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.

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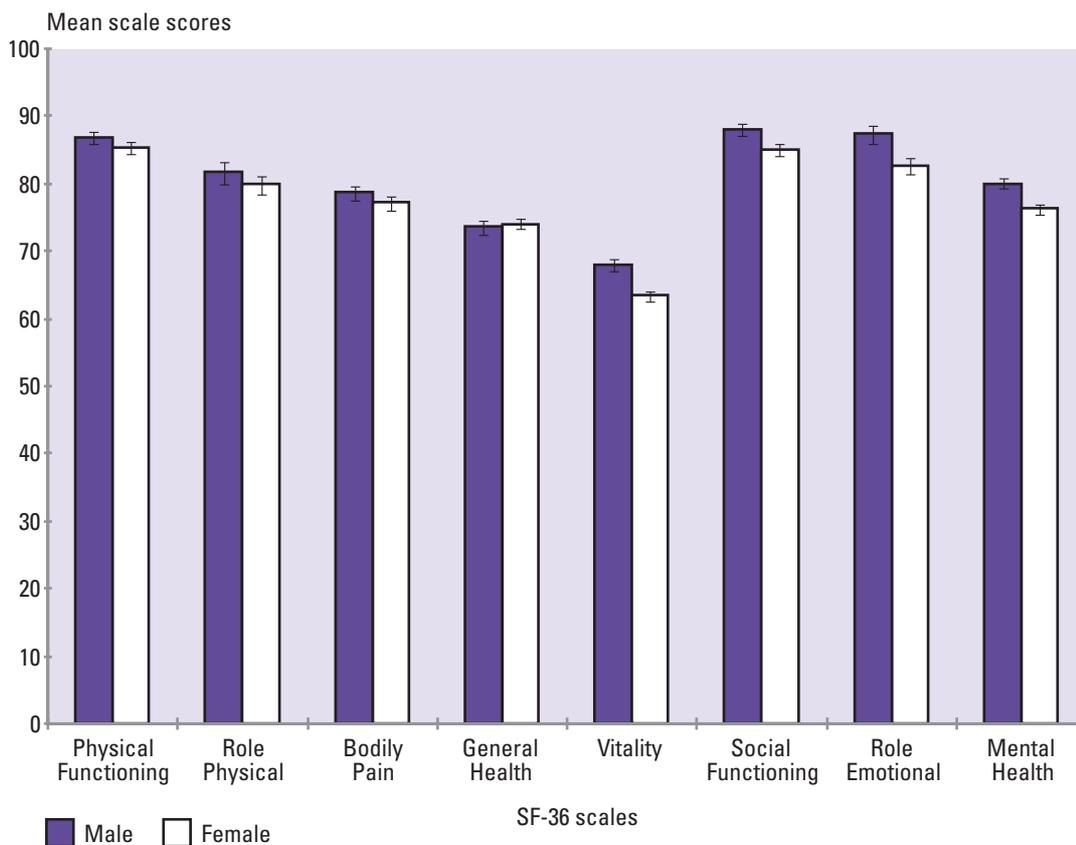
Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures
and Tables.

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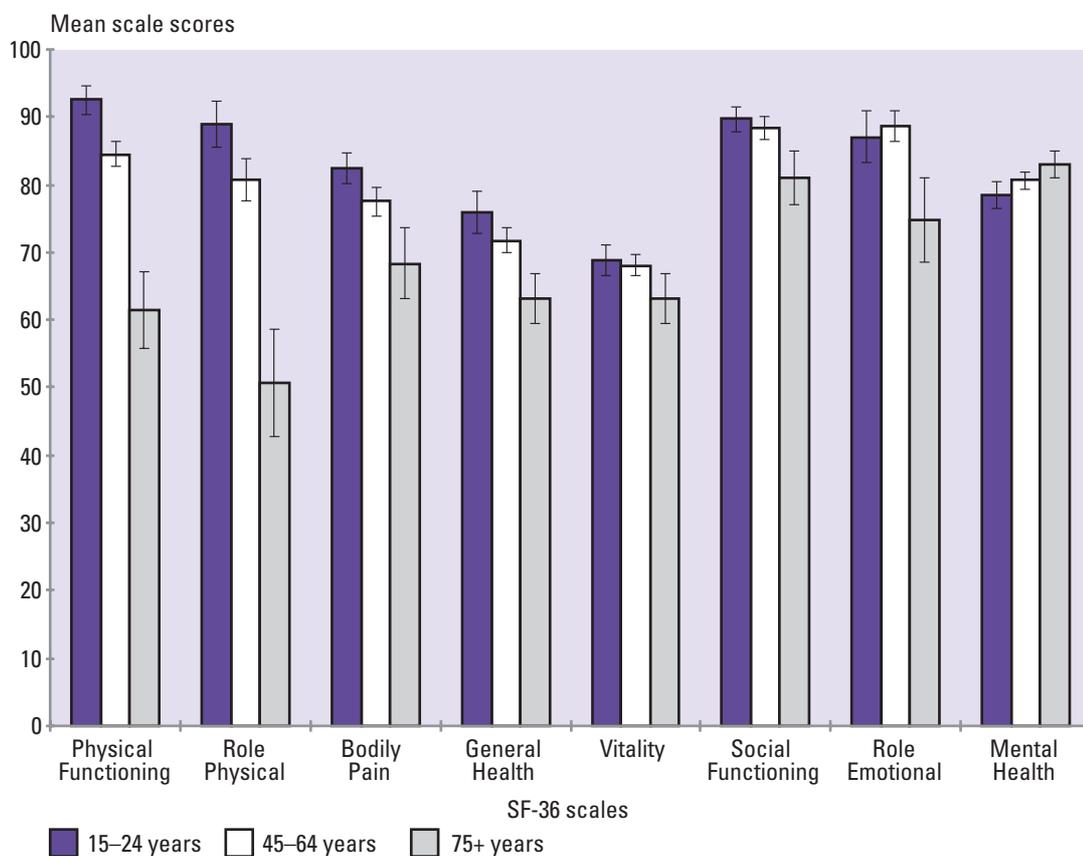
Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

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

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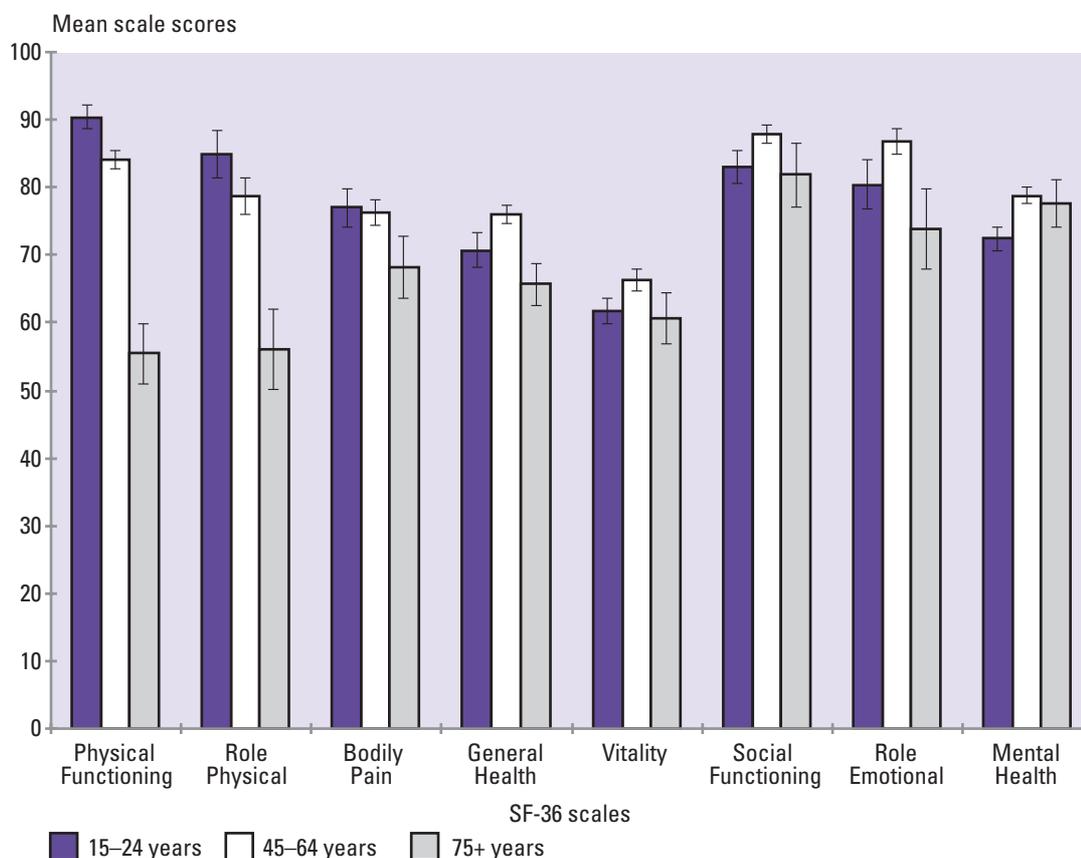
Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

