

# CANCER RESEARCH INVESTMENT IN CANADA, 2008

THE CANADIAN CANCER  
RESEARCH ALLIANCE'S  
SURVEY OF GOVERNMENT  
AND VOLUNTARY SECTOR  
INVESTMENT IN CANCER  
RESEARCH IN 2008

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

CANADIAN PARTNERSHIP  
AGAINST CANCER



PARTENARIAT CANADIEN  
CONTRE LE CANCER

SEPTEMBER 2011

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## MESSAGE FROM THE CHAIRS



**Elizabeth A. Eisenhauer, MD, FRCP**, is the Research Advisory Group Chair for the Canadian Partnership Against Cancer, Director of the Investigational New Drug Program at the NCIC Clinical Trials Groups, and Senior Scientist and Professor at Queen's University in Kingston Ontario.



**Mario Chevette, PhD**, is the President of the Board of Directors of The Cancer Research Society, and Associate Professor, Department of Surgery and Associate Member of the Department of Medicine, Division of Experimental Medicine at McGill University in Montréal, Quebec.

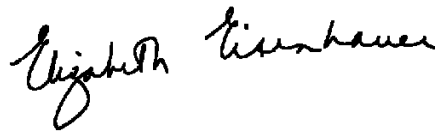
**T**he CCRA annual survey of investment in cancer research provides valuable insights into the nature of cancer research funding in Canada. This report updates our series of reports with 2008 data—in that year, the annual level of research investment by CCRA members and other participating research funders was approaching the \$450M mark. This survey also contains a special report on cancer research investment in survivorship and palliative/end-of-life care research, which found that 4.6% of the overall cancer research investment, or \$18.5M (\$12.2M in survivorship and \$6.4M in palliative/end-of-life care), was invested on average each year from 2005 to 2008. Research on the identification and management of specific late/long-term physical effects of cancer/cancer treatment was a major portion of this research. These findings may help research funders to identify critical research gaps to direct future strategic investments. Updates of the survivorship and palliative/end-of-life analysis will be conducted in the future so that we can track the impact of several new initiatives in these areas.

Since the publication of our last survey, the Pan-Canadian Cancer Research Strategy has been released (May 2010). The strategy represents a landmark—the first time that Canada's cancer research funders have jointly identified priorities for collaborative investment with the commitment to maximize impact on cancer control and accelerate discovery. By working together, funders hope to minimize unnecessary duplication and clarify opportunities for increased leverage through the complementary allocation of limited funds. The strategy's development involved a comprehensive consultation process engaging over 1,000 participants and built on the results of the annual research investment surveys.

The strategy has already yielded significant accomplishments. A new International Cancer Genome Consortium (ICGC) sequencing project, The Canadian Prostate Cancer Genome Network, was launched in February 2011 by Prostate Cancer Canada and the Ontario Institute of Cancer Research. This \$20 million Canadian research project will map the genetic structure of prostate cancer and provide new information that could greatly improve the diagnosis and treatment of the disease.

Another key action of the strategy is the organization of the Canadian Cancer Research Conference. The inaugural conference will take place from November 27 to 30, 2011 in Toronto and will showcase the breadth and excellence of Canadian cancer research, promote key infrastructure and provide trainees and young investigators with networking opportunities, increasing awareness of current Canadian researchers' programs.

In closing, we would like to thank the CCRA members and other organizations that are committed to ongoing collaboration and our overall effort to maximize impact on cancer control and accelerate discovery.



Elizabeth A. Eisenhauer, MD, FRCP  
Co-Chair, CCRA



Mario Chevette, PhD  
Co-Chair, CCRA

# 1. WHAT'S NEW IN THIS REPORT

This report is the fourth in a series of annual reports on cancer research investment in Canada. It provides an overview of the investment, updating many of the baseline tables and figures presented in the three previous reports for the calendar year 2008. In the hard copy version of this report, a special topics report entitled, *Investment in Research on Survivorship and Palliative/End-of-Life Care, 2005–2008*, is included. This report provides new analyses of the level and type of investment in this unique area of research. It is also available as a stand-alone electronic document.

Other changes for this iteration of the report include the inclusion of research funding by the Canadian Partnership Against Cancer and the Ontario Ministry of Research and Innovation. Although an independent organization, the Partnership is funded by Health Canada and, for this reason, it is grouped under the Federal government sector in this report.

While all major cancer research funders from the governmental and voluntary sectors are included (i.e., these are for the most part funders that offer open competitions and support researchers at more than one organization), this report does not include the substantial and growing investment from hospital foundations, federal programs (i.e., the Western Diversification Program, Atlantic Innovation Fund, or the International Science and Technology Partnerships Program through the Foreign Affairs and International Trade Canada), industry-sponsored research or research funding received by Canadian investigators from international funding organizations. Omission of these research investments from this report should be considered when reviewing the results.

The reader is urged to peruse the Methodology chapter, which details the reporting conventions used in the main section of the report. Analyses are descriptive in nature, and, by design, the report contains many tables and figures rather than extensive narrative. Alphabetical order has been used when reporting data by organization, province, and cancer site. Appendix A provides a list of important abbreviations. As with the first and second reports, the data represent a single year snapshot. All four years of investment data for key indicators, however, are presented in appendices C through E.

We hope that this updated information as well as the analyses relating to survivorship and palliation/end-of-life care will be useful to cancer research funders and other key stakeholders as they plan and implement cancer research strategies at the local, provincial, and national levels.

## 2. METHODOLOGY

A detailed methodology was provided in the inaugural report, *Cancer Research Investment in Canada, 2005: The Canadian Cancer Research Alliance's Survey of Government and Voluntary Sector Investment in Cancer Research in 2005* (available at [http://www.ccracrc.ca/aboutus\\_publications\\_en.htm](http://www.ccracrc.ca/aboutus_publications_en.htm)), and readers are encouraged to refer to that report for details on project classification. This chapter builds on that description by providing information relevant to the 2008 analyses.

### 2.1 PARTICIPATING ORGANIZATIONS

This report focuses on research projects being conducted at some point during calendar year 2008. The data source for this study was the Canadian Cancer Research Survey (CCRS) database. This database is composed of peer-reviewed cancer research projects funded by 39 organizations/programs within the federal government, provincial government, and voluntary sectors from January 1, 2005 to December 31, 2008. It includes organizations that fund only cancer research (e.g., Canadian Cancer Society) and organizations that fund all types of health research (e.g., Michael Smith Foundation for Health Research), general research, and technology (e.g., Canada Foundation for Innovation). Current names are used for organizations that have undergone recent name changes, and will vary from previous reports. These changes are noted in the footnotes accompanying Table 3.1.1.

Investment shown for the Networks of Centres of Excellence (NCE) refers to distinct cancer-relevant projects funded by three centres (i.e., Canadian Institute for Photonic Innovations (CIPI), Mathematics of Information Technology & Complex Systems (MITACS), and the Stem Cell Network (SCN)) as well as the new investment in the Centres of Excellence for Commercialization and Research (CECR). Table 2.1.1 provides a summary of the CECR investment captured in this report. Of note, the NCE investment does not include the funds provided for network management and network activities by the Canadian Institutes of Health Research (CIHR), Natural Sciences and Engineering Research Council (NSERC), and Social Sciences and Humanities Research Council (SSHRC) in support of the Networks of Centres of Excellence initiative.

While Health Canada/Public Health Agency of Canada is not shown as a separate funding organization, the agency flows monies through organizations/programs that are identified in the report. A breakdown of this investment is shown in Table 2.1.2.

Appendix B lists participating organizations, as well as specific issues relevant to the quality of the data provided and used for classification purposes. Within the appendices, key comparative analyses of data for investments in 2005, 2006, 2007, and 2008 are provided for

participating organizations (Appendix C), codes of the Common Scientific Outline (CSO) (Appendix D), and cancer sites (Appendices E). These help to bridge the analyses presented in this report with the first three, and provide updated investment figures. As with the three previous reports, the data presented herein is subject to change based on future data submissions or refinements.

TABLE 2.1.1

### 2008 CANCER RESEARCH INVESTMENT IN CENTRES OF EXCELLENCE FOR COMMERCIALIZATION AND RESEARCH (CECR)

CENTRE	Weighting	2008 Investment [1]				TOTAL
		Canadian Institutes of Health Research	Natural Sciences and Engineering Research Council	Social Sciences and Humanities Research Council	Cancer Care Ontario	
Advanced Applied Physics Solutions, Inc. (AAPS), Vancouver	10	\$24,750	\$175,000	\$49,510		\$249,260
Centre for Drug Research and Development (CDRD), Vancouver	33	\$490,160	\$209,825	\$122,572		\$822,557
Centre for Probe Development and Commercialization (CPDC), Hamilton	100	\$1,408,333	\$836,667	\$247,596	\$50,000	\$2,542,596
Institute for Research in Immunology and Cancer (IRIC)/CECR in Therapeutics Discovery (IRICoR), Montreal	100	\$1,614,667	\$472,667	\$405,263		\$2,492,596
The Prostate Centre's Translational Research Initiative for Accelerated Discovery and Development (PC-TRIADD), Vancouver	100	\$1,733,333	\$16,667	\$592,596		\$2,342,596
<b>TOTAL</b>		<b>\$5,271,243</b>	<b>\$1,710,825</b>	<b>\$1,417,535</b>	<b>\$50,000</b>	<b>\$8,449,604</b>

[1] Investment was prorated over a five-year timeframe and, where applicable, adjusted by the cancer relevance weighting. Only the investment shown in this table was used in this report. Other leveraged funding is not captured.

TABLE 2.1.2

### 2008 CANCER RESEARCH INVESTMENT BY ORGANIZATION/PROGRAM WITH MONIES PROVIDED BY HEALTH CANADA

SECTOR/ ORGANIZATION	PROGRAM	2008 Investment	
		\$	%
Multi-funded initiatives	Canadian Breast Cancer Research Alliance	\$2,665,410	21
	Canadian Tobacco Control Research Initiative	\$87,549	Less than 1
Federal agencies	Canadian Institutes of Health Research	\$99,728	Less than 1
Canadian Partnership Against Cancer [1]	Canadian Partnership for Tomorrow Project (CPTP)	\$9,486,769	76
	Terry Fox Research Institute (TFRI) Translational Cancer Research Pilot Project	\$173,492	1
<b>TOTAL</b>		<b>\$12,512,948</b>	<b>100</b>

[1] The Partnership is an independent organization funded by the federal government.

## 2.2 PROJECT CLASSIFICATION

All research projects were coded in terms of type of research and cancer site (see sidebar). The CSO was the typology used for coding the type of research, and final CSO coding for each project was determined after two coders independently classified the projects and then met to discuss discrepancies and determine final agreed-upon codes. Observed agreement of the blind-coded classifications of the two coders in terms of the seven CSO categories was 84.2%. The Cohen's kappa coefficient (unweighted) was 0.80 (95% confidence intervals 0.79-0.81), which is in the "almost perfect" agreement category according to Landis and Koch.<sup>1</sup>

Kite diagrams are used to illustrate the distribution of the CSO across its seven categories. A kite diagram is a type of area chart in which the y-axis is split into two equal parts ranging from 0 to 50%, with the 0 origin located in the middle of the graph. The kite diagram is a succinct visual for detecting differences/similarities across multiple organizations.

Cancer site classification was completed by one coder. In addition to the project descriptions, other sources of information, when available from participating organizations (e.g., site checklists), were used to make the site determinations. When a project was focused on a specific risk factor such as smoking and no mention was made of cancer sites in the project description/additional information, predetermined site allocations based on expert input were used (e.g., for projects focused on smoking, the site allocations were lung 50%, esophagus 15%, larynx 15%, pharynx 15%, and all other sites 5%). As introduced in the 2006 report, projects were also grouped in terms of type of funding mechanism (see sidebar on next page for descriptions). This report does not provide in-depth profiles for each funding mechanism as these are available in the 2006 report. In this report, selected analyses on funding mechanisms are highlighted.

### PROJECT CLASSIFICATION

All projects within the CCRA database were classified according to type of research and type of cancer. The classification was determined on the basis of the available project summary. The Common Scientific Outline (CSO), a classification system specific to cancer research, was used as the tool to classify research type. The CSO is the principal classification framework used by the International Cancer Research Partners (ICRP). The 38 CSO codes are organized into seven broad categories of scientific interest. Each project within the CCRA database was assigned a relevant CSO code. Where more than one CSO code was assigned to a given project, the project budget was distributed equally among the codes. For more information about the CSO, please refer to <http://www.cancerportfolio.org/cso.jsp>.

Projects were also classified according to cancer site using the International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Version for 2007 (ICD-10). The ICD-10 is an international standard diagnostic classification used for general studies of the distribution and frequency of human disease and for health management purposes. It is also used in the national reporting of new cancer cases. Similar to the CSO coding, some projects were assigned more than one cancer site. In these cases, the project budget was allocated accordingly to each code so that it summed to 100% of the total. An electronic version of the ICD-10 is available from the World Health Organization. Please refer to <http://apps.who.int/classifications/apps/icd/icd10online/> for more information.

1. J.R. Landis and G.G. Koch, "The measurement of observer agreement for categorical data," *Biometrics* 33 (1977): 159-174.

## 2.3 REPORTING CONVENTIONS

The term “cancer research investment” represents the direct funding of cancer research that received some form of peer review and that was administered by the organizations participating in the survey. (There is also, however, an estimate of the cancer-relevant portion of the federal government’s Indirect Costs Program in section 3.4.) Within the context of this report, “peer review” is defined as the process of subjecting a research proposal to the scrutiny of others who are experts in the same or similar fields. These experts conduct an impartial review (i.e., they do not have any competing professional or personal interests). The formats for peer review vary among organizations and funding mechanisms, and range from formalized reviews to more ad hoc arrangements to the use of in-house expertise as is commonly used for related support grants.

All projects conducted within calendar year 2008 are included. Given that many organizations have different grant cycles and fiscal years, the selection of calendar 2008 is intended to standardize data collection to a single 12-month period. The 2008 investment has been calculated on a prorated basis and assumes that the project dollars were paid out in equal monthly instalments based on project start and end dates. Although project dollars do not typically flow in that way, this method simplified and standardized the annual investment calculation. In this report, sector breakdowns have been used to denote the sectors in which the organizations that administered the funding program belonged. This does not mean that the entire investment shown for a particular organization came solely from that sector; partner dollars have also been included in these calculations.

Likewise, unless otherwise noted, research projects were included under the organization that administered the grants and awards programs even when a given project was funded by more than one organization. For example, projects included for the Canada Foundation for Innovation (CFI), which were cost-shared 40% by CFI and 60% by partners, were assigned the total project budget even though a substantial portion of the budget for many projects came from provincial government partners.<sup>2</sup> Likewise, Genome Canada projects, which were cost shared on a 50-50 basis, were assigned the total project budget. Genome Canada provided breakdowns for its projects by funding source and these are summarized in Table 2.3.1.

### DEFINITIONS OF FUNDING MECHANISMS

**Career awards:** competitive awards that provide protected time for research on either a long- or short-term basis to outstanding researchers who have demonstrated high levels of productivity and research accomplishments. These awards are given to only a small percentage of all researchers. (They may also be called salary awards.) Research chairs and establishment grants (grants designed to facilitate the recruitment of outstanding researchers) are also included under this funding mechanism.

**Equipment/infrastructure grants:** competitive grants that cover, in part or in full, the costs of construction or major remodelling of new research facilities, and/or the purchase, housing, and installation of equipment, scientific collections, computer software, information databases, and communication linkages used primarily for conducting research. It includes funding for costs associated with cohort establishment.

**Operating grants:** competitive grants that support all the direct costs involved in conducting specific research projects performed by identified researchers. Operating grants typically cover salaries for laboratory staff and research assistants/associates/trainees, costs of research equipment and supplies, and other specific research-related expenses. Multi-component projects (program projects), feasibility grants, proof-of-principle grants, regional development grants, innovation grants, and knowledge translation grants are all included in this category.

**Related support grants:** competitive grants that support travel, workshops/symposia, and researcher time for proposal development/letters of intent. These grants involve small sums of money.

**Trainee awards:** competitive awards that recognize outstanding trainees and support them during their undergraduate, graduate, or post-graduate training. Trainees from Canada who are studying at institutions outside Canada may also be eligible for some types of trainee awards. Block training grants given to institutions that in turn distribute the monies to trainees through a competitive process are also included under this funding mechanism. These awards are in addition to trainee salaries covered in operating grants.

2. CFI does not provide the details of the partner investment. In the database, the estimated partner contribution was added to the CFI maximum contribution.



**TABLE 2.3.1**  
**2008 CANCER RESEARCH INVESTMENT BY FUNDING SOURCE FOR GENOME CANADA**

FUNDING SOURCE	2008 Investment	
	\$	%
Genome Canada	\$4,944,682	50
Private industry	\$2,557,470	26
Provincial government	\$1,638,981	17
Institutional	\$646,420	6
Foreign	\$90,599	Less than 1
<b>TOTAL</b>	<b>\$9,878,152</b>	<b>100</b>

Multi-funded initiatives are somewhat unique in that they administer programs funded entirely by partner organizations, and the partner organizations are from both the federal government and voluntary sectors. For this reason, they were grouped in their own category.

The institutional affiliation of the nominated principal investigator (PI) or project leader (PL) was used for analyses based

on geography (province). There is only one nominated PI/PL per project. Components of multi-component projects are considered individual projects if the funding organization provided details (i.e., description, researchers, budget, etc.) on the component parts. The Canadian Breast Cancer Research Alliance (CBCRA), the Canadian Cancer Society, National Research Council Canada, Ontario Institute for Cancer Research, and The Terry Fox Foundation provided this level of detail. For clinical trials supported by the Canadian Cancer Society, each site involved in the trial is treated as a separate project with its own principal investigator and budget (based on per case and site administration funding).

Project budgets have been weighted in terms of the extent to which they were focused on cancer. Budgets for projects determined to have the study of cancer as their primary focus were weighted at 100%. This included all projects funded by organizations that fund only cancer research, as well as research funded by other organizations where the research was focused on cancer. Budgets for all other research projects that were not entirely focused on cancer were weighted on the basis of the available project descriptions (see Table 2.3.2 for some examples of how weightings were applied). Weightings (i.e., the percentage of funding of a particular project that was assessed as being focused on cancer research) ranged from 5% to 100% (see Table 2.3.3). Of note, six of the CFI “Research Hospital Fund – Large Scale Institutional Endeavours” were included in investments shown for CFI in this report, with weightings ranging from 10% to 50%.<sup>3</sup>

All projects are coded to cancer sites using the ICD-10 in accordance with the level of detail provided in the project description. ICD-10 codes are rolled up to 24 cancer sites. Collectively, these cancer sites represent ~90% of all new cancer cases and deaths per year.

In this report, when the term “number of projects” is specified, it refers to a count of projects without the weightings applied. When the term “project equivalents” is used, it refers to a count of projects with the weightings applied.

3. Includes: Newfoundland and Labrador Centre for Interdisciplinary Research in Human Genetics (cancer weighting 10%; 2008 weighted amount \$327,581); Building the UHN Advanced Therapeutics Research Platform (cancer weighting 20%; 2008 weighted amount \$5,381,598); Translational Research and Intervention Across the Lifespan (cancer weighting 20%; 2008 weighted amount \$5,832,653); Centre for Imaged-Guided Therapeutics (cancer weighting 25%; 2008 weighted amount \$4,666,667); The SickKids Child Health Research Institute (cancer weighting 33%; 2008 weighted amount \$8,770,221); Translation of Innovation into Medical Excellence (TIMEx) (cancer weighting 50%; 2008 weighted amount \$3,586,076).



TABLE 2.3.2

## EXAMPLES OF THE APPLICATION OF CANCER WEIGHTINGS TO RESEARCH PROJECTS

ISSUE	EXAMPLE	APPROACH
Project is not entirely focused on cancer	<i>Quality of end-of-life care: The perspectives of bereaved family members of lung cancer and COPD</i>	Budget was weighted at 50% as the research was looking at cancer and chronic obstructive pulmonary disease (COPD).
Project spans more than one category of the CSO	<i>Molecular and genomic characterization of breast cancer according to metastatic site</i>	Budget was allocated to CSO codes 1.4 - Cancer progression and metastasis and 4.1 - Technology development and/or marker discovery.
Project involves more than one cancer site	<i>Biomarkers and imaging studies of the tumour microenvironment: Treatment response and new therapeutic targets in cervix and prostate cancer</i>	Budget was allocated 50-50 to two cancer sites (i.e., cervix and prostate).

TABLE 2.3.3

## DISTRIBUTION OF WEIGHTINGS APPLIED TO PROJECTS IN THE SURVEY DATABASE, 2005–2008

WEIGHTING	Number of projects	%
100%	7,380	80
80%	57	Less than 1
75%	22	Less than 1
67%	3	Less than 1
50%	444	5
33%	871	9
25%	52	Less than 1
20%	286	3
16.7%	1	Less than 1
10%	116	1
5%	1	Less than 1
<b>TOTAL</b>	<b>9,233</b>	<b>100</b>

## 3. OVERVIEW OF THE 2008 INVESTMENT

This chapter highlights data related to the overall investment as well as the investment by types of research, cancer sites, and funding mechanism.

### 3.1 INVESTMENT

The total 2008 investment in terms of peer-reviewed projects was \$446.2M (Table 3.1.1). This does not include an estimated \$19.7M of cancer-attributable indirect costs based on information provided by the federal government's Indirect Costs Program, which is detailed in section 3.4.

Of the \$446.2M total 2008 cancer research investment, nearly 60% was from programs/agencies funded by the federal government, with CIHR being the single largest investor in cancer research. Although somewhat anomalous in the provincial health research organization sector given its exclusive cancer focus, the Ontario Institute for Cancer Research (OICR) represented 46.7% of the sector investment. The Alberta Health Services – Cancer Care, which includes research investment by the Alberta government as well as the Alberta Cancer Foundation, accounted for 73.2% of the total provincial cancer agency investment. The investment by the Canadian Cancer Society (CCS) represented nearly 51.1% of the total voluntary sector investment, and 9.5% of the overall investment.

