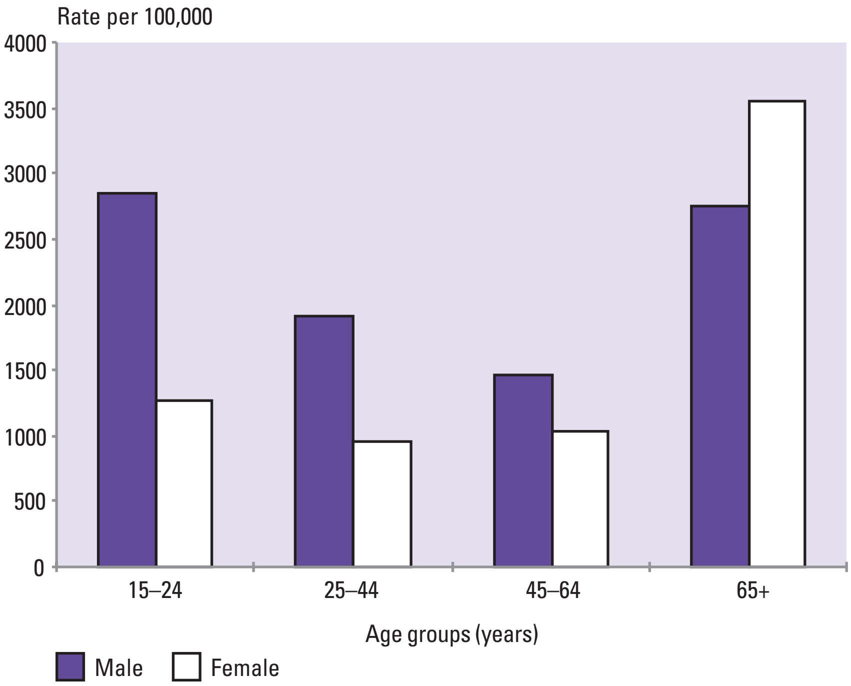
Figure 43: Proportion of adults reporting an injury or poisoning requiring medical treatment in the previous 12 months, by age and sex



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

The results from the 1996/97 Health Survey are consistent with provisional injury hospitalisation data for 1997 (NZHIS 1998). Between the ages of 15 and 64 years, admission rates for injury for men drop progressively with increasing age. The rates for women are lower than those for men and remain relatively stable across this age band, although women aged over 65 years had higher admission rates for injury. However, while data from the 1996/97 Health Survey suggest that those over 65 years have fewer injuries requiring medical attention, the hospital admission data show a sharp increase in admissions for injuries in this age group (see Figure 44). This suggests that the outcome of injuries is more severe for the older age group, and probably reflects the high admission rate for, in particular, hip fractures relating to falls among those aged over 65 years (Norton et al 1995).

Figure 44: Injury and poisoning hospitalisation rates, by age and sex, 1997



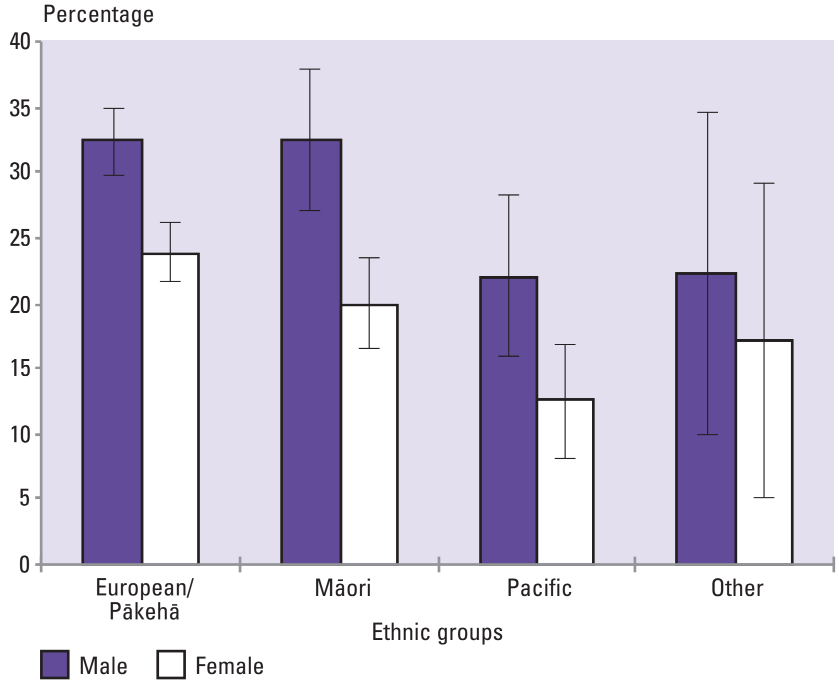
Source: NZHIS 1998
Note: Data are provisional.

Injuries and poisonings, by ethnicity

The proportion of adults reporting that they had been injured or poisoned in the previous year was significantly associated with ethnicity ($p < 0.0001$). European/Pākehā and Māori people reported the highest injury rates. This was true for both sexes, although in all ethnic groups women reported fewer injuries than men from the same ethnic group (see Figure 45).

These results are consistent with the 1997 hospitalisation data (NZHIS 1998). In 1997 Māori and non-Māori had similar rates of hospitalisation for injury (1753 and 1708 per 100,000 respectively), while Pacific people were hospitalised less frequently for injuries (1353 per 100,000). It is not clear why such a difference exists.

Figure 45: Proportion of adults reporting an injury or poisoning requiring medical treatment in the previous 12 months, by ethnicity and sex (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

*Injuries and poisonings, by family income, education and NZDep96 score**

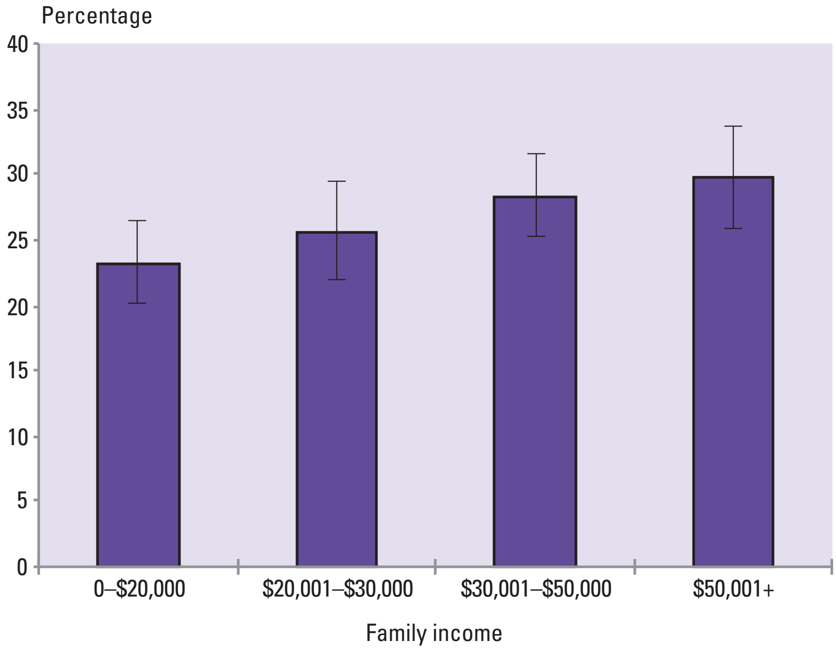
There was an association between the likelihood of having been injured or poisoned and both family income ($p < 0.05$) and level of education ($p < 0.05$). People with higher levels of family income tended to report more injuries and poisonings for which they had received medical attention (see Figure 46). People with no qualifications reported fewer injuries than people with school and/or post-school qualifications (see Figure 47). On the other hand, there was no significant relationship between reported injuries and poisonings and NZDep96 scores.

Findings from other studies suggest that the relationship of socioeconomic status with injuries is not simple and seems to be related to the severity of injuries examined. People from lower socioeconomic groups are more likely to die as a result of injury compared with people in higher socioeconomic groups (Avery et al 1990; Carey et al 1993). However, findings are not consistent when total incidence of injury (Williams et al 1997) or injury morbidity (Anderson et al 1994) are measured. In these cases, often no relationship between socioeconomic status and injury is found.

It has been suggested that the extent and type of injury may vary across socioeconomic groups while the absolute incidence of injury may not (Williams et al 1997). Furthermore, when the outcome of interest is injury requiring medical treatment, the results will be affected by factors which determine whether an individual seeks medical attention, other than injury severity. One of these factors is socioeconomic status, which is negatively associated with health service utilisation (Scott et al 1996). Therefore, people from higher socioeconomic groups may be more likely to seek medical attention for minor injuries than those in lower socioeconomic groups.

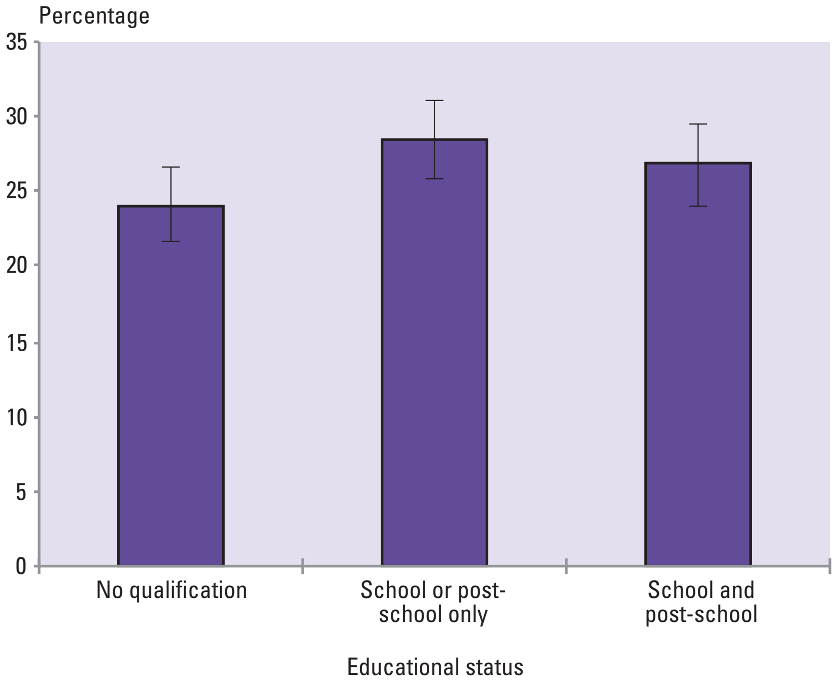
* The NZDep96 score measures the level of deprivation in the area in which a person lives, according to a number of census variables, such as the proportion of people in that area who earn low incomes or who receive income support benefits, are unemployed, do not own their own home, have no access to a car, are single-parent families, or have no qualifications. The scores are divided into quartiles from 1 (least deprived) to 4 (most deprived). For more details, see Chapter 1: The Survey.

Figure 46: Proportion of adults reporting an injury or poisoning requiring medical treatment in the previous 12 months, by family income (age- and sex-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Figure 47: Proportion of adults reporting an injury or poisoning requiring medical treatment in the previous 12 months, by education (age- and sex-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Injuries and poisonings, by alcohol use

There was a significant association between those who reported an injury or poisoning and those who drank any alcohol in the last year ($p < 0.0001$). One in five (19.7%; 17.8–22.6) of those who did not drink alcohol reported an injury or poisoning compared with slightly more than one in four (27.4%; 25.6–29.2) of those who drank any alcohol. The difference between those who drank moderately (AUDIT score of less than eight) and those who drank potentially hazardously (AUDIT score of eight or more) was not statistically significant.

This relationship between an increased risk of injuries or poisonings and alcohol was particularly evident for males. While a fifth of males who did not drink reported an injury or poisoning (20.6%; 15.9–25.3), nearly a third of those who drank either moderately (32.2%; 29.3–35.1) or potentially hazardously (32.9%; 28.2–37.6) reported such an incident. The relationship between alcohol and injuries or poisonings was not significant for females.

For more detail on the AUDIT score, see Chapter 5: Alcohol Use.

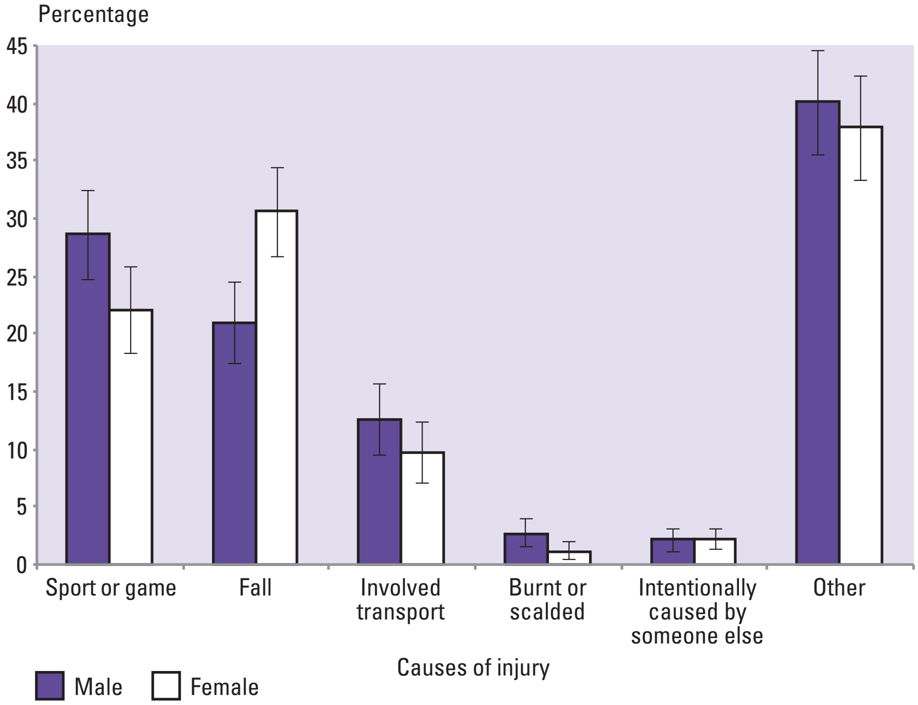
Causes of injuries

People who reported any injury requiring medical attention were asked whether their injury:

- happened while taking part in a sport or game
- happened because of a fall
- involved some form of transport including a car, bus, motorbike, pushbike or boat
- involved getting burnt or scalded
- happened because someone meant to hurt you (see Figure 48).

Participants were invited to select more than one option if appropriate.

Figure 48: Proportion of people reporting specific causes of injury, by sex (age-standardised)



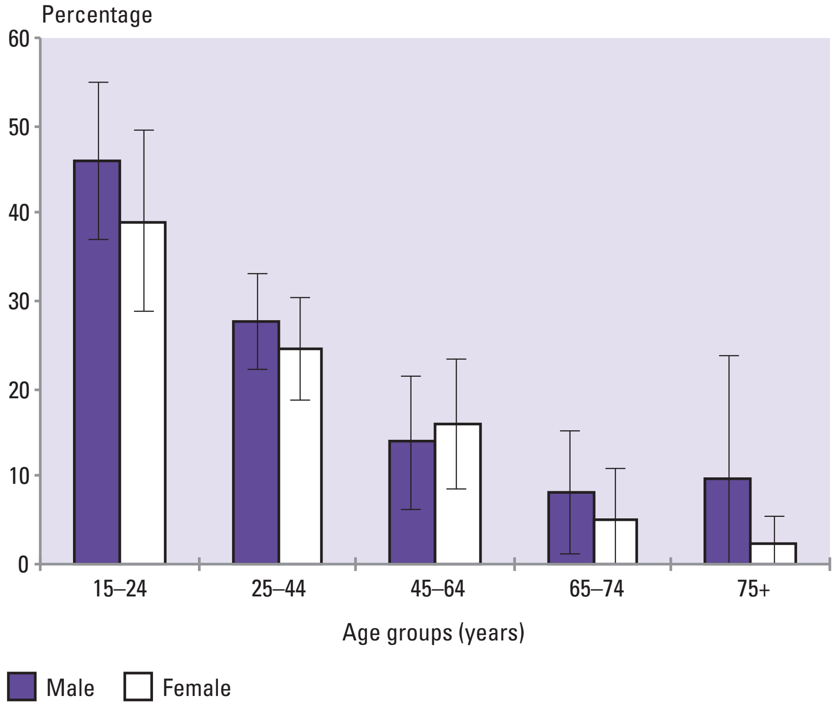
Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Injuries caused by a sport or game

It is relatively difficult to know the extent of the problem of injuries relating to sports and games; however, one analysis in New Zealand suggests that there are around seven fatalities, 4500 hospitalisations and 92,500 accident and emergency attendances every year in New Zealand as a result of such injuries (Hume and Marshall 1994). In the 1996/97 Health Survey, injuries relating to sports or games were identified as a major problem. Of the listed specific causes of an injury, playing a sport or game caused the highest proportion of injuries (25.8%; 23.1–28.5). Men who had been injured were more likely to report sport as the cause than women (28.6%; 24.7–32.5 and 22.1%; 18.4–25.8 respectively; $p < 0.01$). Younger people were also more likely to report being injured because of sport than older people ($p < 0.0001$). For example, 43.9% (37.0–50.8) of those aged 15–24 years reported that they had been injured through sport, compared with 15.0% (9.9–20.1) of those aged 45–64 years (see Figure 49).

There was no relationship between sporting injuries and family income or with NZDep96 scores, but people without educational qualifications were significantly less likely than those with school and/or post-school qualifications to report that an injury was due to sport (19.7%; 14.8–24.6 and 26.5%; 22.2– 31.2 respectively; $p < 0.05$).

Figure 49: Proportion of those injured who reported sports or games as a cause, by age and sex



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

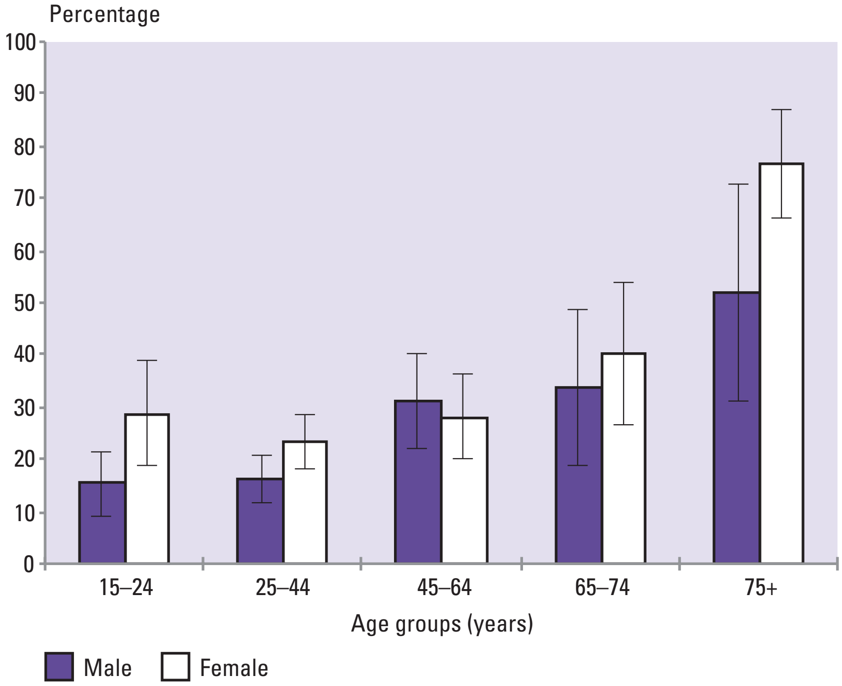
Injuries caused by falls

Falls are the leading cause of injury hospitalisations and the second most common cause of injury death after motor vehicle crashes (Ministry of Health 1998). A quarter (25.2%; 22.5–27.9) of the participants in the 1996/97 Health Survey who reported injuries said they had been injured because of a fall. A higher proportion of injuries among women (30.6%; 26.7–34.5) were caused by a fall

compared with men (20.9%; 17.4–24.4; $p = 0.0001$). Falls were also more commonly reported as a cause of injury among older people ($p < 0.0001$). Around two-thirds of the injuries requiring medical attention among those aged 75 years or over were caused by falls (68.7%; 57.7–79.7) compared with around one in five for those aged 15–24 years (20.2%; 14.7–25.7; see Figure 50).

There was no clear relationship between the likelihood of reporting falls as the cause of an injury, and family income, level of education or NZDep96 scores.

Figure 50: Proportion of those injured who reported falls as a cause, by age and sex



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Injuries involving transport

Motor vehicle crashes are the leading cause of injury deaths in New Zealand (Ministry of Health 1998). In the 1996/97 Health Survey, around one in nine (11.3%; 9.1–13.5) people who reported injuries requiring medical attention said their injury involved transport. A slightly higher proportion of men with injuries (12.6%; 9.5–15.7) compared with women (9.7%; 7.0–12.4) said their injuries involved transport ($p < 0.05$).

Other causes of injuries

Only small proportions of those injured reported that their injuries were due to either being burnt or scalded (2.1%; 1.3–2.9), or that their injuries were intentionally caused by someone else (2.1%; 1.3–2.9). However, under-reporting of these injuries is very plausible.

Around two in five people (39.1%; 36.0–42.2) reported that their injuries involved causes other than those listed.

Poisonings

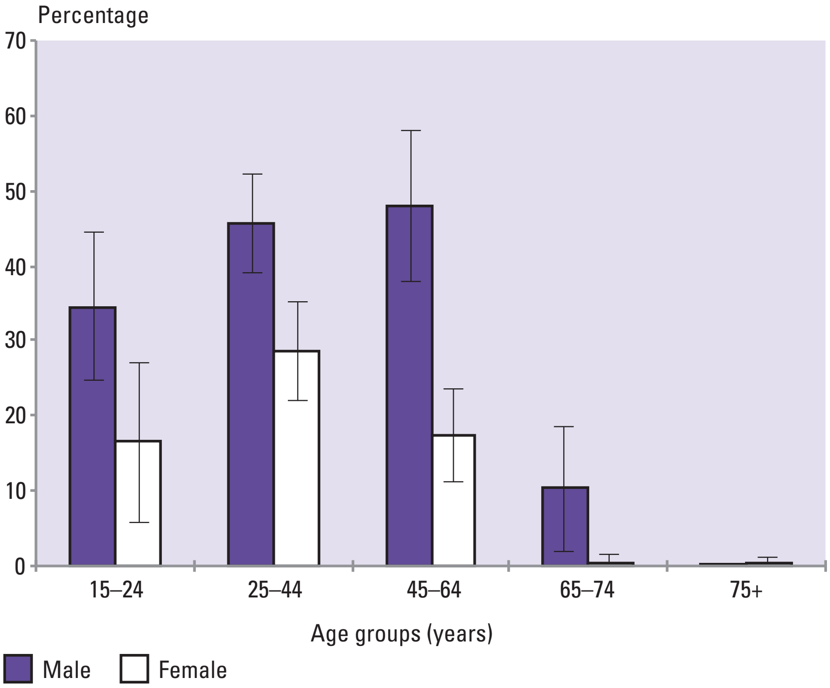
Respondents were asked separately whether they had consumed or been exposed to poison for which they had received medical attention. A total of 1.4% (1.0–1.8) of the sample aged 15 years or over reported that they had been poisoned. Significantly more men (2.3%; 1.3–3.3) than women (0.6%; 0.4–0.8) reported that they had been poisoned ($p < 0.001$).

Where injuries or poisonings occurred

Participants who reported that they had been injured or poisoned were asked if any of the events in question took place at home or at work. People who had been injured more than once could select both options.

Of those who reported an injury or poisoning, 31.2% (28.1–34.3) said the incident had occurred at work. Men (40.3%; 36.0–44.6) were more likely to report that their injury or poisoning had occurred at work than women (19.3%; 15.6–23.0; $p < 0.0001$). The higher rates of injury and poisoning at work for men compared with women will be related to both higher participation in employment amongst men and the different occupational structures of men and women in the workforce. There was also a strong relationship between age and injury or poisoning at work. Not surprisingly, those over 65 years were significantly less likely to report injuries and poisonings at work than those aged between 15 and 64 years ($p < 0.0001$; see Figure 51).

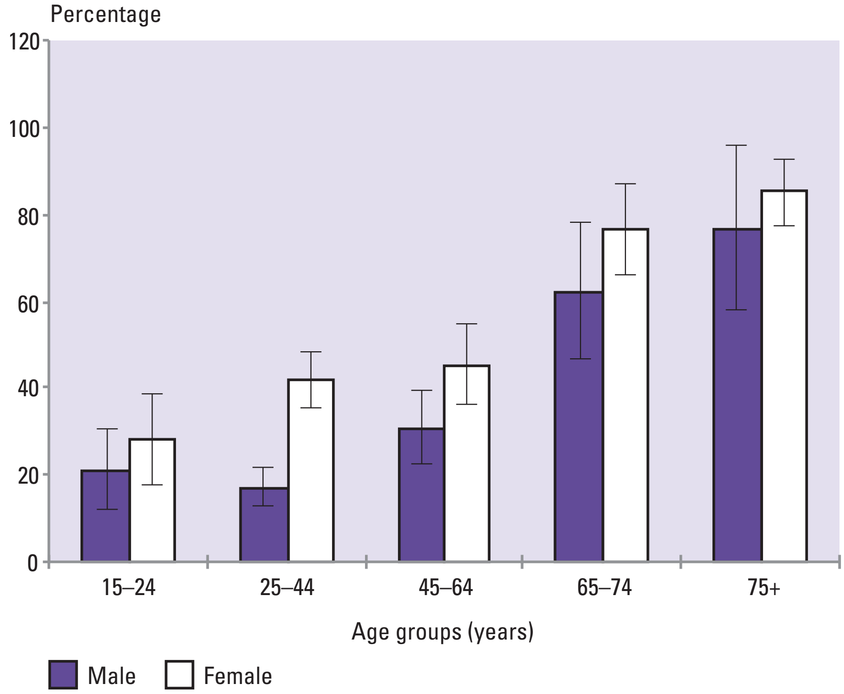
Figure 51: Proportion of those injured reporting injuries or poisonings occurring at work, by age and sex



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Around a third (34.0%; 31.1–36.9) of those who reported an injury or poisoning said that it occurred at home. Women (45.8%; 41.5–50.1) were more likely to report that an injury or poisoning had occurred at home than men (24.9%; 21.0–28.8; $p < 0.0001$). Again, there was a strong relationship with age, with increasing proportions of people in older age groups reporting that their injury or poisoning occurred at home ($p < 0.0001$; see Figure 52).

Figure 52: Proportion of those injured reporting injuries or poisonings occurring at home, by age and sex

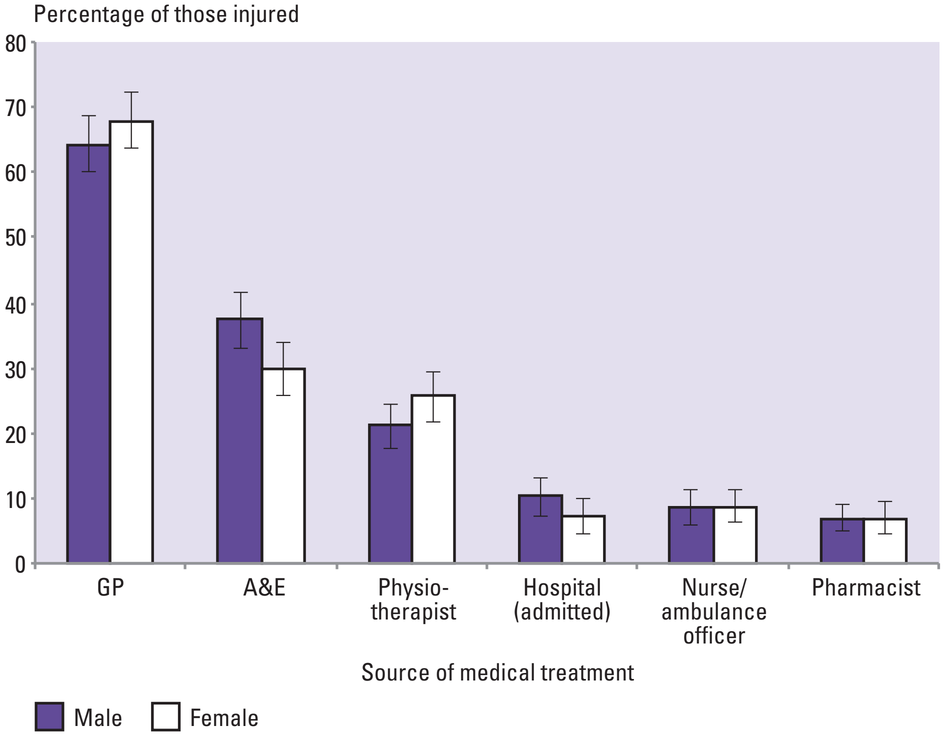


Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Source of medical treatment for an injury or poisoning

Participants who reported injuries or poisonings were asked who provided them with medical treatment for those injuries or poisonings (see Figure 53). A list was provided which included accident and emergency staff, GP or family doctor, nurse, physiotherapist, pharmacist or chemist and St John's ambulance or first aid officer. People were also asked if they had been admitted to hospital because of their injury or poisoning. Again, people who had suffered injuries and poisonings were able to select all that applied.

