

■ Brain cancer

Tumours of the brain are among the most morphologically and clinically heterogeneous of cancers at any site. Indeed, 'brain cancer' comprises a number of distinct intracranial neoplasms, each with its own aetiology (DeAngelis 2001), and is considered here as a collective entity only for ease of description and forecasting.

The incidence of brain cancer increased steadily throughout the 1960s and 1970s, but seems to have stabilised since the beginning of the 1980s. In 1996 the age standardised incidence rate reached 8 per 100,000 among males and 5 per 100,000 among females, an increase of 70% and 50% from the respective 1956 levels. However, the absolute number of registrations more than tripled over the period, from 38 among males and 29 among females in 1956 to 123 and 91 in 1996, respectively, reflecting the impact of demographic trends superimposed on the change in risk.

Trends in brain cancer mortality reflect the incidence trend, particularly the levelling off in risk since the early 1980s. The average annual age standardised mortality rate has changed little over the last two decades, stabilising at 7 per 100,000 among males and 5 per 100,000 among females in 1997. This corresponds to 104 deaths and 84 deaths among males and females, respectively, in that year.

The incidence and mortality risk of brain cancer increase with age, doubling or nearly trebling after age 65 compared to that experienced by the middle aged (45–64 years). Males have an excess risk of being diagnosed with brain cancer compared to females of approximately 50%.

After adjusting for age, Māori show comparable or lower risks of being diagnosed with, and dying from, brain cancer than non-Māori, at least in the mid to late 1990s. There was no evidence for a deprivation gradient in brain cancer incidence or mortality rates.

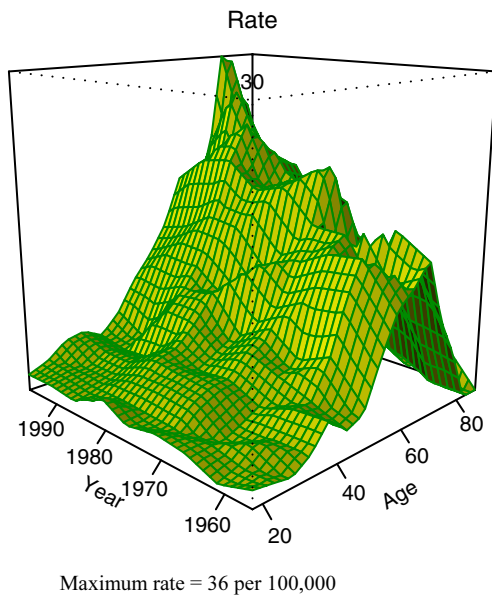
Over the next decade the incidence and mortality rates of brain cancer are forecast to remain essentially stable (increasing slightly among males and decreasing slightly among females). By 2011 the age standardised incidence rate is projected to be 9 per 100,000 (CI 8 – 11) among males and 5 per 100,000 (CI 5 – 8) among females. The corresponding mortality rates in 2012 are projected to be 7 per 100,000 (CI 5 – 8) and 5 per 100,000 (CI 3 – 6), respectively.

Despite stable age specific risks, the numbers of brain cancer registrations and deaths are expected to increase by 30–40% between 1996/97 and 2011/12, to 172 registrations (CI 129 – 244) and 138 deaths (CI 89 – 172) among males and 114 registrations (CI 89 – 179) and 115 deaths (CI 68 – 146) among females.¹ This increase in the brain cancer burden will result primarily from the projected growth in population size, but will be further boosted by the structural ageing of the population over the forecasting period.

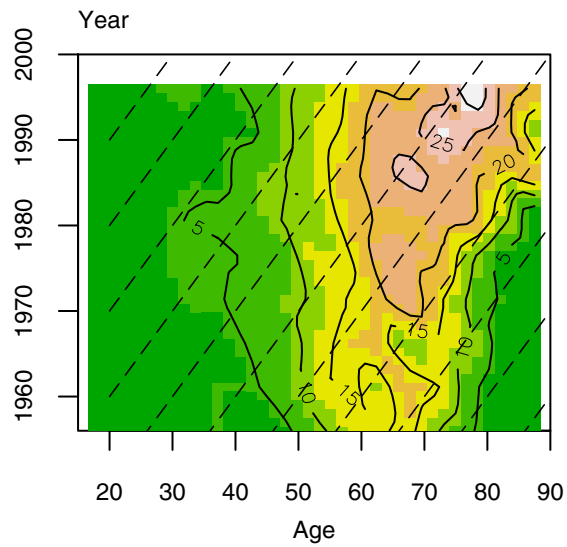
¹ This suggests that the model may have slightly overestimated the decrease in female incidence rates or the increase in female mortality rates (or both), at least in some age groups.

