■ Prostate cancer

Prostate cancer is currently the second most common cancer in terms of incidence and the third most common in terms of mortality among males. Accurate forecasts of prostate cancer incidence and mortality are therefore of major public health importance, yet forecasting the prostate cancer burden is problematic. This is because prostate specific antigen (PSA) testing has been widely if informally used in New Zealand over the past five or so years, transiently inflating prostate cancer incidence. That is, use of this blood test has led to the earlier diagnosis of many prostate cancers (as well as to the diagnosis of some cancers which may otherwise have remained sub-clinical and never come to attention) (Miller and Torleko 2001). So a massive and sudden rise in registrations of prostate cancer has occurred over the past five years, yet it would be false to assume that this trend will continue; rather, it may largely represent a transient effect of PSA 'screening'. Accordingly, the incidence forecast reported here is based only on the 1956 to 1993 period, and the registration data from 1994 onwards are not used in the model. Note that by excluding the 'PSA effect' the rates and counts for prostate cancer estimated here from the mid 1990s onward will be underestimates.

The average annual age standardised prostate cancer incidence rate increased steadily between 1956 and 1991, more than doubling from 32 per 100,000 to 72 per 100,000. The annual number of registrations quadrupled over this period, from 248 to 1002. This reflects the impact of demographic trends over the period, which were responsible for two-thirds of the total increase in registrations.

By contrast, the average annual age standardised mortality rate increased by less than 15% over the mortality observation period, from 29 per 100,000 in 1972 to 33 per 100,000 in 1997, while the number of deaths 'only' doubled, from 246 to 535.

Prostate cancer shows a particularly steep age pattern, with few cases occurring before middle age and over 90% of registrations and deaths occurring in old age, many in extreme old age. The incidence rate at 65 years and above is 14 times higher than at 45–64 years, and the mortality rate is 24 times higher.

After adjusting for age, Māori had lower incidence (possibly reflecting undercounting) but higher mortality rates than non-Māori. No clear deprivation gradient in rates was noticeable.

Excluding the registration data from 1994 onwards (and hence the 'PSA effect'), prostate cancer incidence is forecast to continue its steady upward trend. The age standardised incidence rate is projected to reach 102 per 100,000 (CI 76 – 141) by 2011, corresponding to 2394 registrations (CI 1699 – 3400). This represents a 42% increase in rate and a 139% increase in number of registrations, and is anticipated to rank prostate cancer first in terms of incidence among males (overtaking colorectal cancer). Furthermore, this projection is an underestimate as it excludes the 'PSA effect'. Indeed, on average the number of registrations provisionally reported in 1996 to 1998 already exceeds 2400 each year (but should decline in future years if the 'PSA effect' is truly transient). A possible scenario for a transient 'PSA effect' is illustrated in Figure 30.6.

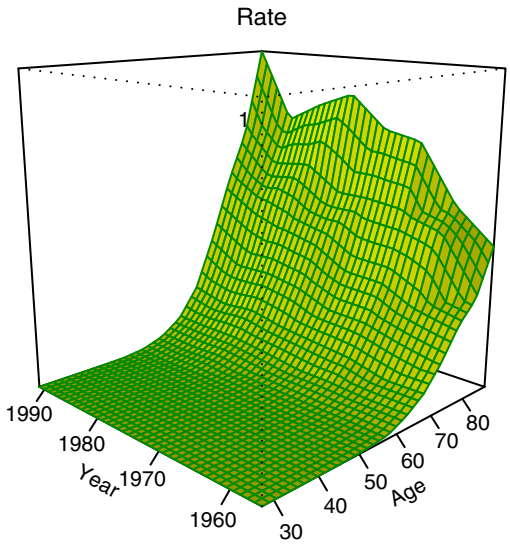
Prostate cancer mortality is also forecast to increase, but very slowly, reaching an age standardised rate of 34 per 100,000 (CI 30 – 46) in 2012. This would correspond to 844 deaths (CI 691 – 1178) in that year, and would make prostate cancer the highest ranked site for males in terms of mortality, overtaking lung and colorectal cancers during the course of the forecasting period.

