

CANCER RESEARCH INVESTMENT IN CANADA, 2015



HIGHLIGHTS

- In 2015, a total of \$480.2M was invested in cancer research by 42 organizations tracked in the Canadian Cancer Research Survey—this was the lowest annual investment in the latest five-year period. The three funders with the highest investments in 2015 were the Canadian Institutes of Health Research (\$140M), the Ontario Institute for Cancer Research (\$46M) and the Canadian Cancer Society (\$40M).
- While the drop in investment from 2011 to 2015 was across all funding mechanisms, this was particularly the case for equipment/infrastructure grants. There was nearly \$80M less invested in equipment/infrastructure grants in 2015 than in 2011.
- The latest five-year trend in terms of funding for operating grants showed a significant drop in the investment in investigator-initiated grants by regionally-based funders and a small increase in investigator-initiated operating grants among national funders.
- While a number of larger research funders showed decreased funding from 2011 to 2015, several funders who typically invested less than \$10M per year posted higher investments in 2015 than 2011.
- In terms of areas of science, the investments in Biology, Treatment, and Etiology were substantially lower in 2015 than 2011. Early detection, diagnosis and prognosis, however, was \$12M higher in 2015 than 2011 and this was the result of a net increase in investment in priority-driven operating grants offered through national funding programs.
- There were significant drops from 2011 to 2015 in the research investments in breast, lung, and colorectal cancers. Lung cancer and other high mortality cancers may require directed/strategic research funding.
- Operating grants that involved funding partnerships among CCRA members represented only a small percentage of all operating grants and suggests that there is room to improve the number of collaborative partnerships by CCRA members.
- There were 211 Canada Research Chairs (CRCs) with at least some cancer-related research focus whose terms were active on January 1, 2016. Most CRCs were male (88%) and working at universities in either Ontario or Quebec.
- There were 1,213 nominated principal investigators with at least one cancer-focused operating grant, career award, and/or equipment grant actively funded on January 1, 2016.

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.

DECEMBER 2017

This summary report describes the trend in the investment in cancer research in Canada for years 2011 to 2015, the last five years of reported data. 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 was the first joint activity undertaken by the CCRA.

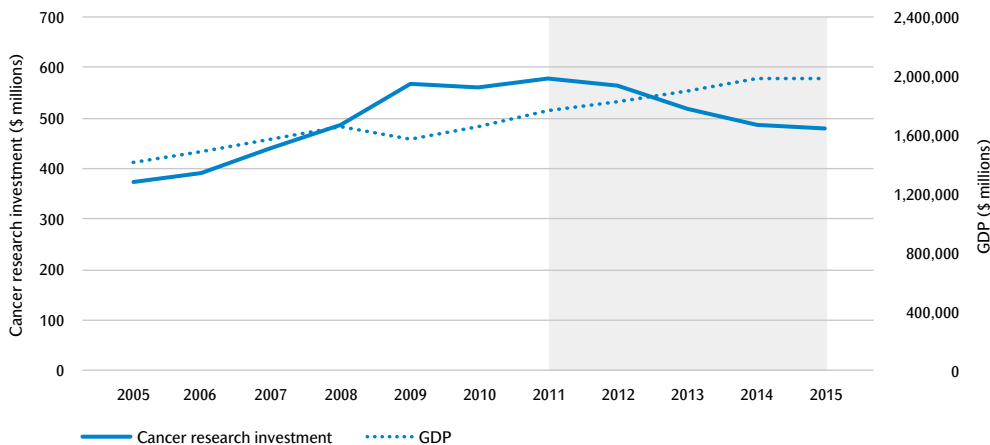
Funding information is captured from 42 organizations/programs. The CCRS captures most of the peer-reviewed research from the governmental and voluntary sectors. It does not, however, include institution-specific funding from hospital foundations, research supported by private foundations or industry R&D unless part of funding partnerships of projects captured in the CCRA. We have estimated that coverage by the CCRS represents 60–80% of the overall cancer research funding in Canada.

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.



FIGURE 1
CANCER RESEARCH INVESTMENT AND GROSS DOMESTIC PRODUCT (NOMINAL), 2005–2015 [1]

