INVESTMENT IN RESEARCH ON CHILDHOOD AND ADOLESCENT CANCERS, 2005–2014

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

We are an alliance of organizations that collectively fund most of the cancer research conducted in Canada – research that will lead to better ways to prevent, diagnose, and treat cancer and improve survivor outcomes. Our members include federal research funding programs/agencies, provincial research agencies, provincial cancer care agencies, cancer charities, and other voluntary associations.

We are motivated by the belief that, through effective collaboration, Canadian cancer research funding organizations can maximize their collective impact on cancer control and accelerate discovery for the ultimate benefit of Canadians affected by cancer.

MARCH 2017

HIGHLIGHTS

- From 2005 to 2014, there was a total of $178M invested in research on childhood and adolescent cancers. This research represented a growing proportion of the overall cancer research investment, 5% in 2014 up from less than 3% in 2005.
- The growth in the investment occurred across funding sectors. The Canadian Institutes of Health Research (CIHR) was the largest funder, with an investment that grew each subsequent year within the decade to a cumulative total of $64M. The Canadian Cancer Society (CCS) was the second largest funder and also the largest funder among the charitable sector, with a cumulative total of $26M.
- The investment in etiological research and research focused on early detection, diagnosis and prognosis increased from 2005 to 2014, while the investment in research focused on cancer biology, much like the overall cancer research investment trend, decreased.
- Operating grants, specifically those within the biomedical research pillar, formed the greatest share of the investment, although there was also growth over time in the operating grant investment focused on clinical research.
- The investment in central nervous systems neoplasms (specifically brain cancers) and leukemias significantly increased from the first to the second quinquennial. Combined these cancers accounted for 71% of the site-specific investment for the decade.
- The data suggest that the increased investment resulted in increased research capacity. There were 60 more nominated principal investigators (PIs) who received grants in the second quinquennial compared with the first and substantially more was invested in training awards at the national (CIHR) and regional (The Cole Foundation and Fonds de recherche du Québec - Santé) levels in 2010–2014.

Cancers affecting children and adolescents are diverse and there is wide variation in etiology, incidence, onset, aggressiveness, treatments, and survival. Although child and adolescent cancers represent a small percentage of the overall number of new cancer cases each year in Canada, cancer is the most common disease-related cause of death among the 1-19 year age group. Great improvements in survival have occurred for many childhood cancers over the past 30 years and there is an overall survival rate of 83%. Early-life cancers have, however, formidable impacts on those affected, their families, and the health, economic and social welfare systems. In addition, there is a growing population of childhood and adolescent cancer survivors and some of them face significant challenges as they transition to adulthood.

This summary report describes the trend in investment in research on childhood and adolescent cancers in Canada for the decade 2005 to 2014. It updates a previous publication that covered the period 2005 to 2010. Data come from the Canadian Cancer Research Survey (CCRS). The CCRS was designed to help inform CCRA members on how to optimize their research investment by addressing gaps, capitalizing on opportunities to partner on funding, and reducing duplication.

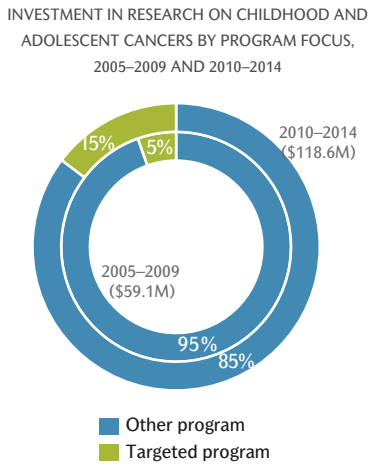
This report was made possible by the Canadian Partnership Against Cancer, an independent, not-for-profit organization funded to accelerate action on cancer control for all Canadians. The Partnership is committed to enhancing the cancer research environment in Canada through its support of the CCRA and CCRA's role in coordinating the cancer research funding system. As a member and funder of the CCRA, the Partnership collaborates with other member organizations to enable the strategy for cancer research in Canada. The Partnership is funded by Health Canada.

