

INVESTMENT IN CANCER SURVIVORSHIP RESEARCH IN CANADA, 2005–2014

HIGHLIGHTS

- A total of \$160.7M was invested in cancer survivorship research from 2005 to 2014. The investment showed a year-upon-year increase with the highest investment from both non-targeted and targeted programs in 2014. The trend was considerably different from the trend found for the overall cancer research investment.
- The second quinquennial (2010 to 2014) was characterized by greater investment in operating grants, in research focused on childhood/adolescent patients, and in research focused on physiological effects.
- Of the 42 organizations tracked in the survey, 36 had some level of investment in survivorship research. Eleven funders accounted for 85% of the survivorship investment over the decade, with the Canadian Institutes of Health Research, the Canadian Cancer Society and Prostate Cancer Canada contributing most substantively to the increased investment over the decade.
- The investment in breast cancer research represented 43% of the site-specific cancer survivorship research investment for the ten-year period. More investment was also made in the most recent quinquennial in leukemias, and colorectal, brain, prostate, and oral cancers.
- A total of 357 nominated principal investigators (PIs) had at least one funded cancer survivorship project within the decade, with 88 more PIs funded in the second quinquennial compared to the first.
- CCRA's recently released *Pan-Canadian Framework for Cancer Survivorship Research* encompasses recommendations for funders on areas for targeted programming, especially in terms of special populations, as well as ways to support knowledge translation.

By 2026, it is estimated that there will be more than two million cancer survivors in Canada.¹ The cancer survivor population is diverse—there are many kinds of cancer and people are diagnosed at different stages and receive different treatments. Treatment outcomes and long-term effects can be further complicated by the patient's age and pre-existing health conditions.

This summary report describes the nature of the investment in cancer survivorship research in Canada for the years 2005 to 2014 and builds upon previous work published in this area. 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.

The CCRS captures data on projects funded on the basis of peer review and often in response to publicly announced research granting competitions. Thus, intramural survivorship research conducted within hospitals, cancer centres or non-cancer agencies are not

captured here. We do not know the magnitude of the investment that may be missing.

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.



[1] Population-adjusted estimate based on recent U.S. statistics published by the American Cancer Society and the National Cancer Institute.



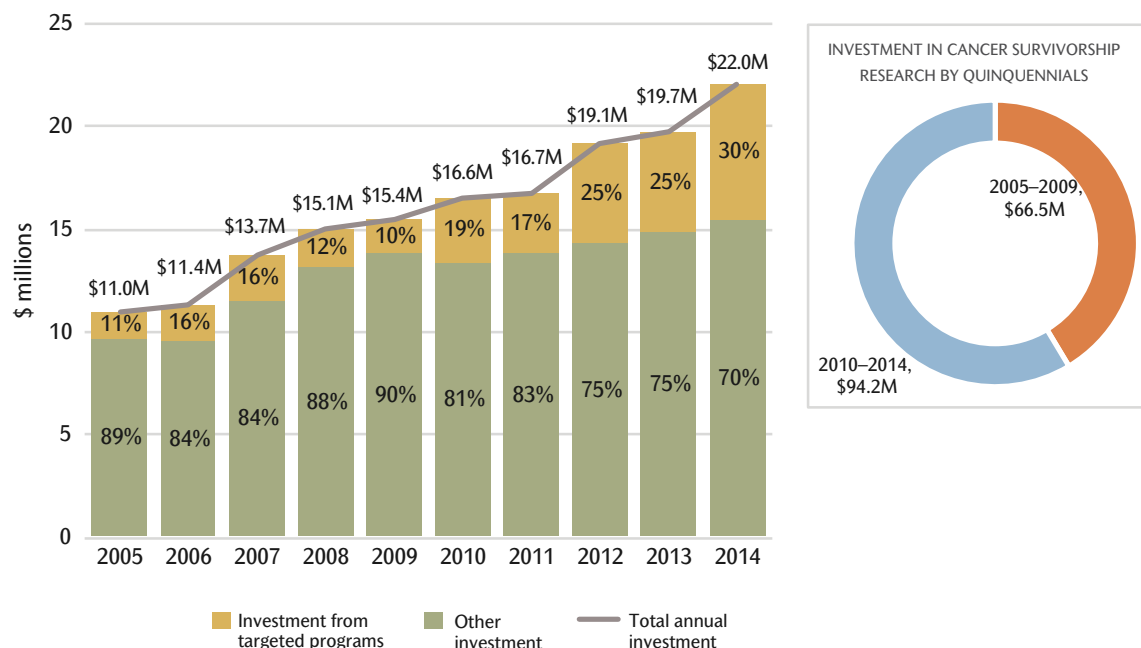
Canadian Cancer Research Alliance • Alliance
canadienne pour la recherche sur le cancer

