

CANCER RESEARCH INVESTMENT IN CANADA, 2005

THE CANADIAN
CANCER RESEARCH
ALLIANCE'S SURVEY
OF GOVERNMENT
AND VOLUNTARY
SECTOR INVESTMENT
IN CANCER RESEARCH
IN 2005

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

SEPTEMBER 2007

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¹ Organizations that directly funded the survey.

² CCRA member organizations.

³ Organizations that are affiliated with CCRA due to their funding structures, but are not member organizations.

⁴ Not a CCRA member, but has a partnership relationship with the Canadian Breast Cancer Foundation, a CCRA member.

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MESSAGE FROM THE CHAIR OF THE CCRA BOARD OF DIRECTORS

Philip E. Branton, PhD, FRSC, is the Scientific Director of the Institute of Cancer Research at the Canadian Institutes of Health Research and the Gilman Cheney Professor of Biochemistry at McGill University.



Philip E. Branton

Cancer is not one but over 200 related diseases characterized by uncontrolled cell growth, and it is primarily, although not exclusively, a disease of older people. Cancer is the leading cause of premature mortality in Canada, and is expected to be the leading cause of death for many more years. In 2007, there will be an estimated 159,900 new cases of cancer in our country and 72,700 cancer deaths¹.

The number of people living with, or having been diagnosed with cancer is increasing at roughly twice the rate of new cases of cancer². Given our aging population and increased life span, more people will experience cancer and there will be many more cancer survivors, a substantial number of whom will deal with residual problems affecting their quality of life. Add to this, family members, partners and caregivers of people with cancer, and we are talking about a disease that has quite literally touched the lives of nearly every person in Canada.

The vast majority of Canadians feel that Canada should be a global leader in health and medical research³, and sizeable investment has been made over the past decade. In fact, research and development expenditures in the health field tripled from 1995 to 2006⁴. A recently published study found that Canada ranked first among several different world regions in terms of number of biomedical publications relative to money spent on research⁵, and this supports the high scientific productivity of Canadian researchers found in earlier studies^{6,7}. In a recent report of the Council of Canadian Academies,

a survey of opinion leaders in Canada ranked cancer research as among the strongest areas within the health sciences domain⁸. Despite these successes, many cancer research proposals which are assessed as having merit go unfunded because the number of worthy applications exceeds the available budgets of funding organizations. These are missed opportunities, and their potential impact is impossible to calculate.

But it is not, however, merely a matter of more research, but of smarter research investment – identifying those areas where we are most likely to maximize our return on investment. These areas include accelerating the translation of research findings from the lab to the bedside, and conversely, taking what we learn in the delivery of evidence-based interventions back to the lab, and investing in areas which will enhance our understanding of the causes and mechanisms of cancer, help us to understand how best to prevent and detect cancer, provide individualized and optimized treatment with minimal side effects, and improve the quality of life for people living with cancer.

This inaugural report from members and affiliated organizations of the Canadian Cancer Research Alliance (CCRA) represents an important first step in our understanding of the cancer research funding landscape in Canada, and I would like to thank the participating organizations for their contribution to this project. This report has helped to elucidate what we anecdotally suspected, namely, that studies of some types of cancers likely require

more funding, that more investment in studies designed to understand the causes of cancer and how to prevent cancer are needed, and that the conduct of cancer research is fairly concentrated in key centres in the country.

CCRA is committed to working together to more effectively plan a pan-Canadian approach to cancer research which will utilize strategic partnerships to overcome some of the barriers to pursuing those major research programs which would truly transform the state of cancer research in the country. Over the coming months, CCRA, in its role as the research-action group of the Canadian Partnership Against Cancer (CPAC), will support two key proposals, one which will facilitate the conduct of innovative translational research projects and the other which will establish a pan-Canadian cohort study platform, setting the stage for

research on cancer causation and prevention for many years to come. These two key initiatives were revealed as critical areas for investment during consultations with experts held across the country over the past few years.

In the upcoming year, through our membership in the International Cancer Research Partners (ICRP), Canadian cancer research projects will be promoted on the ICRP web site, and summarized in an international profile of research. Our members will engage in a planning process to identify other important research opportunities and potential partnerships where resources and expertise can be pooled and maximized so that we are in better position to facilitate those scientific discoveries that will make a difference to the many Canadians affected by cancer.



Philip E. Branton, PhD, FRSC,
Chair, CCRA Board of Directors

¹ Canadian Cancer Society/National Cancer Institute of Canada. *Canadian Cancer Statistics, 2007*. Toronto, 2007.

² Health Canada. *Progress Report on Cancer Control in Canada*. Ottawa: Centre for Chronic Disease Prevention and Control, Population and Public Health Branch. 2004.

³ Research Canada: An Alliance for Health Discovery. *Canada Speaks! 2006. Research Canada's First Public Opinion Survey on Health Research in Canada*. Ottawa, Nov. 2006.

⁴ Statistics Canada. Estimates of total spending on research and development in the health field in Canada, 1989 to 2006. *Science Statistics*, Vol. 30, No. 3, May 2006. Cat. no. 88-001-XIE.

⁵ Soteriades, E.S., Rosmarakis, E.S., Paraschakis, K. & Falagas, M.E. Research contribution of different world regions in the top 50 biomedical journals (1995-2002). *The FASEB Journal*, Vol. 20, No. 1, pp. 29-34, Jan. 2006.

⁶ King, D.A. The scientific impact of nations: What different countries get for their research spending. *Nature*, Vol. 430, No. 6997, pp. 311-316, July 15, 2004.

⁷ Gross, F., Belvedere, O. & Rosso, R. Geography of clinical cancer research publications from 1995 to 1999. *European Journal of Cancer*, Vol. 39, No. 1, pp. 106-111, Jan. 2003.

⁸ Council of Canadian Academies. *The State of Science & Technology in Canada*. Committee on the State of Science & Technology in Canada. Ottawa: Council of Canadian Academies. Sept. 2006.

ABOUT THE CANADIAN CANCER RESEARCH ALLIANCE (CCRA)

C CRA is an alliance of cancer research funding organizations and affiliated partners working together to enhance the overall state of cancer research funding in Canada through improved communication, cooperation and coordination. Members include federal government organizations: Canadian Institutes of Health Research, National Research Council of Canada, Public Health Agency of Canada; provincial government organizations: Alberta Cancer Board, Alberta Heritage Foundation for Medical Research, BC Cancer Agency, CancerCare Manitoba, Cancer Care Nova Scotia, Cancer Care Ontario, Fonds de la recherche en santé du Québec, Michael Smith Foundation for Health Research, New Brunswick Cancer Network, Ontario Institute for Cancer Research, Saskatchewan Cancer Agency; and voluntary sector organizations: Canadian Association of Provincial Cancer Agencies, Canadian Breast Cancer Foundation, Canadian Breast Cancer

Research Alliance, Canadian Cancer Society, Canadian Partnership Against Cancer, National Cancer Institute of Canada, Prostate Cancer Research Foundation of Canada, The Cancer Research Society and The Terry Fox Foundation.