Partner contributions to the multi-funded initiatives are shown in Table 3.1.2. The Canadian Breast Cancer Foundation (CBCF) and CCS were major contributors to the funding programs administered by the Canadian Breast Cancer Research Alliance (CBCRA). CIHR was a major contributor to the Canadian Tobacco Control Research Initiative (CTCRI).

Research investment grew for all sectors from 2005 to 2008 (see Figure 3.1.1), with the exception of the multi-funded initiatives which reflects the gradual winding down of these programs. Again, the provincial governments in Alberta and Ontario emerged as key drivers of growth in investment. Within the federal government sector, the introduction of the CECR program and initiation of The Partnership's research investment contributed substantially to the increased investment.

Overall investment in 2008 by province of the principal investigator/project leader (PI/PL) is summarized in Figure 3.1.2. Given the considerable differences in provincial populations, per capita investment was also provided (in parentheses) to normalize the data. This does not imply that per capita funding should be equally distributed as there are a number of factors which impact provincial cancer research investment. These include, for example, the number of active cancer researchers, their productivity, the presence of one or more medical schools with cancer researchers on faculty, the presence of cancer research institutes, funding application rates and

application success rates, the availability of provincial funding mechanisms, and the availability of appropriate equipment and infrastructure.

Figure 3.1.3 shows the distribution of the funding sources within each province (unlike other tables/figures, these data are based on the actual funding source, and not funder sector). This means, for example, that provincial funding contributed to a federal sector funding program will be counted as a provincial funding source. “Industry” within this figure indicates the industry contribution to cost-shared programs (e.g., Genome Canada, CIHR), and does not reflect all industry funded research activity. In other analyses, these dollars would be reflected under the federal sector. With the exception of Alberta, federal government funding accounted for 45-80% of the total provincial cancer investment.

The provincial government investment is comparatively depicted in Figure 3.1.4 using estimates of provincial GDP to determine the relative degree of cancer research “intensity” with a province. This figure reveals that Alberta and Ontario had the highest investment rates with both, in fact, exceeding \$100 per million GDP.

TABLE 3.1.1

## 2008 CANCER RESEARCH INVESTMENT BY PARTICIPATING ORGANIZATIONS/PROGRAMS

Sector [1]	Organization Type	Organization/Program	Number of Projects	2008 Investment	%	2008 Investment with initiatives included [2]
<b>GOVERNMENT</b> \$352,159,822 78.9%	Federal [3] \$266,821,269 59.8%	Canada Foundation for Innovation [4]	217	\$81,140,707	18.19	\$81,140,707
		Canada Research Chairs Program	275	\$21,560,333	4.83	\$21,560,333
		Canadian Institutes of Health Research	1,754	\$117,301,142	26.29	\$119,046,812 *
		Canadian Partnership Against Cancer [5]	7	\$9,486,769	2.13	\$9,486,769
		Genome Canada [6]	4	\$9,878,152	2.21	\$9,878,152
		National Research Council	42	\$7,341,680	1.65	\$7,341,680
		Natural Sciences and Engineering Research Council	470	\$9,029,600	2.02	\$9,029,600
		Networks of Centres of Excellence [7]	21	\$10,247,954	2.30	\$10,247,954
		Social Sciences and Humanities Research Council	58	\$834,932	0.19	\$834,932
	Provincial Cancer Agency \$28,354,090 6.4%	Alberta Health Services – Cancer Care [8]	245	\$20,761,040	4.65	\$20,761,040
		CancerCare Manitoba	35	\$782,458	0.18	\$782,458
		Cancer Care Nova Scotia	10	\$145,000	0.03	\$145,000
		Cancer Care Ontario	26	\$6,258,156	1.40	\$6,258,156
		Saskatchewan Cancer Agency	9	\$407,438	0.09	\$407,438
	Provincial Health Research Organization \$56,984,463 12.8%	Alberta Innovates – Health Solutions	122	\$6,025,892	1.35	\$6,025,892
		Fonds de la recherche en santé du Québec	282	\$10,037,779	2.25	\$10,037,779
		Manitoba Health Research Council	46	\$903,357	0.20	\$903,357
		Medical Research Fund of New Brunswick	3	\$52,322	0.01	\$52,322
		Michael Smith Foundation for Health Research	195	\$8,491,030	1.90	\$8,491,030
		Nova Scotia Health Research Foundation	33	\$524,586	0.12	\$524,586
		Ontario Institute for Cancer Research	120	\$26,598,332	5.96	\$26,598,332
		Ontario Ministry of Research and Innovation	49	\$3,980,888	0.89	\$3,980,888
		Saskatchewan Health Research Foundation	15	\$370,278	0.08	\$370,278
	<b>VOLUNTARY</b> \$82,827,668 18.6%	Brain Tumour Foundation of Canada	15	\$370,044	0.08	\$370,044
		C <sup>17</sup> Research Network	10	\$325,860	0.07	\$325,860
		Canadian Association of Radiation Oncology	16	\$182,376	0.04	\$182,376
		Canadian Breast Cancer Foundation	171	\$8,948,184	2.01	\$11,023,382 *
		Canadian Cancer Society	525	\$42,310,508	9.48	\$45,538,730 *
Canary Foundation of Canada		3	\$503,375	0.11	\$503,375	
Fondation du cancer du sein du Québec /Quebec Breast Cancer Foundation [9]		0	\$0	0.00	\$0	
Ovarian Cancer Canada		10	\$270,357	0.06	\$270,357	
Prostate Cancer Canada [10]		35	\$896,408	0.20	\$896,408	
The Cancer Research Society		143	\$6,240,157	1.40	\$6,401,957 *	
The Kidney Foundation of Canada		4	\$147,500	0.03	\$147,500	
The Leukemia & Lymphoma Society of Canada		48	\$1,450,975	0.33	\$1,450,975	
The Terry Fox Foundation [11]		223	\$21,181,926	4.75	\$21,181,926	
<b>MULTI-FUNDED [12]</b> \$11,194,419 2.5%	Canadian Breast Cancer Research Alliance	92	\$8,735,248	1.96	\$3,895,980 R	
	Canadian Prostate Cancer Research Initiative	1	\$246,942	0.06	\$0 R	
	Canadian Tobacco Control Research Initiative	61	\$2,212,229	0.50	\$87,549 R	
<b>TOTAL</b>			<b>5,395</b>	<b>\$446,181,909</b>	<b>100</b>	<b>\$446,181,909</b>

[1] Refers to the sector of the organization that administered the funding program.

[2] Figures marked with an asterisk (\*) show the addition of the investment in the multi-funded initiatives. Kite diagrams presented later in this chapter were based on the figures shown in this column for all organizations except the multi-funded initiatives (R), which show the total funding dollars expressed in the "2008 Investment" column.

[3] This figure does not include the cancer-relevant estimate for the federal Indirect Costs Program (\$19.7M), which is discussed in section 3.4.

[4] Federal government contribution to the CFI projects was \$35.5M.

[5] Represents The Partnership's investment in the Canadian Partnership for Tomorrow Project (CPTP). The Partnership's investment in the TFRI Translational Cancer Research Pilot Project was \$173,492 in 2008. This amount is included in the total shown for The Terry Fox Foundation.

[6] Federal government contribution to the Genome Canada projects was \$4.9M.

[7] NCE figure does not include funding from CIHR, NSERC or SSHRC for network management and activities but does reflect investment in cancer-relevant projects supported by specific networks (CIPI, MITACS, and SCN). CIHR, NSERC and SSHRC contributions to five Centres of Excellence for Commercialization and Research (CECR) are also included in the total shown.

[8] As of April 1, 2009, the Alberta Cancer Board and 11 other provincial health authorities joined together to form Alberta Health Services. The grants and awards program funded by both the Alberta Cancer Foundation and the Cancer Prevention Legacy endowment are included here.

[9] There were no monies dispersed for research in the 2008 calendar year by the Fondation du cancer du sein du Québec / Quebec Breast Cancer Foundation.

[10] As of May 4, 2009, the Prostate Cancer Research Foundation of Canada became Prostate Cancer Canada.

[11] Investment figure shown includes \$173,492 provided by the Canadian Partnership for Cancer to the TFRI Translational Cancer Research Pilot Project program.

[12] See Table 3.1.2 for a detailed breakdown of partner contributions to these initiatives.

TABLE 3.1.2

**2008 CANCER RESEARCH INVESTMENT BY PARTICIPATING ORGANIZATIONS FUNDING MULTI-FUNDED INITIATIVES**

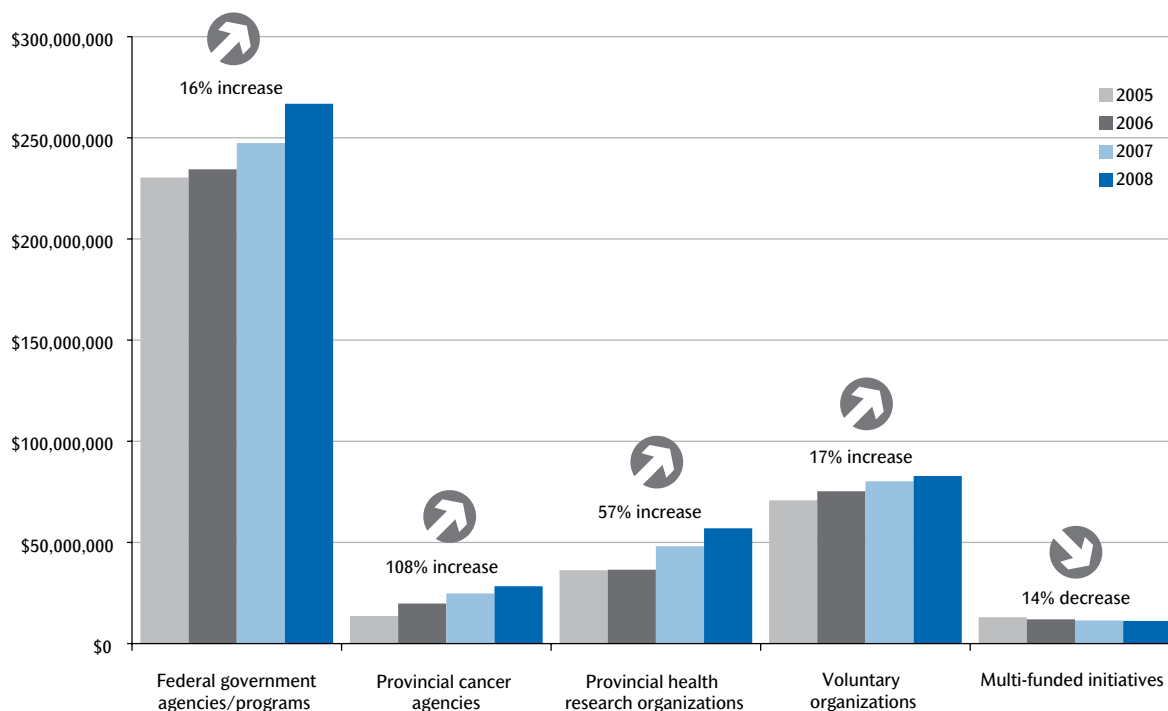
INITIATIVE	Canadian Institutes of Health Research [1]	Canadian Breast Cancer Foundation	Canadian Cancer Society	The Cancer Research Society	Other [2]	TOTAL
Canadian Breast Cancer Research Alliance	\$380,331	\$2,075,197	\$2,221,939	\$161,800	\$3,895,980	\$8,735,248
Canadian Prostate Cancer Research Initiative			\$246,942			\$246,942
Canadian Tobacco Control Research Initiative	\$1,365,338		\$759,342		\$87,549	\$2,212,230
<b>TOTAL</b>	<b>\$1,745,670</b>	<b>\$2,075,197</b>	<b>\$3,228,223</b>	<b>\$161,800</b>	<b>\$3,983,529</b>	<b>\$11,194,419</b>

[1] Within CIHR's open operating grants competition, \$5.2M was invested in breast cancer research, which was de facto attributed to CBCRA. This investment is included in the \$116,504,705 figure shown in Table 3.1.1 and not in this table. The combined CIHR investment in CBCRA for 2008 (CBCRA-administered plus CIHR-administered funding programs) was \$5,567,481.

[2] Includes Avon Canada (\$0.9M), Breast Cancer Society of Canada (\$0.1M), Canadian Nurses Foundation (\$10K), CURE Foundation (\$0.2M), Health Canada/Public Health Agency of Canada (PHAC) (\$2.8M, which represents \$2.7M for CBCRA and \$9K for CTCRI).

FIGURE 3.1.1

**CANCER RESEARCH INVESTMENT BY FUNDER SECTOR [1] IN DOLLARS AND PERCENT CHANGE FROM 2005 TO 2008**



[1] Refers to the sector of the organization that administered the funding program.

FIGURE 3.1.2

**2008 CANCER RESEARCH INVESTMENT BY PROVINCE OF PI/PL IN DOLLARS AND PER CAPITA INVESTMENT (\$442.6M) [1,2]**

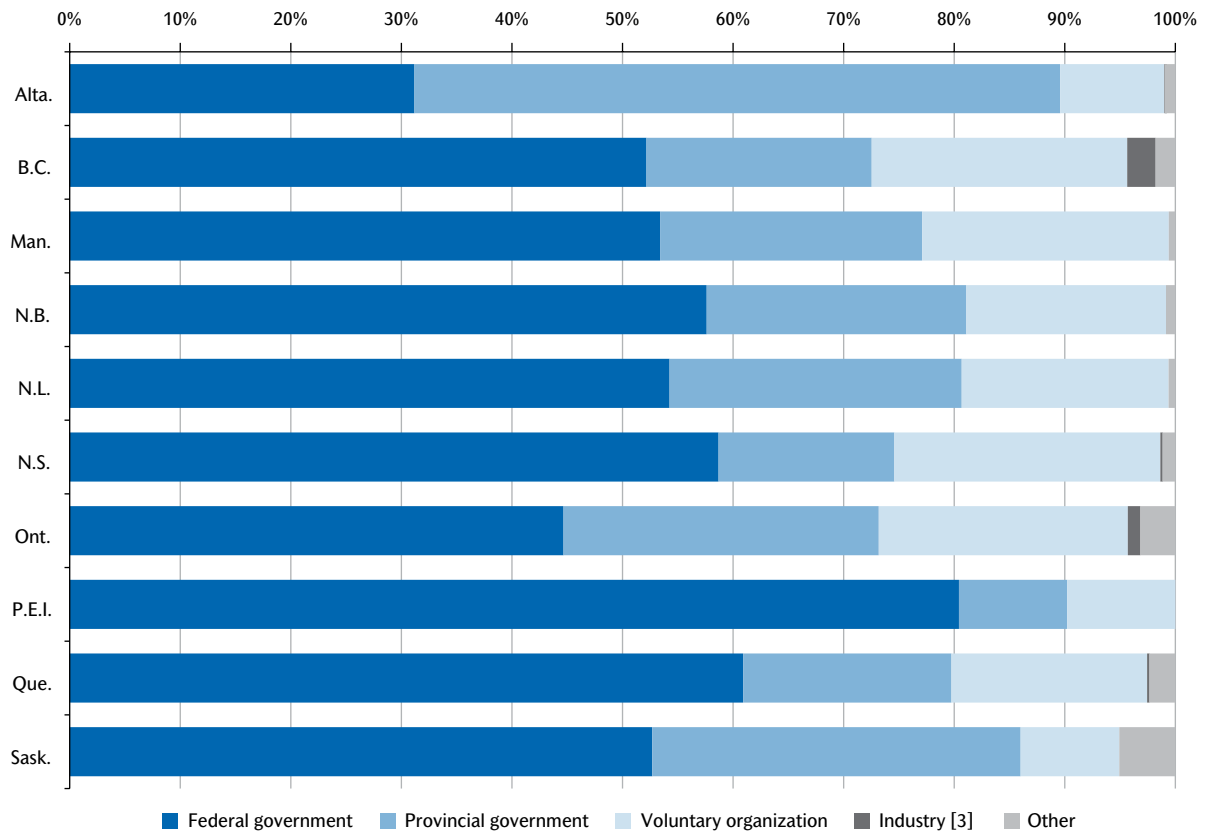


[1] Excludes \$3.6M invested in trainee awards to trainees studying outside of Canada and the estimate of the cancer-related component of the federal government's Indirect Cost program, and other province-specific and institution-specific funding sources not captured in the CCRS.

[2] Provincial population figures based on July 1, 2008 estimates from Statistics Canada, CANSIM, table 051-0001 were used in the per capita investment calculation. Per capita investment is shown in parentheses and should not be interpreted to mean that there should be an equal distribution of per capita funding as there are a number of factors that impact provincial cancer research investment.

FIGURE 3.1.3

**DISTRIBUTION OF 2008 CANCER RESEARCH INVESTMENT BY FUNDING SOURCE [1]  
FOR EACH PROVINCE (\$442.6M) [2]**

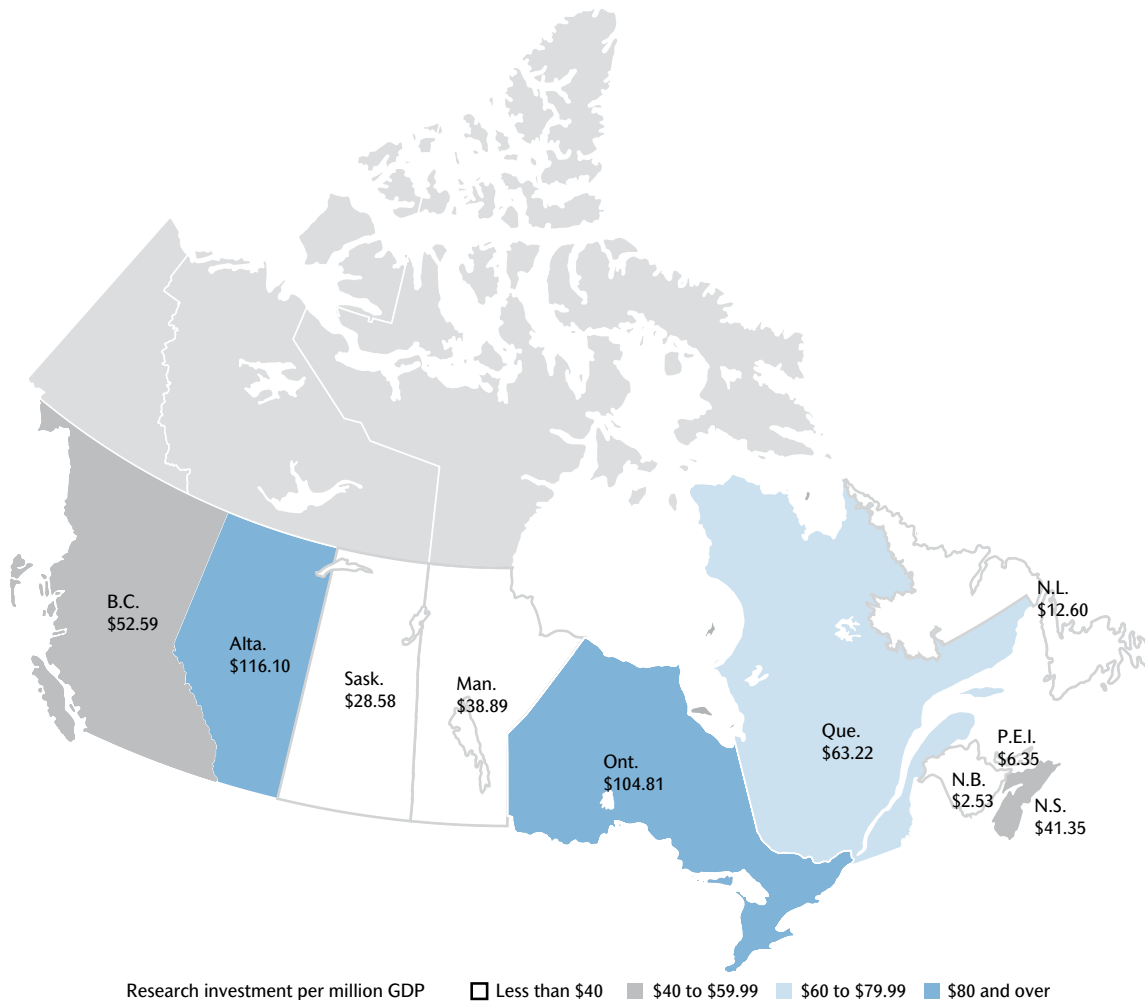


[1] Funding source refers to the actual source of dollars for each project and not to the funder sector of the funding organization.

[2] Excludes \$3.6M invested in trainee awards to trainees studying outside Canada.

[3] Represents industry contributions to co-funded initiatives of federal government programs/agencies as covered in the CCRS and not all industry research funding.

FIGURE 3.1.4

**2008 CANCER RESEARCH INVESTMENT BY PROVINCIAL GOVERNMENTS PER MILLION ESTIMATED GDP FOR 2008 [1]**

[1] Provincial GDP estimates from Statistics Canada, CANSIM, table 384-0002, Catalogue No 13-213-PPB.