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

FIGURE 1
INVESTMENT IN CANCER SURVIVORSHIP RESEARCH BY FUNDING PROGRAM FOCUS, 2005–2014



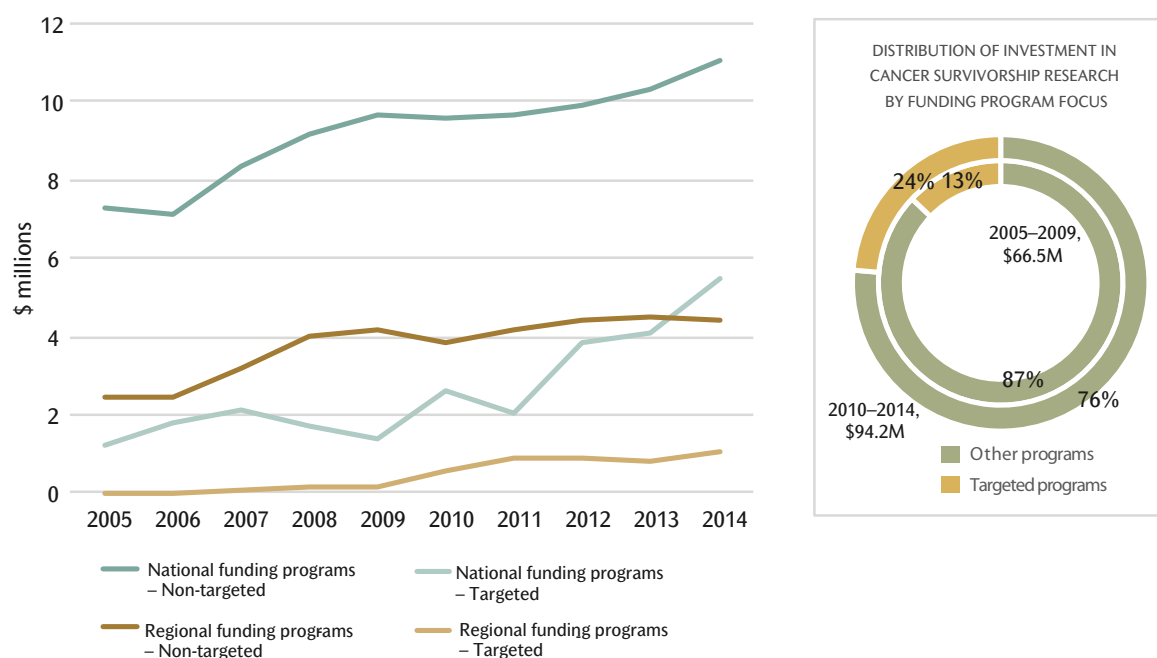
- A grand total of \$160.7M was invested in cancer survivorship research for 1,362 projects over the decade and this represented 3% of the overall cancer research investment.

- \$27.7M more was invested in the 2010 to 2014 period than from 2005 to 2009.

