

# A Summary of Childhood Cancer Statistics in Australia, 1983–2016

The impact of a diagnosis of cancer for a child and their family is immense. Although large gains have been seen in survival over recent decades, cancer remains one of the most common causes of death among children aged under 15 years in Australia.

Beyond the loss of young lives, the burden of childhood cancer extends to the long-term adverse health effects experienced by a large proportion of childhood cancer survivors, either because of the cancer itself or as a result of treatment.

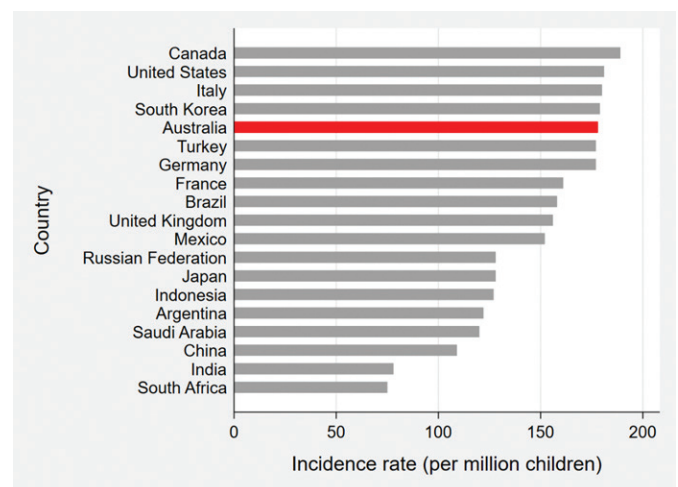
The information presented in this document summarises some of the latest findings from the Australian Childhood Cancer Registry, including data on incidence (how many children are diagnosed with cancer), survival (how many children with cancer remain alive for a given period of time, usually five years) and mortality (how many children die from cancer).

## WHAT IS THE AUSTRALIAN CHILDHOOD CANCER REGISTRY (ACCR)?

- The ACCR is one of the longest-running and most comprehensive national registries of childhood cancer in the world
- It includes all children aged under 15 who are diagnosed with cancer in Australia
- The ACCR is managed and funded entirely by Cancer Council Queensland
- It operates in collaboration with the Australasian Association of Cancer Registries, all Australian State and Territory population cancer registries and all paediatric oncology treating hospitals
- The purpose of the ACCR is to produce and publish statistical information about childhood cancer in Australia and thereby to facilitate research to better understand the causes of childhood cancer and improve outcomes for children with cancer
- Complete and verified data is currently available in the ACCR for the period 1983–2016

## HOW MANY CHILDREN ARE DIAGNOSED WITH CANCER IN AUSTRALIA? (2012–2016)

- On average, approximately 770 children aged 0–14 years old were diagnosed with cancer each year in Australia between 2012 and 2016, corresponding to an age-standardised rate of 172 cases per million children per year
- Australia was estimated to have the fifth highest incidence rate of childhood cancers among countries in the G20, following Canada, the United States, Italy and South Korea (Figure 1)



**Figure 1:** Estimated childhood cancer incidence rates for G20 countries, 2018  
Source: Global Cancer Observatory, International Agency for Research on Cancer.

- The broad categories of leukaemias (31%), tumours of the central nervous system (mainly brain tumours, 23%) and lymphomas (11%) collectively comprised two-thirds (66%) of all childhood cancer cases in Australia between 2012 and 2016. More specifically, the three most common types of childhood cancer were lymphoid leukaemias (25%), astrocytomas (10%) and neuroblastoma and ganglioneuroblastoma (6%)
- Childhood cancer is more common for boys (54% of cases) than for girls (46%)
- Almost half (47%) of all children diagnosed with cancer in Australia were aged 0–4 years old at diagnosis

## HOW HAVE CHILDHOOD CANCER INCIDENCE RATES IN AUSTRALIA CHANGED OVER TIME? (1983–2016)

- After adjusting for changes in the population, the modelled incidence rate of all childhood cancers combined in Australia has increased by a total of 34% between 1983 and 2016 (Figure 2). The most recent trend has seen a 1.1% average annual increase between 2005 and 2016 (12% increase in total over that period)