Figure 53: Source of medical treatment* for an injury or poisoning, by sex (age-standardised)



* Respondents may have had more than one source of treatment.
Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

The most common contact for medical treatment after an injury or poisoning was a GP. Nearly two-thirds (65.9%; 62.8–69.0) of those who reported an injury or poisoning requiring medical attention said they sought help from a GP. Around a third (34.1%; 31.0–37.2) of participants reporting an injury or poisoning said they received medical treatment from accident and emergency staff, while a quarter (23.0%; 20.3–25.7) reported receiving treatment from a physiotherapist. Smaller proportions received treatment from a pharmacist or chemist (7.0%; 5.4–8.6), an ambulance or first aid officer (4.3%; 2.9–5.7) or a nurse (4.5%; 2.7–6.3). Overall, 9.0% (7.0–11.0) of people who reported an injury or poisoning said they had been admitted to hospital as a result.

Injuries and poisonings: children

Injury is the leading cause of death and second leading cause of hospitalisation among New Zealand children after the first year of life (Coggan et al 1997). It has also been estimated that around one in three families with pre-school children has experienced at least one incident of childhood poisoning (Francis 1994). Therefore, in the 1996/97 Health Survey, the caregivers of a random selection of children under the age of 15 years were asked questions on injuries and poisonings relating to their child.

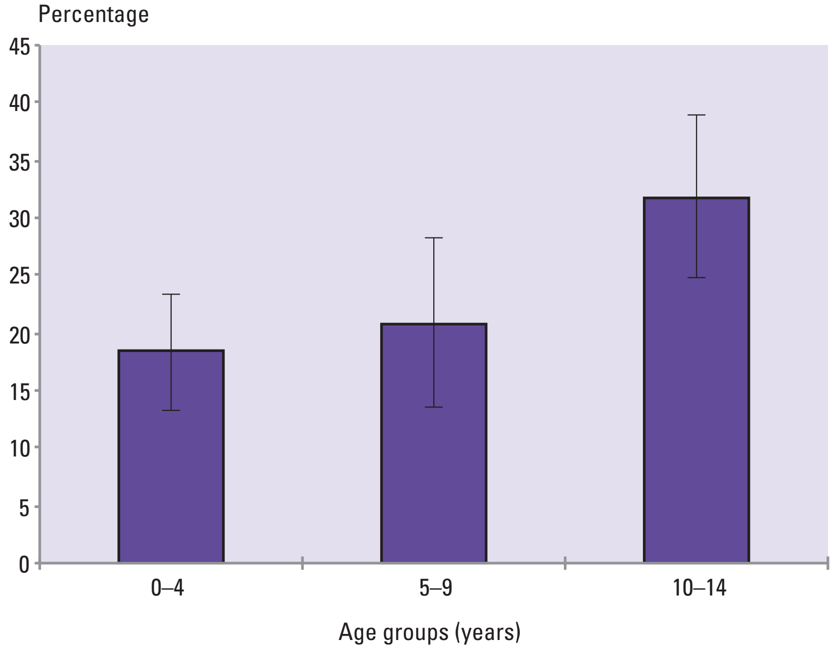
Injuries and poisonings among children

According to their caregivers, nearly a quarter (23.6%; 19.7–27.5) of children aged under 15 years had suffered an injury or poisoning requiring medical attention in the 12 months prior to interview. The prevalence of injuries and poisonings was similar for boys (25.0%; 20.1–29.9) and girls (22.1%; 16.6–27.6); however, rates increased significantly with increasing age ($p < 0.01$). Fewer than one in five (18.4%; 13.3–23.5) children aged under five years had an injury or poisoning compared with nearly a third (31.8%; 24.7–38.9) of those aged 10–14 years (see Figure 54).

There were similar rates of injuries and poisonings among European/Pākehā and Māori children (25.0%; 20.3–29.7 and 27.0%; 17.8–36.2 respectively). The rates for Pacific children and children from the Other ethnic group were lower (16.4%; 7.4–25.4 and 4.9%; 0.0–10.2 respectively), although the numbers involved were small and therefore the confidence intervals are particularly wide for these groups.

There was no relationship between the rate of childhood injuries or poisonings and the family's income or the NZDep96 quartile.

Figure 54: Proportion of children reporting an injury or poisoning requiring medical treatment in the previous 12 months, by age



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Types and sources of treatment of injuries among children

As with adults, the main causes of injuries among children were falls and injuries received during sports or games. A third (33.2%; 25.9–40.5) of children with an injury had received it because of a fall, and a third (31.2%; 22.2–40.2) had received an injury during sports or games. Much smaller proportions reported an injury involving transport, being burnt or scalded, or as the result of an assault. Only a small proportion of caregivers reported that their child had been exposed to poison requiring medical attention in the previous 12 months (2.1%; 0.9–3.3).

When asked whether injuries and poisonings requiring medical attention had occurred at home or at school, over half the caregivers reported such events at home (57.3%; 47.1–67.5), and around one in five (21.0%; 14.3–27.7) at school. These proportions were similar for boys and girls.

As was the case for adults, GPs were the health professionals seen most often by children after an injury or poisoning (59.2%; 48.0–70.4), followed by accident and emergency staff (47.8%; 36.8–58.8). Around 1 in 10 children who had suffered an injury or poisoning (10.2%; 5.3–15.1) had been admitted to hospital as a result in the previous year.

Table 50: Injuries or poisoning requiring medical treatment in the last 12 months among adults, by sociodemographic variables: percent (95% confidence intervals)

Injuries/poisonings requiring treatment			
Adults	**% (95% CI)**		**Pop est**
	Unadj	**Adj***	
Total	26.8 *(25.4–28.2)*		757,361
Sex			
Male	31.4 *(29.0–33.8)*	31.2 *(29.0–33.4)*	431,818
Female	22.4 *(20.6–24.2)*	22.4 *(20.6–24.2)*	325,542
Age			
15–24 years	33.2 *(28.9–37.5)*	32.9 *(28.6–37.2)*	175,387
25–44 years	28.8 *(26.6–31.0)*	28.8 *(26.6–31.0)*	328,530
45–64 years	23.1 *(20.4–25.8)*	23.1 *(20.4–25.8)*	173,201
65–74 years	19.0 *(15.5–22.5)*	18.8 *(15.3–22.3)*	46,470
75+ years	21.1 *(16.8–25.4)*	20.7 *(16.4–25.0)*	33,774
Ethnicity			
European/Pākehā	27.6 *(25.8–29.4)*	28.0 *(26.2–29.8)*	625,910
Māori	28.6 *(25.1–32.1)*	26.1 *(23.0–29.2)*	79,803
Pacific	22.5 *(18.2–26.8)*	17.2 *(13.7–20.7)*	29,723
Other	15.0 *(8.7–21.3)*	19.6 *(11.2–28.0)*	21,925
Family income			
0–$20,000	21.0 *(18.6–23.4)*	23.2 *(20.1–26.3)*	106,069
$20,001–$30,000	22.9 *(19.6–26.2)*	25.7 *(22.0–29.4)*	86,974
$30,001–$50,000	28.3 *(25.2–31.4)*	28.4 *(25.3–31.5)*	151,258
$50,001+	30.0 *(27.1–32.9)*	30.5 *(26.6–34.4)*	262,488
NZDep96 score			
1 (least deprived)	26.6 *(23.3–29.9)*	26.2 *(22.9–29.5)*	215,022
2	28.9 *(25.8–32.0)*	29.6 *(26.3–32.9)*	202,443
3	26.9 *(24.2–29.6)*	26.6 *(23.9–29.3)*	170,928
4 (most deprived)	24.9 *(22.7–27.1)*	24.5 *(22.3–26.7)*	168,968
Education			
No qualification	23.1 *(20.7–25.5)*	24.0 *(21.5–26.5)*	186,422
School or post-school only	29.6 *(27.1–32.1)*	28.5 *(26.0–31.0)*	299,910
School and post-school	27.0 *(24.5–29.5)*	26.9 *(24.2–29.6)*	267,647

* Adjusted rates are adjusted for age and sex, except when they are age-specific, in which case they are adjusted only for sex, or when they are sex-specific, in which case they are adjusted only for age.
Note: For further explanation of Tables, see Appendix 2: Notes to Figures and Tables.

Table 51: Injuries or poisoning requiring medical treatment in the last 12 months, among males, by age and ethnicity: percent (95% confidence intervals)

Injuries/poisonings requiring treatment			
Males	**% (95% CI)**		**Pop est**
	Unadj	**Adj***	
Total	31.4 *(29.0–33.8)*	31.2 *(29.0–33.4)*	431,818
Age			
15–24 years	43.4 *(36.9–49.9)*		115,567
25–44 years	35.4 *(31.9–38.9)*		196,798
45–64 years	24.0 *(19.9–28.1)*		89,686
65–74 years	17.1 *(12.2–22.0)*		19,950
75+ years	15.7 *(9.8–21.6)*		9818
Ethnicity			
European/Pākehā	31.7 *(29.2–34.2)*	32.4 *(29.9–34.9)*	349,948
Māori	37.1 *(31.4–42.8)*	32.5 *(27.2–37.8)*	48,872
Pacific	29.2 *(21.8–36.6)*	22.1 *(15.8–28.4)*	19,149
Other	19.3 *(8.5–30.1)*	22.2 *(9.9–34.5)*	13,849

* Adjusted rates are adjusted for age.
Note: For further explanation of Tables, see Appendix 2: Notes to Figures and Tables.

Table 52: Injuries or poisoning requiring medical treatment in the last 12 months, among females, by age and ethnicity: percent (95% confidence intervals)

Injuries/poisonings requiring treatment			
Females	**% (95% CI)**		**Pop est**
	Unadj	**Adj***	
Total	22.4 *(20.6–24.2)*	22.4 *(20.6–24.2)*	325,542
Age			
15–24 years	22.8 *(18.3–27.3)*		59,820
25–44 years	22.5 *(19.8–25.2)*		131,732
45–64 years	22.2 *(18.7–25.7)*		83,515
65–74 years	20.7 *(15.6–25.8)*		26,520
75+ years	24.5 *(18.2–30.8)*		23,956
Ethnicity			
European/Pākehā	23.7 *(21.5–25.9)*	23.9 *(21.7–26.1)*	275,962
Māori	21.0 *(17.5–24.5)*	20.0 *(16.5–23.5)*	30,930
Pacific	15.9 *(10.4–21.4)*	12.5 *(8.2–16.8)*	10,574
Other	10.9 *(4.0–17.8)*	17.1 *(5.1–29.1)*	8076

* Adjusted rates are adjusted for age.
Note: For further explanation of Tables, see Appendix 2: Notes to Figures and Tables.

Table 53: Injuries or poisoning requiring medical treatment in the last 12 months among children under 15 years: percent (95% confidence intervals)

Injuries/poisonings requiring treatment			
Children	**% (95% CI)**		**Pop est**
	Unadj	**Adj***	
Total	23.6 *(19.7–27.5)*		199,743
Age			
0–4 years	18.4 *(13.3–23.5)*	18.4 *(13.3–23.5)*	51,839
5–9 years	20.9 *(13.5–28.3)*	20.9 *(13.5–28.3)*	62,268
10–14 years	31.8 *(24.7–38.9)*	31.8 *(24.7–38.9)*	85,635
Ethnicity			
European/Pākehā	25.1 *(20.4–29.8)*	25.0 *(20.3–29.7)*	136,422
Māori	26.9 *(17.7–36.1)*	27.0 *(17.8–36.2)*	50,397
Pacific	14.9 *(6.7–23.1)*	16.4 *(7.4–25.4)*	9761
Other	6.1 *(0.6–12.8)*	4.9 *(0.0–10.2)*	3162

* Adjusted rates are adjusted for age and sex, except when they are age-specific, in which case they are adjusted only for sex.

Note: For further explanation of Tables, see Appendix 2: Notes to Figures and Tables.

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Chapter 10: SF-36 Health Status Questionnaire: Demographic and Socioeconomic Variables

Key points

- The SF-36 is a widely used questionnaire for measuring self-reported physical and mental health status.
- The New Zealand population showed higher levels of self-reported health (higher SF-36 mean scores) in comparison with overseas general population norms.
- Males scored slightly, but significantly, higher than women on most scales, particularly those most related to mental health.
- Age had a profound effect on self-reported health, with scores on all scales except the Mental Health scale decreasing with increasing age.
- European/Pākehā rated their health somewhat, but not substantially, higher than either Māori or Pacific people; the latter two groups did not significantly differ from each other.
- Those with school, or school and post-school qualifications, generally had better self-reported health status than those with no school qualifications. Educational status impacted on mental health status in females, but not males.
- SF-36 scores tended to increase with family income, though not for all scales, or for all populations groups. The most pronounced gradient of increasing scores with incomes occurred in non-Māori males, and the least pronounced in Māori females.
- Those who were employed typically showed better self-reported physical and mental health than those unemployed, or not in the labour force. This pattern did not hold for Māori males.
- Non-Māori, particularly non-Māori females, showed higher SF-36 scores in association with lower levels of deprivation (as indexed by NZDep96 scores). Māori showed no clear relationship between the SF-36 and the deprivation index.

Introduction

The SF-36 is a standardised questionnaire derived from a larger set of questions used in the US Medical Outcomes Study in the mid-1980s (Ware and Sherbourne 1992). The SF-36 has become one of the most widely used of the health-related quality of life measures. These are generic, multi-dimensional measures of self-reported health status. Self-reported health measures, based on individuals' own perception of their health status and functioning, are an alternative measure to the more traditional objective measures of health, such as mortality rates and hospitalisation records. Self-reported health measures introduce an element of subjectivity into health status measurement. This is useful in providing a more 'consumer-centred' view of health, and places the measurement emphasis on quality of life or wellbeing.

Quality of life measures such as the SF-36 have become increasingly important this century with the changing pattern of ill-health, particularly in developed countries. The rise in chronic, non-fatal disease and reduction in mortality from infectious diseases has meant that traditional mortality-based measures of population health status do not provide a full picture of the extent of ill-health (the 'burden of disease') in a society.

The SF-36 questionnaire consists of 36 questions (items) measuring physical and mental health status in relation to eight health concepts:

- physical functioning
- role limitations due to physical health
- bodily pain
- general health perceptions
- vitality (energy/fatigue)
- social functioning
- role limitations due to emotional health
- general mental health (psychological distress/wellbeing) (see Table 54).

Responses to each of the SF-36 items are scored and summed according to a standardised scoring protocol (Ware et al 1993), and expressed as a score on a 0–100 scale for each of the eight health concepts. Higher scores represent better self-perceived health. Five of the scales are 'unipolar' (Physical Functioning, Role Physical, Bodily Pain, Social Functioning, and Role Emotional), meaning that they define health status in terms of the absence of disability. The maximum score of 100 is therefore achieved when no disability is reported. The other scales (General Health, Vitality and Mental Health) are 'bipolar' scales, covering both positive and negative health states. The maximum of 100 on these bipolar scales therefore indicates not just the absence of disability, but the presence of a positive state of health.

Interpretation of the SF-36 is based on the mean (average) scores of people in particular groups, for example, age groups, or labour force status groups (employed versus unemployed). The difference among the scales in terms of their unipolar or bipolar construction means that the scales are independent of each other and scale scores cannot be compared. Within any one scale, however, population subgroup means can be compared. For example, the mean score on the Physical Functioning scale (or any other scale) of employed people can be compared with that of unemployed people.

In the graphs of results in this and the next chapter, the SF-36 scale means are presented as a 'profile'; with the scales ordered, from left to right, according to the extent to which they measure physical or mental health. This ordering of the scales is the international standard, and was determined by a principal component factor analysis (see Chapter 1: The Survey). A strength of the SF-36 is this concurrent measurement of mental and physical health status allowing assessment of whether factors associated with the lowering of one equally affect the other.

As well as the eight scales, two summary measures have been calculated: the Physical Component Score (PCS) and Mental Component Score (MCS) (see Chapter 1: The Survey). The summary scores are aggregated measures of the physical health and mental health dimensions underlying the SF-36 questionnaire. The summary measures are not depicted in the graphs, but are presented in the tables. Due to space limitations, only a small number of SF-36 tables have been included in this report, but the remainder can be viewed on the Ministry of Health website *(www.moh.govt.nz).*

This is the first time the SF-36 has been used on a national sample in New Zealand. The population mean scores (norms) presented below provide baseline scores for population health monitoring, so that with repetition of the SF-36 in future national surveys the self-reported health status of population subgroups can be compared over time. The norms also provide benchmarks (standards for comparison) for smaller New Zealand studies using the SF-36, such as clinical or regional studies. The analyses presented in this report can therefore form the basis for formulating and evaluating public health policy and programmes, assist in identifying priority populations and guide the targeting of resources. This use of the SF-36 on a national scale also provides the opportunity for international comparisons via a standardised instrument.

A comprehensive psychometric analysis of the acceptability (in terms of the level of missing data), reliability and construct validity of the SF-36 in the New Zealand population was undertaken as part of the SF-36 analysis. The results indicated that in the New Zealand population as a whole, the SF-36 performed as well or better than in other countries (Scott et al, in press). However, the construct validity of the SF-36 (the extent to which the questionnaire measures the health constructs it aims to measure) may be questionable amongst Pacific people, and older Māori (Scott et al 1999). A summary of some of the results from the psychometric analysis, together with the frequency distributions of the eight scales, can be found in Appendix 3: Psychometric Properties of the SF-36.

The version of the SF-36 used in this survey was the Australian and New Zealand adaptation, which differs only in minor respects from the original. The survey participants completed the SF-36 themselves, at the end of the face-to-face interview that collected the information covered elsewhere in this report. The SF-36 was administered only to adults (aged 15 years and over).

The SF-36 results that follow are presented separately for males and females, and Māori and non-Māori (see Chapter 1: The Survey). SF-36 results for Pacific people are provided in the analysis of SF-36 by ethnic group (European/Pākehā; Māori and Pacific people). The further stratification of all other SF-36 analyses (for example, SF-36 by family income) by ethnic groups other than Māori and non-Māori was not possible due to the smaller size of the Pacific and Other ethnic group samples.

For these SF-36 chapters, a summary box has been included at the beginning of each subsection. Because the SF-36 results are presented for both males and females within Māori and non-Māori groups, and eight SF-36 scales within each of these subgroups, there is a considerable volume of data being presented, and the summary boxes are intended to assist in highlighting the key features of the results.

Table 54: Item groupings and abbreviated item content for the SF-36

Health scale	Item	Abbreviated item content
Physical Functioning (PF)	PF1	Vigorous activities, such as running, lifting heavy objects, strenuous sports
	PF2	Moderate activities, such as moving a table, vacuuming, bowling
	PF3	Lifting or carrying groceries
	PF4	Climbing several flights of stairs
	PF5	Climbing one flight of stairs
	PF6	Bending, kneeling, stooping
	PF7	Walking more than a kilometre
	PF8	Walking half a kilometre
	PF9	Walking 100 metres
	PF10	Bathing or dressing yourself
Role Physical (RP)	RP1	Cut down the amount of time spent on work or other activities
	RP2	Accomplished less than would like
	RP3	Limited in the kind of work or other activities
	RP4	Difficulty performing work or other activities
Bodily Pain (BP)	BP1	Intensity of bodily pain
	BP2	Extent pain interfered with normal work
General Health (GH)	GH1	Is your health: excellent, very good, good, fair, poor
	GH2	I seem to get sick a little easier than other people
	GH3	I am as healthy as anybody I know
	GH4	I expect my health to get worse
	GH5	My health is excellent
Vitality (VT)	VT1	Feel full of life
	VT2	Have a lot of energy
	VT3	Feel worn out
	VT4	Feel tired
Social Functioning (SF)	SF1	Extent health problems interfered with normal social activities
	SF2	Frequency health problems interfered with social activities
Role Emotional (RE)	RE1	Cut down the amount of time spent on work or other activities
	RE2	Accomplished less than would like
	RE3	Didn’t do work or other activities as carefully as usual
Mental Health (MH)	MH1	Been a very nervous person
	MH2	Felt so down in the dumps that nothing could cheer you up
	MH3	Felt calm and peaceful
	MH4	Felt down
	MH5	Been a happy person

Results

SF-36 profiles by demographic variables

SF-36 profiles by total population

> The New Zealand population had higher SF-36 mean scores on all scales in comparison with overseas general population norms (for example, Australian or American).

The SF-36 norms for the total population are presented in Table 55. A feature of this New Zealand data is that the mean scores for the total population were higher across all scales (reflecting better self-reported health) than either the Australian (Australian Bureau of Statistics 1997) or American (Ware et al 1993) norms. This may reflect different modes of administration, cultural differences or different expectations of health in these countries.

Table 55: SF-36 profiles, by sex, and for total population: percent (95% confidence intervals)

	Physical Functioning % (95% CI)	Role Physical % (95% CI)	Bodily Pain % (95% CI)	General Health % (95% CI)	Vitality % (95% CI)	Social Functioning % (95% CI)	Role Emotional % (95% CI)	Mental Health % (95% CI)	PCS** % (95% CI)	MCS** % (95% CI)
Males										
Unstandardised values										
Mean	87.1	81.8	78.7	73.7	67.9	88.2	87.3	79.9	50.1	51.2
95% confidence interval	*(86.1–88.0)*	*(80.2–83.5)*	*(77.7–79.8)*	*(72.7–74.7)*	*(67.0–68.8)*	*(87.3–89.0)*	*(86.0–88.7)*	*(79.2–80.6)*	*(49.7–50.6)*	*(50.8–51.7)*
Age standardised values										
Mean	86.8	81.6	78.7	73.6	67.9	88.1	87.3	80.0	50.0	51.3
Number	3197	3179	3167	3173	3170	3204	3142	3164	3090	3090
Standard deviation	21.6	34.5	23.9	20.3	17.7	19.7	28.9	14.3	9.8	9.2
95% confidence interval	*(85.9–87.8)*	*(80.0–83.2)*	*(77.6–79.7)*	*(72.6–74.6)*	*(67.0–68.8)*	*(87.3–89.0)*	*(85.9–88.6)*	*(79.3–80.6)*	*(49.5–50.5)*	*(50.8–51.7)*
25th percentile	80.0	75.0	62.0	62.0	55.0	75.0	100.0	72.0	45.5	46.5
50th percentile	95.0	100.0	84.0	77.0	70.0	100.0	100.0	84.0	53.1	53.2
75th percentile	100.0	100.0	100.0	87.0	80.0	100.0	100.0	92.0	56.3	57.3
Range	0–100	0–100	0–100	0–100	0–100	0–100	0–100	12–100	9–70	5–72
% missing data*	1.9	2.4	2.8	2.6	2.7	1.7	3.6	2.9	5.2	5.2
Females										
Unstandardised values										
Mean	85.0	79.6	77.1	74.0	63.4	85.1	82.7	76.2	50.1	48.9
95% confidence interval	*(84.2–85.8)*	*(78.2–81.0)*	*(76.1–78.2)*	*(73.2–74.8)*	*(62.6–64.1)*	*(84.2–86.0)*	*(81.4–83.9)*	*(75.6–76.9)*	*(49.7–50.5)*	*(48.4–49.3)*
Age standardised values										
Mean	85.3	79.8	77.2	74.1	63.4	85.1	82.7	76.2	50.2	48.8
Number	4517	4494	4484	4493	4479	4532	4432	4478	4355	4355
Standard deviation	21.6	35.3	24.9	19.8	8.9	21.4	32.5	15.9	10.0	10.5
95% confidence interval	*(84.5–86.1)*	*(78.4–81.2)*	*(76.2–78.2)*	*(73.2–74.9)*	*(62.6–64.1)*	*(84.2–86.0)*	*(81.5–84.0)*	*(75.5–76.8)*	*(49.8–50.6)*	*(48.4–49.3)*
25th percentile	75.0	50.0	61.0	62.0	50.0	75.0	67.0	64.0	43.4	42.3
50th percentile	90.0	100.0	84.0	77.0	65.0	100.0	100.0	80.0	52.8	51.1
75th percentile	100.0	100.0	100.0	87.0	80.0	100.0	100.0	88.0	56.7	56.3
Range	0–100	0–100	0–100	0–100	0–100	0–100	0–100	0–100	7–70	4–75
% missing data*	1.9	2.4	2.6	2.4	2.7	1.6	3.7	2.7	5.4	5.4
Total										
Mean	86.0	80.7	77.9	73.8	65.6	86.6	85.0	78.0	50.1	50.0
Number	7714	7673	7651	7666	7649	7736	7574	7642	7445	7445
95% confidence interval	*(85.4–86.7)*	*(79.6–81.8)*	*(77.1–78.7)*	*(73.2–74.5)*	*(65.0–66.1)*	*(86.0–87.2)*	*(84.0–85.9)*	*(77.5–78.5)*	*(49.8–50.4)*	*(49.7–50.3)*

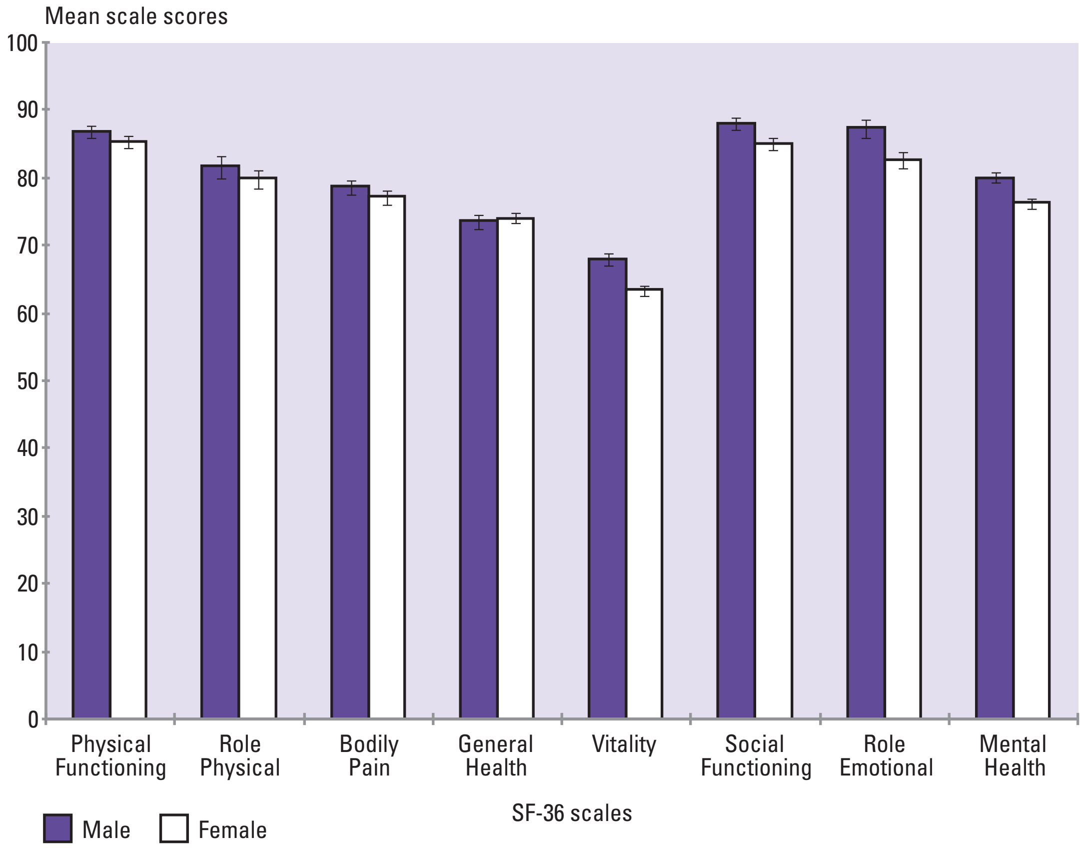
* Percentage for whom scale scores could not be computed because they missed more than half of the items in a scale.
** Physical Component Summary (PCS) score and Mental Component Summary (MCS) score.