- The investment had a year-upon-year increase with significant jumps in years 2007, 2012, and 2014 (Figure 1). The highest investment from both non-targeted and targeted programs over the decade was in 2014.

- Targeted investments significantly increased from the first to the second quinquennial, largely due to national programs (Figure 2).

FIGURE 2
INVESTMENT IN CANCER SURVIVORSHIP RESEARCH BY FUNDING PROGRAM REACH AND FOCUS, 2005–2014



INCLUSION CRITERIA

This report included studies focused on: post-cancer treatment rehabilitation; long-term or late complications of cancer and its treatments; other physical and psychological impacts experienced by cancer survivors and their family/caregivers; social support needs of cancer survivors and their family/caregivers; economic sequelae of cancer for survivors and their family/caregivers; interventions to improve quality of life; the delivery of care, access to care, and quality of care received by survivors after their primary cancer treatment. It also included research focused on psychosocial issues of patients post-diagnosis as well as prehabilitation. Model systems research relevant to cancer survivors, like the longterm effects of chemotherapy on the cognitive function in an animal model, was also included. The investment in research focused on palliative care for advanced stage patients and patients with metastatic disease and research on end-of-life care is not included and is provided in a separate report.

- The growth in the investment was largely due to increased investment in operating grants (Figure 3). The operating grant investment was at its highest in 2014 at \$17.0M.
- A much higher proportion of the investment in 2010–2014 focused on research relevant to child/ adolescent patients and much of this increase was due to the initiation of the multi-funded team grants on the late effects of treatment for childhood cancers administered by the Canadian Institutes of Health Research (CIHR) as well as the childhood adolescent young adult cancer survivor research program funded by the Canadian Cancer Society (CCS).
- Of the 42 organizations tracked in the survey, 36 had some level of investment in survivorship research.
- Over half (56%) of the investment in cancer survivorship research, however, was made by three organizations: CIHR, CCS, and the Canadian Breast Cancer Foundation (CBCF) (Figure 4).
- CIHR represented 32% of the total cancer survivorship research investment and this investment represented 5% of CIHR's overall cancer research investment. There was \$12.4M more invested by CIHR in the second period when compared with the first.
- CCS represented 17% and CBCF 9% of the cancer survivorship research investment.
- Prostate Cancer Canada had a significant increase in its investment in 2014, corresponding to the initiation of the Movember TrueNTH program.

