

# CANCER RESEARCH INVESTMENT IN CANADA, 2007

THE CANADIAN CANCER  
RESEARCH ALLIANCE'S  
SURVEY OF GOVERNMENT  
AND VOLUNTARY SECTOR  
INVESTMENT IN CANCER  
RESEARCH IN 2007



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



OCTOBER 2009

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Kim Badovinac, who managed this project, prepared this report with the invaluable advice and expertise provided by Drs. Mario Chevette and Mireille Vega (The Cancer Research Society), Stuart Edmonds (Canadian Cancer Research Alliance), Jim Hudson (on behalf of the Canadian Breast Cancer Foundation), Nancy Kreiger (Cancer Care Ontario), Morag Park and Benoît Lussier (Canadian Institutes of Health Research (CIHR)), and Christine Williams (Canadian Cancer Society).

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## MESSAGE FROM THE CHAIRS



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



**Morag Park, PhD**, is the Scientific Director of the CIHR Institute of Cancer Research, Director of the Molecular Oncology Group at McGill University Health Centre, and James McGill Professor at McGill University in Montréal, Quebec.

**T**he CCRA annual survey of investment in cancer research provides hard data useful to Canada's cancer research funders, and to others in the cancer control arena. In this, our third report, our special topic is the investment in cancer research focused on children and adolescent cancers, a timely area given that the number of childhood/adolescent cancer survivors is growing, and that many childhood/adolescent cancer survivors experience serious and long-term health effects as a consequence of their cancer and/or treatment.<sup>1</sup> Our survey found that 3% of the overall cancer research investment, or \$13M, was invested in research focused on childhood/adolescent cancers. Research focused on central nervous system cancers and leukemias formed the largest share of this investment. The rest of the report updates the data provided in previous years for 2007. In this round of the survey, we not only increased survey participation again, but undertook a major data quality initiative to improve the consistency of the data across the three years and across research funders. The impact of this effort is described in the Methodology section.

We would like to thank the CCRA members and the growing list of organizations that contributed information to the Canadian Cancer Research Survey. In addition, the Canadian

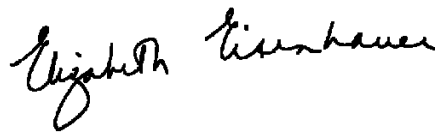
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1. Diller et al. (2009). Chronic disease in the Childhood Cancer Survivor Study Cohort: A review of the published findings. *Journal of Clinical Oncology*, 27(14):2339-2355.

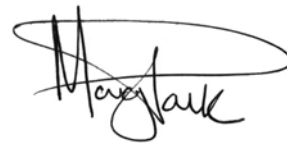
Partnership Against Cancer recognized the benefits of the survey early on in its evolution and have committed to financially supporting it—this report, in fact, is fully funded by the Partnership.

In terms of our other major activity, the Alliance is currently engaged in the development of a pan-Canadian cancer research strategy. The proposed pan-Canadian cancer research strategy will provide a framework to guide cancer research investment in Canada, highlight gaps and opportunities for new collaborations, and provide a vision for Canadian cancer research achievements over the next five years. This process has, and will continue over the next few months, to involve consultations with researchers, research funders, decision-makers, cancer patients, their families, and other members of the public. We anticipate release of the strategy in early 2010.

Investments that advance education, science and research are fundamental to ensuring that Canada can compete at the global level, and continue to benefit the quality of life of its citizens. Investing in cancer research is not only about saving and improving lives for tomorrow, but also about contributing to the richness of our country today both economically and intellectually. The Alliance remains committed to doing its part to facilitate a cancer research environment that will benefit all Canadians affected by cancer.



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



Morag Park, PhD  
Co-Chair, CCRA

# 1. WHAT'S NEW IN THIS REPORT

This report is the third in a series of annual reports on cancer research investment in Canada. It provides an overview of the investment, updating for calendar year 2007 many of the baseline tables and figures presented in the two previous reports. This report is also somewhat unique in that it contains a report within a report. The last part of this document provides separate and new analyses aimed at describing and quantifying investment in cancer research focused on childhood and adolescent cancers. This report, *Investment in Research on Childhood and Adolescent Cancers, 2005-2007*, is available as a stand-alone electronic document.

Other changes for this iteration of the report include:

- the addition of three voluntary organizations—there are now 37 organizations participating in the survey
- the inclusion of recently released data on cancer prevalence from Statistics Canada<sup>1</sup> within the context of the analysis of investment by cancer sites
- detailed allocation of dollars for clinical trials supported by the Canadian Cancer Society-funded Clinical Trials Group (NCIC CTG)<sup>2</sup>
- the results of a major data quality effort, undertaken in order to improve the internal consistency of the data. This is described in detail in Chapter 2.

While all major cancer research funders from the governmental and voluntary sectors are included (i.e. these are funders that offer open competitions and support researchers at more than one organization), this report does not include the important investment from hospital foundations, which likely contribute in excess of \$50M to research,<sup>3</sup> 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

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1. Ellison, LF & Wilkins, K. (2009). Cancer prevalence in the Canadian population. *Health Reports*, 20(1):7-19. Ottawa: Statistics Canada. Cat No 82-003-XPE. Available at <http://www.statcan.gc.ca/pub/82-003-x/2009001/article/10800-eng.pdf>.

2. In previous reports, this detail was not available and the entire NCIC CTG investment was allocated to Queen's University.

3. Of note, the Princess Margaret Hospital Foundation, Canada's largest cancer-focused hospital foundation, reported an annual investment in research of \$47.4M for year ending March 31, 2008 (see The Princess Margaret Hospital Foundation's report, *Conquer Cancer in Our Lifetime: 2008 Report to Our Donors*, available at <http://www.pmf.ca/pdfs/Publications/AnnualReport/PMHAnnualReport2008.pdf>).

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 three 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 childhood and adolescent cancers 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.ccr-aacrc.ca/aboutus\\_publications\\_en.htm](http://www.ccr-aacrc.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 2007 analyses.

### 2.1 PARTICIPATING ORGANIZATIONS

This report focuses on research projects being conducted at some point during calendar year 2007. The three organizations new to the survey (i.e. Canadian Association of Radiation Oncology (CARO), Canary Foundation of Canada, and The Leukemia & Lymphoma Society of Canada (LLSC)), however, provided data on all funded research active from January 1, 2005 to December 31, 2005 as well as projects new in calendar 2006 and 2007. The long-term goal of the survey is to analyze trends in cancer research investment over time, so it was necessary to ensure that data were complete for all years and all organizations.

Current names of organizations 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: the Canadian Institute for Photonic Innovations (CIPI), Mathematics of Information Technology & Complex Systems (MITACS), and the Stem Cell Network (SCN). It 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).

Appendix B lists participating organizations, as well as specific issues relevant to the quality of the data provided and used for classification purposes. No data were available from the BC Cancer Agency for this report. Within the appendices, key comparative analyses of data for investments in 2005, 2006 and 2007 are provided for participating organizations (Appendix C), codes of the Common Scientific Outline (CSO) (Appendix D), and cancer sites (Appendices E and F). These help to bridge the analyses presented in this report with the first two, and provide updated investment figures. As with the two previous reports, the data presented herein is subject to change based on future data submissions or corrections.

## 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. Inter-rater agreement of the blind-coded classifications of the two coders in terms of the seven CSO categories was determined to be in the “almost perfect” agreement range (observed Kappa=0.8936, 95% CI 0.8859-0.9008).

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 visually and succinctly demonstrates differences and similarities across multiple organizations, because it shows a distinct shape for a given distribution.

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, like 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 sites 5%).

As introduced in the 2006 report, projects were also grouped in terms of type of funding mechanism (see sidebar on the 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://www.who.int/classifications/apps/icd/icd10online/> for more information.

## 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 2007 are included. Given that many organizations have different grant cycles and fiscal years, the selection of calendar 2007 is intended to standardize data collection to a single 12-month period. The 2007 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

### DEFINITIONS OF FUNDING MECHANISMS

**Career awards:** Competitive awards which 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. (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 which 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.

**Institutional support:** Support for the general costs of conducting research which cannot be attributed to specific research projects or researchers. This includes indirect costs (overhead).

**Operating grants:** Competitive grants which 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 which support travel, workshops/symposia as well as researcher time for proposal development/letters of intent. These grants generally involve relatively small levels of funding.

**Trainee awards:** Competitive awards which recognize outstanding trainees and support them during their undergraduate, graduate or post-graduate training. Trainees from Canada who are studying at institutions outside of 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.

TABLE 2.3.1

**2007 CANCER RESEARCH INVESTMENT BY FUNDING SOURCE FOR GENOME CANADA**

FUNDING SOURCE	2007 Investment	
	\$	%
Genome Canada	\$8,129,093	49
Private industry	\$5,108,665	31
Institutional	\$1,157,848	7
Provincial government	\$2,200,239	13
Foreign	\$101,378	Less than 1
<b>TOTAL</b>	<b>\$16,697,223</b>	<b>100</b>

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>1</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.

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.

Analyses by province were based on the institutional affiliation of the Principal Investigator (PI) or Project Leader (PL). There is only one designated PI/PL per project. 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, among the CFI the projects considered major science investments,<sup>2</sup> two of the Structural Genomics Consortium projects were included. The budgets were weighted at 10% and accounted for \$395,095 in 2007.

- 
1. CFI did not provide the details of the partner investment, and public sources of information were not available for all projects. In the database, the estimated partner contribution was added to the CFI maximum contribution.
  2. The project end date for the Canadian Light Source (CLS), the single largest CFI investment, was in 2005 so it is not included in the 2007 investment figures shown in this report. It should be noted that both the Saskatchewan Cancer Agency (SCA) and the Saskatchewan Health Research Foundation (SHRF) contributed to CFI's related CLS Biomedical Imaging and Therapy Beamline project. Their respective investments were captured within the CFI investment and were not reflected under the investment figures shown for SCA or SHRF.



TABLE 2.3.2

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

Example	Weighting applied
A career award where the researcher focused on the development of imaging technologies for a number of different applications, one of which is cancer diagnosis	5% or more depending on the number of cancer-related applications indicated
An infrastructure grant where one of five centres involved is focused on cancer research	20%
A research project focused on developing an animal model of nicotine addiction	33%
An operating grant focused on two areas of study: one concerning cardiovascular disease; the other cancer	50%
A trainee award focused on evaluating a smoking cessation program	100%

TABLE 2.3.3

**DISTRIBUTION OF WEIGHTINGS APPLIED TO PROJECTS IN THE SURVEY DATABASE, 2005-2007**

WEIGHTING	Number of projects [1]	%
100%	5,932	82
75%	21	Less than 1
50%	295	4
33%	632	9
25%	17	Less than 1
20%	218	3
10%	87	1
5%	1	Less than 1
<b>TOTAL</b>	<b>7,203</b>	<b>100</b>

[1] 57 projects were deleted from the database for the years 2005 and 2006 (see Section 2.4 for details).

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.

## 2.4 DATA QUALITY

A major effort was undertaken to ensure the consistency of the CCRA database in terms of project inclusion and weighting. This activity involved the review of 3,655 projects (all the projects submitted by the general health research funders) for years 2005 and 2006. An attempt was made to identify “like” projects on the basis of the available project descriptions in order to ensure that weightings were applied in similar ways. Projects were evaluated on whether they should be included (relevance to cancer was clearly stated), and whether the weighting was appropriate given similar projects in the database.

In most cases (for 80.6% of the projects reviewed), the projects remained in the database with the same weighting. A total of 57 projects were excluded as the available descriptions did not have a direct cancer mention. For a small number of projects (n=106), weightings were increased; for a larger number of projects (n=546), weightings were decreased.

The results for each funding organization are shown in Table 2.3.4. This table also shows the relative impact on the annualized investment calculations reported in the 2006 data report. Most investment figures were lowered as a result of the review, although the reweighted figures for the Canada Research Chairs Program (CRCP) and the Canadian Tobacco Control Research Initiative (CTCRI) increased for both 2005 and 2006. Funding figures most impacted by this exercise were the Nova Scotia Health Research Council (NSHRC), the Canadian Institutes of Health Research (CIHR), and the Alberta Heritage Foundation for Medical Research (AHFMR).

TABLE 2.3.4

## WEIGHTING RE-ADJUSTMENTS BY AFFECTED ORGANIZATIONS FOR 2005 AND 2006

Organization	Number of projects				% projects deleted/changed	Investment [1]		Re-weighted investment		Percent change [2]	
	Deleted	Weighting increased	Weighting decreased	No change		2005	2006	2005	2006	2005	2006
Alberta Heritage Foundation for Medical Research	2	6	26	122	22%	\$5,531,172	\$6,636,372	\$4,909,355	\$6,084,743	-11.24	-8.31
Canada Foundation for Innovation	6	23	37	204	24%	\$98,908,324	\$80,405,822	\$95,727,046	\$80,701,936	-3.22	0.37
Canada Research Chairs Program	4	44	23	157	31%	\$15,209,917	\$16,957,083	\$16,549,500	\$18,565,582	8.81	9.49
Canadian Institutes of Health Research	29	14	354	1,666	19%	\$111,737,883	\$124,488,664	\$98,697,734	\$109,236,550	-11.67	-12.25
Canadian Tobacco Control Research Initiative	1	8	25	79	30%	\$1,424,925	\$1,280,348	\$1,536,718	\$1,388,709	7.85	8.46
Fonds de la recherche en santé du Québec	3	0	31	249	12%	\$10,066,617	\$10,322,622	\$9,380,455	\$9,584,478	-6.82	-7.15
Manitoba Health Research Council	2	0	1	25	11%	\$500,265	\$428,680	\$462,615	\$406,587	-7.53	-5.15
Michael Smith Foundation for Health Research	7	2	28	142	21%	\$5,783,544	\$6,621,855	\$5,516,900	\$6,355,182	-4.61	-4.03
Natural Sciences and Engineering Research Council	2	6	15	220	10%	\$4,577,573	\$5,199,487	\$4,372,211	\$5,023,268	-4.49	-3.39
Networks of Centres of Excellence	0	0	1	9	10%	\$680,591	\$1,763,695	\$646,908	\$1,730,035	-4.95	-1.91
Nova Scotia Health Research Council	0	0	3	18	14%	\$320,715	\$401,583	\$271,648	\$339,838	-15.30	-15.38
Saskatchewan Health Research Foundation	1	0	1	22	8%	\$324,768	\$322,258	\$317,968	\$308,292	-2.09	-4.33
Social Sciences and Humanities Research Council	0	3	1	33	11%	\$367,472	\$537,588	\$354,380	\$542,278	-3.56	0.87
<b>TOTAL</b>	<b>57</b>	<b>106</b>	<b>546</b>	<b>2,946</b>	<b>19%</b>	<b>\$255,433,764</b>	<b>\$255,366,056</b>	<b>\$238,743,439</b>	<b>\$240,267,477</b>	<b>-6.53</b>	<b>-5.91</b>

[1] As reported in 2006 data report.

[2] Percentage difference of re-weighted from previously reported investment figures.

## 3. OVERVIEW OF THE 2007 INVESTMENT

In this chapter, several core tables similar to those in the second report are presented. The chapter provides information on the overall investment as well as the investment by types of research, cancer sites, and funding mechanism.

### 3.1 INVESTMENT

The total 2007 investment in terms of peer-reviewed projects was \$402.4M (Table 3.1.1). This does not include an estimated investment of \$9.6M provided by the BC Cancer Foundation to the BC Cancer Agency for research,<sup>1</sup> nor does it include an estimated \$19.6M of cancer-attributable indirect costs based on information provided by the federal government's Indirect Costs Program (see section 3.4).

Of the \$402.4M total 2007 cancer research investment, \$3 of every \$5 were from funding programs administered by the federal government, with CIHR being the single largest investor in cancer research. The investment by the Canadian Cancer Society (CCS) represented nearly 55% of the total voluntary sector investment, and 10.7% of the overall investment. Among the smaller voluntary organizations, it is noteworthy that both the C<sup>17</sup> Research Network and The Leukemia & Lymphoma Society of Canada (LLSC) had over a doubling of their investment from 2005 to 2007.

Although somewhat anomalous in the provincial health research organization sector given its exclusive cancer focus, the Ontario Institute for Cancer Research (OICR) represented 43.7% of the sector investment. The Alberta Cancer Research Institute (ACRI) (which was the Alberta Cancer Board in 2007) accounted for 58.9% of the total provincial cancer agency investment, and is unique in this sector for showing a 130% increase in cancer research investment from 2005 to 2007. Investment by Cancer Care Ontario (CCO) represented 34.9% of this sector's 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).

Although three years is insufficient to indicate a trend (of note, trend analysis will be the focus of a future report), the overall funder sector investment was examined for the three years

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1. According to 2007-08 figures from the BC Cancer Foundation, \$9.6M was provided to the BC Cancer Agency for core research support, and was used to recruit researchers, provide basic lab space, operating costs, and equipment (see *BC Cancer Foundation's Report to Donors 2008*, available at <http://www.bccancerfoundation.com/cms/File/pdf/2008annualreport.pdf>).

as part of a preliminary analysis. As shown in Figure 3.1.1, all sectors except the multi-funded initiatives experienced increased growth in cancer research investment, with the largest percent increase being for provincial cancer agencies. The decreased investment in the multi-funded initiatives was due to the winding down of the Canadian Prostate Cancer Research Initiative (CPCRI) as funding for CBCRA and CTCRI stayed fairly constant over the three years.

Overall investment in 2007 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 40-60% of the total provincial cancer investment. Alberta and to a lesser extent, Saskatchewan, had proportionately more provincial government investment than other provinces. Nova Scotia had proportionately higher investment from the voluntary sector. 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, both exceeding \$80 per million GDP.

TABLE 3.1.1

## 2007 CANCER RESEARCH INVESTMENT BY PARTICIPATING ORGANIZATIONS

Sector [1]	Organization Type	Organization	Number of Projects	2007 Investment	%	2007 Investment with Initiatives included [2]
<b>GOVERNMENT</b> <b>\$311,674,590</b> <b>77%</b>	Federal [3] \$243,220,843 60%	Canada Foundation for Innovation [4]	213	\$79,523,544	19.76	\$79,523,544
		Canada Research Chairs Program	233	\$20,069,417	4.99	\$20,069,417
		Canadian Institutes of Health Research	1,686	\$115,561,353	28.71	\$117,318,382
		Genome Canada [5]	7	\$16,697,223	4.15	\$16,697,223
		National Research Council	15	\$3,416,418	0.85	\$3,416,418
		Natural Sciences and Engineering Research Council	274	\$5,647,575	1.40	\$5,647,575
		Networks of Centres of Excellence [6]	17	\$1,616,755	0.40	\$1,616,755
		Social Sciences and Humanities Research Council	41	\$688,560	0.17	\$688,560
	Provincial Cancer Agency \$24,741,784 6%	Alberta Cancer Research Institute [7]	223	\$14,564,897	3.62	\$14,564,897
		BC Cancer Agency [8]	–	–	–	–
		CancerCare Manitoba	51	\$1,068,240	0.27	\$1,068,240
		Cancer Care Nova Scotia	11	\$150,000	0.04	\$150,000
		Cancer Care Ontario	19	\$8,633,988	2.15	\$8,633,988
		Saskatchewan Cancer Agency	6	\$324,659	0.08	\$324,659
	Provincial Health Research Organization \$43,711,963 11%	Alberta Heritage Foundation for Medical Research	126	\$6,159,480	1.53	\$6,159,480
		Fonds de la recherche en santé du Québec	248	\$9,692,910	2.41	\$9,692,910
		Manitoba Health Research Council	30	\$446,837	0.11	\$446,837
		Medical Research Fund of New Brunswick	3	\$15,000	0.00	\$15,000
		Michael Smith Foundation for Health Research	174	\$7,624,999	1.89	\$7,624,999
		Nova Scotia Health Research Foundation	24	\$375,285	0.09	\$375,285
		Ontario Institute for Cancer Research	66	\$19,081,598	4.74	\$19,081,598
	Saskatchewan Health Research Foundation	17	\$315,854	0.08	\$315,854	
	<b>VOLUNTARY</b> <b>\$79,394,216</b> <b>20%</b>	Brain Tumour Foundation of Canada	11	\$142,610	0.04	\$142,610
C <sup>17</sup> Research Network		7	\$185,731	0.05	\$185,731	
Canadian Association of Radiation Oncology		20	\$261,700	0.07	\$261,700	
Canadian Breast Cancer Foundation		134	\$6,418,304	1.59	\$8,647,173	
Canadian Cancer Society [9]		576	\$43,225,715	10.74	\$46,197,675	
Canary Foundation of Canada [10]		5	\$607,500	0.15	\$607,500	
Ovarian Cancer Canada		10	\$195,938	0.05	\$195,938	
Prostate Cancer Canada [11]		42	\$992,468	0.25	\$992,468	
Quebec Breast Cancer Foundation/Fondation du cancer du sein du Québec		3	\$533,333	0.13	\$533,333	
The Cancer Research Society		145	\$6,248,083	1.55	\$6,402,800	
The Kidney Foundation of Canada		3	\$105,000	0.03	\$105,000	
The Leukemia & Lymphoma Society of Canada		46	\$1,133,943	0.28	\$1,133,943	
The Terry Fox Foundation [9]		212	\$19,343,890	4.81	\$19,343,890	
<b>MULTI-FUNDED [12]</b> <b>\$11,379,384</b> <b>3%</b>	Canadian Breast Cancer Research Alliance	98	\$9,540,847	2.37	\$4,148,549	
	Canadian Prostate Cancer Research Initiative	1	\$266,298	0.07	\$0	
	Canadian Tobacco Control Research Initiative	71	\$1,572,239	0.39	\$118,260	
<b>TOTAL</b>			<b>4,868</b>	<b>\$402,448,190</b>	<b>100</b>	<b>\$402,448,190</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 to the investment made in the projects that the four organizations administered themselves. 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 "2007 Investment" column.