## 3.2 TYPES OF RESEARCH

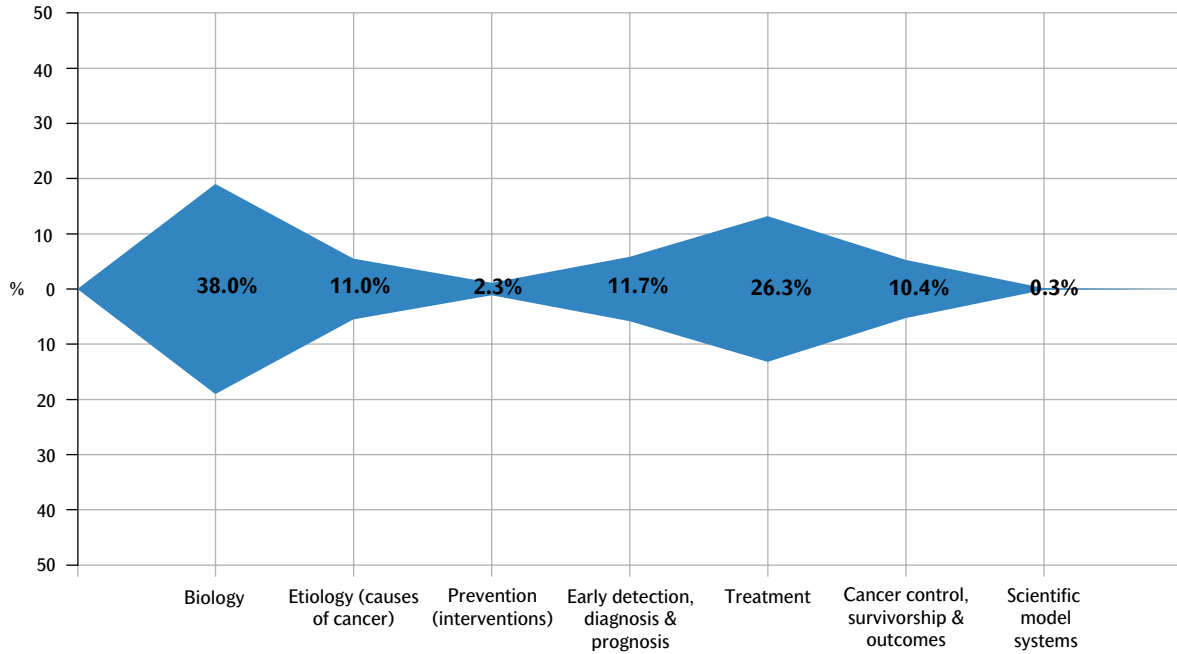
The CSO distribution for the overall 2008 investment is summarized in Figure 3.2.1 and shows a redistribution of funding since 2007 from Biology to the areas of Prevention (interventions), Cancer Control, Survivorship & Outcomes, and Treatment.

Individual kite diagrams are presented for each of the 38 organizations/programs in Figure 3.2.2. A detailed breakdown of the investment by the 38 CSO codes is provided in Table 3.2.1. (For a comparison of the four years of data, please refer to Appendix D.) Three areas represented over 10% of the overall investment and combined nearly 40% of investment: discovery and development of systemic therapies (code 5.3 at 14.9%); normal biology (code 1.1 at 13.7%); and oncogenes and tumour suppressor genes (code 1.3 at 10.9%).

Figure 3.2.3 shows the distribution of CSO categories for each province of the PI/PL. There are fairly marked differences between provinces.

FIGURE 3.2.1

**DISTRIBUTION OF 2008 CANCER RESEARCH INVESTMENT BY CSO CATEGORY (\$446.2M)**



**DISTRIBUTION OF 2007 CANCER RESEARCH INVESTMENT BY CSO CATEGORY (\$412.0M)**

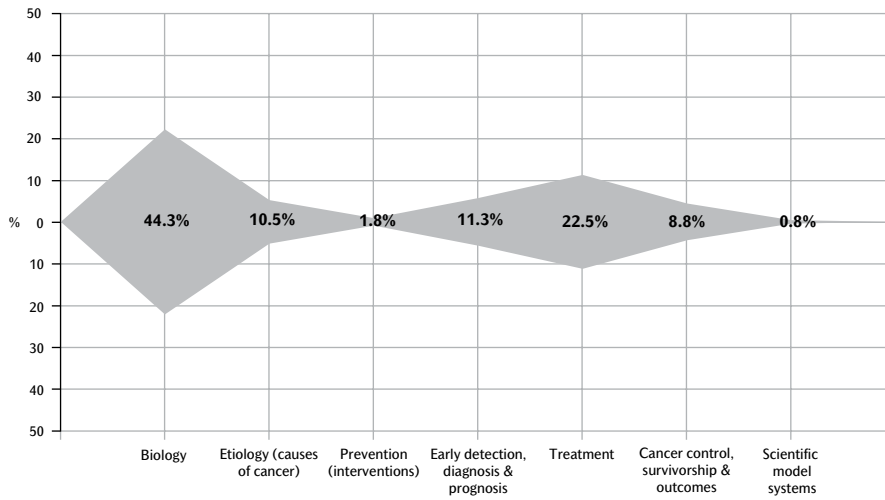
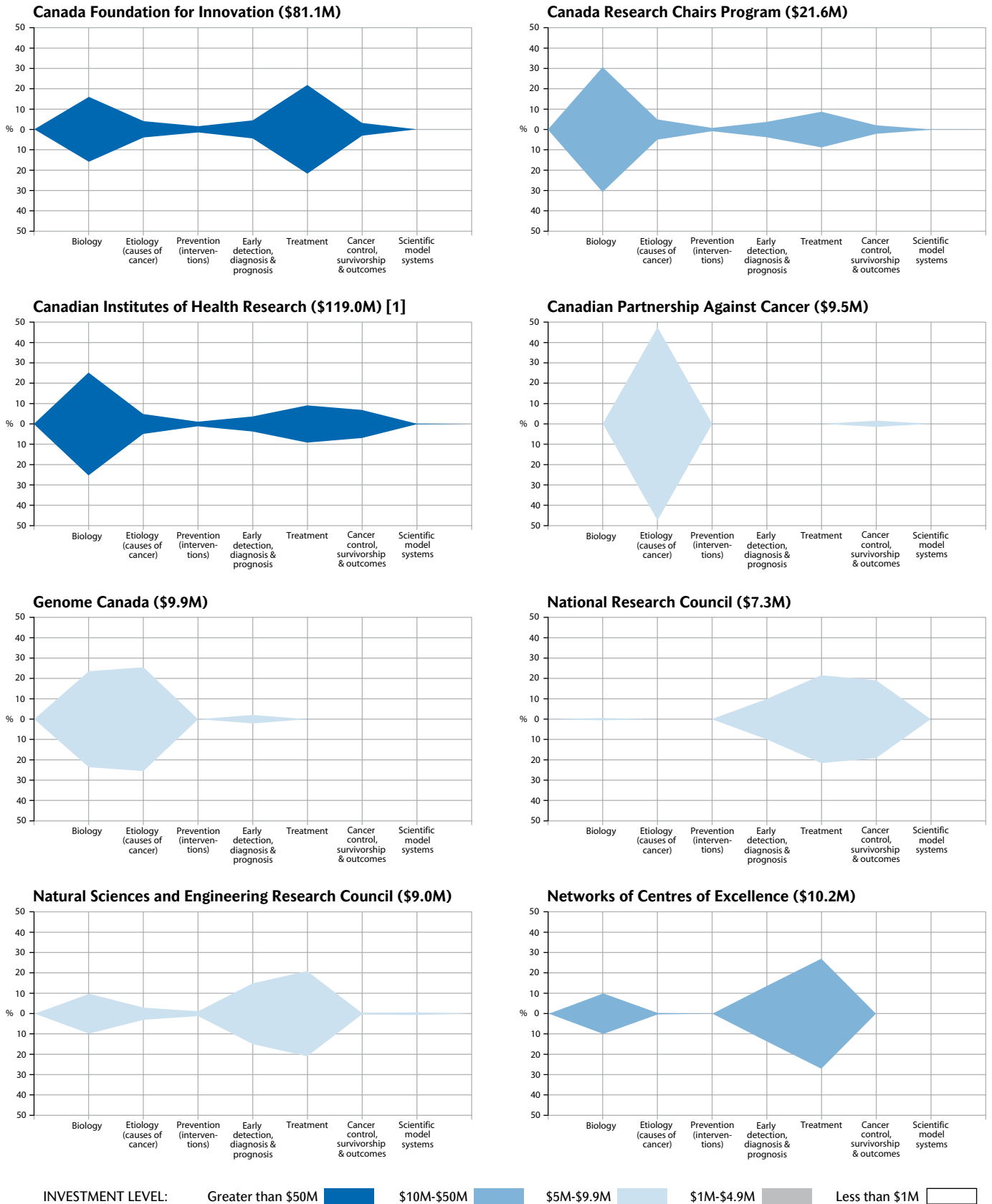
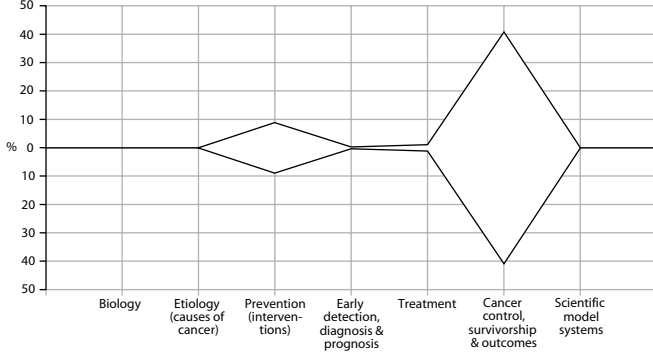


FIGURE 3.2.2

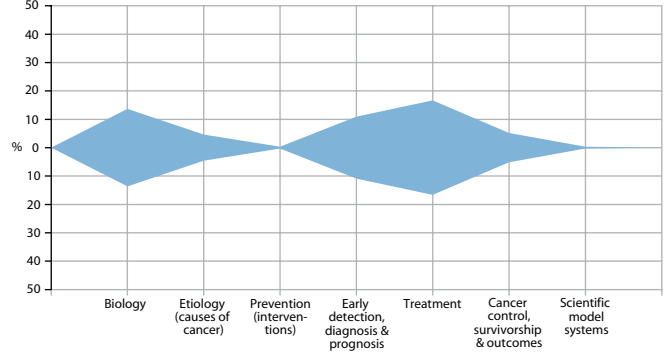
DISTRIBUTION OF 2008 CANCER RESEARCH INVESTMENT FOR PARTICIPATING ORGANIZATIONS BY CSO CATEGORY



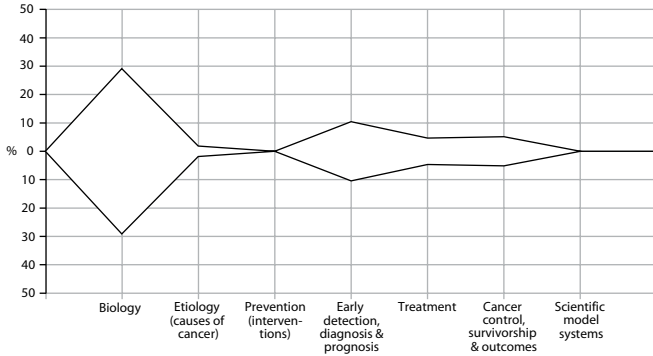
**Social Sciences and Humanities Research Council (\$0.8M)**



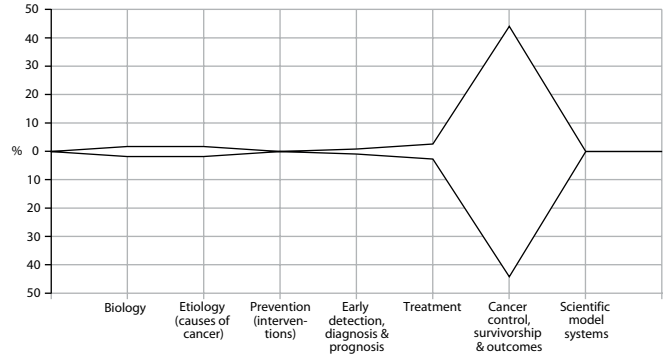
**Alberta Health Services – Cancer Care (\$20.8M)**



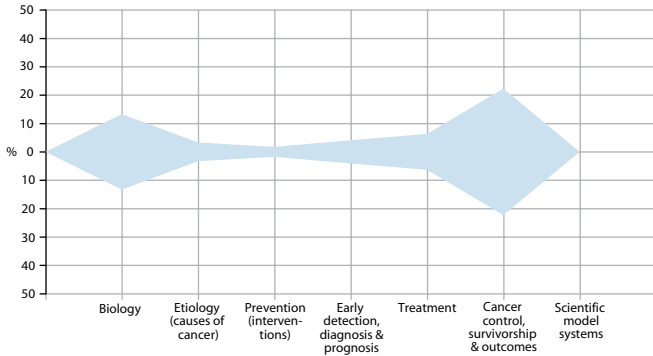
**CancerCare Manitoba (\$0.8M)**



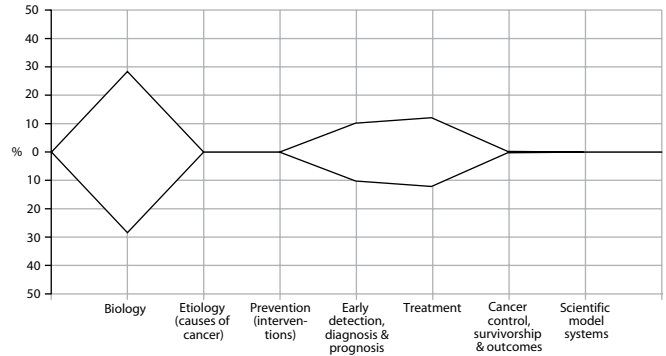
**Cancer Care Nova Scotia (\$0.1M)**



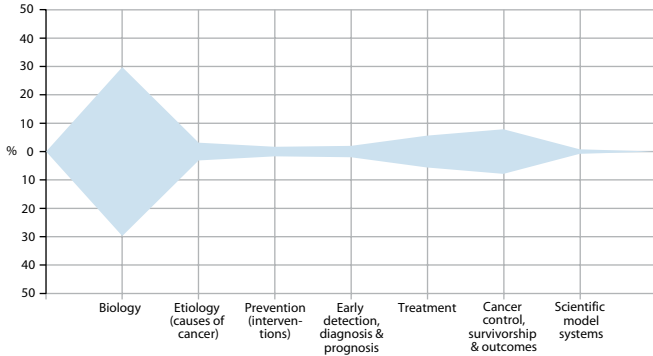
**Cancer Care Ontario (\$6.3M)**



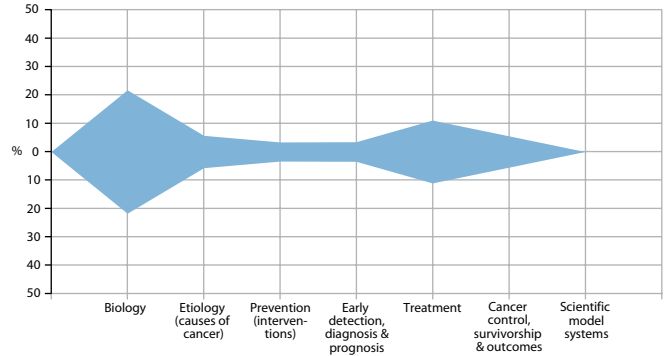
**Saskatchewan Cancer Agency (\$0.4M)**



**Alberta Innovates – Health Solutions (\$6.0M)**

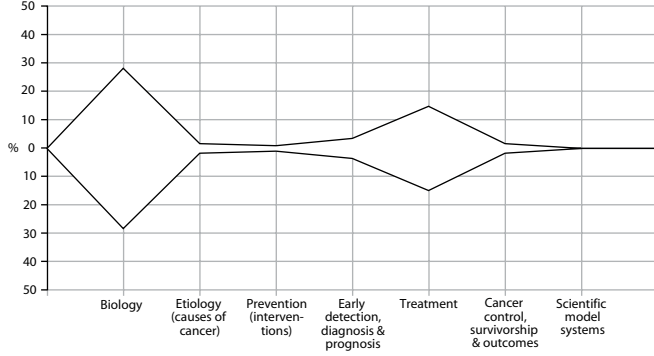


**Fonds de la recherche en santé du Québec (\$10.0M)**

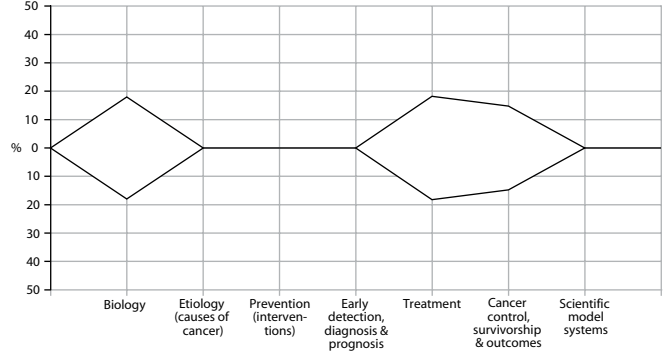


INVESTMENT LEVEL: Greater than \$50M  \$10M-\$50M  \$5M-\$9.9M  \$1M-\$4.9M  Less than \$1M

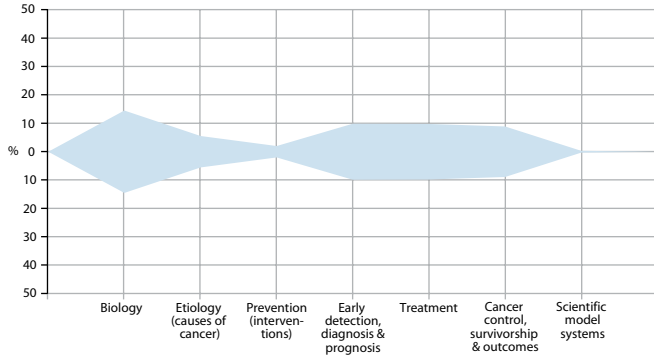
**Manitoba Health Research Council (\$0.9M)**



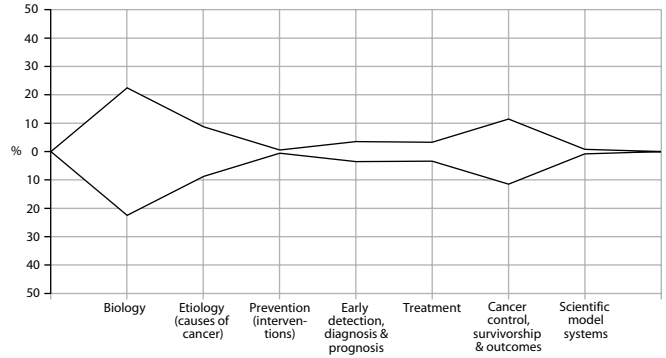
**Medical Research Fund of New Brunswick (\$52,322)**



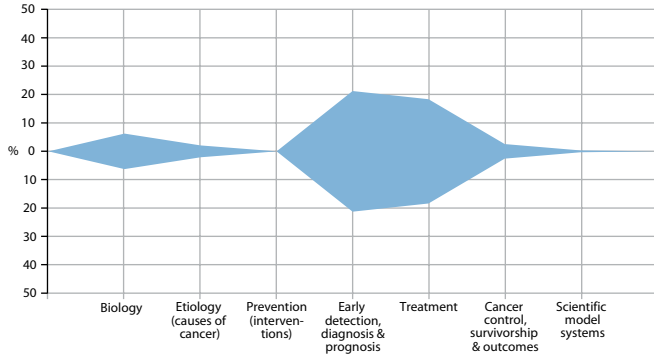
**Michael Smith Foundation for Health Research (\$8.5M)**



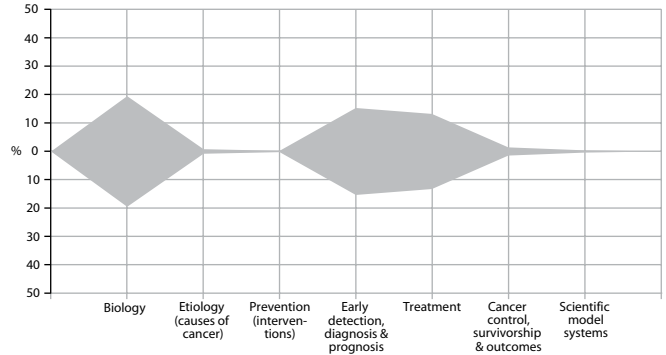
**Nova Scotia Health Research Foundation (\$0.5M)**



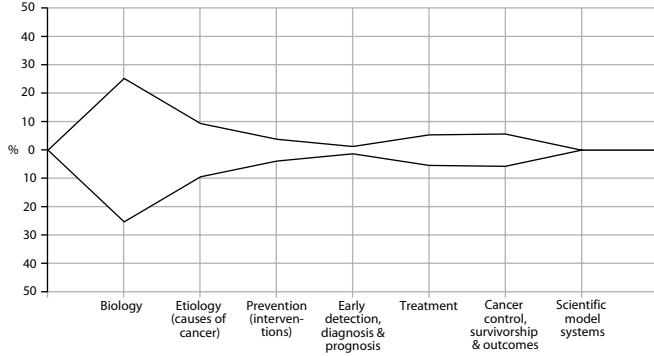
**Ontario Institute for Cancer Research (\$26.6M)**



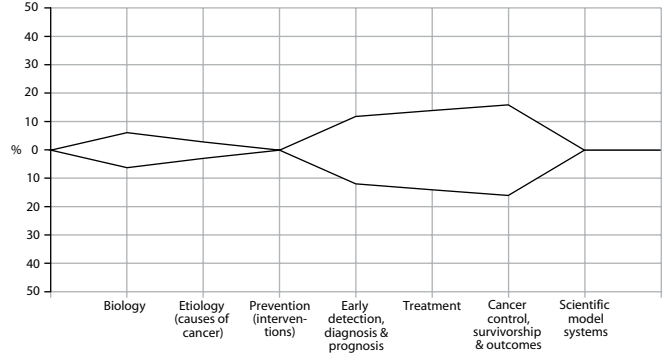
**Ontario Ministry of Research and Innovation (\$4.0M)**



**Saskatchewan Health Research Foundation (\$0.4M)**

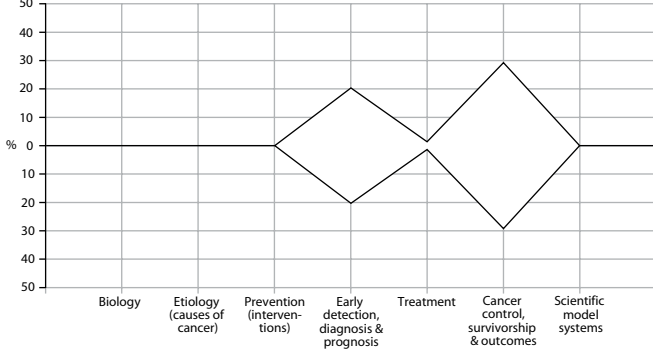


**Brain Tumour Foundation of Canada (\$0.4M)**

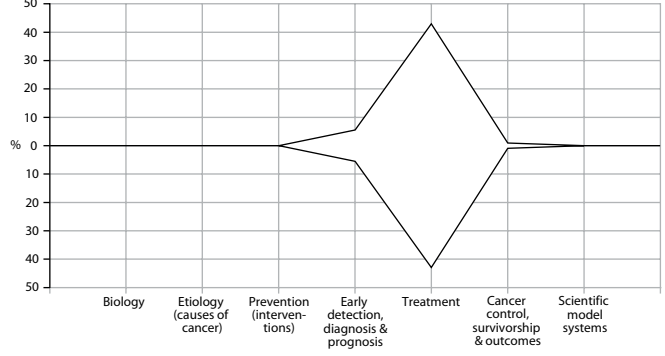


INVESTMENT LEVEL: Greater than \$50M  \$10M-\$50M  \$5M-\$9.9M  \$1M-\$4.9M  Less than \$1M

