CANCER RESEARCH INVESTMENT IN CANADA, 2018

HIGHLIGHTS

- In 2018, a total of $491M was invested in cancer research by 42 organizations tracked in the Canadian Cancer Research Survey – although a slight increase since 2017 (up $17M), the investment has been fairly constant over the past five years.
- After a dip from 2011 to 2014, the investment in treatment research steadily rose and, in 2018, represented over one-third of the overall cancer research investment. The prioritization of translational research by research funders as well as the maturation of cancer research is evidenced by that trend.
- Over half (58%) of the investment from 2014 to 2018 was relevant to one or more cancer sites. The research investment for breast and prostate cancers, the most prevalent cancers for women and men, respectively, dropped by several millions of dollars from 2014 to 2018.
- Collectively, the investment in poor survival cancers (brain, esophageal, liver, lung, and pancreas) rose to represent about a quarter of the investment in 2018, largely due to increased investment in brain cancer research.
- There is a suggestion in the data that investigator-initiated projects may be on the uptick – a trend that will continue to be monitored. While the investment in equipment/infrastructure grants had a precipitous decrease from 2009 to 2014, there was a modest increase from 2014 to 2018, with a greater proportion of the investment going to major facility infrastructure through programs of the Canada Foundation for Innovation.
- This report includes a novel analysis related to the investment in cancer health systems, services and policy research. The work was undertaken as part of the background work to a process underway by CCRA to develop a series of short- and long-term recommendations to support and strengthen research in this area.
- Looking over the past five years (2014 to 2018), approximately 5% of the overall cancer research investment was cancer health systems, services and policy research. Most of that investment was made in operating grants. The Canadian Institutes of Health Research and the Canadian Cancer Society accounted for the vast proportion of this investment. Research focused on primary and community-based health care and patient-centred care/patient experience were among the areas that had higher levels of investment in 2018 when compared with 2014.

CCRA ACRC
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.

OCTOBER 2020

This summary report describes the trend in the investment in cancer research in Canada for years 2005 to 2018, with a focus on the three time points: 2010, 2014 and 2018. 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.

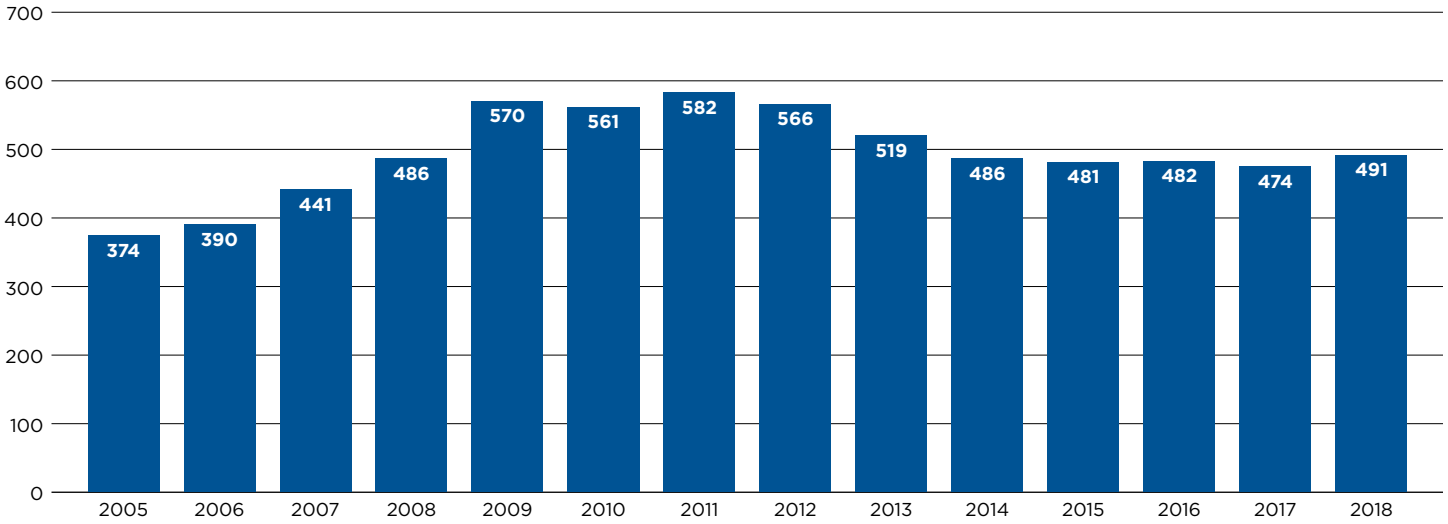
Funding information is captured from 42 organizations/programs. The CCRS captures most of the peer-reviewed research from the governmental and voluntary sectors. It does not, however, include institution-specific funding from hospital foundations, research supported by private foundations or industry 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, the steward of the Canadian Strategy for Cancer Control (the Strategy). The Partnership works with Canada's cancer community to ensure fewer people get cancer, more people survive cancer and those living with the disease have a better quality of life. 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
CANCER RESEARCH INVESTMENT, 2005–2018 ($M)



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.