For both incidence and mortality, most of the projected increase in the absolute burden (over half in the case of mortality) is directly attributable to population ageing, further reinforced by the projected increase in population size.

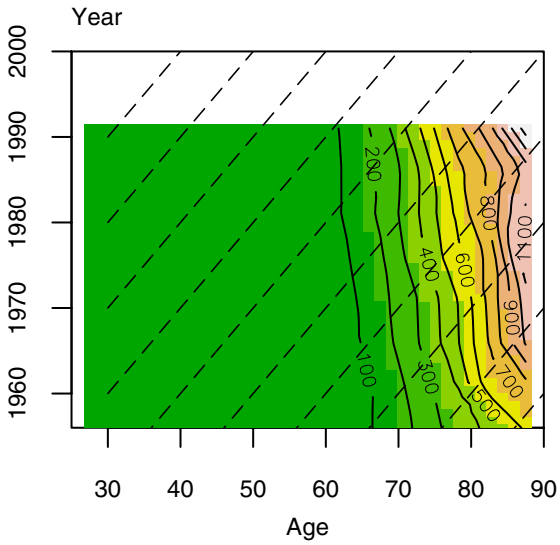
The mortality projection presented here does not capture any benefit from PSA testing, should such benefit exist, because of the long lag time involved. PSA testing only became widespread within the past five years, so little benefit would be anticipated for at least another decade. Several randomised controlled trials due to report over the next four to eight years (the European Randomized Study of Screening for Prostate Cancer, due to report in 2008, and the United States PLCO Cancer Screening Trial, due to report in 2006) should clarify the effectiveness of prostate cancer screening (based on organised PSA testing and follow-up), although concern has been expressed about possible contamination of their control arms (Cookson 2001).

Figure 30.1 Historical trends in age specific rates, prostate cancer

(a) Incidence rates*, perspective plot

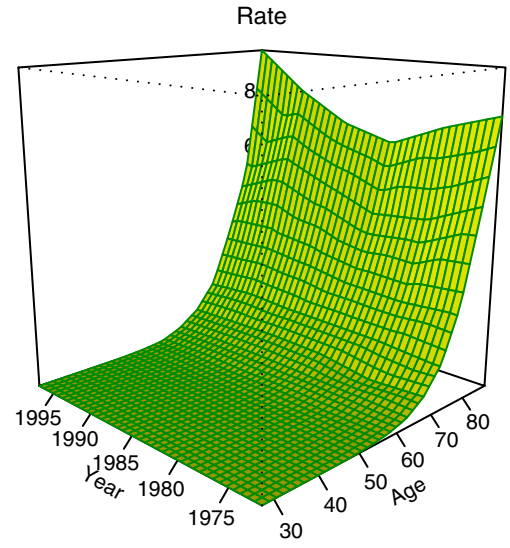


(b) Incidence rates*, contour plot

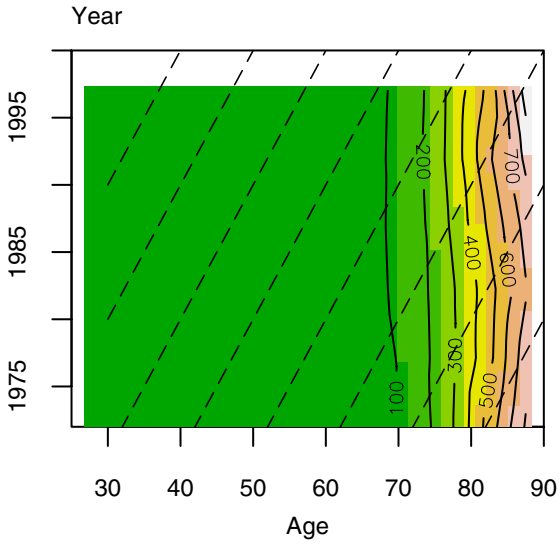


Maximum rate = 1348 per 100,000
* Adjusted for the 'PSA effect'.