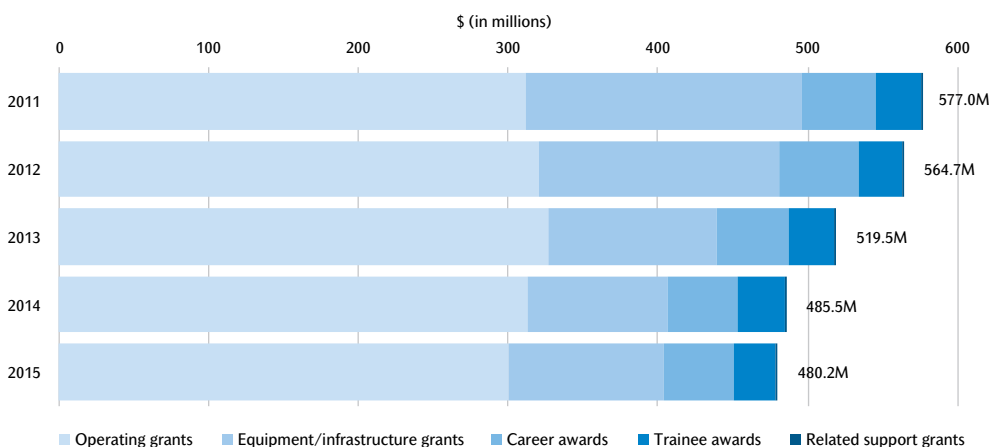


[1] Source: Statistics Canada. Table 384-0038 – Gross domestic product, expenditure-based, provincial and territorial, annual (dollars unless otherwise noted), CANSIM (database). (accessed: October 23, 2017). Gross domestic product at market prices using current prices (nominal) was used. Cancer research investment is not adjusted for inflation.

DEFINITIONS OF FUNDING MECHANISMS

Operating grants support all the direct costs involved in conducting specific research projects including salaries for laboratory staff and research assistants, costs of supplies, samples, etc. The funding programs supporting these grants may be open (investigator-initiated) or focused on specific cancer sites and/or research areas (priority-driven). **Equipment/infrastructure grants** cover the cost of new research facilities, equipment, software, databases, etc. needed for the research activities of one or more researchers. **Career awards**, also known as salary awards and/or research chairs, provides protected time for research. **Trainee awards** support exceptional trainees during their undergraduate, graduate, or post-graduate training. **Related support grants** cover conference travel, workshops costs as well as researcher time for proposal development. For detailed definitions of funding mechanisms, please consult our 2008–2012 trends report.

FIGURE 2
CANCER RESEARCH INVESTMENT BY FUNDING MECHANISM, 2011–2015 [1]



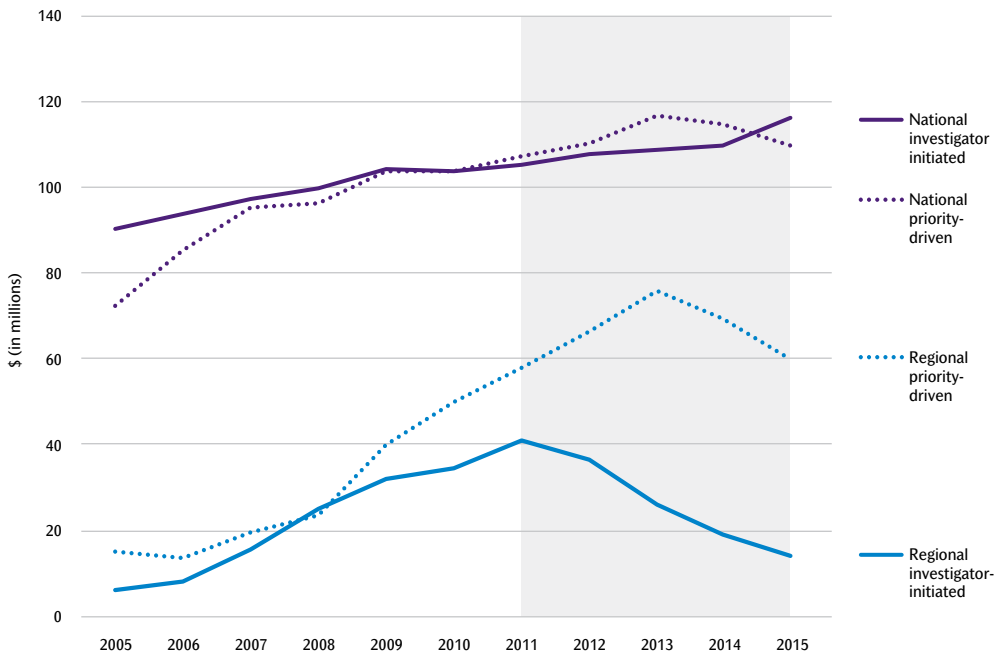
[1] Annual investments totals are provided at the end of each stacked bar. Related support grants account for less than one percent of the investment and are difficult to see on the graph.

- There was \$480.2M invested in 2015. Since its peak in 2011, the cancer research investment overall has shown a net decline (Figure 1). The grey shading highlights the latest five years of data. The annual investments in the most recent five-year period diverged from the overall trend in nominal GDP, suggesting that the investment in cancer research did not keep pace with the overall economic growth of the country.
- The distribution of the investment by funding mechanism showed the greatest decline in equipment/infrastructure, a finding that has been noted in previous reports (Figure 2).
- The investment in operating grants was \$300M in 2015, the lowest amount in the 2011 to 2015 period. Given the reduction in the overall investment, however, operating grants represented 62% of the overall cancer research investment in 2015, up from 54% in 2011.
- The most notable trend from 2011 to 2015 in operating grants was the decline in investigator-initiated operating grants offered by regional funders (Figure 3, next page). There was, however, a small positive increase in the investment in investigator-initiated operating grants among national funders (see inset). The priority recommendation from the final report of the Advisory Panel on Federal Support for Fundamental Science was to increase “investment in independent investigator-led research to redress the imbalance caused by differential investments favouring priority-driven targeted research” (Naylor (Chair), 2017). These data will continue to be monitored.

