Canadian Cancer Research Alliance
Alliance canadienne pour la recherche sur le cancer

Canada's Research Investment in

Childhood and Adolescent Cancers, 2005-2016

THIS REPORT

This brief report provides an overview of the level and nature of research investment in childhood and adolescent cancers made by Canadian research funding organizations. Page 3 of this report presents annual investment data, while page 4 shows the proportion of the investment by key attributes for 2016 (graphs) and for the three four-year periods (tables).

Cancers affecting children and adolescents are diverse and there is wide variation in etiology, incidence, age of onset, aggressiveness, treatments and survival. Although cancer deaths are slowly decreasing and great progress has been made over the past 45 years in terms of survival, cancer remains the most common disease-related cause of death among the age group 1-19 year-olds.[1] In addition, age-standardized rates of cancers among children have been rising in Canada, particularly among the youngest cohort.[2]

There is a growing number of childhood and adolescent cancer survivors and many experience significant long-term health and psychosocial challenges due to their cancer or treatments. Research that helps to reveal the complex biology of cancer and successful ways to prevent, detect, treat, and mitigate the long-term effects of cancer are all important to improving outcomes for childhood and adolescent cancer patients.

CANADIAN CANCER RESEARCH SURVEY

Since 2005, CCRA members have prioritized the quantification of Canada's cancer research funding. To that end, the CCRA's Canadian Cancer Research Survey (CCRS) was created, a database that has evolved over time to track the research investments made by over 40 organizations.

The CCRS is estimated to cover about 60–80% of the research investments made in Canada through peer-reviewed processes. Data are updated and corrected annually and will vary from previously published reports. Investment numbers may differ from those reported by contributing organizations because of methodological conventions like budget proration.

It is noteworthy that Canadian pediatric centres receive significant investment for clinical trials through the Children's Oncology Group, a clinical trials group supported by the National Cancer Institute in the U.S. which is the world's largest organization devoted exclusively to childhood and adolescent cancer research. This investment is not included in the results herein.

Access interactive visualizations and a related slide deck at **www.ccra-acrc.ca**.

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1 Ellison, L; Janz, T. (2015). Childhood incidence and mortality in Canada. *Health at a Glance*, Statistics Canada, Catalogue no. 82-624-X. https://www150.statcan.gc.ca/n1/pub/82-624-x/2015001/article/14213-eng.htm

2 Xie, L; Onysko, J; Morrison, H. (2018). Childhood cancer incidence in Canada: demographic and geographic variation of temporal trend (1992-2010). *Health Promotion and Chronic Disease Prevention in Canada*, 38(3):79-115. https://doi.org/10.24095/hpcdp.38.3.01

Overall Investment

Research investment in childhood and adolescent cancers more than doubled, from $10M in 2005 to $23M in 2016 and a total of $225M was invested in research on childhood and adolescent cancers over the 12 years. The research investment in childhood and adolescent cancers represented nearly 5% of the overall cancer research investment in 2016.

Investment Trend

The investment in research on childhood and adolescent cancers increased over time, although the most recent three years showed a levelling off. This is consistent with the overall cancer research investment trend. While the increased investment was across sectors, the investments by federal government programs/agencies increased year upon year over the decade and represented 54% of the investment in 2016.

Major Funders

The Canadian Institutes of Health Research (CIHR) and the Canadian Cancer Society (CCS) were the top funders of childhood and adolescent cancer research, accounting for 38% and 13% of the 12-year investment, respectively. Other key funders included the Ontario Institute for Cancer Research (OICR), The Terry Fox Research Institute (TFRI), Genome Canada and The Cole Foundation.

Targeted Investment

Funding programs specifically targeting child health, childhood cancers, and related disorders represented a growing proportion of the investment made through national and regional funding programs, from 2% in 2005 to 15% in 2016.

Investment by Funding Mechanism

In terms of funding mechanisms, operating grants (direct support) formed the largest share of the investment. While most of the operating grant investment was in the biomedical research pillar, the investments grew over two-fold for both biomedical and clinical research from 2005–08 to 2013–16.

Investment by Cancer Site

Over 80% of the childhood and adolescent cancer research investment was focused on specific cancers. Central nervous system neoplasms (which includes cancers of the brain and spinal cord) and leukemias represented 39% and 34%, respectively, of the investment for the 12-year period and the investments in both areas had a net increase from 2005–08 to 2013–16. These cancers also represented the highest number of new cancer cases and deaths for this age group.

