National and International Childhood Cancer Incidence and Time Trends

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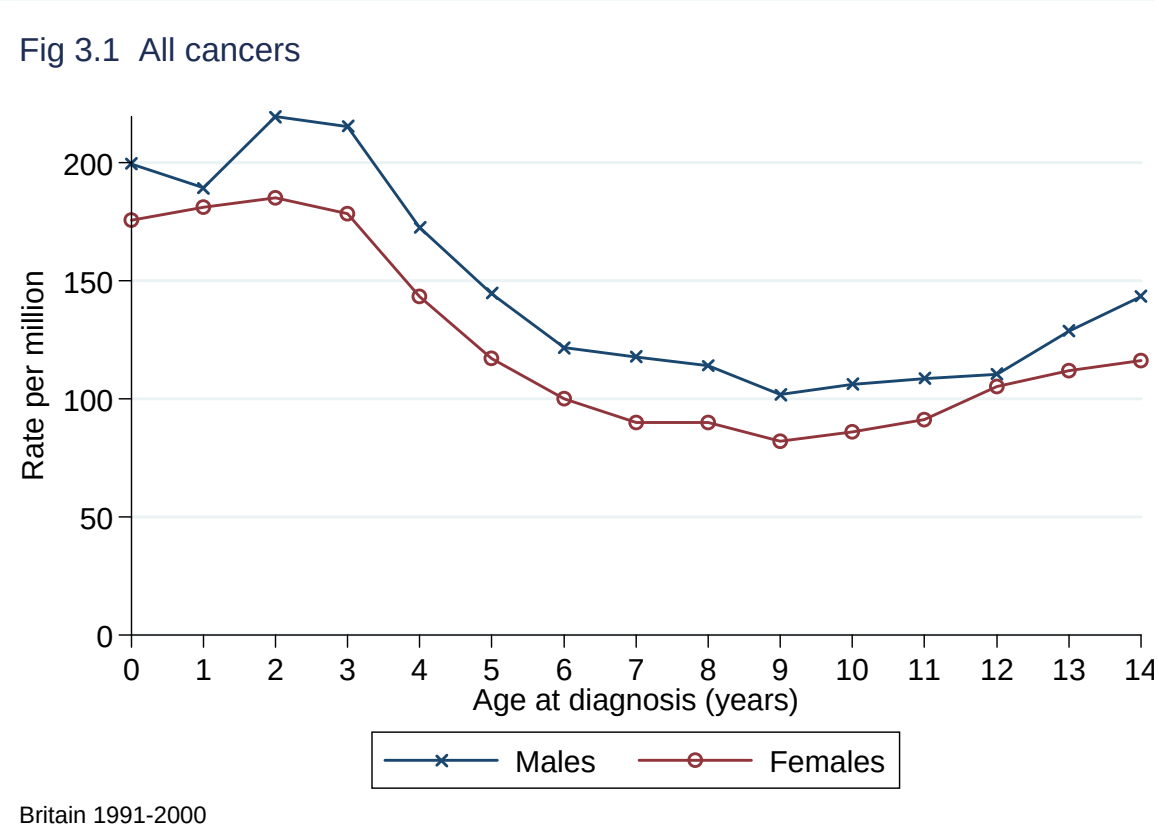
Childhood Cancer Incidence in the UK, 1996-2005

Age-standardized rate (ASR)	**142 per million**
Cumulative risk in first 15 years of life	**1 in 484**
Sex ratio (M/F)	**1.2**

Source: National Registry of Childhood Tumours

Annual Incidence by Single Year of Age
All Cancers, Great Britain, 1991-2000

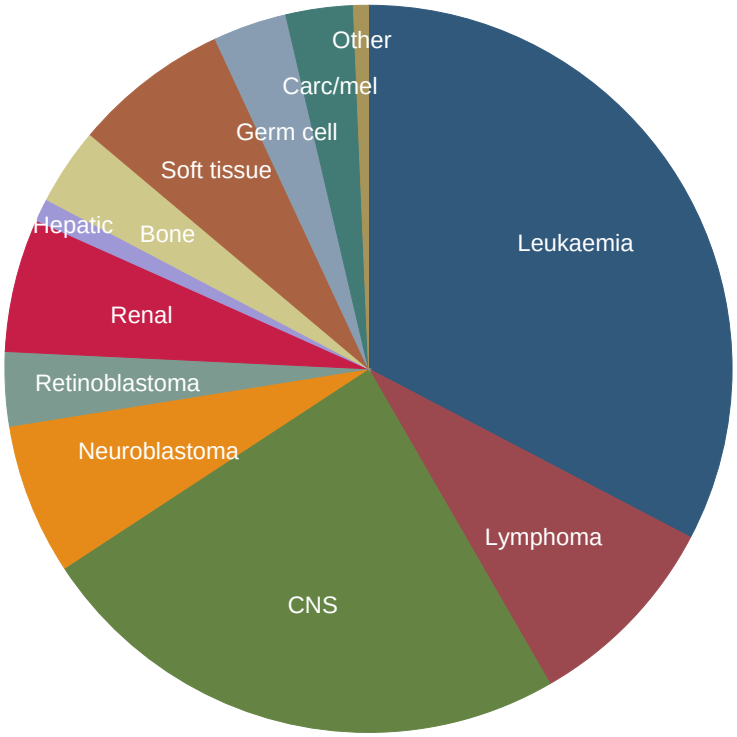


Source: National Registry of Childhood Tumours

Stiller C (ed.) *Childhood Cancer in Britain: Incidence, Survival, Mortality*. OUP, 2007

Contributions of the 12 Main Groups of ICCC-3* to Age-standardized Incidence, Great Britain, 1991-2000

Fig3.2 Age-standardised rate



Britain 1991-2000

***International Incidence of Childhood Cancer, Third Edition**

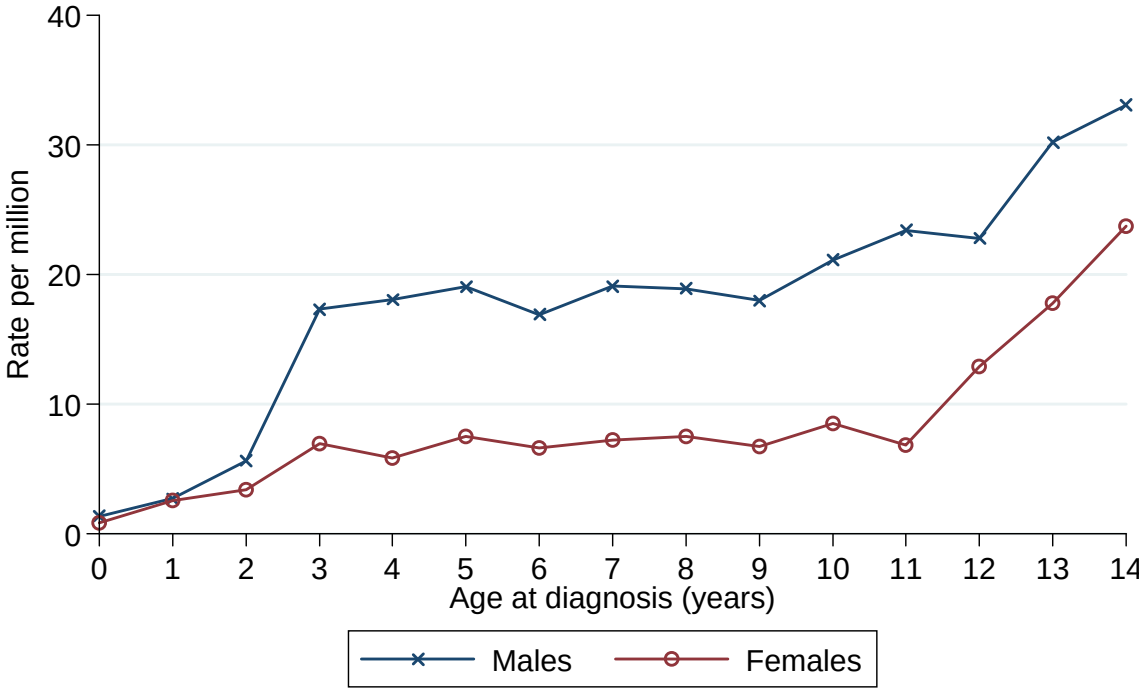
(Steliarova-Foucher E et al. *Cancer* 2005, **103**, 1457-1467)

Source: National Registry of Childhood Tumours

Stiller C (ed.) *Childhood Cancer in Britain: Incidence, Survival, Mortality*. OUP, 2007

Annual Incidence by Single Year of Age
Lymphomas (ICCC-3 Group II), Great Britain, 1991-2000

Fig 3.14 Lymphomas and reticuloendothelial neoplasms



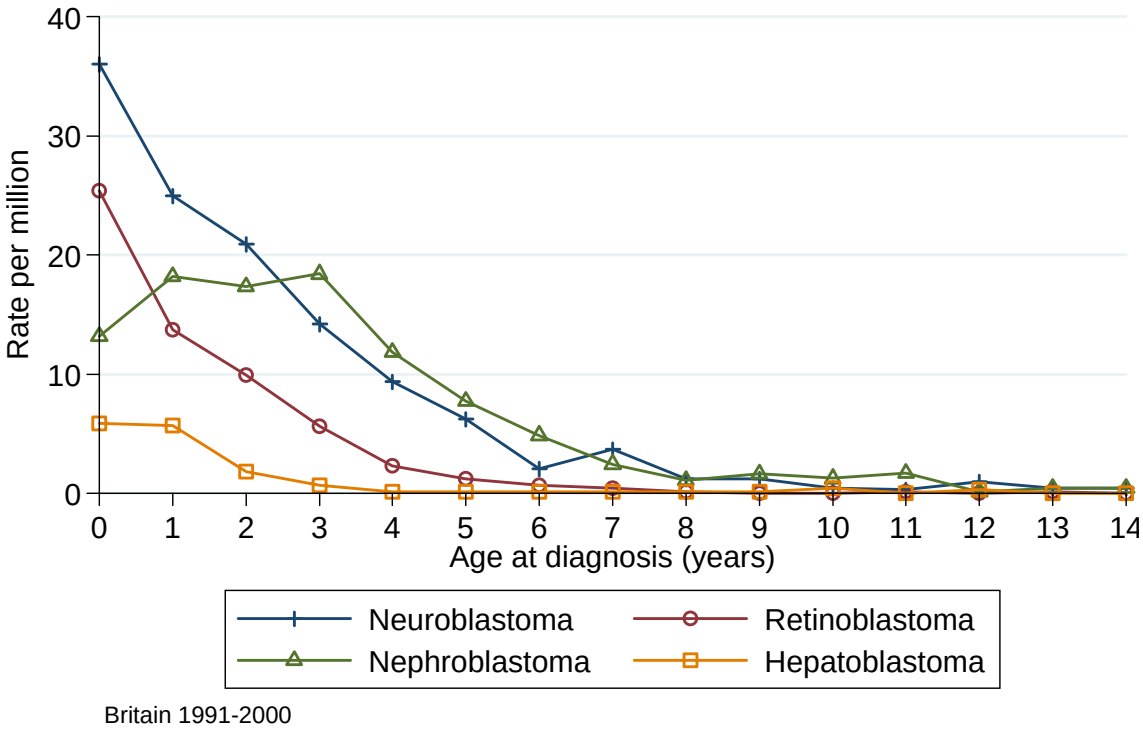
Britain 1991-2000

Source: National Registry of Childhood Tumours

Stiller C (ed.) *Childhood Cancer in Britain: Incidence, Survival, Mortality*. OUP, 2007