[3] This figure does not include the cancer-relevant estimate for the federal Indirect Costs Program (\$19.6M), which is discussed in section 3.4.

[4] Federal government contribution to the CFI projects was \$31.8M.

[5] Federal government contribution to the Genome Canada projects was \$8.1M.

[6] NCE figure does not include funding from CIHR, NSERC or SSHRC for network management and activities. It reflects the investment in cancer-relevant projects supported by specific networks.

[7] As of April 1, 2009, the Alberta Cancer Board and 11 other provincial health authorities joined together to form Alberta Health Services (AHS). The grants and awards program funded by the Alberta Cancer Foundation and the Cancer Prevention Legacy endowment are now under the Alberta Cancer Research Institute banner.

[8] BC Cancer Agency did not contribute data to the 2007 survey. According to 2007-08 figures from the BC Cancer Foundation, \$9.6M was provided to the BC Cancer Agency for core research support, and was used to recruit researchers, and provide basic lab space, operating costs, and equipment (see BC Cancer Foundation's *Report to Donors 2008*, available at <http://www.bccancerfoundation.com/cms/File/pdf/2008annualreport.pdf>).

[9] These research programs were administered by the National Cancer Institute of Canada (NCIC), which ceased operation on January 31, 2009.

[10] The Canary Foundation of Canada became a registered Canadian charity on January 30, 2008. Included are Canadian research projects funded by the U.S. parent organization prior to this time.

[11] As of May 4, 2009, the Prostate Cancer Research Foundation of Canada is now known as Prostate Cancer Canada.

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

TABLE 3.1.2

**2007 CANCER RESEARCH INVESTMENT OF 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	\$629,521	\$2,228,869	\$2,379,191	\$154,717	\$4,148,549	\$9,540,847
Canadian Prostate Cancer Research Initiative	–	–	\$266,298	–	–	\$266,298
Canadian Tobacco Control Research Initiative	\$1,127,509	–	\$326,471	–	\$118,260	\$1,572,239
<b>TOTAL</b>	<b>\$1,757,030</b>	<b>\$2,228,869</b>	<b>\$2,971,960</b>	<b>\$154,717</b>	<b>\$4,266,809</b>	<b>\$11,379,384</b>

- [1] Within CIHR’s open operating grants competition, \$4.9M was invested in breast cancer research in 2007 which was de facto attributed to CBCRA. This investment is included in the \$115,561,353 figure shown in Table 3.1.1, and not in this table. The combined CIHR investment in CBCRA for 2007 (CBCRA-administered plus CIHR-administered funding programs) was \$5,500,683.
- [2] Includes Avon Canada (\$0.95M), Breast Cancer Society of Canada (\$0.11M), CURE Foundation (\$0.23M), and the Public Health Agency of Canada (PHAC) (\$2.97M, which represents \$2.85M for CBCRA and \$0.12M for CTCRI).

FIGURE 3.1.1

**CANCER RESEARCH INVESTMENT BY FUNDER SECTOR IN DOLLARS AND PERCENT CHANGE FROM 2005-2007**

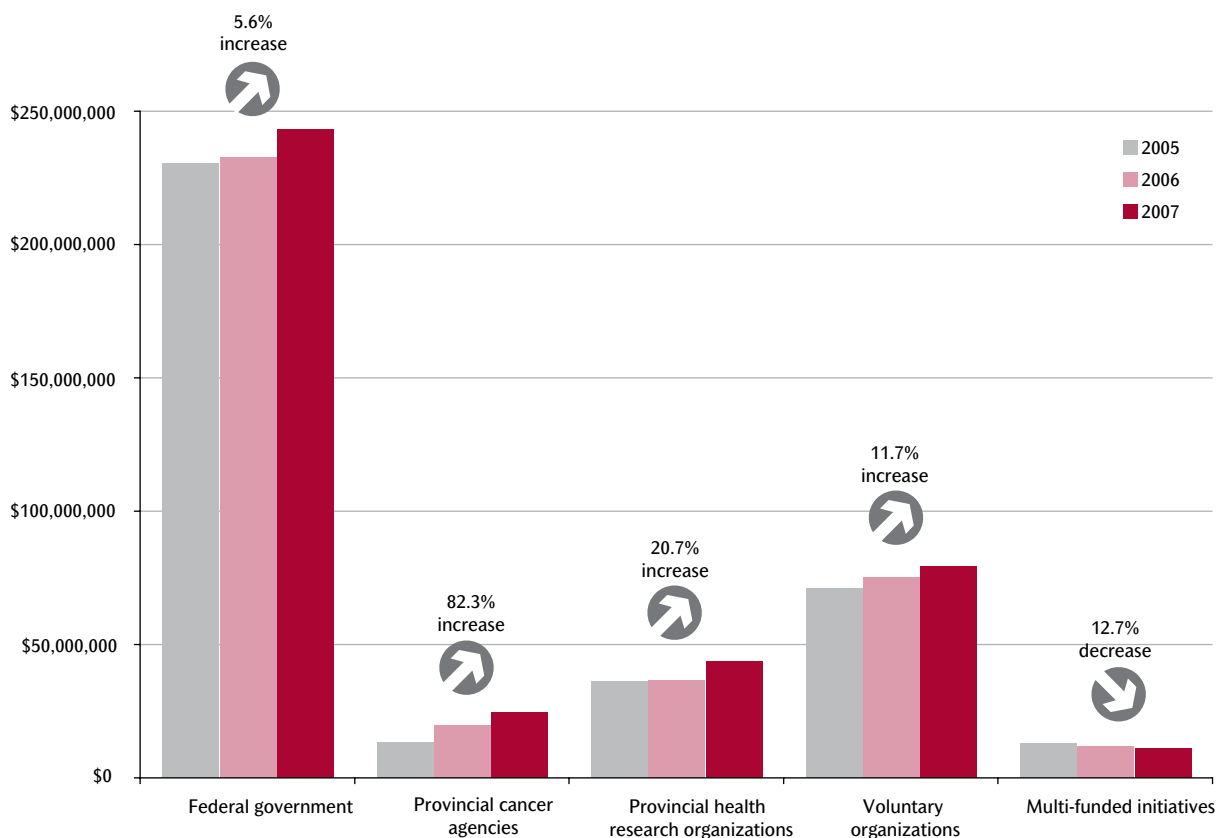


FIGURE 3.1.2

**2007 CANCER RESEARCH INVESTMENT BY PROVINCE OF PI/PL IN DOLLARS  
AND PER CAPITA INVESTMENT (\$398.5M) [1,2]**



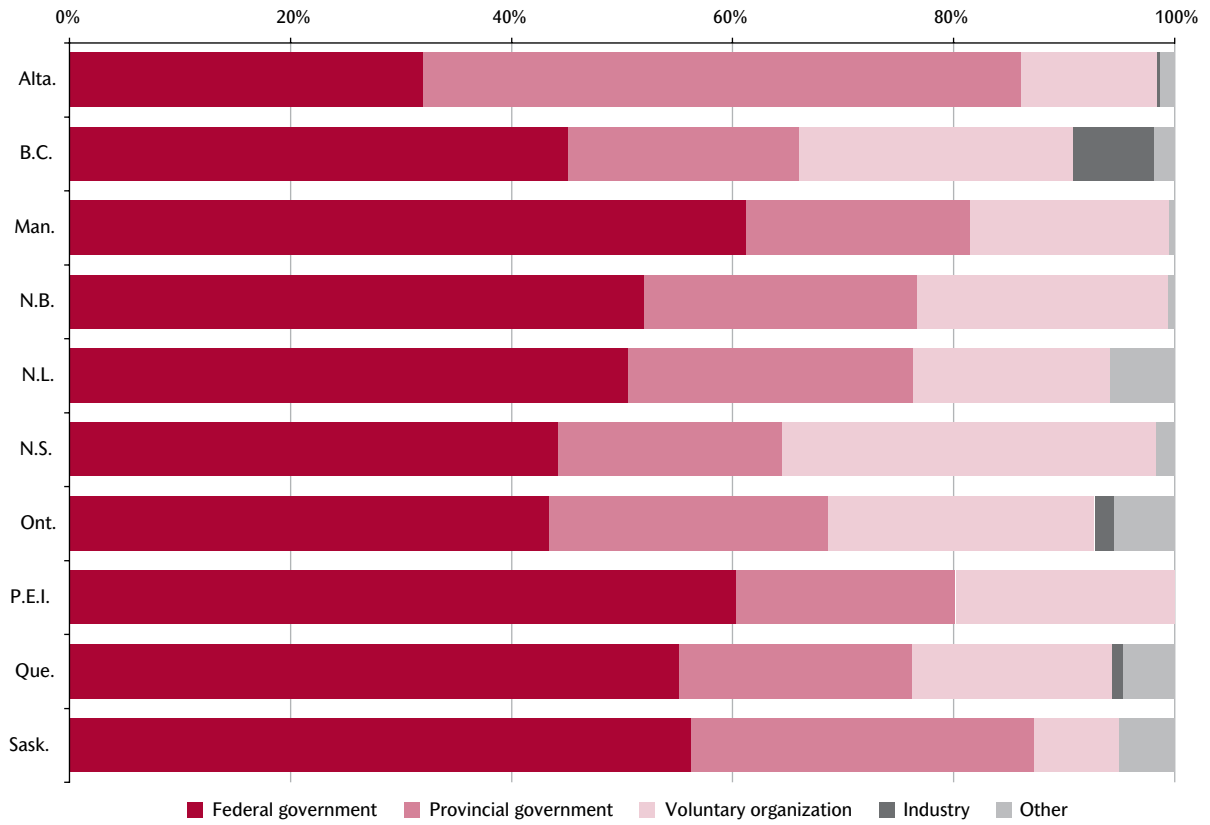
[1] Excludes \$3.9M invested in trainee awards to trainees studying outside of Canada, the estimate of the cancer-related component of the federal government's Indirect Cost program as well as estimates of cancer research investment by the BC Cancer Agency.

[2] Provincial population figures based on July 1, 2007 estimates from Statistics Canada (<http://www40.statcan.gc.ca/101/cst01/demo02a-eng.htm>) 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 which impact provincial cancer research investment.



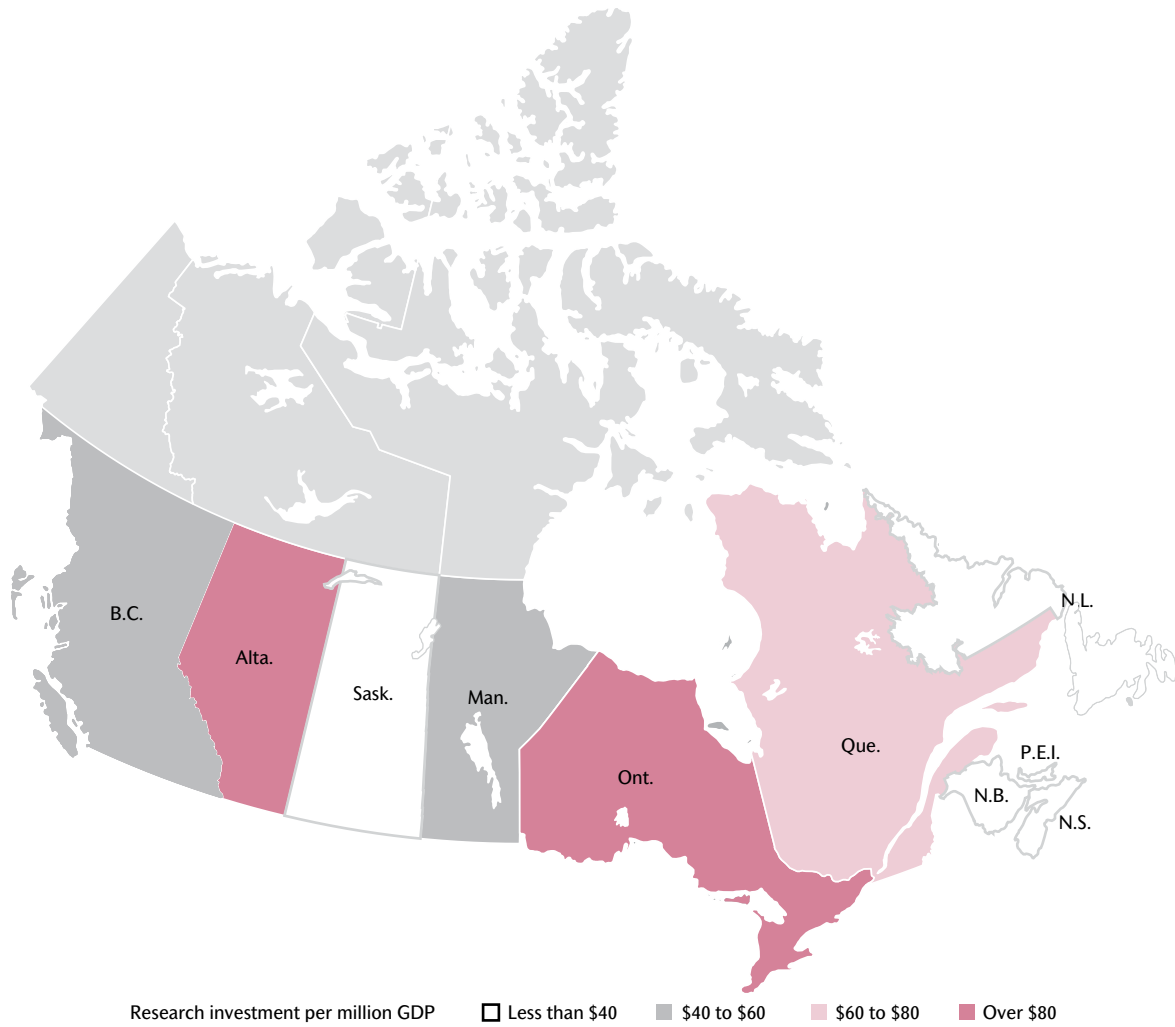
FIGURE 3.1.3

**DISTRIBUTION OF 2007 CANCER RESEARCH INVESTMENT BY FUNDING SOURCE FOR EACH PROVINCE (\$398.5M) [1]**



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

FIGURE 3.1.4

**2007 CANCER RESEARCH INVESTMENT BY PROVINCIAL GOVERNMENTS  
PER MILLION ESTIMATED GDP FOR 2007 [1]**

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

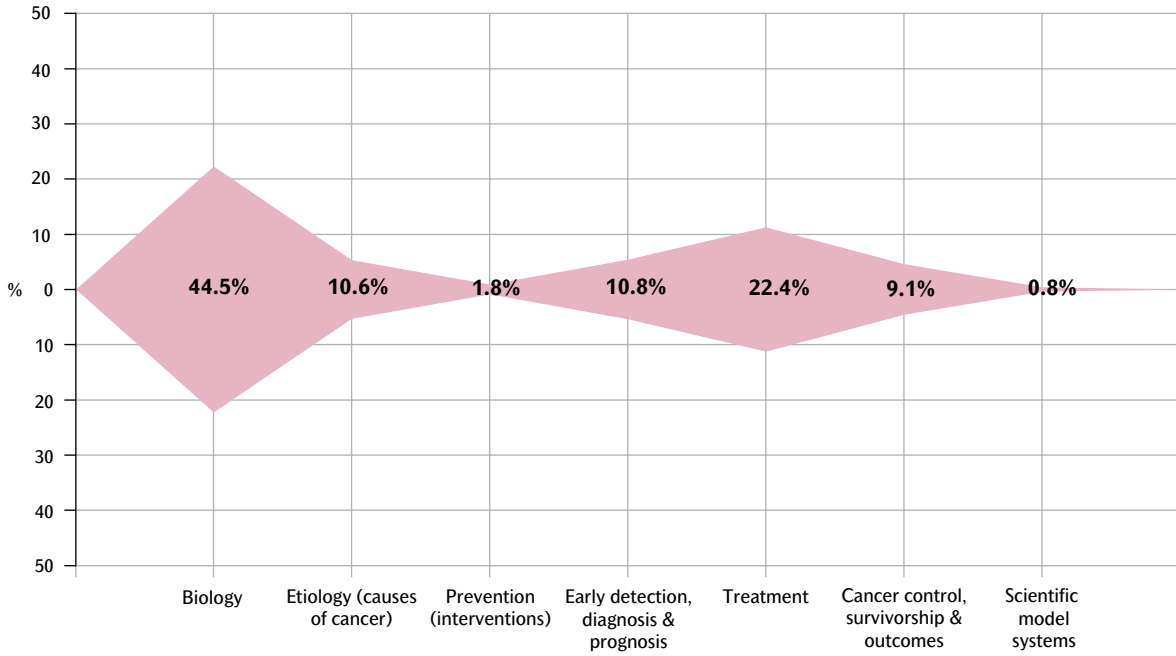
## 3.2 TYPES OF RESEARCH

The CSO distribution for the overall 2007 investment is summarized in Figure 3.2.1 and nearly mirrored the distribution for 2006. Individual kite diagrams are presented for each of the 37 participating organizations 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 three years of data, please refer to Appendix D.) Nearly 40% of the overall investment was in three research areas: normal biology (code 1.1 at 16.0%); discovery and development of systemic therapies (code 5.3 at 12.5%); and oncogenes and tumour suppressor genes (code 1.3 at 11.7%).

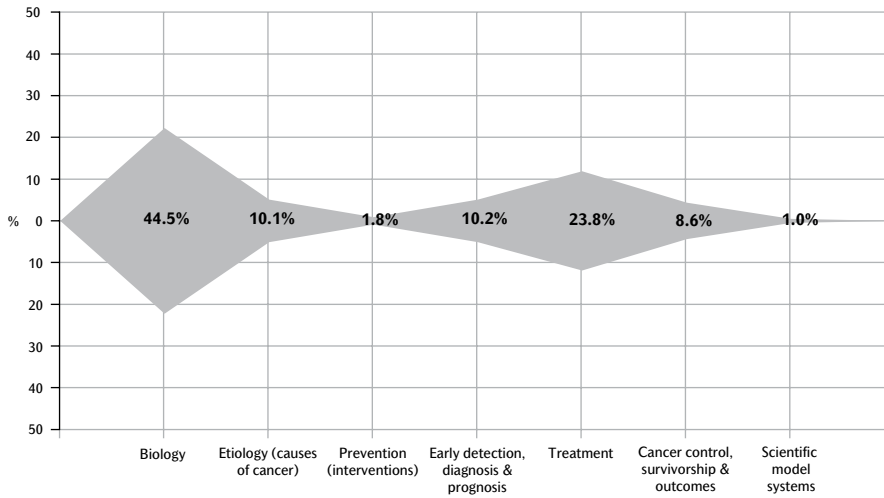
Figure 3.2.3 shows the distribution of CSO categories for each province of the PI/PL. In most provinces, Biology represented the largest proportionate investment. This was especially the case in Quebec (54.5% of the investment was in Biology). British Columbia had the most diversely spread distribution when compared with the other provinces. The graph shows that the PEI investment was largely in Prevention (59.8%), but this was based on only four projects and fluctuated from year to year (i.e. Prevention investment was 11.6% of the total in 2005 and 33.5% of the total in 2006).