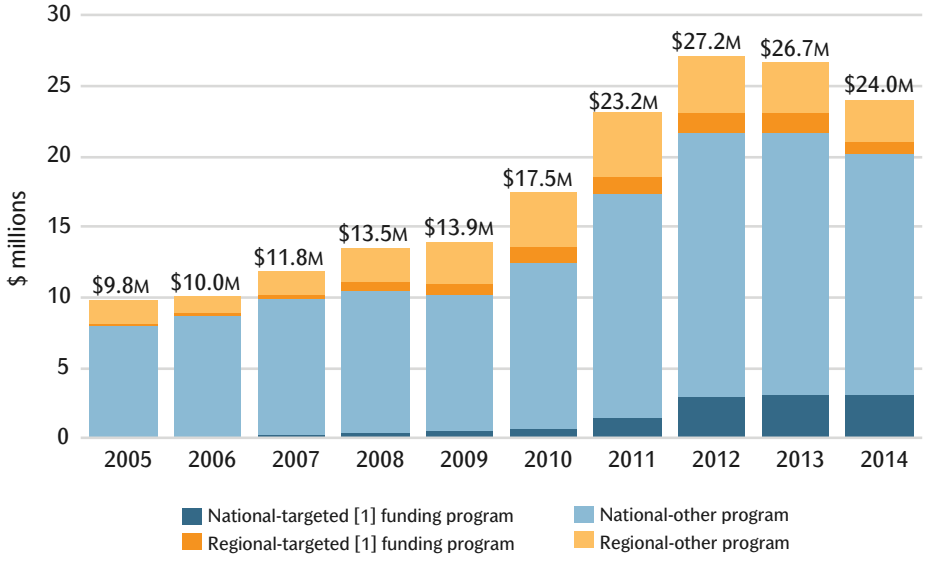
The views expressed herein are those of the CCRA.

CANADIAN PARTNERSHIP AGAINST CANCER | PARTENARIAT CANADIEN CONTRE LE CANCER

FIGURE 1

INVESTMENT IN RESEARCH ON CHILDHOOD AND ADOLESCENT CANCERS, 2005–2014



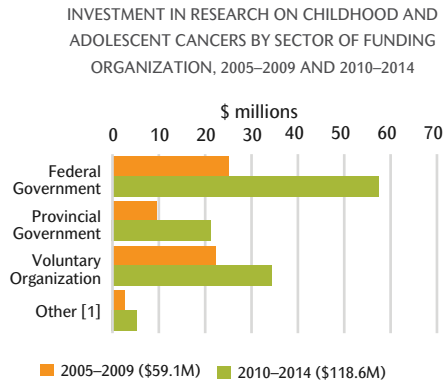


[1] Funding programs that target childhood and adolescent cancer and related health issues.