IMPORTANT

Data are updated annually and will vary from previously published reports. Investment figures presented are nominal, not adjusted for inflation. Figures may differ from those reported by contributing organizations because investments are prorated to calendar year periods.

FIGURE 3
CANCER RESEARCH INVESTMENT IN OPERATING GRANTS BY PROGRAM REACH AND FOCUS, 2005–2015



OPERATING GRANTS BY PROGRAM REACH AND FOCUS, 2011 AND 2015

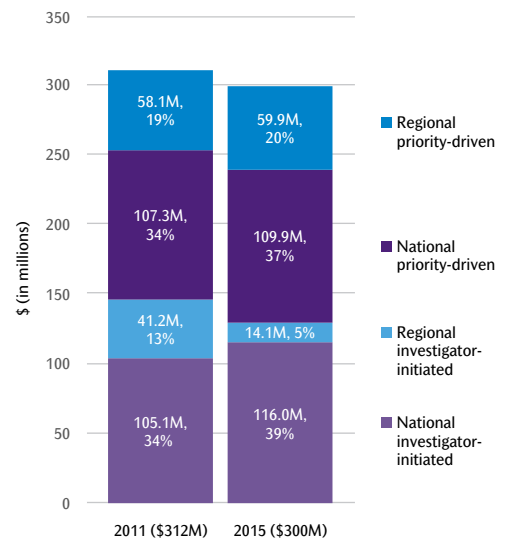
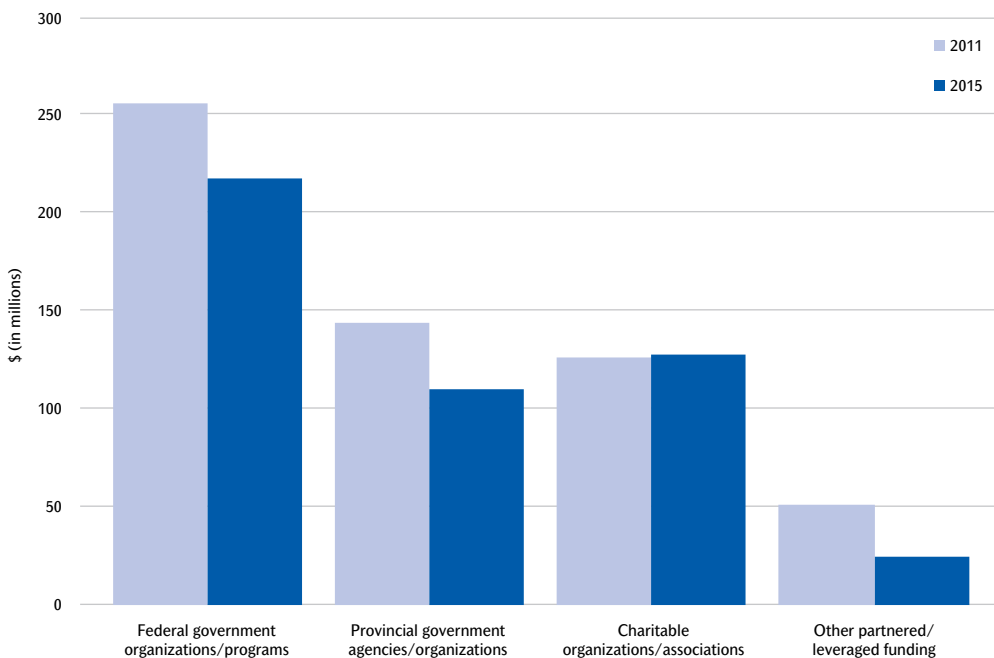
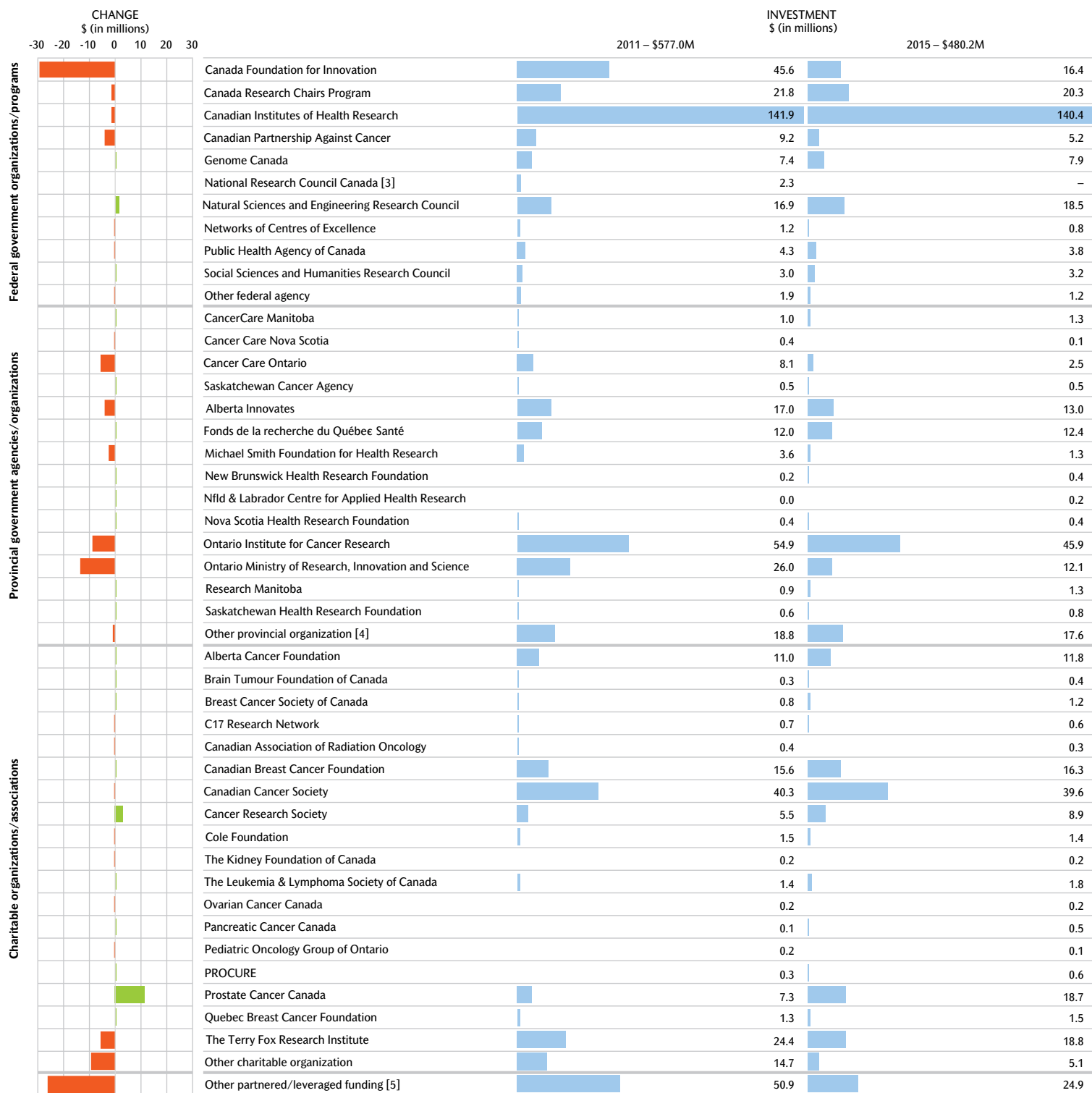