Figure 11.1 Historical trends in age specific rates, brain cancer, males

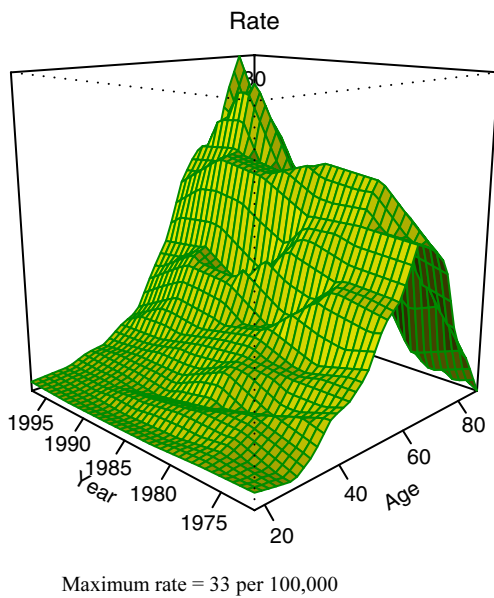
(a) Male incidence rates, perspective plot



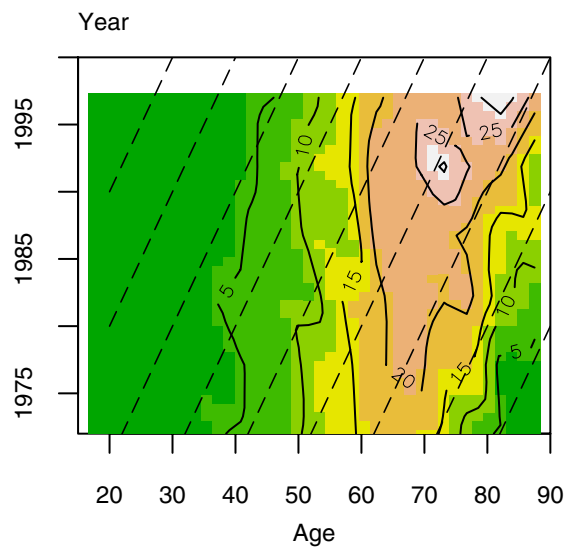
(b) Male incidence rates, contour plot



(c) Male mortality rates, perspective plot



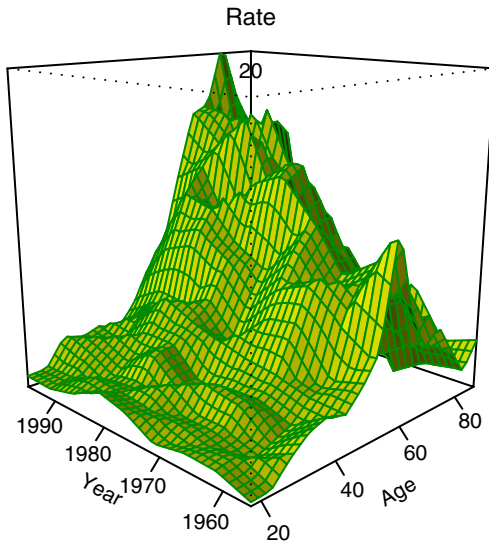
(d) Male mortality rates, contour plot



Please refer to Chapter 2 for interpretation of charts

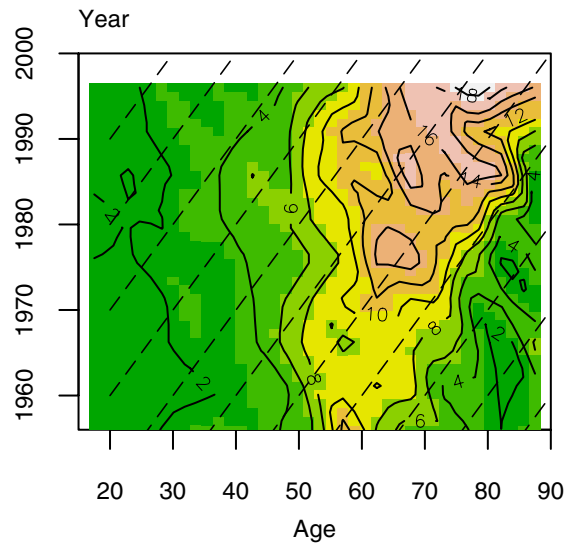
Figure 11.2 Historical trends in age specific rates, brain cancer, females