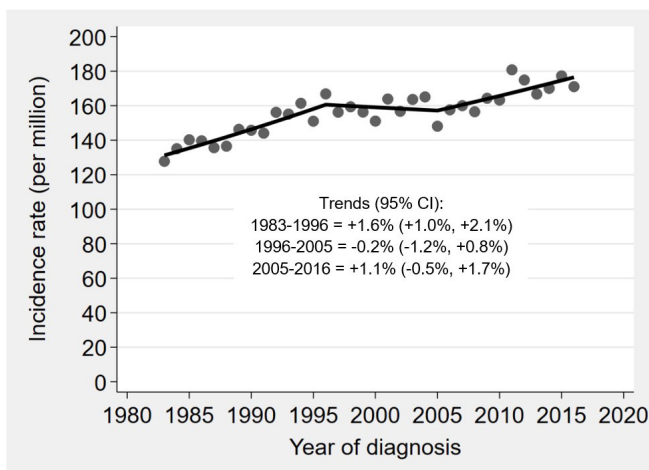


Figure 2: Incidence rates (observed and trend) for all childhood cancers combined, Australia, 1983–2016

- Significantly increasing trends in incidence rates over the entire period from 1983 to 2016 were observed for Burkitt lymphomas (+1.8% per year on average), osteosarcomas (+1.3%), intraspinal & intracranial embryonal tumours (mostly medulloblastoma, +0.8%) and lymphoid leukaemias (+0.6%). In contrast, incidence rates of childhood melanoma have decreased rapidly by an average of 7.1% per year since 1996. Following previous increasing trends, incidence appears to have also peaked for hepatoblastoma (-0.7% per year since 1998) and germ cell tumours & neoplasms of gonads (-4.0% per year since 2008), although neither of these trends were statistically significant
- It is difficult to interpret the underlying reasons for incidence rate trends given the limited understanding of the causes of most cases of childhood cancer

## WHAT ARE THE RATES OF SURVIVAL FOR CHILDREN IN AUSTRALIA FOLLOWING A DIAGNOSIS OF CANCER? (2005–2014)

- Relative survival measures the survival of children with cancer compared to the survival of children of the same age and sex in the general population. As at the end of 2016, five-year relative survival for all children diagnosed with cancer combined in Australia between 2005 and 2014 was 85%
- Survival rates varied depending on the type of cancer. Almost all children who were diagnosed with either Hodgkin lymphomas (99%) or retinoblastoma (98%) survived for at least 5 years. Five-year relative survival rates were also high for children with melanomas (95%), germ cell tumours & neoplasms of gonads (94%), Burkitt lymphomas (93%) or lymphoid leukaemias (93%). In contrast, only 59% and 47% of children with intracranial & intraspinal embryonal tumours (mostly medulloblastoma) or other gliomas, respectively, survived for at least 5 years from their date of diagnosis (Table 1)

Table 1: Five-year relative survival by diagnostic group/subgroup, Australia, 2005–2014