FIGURE 3.2.1

**DISTRIBUTION OF 2007 CANCER RESEARCH INVESTMENT BY CSO CATEGORY (\$402.4M)**



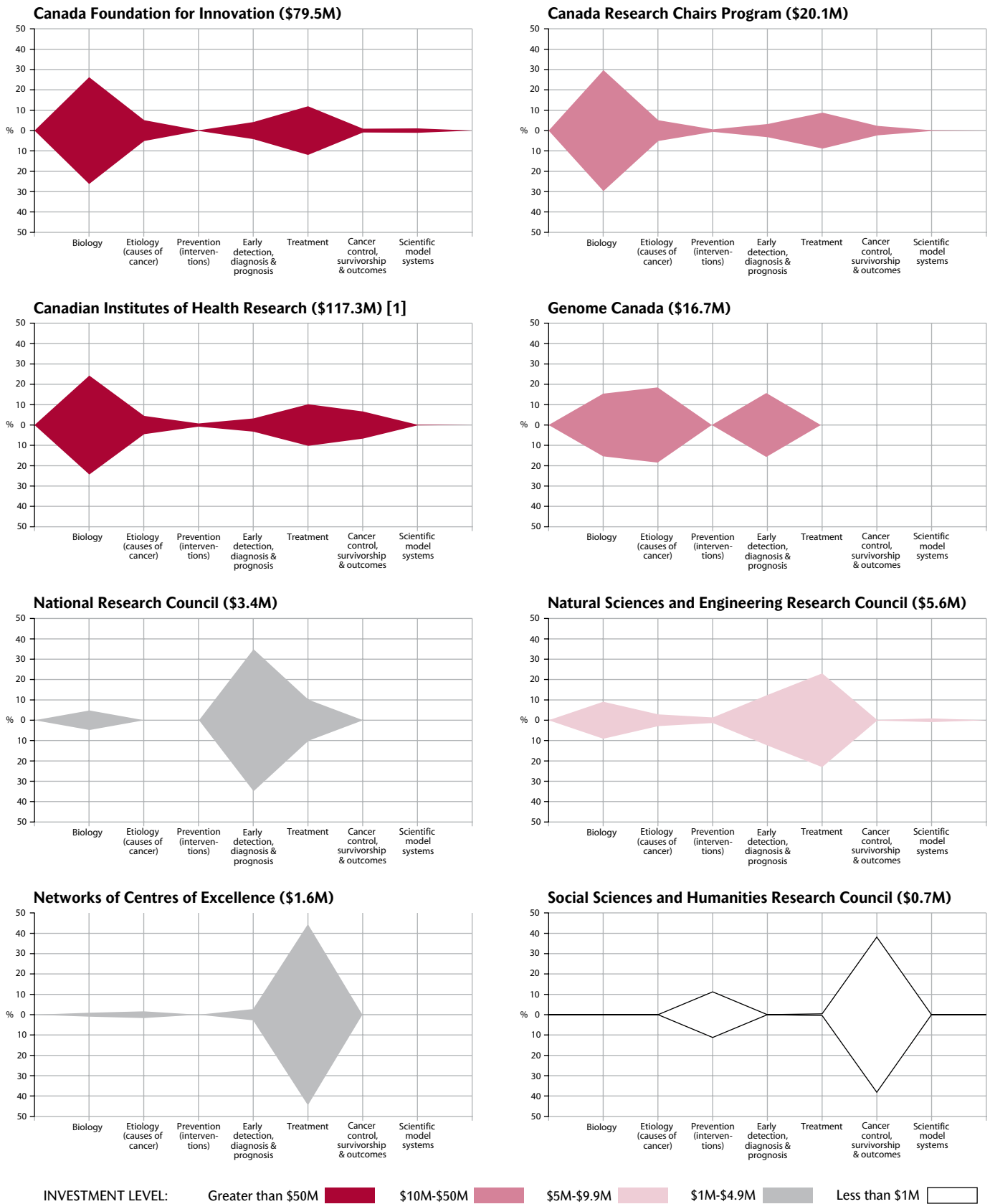
**DISTRIBUTION OF 2006 CANCER RESEARCH INVESTMENT BY CSO CATEGORY (\$376.4M) [1]**

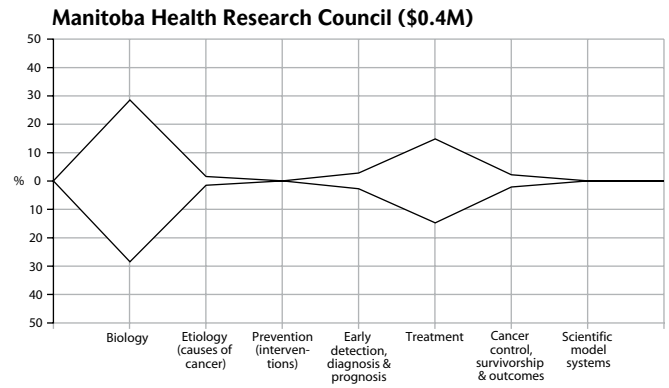
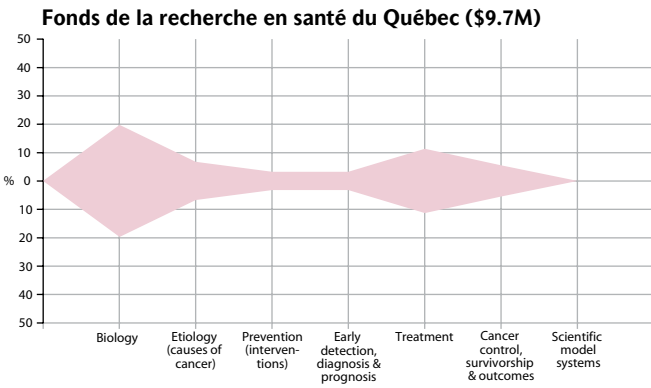
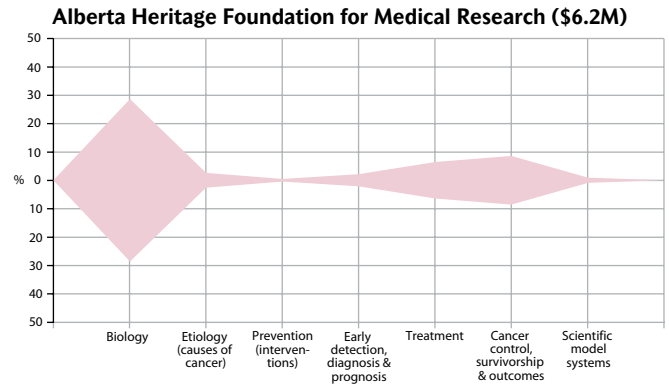
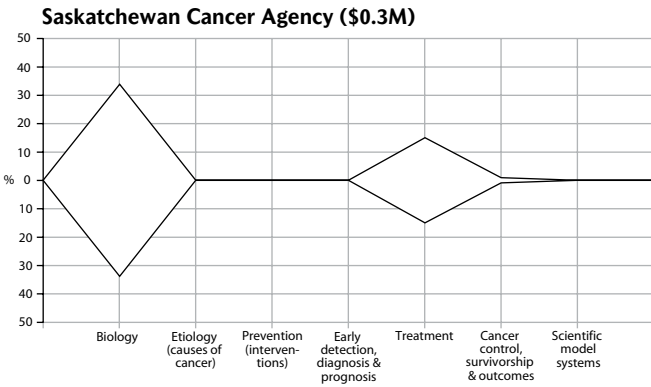
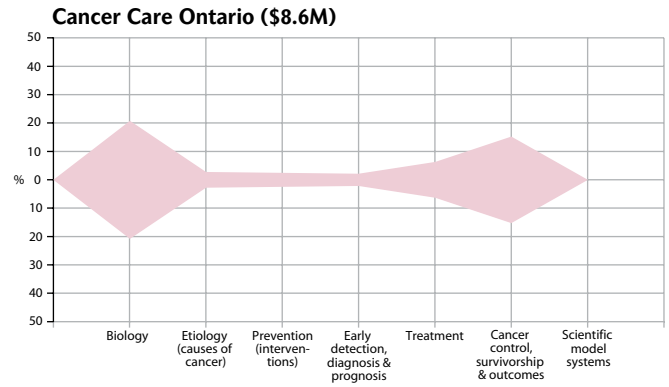
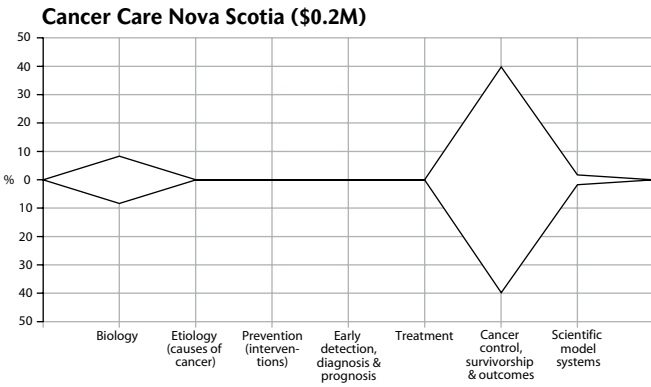
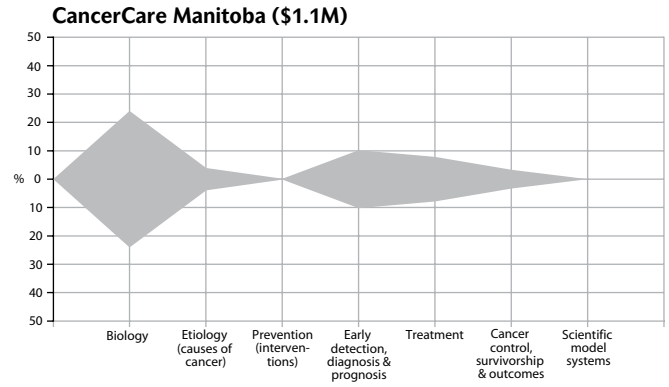
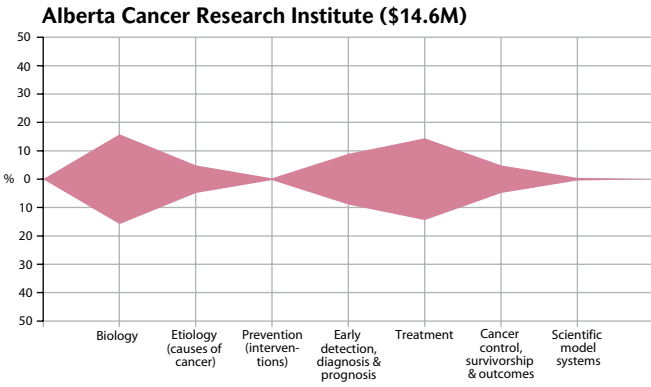


[1] This is based on updated investment figures, and varies from previously published data.

FIGURE 3.2.2

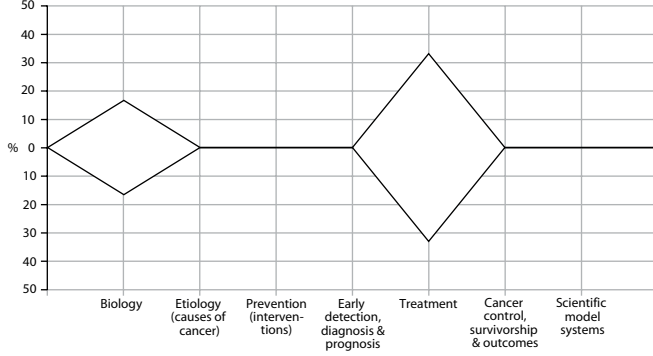
DISTRIBUTION OF 2007 CANCER RESEARCH INVESTMENT FOR PARTICIPATING ORGANIZATIONS BY CSO CATEGORY



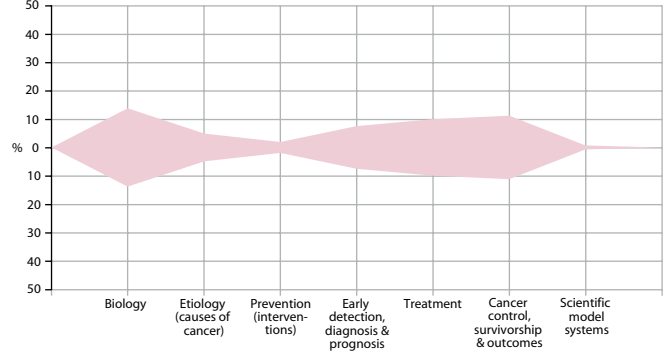


INVESTMENT LEVEL: Greater than \$50M  \$10M-\$50M  \$5M-\$9.9M  \$1M-\$4.9M  Less than \$1M

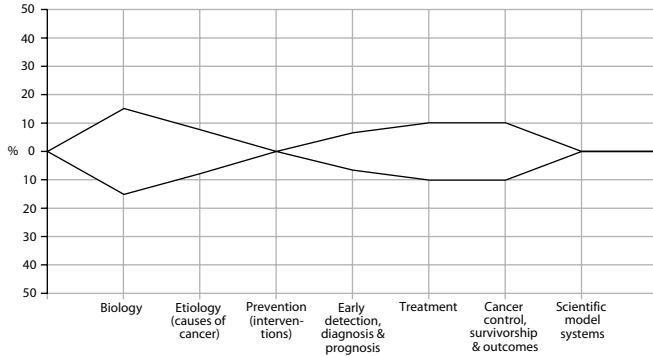
**Medical Research Fund of New Brunswick (\$15,000)**



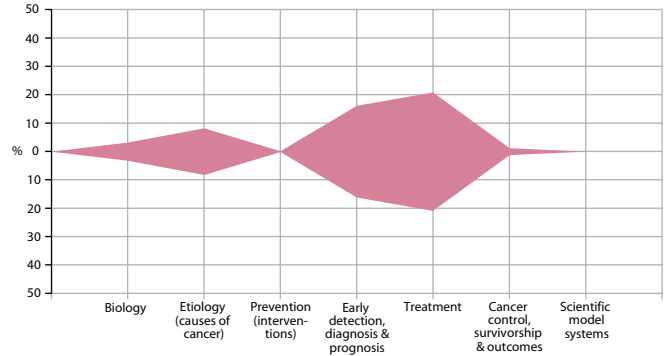
**Michael Smith Foundation for Health Research (\$7.6M)**



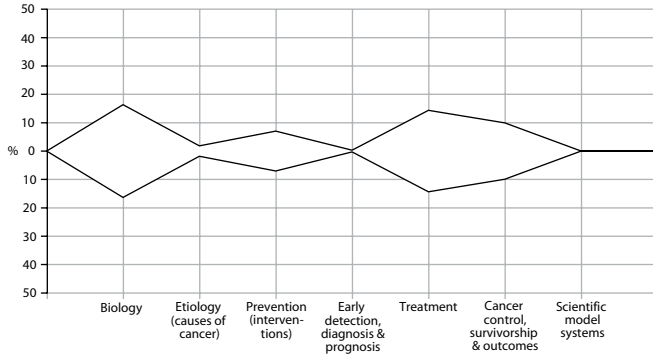
**Nova Scotia Health Research Foundation (\$0.4M)**



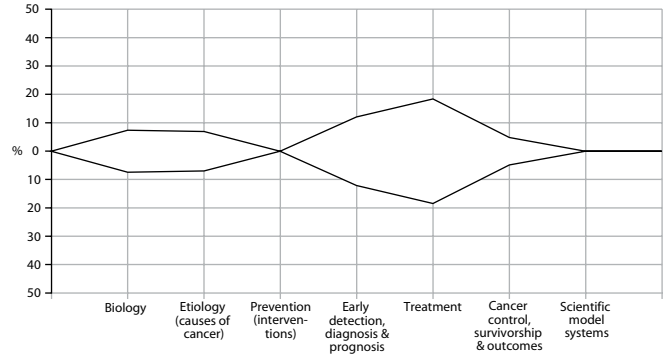
**Ontario Institute for Cancer Research (\$19.1M)**



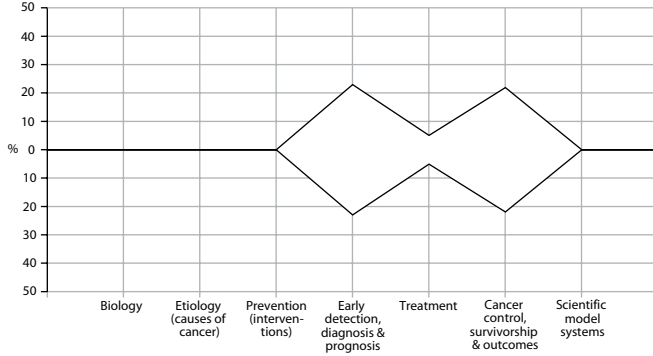
**Saskatchewan Health Research Foundation (\$0.3M)**



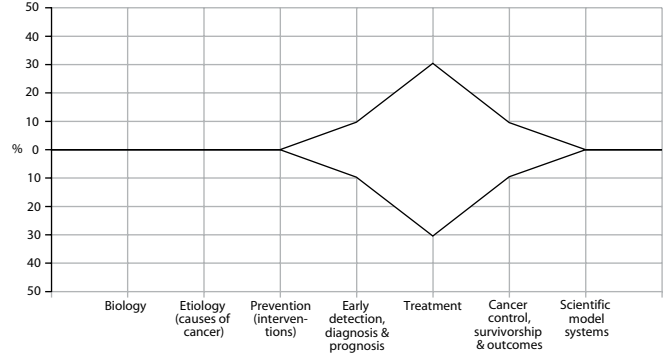
**Brain Tumour Foundation of Canada (\$0.1M)**



**C<sup>17</sup> Research Network (\$0.2M)**

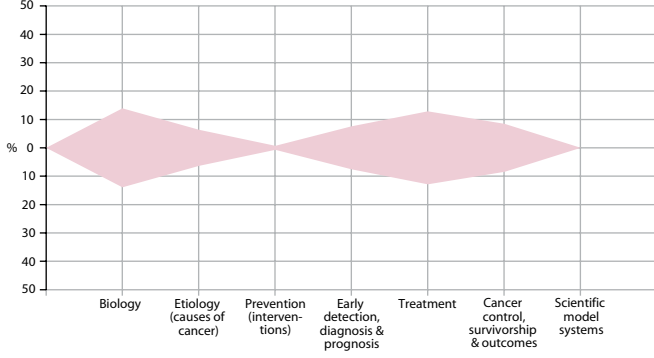


**Canadian Association of Radiation Oncology (\$0.3M)**

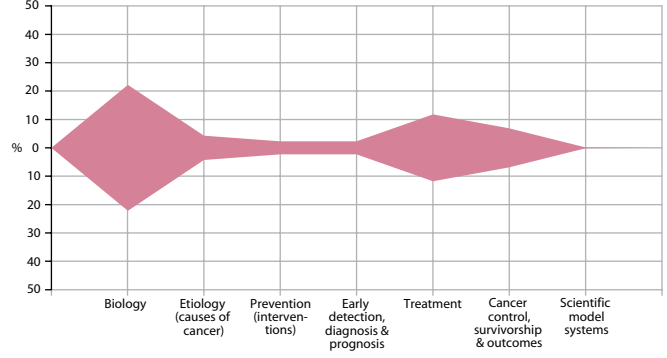


INVESTMENT LEVEL:      Greater than \$50M      \$10M-\$50M      \$5M-\$9.9M      \$1M-\$4.9M      Less than \$1M

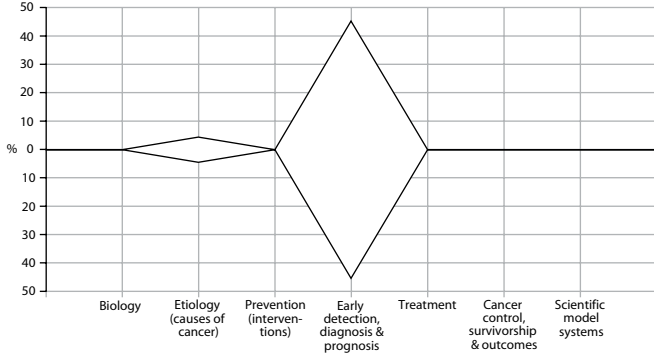
**Canadian Breast Cancer Foundation (\$8.6M) [1]**