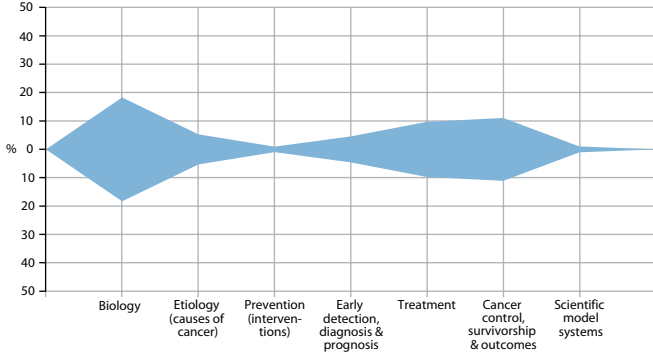
**C<sup>17</sup> Research Network (\$0.3M)**



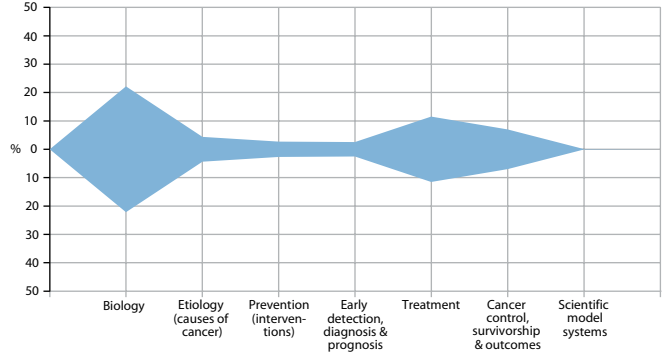
**Canadian Association of Radiation Oncology (\$0.2M)**



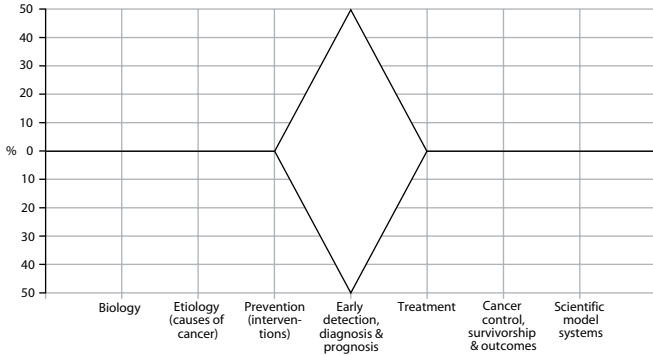
**Canadian Breast Cancer Foundation (\$11.0M) [1]**



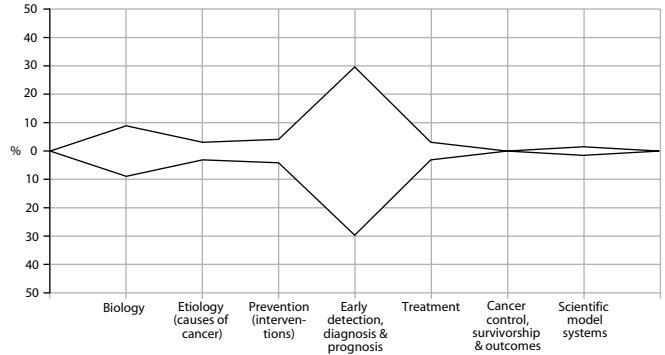
**Canadian Cancer Society (\$45.5M) [1]**



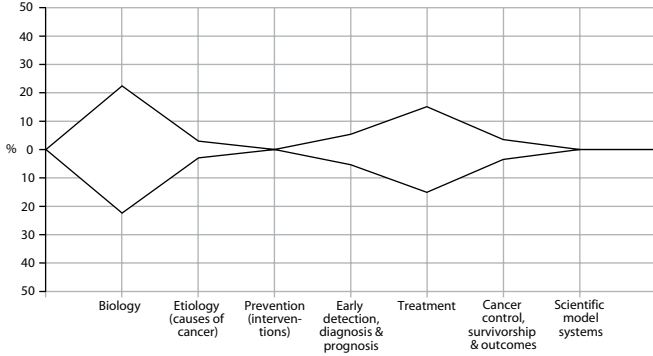
**Canary Foundation of Canada (\$0.5M)**



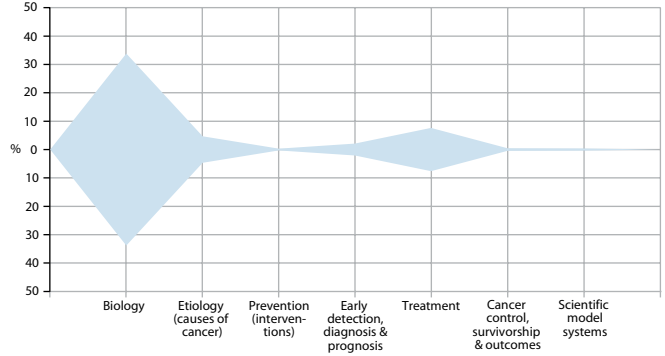
**Ovarian Cancer Canada (\$0.3M)**



**Prostate Cancer Canada (\$0.9M)**

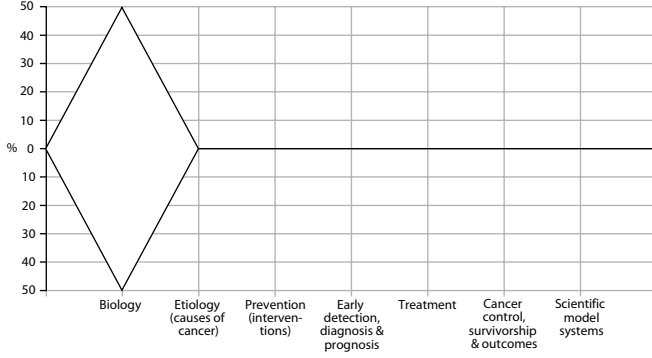


**The Cancer Research Society (\$6.4M) [1]**

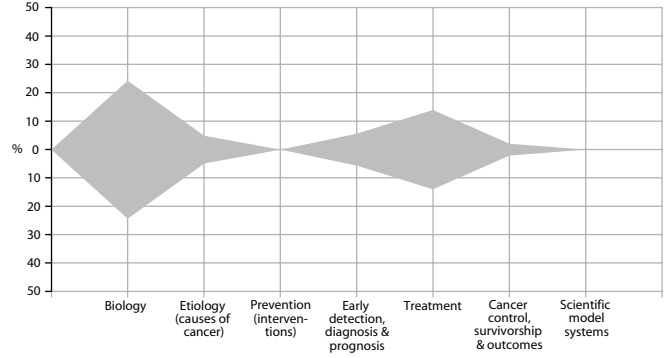


INVESTMENT LEVEL: Greater than \$50M  \$10M-\$50M  \$5M-\$9.9M  \$1M-\$4.9M  Less than \$1M

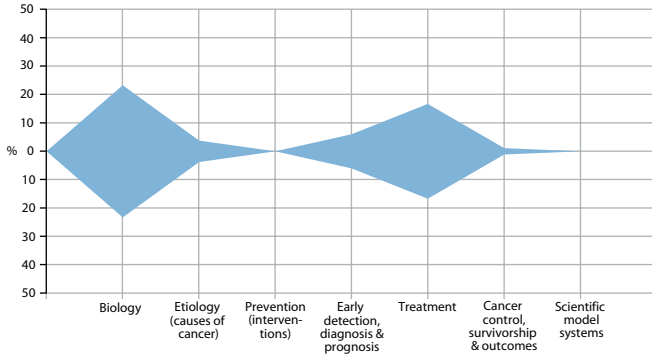
**The Kidney Foundation of Canada (\$0.2M)**



**The Leukemia & Lymphoma Society of Canada (\$1.5M)**

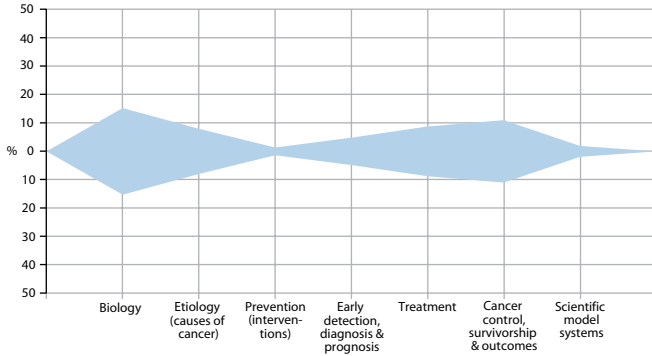


**The Terry Fox Foundation (\$21.2M)**

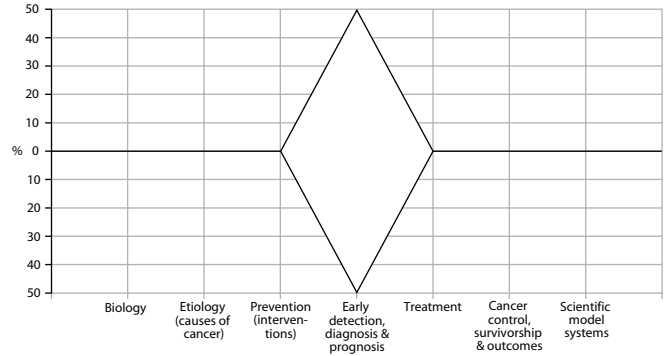


**MULTI-FUNDED INITIATIVES**

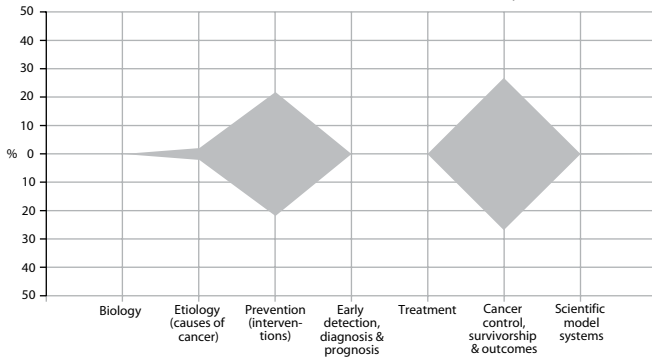
**Canadian Breast Cancer Research Alliance (\$8.7M)**



**Canadian Prostate Cancer Research Initiative (\$0.3M)**



**Canadian Tobacco Control Research Initiative (\$2.2M)**



INVESTMENT LEVEL: Greater than \$50M [Greater than \$50M color] \$10M-\$50M [Blue color] \$5M-\$9.9M [Light blue color] \$1M-\$4.9M [Lightest blue color] Less than \$1M [White color]

[1] Distributions shown for CIHR, CBCF, CCS, and CRS include investments in initiatives; thus total dollars shown in parentheses will add to more than \$445.3M.

TABLE 3.2.1

**DISTRIBUTION OF 2008 CANCER RESEARCH INVESTMENT BY CSO CODES**

CSO Category	CSO Code [1]	2008 Investment	% Total Investment	% Category Investment
<b>1 - BIOLOGY</b> \$169,736,912 38.1%	1.1 - Normal functioning	\$61,067,093	13.69	35.98
	1.2 - Cancer initiation: alterations in chromosomes	\$10,734,366	2.41	6.32
	1.3 - Cancer initiation: oncogenes and tumour suppressor genes	\$48,509,631	10.87	28.58
	1.4 - Cancer progression and metastasis	\$27,583,968	6.18	16.25
	1.5 - Resources and infrastructure	\$21,841,854	4.90	12.87
<b>2 - ETIOLOGY (CAUSES OF CANCER)</b> \$48,849,506 11.0%	2.1 - Exogenous factors [2] in the origin and cause of cancer	\$17,549,020	3.93	35.92
	2.2 - Endogenous factors [3] in the origin and cause of cancer	\$19,892,638	4.46	40.72
	2.3 - Interactions of genes and/or genetic polymorphisms [4] with exogenous and/or endogenous factors	\$4,725,856	1.06	9.67
	2.4 - Resources and infrastructure	\$6,681,992	1.50	13.68
<b>3 - PREVENTION (INTERVENTIONS)</b> \$10,155,576 2.3%	3.1 - Interventions to prevent cancer: personal behaviours that affect cancer risk	\$4,305,938	0.97	42.40
	3.2 - Nutritional science in cancer prevention	\$828,858	0.19	8.16
	3.3 - Chemoprevention	\$861,039	0.19	8.48
	3.4 - Vaccines	\$694,641	0.16	6.84
	3.5 - Complementary and alternative prevention approaches	\$318,671	0.07	3.14
	3.6 - Resources and infrastructure	\$3,146,429	0.71	30.98
<b>4 - EARLY DETECTION, DIAGNOSIS &amp; PROGNOSIS</b> \$52,069,988 11.7%	4.1 - Technology development and/or marker discovery	\$20,169,171	4.52	38.73
	4.2 - Technology and/or marker evaluation with respect to fundamental parameters of method	\$10,368,436	2.32	19.91
	4.3 - Technology and/or marker testing in a clinical setting	\$6,861,085	1.54	13.18
	4.4 - Resources and infrastructure	\$14,671,295	3.29	28.18
<b>5 - TREATMENT</b> \$117,391,216 26.3%	5.1 - Localized therapies [5] – discovery and development	\$8,112,418	1.82	6.91
	5.2 - Localized therapies – clinical applications	\$3,851,734	0.86	3.28
	5.3 - Systemic therapies [6] – discovery and development	\$66,472,651	14.90	56.62
	5.4 - Systemic therapies – clinical applications	\$7,309,041	1.64	6.23
	5.5 - Combinations of localized and systemic therapies	\$709,106	0.16	0.60
	5.6 - Complementary and alternative treatment approaches	\$247,623	0.06	0.21
	5.7 - Resources and infrastructure	\$30,688,642	6.88	26.14
<b>6 - CANCER CONTROL, SURVIVORSHIP &amp; OUTCOMES</b> \$46,566,282 10.3%	6.1 - Patient care and survivorship issues	\$11,120,103	2.49	23.88
	6.2 - Surveillance	\$2,787,237	0.62	5.99
	6.3 - Behaviour	\$5,598,158	1.25	12.02
	6.4 - Cost analyses and health care delivery	\$10,265,495	2.30	22.04
	6.5 - Education and communication	\$2,143,857	0.48	4.60
	6.6 - End-of-life care	\$3,322,912	0.74	7.14
	6.7 - Ethics and confidentiality in cancer research	\$372,852	0.08	0.80
	6.8 - Complementary and alternative approaches for supportive care of patients and survivors	\$346,008	0.08	0.74
	6.9 - Resources and infrastructure	\$10,609,659	2.38	22.78
<b>7 - SCIENTIFIC MODEL SYSTEMS</b> \$1,412,430 0.3%	7.1 - Development and characterization of model systems [7]	\$1,254,180	0.28	88.80
	7.2 - Application of model systems	\$0	0.00	0.00
	7.3 - Resources and infrastructure	\$158,249	0.04	11.20

[1] For a full description of the CSO codes, please refer to <http://www.cancerportfolio.org/cso.jsp>.

[2] Exogenous (originating outside) factors: Lifestyle and environmental factors, and infectious agents like viruses and bacteria that are involved in the origins and causes of cancer.

[3] Endogenous (originating within) factors: Internal factors such as free radicals and genetic factors that are involved in the origins and causes of cancer.

[4] Polymorphisms: Mutations or common variations in a person's DNA.

[5] Localized treatments: Treatments that are administered locally (such as radiotherapy and surgery).

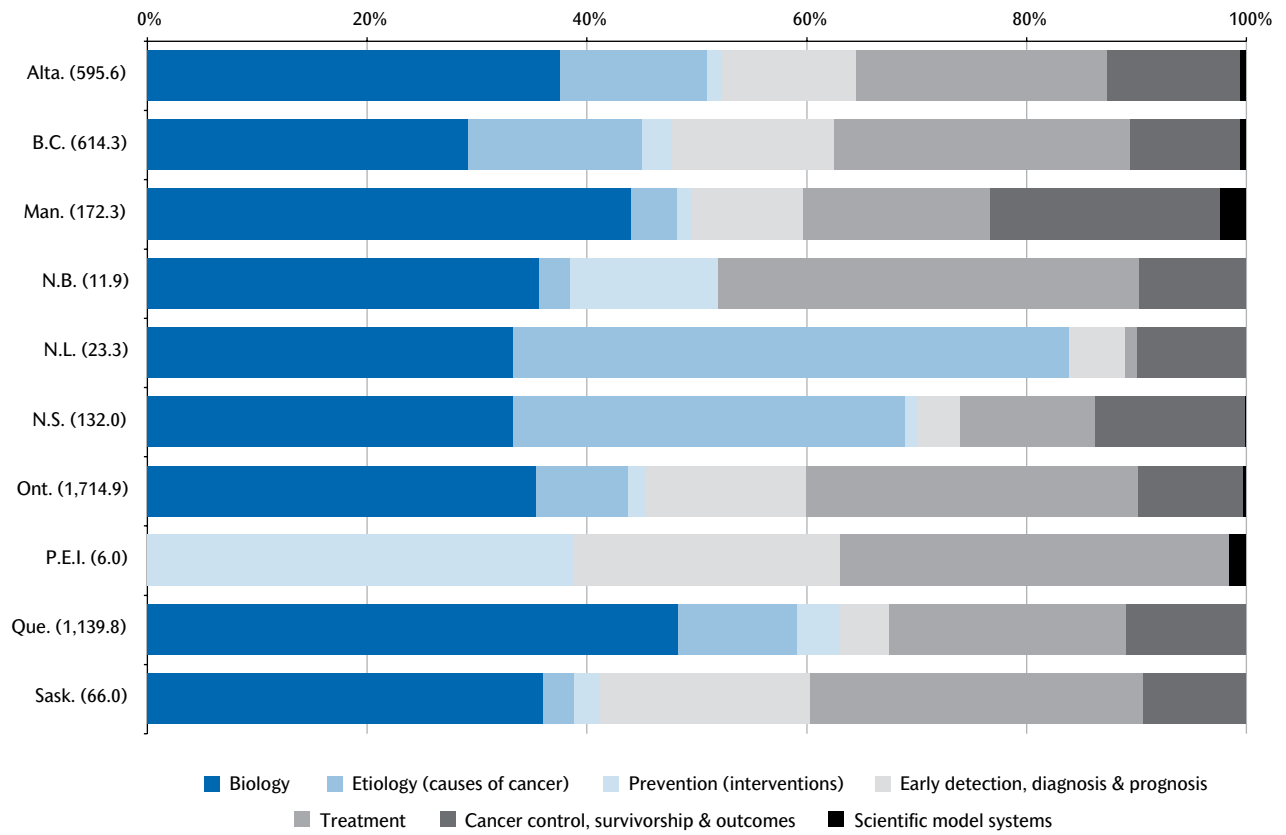
[6] Systemic treatments: Treatments that are administered throughout the body (such as drugs).

[7] Model systems: Specially developed animals, cell cultures, and computer simulations that are used to study cancer processes.



FIGURE 3.2.3

**DISTRIBUTION OF 2008 CANCER RESEARCH INVESTMENT FOR PROVINCE OF PI/PL BY CSO CATEGORY (\$442.6M) [1]**



[1] Project equivalents (weighted project count) shown in parentheses beside province names.

### 3.3 CANCER SITES

A detailed breakdown of the 2008 investment by cancer site is provided in Table 3.3.1. Just over half (51.3%) of the investment was not site specific (i.e., applicable to all cancers). Breast cancer (\$62.4M), leukemia (\$24.3M) and prostate cancer (\$21.2M) had the greatest share of the site-specific investment. While the federal government investment accounted for the majority of individual site-specific investments (Table 3.3.2), the voluntary sector, although representing less than one-third of the federal government investment, accounted for the highest proportionate investment in Hodgkin's disease (57.1%) and cancers of the pancreas (49.2%), and uterus (43.3%).

In terms of how the investment relates to indicators of burden of disease (see sidebar on next page for definitions), Figure 3.3.1 shows the proportion of site-specific cancer research investment relative to the distribution of new cases, cancer deaths, and persons with cancer (based on the 10-year prevalence). The bubble chart (Figure 3.3.2) shows the eight cancers with the highest combined proportions of new cases and deaths in terms of the proportion of the cancer research investment (x-axis), estimated five-year survival ratio (y-axis), and number of new cases (bubble size). For many other cancers, including high incidence cancers such as lung, colorectal, and prostate, the research investment was not commensurate with the burden of disease.

Kite diagrams are presented for the eight cancers with the highest combined proportions of new cases and deaths in Figure 3.3.3. Each site-specific distribution is quite unique, reflecting differing research emphases which may be a consequence of the state of scientific knowledge about that cancer.

## BURDEN OF CANCER INDICATORS

Burden of cancer refers to the health burden that cancer places on the population. There are many indicators used to assess health burden. In this report, we are using the following four.

**New cancer cases:** the number of cases of cancer newly diagnosed during a defined time period and location. This is a count of cancer diagnoses, and not persons with cancer. For example, two new cancer cases would be counted for one man who is diagnosed with cancers of the esophagus and stomach during the same period. In this report, we are using new cancer cases for the year 2007, which is the latest year for which actual data are available. New cancer cases may also be referred to as cancer incidence.

