2 Method

This report includes the development and analysis of 5-year relative survival proportions by geographical category and socioeconomic index calculated for the place of residence at time of diagnosis with cancer. It examines relative survival for persons diagnosed with cancer between 1992 and 1997, and deaths of these persons which occurred between 1992 and 1999.

Relative survival is the ratio of the observed survival rate for a given cohort of cancer patients to the expected survival rate in the general population. The observed survival rate is calculated by dividing the survival period (which is 5 years in this report) up into successive small intervals. The rate is estimated by first calculating the survival rate for each interval. This is the proportion of all cancer patients alive at the start of the interval who are still alive at the end of it. The overall observed survival rate for the period is then the product of the rates for each small interval in the period. This means that patients who were diagnosed between 1995 and 1997 still contribute to the estimate of 5-year survival through contributing to the survival estimates for the earlier intervals in the five-year period, though they do not contribute to the later intervals. These later intervals are only based on data for people diagnosed prior to 1994.

The methodology used in developing the relative survival estimates is outlined in *Cancer Survival in Australia, 2001 Part 1* (AIHW & AACR 2001):

- The Australian state and territory cancer registries provided cancer incidence data for the analyses. The cancer data included place of residence at time of diagnosis.
- The cancer incidence data were matched to data provided in the National Death Index to determine if a death had occurred.
- Population information was sourced from the Australian Bureau of Statistics and classified to geographic categories and socioeconomic status quintiles.
- Mortality data were extracted from the AIHW National Mortality Database, and classified to the respective geographic and socioeconomic groupings.
- Hazard rates were determined for the respective geographic and socioeconomic groupings from the mortality and population figures.
- Relative survival proportions for the seven individual cancers and for all cancers at the appropriate levels were produced using the computer software outlined in *Cancer Survival in Australia, 2001 Part 1* (AIHW & AACR 2001).

Issues in classifying the data by geographic region and socioeconomic status are outlined below.

2.1 Classification by geographical category

The Rural, Remote and Metropolitan Areas (RRMA) classification (DPIE & DHSH 1994) classifies each state and territory into three groups—metropolitan zones, rural zones and remote zones—using information from the 1991 Census. Metropolitan areas include the capital cities and some areas outside the capital cities which are determined according to total population. Rural and remote zones are classified according to an index of remoteness, which is based on population density and distance to large population centres. Some cancer registries record place of residence as a postcode, while other registries record the place of

residence as a statistical local area. Respective electronic concordances were developed by the AIHW to code SLA and postcode into the appropriate RRMA categories and were used to classify the cancer, mortality, and population data to one of the seven categories shown in Table 2.1.

Table 2.1: Structure of the Rural, Remote and Metropolitan Areas (RRMA) classification

Zone	Category	Description
Metropolitan zone	M1	Capital cities
	M2	Other metropolitan areas (urban centre population –100,000)
Rural zone	R1	Large rural centres (urban centre population 25,000–99,999)
	R2	Small rural centres (urban centre population 10,000–24,999)
	R3	Other rural areas (urban centre population <10,000)
Remote zone	Rem1	Remote centres (urban centre population –5,000)
	Rem2	Other remote areas (urban centre population <5,000)

Source: DPIE & DHSH 1994.

Relative survival proportions for the seven individual cancers and for all cancers by RRMA at the appropriate levels were produced using the computer software outlined in *Cancer Survival in Australia, 2001 Part 1* (AIHW & AACR 2001).

A small proportion of cancer incidence and mortality records could not be assigned a RRMA code and were excluded (Table 2.2).

Table 2.2: Records excluded from the geographic analysis

	Cancer incidence cases		Mortality cases	
Year	Males	Females	Males	Females
1992	76	95	217	112
1993	68	74	240	125
1994	66	69	264	132
1995	73	67	245	127
1996	64	91	360	180
1997	80	101	339	170
Total	**1,678**	**1,812**	**2,275**	**1,139**

2.2 Classification by socioeconomic status

As discussed in *Cancer Survival in Australia, 2001 Part 1* (AIHW & AACR 2001), the ABS *Index of Relative Socioeconomic Disadvantage* has been used to classify socioeconomic status in this report. This involved allocating to the residence of each person with a cancer diagnosis a code indicating the socioeconomic status of the SLA or postcode of that residence. These data were then used to calculate the survival rates for each cancer by socioeconomic status. Each person on the mortality database was similarly allocated a socioeconomic status code based on their residence at the time of their death. Finally the population estimates for each SLA were also allocated a socioeconomic status code. The mortality and population data were then used to calculate hazard rates by socioeconomic status for the general population.

One drawback of this analysis by area of residence is that it will misclassify high socioeconomic status persons living in low socioeconomic status areas, and vice versa. Hence findings by socioeconomic status should be interpreted with care.

A small proportion of cancer incidence, mortality and population records were unable to be allocated a socioeconomic index value and were excluded (Table 2.3).

Table 2.3: Records excluded from the socioeconomic status analysis

	Cancer cases		Mortality cases		Population cases	
Year	Males	Females	Males	Females	Males	Females
1992	354	314	577	411	229	117
1993	360	273	584	404	251	129
1994	409	336	178	101	280	138
1995	397	338	177	96	261	136
1996	432	361	171	95	384	187
1997	510	409	169	98	351	176
Total	**2,462**	**2,031**	**927**	**608**	**1,755**	**883**

2.3 Age adjustment

Where survival is compared between different populations with different age structures, it is important to adjust for these differences. Relative survival can be age adjusted in an analogous way to the age adjustment of incidence or mortality rates. The age-adjusted survival proportion is calculated, using the direct standardisation method, as a weighted sum of the age-specific relative survival proportions (see, for example, Berrino et al. 1999). The formula is:

$$ASR = \sum_{j=1}^{n} \left(\frac{m_j}{M} \right) R_j$$

where

ASR = the age-standardised relative survival proportion;

R_j = the age-specific relative survival proportion at age $j, j = 1, \cdots, n$;

m_j = the number of people in the standard population at age $j, j = 1, \cdots, n$; and

M = the total number of people in the whole standard population

$$= \sum_{j=1}^{n} m_j$$

The usual standard population used for age adjustment of Australian health data is the total Australian population for 1991. However, the age structure of the total population is very different to the age structure of people diagnosed with cancer. Instead the population consisting of all people diagnosed with cancer during the period 1991–1997 has been used as the standard population for age adjustment in this report.