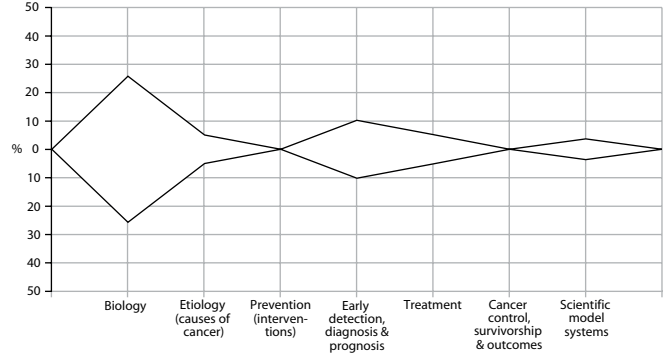
**Canadian Cancer Society (\$46.2M) [1]**



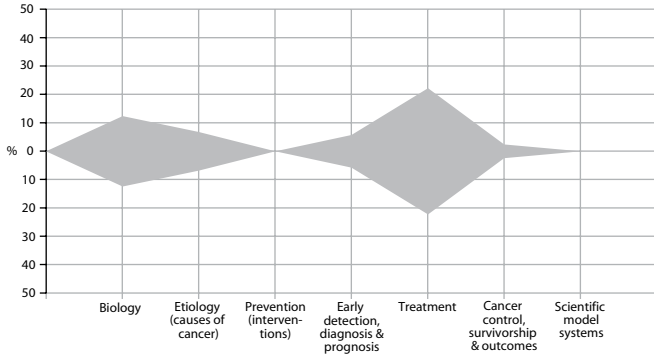
**Canary Foundation of Canada (\$0.6M)**



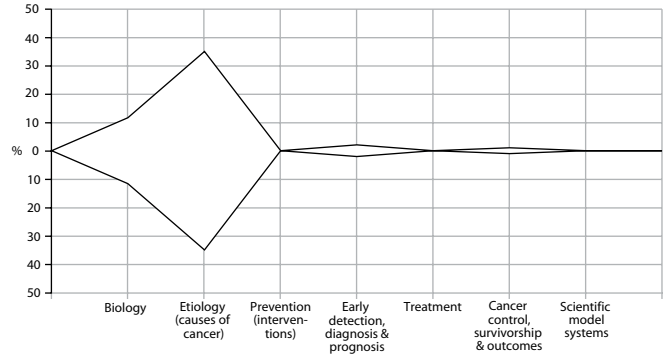
**Ovarian Cancer Canada (\$0.2M)**



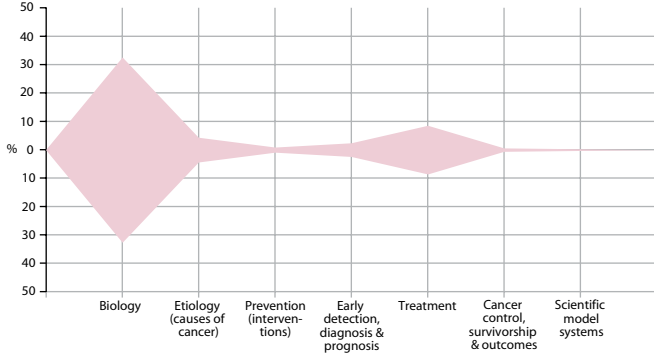
**Prostate Cancer Canada (\$1.0M)**



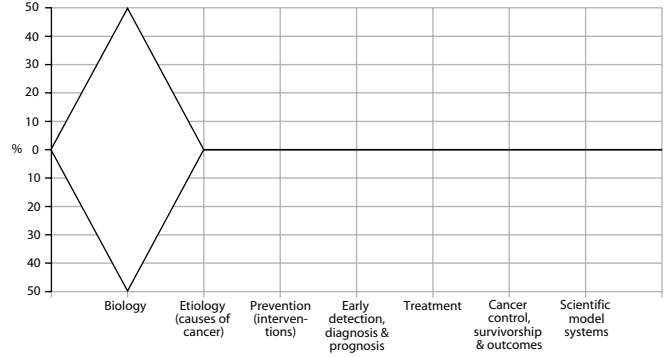
**Quebec Breast Cancer Foundation/Fondation du cancer du sein du Québec (\$0.5M)**



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



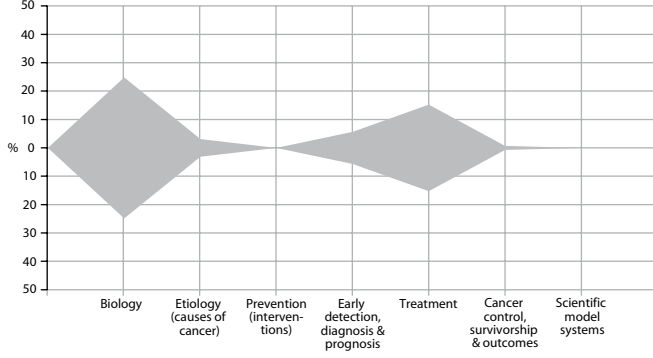
**The Kidney Foundation of Canada (\$0.1M)**



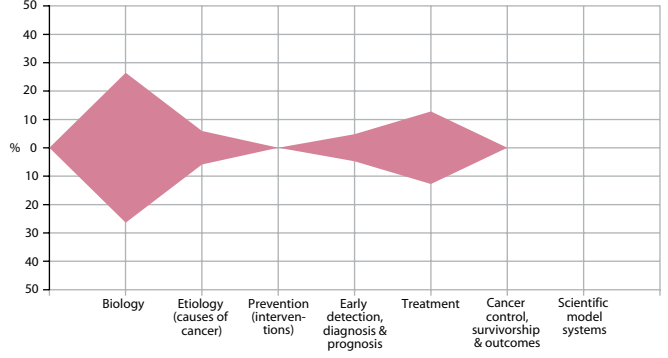
INVESTMENT LEVEL: Greater than \$50M  \$10M-\$50M  \$5M-\$9.9M  \$1M-\$4.9M  Less than \$1M



**The Leukemia & Lymphoma Society of Canada (\$1.1M)**

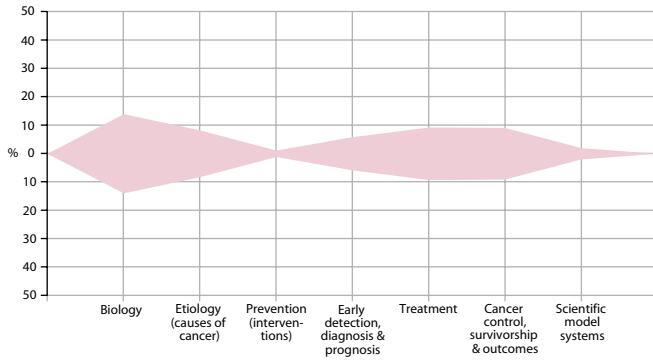


**The Terry Fox Foundation (\$19.3M)**

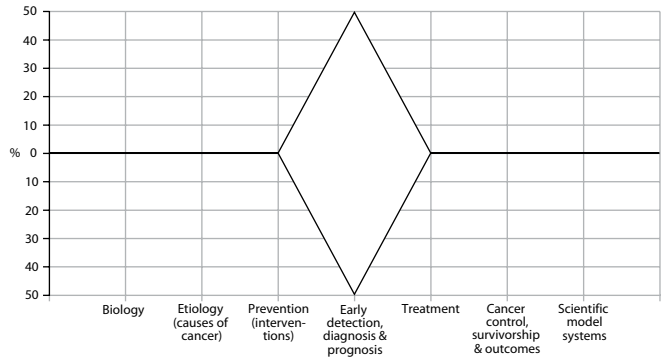


**MULTI-FUNDED INITIATIVES**

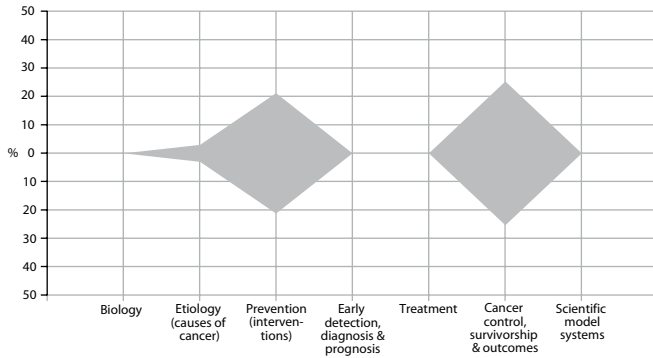
**Canadian Breast Cancer Research Alliance (\$9.5M)**



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



**Canadian Tobacco Control Research Initiative (\$1.6M)**



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

[1] Distributions shown for CIHR, CBCF, CCS and CRS include investment in initiatives; thus total dollars shown in parentheses will add to more than \$402.4M.

TABLE 3.2.1

**DISTRIBUTION OF 2007 CANCER RESEARCH INVESTMENT BY CSO CODES**

CSO Category	CSO Code [1]	2007 Investment	% Total Investment	% Category Investment
<b>1 - BIOLOGY</b> <b>\$179,195,863</b> <b>44.53%</b>	1.1 - Normal functioning	\$64,458,426	16.02	35.97
	1.2 - Cancer initiation: alterations in chromosomes	\$9,373,089	2.33	5.23
	1.3 - Cancer initiation: oncogenes and tumour suppressor genes	\$47,205,335	11.73	26.34
	1.4 - Cancer progression and metastasis	\$25,790,992	6.41	14.39
	1.5 - Resources and infrastructure	\$32,368,021	8.04	18.06
<b>2 - ETIOLOGY (CAUSES OF CANCER)</b> <b>\$42,535,387</b> <b>10.57%</b>	2.1 - Exogenous factors [2] in the origin and cause of cancer	\$11,322,190	2.81	26.62
	2.2 - Endogenous factors [3] in the origin and cause of cancer	\$21,111,258	5.25	49.63
	2.3 - Interactions of genes and/or genetic polymorphisms [4] with exogenous and/or endogenous factors	\$2,590,079	0.64	6.09
	2.4 - Resources and infrastructure	\$7,511,859	1.87	17.66
<b>3 - PREVENTION (INTERVENTIONS)</b> <b>\$7,049,498</b> <b>1.75%</b>	3.1 - Interventions to prevent cancer: personal behaviours that affect cancer risk	\$3,696,682	0.92	52.44
	3.2 - Nutritional science in cancer prevention	\$622,856	0.15	8.84
	3.3 - Chemoprevention	\$567,852	0.14	8.06
	3.4 - Vaccines	\$362,053	0.09	5.14
	3.5 - Complementary and alternative prevention approaches	\$357,125	0.09	5.07
	3.6 - Resources and infrastructure	\$1,442,931	0.36	20.47
<b>4 - EARLY DETECTION, DIAGNOSIS &amp; PROGNOSIS</b> <b>\$43,382,278</b> <b>10.78%</b>	4.1 - Technology development and/or marker discovery	\$18,457,387	4.59	42.55
	4.2 - Technology and/or marker evaluation with respect to fundamental parameters of method	\$7,918,762	1.97	18.25
	4.3 - Technology and/or marker testing in a clinical setting	\$5,285,889	1.31	12.18
	4.4 - Resources and infrastructure	\$11,720,239	2.91	27.02
<b>5 - TREATMENT</b> <b>\$90,402,915</b> <b>22.46%</b>	5.1 - Localized therapies [5] – discovery and development	\$6,024,885	1.50	6.66
	5.2 - Localized therapies – clinical applications	\$3,662,906	0.91	4.05
	5.3 - Systemic therapies [6] – discovery and development	\$50,134,377	12.46	55.46
	5.4 - Systemic therapies – clinical applications	\$7,378,062	1.83	8.16
	5.5 - Combinations of localized and systemic therapies	\$681,517	0.17	0.75
	5.6 - Complementary and alternative treatment approaches	\$236,248	0.06	0.26
	5.7 - Resources and infrastructure	\$22,284,919	5.54	24.65
<b>6 - CANCER CONTROL, SURVIVORSHIP &amp; OUTCOMES RESEARCH</b> <b>\$36,622,595</b> <b>9.10%</b>	6.1 - Patient care and survivorship issues	\$10,296,159	2.56	28.11
	6.2 - Surveillance	\$2,311,612	0.57	6.31
	6.3 - Behaviour	\$5,212,877	1.30	14.23
	6.4 - Cost analyses and healthcare delivery	\$5,824,913	1.45	15.91
	6.5 - Education and communication	\$2,378,856	0.59	6.50
	6.6 - End-of-life care	\$3,620,621	0.90	9.89
	6.7 - Ethics and confidentiality in cancer research	\$162,155	0.04	0.44
	6.8 - Complementary and alternative approaches for supportive care of patients and survivors	\$476,828	0.12	1.30
	6.9 - Resources and infrastructure	\$6,338,575	1.58	17.31
<b>7 - SCIENTIFIC MODEL SYSTEMS</b> <b>\$3,259,655</b> <b>0.81%</b>	7.1 - Development and characterization of model systems [7]	\$2,817,029	0.70	86.42
	7.2 - Application of model systems	\$0	0.00	0.00
	7.3 - Resources and infrastructure	\$442,626	0.11	13.58

[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 which are involved in the origins and causes of cancer.

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

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

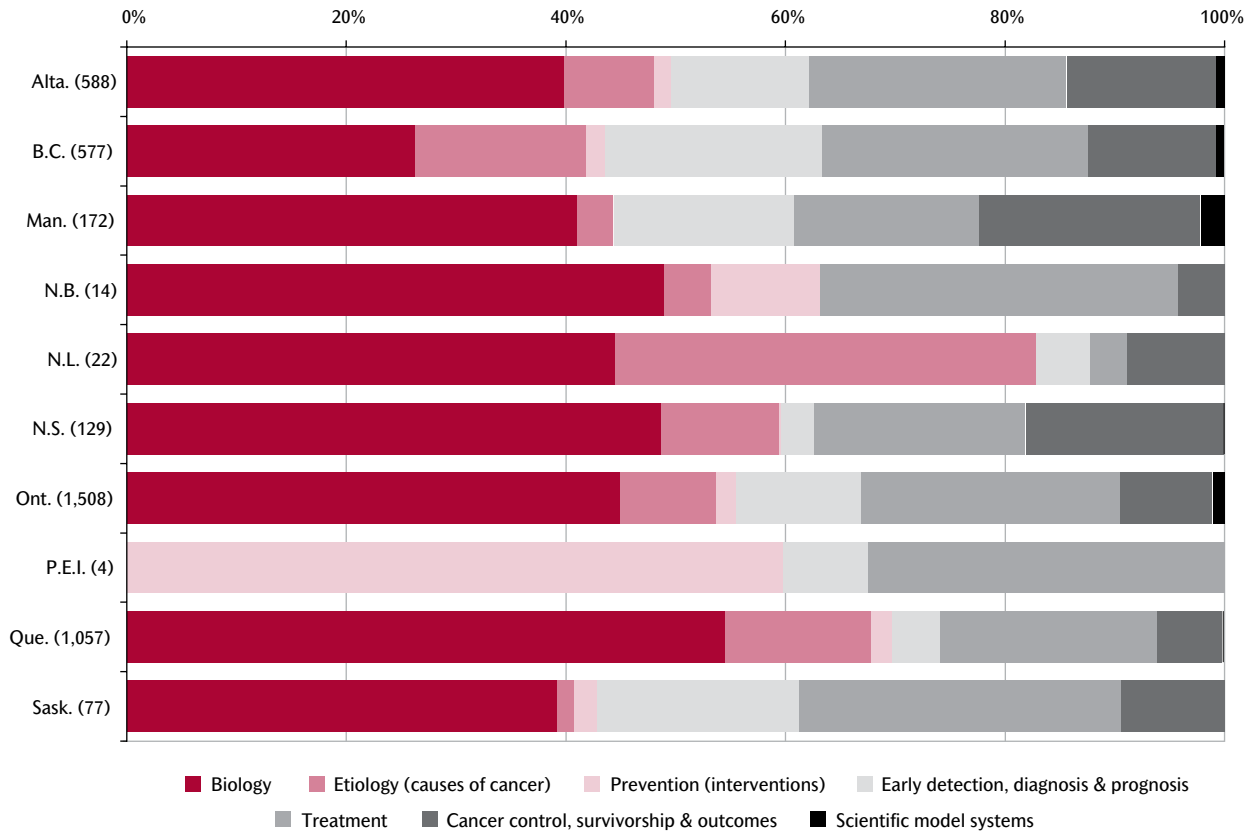
[5] Localized treatments: Treatments which are administered locally (such as radiotherapy and surgery).

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

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

FIGURE 3.2.3

**DISTRIBUTION OF 2007 CANCER RESEARCH INVESTMENT FOR PROVINCE OF PI/PL BY CSO CATEGORY (\$398.5M) [1]**



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

### 3.3 CANCER SITES

A detailed breakdown of the 2007 investment by cancer site is provided in Table 3.3.1. Just over half (51.0%) of the investment was not site specific (i.e. applicable to all cancers). Breast cancer (\$54.6M), leukemia (\$23.7M) and prostate cancer (\$17.2M) had the greatest share of the site-specific investment. The federal government investment accounted for the majority of individual site-specific investments (Table 3.3.2). The proportion of voluntary sector investment in the following sites exceeded 40%: pancreas (59.5%), kidney (58.3%), Hodgkin's disease (44.3%), bladder (44.5%), and liver (41.8%).

In terms of how the investment relates to indicators of burden of disease (see sidebar 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 ten-year prevalence).<sup>2</sup> Another view of the data are shown in the bubble chart (Figure 3.3.2). Here cancer sites are shown 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).

#### 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 2005, 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 2004, 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 Surveillance Action Group of the Canadian Partnership Against Cancer,<sup>2</sup> will provide valuable information to address this bias.

1. Dickman PW & Adami H-O. (2006). Interpreting trends in cancer patient survival. *Journal of Internal Medicine*, 260:103-107.
2. See <http://www.partnershipagaincancer.ca/staging>.

2. Ellison, LF & Wilkins, K. (2009). Cancer prevalence in the Canadian population. *Health Reports*, 20(1):7-19. Ottawa: Statistics Canada. Cat No 82-003-XPE. Available at <http://www.statcan.gc.ca/pub/82-003-x/2009001/article/10800-eng.pdf>.

Together these figures show that breast cancer research, representing \$1 of every \$4 spent on site-specific cancer research, fared well when compared against the various burden of disease indicators. Research investment in lung, colorectal, and prostate cancers was relatively low. A recently published analysis of the productivity costs of cancer mortality in the US found that death from lung cancer alone accounted for more than a quarter of the total costs.<sup>3</sup> The authors concluded that a reduction in lung cancer mortality would offer the greatest reduction in productivity costs associated with cancer.

Kite diagrams are presented for eight selected cancer sites in Figure 3.3.3. Lung cancer, which represents a high proportion of new cancer cases and the highest proportion of cancer deaths, is both difficult to detect in its early stages and successfully treat.<sup>4</sup> This is reflected in the research investment distribution which was spread among the CSO areas of Early Diagnosis, Detection & Prognosis, Cancer Control, Survivorship & Outcomes, and Treatment. This contrasted sharply with prostate cancer, where 44.4% of the research investment was in Treatment—the current challenge being how to identify which men may be cured with treatment, and which men do not require treatment and should not be exposed to the morbidities associated with treatment.<sup>5</sup> Other treatment-dominant distributions were found for bladder and pancreas cancers. Leukemia research, and to a lesser breast cancer research, were characterized by a high proportion of investment in Biology. Nearly 60% of the investment in colorectal cancer research was in Biology and Etiology.

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3. Bradley, CJ et al. (2008). Productivity costs of cancer mortality in the United States, 2000-2020. *Journal of the National Cancer Institute*, 100(24):1763- 1770. Available at <http://jnci.oxfordjournals.org/cgi/content/full/100/24/1763>.
  4. Molina, JR et al. (2008). Non-small cell lung cancer: Epidemiology, risk factors, treatment, and survivorship. *Mayo Clinic Proceedings*, 83(5):584-594. Available at <http://www.mayoclinicproceedings.com/content/83/5/584.long>.
  5. Taichman, RS, Loberg, RD, Mehra, R & Pienta, KJ. (2007). The evolving biology and treatment of prostate cancer. *Journal of Clinical Investigation*, 117(9):2351-2361. Available at <http://www.jci.org/articles/view/31791>.