**Cancer deaths:** the number of deaths attributed to a particular type of cancer during a defined time period and location. In this report, we are using cancer deaths from the year 2007, which is the latest year for which actual data are available. Cancer deaths may also be referred to as cancer mortality.

**Cancer prevalence:** the number of people still alive who were diagnosed with a particular cancer in a given timeframe. In this report, we are using data on the number of people alive on January 1, 2005 who were diagnosed with cancer in the previous ten years.

**Relative survival ratio (RSR):** a measure of the proportion of people in a given population dying from cancer in excess to that of the general population with the same characteristics in terms of age, sex, and province. In this report, we are using five-year relative survival, which is a widely used standard for reporting site-specific cancer survival. In site-specific comparisons of RSR, lead time (the time between diagnosis and death) is an important consideration. For example, the over-diagnosis associated with prostate antigen (PSA) testing for prostate cancer biases the survival ratio upward so it appears higher than it would be if over-diagnosis did not exist. Widespread mammography screening also adds lead time, but it has been reported to have a much smaller effect on RSR than that associated with the PSA.<sup>1</sup> The addition of staging data to the cancer registry systems in Canada, work currently underway through the Staging Initiative of the Surveillance Advisory Group of the Canadian Partnership Against Cancer,<sup>2</sup> will provide valuable information to address this bias.

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1. Dickman PW & Adami H-O. (2006). Interpreting trends in cancer patient survival. *Journal of Internal Medicine*, 260:103-107.

2. See <http://www.partnershipagainstcancer.ca/priorities/surveillance/strategic-initiatives/staging-initiative/>.

TABLE 3.3.1

## 2008 CANCER RESEARCH INVESTMENT BY CANCER SITE AND FUNDER SECTOR [1]

CANCER SITE	GOVERNMENT						VOLUNTARY		MULTI-FUNDED		TOTAL	
	Federal		Provincial Cancer Agency		Provincial Health Research Organization							
	2008 Investment	%	2008 Investment	%	2008 Investment	%	2008 Investment	%	2008 Investment	%	2008 Investment	%
Bladder	\$512,407	0.19	\$79,931	0.28	\$325,503	0.57	\$352,394	0.43	\$0	0.00	\$1,270,235	0.28
Bone and connective tissue	\$1,110,536	0.42	\$80,949	0.29	\$435,096	0.76	\$622,316	0.75	\$0	0.00	\$2,248,896	0.50
Brain	\$12,160,841	4.56	\$1,367,819	4.82	\$1,824,872	3.20	\$4,455,814	5.38	\$0	0.00	\$19,809,345	4.44
Breast	\$27,272,404	10.22	\$4,588,985	16.18	\$5,736,653	10.07	\$16,357,869	19.75	\$8,416,956	75.19	\$62,372,867	13.98
Cervix	\$2,681,108	1.00	\$86,911	0.31	\$840,999	1.48	\$1,250,542	1.51	\$0	0.00	\$4,859,560	1.09
Colorectal	\$9,306,036	3.49	\$564,197	1.99	\$1,049,664	1.84	\$3,254,506	3.93	\$0	0.00	\$14,174,404	3.18
Esophagus	\$1,059,390	0.40	\$12,273	0.04	\$151,322	0.27	\$266,166	0.32	\$319,599	2.85	\$1,808,750	0.41
Gallbladder	\$0	0.00	\$0	0.00	\$8,925	0.02	\$6,404	0.01	\$0	0.00	\$15,329	0.00
Hodgkin's disease	\$242,216	0.09	\$50,000	0.18	\$14,632	0.03	\$408,398	0.49	\$0	0.00	\$715,246	0.16
Kidney	\$1,301,186	0.49	\$74,534	0.26	\$55,604	0.10	\$1,245,482	1.50	\$0	0.00	\$2,676,806	0.60
Larynx	\$506,651	0.19	\$0	0.00	\$122,712	0.22	\$112,115	0.14	\$320,149	2.86	\$1,061,627	0.24
Leukemia	\$15,890,293	5.96	\$185,841	0.66	\$2,666,596	4.68	\$5,543,089	6.69	\$0	0.00	\$24,285,820	5.44
Liver	\$2,068,988	0.78	\$36,042	0.13	\$474,497	0.83	\$1,076,663	1.30	\$0	0.00	\$3,656,190	0.82
Lung	\$6,124,268	2.30	\$465,039	1.64	\$2,134,174	3.75	\$4,833,495	5.84	\$1,145,231	10.23	\$14,702,208	3.30
Multiple myeloma	\$1,411,190	0.53	\$544,771	1.92	\$177,560	0.31	\$1,230,467	1.49	\$0	0.00	\$3,363,987	0.75
Non-Hodgkin's lymphoma	\$6,196,230	2.32	\$301,685	1.06	\$960,633	1.69	\$3,320,904	4.01	\$0	0.00	\$10,779,452	2.42
Oral	\$2,049,833	0.77	\$157,281	0.55	\$1,002,070	1.76	\$895,541	1.08	\$320,716	2.86	\$4,425,441	0.99
Ovary	\$3,603,158	1.35	\$106,175	0.37	\$1,000,681	1.76	\$1,887,523	2.28	\$241,540	2.16	\$6,839,077	1.53
Pancreas	\$701,016	0.26	\$8,542	0.03	\$117,904	0.21	\$800,580	0.97	\$0	0.00	\$1,628,042	0.36
Prostate	\$10,930,074	4.10	\$267,880	0.94	\$2,811,184	4.93	\$6,960,875	8.40	\$246,942	2.21	\$21,216,954	4.76
Skin	\$1,822,215	0.68	\$217,753	0.77	\$572,443	1.00	\$1,614,890	1.95	\$0	0.00	\$4,227,301	0.95
Stomach	\$544,791	0.20	\$0	0.00	\$117,819	0.21	\$312,920	0.38	\$0	0.00	\$975,531	0.22
Thyroid	\$469,167	0.18	\$0	0.00	\$105,999	0.19	\$144,991	0.18	\$0	0.00	\$720,157	0.16
Uterus	\$500,993	0.19	\$114,040	0.40	\$156,365	0.27	\$589,563	0.71	\$0	0.00	\$1,360,962	0.31
Other sites	\$4,353,967	1.63	\$464,158	1.64	\$472,383	0.83	\$2,662,900	3.21	\$0	0.00	\$7,953,408	1.78
Non-specific/All sites	\$154,002,310	57.72	\$18,579,287	65.53	\$33,648,173	59.05	\$22,621,262	27.31	\$183,285	1.64	\$229,034,316	51.33
<b>TOTAL</b>	<b>\$266,821,269</b>	<b>100</b>	<b>\$28,354,090</b>	<b>100</b>	<b>\$56,984,463</b>	<b>100</b>	<b>\$82,827,668</b>	<b>100</b>	<b>\$11,194,419</b>	<b>100</b>	<b>\$446,181,909</b>	<b>100</b>

[1] Refers to the sector of the organization that administered the funding program.

TABLE 3.3.2

**DISTRIBUTION OF 2008 CANCER RESEARCH INVESTMENT FOR EACH CANCER SITE BY FUNDER SECTOR [1]**

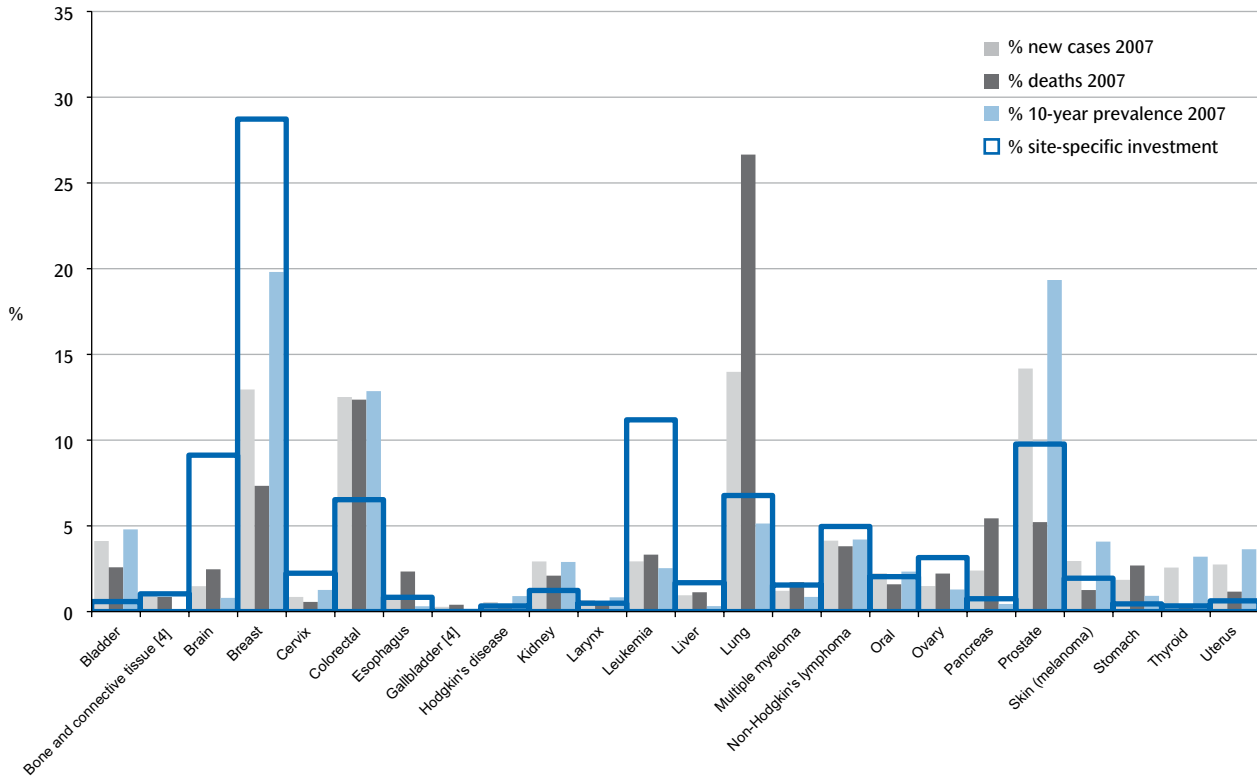
CANCER SITE	\$	%					
		GOVERNMENT			VOLUNTARY	MULTI-FUNDED	TOTAL [2]
		Federal	Provincial Cancer Agency	Provincial Health Research Organization			
Bladder	\$1,270,235	40.3	6.3	25.6	27.7	0.0	100
Bone and connective tissue	\$2,248,896	49.4	3.6	19.3	27.7	0.0	100
Brain	\$19,809,345	61.4	6.9	9.2	22.5	0.0	100
Breast	\$62,372,867	43.7	7.4	9.2	26.2	13.5	100
Cervix	\$4,859,560	55.2	1.8	17.3	25.7	0.0	100
Colorectal	\$14,174,404	65.7	4.0	7.4	23.0	0.0	100
Esophagus	\$1,808,750	58.6	0.7	8.4	14.7	17.7	100
Gallbladder	\$15,329	0.0	0.0	58.2	41.8	0.0	100
Hodgkin's disease	\$715,246	33.9	7.0	2.0	57.1	0.0	100
Kidney	\$2,676,806	48.6	2.8	2.1	46.5	0.0	100
Larynx	\$1,061,627	47.7	0.0	11.6	10.6	30.2	100
Leukemia	\$24,285,820	65.4	0.8	11.0	22.8	0.0	100
Liver	\$3,656,190	56.6	1.0	13.0	29.4	0.0	100
Lung	\$14,702,208	41.7	3.2	14.5	32.9	7.8	100
Multiple myeloma	\$3,363,987	41.9	16.2	5.3	36.6	0.0	100
Non-Hodgkin's lymphoma	\$10,779,452	57.5	2.8	8.9	30.8	0.0	100
Oral	\$4,425,441	46.3	3.6	22.6	20.2	7.2	100
Ovary	\$6,839,077	52.7	1.6	14.6	27.6	3.5	100
Pancreas	\$1,628,042	43.1	0.5	7.2	49.2	0.0	100
Prostate	\$21,216,954	51.5	1.3	13.2	32.8	1.2	100
Skin	\$4,227,301	43.1	5.2	13.5	38.2	0.0	100
Stomach	\$975,531	55.8	0.0	12.1	32.1	0.0	100
Thyroid	\$720,157	65.1	0.0	14.7	20.1	0.0	100
Uterus	\$1,360,962	36.8	8.4	11.5	43.3	0.0	100

[1] Refers to the sector of the organization that administered the funding program.

[2] Project equivalents per cancer site ranged from 3 to 808.

FIGURE 3.3.1

**DISTRIBUTION OF 2008 SITE-SPECIFIC CANCER RESEARCH INVESTMENT (\$217.1M)  
BY NEW CANCER CASES IN 2007 [1], CANCER DEATHS IN 2007 [2], AND 10-YEAR  
PREVALENCE RATES [3]**



[1] Source for new cancer cases: CANSIM Table 103-0550 New cases for ICD-O-3 primary sites of cancer (based on the July 2010 CCR tabulation file), by age group and sex, Canada, provinces and territories, annual. Canadian Cancer Registry - 3207.

[2] Source for cancer deaths: CANSIM Table 102-0522 Deaths, by causes, Chapter II: Neoplasms (C00 to D48), age group and sex, Canada, annual (number). Vital Statistics - Death Database - 3223.

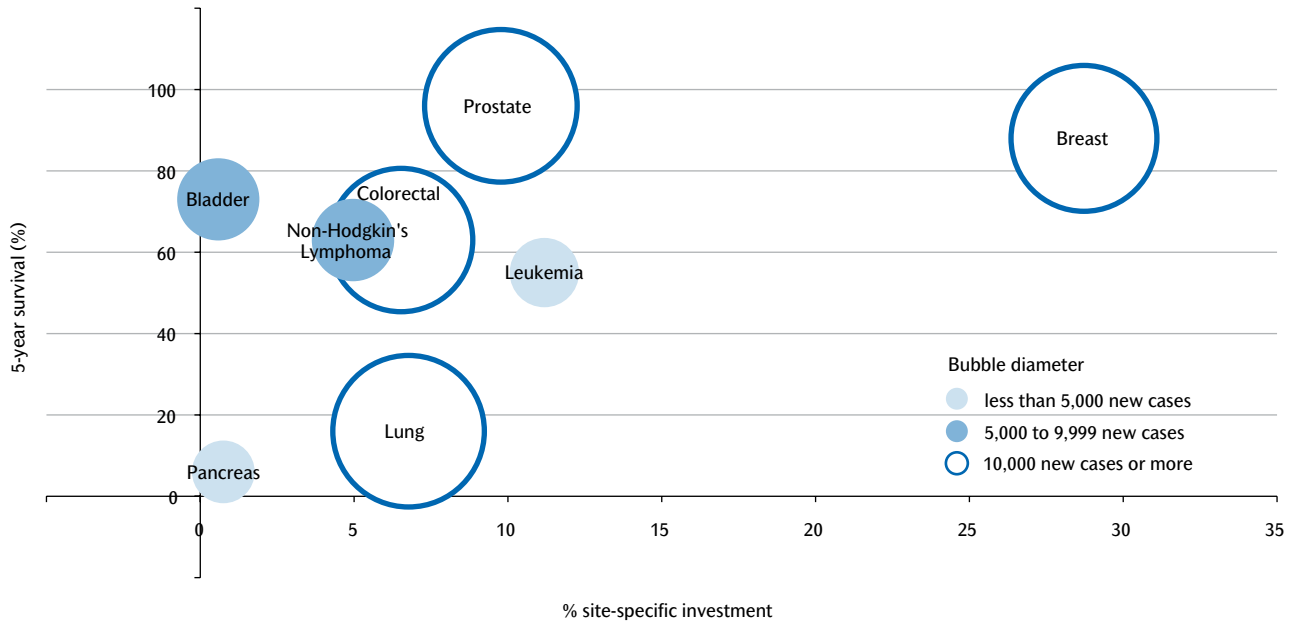
[3] Represents site-specific prevalence for patients diagnosed with cancer since 1997 who were alive on January 1, 2007. Data are available from Canadian Cancer Society's Steering Committee on Cancer Statistics, *Canadian Cancer Statistics, 2011* (Toronto, Canadian Cancer Society, 2011).

[4] Prevalence data were not available for gallbladder and bone and connective tissue cancers.

FIGURE 3.3.2

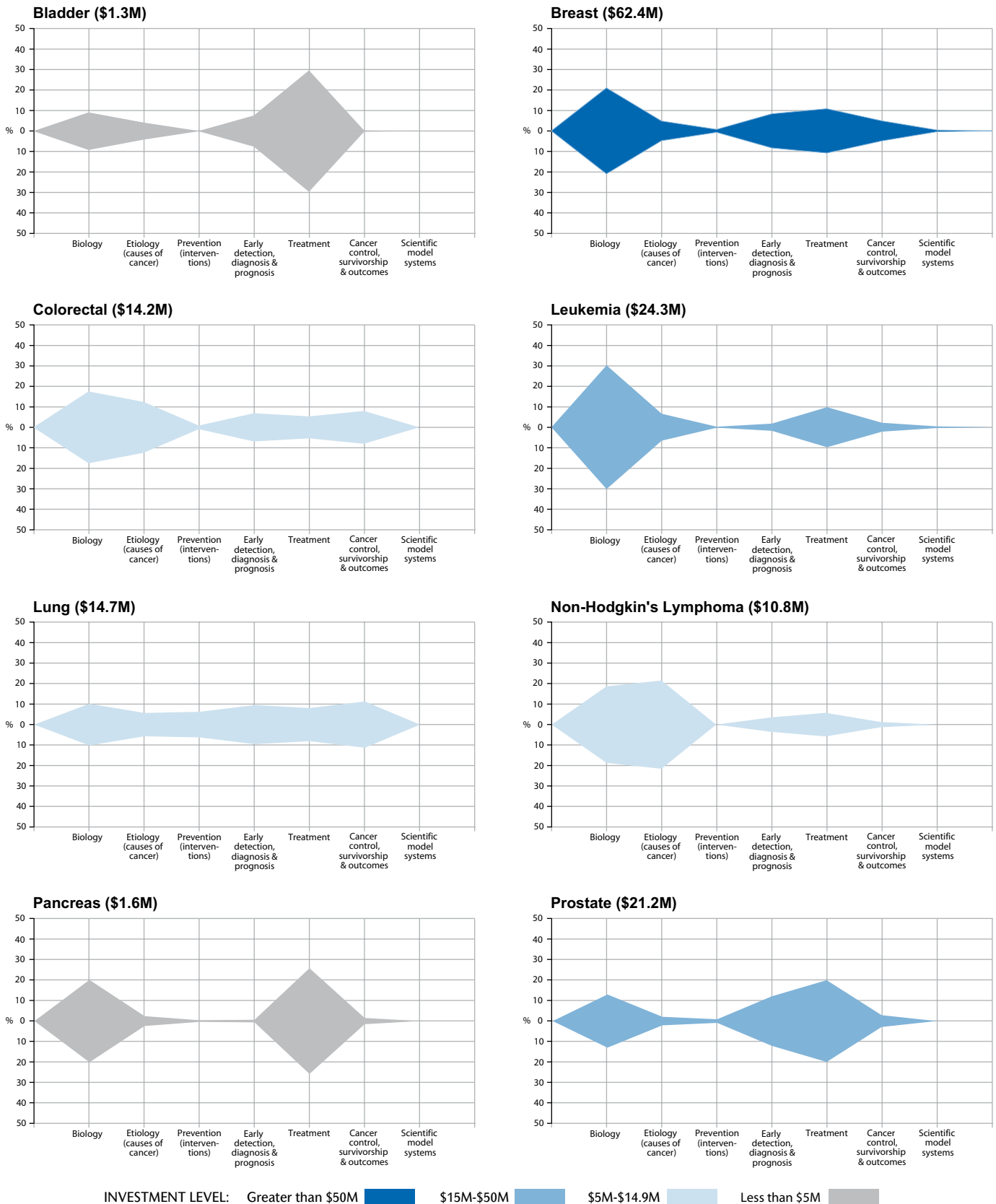
**DISTRIBUTION OF 2008 SITE-SPECIFIC CANCER RESEARCH INVESTMENT FOR SELECTED CANCER SITES [1] BY FIVE-YEAR ESTIMATED SURVIVAL RATIO [2] AND NUMBER OF NEW CASES IN 2007 [3]**

5-year survival (%)	High survival & low investment	High survival & high investment
	Low survival & low investment	Low survival & high investment
% site-specific investment		



[1] Represents cancers with the highest combined proportions of new cases and deaths.  
 [2] Predicted five-year relative survival ratios by the population aged 15 to 99 at diagnosis, Canada excluding Quebec, 2004 to 2006. See: Ellison, LF & Wilkins, K. (2010). An update on cancer survival. *Health Reports*, 21(3), 55–60. Statistics Canada, Catalogue no 82-003-XPE.  
 [3] CANSIM Table 103-0550 New cases for ICD-O-3 primary sites of cancer (based on the July 2010 CCR tabulation file), by age group and sex, Canada, provinces and territories, annual. Canadian Cancer Registry - 3207.

**FIGURE 3.3.3**  
**DISTRIBUTION OF 2008 CANCER RESEARCH INVESTMENT FOR SELECTED CANCER SITES [1] BY CSO CATEGORY**



[1] Represents cancers with the highest combined proportions of new cases and deaths.



### 3.4 FUNDING MECHANISMS

In this section, selected data relating to investment by the six different funding mechanisms (see Figure 3.4.1) is provided. For a detailed analysis of the investment data by funding mechanisms, readers are encouraged to consult the 2006 report. Within this section, the reader is reminded that the database contains projects which were funded on the basis of peer reviewed processes. Thus, it likely captures much of the operating funding received by PIs, but only a portion of career, equipment/infrastructure, trainee and institutional support, which may come from other sources (e.g., universities, hospital foundations, etc.).

Figure 3.4.2 shows the total 2008 investment by funder sector in dollars. Over half of the overall investment (52.0%, \$232.1M) was for operating grants/direct research support. The federal government sector investment was the largest regardless of funding mechanism and represented most of the investment in operating grants and equipment/infrastructure grants.