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.

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* 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)
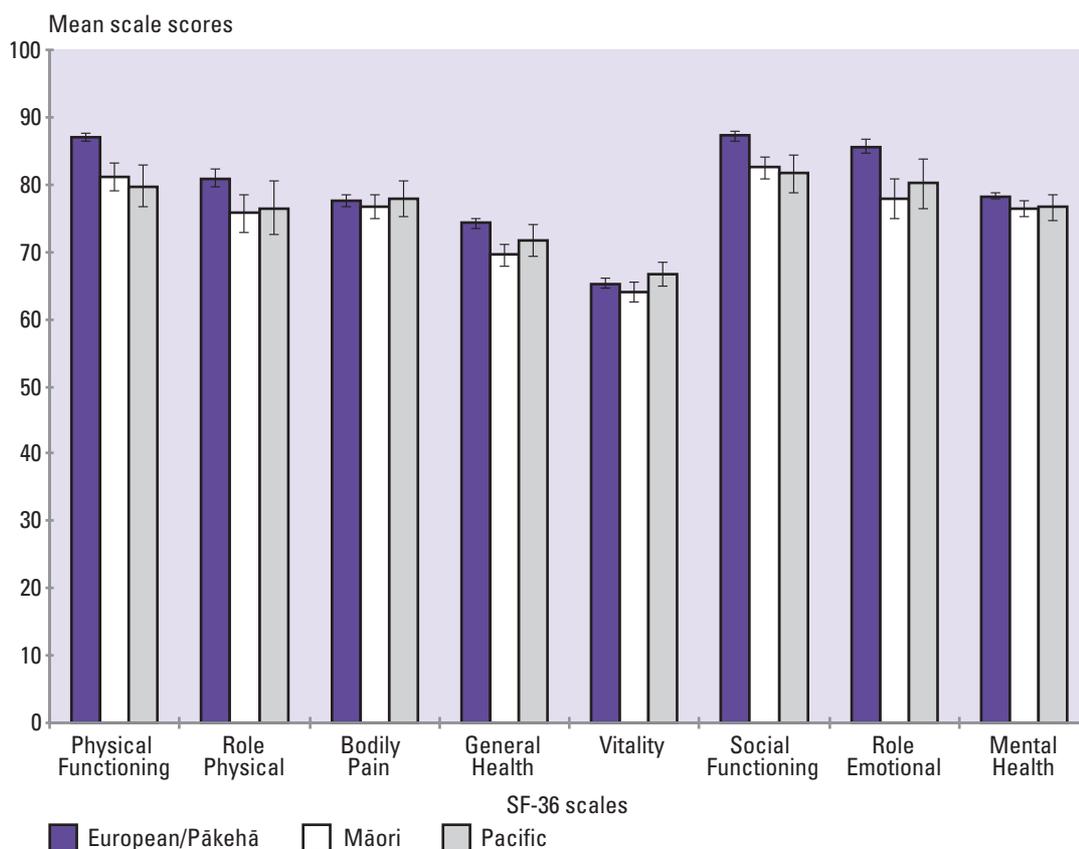
Mean scale scores

SF-36 scales

■ European/Pākehā ☐ Māori ☐ Pacific

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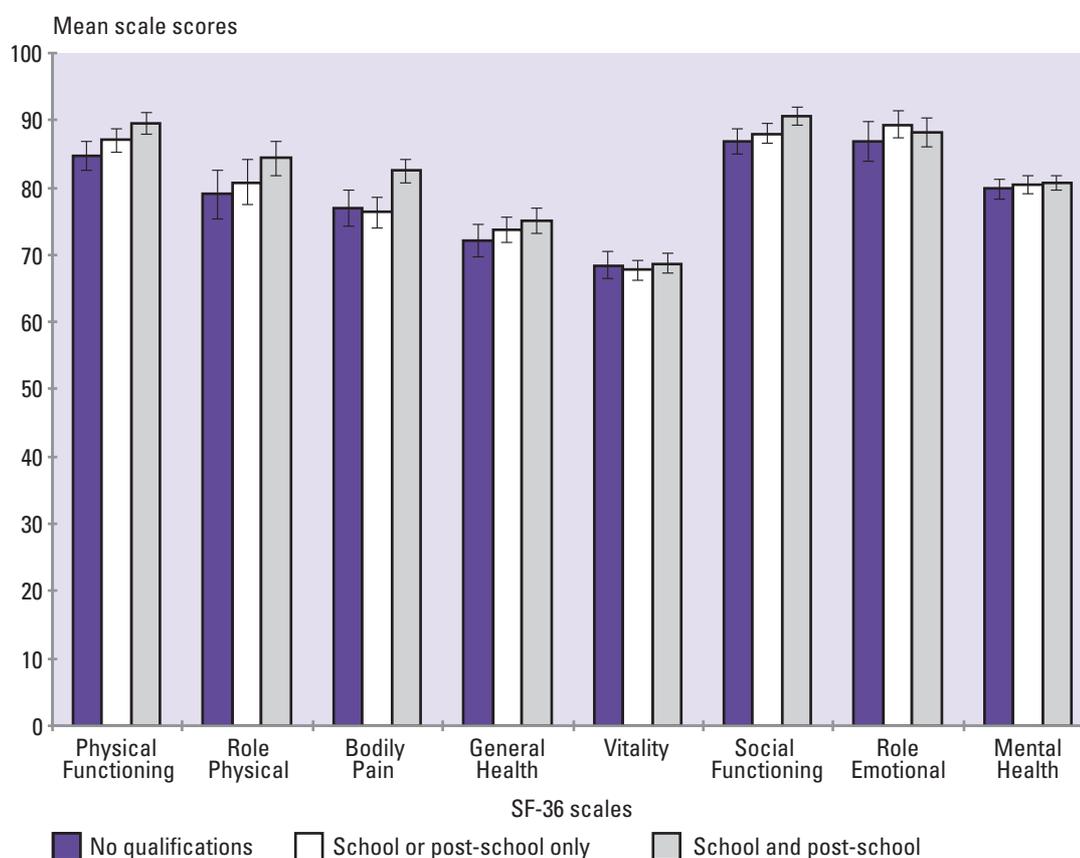
Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