Annual Incidence by Single Year of Age
Principal Embryonal Tumours, Great Britain, 1991-2000

Fig 3.21 Embryonal tumours

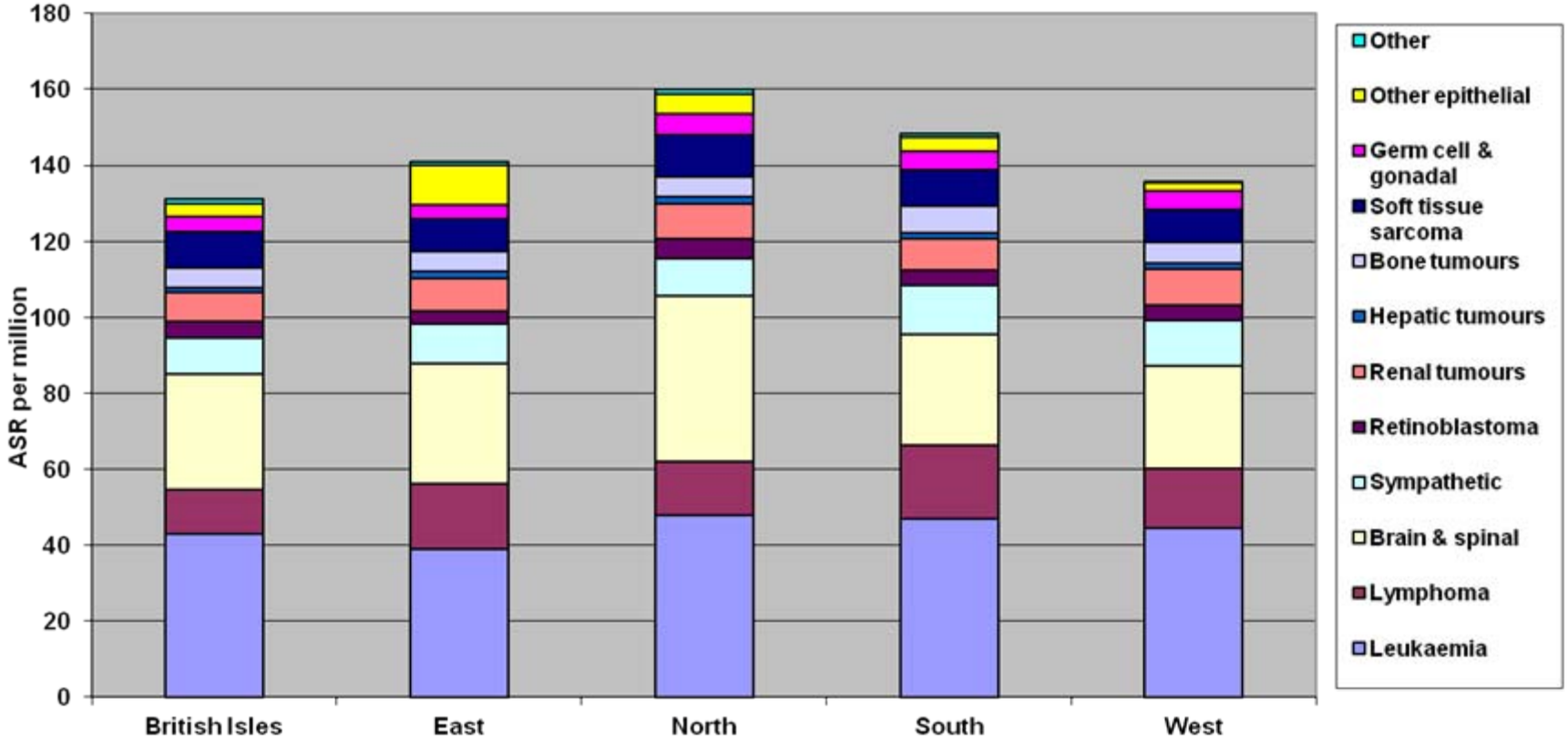


Britain 1991-2000

Source: National Registry of Childhood Tumours

Stiller C (ed.) *Childhood Cancer in Britain: Incidence, Survival, Mortality*. OUP, 2007

Childhood Cancer Incidence in Europe, 1988-1997



British Isles: Ireland, UK **East: Belarus, Estonia, Hungary, Slovakia**

North: Denmark, Finland, Iceland, Norway

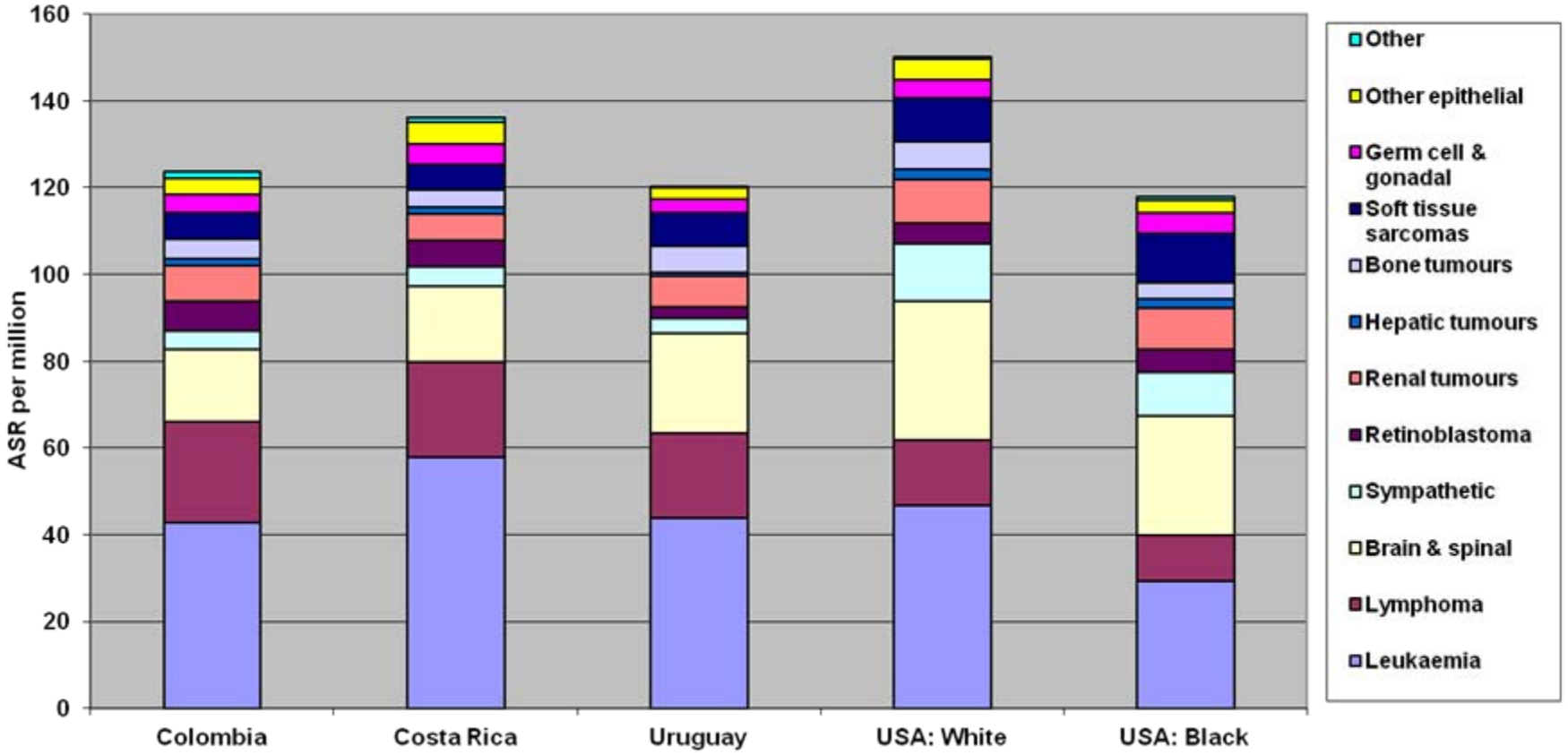
South: Italy, Malta, Slovenia, Spain, Turkey

West: France, Germany, Netherlands, Switzerland

Source: Automated Childhood Cancer Information System (ACCIS)

Stiller CA et al. *Eur J Cancer* 2006, **42**, 1952-1960.

Childhood Cancer Incidence in the Americas in the 1980s



Colombia: Cali

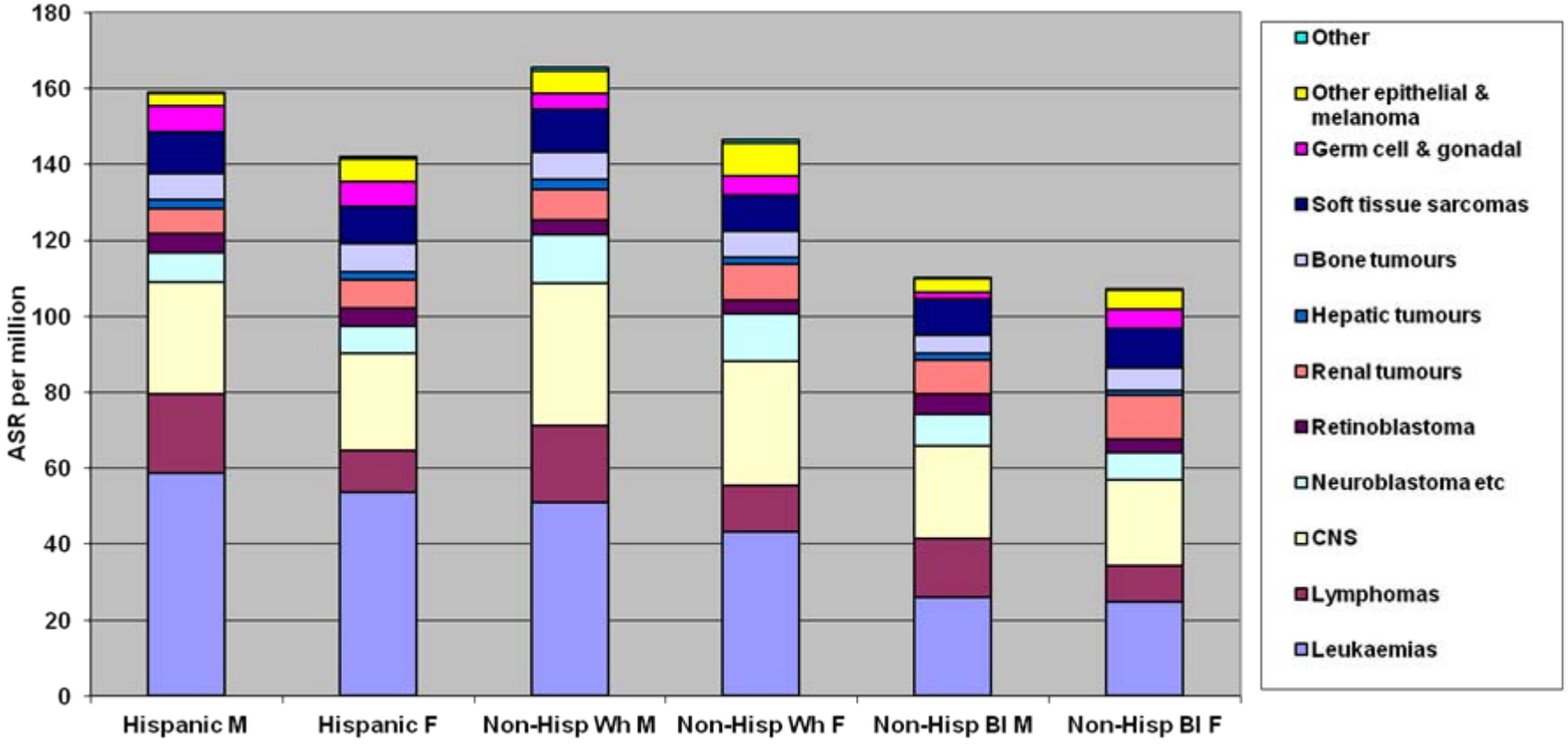
Costa Rica: national

Uruguay: national

USA: SEER registries

Parkin DM et al. (eds.) *International Incidence of Childhood Cancer, Volume 2*. IARC, 1998.