SF-36 profiles by sex

> Males scored slightly, but statistically significantly, higher than females on most of the SF-36 scales, particularly on those scales more closely associated with mental health.

Figure 55 depicts the SF-36 profiles by sex (age-standardised). Table 55 presents the SF-36 norms by sex. There was a significant effect of sex on SF-36 scores ($p < .01$), when standardised for age.

Figure 55: SF-36 profiles, by sex (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Males scored slightly, but statistically significantly, higher than women on all scales except General Health. The differences were more pronounced for the scales more closely associated with mental health (Vitality, Social functioning, Role Emotional and Mental Health) than for the scales associated with physical health (for example, Physical Functioning, Bodily Pain). This can also be seen in the comparison of the principal component summary scores (see Table 55), where the sex difference was not significant for the Physical Component Score (PCS), but was for the Mental Component Score (MCS).

The degree and direction of sex difference in SF-36 scores were similar to those found in the 1995 Australian National Health Survey (Australian Bureau of Statistics 1997), and neither country showed a sex difference on the General Health scale. A difference between the two countries emerged, however, in that New Zealanders showed a more pronounced sex difference on the scales most related to mental health, whereas the Australians showed a fairly similar sex difference

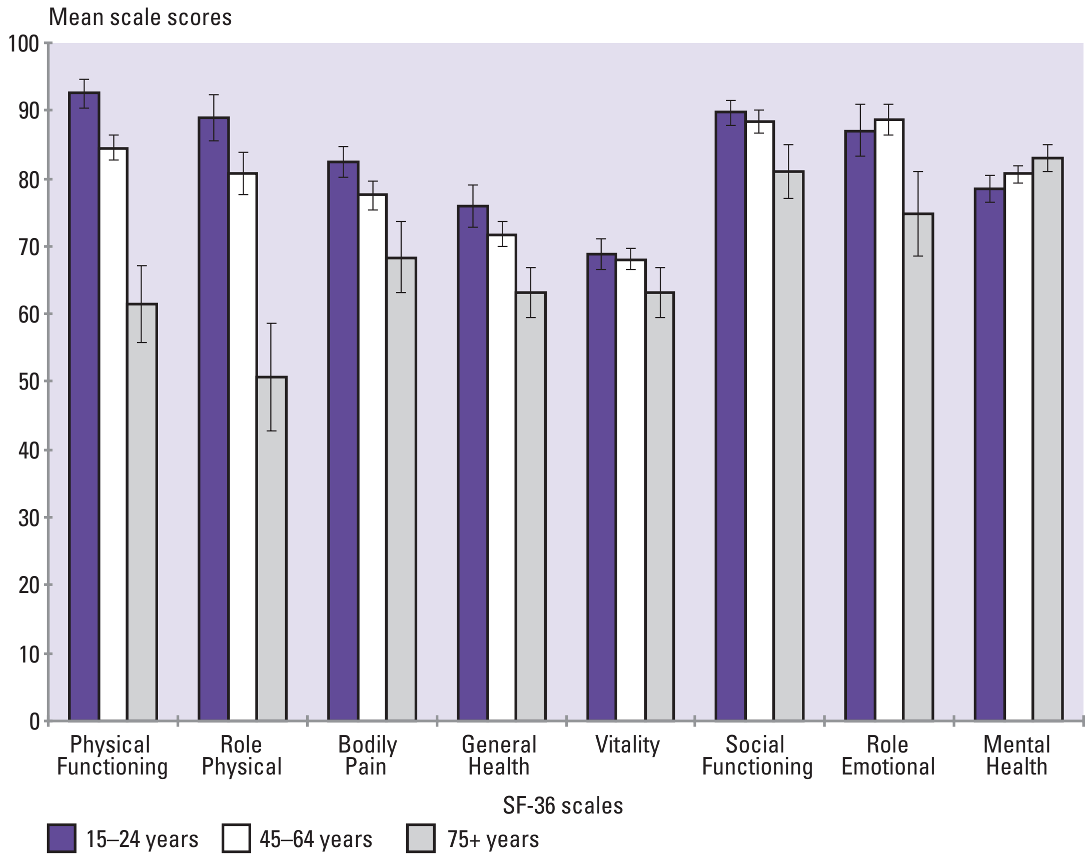
across the scales related to both mental and physical health. The New Zealand data were similar to the American data (Ware et al 1993) to the extent that in both countries men rated their health better than women, but the Americans showed a more pronounced sex difference on the scales most closely related to physical health, rather than mental health.

SF-36 profiles by age and sex

Age had a profound effect on self-reported health as indexed by the SF-36. In general, SF-36 scores decreased with increasing age, with the most pronounced group differences being found in the physical health-related scales. The exception to this pattern was the Mental Health scale, which, for men, showed a gradient of higher scores with increasing age. For women, scores on the Mental Health scale also increased with age up to ages 45–64, and then levelled off.

The SF-36 profiles for three age groups are shown in Figures 56 and 57 (only three groups are presented in the graphs for clarity). The mean scores for all five age groups are presented in Table 56. The age-related profiles are typical for this questionnaire in cross-sectional surveys: decreasing self-reported health with increasing age, with the most pronounced group differences being found in the physical health-related scales. The exception to this pattern was the Mental Health scale, which for men, showed a gradient of higher scores with increasing age. For women, scores on the Mental Health scale also increased with age across the first three age groups, and then levelled off (the mean scores for the 45–64, 65–74 and 75+ age groups did not differ significantly from each other).

Figure 56: SF-36 profiles, by selected age group, males



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

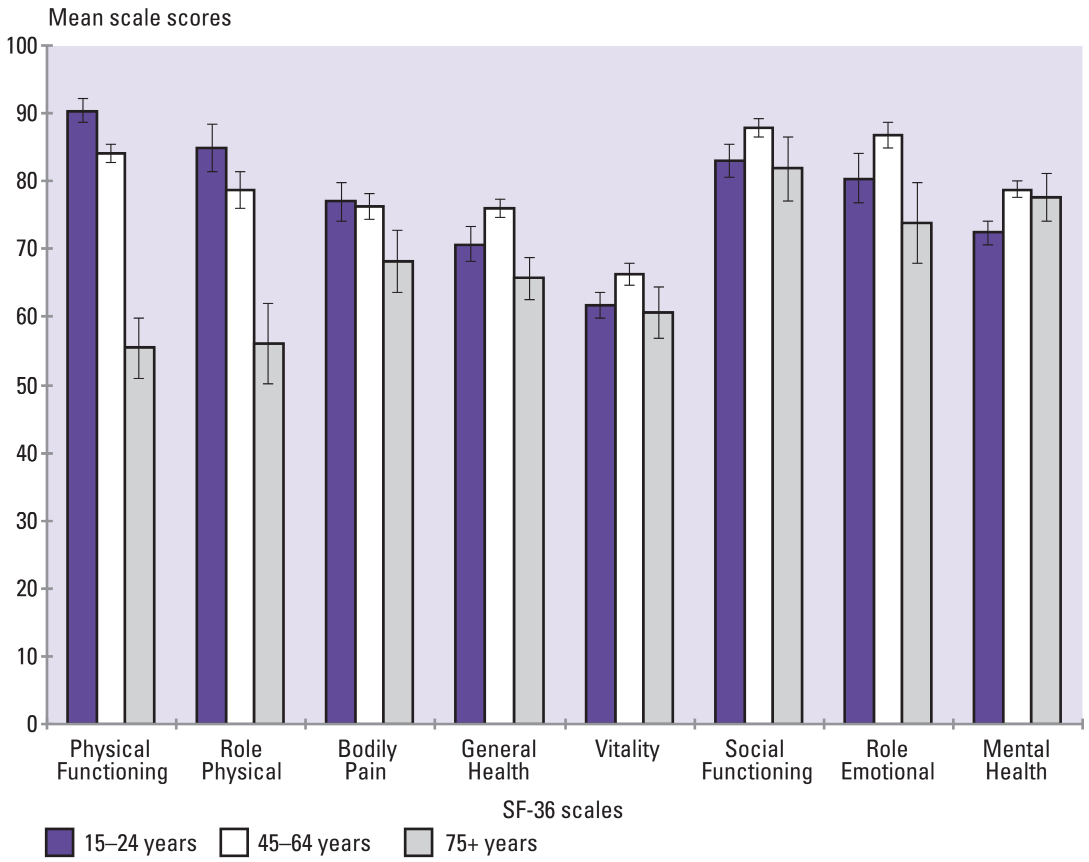
Table 56: SF-36 mean scores, by age and sex: percent (95% confidence intervals)

	Physical Functioning % (95% CI)	Role Physical % (95% CI)	Bodily Pain % (95% CI)	General Health % (95% CI)	Vitality % (95% CI)	Social Functioning % (95% CI)	Role Emotional % (95% CI)	Mental Health % (95% CI)	PCS** % (95% CI)	MCS** % (95% CI)	Number* % (95% CI)
Males											
Age											
15–24 years	92.5	89.0	82.4	75.8	68.8	89.7	87.0	78.4	52.9	50.2	461
	(90.5–94.5)	*(85.7–92.4)*	*(80.1–84.6)*	*(72.7–78.9)*	*(66.5–71.1)*	*(87.8–91.6)*	*(83.2–90.8)*	*(76.5–80.4)*	*(51.9–53.9)*	*(48.9–51.5)*	
25–44 years	91.3	84.2	79.2	76.1	67.6	88.3	87.7	79.0	51.5	50.6	1233
	(90.0–92.6)	*(81.7–86.8)*	*(77.3–81.1)*	*(74.7–77.5)*	*(66.4–68.8)*	*(86.9–89.6)*	*(85.7–89.6)*	*(78.0–80.0)*	*(50.8–52.2)*	*(49.9–51.2)*	
45–64 years	84.5	80.8	77.6	71.8	68.0	88.3	88.7	80.6	48.9	51.9	863
	(82.6–86.3)	*(77.7–83.8)*	*(75.5–79.7)*	*(70.0–73.6)*	*(66.4–69.5)*	*(86.6–90.0)*	*(86.4–91.0)*	*(79.3–81.9)*	*(48.0–49.8)*	*(51.2–52.8)*	
65–74 years	76.0	72.7	77.1	68.5	69.2	87.5	88.3	83.8	45.5	53.8	338
	(72.7–79.2)	*(67.3–78.1)*	*(74.3–80.0)*	*(65.7–71.3)*	*(66.8–71.7)*	*(84.6–90.4)*	*(85.1–91.4)*	*(82.0–85.6)*	*(44.2–46.8)*	*(52.6–55.0)*	
75+ years	61.5	50.7	68.4	63.2	63.2	80.9	74.8	83.0	38.7	52.9	195
	(55.9–67.1)	*(42.7–58.7)*	*(63.2–73.6)*	*(59.4–66.9)*	*(59.6–66.9)*	*(76.9–84.9)*	*(68.6–81.1)*	*(81.0–85.0)*	*(36.1–41.3)*	*(51.5–54.4)*	
Females											
Age											
15–24 years	90.4	84.9	77.0	70.7	61.8	82.9	80.4	72.4	52.2	46.1	570
	(88.6–92.3)	*(81.5–88.3)*	*(74.1–79.9)*	*(68.2–73.3)*	*(59.9–63.7)*	*(80.5–85.4)*	*(76.8–84.1)*	*(70.6–74.1)*	*(51.1–53.2)*	*(44.9–47.3)*	
25–44 years	90.6	83.5	79.6	76.1	62.2	84.6	82.1	75.4	52.3	47.7	1883
	(89.7–91.5)	*(81.7–85.3)*	*(78.3–81.0)*	*(75.0–77.2)*	*(61.1–63.4)*	*(83.3–85.9)*	*(80.1–84.2)*	*(74.5–76.4)*	*(51.8–52.8)*	*(47.1–48.4)*	
45–64 years	84.0	78.6	76.3	76.0	66.3	87.8	86.8	78.8	49.2	51.2	1077
	(82.6–85.4)	*(75.9–81.3)*	*(74.4–78.3)*	*(74.6–77.4)*	*(64.8–67.8)*	*(86.4–89.1)*	*(84.9–88.7)*	*(77.7–80.0)*	*(48.5–49.9)*	*(50.4–51.9)*	
65–74 years	72.3	70.3	74.4	70.9	64.9	86.6	84.2	79.1	45.3	51.9	460
	(69.4–75.2)	*(66.0–74.6)*	*(71.6–77.3)*	*(68.7–73.1)*	*(62.9–67.0)*	*(84.5–88.7)*	*(81.0–87.3)*	*(77.6–80.6)*	*(44.0–46.7)*	*(50.9–52.8)*	
75+ years	55.4	56.0	68.2	65.7	60.6	81.9	73.9	77.7	39.4	51.5	365
	(51.0–59.8)	*(50.1–61.9)*	*(63.6–72.7)*	*(62.6–68.8)*	*(56.9–64.3)*	*(77.2–86.6)*	*(68.0–79.9)*	*(74.2–81.2)*	*(37.6–41.1)*	*(49.3–53.7)*	

* Number of respondents with valid scores for all eight SF-36 scales; ie, this is the minimum number of respondents contributing to any one particular scale.

** Physical Component Summary (PCS) score and Mental Component Summary (MCS) score.

Figure 57: SF-36 profiles, by selected age group, females



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

This disparity in the effect of age on self-reported physical versus mental health status is highlighted by observation of the summary scores (see Table 56), where for both sexes the young showed lower self-reported mental health than physical health (although the difference is more pronounced in females), while the reverse is seen in the older age groups.

It is not possible to say from a cross-sectional survey whether these results are due to age, period or cohort effects. Longitudinal data on the SF-36 are limited, but a British study (Hemingway et al 1997) confirms the age-related decline in physical health found here. It also found decreasing scores on the Mental Health scale with increasing age up until age 55, then either a small increase in Mental Health scores (men) or stabilisation (women). This suggests that the results found in this cross-sectional survey, showing an apparent stability or improvement in mental health with age in both sexes, is at least in part a function of a cohort effect: for example, rising expectations among each succeeding generation leading to apparently lower norms in younger age groups.

However, the Hemingway et al study only followed up participants for three years, so further longitudinal research is needed to clarify the contribution of age and cohort effects to the patterns shown here in the cross-sectional data. Also of note is that institutionalised elderly people were excluded from this survey, and therefore the norms reported here may over-estimate the mental and physical health of older people.*

SF-36 profiles by ethnicity

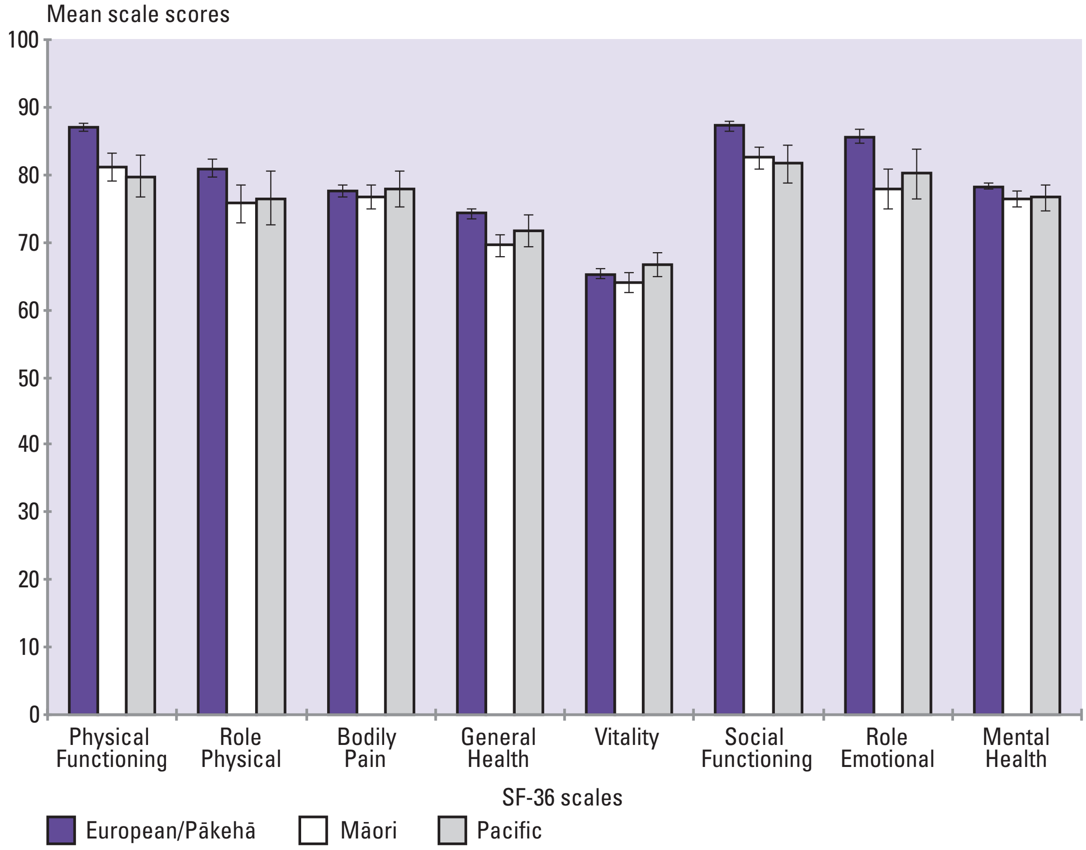
The European/Pākehā group rated their health higher than either Māori or Pacific people on most of the SF-36 scales. Māori and Pacific groups did not differ significantly from each other in SF-36 scores. The ethnic group differentials in SF-36 scores between European and Māori/ Pacific groups, although frequently statistically significant, were not as large as might be expected from objective ethnic differentials in health status (for example, life expectancy data).

The profiles for the three major ethnic groups (age- and sex-standardised) are depicted in Figure 58. Analyses were carried out to determine whether there were significant differences among the (age-standardised) ethnic groups for each of the scales. These analyses showed a significant effect of ethnic group on all scales except Bodily Pain and Vitality (all $p < 0.0001$, except for Role Physical ($p < 0.01$) and Mental Health ($p < 0.05$)). The ethnic group profiles shown in Figure 58 were not further stratified by sex as the effect of ethnic group was found to differ significantly for males and females only on the Mental Health scale.**

The European/Pākehā group rated their health significantly higher than Māori for all scales except Bodily Pain and Vitality, and significantly higher than Pacific people on all scales except Bodily Pain, Vitality and Mental Health. Māori and Pacific groups differed significantly from each other only on the Vitality scale, where Māori had a slightly lower score.

* Approximately 13% of people over 75 years live in non-private dwellings (Health Funding Authority and Ministry of Health 1998).
** Readers are referred to the Ministry of Health's website *(www.moh.govt.nz)* for tables showing the ethnicity x sex SF-36 means.

Figure 58: SF-36 profiles, by ethnicity (age- and sex-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

These differences in self-reported health status by ethnicity, although statistically significant in some cases, are quite small. Objective measures of health status produce somewhat larger differences. For example, the life expectancy of Māori women at birth in 1996 was nine years less than that of European/Pākehā women (Ministry of Health, 1998a). Moreover, considerable ethnic group disparities in health status have been found elsewhere in this survey in, for example, the prevalence of diabetes and asthma. Additionally, they are documented in other publications which monitor population health status, for example, *Progress on Health Outcome Targets* (Ministry of Health 1998b).

This discrepancy between the size of subjective and objective ethnic differentials in health was also noted amongst indigenous Australians in comparison with the general population (Australian Institute of Health and Welfare 1996), although recent data (Australian Institute of Health and Welfare 1998) suggests that these data may have been confounded by differences in the age structure of the indigenous and non-indigenous population. Such a confound cannot explain the New Zealand results however, as the ethnic groups being compared were age-standardised. There are a number of possible explanations for the smaller than expected ethnic differential in self-reported health status, including different cultural perceptions of health, and different expectations of what constitutes 'normal' levels of health.

Other researchers have found that the difference in self-reported health status between ethnic groups is greater than can be explained by differences in objective health status (Shetterly et al 1996; Angel and Guarnaccia 1989). The general conclusion of Shetterly et al seems appropriate in

either case: that cultural influences on definitions of health mean that ethnic differences in self-reported health (whatever the magnitude) may reflect a number of factors besides objective health status.

For further discussion of the SF-36 and its use in New Zealand ethnic groups, see Scott et al 1999.

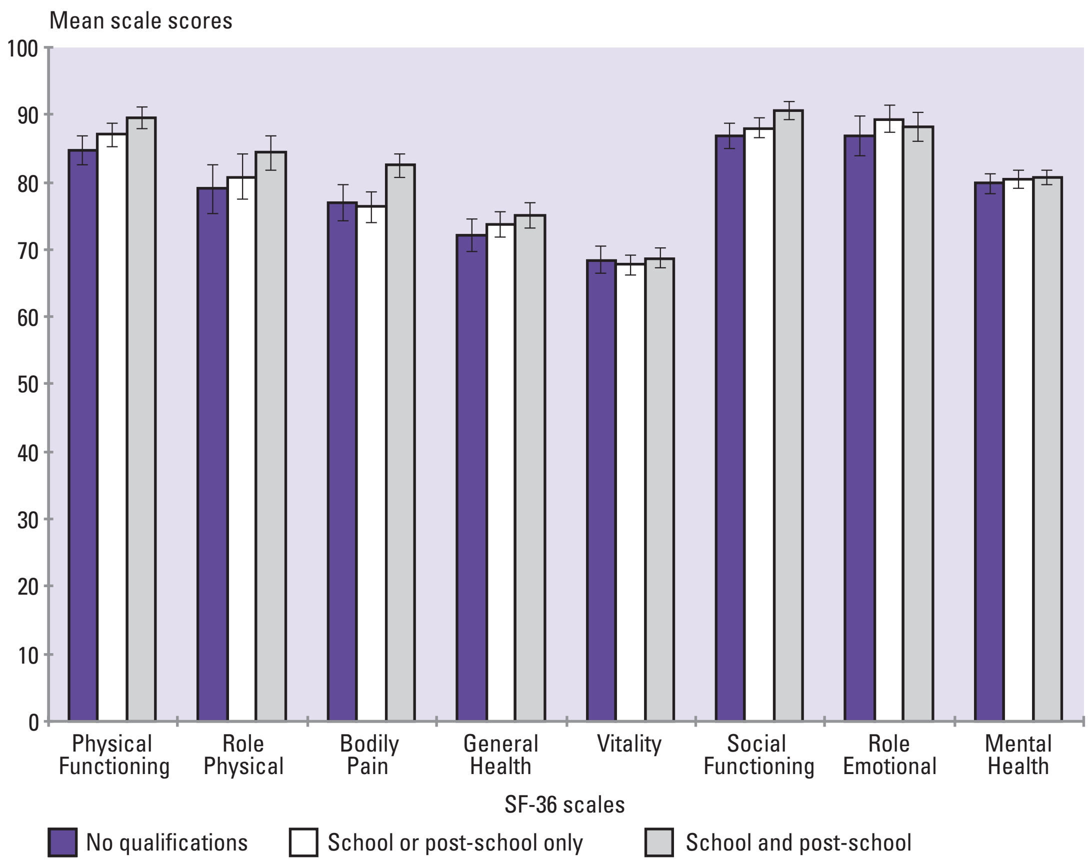
SF-36 profiles by socioeconomic variables

SF-36 profiles by education

> In all population groups there was some tendency for those who had the most educational qualifications (school and post-school) to have higher self-reported health status relative to those with no qualifications, on at least some of the scales. How systematic a pattern this was varied across sex and ethnic group. All groups showed this pattern for the Physical Functioning scale (probably the most sensitive of the scales due to the larger number of items). Females in both ethnic groups showed a significant effect of educational status on mental health, whereas men did not (in either ethnic group).

The relationship between education and SF-36 scores was found to differ significantly for ethnic group (Māori and non-Māori) and sex on all scales ($p < 0.0001$ for each scale, except Role Physical: $p = 0.01$).

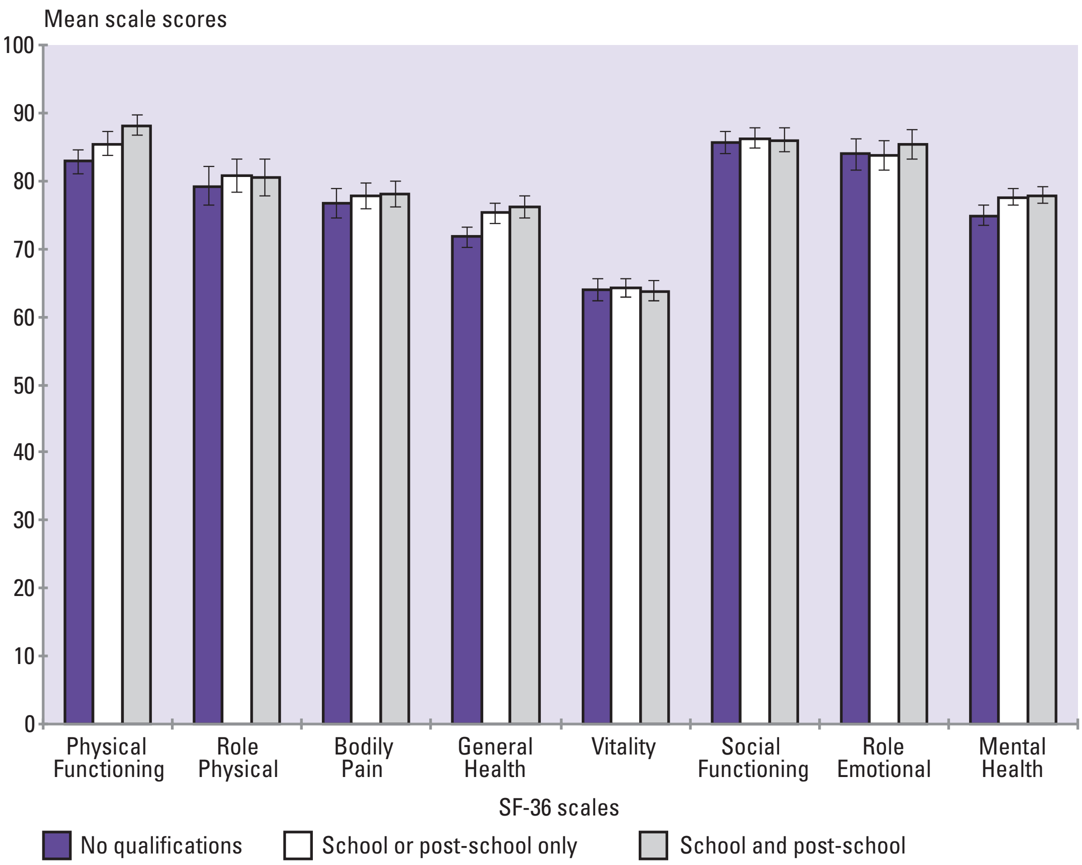
Figure 59: SF-36 profiles, by education, non-Māori males (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

As Figure 59 depicts, for non-Māori males the largest differences between education groups were on the four scales most related to physical health, together with the Social Functioning scale, where those with the most educational qualifications (school and post-school) had significantly higher scores relative to those without any qualifications.

