

Childhood cancers in South Australia

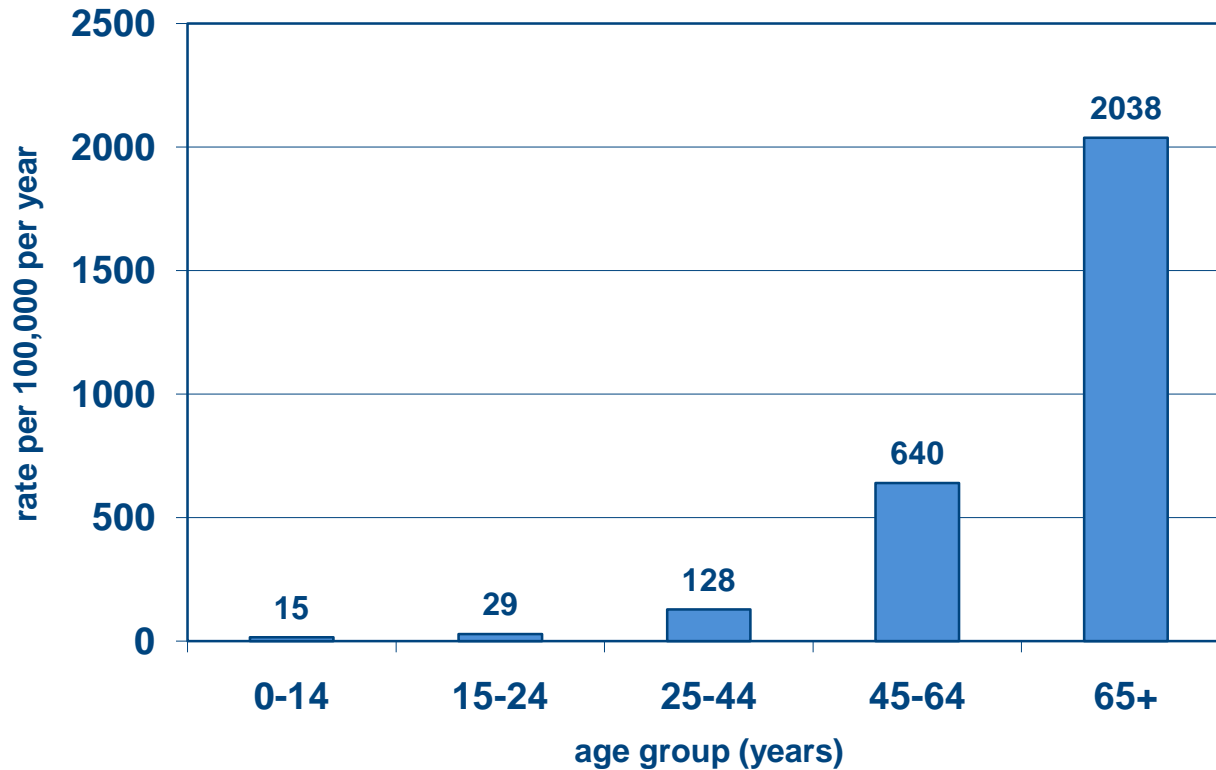
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Outline

- How many children are diagnosed with cancer?
- What are the causes of cancer in children?
- What are the most common types of childhood cancer?
- Have incidence rates changed over time?
- Has survival changed over time?
- What are the long term impacts of childhood cancer?

Incidence of cancer by age

(SA 1991-2006)



Number of cancers among children 0-14years

South Australia

- New cancer cases : 42 per year
- Cancer deaths among children 0-14years: 12 per year

Australia

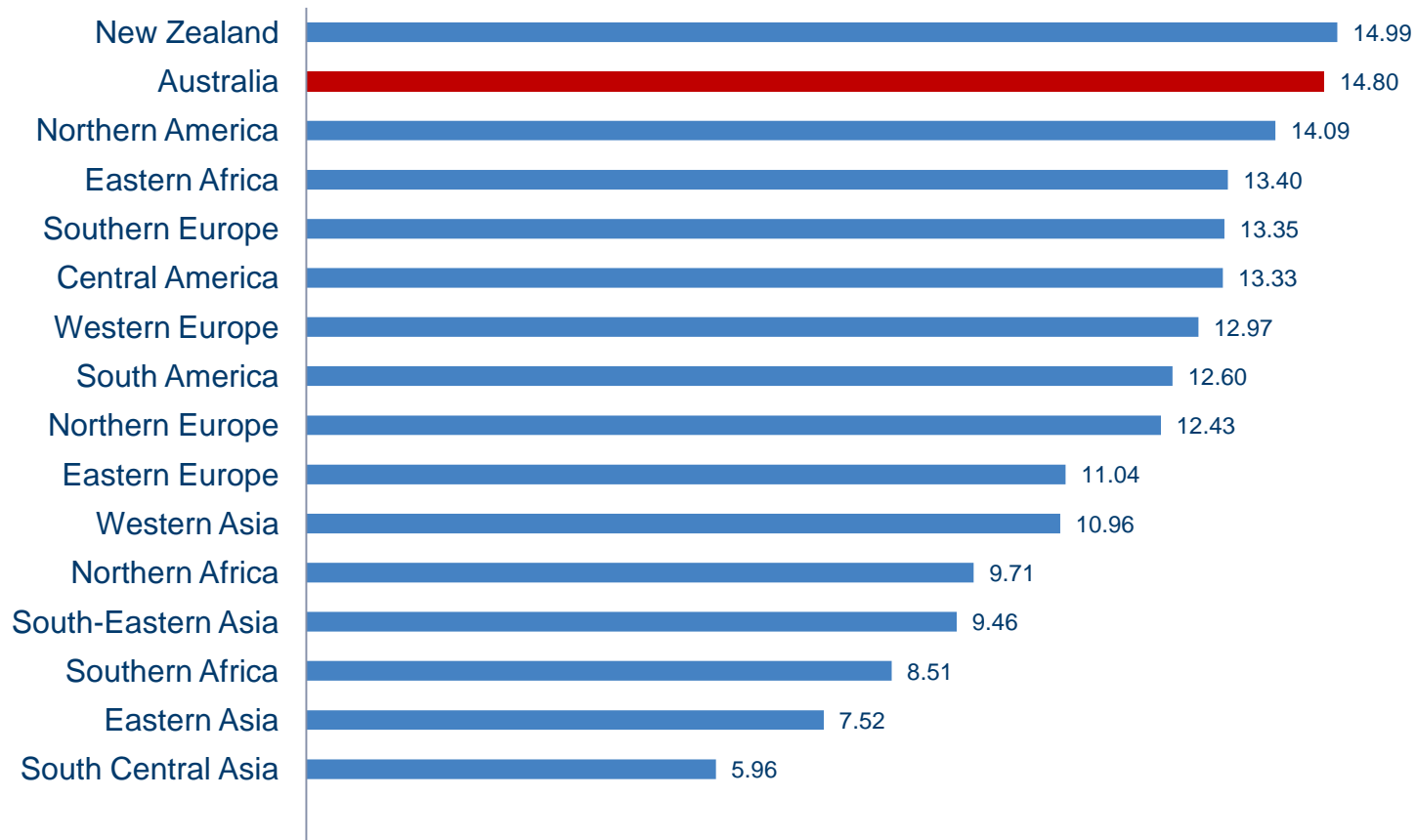
- New cancer cases : 534 per year
- Cancer deaths : 140 per year