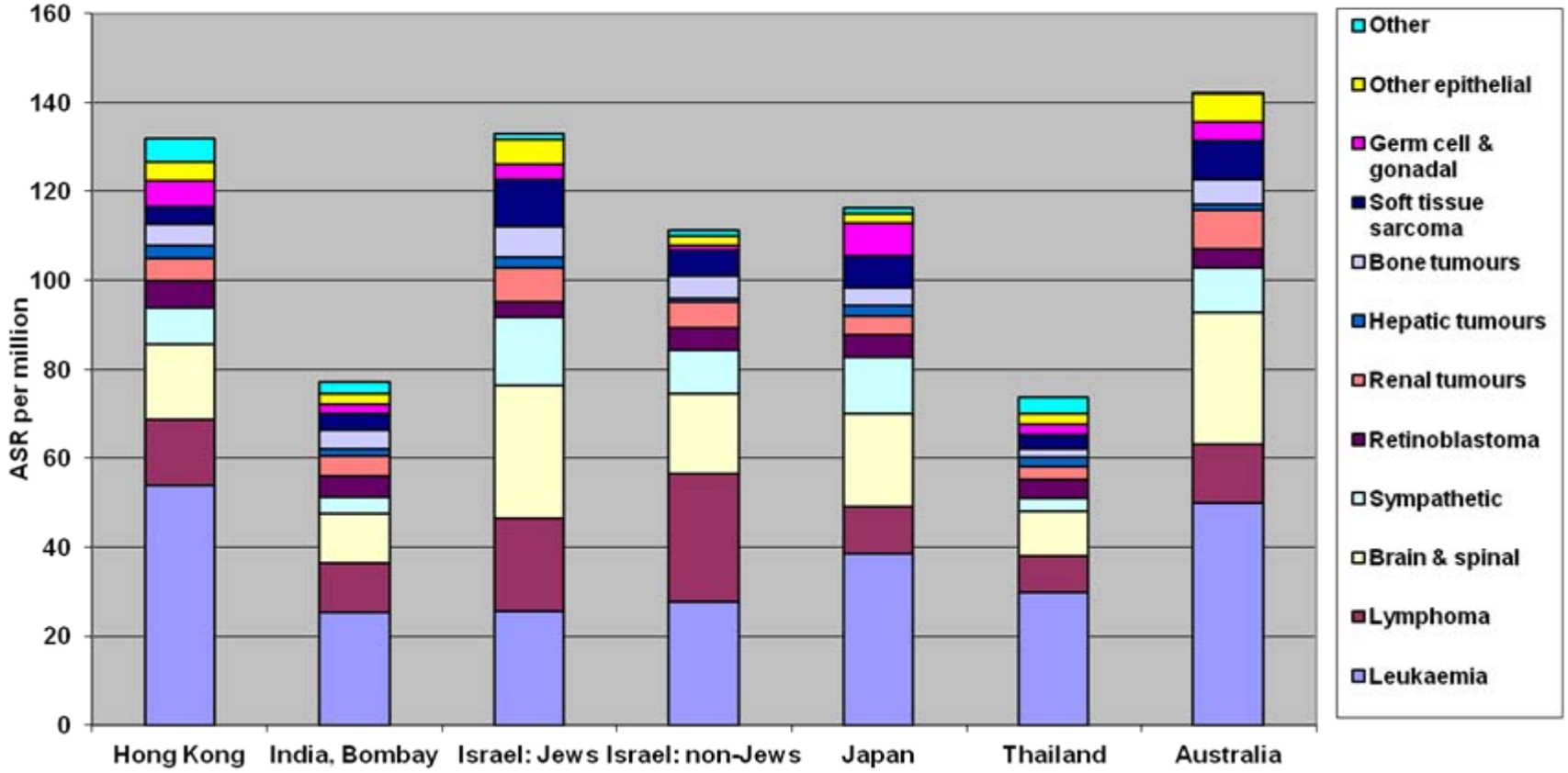
Childhood Cancer Incidence in the USA, 1999-2003



Source: 38 SEER & NPCR registries

Howe HL et al. *Cancer* 2006, **107**, 1711-1742.

Childhood Cancer Incidence in Asia & Oceania in the 1980s



Hong Kong, Israel, Australia: National

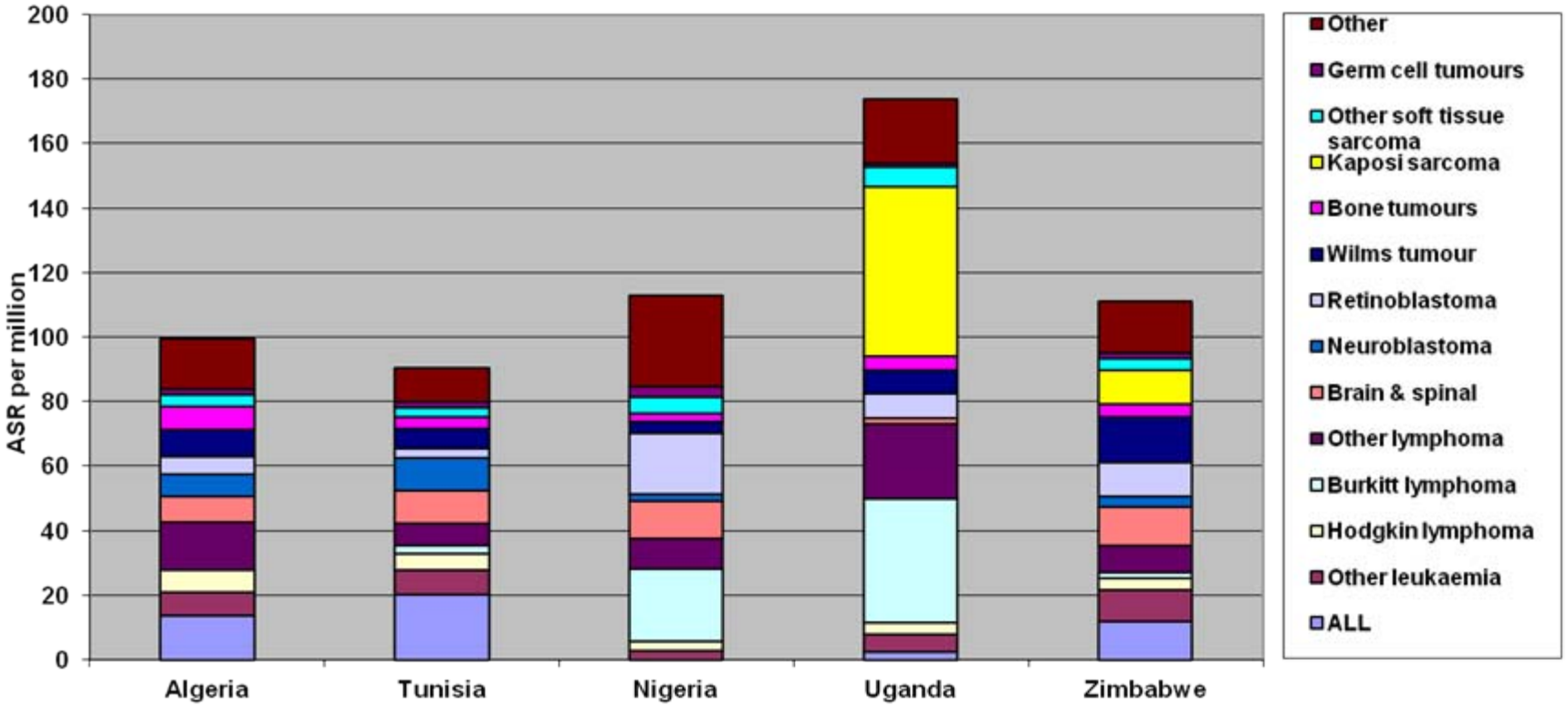
India: Bombay

Japan: 5 registries

Thailand: 4 registries

Parkin DM et al. (eds.) *International Incidence of Childhood Cancer, Volume 2*. IARC, 1998.

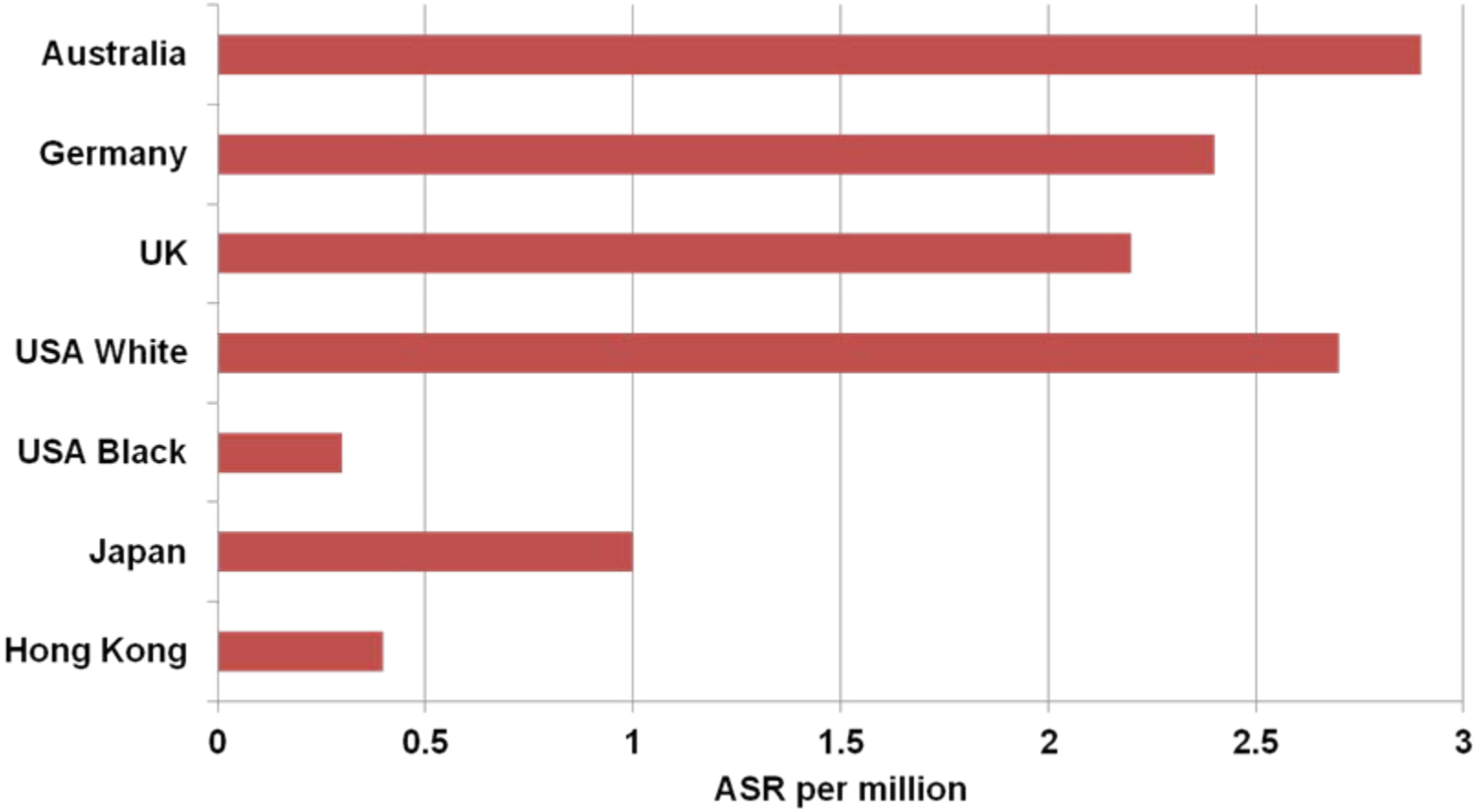
Childhood Cancer Incidence in Africa in the 1990s



Algeria: 4 registries
Tunisia: 3 registries
Nigeria: Ibadan
Uganda: Kyadondo County
Zimbabwe: Harare (Africans)

Parkin DM et al. (eds.) *Cancer in Africa: Epidemiology and Prevention*. IARC Press, 2003.