(a) Female incidence rates, perspective plot

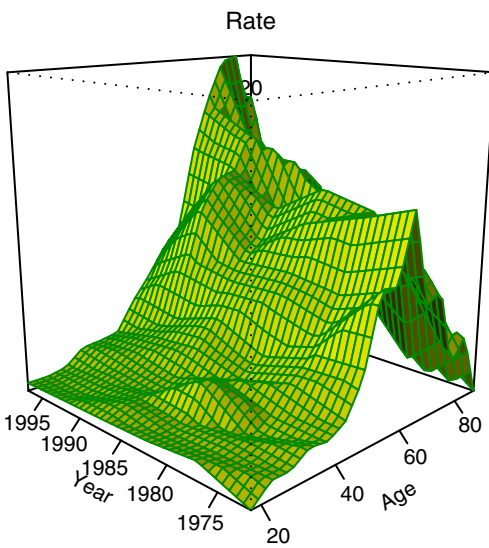


Maximum rate = 22 per 100,000

(b) Female incidence rates, contour plot



(c) Female mortality rates, perspective plot



Maximum rate = 23 per 100,000

(d) Female mortality rates, contour plot

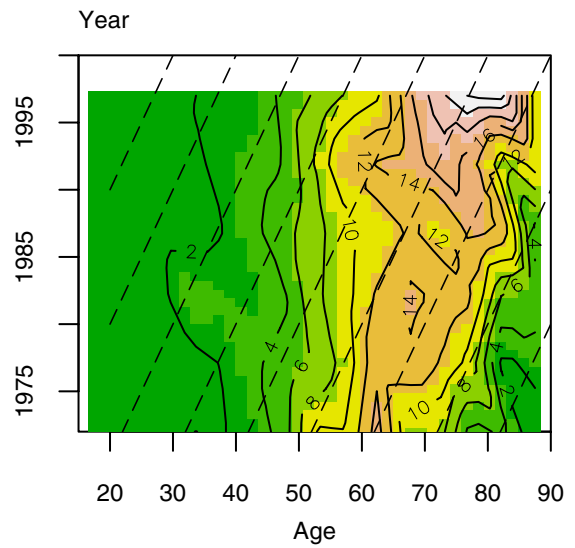


Figure 11.3 Relative risk 1996/97, brain cancer, males

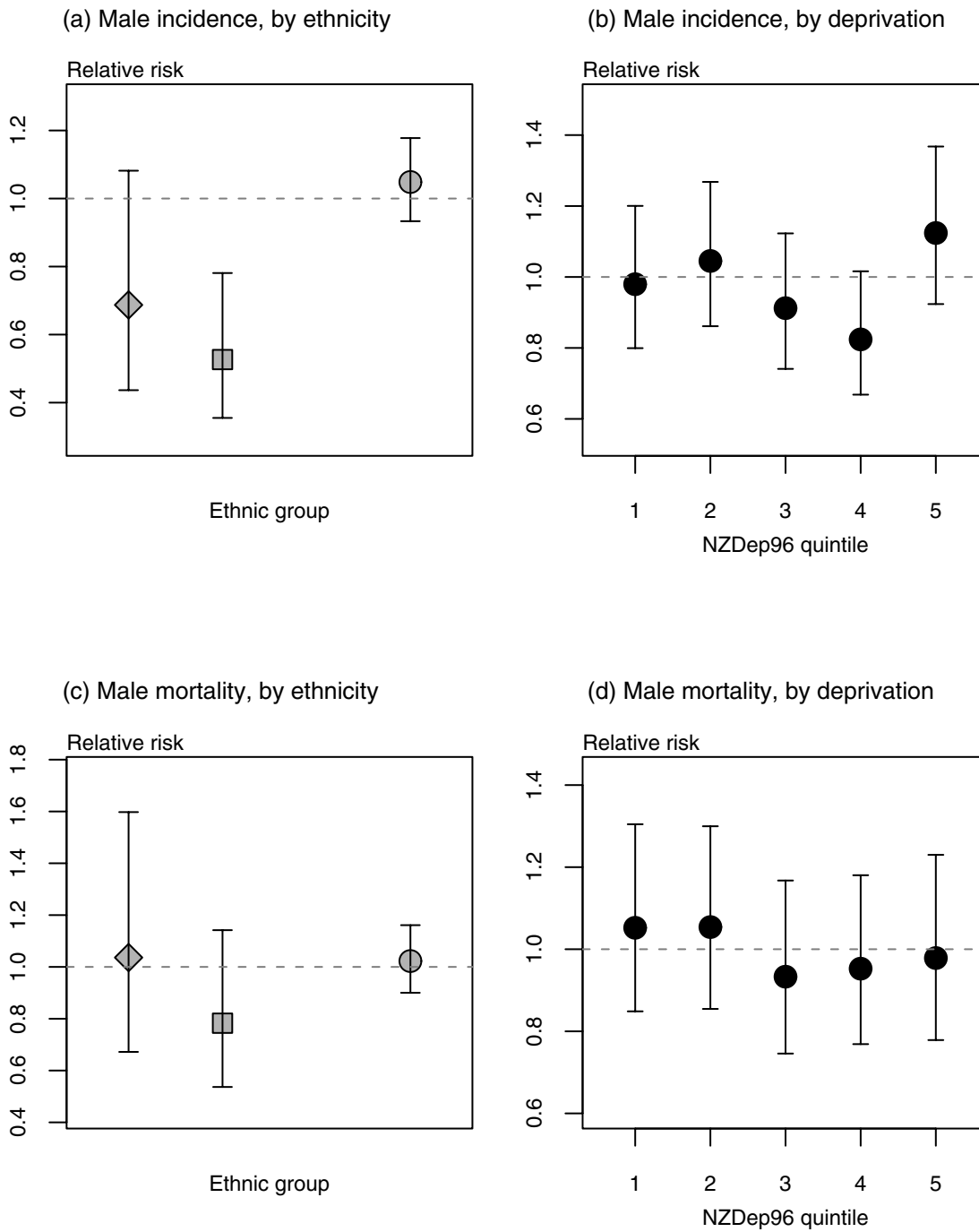
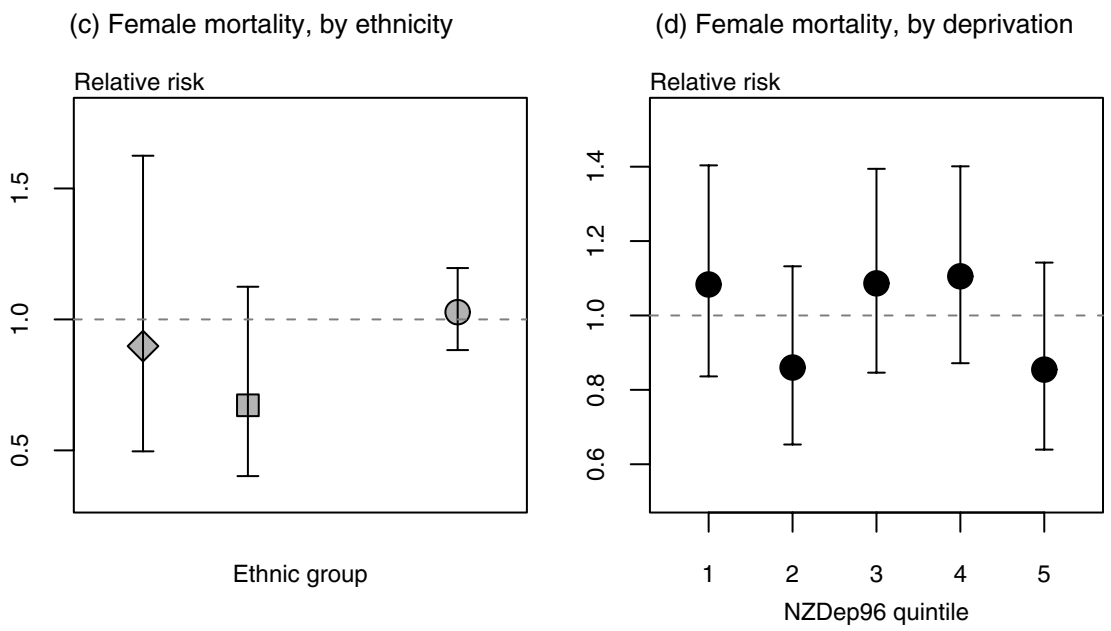
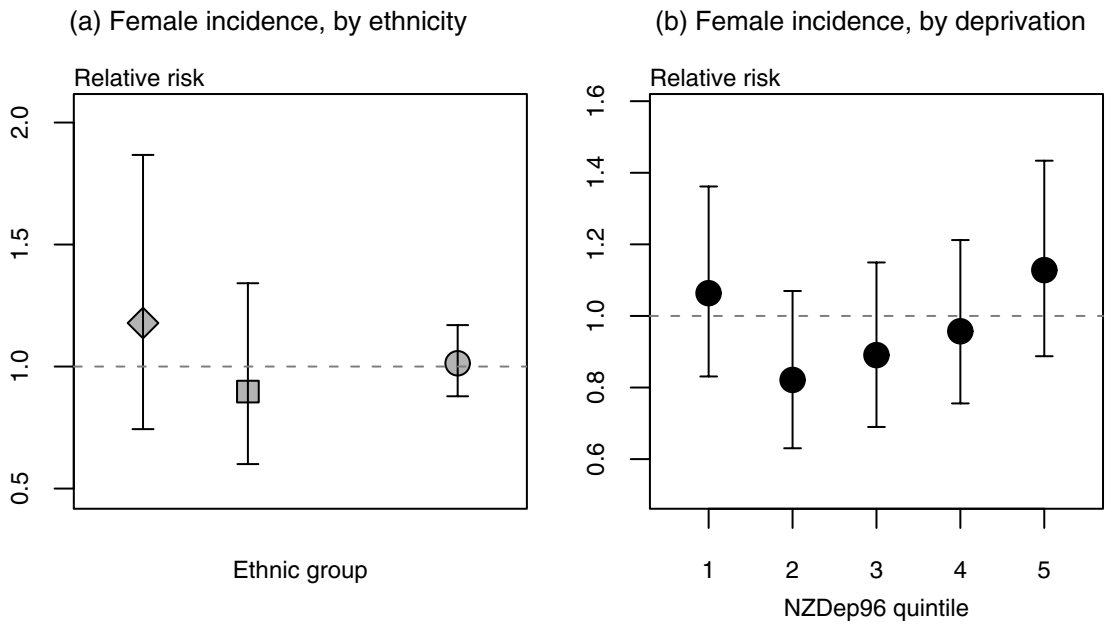