FIGURE 3
INVESTMENT IN CANCER SURVIVORSHIP RESEARCH BY FUNDING MECHANISM, 2005–2014

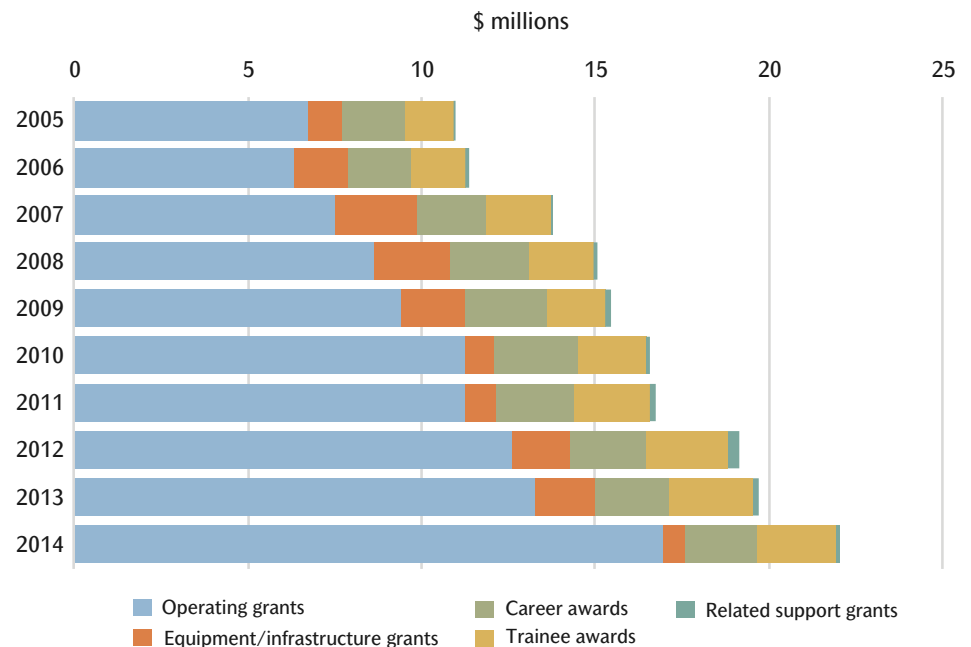
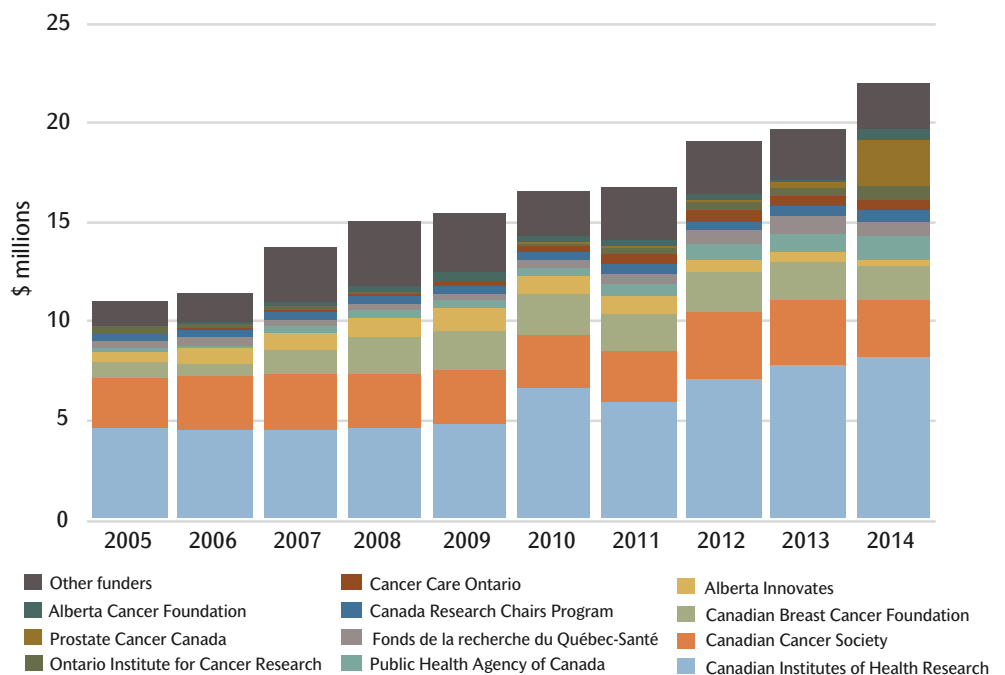