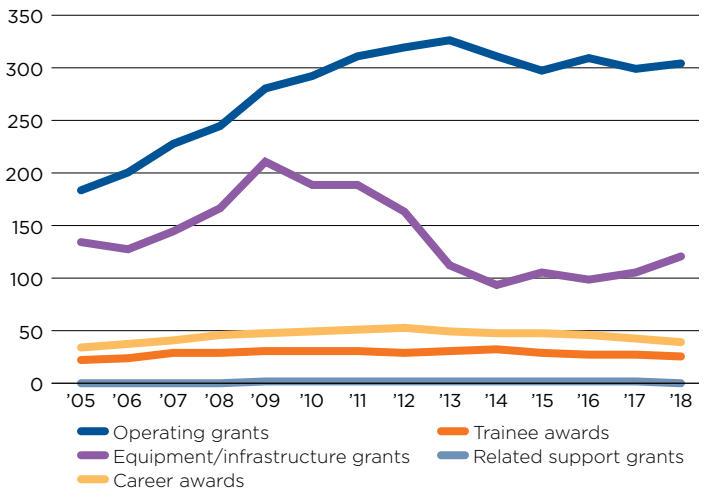
Career awards, also known as salary awards and/or research chairs, provide protected time for research.

Trainee awards support exceptional trainees during their undergraduate, graduate, or post-graduate training.

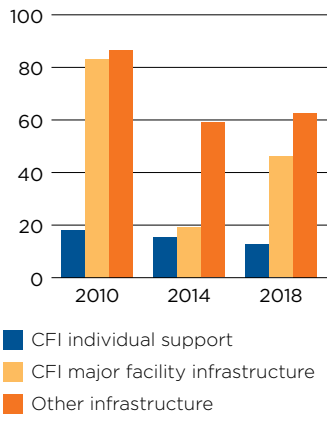
Related support grants cover conference travel, workshop sponsorship as well as researcher time for proposal development. For detailed definitions of funding mechanisms, please consult our CCRS technical report on the CCRA website.

- The overall cancer research investment pattern as tracked in the CCRS was fairly stable over the past five years (Figure 1). There was $491M invested in 2018, a modest $17M increase from 2017.
- That overall trend was also mirrored in the operating grant investment, which was consistent from 2014 to 2018 (Figure 2).
- The dramatic decrease in the investment in equipment/infrastructure since 2009 has begun a reversal in recent years. Increased major facility infrastructure through programs of the Canada Foundation for Innovation (CFI) may reflect a needs-based push for new platforms to support research going forward (Figure 2 inset).
- The overall investment in operating grants made by regional funders declined substantially (46% decrease) from 2014 to 2018 (Figure 3, next page). The investment in investigator-initiated operating grants through open, national competitions increased slightly in recent years. An additional analysis was undertaken to look specifically at the change in the number of cancer-related projects funded through CIHR open grants competitions by grant start year (Figure 3 inset). That suggests the start of an upward trend in investigator-initiated operating grants and will continue to be monitored given the urgent call for increased investigator-initiated research by the Advisory Panel for the Review of Federal Support for Fundamental Science in its 2017 report, *Investing in Canada's Future*.[1]

FIGURE 2
CANCER RESEARCH INVESTMENT BY FUNDING MECHANISM, 2005-2018 ($M)

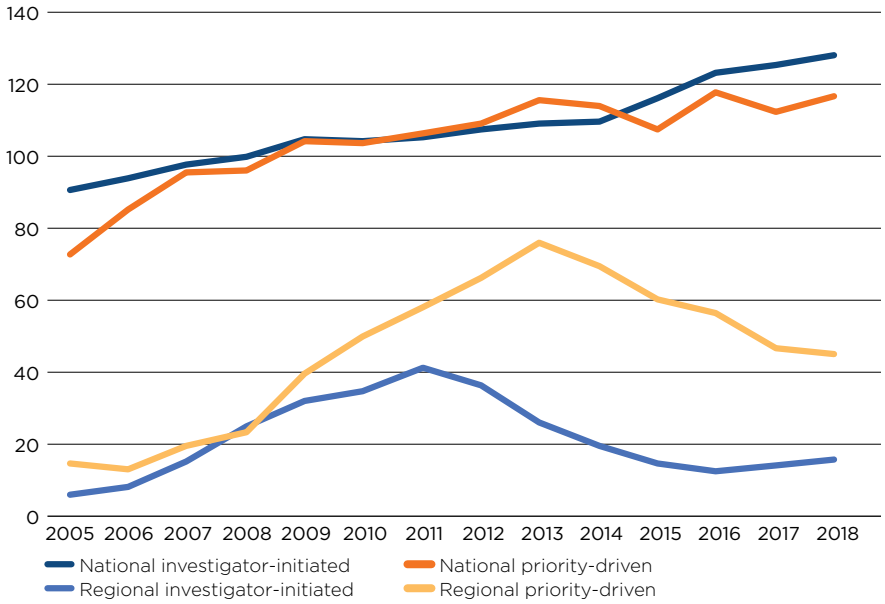


EQUIPMENT/INFRASTRUCTURE BY TYPE, THREE YEARS ($M)

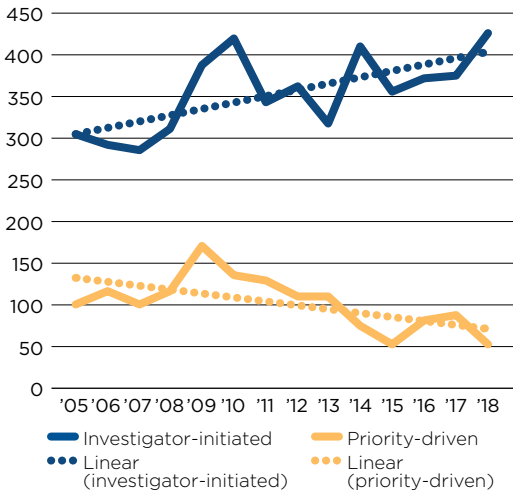


[1] Available at : http://www.sciencereview.ca/eic/site/059.nsf/vwapj/ScienceReview_April2017.pdf/$file/ScienceReview_April2017.pdf.

