Figure 22: Standardised rates of endometrial cancer for 25+ year-olds, by ethnicity

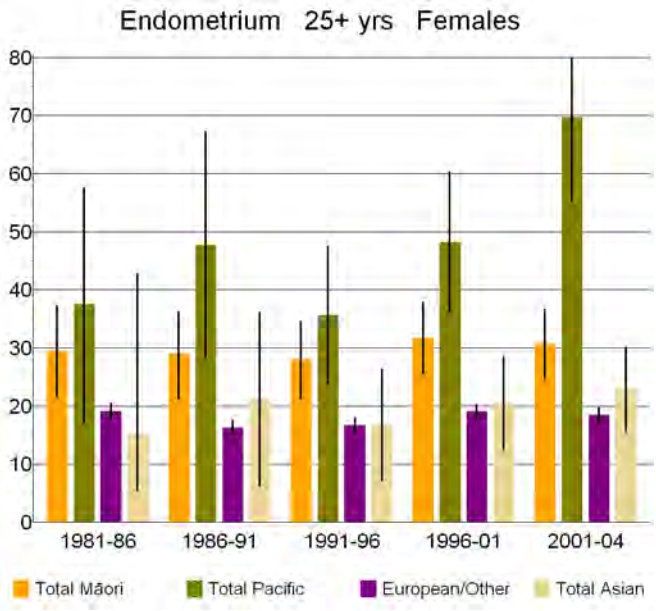


Table 25: Age-standardised rate ratios (SRR) and rate differences (SRD) of endometrial cancer, for Māori, Pacific and Asian compared to European/Other

Exposure Endometrium 25+ years	Cohort	Females	
		SRR (95% CI)	SRD (95% CI)
Total Māori vs European	1981–1986	1.54 (1.17–2.02)	10 (2.5–18)
	1986–1991	1.77 (1.35–2.32)	13 (4.9–20)
	1991–1996	1.67 (1.31–2.15)	11 (4.5–18)
	1996–2001	1.66 (1.35–2.04)	13 (6.4–19)
	2001–2004	1.66 (1.35–2.05)	12 (6.0–19)
	P (trend)	0.72	0.25
	Pooled	1.66 (1.49–1.85)	12 (8.6–15)
Total Pacific vs European	1981–1986	1.96 (1.14–3.37)	18 (-1.9–39)
	1986–1991	2.92 (1.93–4.42)	31 (12–51)
	1991–1996	2.13 (1.51–3.00)	19 (7.0–31)
	1996–2001	2.52 (1.95–3.27)	29 (17–41)
	2001–2004	3.78 (3.03–4.71)	51 (37–66)
	P (trend)	0.14	0.16
	Pooled	2.61 (2.22–3.05)	29 (21–36)
Total Asian vs European	1981–1986	0.80 (0.29–2.24)	-3.7 (-20–12)
	1986–1991	1.30 (0.64–2.64)	4.9 (-10–20)
	1991–1996	1.00 (0.56–1.79)	0.0 (-9.7–9.7)
	1996–2001	1.07 (0.72–1.60)	1.4 (-6.8–9.6)
	2001–2004	1.24 (0.90–1.71)	4.5 (-2.9–12)
	P (trend)	0.35	0.20
	Pooled	1.07 (0.81–1.42)	1.3 (-4.2–6.7)

Notes: 95 percent confidence intervals in brackets. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

9.2 Socioeconomic trends

Age- and ethnicity-adjusted endometrial cancer rates for 25+ year-old females in the low-income group increased by 17 percent over time in the period surveyed (p for trend 0.14), yet decreased by 15 percent in the high-income group (p for trend 0.59; Figure 23 and Table 88 in Appendix 1).

As a consequence of these diverging trends by income group, both absolute and relative measures of inequalities when examined over time suggest a possible movement from lower to higher rates among low-income women between the early 1980s and more recent times, and conversely from higher to lower rates among high-income women in the same period (Table 26).

Figure 23: Standardised rates of endometrial cancer for 25+ year-olds, by income

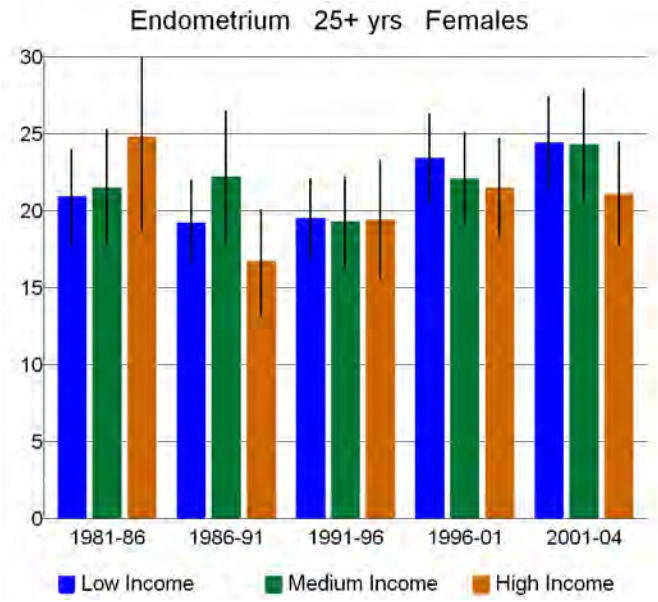


Table 26: Age- and ethnicity-standardised income rate ratios (SRR), rate differences (SRD), relative indices of inequality (RII) and slope indices of inequality (SII) of endometrial cancer

Age group	Cohort	Females			
		Relative inequalities		Absolute inequalities	
		SRR	RII (95% CI)	SRD	SII (95% CI)
Endometrium					
25+ years	1981–1986	0.84	0.8 (0.6–1.2)	-4.0	-4.0 (-17–8.9)
	1986–1991	1.16	1.0 (0.7–1.4)	2.6	-1.0 (-10–8.4)
	1991–1996	1.00	1.1 (0.8–1.5)	0.1	1.0 (-15–18)
	1996–2001	1.09	1.1 (0.9–1.5)	1.9	3.0 (-0.8–6.7)
	2001–2004	1.15	1.1 (0.8–1.5)	3.3	2.0 (-4.8–8.3)
	P (trend)	0.24	0.08	0.25	0.09
	Pooled	1.03	1.0 (0.9–1.2)	0.7	0.0 (-7.1–7.8)

Notes: 95 percent confidence intervals in brackets. SRRs and SRDs compare low- and high-income tertiles. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

Chapter 10: Gallbladder and Bile Duct Cancer

Gallbladder cancer is rare, and generally has a poor prognosis. In 2005, there were 81 cases of cancer of the gallbladder or biliary tract diagnosed in New Zealand, and 71 deaths.[57]

Gallbladder and bile duct cancer are more common among women. Incidence increases with increasing age, and those with a family history seem to have an increased risk. The most established risk factor for cancers of the biliary tract and gallbladder are gallstones. Other risk factors tend to be those that are associated with the development of gallstones, for example obesity and high parity. A diet high in fruit and vegetables may be protective.[67]

10.1 Ethnic trends

Gallbladder and bile duct cancer rates were low for all ethnic groups, and hence not statistically precise (Figure 24 and Table 89 in Appendix 1). There was a suggestion of increasing rates over time among Māori females (the rate doubled from 1981–1986 to 2001–2004, p for trend 0.09). Otherwise no clear trends in rates within ethnic groups were apparent.

Pooled over time, the rate among Māori males were one-third higher than that of European/Other males (SRR 1.38, 95 percent confidence interval 0.91–2.08), and the rate among Pacific males was double the European/Other rate from the 1990s onwards (Table 27). Rates among females were also higher among Māori and Pacific peoples – but confidence intervals for the SRRs comfortably included 1.0.

Over time, there was some evidence of diverging rates between Māori and European/Other females, the SRR increasing from 0.81 (0.32–2.04) to 1.59 (0.85–2.99) over the period surveyed (p for trend 0.03). Likewise, the SRDs over time for Māori compared to European/Other females demonstrated a divergence.

There was little difference in rates between males and females, contrary to an expectation of higher rates among females.

Figure 24: Standardised rates of gallbladder and bile duct cancer for 25+ year-olds, by ethnicity by sex

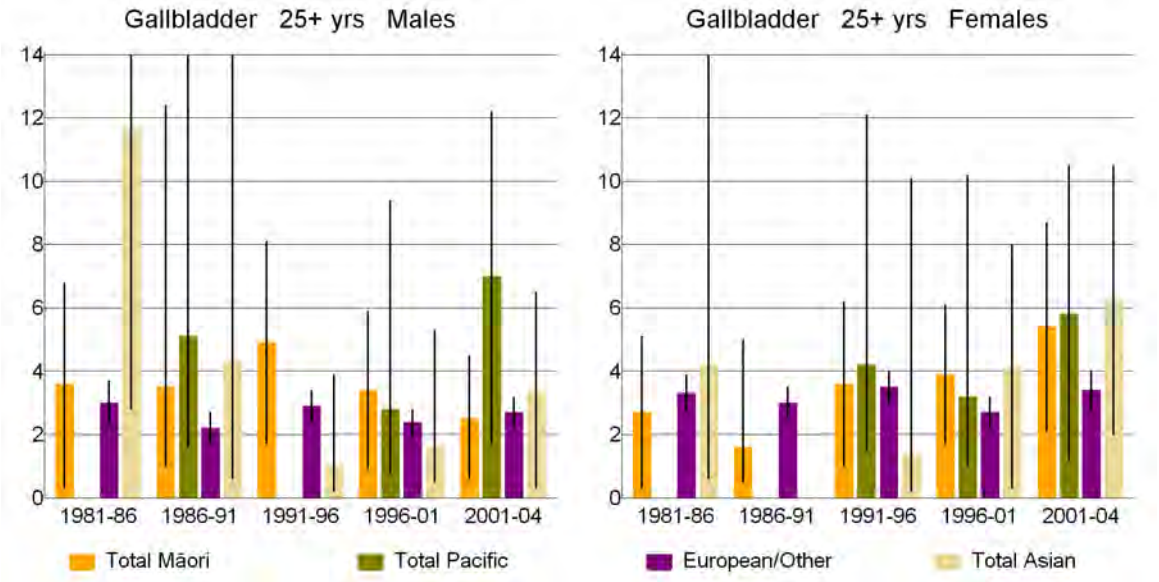


Table 27: Age-standardised rate ratios (SRR) and rate differences (SRD) of gallbladder and bile duct cancer, for Māori, Pacific and Asian compared to European/Other, by sex

Exposure Gallbladder 25+ years	Cohort	Males		Females	
		SRR (95% CI)	SRD (95% CI)	SRR (95% CI)	SRD (95% CI)
Total Māori vs European	1981–1986	1.18 (0.46–3.02)	0.6 (-2.8–3.9)	0.81 (0.32–2.04)	-0.6 (-3.1–1.9)
	1986–1991	1.60 (0.44–5.77)	1.3 (-3.2–5.8)	0.54 (0.18–1.68)	-1.4 (-3.3–0.5)
	1991–1996	1.69 (0.86–3.31)	2.0 (-1.2–5.2)	1.03 (0.50–2.14)	0.1 (-2.5–2.7)
	1996–2001	1.43 (0.67–3.07)	1.0 (-1.5–3.5)	1.46 (0.80–2.65)	1.2 (-1.0–3.5)
	2001–2004	0.92 (0.42–2.05)	-0.2 (-2.2–1.8)	1.59 (0.85–2.99)	2.0 (-1.3–5.3)
	P (trend)	0.55	0.34	0.03	0.05
	Pooled	1.38 (0.91–2.08)	1.0 (-0.5–2.5)	1.05 (0.75–1.47)	0.2 (-0.9–1.3)
Total Pacific vs European	1986–1991	2.33 (0.70–7.77)	2.9 (-3.2–9.0)		
	1991–1996			1.21 (0.41–3.50)	0.7 (-3.8–5.2)
	1996–2001	1.18 (0.35–4.06)	0.4 (-3.0–3.9)	1.18 (0.36–3.87)	0.5 (-3.3–4.2)
	2001–2004	2.56 (1.18–5.58)	4.3 (-1.0–9.6)	1.72 (0.76–3.85)	2.4 (-2.2–7.1)
	Pooled	1.99 (1.24–3.18)	2.4 (0.2–4.6)	1.34 (0.86–2.09)	1.1 (-0.8–3.0)
Total Asian vs European	1981–1986	3.90 (0.93–16.39)	8.7 (-7.9–25)	1.27 (0.18–9.05)	0.9 (-7.3–9.1)
	1986–1991	1.98 (0.28–14.21)	2.1 (-6.4–11)		
	1991–1996	0.34 (0.08–1.37)	-1.9 (-3.4– -0.5)	0.41 (0.06–2.89)	-2.1 (-4.9–0.7)
	1996–2001	0.68 (0.20–2.27)	-0.8 (-2.7–1.2)	1.55 (0.61–3.95)	1.5 (-2.4–5.3)
	2001–2004	1.26 (0.50–3.18)	0.7 (-2.4–3.9)	1.84 (0.92–3.69)	2.9 (-1.4–7.1)
	P (trend)	0.21	0.42		
	Pooled	1.69 (0.69–4.15)	1.8 (-2.2–5.8)	1.20 (0.65–2.22)	0.6 (-1.7–3.0)

Notes: 95 percent confidence intervals in brackets. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

10.2 Socioeconomic trends

Age- and ethnicity-standardised rates of gallbladder and bile duct cancer showed no clear trends over time within income tertiles (Figure 25 and Table 90 in Appendix 1).

There was little evidence of notable inequalities by income among males, but there was a 25–60 percent higher rate among low-income compared to high-income females (Table 28).

Figure 25: Standardised rates of gallbladder and bile duct cancer for 25+ year-olds, by income by sex

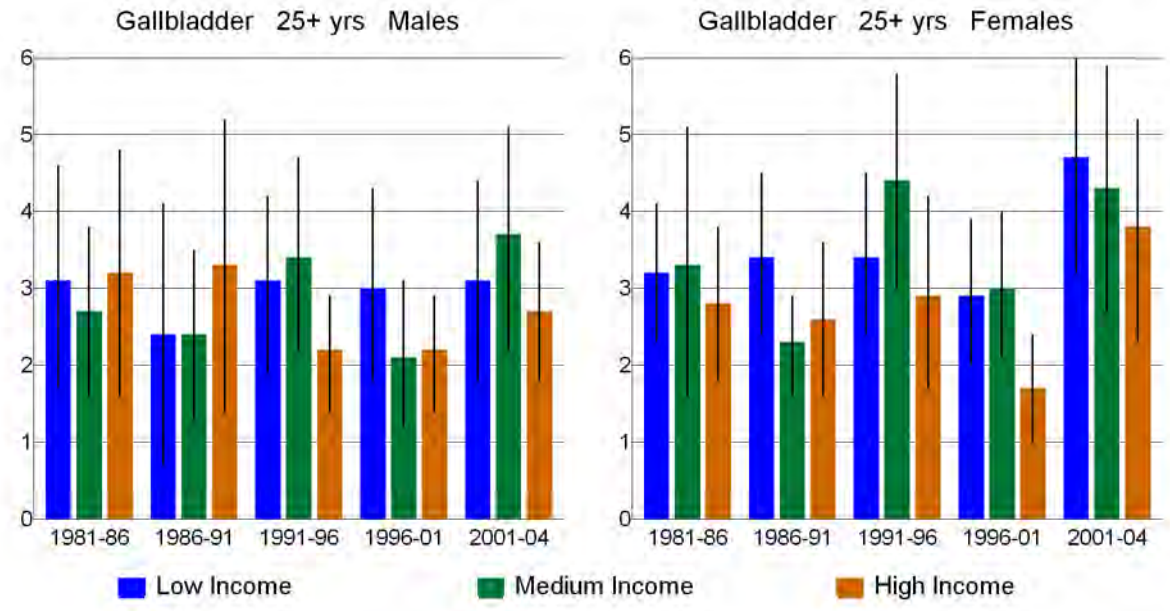


Table 28: Age- and ethnicity-standardised income rate ratios (SRR), rate differences (SRD), relative indices of inequality (RII) and slope indices of inequality (SII) of gallbladder and bile duct cancer, by sex

Age group	Cohort	Males				Females			
		Relative inequalities		Absolute inequalities		Relative inequalities		Absolute inequalities	
		SRR	RII (95% CI)	SRD	SII (95% CI)	SRR	RII (95% CI)	SRD	SII (95% CI)
Gallbladder									
25+ years	1981–1986	0.97	1.1 (0.4–3.2)	-0.1	0.0 (-3.4–4.1)	1.15	1.2 (0.5–3.0)	0.4	1.0 (-0.8–2.1)
	1986–1991	0.73	1.3 (0.4–5.0)	-0.9	1.0 (-2.6–4.2)	1.32	1.7 (0.8–3.4)	0.8	1.0 (-1.2–3.9)
	1991–1996	1.40	1.0 (0.4–2.4)	0.9	0.0 (-5.7–5.6)	1.16	1.3 (0.6–2.6)	0.5	1.0 (-1.2–2.8)
	1996–2001	1.41	1.9 (0.8–4.7)	0.9	1.0 (0.5–2.4)	1.70	2.5 (1.0–6.4)	1.2	2.0 (1.0–3.4)
	2001–2004	1.15	1.2 (0.5–2.8)	0.4	1.0 (-1.1–2.3)	1.25	1.8 (0.8–4.2)	0.9	2.0 (1.0–3.9)
	P (trend)	0.45	0.62	0.42	0.22	0.48	0.32	0.14	0.04
	Pooled	1.08	1.2 (0.8–1.9)	0.2	0.0 (-1.1–2.1)	1.28	1.6 (1.1–2.3)	0.8	1.0 (0.6–2.3)

Notes: 95 percent confidence intervals in brackets. SRRs and SRDs compare low- and high-income tertiles. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

Chapter 11: Hodgkin's Disease

In New Zealand in 2005 there were 95 cases of Hodgkin's disease diagnosed, of which 58 were in men.[57] Five-year survival from Hodgkin's disease is about 80 percent.[68] Hodgkin's disease represents about 10 percent of all lymphomas; the remainder are called non-Hodgkin's lymphoma (NHL). The classification of lymphomas has been subject to change in recent decades, meaning some lymphomas previously considered to be Hodgkin's disease have been reclassified as NHL and vice versa. There are two main forms of Hodgkin's disease: nodular lymphocyte predominant (5 percent) and classical Hodgkin's disease.[68] The latter group is divided into another four subgroups.[68]

Incidence of Hodgkin's disease varies by age, sex, ethnicity, social class and histologic subtype. Similarly to most cancers incidence tends to occur in family clusters; this is thought to be due to shared genetic and environmental exposures.[68]

Epstein-Barr virus plays a role in the development of some, but not all, types of Hodgkin's disease. There are higher rates of Hodgkin's disease among people with autoimmune disorders (such as rheumatoid arthritis) and immunodeficiency. There is no clear evidence for a relationship between a number of other risk factors (including smoking, ionising radiation, physical activity, diet, occupational exposures, alcohol and reproductive hormones) and Hodgkin's disease.[68]

11.1 Ethnic trends

Rates of Hodgkin's disease by ethnicity were unstable over the period surveyed, with no clear trends in rates evident within ethnic groups (Figure 26).

Pooled over time, the highest rates tended to be found among European/Other for both sexes – except compared to Asian females, for which the pooled SRR was 1.41, although with a confidence interval including the null (0.69–2.87). Pacific males had a pooled SRR of 0.57 (0.30–1.11) compared to European/Other males, and Māori females had a pooled SRR of 0.60 (0.36–1.00) compared to European/Other females (Table 29).

Figure 26: Standardised rates of Hodgkin's disease cancer for 25+ year-olds, by ethnicity by sex

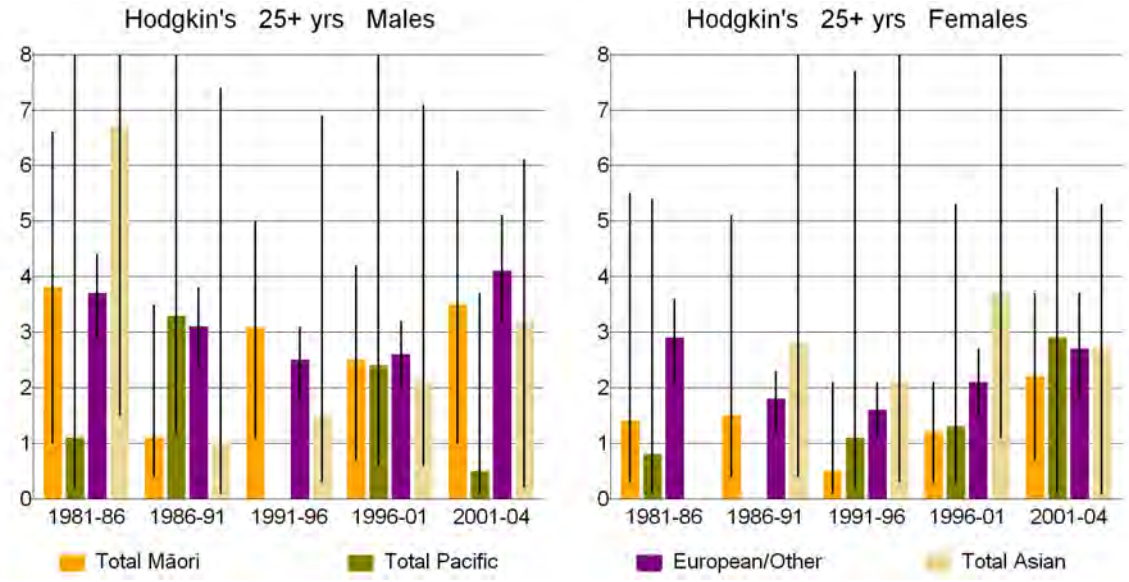


Table 29: Age-standardised rate ratios (SRR) and standardised rate differences (SRDs) of Hodgkin's disease cancer, for Māori, Pacific and Asian compared to European/Other, by sex

Exposure Hodgkin's 25+ years	Cohort	Males		Females	
		SRR (95% CI)	SRD (95% CI)	SRR (95% CI)	SRD (95% CI)
Total Māori vs European	1981–1986	1.03 (0.48–2.21)	0.1 (-2.8–3.0)	0.48 (0.12–1.96)	-1.5 (-3.5–0.6)
	1986–1991	0.37 (0.12–1.16)	-2.0 (-3.4– -0.5)	0.85 (0.24–3.01)	-0.3 (-2.2–1.6)
	1991–1996	1.26 (0.63–2.49)	0.6 (-1.4–2.7)	0.32 (0.08–1.33)	-1.1 (-2.0– -0.2)
	1996–2001	0.95 (0.46–1.97)	-0.1 (-1.9–1.7)	0.56 (0.25–1.27)	-0.9 (-2.0–0.2)
	2001–2004	0.84 (0.40–1.77)	-0.7 (-3.3–2.0)	0.81 (0.38–1.73)	-0.5 (-2.3–1.2)
	P (trend)	0.88	0.53	0.51	0.48
	Pooled	0.88 (0.62–1.25)	-0.4 (-1.4–0.6)	0.60 (0.36–1.00)	-0.9 (-1.6– -0.2)
Total Pacific vs European	1981–1986	0.31 (0.04–2.20)	-2.5 (-4.9– -0.2)	0.27 (0.04–1.91)	-2.1 (-3.8– -0.4)
	1986–1991	1.05 (0.38–2.93)	0.2 (-3.2–3.5)		
	1991–1996			0.68 (0.09–4.90)	-0.5 (-2.7–1.7)
	1996–2001	0.93 (0.23–3.83)	-0.2 (-3.6–3.2)	0.63 (0.15–2.59)	-0.8 (-2.7–1.1)
	2001–2004	0.12 (0.02–0.90)	-3.6 (-5.0– -2.2)	1.05 (0.38–2.93)	0.1 (-2.8–3.1)
	Pooled	0.57 (0.30–1.11)	-1.4 (-2.7– -0.1)	0.62 (0.33–1.19)	-0.9 (-1.8–0.1)
Total Asian vs European	1981–1986	1.82 (0.41–8.07)	3.0 (-6.9–13)		
	1986–1991	0.34 (0.05–2.41)	-2.1 (-4.2–0.1)	1.58 (0.22–11.46)	1.0 (-4.4–6.4)
	1991–1996	0.62 (0.14–2.87)	-0.9 (-3.3–1.5)	1.32 (0.18–9.58)	0.5 (-3.7–4.7)
	1996–2001	0.81 (0.23–2.79)	-0.5 (-3.1–2.1)	1.77 (0.52–6.03)	1.6 (-2.9–6.1)
	2001–2004	0.77 (0.29–2.02)	-1.0 (-4.1–2.2)	0.98 (0.35–2.75)	-0.1 (-2.8–2.7)
	P (trend)	0.32	0.49		
	Pooled	0.91 (0.41–2.03)	-0.3 (-2.6–2.0)	1.41 (0.69–2.87)	0.8 (-1.2–2.8)

Notes: 95 percent confidence intervals in brackets. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

11.2 Socioeconomic trends

Rates of Hodgkin's disease by income were unstable over time, with no clear trends in rates evident within income groups (Figure 27).

Pooled over time, there were no statistically significant differences in Hodgkin's disease incidence by income (Table 30). Neither were there any clear trends in absolute or relative inequalities by income over time.

Figure 27: Standardised rates of Hodgkin's disease cancer for 25+ year-olds, by income by sex

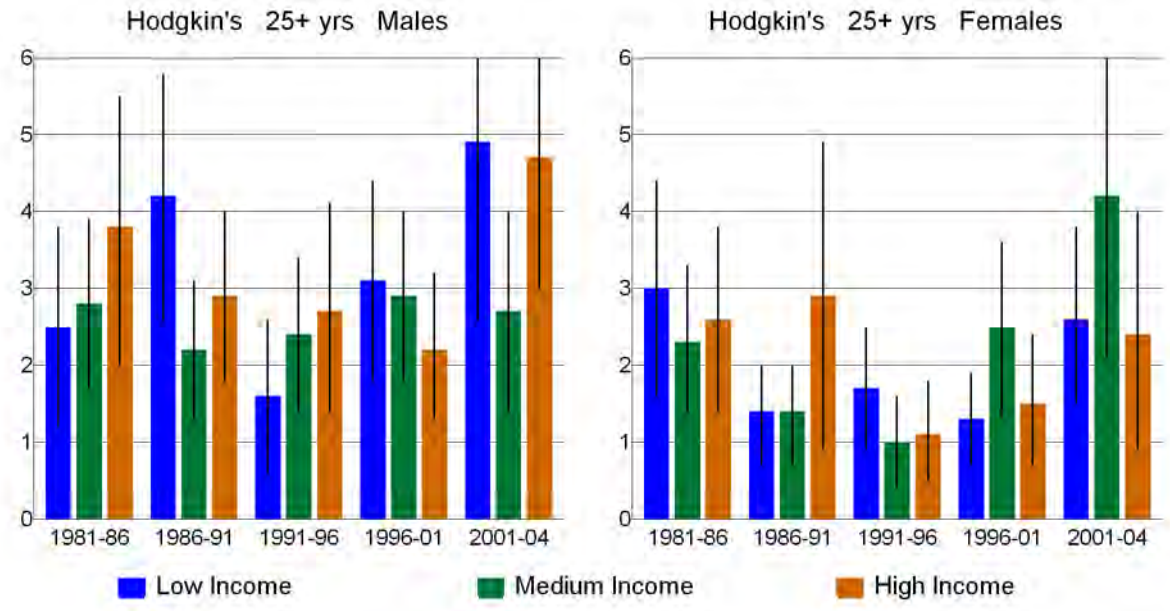


Table 30: Age- and ethnicity-standardised income rate ratios (SRR), rate differences (SRD), relative indices of inequality (RII) and slope indices of inequality (SII) of Hodgkin's disease cancer, by sex

Age group	Cohort	Males				Females			
		Relative inequalities		Absolute inequalities		Relative inequalities		Absolute inequalities	
		SRR	RII (95% CI)	SRD	SII (95% CI)	SRR	RII (95% CI)	SRD	SII (95% CI)
Hodgkin's disease									
25+ years	1981–1986	0.66	0.7 (0.2–2.0)	-1.3	-1.0 (-4.7–2.0)	1.16	1.6 (0.6–4.6)	0.4	1.0 (-2.3–4.7)
	1986–1991	1.47	2.1 (0.8–5.6)	1.3	2.0 (0.5–3.9)	0.47	0.3 (0.0–1.9)	-1.5	-2.0 (-3.7– -0.2)
	1991–1996	0.59	0.6 (0.2–1.7)	-1.1	-1.0 (-3.7–1.2)	1.52	1.8 (0.5–6.3)	0.6	1.0 (-0.8–2.2)
	1996–2001	1.41	1.6 (0.7–4.0)	0.9	1.0 (-0.1–2.6)	0.86	0.6 (0.2–1.9)	-0.2	-1.0 (-2.7–1.2)
	2001–2004	1.06	0.8 (0.3–1.9)	0.3	-1.0 (-6.0–3.9)	1.09	1.2 (0.4–3.8)	0.2	1.0 (-1.0–2.2)
	P (trend)	0.77	0.92	0.55	0.90	0.98	0.74	0.98	0.46
	Pooled	1.00	1.1 (0.7–1.7)	-0.0	0.0 (-1.4–1.9)	0.94	0.9 (0.5–1.5)	-0.1	0.0 (-1.0–0.5)

Notes: 95 percent confidence intervals in brackets. SRRs and SRDs compare low- and high-income tertiles. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

Chapter 12: Kidney Cancer

Kidney cancer comprises a number of different cancer types, including renal cell carcinoma, cancer of the renal pelvis and nephroblastoma. Most adult kidney cancer is renal cell cancer, which includes clear cell, papillary and chromophilic renal cell carcinomas; collecting duct carcinoma; and unclassified renal cell carcinoma.[69] There were 364 cases diagnosed in New Zealand in 2005, making kidney cancer the 11th most common cancer registered and the ninth most common cause of cancer death.[57]

Kidney cancer is somewhat more common among males than females, and its incidence peaks in the sixth and seventh decades of life. A small proportion of kidney cancer is related to inheritable syndromes or conditions.

The two most established risk factors for kidney cancer are obesity and smoking. There is some evidence that a diet high in meat may slightly increase risk of kidney cancer, and that green vegetables and fruit may reduce risk, although findings in this respect have been somewhat inconsistent. Similarly, while many potential occupational exposure risk factors have been hypothesised, none have been found to be consistently associated with kidney cancer, with the possible exception of asbestos.[57] Patients with end-stage renal disease from other causes have considerably increased risk of kidney cancer, and risk is moderately increased for those with a history of kidney stones or kidney infections, and for those with high blood pressure or on certain medications for high blood pressure. Moderate alcohol consumption may be protective.[69]

12.1 Ethnic trends

Kidney cancer incidence among 25+ year-olds increased over the period surveyed in all ethnic groups (Figure 28 and Table 93 in Appendix 1). European/Other rates increased monotonically over time, by 58 percent for males (p for trend 0.01) and 87 percent for females (p for trend <0.01). Māori rates also tended to increase in parallel, but not monotonically. There were also increases in Pacific and Asian male rates, although these rates were measured with considerable imprecision in each cohort.

The kidney cancer rate among Māori tended to be slightly lower than that of European/Other among both males and females. Pacific and Asian rates were about half European/Other rates (Table 31): for example, Pacific men had an SRR of 0.55 (95 percent confidence interval 0.33–0.93).

While rates varied between ethnic groups, there was no clear trend of changing differences by ethnicity over time.