Rate: 1.5 per 10,000 per year

Risk: 1 in 500 children will develop cancer (before age 15)

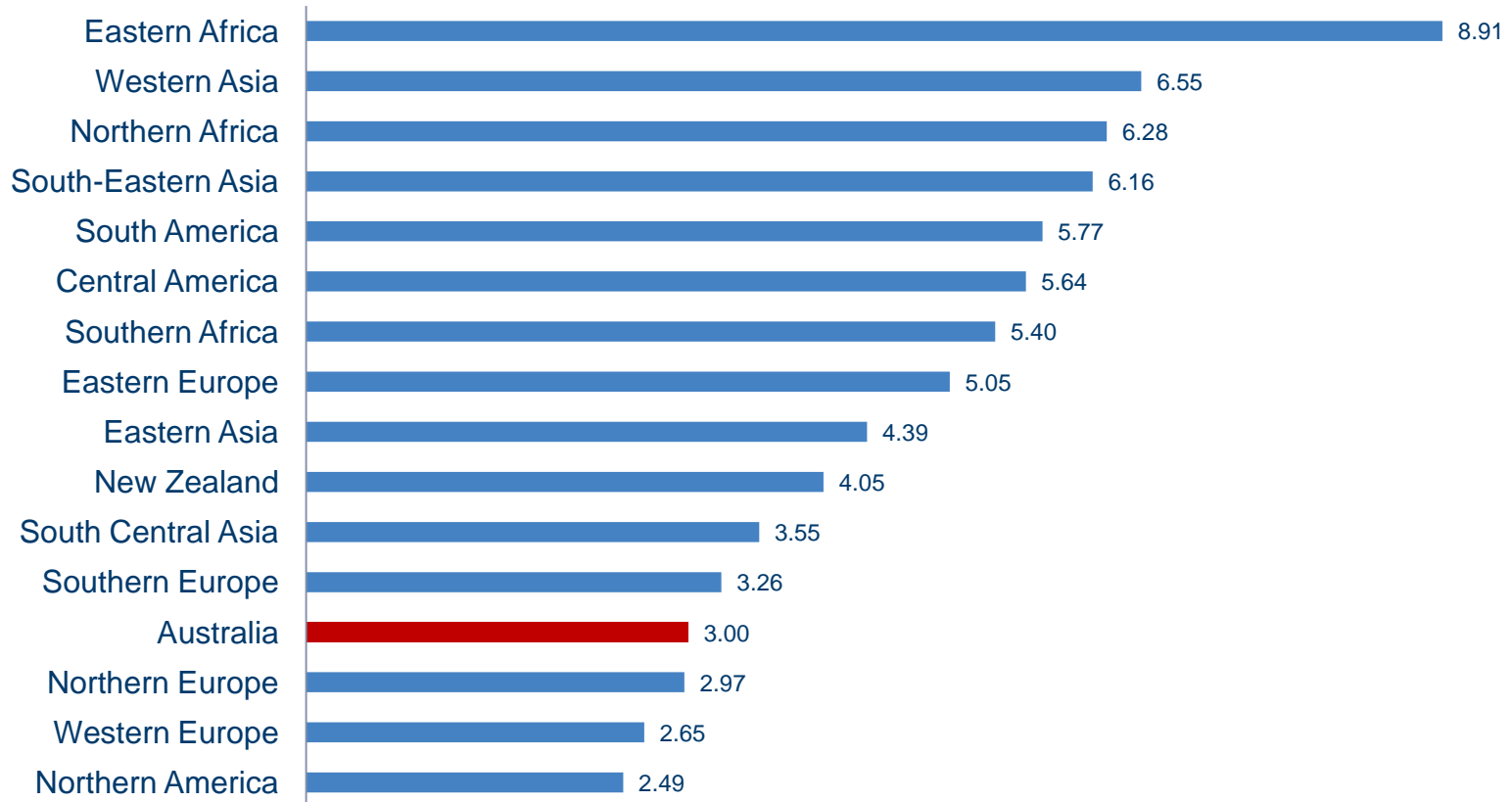
Global comparisons: Incidence

All Cancers, Incidence 0-14 years



Global comparisons: Mortality

All Cancers, Mortality 0-14 years



Risk factors for childhood cancer

Causes are largely unknown!

Known risk factors:

- ✓ Exposure to ionizing radiation
- ✓ Genetic predisposition (eg Downs syndrome - leukaemia)
- ✓ Immune suppression (lymphoma)
- ✓ Specific infections (Epstein Barr Virus – lymphoma)

Risk factors for childhood cancer

Possible risk factors

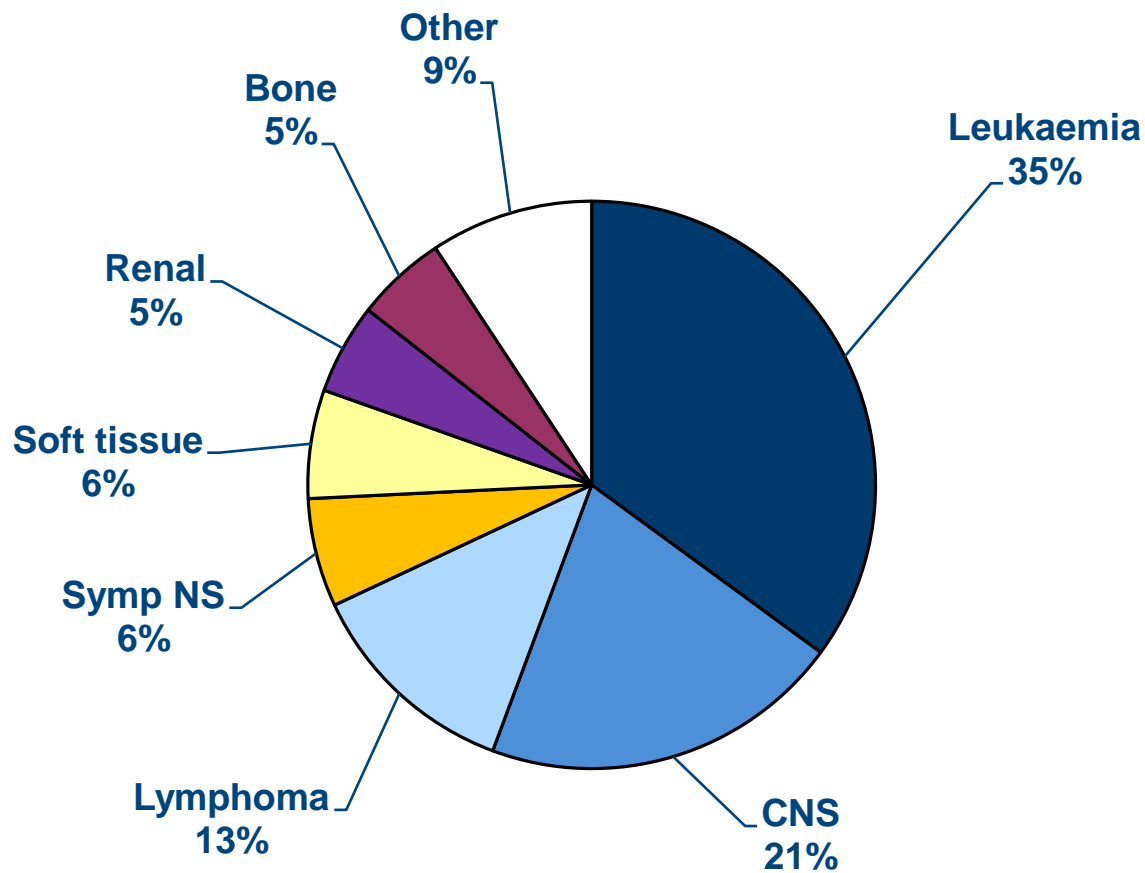
- ? High socioeconomic status (delayed infection hypothesis)
- ? Birth order (delayed infection hypothesis)
- ? Parental exposure to chemicals (solvents, pesticides)