TABLE 3.3.1

## 2007 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							
	2007 Investment	%	2007 Investment	%	2007 Investment	%	2007 Investment	%	2007 Investment	%	2007 Investment	%
Bladder	\$331,729	0.14	\$3,724	0.02	\$169,482	0.39	\$404,523	0.51	\$0	0.00	\$909,458	0.23
Bone and connective tissue	\$1,031,894	0.42	\$50,530	0.20	\$336,158	0.77	\$494,103	0.62	\$0	0.00	\$1,912,685	0.48
Brain	\$9,207,517	3.79	\$975,064	3.94	\$1,120,017	2.56	\$3,817,920	4.81	\$0	0.00	\$15,120,518	3.76
Breast	\$25,119,234	10.33	\$4,025,486	16.27	\$2,596,777	5.94	\$13,671,105	17.22	\$9,216,004	80.99	\$54,628,606	13.57
Cervix	\$2,586,823	1.06	\$108,371	0.44	\$608,027	1.39	\$1,193,322	1.50	\$0	0.00	\$4,496,543	1.12
Colorectal	\$8,677,283	3.57	\$416,975	1.69	\$1,170,287	2.68	\$3,335,279	4.20	\$0	0.00	\$13,599,823	3.38
Esophagus	\$800,696	0.33	\$0	0.00	\$42,301	0.01	\$271,480	0.34	\$234,586	2.06	\$1,349,063	0.34
Gall bladder	\$0	0.00	\$0	0.00	\$0	0.00	\$0	0.00	\$0	0.00	\$0	0.00
Hodgkin's disease	\$352,090	0.14	\$833	0.00	\$201,187	0.46	\$441,082	0.56	\$0	0.00	\$995,192	0.25
Kidney	\$889,383	0.37	\$37,000	0.15	\$12,771	0.03	\$1,314,161	1.66	\$0	0.00	\$2,253,314	0.56
Larynx	\$467,632	0.19	\$0	0.00	\$40,421	0.09	\$96,184	0.12	\$234,586	2.06	\$838,824	0.21
Leukemia	\$14,711,760	6.05	\$272,297	1.10	\$3,202,978	7.33	\$5,526,815	6.96	\$0	0.00	\$23,713,850	5.89
Liver	\$1,335,318	0.55	\$38,333	0.15	\$395,300	0.90	\$1,268,994	1.60	\$0	0.00	\$3,037,945	0.75
Lung	\$8,160,531	3.36	\$505,058	2.04	\$1,374,155	3.14	\$2,981,784	3.76	\$790,286	6.94	\$13,811,814	3.43
Multiple myeloma	\$1,333,215	0.55	\$324,511	1.31	\$592,061	1.35	\$1,203,303	1.52	\$0	0.00	\$3,453,090	0.86
Non-Hodgkin's lymphoma	\$7,335,759	3.02	\$190,864	0.77	\$850,999	1.95	\$3,218,221	4.05	\$0	0.00	\$11,595,843	2.88
Oral	\$2,094,345	0.86	\$151,567	0.61	\$669,542	1.53	\$748,822	0.94	\$234,586	2.06	\$3,898,862	0.97
Ovary	\$3,084,823	1.27	\$139,220	0.56	\$859,327	1.97	\$2,580,814	3.25	\$171,340	1.51	\$6,835,524	1.70
Pancreas	\$579,371	0.24	\$6,599	0.03	\$48,648	0.11	\$933,112	1.18	\$0	0.00	\$1,567,729	0.39
Prostate	\$7,737,689	3.18	\$490,395	1.98	\$1,908,297	4.37	\$6,794,825	8.56	\$266,298	2.34	\$17,197,503	4.27
Skin	\$2,449,094	1.01	\$143,542	0.58	\$788,723	1.80	\$1,983,126	2.50	\$0	0.00	\$5,364,484	1.33
Stomach	\$321,962	0.13	\$0	0.00	\$108,683	0.25	\$154,211	0.19	\$0	0.00	\$584,856	0.15
Thyroid	\$483,733	0.20	\$0	0.00	\$90,257	0.21	\$145,741	0.18	\$0	0.00	\$719,731	0.18
Uterus	\$710,152	0.29	\$117,688	0.48	\$304,666	0.70	\$695,848	0.88	\$0	0.00	\$1,828,353	0.45
Other sites	\$3,944,031	1.62	\$331,751	1.34	\$535,150	1.22	\$2,757,794	3.47	\$0	0.00	\$7,568,726	1.88
Non-specific/All sites	\$139,474,782	57.34	\$16,411,976	66.33	\$25,685,750	58.76	\$23,361,650	29.42	\$231,698	2.04	\$205,165,857	50.98
<b>TOTAL</b>	<b>\$243,220,843</b>	<b>100</b>	<b>\$24,741,784</b>	<b>100</b>	<b>\$43,711,963</b>	<b>100</b>	<b>\$79,394,216</b>	<b>100</b>	<b>\$11,379,384</b>	<b>100</b>	<b>\$402,448,190</b>	<b>100</b>

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

TABLE 3.3.2

**DISTRIBUTION OF 2007 CANCER RESEARCH INVESTMENT FOR EACH CANCER SITE BY FUNDER SECTOR [1]**

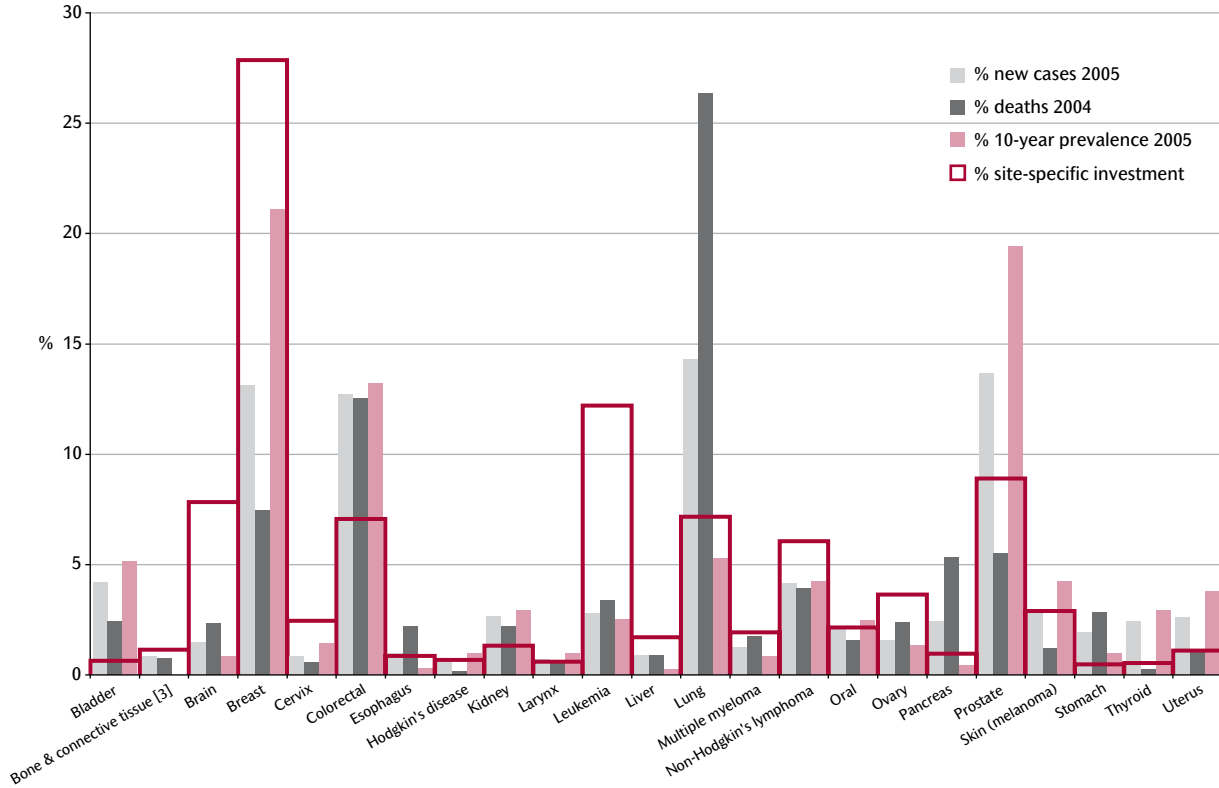
CANCER SITE	2007 Investment	GOVERNMENT			VOLUNTARY	MULTI-FUNDED	TOTAL [2]
		Federal	Provincial Cancer Agency	Provincial Health Research Organization			
Bladder	\$909,458	36.48	0.41	18.64	44.48	0.00	100%
Bone and connective tissue	\$1,912,685	53.95	2.64	17.58	25.83	0.00	100%
Brain	\$15,120,518	60.89	6.45	7.41	25.25	0.00	100%
Breast	\$54,628,606	45.98	7.37	4.75	25.03	16.87	100%
Cervix	\$4,496,543	57.53	2.41	13.52	26.54	0.00	100%
Colorectal	\$13,599,823	63.80	3.07	8.61	24.52	0.00	100%
Esophagus	\$1,349,063	59.35	0.00	3.14	20.12	17.39	100%
Gall bladder	\$0	0.00	0.00	0.00	0.00	0.00	0%
Hodgkin's disease	\$995,192	35.38	0.08	20.22	44.32	0.00	100%
Kidney	\$2,253,314	39.47	1.64	0.57	58.32	0.00	100%
Larynx	\$838,824	55.75	0.00	4.82	11.47	27.97	100%
Leukemia	\$23,713,850	62.04	1.15	13.51	23.31	0.00	100%
Liver	\$3,037,945	43.95	1.26	13.01	41.77	0.00	100%
Lung	\$13,811,814	59.08	3.66	9.95	21.59	5.72	100%
Multiple myeloma	\$3,453,090	38.61	9.40	17.15	34.85	0.00	100%
Non-Hodgkin's lymphoma	\$11,595,843	63.26	1.65	7.34	27.75	0.00	100%
Oral	\$3,898,862	53.72	3.89	17.17	19.21	6.02	100%
Ovary	\$6,835,524	45.13	2.04	12.57	37.76	2.51	100%
Pancreas	\$1,567,729	36.96	0.42	3.10	59.52	0.00	100%
Prostate	\$17,197,503	44.99	2.85	11.01	39.51	1.55	100%
Skin	\$5,364,484	45.65	2.68	14.70	36.97	0.00	100%
Stomach	\$584,856	55.05	0.00	18.58	26.37	0.00	100%
Thyroid	\$719,731	67.21	0.00	12.54	20.25	0.00	100%
Uterus	\$1,828,353	38.84	6.44	16.66	38.06	0.00	100%

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

[2] Project equivalents per cancer site ranged from 13 to 729.

FIGURE 3.3.1

**DISTRIBUTION OF 2007 SITE-SPECIFIC CANCER RESEARCH INVESTMENT (\$197.3M) BY NEW CANCER CASES IN 2005 [1], CANCER DEATHS IN 2004 [1], AND TEN-YEAR PREVALENCE RATES [2]**



[1] Source: Canadian Cancer Society's Steering Committee. *Canadian Cancer Statistics 2009*. Toronto: Canadian Cancer Society, 2009.

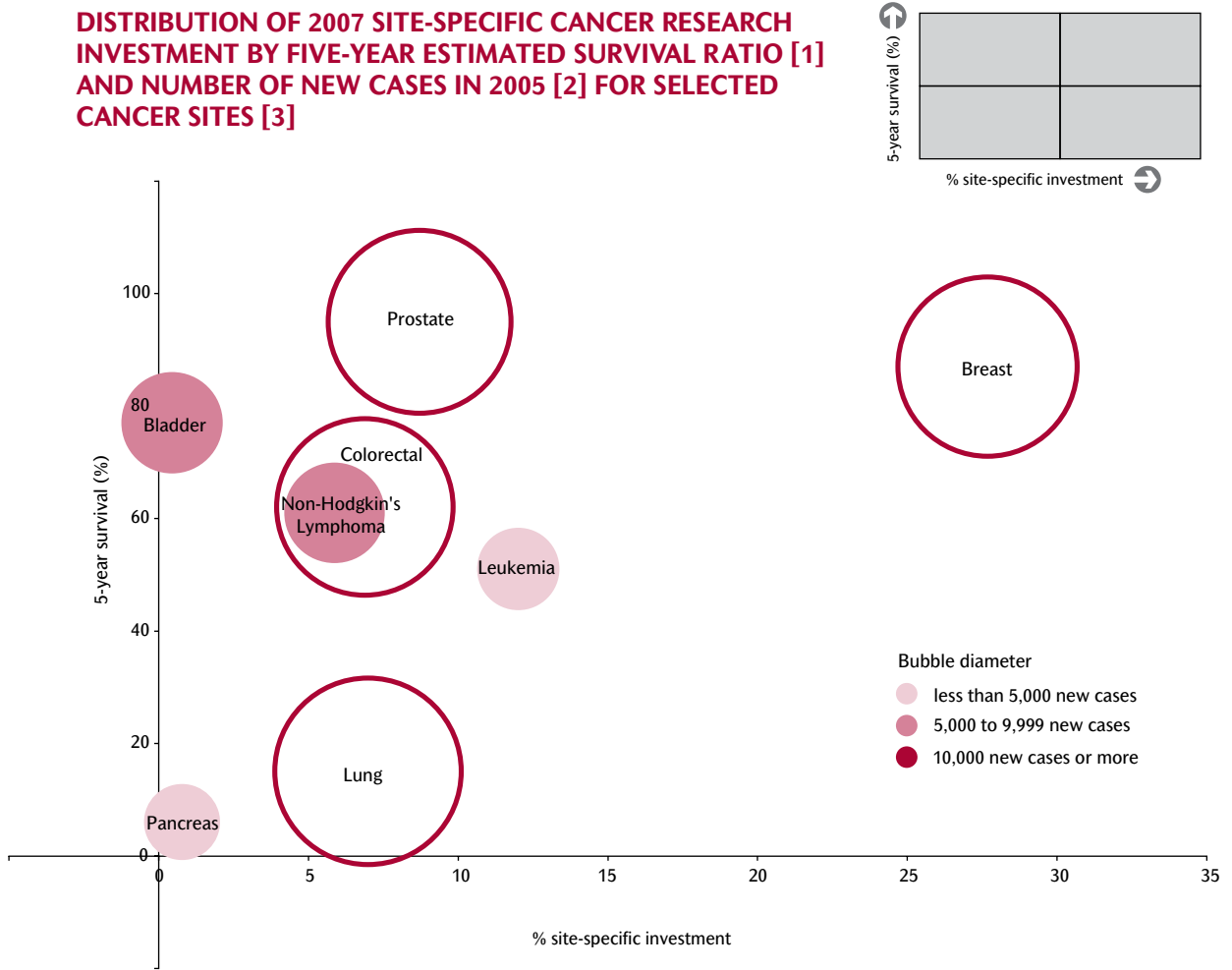
[2] Source: Ellison, LF & Wilkins, K. (2009). Cancer prevalence in the Canadian population. *Health Reports*, 20(1):7-19. Ottawa: Statistics Canada. Cat No 82-003-XPE. Available at <http://www.statcan.gc.ca/pub/82-003-x/2009001/article/10800-eng.pdf>.

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



FIGURE 3.3.2

**DISTRIBUTION OF 2007 SITE-SPECIFIC CANCER RESEARCH INVESTMENT BY FIVE-YEAR ESTIMATED SURVIVAL RATIO [1] AND NUMBER OF NEW CASES IN 2005 [2] FOR SELECTED CANCER SITES [3]**

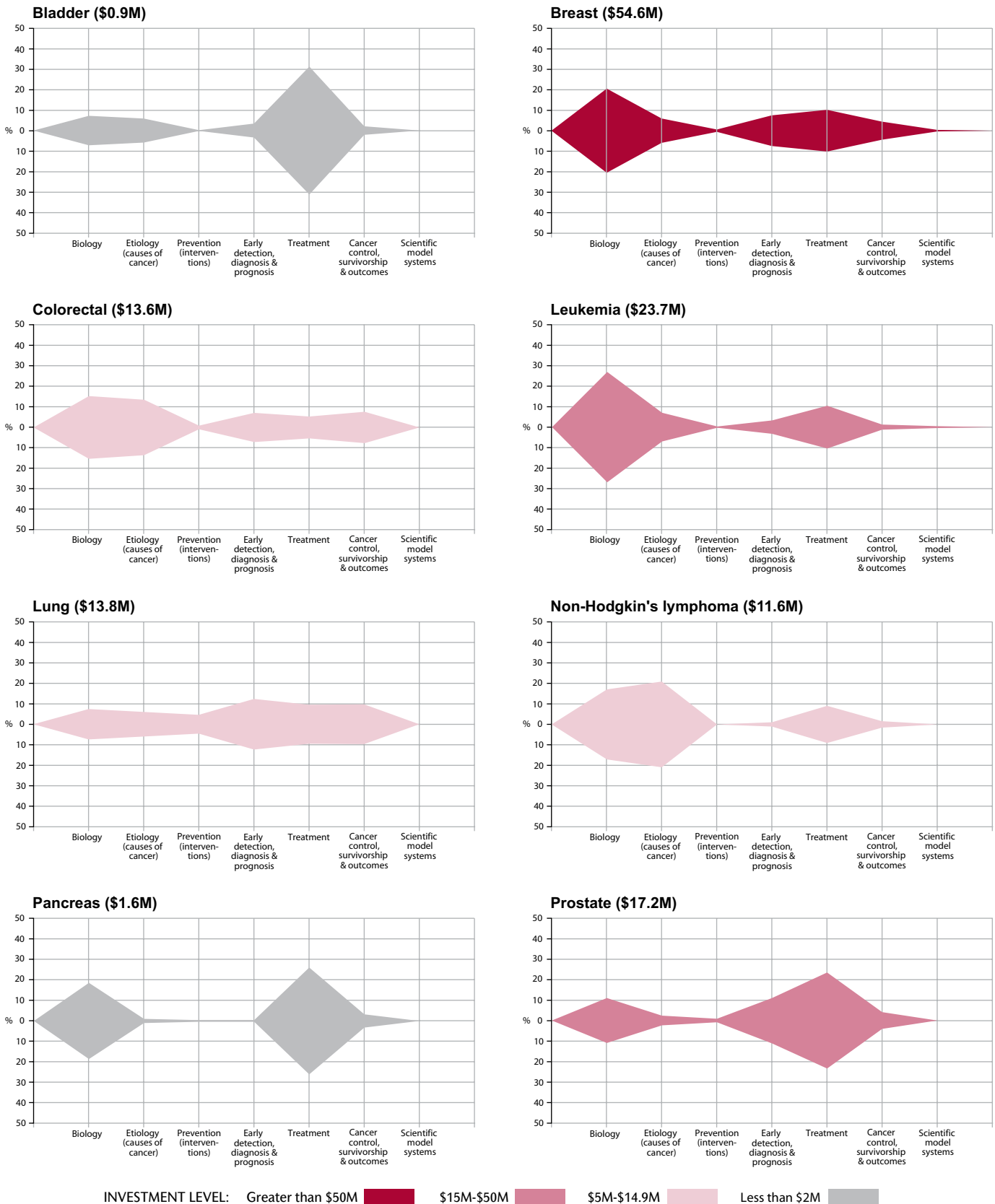


[1] Estimated five-year relative survival for period 2002-2004 all provinces except Quebec. Source: Canadian Cancer Society's Steering Committee. *Canadian Cancer Statistics 2009*. Toronto: Canadian Cancer Society, 2009. Figures used are for men and women combined, except for prostate and ovarian cancers.

[2] Source: Canadian Cancer Society's Steering Committee. *Canadian Cancer Statistics 2009*. Toronto: Canadian Cancer Society, 2009.

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

**FIGURE 3.3.3**  
**DISTRIBUTION OF 2007 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 competitive, 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 2007 investment by funder sector in dollars. Over half of the overall investment (52.3%, \$210.4M) 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 (79.2% and 96.3%, respectively). A very large proportion (53.7%) of the overall investment by the provincial cancer agencies was for equipment/infrastructure grants. Investment by the provincial health research organizations represented a mix of funding mechanisms.