CCRA got its start within the context of the Canadian Strategy for Cancer Control (CSCC). CSCC represents a very broad partnership of Canada's leading cancer organizations that has worked since the late 1990s to create an inclusive, integrated and comprehensive strategy to address the increasing number of new cancer cases and cancer deaths in Canada. The coordinating council of CSCC established eight networks of experts, known as action groups, to identify key strategies and needed initiatives specific to different parts of the cancer control continuum. One of the action groups focused on research, the Research-Action Group (R-AG), and its first chairperson was Dr. Philip Branton.

THE CANCER CONTROL CONTINUUM



From: Canadian Strategy for Cancer Control. *Establishing the Strategic Framework for the Canadian Strategy for Cancer Control*. April 2005. http://209.217.127.72/csc/pdf/Strategy_Framework0405.pdf

The R-AG was originally composed of researchers from each of the four pillars of health research (that is, biomedical, applied clinical, health services/health systems research and population health) as well as selected members of a few organizations that fund cancer research in Canada. Following the initial few meetings, members of the R-AG perceived a compelling need to create a much stronger voice, one that could address research issues across the spectrum of cancer control. To this end, more of the leading funders of cancer research in Canada were invited to an open forum in December of 2003 at which, inspired by the momentum of the CSCC, they discussed

a new vision for a nationally coordinated research effort. This group became the CCRA and is now composed of many of the major cancer research funding organizations from the federal and provincial governments, the voluntary sector as well as other key stakeholders within the Canadian research scene.

In its 2006 budget, the federal government committed \$260 million to the Canadian Strategy for Cancer Control (CSCC) over the next five years. In November 2006, the government announced that implementation of the strategy would be overseen by the Canadian Partnership Against Cancer (CPAC).

MANDATE

CCRA has a three-pronged mandate:

1. It responds to the research needs of other CPAC Action Groups by planning, initiating and overseeing appropriate peer-reviewed research initiatives in its role as the research action group for CPAC.
2. It works to coordinate cancer research, target gaps and eliminate unnecessary overlap at a pan-Canadian level.
3. It identifies, develops and initiates large transformative cancer research initiatives.

THIS REPORT

This report summarizes the results of a survey of cancer research investment made by CCRA members and affiliated organizations in 2005. It represents the first collaboratively funded project on the part of CCRA members, and represents the first description of its kind of cancer funding in Canada.

The information establishes a baseline measure of the level of investment in various areas of cancer research, and will be used by members of the Alliance in their individual

organizational strategic planning as well as in joint planning and decision making. CCRA is committed to continuing and expanding data collection for the next version of this report.

The report is organized around three major topics: cancer research investment; areas of science being supported; and types of cancers being studied. Analyses are descriptive in nature. The data represent a single year snapshot. Alphabetical order has been used when reporting data by organization, province and cancer type.

METHODOLOGY

C CRA members and affiliated organizations were asked to provide data in an electronic format on all peer-reviewed cancer projects which they administered at some point between January 1 and December 31, 2005. Peer review is a process of subjecting a research proposal to the scrutiny of experts in the field, and making funding decisions on the basis of quality assessments.

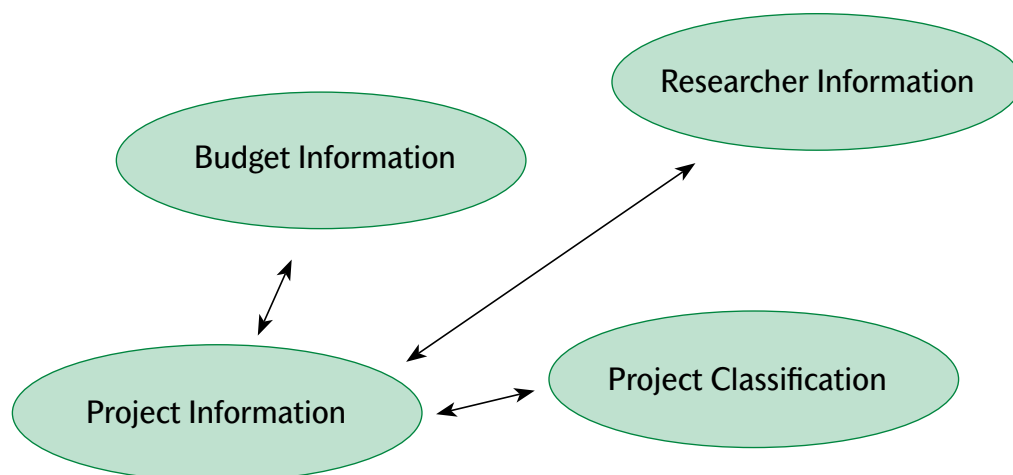
Among the data requested for each project were: project start and end dates; project funding amount; grant/award mechanism; project title; project summary; project researchers; and the location/institution of the project researchers¹. The information provided by members and affiliated organizations was then organized into a relational database, with major tables focusing

on project information, budget information, researcher information and project classification.

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), a partnership comprised of a number of key cancer research funders from the United States and the United Kingdom.

CCRA DATABASE OVERVIEW



The 38 CSO codes are organized into seven broad categories of scientific interest:

BIOLOGY: Research included in this category looks at the biology of how cancer starts and progresses as well as normal biology relevant to these processes.

ETIOLOGY: Research included in this category aims to identify the causes or origins of cancer – genetic, environmental and lifestyle, and the interactions between these factors.

PREVENTION: Research included in this category looks at identifying interventions which reduce cancer risk by reducing exposure to cancer risks and increasing protective factors. Interventions may target lifestyle or may involve drugs or vaccines.

EARLY DETECTION, DIAGNOSIS & PROGNOSIS: Research included in this category focuses on identifying and testing cancer markers and imaging methods that are helpful in detecting and/or diagnosing cancer as well as predicting the outcome or chance of recurrence.

TREATMENT: Research included in this category focuses on identifying and testing treatments administered locally (such as radiotherapy and surgery) and systemically (treatments like chemotherapy which are administered throughout the body) as well as non-traditional (complementary/alternative) treatments (such as supplements, herbs).

CANCER CONTROL, SURVIVORSHIP AND OUTCOMES: Research included in this category includes a broad range of areas: patient care and pain management; tracking cancer cases in the population; beliefs and attitudes that affect behaviour regarding cancer control; education and communication approaches for patients and health care professionals; supportive and end-of-life care; and health care delivery in terms of quality and cost effectiveness.

SCIENTIFIC MODEL SYSTEMS: Research included in this category looks at the

development of new animal models, cell cultures and computer simulations and their application to other studies across the spectrum of cancer research.

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.

Because the CSO was a new tool for CCRA members, a validation process was used for coding. That is, two different coders worked independently to code all of the projects, then met to discuss any discrepancies in project coding and determine final agreed-upon codes.