(c) Mortality rates, perspective plot



(d) Mortality rates, contour plot



Maximum rate = 944 per 100,000

Please refer to Chapter 2 for interpretation of charts

Figure 30.2 Relative risk 1996/97, prostate cancer

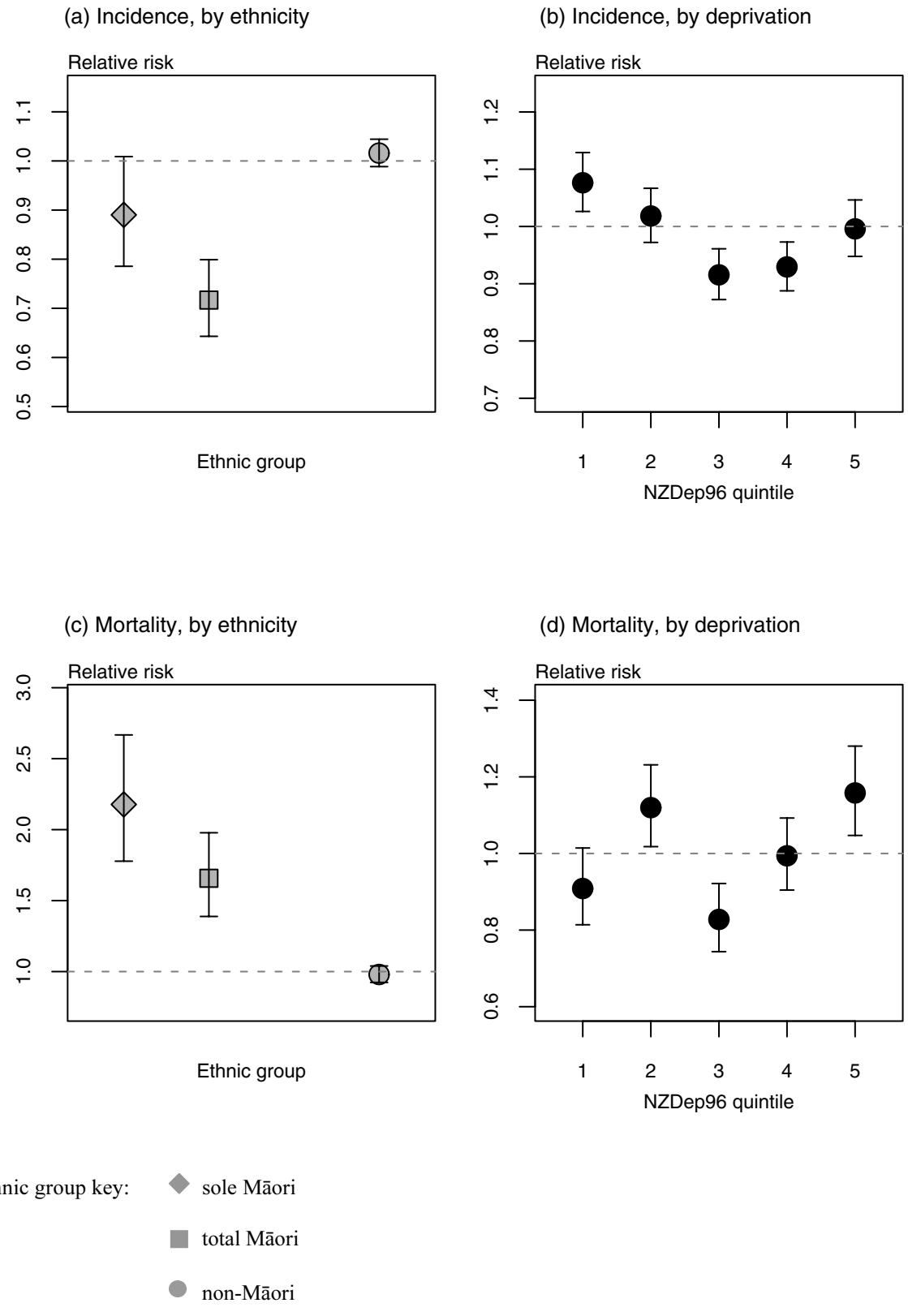
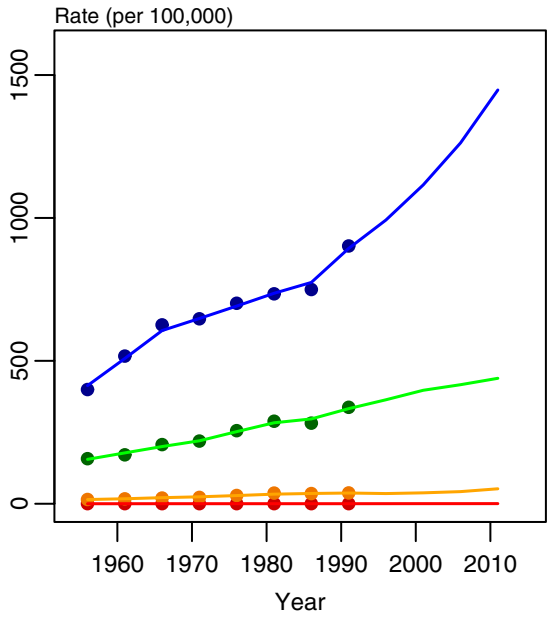
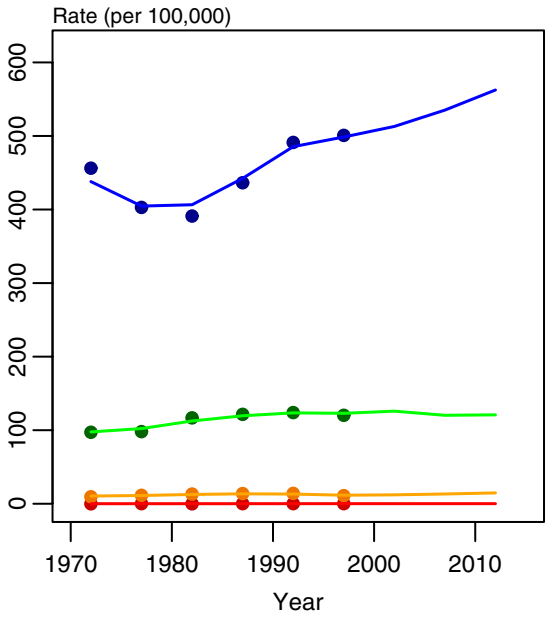