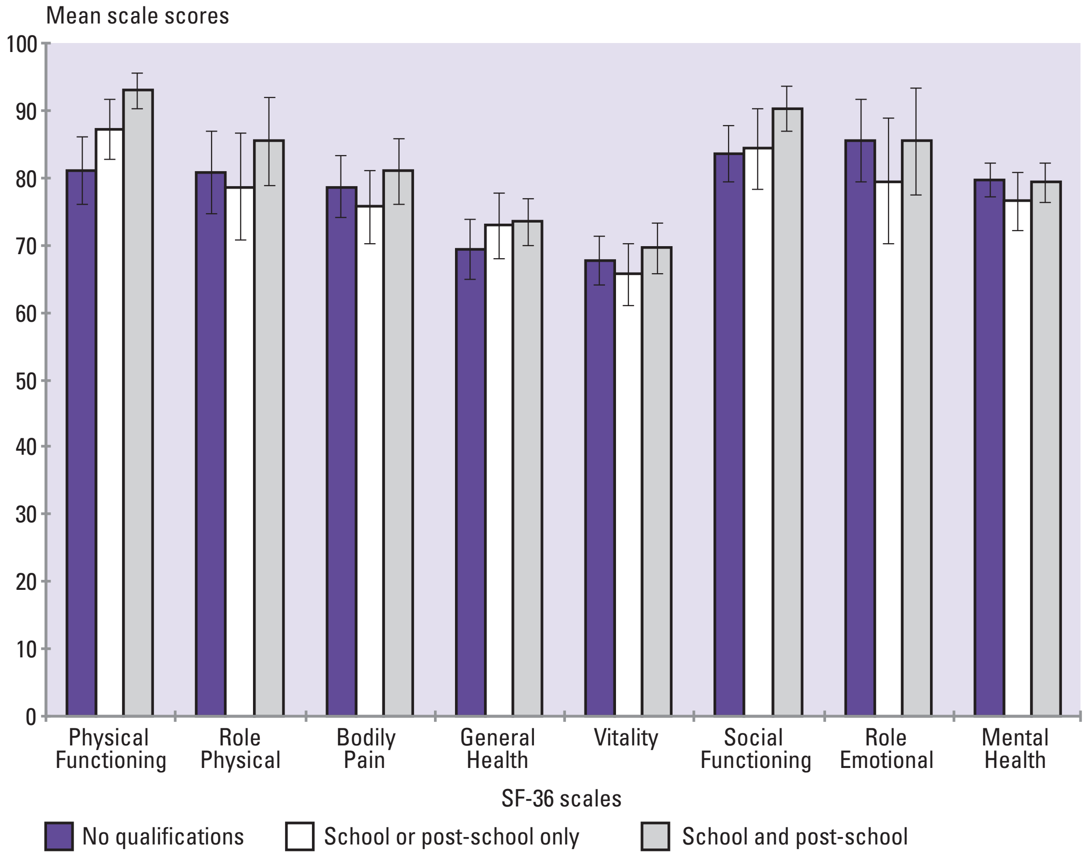
Figure 60: SF-36 profiles, by education, non-Māori females (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Non-Māori females (see Figure 60) showed significant differences between the most and least qualified groups on three of the scales: Physical Functioning, General Health and Mental Health.

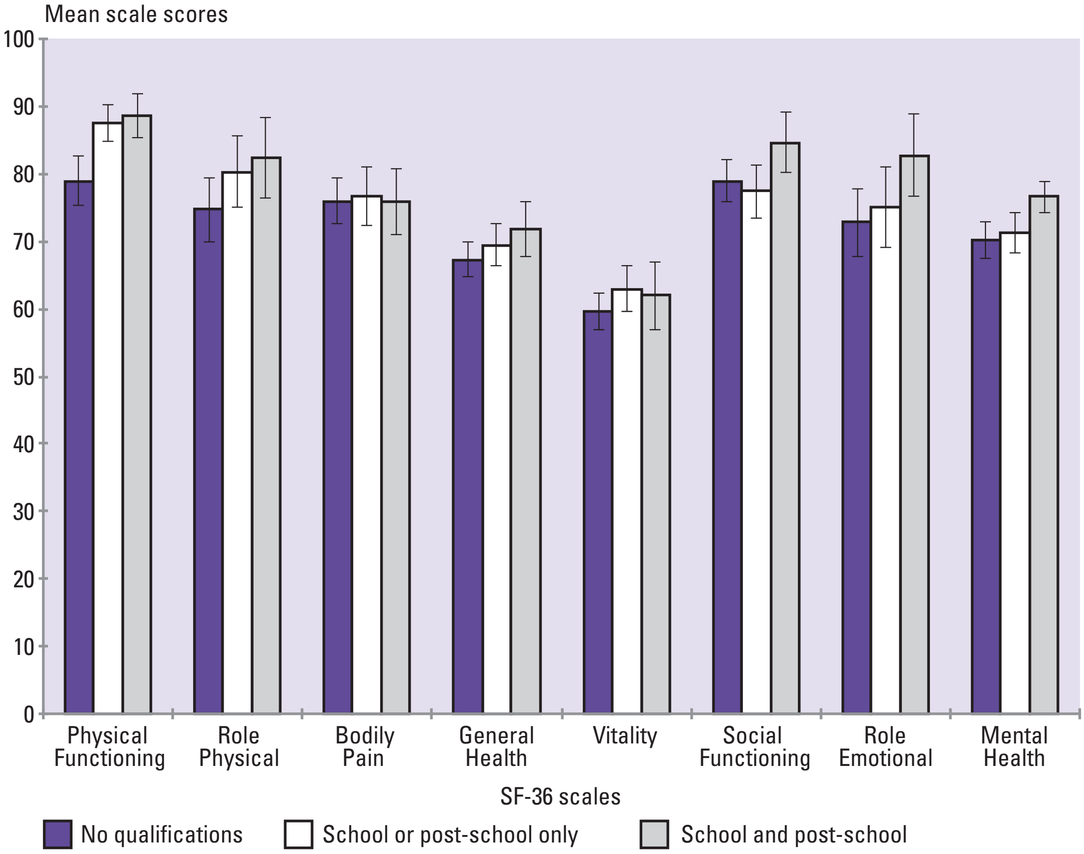
Figure 61: SF-36 profiles, by education, Māori males (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

For Māori males (see Figure 61), there were significant differences between the most and least qualified on only two of the scales: Physical Functioning and Social Functioning.

Figure 62: SF-36 profiles, by education, Māori females (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

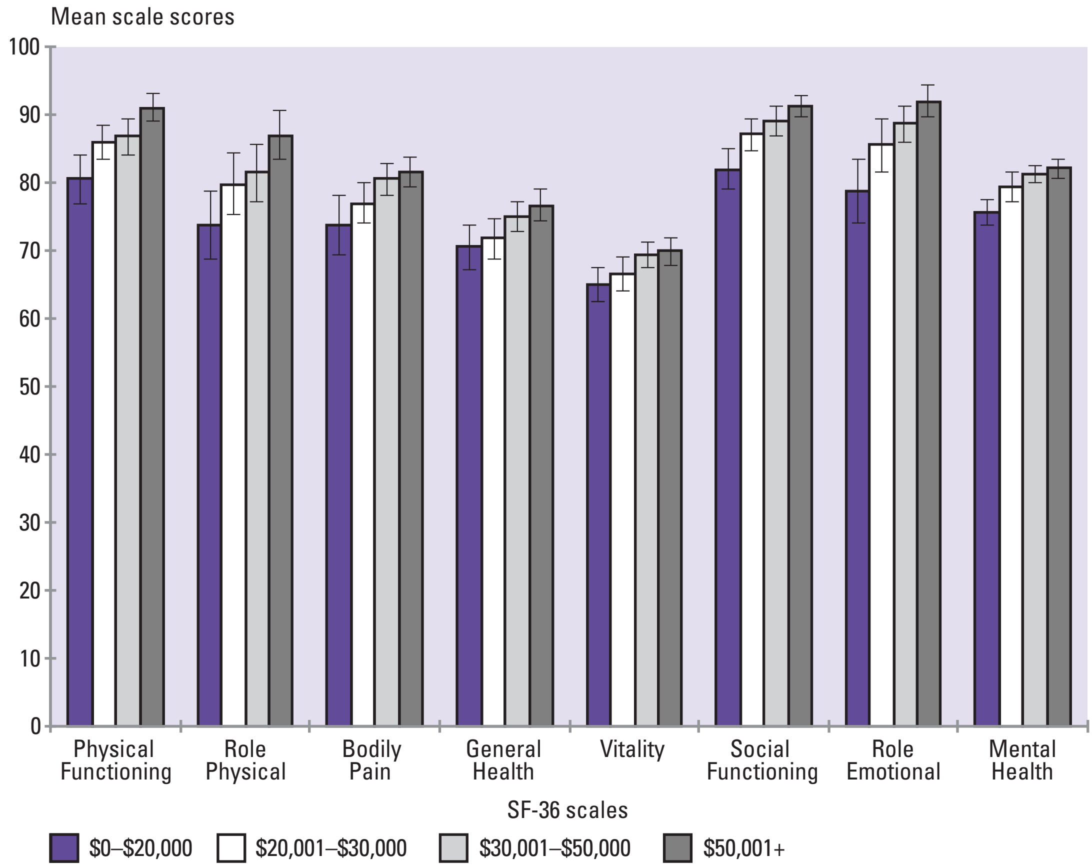
Māori females (see Figure 62) revealed a greater impact of educational status than Māori males, with significant differences between the most and least qualified groups on most of the scales, with the exception of Bodily Pain, General Health and Vitality.

SF-36 profiles by family income

All populations groups showed some tendency for those in the highest income category to have significantly better self-assessed health than those in the lowest income category, on at least some of the scales. As with education, however, there was considerable variability across sex and ethnic group as to how pronounced or systematic this pattern was. The population group showing the clearest gradient of better self-reported health with increasing income was non-Māori males. Non-Māori females and Māori males showed a difference between high and low income groups that was more pronounced for the physical health-related scales. Māori females showed significantly lower health status in the lowest income group relative to the other income groups, but showed no gradient of improvement in health status across the other three income groups.

The relationship between family income and SF-36 scores was found to differ significantly for ethnic group (Māori and non-Māori) and sex on all scales ($p < 0.0001$ for each scale).

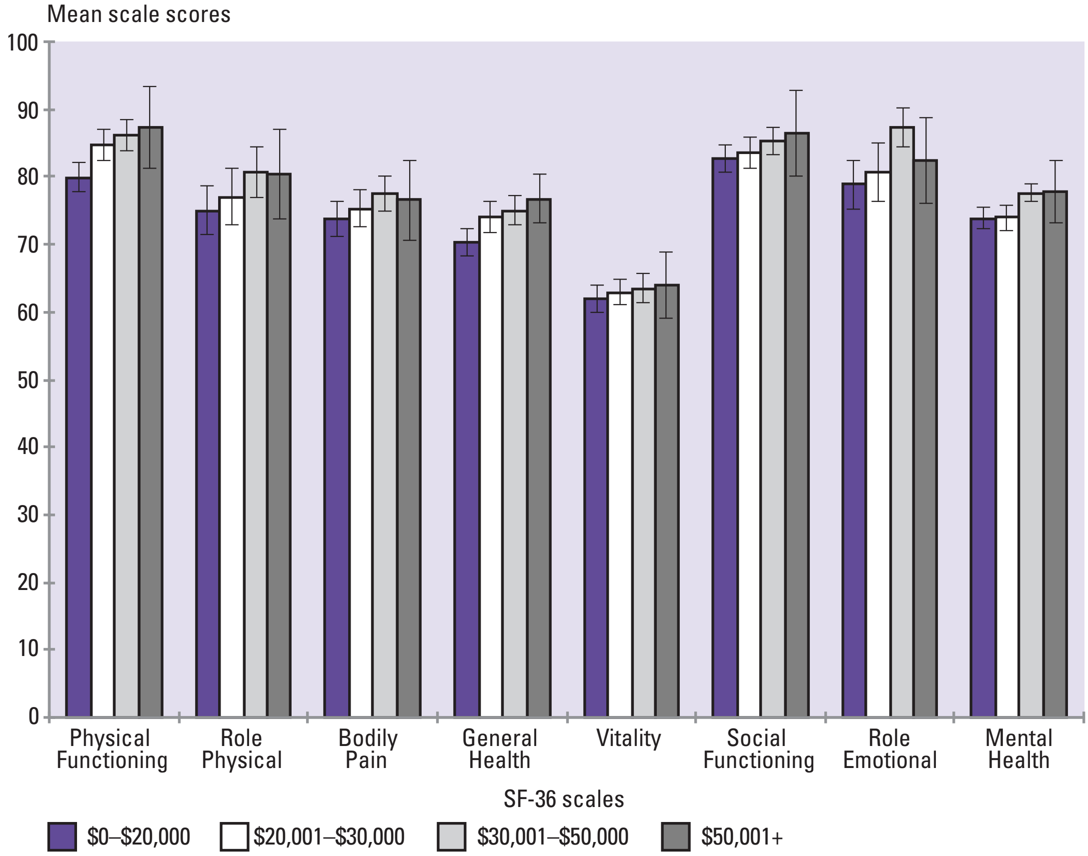
Figure 63: SF-36 profiles, by family income, non-Māori males (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Figure 63 shows a clear gradient for non-Māori males of SF-36 scores increasing with income. The differences between the lowest and highest income groups were significant for each scale, although the differences between each of the four income groups were not always significant.

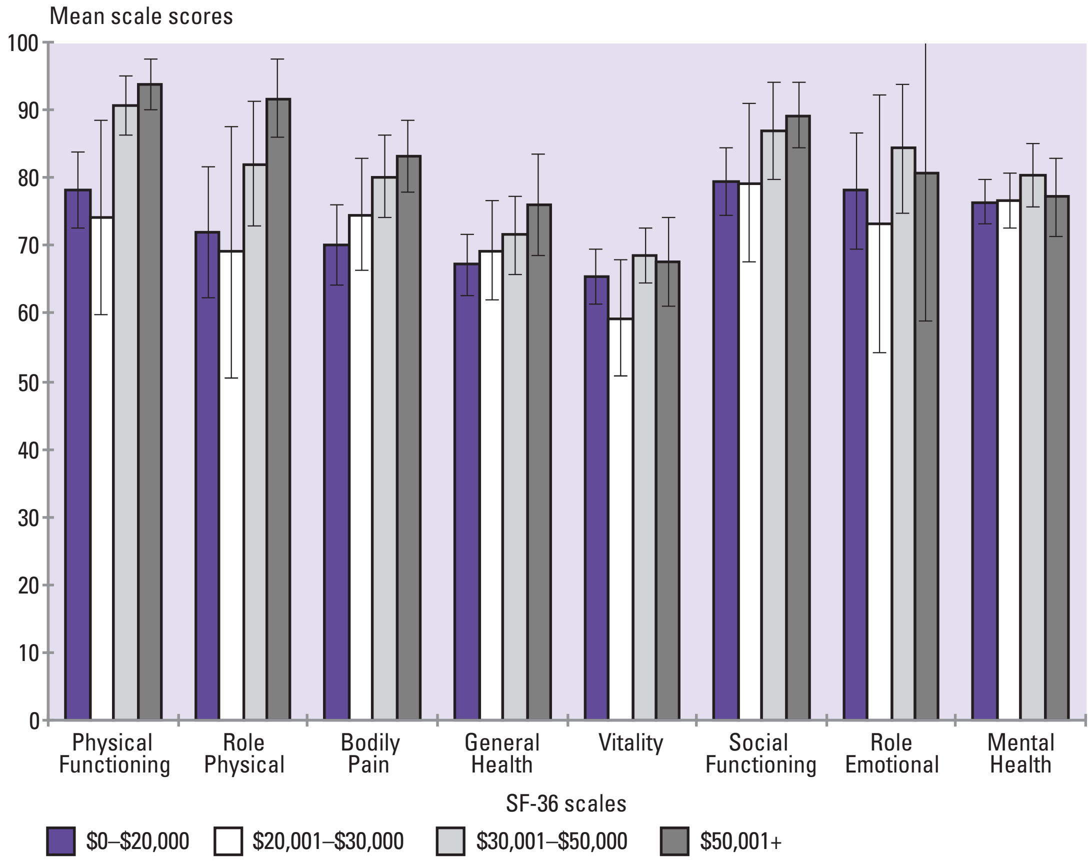
Figure 64: SF-36 profiles, by family income, non-Māori females (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Although there appears to be a similar gradient for non-Māori females of higher scores in higher income groups (see Figure 64), the differences in scores between the lowest and highest income groups were only significant for some of the physical health-related scales (Physical Functioning and General Health).

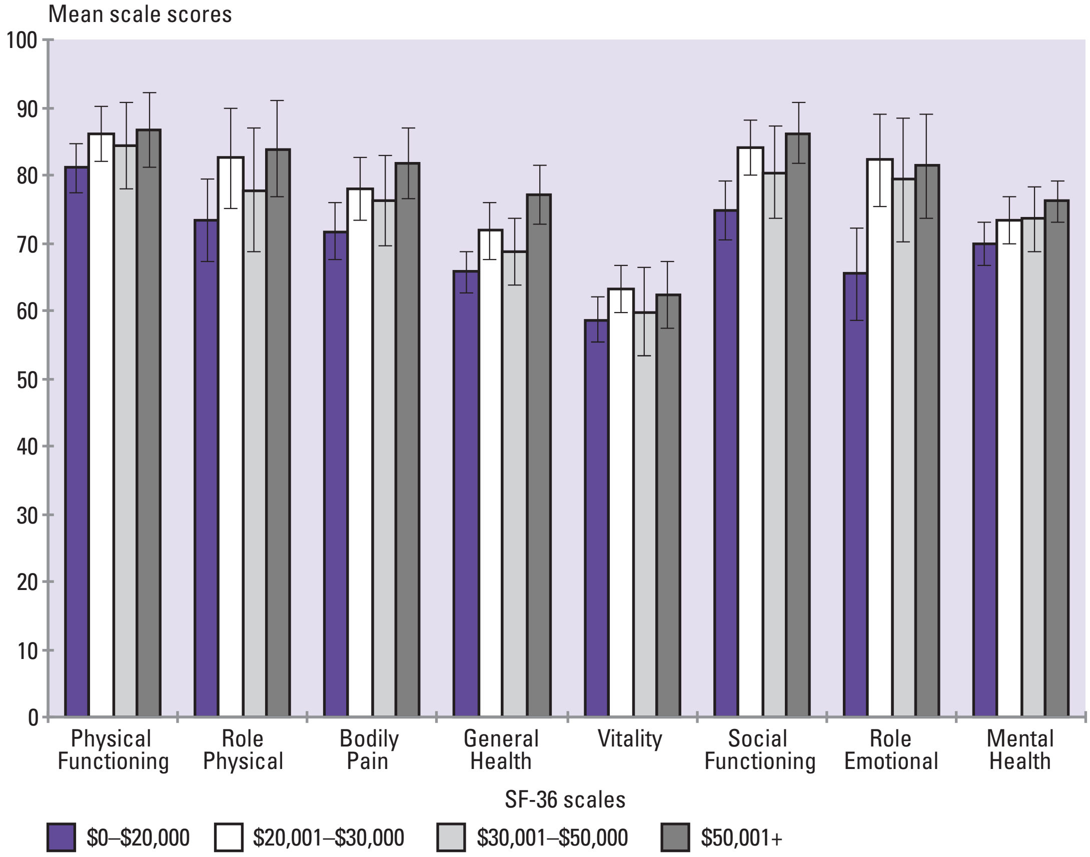
Figure 65: SF-36 profiles, by family income, Māori males (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Māori males (see Figure 65) showed an income-related gradient in self-reported health for most of the scales, with significantly higher scores in the higher income groups for four of the scales: Physical Functioning, Role Physical, Bodily Pain, and Social Functioning.

Figure 66: SF-36 profiles, by family income, Māori females (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Māori females (see Figure 66) showed some income group differential in that there were significant differences in scores between the highest and lowest income groups on most scales (with the exception of Physical Functioning and General Health). They did not show a clear gradient, however, in that scores of the second to lowest income group did not differ significantly from those of the highest income group on any scales.

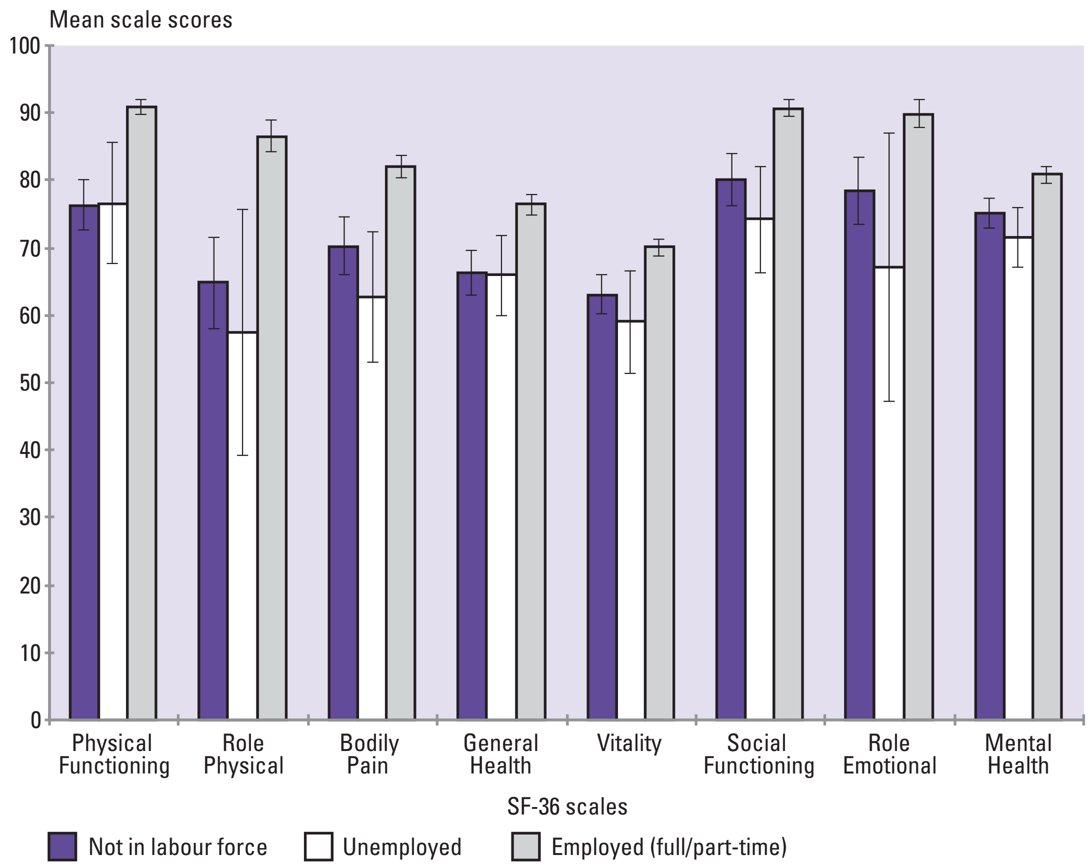
Australian national SF-36 data for equivalised family income groups, stratified by sex (but not ethnicity), showed a clear gradient of higher scores with higher income across all scales, for both sexes (Australian Bureau of Statistics 1997). In New Zealand, then, the relationship between income and self-reported health appears less linear, at least for some sub-population groups, and the impact of income on self-reported health was more pronounced for physical health than mental health.

SF-36 profiles by labour force status

Labour force status impacted quite considerably on both physical and mental self-reported health, particularly for men. For male non-Māori and female Māori, being employed was associated with higher scores than being unemployed, or not in the labour force. Māori males showed the most pronounced differences between the unemployed and not in the labour force groups. The different patterns of labour force status across sex and ethnic group make it unlikely that the impact of this variable can be entirely explained by differences in income between labour force status groups. Rather, perceptions of what it is to be employed, unemployed, or not in the labour force may differ between sex and ethnic groups.

The relationship between labour force status and SF-36 scores was found to differ significantly for ethnic group (Māori and non-Māori) and sex on all scales ($p < 0.0001$ for each scale).

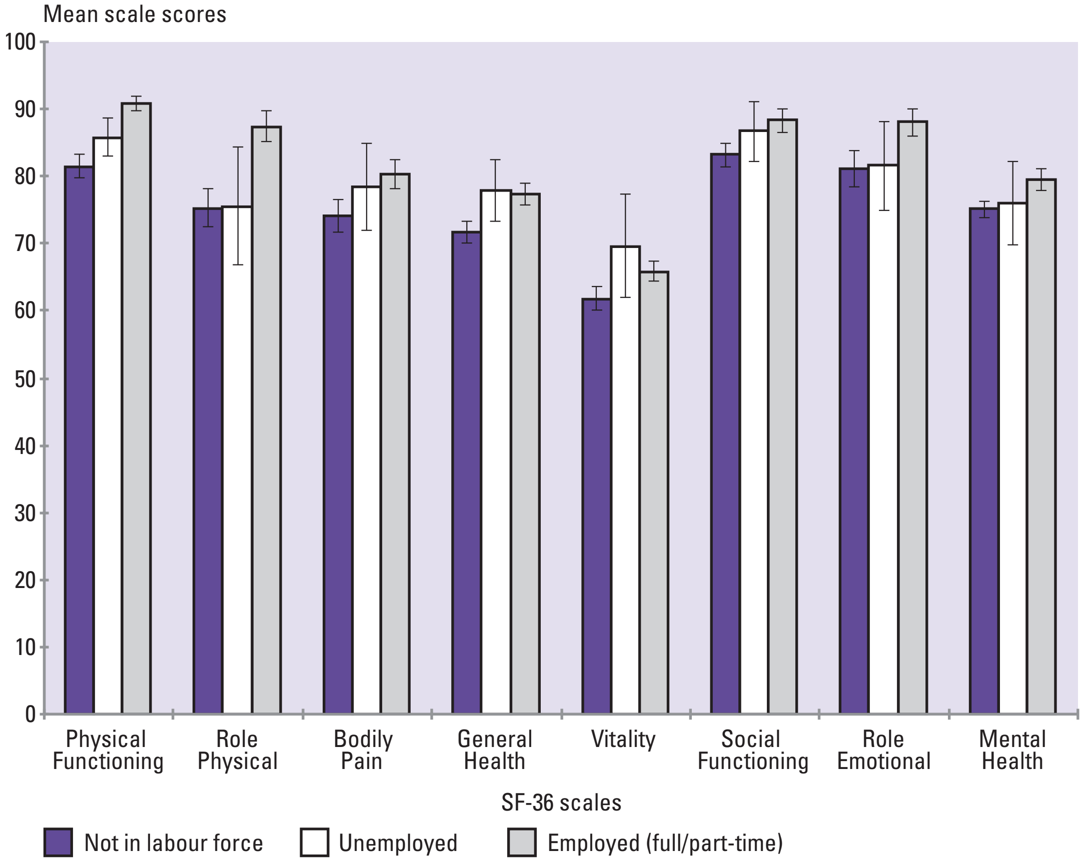
Figure 67: SF-36 profiles, by labour force status, non-Māori males (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

For male non-Māori (see Figure 67), there were significant differences, on all scales, between the employed and the other two groups (unemployed and not in the labour force), with the employed having the better self-reported health. There were no significant differences between the scores for the unemployed and not in the labour force groups.