FIGURE 4
CANCER RESEARCH INVESTMENT BY FUNDING SECTOR, 2011 AND 2015



- The decline in investment from 2011 to 2015 was found in all sectors except the voluntary sector, where the 2015 investment was \$1.4M more than in 2011 (Figure 4).
- The declining research investment from 2011 to 2015 was largely due to a precipitous reduction in cancer-related infrastructure investment through programs offered by the Canada Foundation for Innovation (CFI) (which includes funding from CFI, its provincial partners, and other partners) and a levelling/reduction after the initial ramp up of cancer research investment in Ontario. Twenty-one organizations tracked in this survey had higher investments in 2015 than 2011 (Figure 5, next page). In particular, Prostate Cancer Canada invested \$11.4M more in 2015 than it had in 2011.
- The three funders with the largest investments in 2015 were: Canadian Institutes of Health Research (CIHR) (\$140.3M, representing 29% of the overall investment), the Ontario Institute for Cancer Research (\$45.9M, representing 10% of the overall investment) and the Canadian Cancer Society (\$39.6M, representing 8% of the overall investment).

FIGURE 5
CHANGE IN CANCER RESEARCH INVESTMENT FROM 2011 TO 2015 FOR PARTICIPATING ORGANIZATIONS/PROGRAMS [1,2]



[1] For detailed annual investments by funding organizations tracked in the CCRS from 2005 to 2015, please consult the supplementary data file available on the CCRA website.

[2] Changes of less than \$1 million will be difficult to see on this graph.