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.
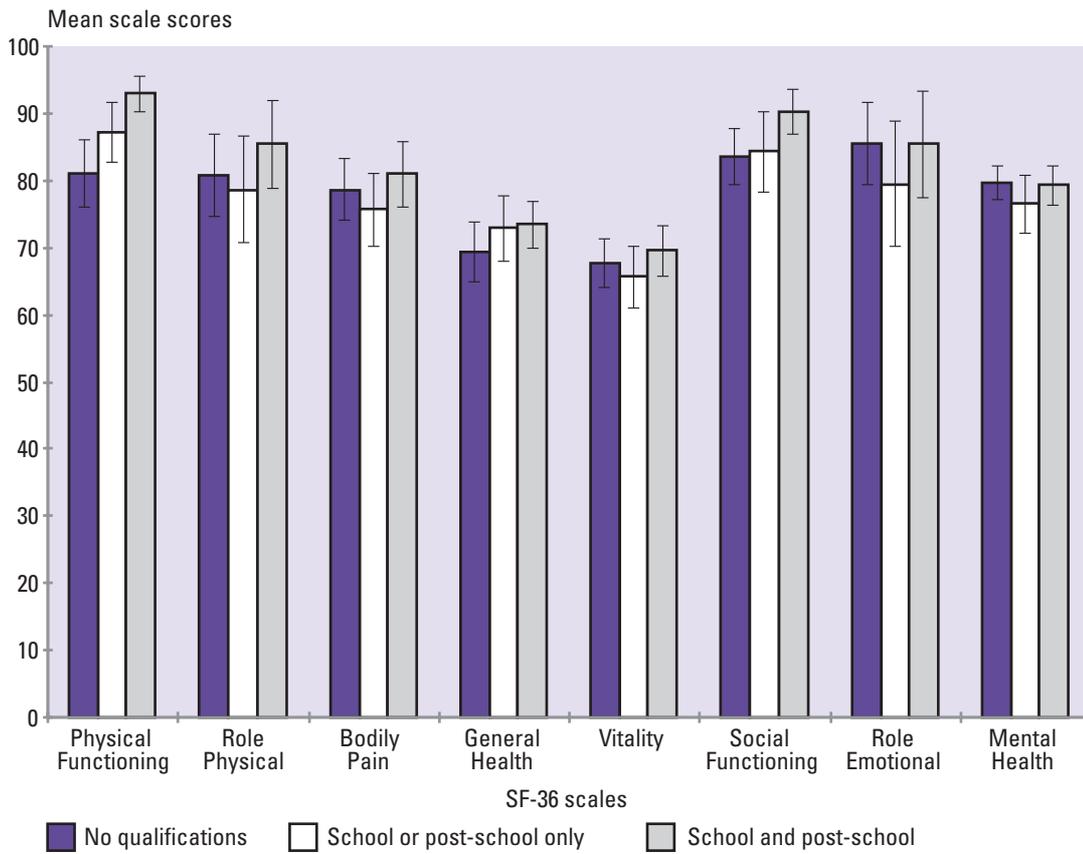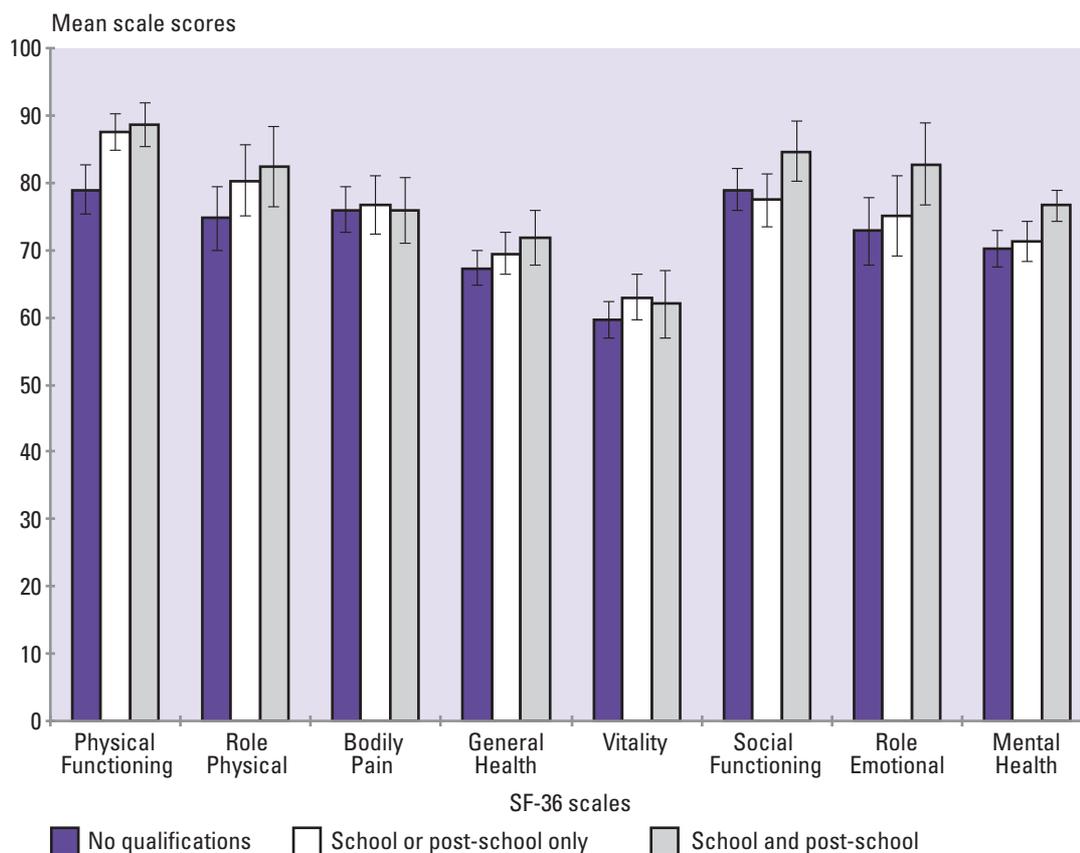
Figure 60: SF-36 profiles, by education, non-Māori females (age-standardised)
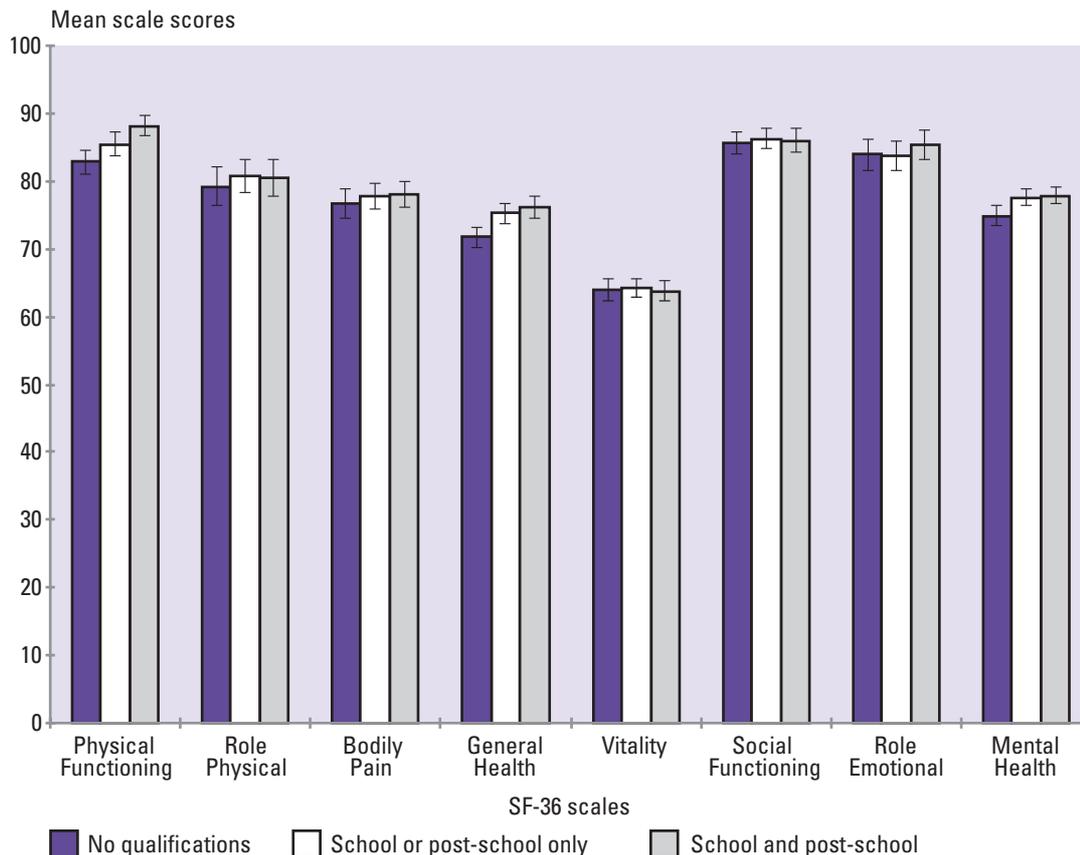
Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