FIGURE 4
INVESTMENT IN CANCER SURVIVORSHIP RESEARCH BY FUNDING ORGANIZATION [1], 2005–2014

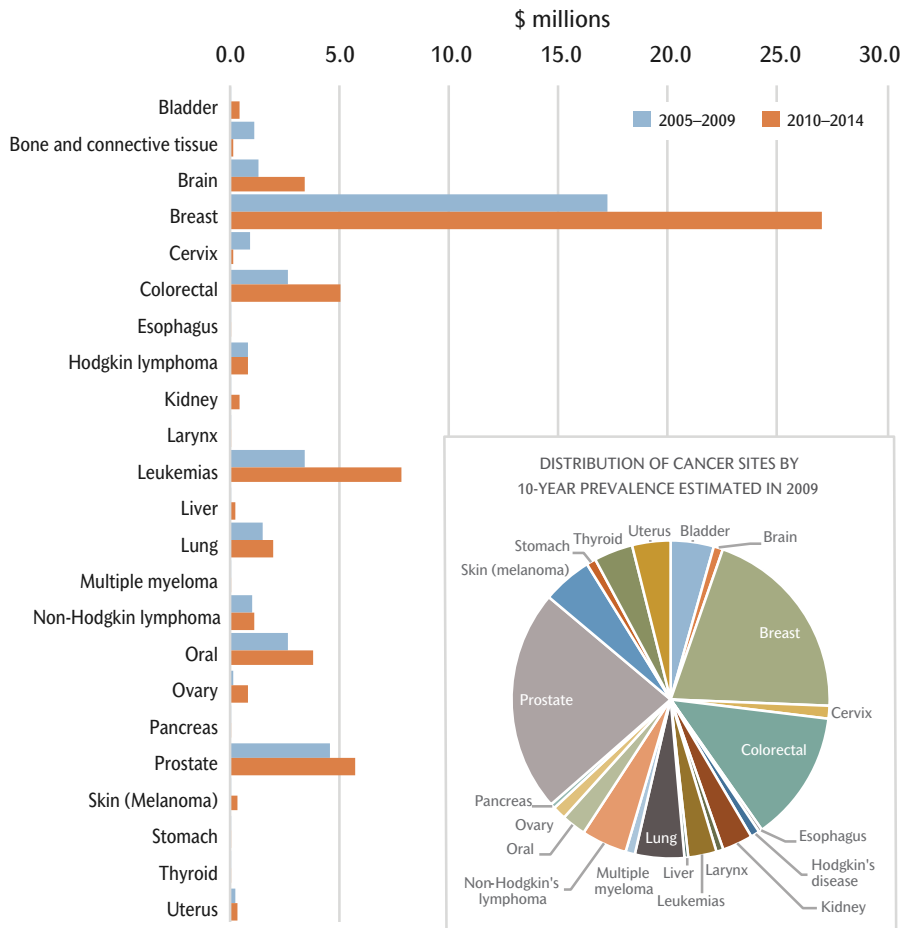


[1] Organizations that account for a cumulative investment of 1.5% are identified by name.

TYPES OF RESEARCH

Model systems: research conducted in animals, human, cells, or other test systems or theoretical models. **Descriptive:** studies that observe/describe human behaviour, interaction or systems, prospectively or retrospectively. **Intervention:** research on pharmaceutical, surgical, psychotherapeutic, supportive, informational interventions/programs designed to mitigate physiological symptoms and improve quality of life for patients and their families/caregivers. **Prediction/assessment:** studies focused on systematic assessment/measurement of psychological and physiological symptoms such as distress, pain, fatigue, bone fractures, cachexia, etc. **Knowledge synthesis:** projects that summarize the existing body of knowledge through specific methods of research identification and appraisal. **Other support:** projects that support the conduct of research, such as capacity building grants, support for research networks and workshops, equipment and infrastructure grants.

FIGURE 5
INVESTMENT IN CANCER SURVIVORSHIP RESEARCH BY CANCER SITES,
2005–2009 AND 2010–2014



- 64% of the cancer survivorship research investment focused on one or more cancer sites. Breast cancer research represented 43% of the site-specific investment over the decade.
- The investment from the first to the second quinquennial increased by more than \$1M for six cancer sites: breast (\$9.8M), leukemias (\$4.4M), colorectal (\$2.4M), brain (\$2.1M), prostate (\$1.2M), and oral (\$1.1M) (Figure 5). Other than for breast cancer, the site-specific investments were poorly correlated with the estimated number of cancer survivors (Figure 5 inset).
- The investment in physiological effects was the dominant focus and increased by \$18.7M in the second quinquennial (Figure 6). The investment in care delivery, access and quality also rose by \$6.9M.
- In terms of physiological effects, 13% of the investment was focused on cardiotoxicity/vascular health and 12% on cognitive/neurological issues. There was less physiological effects research focused on sexual function/fertility in the second period.
- The research investment changed from the first to the second quinquennial in terms of type of research. \$13.2M more was invested in intervention research, \$10.0M more in descriptive research, and \$8.0M more in prediction/assessment research in the 2010–2014 period.