Figure 28: Standardised rates of kidney cancer for 25+ year-olds, by ethnicity by sex

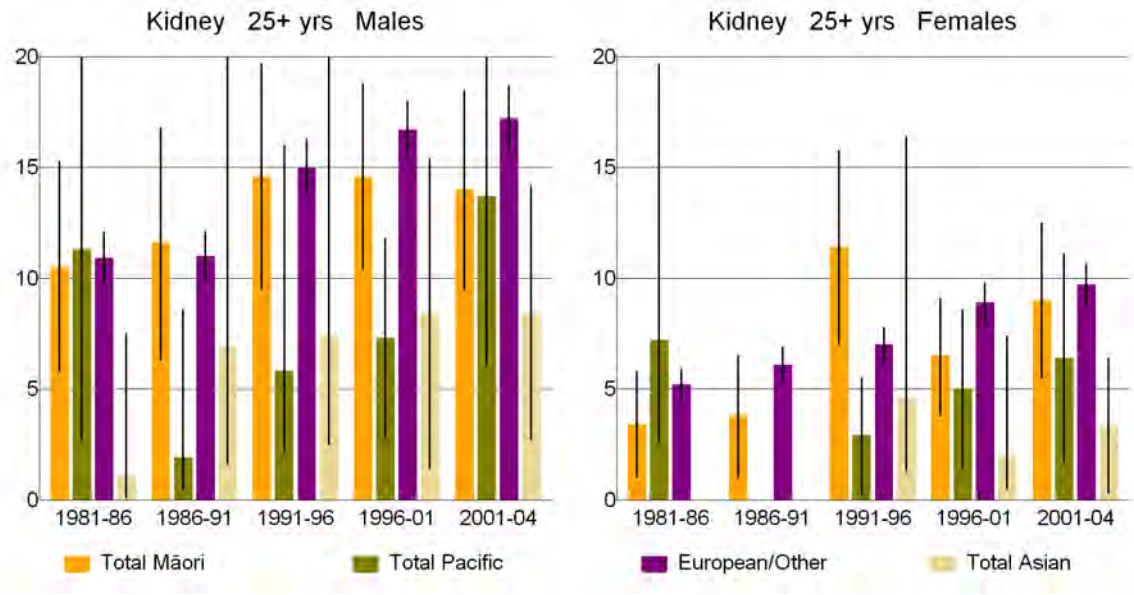


Table 31: Age-standardised rate ratios (SRR) and rate differences (SRD) of kidney cancer, for Māori, Pacific and Asian compared to European/Other, by sex

Exposure Kidney 25+ years	Cohort	Males		Females	
		SRR (95% CI)	SRD (95% CI)	SRR (95% CI)	SRD (95% CI)
Total Māori vs European	1981–1986	0.96 (0.60–1.53)	-0.4 (-5.3–4.5)	0.65 (0.32–1.34)	-1.8 (-4.3–0.7)
	1986–1991	1.05 (0.66–1.67)	0.6 (-4.8–5.9)	0.62 (0.30–1.30)	-2.3 (-5.2–0.6)
	1991–1996	0.97 (0.68–1.39)	-0.4 (-5.6–4.9)	1.63 (1.09–2.42)	4.4 (-0.1–8.8)
	1996–2001	0.87 (0.65–1.18)	-2.1 (-6.5–2.3)	0.73 (0.47–1.11)	-2.4 (-5.2–0.4)
	2001–2004	0.82 (0.59–1.14)	-3.2 (-7.9–1.6)	0.93 (0.62–1.39)	-0.7 (-4.3–3.0)
	P (trend)	0.06	0.05	0.92	0.80
	Pooled	0.93 (0.78–1.10)	-1.0 (-3.2–1.2)	0.92 (0.74–1.15)	-0.6 (-2.0–0.9)
Total Pacific vs European	1981–1986	1.03 (0.24–4.42)	0.4 (-16–17)	1.38 (0.50–3.82)	2.0 (-5.3–9.2)
	1986–1991	0.17 (0.04–0.79)	-9.1 (-12– -6.0)		
	1991–1996	0.38 (0.14–1.07)	-9.3 (-15– -3.3)	0.41 (0.16–1.02)	-4.2 (-6.9– -1.4)
	1996–2001	0.44 (0.24–0.81)	-9.4 (-14– -4.7)	0.56 (0.27–1.16)	-3.9 (-7.6– -0.2)
	2001–2004	0.80 (0.45–1.40)	-3.5 (-11–4.3)	0.67 (0.32–1.39)	-3.2 (-8.0–1.6)
	P (trend)	0.63	0.65		
	Pooled	0.55 (0.33–0.93)	-6.3 (-10– -2.2)	0.70 (0.46–1.06)	-2.3 (-4.5– -0.1)
Total Asian vs European	1981–1986	0.10 (0.01–0.69)	-9.9 (-12– -7.5)		
	1986–1991	0.62 (0.15–2.63)	-4.1 (-14–5.8)		
	1991–1996	0.49 (0.17–1.43)	-7.6 (-16–0.3)	0.65 (0.18–2.35)	-2.4 (-8.3–3.5)
	1996–2001	0.50 (0.22–1.16)	-8.3 (-15– -1.2)	0.23 (0.06–0.84)	-6.9 (-9.6– -4.1)
	2001–2004	0.49 (0.25–0.98)	-8.7 (-15– -2.8)	0.34 (0.14–0.87)	-6.3 (-9.6– -3.1)
	P (trend)	0.62	0.41		
	Pooled	0.45 (0.27–0.75)	-7.7 (-11– -4.4)	0.39 (0.22–0.69)	-5.1 (-7.1– -3.2)

Notes: 95 percent confidence intervals in brackets. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

12.2 Socioeconomic trends

Kidney cancer incidence among 25+ year-olds increased over the period surveyed by about 50 percent or more in each income group for males, and approximately doubled in each income group among females (Figure 29 and Table 94 in Appendix 1; p for trend less than 0.10 in each instance).

Pooled over time, among males there was no notable difference in kidney cancer rates by income. Among females, however, the low-income group tended to have a rate over one-third higher than that of the high-income group (pooled SRR 1.36 and pooled RII 1.3 (95 percent confidence interval 1.1–1.7); Table 32).

There were no clear trends in absolute or relative inequalities in kidney cancer over time among males and females.

Figure 29: Standardised rates of kidney cancer for 25+ year-olds, by income by sex

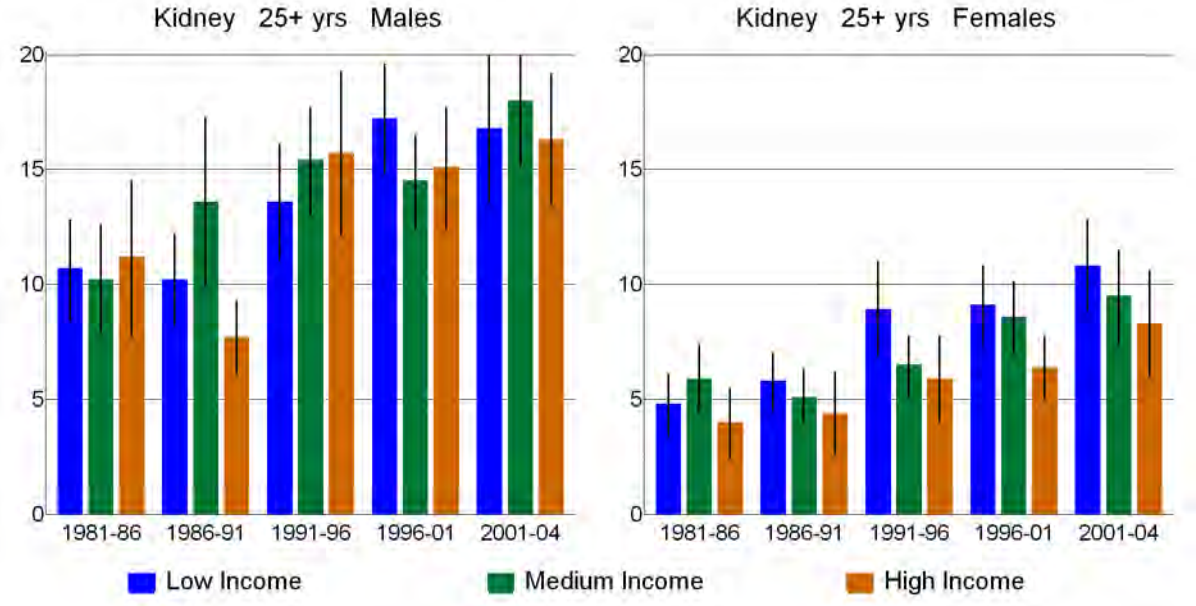


Table 32: Age- and ethnicity-standardised income rate ratios (SRR), rate differences (SRD), relative indices of inequality (RII) and slope indices of inequality (SII) of kidney cancer, except renal pelvis cancer, by sex

Age group	Cohort	Males				Females			
		Relative inequalities		Absolute inequalities		Relative inequalities		Absolute inequalities	
		SRR	RII (95% CI)	SRD	SII (95% CI)	SRR	RII (95% CI)	SRD	SII (95% CI)
Kidney									
25+ years	1981–1986	0.96	0.9 (0.5–1.6)	-0.5	-1.0 (-3.6–1.8)	1.20	0.9 (0.5–1.9)	0.8	0.0 (-4.1–3.4)
	1986–1991	1.32	1.6 (0.9–2.9)	2.5	5.0 (-2.6–13)	1.31	1.6 (0.9–2.8)	1.4	2.0 (1.0–3.5)
	1991–1996	0.86	0.8 (0.5–1.4)	-2.1	-3.0 (-4.6– -0.6)	1.52	1.7 (1.0–3.0)	3.1	4.0 (1.6–5.7)
	1996–2001	1.14	1.3 (0.9–1.7)	2.1	3.0 (0.3–6.4)	1.43	1.4 (0.9–2.1)	2.7	3.0 (-3.6–9.0)
	2001–2004	1.03	0.9 (0.7–1.3)	0.5	-1.0 (-4.8–2.8)	1.30	1.2 (0.8–1.9)	2.5	2.0 (-1.0–4.7)
	P (trend)	0.87	0.84	0.99	0.77	0.71	0.90	0.07	0.50
	Pooled	1.04	1.1 (0.9–1.3)	0.5	1.0 (-0.8–2.7)	1.36	1.3 (1.1–1.7)	2.1	2.0 (1.2–2.8)

Notes: 95 percent confidence intervals in brackets. SRRs and SRDs compare low- and high-income tertiles. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

Chapter 13: Larynx, Nasal, Ear and Sinus Cancer

Cancers of the ear, sinuses and larynx are uncommon. This combination of cancers accounted for 114 registered cancers, the majority of which were laryngeal, in 2005.[57]

Laryngeal cancer is considerably more common among men than women, and risk increases with increasing age. The majority of laryngeal cancer is due to tobacco smoking, alcohol consumption or an interaction between the two. Occupational exposure to inorganic acids, nickel, asbestos and ionising radiation; and laryngeal infection with HPV may also be associated with an increased risk of laryngeal cancer. High intake of fruit and vegetables may be protective.[70]

13.1 Ethnic trends

Larynx, nasal, ear and sinus cancer incidence decreased by 43 percent among European/Other males (p for trend <0.01) over the period surveyed, and approximately halved among Pacific and Asian males (although the statistical significance of the trend was borderline) (Figure 30 and Table 95 in Appendix 1). Rates among Māori males were unstable over time, and among females even more so.

Pooled over time, Māori and Pacific male rates were 1.12 and 1.25 times greater respectively than European/Other rates, but confidence intervals included the null. Asian male rates were 1.55 times European/Other male rates (95 percent confidence interval 0.95–2.52) (Table 33). Among females, Asian rates were twice the European/Other rate (but confidence intervals included the null), Māori rates 1.75 times greater (1.18–2.58) and Pacific rates 2.32 times greater (0.97–5.56).

There were no significant trends over time in ethnic inequalities in larynx, nasal, ear and sinus cancer incidence.

Figure 30: Standardised rates of larynx, nasal, ear and sinus cancer for 25+ year-olds, by ethnicity by sex

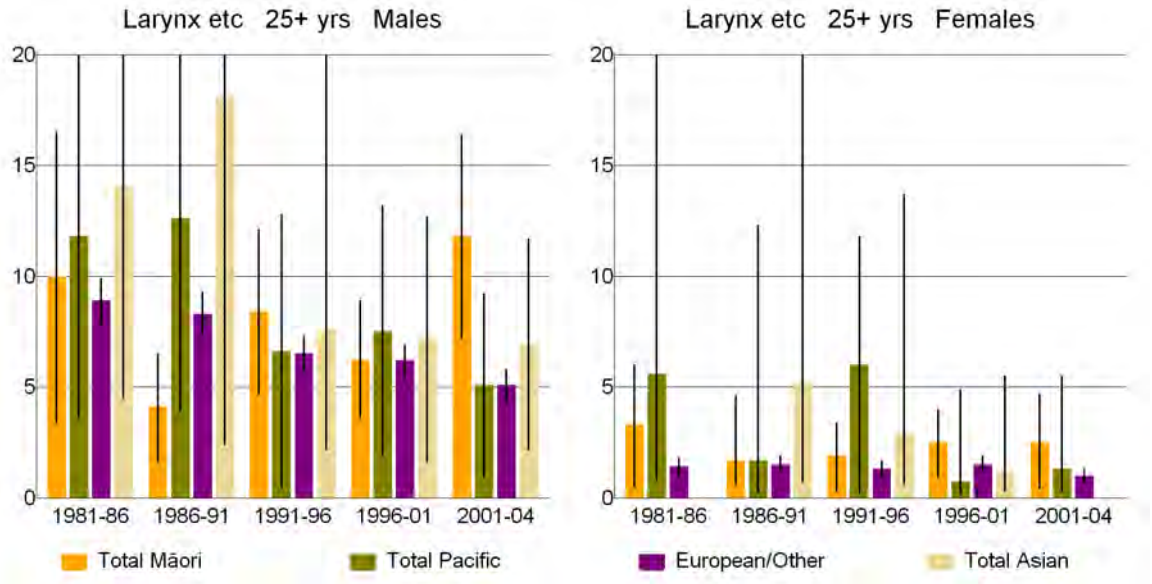


Table 33: Age-standardised rate ratios (SRR) and rate differences (SRD) of larynx, nasal, ear and sinus cancer, for Māori, Pacific and Asian compared to European/Other, by sex

Exposure Larynx etc 25+ years	Cohort	Males		Females	
		SRR (95% CI)	SRD (95% CI)	SRR (95% CI)	SRD (95% CI)
Total Māori vs European	1981–1986	1.12 (0.58–2.19)	1.1 (-5.6–7.7)	2.36 (0.98–5.69)	1.9 (-0.9–4.6)
	1986–1991	0.49 (0.27–0.91)	-4.2 (-6.9– -1.6)	1.11 (0.39–3.12)	0.2 (-1.6–1.9)
	1991–1996	1.29 (0.81–2.04)	1.9 (-1.9–5.7)	1.40 (0.59–3.32)	0.5 (-1.0–2.1)
	1996–2001	1.01 (0.65–1.58)	0.1 (-2.7–2.8)	1.60 (0.82–3.11)	0.9 (-0.7–2.5)
	2001–2004	2.32 (1.53–3.52)	6.7 (2.0–11)	2.54 (1.04–6.20)	1.5 (-0.6–3.7)
	P (trend)	0.16	0.16	0.85	0.67
	Pooled	1.12 (0.87–1.43)	0.8 (-1.1–2.8)	1.75 (1.18–2.58)	1.0 (0.1–1.9)
Total Pacific vs European	1981–1986	1.32 (0.40–4.33)	2.9 (-11–17)	4.05 (0.56 – 29.3)	4.2 (-6.7–15)
	1986–1991	1.51 (0.47–4.84)	4.3 (-10–19)	1.13 (0.16–8.17)	0.2 (-3.2–3.6)
	1991–1996	1.01 (0.39–2.61)	0.1 (-6.2–6.3)	4.49 (1.65–12.2)	4.7 (-1.1–11)
	1996–2001	1.22 (0.57–2.61)	1.4 (-4.3–7.1)	0.45 (0.06–3.27)	-0.8 (-2.3–0.6)
	2001–2004	1.00 (0.44–2.30)	0.0 (-4.2–4.2)	1.26 (0.28–5.68)	0.3 (-1.6–2.1)
	P (trend)	0.22	0.24	0.40	0.74
	Pooled	1.25 (0.74–2.12)	1.8 (-2.8–6.4)	2.32 (0.97–5.56)	1.8 (-0.9–4.5)
Total Asian vs European	1981–1986	1.59 (0.51–4.99)	5.2 (-11–21)		
	1986–1991	2.18 (0.91–5.22)	9.8 (-5.9–26)	3.42 (0.47–24.66)	3.7 (-6.6–14)
	1991–1996	1.16 (0.33–4.14)	1.1 (-8.5–11)	2.14 (0.44–10.46)	1.5 (-3.0–6.0)
	1996–2001	1.16 (0.53–2.54)	1.0 (-4.6–6.6)	0.79 (0.17–3.64)	-0.3 (-2.2–1.5)
	2001–2004	1.37 (0.68–2.75)	1.9 (-2.9–6.7)		
	P (trend)	0.28	0.38		
	Pooled	1.55 (0.95–2.52)	3.9 (-1.5–9.2)	2.16 (0.82–5.73)	1.7 (-1.3–4.7)

Notes: 95 percent confidence intervals in brackets. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

13.2 Socioeconomic trends

Larynx, nasal, ear and sinus cancer incidence rates among males decreased by 23 percent in the low-income group, by 39 percent in the middle income group and by 45 percent in the high-income group (p for trend <0.10 in all three groups) (Figure 31 and Table 96 in Appendix 1). Among females, rates were about one-fifth those of males, and were unstable over time, with no clear patterns other than a halving of rates among the low-income group.

Pooled over time, rates were up to twice as high among low-income compared to high-income groups, for both males and females (Table 34). Inequality among females was unstable over time, but among males may have increased (as indicated, for example, by the RII, which increased from 1.70 to 2.90, p for trend 0.10). Such a pattern of differing trends in inequality by sex seems unlikely, and it may be that this pattern is a chance finding.

Figure 31: Standardised rates of larynx, nasal, ear and sinus cancer for 25+ year-olds, by income by sex

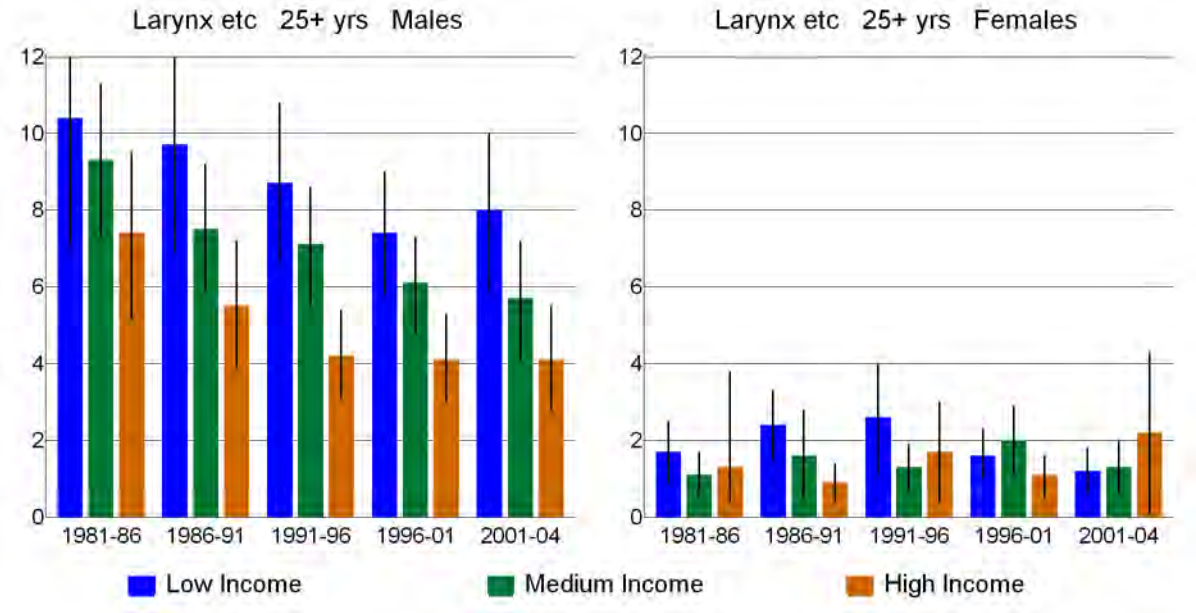


Table 34: Age- and ethnicity-standardised income rate ratios (SRR), rate differences (SRD), relative indices of inequality (RII) and slope indices of inequality (SII) of larynx, nasal, ear and sinus cancer, by sex

Age group	Cohort	Males				Females			
		Relative inequalities		Absolute inequalities		Relative inequalities		Absolute inequalities	
		SRR	RII (95% CI)	SRD	SII (95% CI)	SRR	RII (95% CI)	SRD	SII (95% CI)
Larynx etc									
25+ years	1981–1986	1.42	1.7 (1.0–3.1)	3.1	5.0 (1.2–7.9)	1.29	2.0 (0.4–10.2)	0.4	1.0 (-1.7–3.6)
	1986–1991	1.75	2.0 (1.1–3.7)	4.1	5.0 (4.4–5.6)	2.66	3.1 (0.7–14.2)	1.5	2.0 (0.4–3.2)
	1991–1996	2.05	3.4 (1.6–7.5)	4.4	7.0 (6.1–7.7)	1.53	1.8 (0.5–6.5)	0.9	1.0 (-0.7–2.7)
	1996–2001	1.79	2.6 (1.4–5.1)	3.3	5.0 (2.3–7.9)	1.52	2.0 (0.7–5.9)	0.6	1.0 (-0.7–2.8)
	2001–2004	1.93	2.9 (1.3–6.6)	3.8	5.0 (4.2–6.7)	0.55	0.4 (0.1–3.1)	-1.0	-1.0 (-2.9–0.2)
	P (trend)	0.24	0.10	0.86	0.75	0.24	0.30	0.31	0.07
	Pooled	1.74	2.3 (1.7–3.1)	3.8	6.0 (4.6–6.4)	1.38	1.7 (1.0–3.2)	0.5	1.0 (0.7–1.0)

Notes: 95 percent confidence intervals in brackets. SRRs and SRDs compare low- and high-income tertiles. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

Chapter 14: Leukaemia

The term 'leukaemia' encompasses a heterogeneous range of malignancies of the haematopoietic system. In 2005 there were 575 cases of adult leukaemia diagnosed in New Zealand; about 42 percent were in women.[57] Five-year survival from leukaemia in New Zealand is approximately 50 percent.[58] The classification of leukaemia is complex, has evolved over time, and is important, as specific subtypes entail different epidemiology, treatment and prognoses.[71]

Overall leukaemia is more common in older age groups, in men and in certain countries.[71] In a proportion of cases genetic factors play a role. Little is known about environmental risk factors for leukaemia. For some types of leukaemia smoking appears to play a role, as do infectious agents, ionising radiation, exposure to benzene, and chemotherapy medications. However, these risk factors are unlikely to explain the majority of cases.[71]

14.1 Ethnic trends

Incidence increased by 75 percent and 102 percent for Māori and European/Other males respectively (p for trend 0.04 and <0.01), and by 42 percent, 109 percent, 89 percent and 56 percent for Māori, Pacific, European/Other and Asian females respectively (although only in the case of European/Other was the p for trend significant: <0.01) (Table 97 in Appendix 1). These patterns were similar across age groups (Figure 33).

Pooled over time, Asian female rates were about two-thirds those of European/Other females, and Māori female rates were 1.21 (95 percent confidence interval 1.02–1.43) times greater. There were no substantive differences by ethnicity in rates for males across combined age groups.

Consistent with the lack of observed increase in Pacific and Asian male leukaemia rates over time, there was a trend among these two groups compared to European/Other males for relative inequality rate ratios to fall below 1.0 (Tables 35 and 36). However, neither of these two trends was statistically significant.

Figure 32: Standardised rates of leukaemia cancer for 25+ year-olds, by ethnicity by sex

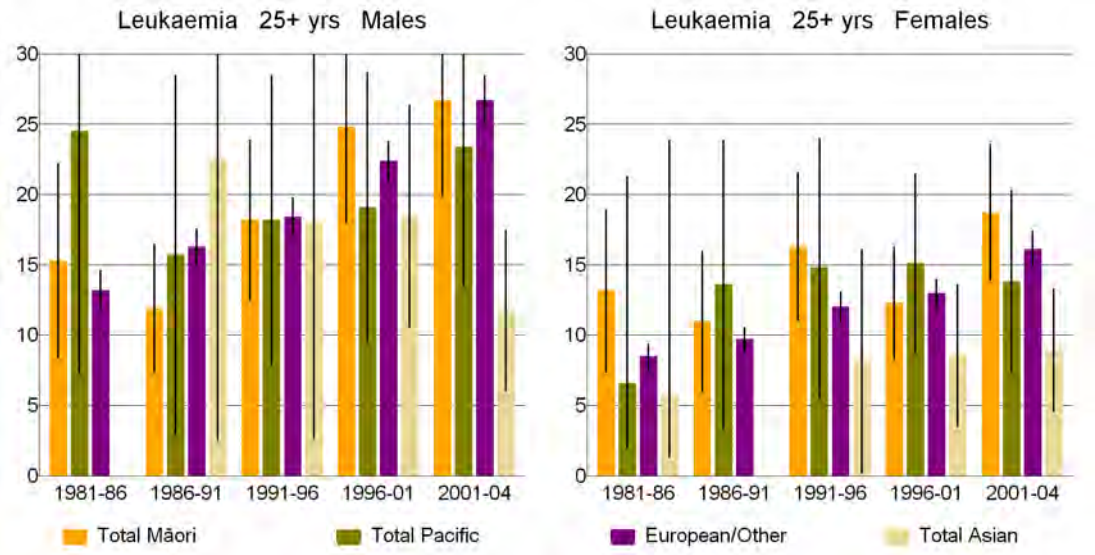


Figure 33: Standardised rates of leukaemia cancer, by ethnicity by sex and age group

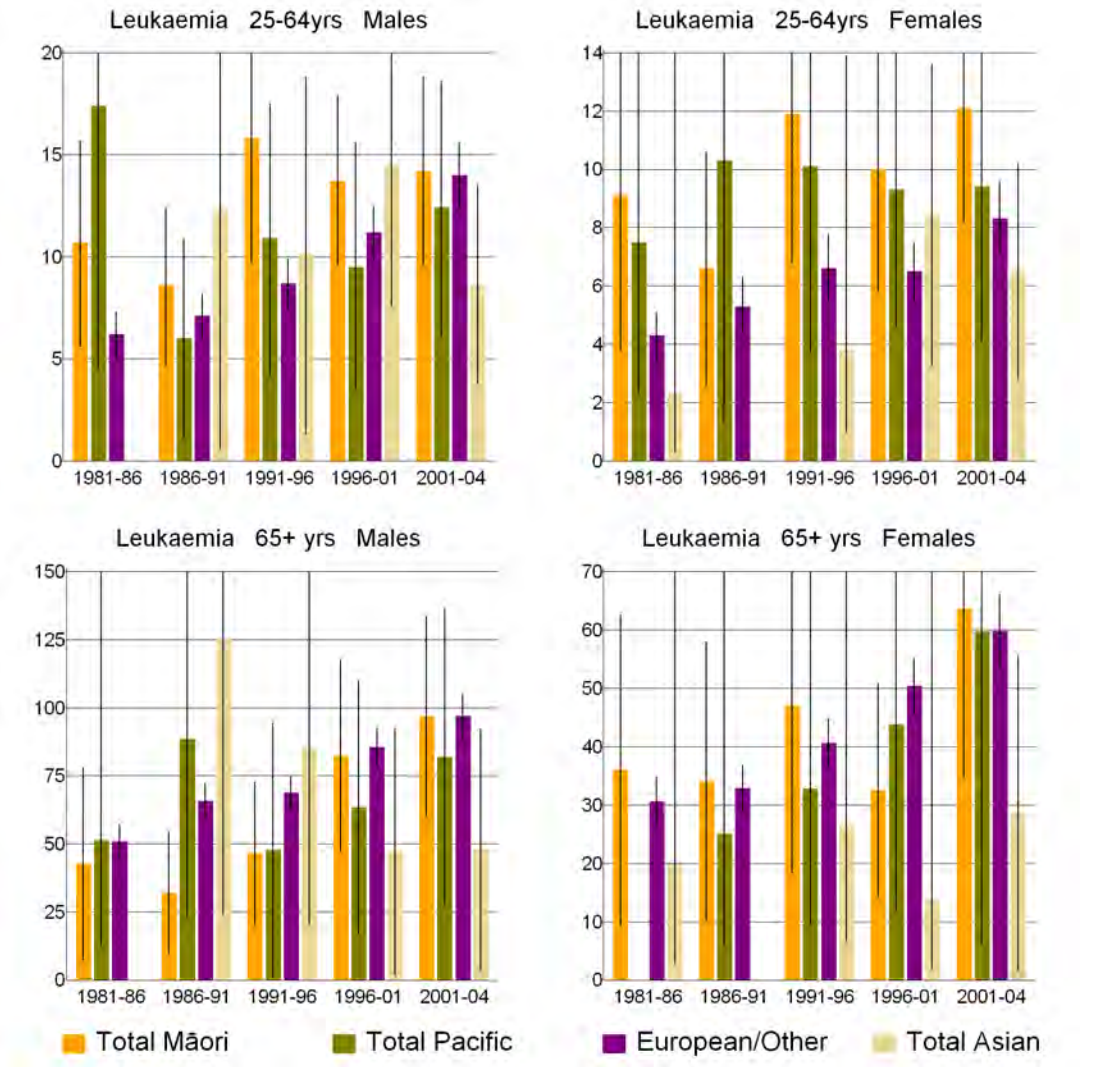


Table 35: Age-standardised rate ratios (SRR) of leukaemia cancer, for Māori, Pacific and Asian compared to European/Other, by sex

Exposure Leukaemia Total ethnicity	Cohort	25+ years SRR (95% CI)	25–64 years SRR (95% CI)	65+ years SRR (95% CI)
Males				
Total Māori vs European	1981–1986	1.16 (0.73–1.83)	1.72 (1.04–2.86)	0.84 (0.36–1.94)
	1986–1991	0.73 (0.50–1.09)	1.20 (0.75–1.93)	0.49 (0.24–0.99)
	1991–1996	0.99 (0.72–1.36)	1.83 (1.21–2.76)	0.68 (0.38–1.20)
	1996–2001	1.11 (0.84–1.47)	1.23 (0.89–1.71)	0.96 (0.63–1.48)
	2001–2004	1.00 (0.77–1.30)	1.02 (0.72–1.43)	1.00 (0.68–1.47)
	P (trend)	0.76	0.22	0.13
	Pooled	1.00 (0.86–1.16)	1.36 (1.13–1.63)	0.80 (0.63–1.03)
Total Pacific vs European	1981–1986	1.85 (0.91–3.77)	2.81 (1.31–6.04)	1.01 (0.25–4.09)
	1986–1991	0.97 (0.43–2.19)	0.84 (0.37–1.93)	1.35 (0.35–5.14)
	1991–1996	0.99 (0.56–1.75)	1.26 (0.67–2.35)	0.69 (0.26–1.85)
	1996–2001	0.85 (0.51–1.42)	0.85 (0.45–1.63)	0.74 (0.35–1.55)
	2001–2004	0.87 (0.57–1.34)	0.89 (0.53–1.49)	0.84 (0.43–1.66)
	P (trend)	0.10	0.15	0.42
	Pooled	1.05 (0.79–1.40)	1.21 (0.87–1.69)	0.91 (0.55–1.51)
Total Asian vs European	1986–1991	1.39 (0.57–3.40)	1.72 (0.65–4.53)	1.91 (0.36–10.02)
	1991–1996	0.98 (0.41–2.30)	1.16 (0.48–2.81)	1.24 (0.30–5.14)
	1996–2001	0.83 (0.54–1.27)	1.29 (0.79–2.12)	0.55 (0.21–1.44)
	2001–2004	0.44 (0.27–0.72)	0.62 (0.35–1.10)	0.50 (0.20–1.25)
	Pooled	0.88 (0.62–1.25)	1.15 (0.82–1.63)	1.00 (0.48–2.11)
Females				
Total Māori vs European	1981–1986	1.55 (0.99–2.45)	2.15 (1.15–4.00)	1.18 (0.55–2.50)
	1986–1991	1.14 (0.71–1.81)	1.24 (0.66–2.31)	1.03 (0.51–2.11)
	1991–1996	1.37 (0.98–1.91)	1.79 (1.13–2.83)	1.16 (0.62–2.14)
	1996–2001	0.94 (0.67–1.32)	1.54 (0.98–2.41)	0.65 (0.37–1.15)
	2001–2004	1.16 (0.89–1.53)	1.45 (1.02–2.07)	1.06 (0.67–1.69)
	P (trend)	0.27	0.31	0.60
	Pooled	1.21 (1.02–1.43)	1.61 (1.29–2.02)	0.99 (0.75–1.31)
Total Pacific vs European	1981–1986	0.77 (0.24–2.53)	1.76 (0.53–5.80)	
	1986–1991	1.41 (0.66–3.01)	1.94 (0.79–4.75)	0.76 (0.18–3.17)
	1991–1996	1.23 (0.66–2.32)	1.51 (0.79–2.90)	0.81 (0.23–2.81)
	1996–2001	1.16 (0.76–1.79)	1.43 (0.85–2.42)	0.87 (0.42–1.81)
	2001–2004	0.86 (0.54–1.38)	1.13 (0.63–2.02)	1.00 (0.40–2.47)
	P (trend)	0.35	0.02	
	Pooled	1.09 (0.81–1.47)	1.53 (1.07–2.18)	0.87 (0.55–1.37)
Total Asian vs European	1981–1986	0.67 (0.16–2.84)	0.55 (0.08–3.95)	0.65 (0.09–4.64)
	1991–1996	0.68 (0.26–1.82)	0.57 (0.16–2.12)	0.65 (0.16–2.62)
	1996–2001	0.66 (0.36–1.20)	1.30 (0.69–2.43)	0.27 (0.04–1.94)
	2001–2004	0.56 (0.34–0.91)	0.78 (0.43–1.41)	0.48 (0.19–1.24)
	Pooled	0.64 (0.43–0.95)	0.82 (0.54–1.24)	0.49 (0.25–0.98)

Notes: 95 percent confidence intervals in brackets. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

Table 36: Age-standardised rate differences (SRD) of leukaemia cancer, for Māori, Pacific and Asian compared to European/Other, by sex

Exposure Leukaemia Total ethnicity	Cohort	25+ years SRD (95% CI)	25–64 years SRD (95% CI)	65+ years SRD (95% CI)
Males				
Total Māori vs European	1981–1986	2.1 (-4.9–9.1)	4.5 (-0.7–9.6)	-8.2 (-44–28)
	1986–1991	-4.3 (-9.1–0.4)	1.4 (-2.5–5.4)	-34 (-57– -11)
	1991–1996	-0.2 (-6.0–5.7)	7.2 (0.9–13)	-22 (-49–4.5)
	1996–2001	2.4 (-4.5–9.4)	2.6 (-1.8–7.0)	-3.1 (-39–33)
	2001–2004	-0.1 (-7.0–6.9)	0.2 (-4.7–5.1)	-0.1 (-38–37)
	P (trend)	0.64	0.50	0.32
	Pooled	-0.0 (-2.9–2.8)	3.3 (1.1–5.6)	-14 (-29–0.1)
Total Pacific vs European	1981–1986	11 (-6.0–29)	11 (-1.7–24)	0.4 (-71–72)
	1986–1991	-0.6 (-13–12)	-1.1 (-6.1–3.9)	23 (-96–141)
	1991–1996	-0.2 (-11–10)	2.2 (-4.5–9.0)	-21 (-68–26)
	1996–2001	-3.3 (-13–6.5)	-1.6 (-7.8–4.6)	-22 (-69–25)
	2001–2004	-3.4 (-13–6.6)	-1.6 (-8.1–4.9)	-15 (-70–40)
	P (trend)	0.10	0.42	0.32
	Pooled	1.0 (-4.7–6.6)	2.0 (-1.7–5.6)	-6.7 (-40–27)
Total Asian vs European	1986–1991	6.3 (-14–27)	5.1 (-6.6–17)	60 (-148–268)
	1991–1996	-0.4 (-16–15)	1.4 (-7.4–10)	17 (-105–138)
	1996–2001	-3.9 (-12–4.1)	3.3 (-3.7–10)	-38 (-84–7.5)
	2001–2004	-15 (-21– -9.0)	-5.3 (-11– -0.2)	-49 (-94– -3.7)
	Pooled	-2.5 (-8.9–3.9)	1.5 (-2.4–5.5)	0.3 (-58–59)
Females				
Total Māori vs European	1981–1986	4.7 (-1.2–11)	4.9 (-0.6–10)	5.4 (-22–32)
	1986–1991	1.3 (-3.8–6.4)	1.3 (-2.8–5.3)	1.1 (-23–25)
	1991–1996	4.4 (-1.0–9.7)	5.2 (0.0–10)	6.4 (-23–35)
	1996–2001	-0.8 (-4.9–3.4)	3.5 (-0.8–7.8)	-18 (-37–1.2)
	2001–2004	2.7 (-2.4–7.7)	3.8 (-0.3–7.9)	3.8 (-26–33)
	P (trend)	0.49	0.80	0.41
	Pooled	2.4 (0.1–4.7)	3.7 (1.6–5.9)	-0.4 (-12–11)
Total Pacific vs European	1981–1986	-1.9 (-9.7–5.9)	3.2 (-5.6–12)	
	1986–1991	3.9 (-6.4–14)	5.0 (-4.1–14)	-7.9 (-44–28)
	1991–1996	2.8 (-6.5–12)	3.4 (-3.0–9.8)	-7.8 (-49–33)
	1996–2001	2.1 (-4.3–8.6)	2.8 (-2.0–7.6)	-6.6 (-39–26)
	2001–2004	-2.3 (-8.8–4.3)	1.1 (-4.3–6.6)	-0.1 (-54–54)
	P (trend)	0.83	0.11	
	Pooled	1.1 (-2.7–4.8)	3.2 (-0.1–6.5)	-5.9 (-24–12)
Total Asian vs European	1981–1986	-2.8 (-11–5.4)	-1.9 (-6.6–2.8)	-11 (-50–29)
	1991–1996	-3.8 (-12–4.2)	-2.8 (-7.9–2.2)	-14 (-51–23)
	1996–2001	-4.4 (-9.6–0.7)	1.9 (-3.3–7.2)	-37 (-64– -9.4)
	2001–2004	-7.1 (-12– -2.6)	-1.8 (-5.7–2.1)	-31 (-59– -3.3)
	Pooled	-4.4 (-7.5– -1.3)	-1.1 (-3.3–1.0)	-23 (-38– -7.5)

Notes: 95 percent confidence intervals in brackets. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

14.2 Socioeconomic trends

Leukaemia incidence rates among those aged 25+ years increased steadily over the period surveyed, to double in all sex and income groups (Figures 34 and 35 and Table 98 in Appendix 1). Increases were similar across age groups (Figure 35).