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)

Mean scale scores

SF-36 scales

■ No qualifications   □ School or post-school only   ▨ School and post-school

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)

Mean scale scores

SF-36 scales

■ No qualifications   □ School or post-school only   ▨ School and post-school

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)
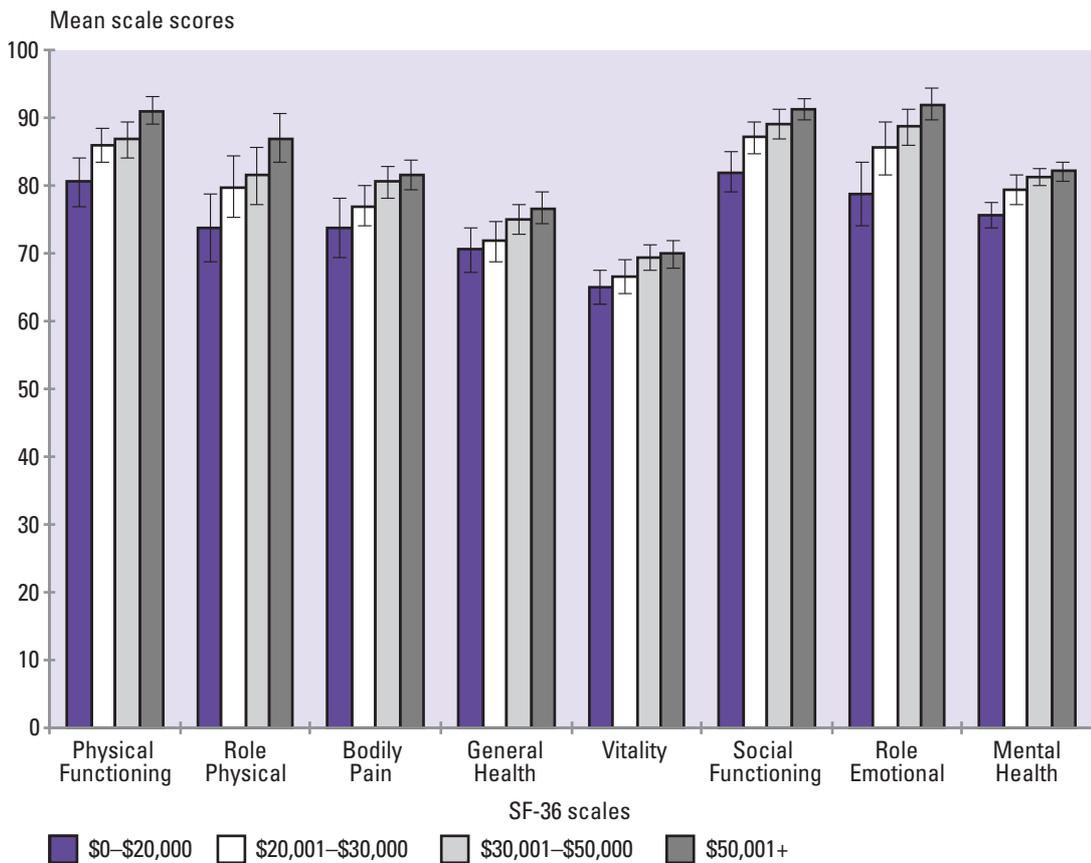
Mean scale scores

SF-36 scales

| | $0–$20,000 | | $20,001–$30,000 | | $30,001–$50,000 | | $50,001+ |

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.
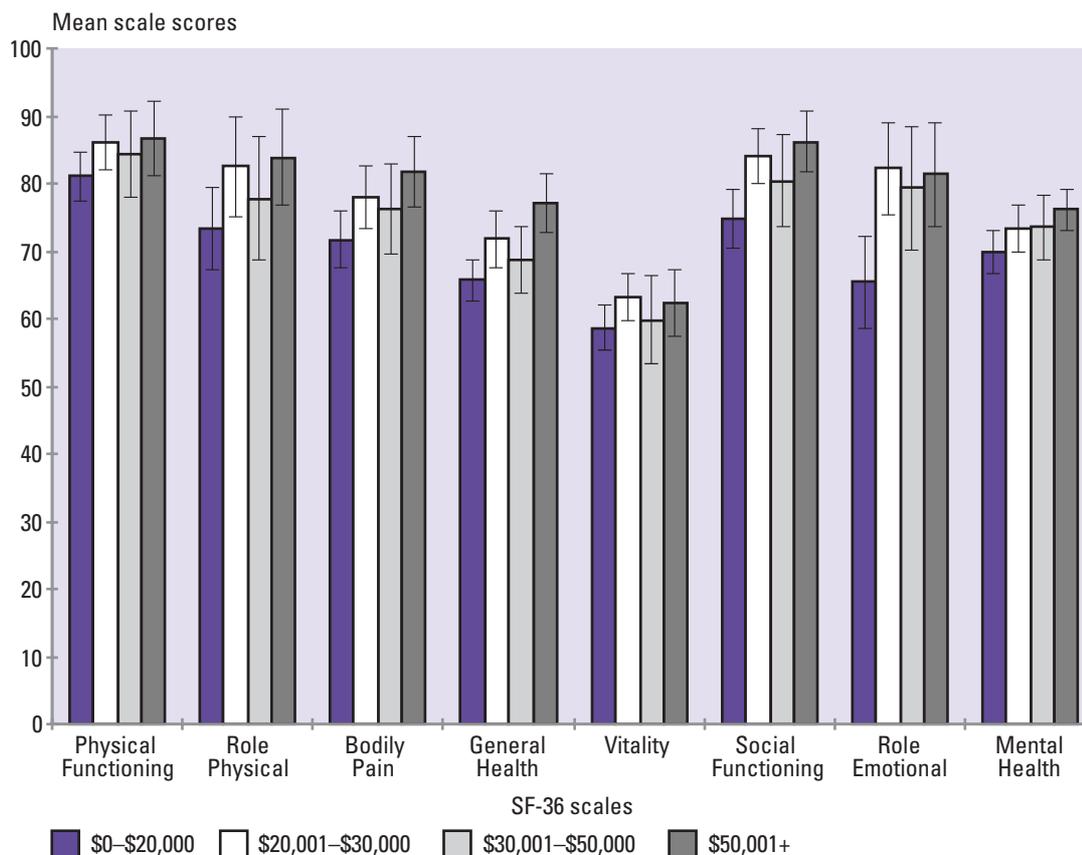
Figure 64: SF-36 profiles, by family income, non-Māori females (age-standardised)
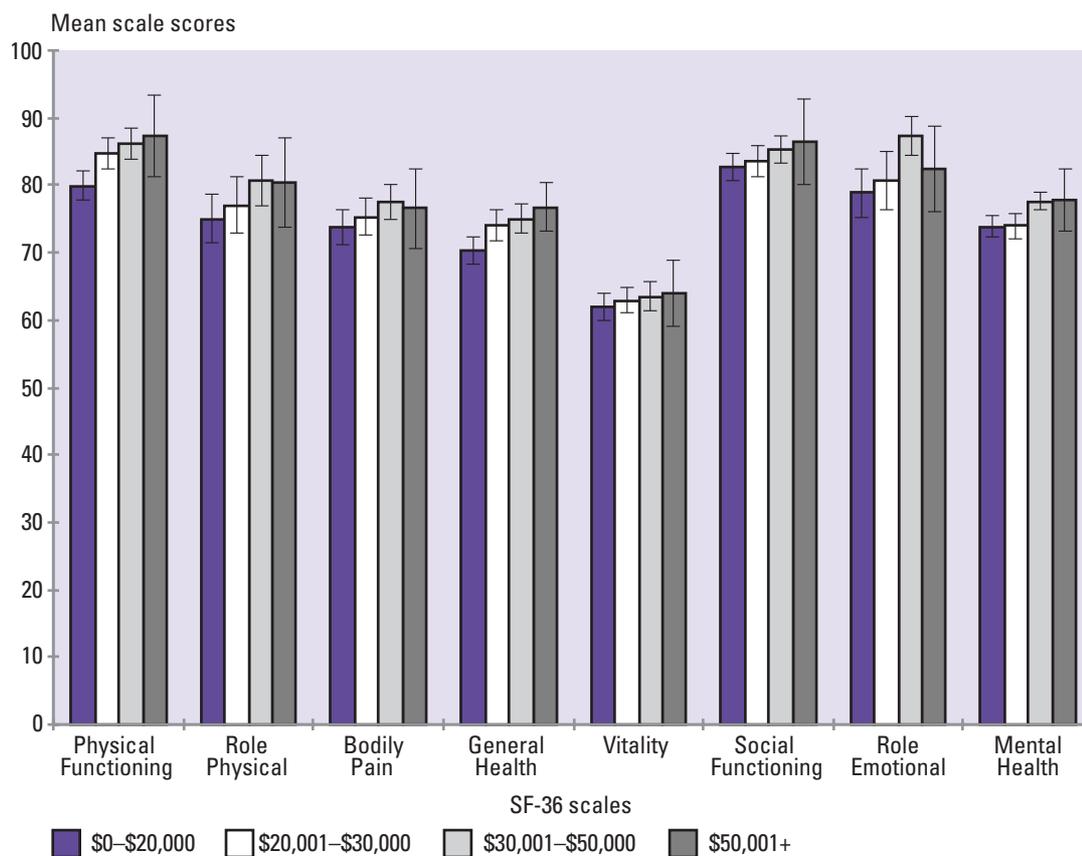
Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