Unlikely to be risk factors

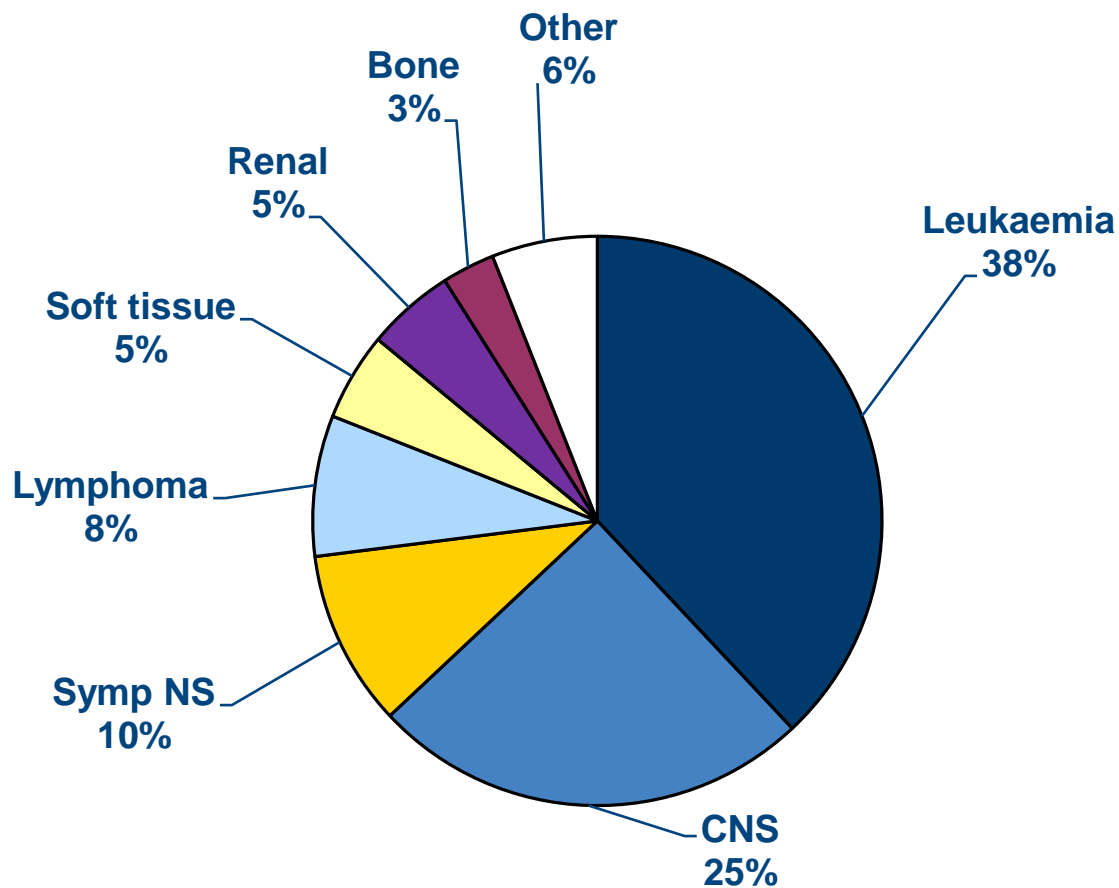
- × Electromagnetic radiation (high voltage power lines)
- × Vitamin K injections
- × Maternal smoking or alcohol consumption
- × Ultrasound in pregnancy

Patterns of childhood cancer in South Australia

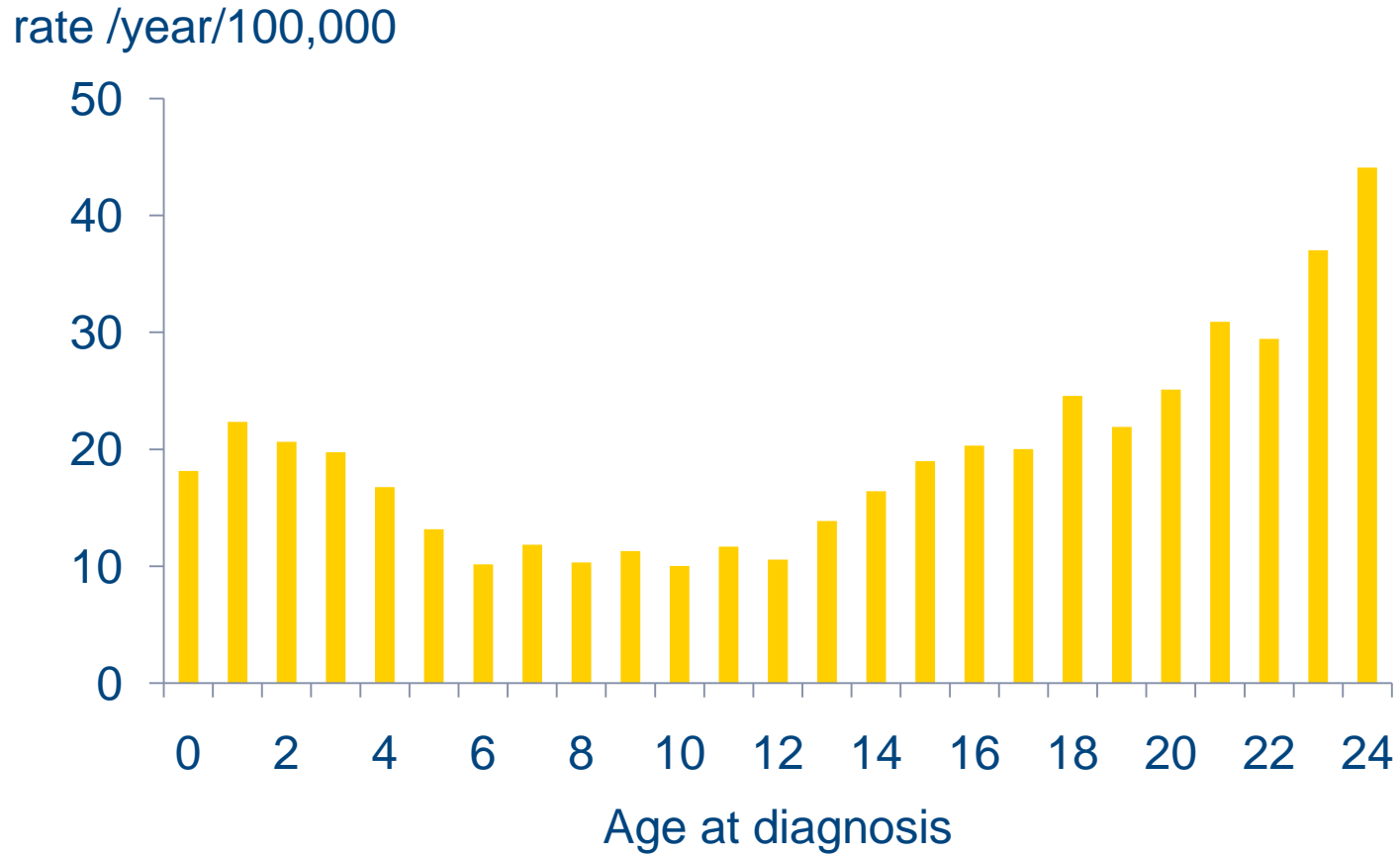
Leading types of childhood cancer (SA 1977-2004)