Ewing Sarcoma of Bone: Incidence in the 1980s



Australia, Germany, Hong Kong: National

UK: England & Wales

Japan: 5 registries

USA: SEER registries

Parkin DM et al. (eds.) *International Incidence of Childhood Cancer, Volume 2*. IARC, 1998.

Adrenocortical Carcinoma in Southern Brazil

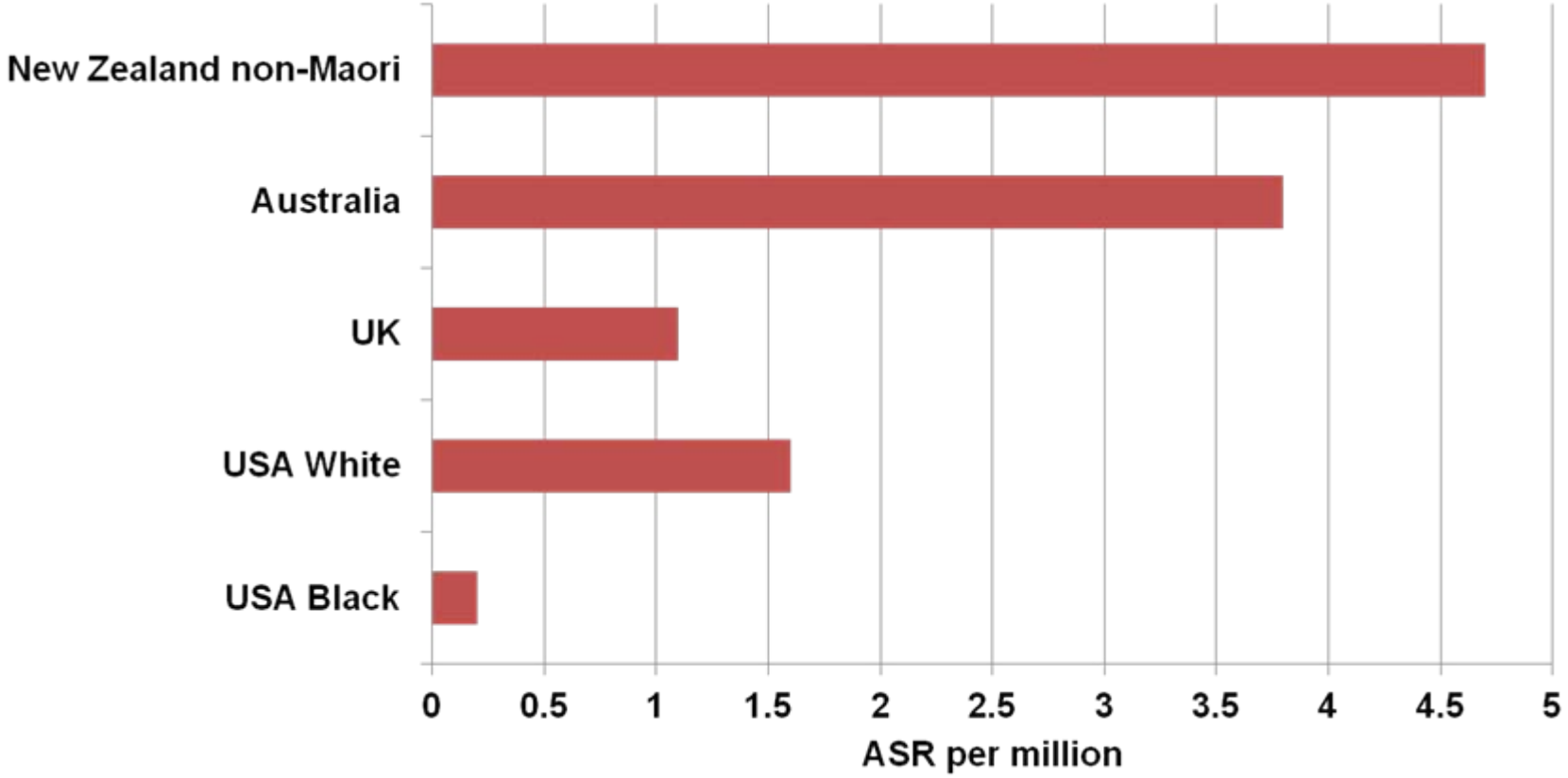
	ASR per million	
	Incidence	**Mortality**
São Paulo (1969-1978)[1]	**1.5**	
Goiânia (1989-1994)[2]	**2.8**	
Curitiba (1998-2003)[3]	**3.5?**	**1.6**
Other world regions[2]	**<0.5**	

1 Parkin DM et al. (eds.) *International Incidence of Childhood Cancer*. IARC, 1988.

2 Parkin DM et al. (eds.) *International Incidence of Childhood Cancer, Volume 2*. IARC, 1998.

3 Pianovski MAD et al. *Pediatr Blood Cancer* 2006,**47**,56-60

Malignant Melanoma: Incidence in the 1980s



Australia, New Zealand: National

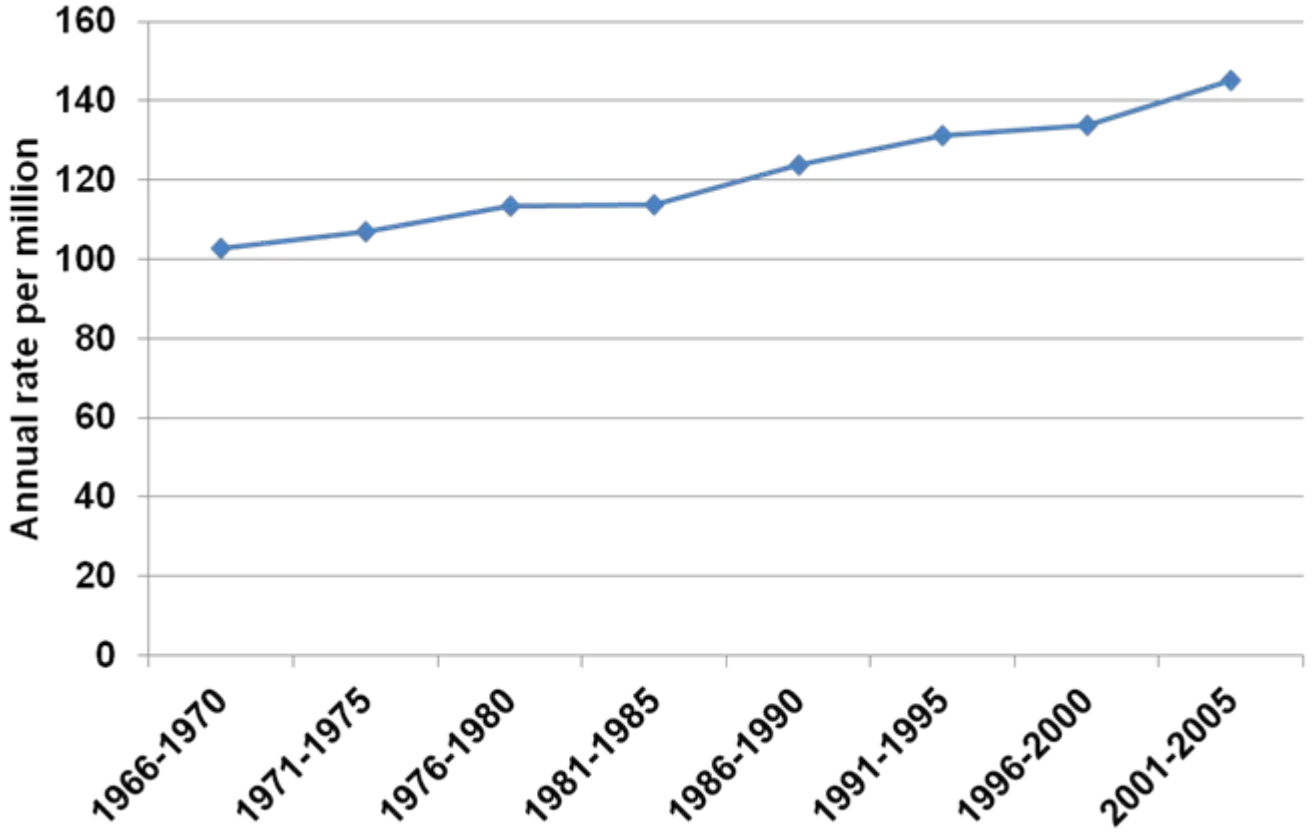
UK: England & Wales

USA: SEER registries

Parkin DM et al. (eds.) *International Incidence of Childhood Cancer, Volume 2*. IARC, 1998.