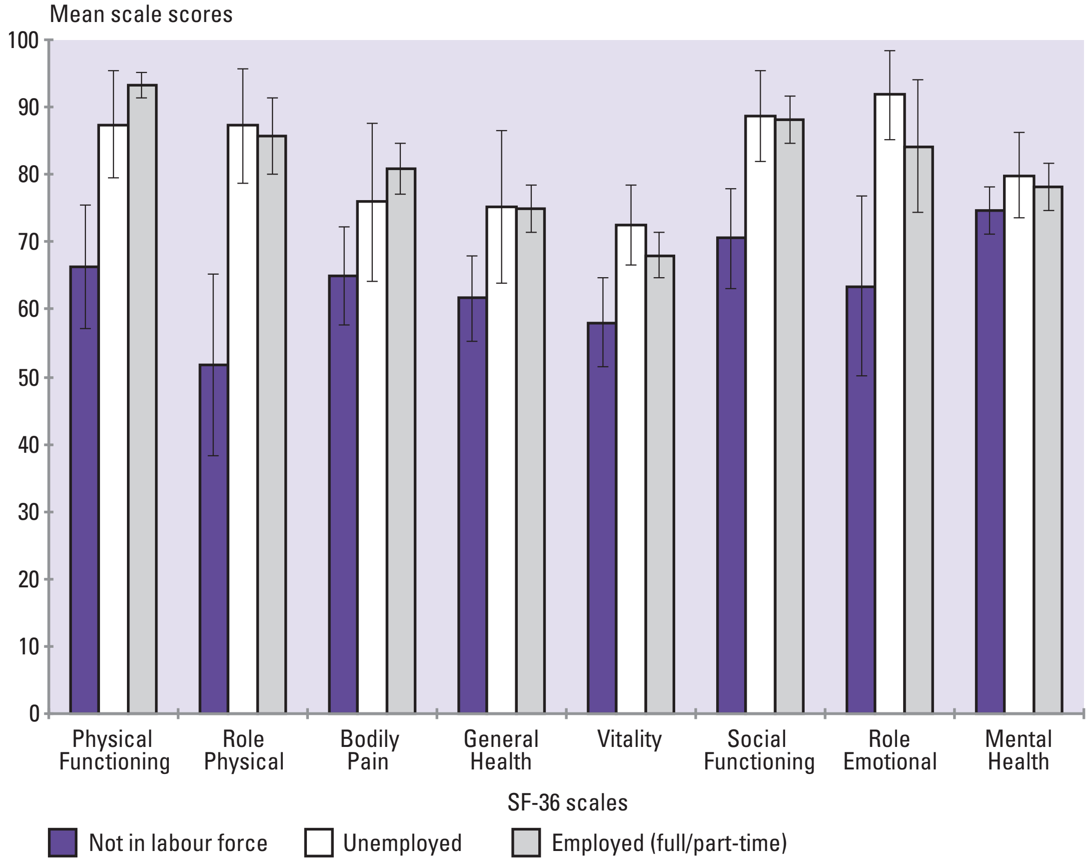
Figure 68: SF-36 profiles, by labour force status, non-Māori females (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Female non-Māori (see Figure 68) showed less pronounced differences between labour force status groups generally, and only showed consistently higher scores for the employed on the Physical Functioning and Role Physical scales.

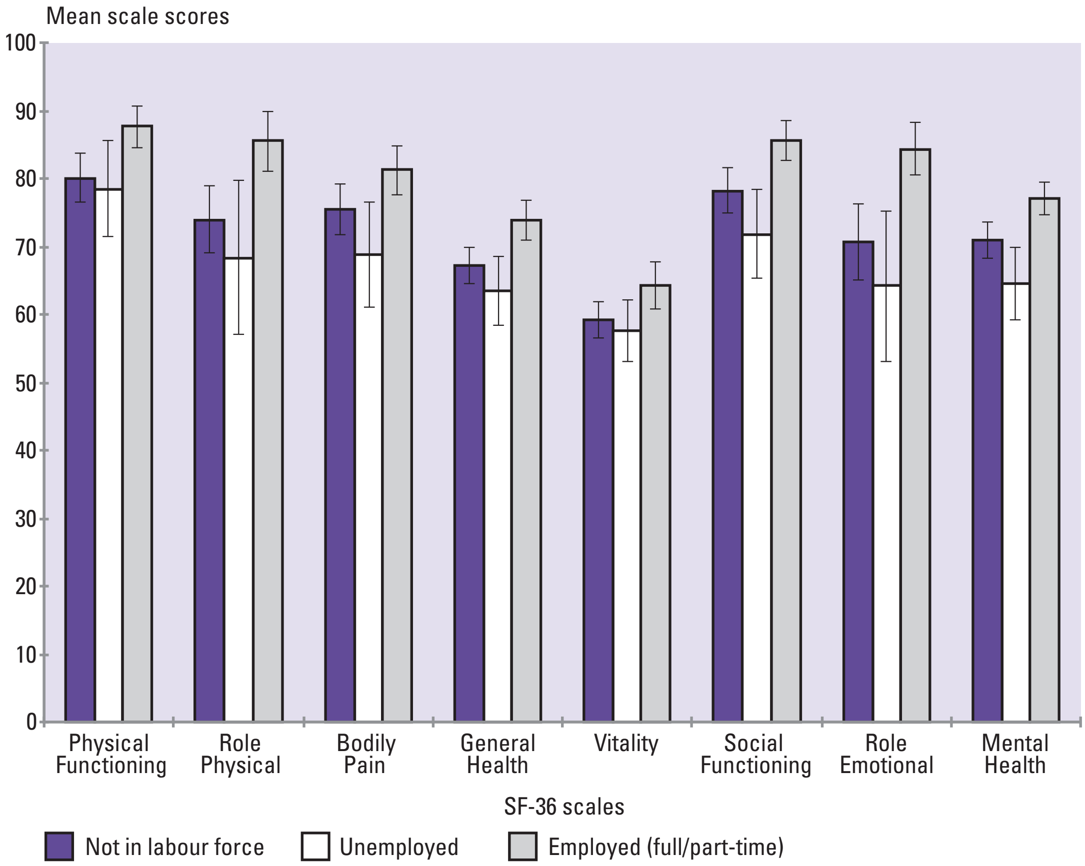
Figure 69: SF-36 profiles, by labour force status, Māori males (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Male Māori (see Figure 69) showed pronounced differences across labour force status groups, but the pattern was quite different from that of male non-Māori. Male Māori did not show any significant differences between employed and unemployed groups, but did show significant differences between unemployed and not in the labour force groups on most scales, with the exception of Bodily Pain and Mental Health.

Figure 70: SF-36 profiles, by labour force status, Māori females (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Female Māori (see Figure 70) showed a very similar, if somewhat less pronounced, pattern to male non-Māori with the employed having significantly higher scores on all scales in comparison with each of the other two groups (unemployed and not in the labour force), and with no significant differences between the unemployed and not in the labour force groups on any scale, except Mental Health.

Australians (Australian Bureau of Statistics 1997) generally showed a similar pattern to New Zealanders, in that the employed showed the highest scores (although the absolute values were higher in the New Zealand sample as indicated above for the total population norms).

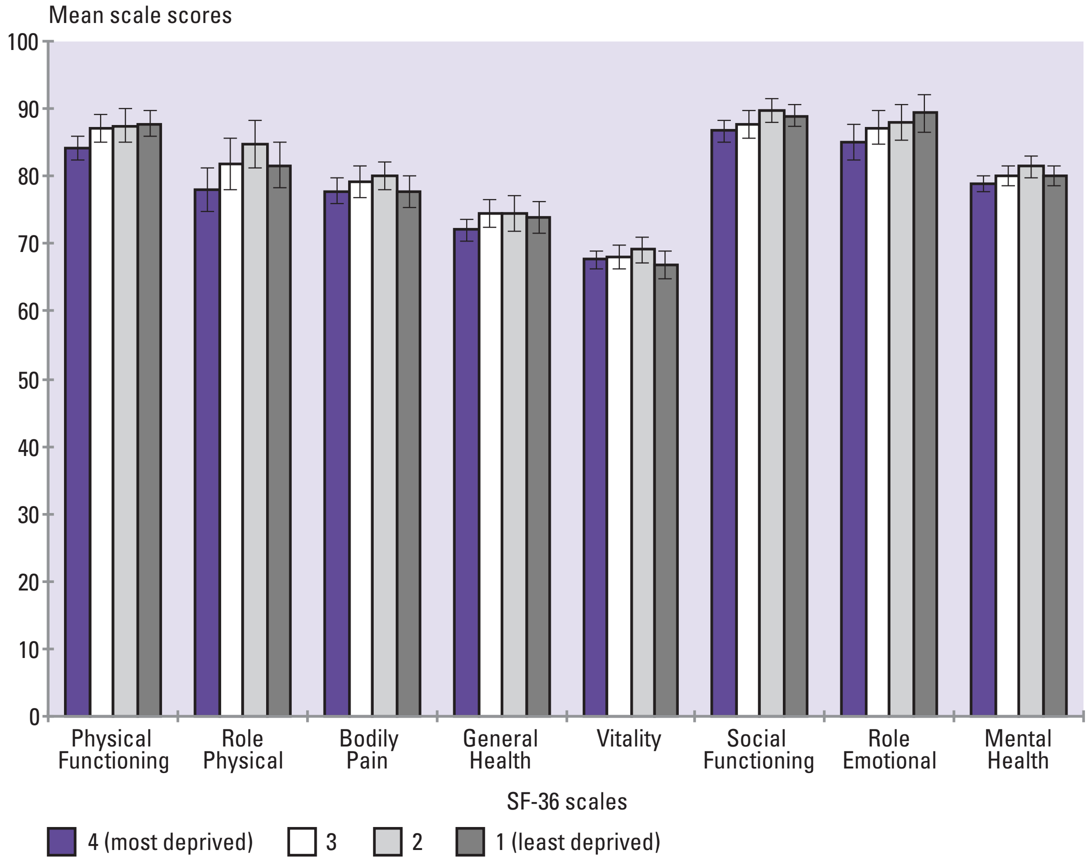
*SF-36 profiles by NZDep96 score**

Non-Māori showed a small tendency for better self-reported health to be associated with lower levels of deprivation, as indexed by the NZDep96 score. This pattern was more systematic (that is, occurred significantly across more of the scales) in non-Māori females than non-Māori males. Māori showed no clear relationship between SF-36 scores and the deprivation index. Explanations may relate to the relationship between childhood health status and adult health status, and/or to the geographic distribution of ethnic groups.

* The NZDep96 score measures the level of deprivation in the area in which a person lives, according to a number of census variables, such as the proportion of people in that area who earn low incomes or who receive income support benefits, are unemployed, do not own their own home, have no access to a car, are single-parent families, or have no qualifications. The scores are divided into quartiles from 1 (least deprived) to 4 (most deprived). For more details, see Chapter 1: The Survey.

The relationship between the NZDep96 index and SF-36 scores was found to differ significantly for ethnic group and sex on all scales (all $p < 0.0001$, except for Role Physical ($p < 0.0005$) and Bodily Pain ($p < 0.01$)).

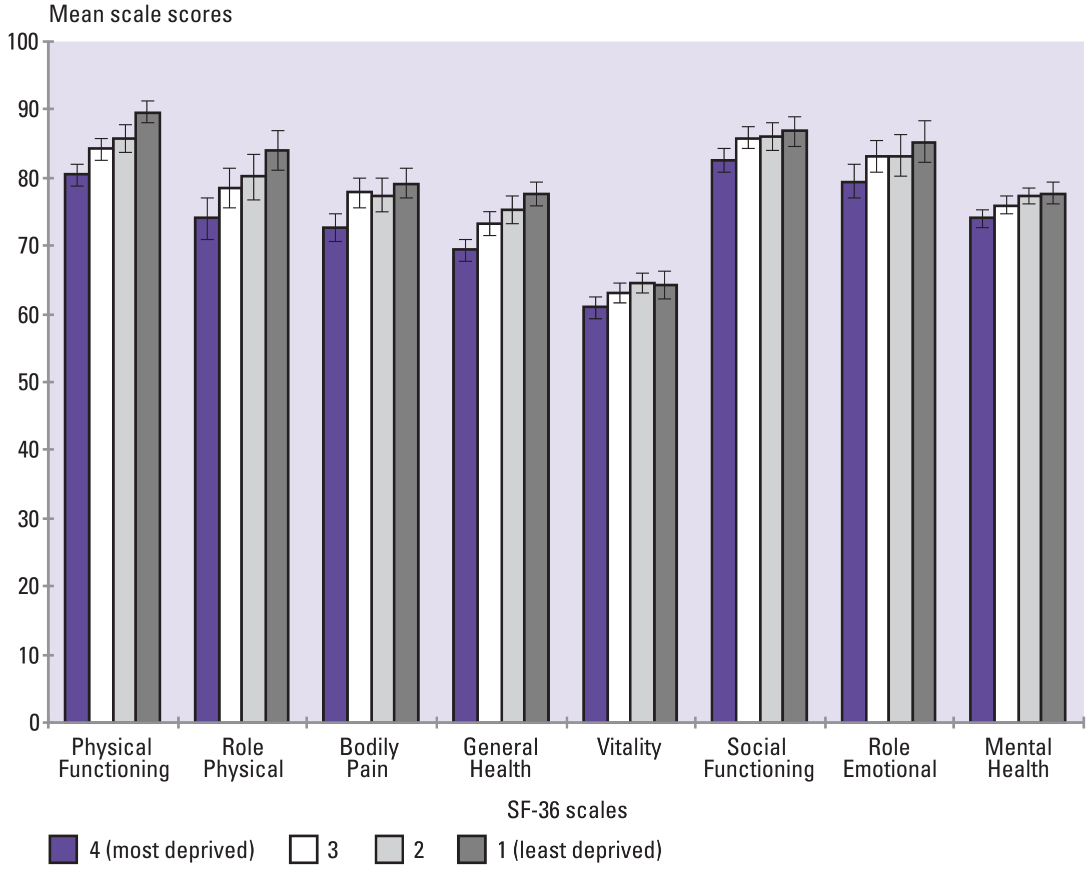
Figure 71: SF-36 profiles, by NZDep96 score, non-Māori males (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Non-Māori males (see Figure 71) showed a tendency for the most deprived groups to have the lowest scores, but this did not apply to all scales. The most deprived groups had significantly lower scores relative to one of the two least deprived groups on three of the scales (Physical Functioning, Social Functioning and Role Emotional).

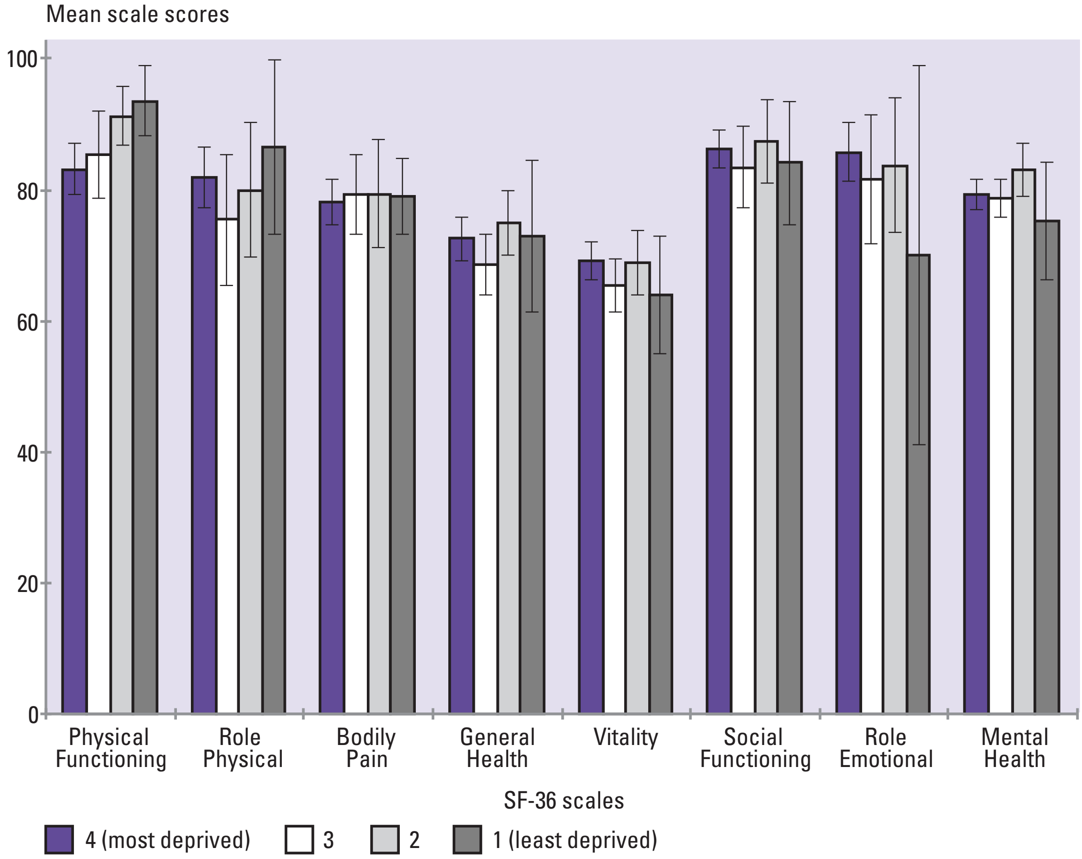
Figure 72: SF-36 profiles, by NZDep96 score, non-Māori females (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Non-Māori females (see Figure 72) showed a clearer gradient than non-Māori males, with slightly larger differences in scores between deprivation groups, and significant differences in scores between the most and least deprived groups on all scales.

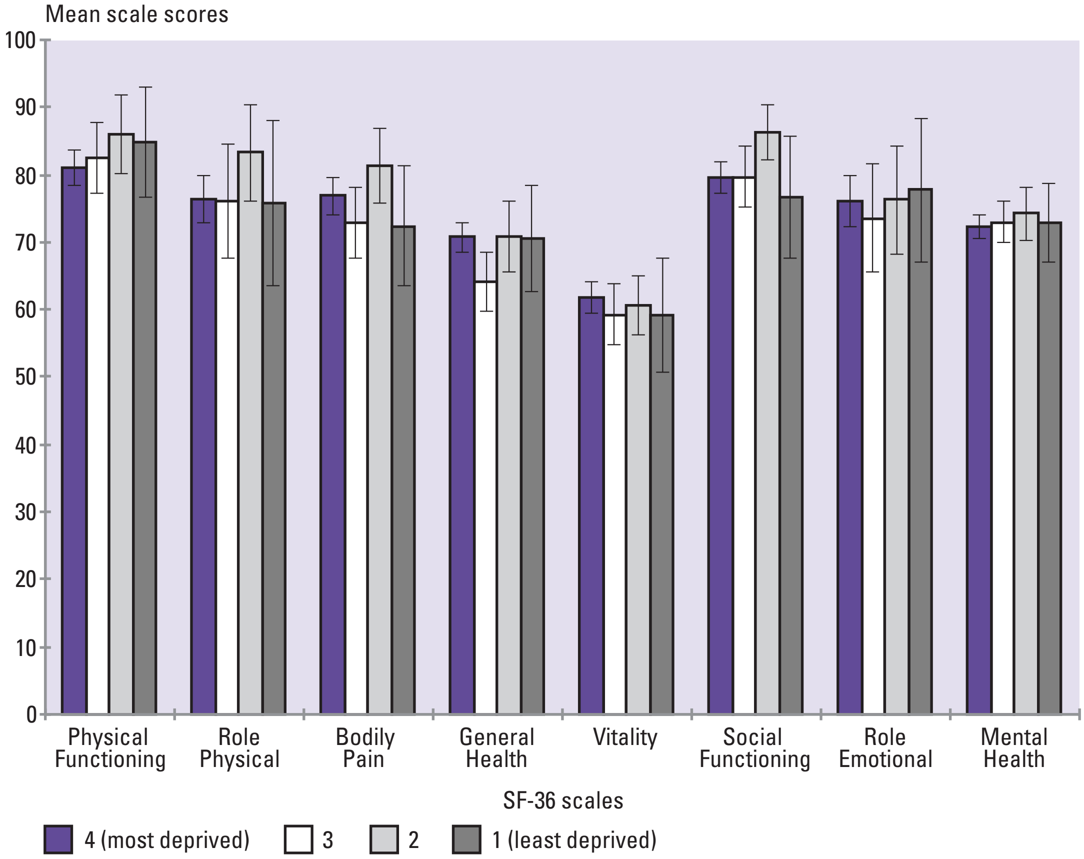
Figure 73: SF-36 profiles, by NZDep96 score, Māori males (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Male Māori (see Figure 73) showed no clear relationship between the deprivation score and self-reported health. The most deprived group had a significantly lower score than the least deprived group on one scale only (Physical Functioning).

Figure 74: SF-36 profiles, by NZDep96 score, Māori females (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

As with Māori males, Māori females (see Figure 74) showed no systematic pattern in SF-36 scores by deprivation score, with no significant difference between the most and least deprived groups on any scale.

Explanations for this lack of relationship between NZDep96 scores and self-reported health in Māori may relate to the geographic distribution of ethnic groups in New Zealand. Those Māori in the least deprived category are more likely to be living in a predominantly non-Māori community, which may perhaps have some negative consequences for self-reported health. An alternative explanation focuses on the extent to which adult health status is determined by child health status (Hart et al 1998). People living in the least deprived areas as adults may, as children, have been brought up in the more deprived areas. This may have adverse effects on their health and may explain why current health status does not show the expected association with area level of deprivation. It is possible that this is more likely to have occurred among Māori than non-Māori.

SF-36 and socioeconomic indicators: conclusion

There is considerable literature documenting a close association between different measures of socioeconomic status (SES) and health outcomes (National Advisory Committee on Health and Disability 1998). This association was demonstrated in some of the findings presented above; however, the relationship between the SF-36 and SES indicators was not always clear-cut. That is, the frequently documented linear association between improving health status and increasing SES did not occur systematically in both ethnic groups, or in both sexes, for all variables. This variability may be explained by one or a combination of the following considerations:

- Differences in health status between Māori and non-Māori cannot be totally explained by SES: cultural factors also play a role (Pearce et al 1983; Pearce et al 1993).
- SES variables such as labour force status and income may have different meanings for different cultures, and for males and females (Angel and Gronfein 1988).
- Most of the SES variables included in this analysis measure current SES and fluctuate considerably across time. They are confounded, therefore, by the extent to which adult health status is determined by childhood health status and environment. A number of studies have concluded that the main influence of SES on health outcomes is a cumulative one, acting across the life span (Hart et al 1998).

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Chapter 11: SF-36 Health Status Questionnaire: Health Risk Behaviours, Specific Conditions and Health Service Utilisation

Key points

- Smoking status had some impact on self-reported health, particularly amongst non-Māori, though less than its effect on objective health status.
- Increasing duration of physical activity was generally associated with higher SF-36 scores.
- Low-to-moderate consumers of alcohol had, on the whole, better self-reported health than either non-drinkers, or heavier drinkers.
- The cross-sectional nature of the survey makes it unclear whether lower health status was a consequence of the adoption of certain patterns of behaviour, or a determinant of them.
- High blood pressure had considerable impact on SF-36 scores, particularly amongst Māori, perhaps reflecting ethnic differences in stage or implications of diagnosis.
- Diabetes had some impact on self-reported health, though again this was more pronounced in Māori.
- Those who had made fewest visits to their GP and had no hospital admissions in the past 12 months had the best self-reported health.

Results

SF-36* profiles by health risk behaviours

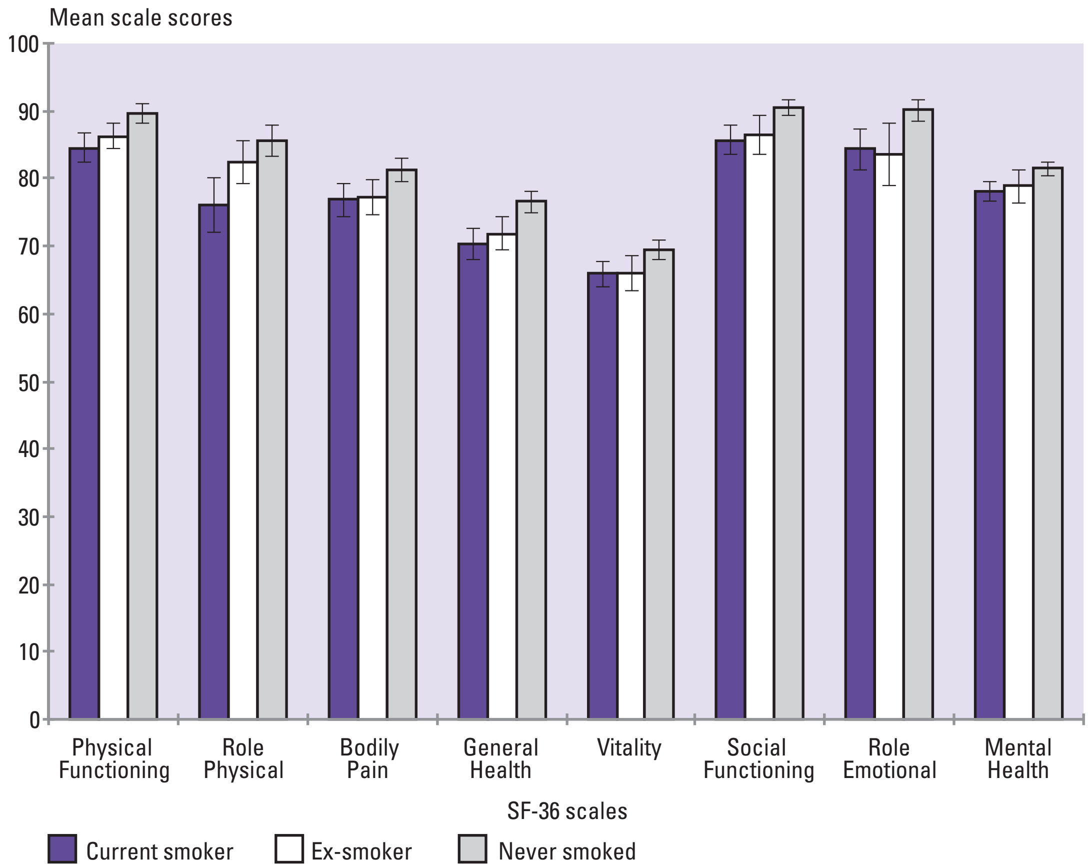
SF-36 profiles by smoking status

Smoking status affected self-reported health, both physical and mental, although less profoundly than its generally accepted effect on objective health status. On the SF-36 the self-reported health advantage for never-smokers occurred more systematically in non-Māori than in Māori, and amongst Māori occurred more for females than for males. Explanations for some of these patterns may relate to a discrepancy between the nature and degree of the subjective effects of smoking (some of which may be perceived of as positive, for example, as stress relief) and the profound, negative objective effects.

The relationship between smoking status (current smoker, ex-smoker and never-smoker) and SF-36 scores was found to differ significantly for ethnic group and sex on all scales ($p < 0.0001$ for each scale).

* See Chapter 10 for an introduction to the SF-36.