Kite diagrams have been used in this report to show the distribution of the 2005 research investment across the seven CSO categories. In commonly used bar charts, data are presented from a starting point of 0 to maximum value of 100. In the kite diagram, the plot area is split into two equal parts of 50, with the 0 point located in the middle of the graph. The distribution is shown on either side of the 0 origin. The kite diagram provides a visually succinct way to demonstrate differences and similarities across multiple organizations because each distribution results in a distinct shape.

For more information about the CSO, please refer to <http://www.cancerportfolio.org/cso.jsp>

Projects were also classified according to cancer type using the International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Version for 2006 (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. The ICD-10 is organized in terms of body system. For example, one section deals with the digestive system and details codes for cancers of the esophagus, stomach, colon, and so on. The more detailed classification was used to code research projects at the level of the body part.

Similar to the CSO coding, some projects were assigned more than one cancer type. 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.

REPORTING CONVENTIONS

The term “cancer research investment” is used within this report to represent the direct funding of cancer research projects that are peer-reviewed, and administered by the organizations participating in the survey. Unless otherwise noted, research projects are included under the organization which administers the grants and awards programs even in those situations where the project may be funded by more than one organization. The investment shown for individual organizations may not reflect additional expenditures on researcher salaries, infrastructure, indirect costs, and other vital components that support the conduct of research.

All projects actively funded in calendar year 2005 were included. Given that many organizations have different grant cycles and fiscal years, the selection of calendar 2005 was intended to standardize data collection to a single 12-month period. The 2005 investment was calculated on a pro-rated basis, and assumed that the project dollars were paid out in equal monthly install-

ments. Although this is not the way project dollars typically flow, this method was used for simplicity and parity.

Where data were available on large-scale research projects which had multi-components, each component was considered a distinct project.

Analyses by geographic region are based solely on the institutional affiliation of the Principal Investigator (PI). There is only one designated PI per project.

In addition to the 3,083 cancer-specific projects, the CCRA database also contains 177 projects which were deemed to be cancer-related, but did not have the study of cancer as a primary focus. To include this investment, but not overstate it, these projects were given a weighted investment of 33%.

Please note that data reported are subject to change based on future data submissions or corrections.

WHAT'S NOT INCLUDED IN THIS REPORT

This report is a descriptive look at cancer research funded in 2005, and is a vital starting point. The data represent a single snapshot of research investment, however, and no inferences can be made beyond the 2005 data.

This report looks at actual dollars spent on research projects, and does not include information on financial commitments (that is, monies allocated in a single fiscal year to fund research over a number of years). It is important to understand this as well as the reporting conventions used in this report when comparing figures in this report with figures in financial year-end reporting by the participating organizations.

While this report does have important information about the research investment by major cancer research funders, it does not, however, have data from the following sources:

- federal government organizations such as the Canadian Foundation of Innovation, Canadian Research Chairs, Genome Canada, Natural Sciences and Engineering Research Council of Canada, Network of Centres of Excellence, and Social Sciences and Humanities Research Council of Canada
- other non-governmental/voluntary sector organizations such as the Brain Tumour Foundation of Canada, Canadian Association of Radiation Oncologists, Canadian Dermatology Foundation, Canadian Foundation for Women's Health, Canadian Liver Foundation, The Kidney Foundation of Canada, Ontario Association of Medical Laboratories, Ovarian Cancer Canada, Prostate Cancer Research Foundation of Canada, and Rethink Breast Cancer
- hospital foundations such as Princess Margaret Hospital Foundation
- provincial government organizations such as the Change Foundation (Ontario), Manitoba Health Research Council, Medical Research Fund of New Brunswick, Nova Scotia Health Research Foundation, PEI Health Research Institute and Saskatchewan Health Research Foundation, as well as provincial workers' compensation boards
- organizations from outside Canada that fund Canada-based cancer researchers such as the U.S. National Cancer Institute, part of the U.S. government's National Institutes of Health
- business/industry

The report does not evaluate the impacts of this research or assess return on research investment (also known as research "payback").

¹All members and affiliated organizations provided these data with the exception of Cancer Care Nova Scotia (CCNS). Information on the one project included for CCNS was based on a meeting held with its former Commissioner, Dr. Andrew Padmos. Data on 12 student awards amounting to an investment of \$60,000 in 2005 are missing from the CCNS figures shown in this report.

FINDINGS

► INVESTMENT

WHAT WE KNOW

Nearly \$254M was invested in cancer research by CCRA member and affiliated organizations in 2005. There were 1,952 principal investigators for the overall total of 3,260 projects.

The Canadian Institutes of Health Research (CIHR) represented the single largest funder of cancer research in Canada, investing \$111.5M in 2005 in projects that they administered. The National Cancer Institute of Canada (NCIC) represented the single largest cancer research funder in the voluntary sector, investing \$57.5M in projects that they administered. Both organizations fund all types of cancer research conducted across the country.

Multi-funded partnerships represent an integral part of cancer research funding in Canada. In addition to administering their own programs, many cancer research funders contribute to grants and awards programs administered by other groups. This includes three pan-Canadian multi-funded research initiatives (totaling \$13M in 2005): the Canadian Breast Cancer Research Alliance (\$10.2M); the Canadian Tobacco Control Research Initiative (\$1.4M); and the Canadian Prostate Cancer Research Initiative (\$1.4M). The largest relative investment in the initiatives was for the Canadian Breast Cancer Foundation. In 2005, it invested \$2.9M in the Canadian Breast Cancer Research Alliance and \$4.3M in projects administered by its regional chapters.

About two-thirds of the 2005 cancer research investment (\$188M) was for grants which directly

supported the conduct of research (operating grants). Over 70% of the research investment made by provincial cancer agencies was for equipment/infrastructure. The proportion of salary awards (18%) was highest for provincial health research organizations.

Canada's most populous provinces received the greatest share of the cancer research dollars in 2005.

WHAT WE DON'T KNOW

The provincial distribution of the research dollars may be related to a number of factors which are not evaluated in this report, such as researcher capacity (number of active cancer researchers and their expertise), availability of provincial funding mechanisms, availability of equipment/infrastructure, presence of medical schools/universities with cancer researchers on faculty, and funding application rates and application success rates.

A number of provincial health research organizations are missing from this report, and this affects the cancer research investment shown for some provinces.

WHAT'S HAPPENING

The Alberta Heritage Foundation for Medical Research (AHFMR) has recently launched a new Team Grants program that provides opportunities for high-quality recognized teams of investigators to complete research initiatives with defined health outcomes. Funds are available to support

collaborative, interdisciplinary and multi-institutional teams (not limited to Alberta) that address important and complex research questions in defined areas that are aligned with strategic research priorities. AHFMR is also looking at enhancing its research investments in Alberta through the Polaris awards program which intends to invest up to \$10 million (which will have to be matched locally) in each of three (initially) high level recruitments to the province in order to accelerate research in key areas that are of priority for Alberta.