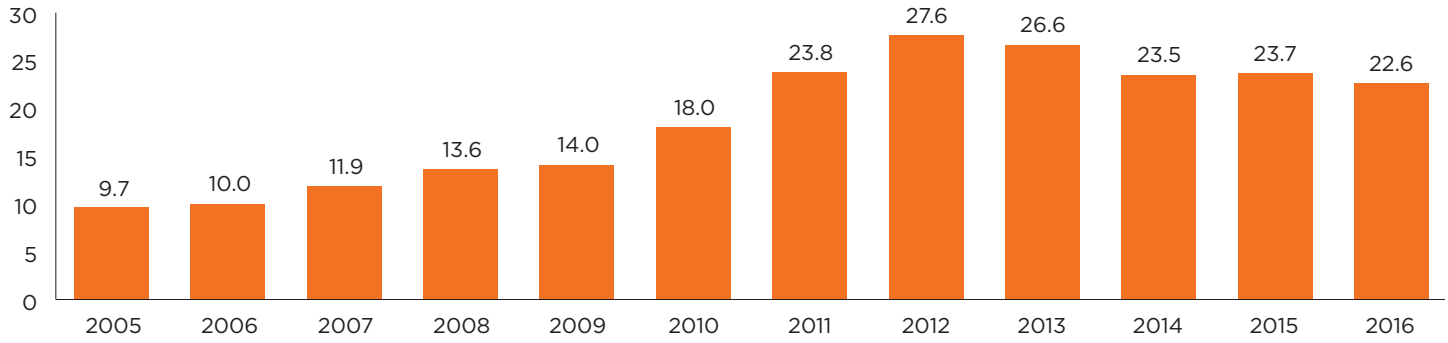
Investment by Area of Science

Biology continued to be the area with the highest investment although it represented a shrinking proportion of the annual investment over the 12 years, consistent with the overall cancer research investment trend. Investment in "Early detection, diagnosis & prognosis" had the greatest increase from the first to the latest four-year period, with nearly a six-fold increase. This reflects increased investment in research focused on biomarkers.

Researchers

Over the 12 years, there were 208 nominated principal investigators (PIs) funded for research projects on childhood and adolescent cancers. This number represented nominated PIs who were funded for at least one operating grant, equipment award, or career award, which was wholly focused on childhood and adolescent cancers. Many were based in Ontario, but it is noteworthy that many research projects involved multiple institutions. Multi-centred and multi-disciplinary research is critical to advancing the evidence base.

Annual Investment ($M)



Investment by Funder ($M)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
CIHR	3.5	3.6	3.9	4.3	4.7	6.1	7.9	9.6	9.8	10.8	11.0	10.0
CCS	2.0	2.2	2.8	3.0	2.7	2.6	2.6	3.1	2.4	1.9	2.5	2.4
TFRI	0.5	0.6	0.7	0.8	0.8	1.2	1.8	2.0	1.3	0.5	0.8	0.9
OICR	1.0	0.4	0.5	0.9	1.1	1.3	1.4	1.1	0.8	0.8	1.1	1.3
Genome Canada	0.1	0.2	0.2	0.2	0.2	0.5	1.6	2.4	1.9	1.1	0.6	1.5
Cole Foundation	0.0	0.1	0.2	0.5	0.6	0.9	1.0	1.2	1.2	0.8	0.8	0.8
Other funders	2.6	3.0	3.7	4.0	4.0	5.4	7.6	8.3	9.4	7.7	7.0	5.7

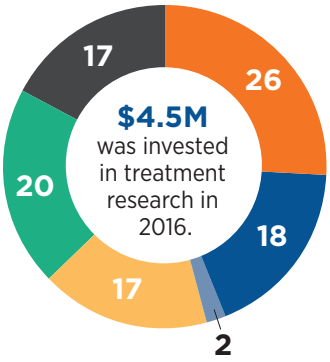
Investment by Cancer Site ($M)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Central Nervous System (brain & CNS)	1.7	2.0	2.8	3.5	3.2	3.6	6.9	9.9	10.7	9.4	9.0	9.3
Leukemias	2.5	2.5	3.6	4.3	4.2	5.8	7.0	7.2	6.9	6.4	7.0	6.5
Neuroblastoma	0.5	0.7	0.9	0.9	0.9	1.1	1.3	1.3	1.2	0.8	0.9	1.0
Soft tissue	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.6	0.8
Bone	0.4	0.3	0.1	0.2	0.8	1.2	1.5	1.4	0.6	0.4	0.5	0.5
Non-Hodgkin's lymphoma	0.3	0.3	0.5	0.5	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.4
Eye	1.0	0.6	0.6	0.5	0.7	0.8	0.9	0.6	0.4	0.4	0.5	0.3
Other cancers	0.8	0.7	0.7	0.9	1.0	1.3	1.5	1.3	1.3	1.1	0.9	0.5

Program Type (%)

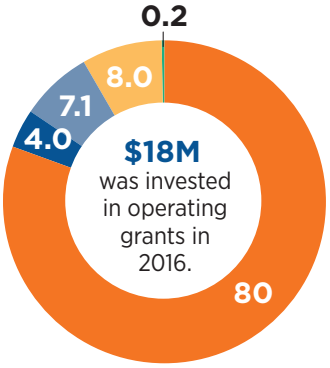
	2013–16	2009–12	2005–08
National – targeted program	**12**	7	2
Regional – targeted program	**4**	5	3
National – other program	**73**	68	79
Regional – other program	**11**	20	16

Areas of Science (%)



	2013–16	2009–12	2005–08
Biology	**29**	33	48
Etiology	**19**	24	17
Prevention	**1**	0	0
Early detection, diagnosis & prognosis	**18**	10	6
Treatment	**15**	14	11
Cancer control, survivorship & outcomes	**18**	19	19

Funding Mechanism (%)



	2013–16	2009–12	2005–08
Operating grants	**77.2**	73.1	65.8
Equipment/infrastructure grants	**8.9**	9.9	12.1
Career awards	**6.4**	8.4	12.2
Trainee awards	**7.3**	8.4	9.8
Related support grants	**0.2**	0.3	0.2

CANADIAN PARTNERSHIP AGAINST CANCER
PARTENARIAT CANADIEN CONTRE LE CANCER

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