FIGURE 6
INVESTMENT IN CANCER SURVIVORSHIP RESEARCH BY RESEARCH FOCUS AND
TYPE OF RESEARCH, 2005–2009 AND 2010–2014

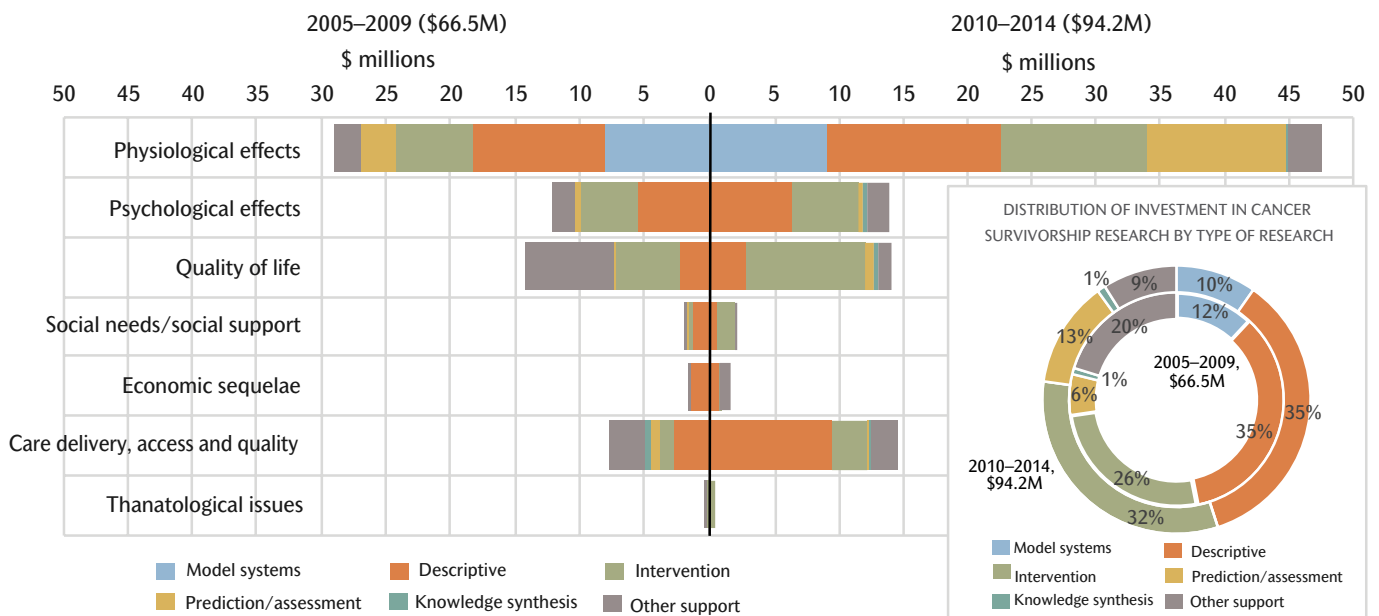
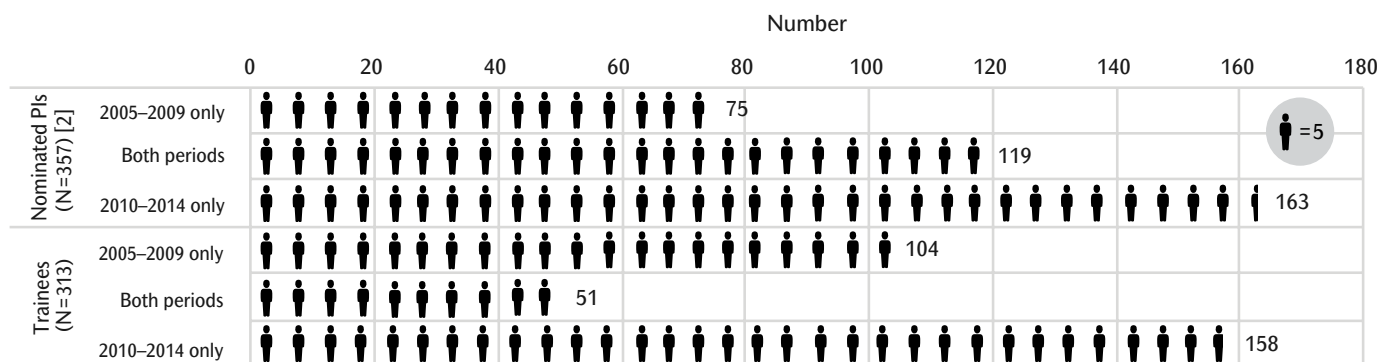