FIGURE 3
OPERATING GRANT INVESTMENT BY PROGRAM REACH AND TYPE, 2005–2018 ($M)



CIHR CANCER-RELATED PROJECTS [1] BY START YEAR [2], 2005–2018 ($M)



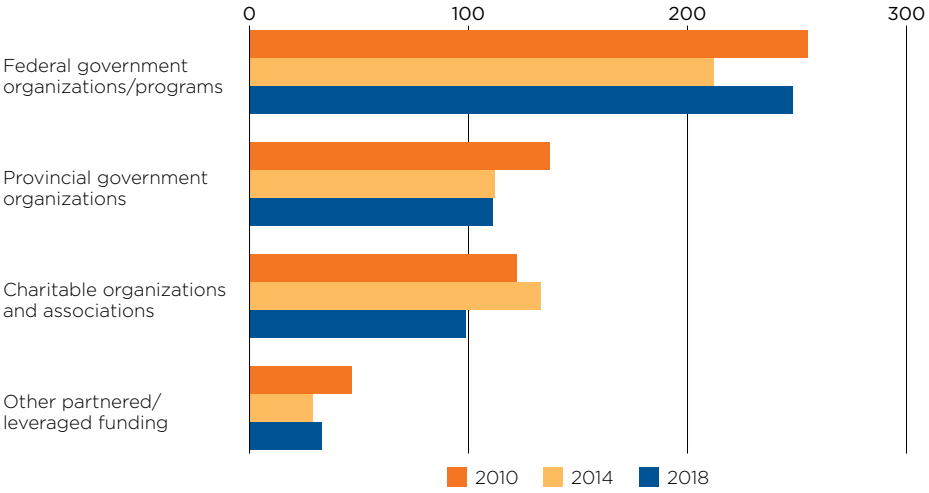
[1] Projects were weighted by their cancer relevance.
[2] Start year refers to the year in which the project was initiated. That differs from other data presented.

- The investment made by federal organizations increased 17% from 2014 to 2018 ($212M to $248M, respectively), while the investment by charitable organizations fell 26% (from $133M in 2014 to $99M in 2018) (Figure 4). Federal agencies and programs comprised 51% of the overall investment in cancer research in 2018 while charitable organizations accounted for $1 of every $5 invested (Figure 4, inset).
- Eighteen organizations showed a net increase in their research investments in 2018 compared to 2014 (Figure 5, next page). For the Canadian Institutes of Health Research (CIHR), that increase was nearly $25M. The Ontario Institute for Cancer Research (OICR) and CFI each had $10M more in their investments in 2018 than in 2014.
- Charities represented a shrinking piece of the cancer research investment pie from 2014 to 2018. That was largely the result of a 34% drop in the investment made by the Canadian Cancer Society (CCS) during these two time points. In contrast, The Terry Fox Research Institute (TFRI), the second largest charitable research funder, posted a $2.3M increase from 2014 to 2018 and The Leukemia & Lymphoma Society of Canada, although representing a much smaller proportion of the overall research investment, more than doubled its 2014 investment in 2018.
- Three of every five dollars invested in 2018 came from the following: CIHR ($164.5M); OICR ($55.2M); CCS ($37.8M); TFRI ($23.6M); and CFI ($23.4M).

IMPORTANT

Data are updated annually and will vary from previously published reports. Unless otherwise noted, 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 4
CANCER RESEARCH INVESTMENT BY FUNDING SECTOR, THREE YEARS ($M)



CANCER RESEARCH INVESTMENT BY FUNDING SECTOR, 2018 (%)