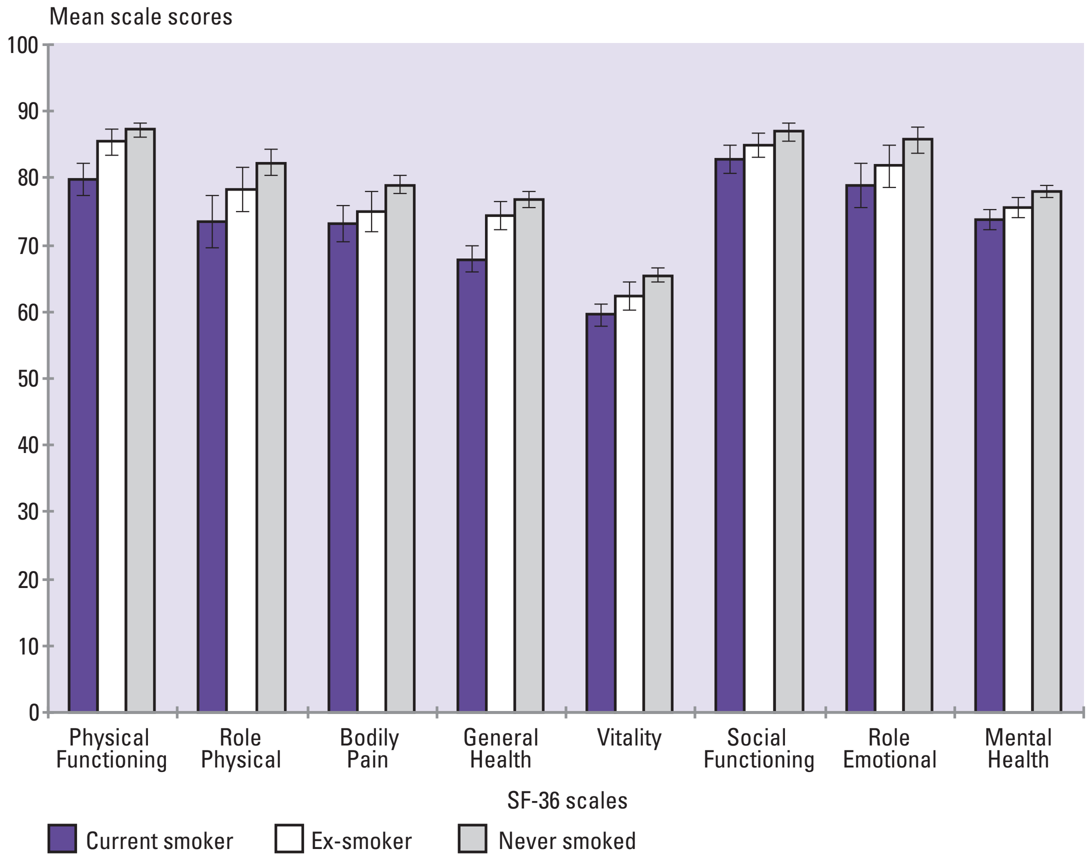
Figure 75: SF-36 profiles, by smoking status, non-Māori males (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Non-Māori males showed a clear pattern of highest ratings for self-assessed health in the never-smoked group (see Figure 75). This group had significantly higher scores than the current smoker group on all scales, and they were significantly higher than the ex-smoker group on most scales, except Role Physical and Mental Health.

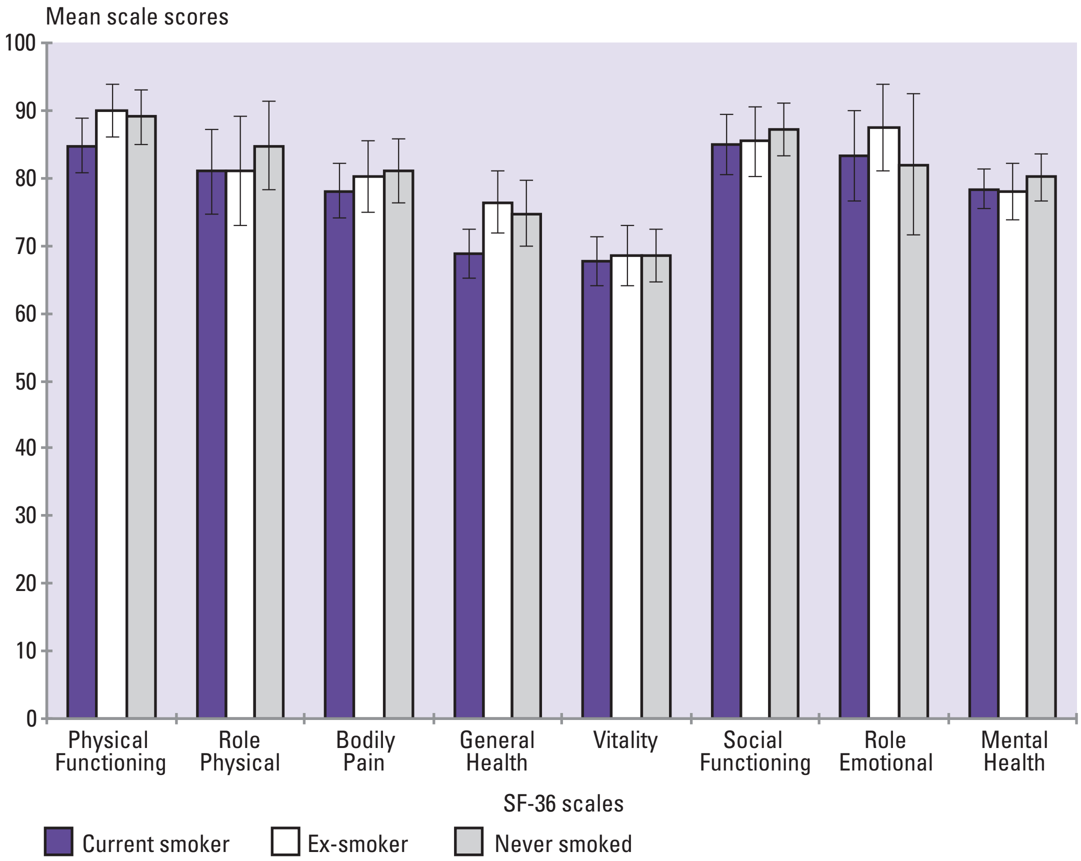
Figure 76: SF-36 profiles, by smoking status, non-Māori females (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

As Figure 76 illustrates, non-Māori females exhibited a similar pattern to non-Māori males, showing significantly higher scores amongst the never-smoked group relative to current smokers on all scales.

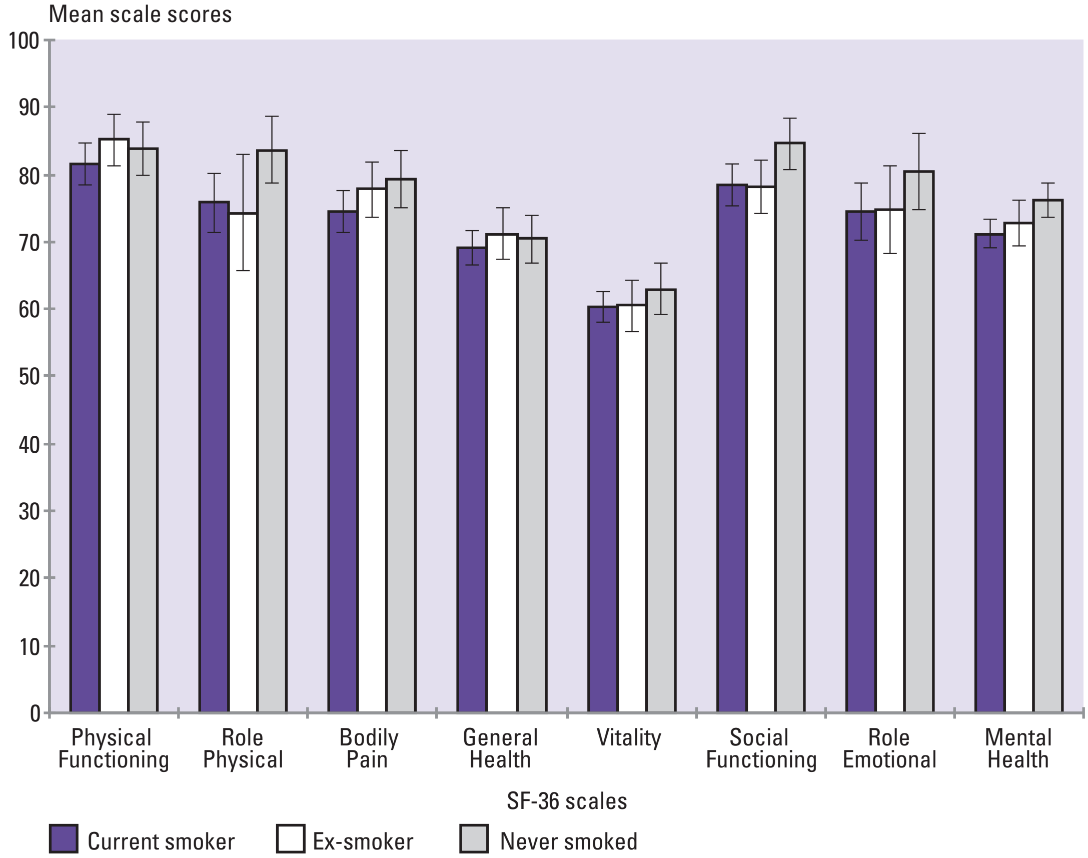
Figure 77: SF-36 profiles, by smoking status, Māori males (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Among Māori males the never-smoked group did not score significantly higher than current smokers on any scale, nor did they rate their health significantly higher than ex-smokers on any scale (see Figure 77).

Figure 78: SF-36 profiles, by smoking status, Māori females (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Māori females showed a rather more differentiated pattern between the smoking groups than Māori males (see Figure 78). The never-smoked group scored significantly higher than the current smokers on three of the scales (Role Physical, Social Functioning and Mental Health), though only significantly higher than ex-smokers on the Social Functioning scale.

Although these data showed statistically significant differences in self-reported health amongst groups differing in smoking status, the differences are smaller than the well-documented profound objective effect of smoking on physical health (see Chapter 2: Smoking). There may be several explanations for this. Smoking probably has fewer immediately discernible effects on health relative to its known long-term consequences. Also, self-reported health in relation to smoking is likely to be influenced by the extent to which smoking is considered socially acceptable amongst some sub-groups in the population, such as young women. These data may also reflect the perception among some smokers that smoking relieves stress. This latter possibility may be particularly pertinent to Māori.

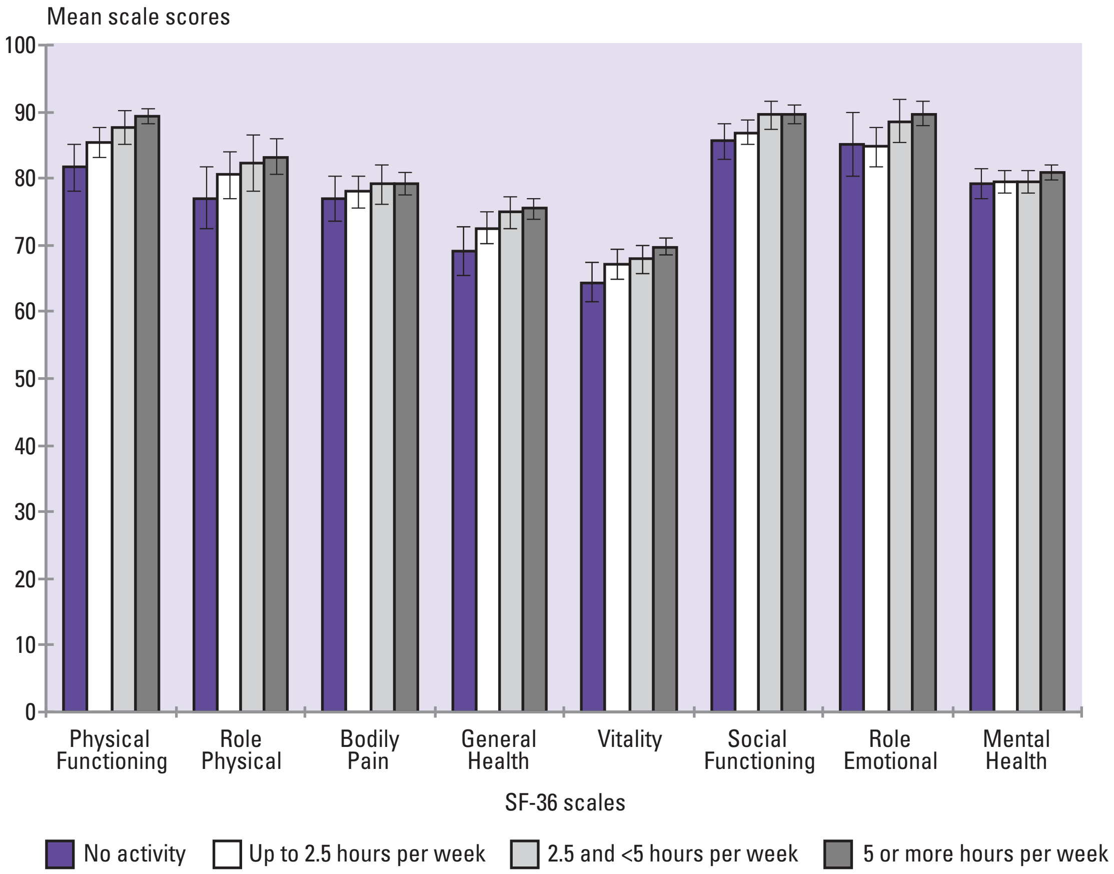
A British study (Lyons et al 1994) on SF-36 scores among smokers and non-smokers found significantly poorer health status in smokers (including current and ex-smokers) after adjusting for age, sex, alcohol intake and social group. However, the differences were only significant for the four scales relating to physical health, together with the Vitality scale. Similarly, Tillman and Silcock (1997) found that smoking status only significantly affected scores on three of the SF-36 scales (Vitality, General Health and Mental Health).

SF-36 profiles by physical activity

> Duration of physical activity was associated with higher SF-36 scores in both ethnic groups, although the direction of the effect is unclear; that is, whether level of physical activity is influencing health status, or is the result of it. The relationship between duration of physical activity and SF-36 scores was more systematic (occurring across more of the scales) in non-Māori, and most systematic of all in non-Māori females. Non-Māori females were the only group to show an association between duration of physical activity and the Mental Health scale.

The relationship between duration of physical activity and SF-36 scores was found to differ significantly for ethnic group and sex on all scales ($p < 0.0001$) except Bodily Pain. For discussion on the definition of physical activity, see Chapter 3: Physical Activity.

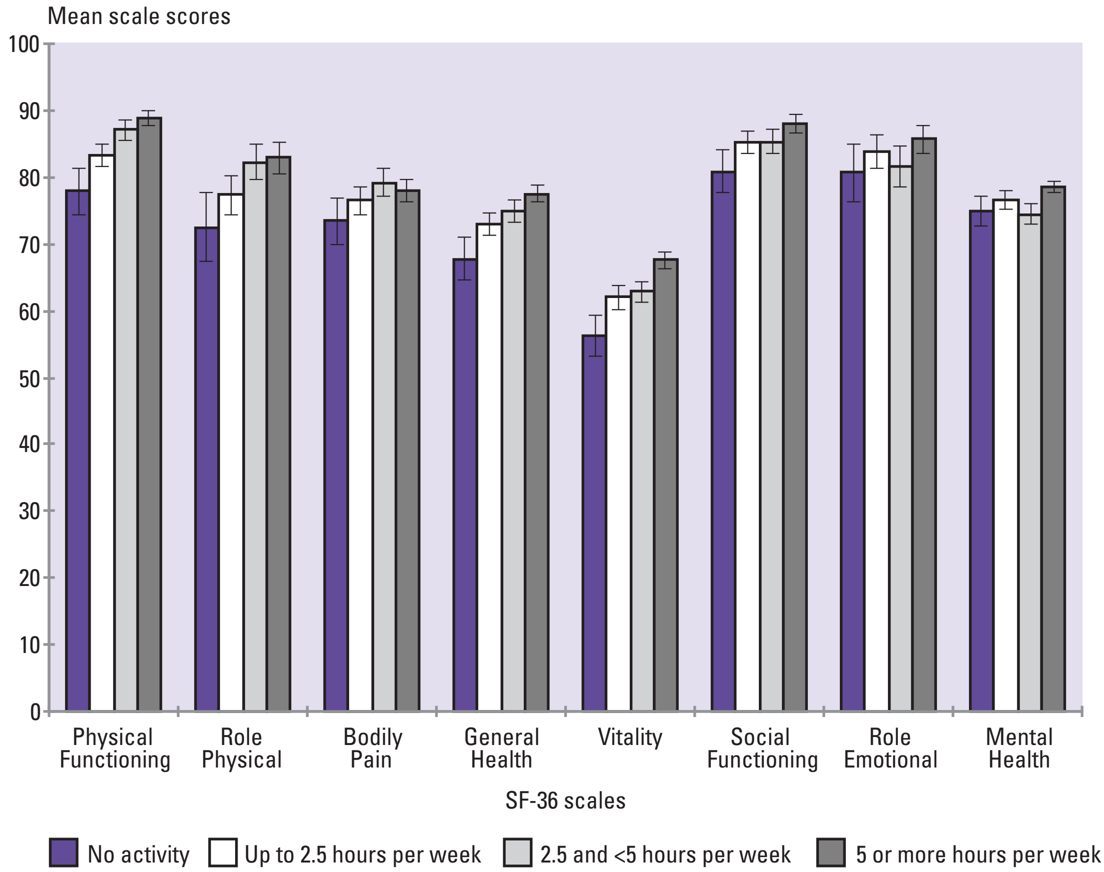
Figure 79: SF-36 profiles, by duration of physical activity, non-Māori males (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Non-Māori males showed a gradient of increasing self-reported health with increasing duration of physical activity (see Figure 79). This emerged as a significant effect between the two most extreme groups (no activity versus five or more hours per week) on the Physical Functioning, Role Physical, General Health, Vitality and Social Functioning scales.

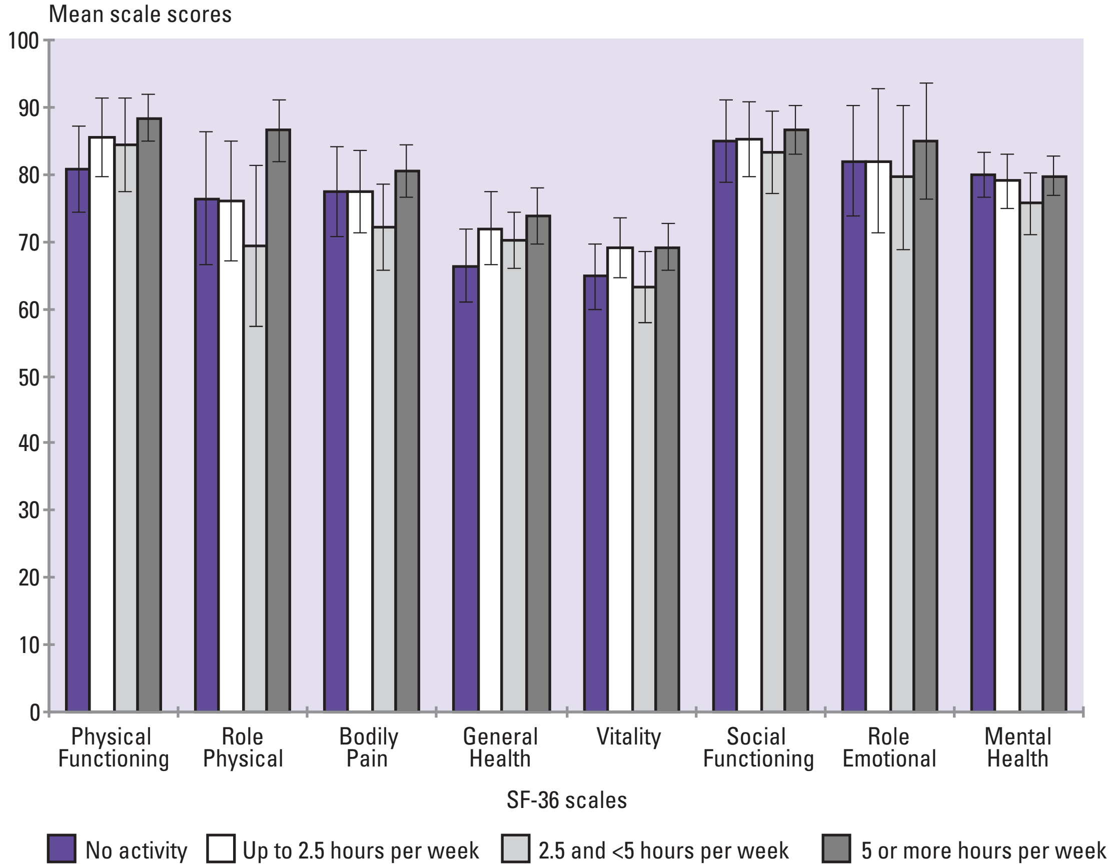
Figure 80: SF-36 profiles, by duration of physical activity, non-Māori females (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

In non-Māori females a similar but slightly more pronounced gradient occurred, with those engaged in five or more hours of activity per week having significantly higher scores on all scales, compared with those engaged in no activity (see Figure 80).

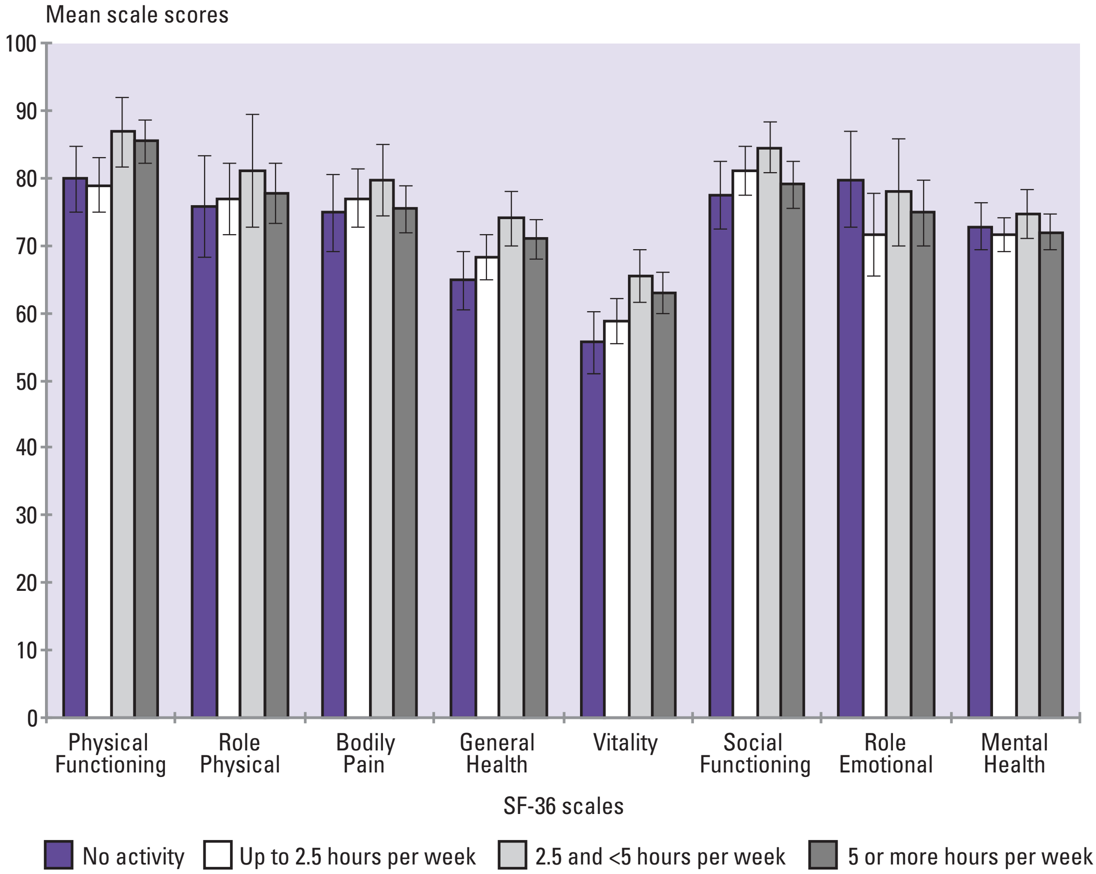
Figure 81: SF-36 profiles, by duration of physical activity, Māori males (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Māori males showed a more variable pattern than non-Māori, with significant differences between the two extremes of physical activity duration on only two of the scales related to physical health (Physical Functioning and General Health) (see Figure 81).

Figure 82: SF-36 profiles, by duration of physical activity, Māori females (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Māori females showed a significant difference between the two extremes of physical activity duration on two scales (General Health and Vitality) (see Figure 82). They also showed a tendency, which was significant on one scale (Social Functioning), for the group with the second to highest duration of activity to have higher scores than the group with the highest duration.

Due to the cross-sectional nature of these data, it is not clear whether people who do less exercise feel less healthy as a consequence, or whether people who feel less well therefore do less exercise. Probably both apply.

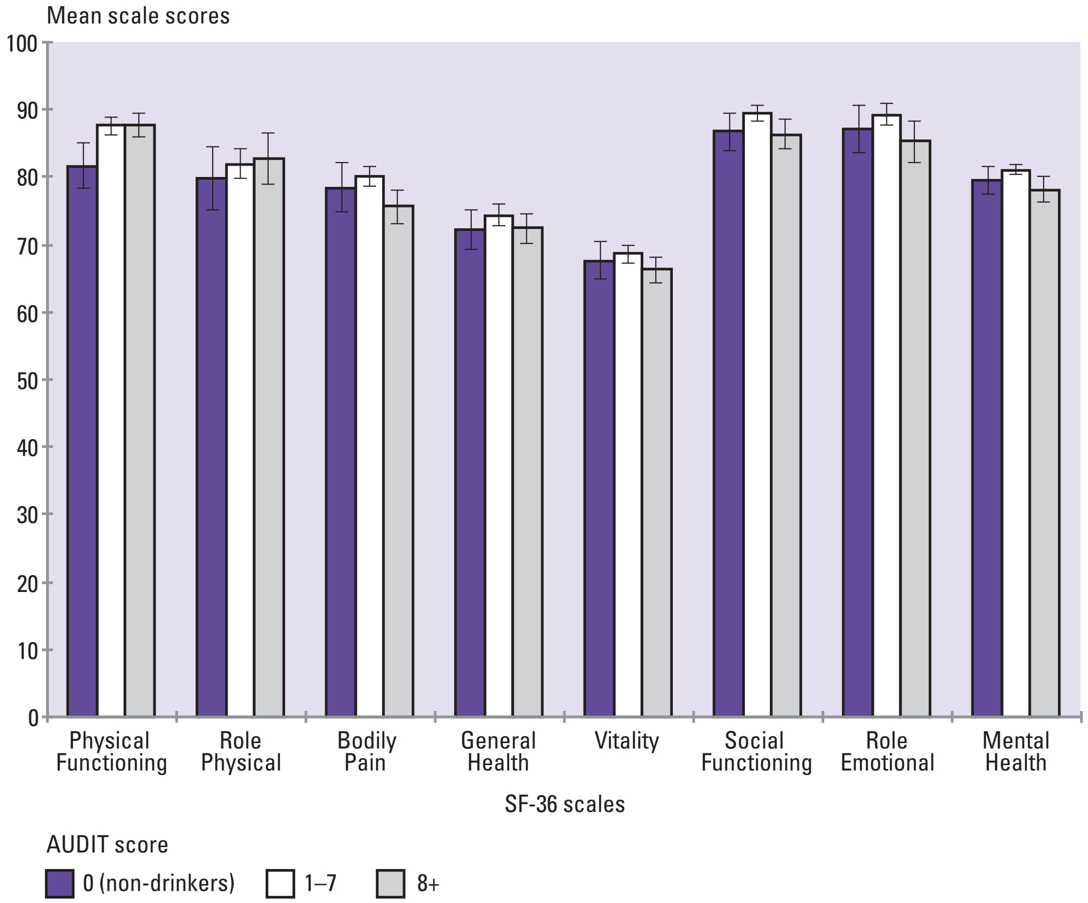
SF-36 profiles by AUDIT score (alcohol)

Low-to-moderate drinkers, on the whole, had better self-reported health than either non-drinkers or potentially hazardous drinkers. Across all groups the advantage of low-to-moderate drinking over non-drinking showed most consistently on the Physical Functioning scale, while the relative advantage of low-to-moderate drinking over heavier drinking emerged mostly consistently on the Mental Health scale. Whether drinking patterns are influencing health status, or vice versa, is uncertain.