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)
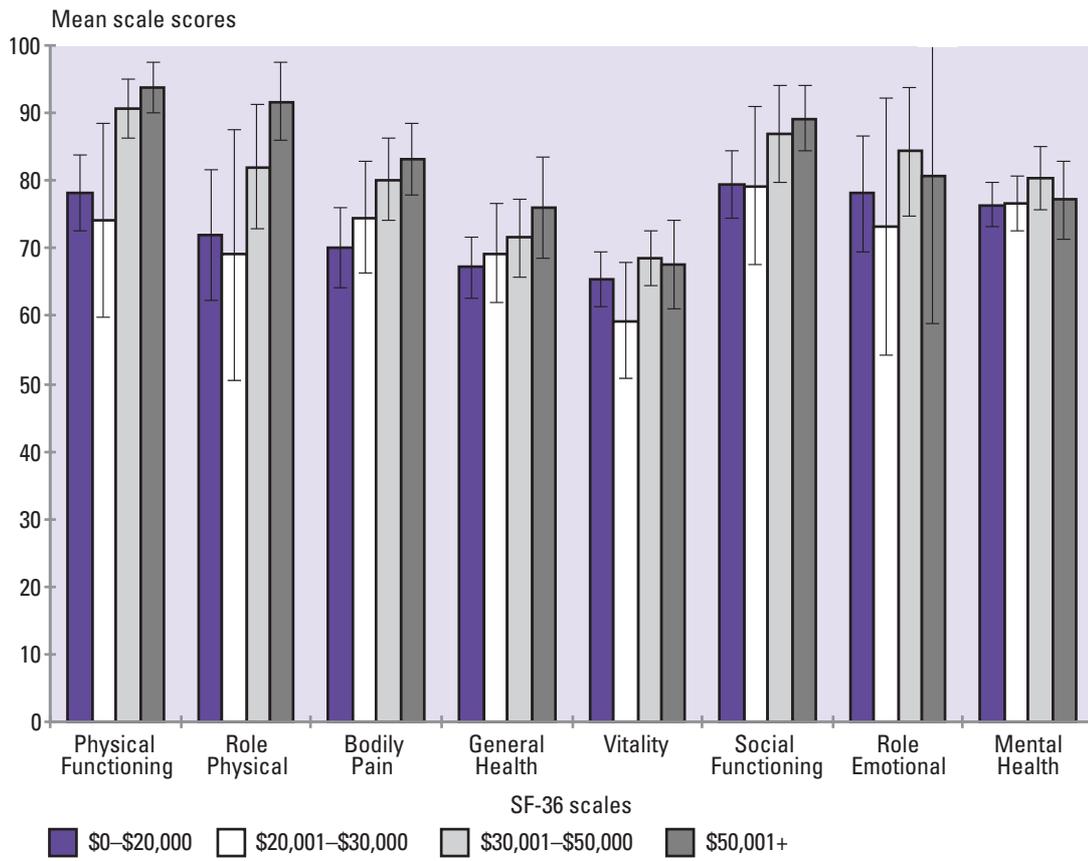
Mean scale scores

$0–$20,000 $20,001–$30,000 $30,001–$50,000 $50,001+

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.