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

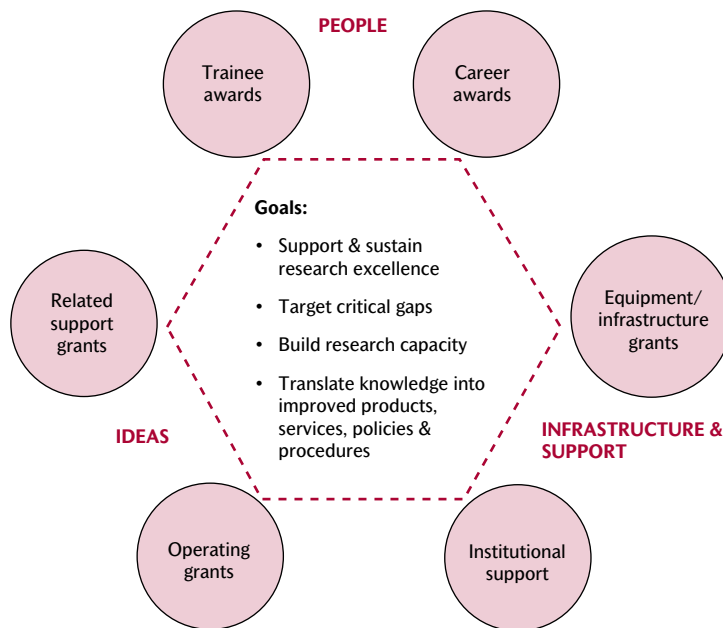


Table 3.4.1 further elaborates the federal government investment, showing it in its entirety without partner dollars. Data released by Statistics Canada<sup>6</sup> reveals that total estimated extramural federal research and development spending for all areas of science was \$3,946M in 2007/08. The federal government cancer research investment, at \$205.4M, represents 5.2% 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 half of all investments, regardless of province. In Alberta, \$1 of every \$5 invested was for career awards, while in Ontario, nearly \$2 of every \$5 invested was for equipment/infrastructure grants. The proportion of investment in trainee awards exceeded 10% in Saskatchewan (11.5%), Manitoba (10.9%), and Nova Scotia (10.7%).

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, although Early Detection, Diagnosis & Prognosis was a comparatively higher proportion of the investment in operating grants. For career awards, the highest proportion of investment was in Biology (54.5%). One-quarter of the investment in equipment/infrastructure grants (26.1%) was in Treatment. The CSO distribution for related support grants was quite different from the other funding mechanisms, with 27.6% of the investment in Cancer Control, Survivorship & Outcomes, and 11.6% in Prevention. These data are summarized in Figure 3.4.6, which compares the funding mechanisms in terms of their relative investment size.

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. Nearly two-thirds (62.9%) were the latter (see Figure 3.4.7), although it should be noted that 6.5% of this investment had geographic restrictions. Site-specific operating grants programs were primarily the domain of the multi-funded initiatives and voluntary sector.

Canada Foundation for Innovation (CFI) representing 63.6% of the \$124.9M invested in equipment/infrastructure grants. Figure 3.4.8 shows the distribution of this investment by province of PI/PL.

A breakdown in terms of types of career/salary awards is provided in Table 3.4.2. On December 31, 2007, there were 223 Canada Research Chairs, 107 Tier 1 and 116 Tier 2, engaged in research of which at least some portion was cancer-related. CIHR was the granting agency for 81.6% of these chairs. Nearly three-quarters (73.1%) of the chairs were working at institutions in Ontario (96 chairs) and Quebec (67 chairs).

Trainees at the graduate level formed 63.2% of the 1,801 awards funded in 2007 (see Table 3.4.3). Over one-third (35.8%) of graduate level trainee awards were awarded as part of the

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6. Statistics Canada. Federal Government Expenditures on Scientific Activities, 2008/09 (Intentions). *Science Statistics*, November 2008, Vol. 32, No. 7. Ottawa: Statistics Canada, Science, Innovation and Electronic Information Division. Cat No 88-001-X. Available at <http://www.statcan.gc.ca/pub/88-001-x/88-001-x2008007-eng.pdf>.

### 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 which were not universities were mapped to affiliated universities, where applicable.
3. The ratio of the Indirect Costs paid to institutions in 2009-10 relative to averaged funding received by researchers for fiscal years 2005-06, 2006-07 and 2007-08 by all three funding agencies (data supplied by the ICP program) was applied to the 2005-2007 survey data.

#### Example: University of Manitoba

- a. Three-year total paid to all University of Manitoba researchers by CIHR, NSERC, and SSHRC: \$109.8M; averaged annual \$36.6M
- b. Indirect cost payment in 2009/10: \$8.4M
- c. Ratio ( $\$8.4M/\$36.6M$ ) = 22.9%
- d. Three-year total paid to cancer researchers by CIHR, NSERC, and SSHRC (from survey database): \$7.7M; averaged annual \$2.6M
- e. Calculated indirect costs for cancer research ( $\$2.6M \times 22.9\%$ ) = \$0.6M

Canada Graduate Scholarship program (i.e. CIHR \$2,653,317; NSERC \$557,545; SSHRC \$270,720). Of note, this program is targeted to receive a one-time injection of \$8.7M over three-years as announced in the 2009 Federal government budget.<sup>7</sup> Post-doctoral/fellowship awards accounted for 42.5% of the investment. Projects for trainees studying at institutions outside Canada totaled \$3.9M. The provincial distribution of trainee awards is shown in Figure 3.4.9.

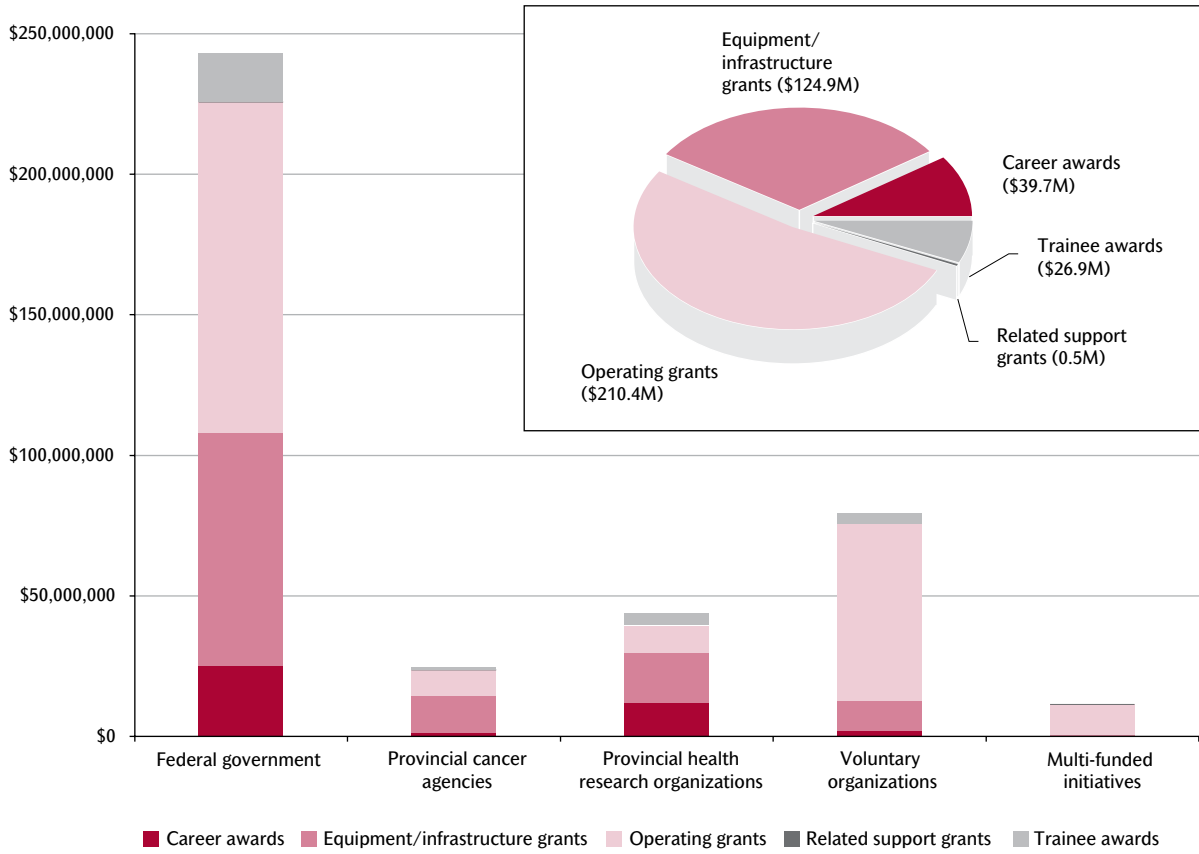
An estimate of the “cancer” component of the federal Indirect Costs Program (ICP) was calculated as one source of institutional support received by institutions that employ researchers engaged in cancer researcher (see sidebar for details on how this estimate was calculated). The estimate for the ICP was \$19.6M for 2007. The provincial distribution is shown in Figure 3.4.10.

Research-related support remained a small component of the overall funding mechanism mix, accounting for \$497,768 in 2007.

7. Government of Canada. (2009). *Canada's Economic Action Plan: Budget 2009*. Ottawa: Public Works and Government Services Canada. Available at <http://www.budget.gc.ca/2009/pdf/budget-planbudgetaire-eng.pdf>.

FIGURE 3.4.2

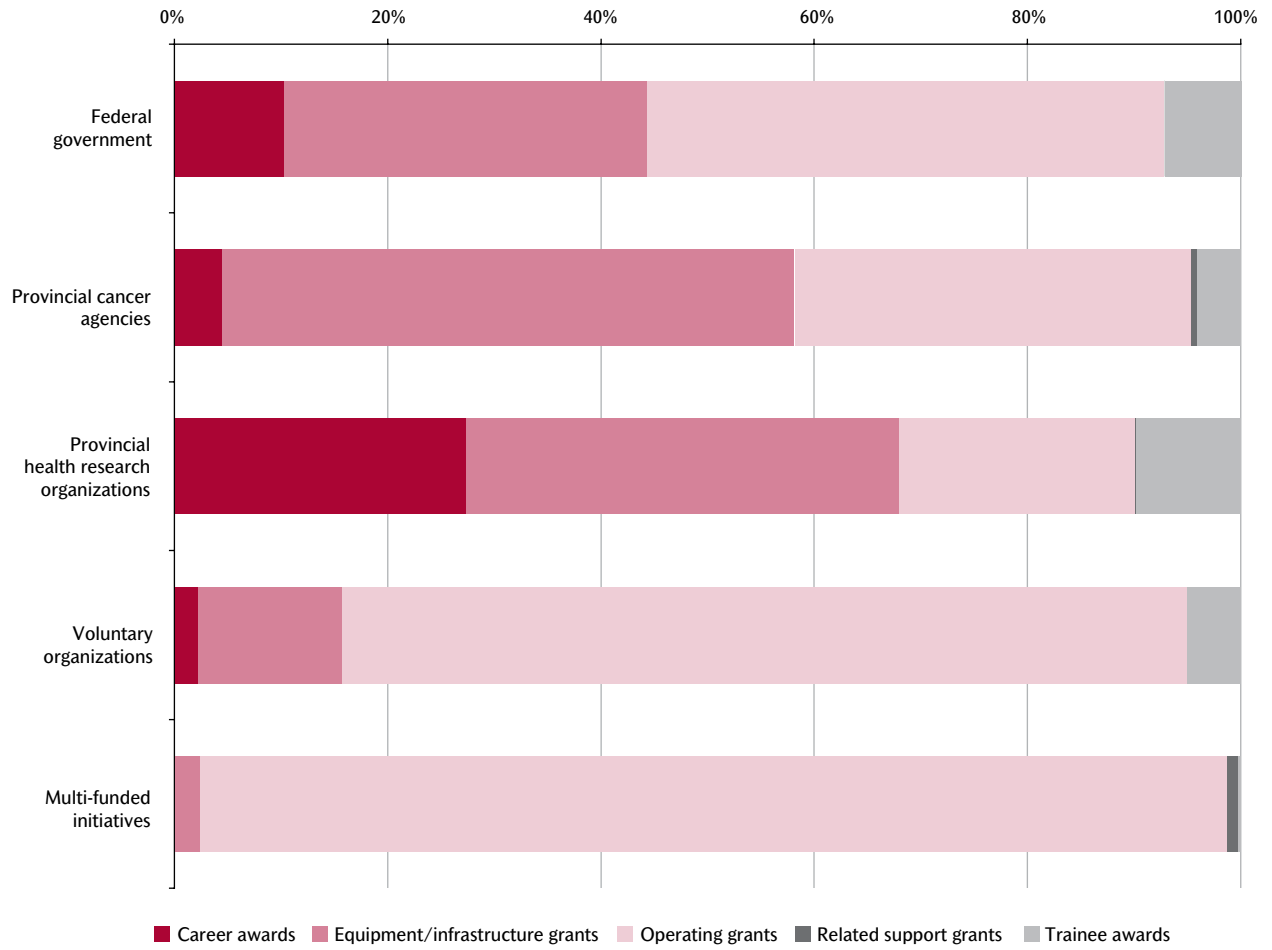
**2007 CANCER RESEARCH INVESTMENT BY FUNDING MECHANISM FOR EACH FUNDER SECTOR (\$402.4M) [1]**



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

FIGURE 3.4.3

**DISTRIBUTION OF 2007 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

**2007 FEDERAL GOVERNMENT CANCER RESEARCH INVESTMENT BY FUNDING MECHANISM**

PROGRAM/ ORGANIZATION	FUNDING MECHANISM						TOTAL
	Career awards	Equipment/ Infrastructure grants	Institutional support (indirect costs)	Operating grants	Related support grants	Trainee awards [1]	
Canada Foundation for Innovation	–	\$31,773,178	–	–	–	–	\$31,773,178
Canada Research Chairs Program	\$20,069,417	–	–	–	–	–	\$20,069,417
Canadian Institutes of Health Research [2]	\$4,305,345	\$3,775,945	–	\$92,020,803	\$100,302	\$12,908,250	\$113,110,645
Genome Canada	–	–	–	\$8,129,093	–	–	\$8,129,093
Indirect Costs Program	–	–	\$19,577,795	–	–	–	\$19,577,795
National Research Council	–	–	–	\$3,416,418	–	–	\$3,416,418
Natural Sciences and Engineering Research Council	\$0	\$331,989	–	\$2,956,483	\$0	\$1,794,522	\$5,082,993
Networks of Centres of Excellence [3]	–	–	–	\$507,100	–	\$79,350	\$586,450
Public Health Agency of Canada [4]	–	–	–	\$2,987,477	\$9,026	–	\$2,996,503
Social Sciences and Humanities Research Council	–	\$0	–	\$240,387	\$20,803	\$428,565	\$689,755
Other [5]	–	–	–	\$4,444	–	–	\$4,444
<b>TOTAL</b>	<b>\$24,374,762</b>	<b>\$35,881,112</b>	<b>\$19,577,795</b>	<b>\$110,262,204</b>	<b>\$130,131</b>	<b>\$15,210,687</b>	<b>\$205,436,690</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 funder programs, including 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 2007.

[1] Includes Canada Graduate Scholarships totalling \$3,481,582 (CIHR \$2,653,317; NSERC \$557,545; SSHRC \$270,720).

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

[3] Does not include federal contribution to the management and related activities of the networks.

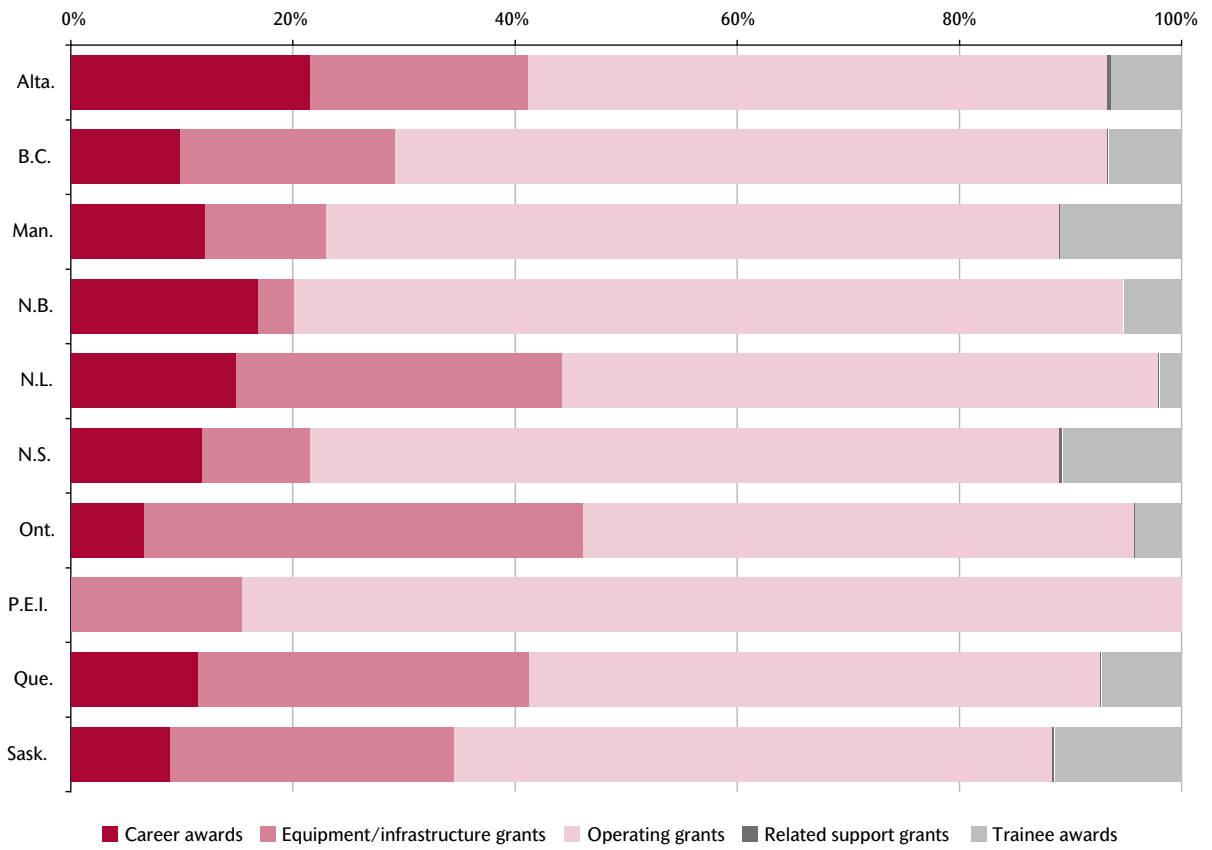
[4] Represents PHAC's contribution to CBCRA and CTCRI and to an individual CIHR project.