All Childhood Cancer, Great Britain, 1966-2005

Age-sex-standardized rates by 5-year period of diagnosis

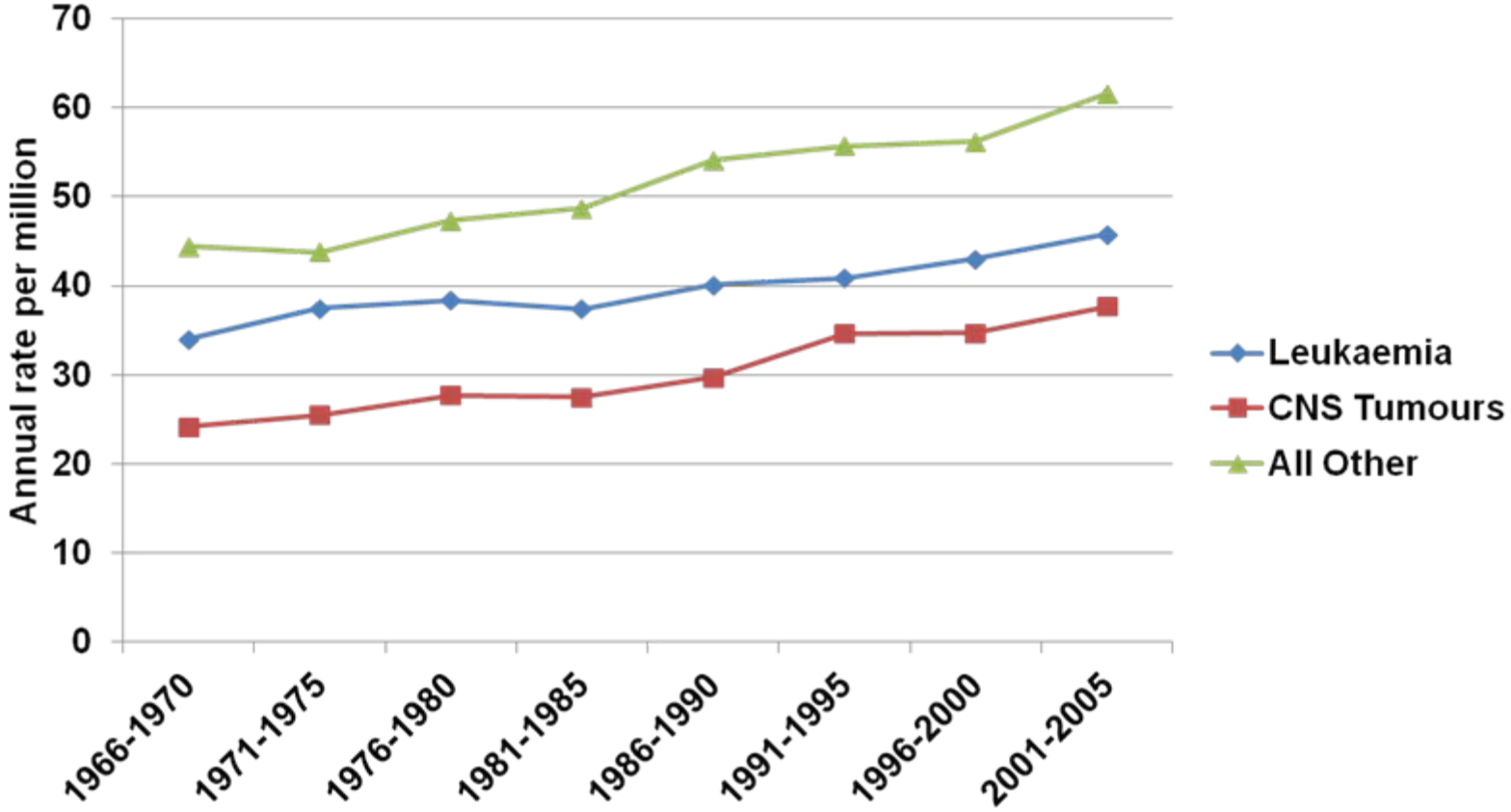


Annual average % change (95% CI) **1.0 (0.9,1.1)**

Source: National Registry of Childhood Tumours

All Childhood Cancer, Great Britain, 1966-2005

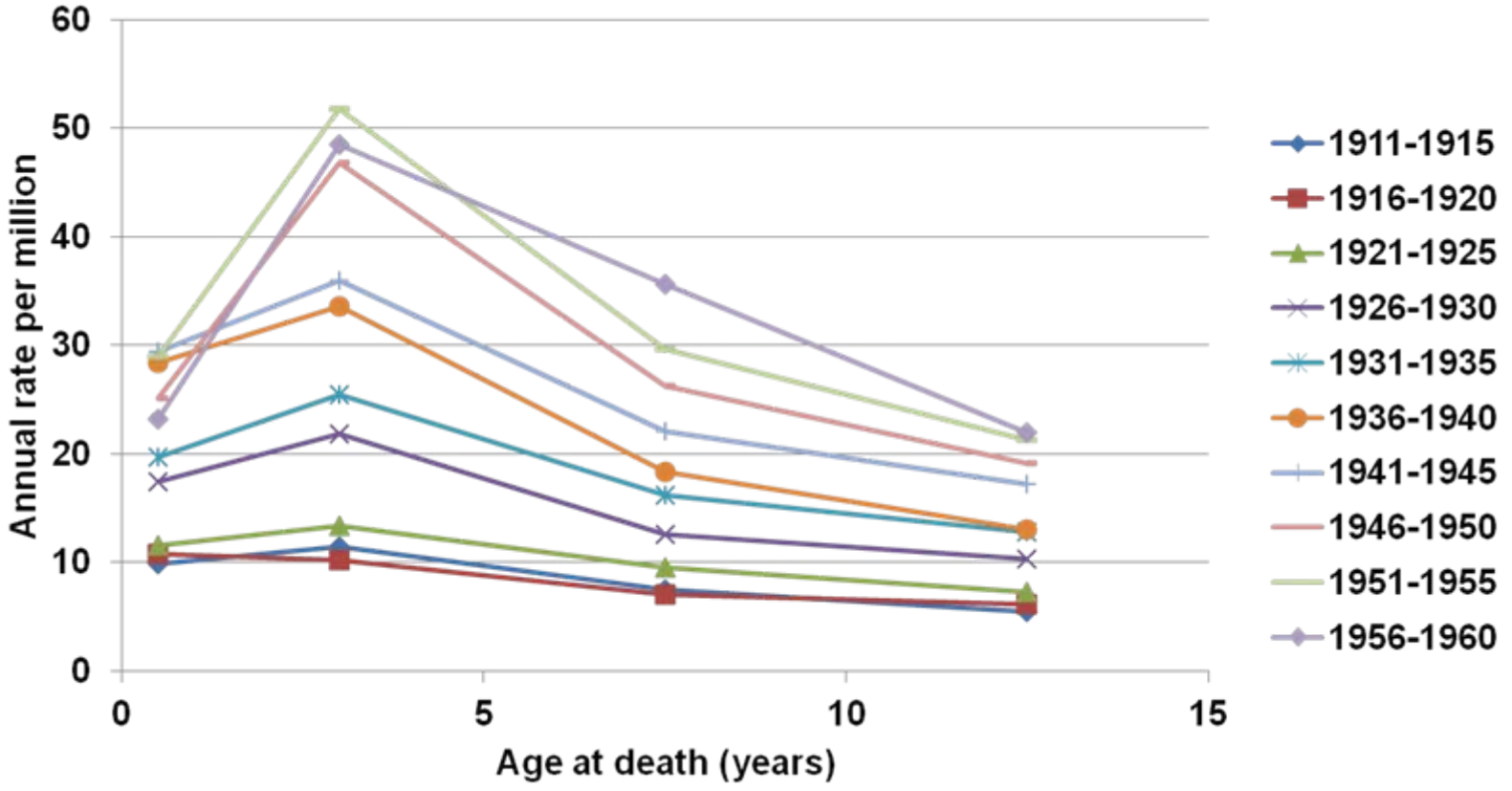
Age-sex-standardized rates by 5-year period of diagnosis



	Annual average % change (95% CI)
Leukaemia (ICCC-3 I)	0.7 (0.6,0.9)
CNS tumours (ICCC-3 III, Xa)	1.3 (1.2,1.5)
All other childhood cancers	1.0 (0.9,1.1)

Source: National Registry of Childhood Tumours

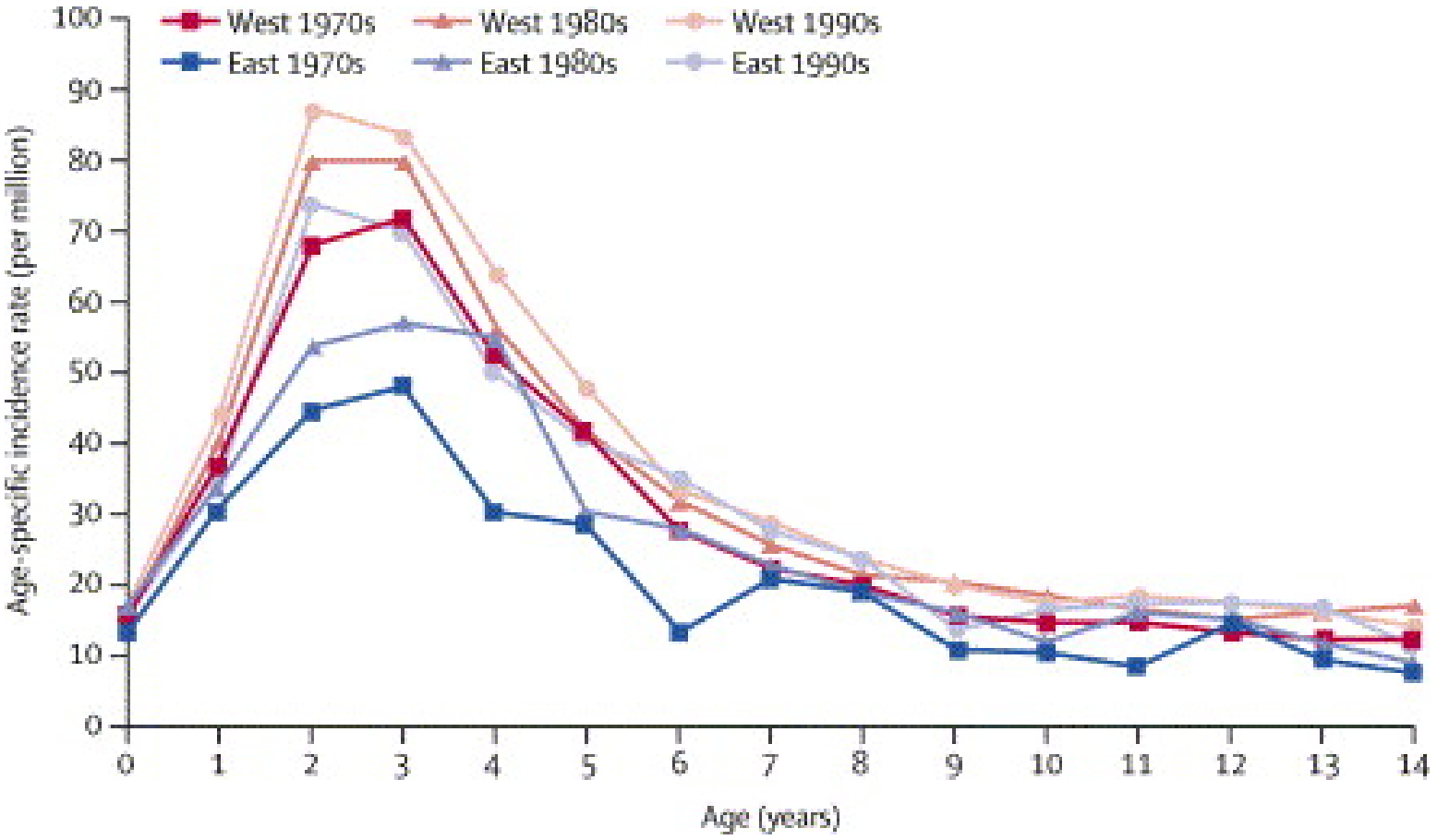
Childhood Leukaemia in England and Wales, 1911-1960