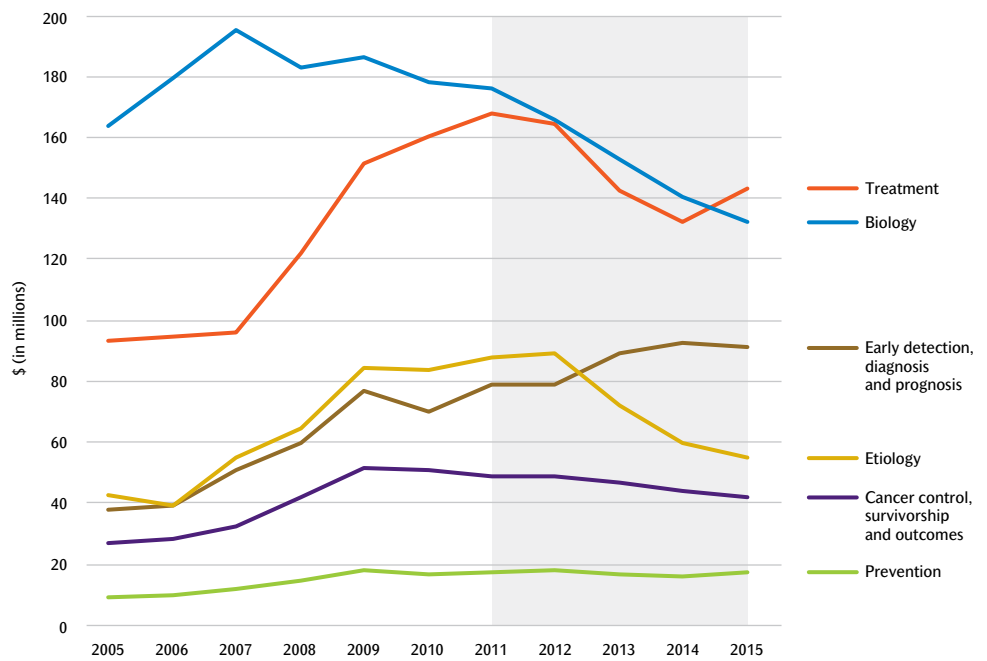
[3] No new data supplied for year 2015. No difference calculated.

[4] Includes provincial support for CFI grants as well as other provincial funding.

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

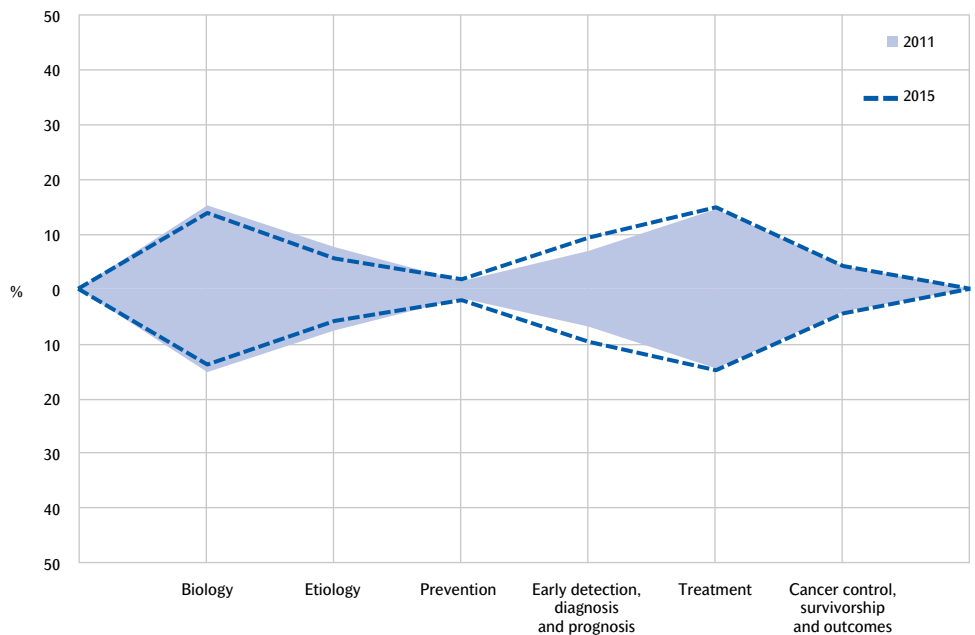
- Early detection, diagnosis and prognosis was the Common Scientific Outline (CSO) category that had a consistently upward trend in investment from 2011 to 2015 (Figure 6). There was \$12.2M more invested in 2015 in this area of cancer research than in 2011.
- Etiology had the largest reduction in the investment from 2011 to 2015, a difference of \$43.9M. This was largely due to a drop in equipment/infrastructure investment after large investments were made in genomics platforms by CFI and OICR.
- These changes are also depicted in the distribution of the investment by CSO categories for years 2011 and 2015 (Figure 7).
- Notably, the distribution of the investment in national operating grants by CSO varied for investigator-initiated and priority-driven programs (Figure 8, next page). The investments in Early detection, diagnosis and prognosis, Treatment (particularly in 2011), and Cancer control, survivorship and outcomes were all proportionally larger under priority-driven programs. In contrast, the investment in Biology was proportionately larger under investigator-initiated programs, although this investment did fall from 2011 to 2015.
- Priority-driven programs help to boost research in gap areas or in areas where capacity building or answers to system-level questions are needed. Determining the optimal balance of investments between investigator-initiated and priority-driven programs is an important challenge for funders of cancer research.