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



FIGURE 3.4.4

**DISTRIBUTION OF 2007 CANCER RESEARCH INVESTMENT FOR PROVINCE OF PI/PL BY FUNDING MECHANISM (\$398.5M)**



**FIGURE 3.4.5**  
**DISTRIBUTION OF 2007 CANCER RESEARCH INVESTMENT FOR FUNDING MECHANISM BY CSO CATEGORY**

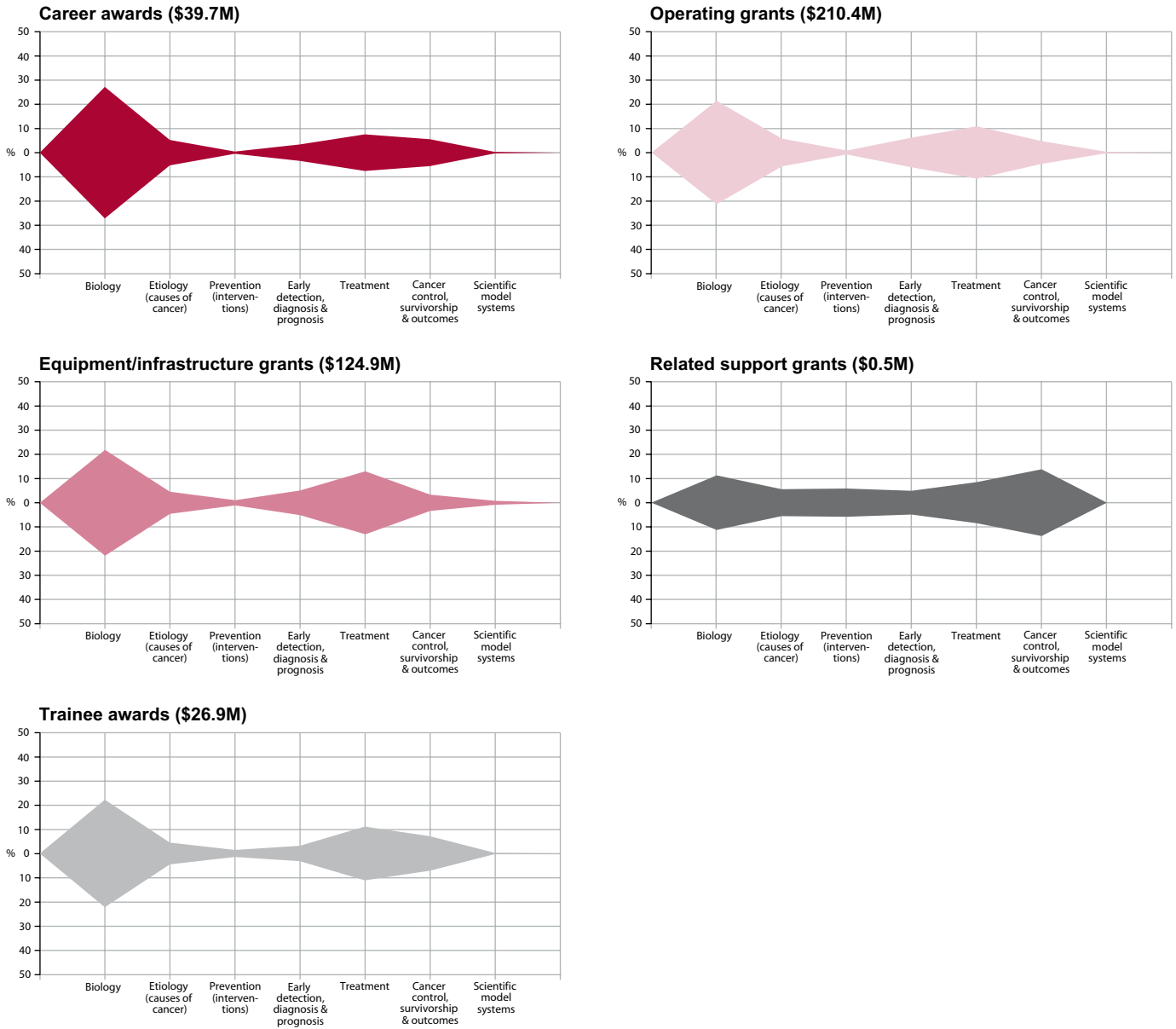
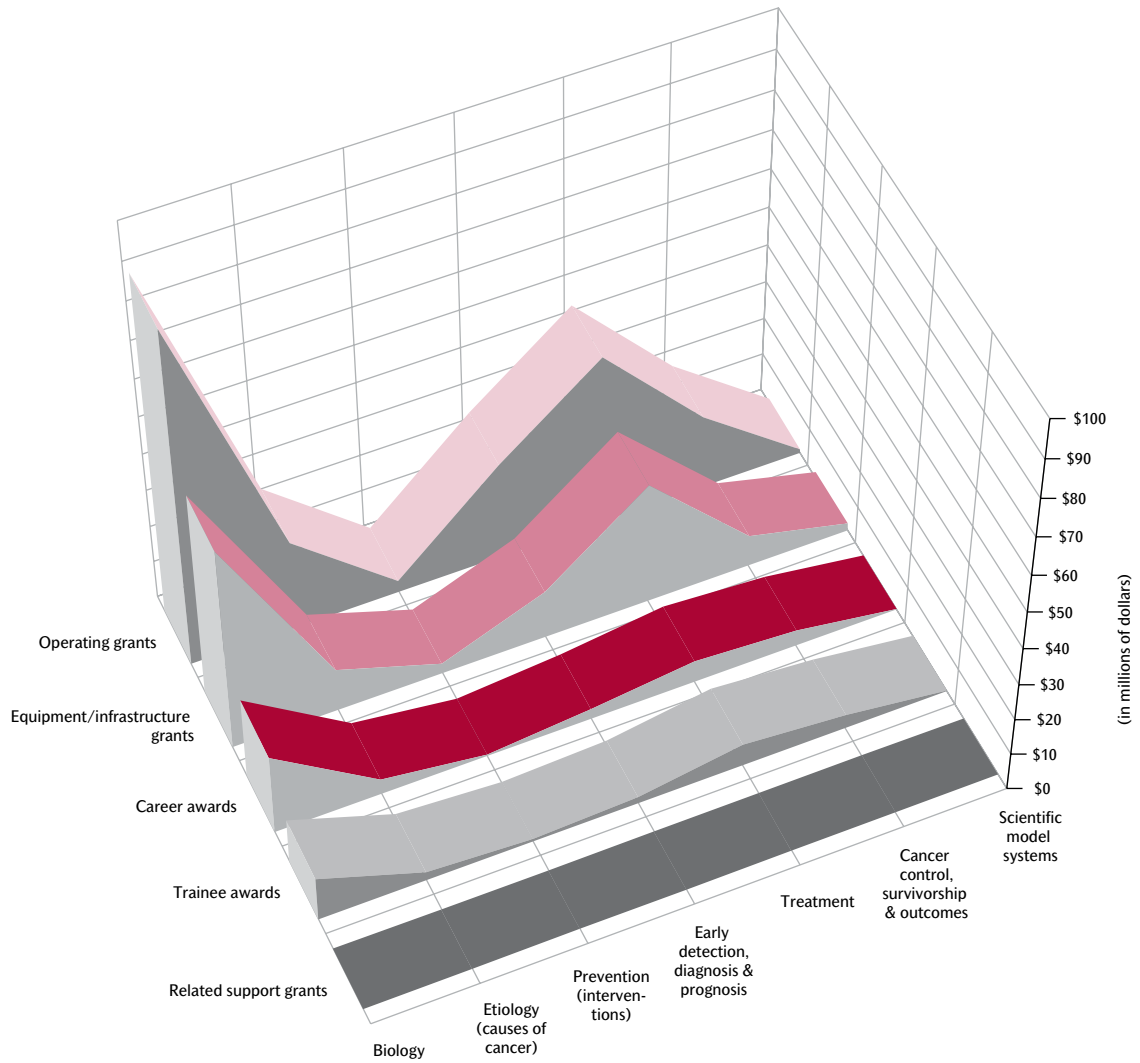


FIGURE 3.4.6

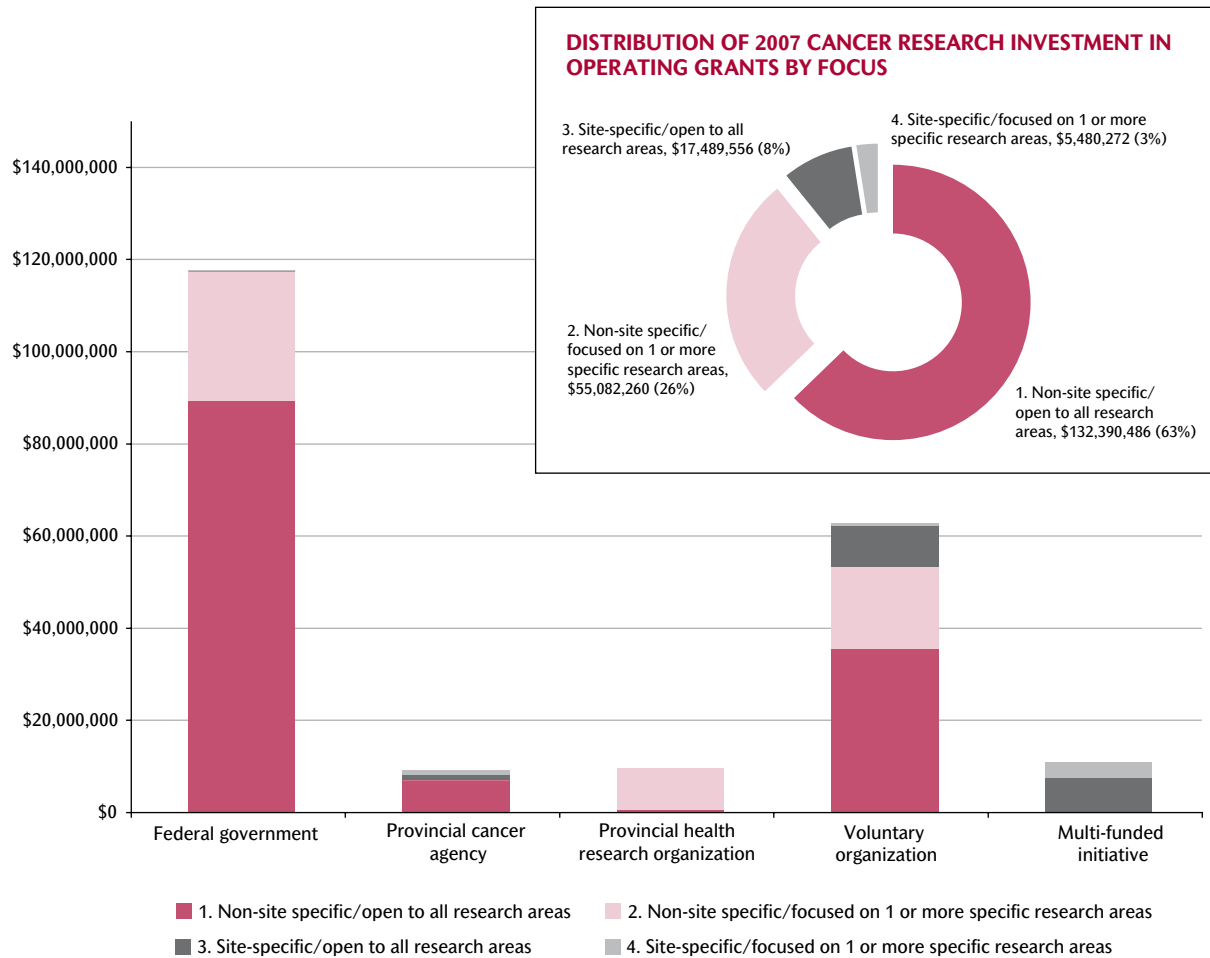
**2007 CANCER RESEARCH INVESTMENT BY FUNDING MECHANISM AND CSO CATEGORY (\$402.4M) [1]**



[1] Funding mechanisms are ordered by investment size rather than alphabetically in this figure.

FIGURE 3.4.7

### 2007 CANCER RESEARCH INVESTMENT IN OPERATING GRANTS FOR EACH FUNDER SECTOR BY FOCUS (\$210.4M) [1]



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

TABLE 3.4.2

### 2007 CANCER RESEARCH INVESTMENT IN CAREER AWARDS BY AWARD TYPE AND NUMBER OF PROJECTS

TYPE OF AWARD	2007 Investment		Number of Projects	Number of Projects Weighted at 100%
	\$	%		
Career/salary	\$17,803,194	45	464	356
Establishment	\$863,373	2	70	54
Tier 1 CRC	\$13,078,500	33	107	51
Tier 2 CRC	\$6,990,917	18	157	74
Other chair	\$937,500	2	10	7
<b>TOTAL</b>	<b>\$39,673,483</b>	<b>100</b>	<b>808</b>	<b>542</b>

FIGURE 3.4.8

**DISTRIBUTION OF 2007 CANCER RESEARCH INVESTMENT IN EQUIPMENT/INFRASTRUCTURE GRANTS BY PROVINCE OF PI/PL (\$124.9M)**

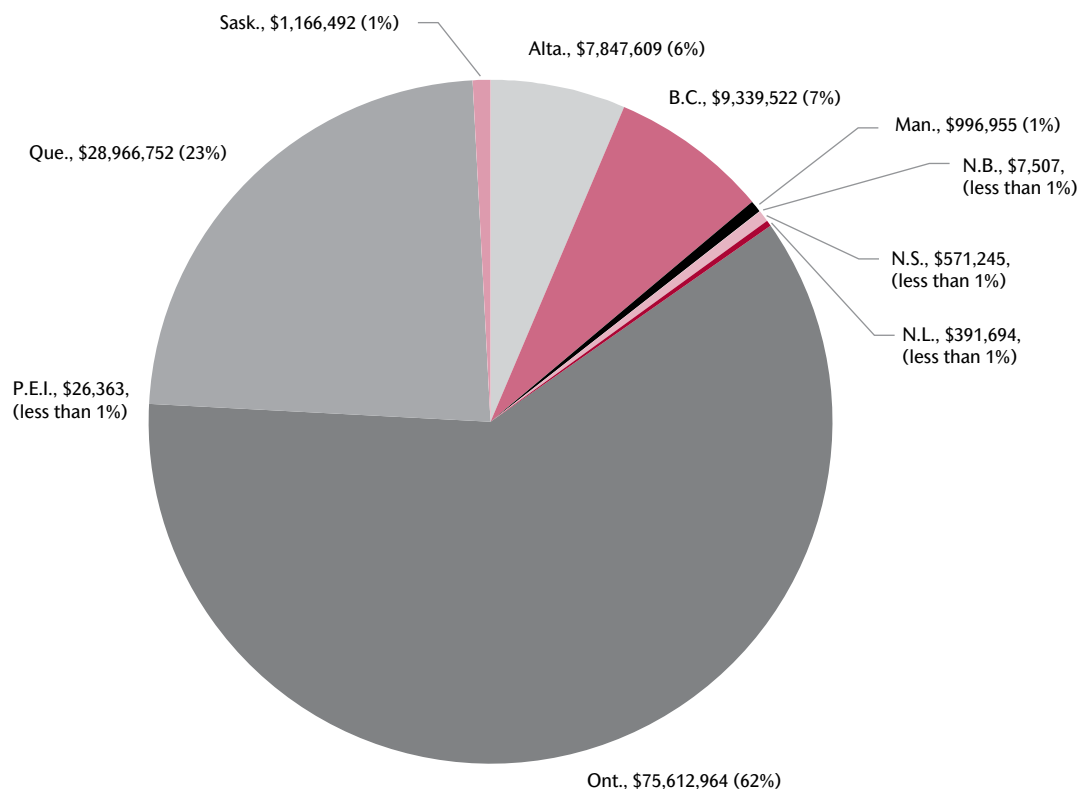
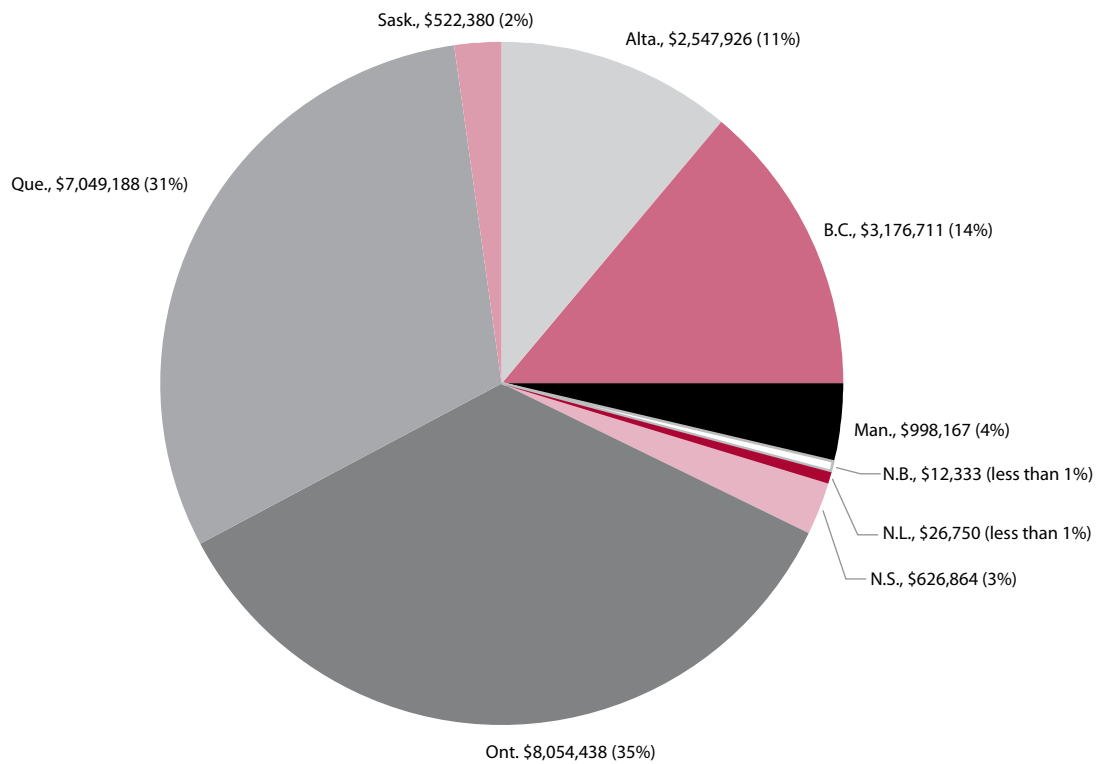


TABLE 3.4.3

**2007 CANCER RESEARCH INVESTMENT IN TRAINEE AWARDS BY TRAINEE LEVEL AND NUMBER OF PROJECTS**

TYPE OF TRAINEE AWARD	2007 Investment		Number of Projects	Number of Projects Weighted at 100%
	\$	%		
Undergraduate	\$214,710	Less than 1	60	56
Graduate	\$9,717,812	36	1,139	1,014
Post-doctoral/Fellowship	\$11,447,840	43	570	513
Institutional training award	\$5,526,898	21	32	25
<b>TOTAL</b>	<b>\$26,907,260</b>	<b>100</b>	<b>1,801</b>	<b>1,608</b>

FIGURE 3.4.9

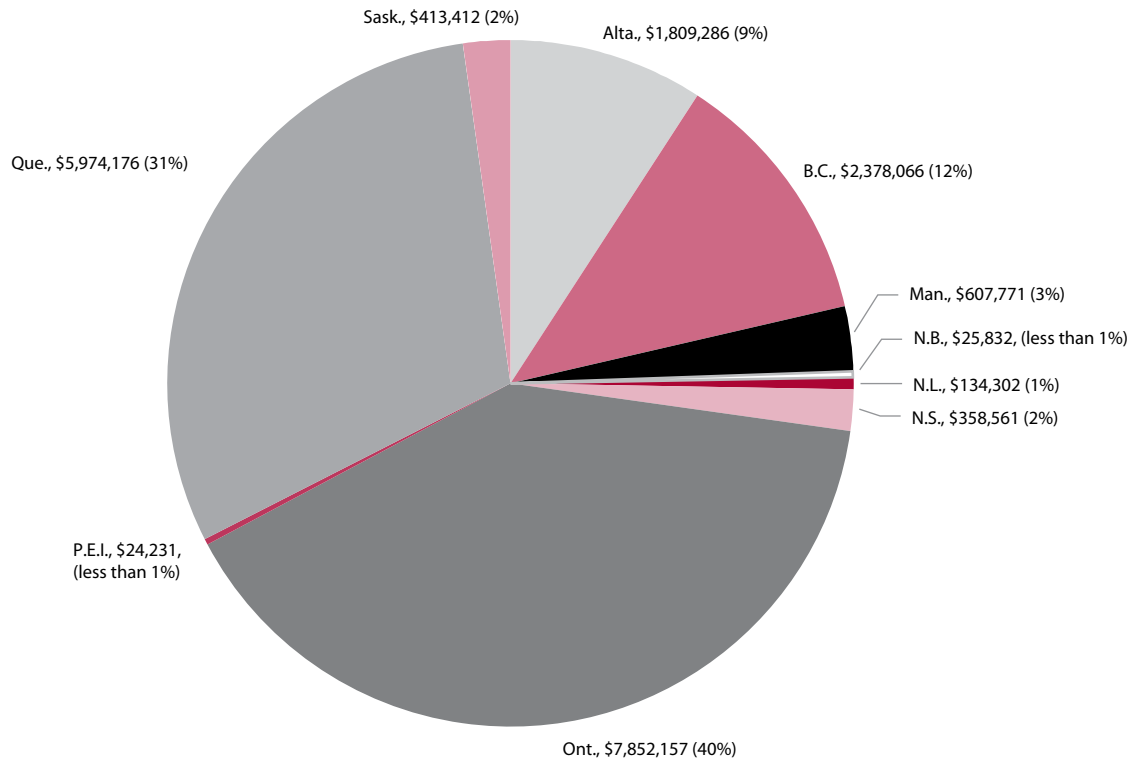
**DISTRIBUTION OF 2007 CANCER RESEARCH INVESTMENT IN TRAINEE AWARDS BY PROVINCE OF PI/PL (\$23.0M) [1,2]**

[1] Excludes \$3.9M awarded to trainees who were at institutions outside of Canada.

[2] There were no trainee awards in P.E.I. in 2007.