The Ontario Institute for Cancer Research (OICR) is in the process of launching large-scale translational cancer research programs with a focus on prevention, early detection, diagnosis and treatment. The programs will ramp up to \$80 million per year by 2009. In order to increase capacity in cancer research, OICR is launching an Investigator Program to recruit and retain 50 principal investigators in Ontario.

The Canadian Breast Cancer Foundation awards peer-reviewed research grants through its own specific regional programs which cover the entire breast cancer spectrum, and is a funding partner in the Canadian Breast Cancer Research Alliance (CBCRA), making extra contributions to CBCRA in the research areas of etiology/primary prevention, breast cancer metastasis, and survivorship/quality of life. The Foundation's BC/Yukon and Ontario Chapters recently completed separate research inquiries into the state of breast cancer care in British Columbia and Ontario, respectively. The findings of these initiatives have provided strategic insight to the Foundation, helping to inform the organization's research investments in these regions going forward. Other strategic initiatives are also being considered nationally as part of a comprehensive allocations agenda.

The Alberta Cancer Board, through the provincial government's establishment of the *Alberta Cancer Prevention Legacy Act*, is developing a single Alberta Cancer Research Institute (ACRI) in partnership with the University of Alberta and the University of Calgary to coordinate all cancer research in the province. New Legacy funding has been provided for large translational group projects, new clinical trials, research operating grants, including high risk for high return grants, pilot grants, training awards, and endowed chairs in cancer research. This funding is being matched by the Alberta Cancer Foundation. The Weekend to End Breast Cancer funds, collected from walkathons in both Calgary and Edmonton, are being directed along similar lines with the emphasis on breast cancer research.

The Canadian Cancer Action Network (CCAN), which represents Canada's leading cancer patient organizations, works with federal and provincial decision makers to facilitate and sustain a health care and research model that is successful in the fight against cancer. The group advocates for a national system which will optimize care and treatment outcomes through all phases of the cancer control continuum, from prevention, through to treatment and palliation.

In mid-May, the Federal government announced a new national science and technology strategy which aims to focus federal support for research and development in health as well as other key areas.

CCRA is working on refining its database to look at the geographic dispersion of research dollars, and the level of expertise in cancer research across the country. This will be aided by expanded involvement from other organizations funding cancer research. This information will be provided in future reports.

TABLE 1.

2005 CANCER RESEARCH INVESTMENT OF CCRA MEMBER AND AFFILIATED ORGANIZATIONS

Sector	Organization Type	CCRA Member & Affiliated Organization	Number of Projects	2005 Investment	%	2005 Investment with Initiatives included[1]
GOVERNMENT \$172,254,024 68%	Federal \$113,800,975 45%	Canadian Institutes of Health Research	1,527	\$111,458,325	43.96	\$113,288,298*
		National Research Council	15	\$2,342,650	0.92	\$2,342,650
	Provincial Cancer Agency \$21,757,453 9%	Alberta Cancer Board	129	\$6,333,854	2.50	\$6,333,854
		BC Cancer Agency	10	\$6,281,125	2.48	\$6,281,125
		CancerCare Manitoba	42	\$953,853	0.38	\$953,853
		Cancer Care Nova Scotia[2]	1	\$100,000	0.04	\$100,000
		Cancer Care Ontario	19	\$7,798,133	3.08	\$7,798,133
		Saskatchewan Cancer Agency	8	\$290,488	0.11	\$290,488
	Provincial Health Research Organization \$36,695,596 14%	Alberta Heritage Foundation for Medical Research	97	\$5,483,672	2.16	\$5,483,672
		Fonds de la recherche en santé du Québec	202	\$10,066,617	3.97	\$10,066,617
		Michael Smith Foundation for Health Research	115	\$5,783,604	2.28	\$5,783,604
		Ontario Institute for Cancer Research	71	\$15,361,703	6.06	\$15,361,703
	VOLUNTARY \$68,322,077 27%		Canadian Breast Cancer Foundation	87	\$4,316,988	1.70
		Fondation du cancer du sein du Québec	3	\$1,066,667	0.42	\$1,066,667
		National Cancer Institute of Canada[3]	620	\$57,504,539	22.68	\$61,546,820*
		The Cancer Research Society	131	\$5,433,883	2.14	\$5,519,556*
MULTI-FUNDED[4] \$12,992,030 5%		Canadian Breast Cancer Research Alliance	97	\$10,154,033	4.00	\$4,124,701 ^R
		Canadian Prostate Cancer Research Initiative	15	\$1,430,538	0.56	\$0 ^R
		Canadian Tobacco Control Research Initiative	71	\$1,407,459	0.56	\$0 ^R
TOTAL			3,260	\$253,568,130	100.00	\$253,568,130

[1] Figures marked with an asterisk (*) show the addition of the investment in the multi-funded initiatives to the investment made in projects that the four organizations administer themselves. Kite diagrams presented in the next section are 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 "2005 Investment" column.

[2] Figure shown for Cancer Care Nova Scotia does not include 12 studentships estimated at \$60,000 in 2005.

[3] The National Cancer Institute of Canada is funded by the Canadian Cancer Society and The Terry Fox Foundation.

[4] See Table 2 for a detailed breakdown of CCRA member contributions to these initiatives.

TABLE 2.

2005 CANCER RESEARCH INVESTMENT OF CCRA MEMBER AND AFFILIATED ORGANIZATIONS INCLUDED IN MULTI-FUNDED INITIATIVES

Initiative	Canadian Institutes of Health Research	Canadian Breast Cancer Foundation	National Cancer Institute of Canada[1]	The Cancer Research Society	Other[2]	TOTAL
Canadian Breast Cancer Research Alliance	\$668,774	\$2,909,402	\$2,365,483	\$85,673	\$4,124,701	\$10,154,033
Canadian Prostate Cancer Research Initiative	\$168,964	\$0	\$1,261,574	\$0	\$0	\$1,430,538
Canadian Tobacco Control Research Initiative	\$992,236	\$0	\$415,223	\$0	\$0	\$1,407,459
TOTAL	\$1,829,974	\$2,909,402	\$4,042,280	\$85,673	\$4,124,701	\$12,992,030

[1] The National Cancer Institute of Canada's contribution to the initiatives is funded by the Canadian Cancer Society.

[2] Includes Avon Canada (\$0.95M), Breast Cancer Society of Canada (\$0.11M), CURE Foundation (\$0.23M) and the Public Health Agency of Canada (\$2.84M).

TABLE 3.