FIGURE 6
CANCER RESEARCH INVESTMENT BY CSO CATEGORY [1], 2005–2015



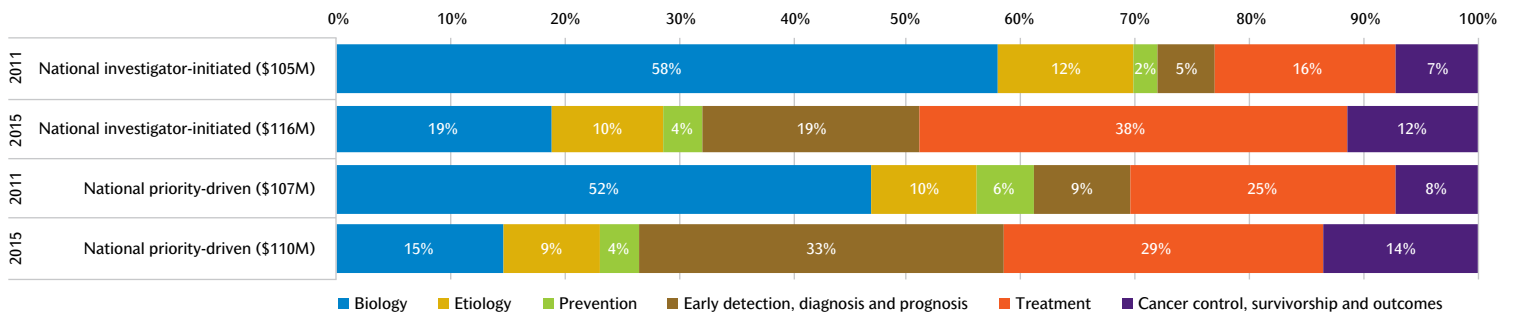
[1] For further information about the Common Scientific Outline (CSO), please see <https://www.icrpartnership.org/cso>.

FIGURE 7
DISTRIBUTION OF CANCER RESEARCH INVESTMENT BY CSO CATEGORY, 2011 AND 2015



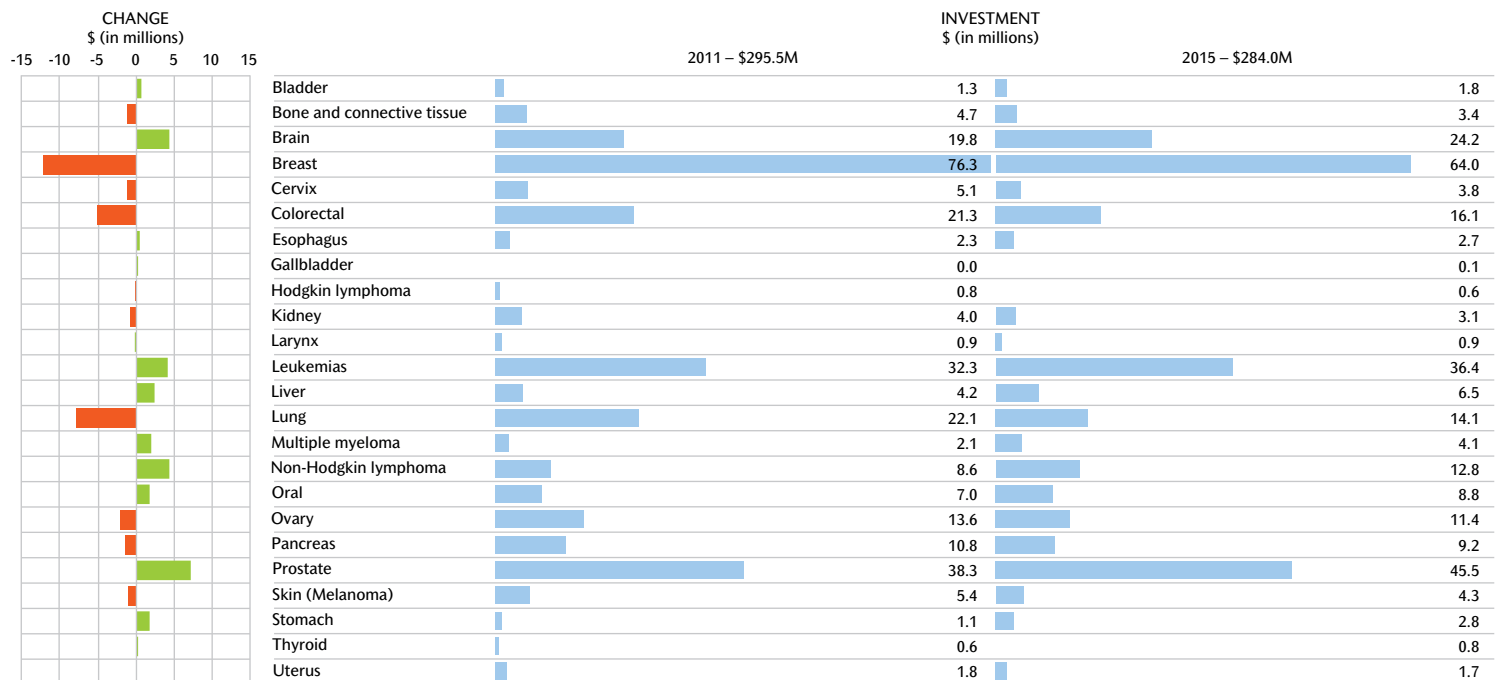
Proportion of investment (%)	Biology	Etiology	Prevention	Early detection, diagnosis and prognosis	Treatment	Cancer control, survivorship and outcomes
2011 – \$577.0M	31	15	3	14	29	8
2015 – \$480.2M	27	11	4	19	30	9