Leading causes of cancer death in children (SA 1977-2004)

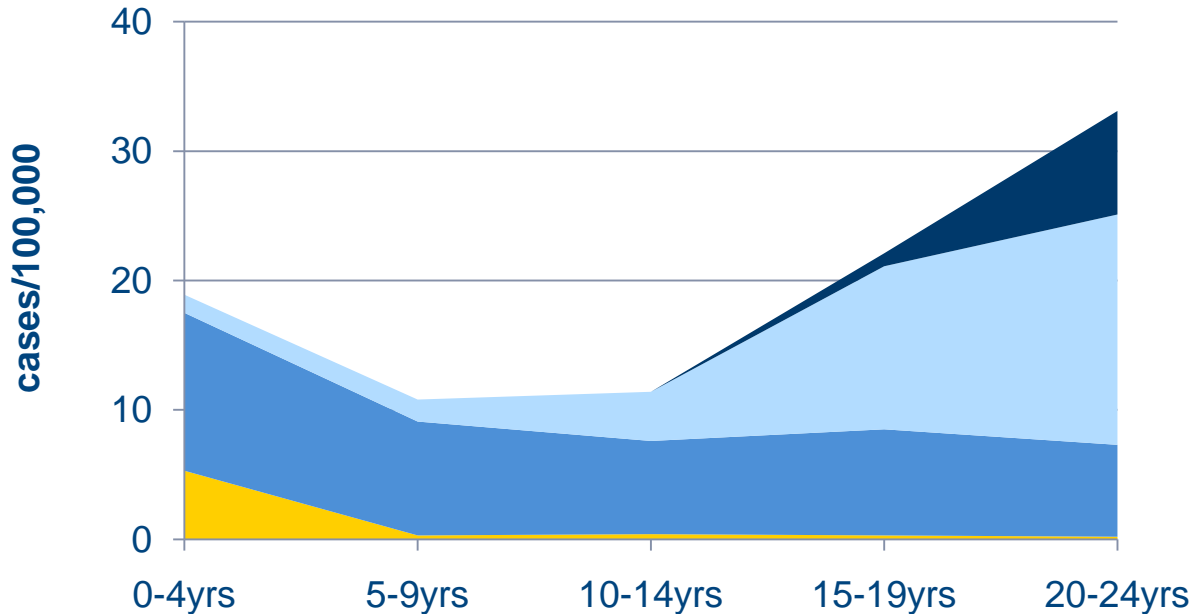


Age specific incidence



Age distribution of cancers

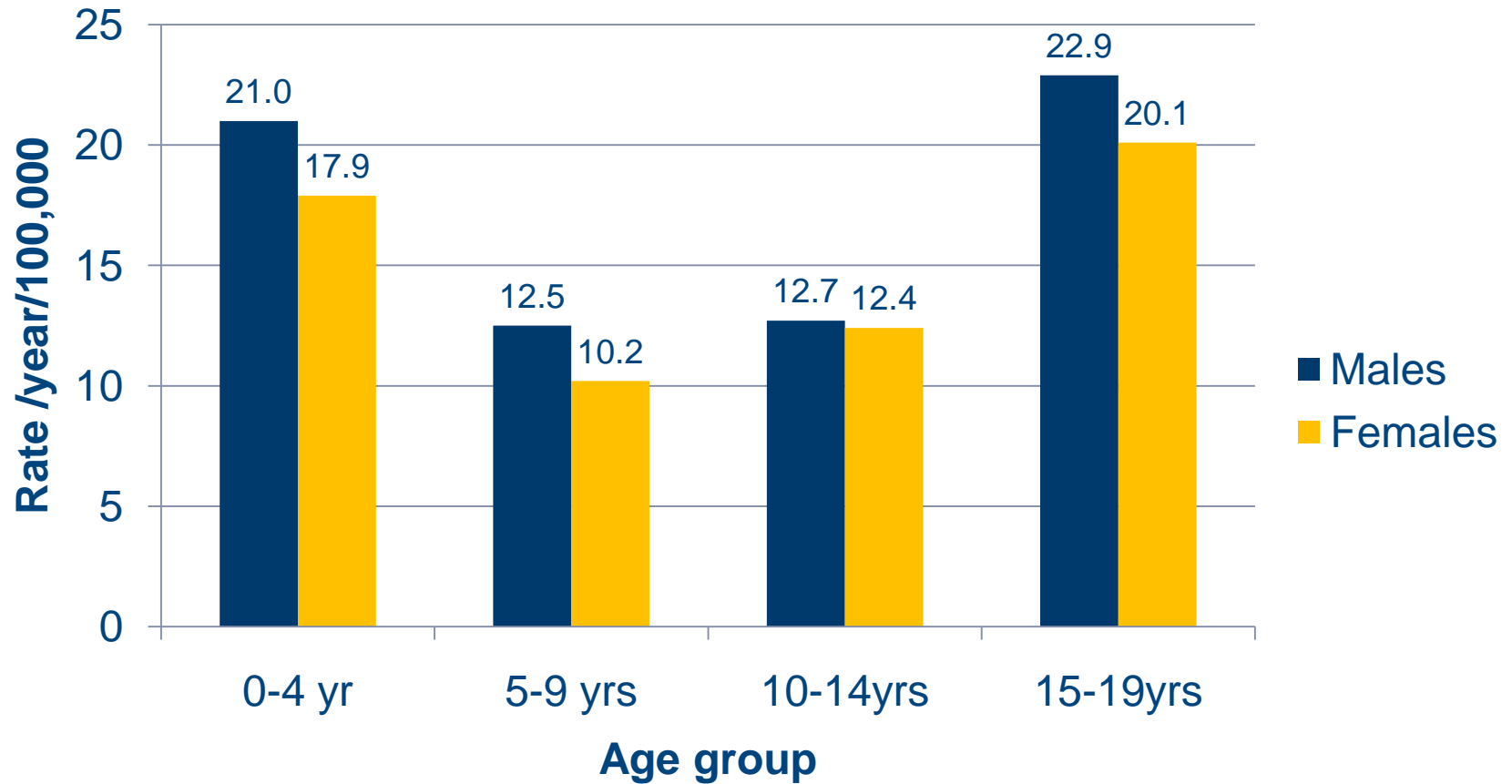
(Age specific incidence SA 1977-2004)



- embryonal (retinoblastoma, liver, renal, SNS)
- paediatric (leukaemia, lymphoma, CNS)
- adolescent/young adult (bone, soft tissue, germ cell, melanoma, thyroid)
- adult carcinomas (breast, colorectal, lung, genitourinary)

