Epidemiology of childhood cancer in Australia and trends over the last 20 years.

Joanne Aitken PhD
Director of Cancer Registries and Scientific Consultant, Epidemiology
Cancer Council Queensland

More than 600 children aged 0-14 years old are diagnosed with cancer each year in Australia. Despite advances in therapy, cancer remains one of the leading causes of death within this age group. This paper will present childhood cancer incidence and population-based survival estimates, by diagnostic group, sex, age at diagnosis, and tumour stage (where available). International comparisons and changes in survival over time will be discussed.

The Australian Paediatric Cancer Registry
The information to be presented comes from an analysis of data collected by the Australian Paediatric Cancer Registry (APCR). This is one of the few national registries of childhood cancer that are in operation anywhere in the world. The Registry includes diagnostic and treatment information on all children in Australia aged under 15 years who are diagnosed with cancer. High quality data is currently available for the period from 1983 to 2007, involving over 14,000 cases of childhood cancer, 95% of which have been histologically verified. The Registry operates with the assistance and cooperation of all State and Territory cancer registries and major paediatric oncology hospitals throughout Australia. As is standard practice with all cancer registry data, strict protocols are in place to ensure the privacy and confidentiality of all information. The Cancer Council Queensland has managed the APCR since 2004 and provides the sole source of funding.

The burden of childhood cancer
Cancers among children are relatively rare, comprising less than 1% of all cancer diagnoses. Nevertheless, almost 120 children aged 0-14 years die from cancer in Australia each year, placing cancer as the second most common cause of death among children after external causes such as injuries, accidents and poisoning.

Childhood cancer incidence
From 1997-2006, an average of 618 children were diagnosed with cancer each year in Australia, corresponding to an annual rate of 156 cases per million children. This is similar to the United States, and is one of the highest reported incidence rates among other developed nations, consistent with research that has shown a strong correlation between childhood cancer incidence and a country’s level of prosperity.

Leukaemias are the most common type of cancer diagnosed among Australian children, accounting for around one third of all cases (or an average of 207 per year) between 1997-2006. The next most common childhood cancers are tumours of the central nervous system, with 141 cases per year or 23% of all childhood cancers, followed by lymphomas with 62 cases per year or 10% of the total.

The incidence of all childhood cancers combined is significantly higher among boys than girls. 54% of all cases are among boys, with an average of 337 cases per year compared to 282 cases per year for girls. Almost half of all cases (46%) are aged 0-4 years at diagnosis, one quarter (25%) are aged 5-9 years and 29% are aged 10-14 years.

Incidence rate trends
The trend in incidence rates for all childhood cancers combined increased significantly by an average of 1.7% per year between 1983-1994, although rates have subsequently remained stable overall. Childhood cancer incidence rates for boys and girls have been converging in recent years. Among boys there was a significant increase of 1.7% per year from 1983-
1994 and the trend has been stable since then. Among girls, there has been an ongoing significant increase of 0.9% per year.

**Childhood cancer survival**

Turning now to survival, the estimates to be presented are based on the survival of children diagnosed between 1995 and 2004 who were followed-up to the end of 2006. All estimates are expressed in terms of relative survival, that is, relative to the survival of children in the general population of the same age and sex.

Relative survival for all childhood cancers combined averages around 90% by the end of the first year after diagnosis falling to 80% after 5 years, with a small decline to 77% after 10 years.

Information on stage at diagnosis is recorded in the Registry for certain cancers, including lymphomas, neuroblastoma, renal tumours and the diagnostic subgroup of rhabdomyosarcomas. Survival is consistently better for early stage cancers: five-year relative survival is 94% among children with Stage I or II cancers compared to 62% for children with cancer that is metastatic at diagnosis. The biggest differences in stage occurred among children diagnosed with neuroblastoma, with five-year survival varying from 96% for stage I cases to 50% for stage IV cases.

There has been a continuing improvement in childhood cancer survival in Australia over time. For children diagnosed between 1983-1994, five-year relative survival for all cancers combined was 72%. This has improved to almost 80% overall for those diagnosed between 1995-2004. Similar improvements in survival have been reported for children with cancer in other developed countries.

Recent analyses of geographical differences in childhood cancer incidence and survival in Australia will be discussed.

**Figure 1**

*Incidence Rate Trends*

*Incidence rate by year of diagnosis for all childhood cancers combined, Australia, 1983-2006*

Notes: 1. Rates are directly age-standardised to the 2001 Australian Standard Population.
Survival by Stage
Five-year relative survival for selected childhood cancers* by stage at diagnosis, Australia, 1995-2004

* Includes the diagnostic groups lymphomas, neuroblastoma, renal tumours and the subgroup rhabdomyosarcomas.