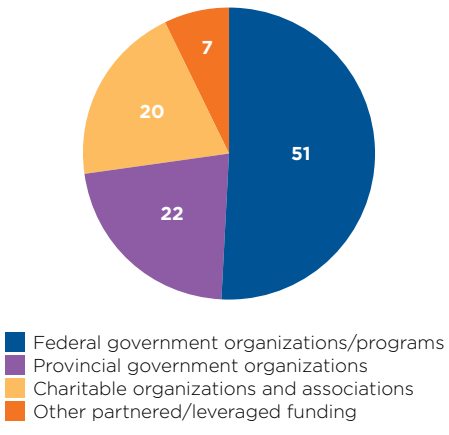
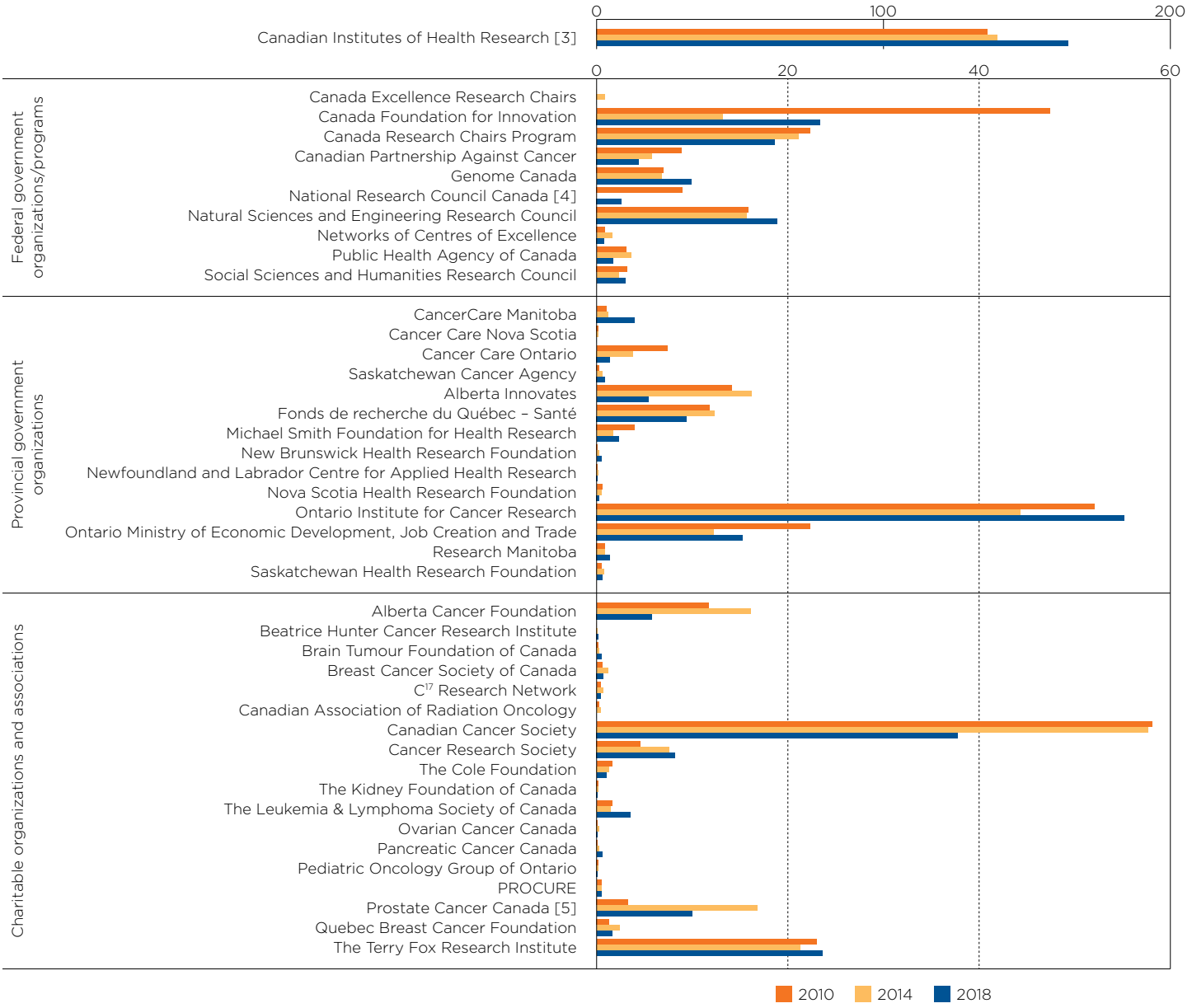


FIGURE 5

CANCER RESEARCH INVESTMENT BY ORGANIZATIONS/PROGRAMS TRACKED [1,2], THREE YEARS ($M)

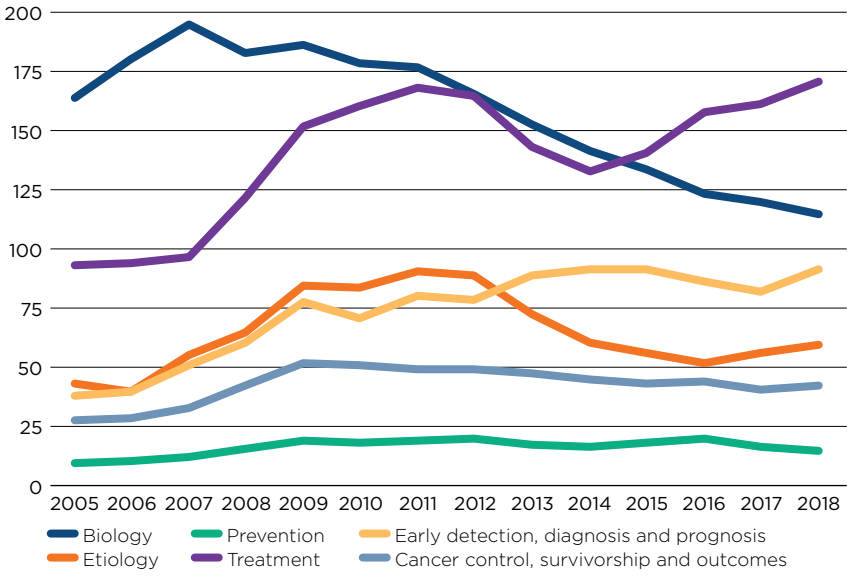


[1] For detailed annual investment by funding organizations tracked in the CCRS from 2005 to 2018 as well as leveraged funding, please consult the supplementary data file available on the CCRA website.
[2] Investments of less than $2 million will be difficult to see on this graph.
[3] Data are shown separately for CIHR, and the axis is scaled differently.
[4] Data are incomplete for 2014 and are not shown.
[5] On February 3, 2020, the Canadian Cancer Society and Prostate Cancer Canada announced their amalgamation. For the purposes of this report, the individual investments made by each charity is reported.