Figure 11.4 Relative risk 1996/97, brain cancer, females

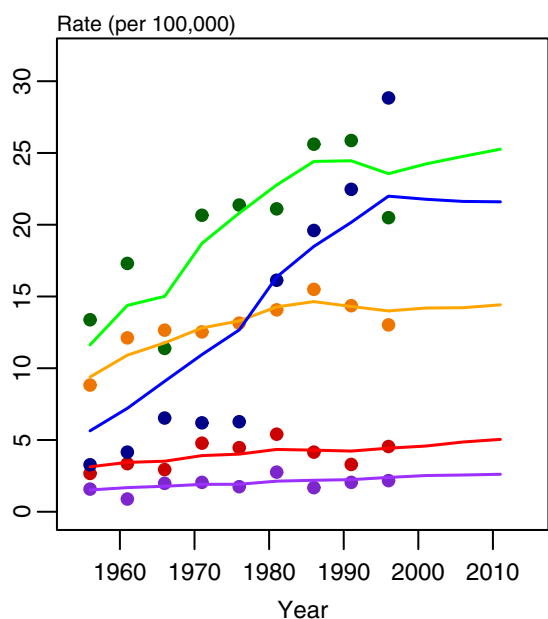


Ethnic group key:

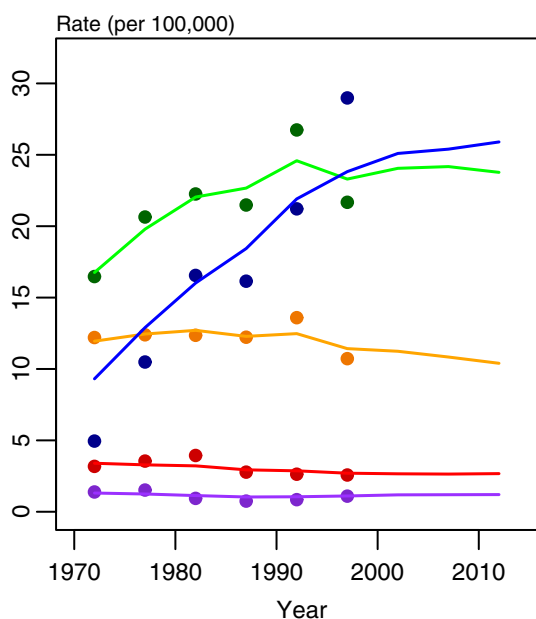
- ◆ sole Māori
- total Māori
- non-Māori

Figure 11.5 Trends and projections of life cycle stage specific rates, brain cancer