2005 CANCER RESEARCH INVESTMENT OF CCRA MEMBER AND AFFILIATED ORGANIZATIONS BY GRANT TYPE

Grant Type	GOVERNMENT						VOLUNTARY		MULTI-FUNDED		TOTAL	
	Federal		Provincial Cancer Agency		Provincial Health Research Organization		2005 Investment %		2005 Investment %		2005 Investment %	
	2005 Investment	%	2005 Investment	%	2005 Investment	%	2005 Investment	%	2005 Investment	%	2005 Investment	%
Direct support (operating grants)	\$94,499,109	83.04	\$4,532,345	20.83	\$19,238,537	52.43	\$57,374,185	83.98	\$12,412,072	95.54	\$188,056,247	74.16
Equipment/infrastructure	\$4,321,147	3.80	\$16,028,362	73.67	\$7,624,421	20.78	\$5,922,985	8.67	\$0	0.00	\$33,896,915	13.37
Salary awards	\$6,487,813	5.70	\$480,000	2.21	\$6,687,487	18.22	\$2,157,903	3.16	\$0	0.00	\$15,813,203	6.24
Trainee research	\$8,286,087	7.28	\$634,883	2.92	\$3,140,151	8.56	\$2,845,916	4.17	\$426,827	3.29	\$15,333,865	6.05
Research-related support[1]	\$206,819	0.18	\$81,864	0.38	\$5,000	0.01	\$21,088	0.03	\$153,130	1.18	\$467,900	0.18
TOTAL	\$113,800,975	100.00	\$21,757,454	100.00	\$36,695,596	100.00	\$68,322,077	100.00	\$12,992,030	100.00	\$253,568,130	100.00

[1] Research-related support includes travel awards, and monies to help develop research proposals and support the delivery of workshops/symposium.

FIGURE 1.

DISTRIBUTION OF 2005 CANCER RESEARCH INVESTMENT OF CCRA MEMBER AND AFFILIATED ORGANIZATIONS BY GRANT TYPE

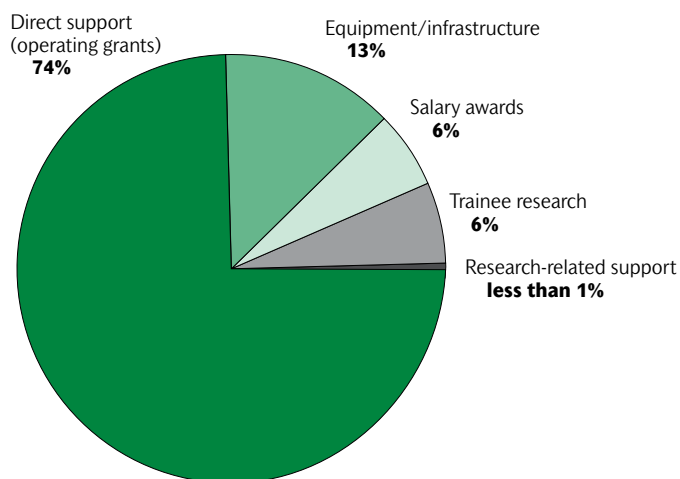


TABLE 4.

**2005 CANCER RESEARCH INVESTMENT OF CCRA MEMBER AND AFFILIATED ORGANIZATIONS
BY PROVINCE OF PRINCIPAL INVESTIGATOR**

Province	GOVERNMENT											
	Federal		Provincial Cancer Agency		Provincial Health Research Organization[1]		VOLUNTARY		MULTI-FUNDED		TOTAL	
	2005 Investment	%	2005 Investment	%	2005 Investment	%	2005 Investment	%	2005 Investment	%	2005 Investment	%
Alberta	\$10,081,321	8.86	\$6,333,854	29.11	\$5,463,672	14.89	\$4,362,843	6.39	\$548,542	4.22	\$26,790,232	10.57
British Columbia	\$13,283,008	11.67	\$6,281,125	28.87	\$5,803,604	15.82	\$8,571,044	12.55	\$1,526,374	11.75	\$35,465,154	13.99
Manitoba	\$4,254,458	3.74	\$953,853	4.38	\$0	0.00	\$788,432	1.15	\$102,173	0.79	\$6,098,916	2.41
New Brunswick	\$80,910	0.07	\$0	0.00	\$0	0.00	\$0	0.00	\$4,900	0.04	\$85,810	0.03
Newfoundland & Labrador	\$632,359	0.56	\$0	0.00	\$0	0.00	\$75,817	0.11	\$62,543	0.48	\$770,719	0.30
Nova Scotia[2]	\$1,817,187	1.60	\$100,000	0.46	\$0	0.00	\$1,312,124	1.92	\$25,000	0.19	\$3,254,311	1.28
Ontario	\$44,015,801	38.68	\$7,768,133	35.70	\$15,386,703	41.93	\$39,195,725	57.37	\$8,364,363	64.38	\$114,730,725	45.25
Prince Edward Island	\$95,170	0.08	\$0	0.00	\$0	0.00	\$0	0.00	\$0	0.00	\$95,170	0.04
Quebec	\$35,586,505	31.27	\$0	0.00	\$9,882,443	26.93	\$13,388,352	19.60	\$2,310,273	17.78	\$61,167,573	24.12
Saskatchewan	\$2,120,388	1.86	\$290,488	1.34	\$0	0.00	\$271,874	0.40	\$47,861	0.37	\$2,730,612	1.08
Outside Canada[3]	\$1,833,869	1.61	\$30,000	0.14	\$159,174	0.43	\$355,867	0.52	\$0	0.00	\$2,378,910	0.94
TOTAL	\$113,800,975	100.00	\$21,757,453	100.00	\$36,695,596	100.00	\$68,322,077	100.00	\$12,992,030	100.00	\$253,568,130	100.00

[1] Several provincial health research organizations are not members.

[2] Figure for Nova Scotia is \$60,000 higher than shown

[3] Research investment in trainees from Canada who were attending institutions outside of Canada.

FINDINGS

► TYPES OF RESEARCH

WHAT WE KNOW

About 46% (\$115.3M) of cancer research investment was in the area of cancer biology, with an additional 22% (\$56.8M) in treatment. Over half of all salary awards and trainee research grants were in the cancer biology area, somewhat higher than the proportion (44%) of direct support (operating grants) in this CSO area.

Nearly 17% (\$43M) of the cancer research investment by CCRA member and affiliated organizations was dedicated to resources and infrastructure supporting the conduct of research across the seven categories of the CSO.

The distribution of individual organization's research investment as presented in the kite diagrams varied considerably, although larger funders tended to have similar profiles, spending the largest portion of their investment in the area of cancer biology. The strategic priorities of CCRA members and affiliated organizations are evidenced in their CSO profiles. For example, Ontario Institute for Cancer Research has a strong translational research and clinical trials focus, and the profile shows a big bulge in the treatment category. Similarly, The Cancer Research Society has been committed to funding projects in the area of cancer biology, and this is illustrated by the prominence of the biology category.

While only 2% (\$5.8M) of the CCRA member and affiliated organizations' cancer research investment was in the prevention

category, it is important to recognize that this category is narrowly defined within the CSO to include only research on prevention interventions. A truer picture of total cancer research investment in primary prevention is reflected by combining the investment in the prevention categories with some of the projects focused on etiology (origins and causes of cancer) as well as some projects within the surveillance code of the cancer control, survivorship and outcomes category. It is estimated that the full prevention investment is between 7-10% of the total 2005 investment.