| Diagnostic group/subgroup (a)   | Five-year relative survival estimate (b,c)   |
|---|--|
| I. Leukaemias, myeloproliferative & myelodysplastic diseases<br>Ia. Lymphoid leukaemias<br>Ib. Acute myeloid leukaemias   | 90.0 (88.7–91.3)<br>92.8 (91.4–94.0)<br>77.6 (72.5–81.9)   |
| II. Lymphomas & reticuloendothelial neoplasms<br>IIa. Hodgkin lymphoma<br>IIb. Non-Hodgkin lymphoma<br>IIc. Burkitt lymphoma  | 94.4 (92.3–95.9)<br>99.3 (96.8–99.9)<br>89.0 (84.3–92.4)<br>93.1 (87.0–96.4)                     |
| III. Central nervous system & intracranial/intraspinal neoplasms (d)<br>IIIa. Ependymomas and choroid plexus tumours (d)<br>IIIb. Astrocytomas (d)<br>IIIc. Intracranial & intraspinal embryonal tumours (d)<br>IIId. Other gliomas (d) | 76.0 (73.7–78.0)<br>75.4 (67.6–81.6)<br>85.7 (82.7–88.2)<br>59.1 (53.2–64.4)<br>46.5 (39.2–53.5) |
| IV. Neuroblastoma & other peripheral nervous cell tumours<br>IVa. Neuroblastoma & ganglioneuroblastoma  | 77.2 (73.0–81.0)<br>77.1 (72.8–80.9)   |
| V. Retinoblastoma   | 98.3 (94.4–99.6)   |
| VI. Renal tumours<br>VIa. Nephroblastoma & other nonepithelial renal tumours  | 90.1 (86.1–92.9)<br>90.8 (86.9–93.6)   |
| VII. Hepatic tumours<br>VIIa. Hepatoblastoma  | 75.1 (65.0–82.6)<br>78.7 (68.5–85.9)   |
| VIII. Malignant bone tumours<br>VIIIa. Osteosarcomas<br>VIIIc. Ewing tumours & related bone sarcomas  | 80.3 (74.5–85.0)<br>70.4 (60.2–78.6)<br>87.4 (79.7–92.3)   |
| IX. Soft tissue & other extraosseous sarcomas<br>IXa. Rhabdomyosarcomas   | 75.8 (71.2–79.9)<br>75.7 (68.9–81.2)   |
| X. Germ cell tumours, trophoblastic tumours & neoplasms of gonads (d)   | 94.2 (90.7–96.4)   |
| XI. Other malignant epithelial neoplasms & melanomas<br>XIa. Melanomas  | 93.3 (89.5–95.8)<br>95.3 (87.8–98.3)   |

Notes: a.) Defined using the International Classification of Childhood Cancers, version 3 (ICCC-3). b.) Relative survival estimates were calculated using the cohort method for children diagnosed with cancer between 1 Jan 2005 and 31 Dec 2014, with follow-up on mortality status to 31 Dec 2016. c.) 95% confidence interval shown in brackets. d.) Includes intracranial and intraspinal tumours of benign or uncertain behaviour.

- Five-year relative survival rates for childhood cancer in Australia are similar to recent estimates from countries in North America and Europe. For example, the latest overall five-year survival reported for childhood cancer was 88% in Switzerland (2004–2013), 85% in Germany (2004–2013) and 84% in the United States (2009–2015), Canada (2012–2014) and England (2011–2015), compared to 85% in Australia (2005–2014)

## HOW HAVE SURVIVAL RATES FOR CHILDREN WITH CANCER IN AUSTRALIA CHANGED OVER TIME? (1983–2014)

- Five-year relative survival for all childhood cancers combined have improved significantly in Australia over the last three decades, from 73% for children diagnosed between 1983–1993 to 85% for those diagnosed between 2005–2014 (Figure 3)

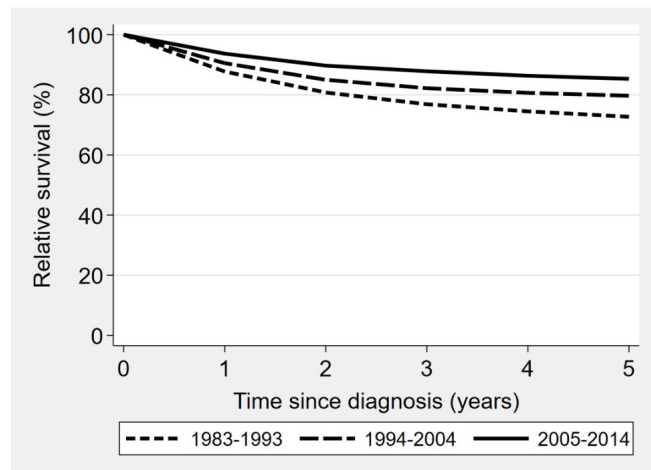


Figure 3: Relative survival by period of diagnosis for all childhood cancers combined, Australia, 1983–2014 (with follow-up to 31 Dec 2016)