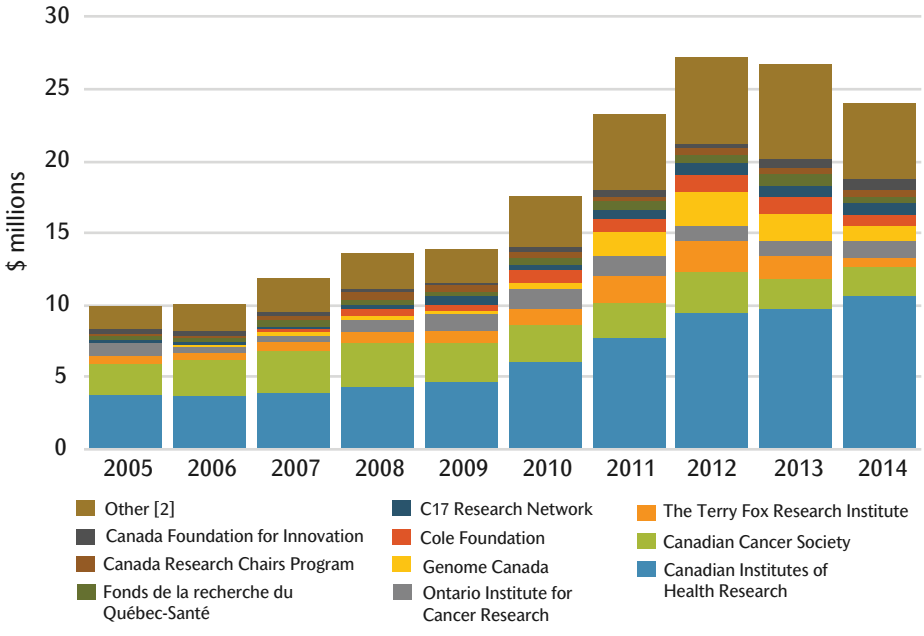
- From 2005 to 2014, $177.7M was invested in research on childhood and adolescent cancers. The annual investment was highest at $27.2M in 2012 and has represented a growing proportion of the overall cancer research investment, from 2.6% in 2005 to 5.0% in 2014 (Figure 1). The investment from targeted funding programs was $14.2M higher in 2010–2014 than 2005–2009.
- The increase from the first to the second quinquennial occurred across all sectors, with the greatest increase in the Federal government sector.
- The Canadian Institutes of Health Research (CIHR) was the largest funder, with a cumulative total of $63.8M over the decade. The CIHR investment grew year upon year, from $3.8M in 2005 to $10.7M in 2014 (Figure 2). The Canadian Cancer Society (CCS) was the second largest funder and also the largest funder among the charitable sector, with a cumulative total of $26M.
- The multi-funded Medulloblastoma Advanced Genomics International Consortium (MAGIC) administered through Genome Canada's Large-Scale Applied Research program was the single largest investment in the decade and represented 6% of the entire ten-year research investment in childhood and adolescent cancers.

FIGURE 2

INVESTMENT IN RESEARCH ON CHILDHOOD AND ADOLESCENT CANCERS BY FUNDING ORGANIZATION [1], 2005–2014



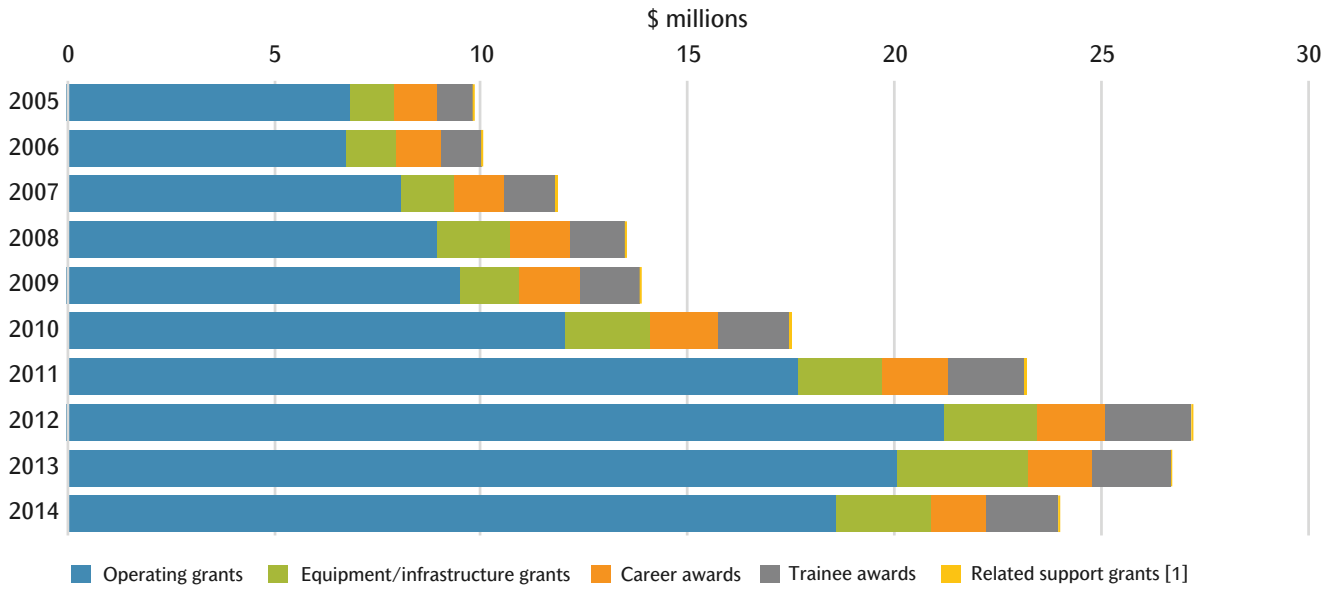
[1] Co-funding of projects supported by CCRS participating organizations by institutional, industry, and foreign sources.