FIGURE 7
NUMBER OF RECIPIENTS OF GRANTS AND TRAINEE AWARDS [1] BY TIME PERIOD (N=655)

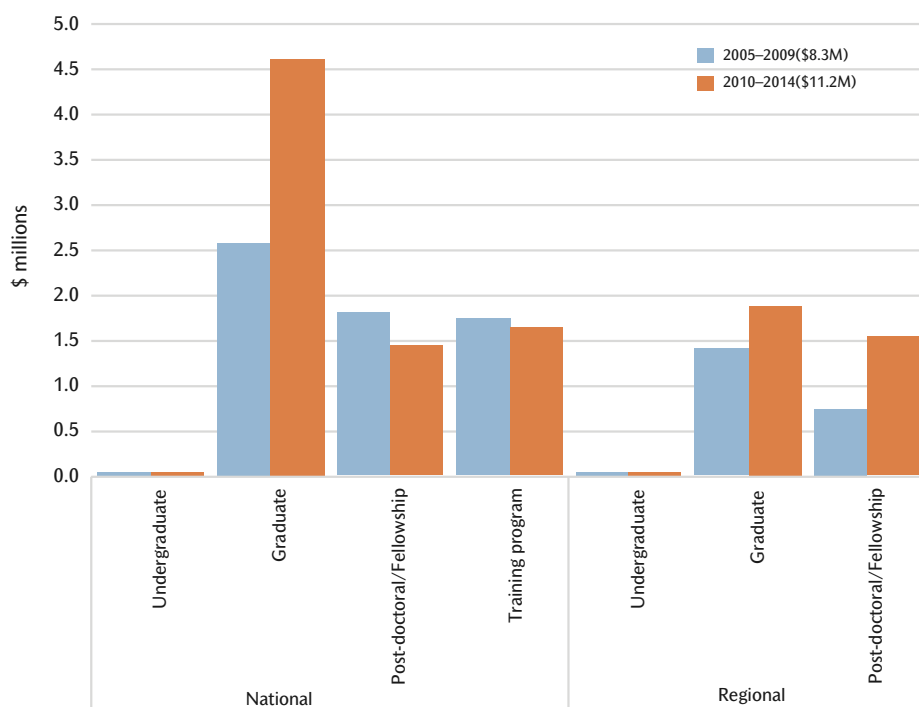


[1] Includes trainees or nominated PIs with at least one award/grant with a cancer weighting of 80% or more and active during one or both time periods. Recipients of related support grants who did not receive any other funding were not included.

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

- A total of 357 nominated principal investigators (PIs) had at least one funded cancer survivorship project within the decade. This represented 12% of the total number of cancer researchers. Consistent with the increase in the investment, there was also an increase in the number of nominated principal investigators (PIs) from the first to the second quinquennial. In fact, there 88 more PIs funded in 2010–2014 (Figure 7). One-third of the PIs were funded at some point in both quinquennials and these researchers accounted for 58% of the overall survivorship research investment and 62% of the targeted investment.
- Of the 357 PIs, over half (N=203) had received funding in 2013-2014 (a proxy of current capacity) and they were working at institutions located in nine provinces. Most were working in Ontario (93), Quebec (35), British Columbia (27) or Alberta (21).