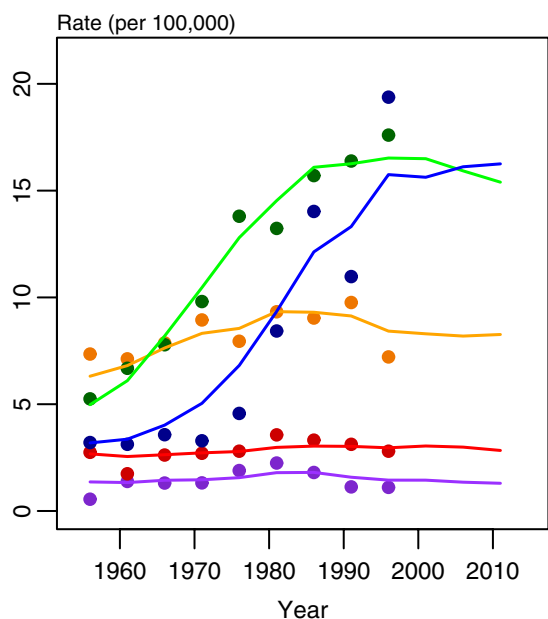
(a) Male incidence rates



(b) Male mortality rates



(c) Female incidence rates



(d) Female mortality rates

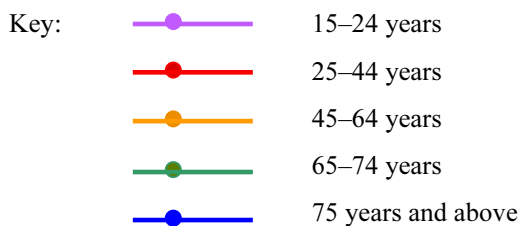
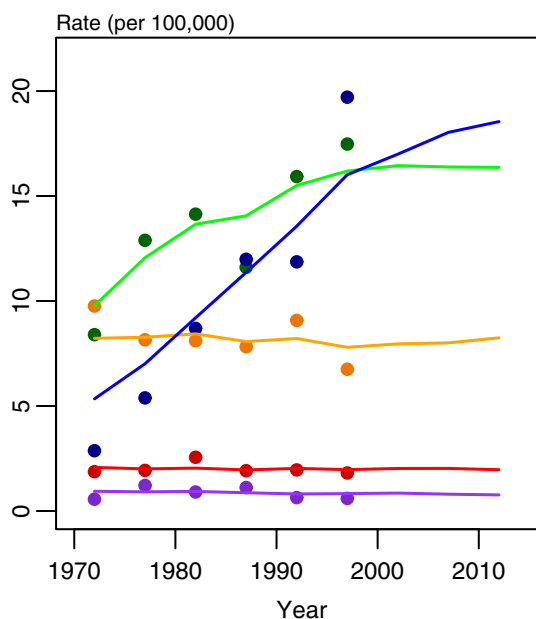
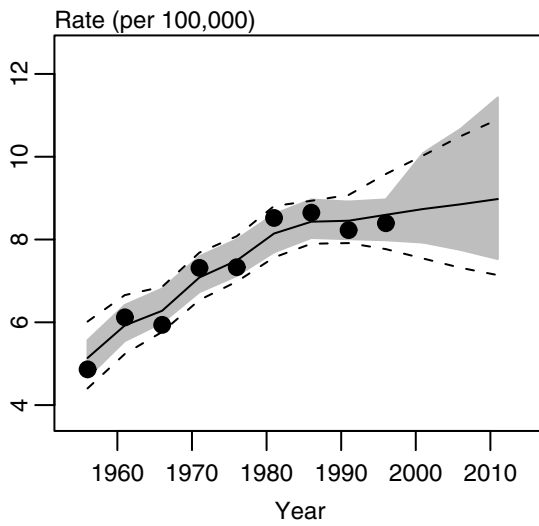
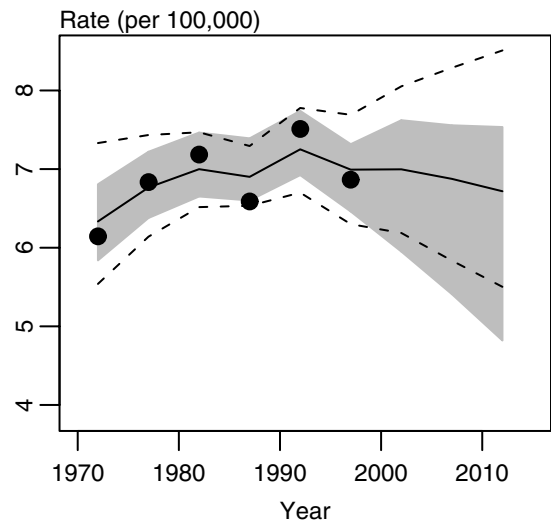