Figure 30.3 Trends and projections of life cycle stage specific rates, prostate cancer

(a) Incidence rates*

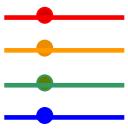


(b) Mortality rates



* Adjusted for the 'PSA effect'.

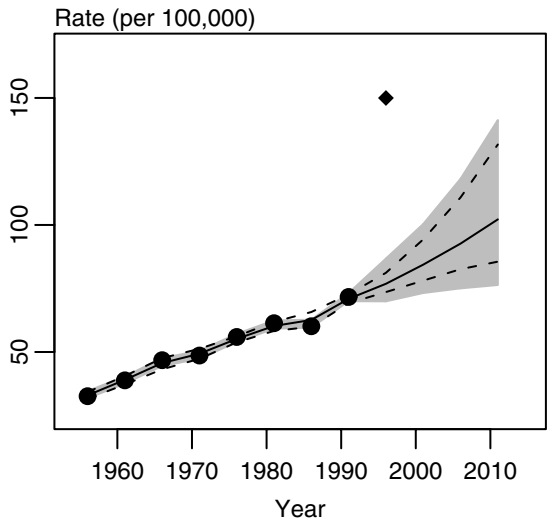
Key:



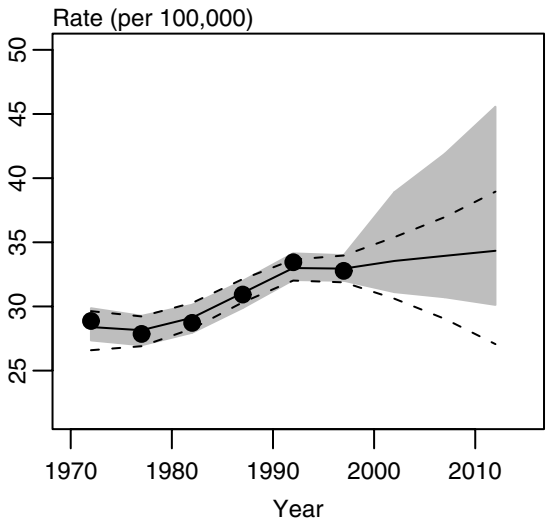
25–44 years
45–64 years
65–74 years
75 years and above

Figure 30.4 Trends and projections of age standardised rates, prostate cancer

(a) Incidence rates



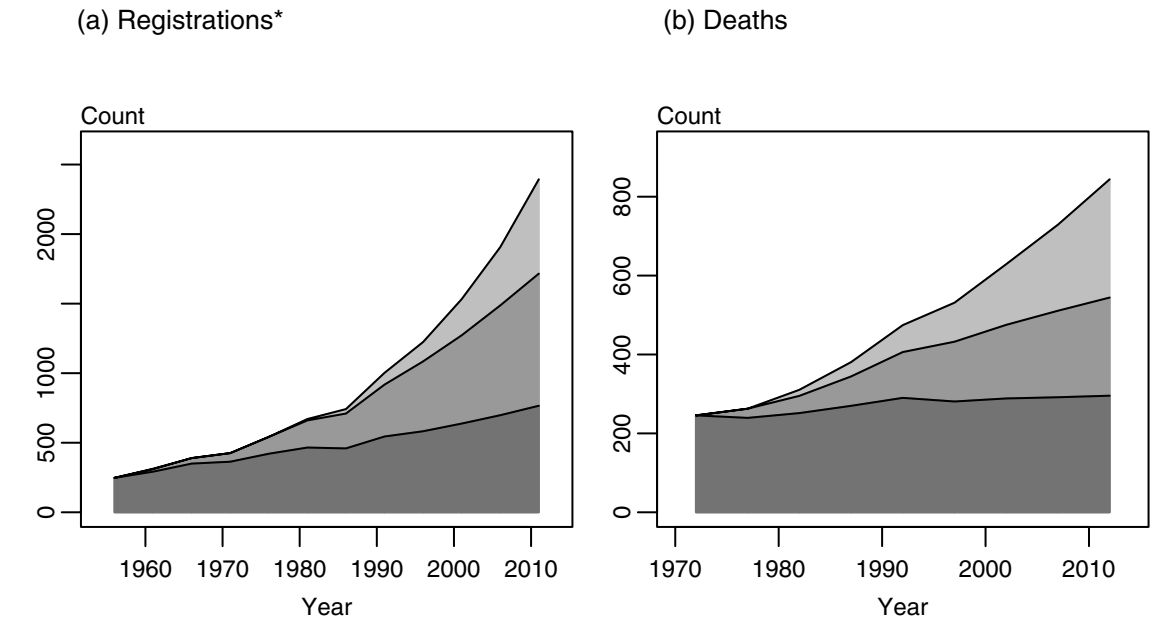
(b) Mortality rates



Key:

- Observed
- Observed, 1994–98
- Fitted and projected (with adjustment for the 'PSA effect' in Figure (a))
- Minimum and maximum estimates
- 90% Bayesian credible interval

Figure 30.5 Drivers of change in the cancer burden, prostate cancer



* Adjusted for the 'PSA effect'.