Nearly 55% of the \$57M cancer research investment in treatment by CCRA members and affiliated organizations was in the area of discovery and development of systemic treatments (treatments that are administered to the whole body). This includes research on novel therapies, identification of molecular targets for drug discovery, drug resistance as well as methods of drug delivery.

Of the \$29M cancer research investment by CCRA members and affiliated organizations in cancer control, survivorship and outcomes, 27% (\$7.9M) focused on patient care and survivorship issues. This includes research in the areas of quality of life and symptom management.

WHAT WE DON'T KNOW

Factors like researcher capacity (number and expertise), resource needs, scientific opportunity and the strategic priorities of funders all play a

role in shaping the research that is funded. While some areas of research may receive more money than other areas, the data cannot tell us what the distribution of research investment ought to be in order to maximize return on research investment.

WHAT'S HAPPENING

In 2006, the National Cancer Institute of Canada (NCIC) launched a Cancer Research Prevention Initiative, comprised of four teams of experts, to examine what is currently known about cancer causes and prevention, to identify the gaps in knowledge, and to make recommendations on priority areas for new research investments to fill these gaps. The Initiative, which will be presenting its preliminary findings at the Institute's 60th anniversary research conference later this year, is designed to boost strategic investment in cancer prevention research. The NCIC also recently issued a call for applications to establish a centre of excellence for health economics, services, policy and ethics research in cancer control. The centre will be the first cancer-specific research effort of its kind in Canada and is expected to begin operations in 2008.

The Environment-Cancer Fund (ECF) is a new fundraising initiative created by The Cancer Research Society to support research into the links between the everyday environment (such as our lifestyles or our exposure to carcinogens) and the development of cancer. The ECF will take a multidisciplinary approach by funding studies in epidemiology, genetics, virology, nutrition, and so on, and is the first major fund of its kind in Canada.

The Alberta Cancer Board's Tomorrow Project, a provincial study that is observing a

large group of people over many years (known as a cohort study) started in 2000, and is now in its third phase. This project has developed and tested a number of questionnaires and blood sample collection protocols, and is aiming to increase enrollment to 30,000 participants by the end of 2007.

The Ontario Institute for Cancer Research (OICR), fuelled with expanded dollars from the Ontario government, will work with Cancer Care Ontario to develop and implement a cohort study designed to bring more effective prevention strategies to the Ontario population. Two additional innovation programs identified in the OICR Strategic Plan developed in January 2007 include the One Millimetre Cancer Challenge, which will develop biomarkers and imaging technologies to detect very small tumours, and the Cancer Stem Cell Project, which will investigate the role of cancer stem cells in terms of chemotherapy and radiation resistance, and new tumour formation.

In March 2007, The Terry Fox Foundation incorporated the Terry Fox Research Institute (TFRI) after consulting widely with the Canadian cancer research community on the best use of funds from the 25th Anniversary run. TFRI will link major cancer research centres, "nodes", across the country. Currently nodes in British Columbia, Alberta, Ontario and Quebec have been established. Other nodes will be added in the future. This Canada-wide Institute will focus on translational cancer research. TFRI is committed to investing a minimum of \$10M per year for the next 10 years on milestone driven outcomes orientated projects. It will seek co-funding of projects with other organizations. In the future, TFRI hopes to link with cancer

research organizations in many of the countries that support Terry Fox runs.

Also in March 2007, the Canadian Institutes of Health Research (CIHR) and the Canadian Foundation of Innovation (CFI) launched a joint Regional/National Clinical Research Initiatives (CRI) program designed to both improve the national infrastructure for clinical

research and increase operational funding.

Under the CRI, the CFI and CIHR challenge institutions and their investigators to consider non-traditional models and/or combinations of traditional/non-traditional models to best meet the overall objective of enhancing clinical research through multidisciplinary and collaborative approaches.

TABLE 5.

**2005 CANCER RESEARCH INVESTMENT BY CCRA MEMBER AND AFFILIATED ORGANIZATIONS
BY CSO CATEGORY AND GRANT TYPE**

Grant Type	CSO Category															
	Biology		Etiology		Prevention		Early detection, diagnosis & prognosis		Treatment		Cancer control, survivorship & outcomes		Scientific model systems		Total	
	2005 Investment	%	2005 Investment	%	2005 Investment	%	2005 Investment	%	2005 Investment	%	2005 Investment	%	2005 Investment	%	2005 Investment	%
Direct support (operating grants)	\$85,929,384	74.52	\$20,640,394	81.95	\$4,184,346	72.22	\$15,247,899	76.50	\$40,003,084	70.44	\$21,231,394	72.35	\$819,747	67.66	\$188,056,247	74.16
Equipment/ infrastructure	\$12,277,218	10.65	\$1,143,305	4.54	\$1,087,293	18.77	\$3,368,645	16.90	\$11,734,373	20.66	\$4,199,270	14.31	\$86,810	7.17	\$33,896,915	13.37
Salary awards	\$9,017,887	7.82	\$1,603,409	6.37	\$205,327	3.54	\$524,610	2.63	\$2,112,099	3.72	\$2,110,254	7.19	\$239,619	19.78	\$15,813,203	6.24
Trainee research	\$8,005,019	6.94	\$1,710,387	6.79	\$243,102	4.20	\$760,801	3.82	\$2,884,323	5.08	\$1,664,858	5.67	\$65,375	5.40	\$15,333,865	6.05
Research-related support[1]	\$79,158	0.07	\$87,781	0.35	\$74,132	1.28	\$28,998	0.15	\$57,128	0.10	\$140,704	0.48	\$0	0.00	\$467,900	0.18
TOTAL	\$115,308,665	100.00	\$25,185,275	100.00	\$5,794,199	100.00	\$19,930,952	100.00	\$56,791,007	100.00	\$29,346,480	100.00	\$1,211,551	100.00	\$253,568,130	100.00

[1] Research-related support includes travel awards, and monies to help develop research proposals and support the delivery of workshops/symposium.

FIGURE 2.