Distribution of the investment by funding mechanism is shown in Figure 3.4.3. Investment by the voluntary and multi-sector organizations was primarily for operating grants (79.4% and 98.6%, respectively). Just over half (50.6%) of the overall investment by the provincial cancer agencies was for equipment/infrastructure grants. Career awards formed a quarter (24.8%) of the overall investment by the provincial health research organizations.

**FIGURE 3.4.1**  
**FUNDING MECHANISMS FOR CANCER RESEARCH**

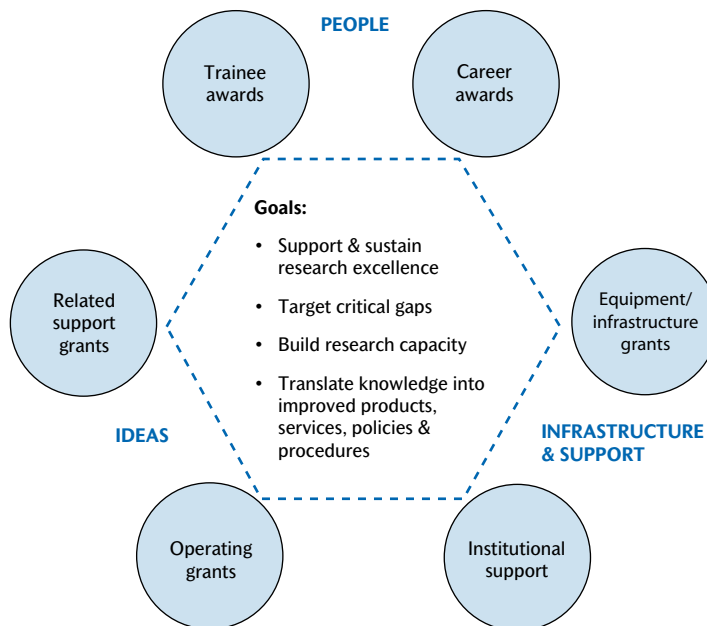


Table 3.4.1 further elaborates the federal government investment, showing it in its entirety without partner dollars. Data released by Statistics Canada<sup>4</sup> reveals that total estimated extramural federal research and development spending for all areas of science was \$4.1B in 2007/08. The federal government cancer research investment, at \$236.6M, represents 5.8% of this total.

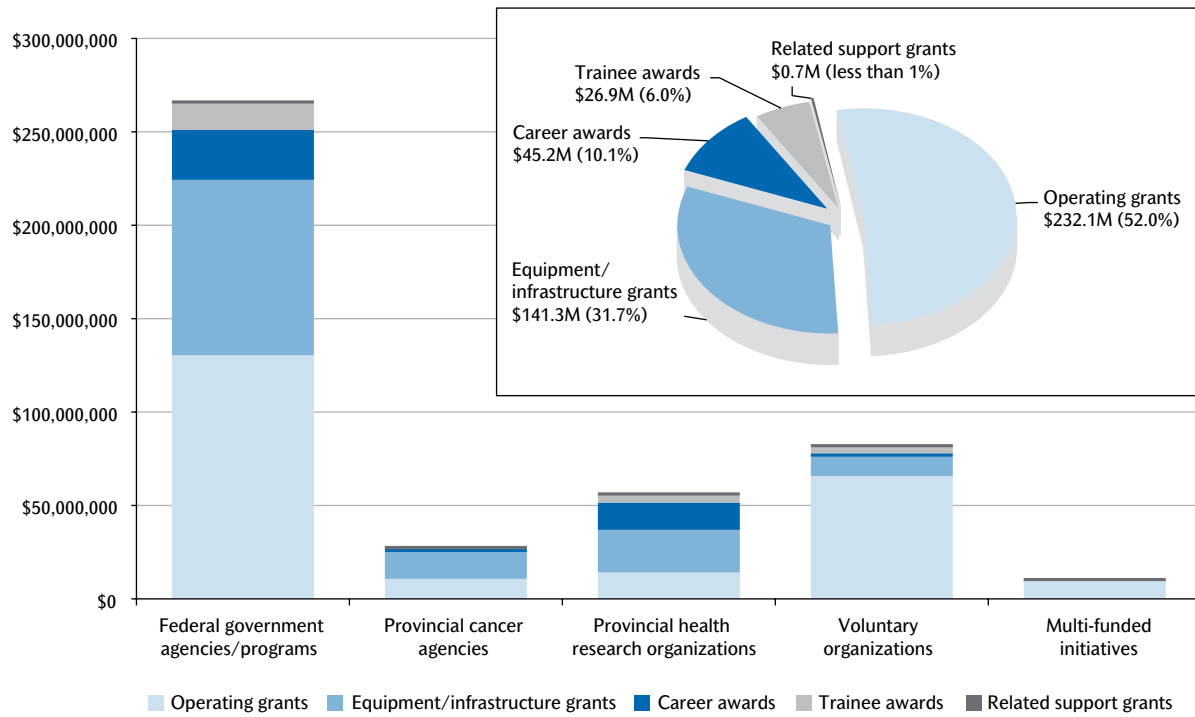
The distribution of funding mechanisms by province of PI/PL is provided in Figure 3.4.4. Operating grants comprised a minimum of 47% of all investments, regardless of province. Investment in equipment/infrastructure grants ranked second for most provinces. The highest proportion of investment in trainee awards was in Manitoba (12.5%) as a result of provincial funding programs.

Individual kite diagrams for funding mechanisms are provided in Figure 3.4.5. The kite diagrams for the operating grants and trainee awards were quite similar. For career awards, the highest proportion of investment was in Biology (51.3%). In contrast, over one-third of the investment in equipment/infrastructure grants (35.1%) was in Treatment. The CSO distribution for related support grants was quite different from the other funding mechanisms, with 31.1% of the investment in Cancer Control, Survivorship & Outcomes, and 8.4% in Prevention. These data are summarized in Figure 3.4.6, which compares the funding mechanisms in terms of their relative investment size.

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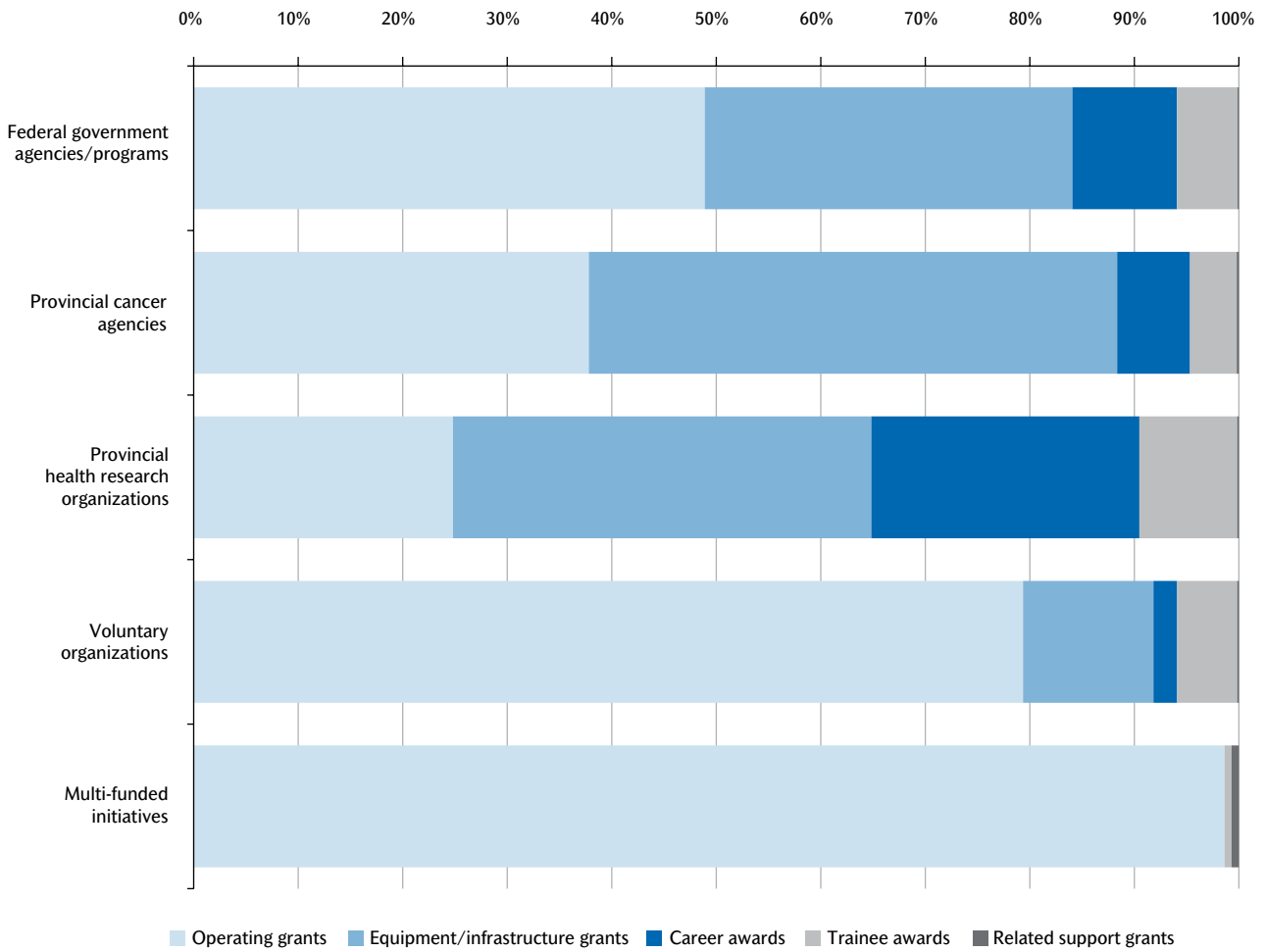
4. Statistics Canada. Federal Government on Scientific Activities, 2009/2010 (Intentions). *Science Statistics*, October 2009, Vol. 33, No. 6. Ottawa: Statistics Canada, Science, Innovation and Electronic Information Division. Catalogue No 88-001-X. Available at <http://www.statcan.gc.ca/pub/88-001-x/88-001-x2009006-eng.pdf>.

**FIGURE 3.4.2**  
**2008 CANCER RESEARCH INVESTMENT BY FUNDING MECHANISM FOR EACH FUNDER SECTOR [1] (\$446.2M)**



[1] Refers to the sector of the organization that administers the funding program.

**FIGURE 3.4.3**  
**DISTRIBUTION OF 2008 CANCER RESEARCH INVESTMENT BY FUNDING MECHANISM**  
**FOR EACH FUNDER SECTOR [1]**



[1] Refers to the sector of the organization that administers the funding program.

TABLE 3.4.1

## 2008 FEDERAL GOVERNMENT CANCER RESEARCH INVESTMENT BY FUNDING MECHANISM

PROGRAM/ ORGANIZATION	FUNDING MECHANISM						TOTAL
	Operating grants	Equipment/ infrastructure grants	Institutional support (indirect costs)	Career awards	Trainee awards [1]	Related support grants	
Canada Foundation for Innovation	–	\$35,548,498	–	–	–	–	\$35,548,498
Canada Research Chairs Program	–	–	–	\$21,560,333	–	–	\$21,560,333
Canadian Institutes of Health Research [2]	\$102,312,116	\$3,198,972	–	\$4,510,195	\$11,335,383	\$166,359	\$121,523,024
Canadian Partnership Against Cancer [3]	\$173,492	\$9,486,769	–	–	–	–	\$9,660,261
Genome Canada	\$4,944,682	–	–	–	–	–	\$4,944,682
Health Canada/Public Health Agency of Canada [4]	\$2,774,907	–	–	\$67,142	–	\$10,638	\$2,852,687
Indirect Costs Program	–	–	\$19,718,451	–	–	–	\$19,718,451
National Research Council	\$7,200,491	–	–	–	–	\$141,189	\$7,341,680
Natural Sciences and Engineering Research Council	\$7,313,114	\$562,104	–	\$3,300	\$2,102,744	\$0	\$9,981,262
Networks of Centres of Excellence [5]	\$1,130,373	–	–	–	\$77,500	–	\$1,207,873
Social Sciences and Humanities Research Council	\$1,763,420	\$0	–	–	\$466,873	\$24,573	\$2,254,867
Other [6]	\$1,081	–	–	–	–	–	\$1,081
<b>TOTAL</b>	<b>\$127,613,676</b>	<b>\$48,796,344</b>	<b>\$19,718,451</b>	<b>\$26,140,969</b>	<b>\$13,982,500</b>	<b>\$342,760</b>	<b>\$236,594,701</b>

This table includes an estimate of the cancer component of the Indirect Costs Program. Unlike other tables in this report, the investment figures shown do not include partner dollars, but do include investment in other cancer funder programs not administered by federal agencies such as the multi-funded initiatives. Cells with a hyphen indicate that there were no funding mechanisms of that type offered by the federal program/organization. This is distinguished from \$0 values, which indicate that funding programs within that mechanism were offered by the organization, but there were no cancer relevant projects funded in 2008.

[1] Includes Canada Graduate Scholarships totalling \$4,286,000 (CIHR \$3,423,451; NSERC \$602,654; SSHRC \$259,896).

[2] Includes CIHR's contribution to the multi-funded initiatives and to the NSERC Collaborative Health Research Projects program.

[3] Includes \$9,486,769 (equipment/infrastructure) for the Canadian Partnership for Tomorrow Project and \$173,492 (operating grants) for the TFRI Translational Cancer Research Pilot Project.

[4] Represents Health Canada/PHAC's contribution to CBCRA and CTCRI and to specific CIHR programs.

[5] Does not include federal contributions to the management and related activities of the networks. Investment in the Centres of Excellence for Commercialization and Research (CECR) is reflected under the federal funding agencies as follows: CIHR \$5,271,243.33; NSERC \$1,710,825; and SSHRC \$1,417,535.38 (total for 2008 is \$8,399,504).

[6] Represents a contribution from Agriculture Canada to an NSERC project.

**FIGURE 3.4.4**  
**DISTRIBUTION OF 2008 CANCER RESEARCH INVESTMENT BY PROVINCE OF PI/PL**  
**BY FUNDING MECHANISM (\$442.6M)**

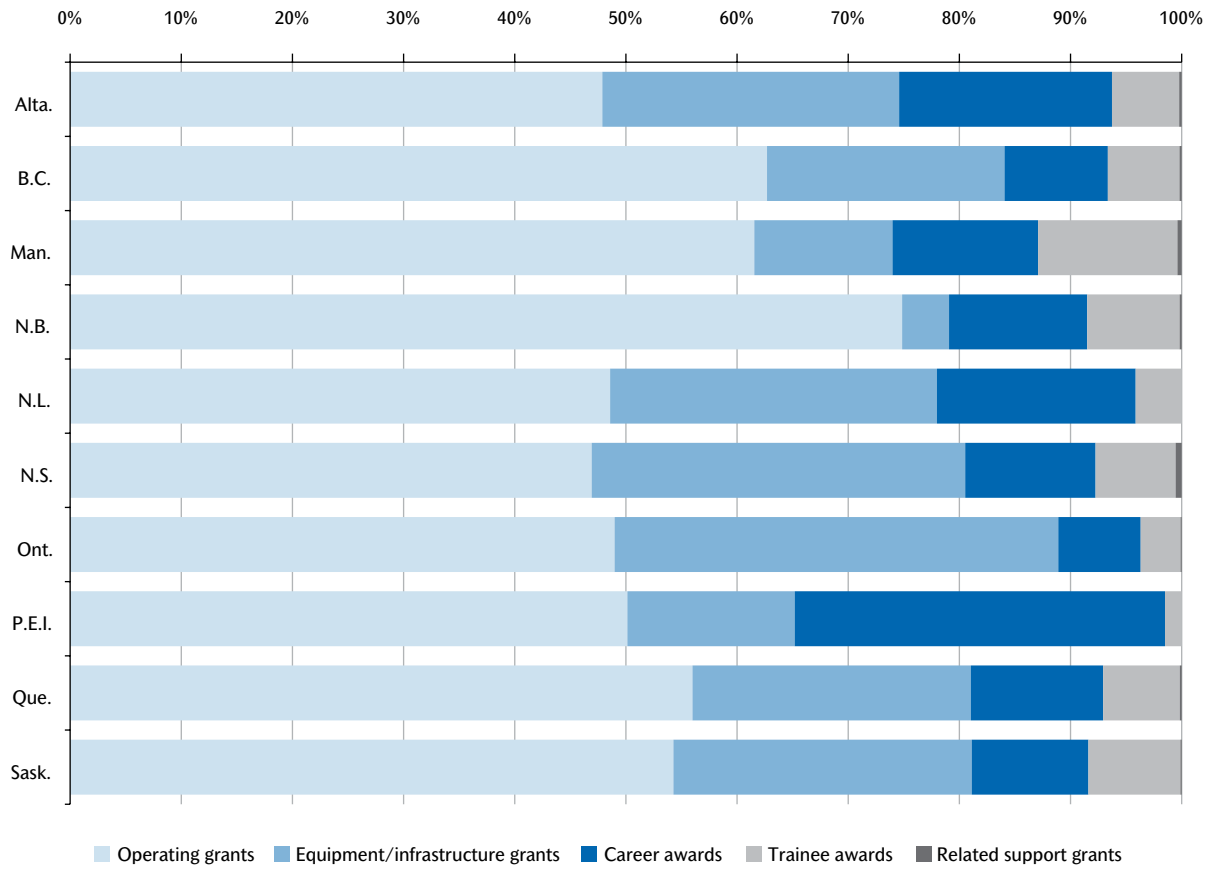


FIGURE 3.4.5

DISTRIBUTION OF 2008 CANCER RESEARCH INVESTMENT FOR FUNDING MECHANISM BY CSO CATEGORY

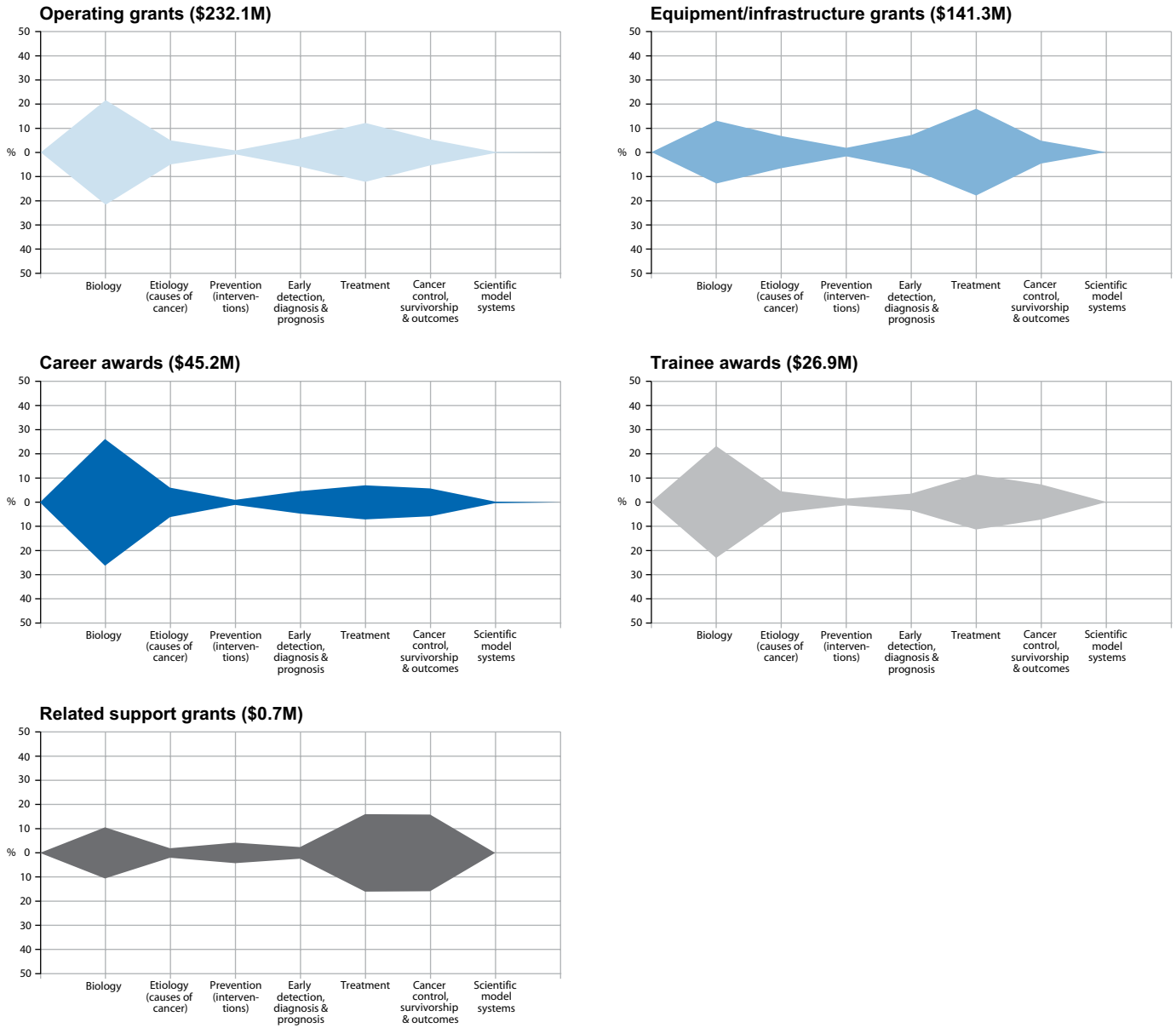
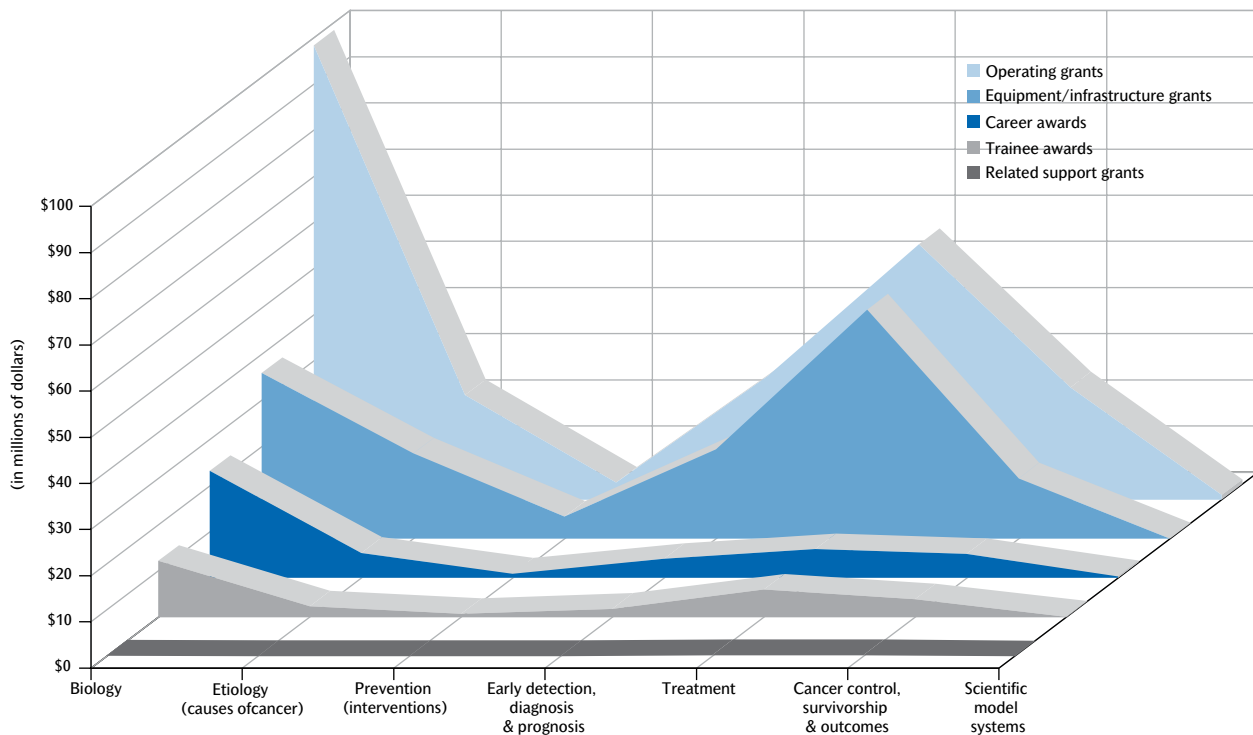


FIGURE 3.4.6

**2008 CANCER RESEARCH INVESTMENT BY FUNDING MECHANISM AND CSO CATEGORY (\$446.2M)**



Operating grants, or direct support for research, may require applicants to focus on specific areas of research or cancer sites, or may be researcher-directed/open. Sixty percent (60.7%) of the investment was for researcher-directed operating grants that were not site-specific (see Figure 3.4.7), although it should be noted that 9.1% of this investment had geographic restrictions (i.e., was for province-specific competitions). Site-specific operating grants programs were primarily the domain of the multi-funded initiatives and voluntary sector.