Pooled over time, there were no significant relative or absolute inequalities (Table 37).

Figure 34: Standardised rates of leukaemia cancer for 25+ year-olds, by income by sex

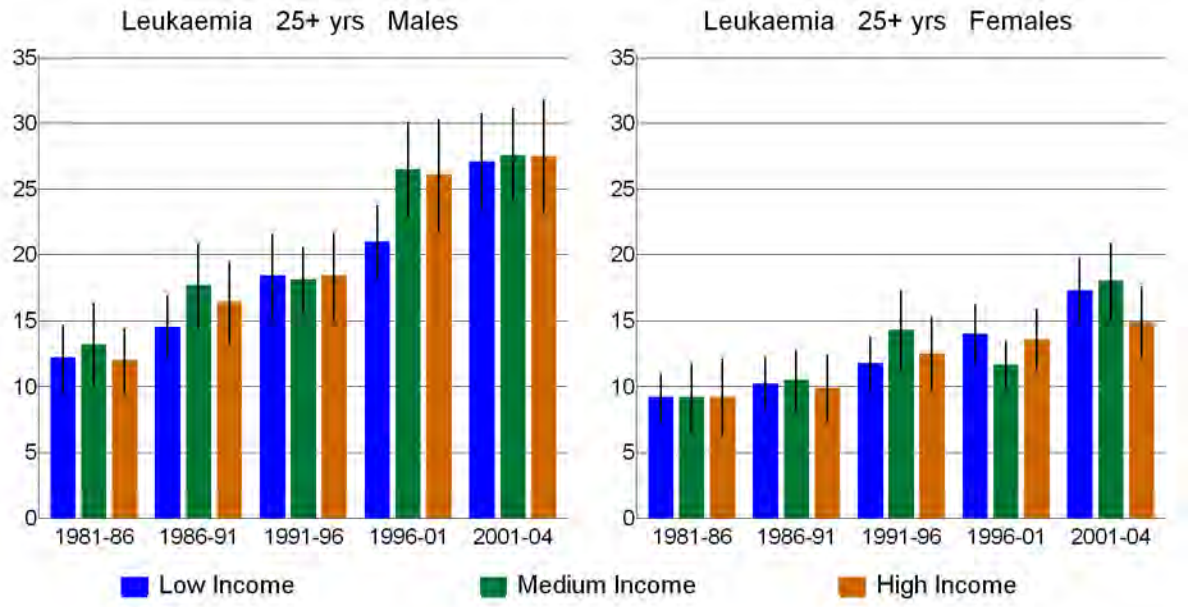


Figure 35: Standardised rates of leukaemia cancer, by income by sex and age group

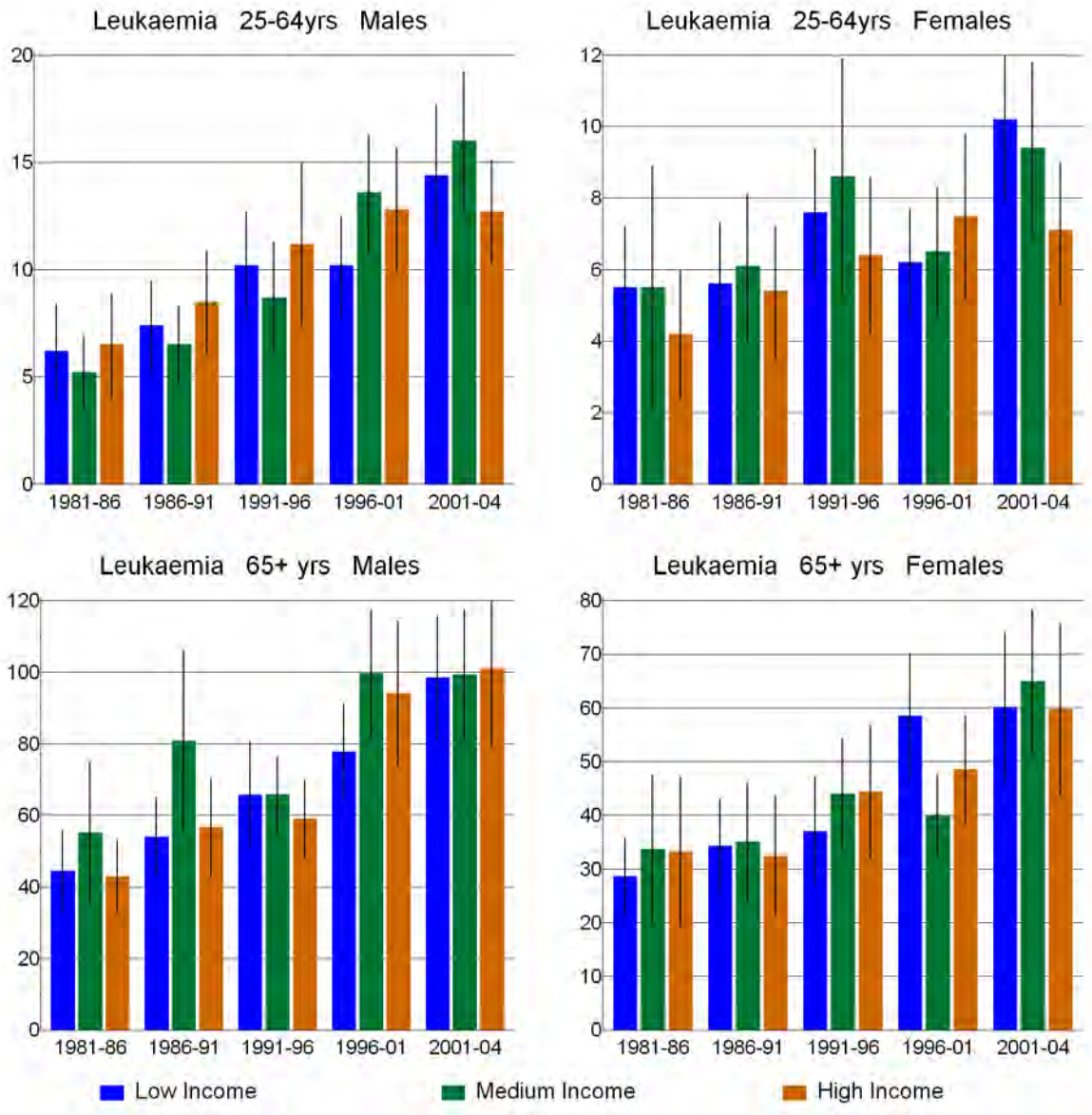


Table 37: Age- and ethnicity-standardised income rate ratios (SRR), rate differences (SRD), relative indices of inequality (RII) and slope indices of inequality (SII) of leukaemia cancer, by sex

Age group	Cohort	Males				Females			
		Relative inequalities		Absolute inequalities		Relative inequalities		Absolute inequalities	
		SRR	RII (95% CI)	SRD	SII (95% CI)	SRR	RII (95% CI)	SRD	SII (95% CI)
Leukaemia									
25+ years	1981–1986	1.02	1.1 (0.7–1.8)	0.2	1.0 (-4.5–7.2)	0.99	0.9 (0.5–1.6)	-0.1	-1.0 (-4.7–3.0)
	1986–1991	0.89	0.8 (0.5–1.1)	-1.8	-4.0 (-9.4–0.9)	1.03	0.9 (0.6–1.4)	0.3	-1.0 (-6.6–4.7)
	1991–1996	1.00	1.1 (0.8–1.6)	0.0	2.0 (-4.2–8.5)	0.94	1.0 (0.6–1.8)	-0.8	1.0 (-13–14)
	1996–2001	0.81	0.8 (0.6–1.0)	-5.1	-6.0 (-13–0.6)	1.03	1.1 (0.8–1.5)	0.4	1.0 (-4.0–6.0)
	2001–2004	0.99	1.0 (0.7–1.3)	-0.3	0.0 (-6.7–5.8)	1.17	1.4 (1.0–1.9)	2.5	5.0 (0.4–9.8)
	P (trend)	0.82	0.86	0.48	0.85	0.17	0.02	0.23	0.03
	Pooled	0.92	0.9 (0.8–1.1)	-1.5	-1.0 (-2.9–0.1)	1.03	1.1 (0.9–1.3)	0.4	1.0 (-1.8–3.6)
25–64 years	1981–1986	0.96	1.1 (0.5–2.2)	-0.3	0.0 (-4.8–5.5)	1.31	0.9 (0.3–2.6)	1.3	0.0 (-4.9–4.1)
	1986–1991	0.87	0.6 (0.3–1.1)	-1.1	-4.0 (-9.4–0.7)	1.04	0.9 (0.5–1.8)	0.2	-1.0 (-3.7–2.4)
	1991–1996	0.91	1.2 (0.6–2.1)	-1.0	1.0 (-6.3–9.0)	1.19	1.2 (0.6–2.2)	1.2	1.0 (-6.6–8.7)
	1996–2001	0.79	0.8 (0.5–1.2)	-2.7	-3.0 (-9.3–2.5)	0.82	0.8 (0.5–1.5)	-1.3	-1.0 (-4.3–1.7)
	2001–2004	1.14	1.2 (0.8–1.9)	1.7	3.0 (-2.1–7.9)	1.45	2.0 (1.1–3.7)	3.2	6.0 (2.3–9.2)
	P (trend)	0.41	0.52	0.80	0.44	0.76	0.25	0.83	0.25
	Pooled	0.92	0.9 (0.7–1.2)	-0.8	-1.0 (-3.4–1.6)	1.13	1.1 (0.8–1.5)	0.8	1.0 (-1.2–2.9)
65+ years	1981–1986	1.04	1.0 (0.5–1.9)	1.5	1.0 (-24–25)	0.86	0.8 (0.4–1.7)	-4.6	-6.0 (-23–11)
	1986–1991	0.95	1.0 (0.6–1.7)	-2.9	1.0 (-58–61)	1.06	1.0 (0.5–1.8)	2.0	-1.0 (-22–21)
	1991–1996	1.11	1.2 (0.8–1.9)	6.7	12 (-3.2–28)	0.84	1.1 (0.5–2.5)	-7.3	5.0 (-40–49)
	1996–2001	0.83	0.8 (0.6–1.2)	-16	-17 (-45–11)	1.20	1.4 (0.8–2.2)	9.9	15 (-9.9–40)
	2001–2004	0.97	1.0 (0.7–1.4)	-2.6	-2.0 (-36–31)	1.01	1.0 (0.6–1.6)	0.3	1.0 (-29–31)
	P (trend)	0.52	0.55	0.51	0.67	0.44	0.41	0.43	0.14
	Pooled	0.96	1.0 (0.8–1.2)	-2.7	0.0 (-15–14)	1.00	1.1 (0.8–1.4)	0.0	2.0 (-5.6–10)

Notes: 95 percent confidence intervals in brackets. SRRs and SRDs compare low- and high-income tertiles. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

Chapter 15: Lip, Mouth and Pharynx Cancer

In 2005 in New Zealand 285 cases of cancer of the lip, mouth and pharynx were diagnosed, the majority (195) in men.[57] This is a diverse group of cancers anatomically; however, with the exception of cancers of the nasopharynx (accounting for 29 of the 285 cases in 2005) the risk factors are similar.[72] The majority are squamous cell cancers.

Oral cancers (that is, all this group except cancers of the nasopharynx) are more common among older people and men. The most important risk factors for these cancers are tobacco consumption, alcohol and, for some cancers, HPV infection. Consumption of non-starchy vegetables, fruits and food containing carotenoids is likely to decrease the risk of oral cancer.[60]

Nasopharyngeal cancer is an uncommon cancer, although endemic in some areas of the world (such as China). Epstein-Barr virus plays a causal role in the origin of nasopharyngeal cancer. Other risk factors include exposure to formaldehyde, tobacco and consumption of Chinese-style salted fish.[73]

15.1 Ethnic trends

Lip, mouth and pharynx cancer rates among 25+ year-olds decreased from 1981–1986 to 2001–2004 among Pacific males by 59 percent (p for trend 0.03), and among European/Other males by 30 percent (p for trend <0.01) (Figure 36 and Table 99 in Appendix 1). Conversely, the Māori male rate increased by 77 percent (p for trend 0.04). There was no trend evident over time among Asian males. Among females, rates were unstable over time, with no clear evident trends.

Pooled over time, Māori, Pacific and Asian male rates were 0.86, 1.49 and 1.51 times European/Other rates respectively, with confidence intervals excluding the null in the case of Pacific and Asian people. Among females, the rate ratios were 0.79, 1.16 and 1.21, but all confidence intervals included the null (Table 38).

There were no clear trends of changing inequalities over time.

Figure 36: Standardised rates of lip, mouth and pharynx cancer for 25+ year-olds, by ethnicity by sex

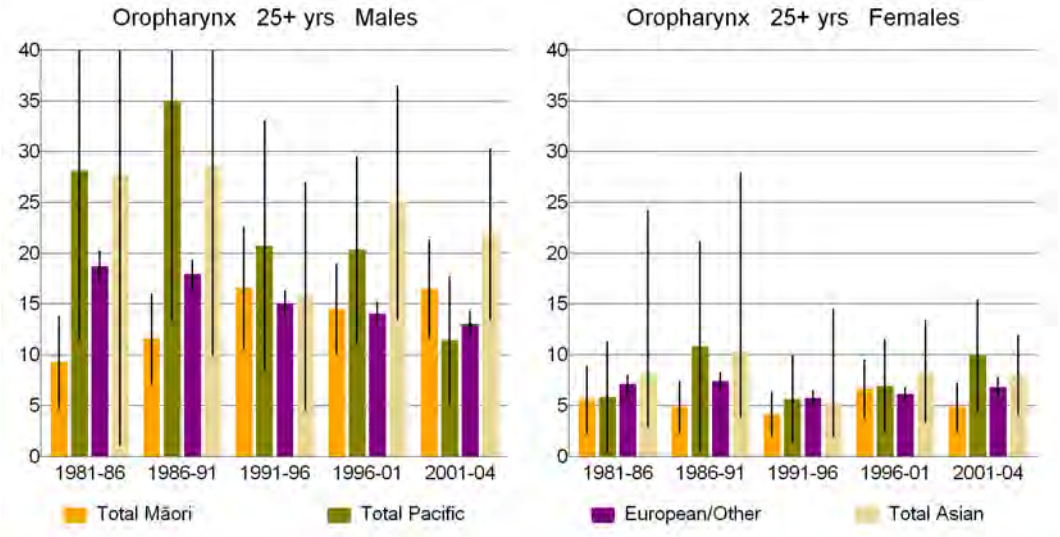


Table 38: Age-standardised rate ratios (SRR) and rate differences (SRD) of lip, mouth and pharynx cancer, for Māori, Pacific and Asian compared to European/Other, by sex

Exposure Oropharynx 25+ years	Cohort	Males		Females	
		SRR (95% CI)	SRD (95% CI)	SRR (95% CI)	SRD (95% CI)
Total Māori vs European	1981–1986	0.50 (0.30–0.82)	-9.4 (-14– -4.6)	0.79 (0.42–1.47)	-1.5 (-5.0–2.0)
	1986–1991	0.65 (0.44–0.96)	-6.3 (-11– -1.7)	0.66 (0.38–1.12)	-2.5 (-5.2–0.1)
	1991–1996	1.10 (0.76–1.60)	1.6 (-4.6–7.7)	0.72 (0.41–1.26)	-1.6 (-4.0–0.8)
	1996–2001	1.03 (0.75–1.42)	0.5 (-4.1–5.0)	1.08 (0.68–1.70)	0.5 (-2.5–3.5)
	2001–2004	1.27 (0.93–1.73)	3.5 (-1.5–8.5)	0.71 (0.43–1.18)	-2.0 (-4.5–0.6)
	P (trend)	0.02	0.01	0.64	0.69
	Pooled	0.86 (0.72–1.01)	-2.3 (-4.6– -0.0)	0.79 (0.62–1.00)	-1.4 (-2.7– -0.1)
Total Pacific vs European	1981–1986	1.50 (0.83–2.74)	9.4 (-7.3–26)	0.83 (0.32–2.12)	-1.2 (-6.8–4.3)
	1986–1991	1.95 (1.05–3.63)	17 (-4.5–39)	1.46 (0.55–3.87)	3.4 (-7.1–14)
	1991–1996	1.38 (0.76–2.50)	5.7 (-6.6–18)	0.97 (0.45–2.12)	-0.2 (-4.5–4.2)
	1996–2001	1.45 (0.92–2.29)	6.3 (-2.9–16)	1.14 (0.58–2.22)	0.8 (-3.8–5.5)
	2001–2004	0.88 (0.50–1.55)	-1.5 (-8.0–4.9)	1.45 (0.81–2.58)	3.0 (-2.6–8.7)
	P (trend)	0.18	0.06	0.25	0.17
	Pooled	1.49 (1.13–1.98)	7.8 (1.2–14)	1.16 (0.79–1.71)	1.1 (-1.9–4.0)
Total Asian vs European	1981–1986	1.48 (0.57–3.88)	9.0 (-18–36)	1.17 (0.40–3.45)	1.2 (-7.7–10)
	1986–1991	1.60 (0.83–3.09)	11 (-8.1–30)	1.39 (0.51–3.81)	2.9 (-7.4–13)
	1991–1996	1.05 (0.51–2.14)	0.7 (-11–12)	0.91 (0.33–2.55)	-0.5 (-5.9–4.9)
	1996–2001	1.78 (1.11–2.85)	11 (-0.7–23)	1.36 (0.74–2.53)	2.2 (-2.9–7.3)
	2001–2004	1.69 (1.13–2.51)	8.9 (0.3–17)	1.18 (0.71–1.95)	1.2 (-2.8–5.2)
	P (trend)	0.45	0.60	0.95	0.84
	Pooled	1.51 (1.09–2.09)	8.0 (0.3–16)	1.21 (0.80–1.84)	1.4 (-1.9–4.7)

Notes: 95 percent confidence intervals in brackets. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

15.2 Socioeconomic trends

Lip, mouth and pharynx cancer rates among 25+ year-olds decreased by between 9 and 35 percent over the period surveyed among the male income groups, but showed no real trend over time among the female groups (Figure 37 and Table 100 in Appendix 1).

Pooled over time, lip, mouth and pharynx cancer rates among low-income males were over 50 percent higher (SRR) or double (RII) those among high-income males (Table 39). Among females, low-income rates were about a third higher. These inequalities did not notably change over time.

Figure 37: Standardised rates of lip, mouth and pharynx cancer for 25+ year-olds, by income by sex

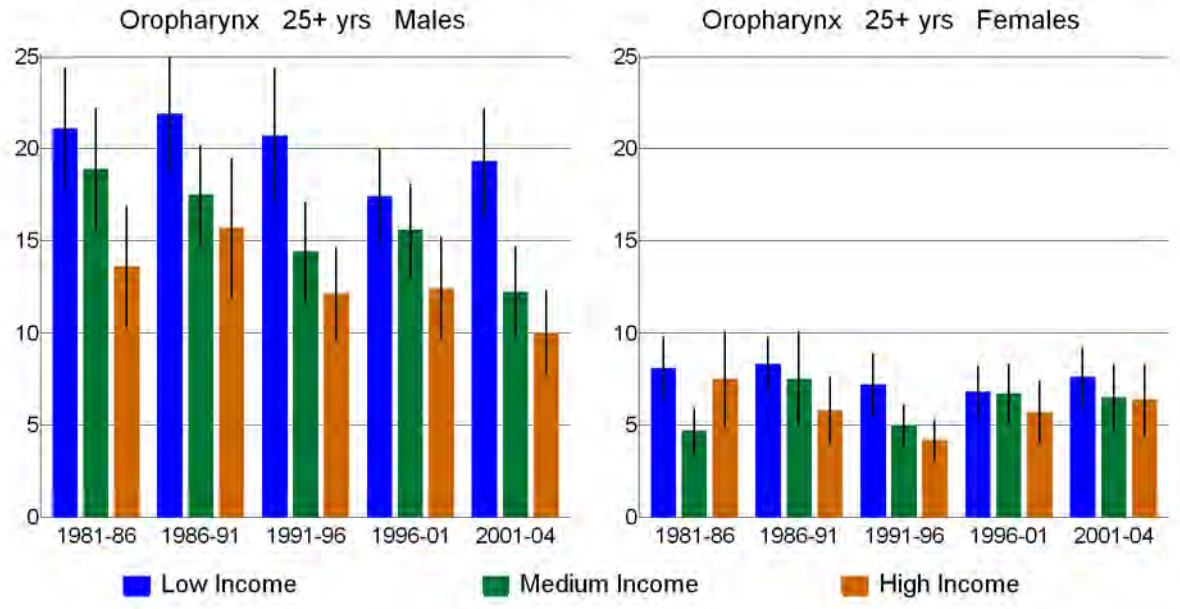


Table 39: Age- and ethnicity-standardised income rate ratios (SRR), rate differences (SRD), relative indices of inequality (RII) and slope indices of inequality (SII) of lip, mouth and pharynx cancer, by sex

Age group	Cohort	Males				Females			
		Relative inequalities		Absolute inequalities		Relative inequalities		Absolute inequalities	
		SRR	RII (95% CI)	SRD	SII (95% CI)	SRR	RII (95% CI)	SRD	SII (95% CI)
Oropharynx									
25+ years	1981–1986	1.55	2.1 (1.3–3.2)	7.5	13 (6.0–19)	1.08	1.1 (0.6–2.1)	0.6	1.0 (-4.5–6.0)
	1986–1991	1.39	1.5 (1.0–2.2)	6.2	8.0 (1.8–13)	1.43	1.3 (0.7–2.5)	2.5	2.0 (0.0–4.4)
	1991–1996	1.71	2.1 (1.3–3.3)	8.6	10 (5.9–15)	1.70	2.3 (1.3–4.3)	2.9	4.0 (1.1–7.3)
	1996–2001	1.40	1.7 (1.1–2.5)	5.0	8.0 (4.2–11)	1.20	1.4 (0.8–2.3)	1.1	2.0 (0.1–3.6)
	2001–2004	1.93	2.6 (1.6–4.2)	9.3	12 (6.9–16)	1.19	1.3 (0.8–2.2)	1.2	2.0 (-1.4–4.9)
	P (trend)	0.36	0.56	0.70	0.92	0.91	0.87	0.72	0.96
	Pooled	1.56	1.9 (1.6–2.3)	7.2	10 (8.7–12)	1.29	1.4 (1.1–1.8)	1.7	2.0 (0.2–4.0)

Notes: 95 percent confidence intervals in brackets. SRRs and SRDs compare low- and high-income tertiles. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

Chapter 16: Liver Cancer

Primary liver cancer is uncommon in New Zealand: 223 cases were diagnosed in 2005.[57] The two main types of liver cancer are hepatocellular carcinoma (the most common type) and cholangiocarcinoma. Both have a high fatality rate. Liver cancer is somewhat more common among men than women, and rates increase with increasing age.[67] Liver cancer is more common among Asian, Māori and Pacific people in New Zealand than among New Zealand Europeans.[27]

There are several well-established risk factors for liver cancer. Chronic infection with hepatitis B or C viruses are thought to account for over three-quarters of the world's primary liver cancer. Hepatitis B is the cause of large variations in liver cancer incidence in New Zealand by ethnic group.[28] Alcohol consumption and its effects (particularly alcoholic cirrhosis), which also cause chronic inflammation of the liver, heighten risk. Other risk factors include smoking, dietary aflatoxin (a toxin produced by mould that can contaminate food), exposure to vinyl chloride (angiocarcinoma), inherited metabolic disorders (such as haemachromatosis, α-antitrypsin deficiency), obesity and diabetes mellitus. A diet rich in vegetables, retinol and selenium may be protective.[67]

16.1 Ethnic trends

Liver cancer rates increased over the period surveyed by 90 percent among Māori males (p for trend 0.03) and 79 percent among European/Other males (p for trend 0.01) (Figure 38 and Table 101 in Appendix 1). Rates also increased among Pacific and Asian males, but erratically so. Rates over time were more unstable among females, although increased steadily by 29 percent among European/Other females (p for trend 0.07).

There were very large ethnic inequalities in liver cancer incidence. Pooled over time, Māori and Asian male rates were about five times the European/Other rate, and Pacific male rates seven times that (Table 40). Māori and Asian female rates were about three times European/Other rates, and Pacific five times. All confidence intervals for these rates excluded 1.0. Rate ratios tended to be greater at younger ages (although this report does not show those results).

Over time, there was some evidence of a trend of widening absolute inequalities between Māori males and European/Other males (the SRD increased from 9.7 to 19 per 100,000, p for trend 0.04). Otherwise, there was no statistical evidence of changing inequalities over time.

Figure 38: Standardised rates of liver cancer for 25+ year-olds, by ethnicity by sex

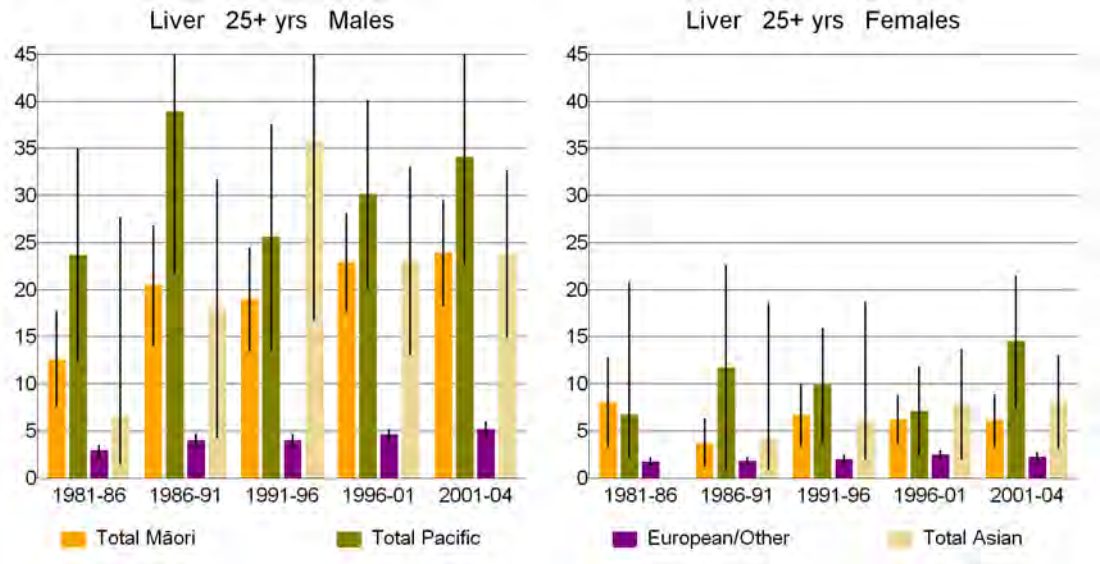


Table 40: Age-standardised rate ratios (SRR) and rate differences (SRD) of liver cancer, for Māori, Pacific and Asian compared to European/Other, by sex

Exposure Liver 25+ years	Cohort	Males		Females	
		SRR (95% CI)	SRD (95% CI)	SRR (95% CI)	SRD (95% CI)
Total Māori vs European	1981–1986	4.38 (2.79–6.88)	9.7 (4.7–15)	4.69 (2.47–8.89)	6.3 (1.6–11)
	1986–1991	5.08 (3.58–7.21)	17 (10–23)	2.10 (1.03–4.31)	2.0 (-0.6–4.5)
	1991–1996	4.80 (3.46–6.66)	15 (9.5–21)	3.28 (1.94–5.55)	4.7 (1.4–7.9)
	1996–2001	5.00 (3.84–6.52)	18 (13–24)	2.53 (1.61–3.98)	3.8 (1.1–6.4)
	2001–2004	4.58 (3.48–6.04)	19 (13–24)	2.75 (1.67–4.52)	3.9 (1.1–6.7)
	P (trend)	0.90	0.04	0.27	0.87
	Pooled	4.79 (4.14–5.54)	15 (13–18)	3.02 (2.33–3.92)	4.1 (2.6–5.6)
Total Pacific vs European	1981–1986	8.22 (4.88–13.8)	21 (9.5–32)	3.93 (1.24–12.5)	5.0 (-2.6–13)
	1986–1991	9.65 (6.02–15.5)	35 (18–52)	6.56 (2.52–17.1)	9.9 (-1.0–21)
	1991–1996	6.47 (3.96–10.6)	22 (9.6–34)	4.82 (2.53–9.19)	7.8 (1.8–14)
	1996–2001	6.58 (4.60–9.41)	26 (16–36)	2.89 (1.46–5.73)	4.6 (-0.1–9.4)
	2001–2004	6.55 (4.55–9.42)	29 (18–40)	6.48 (3.83 – 11.0)	12 (5.2–19)
	P (trend)	0.15	0.47	0.64	0.58
	Pooled	7.41 (6.06–9.07)	26 (20–32)	4.80 (3.34–6.89)	7.7 (4.3–11)
Total Asian vs European	1981–1986	2.25 (0.52–9.78)	3.6 (-5.8–13)		
	1986–1991	4.46 (2.04–9.73)	14 (0.2–28)	2.28 (0.49–10.6)	2.3 (-3.9–8.5)
	1991–1996	9.02 (5.21–15.6)	32 (13–51)	2.99 (0.96–9.3)	4.1 (-2.8–11)
	1996–2001	5.03 (3.19–7.93)	19 (8.5–29)	3.18 (1.48–6.85)	5.4 (-0.5–11)
	2001–2004	4.57 (3.07–6.82)	19 (9.7–28)	3.62 (1.90–6.91)	5.8 (0.9–11)
	P (trend)	0.64	0.15		
	Pooled	5.21 (3.92–6.92)	17 (11–23)	3.03 (1.96–4.67)	4.3 (1.6–7.0)

Notes: 95 percent confidence intervals in brackets. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

16.2 Socioeconomic trends

Liver cancer rates among males approximately doubled in all three income groups, and monotonically so among the low- and medium-income groups, such that the p for trend was less than 0.01 (Figure 39 and Table 102 in Appendix 1). Among females rates were unstable over time.