Mortality at age 0, 1-4, 5-9, 10-14

Shah A, Coleman MP. *Br J Cancer* 2007, **97**, 1009-1012

Acute Lymphoblastic Leukaemia in Europe, 1970-1999



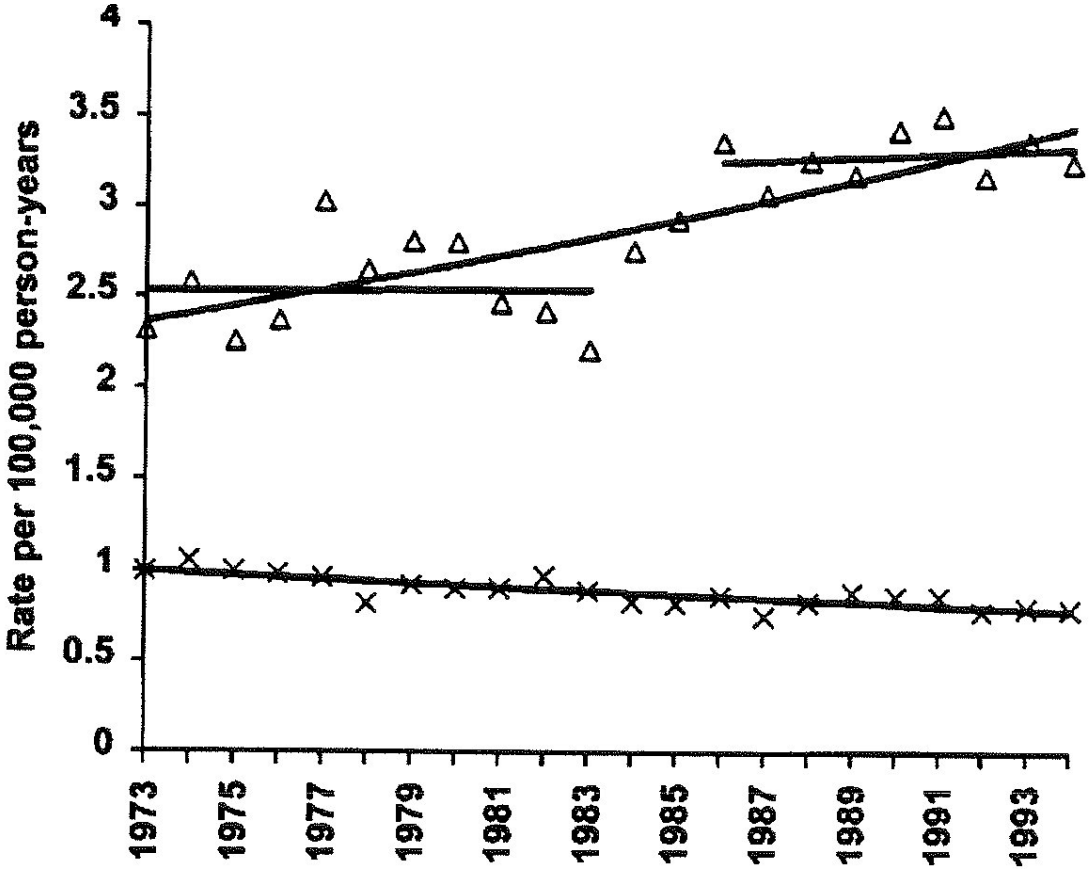
West: Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Malta, Netherlands, Norway, Spain, Switzerland, UK

East: Belarus, Estonia, Slovakia, Slovenia, Turkey

Source: ACCIS

Steliarova-Foucher E et al. *Lancet* 2004, **364**, 2097-2105

Primary Malignant Brain Tumours in the USA, 1973-1994



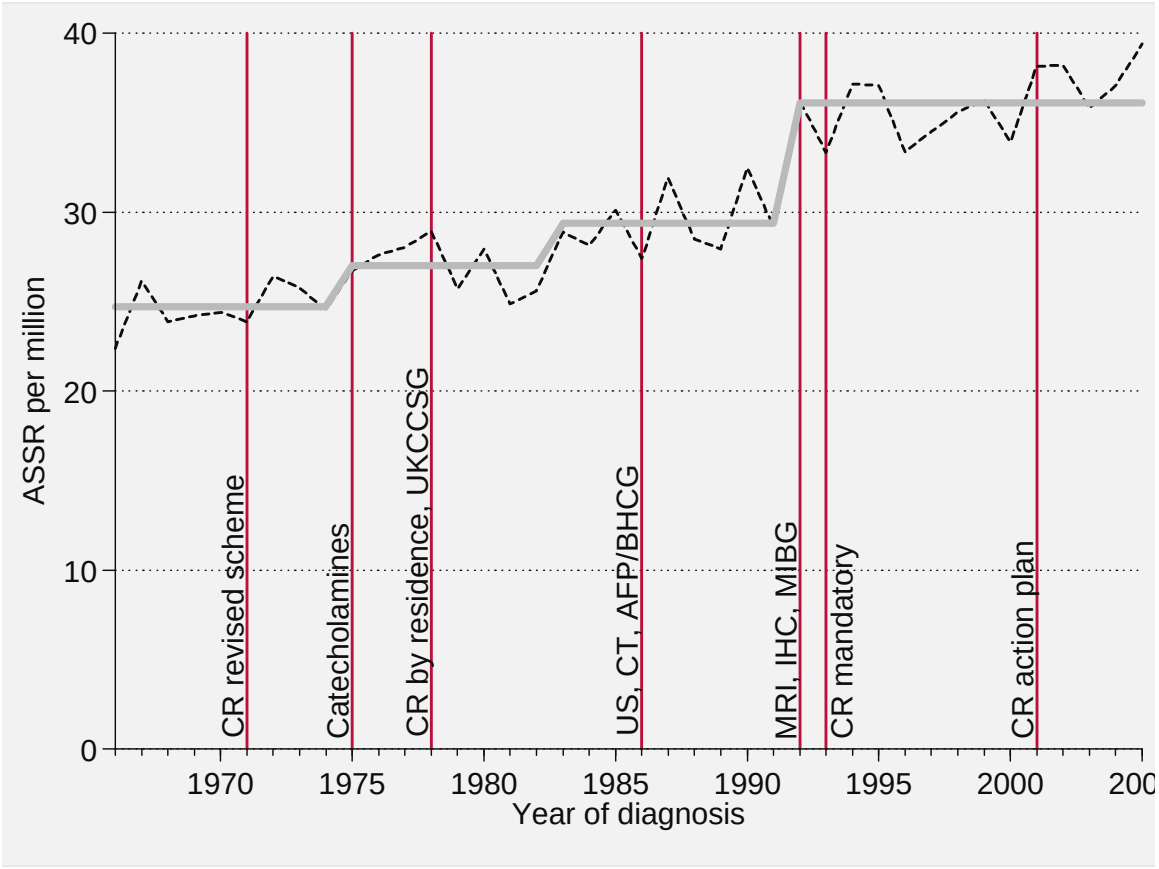
Age-standardized annual rates: **Δ Incidence** **X Mortality**

	1973	1977	1982	1984	1985
No. of CT scanners	8	921			
No. of MRI units			10	108	371

Source: SEER Program

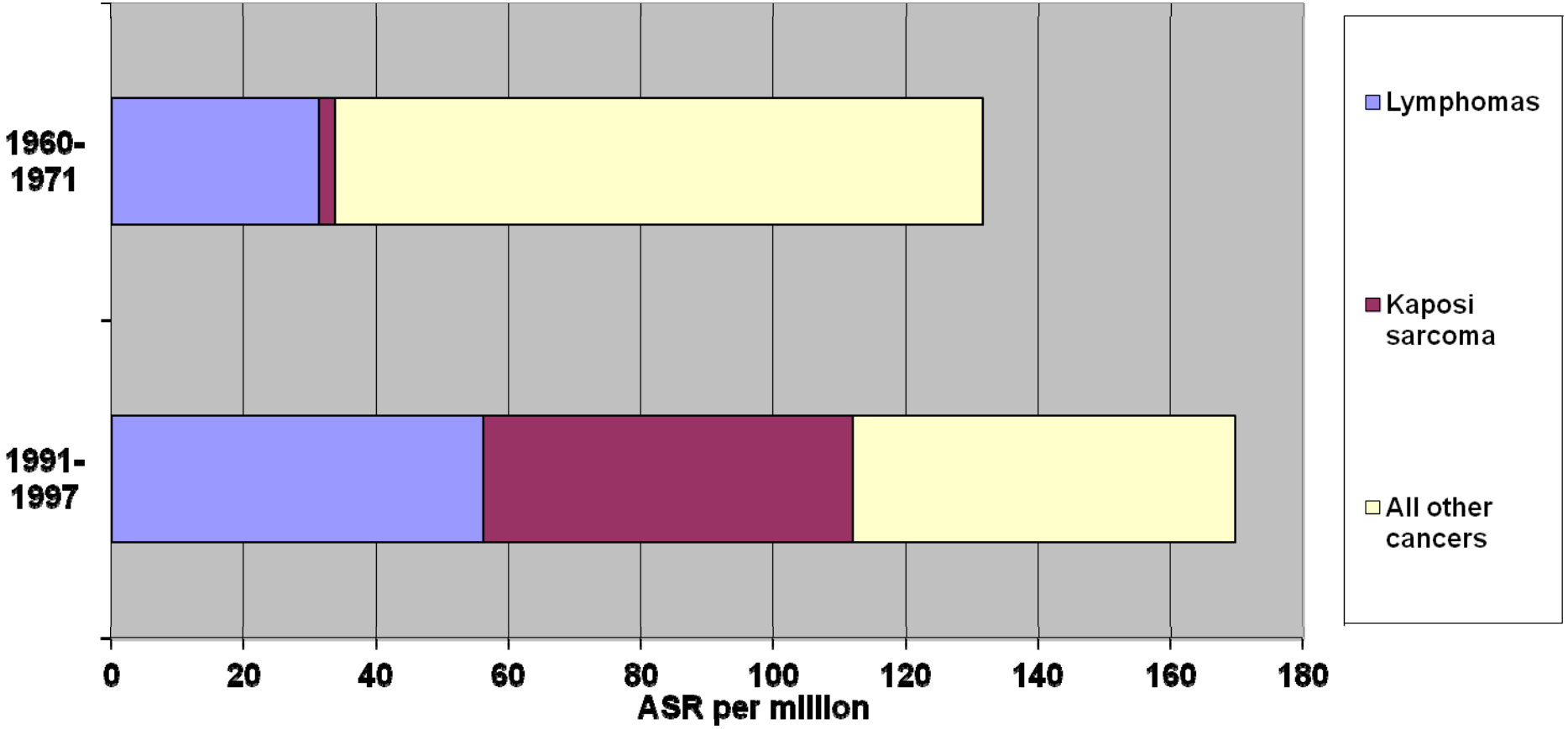
Smith MA et al. *J Natl Cancer Inst* 1998, **90**, 1269-1277

Childhood CNS Tumours in Great Britain, 1966-2005



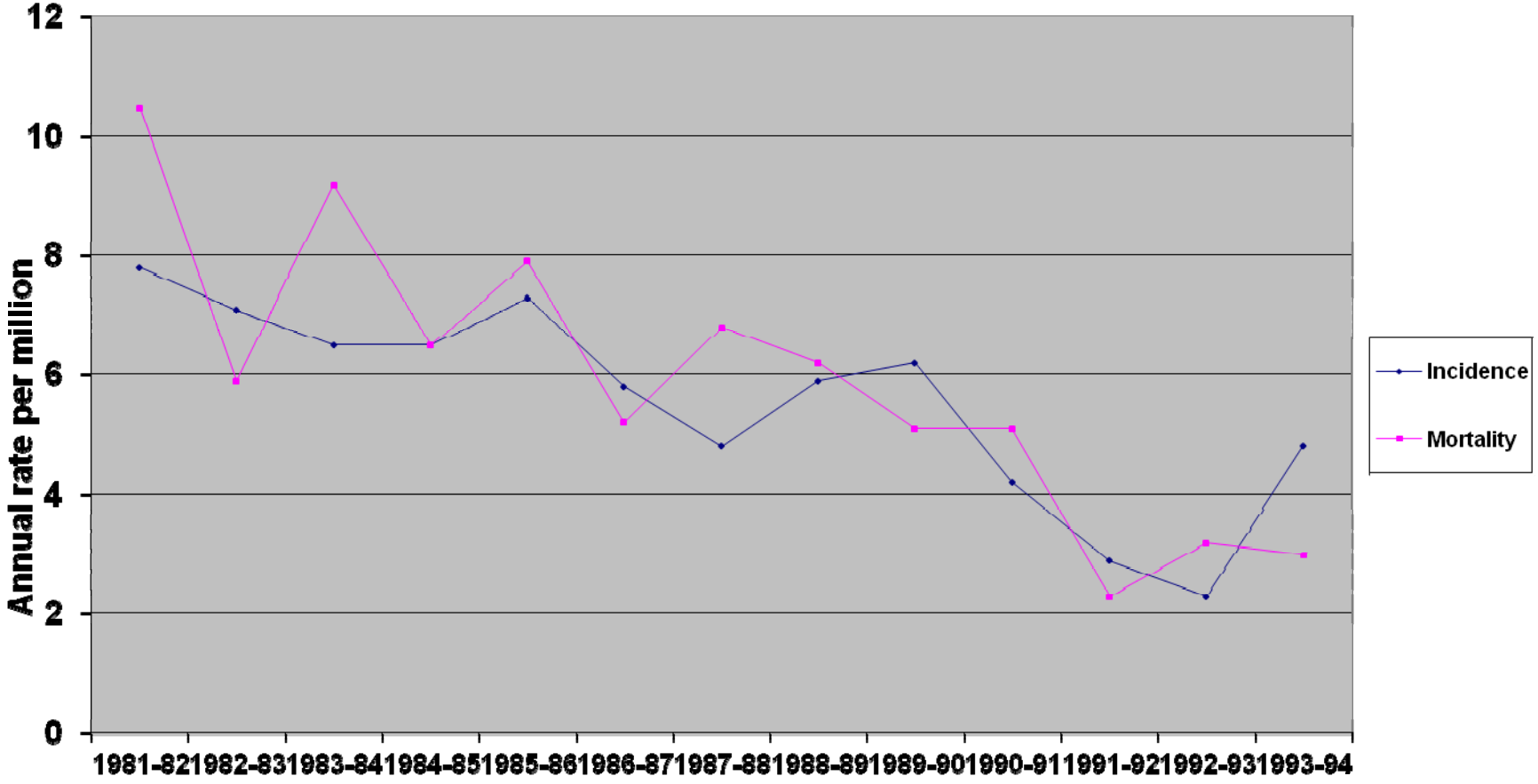
Source: National Registry of Childhood Tumours