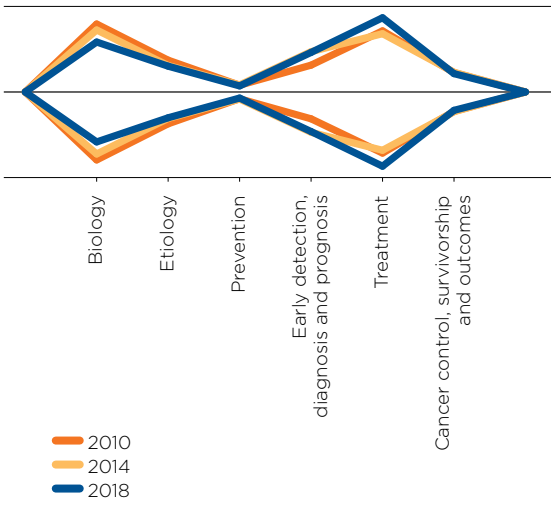
- The investment by area of science (Common Scientific Outline – CSO) showed several notable patterns. After a dip from 2011 to 2014, the investment in Treatment research steadily rose (Figure 6, next page) and, in 2018, it represented 35% of the overall investment (Figure 6 inset). That time trend illustrates the maturation of cancer research as it progresses through the translational pipeline and the priority of research funders on supporting translational research.
- The decline in the investment in Biology over time, a pattern that also held when only operating grants were examined, may reflect a rebalancing of the investment. It is important to note, however, that without sustained investment to improve our understanding of cancer biology, our ability to advance cancer science will be severely curtailed.
- Etiological research investment also decreased significantly since 2012, although there was a slight upward trend from 2016 on. Cancer prevention (limited to cancer prevention interventions in the CSO classification) continued to represent a very small but stable area of investment.

FIGURE 6

CANCER RESEARCH INVESTMENT BY CSO [1], 2005–2018 ($M)



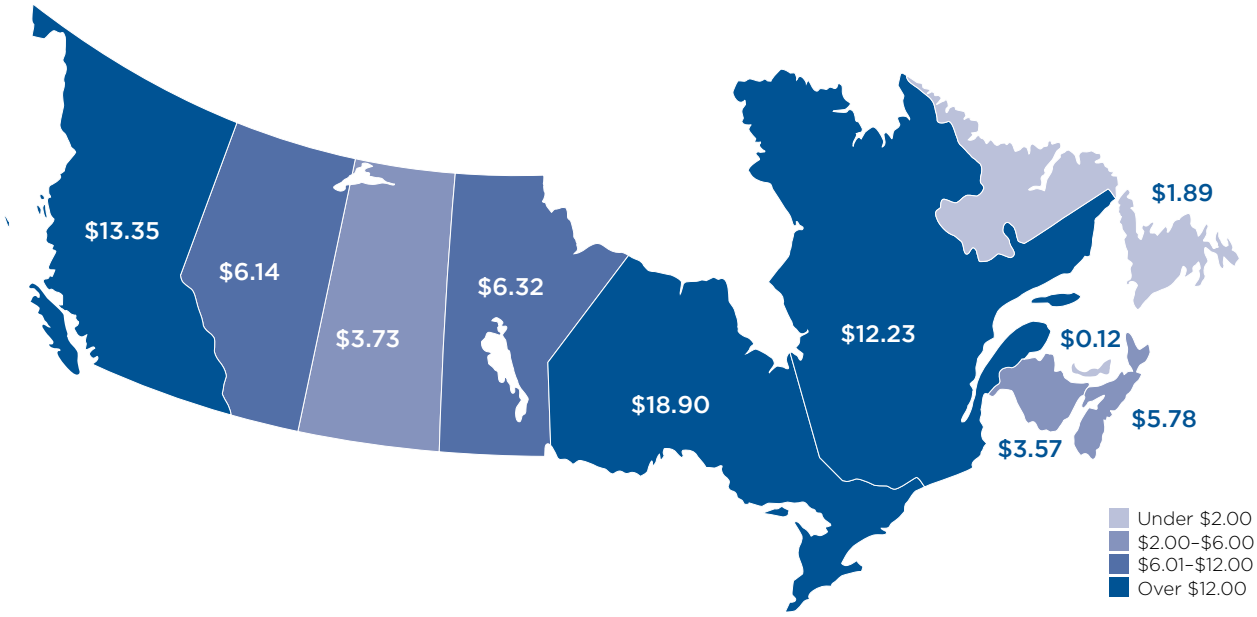
CANCER RESEARCH INVESTMENT BY CSO, THREE YEARS (%)



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

FIGURE 7

PER CAPITA INVESTMENT BY PROVINCE OF NOMINATED PRINCIPAL INVESTIGATOR, 2018 [1]



[1] Population estimates on July 1st from Statistics Canada. Table 17-10-0005-01 available at https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1710000501.

- Principal investigators in Canada's most populous provinces received the largest share of the cancer research dollars (Figure 7). In terms of percent increase in per capita funding from 2014 to 2018, it was largest at 46% for New Brunswick and reflected increased investment from both provincial and national funding programs. There was $52.5M more in 2018 than 2014 through national funding programs going to principal investigators working in Ontario.
- The patterns of site-specific research investment varied from site to site, with the 2018 investment being the highest for the three years examined for bladder, brain, laryngeal, liver, ovary, and thyroid cancers as well as leukemia and Hodgkin lymphoma (Figure 8, next page). The 2018 investment was the lowest out of the three years shown for melanoma and breast, cervical, and colorectal cancers. The research investment in prostate and breast cancers, the most prevalent cancers in Canada, was lower in 2018 than 2014, by 34% and 15%, respectively.
- The research investment in poor survival cancers (defined as cancers with a five-year net survival of 25% or less) varied across the three years featured in this report (Figure 9, next page). Although combined, the investment for all five cancers comprised one-quarter of the overall site-specific investment in 2018 (Figure 9 inset), the increase since 2014 was largely due to more research investment in brain cancer.