FIGURE 3.4.10

**DISTRIBUTION OF CANCER-RELATED INDIRECT COSTS ESTIMATED FOR 2007 BY PROVINCE OF PI/PL (\$19.6M)**



**APPENDIX A. ABBREVIATIONS**

<b>ACRI</b>	Alberta Cancer Research Institute
<b>AHFMR</b>	Alberta Heritage Foundation for Medical Research
<b>CARO</b>	Canadian Association of Radiation Oncology
<b>CBCF</b>	Canadian Breast Cancer Foundation
<b>CBCRA</b>	Canadian Breast Cancer Research Alliance
<b>CBRPE</b>	Centre for Behavioural Research & Program Evaluation (CCS)
<b>CCMB</b>	CancerCare Manitoba
<b>CCNS</b>	Cancer Care Nova Scotia
<b>CCO</b>	Cancer Care Ontario
<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>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>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 (US)
<b>NCIC CTG</b>	Clinical Trials Group (CCS)
<b>NCRI</b>	National Cancer Research Institute (UK)
<b>NRC</b>	National Research Council
<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



## APPENDIX B. DATA CAVEATS FOR INDIVIDUAL ORGANIZATIONS

ORGANIZATION [1]	NUMBER OF PROJECTS [2]	CAVEATS		
		PROJECT DESCRIPTIONS [3]	IMPUTED BUDGETS	IMPUTED START &/ END DATES
Alberta Cancer Research Institute	351	No descriptions for 8 projects*		
Alberta Heritage Foundation for Medical Research	188		71 [4]	
Brain Tumour Foundation of Canada	17	Lay abstracts only		
C <sup>17</sup> Research Network	8	Lay abstracts only		
Canada Foundation for Innovation	332	Keywords 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.	10 end dates [5]
Canada Research Chairs Program	264	Lay abstracts only*		
Canadian Association of Radiation Oncology	36			
Canadian Breast Cancer Foundation	188			
Canadian Breast Cancer Research Alliance	146			
Canadian Cancer Society	870	No descriptions for 9 projects*	Institutions involved in the conduct of the same clinical trials are treated separately in order to capture the trial investment by geographic region.	
Canadian Institutes of Health Research	2,512	No descriptions for 87 projects*	Imputed partner contributions for 166 projects.	
Canadian Prostate Cancer Research Initiative	16			
Canadian Tobacco Control Research Initiative	163			
Canary Foundation of Canada	7			
CancerCare Manitoba	86	Only lay abstracts for 61 projects		
Cancer Care Nova Scotia	34	Only lay abstracts for 20 projects		
Cancer Care Ontario	23	Lay abstracts only		
Fonds de la recherche en santé du Québec	350	No descriptions for 8 projects*		
Genome Canada	7	Lay abstracts only		
Manitoba Health Research Council	43	Lay abstracts only; no descriptions for 13 projects		
Medical Research Fund of New Brunswick	3	Lay descriptions only		
Michael Smith Foundation for Health Research	231	Only lay abstracts for 101 projects		
National Research Council	15	Lay abstracts only		
Natural Sciences and Engineering Research Council	348	No descriptions for 267 projects*	1	95 start and/or end dates [6]
Networks of Centres of Excellence	20	Lay abstracts only		
Nova Scotia Health Research Foundation	34	No descriptions for 5 projects*; only lay abstracts for 27 projects		
Ontario Institute for Cancer Research	108	No descriptions for 9 projects*		
Ovarian Cancer Canada	12	Lay abstracts only; no descriptions for 6 projects	3	7 end dates
Prostate Cancer Canada	54			
Quebec Breast Cancer Foundation/Fondation du cancer du sein du Québec	3			
Saskatchewan Cancer Agency	11			
Saskatchewan Health Research Foundation	31	Lay abstracts only		
Social Sciences and Humanities Research Council	54	No descriptions provided*	7	30 start and/or end dates [6]
The Cancer Research Society	237			
The Kidney Foundation of Canada	9			
The Leukemia & Lymphoma Society of Canada	76	No descriptions for 31 studentships		
The Terry Fox Foundation	316			

\*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, the project was coded on the basis of the 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 submitted per organization and included in the CCRA database. Overall total is 7,203.

[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] AHFMR 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.

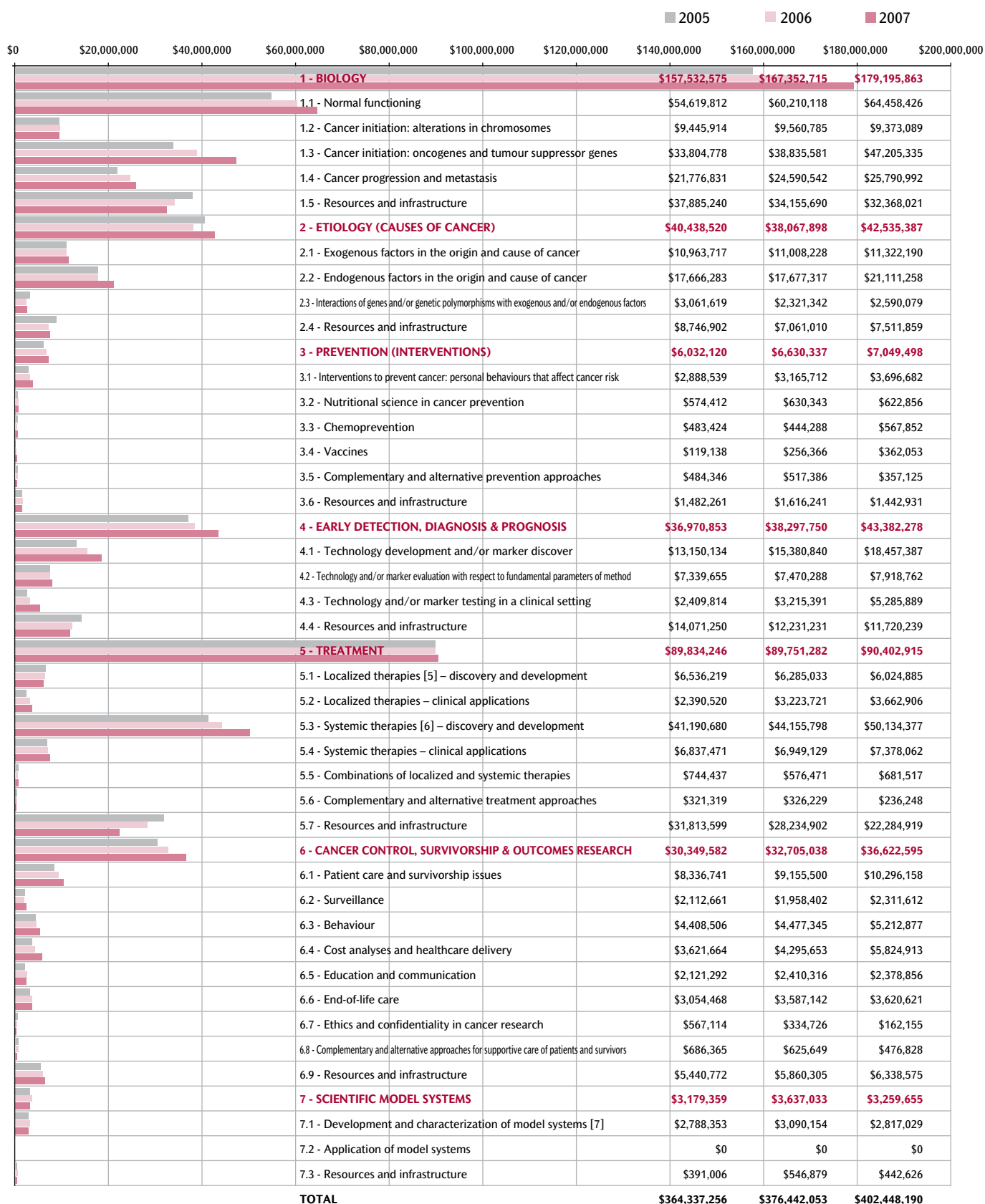
[6] Proactive public disclosure of start/end dates for NSERC and SSHRC grants over \$25,000 was announced by the Government of Canada on October 21, 2005. Both organizations now publish this information on a go-forward basis on their respective web sites.

## APPENDIX C. 2005, 2006, AND 2007 INVESTMENT BY ORGANIZATION

	2005	2006	2007
<b>FEDERAL GOVERNMENT</b>	<b>\$230,423,792</b>	<b>\$232,853,983</b>	<b>\$243,220,843</b>
Canada Foundation for Innovation	\$95,727,046	\$80,701,936	\$79,523,544
Canada Research Chairs Program	\$16,549,500	\$18,565,582	\$20,069,417
Canadian Institutes of Health Research	\$98,697,734	\$109,236,550	\$115,561,353
Genome Canada	\$11,733,362	\$13,773,584	\$16,697,223
National Research Council	\$2,342,650	\$3,280,751	\$3,416,418
Natural Sciences and Engineering Research Council	\$4,372,211	\$5,023,268	\$5,647,575
Networks of Centres of Excellence	\$646,908	\$1,730,035	\$1,616,755
Social Sciences and Humanities Research Council	\$354,380	\$542,278	\$688,560
<b>PROVINCIAL CANCER AGENCY</b>	<b>\$13,570,169</b>	<b>\$19,755,424</b>	<b>\$24,741,784</b>
Alberta Cancer Research Institute	\$6,333,854	\$9,530,181	\$14,564,897
CancerCare Manitoba	\$913,477	\$1,170,274	\$1,068,240
Cancer Care Nova Scotia	\$155,000	\$160,000	\$150,000
Cancer Care Ontario	\$5,877,350	\$8,632,836	\$8,633,988
Saskatchewan Cancer Agency	\$290,488	\$262,134	\$324,659
<b>PROVINCIAL HEALTH RESEARCH ORGANIZATION</b>	<b>\$36,220,644</b>	<b>\$36,684,357</b>	<b>\$43,711,963</b>
Alberta Heritage Foundation for Medical Research	\$4,909,355	\$6,084,743	\$6,159,480
Fonds de la recherche en santé du Québec	\$9,380,455	\$9,584,478	\$9,692,910
Manitoba Health Research Council	\$462,615	\$406,587	\$446,837
Medical Research Fund of New Brunswick	\$0	\$45,000	\$15,000
Michael Smith Foundation for Health Research	\$5,516,900	\$6,355,182	\$7,624,999
Nova Scotia Health Research Foundation	\$271,648	\$339,838	\$375,285
Ontario Institute for Cancer Research	\$15,361,703	\$13,560,237	\$19,081,598
Saskatchewan Health Research Foundation	\$317,968	\$308,292	\$315,854
<b>VOLUNTARY ORGANIZATION</b>	<b>\$71,084,450</b>	<b>\$75,160,674</b>	<b>\$79,394,216</b>
Brain Tumour Foundation of Canada	\$83,333	\$160,723	\$142,610
C <sup>7</sup> Research Network	\$23,750	\$59,300	\$185,731
Canadian Association of Radiation Oncology	\$186,307	\$187,417	\$261,700
Canadian Breast Cancer Foundation	\$4,304,322	\$5,080,326	\$6,418,304
Canadian Cancer Society	\$40,492,704	\$41,352,468	\$43,225,715
Canary Foundation of Canada	\$0	\$231,500	\$607,500
Ovarian Cancer Canada	\$163,666	\$68,333	\$195,938
Prostate Cancer Canada	\$945,108	\$1,183,059	\$992,468
Quebec Breast Cancer Foundation/Fondation du cancer du sein du Québec	\$1,066,667	\$1,066,667	\$533,333
The Cancer Research Society	\$5,408,883	\$5,638,758	\$6,248,083
The Kidney Foundation of Canada	\$273,906	\$151,953	\$105,000
The Leukemia & Lymphoma Society of Canada	\$547,000	\$924,250	\$1,133,943
The Terry Fox Foundation	\$17,588,804	\$19,055,919	\$19,343,890
<b>MULTI-FUNDED INITIATIVE</b>	<b>\$13,038,201</b>	<b>\$11,987,614</b>	<b>\$11,379,384</b>
Canadian Breast Cancer Research Alliance	\$10,070,945	\$10,043,837	\$9,540,847
Canadian Prostate Cancer Research Initiative	\$1,430,538	\$555,069	\$266,298
Canadian Tobacco Control Research Initiative	\$1,536,718	\$1,388,708	\$1,572,239
<b>TOTAL</b>	<b>\$364,337,256</b>	<b>\$376,442,053</b>	<b>\$402,448,190</b>

Total investment was \$364.3M in 2005, \$376.4M in 2006, and \$402.4M in 2007. 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 graph does not include estimates for the Indirect Costs Program and the BC Cancer Agency.

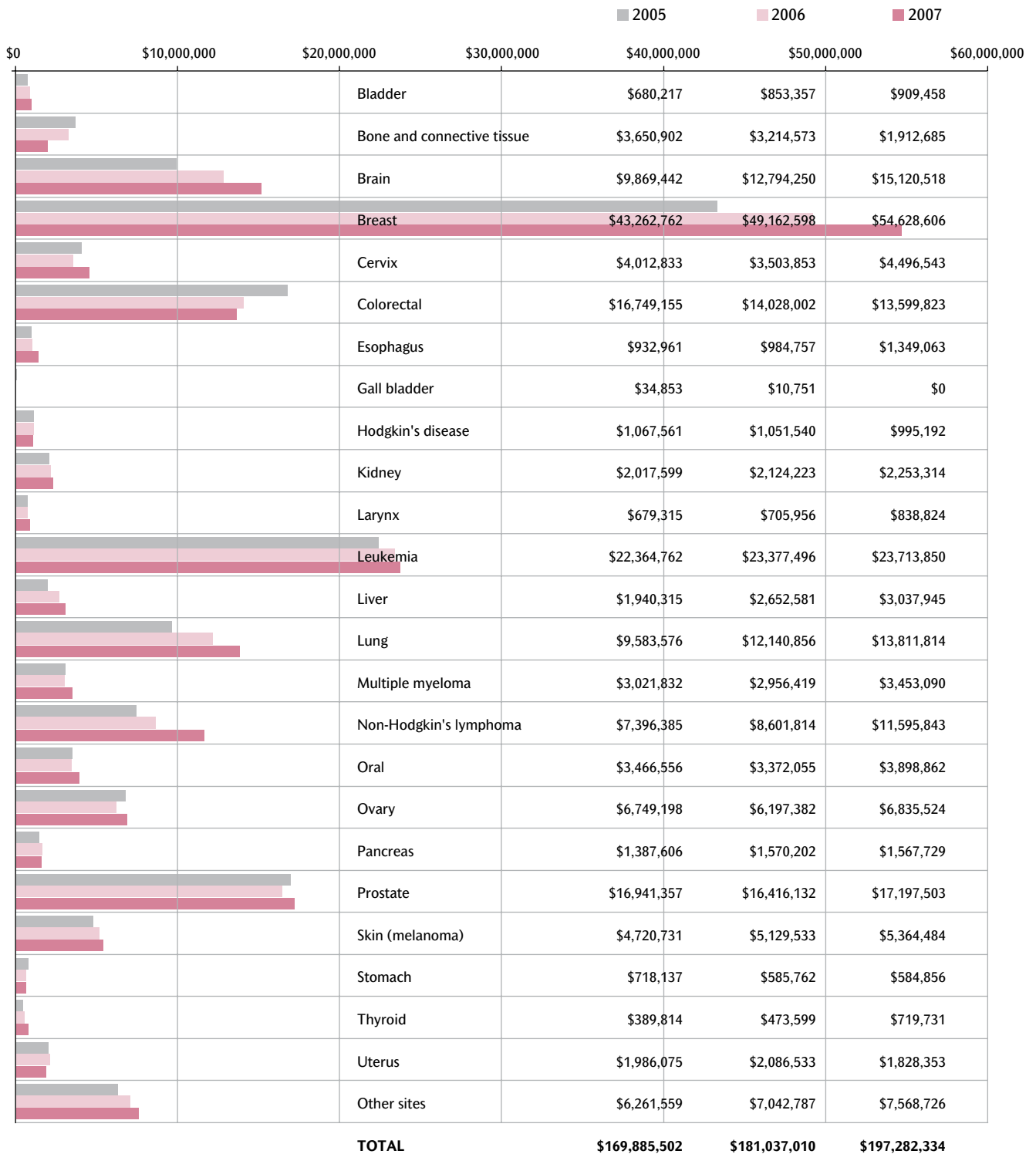
**APPENDIX D. 2005, 2006, AND 2007 INVESTMENT BY CSO CODES**



Category totals are indicated in upper case letters. Total investment was \$364.3M in 2005, \$376.4M in 2006, and \$402.4M in 2007.

This graph does not include estimates for the Indirect Costs Program and the BC Cancer Agency.

**APPENDIX E. 2005, 2006, AND 2007 INVESTMENT BY CANCER SITE**



Site-specific investment was \$169.9M in 2005, \$181.0M in 2006 and \$197.3M in 2007. This graph does not include estimates for the Indirect Costs Program and the BC Cancer Agency.

**APPENDIX F. DISTRIBUTION OF 2005, 2006, AND 2007 INVESTMENT BY CANCER SITE**

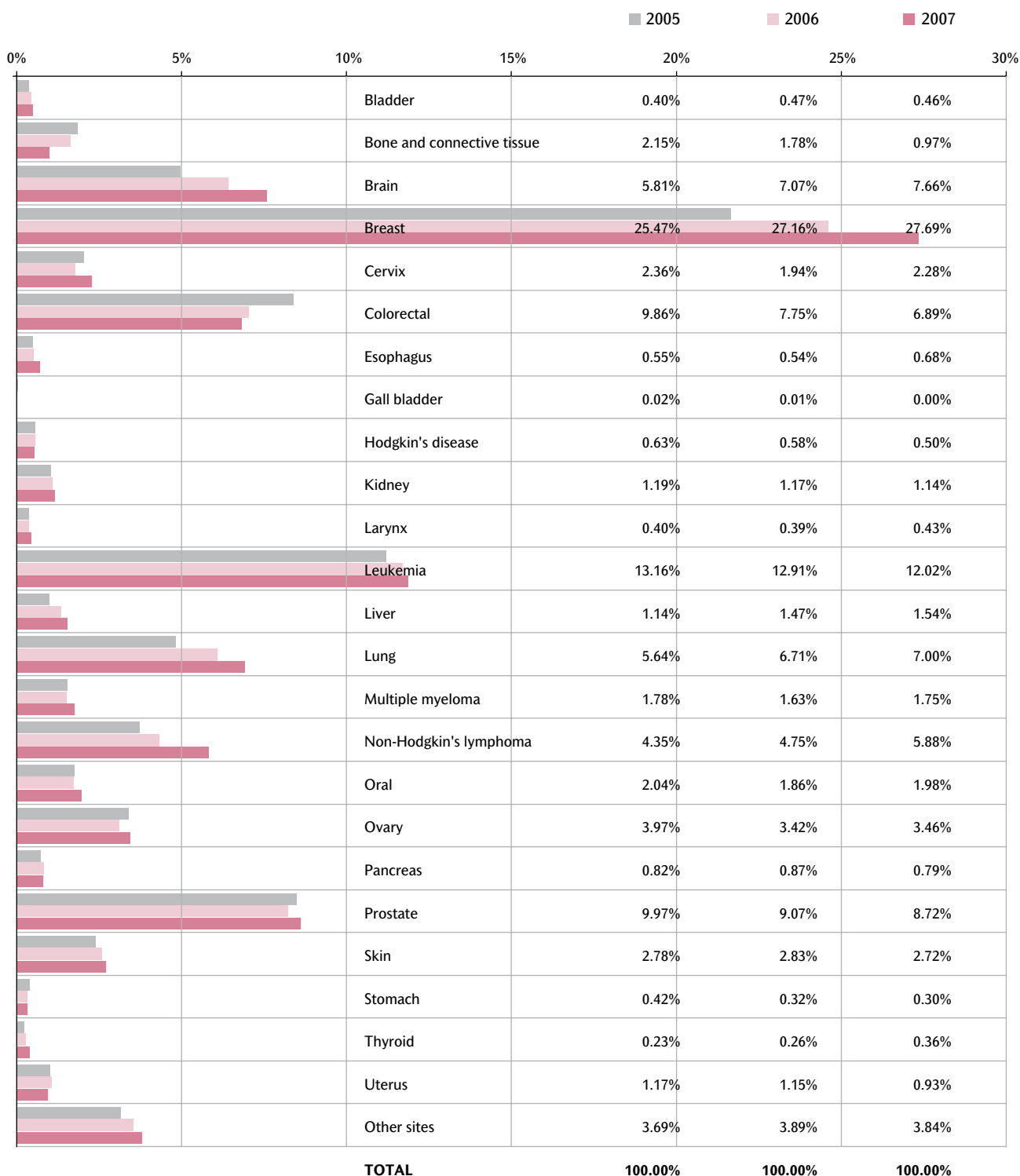


Figure depicts proportionate distribution of dollars as shown in Appendix E.



# OUR MEMBERS

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