Table 30.1 Key results, prostate cancer

	Incidence			Mortality		
	1991	2011 (CI)*	change (%)	1997	2012 (CI)	change (%)
Age standardised or age specific rate (per 100,000)						
15+	72	102 (76 – 141)	42	33	34 (30 – 46)	4
25–44	0	0 (0 – 1)	-	0	0 (0 – 0)	-
45–64	38	52 (38 – 85)	37	12	15(10 – 20)	27
65+	537	847 (599 – 1179)	58	261	297 (246 – 415)	14
Number of cases						
15+	1002	2394 (1699 – 3400)	139	535	844 (691 – 1178)	58
25–44	1	2 (1 – 5)	-	1	1 (1 – 2)	-
45–64	122	281 (206 – 458)	130	44	80 (58 – 110)	82
65+	879	2110 (1492 – 2937)	140	490	764 (633 – 1067)	56

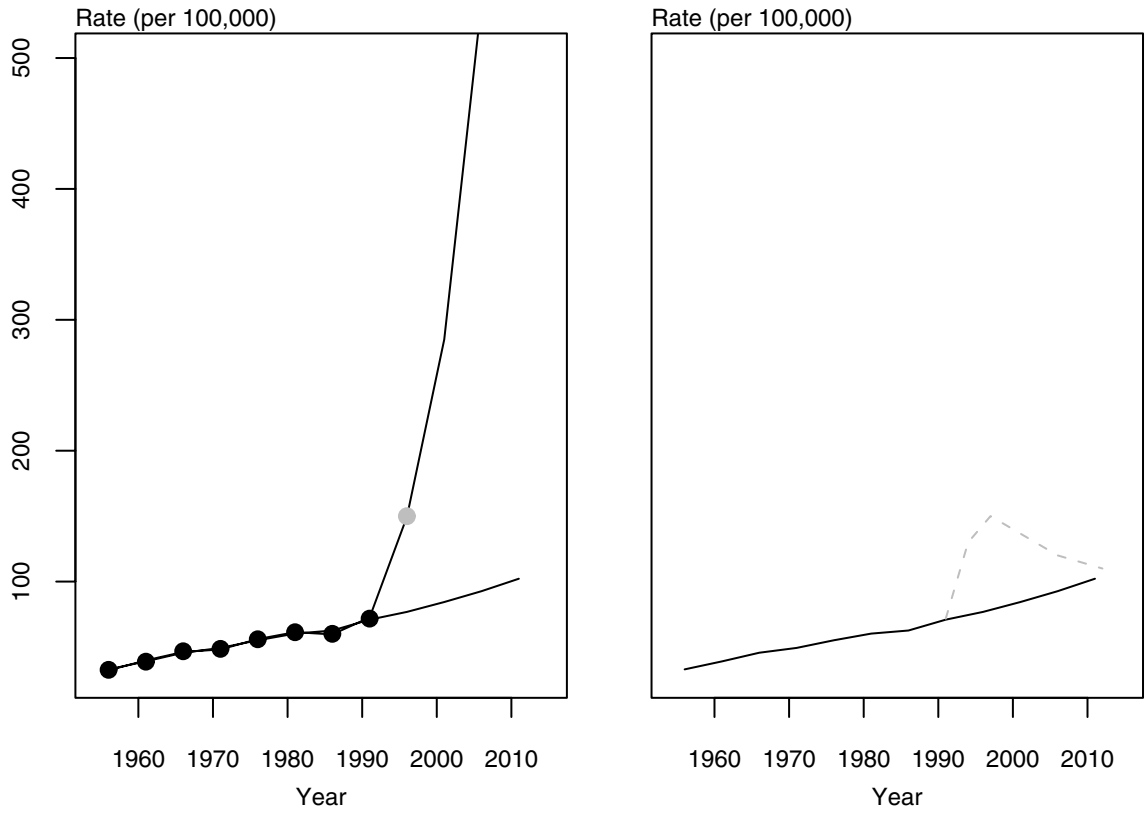
* Adjusted for the 'PSA effect'.

CI = 90% Bayesian credible interval
Percentage change omitted when estimate is not robust because of small numbers.

Figure 30.6 Alternative projections to 2011, prostate cancer: age standardised registration rates

(a) Projections with and without 1994-98 data

(b) Illustrative transient 'PSA effect'



Key:

Fitted and projected, without the 1994–98 registration data

Fitted and projected, with the 1994–98 registration data

Illustrative transient 'PSA effect'