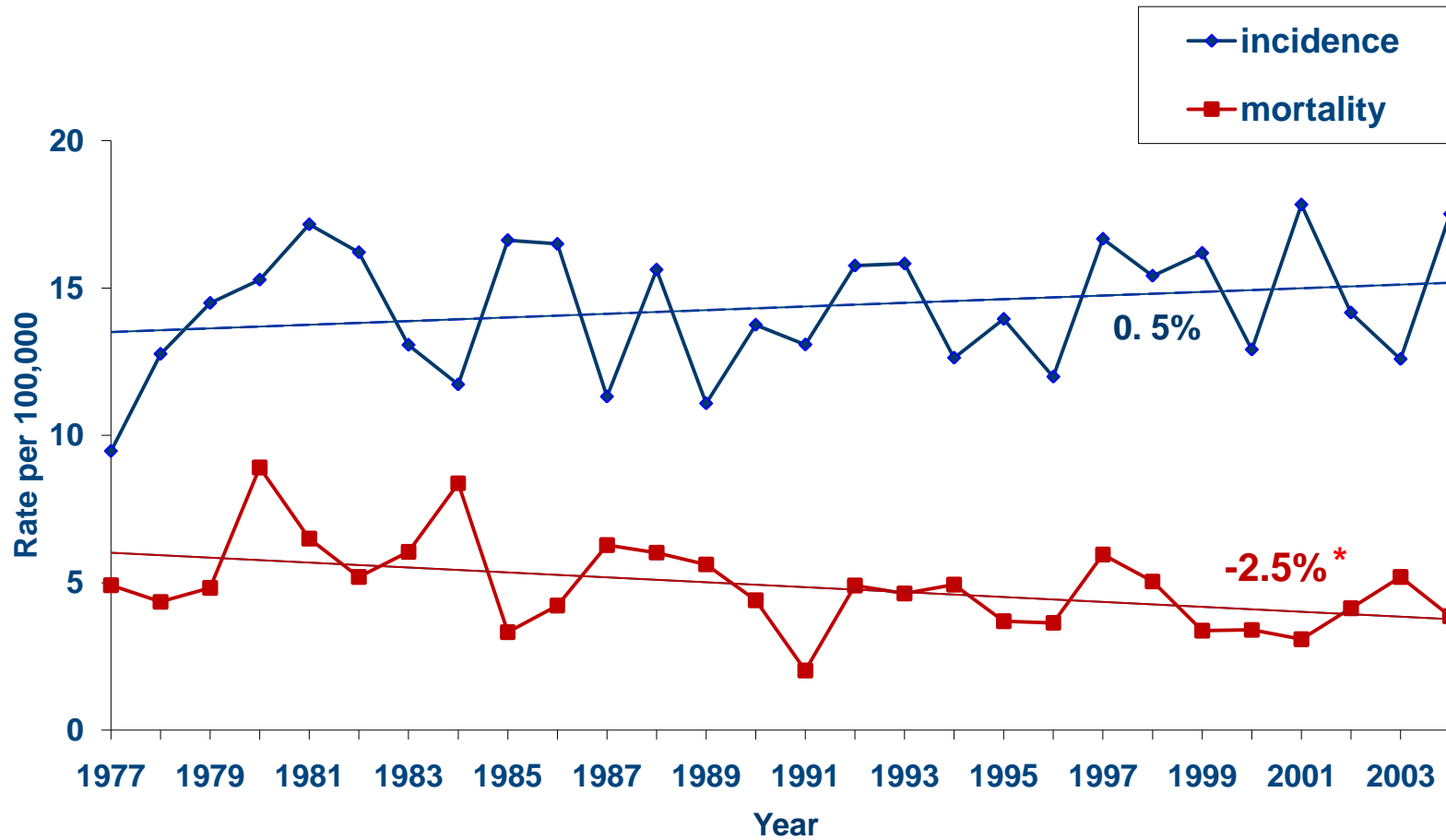
Differences in incidence by sex

(SA1977-2004)



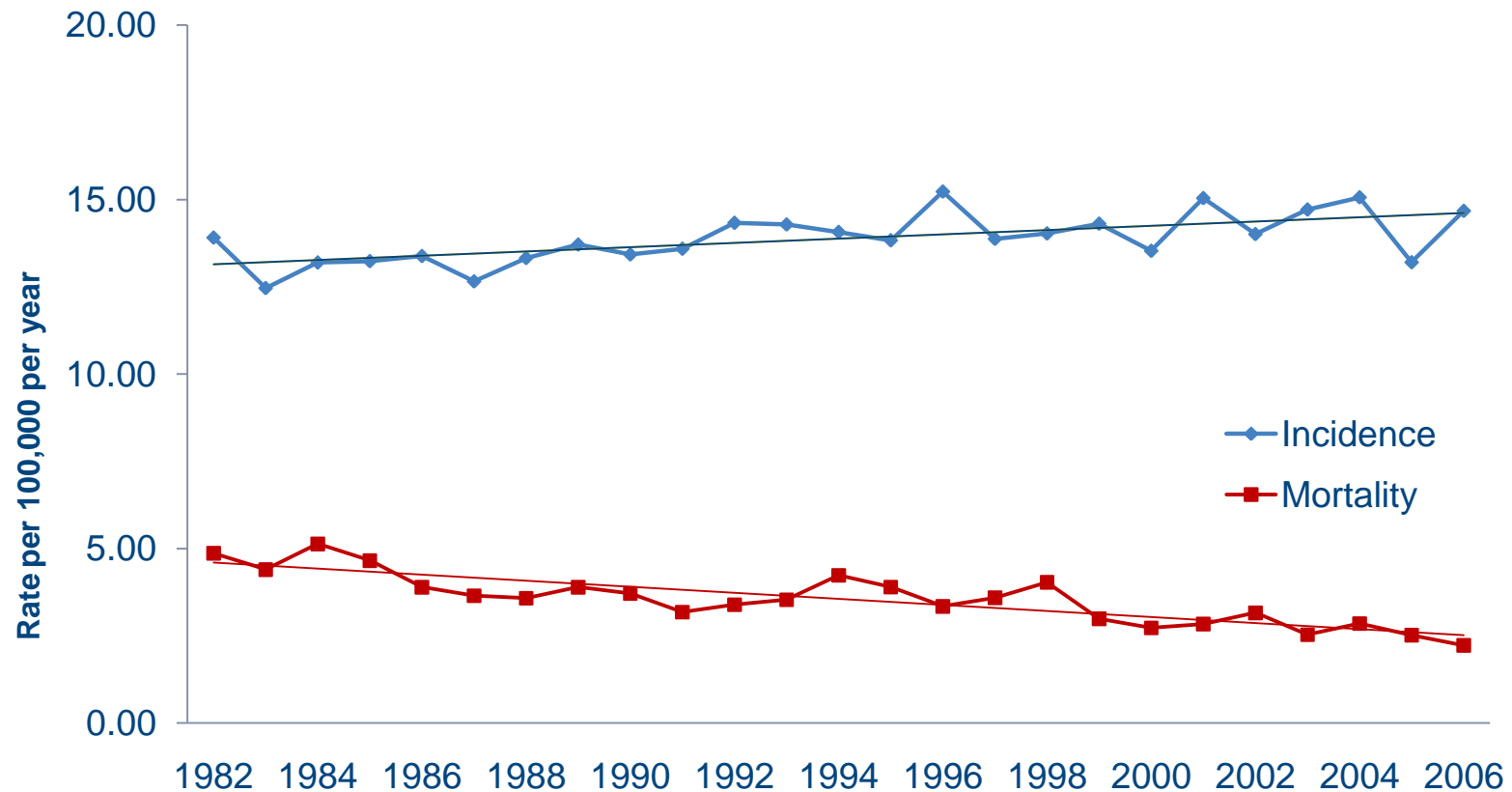
Trends in cancer incidence and mortality