FIGURE 8
DISTRIBUTION OF CANCER RESEARCH INVESTMENT IN NATIONAL OPERATING GRANTS BY CSO CATEGORY, 2011 AND 2015



- The investments in research relevant to prostate cancer and brain cancer were significantly higher in 2015 than in 2011 (Figure 9 below). The increased investment in prostate cancer research was nearly entirely due to Prostate Cancer Canada. Prostate Cancer Canada represented 41% of the 2015 investment in prostate cancer research, up from 19% in 2011.
- The investments made by CIHR and Alberta Innovates as well as CFI programs all contributed to the increased investment in brain cancer research in 2015. The increased research investment in leukemias from 2011 to 2015 was largely due to new programs offered through Genome Canada. Likewise, the net increase in research investment in non-Hodgkin lymphoma was due to new funding from OICR as well as Genome Canada.
- Significant drops from 2011 to 2015 were found for the research investments in breast, lung, and colorectal cancers.
- While the research investment in terms of the five cancers with the lowest five-year survival was higher in 2015 than it was in 2005 (Figure 10, next page), the latest five-year period showed a significant decline in the research investment in lung cancer investment and a modest decline in the research investment in pancreatic cancer. Targeted research funding may be needed for lung cancer and other high fatality cancers like pancreatic and liver cancers.

FIGURE 9
CHANGE IN CANCER RESEARCH INVESTMENT BY CANCER SITE FROM 2011 TO 2015 [1,2]



[1] For detailed annual investments by cancer site for years 2005 to 2015, please consult the supplementary data file available on the CCRA website.
 [2] Changes of less than \$1 million are difficult to see on this graph.

- From 2011 to 2015, there were 327 operating grants that involved funding partnerships. Partnered operating grants involving two or more CCRA members was at its lowest number in 2015, suggesting that further work is needed to catalyze funding partnerships.
- Since 2006, the Canadian Research Chairs (CRCs) nominated by universities to fill the allocations established by the Federal granting agencies were required to reflect equity targets that were based on the number of eligible academics. These targets were not met. As of May 2017, universities are required to develop and annually report on their own equity, diversity and inclusion action plans to address the underrepresentation of four designated groups—women, persons with disabilities, indigenous peoples, and members of visible minorities—among nominated and renewed CRCs.
- There were 211 CRCs with at least some cancer-related research focus whose terms were active on January 1, 2016. The three provinces with the largest populations, also had the highest number of CRCs—Ontario representing 45%, Quebec representing 28%, and British Columbia representing 14% of the overall number.
- Of the 114 Tier 1 researchers, 96 were male and 16 were female. This disparity was less pronounced among Tier 2 chairs (the more junior researchers), where there were 66 men and 31 women.