- Very large improvements in five-year relative survival have occurred for lymphoid leukaemias (76% for children diagnosed between 1983–1993 compared to 93% for those diagnosed between 2005–2014), acute myeloid leukaemias (46% to 78%), Burkitt lymphomas (73% to 93%), neuroblastoma & ganglioneuroblastoma (52% to 77%) and Ewing tumours & related bone sarcomas (64% to 87%). Smaller, but still significant, rises in survival were also recorded for children with Hodgkin lymphoma (94% to 99%), non-Hodgkin lymphomas (77% to 89%), astrocytomas (79% to 86%), rhabdomyosarcoma (64% to 76%) and germ cell tumours & neoplasms of gonads (84% to 94%). However, there has been little or no improvement in survival for a few other types of childhood cancer over recent decades, most notably some forms of glioma, hepatoblastoma and osteosarcomas
- Most of the gains in childhood cancer survival have occurred as a direct result of improvements in treatment through international collaborative clinical trials

## HOW MANY CHILDREN DIE FROM CANCER IN AUSTRALIA? (2012–2016)

- There were just under 100 deaths per year due to cancer for children under the age of 15 in Australia each year on average between 2012 and 2016, equating to an age-standardised mortality rate of 22 deaths per million children per year
- Australia was estimated to have the second lowest childhood cancer mortality rate among all G20 countries, behind only Japan and similar to the United States and the United Kingdom (Figure 4)

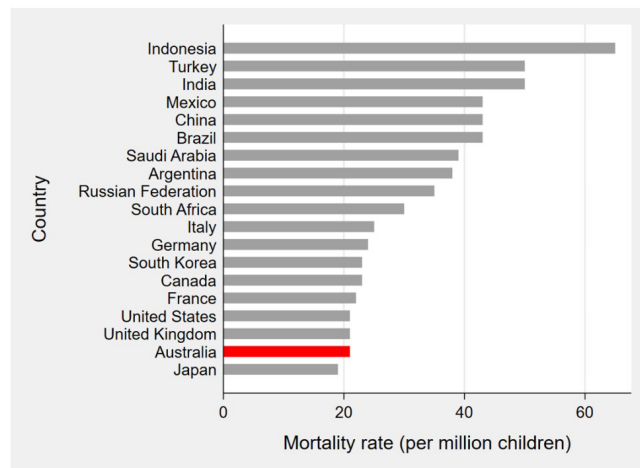


Figure 4: Estimated childhood cancer mortality rates for G20 countries, 2018  
Source: Global Cancer Observatory, International Agency for Research on Cancer.

- Tumours of the central nervous system (mainly brain tumours) accounted for the largest number of cancer deaths for children in Australia between 2012 and 2016 (40%), followed by leukaemias (25%) and neuroblastoma (10%)

## HOW HAVE CHILDHOOD CANCER MORTALITY RATES IN AUSTRALIA CHANGED OVER TIME? (1998–2016)

- Overall childhood cancer mortality rates decreased by an average of 2.7% per year between 1998 and 2016, or a total decrease of 39% based on the modelled estimates (Figure 5)

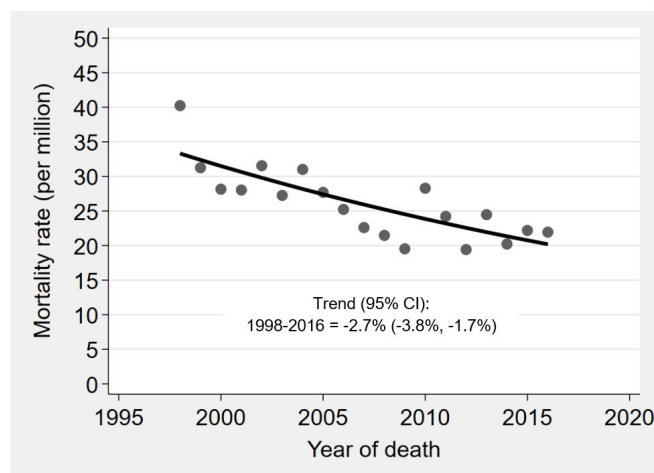


Figure 5: Mortality rates (observed and trend) for all childhood cancers combined, Australia, 1998–2016

- A very large reduction in mortality rates was seen for childhood leukaemia between 1998 and 2007 (61% in total), but mortality rates for leukaemia have remained stable since then. Smaller, ongoing decreases in mortality rates of around 1% and 2% per annum were found for tumours of the central nervous system and all other childhood cancers combined, respectively

Prepared by Assoc Prof Danny Youlden, November 2019. Data source (unless otherwise stated): Australian Childhood Cancer Registry, November 2019 extract.