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).
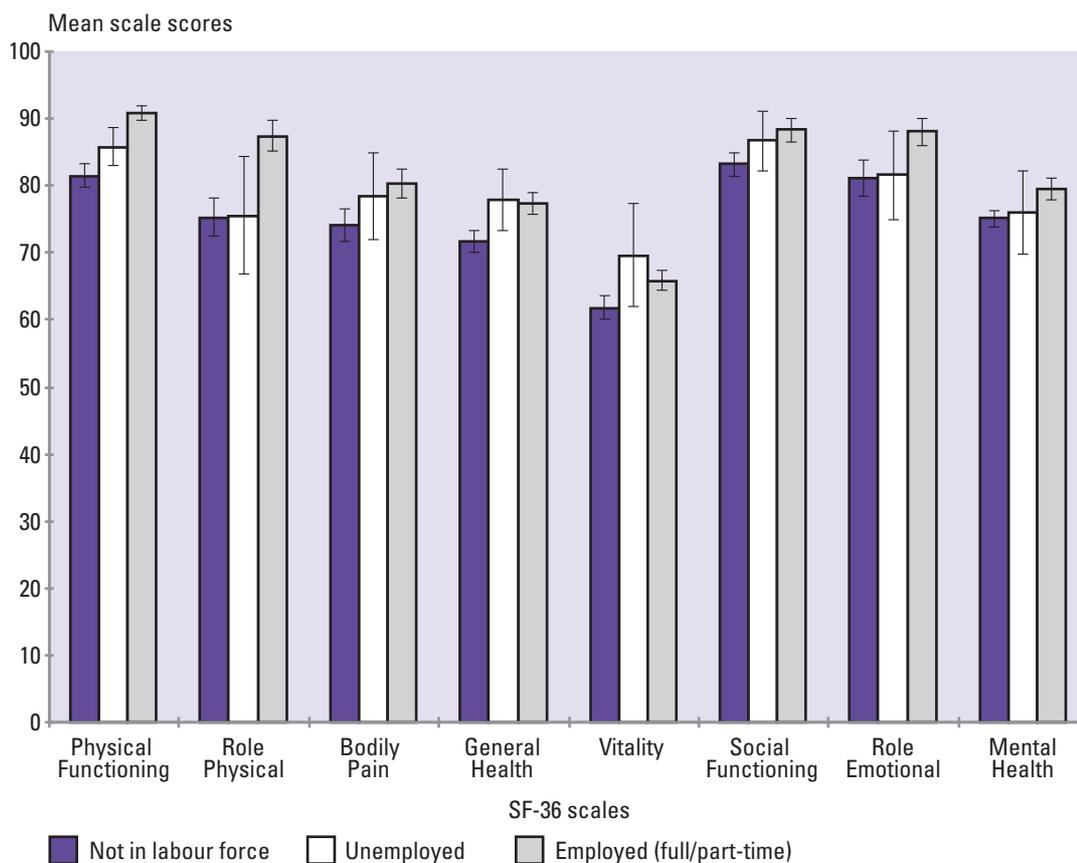
Figure 67: SF-36 profiles, by labour force status, non-Māori males (age-standardised)
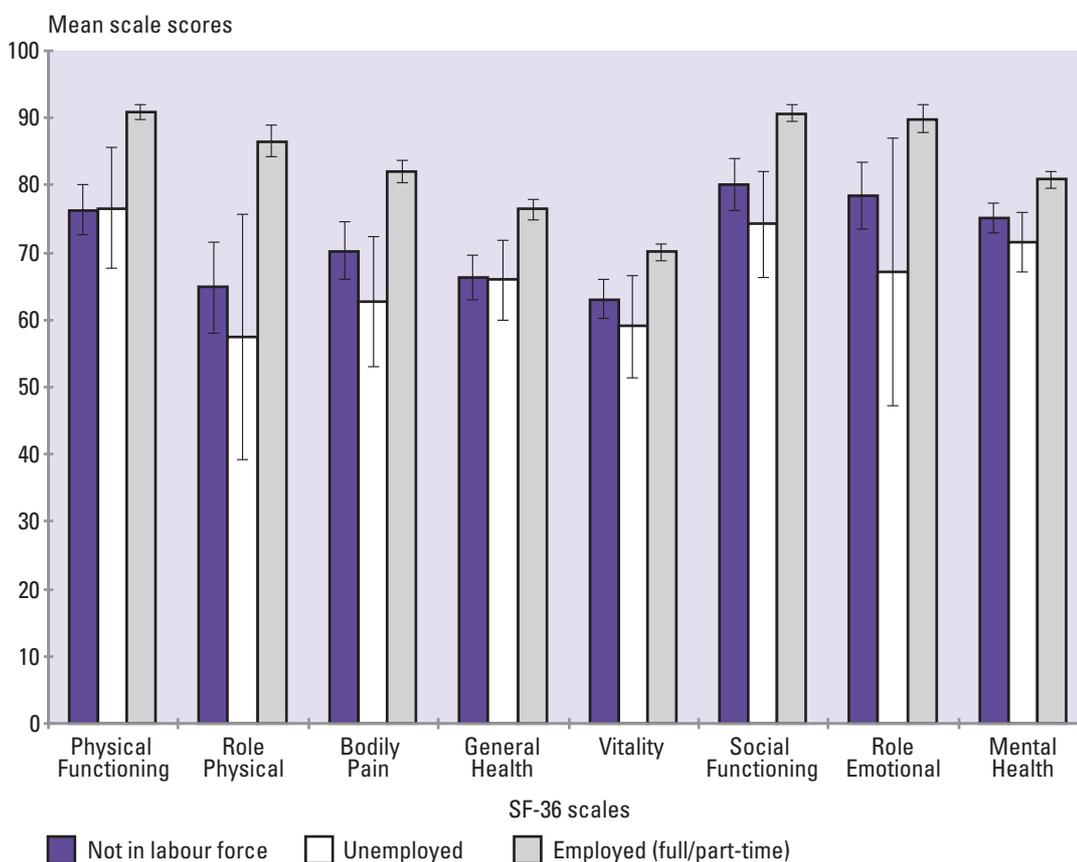
Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

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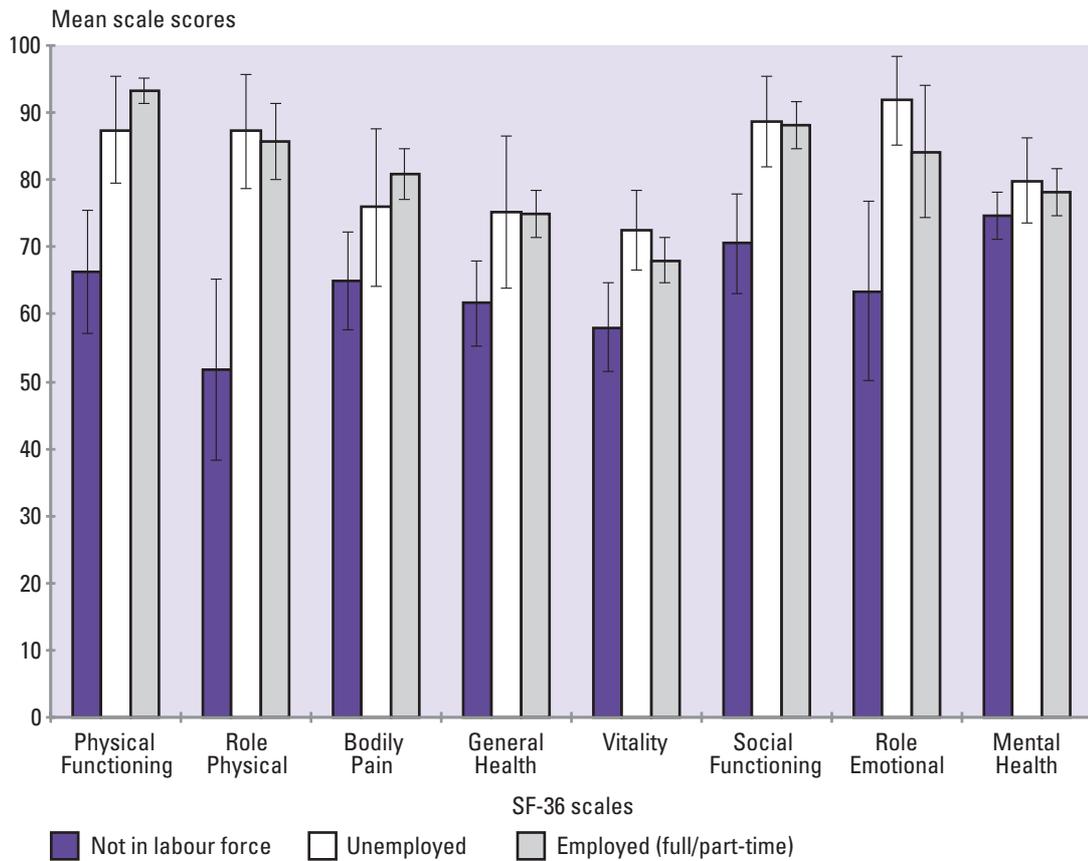
Figure 68: SF-36 profiles, by labour force status, non-Māori females (age-standardised)

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)

Mean scale scores

SF-36 scales

■ Not in labour force   □ Unemployed   ▨ Employed (full/part-time)