Childhood Cancer Incidence in Kyadondo County, Uganda 1960-1971 and 1991-1997



Wabinga HR et al. *Br J Cancer* 2000, **82**, 1585-1592

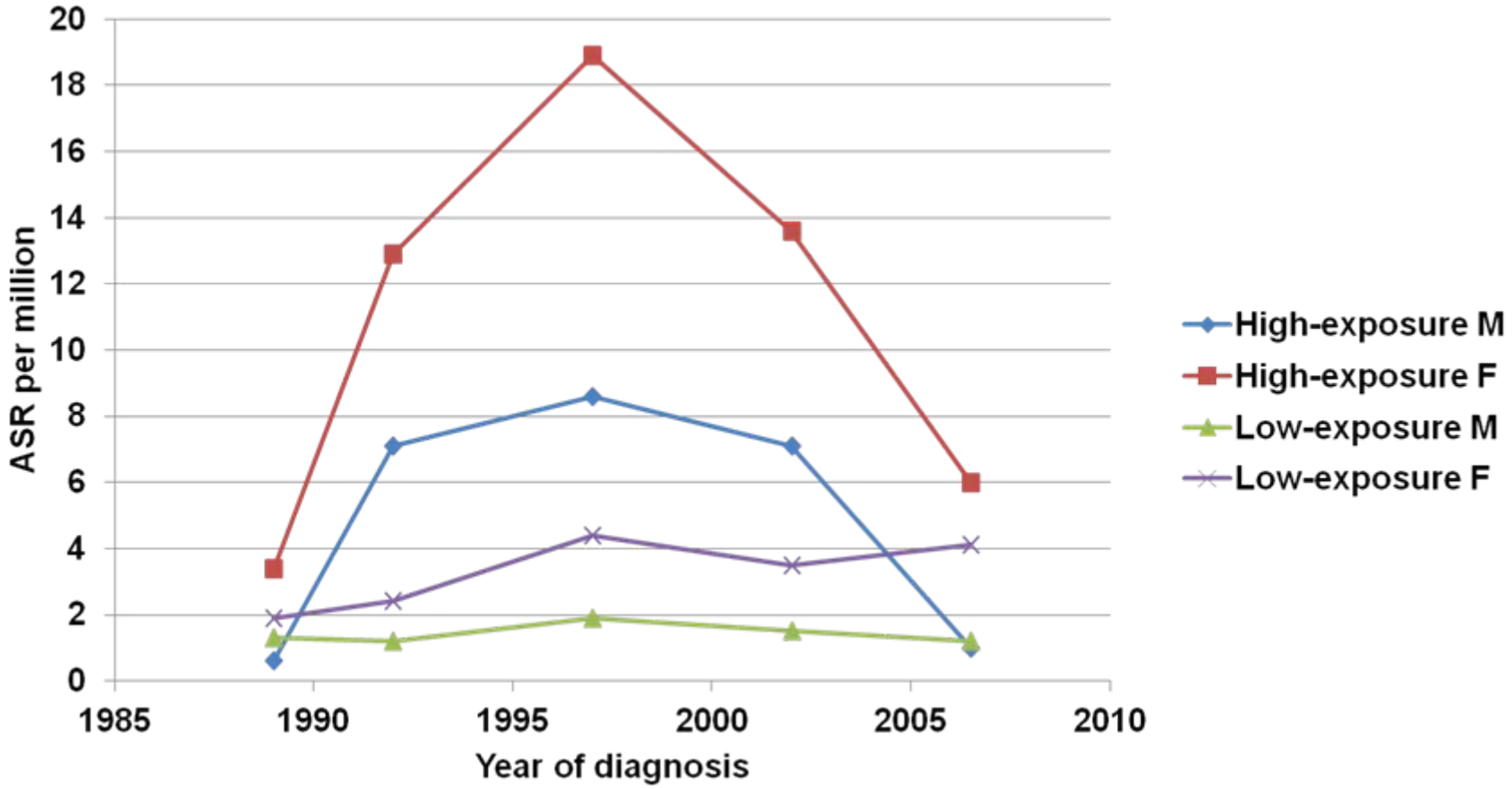
Hepatocellular Carcinoma in Taiwan, 1981-1994
Incidence & mortality (age 6-14)



Hepatitis B mass vaccination began 1984

Chang M-H et al. *N Engl J Med* 1997, **336**, 1855-1859

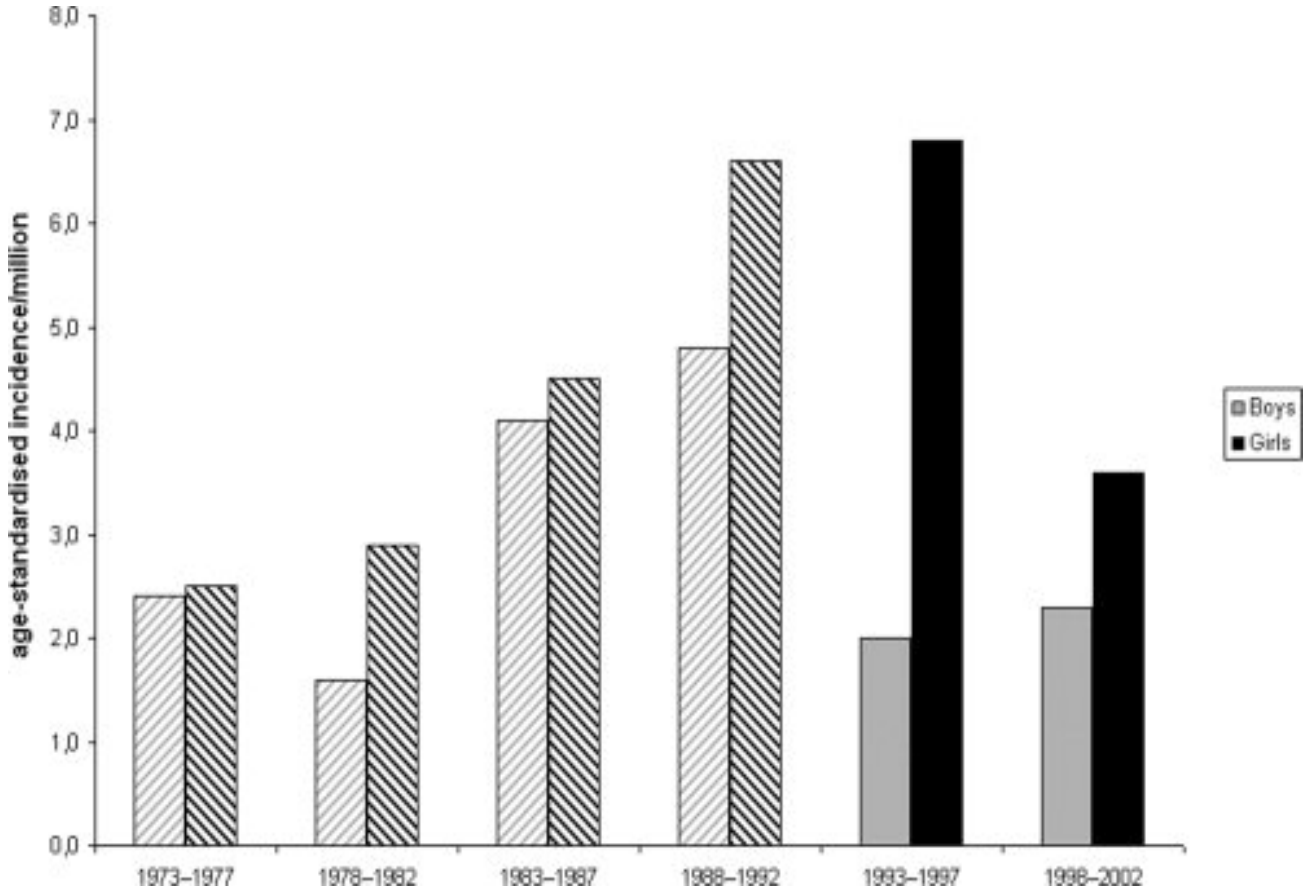
Thyroid Cancer Incidence in Children and Adolescents Ukraine, 1989-2008



ASR at age 0-19 in 1989, 1990-1994, 1995-1999, 2000-2004, 2005-2008
Regions classified by reconstructed ^{131}I thyroid dose
High exposure: >35 mGy Low exposure: ≤35 mGy

Fuzik M et al. *Radiat Environ Biophys* 2011, **50**, 47-55

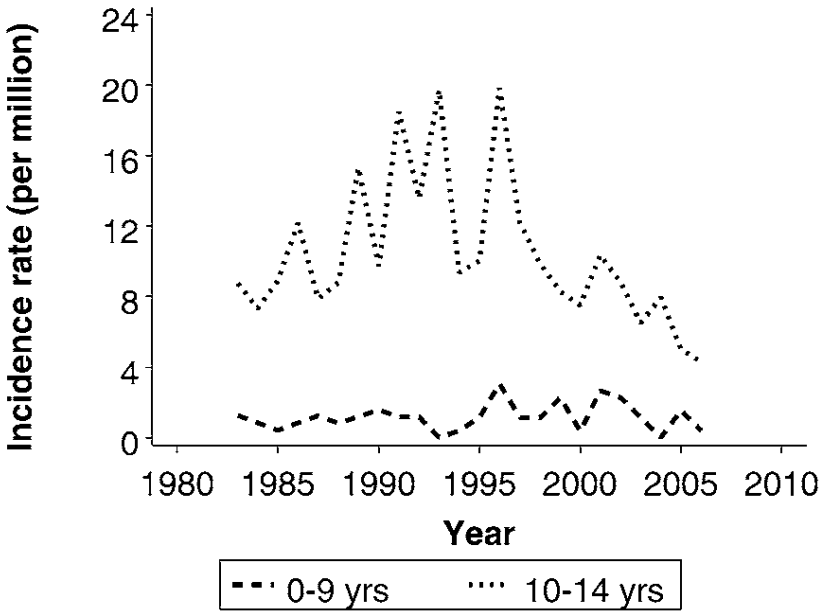
Cutaneous Malignant Melanoma in Children & Adolescents Sweden, 1973-2002