FIGURE 8
CANCER SURVIVORSHIP RESEARCH INVESTMENT IN TRAINING AWARDS BY PROGRAM REACH AND TIME PERIOD



- 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 313 trainees who received one or more trainee awards from 2005 to 2014. Of the 313 trainees, 15 (5%) had subsequently received an operating grant, career award or equipment/infrastructure grant before the end of 2014.
- The amount invested in trainee awards rose from \$6.6M in 2005–2009 to \$9.5M in 2010–2014 and there were 54 more trainees in the second period than the first. There was \$2.5M more invested in graduate trainee awards from 2010–2014 than 2005–2009, most of which was attributable to increased investment by CIHR (Figure 8). Among regional funders, there was an increased investment (\$0.8M) in the second period for post-doctoral awards/fellowships.
- 18% of the investment in trainee awards came from targeted programs.

OUR MEMBERS

Alberta Cancer Foundation	The Kidney Foundation of Canada
Alberta Innovates	The Leukemia & Lymphoma Society of Canada
Brain Tumour Foundation of Canada	Michael Smith Foundation for Health Research
Breast Cancer Society of Canada	National Research Council
BC Cancer Agency	Natural Sciences and Engineering Research Council of Canada
C ¹⁷ Research Network	New Brunswick Cancer Network
Canadian Association of Provincial Cancer Agencies	Nova Scotia Health Research Foundation
Canadian Association of Radiation Oncology	Ontario Institute for Cancer Research
Canadian Breast Cancer Foundation*	Ovarian Cancer Canada
Canadian Cancer Society	Pancreatic Cancer Canada
Canadian Institutes of Health Research	PROCURE
Canadian Partnership Against Cancer	Prostate Cancer Canada
CancerCare Manitoba	Public Health Agency of Canada
Cancer Care Nova Scotia	Quebec Breast Cancer Foundation
Cancer Care Ontario	Research Manitoba
Cancer Research Society	Saskatchewan Cancer Agency
Fonds de recherche du Québec – Santé	The Terry Fox Research Institute
Genome Canada	Affiliate member: BioCanRx

* 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 Survivorship and Palliative and End-of-Life Care, 2005–2008*, 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. Of note, several CCRA members collaborated to develop the recently released, *Pan-Canadian Framework for Cancer Survivorship Research*. This framework identifies several priority areas for research in this area and can also be accessed at our website.

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 reviewers for this report were: Dr. Stuart Edmonds, Vice President, Research, Health Promotion and Survivorship for Prostate Cancer Canada; Dr. Stephen Robbins, Scientific Director for the CIHR Institute of Cancer Research; and Dr. Michael Wortzman, Assistant Director, Research Programs for the Canadian Cancer Society.

Instrumental to the initial reports conducted on this topic were: Dr. Nicole Culos-Reed, Mr. Darren Dick, Mr. Richard Doll, Dr. Lise Fillion, Dr. Margaret Fitch, Dr. Jennifer Jones, Ms. Irene Nicoll, Dr. Morag Park, and Dr. Christine Williams.

PERMISSION TO REPRODUCE

Except as otherwise specifically noted, the information in this publication may be reproduced, in part or in whole and by any means, without charge or further permission from the Canadian Cancer Research Alliance (CCRA), provided that due diligence is exercised in ensuring the accuracy of the information reproduced, CCRA is identified as the source institution, and the reproduction is not represented as being an official version of the information, or as having been made in affiliation with, or with the endorsement of, CCRA.

© Canadian Cancer Research Alliance, 2017

ISBN 978-1-927650-44-8 (PDF)

Aussi offert en français