[1] Only organizations with an investment that represented 2% or more of the cumulative investment are identified by name.
[2] All other research funders captured in the CCRS.

FIGURE 3

INVESTMENT IN RESEARCH ON CHILDHOOD AND ADOLESCENT CANCERS BY FUNDING MECHANISM, 2005–2014



[1] Related support grants account for less than one percent of the investment and are difficult to see on the graph.

- The largest share of the investment was in operating grants for all years in the decade, with the growth in operating grant investment rising substantively in 2011 and again in 2012 before falling slightly in 2013 and 2014 (Figure 3). 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 2005–2009 to 2010–2014 (Figure 4).
- Looking at the distribution of the research investment across funding mechanisms and by CSO (Figure 5), the proportion of the investment in the second quinquennial in Biology went down while the proportions for etiological research and research in the area of Early detection, diagnosis and prognosis went up. The distributions were nearly the same for the Treatment and Cancer control, survivorship and outcomes categories for both five-year periods.

FIGURE 4

DISTRIBUTION OF OPERATING GRANT INVESTMENT IN CHILDHOOD AND ADOLESCENT CANCERS BY RESEARCH PILLAR, 2005–2009 AND 2010–2014

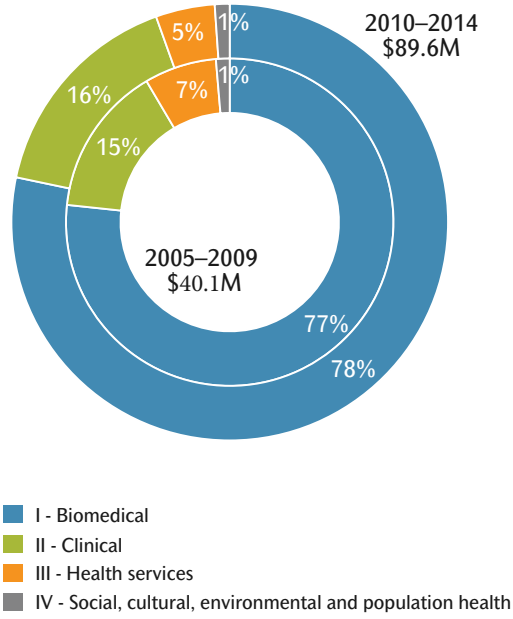
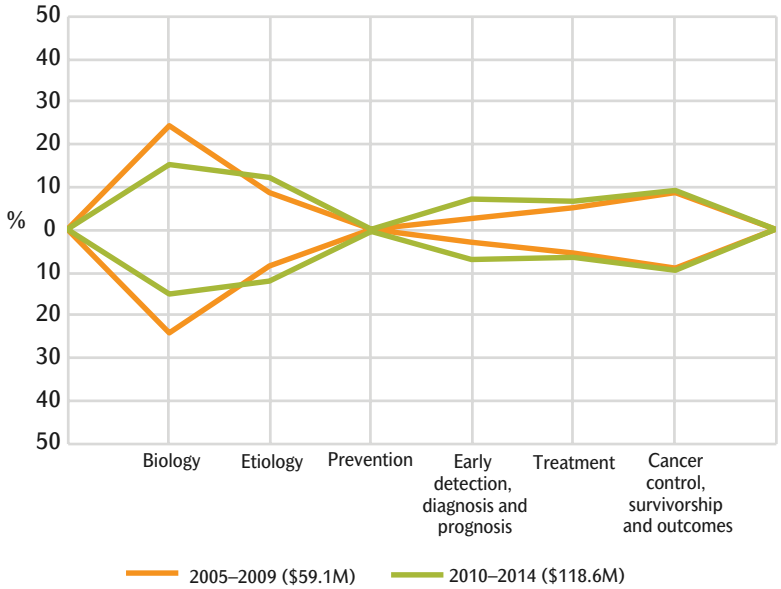