- Members of the CCRA are presently engaged in a project to identify actionable short- and long-term recommendations for cancer health systems, services and policy research.[2] To that end, a novel analysis was undertaken to quantify the cancer health systems, services and policy research investment for the most recent five-year period (2014 to 2018).
- The results revealed that the annual research investment was constant from 2014 to 2018, varying between $26M and $27M (Figure 10, next page). The cancer health systems, services and policy research represented about 5% of the overall cancer research investment for the five-year period (Figure 10 inset) and nearly three-quarters of the investment was for operating grants (Figure 10 inset).
- Nearly two of every three dollars invested in cancer health systems, services and policy research in 2018 was done so by CIHR and CCS (Figure 11, next page). Both organizations had higher investments in 2018 than 2014—CIHR at $2.7M more and CCS at $0.9M more.
- The distribution of the 2014 and 2018 investments varied by research focus (Figure 12, next page). Proportionately more of the 2018 investment was focused on primary and community-based health care, patient-centred care / patient experience, health care financing/funding/governance, and infrastructure/network support. The distribution of site-specific research also differed from the overall cancer research investment (not shown). Proportionately more of the health systems, services and policy research investment went to cervical and colorectal cancers.
- An estimated one in five dollars invested in cancer health systems, services and policy research from 2014 to 2018 had some focus on equity and underserved populations.

FIGURE 8

INVESTMENT BY CANCER SITE, THREE YEARS ($M)THREE YEARS ($M)

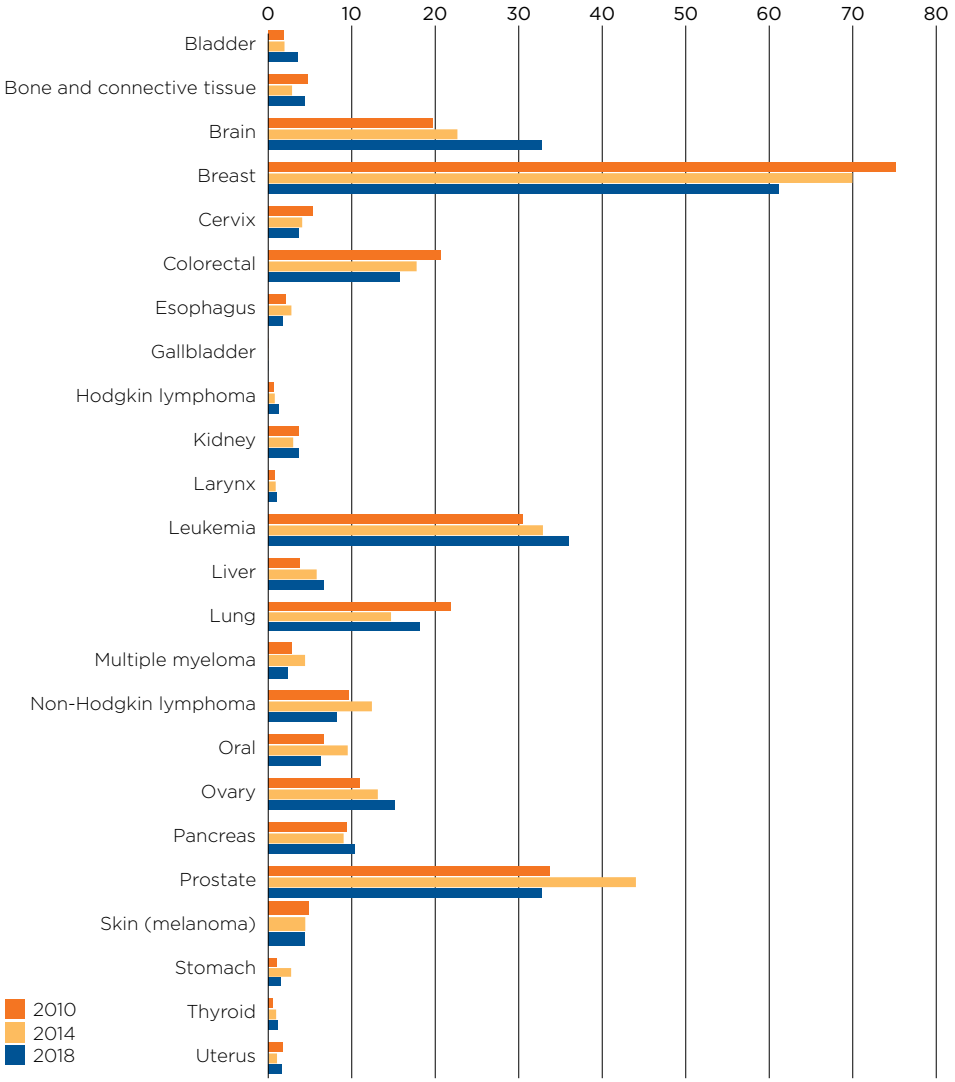
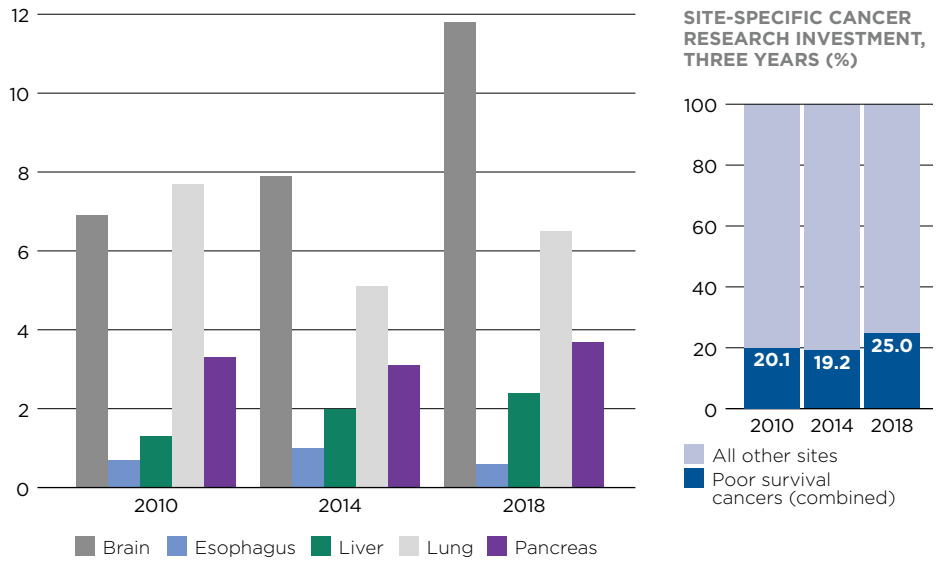