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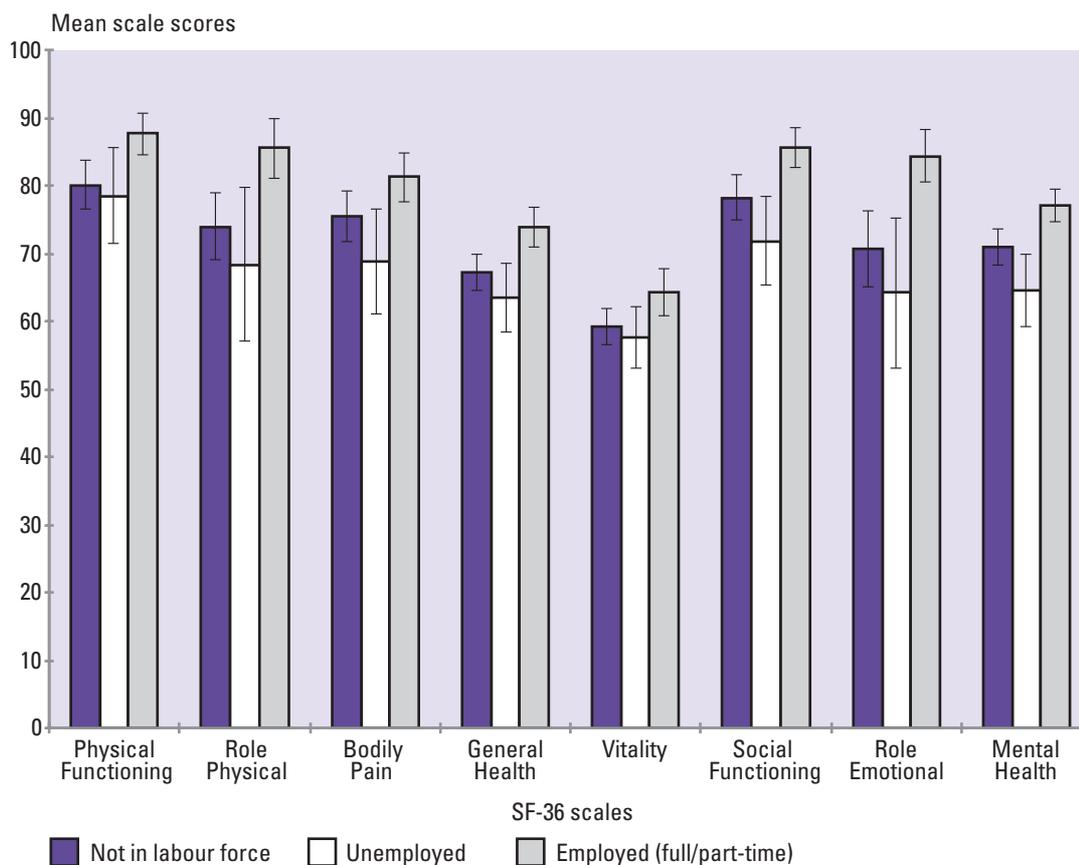
Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

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.

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* 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 ($p < 0.01$)).
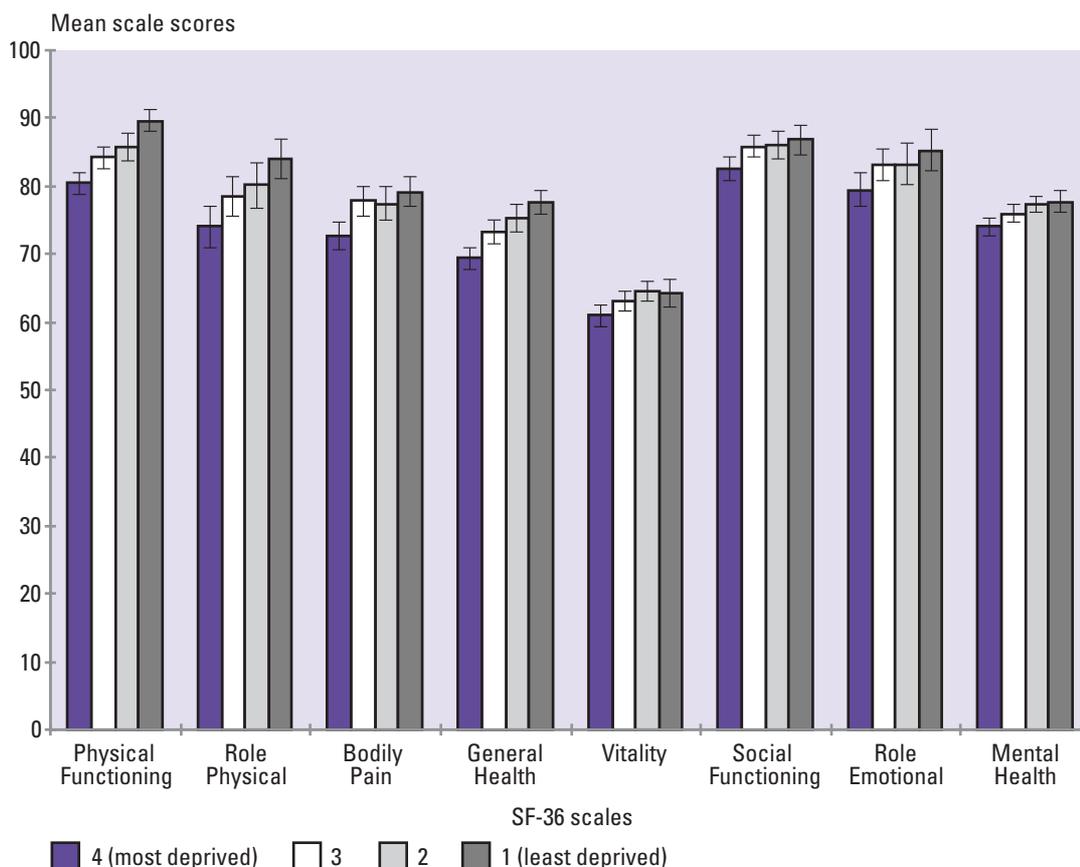
Figure 71: SF-36 profiles, by NZDep96 score, non-Māori males (age-standardised)
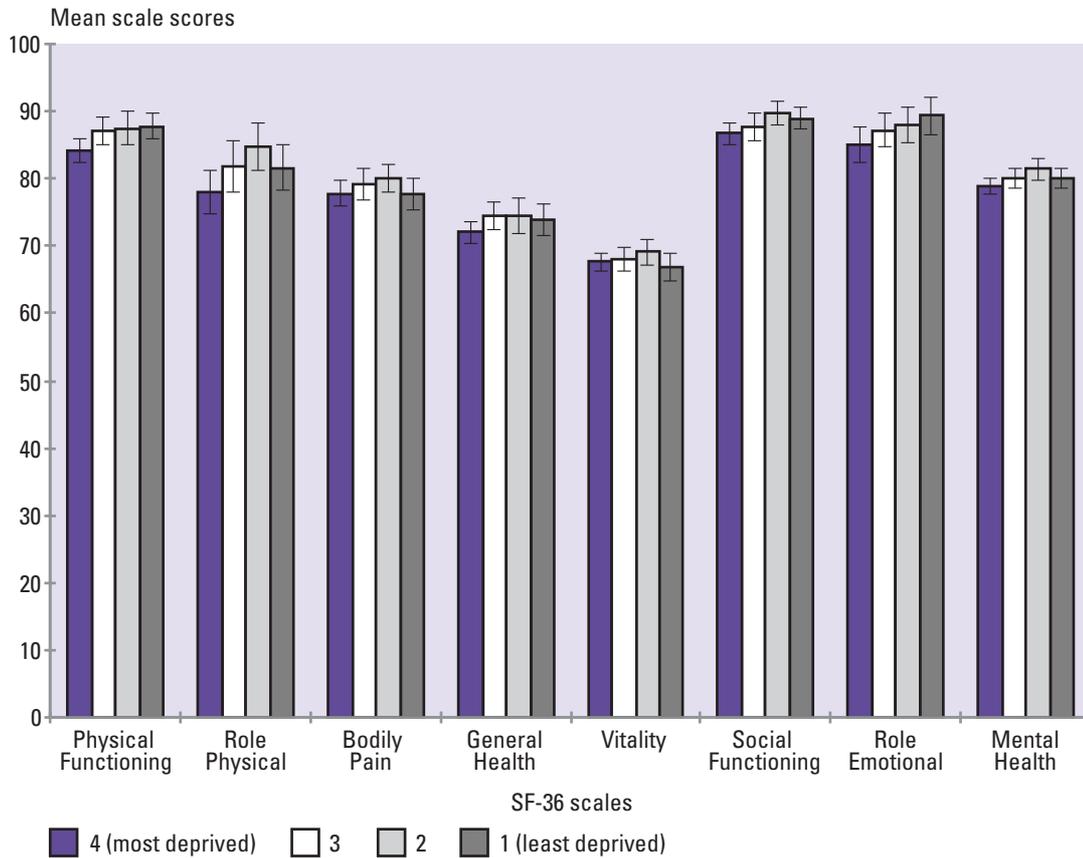
Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