FIGURE 5

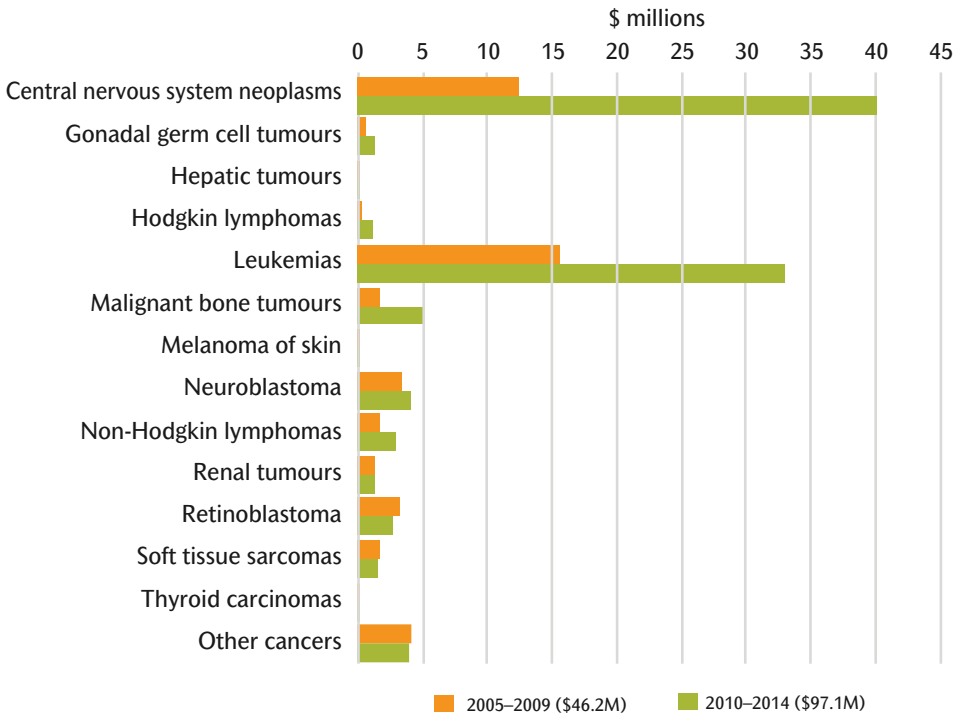
DISTRIBUTION OF INVESTMENT IN RESEARCH ON CHILDHOOD AND ADOLESCENT CANCERS BY CSO V.2 CATEGORY [1], 2005–2009 AND 2010–2014



[1] For further information about the Common Scientific Outline (CSO) V.2, please see https://www.icrpartnership.org/cso

FIGURE 6

SITE-SPECIFIC RESEARCH INVESTMENT IN CHILDHOOD AND ADOLESCENT CANCERS BY CANCER TYPE, 2005–2009 AND 2010–2014 [1]