South Australian children (1977-2004)



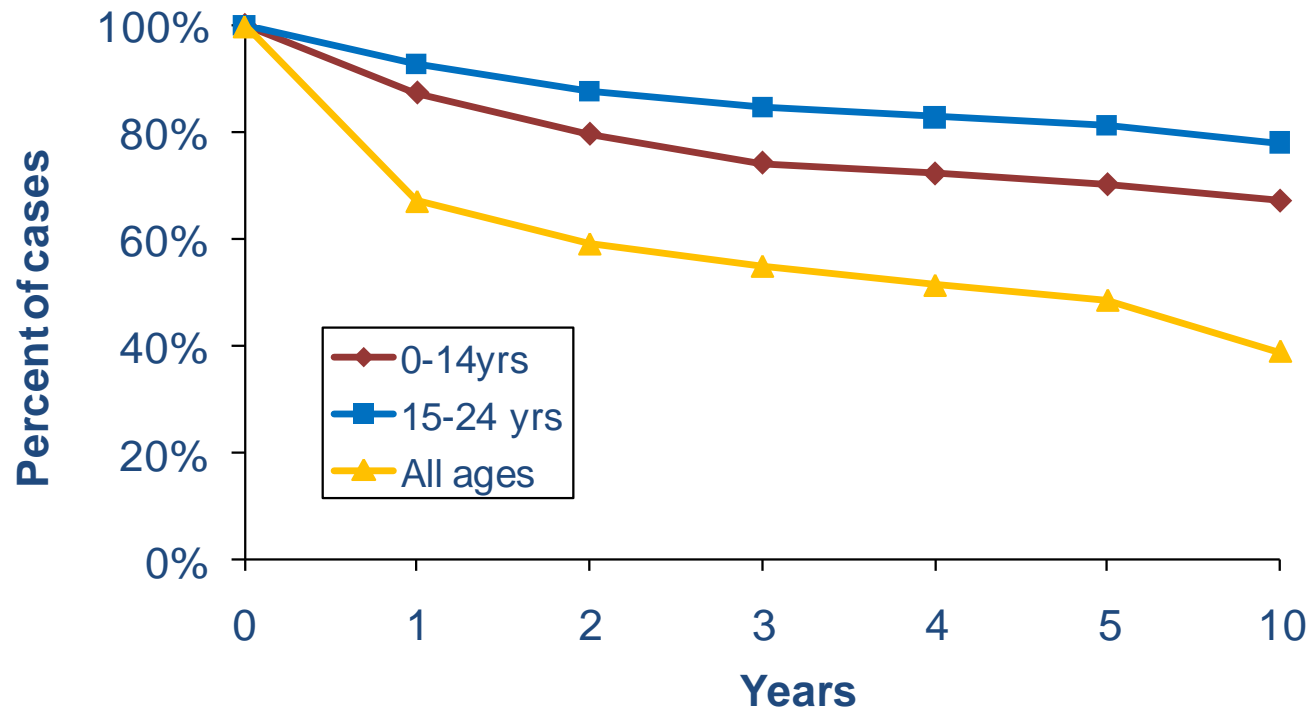
Trends incidence and mortality

Australian children (1982-2006)



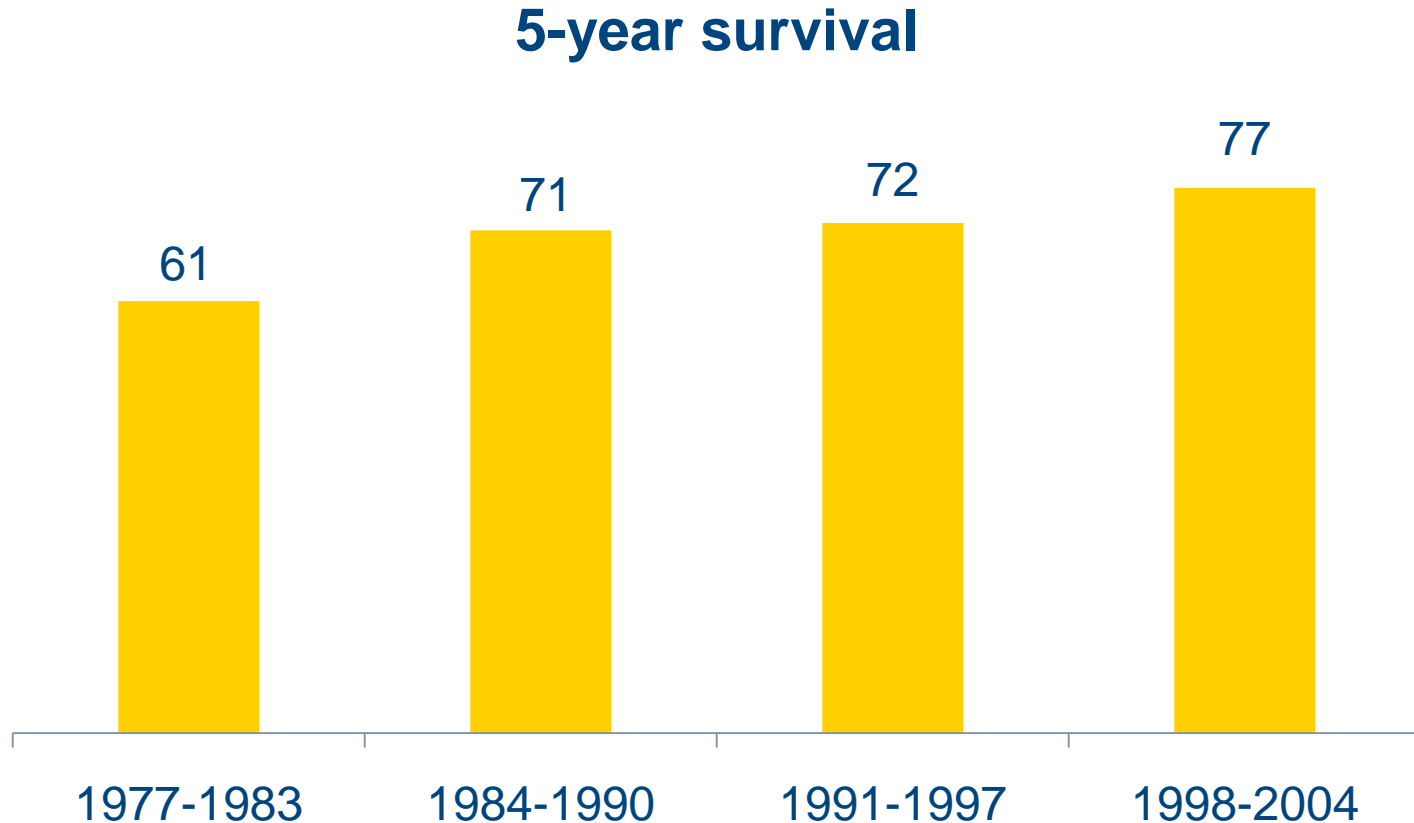
Survival from cancer by age group

(SA 1991-2003)