Respondents were classified into three groups with regard to alcohol consumption: non-drinkers; those who scored 1–7 on AUDIT ('low-to-moderate drinkers'); and those who scored 8 or more on AUDIT ('potentially hazardous drinkers'). For more information about AUDIT, see Chapter 5: Alcohol Use.

The relationship between alcohol consumption group and SF-36 scores was found to differ significantly for ethnic group and sex, for all scales ($p < .0001$, except Role Physical ($p < .01$) and Bodily Pain ($p < .05$)).

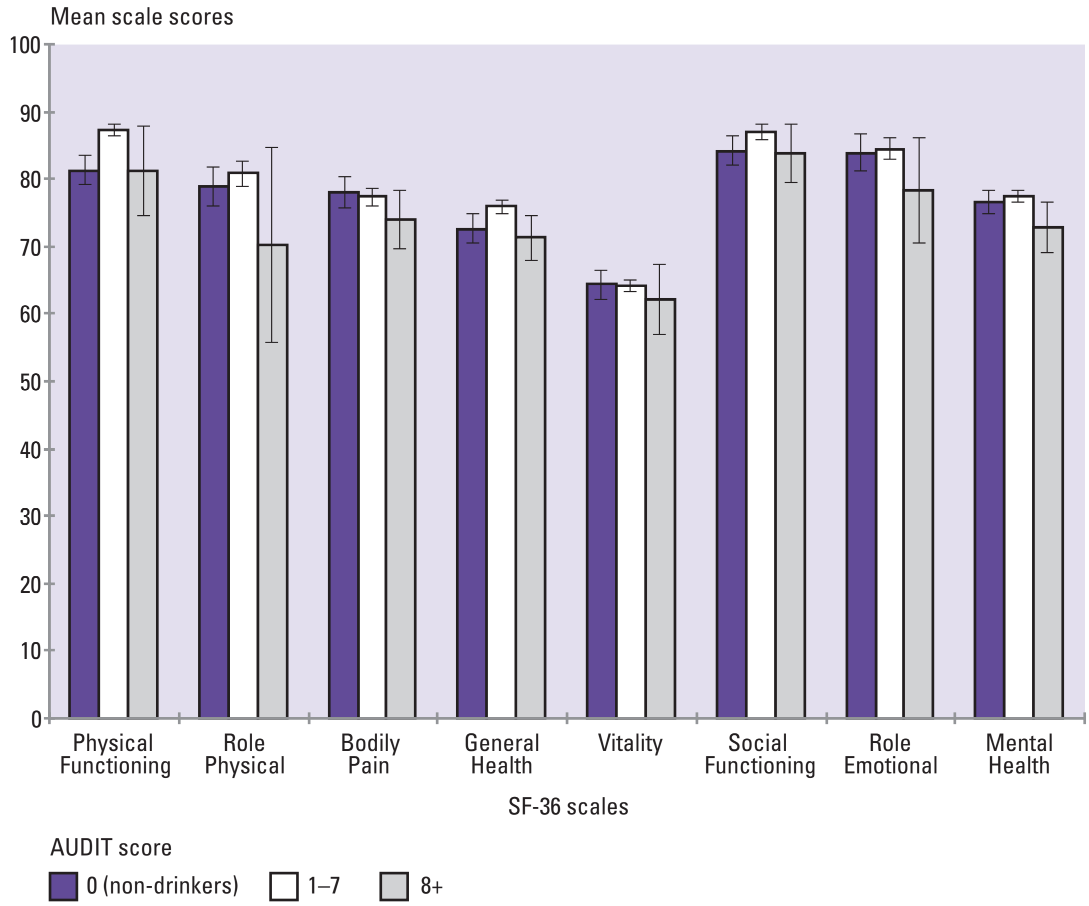
Figure 83: SF-36 profiles, by AUDIT score, non-Māori males (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Figure 83 shows that self-reported health amongst non-Māori males was generally best in the group scoring 1–7 on AUDIT: the low-to-moderate drinkers. This group scored significantly higher than non-drinkers on the Physical Functioning scale, and significantly higher than the potentially hazardous drinkers (AUDIT score of 8+) on the Bodily Pain scale and the three scales most associated with mental health (Social Functioning, Role Emotional and Mental Health).

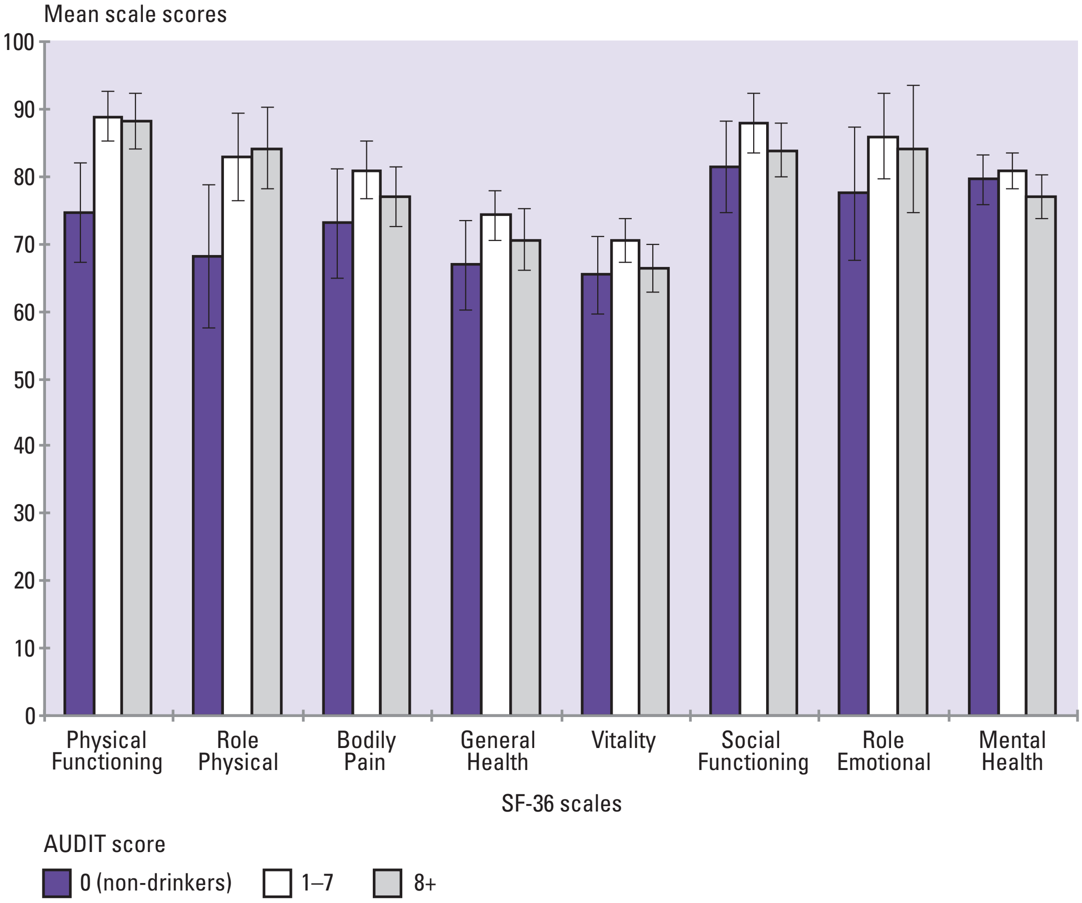
Figure 84: SF-36 profiles, by AUDIT score, non-Māori females (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Non-Māori females (see Figure 84) also tended to show the highest SF-36 scores in the low-to-moderate drinkers group, which scored significantly higher than non-drinkers on the Physical Functioning, General Health and Social Functioning scales, and significantly higher than potentially hazardous drinkers on the General Health and Mental Health scales.

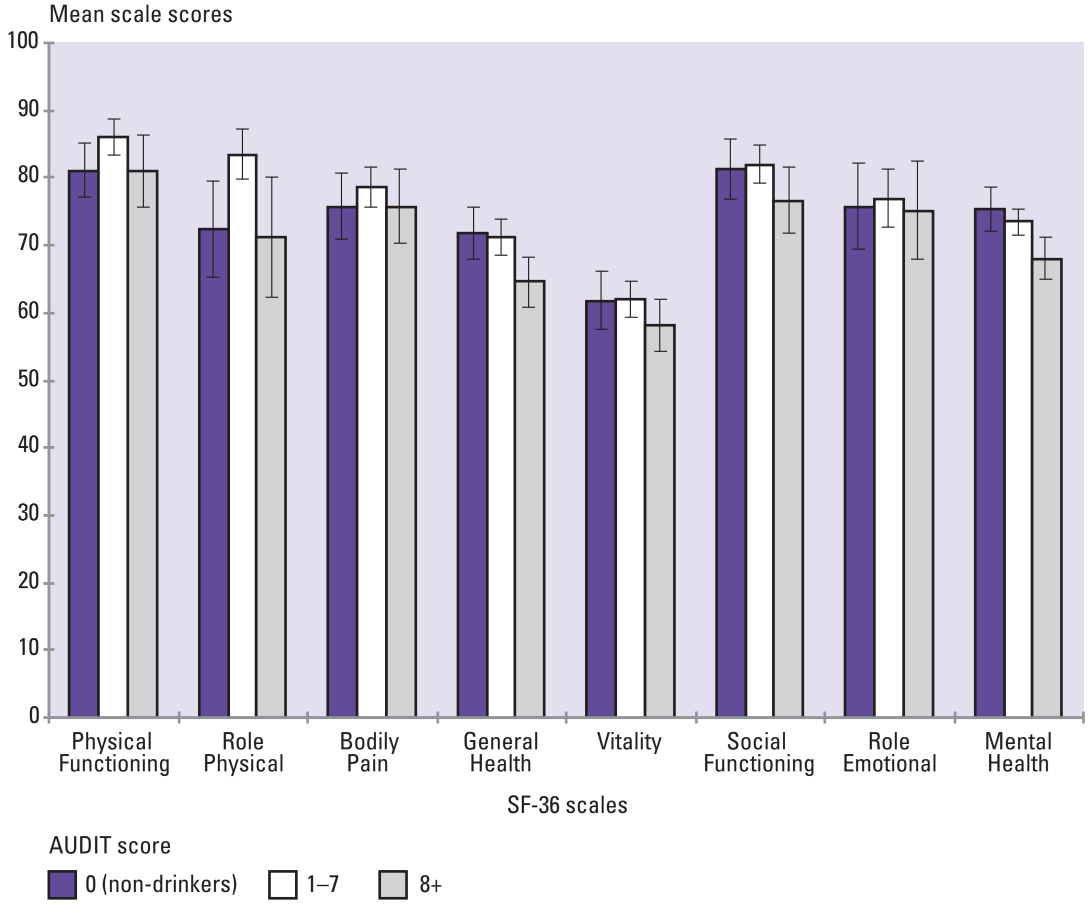
Figure 85: SF-36 profiles, by AUDIT score, Māori males (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

In Māori males (see Figure 85) the same general trend occurred for the low-to-moderate drinking group to have the higher scores, at least relative to non-drinkers, although the group differences were not always statistically significant. The low-to-moderate drinkers had significantly higher scores than non-drinkers for the Physical Functioning and Role Physical scales, and significantly higher scores than potentially hazardous drinkers for the Vitality scale.

Figure 86: SF-36 profiles, by AUDIT score, Māori females (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Māori females (see Figure 86), showed a similar pattern to Māori males, with significantly better self-reported health for the low-to-moderate drinkers relative to non-drinkers on the Physical Functioning and Role Physical scales. Māori females showed a significant advantage of low-to-moderate drinking relative to potentially hazardous drinking on the Role Physical, General Health and Mental Health scales.

The suggestion of an advantage of low-to-moderate drinking over not drinking at all, or heavier drinking, is not new. There have been many reports of this J- or U-shaped association between alcohol and all-cause mortality (Brenner et al 1997; Anderson 1996; Poikalainen 1995; Duffy 1995). It has also been found in subjective assessments of health, using the single self-rated health question (Poikalainen et al 1996) and amongst primary care patients using the SF-36 (Volk et al 1997).

The public health literature documenting the consequences for health of heavier drinking has tended to highlight the physical consequences of drinking, in that mortality has usually been the health outcome measure (although suicide is one of the causes of alcohol-related mortality). These SF-36 results showing, in most groups, better self-reported mental health status in low-to-moderate drinkers relative to heavier drinkers, may highlight the mental health consequences of heavier drinking. Alternatively, the results may suggest a greater awareness, amongst heavier drinkers, of the mental rather than the physical consequences.

However, cross-sectional studies such as this one limit any conclusions about whether drinking patterns are determining health status, or the reverse. The lower SF-36 scores in heavier drinkers may reflect the higher prevalence of mood and anxiety disorders amongst those with alcohol dependence (Volk et al 1997), or the tendency for some individuals experiencing stress or low mood to drink more heavily to 'self-medicate'. Similarly, the lower SF-36 scores amongst non-drinkers may be influenced by those who have physical ill-health and have therefore given up alcohol. With regard to the latter point, however, a number of studies have controlled for former drinkers and for those with pre-existing medical conditions amongst current non-drinkers, and have still found the usual J- or U-shaped relationship between consumption and mortality (Brenner et al 1997; Poikalainen et al 1996).

For a multivariate analysis of alcohol use and the SF-36 results from this survey see Scott et al 1999.

SF-36 profiles and health risk behaviours: conclusion

On the whole, the expected relationships between self-reported health status and health risk behaviours emerged, although they were not always as pronounced as results using objective health status indicators (for example, between smoking and mortality rates). Interpretation of the data is complicated by ethnic group and sex differences, and because a cross-sectional survey such as this one cannot establish whether poorer health status is a consequence or a determinant of the adoption of certain patterns of behaviour.

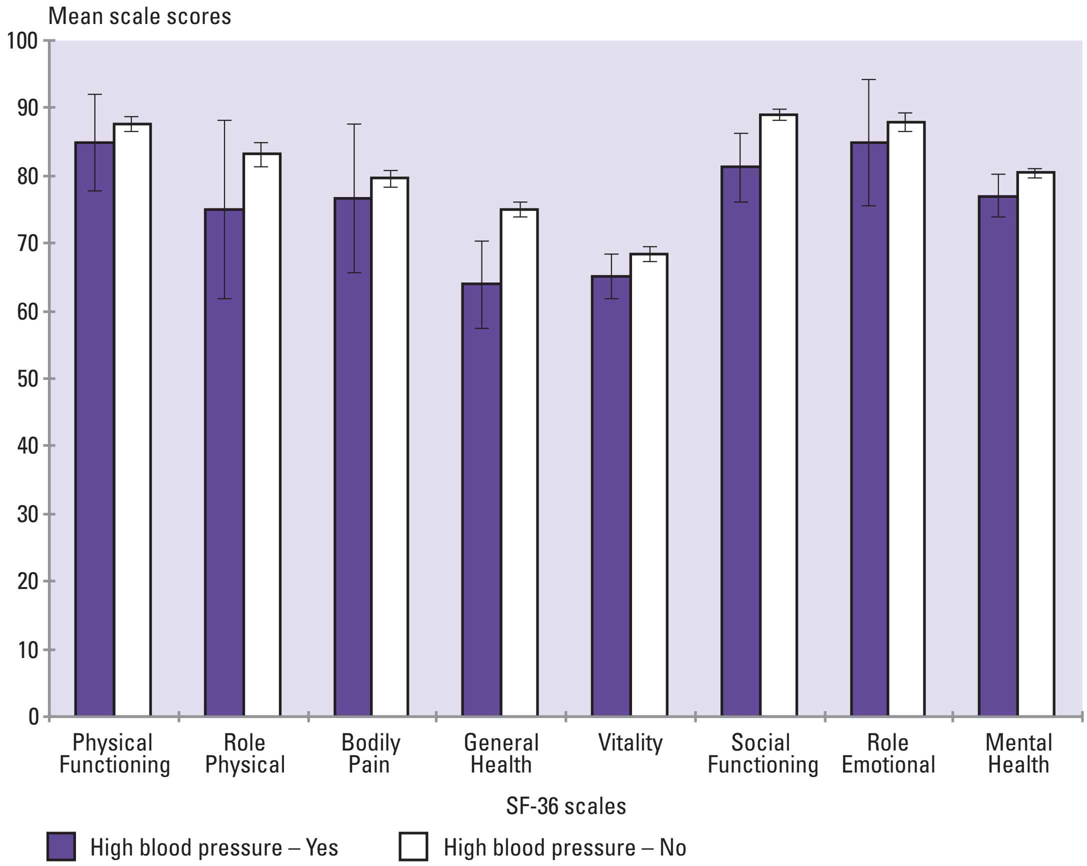
SF-36 profiles by specific conditions

SF-36 profiles by high blood pressure

High blood pressure status appeared to have a considerable impact on self-reported health, although the effects differed according to ethnicity (generally greater in Māori) and sex (greater in males among Māori, but in females among non-Māori). These results may be showing some co-existence of high blood pressure with other disorders. There may also be ethnic differences in the stage and/or implications of a diagnosis of high blood pressure.

The relationship between high blood pressure status (whether or not an individual has ever taken, or is currently taking, medication for high blood pressure) and SF-36 scores was found to differ significantly for ethnic group and sex on all scales ($p < .0001$ for each scale).

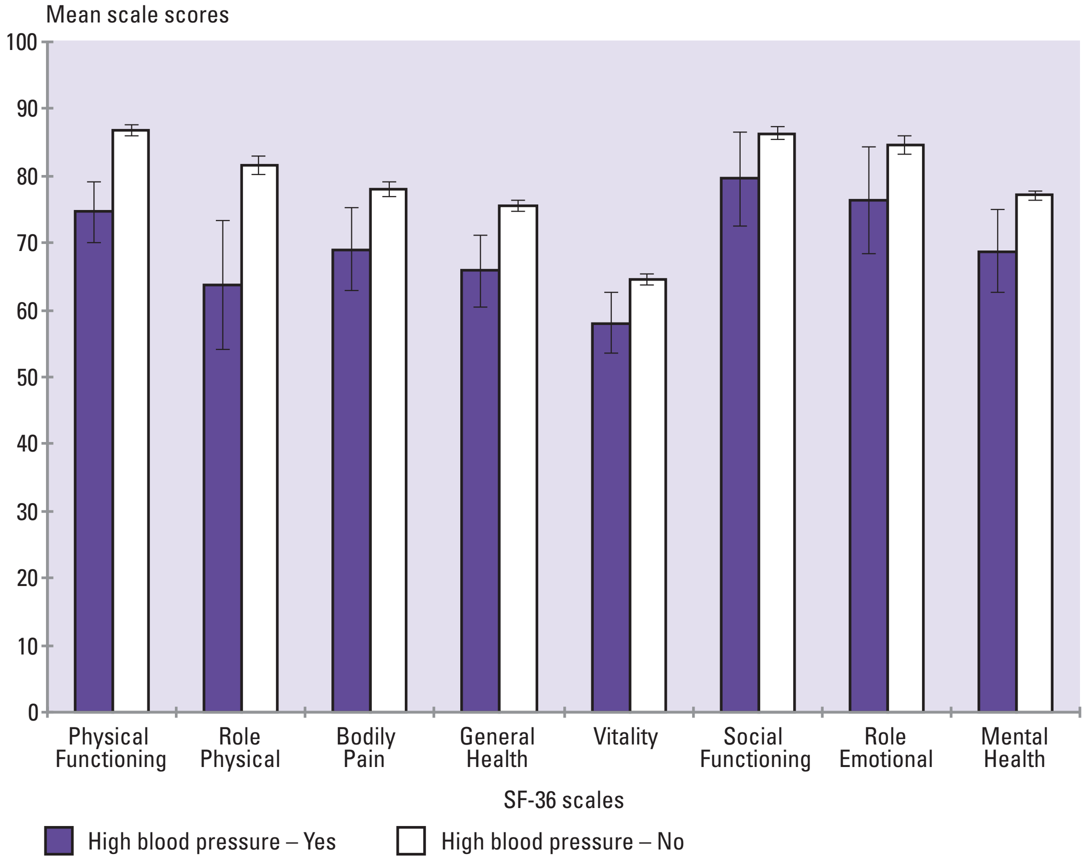
Figure 87: SF-36 profiles, by high blood pressure status, non-Māori males (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

In non-Māori males (see Figure 87), those without high blood pressure had generally higher self-rated health than those with high blood pressure; however, due to the size of the confidence intervals this effect was only statistically significant for some scales (General Health, Vitality, Social Functioning and Mental Health).

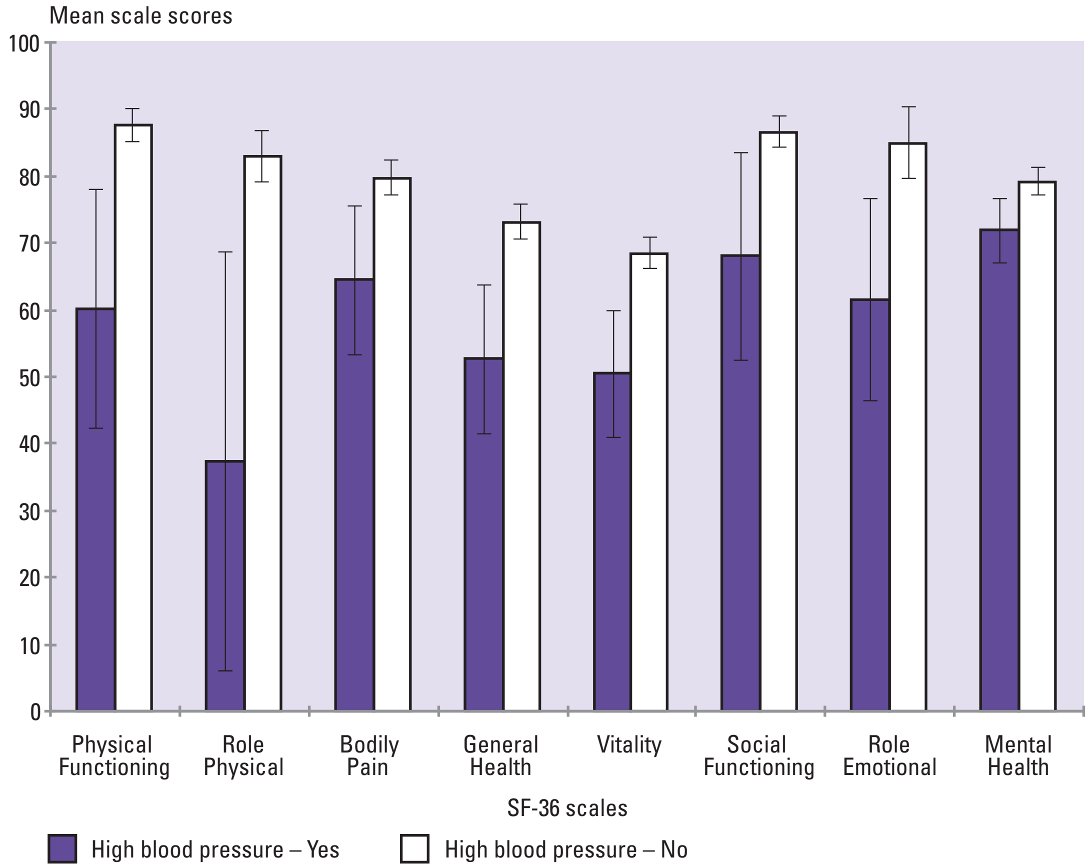
Figure 88: SF-36 profiles, by high blood pressure status, non-Māori females (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Non-Māori females (see Figure 88) showed a more pronounced effect, whereby those without high blood pressure scored significantly higher than those with high blood pressure on all scales except Social Functioning.

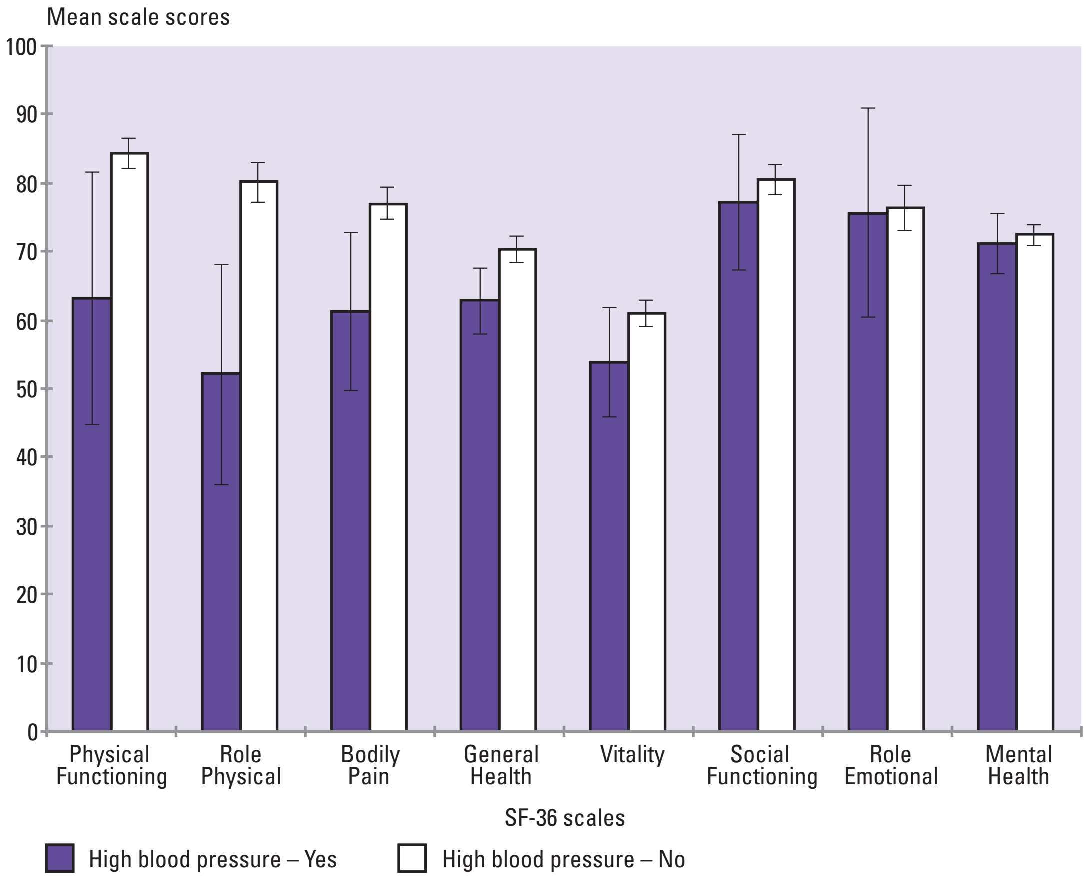
Figure 89: SF-36 profiles, by high blood pressure status, Māori males (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

The relationship between high blood pressure status and SF-36 scores among Māori males (see Figure 89) was considerable. Those without high blood pressure had statistically higher scores on all scales relative to those with high blood pressure, particularly those scales relating to role performance limitations due to physical and emotional health (Role Physical and Role Emotional).

Figure 90: SF-36 profiles, by high blood pressure status, Māori females (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

For Māori females (see Figure 90), those without high blood pressure had significantly higher scores than those with high blood pressure for the four scales most related to physical health.

Uncomplicated high blood pressure is generally asymptomatic, so it may be that this impact of high blood pressure on self-reported health is a function of co-existent conditions such as diabetes, heart disease and stroke; or of some of the side effects of anti-hypertensive medication. It may also be that high blood pressure is to some degree a marker for chronic disease and disability.

There is also a body of research on the impact of hypertension labelling which has found that a diagnosis of hypertension negatively affects individuals' perceptions of their health (independently of actual health status) and results in increased absenteeism from work (Bloom and Monterossa 1981; Melamed et al 1997). Although Stewart et al (1989) found that self-reported health status was less negatively affected in hypertensives than in other clinical groups.