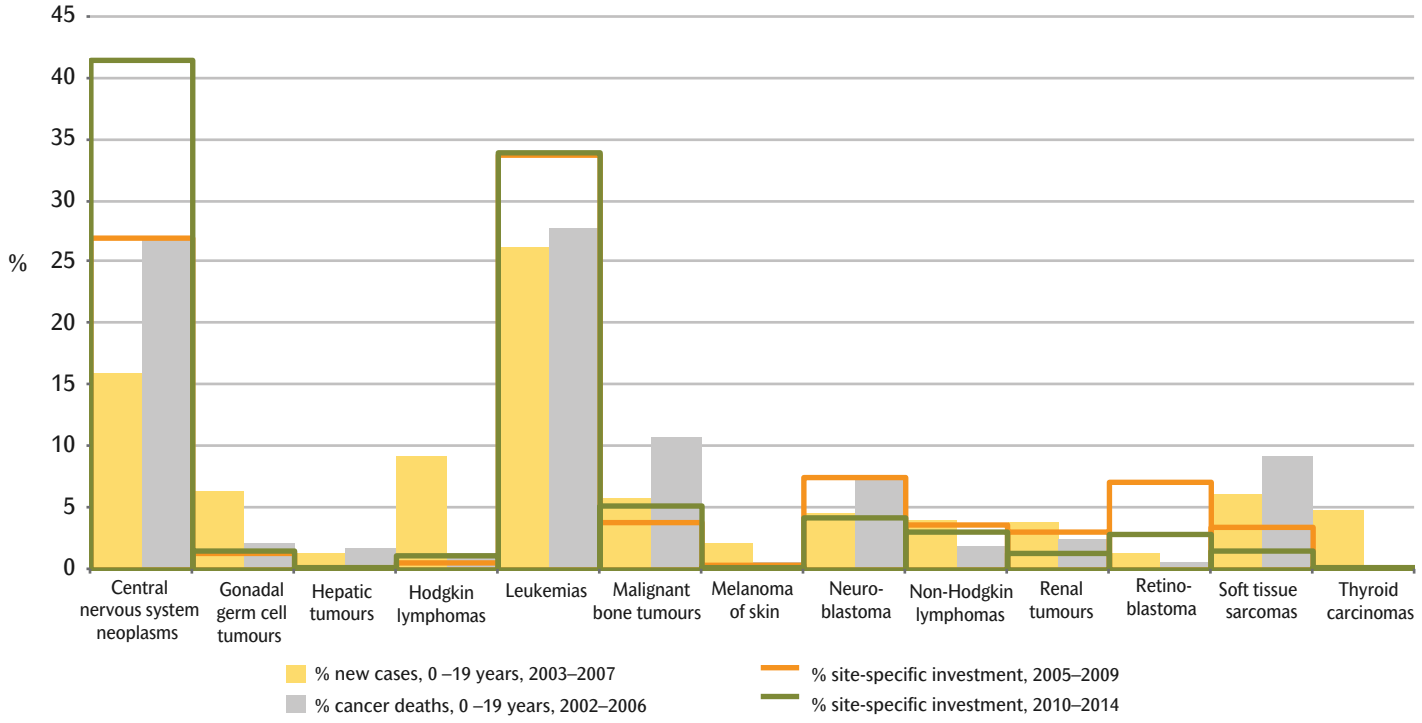


[1] Investments of less than $50,000 cannot be seen on the graph.

- Over 80% of the overall investment in research on childhood and adolescent cancers was site-specific.
- The research investment in central nervous systems cancers (specifically brain cancers) and leukemias accounted for 71% of the site-specific investment over the decade, and the investments grew from the first to the second quinquennial by $27.6M and $17.3M, respectively (Figure 6). These are also the cancers with the highest burden, which is defined in this report in terms of new cancer cases and cancer deaths (Figure 7).
- CIHR and Genome Canada accounted for the largest share of the increased investment in brain cancers from the first to the second period and CIHR and The Cole Foundation accounted for the largest share of the increased investment in leukemias.
- Acute lymphoblastic leukemia research represented the highest investment within the overall leukemia research investment and this is the most common form of leukemia in children.
- To be commensurate with cancer burden, enhanced investment in soft tissue sarcomas and gonadal germ cell tumours may be warranted.

