2 Method overview

The objective of this report was to estimate relative survival proportions for persons with cancer in Australia. The persons included in this analysis were those diagnosed with cancer from 1982 to 1997, with survival follow-up to 31 December 1999.

In undertaking this analysis, data sets and computer codes were brought together in the following steps:

- Cancer incidence data for the analysis were provided by the Australian State and Territory cancer registries.
- These cancer incidence data were matched to data in the National Death Index maintained by the AIHW.
- Population data for each of the 16 years in the study, by age and sex, were sourced from the Australian Bureau of Statistics.
- Population mortality numbers by age and sex were extracted from the AIHW's National Mortality Database and, with the population data supplied by the ABS, were used to create Australian population hazard rates.
- Relative survival proportions for the 20 individual cancer sites, and for all cancers, were produced using a suite of codes developed by the Mayo Foundation in the United States from statistical software produced by the SAS Institute. The Mayo code was adapted by the Queensland Cancer Registry and the AIHW to produce the required estimates.

The analysis produced estimates of relative survival by three diagnosis periods (1982–1986, 1987–1991 and 1992–1997), survival time (1 to 15 years), age group (specific to cancer site), and sex (male, female, and total persons).

For a more detailed discussion on the method and process used see Appendix 1.

Relative survival analysis

Relative survival analysis compares the survival of persons diagnosed with cancer (observed) with that experienced by the general age- and sex-matched population to which they belong (expected). The ratio of observed to expected is used to estimate the proportion of people whose risk of dying has been affected by their disease. This method of analysis does not require knowledge of the cause of death.

Survival period

This analysis focuses on one-year and five-year survival. Although ten-and fifteen-year survival proportions have been calculated, their interpretation can be problematic and thus they have not been discussed within the cancer chapters.

One-year survival is an indicator of:

- how effective a cancer treatment has been
- the stage at which the cancer was detected.

Five-year survival is an indicator of:

- the effectiveness of treatment
- the impact of the cancer treatment and whether treatment side-effects are associated with additional mortality
- cancer monitoring rather than cancer treatment, and may also be interpreted as a milestone indicating an arrest in the disease process or a slow development of the disease.

Ten- and fifteen-year relative survival estimates indicate survival in the longer term, extending the survival picture that five-year relative survival begins. However, problems of interpretation arise as the age at diagnosis increases. Expectation of length of life in the general population needs to be in excess of fifteen years for a survival estimate of fifteen years to be sensible. As a person moves into the 60+ ages, expectation of the remaining years of life decreases to fifteen years and below. Another problem associated with interpreting longer survival is that patients may get lost to follow-up, thus a date of death may not get recorded. Given that many cancers are first detected at later ages, these effects need to be considered when analysing ten- and fifteen-year survival.

The relative survival proportion statistics are influenced by the stage at which cancers are detected. Stage of cancer is currently not routinely coded by most State and Territory cancer registries. Hence analysis of survival by stage of cancer for Australia as a whole is not possible. The New South Wales Cancer Registry, however, has a well-developed coding system for stage of cancer, and this is, in time, likely to be implemented in other States and Territories.

Interpretation of survival measures

Increased survival may arise from a number of factors. These include:

- public education about screening programs and self-examination
- the effect of changing mortality patterns from other causes of death
- increased effectiveness of general practitioners in diagnosing and following up on suspicious signs and symptoms
- increased speed in referral
- more effective investigation and staging of disease
- more widespread availability of treatment
- more effective treatment (Coleman et al. 1999).

Interpretation of relative survival also needs to done in the context of the healthcare setting. In addition to the factors affecting survival, screening can bring about large increases in relative survival. Earlier diagnosis may lead to a greater probability of a cure. However, earlier detection will simply add to the survival time if the death date does not change. Differences in coding practices by cancer registries may also influence survival measures. For instance, it has been reported that the US SEER program combines in situ and invasive bladder cancers when reporting incidence, making comparability difficult (Parkin et al. 1992).