New Zealand child cancer incidence and survival: An update from the New Zealand Children's Cancer Registry

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Background

Since the year 2000, the New Zealand Children's Cancer Registry (NZCCR) has collected comprehensive data pertaining to the demographics, diagnosis and treatment for New Zealand children diagnosed with cancer. The first outcome analysis of the NZCCR was released in 2014 and covered childhood cancers diagnosed between 2000 and 2009[1,2].

Aim

To provide updated incidence and survival estimates for New Zealand childhood cancers and compare these with international benchmarks.

Method

Registrations for children aged 0-14 years with a new primary cancer were sourced from the NZCCR and validated against the New Zealand Cancer Registry and National Mortality Collection using unique patient identifier. Capture-recapture methods estimated case completeness at 99.9%. Incidence rates (IR) for 2010-2014 and relative survival estimates for 2005-2014 were calculated according to sex, age group, prioritised ethnicity and International Classification of Childhood Cancers (ICCC) diagnostic group.

Results - Incidence

There were 762 new childhood cancer registrations between 2010 and 2014, giving an overall age-standardised incidence rate of 167 per million per year. Child cancer incidence overall was not significantly higher than the 155 per million previously reported for the 2000-2009 period[1] but there was a notable increase for boys and 0-4 year olds. This was partly attributable to the recent re-classification of Langerhans cell histiocytosis as a malignancy.

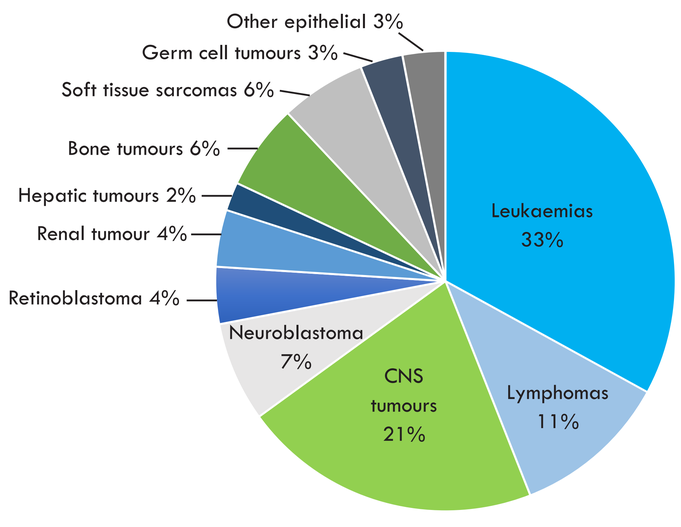
Table 1: Child cancer incidence by sex, age group, and ethnicity

	2000-2009[1]			2010-2014		
	Average cases per year	Age standardised incidence (95% CI)		Average cases per year	Age standardised incidence (95% CI)	
Sex						
Male	70	159	(147-170)	86	183	(166-201)
Female	63	150	(138-162)	67	150	(134-166)
Age group						
0/4 years	58	202	(186-219)	76	244	(219-268)
5-9 years	35	119	(107-132)	37	124	(106-141)
10-14 years	40	129	(117-142)	39	132	(113-150)
Prioritised Ethnicity						
Māori	26	134	(118-151)	37	158	(135-180)
Non-Māori	107	[a]	[a]	115	170	(156-184)
Total	**133**	**155**	**(146-163)**	**152**	**167**	**(155-179)**

[a] Incidence for non-Māori cannot be directly compared between the two time periods due to methodological differences in prioritised ethnicity groupings

The most common cancers diagnosed were leukaemias (IR: 56 per million) and central nervous system tumours (IR: 35 per million). Haematological malignancies accounted for half (50%) of all cancers diagnosed in boys but just 37% of girls. Retinoblastoma, neuroblastoma, renal and hepatic tumours all skewed heavily towards the younger child population, while malignant bone tumours and 'other epithelial neoplasms' were more commonly diagnosed among those aged 10-14 years.

Figure 1: Child cancer by ICCC diagnostic group, 2010-2014



Results - Survival

The five-year relative survival estimate for children diagnosed between 2005 and 2014 was 84%, an increase of 3% from 2000-2009[2]. One-year, three-year, and ten-year survival estimates were 91%, 85% and 82% respectively. By age group, five-year survival estimates were unchanged for 0-4 year olds (83%) but improvements were evident for those aged 5-9 years (+4% to 84%) and 10-14 years (+6% to 84%).

Of the 240 deaths recorded within the cohort, CNS tumours accounted for 38% of all deaths and leukaemias accounted for an additional 25%.

Table 2: Childhood cancer five-year survival 2005-2014

		2000-2009[2]	2005-2014	% change
Sex				
Male		83	84	↑ 1%
Female		79	83	↑ 4%
Age Group				
0-4 years		83	83	-
5-9 years		80	84	↑ 4%
10-14 years		78	84	↑ 6%
Prioritised ethnicity				
Māori		77	79	↑ 2%
Pacific Peoples		81	79	↓ 2%
Non-Māori / Non-Pacific		82	86	↑ 4%
ICCC diagnostic group				
I	Leukaemias	85	89	↑ 4%
II	Lymphomas	93	96	↑ 3%
III	CNS tumours	71	71	-
IV	Neuroblastoma	66	73	↑ 7%
V	Retinoblastoma	100	100	-
VI	Renal tumours	97	96	↓ 1%
VII	Hepatic tumours	69	72	↑ 3%
VIII	Malignant bone tumours	67	79	↑ 12%
IX	Soft tissue sarcomas	73	71	↓ 2%
X	Germ cell tumours	97	98	↑ 1%
XI	Other malignant epithelial	85	90	↑ 5%
All childhood cancers		**81**	**84**	**↑ 3%**

Discussion

Approximately 150 New Zealand children aged 0-14 years are diagnosed with cancer each year, of whom half are under the age of five at diagnosis. At 167 per million, New Zealand's child cancer incidence is comparable to recent reported rates from Australia (IR: 165 per million in 2009-2013[3]).

Pleasingly, five-year child cancer survival has improved from 81% in 2000-2009 to 84% for the 2005-2014 period. The greatest improvements in five-year survival were for those diagnosed with malignant bone tumours (+12% to 79%). Survival improvements were also seen for neuroblastoma (+7 to 73%) likely reflecting the advancements made in treating high-risk neuroblastoma patients during this time.

Of concern is the 79% overall five-year cancer survival for Māori and Pacific children compared to 86% for non-Māori/non-Pacific Peoples. Small annual case numbers limits our ability to make ethnic comparisons by tumour group or disease staging at diagnosis. However, we are able to report that survival for the most common childhood cancer, acute lymphoblastic leukaemia, remains consistent across the three ethnic groups, ranging from 91 to 93%.

New Zealand's overall five-year survival estimate for childhood cancers of 84% is comparable with those recently published by Australia (84%)[3], Canada (83%)[4], the United States (83%)[5], and Germany (85%)[6]. Comparisons across diagnostic groups indicate that further survival gains are most likely achievable for New Zealand children diagnosed with bone tumours, soft tissue sarcomas, CNS tumours and neuroblastoma.

References

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