FIGURE 7

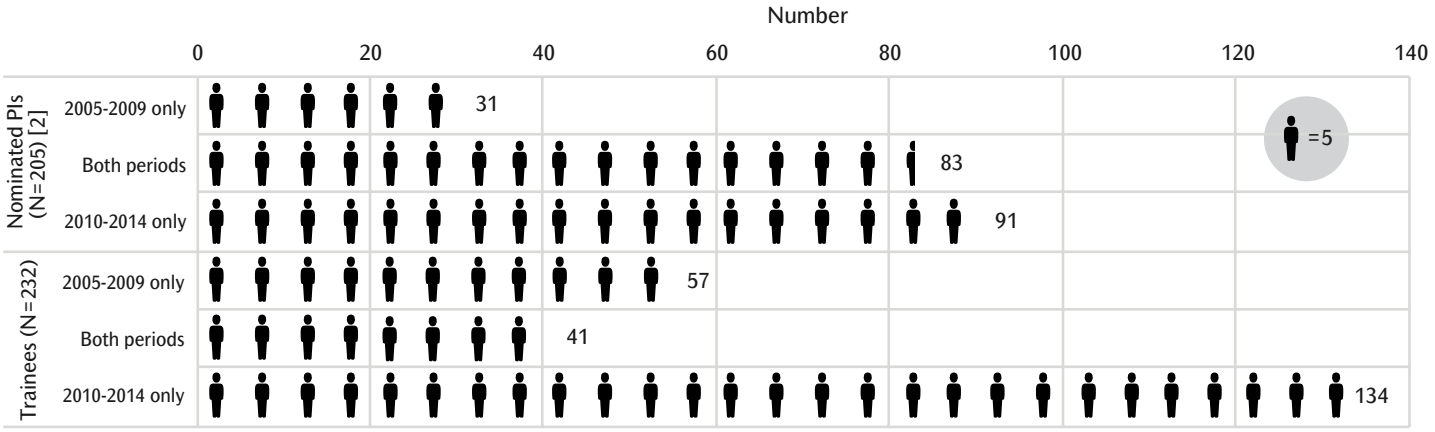
DISTRIBUTION OF SITE-SPECIFIC CANCER RESEARCH INVESTMENT IN CHILDHOOD AND ADOLESCENT CANCERS IN 2005–2009 AND 2010–2014 BY NEW CANCER CASES AND CANCER DEATHS [1], SELECTED CANCER TYPES



[1] Source: Canadian Cancer Society: *Canadian Cancer Statistics, 2011.*

FIGURE 8

NUMBER OF RECIPIENTS OF GRANTS AND TRAINEE AWARDS [1] BY TIME PERIOD (N=431)



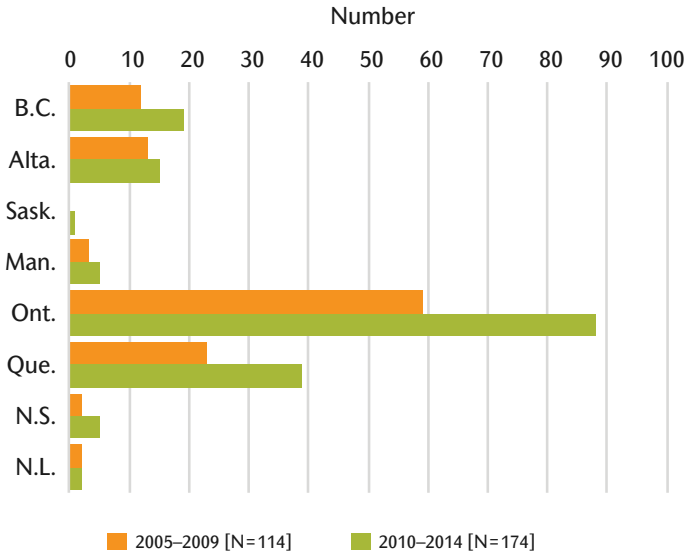
[1] Includes trainees or nominated PIs with at least one award/grant with a cancer weighting of 80% or more and active during one or both time periods.

[2] Includes recipients of trainee awards who subsequently received one or more operating grant, career award, or equipment/infrastructure grant.