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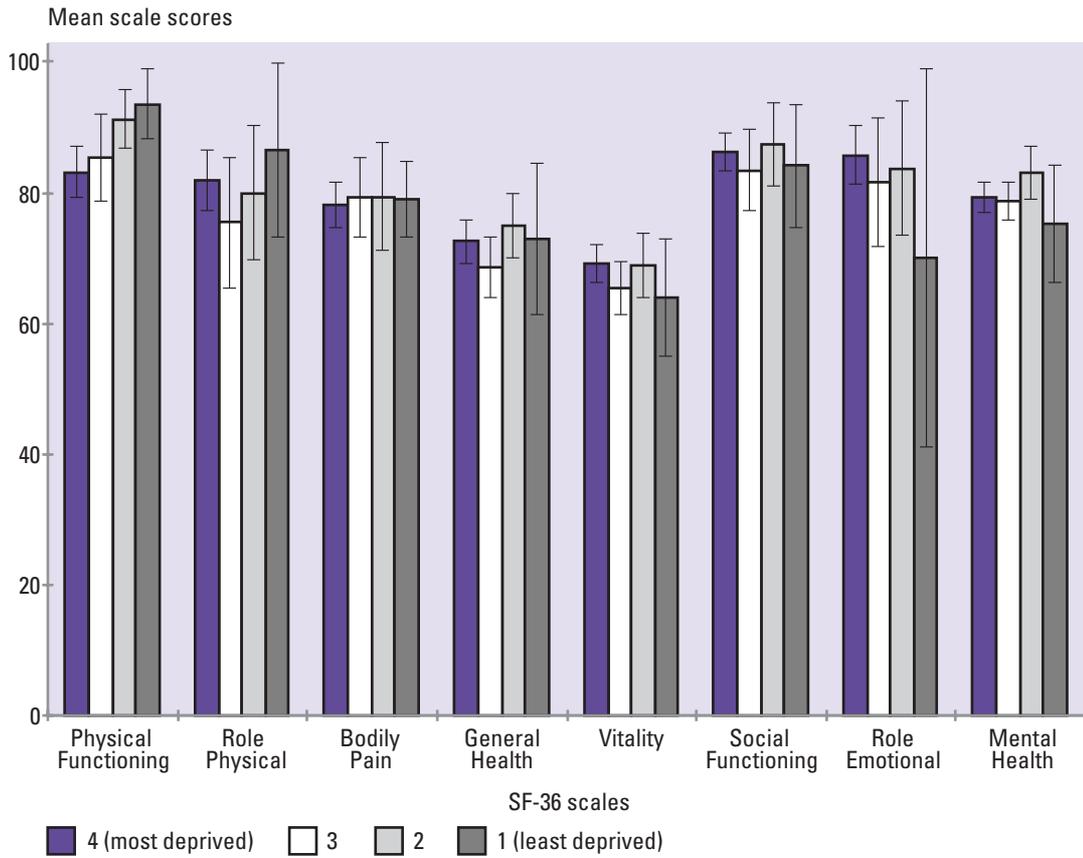
Figure 72: SF-36 profiles, by NZDep96 score, non-Māori females (age-standardised)

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)

Mean scale scores

SF-36 scales

■ 4 (most deprived)   □ 3   ■ 2   ■ 1 (least deprived)

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)
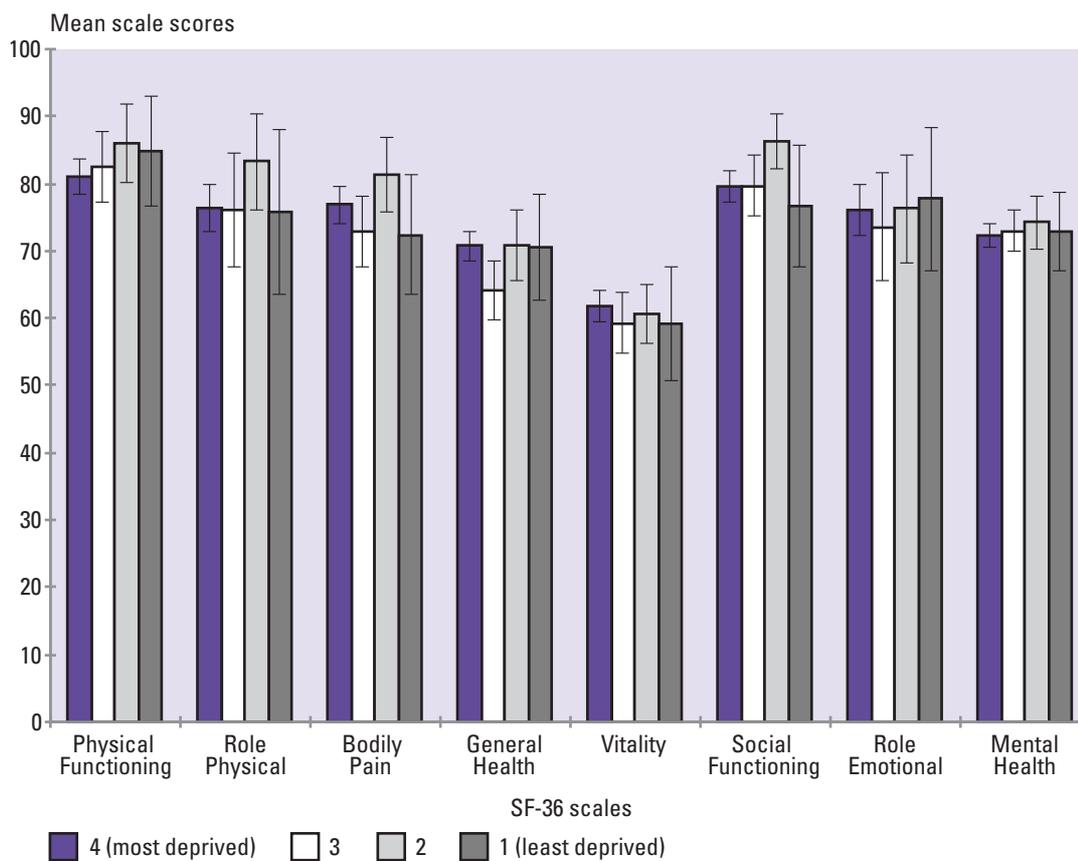
Mean scale scores

4 (most deprived)   3   2   1 (least deprived)

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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