FIGURE 10
CANCER RESEARCH INVESTMENT FOR FIVE CANCER SITES WITH THE LOWEST FIVE-YEAR SURVIVAL, 2005–2015

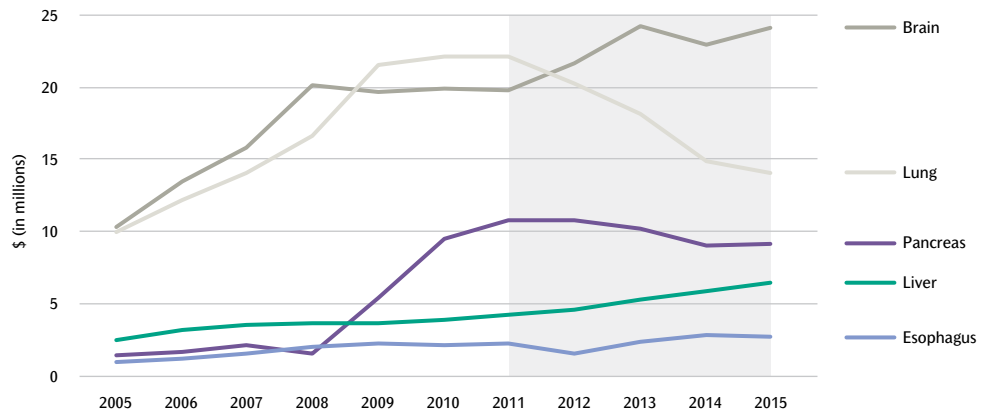


FIGURE 11
NUMBER OF OPERATING GRANTS BY START YEAR AND TYPE OF FUNDING PARTNERSHIP, 2011–2015

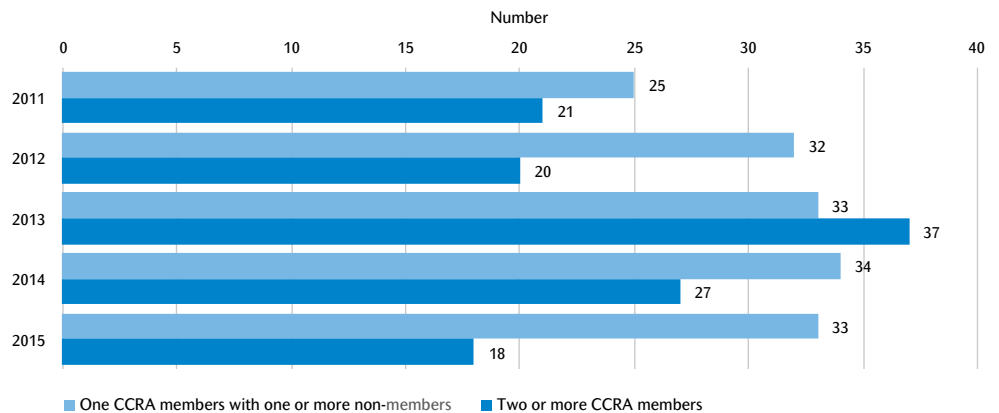
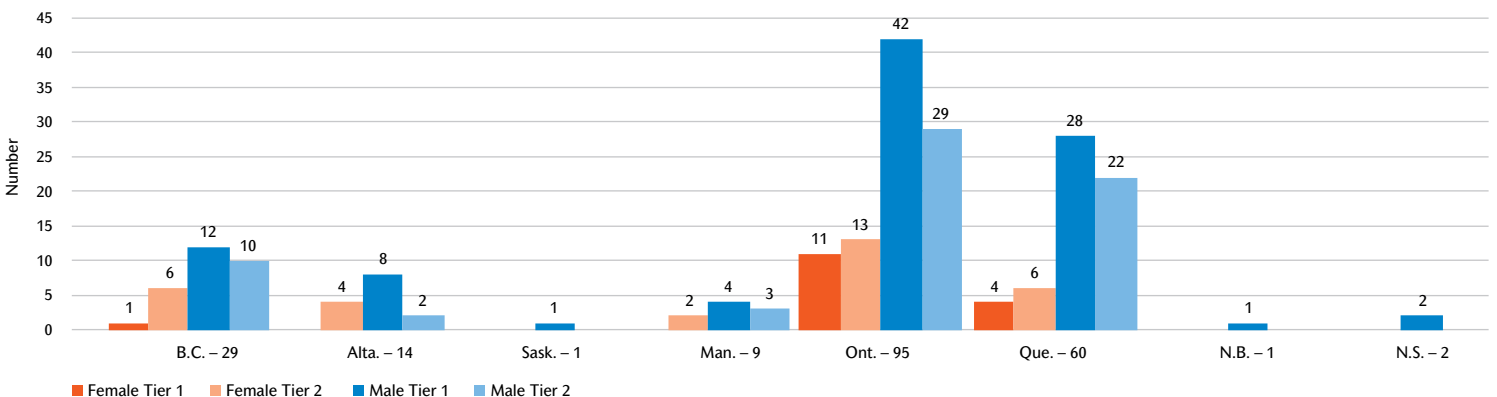


FIGURE 12
NUMBER OF CANADA RESEARCH CHAIRS WITH SOME CANCER RESEARCH FOCUS WITH TERMS ACTIVE ON JANUARY 1, 2016 [1] BY GENDER, TIER [2] AND PROVINCE



[1] Total chairs per province is provided alongside the provincial labels on the x-axis.
 [2] In an effort to enhance diversity, effective November 2017, Tier 1 Chairs which are tenable for seven years are renewable only once (previously they could be renewed indefinitely). Institutions receive \$200,000 annually for these chairs. There are no changes to Tier 2 Chairs, who remain tenable for five years with one renewal. Institutions receive \$100,000 annually for these Tier 2 chairs.

OUR MEMBERS

Alberta Cancer Foundation
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Brain Tumour Foundation of Canada
BC Cancer Agency
Breast Cancer Society of Canada
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Canadian Association of Provincial Cancer Agencies
Canadian Association of Radiation Oncology
Canadian Breast Cancer Foundation*
Canadian Cancer Society
Canadian Institutes of Health Research
Canadian Partnership Against Cancer
CancerCare Manitoba
Cancer Care Nova Scotia
Cancer Care Ontario
Cancer Research Society
Fonds de recherche du Québec – Santé
Genome Canada
The Kidney Foundation of Canada

The Leukemia & Lymphoma Society of Canada
Michael Smith Foundation for Health Research
National Research Council
Natural Sciences and Engineering Research Council of Canada
New Brunswick Cancer Network
Nova Scotia Health Research Foundation
Ontario Institute for Cancer Research
Ovarian Cancer Canada
Pancreatic Cancer Canada
PROCURE
Prostate Cancer Canada
Public Health Agency of Canada
Quebec Breast Cancer Foundation
Research Manitoba
Saskatchewan Cancer Agency
The Terry Fox Research Institute

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, *Cancer Research Investment in Canada, 2008–2012*, at <http://www.ccra-acrc.ca>. A slide deck based on the results of this analysis and an Excel file with trend data are both available on our website under the Publications menu. For additional copies of this publication, please contact us at info@ccra-acrc.ca.

ACKNOWLEDGEMENTS

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