DISTRIBUTION OF 2005 CANCER RESEARCH INVESTMENT OF CCRA MEMBER AND AFFILIATED ORGANIZATIONS BY CSO CATEGORY

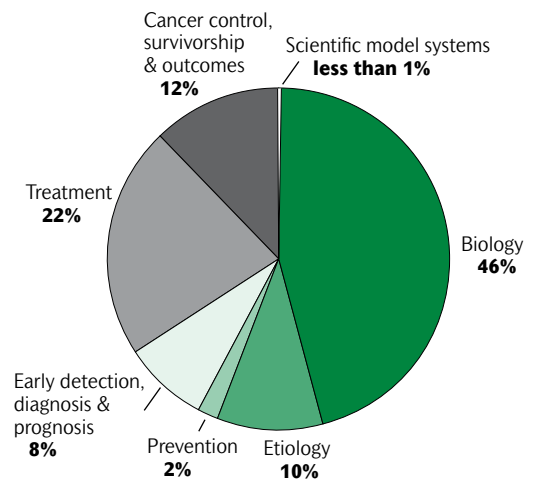
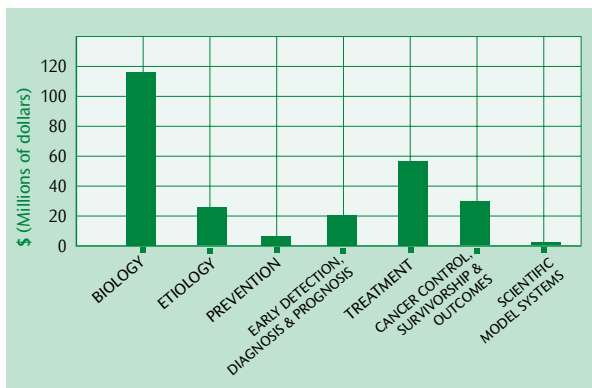
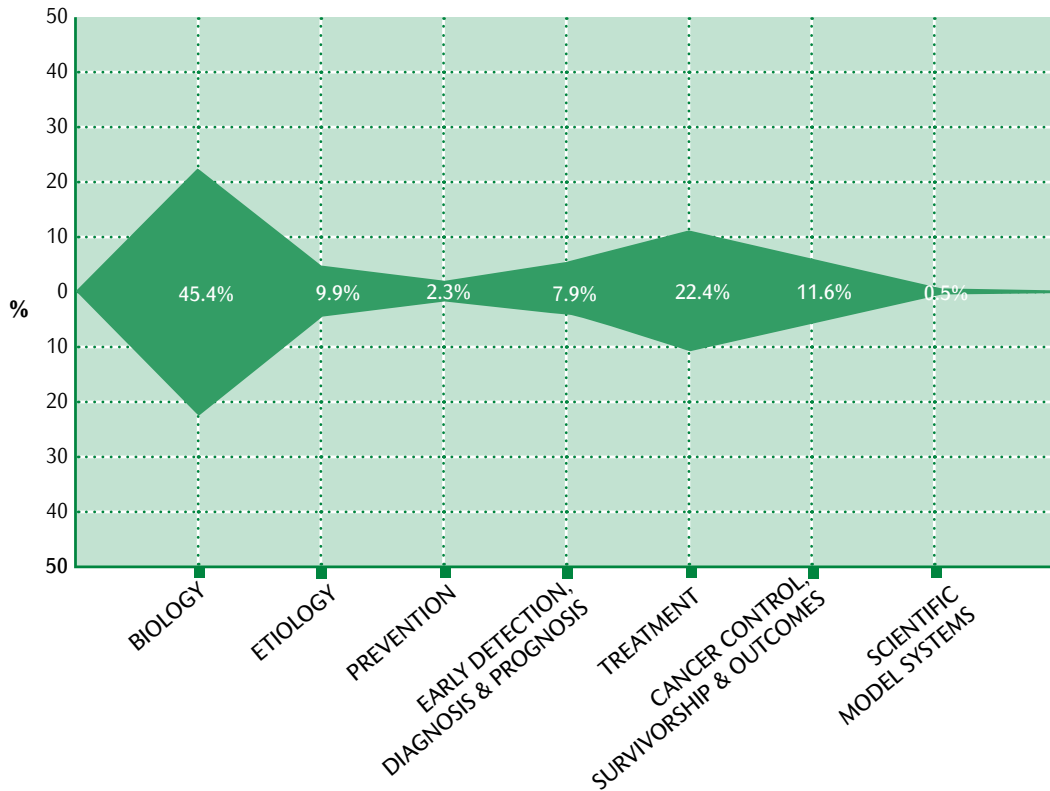
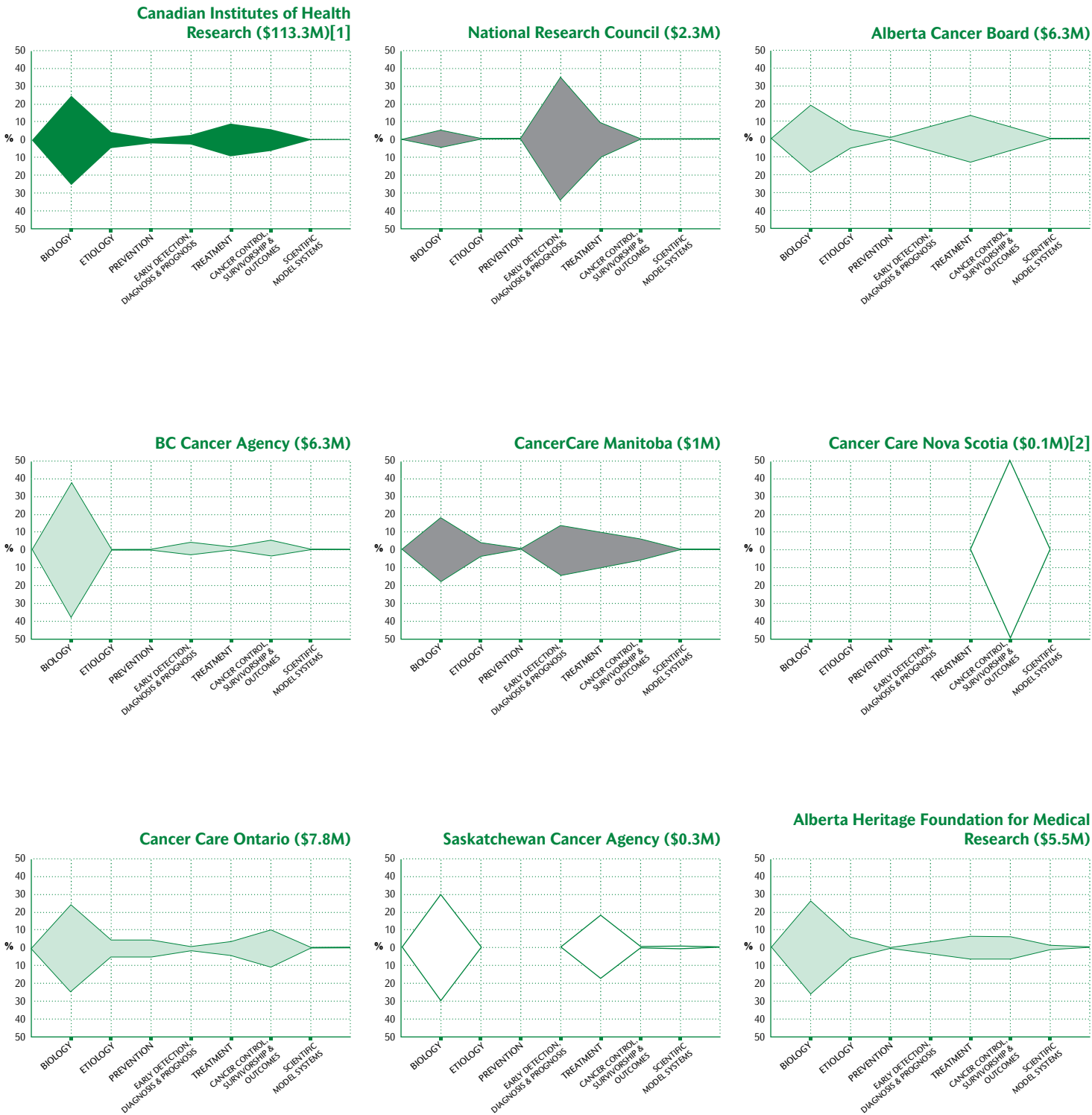
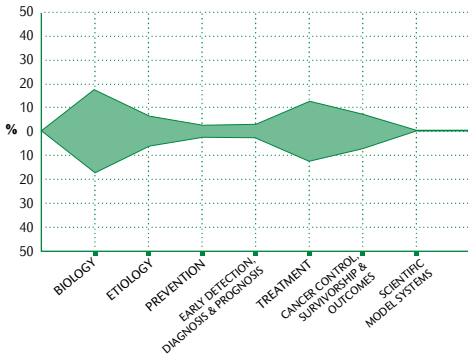