Figure 11.6 Trends and projections of age standardised rates, brain cancer

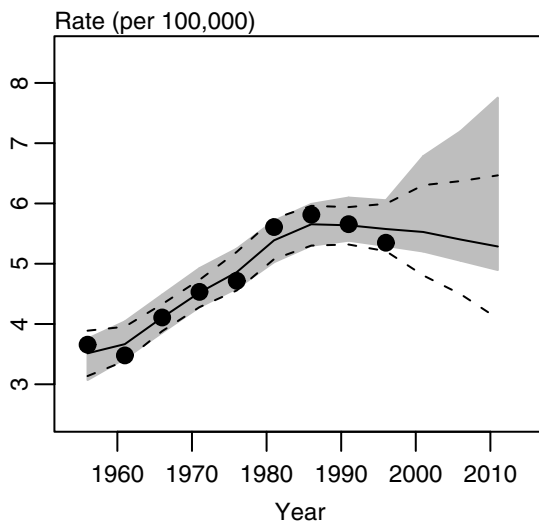
(a) Male incidence rates



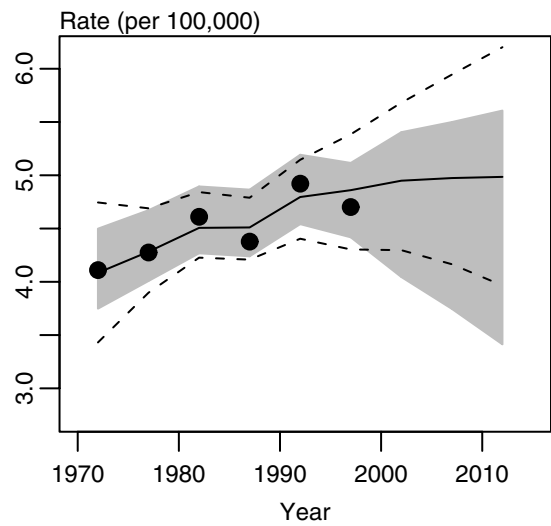
(b) Male mortality rates



(c) Female incidence rates



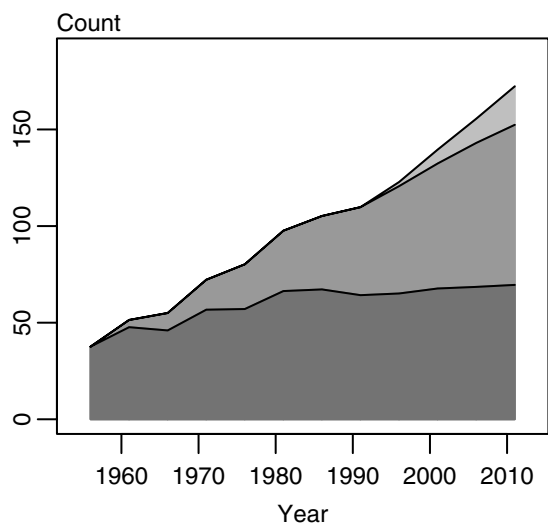
(d) Female mortality rates



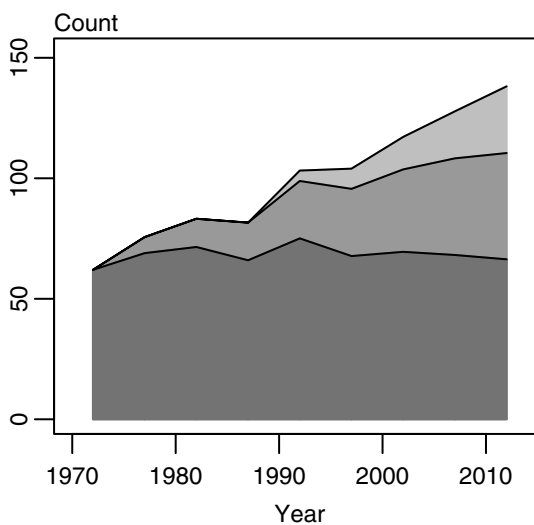
Key: ● Observed
 — Fitted and projected
 - - Minimum and maximum estimates
 ■ 90% Bayesian credible interval