Pooled over time, liver cancer rates were up to 60 percent greater among low-income males and females compared to their high income counterparts (Table 41). There was no evidence of changing income inequalities over time.

Figure 39: Standardised rates of liver cancer for 25+ year-olds, by income by sex

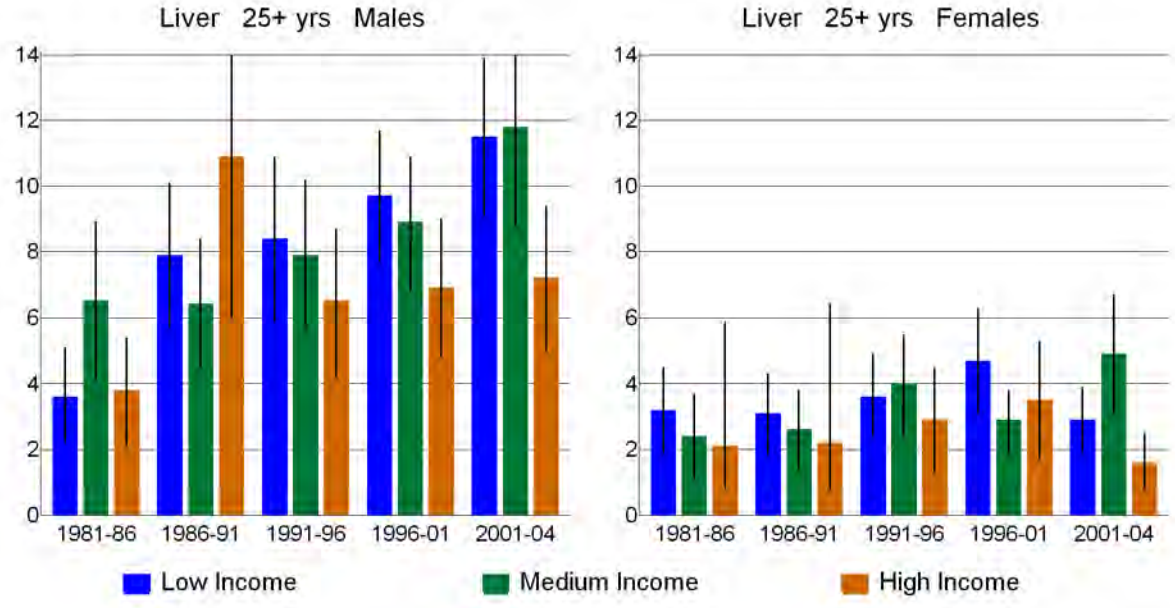


Table 41: Age- and ethnicity-standardised income rate ratios (SRR), rate differences (SRD), relative indices of inequality (RII) and slope indices of inequality (SII) of liver cancer, by sex

Age group	Cohort	Males				Females			
		Relative inequalities		Absolute inequalities		Relative inequalities		Absolute inequalities	
		SRR	RII (95% CI)	SRD	SII (95% CI)	SRR	RII (95% CI)	SRD	SII (95% CI)
Liver									
25+ years	1981–1986	0.96	1.4 (0.6–3.3)	-0.1	2.0 (-3.2–6.2)	1.51	2.5 (0.6–11.3)	1.1	2.0 (-1.3–5.6)
	1986–1991	0.73	0.7 (0.3–1.6)	-3.0	-3.0 (-7.1–1.6)	1.39	1.6 (0.5–5.7)	0.9	1.0 (-3.6–6.0)
	1991–1996	1.30	1.6 (0.8–3.3)	1.9	3.0 (-2.9–9.7)	1.24	1.2 (0.4–3.1)	0.7	1.0 (-1.8–2.9)
	1996–2001	1.40	1.8 (1.0–3.2)	2.8	5.0 (2.4–7.0)	1.33	2.3 (0.8–6.0)	1.2	3.0 (1.8–4.0)
	2001–2004	1.59	2.2 (1.2–4.1)	4.3	7.0 (-2.1–17)	1.77	1.4 (0.6–3.6)	1.3	1.0 (-4.2–6.4)
	P (trend)	0.03	0.16	0.05	0.14	0.38	0.70	0.26	0.35
	Pooled	1.14	1.3 (1.0–1.8)	1.0	2.0 (0.2–4.2)	1.41	1.6 (1.0–2.6)	1.0	1.0 (1.0–1.8)

Notes: 95 percent confidence intervals in brackets. SRRs and SRDs compare low- and high-income tertiles. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

Chapter 17: Lung, Bronchus and Tracheal Cancer

Lung cancer is the leading cause of cancer death and the fifth most commonly diagnosed cancer in New Zealand: there were 1451 deaths and 1659 new diagnoses in 2005.[57] The main types of lung cancer are squamous cell carcinoma, small and large cell carcinoma and adenocarcinoma.[70]

By far the most important risk factor for lung cancer is tobacco smoking. Trends in lung cancer mortality in New Zealand (and internationally) closely follow trends in smoking a few decades earlier.[9] Lung cancer is more common among men than women, and the risk increases with increasing age. Those with a family history of lung cancer are at slightly higher risk of developing the disease.

Several occupational exposures have been associated with lung cancer. The most important of these are asbestos, silica and radon, and certain metals such as inorganic arsenic, chromium (VI), nickel and cadmium. Other environmental factors that are associated with risk of lung cancer include environmental tobacco smoke and possibly both indoor and outdoor air pollution. There is evidence that a diet high in fruit and vegetables and low in red meat may protect against lung cancer.[70]

17.1 Ethnic trends

Lung cancer among 25+ year-olds decreased steadily by 32 percent among European/Other males over the period surveyed (p for trend <0.01), and may have reduced more recently among Māori males (Figure 40 and Table 103 in Appendix 1). Conversely, among females, rates increased in all four ethnic groups: by 55 percent among European/Other (p for trend 0.01), 77 percent among Māori (p for trend 0.04), 245 percent among Pacific people (p for trend 0.02) and 44 percent among Asian people (although with no real trend over time). By age group, reductions among European/Other and Māori male rates were more notable among 25–64 year-olds (Figure 41). Percentage changes among females were similar across age groups.

Pooled over time, lung cancer rates among Māori, Pacific and Asian males were 2.00, 1.38 and 0.77 times European/Other rates respectively (Table 42; all confidence intervals excluded the null). Among females, only Māori had a clearly higher rate (an SRR of 3.37, 95 percent confidence interval 3.17–3.58). Relative inequalities in lung cancer incidence compared to European/Other increased over time among Māori males (the SRR increased from 1.73 to 2.30, p for trend <0.01) and Pacific females (the SRR increased from 0.66 to 1.48, p for trend 0.11). Among females, absolute inequalities increased over time for Māori compared to European/Other (the SRD increased from 50 to 94 per 100,000) (Table 43).

Figure 40: Standardised rates of lung cancer for 25+ year-olds, by ethnicity by sex

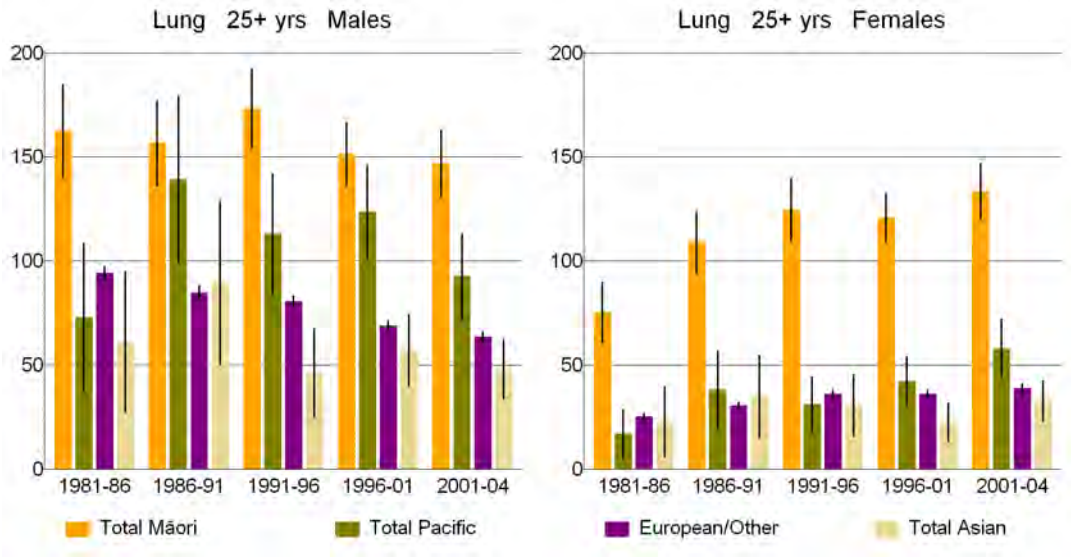


Figure 41: Standardised rates of lung cancer, by ethnicity by sex and age group

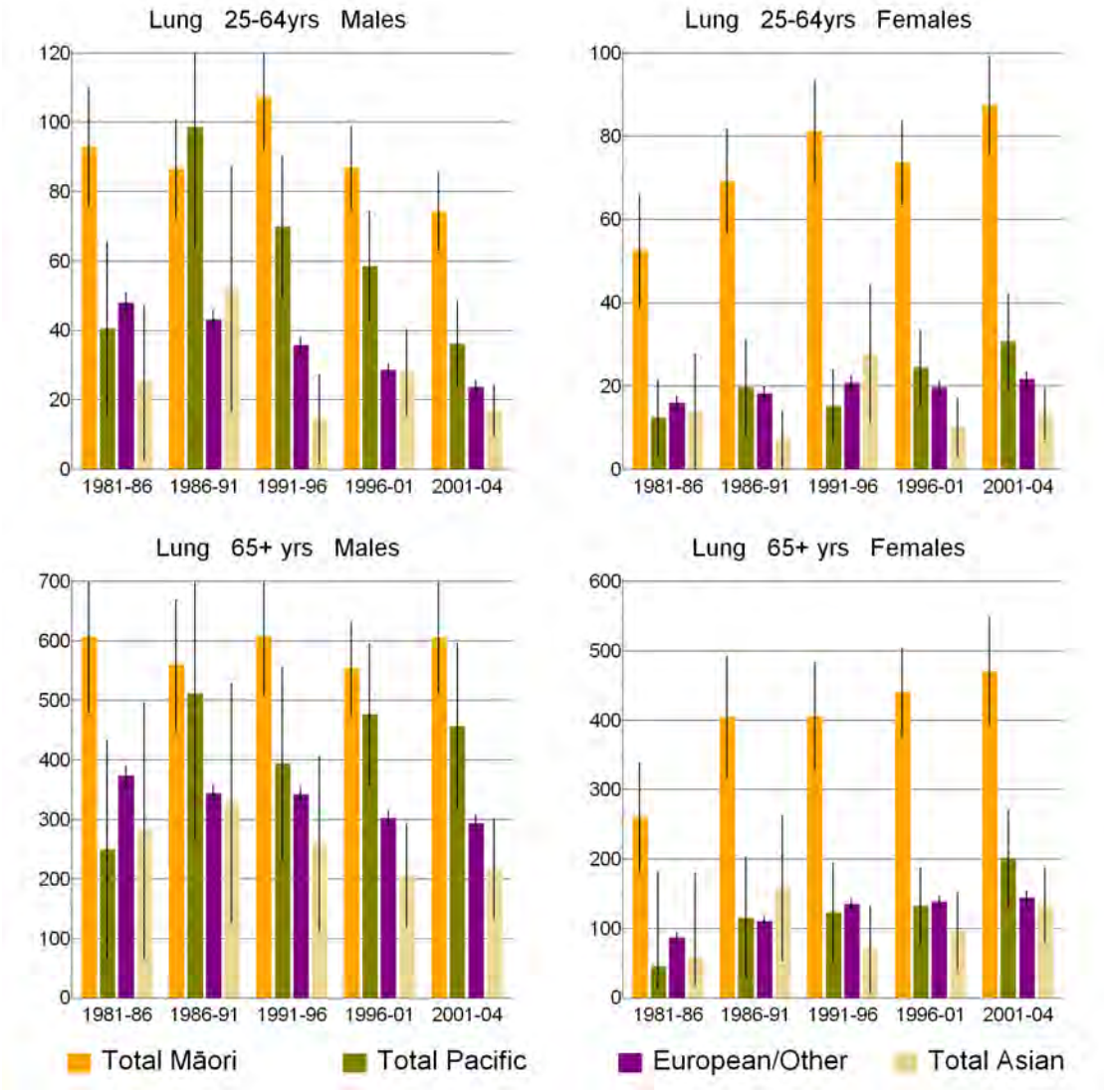


Table 42: Age-standardised rate ratios (SRR) of lung cancer, for Māori, Pacific and Asian compared to European/Other, by sex

Exposure Lung Total ethnicity	Cohort	25+ years SRR (95% CI)	25–64 years SRR (95% CI)	65+ years SRR (95% CI)
Males				
Total Māori vs European	1981–1986	1.73 (1.50–2.00)	1.93 (1.59–2.35)	1.63 (1.31–2.02)
	1986–1991	1.84 (1.61–2.11)	2.00 (1.68–2.39)	1.63 (1.33–1.99)
	1991–1996	2.14 (1.91–2.40)	3.01 (2.57–3.52)	1.78 (1.51–2.11)
	1996–2001	2.19 (1.97–2.44)	3.05 (2.60–3.57)	1.83 (1.58–2.12)
	2001–2004	2.30 (2.05–2.58)	3.14 (2.64–3.74)	2.06 (1.75–2.43)
	P (trend)	<.01	0.04	0.02
	Pooled	2.00 (1.89–2.12)	2.48 (2.29–2.68)	1.76 (1.62–1.91)
Total Pacific vs European	1981–1986	0.78 (0.48–1.26)	0.84 (0.45–1.58)	0.67 (0.32–1.40)
	1986–1991	1.64 (1.22–2.19)	2.28 (1.59–3.26)	1.49 (0.92–2.41)
	1991–1996	1.40 (1.08–1.81)	1.95 (1.44–2.65)	1.15 (0.76–1.75)
	1996–2001	1.79 (1.48–2.16)	2.05 (1.54–2.73)	1.58 (1.22–2.03)
	2001–2004	1.45 (1.16–1.82)	1.52 (1.07–2.17)	1.56 (1.15–2.12)
	P (trend)	0.56	0.88	0.19
	Pooled	1.38 (1.21–1.57)	1.70 (1.42–2.03)	1.25 (1.03–1.52)
Total Asian vs European	1981–1986	0.65 (0.37–1.13)	0.52 (0.21–1.27)	0.75 (0.35–1.62)
	1986–1991	1.05 (0.68–1.64)	1.20 (0.61–2.38)	0.95 (0.51–1.77)
	1991–1996	0.57 (0.36–0.91)	0.40 (0.17–0.99)	0.76 (0.43–1.34)
	1996–2001	0.83 (0.61–1.12)	0.98 (0.62–1.54)	0.68 (0.45–1.04)
	2001–2004	0.75 (0.56–1.02)	0.72 (0.46–1.12)	0.74 (0.50–1.09)
	P (trend)	0.85	0.88	0.36
	Pooled	0.77 (0.63–0.95)	0.76 (0.54–1.08)	0.78 (0.59–1.04)
Females				
Total Māori vs European	1981–1986	2.99 (2.44–3.65)	3.32 (2.51–4.38)	3.00 (2.18–4.12)
	1986–1991	3.58 (3.09–4.15)	3.82 (3.11–4.69)	3.68 (2.93–4.62)
	1991–1996	3.44 (3.02–3.92)	3.93 (3.29–4.68)	3.02 (2.47–3.70)
	1996–2001	3.33 (2.99–3.71)	3.76 (3.20–4.43)	3.19 (2.72–3.73)
	2001–2004	3.42 (3.05–3.82)	4.05 (3.46–4.75)	3.26 (2.73–3.90)
	P (trend)	0.74	0.16	0.84
	Pooled	3.37 (3.17–3.58)	3.78 (3.47–4.12)	3.23 (2.94–3.55)
Total Pacific vs European	1981–1986	0.66 (0.33–1.35)	0.78 (0.37–1.65)	0.52 (0.13–2.10)
	1986–1991	1.25 (0.76–2.06)	1.08 (0.59–1.96)	1.05 (0.49–2.25)
	1991–1996	0.86 (0.56–1.32)	0.73 (0.40–1.33)	0.91 (0.51–1.64)
	1996–2001	1.17 (0.88–1.55)	1.24 (0.85–1.82)	0.96 (0.63–1.46)
	2001–2004	1.48 (1.15–1.91)	1.42 (0.97–2.08)	1.40 (0.97–2.00)
	P (trend)	0.11	0.09	0.09
	Pooled	1.09 (0.91–1.31)	1.04 (0.83–1.31)	0.98 (0.75–1.28)
Total Asian vs European	1981–1986	0.90 (0.42–1.91)	0.88 (0.32–2.40)	0.67 (0.21–2.08)
	1986–1991	1.14 (0.64–2.04)	0.39 (0.15–1.05)	1.43 (0.73–2.79)
	1991–1996	0.85 (0.52–1.38)	1.34 (0.73–2.46)	0.52 (0.21–1.28)
	1996–2001	0.62 (0.41–0.94)	0.52 (0.26–1.04)	0.69 (0.38–1.25)
	2001–2004	0.84 (0.62–1.14)	0.62 (0.39–0.99)	0.93 (0.62–1.39)
	P (trend)	0.44	0.56	0.69
	Pooled	0.86 (0.68–1.09)	0.76 (0.53–1.08)	0.83 (0.60–1.15)

Notes: 95 percent confidence intervals in brackets. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

Table 43: Age-standardised rate differences (SRD) of lung cancer, for Māori, Pacific and Asian compared to European/Other, by sex

Exposure Lung Total ethnicity	Cohort	25+ years SRD (95% CI)	25–64 years SRD (95% CI)	65+ years SRD (95% CI)
Males				
Total Māori vs European	1981–1986	69 (46–91)	45 (27–62)	233 (105–362)
	1986–1991	72 (51–92)	43 (29–58)	216 (105–327)
	1991–1996	93 (73–112)	72 (56–87)	267 (167–368)
	1996–2001	82 (67–98)	58 (46–71)	251 (171–331)
	2001–2004	83 (67–99)	51 (39–62)	312 (218–406)
	P (trend)	0.30	0.66	0.10
	Pooled	79 (71–88)	54 (47–60)	253 (206–300)
Total Pacific vs European	1981–1986	-21 (-57–15)	-7.6 (-33–18)	-124 (-309–61)
	1986–1991	54 (14–94)	55 (20–90)	168 (-77–413)
	1991–1996	32 (3.1–61)	34 (13–55)	52 (-111–215)
	1996–2001	54 (31–77)	30 (14–46)	174 (54–294)
	2001–2004	29 (8.1–49)	12 (-0.2–25)	164 (24–304)
	P (trend)	0.45	0.96	0.09
	Pooled	30 (16–44)	25 (15–36)	83 (2.6–163)
Total Asian vs European	1981–1986	-33 (-67–0.9)	-23 (-45– -0.5)	-92 (-307–124)
	1986–1991	4.6 (-35–44)	8.6 (-27–44)	-16 (-218–186)
	1991–1996	-35 (-56– -13)	-21 (-34– -8.2)	-82 (-230–65)
	1996–2001	-12 (-30–5.7)	-0.6 (-13–12)	-96 (-184– -8.0)
	2001–2004	-16 (-30– -0.9)	-6.7 (-14–0.9)	-77 (-163–8.8)
	P (trend)	0.52	0.33	0.71
	Pooled	-18 (-31– -5.6)	-8.7 (-18–1.0)	-72 (-146–0.6)
Females				
Total Māori vs European	1981–1986	50 (36–65)	37 (23–50)	173 (94–252)
	1986–1991	79 (64–94)	51 (38–64)	295 (207–382)
	1991–1996	88 (73–104)	61 (48–73)	272 (193–350)
	1996–2001	85 (73–96)	54 (44–64)	302 (238–367)
	2001–2004	94 (81–108)	66 (54–78)	326 (248–405)
	P (trend)	0.05	0.07	0.06
	Pooled	78 (72–85)	53 (47–59)	271 (236–306)
Total Pacific vs European	1981–1986	-8.5 (-20–3.5)	-3.5 (-13–5.8)	-41 (-105–22)
	1986–1991	7.7 (-11–27)	1.5 (-10–13)	5.5 (-83–94)
	1991–1996	-5.0 (-18–8.4)	-5.6 (-15–3.5)	-12 (-84–60)
	1996–2001	6.1 (-5.7–18)	4.8 (-4.5–14)	-5.7 (-62–50)
	2001–2004	19 (4.4–33)	9.0 (-2.6–21)	57 (-15–128)
	P (trend)	0.08	0.17	0.09
	Pooled	3.1 (-3.4–9.5)	0.8 (-3.7–5.4)	-2.1 (-34–30)
Total Asian vs European	1981–1986	-2.5 (-20–15)	-1.9 (-16–12)	-29 (-95–37)
	1986–1991	4.4 (-16–25)	-11 (-18– -3.9)	48 (-58–152)
	1991–1996	-5.5 (-21–9.4)	7.0 (-9.7–24)	-64 (-127– -1.0)
	1996–2001	-14 (-23– -4.3)	-9.4 (-17– -2.2)	-42 (-99–14)
	2001–2004	-6.2 (-16–3.8)	-8.2 (-15– -1.8)	-11 (-65–44)
	P (trend)	0.40	0.88	0.98
	Pooled	-4.6 (-11–2.2)	-4.6 (-9.7–0.6)	-20 (-53–13)

Notes: 95 percent confidence intervals in brackets. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

17.2 Socioeconomic trends

Lung cancer among 25+ year-olds reduced steadily in all income tertiles among males, but more so among the high-income (39 percent, p for trend 0.03) than the low-income tertile (22 percent, p for trend <0.01) (Figure 42 and Table 104 in Appendix 1). Conversely, among females rates increased in all tertile groups, but more so among the low-income (86 percent, p for trend 0.01) than the high-income tertile (55 percent, p for trend 0.15). Among males, these decreases were most evident among those younger than 65 years of age (Figure 43). Among females, the percentage increases were similar across age groups.

Pooled over time, lung cancer rates for those aged 25+ years were at least 50 percent higher among low-income males (SRR 1.56, RII 1.9), and at least one-third higher among low-income females (SRR 1.35, RII 1.6) (Table 44). Income differences in lung cancer incidence widened over time for both males (more so in terms of relative inequalities) and females (more so in terms of absolute inequalities) across age groups.

Relative inequalities in lung cancer incidence by income were greater in younger age groups. Widening of male relative inequalities was most evident among 25–64 year-olds (the RII increasing from 1.6 to 4.1, p for trend <0.01).

Figure 42: Standardised rates of lung cancer for 25+ year-olds, by income by sex

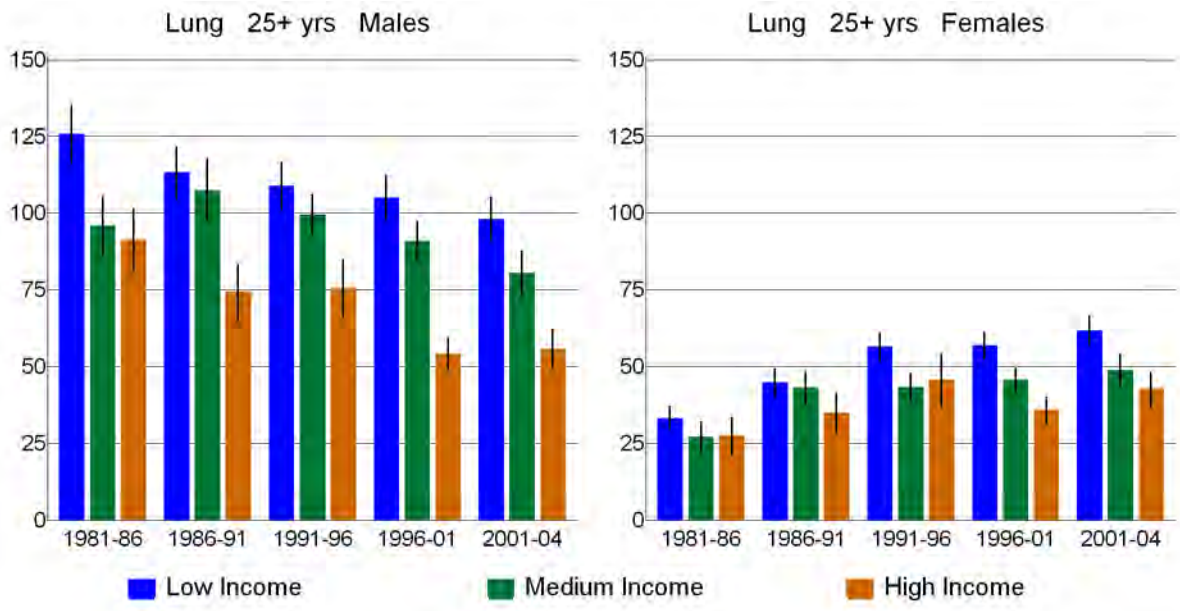


Figure 43: Standardised rates of lung cancer, by income by sex and age group

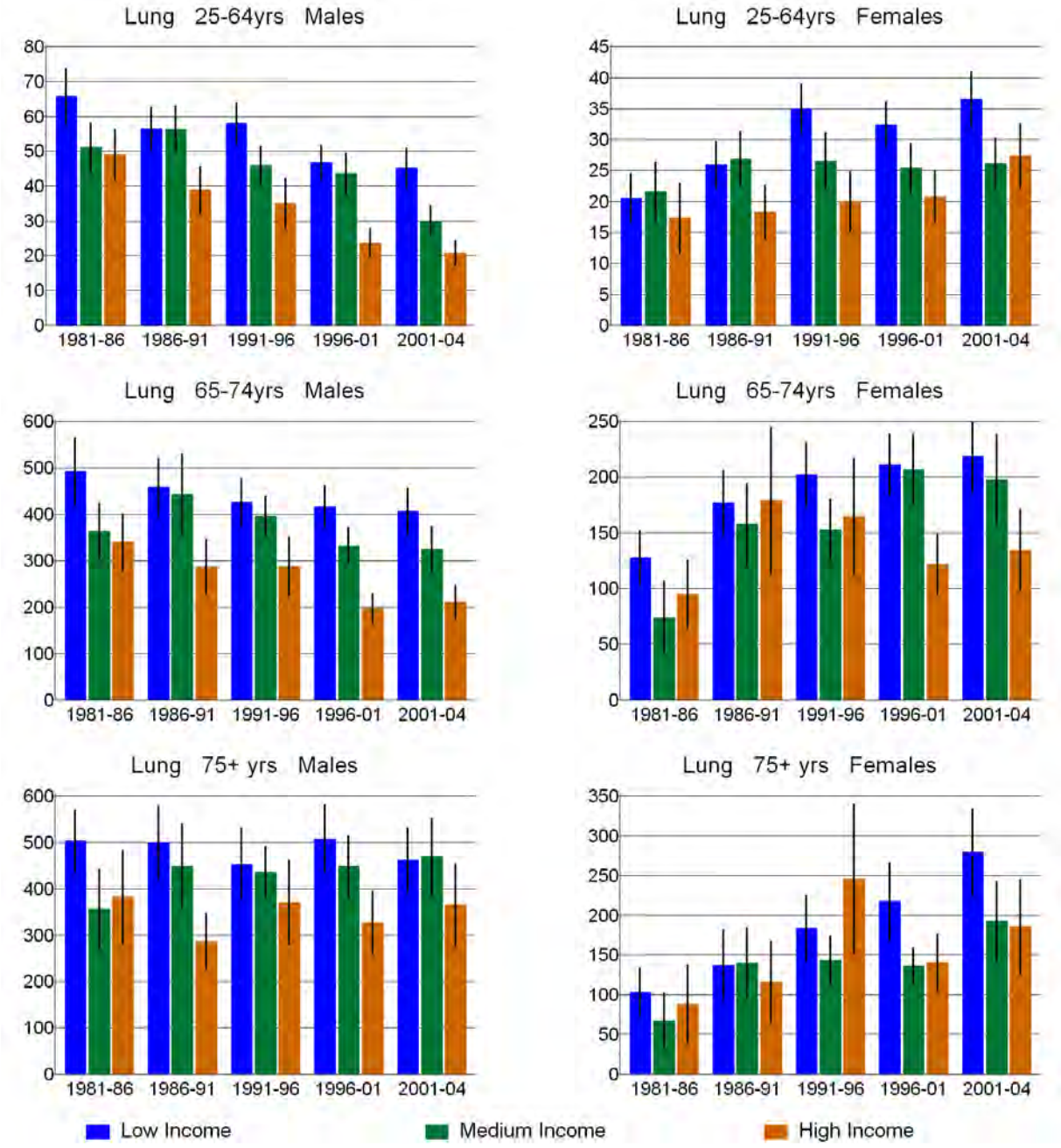


Table 44: Age- and ethnicity-standardised income rate ratios (SRR), rate differences (SRD), relative indices of inequality (RII) and slope indices of inequality (SII) of lung cancer, by sex

Age group	Cohort	Males				Females			
		Relative inequalities		Absolute inequalities		Relative inequalities		Absolute inequalities	
		SRR	RII (95% CI)	SRD	SII (95% CI)	SRR	RII (95% CI)	SRD	SII (95% CI)
Lung									
25+ years	1981–1986	1.38	1.5 (1.3–1.9)	35	43 (19–67)	1.21	1.2 (0.9–1.8)	5.8	6.0 (-6.6–18)
	1986–1991	1.52	1.9 (1.5–2.3)	39	60 (28–92)	1.28	1.4 (1.0–1.8)	9.7	13 (3.2–24)
	1991–1996	1.44	1.7 (1.3–2.2)	33	49 (32–67)	1.24	1.4 (1.1–1.9)	11	17 (7.1–27)
	1996–2001	1.94	2.8 (2.3–3.6)	51	79 (63–95)	1.59	2.1 (1.7–2.7)	21	33 (23–44)
	2001–2004	1.76	2.5 (1.9–3.2)	42	64 (40–89)	1.45	1.9 (1.5–2.4)	19	30 (11–50)
	P (trend)	0.11	0.06	0.31	0.18	0.17	0.08	0.02	0.02
	Pooled	1.56	1.9 (1.7–2.1)	40	59 (46–72)	1.35	1.6 (1.4–1.8)	13	19 (15–23)
25–64 years	1981–1986	1.34	1.6 (1.2–2.1)	17	24 (16–33)	1.19	1.2 (0.7–2.1)	3.3	4.0 (0.6–7.3)
	1986–1991	1.45	2.1 (1.5–2.8)	18	35 (20–51)	1.41	1.6 (1.1–2.3)	7.6	11 (-1.0–22)
	1991–1996	1.66	2.2 (1.5–3.1)	23	34 (25–42)	1.75	2.3 (1.5–3.5)	15	22 (15–28)
	1996–2001	1.98	3.1 (2.1–4.7)	23	37 (29–46)	1.56	2.3 (1.6–3.3)	12	20 (13–27)
	2001–2004	2.18	4.1 (2.4–6.9)	25	36 (30–41)	1.34	1.9 (1.3–2.7)	9.2	17 (6.4–29)
	P (trend)	<.01	<.01	0.02	0.07	0.92	0.25	0.32	0.04
	Pooled	1.61	2.2 (1.9–2.6)	21	34 (28–40)	1.46	1.8 (1.5–2.2)	9.3	15 (11–18)
65–74 years	1981–1986	1.45	1.7 (1.2–2.4)	153	208 (-41–456)	1.34	1.8 (1.0–3.4)	33	61 (-39–162)
	1986–1991	1.60	2.0 (1.2–3.0)	171	265 (50–480)	0.99	1.0 (0.6–1.7)	-2.3	6.0 (-30–42)
	1991–1996	1.48	1.8 (1.3–2.4)	138	202 (110–295)	1.23	1.4 (0.9–2.3)	37	60 (-7.6–128)
	1996–2001	2.12	3.1 (2.1–4.5)	220	334 (265–403)	1.74	1.8 (1.2–2.5)	89	103 (5.2–201)
	2001–2004	1.93	2.4 (1.7–3.6)	195	257 (20–495)	1.63	2.0 (1.3–3.2)	84	121 (34–207)
	P (trend)	0.11	0.17	0.25	0.22	0.17	0.30	0.08	0.08
	Pooled	1.65	2.0 (1.7–2.3)	175	235 (176–294)	1.33	1.5 (1.2–1.8)	46	61 (40–81)

Age group	Cohort	Males				Females			
		Relative inequalities		Absolute inequalities		Relative inequalities		Absolute inequalities	
		SRR	RII (95% CI)	SRD	SII (95% CI)	SRR	RII (95% CI)	SRD	SII (95% CI)
75+ years	1981–1986	1.32	1.7 (1.1–2.6)	121	212 (91–333)	1.17	1.4 (0.6–3.1)	15	28 (-43–99)
	1986–1991	1.75	2.0 (1.3–3.1)	214	280 (62–497)	1.18	1.2 (0.6–2.5)	21	26 (-26–79)
	1991–1996	1.22	1.3 (0.8–2.1)	82	115 (17–213)	0.75	0.6 (0.3–1.2)	-62	-83 (-240–75)
	1996–2001	1.56	2.1 (1.4–3.1)	181	307 (176–437)	1.55	2.2 (1.3–3.7)	77	118 (11–224)
	2001–2004	1.26	1.5 (0.9–2.3)	96	167 (-48–383)	1.50	2.1 (1.0–4.2)	94	171 (29–313)
	P (trend)	0.71	0.83	0.67	0.93	0.29	0.38	0.23	0.22
	Pooled	1.41	1.6 (1.3–2.0)	141	204 (128–280)	1.17	1.3 (0.9–1.8)	26	39 (-39–117)

Notes: 95 percent confidence intervals in brackets. SRRs and SRDs compare low- and high-income tertiles. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

Chapter 18: Melanoma

Melanoma is a cancer arising from melanocyte cells in the skin. New Zealand has one of the highest incidence rates of melanoma in the world: more than 2000 cases were diagnosed in 2005 (excluding in situ disease).[57] Incidence rates have increased in New Zealand for the last several decades. Melanoma is now the fourth most commonly registered cancer in New Zealand overall (behind colorectal, breast and prostate), although it ranks third for both men and women separately.[57]

Melanoma is more common among fair-skinned people. Incidence increases with increasing age, and men have a slightly higher risk than women. Approximately 5–10 percent of melanomas occur in families with a strong family history of melanoma. The strongest risk factor for melanoma is episodic exposure to ultraviolet radiation leading to sunburn, especially early in life and particularly among those with fair skin that tans poorly and sunburns easily. Use of sunbeds appears to moderately increase the risk of melanoma, but only if used in teens or early adulthood. Those with multiple nevi (moles) are at increased risk. There is some evidence that a diet high in fruit and vegetables, and smoking, may reduce risk of melanoma.[74]

18.1 Ethnic trends

Melanoma rates for 25+ year-olds increased for all sex by ethnic groupings except Asian males and females over the period surveyed. The implementation of mandatory reporting to the NZCR in 1994 is responsible for some of this increase. The number of melanoma registrations jumped by nearly 50 percent in 1994, compared to that expected based on trends in numbers both before and after 1994 (workings on these data are available from the authors). This means that an observed ratio of increase in rates over time in CancerTrends needs to be multiplied by 0.67 to give an approximation of the true ratio of increase.