A breakdown in terms of types of career/salary awards is provided in Table 3.4.2. On December 31, 2008, there were 241 Canada Research Chairs, 109 Tier 1 and 132 Tier 2, engaged in research of which at least some portion was cancer-related. CIHR was the granting agency for 79.7% of these chairs. Over seventy percent (72.2%) of the chairs were working at institutions in Ontario (104 chairs) and Quebec (70 chairs).

Canada Foundation for Innovation (CFI) represented 57.4% of the \$141.3M invested in equipment/infrastructure grants. Figure 3.4.8 shows the distribution of this investment by province of PI/PL.



The number of graduate level awards represented 61.6% of all 1,354 trainee awards funded in 2008 (see Table 3.4.3). Over one-third (37.5%) of graduate level trainee award investment represented the Canada Graduate Scholarship program supported by the three federal government research agencies (i.e., CIHR \$3,423,451; NSERC \$602,654; SSHRC \$259,896). Post-doctoral/fellowship awards accounted for 43.1% of the overall trainee investment. Projects for trainees studying at institutions outside Canada totaled \$3.6M. The provincial distribution of trainee awards is shown in Figure 3.4.9.

An estimate of the “cancer” component of the federal Indirect Costs Program (ICP) was calculated as one source of institutional support received by institutions that employ researchers engaged in cancer researcher (see sidebar for details on how this estimate was calculated). The estimate for the ICP was \$19.7M for 2008. The provincial distribution is shown in Figure 3.4.10.

Research-related support remained a small component of the overall funding mechanism mix, at \$694,213 in 2008.

#### INDIRECT COSTS CALCULATION

The estimate of the “cancer” component of the federal ICP was calculated in the following way:

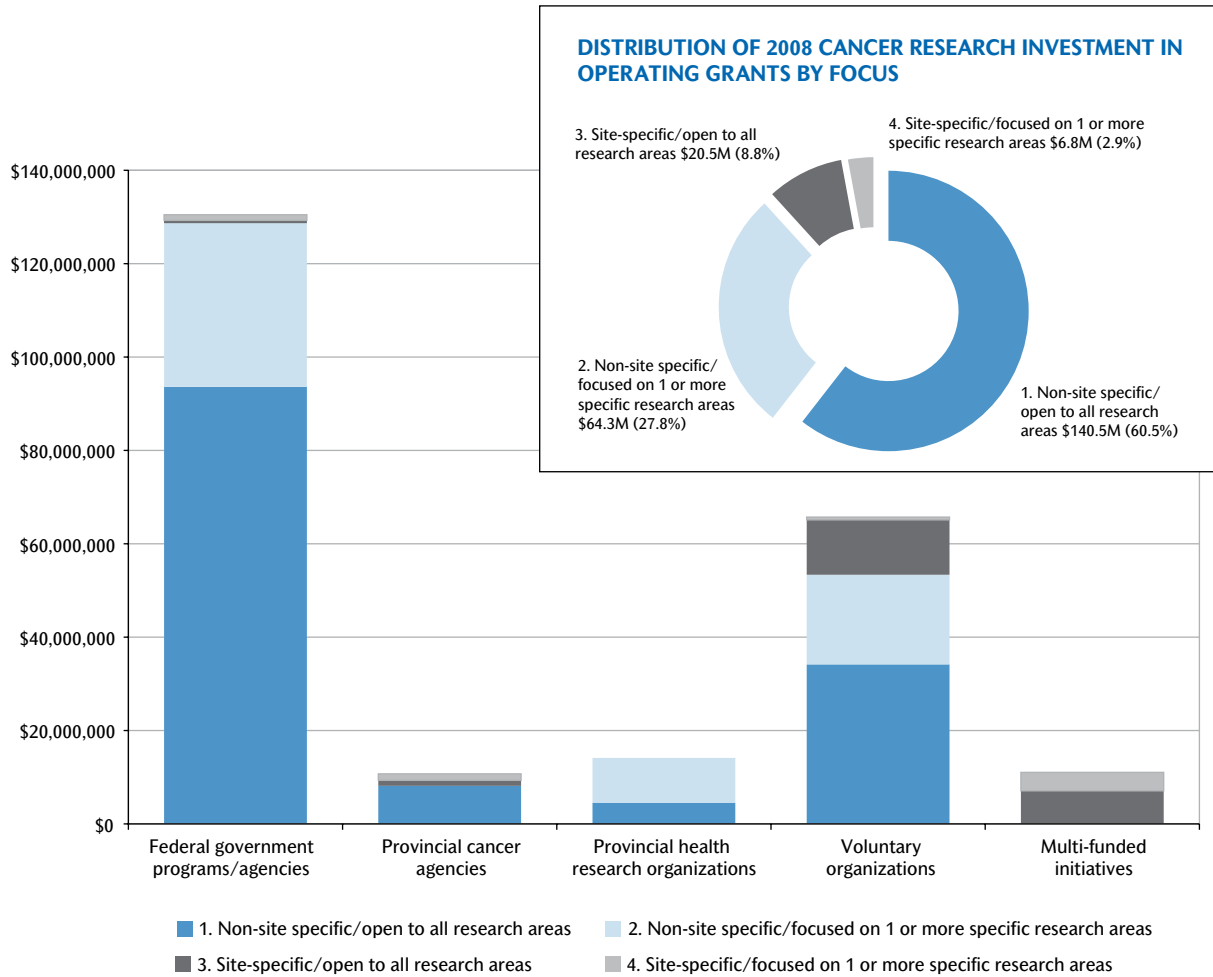
1. All projects within the survey database for CIHR, NSERC, and SSHRC were identified.
2. The funding programs for each federal granting agency were included/excluded/weighted according to the ICP program guidelines, and host organizations that were not universities were mapped to affiliated universities, where applicable.
3. The proportion of Indirect Costs paid to institutions in 2009/10 relative to averaged funding received by researchers for fiscal years 2006/07, 2007/08, and 2008/09 by all three funding agencies (data supplied by the ICP program) was applied to the 2006-2008 CCRS data. The assumption is that all projects at an institution receive the same level of support.

#### Example: University of Alberta

- a. Three-year total paid to all University of Alberta researchers by CIHR, NSERC, and SSHRC: \$258.7M; averaged annual \$86.2M
- b. Indirect cost payment in 2010/11: \$16.3M
- c. Proportion ( $\$16.3M/\$86.2M$ ) = 18.9%
- d. Three-year total paid to cancer researchers by CIHR, NSERC, and SSHRC (from survey database): \$16.0M; averaged annual \$5.3M
- e. Calculated indirect costs for cancer research ( $\$5.3M \times 18.9\%$ ) = \$1.0M

FIGURE 3.4.7

**2008 CANCER RESEARCH INVESTMENT IN OPERATING GRANTS FOR EACH FUNDER SECTOR [1] BY FOCUS (\$232.1M)**



[1] Refers to the sector of the organization that administered the funding program.

TABLE 3.4.2

**2008 CANCER RESEARCH INVESTMENT IN CAREER AWARDS BY AWARD TYPE AND NUMBER OF PROJECTS**

TYPE OF AWARD	2008 Investment		Number of projects	Number of projects weighted at 100%
	\$	%		
Career/salary	\$20,455,108	45.29	358	271
Establishment	\$1,084,942	2.40	48	35
Tier 1 CRC	\$13,688,333	30.31	124	54
Tier 2 CRC	\$7,872,000	17.43	151	60
Other chair	\$2,065,302	4.57	26	20
<b>TOTAL</b>	<b>\$45,165,686</b>	<b>100</b>	<b>707</b>	<b>440</b>

FIGURE 3.4.8

**DISTRIBUTION OF 2008 CANCER RESEARCH INVESTMENT IN EQUIPMENT/INFRASTRUCTURE GRANTS BY PROVINCE OF PI/PL (\$141.3M)**

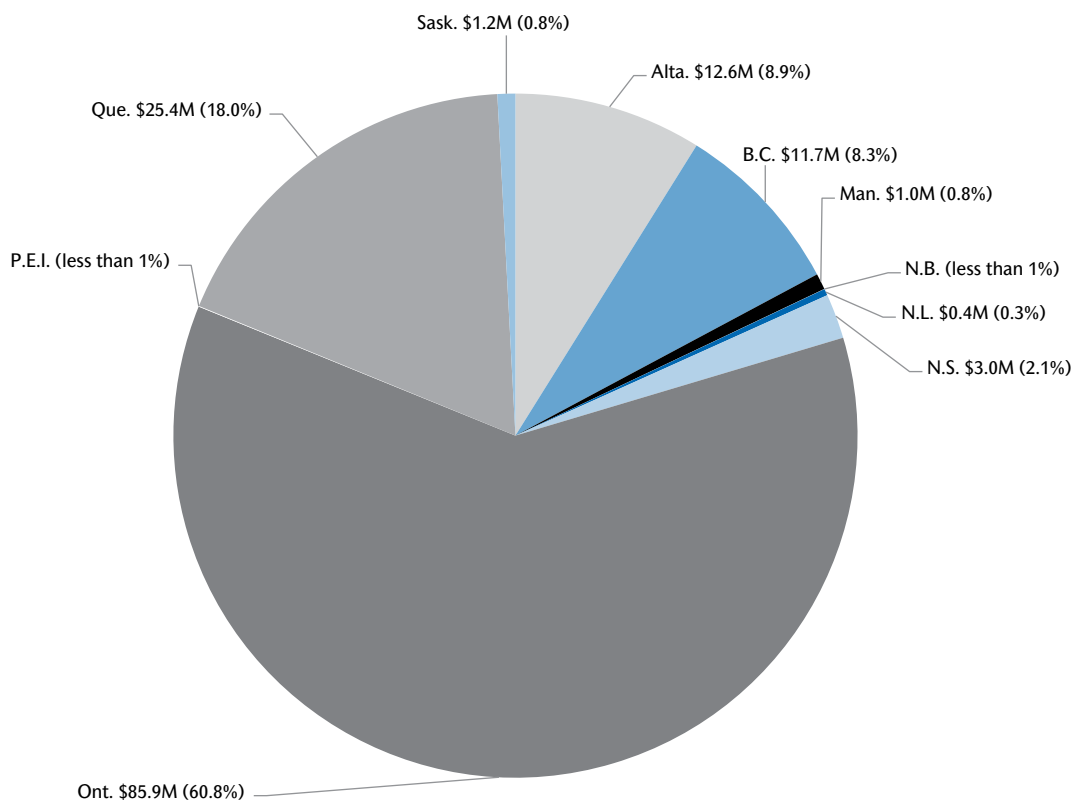
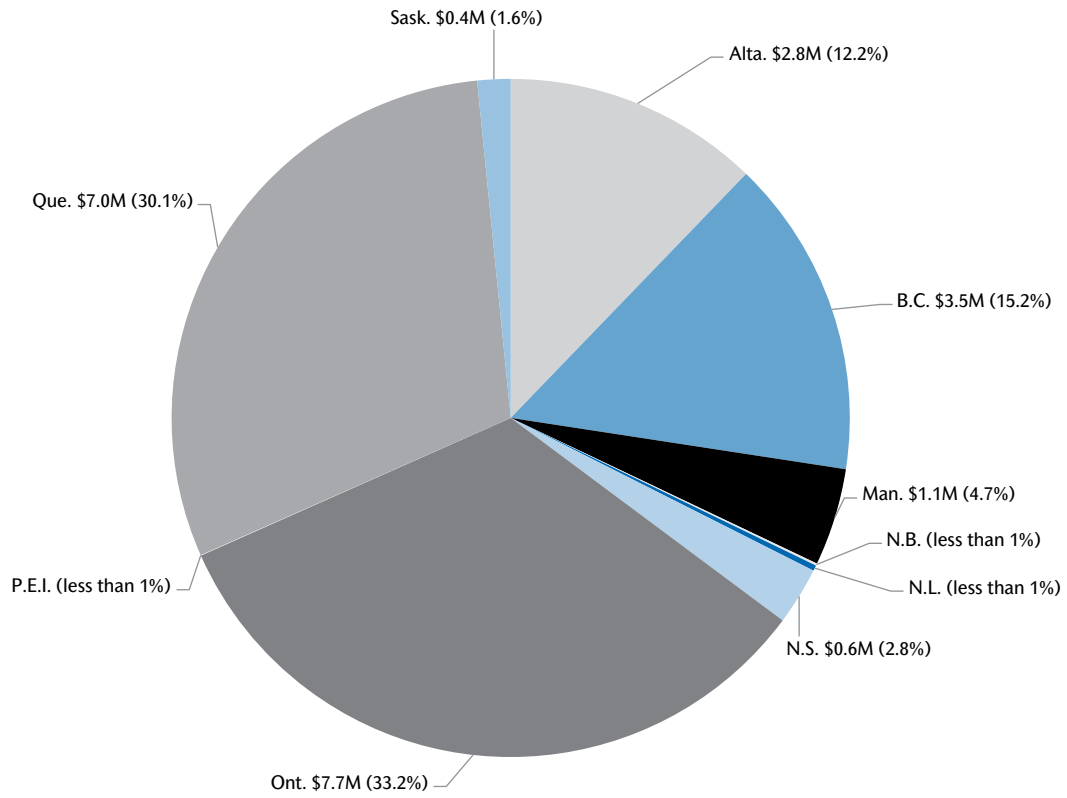


TABLE 3.4.3

**2008 CANCER RESEARCH INVESTMENT IN TRAINEE AWARDS BY AWARD TYPE AND NUMBER OF PROJECTS**

TYPE OF TRAINEE AWARD	2008 Investment		Number of projects	Number of projects weighted at 100%
	\$	%		
Undergraduate	\$269,152	1.00	66	65
Graduate	\$11,423,631	42.46	834	708
Post-doctoral/Fellowship	\$11,593,116	43.09	422	371
Institutional training award	\$3,615,765	13.44	32	18
<b>TOTAL</b>	<b>\$26,901,663</b>	<b>100</b>	<b>1,354</b>	<b>1,162</b>

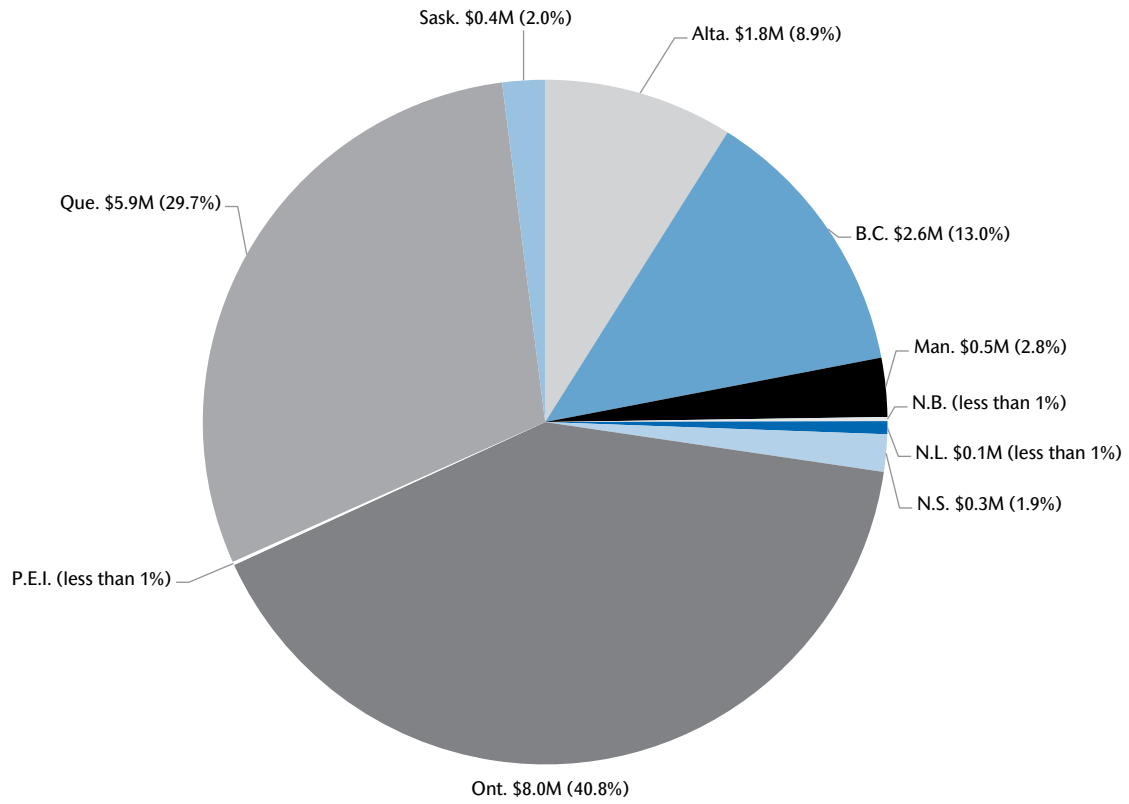
FIGURE 3.4.9

**DISTRIBUTION OF 2008 CANCER RESEARCH INVESTMENT IN TRAINEE AWARDS  
BY PROVINCE OF PI/PL (\$23.3M) [1]**

[1] Excludes \$3.6M awarded to trainees who were at institutions outside Canada.