Trends in survival for childhood cancer

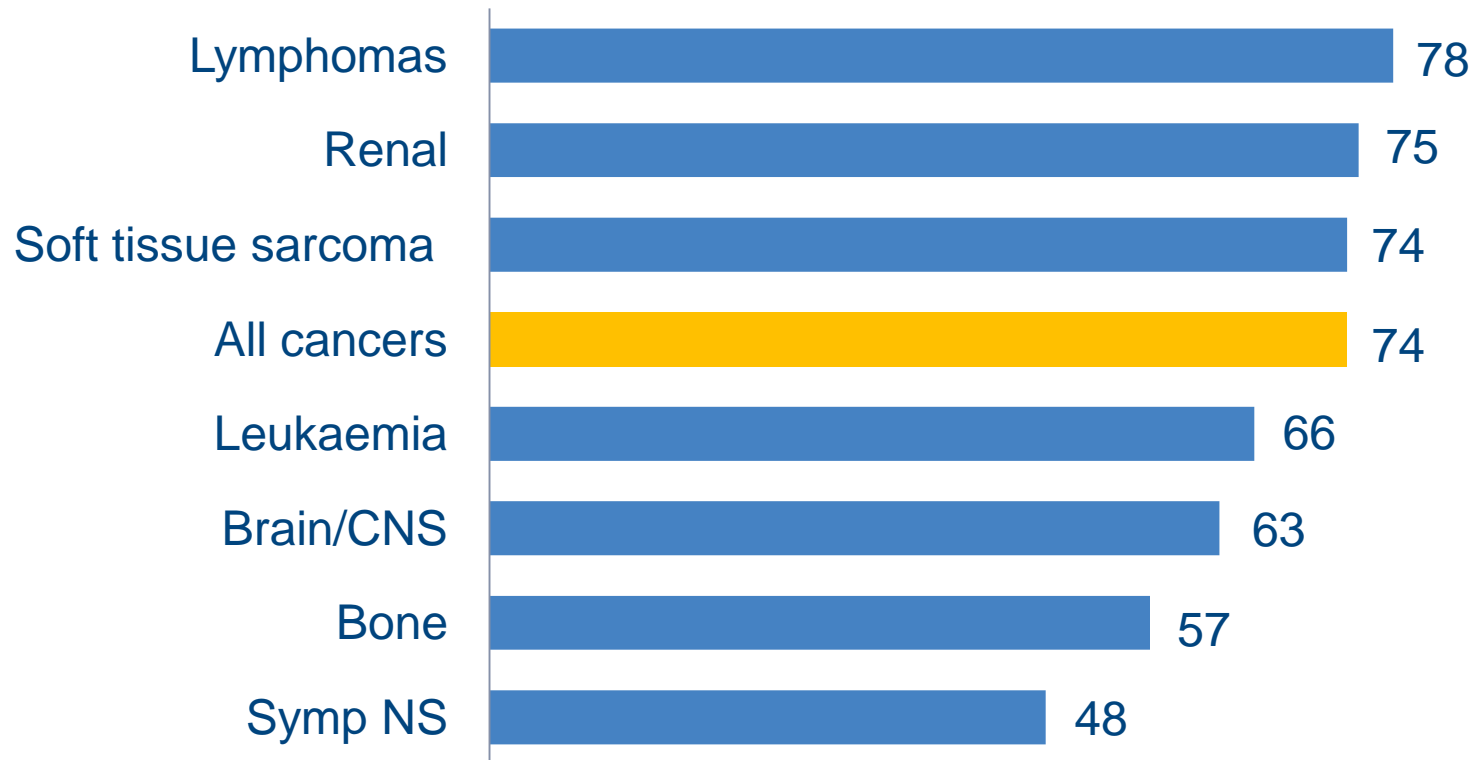
(SA1977-2004)



Survival by type of cancer

(Children 0-14yrs, SA1977-2004)

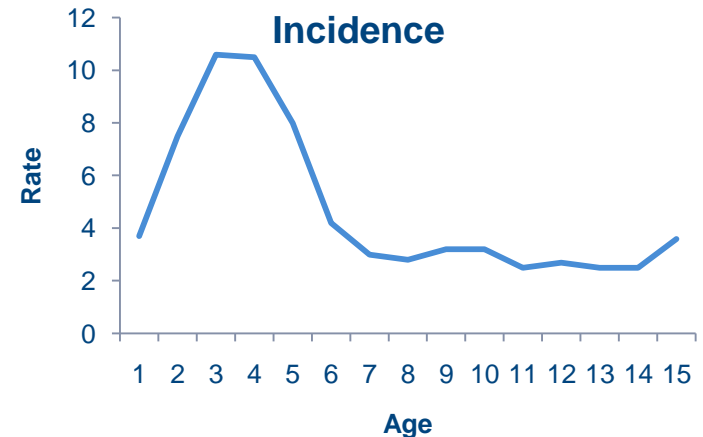
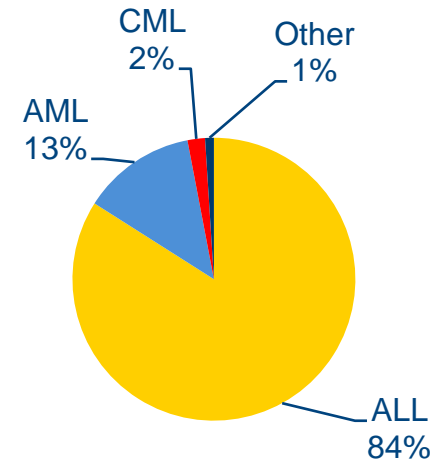
5-year survival



Specific types of childhood cancer

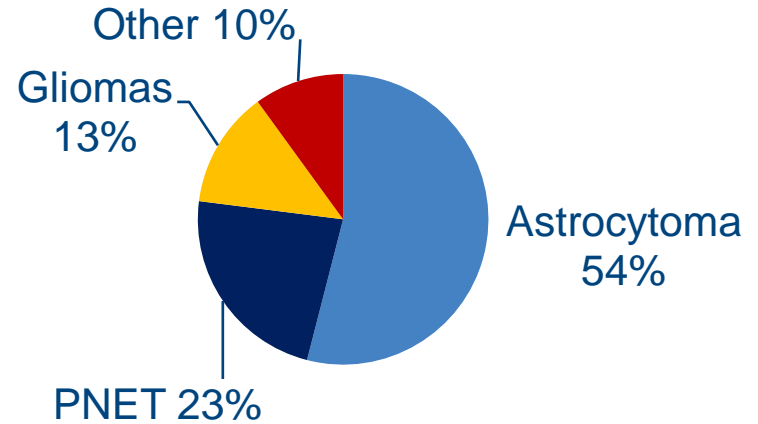
Leukaemia

- Leading childhood cancer/cancer deaths
- ALL most common type among children
- Affects boys slightly more than girls
- Incidence peaks in early childhood
- No evidence of increasing incidence
- Mortality has decreased (-4%)
- Notable improvements in survival (5yr survival 55-88%)

