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

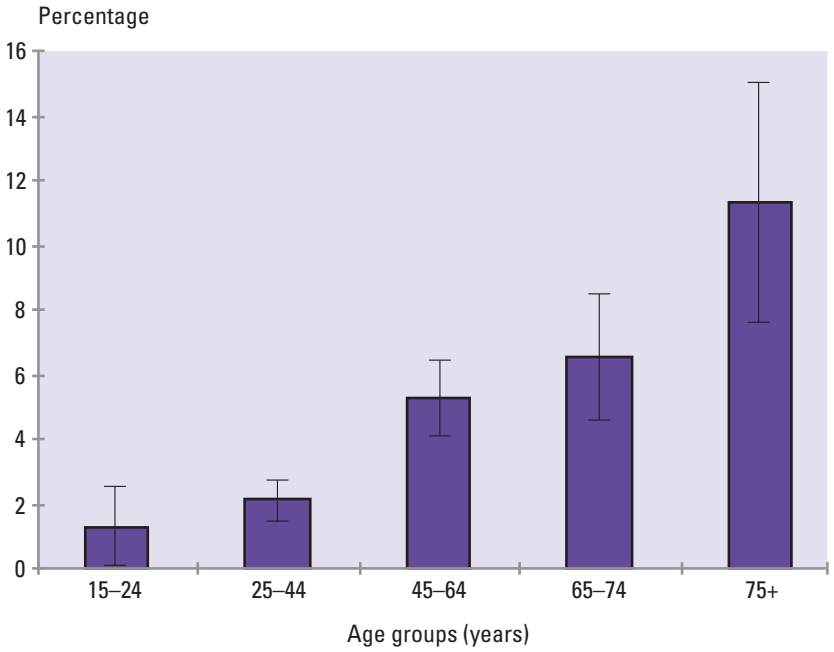
Diabetes by age and sex

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.

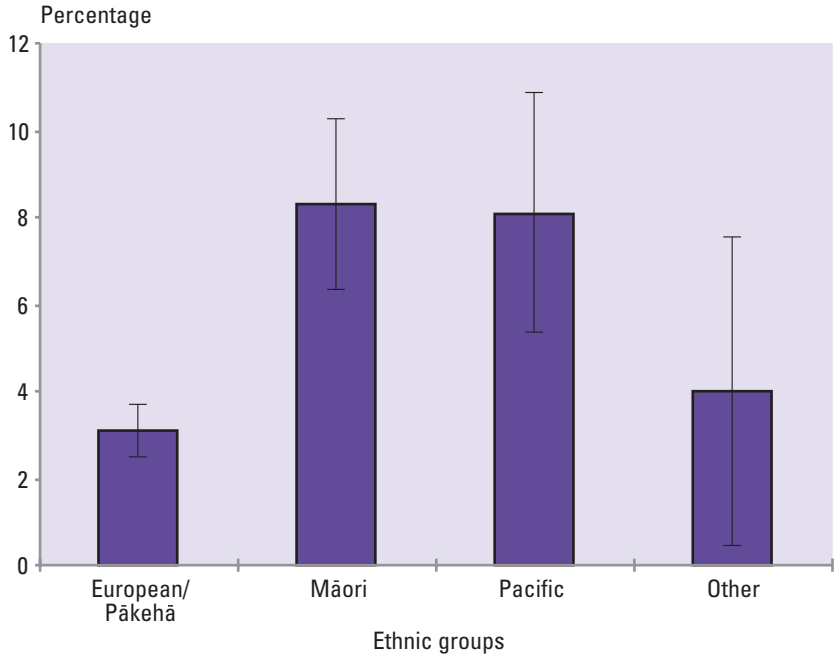
Diabetes by ethnicity

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)

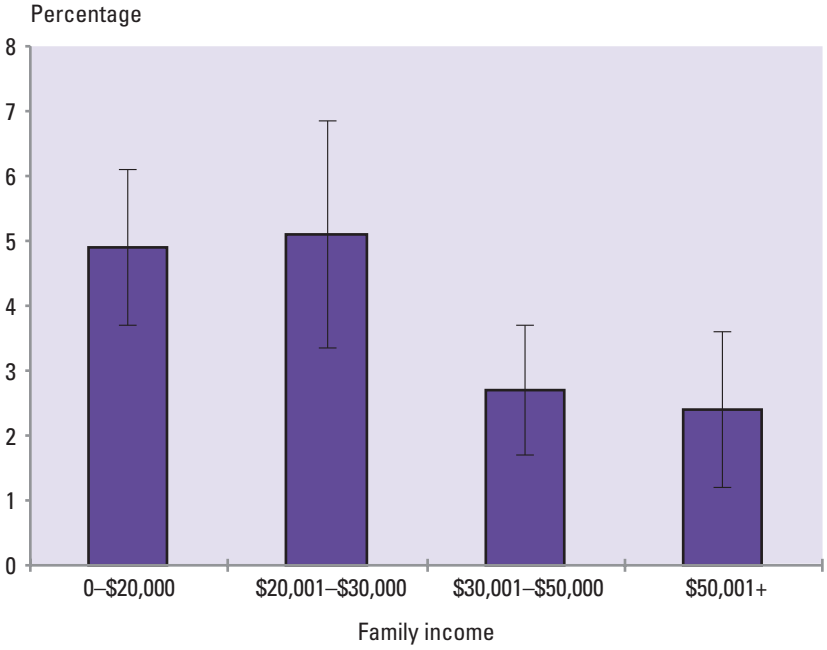


Note: Error bars indicate 95% confidence intervals. For further explanation of graphs, see Appendix 2: Notes to Figures and Tables.

*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).

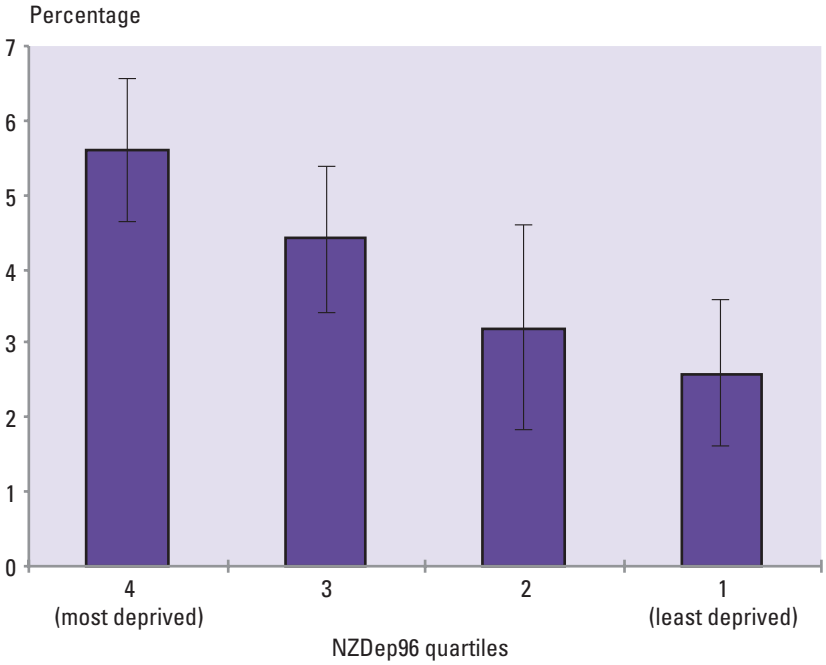
Figure 38: Proportion of people with diagnosed diabetes, by family income (age- and sex-standardised)



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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