FIGURE 3.4.10

**DISTRIBUTION OF CANCER-RELATED INDIRECT COSTS ESTIMATED FOR 2008  
BY PROVINCE OF PI/PL (\$19.7M)**



## APPENDIX A. ABBREVIATIONS

<b>AIHS</b>	Alberta Innovates – Health Solutions
<b>CARO</b>	Canadian Association of Radiation Oncology
<b>CBCF</b>	Canadian Breast Cancer Foundation
<b>CBCRA</b>	Canadian Breast Cancer Research Alliance
<b>CCRC</b>	Canadian Cancer Research Conference
<b>CCMB</b>	CancerCare Manitoba
<b>CCNS</b>	Cancer Care Nova Scotia
<b>CCO</b>	Cancer Care Ontario
<b>CCRS</b>	Canadian Cancer Research Survey
<b>CECR</b>	Centres of Excellence for Commercialization and Research
<b>CFI</b>	Canada Foundation for Innovation
<b>CIHR</b>	Canadian Institutes of Health Research
<b>CIPI</b>	Canadian Institute for Photonic Innovations (an NCE)
<b>CLS</b>	Canadian Light Source
<b>COG</b>	Children's Oncology Group
<b>CPCRI</b>	Canadian Prostate Cancer Research Initiative
<b>CRC</b>	Canada Research Chair
<b>CSO</b>	Common Scientific Outline
<b>CTCRI</b>	Canadian Tobacco Control Research Initiative
<b>FRSQ</b>	Fonds de la recherche en santé du Québec
<b>ICD-10</b>	International Statistical Classification of Disease and Related Health Problems, 10th Revision
<b>ICGC</b>	International Cancer Genome Consortium
<b>ICP</b>	Indirect Costs Program (federal)
<b>ICRP</b>	International Cancer Research Partners
<b>KFOC</b>	The Kidney Foundation of Canada
<b>LLSC</b>	The Leukemia & Lymphoma Society of Canada
<b>MHRC</b>	Manitoba Health Research Council
<b>MITACS</b>	Mathematics of Information Technology & Complex Systems (an NCE)
<b>MRFNB</b>	Medical Research Fund of New Brunswick
<b>MSFHR</b>	Michael Smith Foundation for Health Research
<b>NCE</b>	Networks of Centres of Excellence
<b>NCI</b>	National Cancer Institute (U.S.)
<b>NCIC CTG</b>	Clinical Trials Group (CCS)
<b>NCRI</b>	National Cancer Research Institute (U.K.)
<b>NRC</b>	National Research Council of Canada
<b>NSERC</b>	Natural Sciences and Engineering Research Council
<b>NSHRF</b>	Nova Scotia Health Research Foundation
<b>OCC</b>	Ovarian Cancer Canada
<b>OICR</b>	Ontario Institute for Cancer Research
<b>PCC</b>	Prostate Cancer Canada
<b>PHAC</b>	Public Health Agency of Canada
<b>PI/PL</b>	Principal Investigator/Project Leader
<b>QBCF</b>	Quebec Breast Cancer Foundation/Fondation du cancer du sein du Québec
<b>SCA</b>	Saskatchewan Cancer Agency
<b>SCN</b>	Stem Cell Network (an NCE)
<b>SHRF</b>	Saskatchewan Health Research Foundation
<b>SSHRC</b>	Social Sciences and Humanities Research Council
<b>TFF</b>	The Terry Fox Foundation
<b>TFRI</b>	Terry Fox Research Institute

**APPENDIX B. DATA CAVEATS FOR INDIVIDUAL ORGANIZATIONS**

ORGANIZATION [1]	NUMBER OF PROJECTS [2]	CAVEATS		
		PROJECT DESCRIPTIONS [3]	IMPUTED BUDGETS	IMPUTED START &/ END DATES
Alberta Health Services – Cancer Care	461	No descriptions for 8 projects.* 70 projects have lay abstracts only.		
Alberta Innovates – Health Solutions	229	No description for 1 project.*	83 projects [4]	
Brain Tumour Foundation of Canada	23	Lay abstracts only.		
C <sup>17</sup> Research Network	11	Lay abstracts only.		
Canada Foundation for Innovation	419	Key words only; no descriptions provided.*	Partner amounts are assumed to be 2.5 times the CFI maximum amounts. The CFI maximum amounts are assumed to be 40% of the grant totals.	96 end dates [5]
Canada Research Chairs Program	336	Lay descriptions only.		
Canadian Association of Radiation Oncology	42	No description for 1 project.*		4 end dates
Canadian Breast Cancer Foundation	271	No descriptions for 8 projects.* 27 projects have lay abstracts only.		
Canadian Breast Cancer Research Alliance	169			
Canadian Cancer Society	996	No descriptions for 12 projects.* 27 projects have lay abstracts only.	No imputation. Institutions involved in the conduct of the same clinical trials, however, are counted as separate projects in order to capture the trial investment by geographic region.	2 end dates
Canadian Institutes of Health Research	3,029	No descriptions for 108 projects.* 127 projects have lay abstracts only.	Imputed partners contributions for 200 projects.	
Canadian Partnership Against Cancer	7	Lay descriptions only.		
Canadian Prostate Cancer Research Initiative	16	2 projects have lay descriptions only.		
Canadian Tobacco Control Research Initiative	192	165 projects have lay descriptions only.		
Canary Foundation of Canada	11			
Cancer Care Nova Scotia	43	29 projects have lay descriptions only.		9 end dates
Cancer Care Ontario	30	No descriptions for 8 projects.* 19 projects have lay abstracts only.		
CancerCare Manitoba	99	63 projects have lay descriptions only.		
Fondation du cancer du sein du Québec / Quebec Breast Cancer Foundation	3			
Fonds de la recherche en santé du Québec	455	No descriptions for 8 projects.* 12 projects have lay abstracts only.		
Genome Canada	7	Lay descriptions only.		
Manitoba Health Research Council	69	No descriptions for 13 projects.* 42 projects have lay abstracts only.	1 project	1 end date
Medical Research Fund of New Brunswick	6	3 projects have lay descriptions only.		
Michael Smith Foundation for Health Research	294	177 project have lay descriptions only.		
National Research Council	42	16 projects have lay descriptions only.		
Natural Sciences and Engineering Research Council	653	No descriptions for 395 projects.* 253 projects have lay abstracts only.	32 projects	158 end dates [6]
Networks of Centres of Excellence	42	No description for 1 project.* 41 projects have lay abstracts only.	8 projects	8 end dates
Nova Scotia Health Research Foundation	49	No descriptions for 5 projects.* 42 projects have lay abstracts only.	1 project	28 end dates
Ontario Institute for Cancer Research	182	No descriptions for 10 projects.* 12 projects have lay abstracts only.	1 project	
Ontario Ministry of Research and Innovation	51	No descriptions for 7 projects.* 44 projects have only very brief lay abstracts.		51 end dates
Ovarian Cancer Canada	18	No descriptions for 12 projects.* 5 projects have lay abstracts only.	3 projects	13 end dates
Prostate Cancer Canada	69			
Saskatchewan Cancer Agency	16	One project has only a lay abstract.		
Saskatchewan Health Research Foundation	40			
Social Sciences and Humanities Research Council	83	No descriptions for 80 projects.* 1 project has only a lay abstracts.	6 projects	43 end dates [6]
The Cancer Research Society	277	No descriptions for 2 projects.* 5 projects have lay abstracts only.		
The Kidney Foundation of Canada	11			
The Leukemia & Lymphoma Society of Canada	101	No descriptions for 37 projects.*		
The Terry Fox Foundation	381	14 projects have only lay abstracts.		

\* Where no descriptions were available, public information (i.e., thesis abstracts, publications, web-based information) was used to code a given project. For all CRC grants, additional public information was used for coding purposes. In rare cases where no public information was available, project was coded on the basis of title.

[1] This list does not contain the Indirect Costs Program given the nature of the program, which is institution-specific, and not research project-specific.

[2] Number of projects included in the CCRA database. Overall total is 9,233.

[3] Descriptions are important to the coding/project classification process. The more information available for a given project, the more confidence we have in the classification results.

[4] AHS does not disclose salary grants by researcher, and provided CCRA with averaged salary figures for these projects. For all other projects where total project budget information was not made available, budgets were imputed on the basis of "like" grants.

[5] CFI end dates were unavailable for projects still in progress. Dates were imputed on the basis of "like" grants for which data were available or other public information, and will be revised when these dates are made available.

[6] Proactive public disclosure of start dates for NSERC and SSHRC grants over \$25,000 was announced by the Government of Canada on October 21, 2005. Both organizations publish this information on their respective web sites.

## APPENDIX C. 2005 TO 2008 INVESTMENT BY ORGANIZATION

ORGANIZATION [1]	2005	2006	2007	2008
<b>FEDERAL GOVERNMENT</b>	<b>\$230,325,871</b>	<b>\$234,414,085</b>	<b>\$247,405,700</b>	<b>\$266,821,269</b>
Canada Foundation for Innovation	\$95,691,646	\$82,092,145	\$82,427,758	\$81,140,707
Canada Research Chairs Program	\$16,795,806	\$19,070,666	\$20,647,417	\$21,560,333
Canadian Institutes of Health Research	\$98,499,820	\$108,884,583	\$115,392,006	\$117,301,142
Canadian Partnership Against Cancer	\$0	\$0	\$0	\$9,486,769
Genome Canada	\$11,733,362	\$13,773,584	\$16,697,223	\$9,878,152
National Research Council	\$2,342,650	\$3,280,751	\$3,416,418	\$7,341,680
Natural Sciences and Engineering Research Council	\$4,377,985	\$5,664,138	\$7,051,426	\$9,029,600
Networks of Centres of Excellence	\$517,289	\$1,092,641	\$1,009,486	\$10,247,954
Social Sciences and Humanities Research Council	\$367,313	\$555,578	\$763,967	\$834,932
<b>PROVINCIAL CANCER AGENCY</b>	<b>\$13,624,669</b>	<b>\$19,803,424</b>	<b>\$24,789,784</b>	<b>\$28,354,090</b>
Alberta Health Services – Cancer Care	\$6,333,854	\$9,530,181	\$14,564,897	\$20,761,040
CancerCare Manitoba	\$967,977	\$1,218,274	\$1,116,240	\$782,458
Cancer Care Nova Scotia	\$155,000	\$160,000	\$150,000	\$145,000
Cancer Care Ontario	\$5,877,350	\$8,632,836	\$8,633,988	\$6,258,156
Saskatchewan Cancer Agency	\$290,488	\$262,134	\$324,659	\$407,438
<b>PROVINCIAL HEALTH RESEARCH ORGANIZATION</b>	<b>\$36,267,488</b>	<b>\$36,524,077</b>	<b>\$48,087,122</b>	<b>\$56,984,463</b>
Alberta Innovates – Health Solutions	\$4,869,355	\$6,004,743	\$6,079,480	\$6,025,892
Fonds de la recherche en santé du Québec	\$9,380,455	\$9,593,964	\$9,701,489	\$10,037,779
Manitoba Health Research Council	\$459,130	\$404,845	\$446,837	\$903,357
Medical Research Fund of New Brunswick	\$0	\$45,000	\$15,000	\$52,322
Michael Smith Foundation for Health Research	\$5,529,047	\$6,045,936	\$7,378,542	\$8,491,030
Nova Scotia Health Research Foundation	\$271,648	\$339,838	\$375,285	\$524,586
Ontario Institute for Cancer Research	\$15,361,703	\$13,297,389	\$20,870,325	\$26,598,332
Ontario Ministry of Research and Innovation	\$57,000	\$484,677	\$2,919,875	\$3,980,888
Saskatchewan Health Research Foundation	\$339,149	\$307,685	\$300,290	\$370,278
<b>VOLUNTARY ORGANIZATION</b>	<b>\$70,789,109</b>	<b>\$75,292,797</b>	<b>\$80,225,338</b>	<b>\$82,827,668</b>
Brain Tumour Foundation of Canada	\$83,333	\$160,723	\$142,610	\$370,044
C <sup>17</sup> Research Network	\$23,750	\$59,300	\$185,731	\$325,860
Canadian Association of Radiation Oncology	\$186,307	\$187,417	\$261,700	\$182,376
Canadian Breast Cancer Foundation	\$4,304,322	\$5,080,326	\$6,430,804	\$8,948,184
Canadian Cancer Society	\$40,197,363	\$41,484,592	\$43,198,345	\$42,310,508
Canary Foundation of Canada	\$0	\$231,500	\$1,452,500	\$503,375
Fondation du cancer du sein du Québec / Quebec Breast Cancer Foundation	\$1,066,667	\$1,066,667	\$533,333	\$0
Ovarian Cancer Canada	\$163,666	\$68,333	\$195,938	\$270,357
Prostate Cancer Canada	\$945,108	\$1,183,059	\$992,468	\$896,408
The Cancer Research Society	\$5,408,883	\$5,638,758	\$6,248,083	\$6,240,157
The Kidney Foundation of Canada	\$273,906	\$151,953	\$105,000	\$147,500
The Leukemia & Lymphoma Society of Canada	\$547,000	\$924,250	\$1,133,943	\$1,450,975
The Terry Fox Foundation [2]	\$17,588,804	\$19,055,919	\$19,344,882	\$21,181,926
<b>MULTI-FUNDED INITIATIVE</b>	<b>\$13,021,210</b>	<b>\$11,987,589</b>	<b>\$11,442,682</b>	<b>\$11,194,419</b>
Canadian Breast Cancer Research Alliance	\$10,070,945	\$10,043,837	\$9,540,847	\$8,735,248
Canadian Prostate Cancer Research Initiative	\$1,430,538	\$555,069	\$266,298	\$246,942
Canadian Tobacco Control Research Initiative	\$1,519,727	\$1,388,683	\$1,635,537	\$2,212,229
<b>TOTAL</b>	<b>\$364,028,346</b>	<b>\$378,021,972</b>	<b>\$411,950,626</b>	<b>\$446,181,909</b>

[1] Organizations are listed alphabetically under the relevant funding sector (sector totals are shown in upper case letters). Contributions to multi-funded initiatives are not included in the amounts shown for CIHR, CBCF, CCS, and CRS. This table does not include investment estimates for the Indirect Costs Program or other province-specific and institution-specific funding sources not captured in the CCRS.

[2] Investment shown for The Terry Fox Foundation includes the projects supported by The Terry Fox Research Institute.



## APPENDIX D. 2005 TO 2008 INVESTMENT [1] BY CSO CODES

CSO Code	2005	2006	2007	2008
<b>1 - BIOLOGY</b>	<b>\$157,774,845</b>	<b>\$168,233,440</b>	<b>\$182,437,470</b>	<b>\$169,736,912</b>
1.1 - Normal functioning	\$54,824,330	\$60,926,636	\$66,270,106	\$61,067,093
1.2 - Cancer initiation: alterations in chromosomes	\$9,410,677	\$9,559,825	\$9,403,040	\$10,734,366
1.3 - Cancer initiation: oncogenes and tumour suppressor genes	\$33,857,603	\$39,020,021	\$47,699,505	\$48,509,631
1.4 - Cancer progression and metastasis	\$21,780,681	\$24,610,974	\$26,262,320	\$27,583,968
1.5 - Resources and infrastructure	\$37,901,554	\$34,115,984	\$32,802,499	\$21,841,854
<b>2 - ETIOLOGY (CAUSES OF CANCER)</b>	<b>\$40,545,640</b>	<b>\$38,719,115</b>	<b>\$43,225,423</b>	<b>\$48,849,506</b>
2.1 - Exogenous factors in the origin and cause of cancer	\$11,162,112	\$11,792,842	\$12,181,991	\$17,549,020
2.2 - Endogenous factors in the origin and cause of cancer	\$17,583,258	\$17,357,733	\$20,682,264	\$19,892,638
2.3 - Interactions of genes and/or genetic polymorphisms with exogenous and/or endogenous factors	\$3,058,307	\$2,312,636	\$2,584,515	\$4,725,856
2.4 - Resources and infrastructure	\$8,741,964	\$7,255,904	\$7,776,652	\$6,681,992
<b>3 - PREVENTION (INTERVENTIONS)</b>	<b>\$6,331,946</b>	<b>\$6,963,598</b>	<b>\$7,413,857</b>	<b>\$10,155,576</b>
3.1 - Interventions to prevent cancer: personal behaviours that affect cancer risk	\$2,807,411	\$3,203,783	\$3,766,139	\$4,305,938
3.2 - Nutritional science in cancer prevention	\$582,155	\$714,154	\$762,668	\$828,858
3.3 - Chemoprevention	\$870,218	\$658,682	\$728,305	\$861,039
3.4 - Vaccines	\$119,138	\$256,366	\$367,348	\$694,641
3.5 - Complementary and alternative prevention approaches	\$470,769	\$514,384	\$346,465	\$318,671
3.6 - Resources and infrastructure	\$1,482,255	\$1,616,229	\$1,442,931	\$3,146,429
<b>4 - EARLY DETECTION, DIAGNOSIS &amp; PROGNOSIS</b>	<b>\$37,041,709</b>	<b>\$38,494,288</b>	<b>\$46,751,405</b>	<b>\$52,069,988</b>
4.1 - Technology development and/or marker discovery	\$13,272,115	\$15,621,607	\$20,193,442	\$20,169,171
4.2 - Technology and/or marker evaluation with respect to fundamental parameters of method	\$7,280,280	\$7,479,906	\$8,539,891	\$10,368,436
4.3 - Technology and/or marker testing in a clinical setting	\$2,409,814	\$3,215,391	\$5,348,869	\$6,861,085
4.4 - Resources and infrastructure	\$14,079,500	\$12,177,384	\$12,669,203	\$14,671,295
<b>5 - TREATMENT</b>	<b>\$88,912,412</b>	<b>\$89,604,821</b>	<b>\$92,484,238</b>	<b>\$117,391,216</b>
5.1 - Localized therapies – discovery and development	\$6,504,813	\$6,635,506	\$7,014,595	\$8,112,418
5.2 - Localized therapies – clinical applications	\$2,364,251	\$3,217,913	\$3,642,283	\$3,851,734
5.3 - Systemic therapies – discovery and development	\$40,649,929	\$43,695,380	\$50,468,187	\$66,472,651
5.4 - Systemic therapies – clinical applications	\$6,575,437	\$6,892,937	\$7,413,700	\$7,309,041
5.5 - Combinations of localized and systemic therapies	\$734,697	\$574,318	\$673,871	\$709,106
5.6 - Complementary and alternative treatment approaches	\$364,756	\$417,093	\$269,485	\$247,623
5.7 - Resources and infrastructure	\$31,718,529	\$28,171,676	\$23,002,117	\$30,688,642
<b>6 - CANCER CONTROL, SURVIVORSHIP &amp; OUTCOMES</b>	<b>\$30,208,593</b>	<b>\$32,322,784</b>	<b>\$36,266,366</b>	<b>\$46,566,282</b>
6.1 - Patient care and survivorship issues	\$8,524,638	\$9,211,728	\$10,446,752	\$11,120,103
6.2 - Surveillance	\$2,112,661	\$1,970,657	\$2,341,632	\$2,787,237
6.3 - Behaviour	\$4,375,511	\$4,453,970	\$5,234,451	\$5,598,158
6.4 - Cost analyses and health care delivery	\$3,714,584	\$4,449,270	\$5,758,879	\$10,265,495
6.5 - Education and communication	\$2,097,701	\$2,384,763	\$2,350,079	\$2,143,857
6.6 - End-of-life care	\$2,954,670	\$3,394,975	\$3,444,413	\$3,322,912
6.7 - Ethics and confidentiality in cancer research	\$561,614	\$329,226	\$158,488	\$372,852
6.8 - Complementary and alternative approaches for supportive care of patients and survivors	\$686,365	\$625,649	\$476,828	\$346,008
6.9 - Resources and infrastructure	\$5,180,848	\$5,502,547	\$6,054,843	\$10,609,659
<b>7 - SCIENTIFIC MODEL SYSTEMS</b>	<b>\$3,213,200</b>	<b>\$3,683,926</b>	<b>\$3,371,867</b>	<b>\$1,412,430</b>
7.1 - Development and characterization of model systems	\$2,822,194	\$3,137,047	\$2,929,241	\$1,254,180
7.2 - Application of model systems	\$0	\$0	\$0	\$0
7.3 - Resources and infrastructure	\$391,006	\$546,879	\$442,626	\$158,249
<b>TOTAL</b>	<b>\$364,028,346</b>	<b>\$378,021,972</b>	<b>\$411,950,626</b>	<b>\$446,181,909</b>

[1] Category totals are shown in upper case letters. This table does not include investment estimates for the Indirect Costs Program or other province-specific and institution-specific funding sources not captured in the CCRS.

## APPENDIX E. 2005 TO 2008 INVESTMENT [1] BY CANCER SITE

CANCER SITE	\$				%			
	2005	2006	2007	2008	2005	2006	2007	2008
Bladder	\$680,217	\$853,357	\$909,458	\$1,270,235	0.40	0.47	0.45	0.58
Bone and connective tissue	\$3,663,844	\$3,223,682	\$1,967,099	\$2,248,896	2.15	1.77	0.97	1.04
Brain	\$9,913,971	\$12,948,820	\$15,429,973	\$19,809,345	5.82	7.12	7.62	9.12
Breast	\$43,176,662	\$48,949,229	\$56,830,011	\$62,372,867	25.33	26.91	28.07	28.72
Cervix	\$4,117,472	\$3,684,056	\$4,592,767	\$4,859,560	2.42	2.03	2.27	2.24
Colorectal	\$16,744,354	\$14,069,203	\$13,652,412	\$14,174,404	9.83	7.74	6.74	6.53
Esophagus	\$929,852	\$1,013,323	\$1,374,352	\$1,808,750	0.55	0.56	0.68	0.83
Gallbladder	\$34,853	\$10,751	\$0	\$15,329	0.02	0.01	0.00	0.01
Hodgkin's disease	\$1,032,081	\$1,011,256	\$934,800	\$715,246	0.61	0.56	0.46	0.33
Kidney	\$2,014,285	\$2,137,874	\$2,274,147	\$2,676,806	1.18	1.18	1.12	1.23
Larynx	\$639,080	\$707,483	\$883,983	\$1,061,627	0.37	0.39	0.44	0.49
Leukemia	\$22,665,755	\$23,231,642	\$23,665,879	\$24,285,820	13.30	12.77	11.69	11.18
Liver	\$2,399,098	\$3,129,003	\$3,472,556	\$3,656,190	1.41	1.72	1.72	1.68
Lung	\$9,610,642	\$12,248,207	\$14,007,322	\$14,702,208	5.64	6.73	6.92	6.77
Multiple myeloma	\$2,987,535	\$2,947,865	\$3,427,136	\$3,363,987	1.75	1.62	1.69	1.55
Non-Hodgkin's lymphoma	\$7,432,037	\$8,580,838	\$11,629,771	\$10,779,452	4.36	4.72	5.75	4.96
Oral	\$3,519,256	\$3,427,721	\$3,835,924	\$4,425,441	2.06	1.88	1.89	2.04
Ovary	\$6,731,102	\$6,346,873	\$7,184,833	\$6,839,077	3.95	3.49	3.55	3.15
Pancreas	\$1,396,697	\$1,643,584	\$2,077,153	\$1,628,042	0.82	0.90	1.03	0.75
Prostate	\$16,832,780	\$16,516,345	\$18,229,074	\$21,216,954	9.88	9.08	9.01	9.77
Skin (Melanoma)	\$4,612,741	\$5,082,244	\$5,302,346	\$4,227,301	2.71	2.79	2.62	1.95
Stomach	\$780,804	\$680,362	\$722,036	\$975,531	0.46	0.37	0.36	0.45
Thyroid	\$389,814	\$473,599	\$719,731	\$720,157	0.23	0.26	0.36	0.33
Uterus	\$1,894,438	\$2,021,314	\$1,797,435	\$1,360,962	1.11	1.11	0.89	0.63
Other sites	\$6,225,304	\$6,941,531	\$7,512,441	\$7,953,408	3.65	3.82	3.71	3.66
<b>TOTAL</b>	<b>\$170,424,673</b>	<b>\$181,880,162</b>	<b>\$202,432,639</b>	<b>\$217,147,593</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

[1] This table excludes investment in research that is relevant to all cancer sites/not site-specific.

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