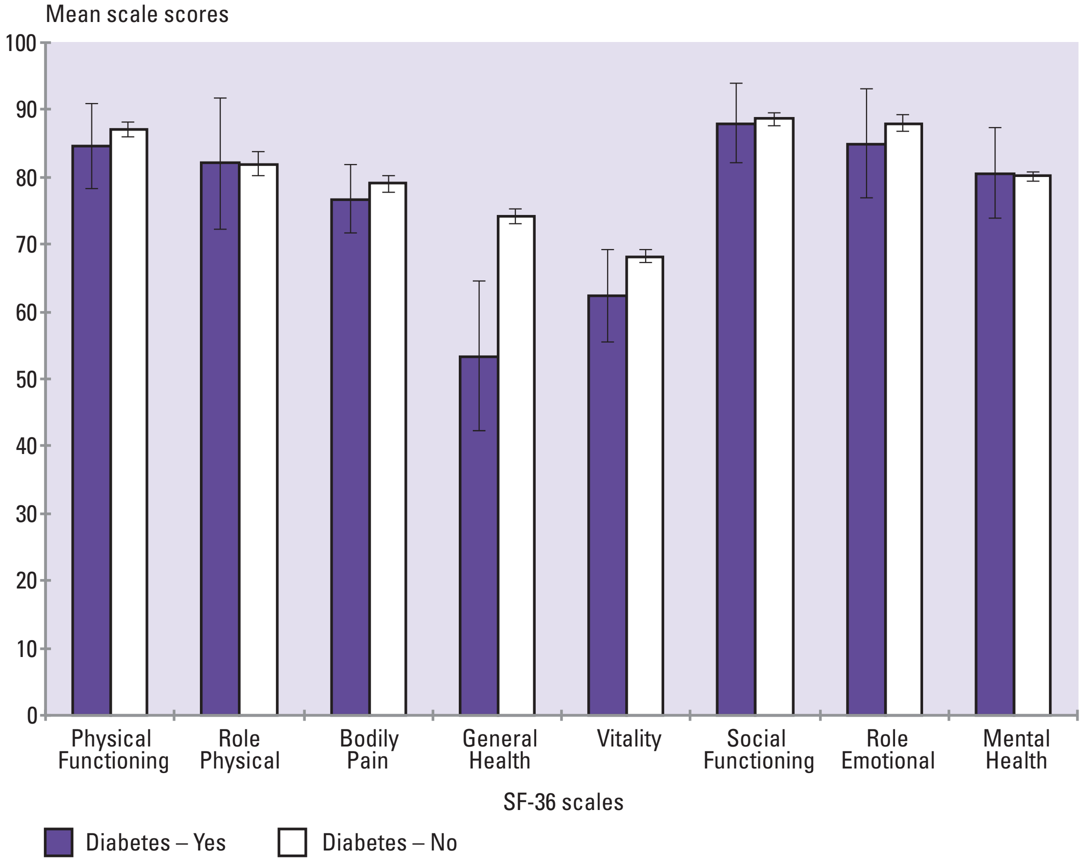
The effect of high blood pressure status on self-reported health was greater for Māori, particularly Māori men, which may reveal ethnic differences in the stage of diagnosis, and/or the consequences of such a diagnosis. Where Māori have poorer access to medical care they may only be diagnosed with high blood pressure if they have a co-existent condition, or at a later stage when there is more likelihood of complications from the high blood pressure. Additionally, cultural differences in the perception of health and disease may mean that Māori men are more negatively affected by a diagnosis of high blood pressure than non-Māori men.

SF-36 profiles by diabetes status

> Diabetes status had considerable effect on the self-reported health of Māori, but much less effect on non-Māori. In Māori, both males and females appeared to be affected to a similar degree, although there was some variation in which of the SF-36 scales were most affected.

The relationship between diabetes status (whether an individual has been told by a doctor they have diabetes) and SF-36 scores was found to differ significantly for ethnic group and sex on all scales ($p < .0001$ for each scale, except Bodily Pain ($p < .01$) and Physical Functioning ($p < .001$)).

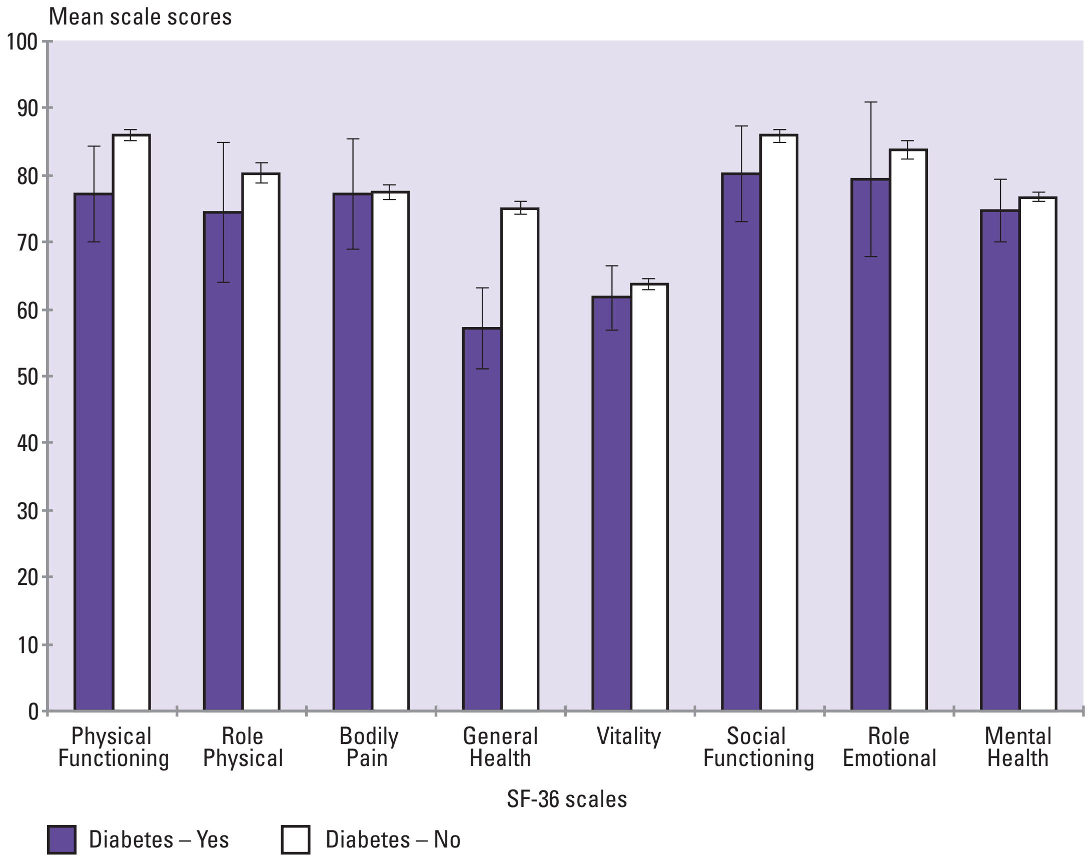
Figure 91: SF-36 profiles, by diabetes status, non-Māori males (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

As Figure 91 indicates, diabetes status did not impact greatly on the SF-36 scores of non-Māori males, with significant differences in diabetes status groups only on the General Health scale.

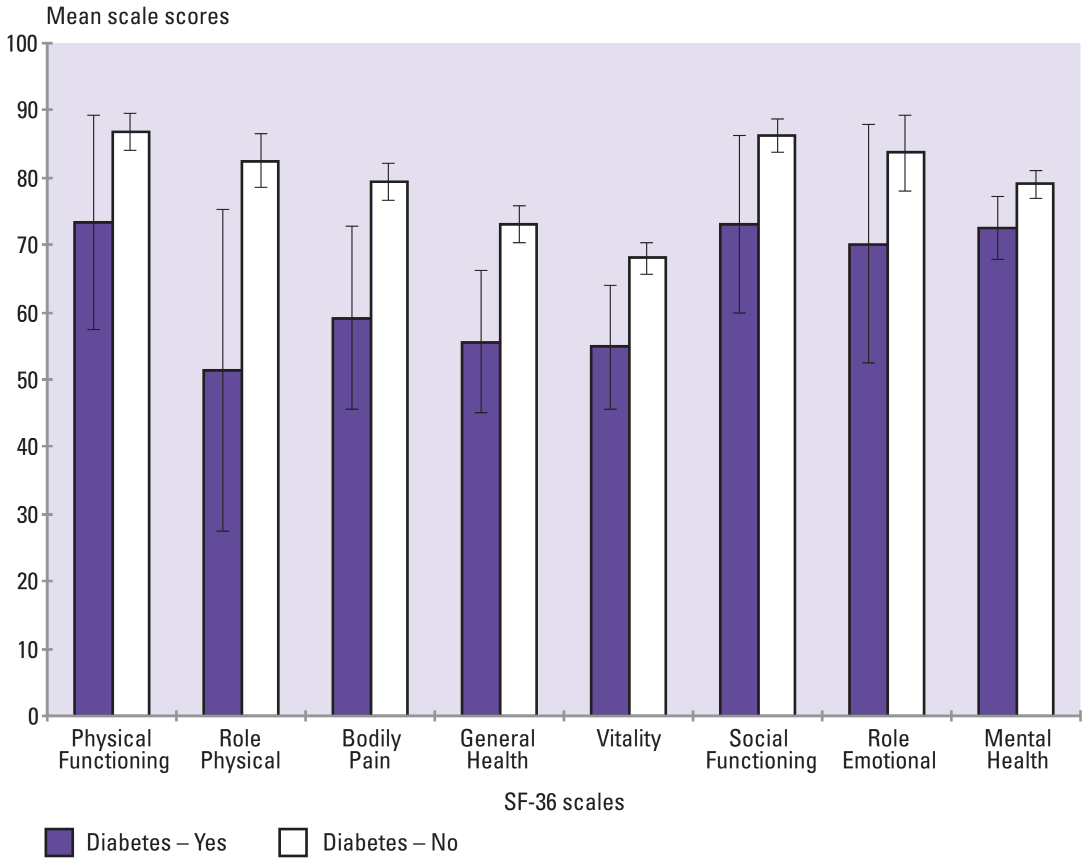
Figure 92: SF-36 profiles, by diabetes status, non-Māori females (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Similarly, there were few differences in diabetes status groups for non-Māori females, except on the General Health and Physical Functioning scales (see Figure 92).

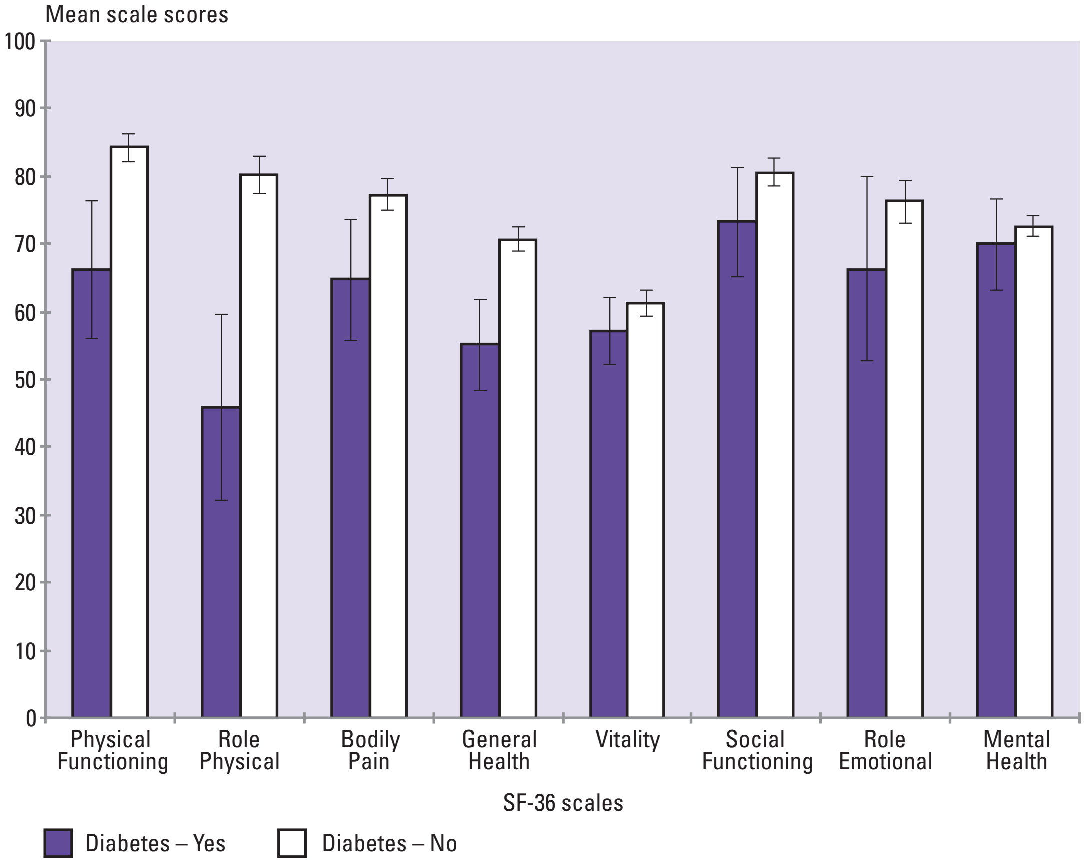
Figure 93: SF-36 profiles, by diabetes status, Māori males (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

In Māori males (see Figure 93), the effect was more pronounced than in non-Māori (as was the case with high blood pressure): Māori males without diabetes showed significantly higher scores than those with diabetes on most of the scales (Role Physical, Bodily Pain, General Health, Vitality and Mental Health).

Figure 94: SF-36 profiles, by diabetes status, Māori females (age-standardised)



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Māori women (see Figure 94) showed a similar pattern in diabetes as with high blood pressure: significant differences between the two diabetes status groups on the four scales most associated with physical health.

The comments made above with reference to the ethnic differences in the effect of high blood pressure on SF-36 scores may apply to diabetes also.

In other studies where the SF-36 profiles of groups differing in type and severity of clinical condition have been compared (McCallum 1995; McHorney et al 1993), the SF-36 results have generally been in line with the nature and severity of the condition measured. However, there have been occasional unexpected findings, where mild conditions have been associated with lower SF-36 scores than more serious conditions such as diabetes (Solomon et al 1993). This may reflect deficiencies in the labelling of conditions as 'mild' or 'serious', or it may reflect the degree to which the SF-36 is influenced by a number of factors in addition to symptom severity.

SF-36 profiles and specific conditions: conclusion

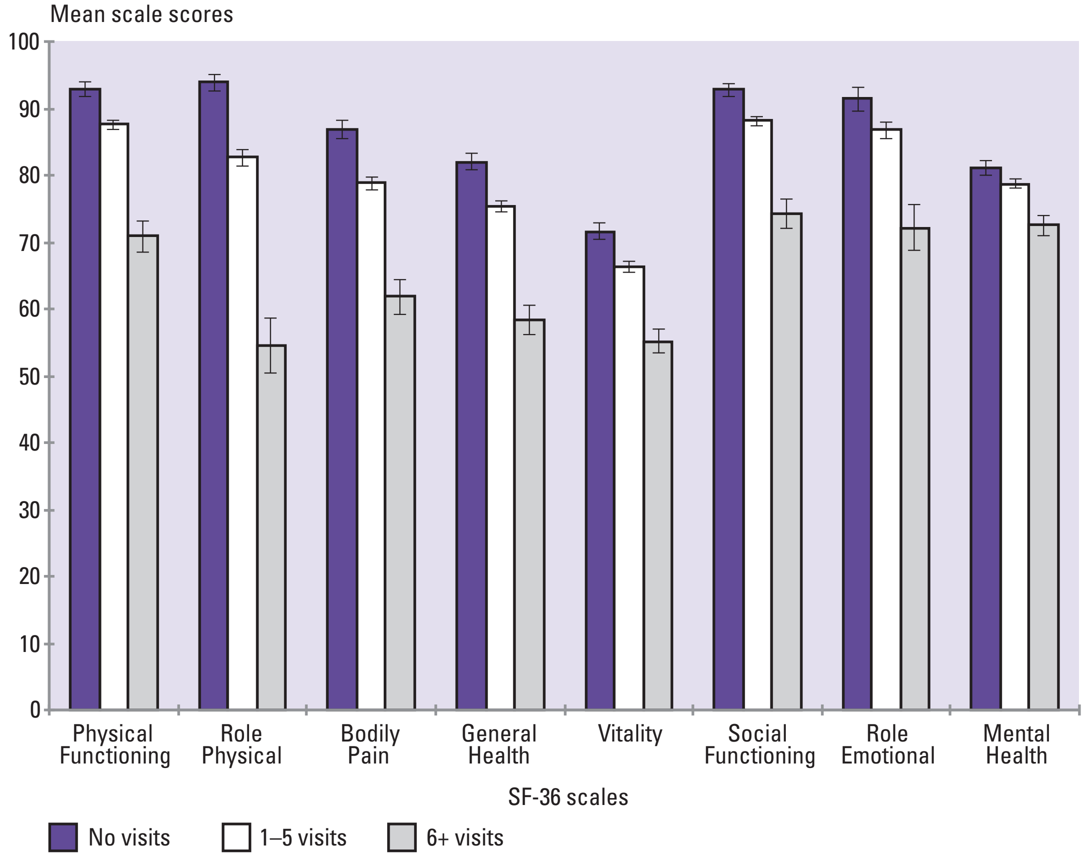
Considerable differences emerged in the self-reported health status of groups with and without specific conditions such as high blood pressure and diabetes. The degree of these differences seems to be not always consistent with the level of symptomatology generally associated with these conditions. It may be that some diagnoses are markers of other chronic conditions. There may also be ethnic differences in the stage or implications of diagnosis.

SF-36 profiles by health service utilisation

SF-36 profiles by frequency of GP use

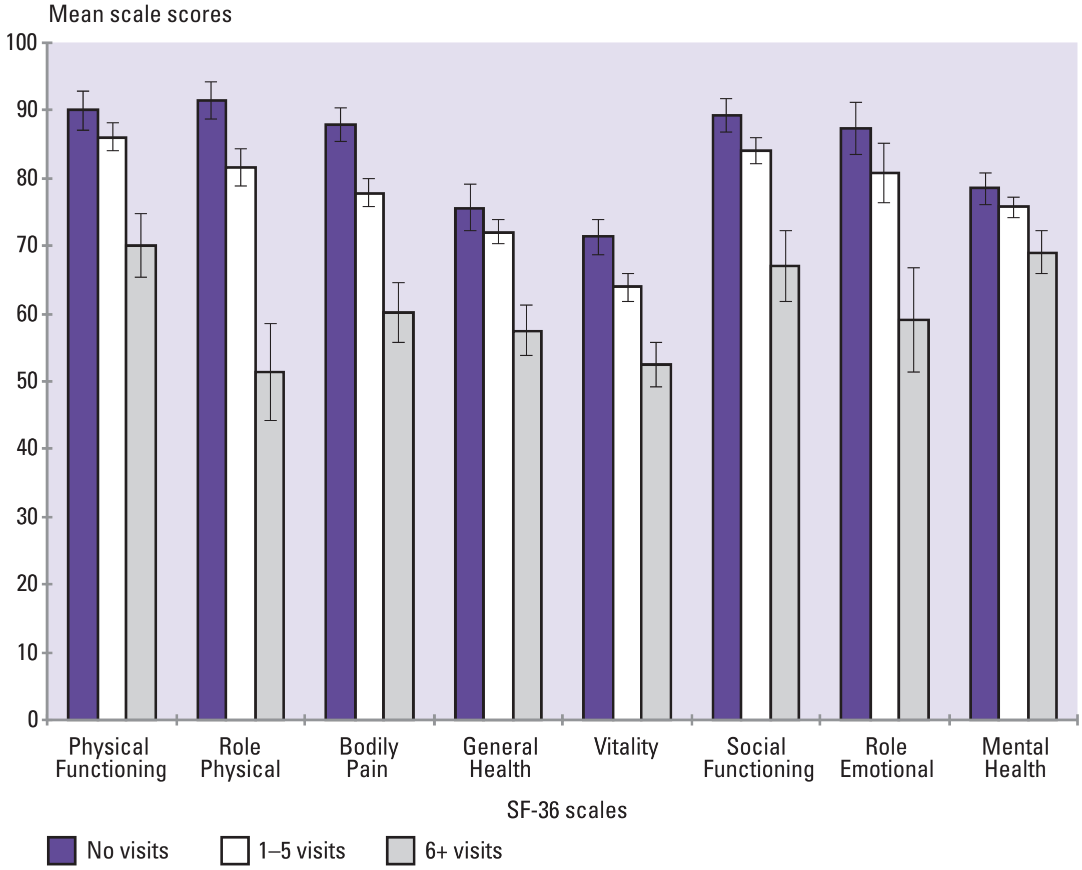
The SF-36 scores by frequency of GP use: (no visits; 1–5 visits; and 6 or more visits in the past 12 months) are presented in Figures 95 and 96. These are stratified by ethnicity only as there was little sex difference. The comparisons are not age-standardised.

Figure 95: SF-36 profiles, by GP use, non-Māori



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Figure 96: SF-36 profiles, by GP use, Māori



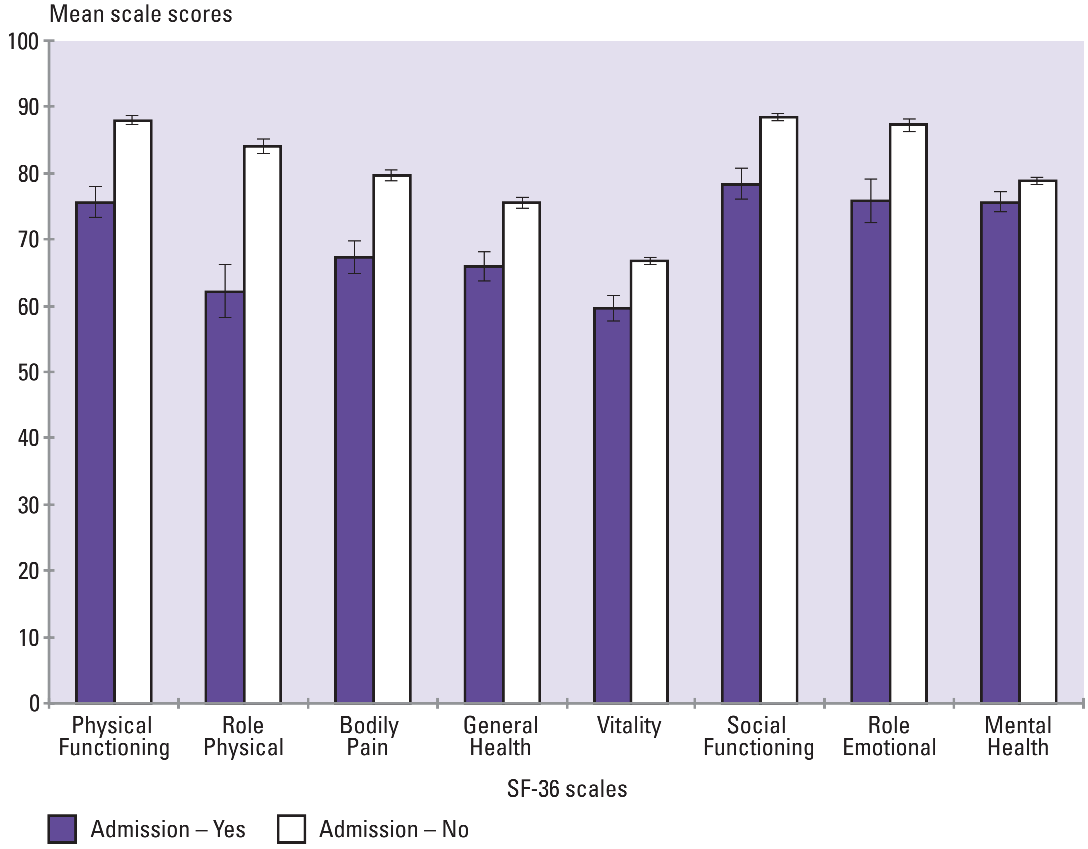
Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

As Figures 95 and 96 indicate, there was little ethnic difference in the relationship between SF-36 scores and frequency of GP use. The expected gradient emerged in both groups, with those going to their GP more frequently during the year showing the lower SF-36 scores, although the differences between the 'No visits' and '1–5 visits' groups were not always statistically significant.

SF-36 profiles by hospital admission

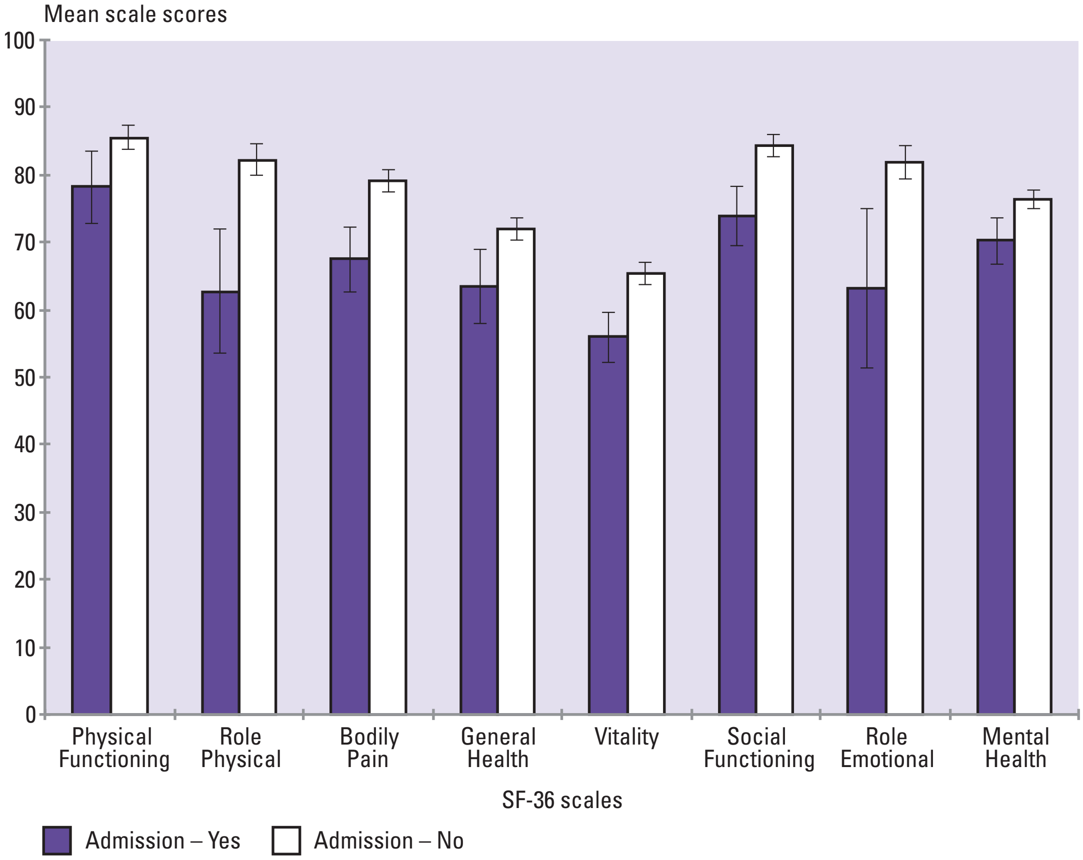
The relationship between self-reported health status and whether or not an individual had been admitted to hospital in the past 12 months is shown in Figures 97 and 98. As with frequency of GP use, these data are stratified by ethnicity only as there was little sex difference. The comparisons are not age-standardised.

Figure 97: SF-36 profiles, by hospital admission, non-Māori



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

Figure 98: SF-36 profiles, by hospital admission, Māori



Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

For both Māori and non-Māori, self-reported health status was significantly lower in those who had been admitted to hospital in the past 12 months.

SF-36 profiles by health service utilisation: conclusion

The relationship between SF-36 scores and health service utilisation showed the expected pattern of higher health status in those who had made least use of primary or secondary health care.

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