Considering the results shown in Figures 44 and 45 and Table 105 in Appendix 1, melanoma rates adjusted for the NZCR reporting changes in 1994 probably nearly doubled among European/Other males, but did not alter over time among Māori and Pacific males – although rates for all non-European/Other groups were low and unstable over time. Among females, rates probably increased by up to 50 percent among both European/Other and Māori. Increases were greater in percentage terms among older age groups.

Assuming the percentage of under-reporting of melanoma rates prior to 1994 did not vary by ethnic group, it should be possible to interpret the SRRs over time. Pooled over time, there were very large relative inequalities in melanoma incidence by ethnicity: rates among Māori were about one-fifth those of European/Other, and Pacific and Asian rates less than 10 percent (Table 45). All these pooled SRRs had confidence intervals excluding 1.0. Rates among Māori were double those of either Pacific or Asian. Over time, the percentage increase in European/Other rates tended to outpace percentage increases within the other ethnic groups, such that relative inequalities tended to widen further.

Direct interpretation of absolute inequalities would require further modelling (beyond the scope of this report) due to the 1994 reporting changes. Nevertheless, the absolute gap between European/Other rates and rates for the three other ethnic groups was large in later years (Table 46), and if relative inequalities increased over time then absolute inequalities must have truly increased as well.

Figure 44: Standardised rates of melanoma cancer for 25+ year-olds, by ethnicity by sex

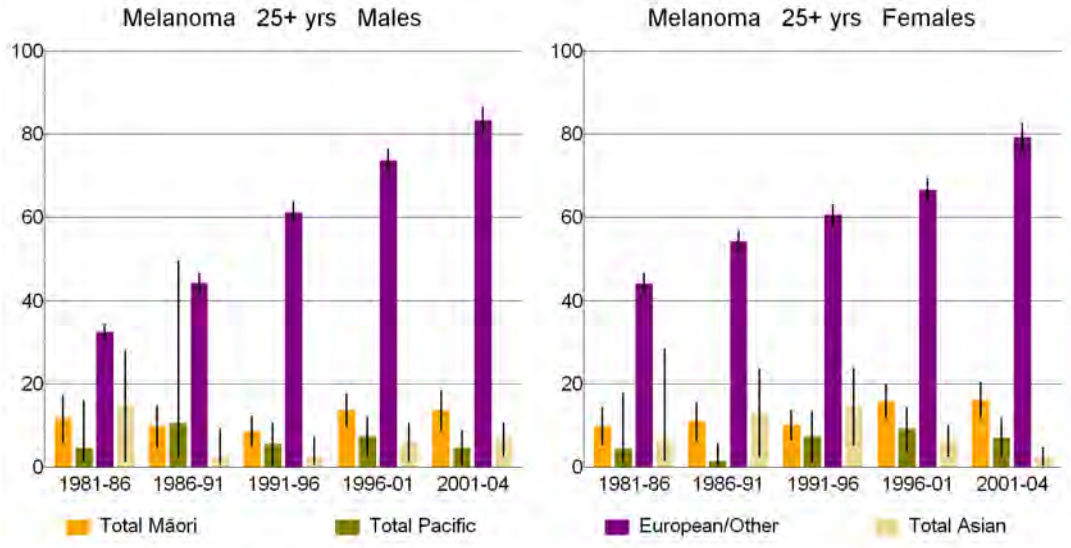


Figure 45: Standardised rates of melanoma cancer, by ethnicity by sex and age group

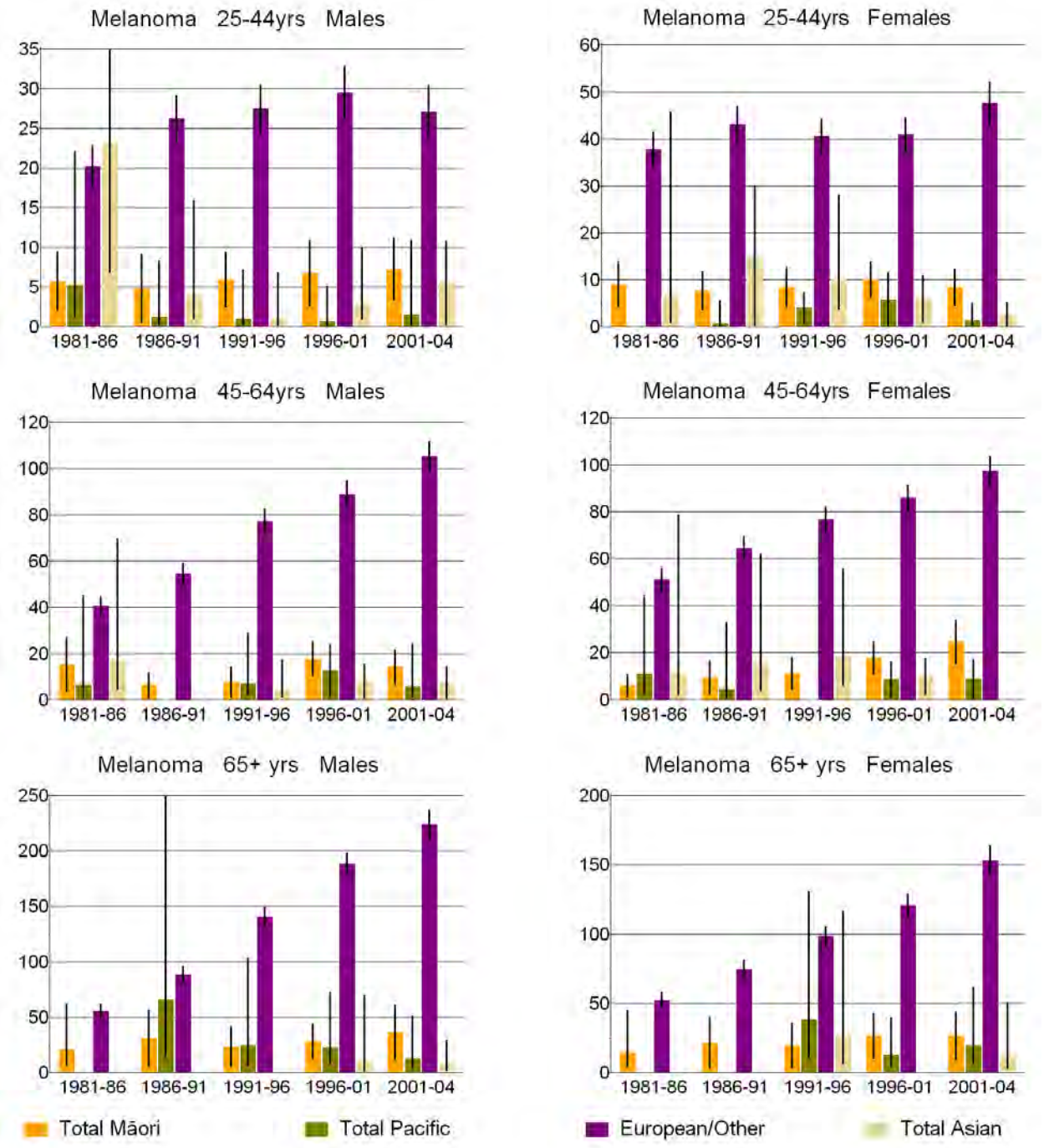


Table 45: Age-standardised rate ratios (SRR) of melanoma cancer, for Māori, Pacific and Asian compared to European/Other, by sex

Exposure Melanoma Total ethnicity	Cohort	25+ years SRR (95% CI)	25–44 years SRR (95% CI)	45–64 years SRR (95% CI)	65+ years SRR (95% CI)
Males					
Total Māori vs European	1981–1986	0.36 (0.22–0.58)	0.28 (0.15–0.55)	0.38 (0.17–0.82)	0.37 (0.12–1.14)
	1986–1991	0.22 (0.13–0.38)	0.18 (0.07–0.46)	0.12 (0.05–0.28)	0.35 (0.15–0.80)
	1991–1996	0.14 (0.09–0.22)	0.22 (0.12–0.39)	0.10 (0.04–0.23)	0.17 (0.08–0.36)
	1996–2001	0.19 (0.14–0.25)	0.23 (0.12–0.43)	0.20 (0.13–0.30)	0.15 (0.09–0.26)
	2001–2004	0.16 (0.12–0.23)	0.27 (0.15–0.47)	0.13 (0.08–0.23)	0.16 (0.08–0.32)
	P (trend)	0.13	0.88	0.29	0.06
	Pooled	0.20 (0.16–0.24)	0.23 (0.17–0.31)	0.17 (0.13–0.23)	0.20 (0.14–0.29)
Total Pacific vs European	1981–1986	0.14 (0.04–0.50)	0.26 (0.06–1.10)	0.16 (0.02–1.12)	
	1986–1991	0.24 (0.05–1.12)	0.04 (0.01–0.32)		0.74 (0.17–3.24)
	1991–1996	0.09 (0.04–0.23)	0.04 (0.01–0.26)	0.09 (0.02–0.37)	0.18 (0.04–0.74)
	1996–2001	0.10 (0.05–0.19)	0.02 (0.00–0.17)	0.14 (0.06–0.35)	0.12 (0.04–0.39)
	2001–2004	0.06 (0.02–0.14)	0.06 (0.01–0.40)	0.05 (0.01–0.23)	0.06 (0.01–0.23)
	P (trend)	0.18	0.14		
	Pooled	0.11 (0.06–0.21)	0.07 (0.03–0.19)	0.11 (0.06–0.19)	0.21 (0.10–0.45)
Total Asian vs European	1981–1986	0.45 (0.18–1.12)	1.15 (0.33–3.95)	0.42 (0.10–1.73)	
	1986–1991	0.05 (0.01–0.21)	0.15 (0.04–0.61)		
	1991–1996	0.04 (0.01–0.12)	0.03 (0.00–0.25)	0.06 (0.01–0.22)	
	1996–2001	0.08 (0.04–0.18)	0.10 (0.03–0.34)	0.09 (0.03–0.23)	0.05 (0.01–0.37)
	2001–2004	0.08 (0.04–0.15)	0.20 (0.08–0.54)	0.07 (0.03–0.18)	0.03 (0.01–0.13)
	P (trend)	0.14	0.18		
	Pooled	0.11 (0.07–0.18)	0.28 (0.12–0.66)	0.12 (0.06–0.24)	0.04 (0.02–0.10)
Females					
Total Māori vs European	1981–1986	0.22 (0.14–0.35)	0.24 (0.14–0.41)	0.12 (0.05–0.26)	0.27 (0.09–0.87)
	1986–1991	0.20 (0.13–0.31)	0.18 (0.10–0.31)	0.14 (0.07–0.31)	0.29 (0.12–0.70)
	1991–1996	0.17 (0.12–0.24)	0.21 (0.12–0.35)	0.14 (0.08–0.27)	0.20 (0.09–0.46)
	1996–2001	0.24 (0.18–0.31)	0.24 (0.16–0.36)	0.21 (0.14–0.31)	0.22 (0.12–0.41)
	2001–2004	0.20 (0.15–0.27)	0.18 (0.11–0.29)	0.25 (0.17–0.37)	0.17 (0.09–0.34)
	P (trend)	0.89	0.72	0.01	0.06
	Pooled	0.21 (0.18–0.24)	0.21 (0.17–0.26)	0.18 (0.14–0.23)	0.22 (0.15–0.32)
Total Pacific vs European	1981–1986	0.10 (0.02–0.41)		0.21 (0.05–0.87)	
	1986–1991	0.02 (0.01–0.11)	0.02 (0.00–0.13)	0.07 (0.01–0.51)	
	1991–1996	0.12 (0.05–0.28)	0.10 (0.04–0.23)		0.39 (0.11–1.34)
	1996–2001	0.14 (0.08–0.24)	0.14 (0.05–0.38)	0.10 (0.04–0.24)	0.11 (0.03–0.33)
	2001–2004	0.09 (0.04–0.18)	0.03 (0.01–0.11)	0.09 (0.03–0.24)	0.13 (0.04–0.41)
	P (trend)	0.77			
	Pooled	0.10 (0.06–0.14)	0.07 (0.04–0.12)	0.11 (0.06–0.20)	0.20 (0.11–0.36)
Total Asian vs European	1981–1986	0.15 (0.03–0.65)	0.17 (0.02–1.22)	0.22 (0.03–1.55)	
	1986–1991	0.24 (0.11–0.55)	0.35 (0.13–0.95)	0.24 (0.06–0.96)	
	1991–1996	0.24 (0.13–0.46)	0.25 (0.09–0.69)	0.24 (0.08–0.73)	0.27 (0.06–1.19)
	1996–2001	0.10 (0.05–0.17)	0.15 (0.06–0.34)	0.11 (0.05–0.26)	
	2001–2004	0.03 (0.01–0.08)	0.05 (0.02–0.14)		0.08 (0.02–0.33)
	P (trend)	0.11	0.07		
	Pooled	0.15 (0.10–0.22)	0.20 (0.11–0.35)	0.20 (0.10–0.37)	0.17 (0.08–0.34)

Notes: 95 percent confidence intervals in brackets. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

Table 46: Age-standardised rate differences (SRD) of melanoma cancer, for Māori, Pacific and Asian compared to European/Other, by sex

Exposure Melanoma Total ethnicity	Cohort	25+ years SRD (95% CI)	25–44 years SRD (95% CI)	45–64 years SRD (95% CI)	65+ years SRD (95% CI)
Males					
Total Māori vs European	1981–1986	-21 (-27– -15)	-15 (-19– -9.9)	-25 (-38– -13)	-35 (-59– -11)
	1986–1991	-34 (-40– -29)	-21 (-27– -16)	-48 (-55– -41)	-58 (-84– -31)
	1991–1996	-52 (-57– -48)	-22 (-26– -17)	-70 (-78– -61)	-117 (-137– -96)
	1996–2001	-60 (-65– -55)	-23 (-28– -18)	-71 (-81– -62)	-160 (-179– -141)
	2001–2004	-70 (-76– -64)	-20 (-25– -15)	-91 (-101– -81)	-188 (-216– -160)
Total Pacific vs European	1981–1986	-28 (-34– -22)	-15 (-23– -7.1)	-34 (-47– -21)	
	1986–1991	-34 (-50– -17)	-25 (-29– -21)		-23 (-120–74)
	1991–1996	-56 (-61– -50)	-26 (-30– -23)	-70 (-82– -59)	-116 (-152– -79)
	1996–2001	-66 (-72– -61)	-29 (-32– -25)	-76 (-89– -64)	-166 (-194– -137)
	2001–2004	-79 (-84– -73)	-26 (-30– -21)	-100 (-110– -89)	-211 (-234– -189)
Total Asian vs European	1981–1986	-18 (-31– -4.3)	2.9 (-26–32)	-23 (-48–1.0)	
	1986–1991	-42 (-46– -38)	-22 (-29– -16)		
	1991–1996	-59 (-63– -55)	-27 (-30– -23)	-73 (-81– -65)	
	1996–2001	-68 (-73– -62)	-27 (-32– -22)	-81 (-91– -71)	-178 (-200– -156)
	2001–2004	-77 (-82– -72)	-22 (-28– -15)	-98 (-108– -88)	-217 (-233– -200)
Females					
Total Māori vs European	1981–1986	-34 (-39– -29)	-29 (-35– -23)	-45 (-52– -38)	-38 (-55– -21)
	1986–1991	-43 (-49– -38)	-35 (-41– -30)	-55 (-64– -46)	-53 (-74– -33)
	1991–1996	-50 (-55– -46)	-32 (-38– -26)	-66 (-74– -57)	-79 (-97– -61)
	1996–2001	-51 (-56– -46)	-31 (-36– -26)	-68 (-77– -59)	-94 (-113– -76)
	2001–2004	-63 (-69– -58)	-39 (-45– -33)	-73 (-84– -62)	-126 (-147– -106)
Total Pacific vs European	1981–1986	-40 (-46– -33)		-40 (-56– -24)	
	1986–1991	-53 (-56– -50)	-42 (-47– -38)	-60 (-70– -49)	
	1991–1996	-53 (-60– -46)	-37 (-42– -32)		-60 (-108– -13)
	1996–2001	-58 (-63– -52)	-35 (-42– -29)	-78 (-87– -68)	-108 (-125– -91)
	2001–2004	-72 (-78– -66)	-46 (-51– -41)	-89 (-100– -78)	-133 (-158– -108)
Total Asian vs European	1981–1986	-38 (-47– -28)	-31 (-45– -18)	-40 (-62– -18)	
	1986–1991	-41 (-52– -30)	-28 (-43– -13)	-49 (-71– -27)	
	1991–1996	-46 (-56– -36)	-30 (-41– -20)	-58 (-80– -37)	-72 (-112– -32)
	1996–2001	-60 (-65– -56)	-35 (-41– -29)	-76 (-86– -67)	
	2001–2004	-77 (-81– -73)	-45 (-50– -40)		-141 (-162– -121)

Notes: 95 percent confidence intervals in brackets. Note that trends in absolute inequalities over time are not interpretable due to increases in melanoma reporting from 1994, hence pooled SRDs and p for trends are not shown.

18.2 Socioeconomic trends

The same caveats applying to interpretation of these data due to increased reporting since 1994 as described above for ethnic rates apply to rates by income.

Over time, age- and ethnicity-adjusted melanoma rates probably nearly doubled among males in all income groups, and probably increased by less for females in all income groups, after allowing for changes in levels of melanoma registrations (Figure 46 and Table 106 in Appendix 1). These percentage increases in rates were more notable in older age groups (Figure 47).

Pooled over time, lower-income people had between one-quarter and one-third lower melanoma rates than high-income people (Table 47). This relative inequality was consistent across both time and sex. Trends in absolute inequalities (that is, SRDs and SIIs) are not interpretable over time in this case, due to underestimation in the 1980s and early 1990s. However, they are substantive in recent cohorts. Further, given the true increase in rates over time accompanied by stable relative inequalities over time, absolute inequities in melanoma incidence by income must have increased.

Figure 46: Standardised rates of melanoma cancer for 25+ year-olds, by income by sex

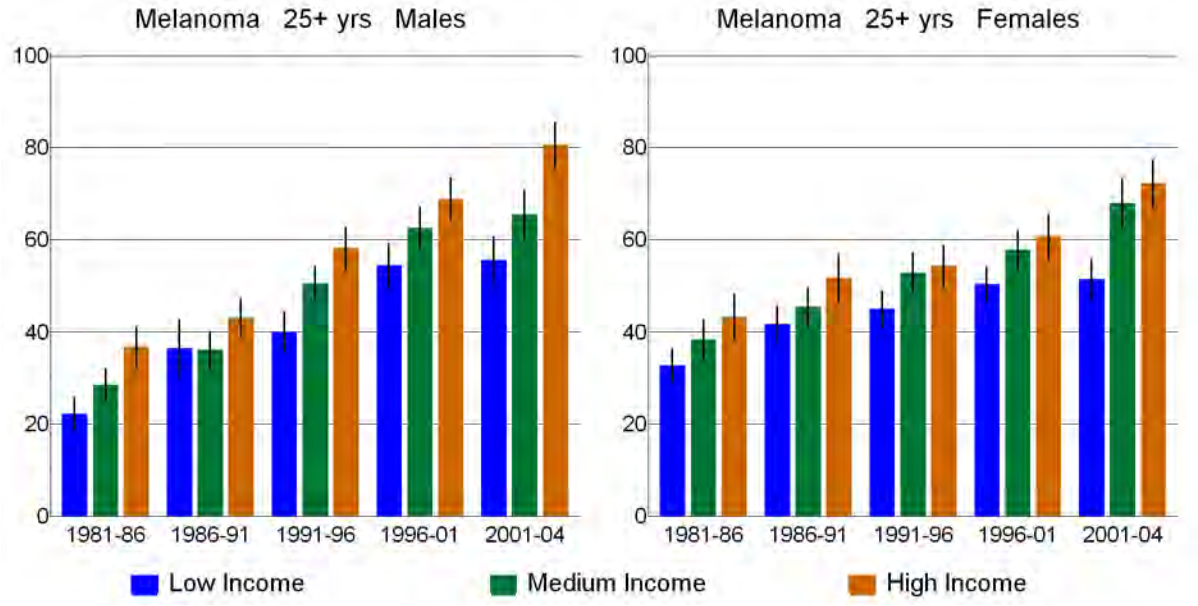


Figure 47: Standardised rates of melanoma cancer, by income by sex and age group

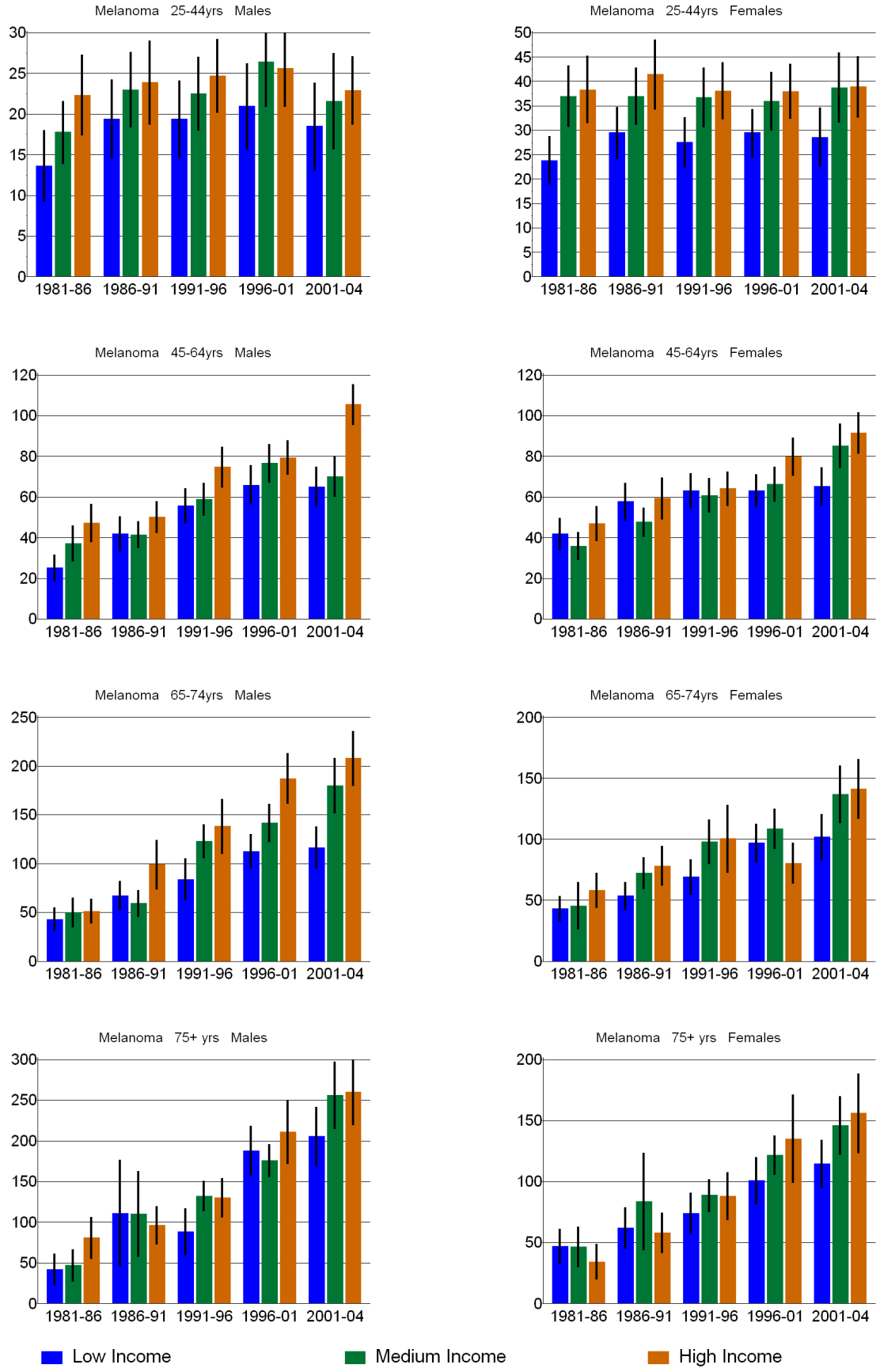


Table 47: Age- and ethnicity-standardised income rate ratios (SRR), rate differences (SRD), relative indices of inequality (RII) and slope indices of inequality (SII) of melanoma cancer, by sex ‡

Age group	Cohort	Males				Females			
		Relative inequalities		Absolute inequalities		Relative inequalities		Absolute inequalities	
		SRR	RII (95% CI)	SRD	SII (95% CI)	SRR	RII (95% CI)	SRD	SII (95% CI)
Melanoma									
25+ years	1981–1986	0.60	0.6 (0.4–0.7)	-15	-17 (-24– -9.6)	0.76	0.7 (0.5–0.9)	-11	-15 (-18– -12)
	1986–1991	0.85	0.9 (0.5–1.7)	-6.5	-2.0 (-24–19)	0.81	0.7 (0.6–0.9)	-9.9	-16 (-26– -6.7)
	1991–1996	0.69	0.6 (0.5–0.8)	-18	-23 (-34– -12)	0.83	0.8 (0.7–1.0)	-9.4	-12 (-23– -0.9)
	1996–2001	0.79	0.7 (0.6–0.8)	-14	-23 (-33– -12)	0.83	0.7 (0.6–0.9)	-10	-18 (-33– -3.3)
	2001–2004	0.69	0.6 (0.5–0.7)	-25	-38 (-52– -23)	0.71	0.6 (0.5–0.8)	-21	-29 (-45– -13)
	P (trend)	0.86	0.87			0.55	0.61		
	Pooled	0.73	0.7 (0.6–0.8)			0.79	0.7 (0.7–0.8)		
25–44 years	1981–1986	0.61	0.6 (0.4–1.0)	-8.7	-9.0 (-23–4.2)	0.62	0.5 (0.3–0.8)	-15	-20 (-35– -6.2)
	1986–1991	0.81	0.9 (0.6–1.4)	-4.4	-3.0 (-7.1–1.2)	0.71	0.6 (0.4–0.9)	-12	-18 (-24– -13)
	1991–1996	0.78	0.7 (0.5–1.1)	-5.3	-8.0 (-20–4.5)	0.72	0.7 (0.5–1.0)	-11	-13 (-26– -0.8)
	1996–2001	0.82	0.8 (0.5–1.2)	-4.6	-6.0 (-16–3.8)	0.78	0.6 (0.5–0.9)	-8.5	-15 (-29– -2.2)
	2001–2004	0.81	0.8 (0.5–1.3)	-4.4	-4.0 (-21–12)	0.73	0.7 (0.5–1.0)	-10	-13 (-28–1.2)
	P (trend)	0.20	0.40			0.12	0.06		
	Pooled	0.77	0.8 (0.6–0.9)			0.71	0.6 (0.5–0.7)		
45–64 years	1981–1986	0.53	0.6 (0.3–1.0)	-22	-21 (-33– -9.3)	0.89	0.9 (0.6–1.3)	-5.1	-5.0 (-18–8.5)
	1986–1991	0.83	0.8 (0.5–1.1)	-8.3	-13 (-29–3.4)	0.97	0.9 (0.6–1.2)	-1.7	-8.0 (-39–23)
	1991–1996	0.75	0.6 (0.4–0.8)	-19	-34 (-54– -13)	0.99	1.0 (0.7–1.3)	-0.9	-1.0 (-16–14)
	1996–2001	0.83	0.7 (0.6–1.0)	-13	-23 (-38– -8.4)	0.79	0.6 (0.5–0.8)	-17	-31 (-60– -1.6)
	2001–2004	0.62	0.5 (0.4–0.6)	-40	-59 (-82– -36)	0.71	0.6 (0.5–0.8)	-26	-38 (-57– -19)
	P (trend)	0.87	0.48			0.13	0.12		
	Pooled	0.72	0.6 (0.5–0.7)			0.86	0.8 (0.7–0.9)		

Age group	Cohort	Males				Females			
		Relative inequalities		Absolute inequalities		Relative inequalities		Absolute inequalities	
		SRR	RII (95% CI)	SRD	SII (95% CI)	SRR	RII (95% CI)	SRD	SII (95% CI)
65–74 years	1981–1986	0.84	0.6 (0.4–1.1)	-8.3	-21 (-31– -12)	0.74	0.5 (0.3–1.0)	-15	-32 (-71–6.5)
	1986–1991	0.68	0.4 (0.2–0.8)	-32	-61 (-108– -14)	0.69	0.6 (0.4–0.9)	-25	-33 (-73–7.3)
	1991–1996	0.61	0.7 (0.5–1.0)	-54	-49 (-97– -1.0)	0.69	0.6 (0.4–1.0)	-32	-43 (-82– -3.8)
	1996–2001	0.60	0.5 (0.3–0.7)	-75	-112 (-152– -71)	1.21	1.0 (0.7–1.4)	17	0.0 (-53–52)
	2001–2004	0.56	0.4 (0.3–0.6)	-91	-135 (-166– -103)	0.72	0.7 (0.5–1.0)	-40	-46 (-75– -17)
	P (trend)	0.03	0.28			0.64	0.31		
	Pooled	0.62	0.5 (0.4–0.6)			0.80	0.7 (0.6–0.9)		
75+ years	1981–1986	0.52	0.5 (0.2–1.2)	-39	-38 (-66– -11)	1.37	1.2 (0.5–2.8)	13	8.0 (-4.0–21)
	1986–1991	1.16	2.1 (0.2–25.7)	15	105 (-192–401)	1.07	0.9 (0.3–2.4)	3.9	-7.0 (-84–69)
	1991–1996	0.68	0.7 (0.3–1.4)	-42	-52 (-118–15)	0.84	0.8 (0.5–1.2)	-14	-21 (-48–6.0)
	1996–2001	0.89	0.8 (0.6–1.1)	-23	-51 (-67– -36)	0.74	0.8 (0.5–1.1)	-35	-32 (-93–30)
	2001–2004	0.79	0.6 (0.4–0.9)	-54	-107 (-220–6.7)	0.73	0.7 (0.5–1.0)	-41	-54 (-114–5.1)
	P (trend)	0.70	0.84			0.03	0.02		
	Pooled	0.82	0.8 (0.5–1.2)			0.85	0.8 (0.6–1.1)		

Notes: 95 percent confidence intervals in brackets. SRRs and SRDs compare low- and high-income tertiles. Underlying non-linear trends mean the p for trend value must be interpreted cautiously. Trends in absolute inequalities over time are not interpretable due to increases in melanoma reporting from 1994, hence pooled SRDs and SIIs and p for trends are not shown.