Figure 11.7 Drivers of change in the cancer burden, brain cancer

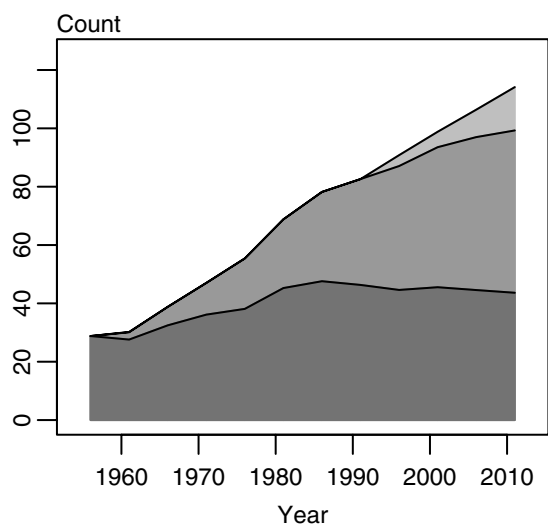
(a) Male registrations



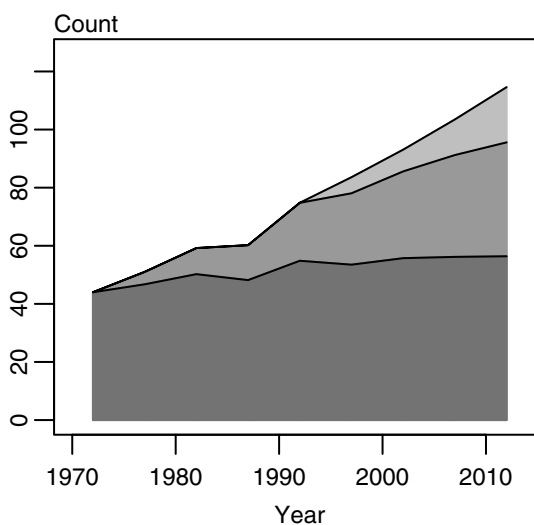
(b) Male deaths



(c) Female registrations



(d) Female deaths



- Key:
- Risk effect
 - Population size effect
 - Population ageing effect

Table 11.1 Key results, brain cancer

Males

| | Incidence | | | Mortality | | |
|--|-----------|-----------------|------------|-----------|----------------|------------|
| | 1996 | 2011 (CI) | change (%) | 1997 | 2012 (CI) | change (%) |
| <i>Age standardised or age specific rate (per 100,000)</i> | | | | | | |
| 15+ | 8 | 9 (8 – 11) | 7 | 7 | 7 (5 – 8) | -2 |
| 15–44 | 4 | 4 (3 – 6) | - | 2 | 2 (1 – 2) | - |
| 45–64 | 13 | 14 (11 – 21) | 11 | 11 | 10 (7 – 13) | -3 |
| 65+ | 24 | 24 (18 – 33) | 1 | 24 | 25 (17 – 32) | 1 |
| <i>Number of cases</i> | | | | | | |
| 15+ | 123 | 172 (129 – 244) | 40 | 104 | 138 (89 – 172) | 33 |
| 15–44 | 31 | 36 (25 – 48) | 16 | 17 | 18 (10 – 21) | 6 |
| 45–64 | 48 | 77 (60 – 113) | 60 | 41 | 56 (36 – 69) | 37 |
| 65+ | 43 | 59 (44 – 83) | 37 | 46 | 63 (43 – 82) | 37 |

Females

| | Incidence | | | Mortality | | |
|--|-----------|----------------|------------|-----------|----------------|------------|
| | 1996 | 2011 (CI) | change (%) | 1997 | 2012 (CI) | change (%) |
| <i>Age standardised or age specific rate (per 100,000)</i> | | | | | | |
| 15+ | 5 | 5 (5 – 8) | -1 | 5 | 5 (3 – 6) | 6 |
| 15–44 | 2 | 2 (2 – 5) | - | 1 | 2 (1 – 2) | - |
| 45–64 | 7 | 8 (7 – 14) | 15 | 7 | 8 (5 – 10) | 21 |
| 65+ | 18 | 16 (11 – 21) | -14 | 19 | 17 (11 – 22) | -6 |
| <i>Number of cases</i> | | | | | | |
| 15+ | 91 | 114 (89 – 179) | 25 | 84 | 115 (68 – 146) | 37 |
| 15–44 | 19 | 20 (18 – 38) | 5 | 12 | 13 (7 – 17) | 8 |
| 45–64 | 27 | 46 (38 – 76) | 70 | 26 | 47 (27 – 58) | 81 |
| 65+ | 45 | 48 (33 – 65) | 7 | 46 | 55 (34 – 71) | 20 |

CI = 90% Bayesian credible interval

Percentage change omitted when estimate is not robust because of small numbers.