FIGURE 9

SITE-SPECIFIC INVESTMENT FOR POOR SURVIVAL CANCERS [1], THREE YEARS (%)



[1] Cancer sites with a predicted five-year net survival rate of 25% or less. Source: Canadian Cancer Statistics Advisory Committee. *Canadian Cancer Statistics 2020*. Toronto, ON: Canadian Cancer Society; 2020.

[2] Health systems, services and policy research is the field of scientific investigation that seeks to improve the efficiency and effectiveness of health providers and the health care system itself through changes to practice and policy. It generates evidence on how to invest in programs, services and technologies that maximize health and health system outcomes and involves multiple disciplines, professions, and methodologies. For more, see https://cihr-irsc.gc.ca/e/27284.html.

FIGURE 10

CANCER HEALTH SYSTEMS, SERVICES AND POLICY RESEARCH INVESTMENT, 2014–2018 ($M)

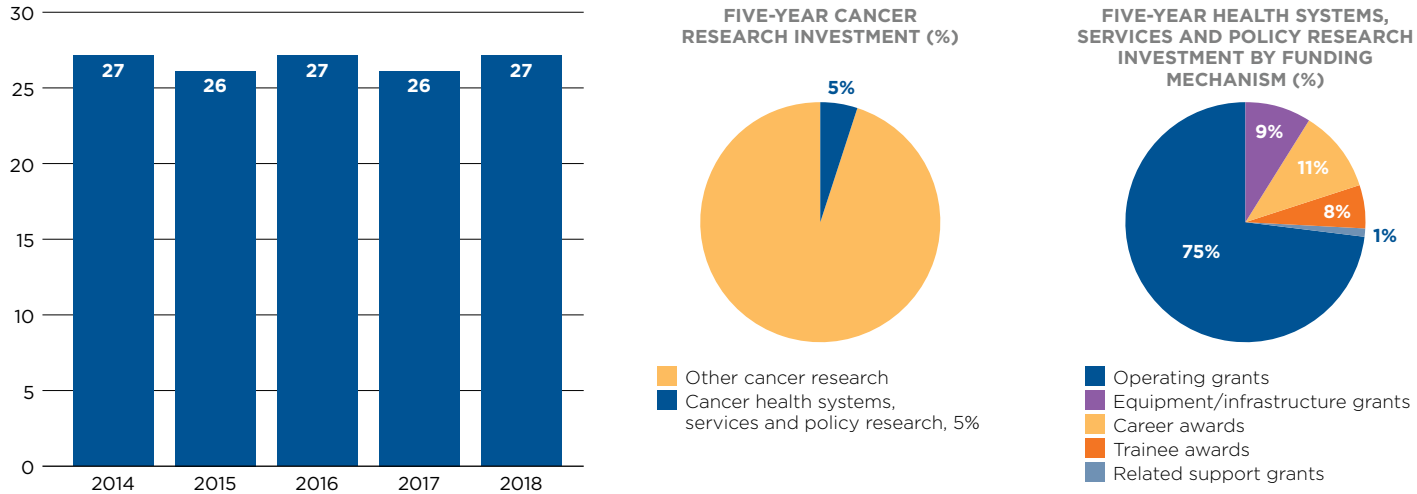
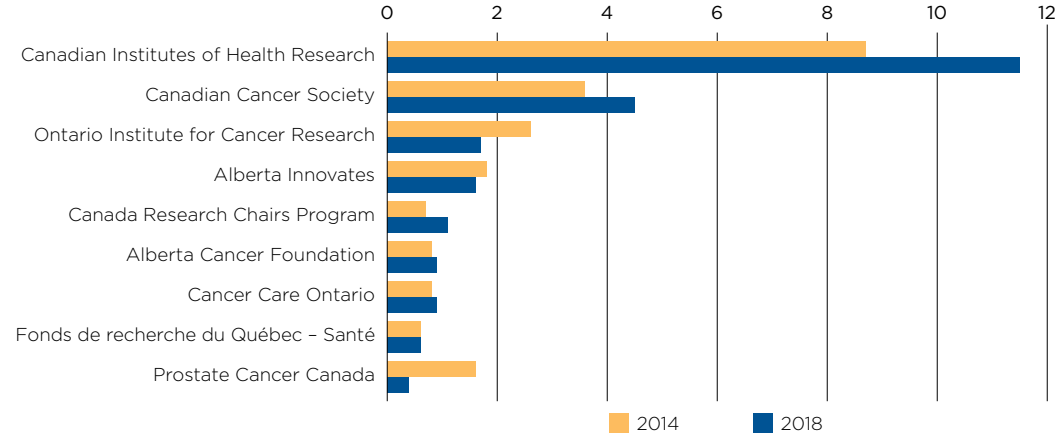