- There were 205 nominated PIs who received one or more grants focused on childhood and adolescent cancers during the decade. Most of them had received funding in the last five years (Figure 8). The increase in PIs from the first to the second quinquennial was across all provinces, except Newfoundland and Labrador (Figure 9).
- Although the vast majority of trainees are supported through operating grants, a small group of trainees do receive awards to facilitate completion of their research training. There were 77 more trainees who received awards during the 2010–2014 period than the 2005–2009 period (Figure 8) and 16 trainees (21%) went on to receive a subsequent grant as a PI.
- There were significant increases in the investment in trainee awards by both national and regional funders in 2010-2014 (Figure 10). There was a doubling of trainee support by CIHR and an increase in Quebec-based funding on the part of The Cole Foundation and Fonds de recherche du Québec - Santé.

FIGURE 9

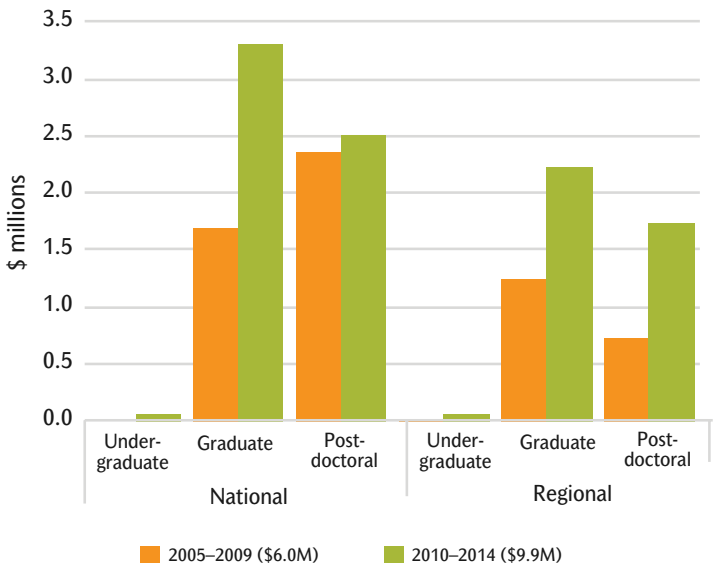
NUMBER OF NOMINATED PIS BY PROVINCE OF INSTITUTIONAL AFFILIATION AND TIME PERIOD [1] (N=205)



[1] Includes nominated PIs with at least one award with a childhood/adolescent cancers weighting of 80% or more and active during one or both time periods. There were 83 PIs who were active during both periods.

FIGURE 10

TRAINEE AWARD INVESTMENT IN RESEARCH ON CHILDHOOD AND ADOLESCENT CANCERS BY PROGRAM REACH AND TIME PERIOD



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* As of February 1, 2017, the Canadian Cancer Society and the Canadian Breast Cancer Foundation merged operations. The data in this report reflects the investments made by these individual organizations prior to this merger.

For details on the methodology used for this report, please consult our report, *Investment in Research on Childhood and Adolescent Cancers, 2005–2010*, at http://www.ccra-acrc.ca. A slide deck based on the results of this analysis is also available on our website under the Publications menu.

ACKNOWLEDGEMENTS

We would like to thank the many organizations that participate in the CCRS by contributing their data on an annual basis. Without them, this report would not have been possible. Expert review of this report was provided by Ms. Kathy Brodeur-Robb, Executive Director of the C[17] Council and Dr. Stephen Robbins, Scientific Director, CIHR Institute of Cancer Research.

Other experts instrumental to initial reports on this topic were: Drs. Ronald Barr (McMaster University), Mark Bernstein (IWK Health Centre), Paul Grundy (Canadian Partnership Against Cancer), Robin Harkness (Ontario Genomics), Nada Jabado (Montreal Children's Hospital), David Malkin (The Hospital for Sick Children), Daniel Sinnett (Centre de Recherche du CHU Sainte-Justine), and Christine Williams (Ontario Institute for Cancer Research).

ISBN 978-1-927650-38-7 (PDF)

Aussi offert en français