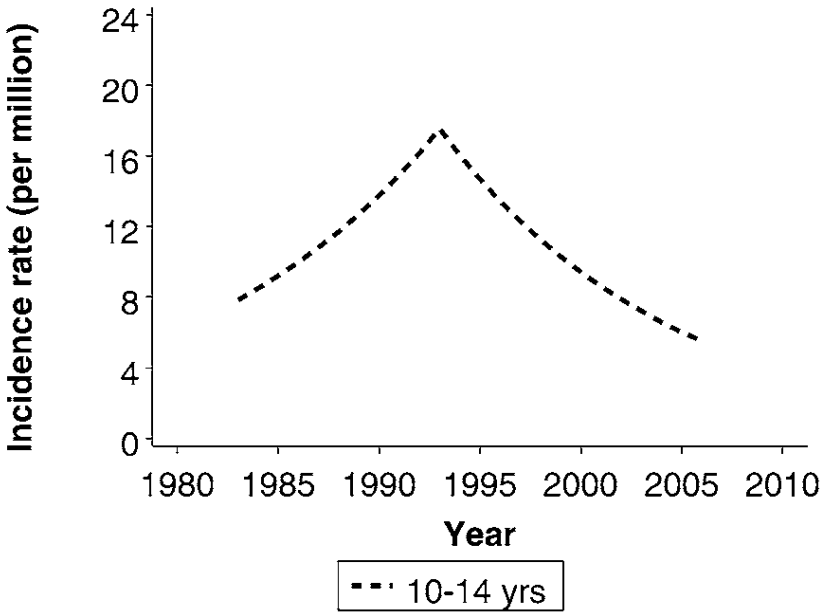


ASR at age 0-19

Karlsson PM, Fredrikson M. *Int J Cancer* 2007, **121**, 323-328

Childhood Melanoma in Australia, 1983-2006





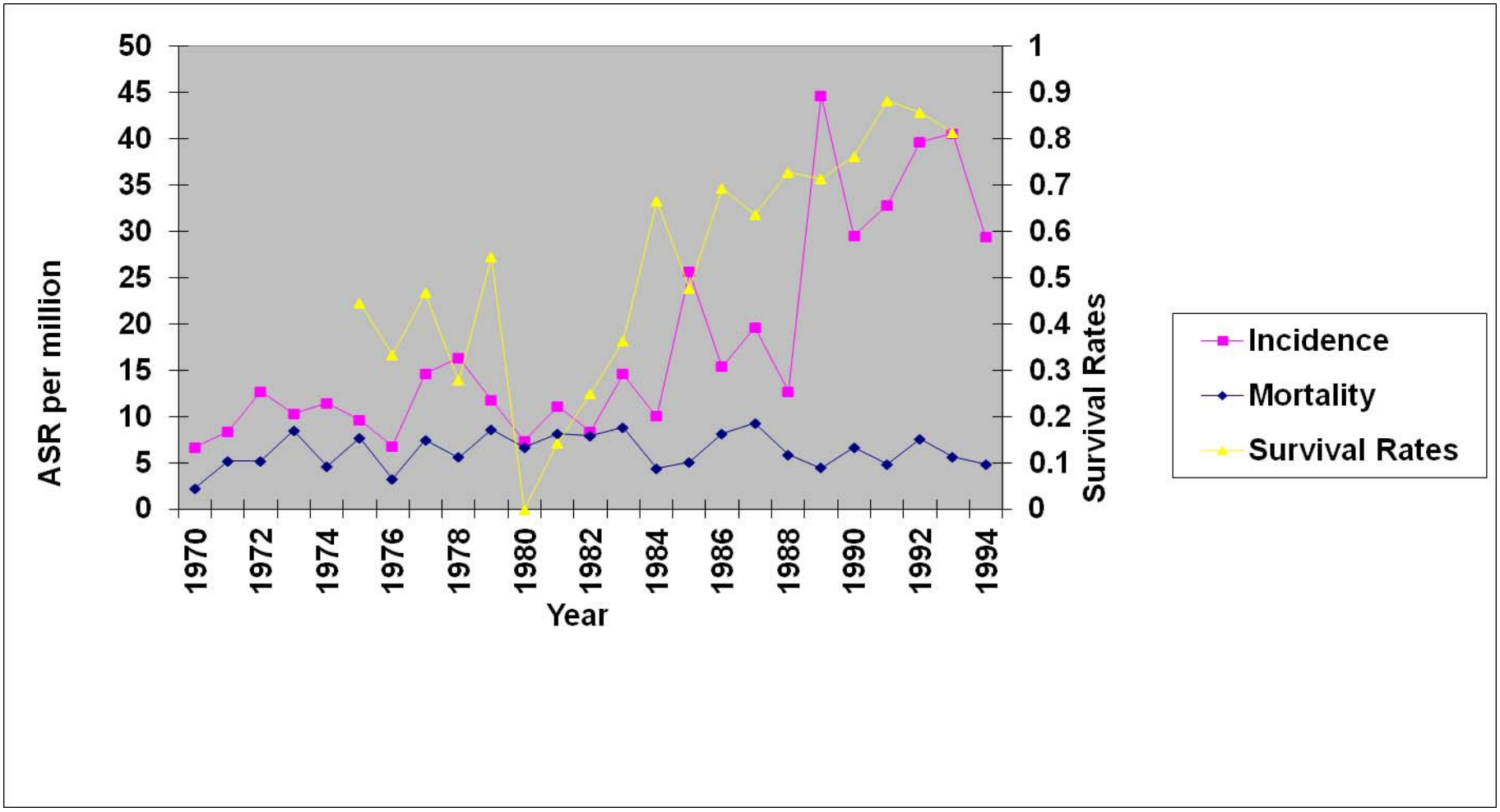
Observed incidence by year of diagnosis

Underlying trends

1983-1993	**+8.4% per year**
1993-2006	**-8.5% per year**

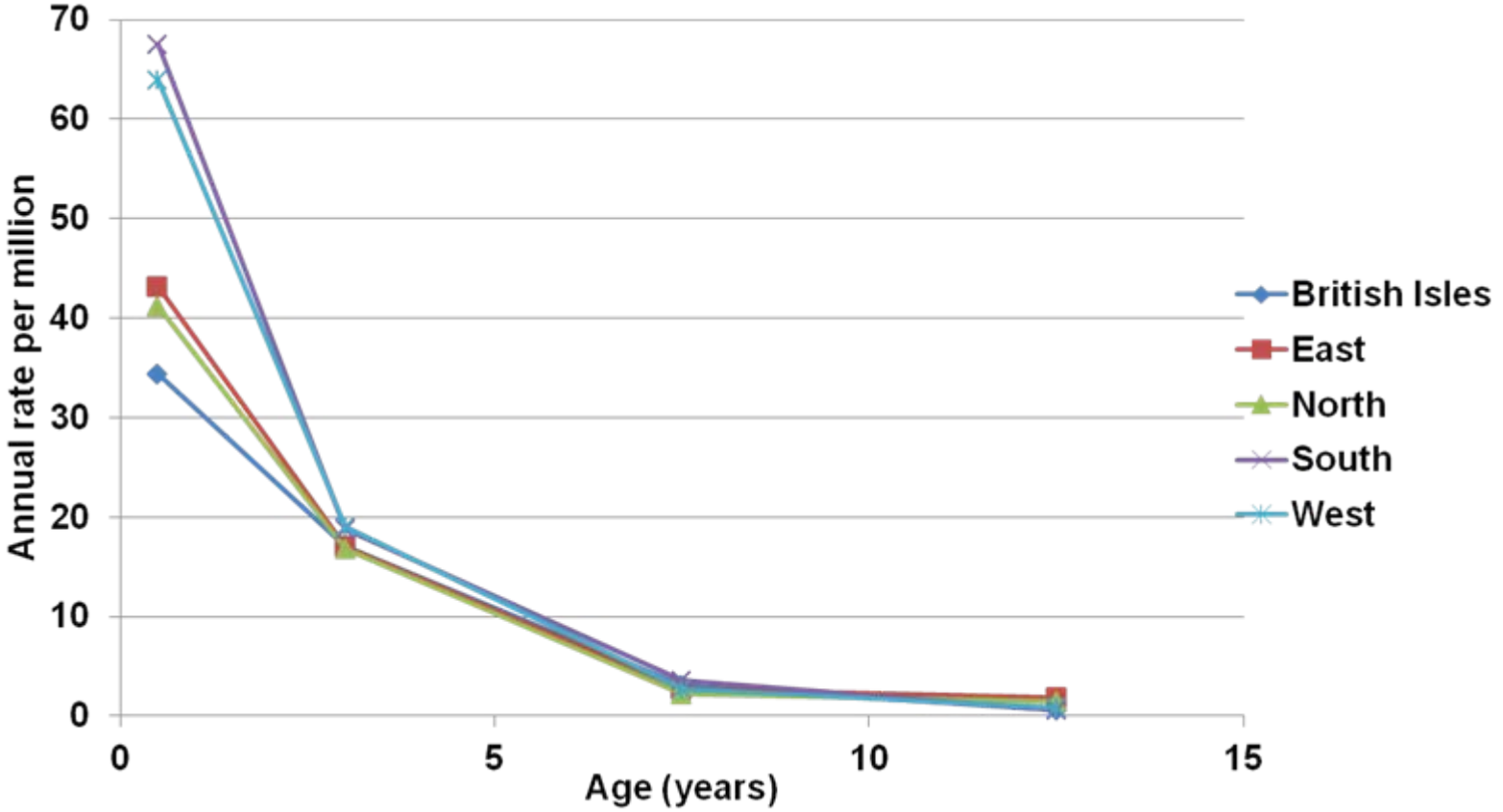
Youlden D et al. *Childhood Cancer Incidence in Australia, 1983-2006*. Brisbane, 2009

Neuroblastoma in Japan
Incidence, mortality and survival, 1970-1994
Osaka Prefecture excluding Osaka City



Honjo S et al. *Int J Cancer* 2003, **103**, 538-543

Neuroblastoma in Europe, 1988-1997



Incidence at age 0, 1-4, 5-9, 10-14

British Isles: Ireland, UK **East: Belarus, Estonia, Hungary, Slovakia**

North: Denmark, Finland, Iceland, Norway

South: Italy, Malta, Slovenia, Spain, Turkey

West: France, Germany, Netherlands, Switzerland

Source: ACCIS

Spix C et al. *Eur J Cancer* 2006, **42**, 2081-2091.

Future Work

International Incidence of Childhood Cancer, Volume 3 (IICC-3)

ACCIS-2

- **Calls for data have been issued**
- **Years of diagnosis to at least 2005**
- **Age 0-19 in both studies**
- **Increased geographical coverage, especially outside W Europe, N America and Australia / New Zealand**

Future Trends

Most marked trends will probably occur in lower income countries

- **Kaposi sarcoma in areas of high HHV8 expected to rise and fall with childhood HIV**
- **Hepatocellular carcinoma in areas of moderately high incidence should decline with uptake of hepatitis B vaccination**
- **Burkitt lymphoma may increase if geographical range of holoendemic malaria widens with climate change**

- **Recorded incidence of many other cancers may rise as populations become more affluent and availability of facilities for diagnosis and treatment increases**