FIGURE 11

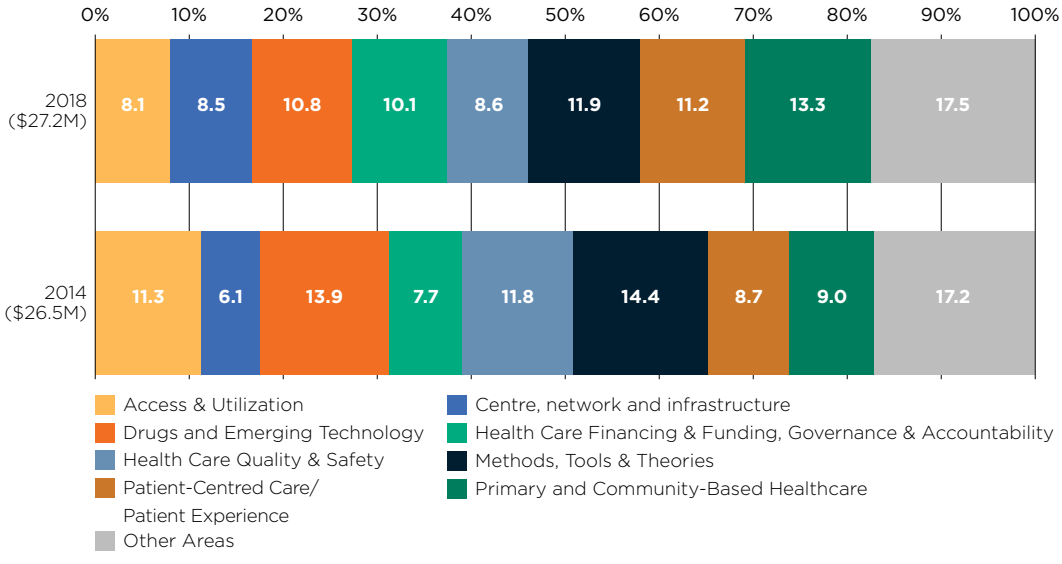
CANCER HEALTH SYSTEMS, SERVICES AND POLICY RESEARCH INVESTMENT BY FUNDING ORGANIZATION [1], 2014 AND 2018 ($M)



[1] Organizations that when combined accounted for more than 80% of the cancer health systems, services and policy research from 2014 to 2018.

FIGURE 12

CANCER HEALTH SYSTEMS, SERVICES AND POLICY RESEARCH INVESTMENT BY RESEARCH FOCUS [1], 2014 AND 2018 (%)



[1] For more information about the classification used in this graph, please contact the CIHR Institute of Health Services and Policy Research (IHSPR).

QUANTIFYING THE HEALTH SYSTEMS, SERVICES AND POLICY RESEARCH INVESTMENT

All research projects in the CCRS that were coded to CSO categories, 3, 4, 5, and 6, for years 2014 to 2018, were reviewed for their relevance to health systems, services, and policy research. Although CSO 6.4, "Health services, economic and health policy analyses," was captured, projects falling outside this CSO subcode were also reviewed for inclusion. As a result, research projects that were included, in part or whole, may have been coded to CSO 3.1 (e.g., primary prevention strategies employed in primary care settings), CSO 4.3 (cancer screening strategies and policies), CSO 5.4 (e.g., clinical trials that included an economic analysis of the trial drug), CSO 6.6 (e.g., integrated palliative care approaches), and CSO 6.9 (e.g., novel methodologies or knowledge translation activities). A sample of coded projects was validated by external experts and the final investment figures reported herein were consistent with independent analyses undertaken by CIHR Institute of Cancer Research.

OUR MEMBERS

Alberta Cancer Foundation
Alberta Innovates
Brain Tumour Foundation of Canada
Breast Cancer Society of Canada
BC Cancer
C[17] Research Network
Canadian Association of Provincial Cancer Agencies
Canadian Association of Radiation Oncology
Canadian Cancer Society*
Canadian Institutes of Health Research
Canadian Partnership Against Cancer
CancerCare Manitoba
Cancer Care Ontario – Ontario Health¶
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Genome Canada
The Kidney Foundation of Canada
The Leukemia & Lymphoma Society of Canada
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New Brunswick Cancer Network
Nova Scotia Cancer Care Program
Ontario Institute for Cancer Research
Ovarian Cancer Canada
Pancreatic Cancer Canada
PROCURE
Public Health Agency of Canada
Quebec Breast Cancer Foundation
Research Manitoba
Saskatchewan Cancer Agency
Saskatchewan Health Research Foundation
The Terry Fox Research Institute

Affiliate member: BioCanRx

* On February 3, 2020, the Canadian Cancer Society and Prostate Cancer Canada amalgamated. The data in this report reflects the investments made by these individual organizations prior to the amalgamation.

¶ Cancer Care Ontario was dissolved in December 2019 and is now part of Ontario Health.

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, an Excel file with trend data, and a series of interactive dashboards related to this report are also available on our website.

For more information, please contact us at info@ccra-acrc.ca.

ACKNOWLEDGEMENTS

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