Chapter 19: Myeloma

Multiple myeloma is a malignancy of specific cells in the immune system (plasma cells).[75] In 2005 in New Zealand there were 251 cases diagnosed, of which 142 occurred in men. Five-year survival from multiple myeloma is relatively poor: about 28 percent.[75]

Myeloma is more common in older age groups and among men. There are differences in risk of myeloma by country of birth and by ethnicity/racial group in some countries. There is some evidence that higher SEP is associated with increased risk of myeloma.[75]

The causative factors for myeloma are not clear. There is some evidence that people with specific immune disorders, autoimmune diseases, specific chronic inflammatory conditions and immunosuppressive viral infections are at increased risk. Some common gene variations have been associated with an increased risk. Exposure to ionising radiation increases risk of myeloma, as does agricultural work (possibly through pesticide exposure or animal contact). There is no clear relationship with tobacco use, and the role (if any) that diet and obesity play in risk is unclear.[75]

19.1 Ethnic trends

Myeloma rates among the 25+ year-old European/Other group increased over the period surveyed by 37 percent among males and 26 percent among females (p for trend 0.02 and 0.03 respectively) (Figure 48 and Table 107 in Appendix 1). Rates tended to increase in the three other groups (except among Asian males), but were unstable over time such that clear trends were not evident.

Pooled over time, Māori rates were two-thirds greater than European/Other rates, and Pacific rates approximately double (Table 48). Asian male rates were half those of European/Other, and Asian female rates about 20 percent greater than European/Other (both with a confidence interval including the null). There were no clear trends of changing inequalities over time.

Figure 48: Standardised rates of myeloma cancer for 25+ year-olds, by ethnicity by sex

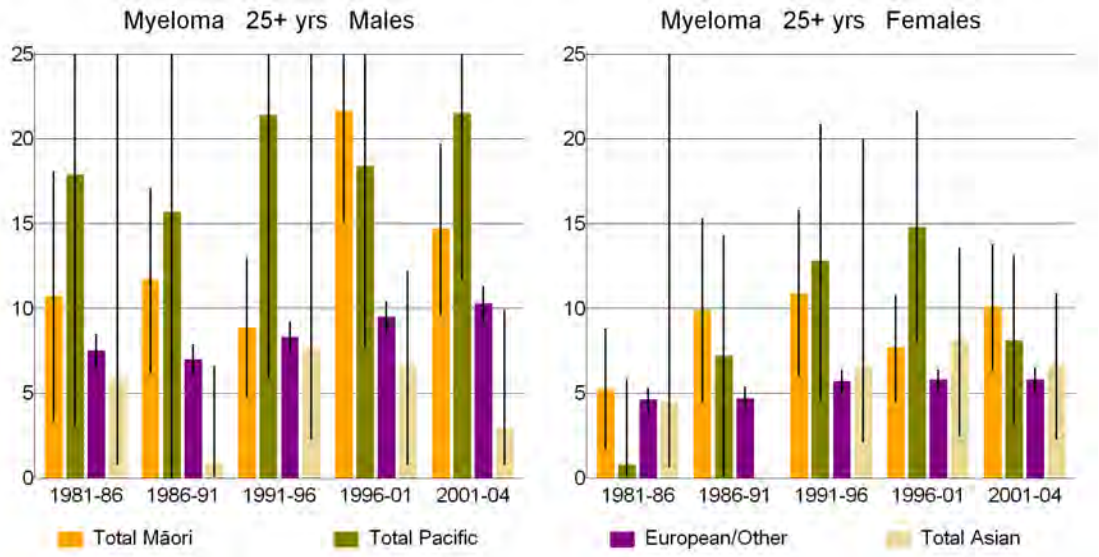


Table 48: Age-standardised rate ratios (SRR) and rate differences (SRD) of myeloma cancer, for Māori, Pacific and Asian compared to European/Other, by sex

Exposure Myeloma 25+ years	Cohort	Males		Females	
		SRR (95% CI)	SRD (95% CI)	SRR (95% CI)	SRD (95% CI)
Total Māori vs European	1981–1986	1.43 (0.71–2.87)	3.2 (-4.2–11)	1.14 (0.57–2.27)	0.6 (-3.0–4.2)
	1986–1991	1.67 (1.03–2.71)	4.7 (-0.9–10)	2.09 (1.19–3.67)	5.2 (-0.3–11)
	1991–1996	1.07 (0.67–1.73)	0.6 (-3.6–4.8)	1.90 (1.20–3.02)	5.2 (0.2–10)
	1996–2001	2.28 (1.66–3.13)	12 (5.6–19)	1.33 (0.87–2.04)	1.9 (-1.3–5.1)
	2001–2004	1.43 (1.00–2.04)	4.4 (-0.7–9.6)	1.75 (1.19–2.57)	4.3 (0.6–8.1)
	P (trend)	0.79	0.64	0.98	0.46
	Pooled	1.60 (1.30–1.95)	5.0 (2.4–7.7)	1.64 (1.31–2.06)	3.4 (1.5–5.3)
Total Pacific vs European	1981–1986	2.38 (1.03–5.51)	10 (-4.5–25)	0.18 (0.02–1.27)	-3.8 (-5.5– -2.0)
	1986–1991	2.25 (0.82–6.15)	8.7 (-7.0–25)	1.51 (0.56–4.11)	2.4 (-4.7–9.6)
	1991–1996	2.58 (1.24–5.37)	13 (-2.4–29)	2.23 (1.16–4.27)	7.0 (-1.1–15)
	1996–2001	1.94 (1.08–3.50)	8.9 (-1.8–20)	2.57 (1.60–4.14)	9.1 (2.2–16)
	2001–2004	2.09 (1.31–3.34)	11 (1.3–21)	1.41 (0.76–2.64)	2.4 (-2.7–7.4)
	P (trend)	0.28	0.80	0.90	0.08
	Pooled	2.24 (1.60–3.12)	10 (4.2–17)	1.66 (1.19–2.30)	3.5 (0.6–6.3)
Total Asian vs European	1981–1986	0.77 (0.11–5.47)	-1.7 (-13–9.6)	0.97 (0.14–6.90)	-0.2 (-8.9–8.6)
	1986–1991	0.13 (0.02–0.94)	-6.1 (-8.1– -4.1)		
	1991–1996	0.92 (0.28–3.09)	-0.6 (-9.9–8.6)	1.13 (0.36–3.51)	0.7 (-6.6–8.1)
	1996–2001	0.69 (0.29–1.66)	-2.9 (-8.7–2.8)	1.40 (0.70–2.82)	2.3 (-3.3–7.9)
	2001–2004	0.28 (0.08–0.97)	-7.4 (-11– -3.7)	1.15 (0.59–2.23)	0.9 (-3.5–5.2)
	P (trend)	0.61	0.76		
	Pooled	0.57 (0.29–1.15)	-3.6 (-7.0– -0.2)	1.18 (0.72–1.91)	1.0 (-2.1–4.1)

Notes: 95 percent confidence intervals in brackets. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

19.2 Socioeconomic trends

Age- and ethnicity-standardised myeloma rates increased in all income tertiles, for both males and females, by amounts ranging from 8 percent (among high-income males) to 112 percent (among medium-income females) (Figure 49 and Table 108 in Appendix 1). Increases over time were statistically significant for low-income males and females, and for medium-income males.

Pooled over time, myeloma rates were one-quarter lower among males with low incomes. There was possibly a trend of changing relative inequalities among females (due to low-income rates increasing more than high-income rates), but this finding is inconclusive (Table 49).

Figure 49: Standardised rates of myeloma cancer for 25+ year-olds, by income by sex

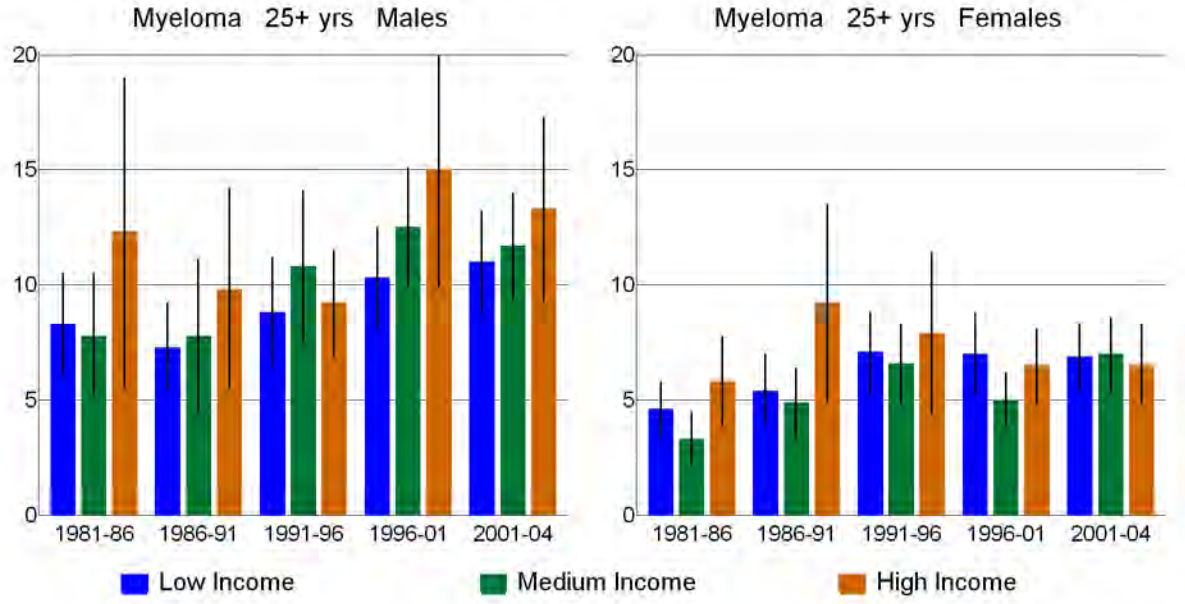


Table 49: Age- and ethnicity-standardised income rate ratios (SRR), rate differences (SRD), relative indices of inequality (RII) and slope indices of inequality (SII) of myeloma cancer, by sex

Age group	Cohort	Males				Females			
		Relative inequalities		Absolute inequalities		Relative inequalities		Absolute inequalities	
		SRR	RII (95% CI)	SRD	SII (95% CI)	SRR	RII (95% CI)	SRD	SII (95% CI)
Myeloma									
25+ years	1981–1986	0.68	0.7 (0.3–1.7)	-4.0	-3.0 (-12–5.9)	0.79	0.9 (0.5–1.7)	-1.3	-1.0 (-3.7–2.4)
	1986–1991	0.75	0.5 (0.2–1.2)	-2.5	-5.0 (-9.2– -0.5)	0.59	0.6 (0.3–1.4)	-3.8	-3.0 (-10–4.9)
	1991–1996	0.96	0.9 (0.4–1.8)	-0.3	-1.0 (-6.3–4.2)	0.89	1.0 (0.4–2.4)	-0.9	0.0 (-4.3–4.8)
	1996–2001	0.69	0.6 (0.3–1.0)	-4.7	-7.0 (-8.5– -4.8)	1.09	0.8 (0.5–1.4)	0.6	-1.0 (-5.3–3.2)
	2001–2004	0.83	0.7 (0.5–1.2)	-2.3	-4.0 (-9.1–1.8)	1.06	0.9 (0.6–1.5)	0.4	-1.0 (-4.4–3.2)
	P (trend)	0.83	0.92	0.97	0.45	0.08	0.57	0.15	0.84
	Pooled	0.76	0.7 (0.5–1.0)	-2.8	-4.0 (-5.6– -1.4)	0.85	0.8 (0.6–1.2)	-1.0	-1.0 (-4.8–2.5)

Notes: 95 percent confidence intervals in brackets. SRRs and SRDs compare low- and high-income tertiles. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

Chapter 20: Non-Hodgkin's Lymphoma

NHL is a heterogeneous group of malignancies originating from lymphocytes. It is divided into B-cell and T-cell neoplasms, each of which contains numerous distinguishable subtypes. Because NHL is a heterogeneous malignancy, prognosis varies considerably, and risk factors are likely to vary between subtypes. In New Zealand, there were 682 new cases of NHL diagnosed in 2005, making it the sixth most commonly registered cancer.[57]

NHL is more common among men than women. Incidence increases with increasing age, and is known to cluster within families. NHL has the dubious distinction among cancers of having one of the most rapidly rising incidence rates worldwide. Rates have increased on average 2–4 percent annually in developed countries since the early 1970s; much of this increase remains unexplained despite considerable research interest.[76]

The most established risk factors for NHL are immunosuppression, either primary (genetic) or acquired (for example through HIV/AIDS or after organ transplantation); autoimmune disorders (such as rheumatoid arthritis or systemic lupus erythematosis) and certain infectious agents (including Ebstein-Barr virus, human T-cell leukaemia/lymphoma virus type I, *Helicobacter pylori* and possibly hepatitis C). However, this combination of factors explains only a small proportion of cases. Other less well-established risk factors include exposure to some chemicals (such as chlorinated organic compounds, benzene and organic solvents), obesity and a diet high in certain meats, fat and dairy foods. Exposure to ultraviolet radiation may reduce the risk of NHL.[76]

20.1 Ethnic trends

Over the period surveyed, NHL rates for 25+ year-olds increased among European/Other by 91 percent and 108 percent for males and females respectively (p for trend both <0.01), and among Māori by 88 percent and 57 percent respectively (p for trend <0.01 and 0.15) (Figure 50 and Table 109 in Appendix 1). Pacific and Asian rates were too unstable over time to allow reliable interpretation.

Pooled over time, Māori and Pacific rates were little different from European/Other rates (Table 50). However, Asian rates were about 70 percent of European/Other rates among both males and females. There were no clear trends in NHL inequalities by ethnicity.

Figure 50: Standardised rates of non-Hodgkin's lymphoma cancer for 25+ year-olds, by ethnicity by sex

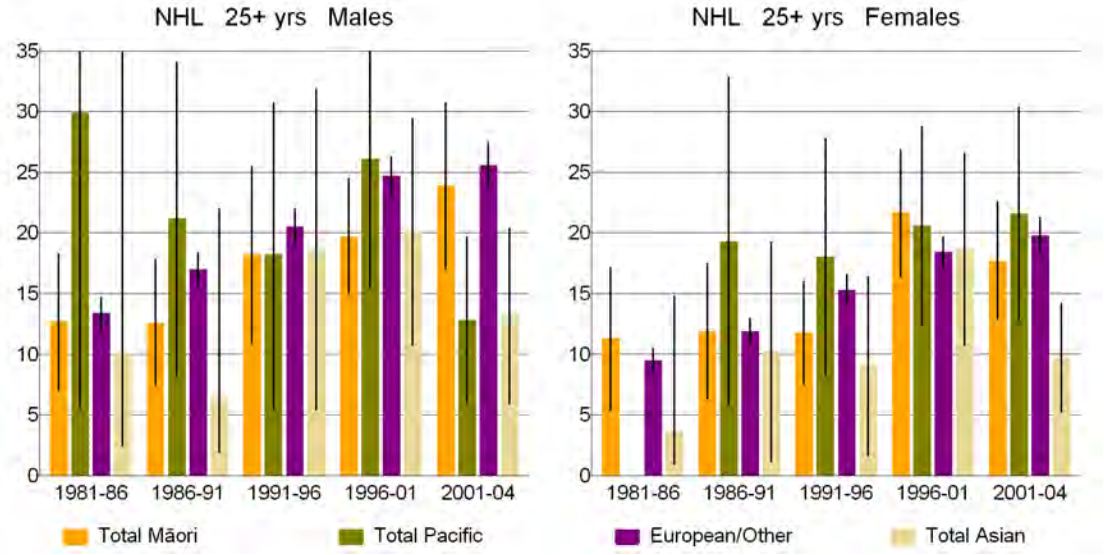


Table 50: Age-standardised rate ratios (SRR) and rate differences (SRD) of non-Hodgkin's lymphoma cancer, for Māori, Pacific and Asian compared to European/Other, by sex

Exposure NHL 25+ years	Cohort	Males		Females	
		SRR (95% CI)	SRD (95% CI)	SRR (95% CI)	SRD (95% CI)
Total Māori vs European	1981–1986	0.95 (0.60–1.50)	-0.7 (-6.6–5.1)	1.19 (0.70–2.03)	1.8 (-4.1–7.8)
	1986–1991	0.74 (0.49–1.14)	-4.3 (-9.8–1.1)	1.00 (0.62–1.62)	0.0 (-5.8–5.7)
	1991–1996	0.89 (0.59–1.33)	-2.3 (-9.7–5.1)	0.77 (0.53–1.11)	-3.6 (-8.0–0.8)
	1996–2001	0.80 (0.62–1.03)	-4.9 (-10–0.1)	1.18 (0.92–1.52)	3.3 (-2.1–8.7)
	2001–2004	0.94 (0.70–1.26)	-1.7 (-8.8–5.5)	0.89 (0.67–1.19)	-2.1 (-7.2–3.0)
	P (trend)	0.79	0.55	0.77	0.73
	Pooled	0.86 (0.73–1.01)	-2.9 (-5.6– -0.1)	1.00 (0.85–1.18)	0.0 (-2.4–2.4)
Total Pacific vs European	1981–1986	2.24 (0.42–11.98)	17 (-34–67)		
	1986–1991	1.25 (0.67–2.31)	4.2 (-8.8–17)	1.62 (0.80–3.29)	7.4 (-6.2–21)
	1991–1996	0.89 (0.44–1.79)	-2.3 (-15–10)	1.17 (0.68–2.03)	2.7 (-7.2–13)
	1996–2001	1.06 (0.70–1.60)	1.4 (-9.3–12)	1.12 (0.75–1.68)	2.2 (-6.1–11)
	2001–2004	0.50 (0.29–0.86)	-13 (-20– -5.7)	1.09 (0.72–1.65)	1.8 (-7.2–11)
	P (trend)	0.09	0.05		
	Pooled	1.11 (0.66–1.86)	2.1 (-9.4–14)	1.23 (0.96–1.56)	3.6 (-1.1–8.3)
Total Asian vs European	1981–1986	0.75 (0.18–3.13)	-3.4 (-18–11)	0.39 (0.10–1.57)	-5.8 (-11– -0.6)
	1986–1991	0.38 (0.11–1.30)	-11 (-19– -2.6)	0.85 (0.35–2.09)	-1.7 (-11–7.4)
	1991–1996	0.91 (0.44–1.86)	-1.9 (-15–12)	0.59 (0.26–1.34)	-6.3 (-14–1.2)
	1996–2001	0.81 (0.51–1.31)	-4.6 (-14–4.9)	1.02 (0.66–1.57)	0.3 (-7.8–8.4)
	2001–2004	0.51 (0.29–0.90)	-12 (-20– -4.9)	0.49 (0.30–0.78)	-10 (-15– -5.4)
	P (trend)	0.58	0.54	0.78	0.45
	Pooled	0.69 (0.48–0.99)	-6.3 (-11– -1.3)	0.70 (0.51–0.96)	-4.5 (-7.7– -1.2)

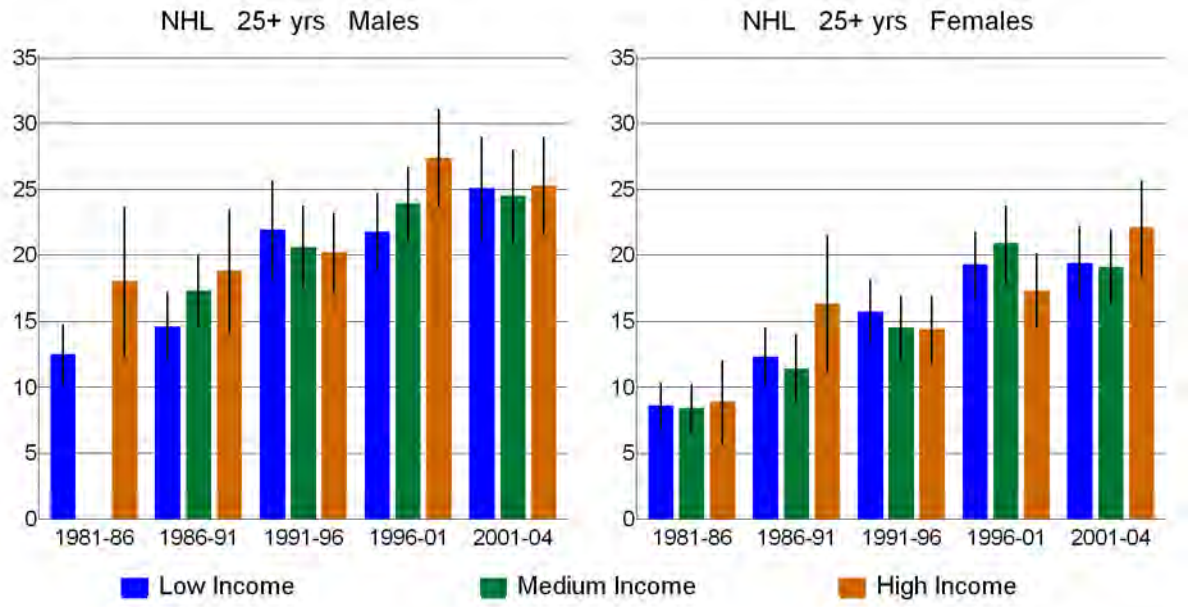
Notes: 95 percent confidence intervals in brackets. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

20.2 Socioeconomic trends

Within income groups, rates of NHL tended to double over time (p for trend <0.05 in most instances; Figure 51 and Table 110 in Appendix 1).

Pooled over time, there was no notable difference by income in NHL rates (Table 51). There were no statistically significant trends in either absolute or relative inequalities over time.

Figure 51: Standardised rates of non-Hodgkin's lymphoma cancer for 25+ year-olds, by income by sex



Note: A spuriously high age- and ethnicity-standardised NHL rate was observed among medium-income males in 1981–1986, due to the process of age and ethnicity standardisation (see Methods for discussion of this): this rate has therefore been suppressed.

Table 51: Age- and ethnicity-standardised income rate ratios (SRR), rate differences (SRD), relative indices of inequality (RII) and slope indices of inequality (SII) of non-Hodgkin's lymphoma cancer, by sex

Age group	Cohort	Males				Females			
		Relative inequalities		Absolute inequalities		Relative inequalities		Absolute inequalities	
		SRR	RII (95% CI)	SRD	SII (95% CI)	SRR	RII (95% CI)	SRD	SII (95% CI)
NHL									
25+ years	1981–1986	0.69		-5.6	-6.0 (-13–1.6)	0.97	0.9 (0.5–1.5)	-0.3	-1.0 (-5.2–3.2)
	1986–1991	0.78	0.9 (0.6–1.3)	-4.2	-2.0 (-10–6.6)	0.76	0.9 (0.5–1.4)	-4.0	-2.0 (-7.6–3.5)
	1991–1996	1.08	0.9 (0.7–1.4)	1.7	-1.0 (-7.0–4.5)	1.09	1.2 (0.7–1.8)	1.4	2.0 (-5.5–9.5)
	1996–2001	0.80	0.7 (0.5–0.9)	-5.6	-9.0 (-11– -6.9)	1.11	1.1 (0.8–1.5)	2.0	1.0 (-2.8–5.2)
	2001–2004	0.99	0.9 (0.7–1.3)	-0.2	-2.0 (-3.1– -0.6)	0.88	0.9 (0.7–1.3)	-2.6	-1.0 (-6.0–3.3)
	P (trend)	0.51		0.59	0.37	0.99	0.66	0.90	0.55
	Pooled	0.87		-2.9	-5.0 (-9.2– -0.4)	0.96	1.0 (0.8–1.2)	-0.6	0.0 (-2.4–1.8)

Notes: 95 percent confidence intervals in brackets. SRRs and SRDs compare low- and high-income tertiles. Underlying non-linear trends mean the p for trend value must be interpreted cautiously. A spuriously high age- and ethnicity-standardised NHL rate was observed for medium-income males in 1981–1986, due to the process of age and ethnicity standardisation (see Methods for discussion of this). The rate has therefore been suppressed, meaning that none of the following could be reliably calculated: an RII for 1981–1986, a trend statistic for the RII and a pooled RII over time.

Chapter 21: Oesophageal Cancer

In 2005 there were 219 cases of oesophageal cancer diagnosed in New Zealand, the majority (148) among men.[57] Oesophageal cancer has very poor prognosis; about 12 percent of people in New Zealand diagnosed with oesophageal cancer are alive after five years.[58] There are two main types of oesophageal cancer: squamous cell carcinoma and adenocarcinoma. Internationally squamous cancers comprise the majority of oesophageal cancers. However, in a number of developed countries, including New Zealand, there has been a dramatic rise in the proportion of adenocarcinoma oesophageal cancers – among white males in the United States, adenocarcinoma is now more common than squamous cell carcinoma.[77]

The risk of oesophageal cancer increases with age, and it is more common in men than women. Ethnic origin is an important risk factor: there are regions of the world (such as China) with rates that are considerably higher. Family history of oesophageal cancer is a risk factor for a small proportion of cases, suggesting that in some families there is an inherited susceptibility.[77]

For squamous cell carcinoma there is a clear association between heavy alcohol use, tobacco smoking and risk of incidence. There is probable evidence that certain elements of diet are protective against squamous oesophageal cancer: specifically consumption of non-starchy vegetables, fruits, and food containing beta carotene and vitamin C.[60] HPV infection has been associated with squamous oesophageal cancer, and some occupations are associated with an increased risk; however, the exact occupational exposures causing risk are unclear.[77]

Risk factors for adenocarcinoma of the oesophagus are different from those for squamous oesophageal cancer. The strongest risk factor for oesophageal adenocarcinoma is gastro-oesophageal reflux.[77] Increasing BMI is also a strong risk factor for this type of oesophageal cancer, possibly acting via reflux.[60] Smoking increases the risk of this cancer, although to a much lesser extent than it does squamous cell cancer; alcohol is not implicated. Infection with *Helicobacter pylori* may be a risk factor, although this is uncertain.[77]

21.1 Ethnic trends

Oesophageal cancer rates among 25+ year-olds showed no clear trend over time in any of the ethnic groups, for either sex (Figure 52 and Table 111 in Appendix 1).

Pooled over time, Māori male rates were 1.46 times European/Other rates (95 percent confidence interval 1.20–1.76), but there was no equivalent difference among females (Table 52). Asian male and Pacific and Asian female rates were approximately half those of European/Other. There were no clear trends over time in inequalities.

Figure 52: Standardised rates of oesophageal cancer for 25+ year-olds, by ethnicity by sex

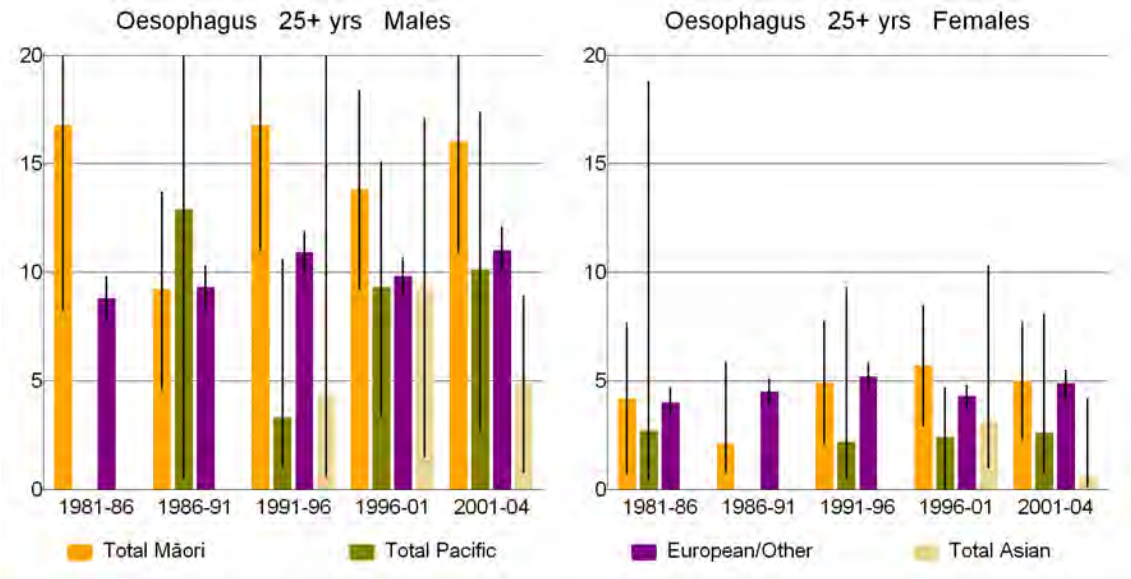


Table 52: Age-standardised rate ratios (SRR) and rate differences (SRD) of oesophageal cancer, for Māori, Pacific and Asian compared to European/Other, by sex

Exposure Oesophagus 25+ years	Cohort	Males		Females	
		SRR (95% CI)	SRD (95% CI)	SRR (95% CI)	SRD (95% CI)
Total Māori vs European	1981–1986	1.91 (1.14–3.21)	8.0 (-0.6–17)	1.04 (0.45–2.40)	0.2 (-3.4–3.7)
	1986–1991	0.98 (0.59–1.64)	-0.1 (-4.8–4.5)	0.46 (0.16–1.31)	-2.4 (-4.7– -0.2)
	1991–1996	1.54 (1.08–2.20)	5.9 (0.0–12)	0.95 (0.52–1.72)	-0.3 (-3.2–2.7)
	1996–2001	1.41 (1.00–2.00)	4.0 (-0.7–8.7)	1.35 (0.81–2.24)	1.5 (-1.4–4.3)
	2001–2004	1.45 (1.04–2.01)	4.9 (-0.2–10)	1.03 (0.59–1.80)	0.1 (-2.7–2.9)
	P (trend)	0.74	0.64	0.51	0.35
	Pooled	1.46 (1.20–1.76)	4.5 (1.8–7.3)	0.95 (0.71–1.29)	-0.2 (-1.5–1.1)
Total Pacific vs European	1981–1986			0.66 (0.09–4.68)	-1.4 (-6.6–3.8)
	1986–1991	1.39 (0.53–3.66)	3.6 (-8.9–16)		
	1991–1996	0.30 (0.09–0.98)	-7.6 (-12– -3.6)	0.42 (0.10–1.81)	-3.0 (-6.2–0.2)
	1996–2001	0.95 (0.50–1.80)	-0.5 (-6.4–5.5)	0.56 (0.20–1.52)	-1.9 (-4.3–0.5)
	2001–2004	0.91 (0.44–1.91)	-1.0 (-8.4–6.5)	0.53 (0.17–1.68)	-2.3 (-5.3–0.8)
	Pooled	0.86 (0.57–1.31)	-1.4 (-5.0–2.3)	0.54 (0.28–1.05)	-2.1 (-3.8– -0.5)
Total Asian vs European	1991–1996	0.39 (0.06–2.80)	-6.6 (-15–1.9)		
	1996–2001	0.95 (0.41–2.21)	-0.5 (-8.3–7.4)	0.73 (0.22–2.43)	-1.1 (-4.9–2.6)
	2001–2004	0.44 (0.19–1.02)	-6.2 (-10– -2.0)	0.12 (0.02–0.86)	-4.3 (-5.6– -3.0)
	Pooled	0.60 (0.35–1.01)	-4.3 (-7.6– -1.0)	0.44 (0.23–0.85)	-2.5 (-3.9– -1.2)

Notes: 95 percent confidence intervals in brackets. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

21.2 Socioeconomic trends

Age- and ethnicity-standardised rates of oesophageal cancer increased by 50 percent among low-income males (p for trend 0.08) and by 38 percent among medium-income females (p for trend 0.04) over the period surveyed (Figure 53 and Table 112 in Appendix 1). There were no notable trends over time in rates in the four other income by sex groups.