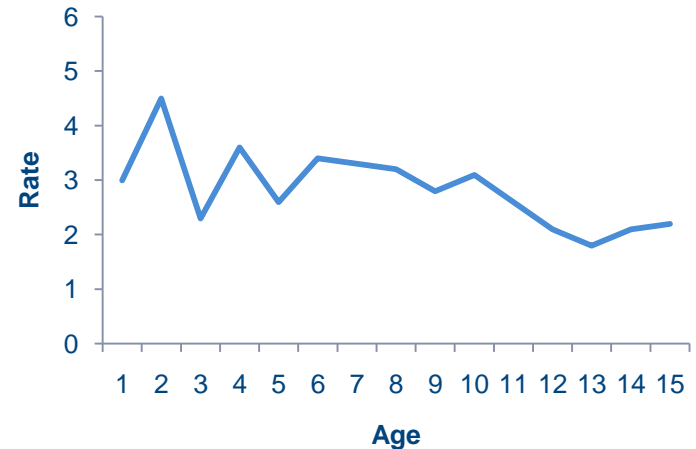


Brain / CNS tumours

- 2nd most common childhood cancer
- 2nd most common cause cancer death
- Incidence higher among young children
- Incidence and mortality rates stable
- Survival around 60% at 5 yrs
- No improvement in survival

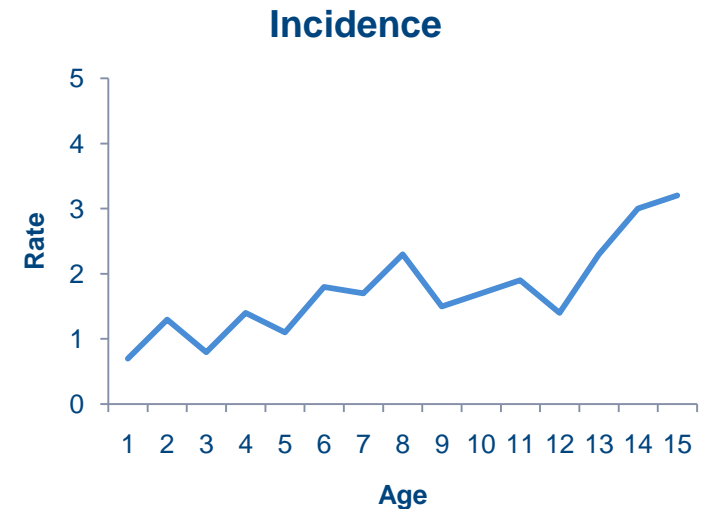
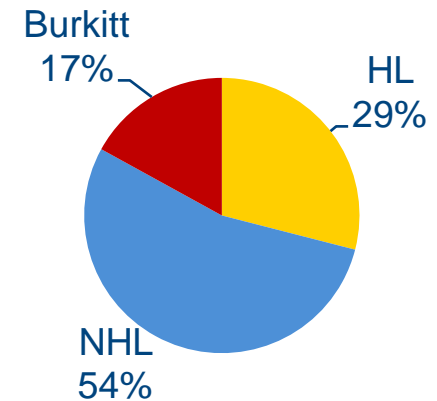


Incidence



Lymphoma

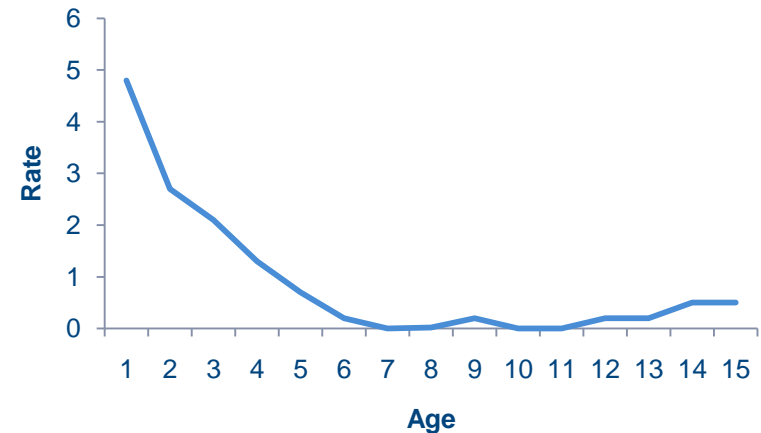
- 3rd most common cancer
- 4th most common cause of cancer death
- Boys affected more than girls
- Incidence higher in older children
- No evidence of increasing incidence in children (but notable increase among AYA)
- Large improvement in survival (5 yr survival 63%-96%)



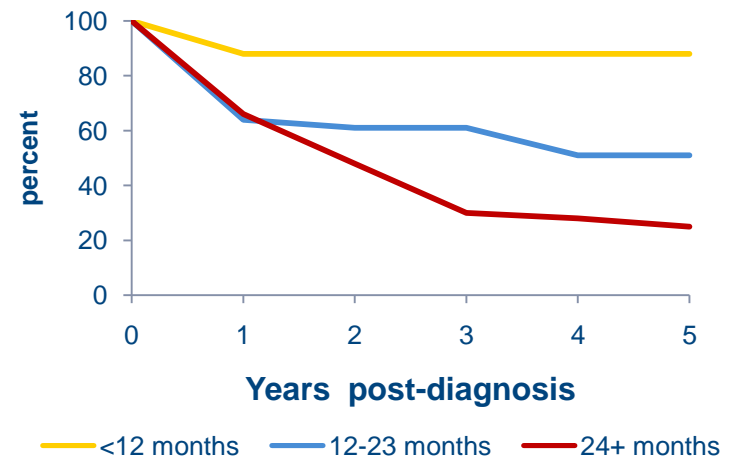
Sympathetic NS tumours

- 4th most common childhood cancer
- 3rd most common cancer death
- Vast majority are neuroblastomas (100%)
- Occur in early childhood
- No change in incidence rates
- No improvement in survival
- Survival depends on age at diagnosis

Incidence



Survival by age



Late effects of childhood cancer

Late effects of treatment for childhood cancer

- 2/3 of survivors report at least one chronic condition
(3 times the risk of their siblings)
- 1/3 report at least one severe or life threatening condition
(8 times the risk of their siblings)
- 8 times more likely to die prematurely than general population
- ~20 times greater risk of second cancer than general public

Possible late effects

Second cancers (leukaemia, breast, thyroid, skin, bone, sarcomas)

Radiation to organ sites, chemotherapy (alkylating agents)

Heart damage/heart failure

Radiation to chest, chemotherapy (anthracycline)

Cognitive impairment

Radiation to head & neck region, cranial surgery, methotrexate*

Growth and skeletal problems (short stature, obesity, osteoporosis)

Radiation to brain (or bones), steroids, some chemotherapy

Gonad dysfunction (infertility, early menopause)

Radiation to pelvic region (or brain), chemotherapy (alkylating agents)

Respiratory problems (lung fibrosis)

Radiation to the chest and some chemotherapy (synergistic)

Childhood cancer survivors study (USA):

Late effects among 10,400 survivors (1970-1986) compared with siblings

Disabling conditional	Relative risk
Major joint replacement	54.0
Heart failure	15.1
Second cancer (excluding skin)	14.8
Severe cognitive dysfunction	10.5
Coronary artery disease	10.4
Cerebrovascular event (e.g. stroke)	9.3
Renal failure	8.9
Hearing loss	6.3
Vision impaired	5.8
Ovaries not functioning	3.5

Summary

- Childhood cancer is rare
- Australian/NZ among highest rates globally
- Causes are largely unknown
- Risk is greater for males than females
- Incidence has increased very slightly (0.5% per year)
- Mortality has decreased (−2.5% per year)
- Survival has improved considerably over past 30yrs (but not for all types of childhood cancer)
- Severe long term effects/increased risk of second cancer