Pooled over time, rates were up to twice as high among low- compared to high-income males, but little different by income among females (Table 53). There was some evidence of widening income inequalities in oesophageal cancer incidence over time among males. For example, the SII increased from 1.0 to 10 per 100,000 (p for trend 0.08).

Figure 53: Standardised rates of oesophageal cancer for 25+ year-olds, by income by sex

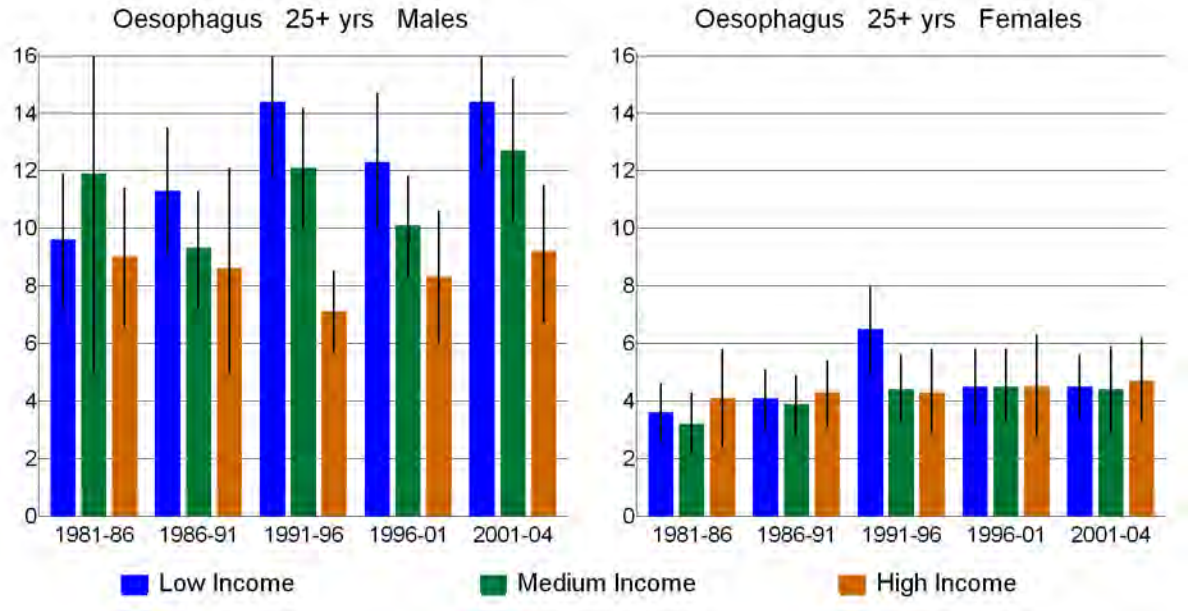


Table 53: Age- and ethnicity-standardised income rate ratios (SRR), rate differences (SRD), relative indices of inequality (RII) and slope indices of inequality (SII) of oesophageal cancer, by sex

Age group	Cohort	Males				Females			
		Relative inequalities		Absolute inequalities		Relative inequalities		Absolute inequalities	
		SRR	RII (95% CI)	SRD	SII (95% CI)	SRR	RII (95% CI)	SRD	SII (95% CI)
Oesophagus									
25+ years	1981–1986	1.07	1.1 (0.4–2.9)	0.6	1.0 (-9.1–11)	0.87	0.6 (0.3–1.4)	-0.5	-2.0 (-5.5–2.1)
	1986–1991	1.31	1.8 (1.0–3.2)	2.7	5.0 (1.7–8.8)	0.96	0.9 (0.5–1.6)	-0.2	0.0 (-2.1–1.1)
	1991–1996	2.02	4.1 (0.8–20.4)	7.3	16 (2.7–28)	1.49	1.5 (0.9–2.7)	2.1	2.0 (-1.3–5.2)
	1996–2001	1.49	2.2 (1.3–3.7)	4.0	8.0 (4.7–11)	1.00	1.0 (0.5–1.9)	0.0	0.0 (-2.6–2.4)
	2001–2004	1.58	2.5 (1.5–4.2)	5.3	10 (6.4–13)	0.94	1.0 (0.5–1.9)	-0.3	0.0 (-0.7–0.8)
	P (trend)	0.50	0.11	0.26	0.08	0.94	0.50	0.88	0.83
	Pooled	1.46	2.0 (1.4–3.0)	3.9	8.0 (4.2–11)	1.06	1.0 (0.7–1.3)	0.3	0.0 (-1.6–1.2)

Notes: 95 percent confidence intervals in brackets. SRRs and SRDs compare low- and high-income tertiles. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

Chapter 22: Ovarian Cancer

Ovarian cancer is the fourth most common cause of cancer death among New Zealand women: there were 190 deaths in 2005, and 301 new cancers diagnosed.[57] Ovarian cancer has a relatively poor prognosis. Most cancers present late, and fewer than half of those diagnosed survive for five years beyond diagnosis.[58] Ovarian tumours are classified according to their tissue of origin as epithelial (90 percent), sex-cord stromal (6 percent) or germ-cell (3 percent). Epithelial tumours can be serous, mucinous or endometrioid, and there is some evidence of different etiology in different subtypes. Tumour subtype incidence varies by age; in women under 40 years germ-cell tumours account for 90 percent of ovarian cancers.[78]

The risk of ovarian cancer increases with age, and is rare in women under 40 years old. A family history of ovarian cancer also raises the risk, and about 10 percent of ovarian cancers are attributable to breast-ovarian cancer syndrome (associated with BRCA 1 and 2 gene mutations).[78]

The causes of ovarian cancer are not well understood. Not having children increases the risk, while pregnancy and breastfeeding have a protective effect, but the mechanisms are unclear. The number of ovulations in a woman's lifetime is thought to play a role, as are hormonal factors. The use of oral contraceptives has a protective effect, increasing with duration of use. Post-menopausal hormone replacement therapy appears to increase the risk of ovarian cancer. Environmental factors such as high-dose radiation and asbestos exposure can also be important risk factors in some contexts.[78]

22.1 Ethnic trends

There were no clear trends over time in incidence rates among those aged 25+ years within ethnic groups (Figure 54 and Table 113 in Appendix 1). Data was too sparse to stratify further by age group.

Pooled over time, there were no differences in rates between Māori, Asian and European/Other. Pacific females had a 1.35 times greater rate than European/Other (95 percent confidence interval 1.10–1.66); however, Pacific and European/Other rates appeared to converge over time (the SRR decreasing from 1.61 to 1.02 over the period; p for trend 0.09) (Table 54).

Figure 54: Standardised rates of ovarian cancer for 25+ year-olds, by ethnicity

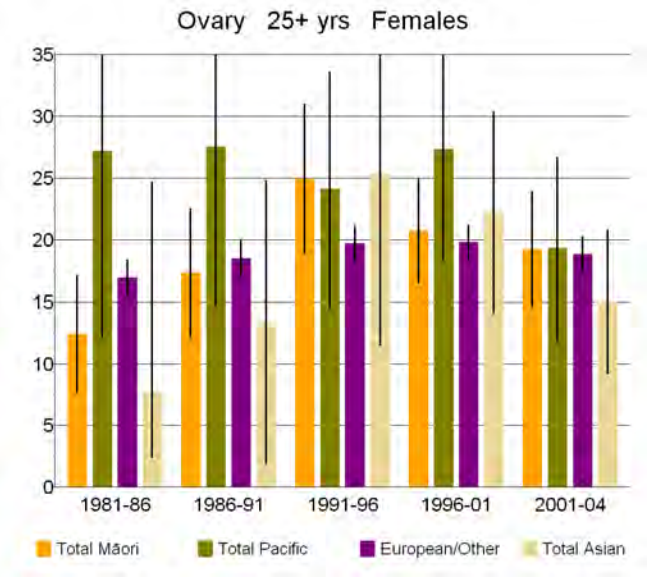


Table 54: Age-standardised rate ratios (SRR) and standardised rate differences (SRD) of ovarian cancer, for Māori, Pacific and Asian compared to European/Other

Exposure Ovary 25+ years	Cohort	Females	
		SRR (95% CI)	SRD (95% CI)
Total Māori vs European	1981–1986	0.73 (0.50–1.08)	-4.5 (-9.4–0.4)
	1986–1991	0.94 (0.69–1.28)	-1.2 (-6.6–4.2)
	1991–1996	1.27 (0.98–1.63)	5.3 (-1.0–12)
	1996–2001	1.05 (0.84–1.30)	0.9 (-3.6–5.4)
	2001–2004	1.02 (0.79–1.32)	0.4 (-4.5–5.3)
	P (trend)	0.56	0.29
	Pooled	1.01 (0.89–1.14)	0.1 (-2.2–2.5)
Total Pacific vs European	1981–1986	1.61 (0.92–2.81)	10 (-4.9–25)
	1986–1991	1.49 (0.93–2.39)	9.0 (-3.9–22)
	1991–1996	1.22 (0.82–1.83)	4.4 (-5.2–14)
	1996–2001	1.38 (0.98–1.93)	7.5 (-1.6–17)
	2001–2004	1.02 (0.69–1.52)	0.4 (-7.2–8.0)
	P (trend)	0.09	0.09
	Pooled	1.35 (1.10–1.66)	6.6 (1.5–12)
Total Asian vs European	1981–1986	0.45 (0.14–1.47)	-9.2 (-18– -0.1)
	1986–1991	0.72 (0.30–1.71)	-5.2 (-17–6.4)
	1991–1996	1.28 (0.74–2.22)	5.6 (-8.2–19)
	1996–2001	1.12 (0.77–1.63)	2.4 (-5.9–11)
	2001–2004	0.80 (0.54–1.18)	-3.8 (-9.8–2.1)
	P (trend)	0.92	0.48
	Pooled	0.90 (0.68–1.18)	-2.0 (-6.6–2.7)

Notes: 95 percent confidence intervals in brackets. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

22.2 Socioeconomic trends

Age- and ethnicity-standardised rates of ovarian cancer in those aged 25+ years increased by 24 percent and 32 percent among low- and medium-income tertiles over the period surveyed (p for trend 0.03 and 0.07 respectively), but were unstable over time among high-income females (Figure 55 and Table 114 in Appendix 1). There was a tendency for rates to increase over time among low- and middle-income groups at older ages (Figure 56).

Pooled over time, there was no difference in ovarian cancer rates by income, across all age groups. However, there was some evidence among females older than 45 of increasing rates over time among low-income females (Table 55).

Figure 55: Standardised rates of ovarian cancer for 25+ year-olds, by income

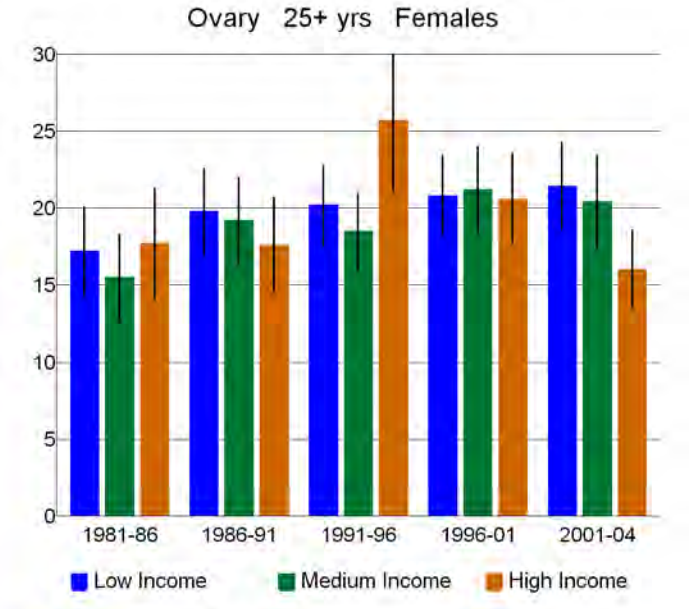


Figure 56: Standardised rates of ovarian cancer, by income by age group

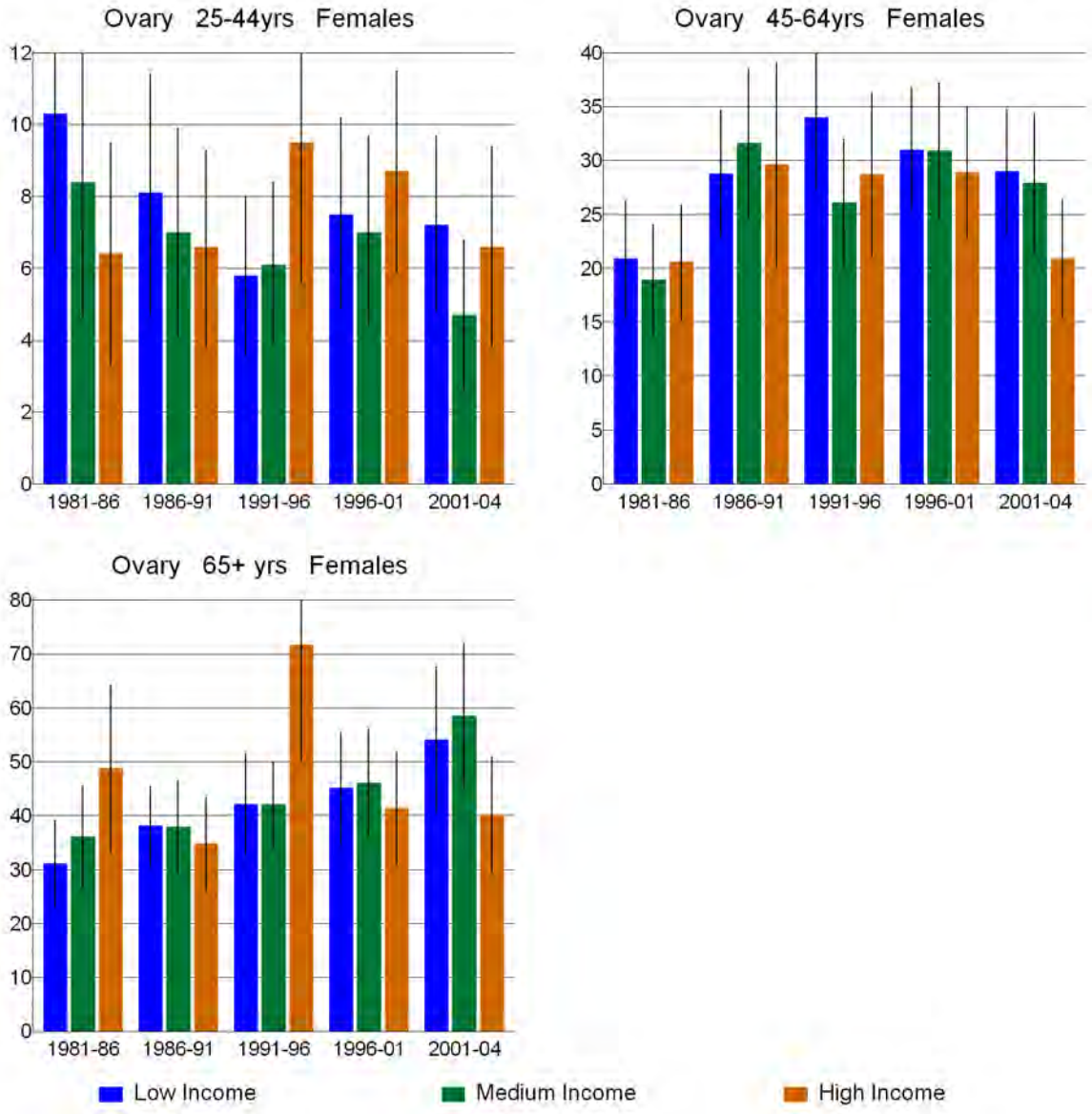


Table 55: Age- and ethnicity-standardised income rate ratios (SRR), rate differences (SRD), relative indices of inequality (RII) and slope indices of inequality (SII) of ovarian cancer

Age group	Cohort	Females			
		Relative inequalities		Absolute inequalities	
		SRR	RII (95% CI)	SRD	SII (95% CI)
Ovary					
25+ years	1981–1986	0.97	1.2 (0.8–1.7)	-0.6	3.0 (-5.0–10)
	1986–1991	1.12	1.2 (0.9–1.7)	2.1	4.0 (-7.9–16)
	1991–1996	0.78	0.6 (0.5–0.9)	-5.5	-9.0 (-18– -1.0)
	1996–2001	1.01	1.1 (0.8–1.4)	0.2	2.0 (-3.0–6.6)
	2001–2004	1.34	1.6 (1.2–2.2)	5.4	9.0 (-3.5–21)
	P (trend)	0.40	0.67	0.42	0.86
	Pooled	1.01	1.1 (0.9–1.2)	0.1	1.0 (-2.7–4.9)
25–44 years	1981–1986	1.60	3.9 (0.9–15.9)	3.9	10 (4.8–15)
	1986–1991	1.23	1.5 (0.6–3.6)	1.5	3.0 (-3.4–9.1)
	1991–1996	0.61	0.4 (0.1–1.2)	-3.7	-6.0 (-11– -2.1)
	1996–2001	0.86	1.0 (0.5–2.0)	-1.2	0.0 (-4.6–4.1)
	2001–2004	1.09	1.3 (0.6–3.0)	0.6	2.0 (-4.2–7.4)
	P (trend)	0.33	0.58	0.47	0.36
	Pooled	1.03	1.2 (0.9–1.8)	0.2	2.0 (-1.5–4.7)
45–64 years	1981–1986	1.01	1.0 (0.6–1.8)	0.3	1.0 (-8.0–9.4)
	1986–1991	0.97	1.1 (0.7–1.8)	-0.8	3.0 (-25–31)
	1991–1996	1.18	1.0 (0.6–1.6)	5.3	0.0 (-15–15)
	1996–2001	1.07	1.3 (0.9–2.0)	2.1	8.0 (-1.9–18)
	2001–2004	1.39	1.5 (0.9–2.5)	8.2	11 (-6.2–28)
	P (trend)	0.14	0.08	0.09	0.05
	Pooled	1.11	1.2 (1.0–1.5)	2.7	5.0 (-5.2–14)
65+ years	1981–1986	0.64	0.6 (0.3–1.0)	-18	-22 (-45–0.8)
	1986–1991	1.09	0.9 (0.6–1.5)	3.3	-3.0 (-21–16)
	1991–1996	0.59	0.5 (0.3–0.9)	-30	-31 (-63–0.6)
	1996–2001	1.09	1.0 (0.6–1.5)	3.6	-2.0 (-35–30)
	2001–2004	1.35	1.4 (0.8–2.3)	14	15 (-26–55)
	P (trend)	0.25	0.20	0.34	0.36
	Pooled	0.87	0.8 (0.6–1.0)	-6.2	-9.0 (-24–7.2)

Notes: 95 percent confidence intervals in brackets. SRRs and SRDs compare low- and high-income tertiles. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

Chapter 23: Pancreatic Cancer

Pancreatic cancer is a relatively uncommon cancer with a poor prognosis. Most (95 percent of) pancreatic tumours arise in the exocrine part of the pancreas. In 2005, there were 403 new cases of pancreatic cancer diagnosed, and 353 deaths, making pancreatic cancer the ninth most common cancer diagnosed but the fifth most common cause of cancer death.[57]

Pancreatic cancer is slightly more common among males. Risk increases with increasing age, and those with a family history of pancreatic cancer have a considerably increased risk themselves. Some pancreatic cancer is associated with particular cancer susceptibility syndromes such as hereditary non-polyposis colon cancer, familial breast cancer (with BRCA 2 alteration) and familial melanoma.[79]

There are few risk factors that are consistently shown to be associated with pancreatic cancer. Smoking is the most established of these. Obesity, type II diabetes, pancreatitis (particularly hereditary pancreatitis) and possibly gallstones and cholecystectomy may confer a moderate increase in risk. A diet rich in vegetables and fruits, and physical activity may be protective.[79]

23.1 Ethnic trends

Pancreatic cancer rates for 25+ year-olds were unstable over time within ethnic groups. However, there was some evidence of a decrease in Pacific female rates (p for trend 0.06) and an increase in Māori female rates (p for trend 0.02) (Figure 57 and Table 115 in Appendix 1).

Pooled over time, among males Māori and Pacific rates were about 50 percent greater than European/Other rates, and Asian rates one-third less than European/Other (Table 56). Among females, Māori rates were 51 percent greater, and Pacific rates 24 percent greater, than European/Other. There were no clear trends in these inequalities over time.

Figure 57: Standardised rates of pancreatic cancer for 25+ year-olds, by ethnicity by sex

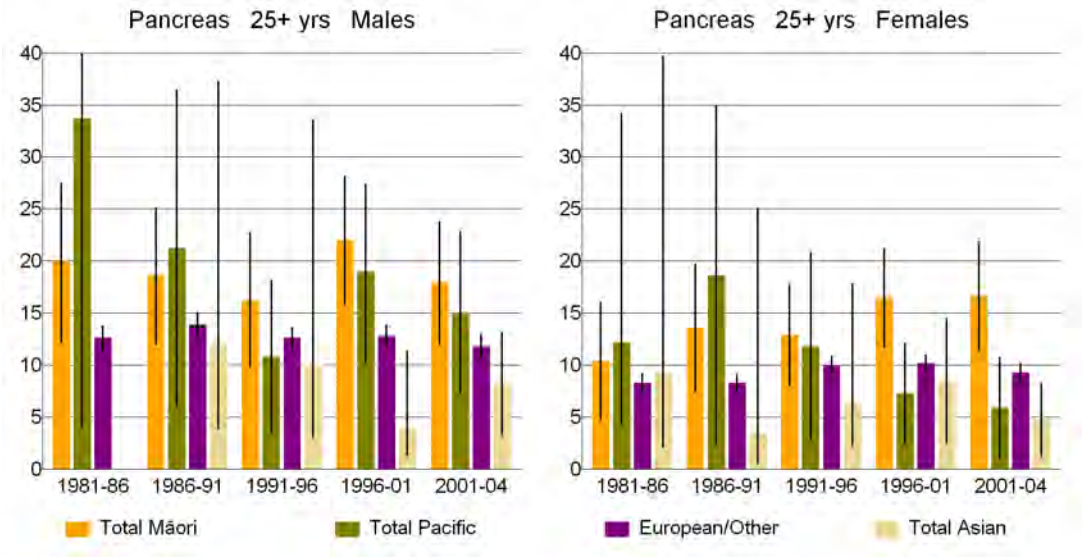


Table 56: Age-standardised rate ratios (SRR) and rate differences (SRD) of pancreatic cancer, for Māori, Pacific and Asian compared to European/Other, by sex

Exposure Pancreas 25+ years	Cohort	Males		Females	
		SRR (95% CI)	SRD (95% CI)	SRR (95% CI)	SRD (95% CI)
Total Māori vs European	1981–1986	1.58 (1.06–2.35)	7.3 (-0.4–15)	1.25 (0.72–2.19)	2.1 (-3.7–7.8)
	1986–1991	1.34 (0.93–1.92)	4.7 (-2.0–11)	1.63 (1.03–2.59)	5.3 (-0.9–11)
	1991–1996	1.29 (0.86–1.93)	3.6 (-2.9–10)	1.29 (0.87–1.91)	2.9 (-2.1–7.9)
	1996–2001	1.71 (1.27–2.30)	9.1 (2.8–16)	1.62 (1.20–2.18)	6.3 (1.5–11)
	2001–2004	1.51 (1.07–2.13)	6.1 (0.0–12)	1.80 (1.30–2.50)	7.4 (2.1–13)
	P (trend)	0.62	0.73	0.15	0.09
	Pooled	1.48 (1.26–1.74)	6.2 (3.2–9.2)	1.51 (1.26–1.80)	4.7 (2.2–7.1)
Total Pacific vs European	1981–1986	2.67 (1.10–6.49)	21 (-8.6–51)	1.47 (0.52–4.14)	3.9 (-8.7–17)
	1986–1991	1.53 (0.74–3.14)	7.3 (-8.0–23)	2.24 (0.93–5.41)	10 (-6.0–27)
	1991–1996	0.86 (0.44–1.70)	-1.7 (-9.1–5.6)	1.18 (0.55–2.53)	1.8 (-7.2–11)
	1996–2001	1.47 (0.92–2.33)	6.0 (-2.6–15)	0.72 (0.37–1.39)	-2.9 (-7.8–2.0)
	2001–2004	1.27 (0.75–2.14)	3.2 (-4.6–11)	0.64 (0.28–1.47)	-3.3 (-8.3–1.6)
	P (trend)	0.33	0.95	0.10	0.08
	Pooled	1.58 (1.09–2.29)	7.4 (-0.1–15)	1.24 (0.81–1.91)	2.2 (-2.7–7.1)
Total Asian vs European	1981–1986			1.11 (0.25–4.80)	0.9 (-13–14)
	1986–1991	0.86 (0.27–2.69)	-2.0 (-16–12)	0.42 (0.06–3.03)	-4.8 (-12–2.2)
	1991–1996	0.79 (0.23–2.68)	-2.6 (-15–9.5)	0.62 (0.22–1.78)	-3.8 (-10–2.8)
	1996–2001	0.30 (0.10–0.89)	-9.0 (-13– -4.7)	0.83 (0.41–1.70)	-1.7 (-7.7–4.4)
	2001–2004	0.69 (0.38–1.28)	-3.6 (-8.7–1.5)	0.51 (0.24–1.09)	-4.5 (-8.2– -0.8)
	P (trend)			0.33	0.58
	Pooled	0.66 (0.39–1.13)	-4.3 (-8.9–0.2)	0.71 (0.40–1.26)	-2.7 (-6.4–1.1)

Notes: 95 percent confidence intervals in brackets. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

23.2 Socioeconomic trends

Pancreatic cancer rates among 25+ year-olds increased by 44 percent over the period surveyed among females in the low-income tertile (p for trend 0.01), but there were no notable trends in the other income tertiles by sex groups (Figure 58 and Table 116 of Appendix 1).

Pooled over time, there were no notable differences in pancreatic cancer incidence by income (Table 57). Due to the increasing rates among low-income females, there was some evidence of widening inequalities among females. For example, the RII increased from 0.8 to 1.6 (p for trend 0.09).

Figure 58: Standardised rates of pancreatic cancer for 25+ year-olds, by income by sex

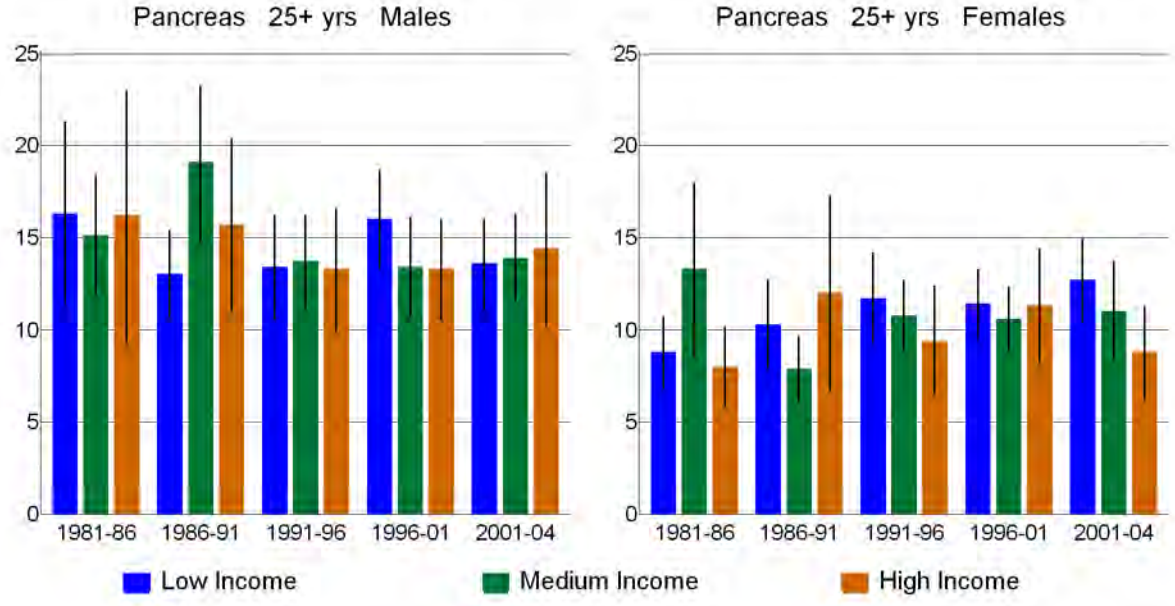


Table 57: Age- and ethnicity-standardised income rate ratios (SRR), rate differences (SRD), relative indices of inequality (RII) and slope indices of inequality (SII) of pancreatic cancer, by sex

Age group	Cohort	Males				Females			
		Relative inequalities		Absolute inequalities		Relative inequalities		Absolute inequalities	
		SRR	RII (95% CI)	SRD	SII (95% CI)	SRR	RII (95% CI)	SRD	SII (95% CI)
Pancreas									
25+ years	1981–1986	1.01	1.3 (0.7–2.6)	0.1	4.0 (-4.4–13)	1.10	0.8 (0.5–1.5)	0.8	-2.0 (-5.9–2.2)
	1986–1991	0.83	0.7 (0.4–1.2)	-2.7	-5.0 (-15–4.2)	0.85	0.7 (0.3–1.6)	-1.8	-4.0 (-18–11)
	1991–1996	1.01	1.1 (0.6–1.8)	0.2	1.0 (-2.9–4.2)	1.25	1.5 (0.8–2.8)	2.3	4.0 (-2.2–11)
	1996–2001	1.20	1.4 (0.9–2.2)	2.7	5.0 (1.2–8.2)	1.01	1.2 (0.8–1.8)	0.1	2.0 (-0.2–3.6)
	2001–2004	0.94	0.9 (0.6–1.4)	-0.8	-2.0 (-7.1–3.2)	1.45	1.6 (1.0–2.6)	3.9	5.0 (0.0–10)
	P (trend)	0.53	0.90	0.52	0.97	0.34	0.09	0.31	0.06
	Pooled	0.99	1.0 (0.8–1.3)	-0.1	1.0 (-2.5–3.6)	1.09	1.0 (0.8–1.4)	0.9	0.0 (-2.7–3.5)

Notes: 95 percent confidence intervals in brackets. SRRs and SRDs compare low- and high-income tertiles. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

Chapter 24: Prostate cancer

Prostate cancer is the most common cancer diagnosed in men: 2471 new cases were detected in 2005.[57] Almost all prostate cancers are adenocarcinomas, which arise from glandular epithelial cells in the prostate gland. The introduction of the prostate-specific antigen (PSA) test in the early 1990s in New Zealand and internationally has resulted in a large increase in the number of cases of prostate cancer diagnosed. This makes interpreting time trends in the incidence of this cancer problematic.[80]

Age is the most well-documented risk factor for prostate cancer: rates of incidence in men over the age of 65 are10 times those in men aged 45–54. Comparisons between countries show that place of birth is strongly related to risk of prostate cancer, and migrants who move from low-risk to high-risk countries have an increased risk compared to men in their home countries. Finally, men with a family history of prostate cancer have a higher risk of developing prostate cancer themselves (this mainly applies to men who develop cancer under the age of 70). For the population in general (that is, men without a strong family history of prostate cancer), genetic predisposition is thought to play an important, if relatively modest, part in cancer risk.[80]

Environmental risk factors in prostate cancer are clearly important; however, epidemiological studies have largely failed to identify specific risk factors, despite extensive research in recent decades. There is evidence that diets high in calcium probably increase risk of prostate cancer, while consumption of foods containing lycopene and selenium are protective.[60] Endogenous hormones are suspected to play a role; however, the precise hormone and proposed mechanism of action are not clear. BMI is not associated with prostate cancer risk; neither are height, sexually transmitted infections, physical activity, ionising radiation, vasectomy, tobacco use or alcohol consumption. Occupational exposures have not been consistently associated with prostate cancer.[80]

24.1 Ethnic trends

Prostate cancer incidence among 25+ year-olds increased by between 193 percent (among European/Other) and 726 percent (among Asian people) from 1981–1986 to 2001–2004 (p for trend all 0.02 or less) (Figure 59 and Table 117 in Appendix 1). These percentage increases were greater in younger age groups (Figure 60). Of particular note is the fact that Māori and European/Other rates increased in unison. As noted above, the introduction of PSA testing in the late 1980s and early 1990s makes interpretation of these trends problematic.

Pooled over time, Māori rates for 25+ year-olds were 92 percent of European/Other rates (95 percent confidence interval 0.86–0.98), Pacific rates were not statistically significantly different and Asian rates were less than half European/Other rates (Table 58).

Figure 59: Standardised rates of prostate cancer for 25+ year-olds, by ethnicity

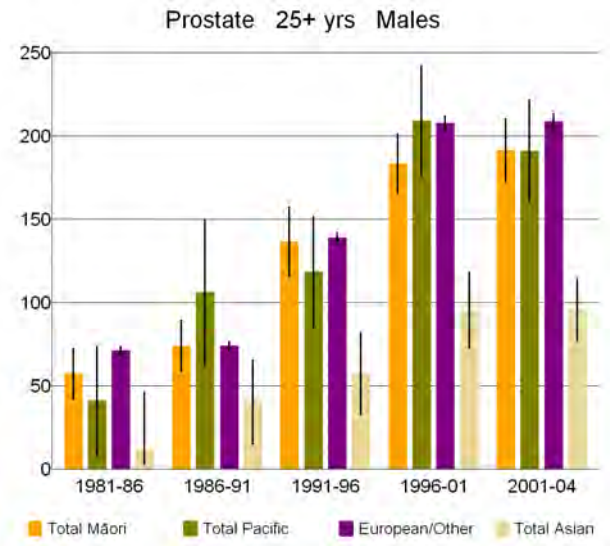


Figure 60: Standardised rates of prostate cancer, by ethnicity by age group

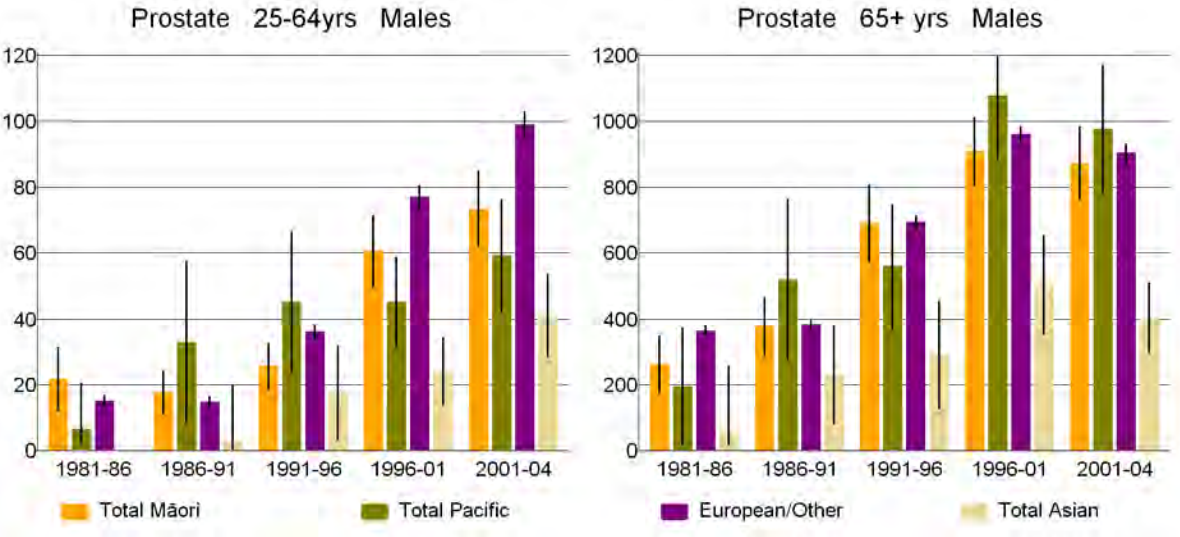


Table 58: Age-standardised rate ratios (SRR) of prostate cancer, for Māori, Pacific and Asian compared to European/Other

Exposure Prostate Total ethnicity	Cohort	25+ years SRR (95% CI)	25–64 years SRR (95% CI)	65+ years SRR (95% CI)
Males				
Total Māori vs European	1981–1986	0.81 (0.61–1.06)	1.44 (0.91–2.28)	0.72 (0.52–1.00)
	1986–1991	1.00 (0.81–1.24)	1.20 (0.81–1.76)	0.99 (0.78–1.25)
	1991–1996	0.98 (0.84–1.15)	0.71 (0.54–0.94)	1.00 (0.84–1.18)
	1996–2001	0.88 (0.80–0.98)	0.79 (0.65–0.95)	0.95 (0.84–1.06)
	2001–2004	0.92 (0.83–1.02)	0.74 (0.63–0.87)	0.97 (0.85–1.10)
	P (trend)	0.85	0.11	0.51
	Pooled	0.92 (0.86–0.98)	0.83 (0.74–0.93)	0.94 (0.87–1.01)
Total Pacific vs European	1981–1986	0.58 (0.26–1.29)	0.43 (0.13–1.37)	0.53 (0.21–1.34)
	1986–1991	1.43 (0.95–2.17)	2.22 (1.04–4.72)	1.36 (0.85–2.18)
	1991–1996	0.85 (0.64–1.13)	1.25 (0.78–2.01)	0.81 (0.57–1.13)
	1996–2001	1.01 (0.86–1.18)	0.59 (0.43–0.79)	1.12 (0.93–1.35)
	2001–2004	0.91 (0.78–1.08)	0.60 (0.45–0.80)	1.08 (0.88–1.32)
	P (trend)	0.57	0.22	0.76
	Pooled	0.95 (0.84–1.08)	0.80 (0.64–1.00)	1.00 (0.87–1.15)
Total Asian vs European	1981–1986	0.16 (0.04–0.65)		0.18 (0.04–0.70)
	1986–1991	0.54 (0.29–1.02)	0.19 (0.03–1.34)	0.60 (0.31–1.16)
	1991–1996	0.41 (0.27–0.64)	0.48 (0.21–1.11)	0.42 (0.24–0.74)
	1996–2001	0.46 (0.36–0.59)	0.31 (0.20–0.48)	0.52 (0.39–0.71)
	2001–2004	0.46 (0.38–0.56)	0.41 (0.31–0.56)	0.45 (0.34–0.58)
	P (trend)	0.72		0.79
	Pooled	0.43 (0.36–0.51)	0.37 (0.29–0.48)	0.45 (0.37–0.56)

Notes: 95 percent confidence intervals in brackets. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

Table 59: Age-standardised rate differences (SRD) of prostate cancer, for Māori, Pacific and Asian compared to European/Other

Exposure Prostate Total ethnicity	Cohort	25+ years SRD (95% CI)	25–64 years SRD (95% CI)	65+ years SRD (95% CI)
Males				
Total Māori vs European	1981–1986	-14 (-30–1.8)	6.6 (-3.3–17)	-102 (-190– -15)
	1986–1991	0.1 (-16–16)	2.9 (-3.9–9.7)	-5.6 (-96–85)
	1991–1996	-2.3 (-24–19)	-11 (-18– -3.2)	-3.3 (-123–116)
	1996–2001	-24 (-43– -5.7)	-16 (-28– -5.1)	-53 (-160–55)
	2001–2004	-18 (-37–2.3)	-26 (-38– -13)	-30 (-145–85)
Total Pacific vs European	1981–1986	-30 (-64–3.1)	-8.7 (-16– -1.0)	-170 (-350–9.0)
	1986–1991	32 (-12–76)	18 (-6.5–43)	138 (-106–382)
	1991–1996	-20 (-54–13)	9.0 (-13–31)	-135 (-325–55)
	1996–2001	1.5 (-32–35)	-32 (-46– -18)	117 (-80–314)
	2001–2004	-18 (-49–13)	-40 (-58– -22)	73 (-123–269)
Total Asian vs European	1981–1986	-60 (-76– -43)		-301 (-391– -210)
	1986–1991	-34 (-59– -8.4)	-12 (-18– -6.4)	-154 (-306– -2.0)
	1991–1996	-81 (-106– -56)	-19 (-34– -4.1)	-402 (-568– -237)
	1996–2001	-112 (-136– -89)	-53 (-64– -42)	-459 (-610– -307)
	2001–2004	-113 (-133– -94)	-58 (-71– -45)	-500 (-609– -391)

Notes: 95 percent confidence intervals in brackets. P values for trend and pooled SRDs are not presented due to the influence of PSA testing, having the effect of spuriously increasing rates.

24.2 Socioeconomic trends

Prostate cancer rates among 25+ year-olds approximately tripled in all income tertiles from 1986–1991 to 1996–2001 (Figure 61 and Table 118 in Appendix 1). Further, rates decreased from 1996–2001 to 2001–2004 among 75+ year-olds (Figure 62). Both of these trends may reflect the impact of widespread opportunistic PSA testing.

Pooled over time, prostate cancer rates among 25+ year-olds were 15–20 percent lower among low-income males, an inequality that was consistent over time (Table 60). This relative inequality was less marked in older age groups. There was no evidence of changing relative inequalities over time.

Figure 61: Standardised rates of prostate cancer for 25+ year-olds, by income

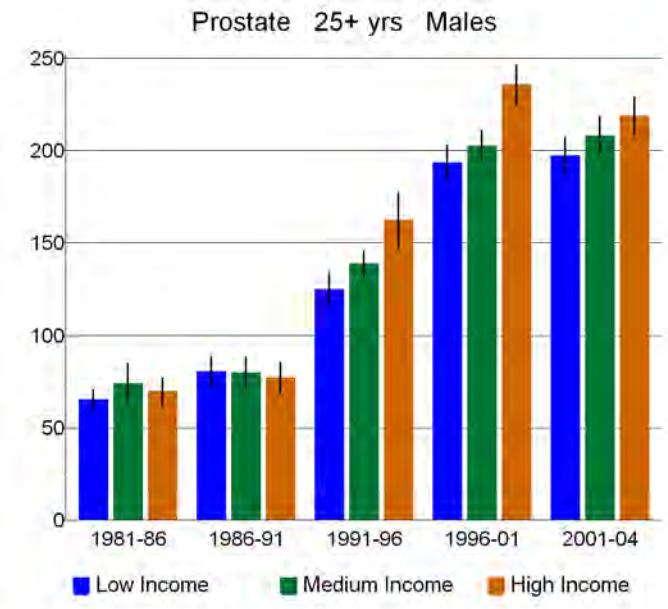


Figure 62: Standardised rates of prostate cancer, by income by age group

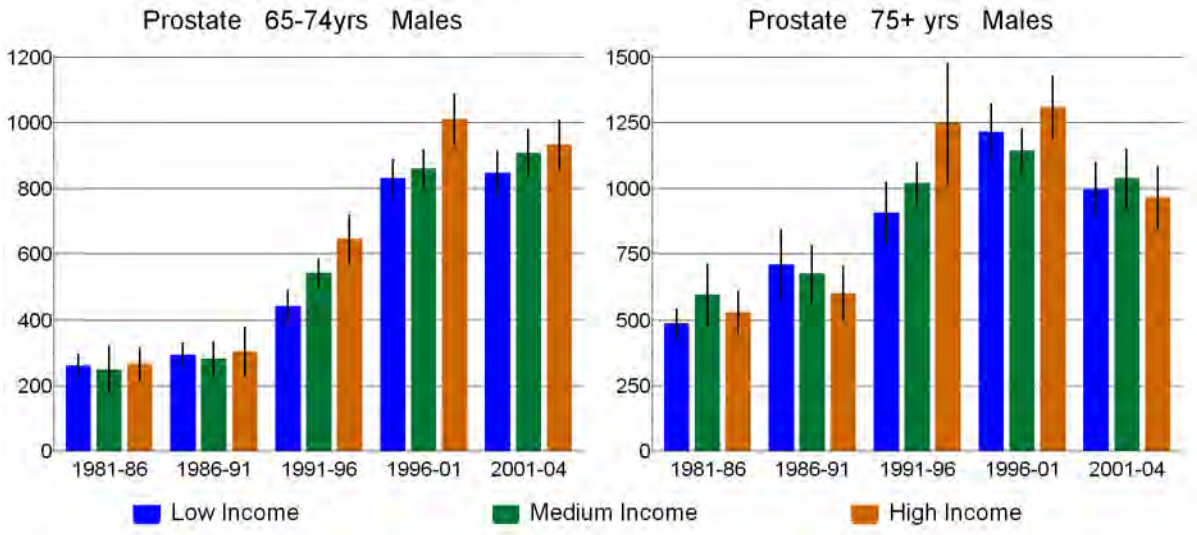


Table 60: Age- and ethnicity-standardised income rate ratios (SRR), rate differences (SRD), relative indices of inequality (RII) and slope indices of inequality (SII) of prostate cancer

Age group	Cohort	Males			
		Relative inequalities		Absolute inequalities	
		SRR	RII (95% CI)	SRD	SII (95% CI)
Prostate					
25+ years	1981–1986	0.94	1.0 (0.8–1.3)	-4.2	0.0 (-21–22)
	1986–1991	1.05	1.1 (0.9–1.3)	3.5	4.0 (-7.2–16)
	1991–1996	0.77	0.7 (0.6–0.9)	-38	-47 (-73– -20)
	1996–2001	0.82	0.7 (0.6–0.8)	-42	-79 (-103– -56)
	2001–2004	0.90	0.9 (0.8–0.9)	-22	-34 (-40– -29)
	P (trend)	0.67	0.61		
	Pooled	0.86	0.8 (0.8–0.9)		
25–64 years	1981–1986	0.98	1.1 (0.6–1.9)	-0.3	1.0 (-2.2–5.0)
	1986–1991	0.82	0.7 (0.4–1.2)	-3.4	-6.0 (-19–7.6)
	1991–1996	1.00	1.0 (0.7–1.3)	-0.1	-2.0 (-16–12)
	1996–2001	0.68	0.6 (0.5–0.7)	-27	-42 (-45– -38)
	2001–2004	0.74	0.6 (0.5–0.7)	-28	-43 (-51– -36)
	P (trend)	0.25	0.20		
	Pooled	0.78	0.7 (0.6–0.8)		
65–74 years	1981–1986	0.98	1.0 (0.7–1.6)	-5.2	8.0 (-35–51)
	1986–1991	0.97	1.1 (0.7–1.6)	-9.6	22 (-63–106)
	1991–1996	0.69	0.6 (0.5–0.8)	-203	-246 (-378– -114)
	1996–2001	0.82	0.7 (0.6–0.8)	-181	-300 (-421– -179)
	2001–2004	0.91	0.9 (0.7–1.0)	-86	-139 (-320–41)
	P (trend)	0.97	0.82		
	Pooled	0.84	0.8 (0.7–0.9)		
75+ years	1981–1986	0.92	0.9 (0.6–1.3)	-40	-65 (-289–160)
	1986–1991	1.18	1.2 (0.9–1.7)	107	126 (24–229)
	1991–1996	0.73	0.7 (0.5–1.0)	-341	-333 (-516– -150)
	1996–2001	0.93	0.8 (0.7–1.0)	-94	-243 (-461– -25)
	2001–2004	1.03	1.1 (0.8–1.3)	30	48 (-139–235)
	P (trend)	0.86	0.97		
	Pooled	0.92	0.9 (0.8–1.0)		

Notes: 95 percent confidence intervals in brackets. SRRs and SRDs compare low- and high-income tertiles. Underlying non-linear trends mean the p for trend value must be interpreted cautiously. P values for trend and pooled SRDs and SIIs are not presented due to the influence of PSA testing, having the effect of spuriously increasing rates.

Chapter 25: Stomach Cancer

In 2005 in New Zealand 341 cases of stomach cancer were registered, of which 203 were in men.[57] Stomach cancer has a poor prognosis, with a 20 percent five-year survival rate in New Zealand.[58] The majority (95 percent) of cases of stomach cancer are adenocarcinoma, of which there are two main subtypes: intestinal and diffuse.

The risk of stomach cancer is higher in men, and increases with age. Place of birth is an important factor. Different countries have very different rates of stomach cancer, but migration does not alter an individual's risk, suggesting that early life exposures are important. Finally, there are a number of families internationally (including at least one in New Zealand) who have very strong histories of stomach cancer, which are associated with specific gene mutations.[81]

There are a number of dietary risk factors for stomach cancer. There is evidence that consumption of non-starchy and allium (onion family) vegetables and fruit probably reduce risk, while salt (directly or through processed foods) increases risk.[60] Infection with *Helicobacter pylori* increases the risk of stomach cancer, as does smoking and exposure to ionising radiation. Infection early in life with *Helicobacter pylori* is thought to account for the majority of cases of stomach cancer in most countries, including New Zealand. Evidence of the role of occupational exposures to chemicals in increasing the risk of stomach cancer is inconsistent.[81]

25.1 Ethnic trends

Stomach cancer rates fell by 33 percent and 42 percent among European/Other males and females respectively over the period surveyed (p for trend ≤0.05; Figure 63 and Table 119 in Appendix 1). Rates were unstable over time in the other ethnic groups, although tended to decrease.

Pooled over time, Māori and Pacific had two to three times the rates of European/Other, for both sexes (Table 61), these differences being greater in younger age groups. Asian rates were similar to those of European/Other. There was evidence of widening relative inequalities between Māori and European/Other females (the SRR increasing from 2.44 to 4.14, p for trend 0.05), but otherwise no evidence of changing ineqalities over time (Tables 61 and 62).

Figure 63: Standardised rates of stomach cancer for 25+ year-olds, by ethnicity by sex

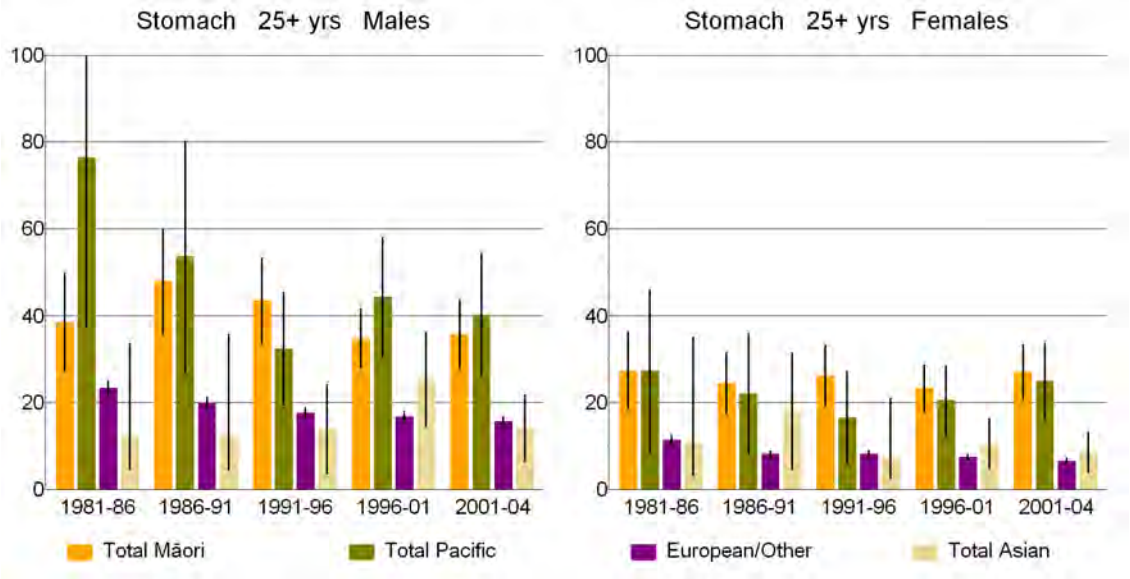


Figure 64: Standardised rates of stomach cancer, by ethnicity by sex and age group

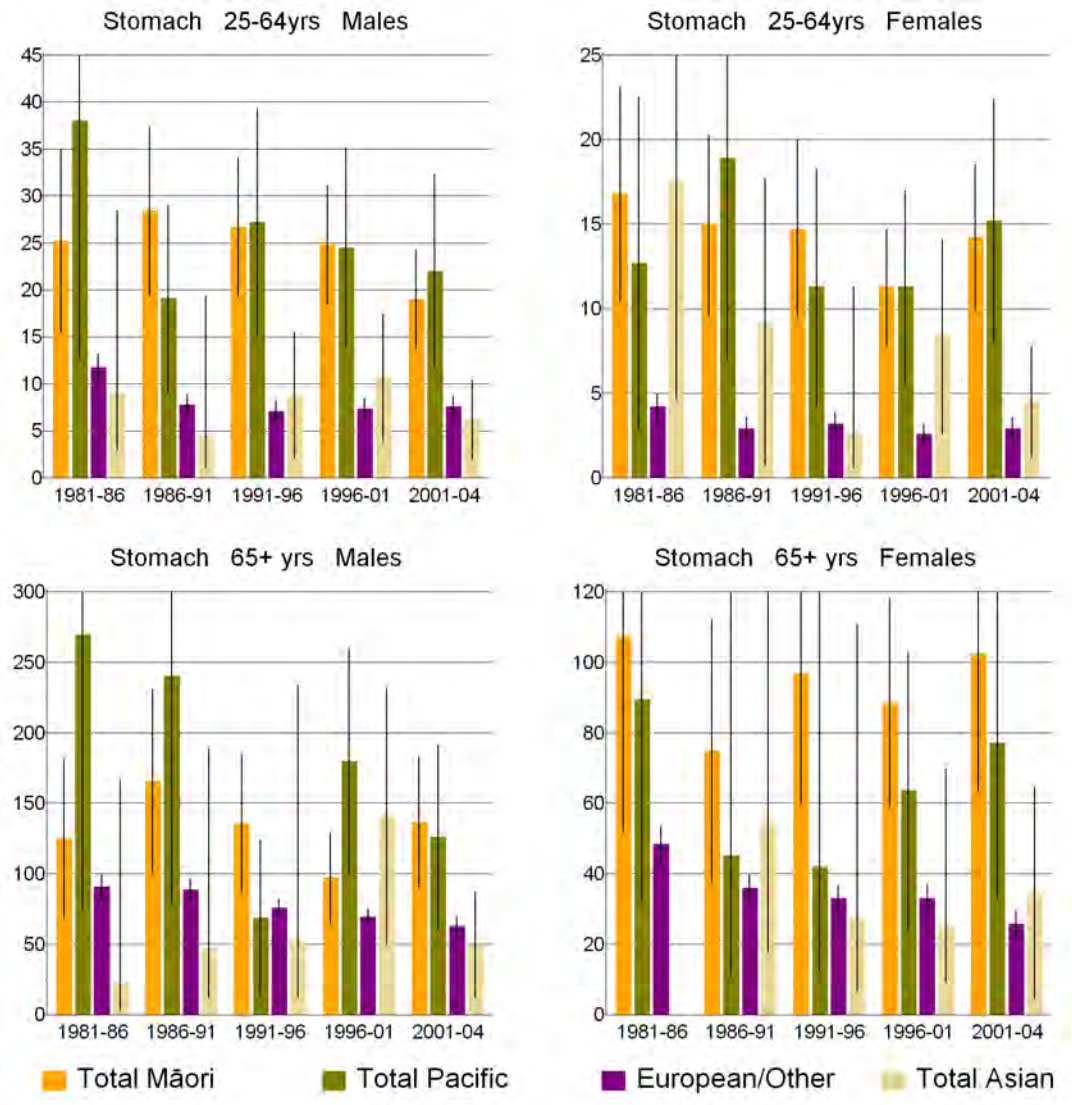


Table 61: Age-standardised rate ratios (SRR) of stomach cancer, for Māori, Pacific and Asian compared to European/Other, by sex

Exposure Stomach Total ethnicity	Cohort	25+ years SRR (95% CI)	25–64 years SRR (95% CI)	65+ years SRR (95% CI)
Males				
Total Māori vs European	1981–1986	1.64 (1.22–2.22)	2.14 (1.43–3.22)	1.38 (0.87–2.19)
	1986–1991	2.40 (1.85–3.11)	3.64 (2.57–5.14)	1.87 (1.25–2.79)
	1991–1996	2.46 (1.94–3.12)	3.74 (2.72–5.13)	1.78 (1.23–2.58)
	1996–2001	2.07 (1.68–2.56)	3.38 (2.52–4.53)	1.40 (0.99–1.97)
	2001–2004	2.27 (1.79–2.88)	2.52 (1.83–3.46)	2.19 (1.53–3.11)
	P (trend)	0.61	0.94	0.42
	Pooled	2.14 (1.90–2.40)	3.01 (2.58–3.52)	1.68 (1.41–2.02)
Total Pacific vs European	1981–1986	3.26 (1.94–5.48)	3.24 (1.65–6.39)	2.97 (1.43–6.17)
	1986–1991	2.68 (1.62–4.43)	2.45 (1.43–4.19)	2.71 (1.37–5.33)
	1991–1996	1.83 (1.22–2.75)	3.81 (2.38–6.10)	0.90 (0.40–2.02)
	1996–2001	2.64 (1.92–3.62)	3.34 (2.11–5.27)	2.59 (1.64–4.09)
	2001–2004	2.56 (1.78–3.67)	2.92 (1.78–4.77)	2.01 (1.18–3.42)
	P (trend)	0.65	0.90	0.54
	Pooled	2.64 (2.11–3.30)	3.16 (2.42–4.13)	2.29 (1.66–3.18)
Total Asian vs European	1981–1986	0.52 (0.19–1.44)	0.78 (0.25–2.45)	0.26 (0.04–1.85)
	1986–1991	0.63 (0.22–1.80)	0.59 (0.14–2.49)	0.53 (0.13–2.13)
	1991–1996	0.78 (0.37–1.66)	1.23 (0.57–2.67)	0.70 (0.16–3.09)
	1996–2001	1.51 (0.97–2.34)	1.45 (0.76–2.78)	2.03 (1.06–3.89)
	2001–2004	0.90 (0.52–1.56)	0.82 (0.41–1.64)	0.79 (0.37–1.71)
	P (trend)	0.44	0.82	0.68
	Pooled	0.83 (0.60–1.16)	0.96 (0.63–1.46)	0.81 (0.50–1.32)
Females				
Total Māori vs European	1981–1986	2.44 (1.73–3.43)	4.02 (2.63–6.16)	2.22 (1.31–3.77)
	1986–1991	3.03 (2.23–4.11)	5.11 (3.34–7.82)	2.08 (1.24–3.47)
	1991–1996	3.21 (2.41–4.26)	4.61 (3.03–7.03)	2.93 (1.97–4.36)
	1996–2001	3.13 (2.43–4.03)	4.28 (2.91–6.28)	2.67 (1.87–3.82)
	2001–2004	4.14 (3.18–5.39)	4.84 (3.31–7.09)	4.00 (2.66–6.02)
	P (trend)	0.05	0.63	0.08
	Pooled	3.05 (2.67–3.48)	4.54 (3.76–5.48)	2.62 (2.14–3.21)
Total Pacific vs European	1981–1986	2.43 (1.22–4.85)	3.04 (1.37–6.76)	1.85 (0.66–5.19)
	1986–1991	2.73 (1.44–5.17)	6.45 (3.28–12.69)	1.26 (0.31–5.05)
	1991–1996	2.01 (1.05–3.86)	3.53 (1.82–6.86)	1.27 (0.37–4.32)
	1996–2001	2.74 (1.83–4.12)	4.29 (2.46–7.49)	1.92 (1.03–3.60)
	2001–2004	3.82 (2.62–5.55)	5.18 (3.06–8.77)	3.00 (1.67–5.42)
	P (trend)	0.14	0.74	0.15
	Pooled	2.64 (2.02–3.44)	4.35 (3.22–5.89)	1.76 (1.13–2.75)

Exposure Stomach Total ethnicity	Cohort	25+ years SRR (95% CI)	25–64 years SRR (95% CI)	65+ years SRR (95% CI)
Total Asian vs European	1981–1986	0.95 (0.29–3.14)	4.19 (1.08–16.21)	
	1986–1991	2.22 (1.04–4.74)	3.13 (1.21–8.13)	1.52 (0.49–4.75)
	1991–1996	0.89 (0.31–2.58)	0.84 (0.19–3.61)	0.83 (0.20–3.37)
	1996–2001	1.41 (0.80–2.49)	3.17 (1.54–6.52)	0.77 (0.28–2.12)
	2001–2004	1.31 (0.75–2.31)	1.52 (0.70–3.29)	1.35 (0.56–3.25)
	P (trend)	0.60	0.26	
	Pooled	1.32 (0.88–1.98)	2.73 (1.44–5.16)	1.10 (0.64–1.89)

Notes: 95 percent confidence intervals in brackets. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

Table 62: Age-standardised rate differences (SRD) of stomach cancer, for Māori, Pacific and Asian compared to European/Other, by sex

Exposure Stomach Total ethnicity	Cohort	25+ years SRD (95% CI)	25–64 years SRD (95% CI)	65+ years SRD (95% CI)
Males				
Total Māori vs European	1981–1986	15 (3.7–27)	13 (3.6–23)	34 (-23–91)
	1986–1991	28 (16–40)	21 (12–30)	77 (12–142)
	1991–1996	26 (16–36)	20 (12–27)	60 (10–109)
	1996–2001	18 (11–25)	18 (11–24)	28 (-5.3–60)
	2001–2004	20 (12–28)	12 (6.0–17)	74 (28–121)
	P (trend)	0.86	0.35	0.86
	Pooled	21 (17–26)	17 (13–20)	54 (30–77)
Total Pacific vs European	1981–1986	53 (14–92)	26 (0.9–52)	179 (-17–374)
	1986–1991	34 (7.0–60)	11 (1.4–21)	151 (-10–313)
	1991–1996	15 (1.7–28)	20 (7.9–32)	-7.3 (-63–48)
	1996–2001	28 (14–41)	17 (6.5–28)	111 (30–192)
	2001–2004	25 (10–39)	15 (4.1–25)	63 (-2.5–129)
	P (trend)	0.79	0.99	0.89
	Pooled	31 (20–42)	18 (11–25)	101 (43–159)
Total Asian vs European	1981–1986	-11 (-24–1.3)	-2.6 (-13–7.9)	-67 (-114– -20)
	1986–1991	-7.4 (-21–5.8)	-3.2 (-9.9–3.5)	-42 (-108–24)
	1991–1996	-3.8 (-14–6.6)	1.7 (-5.1–8.4)	-23 (-102–57)
	1996–2001	8.6 (-2.4–20)	3.3 (-3.5–10)	71 (-20–162)
	2001–2004	-1.6 (-9.4–6.2)	-1.3 (-5.7–3.0)	-13 (-51–26)
	P (trend)	0.24	0.71	0.18
	Pooled	-3.1 (-8.2–2.0)	-0.4 (-3.7–3.0)	-15 (-46–16)
Females				
Total Māori vs European	1981–1986	16 (7.1–25)	13 (6.2–19)	59 (3.2–115)
	1986–1991	16 (9.3–24)	12 (6.6–18)	39 (1.2–77)
	1991–1996	18 (11–25)	12 (6.2–17)	64 (27–101)
	1996–2001	16 (10–21)	8.6 (5.1–12)	55 (26–85)

Exposure Stomach Total ethnicity	Cohort	25+ years SRD (95% CI)	25–64 years SRD (95% CI)	65+ years SRD (95% CI)
	2001–2004	21 (14–27)	11 (6.9–16)	77 (38–116)
	P (trend)	0.31	0.37	0.24
	Pooled	17 (14–20)	11 (8.9–14)	58 (39–76)
Total Pacific vs European	1981–1986	16 (-2.7–35)	8.5 (-1.3–18)	41 (-51–133)
	1986–1991	14 (0.0–28)	16 (3.9–28)	9.2 (-54–72)
	1991–1996	8.3 (-2.4–19)	8.1 (1.0–15)	8.9 (-42–60)
	1996–2001	13 (4.9–21)	8.7 (2.9–14)	31 (-8.9–70)
	2001–2004	18 (9.5–27)	12 (5.1–20)	52 (7.3–96)
	P (trend)	0.43	0.80	0.22
	Pooled	14 (7.9–20)	11 (6.7–15)	27 (-0.8–55)
Total Asian vs European	1981–1986	-0.6 (-13–12)	13 (-10–37)	
	1986–1991	9.9 (-3.6–24)	6.2 (-2.3–15)	19 (-43–81)
	1991–1996	-0.9 (-8.7–6.9)	-0.5 (-4.4–3.4)	-5.6 (-44–33)
	1996–2001	3.1 (-2.8–9.0)	5.7 (0.0–12)	-7.5 (-34–19)
	2001–2004	2.0 (-2.8–6.8)	1.5 (-1.8–4.9)	8.9 (-21–39)
	P (trend)	0.96	0.86	
	Pooled	2.7 (-1.8–7.2)	5.5 (0.0–11)	3.3 (-16–22)

Notes: 95 percent confidence intervals in brackets. Underlying non-linear trends mean the p for trend value must be interpreted cautiously.

25.2 Socioeconomic trends

Over the period surveyed, stomach cancer rates for those aged 25+ years decreased by between 17 percent (in the middle-income tertile; p for trend 0.48) and 37 percent (in the high-income tertile; p for trend 0.01) among males, and decreased by 40 percent (in the low-income tertile; p for trend 0.01) among females (Figure 65 and Table 120 in Appendix 1). Patterns of percentage decrease were similar across age groups (Figure 66).

Pooled over time for those aged 25+ years, stomach cancer rates were one-third or more higher among low-income groups than among high-income groups for both sexes (with SRRs of 1.31 and 1.34 and RIIs of 1.5 and 1.6 for males and females respectively) (Table 63). There was evidence of decreasing inequalities over time in female stomach cancer by income group (for example, the SRD reduced from 6.0 to -1.1 per 100,000; p for trend <0.01).