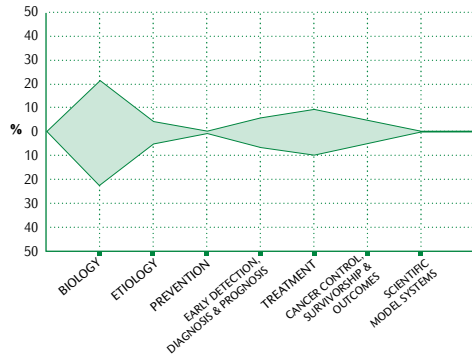
FIGURE 3.
DISTRIBUTION OF 2005 CANCER RESEARCH INVESTMENT OF INDIVIDUAL CCRA MEMBER AND AFFILIATED ORGANIZATIONS BY CSO CATEGORY



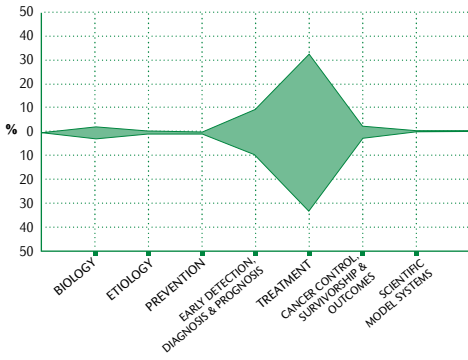
Fonds de la recherche en santé du Québec (\$10.1M)



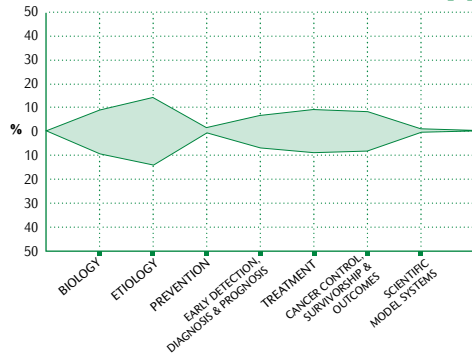
Michael Smith Foundation for Health Research (\$5.8M)



Ontario Institute for Cancer Research (\$15.4M)

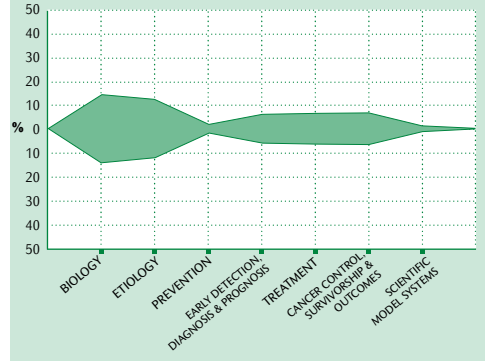


Canadian Breast Cancer Foundation (\$7.2M)[1]

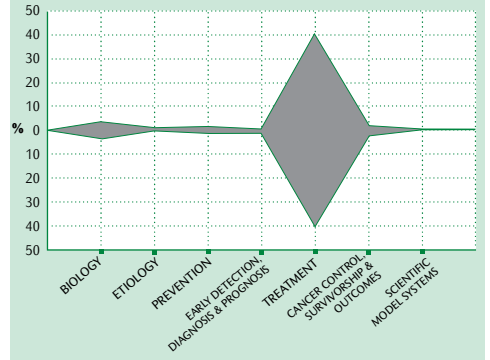


MULTI-FUNDED INITIATIVES

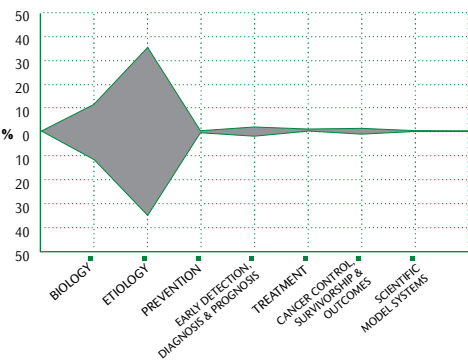
Canadian Breast Cancer Research Alliance (10.2M)



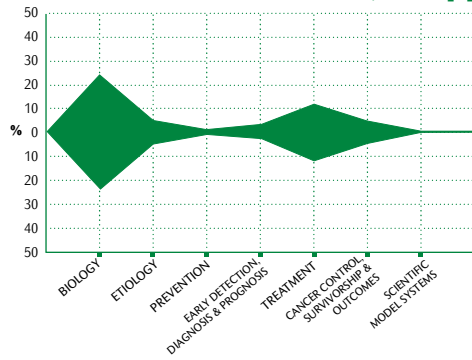
Canadian Prostate Cancer Research Initiative (\$1.4M)



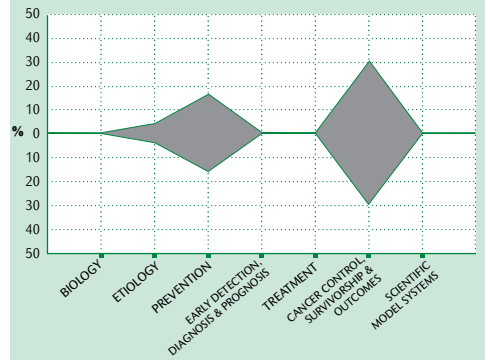
Fondation du cancer du sein du Québec (\$1M)



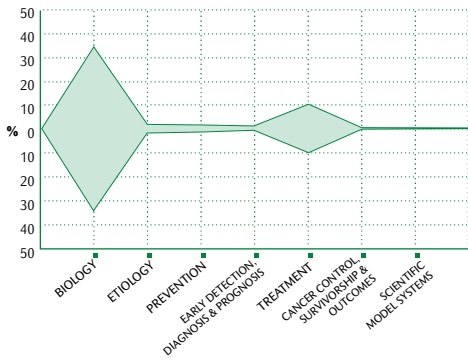
National Cancer Institute of Canada (\$61.6M)[1]



Canadian Tobacco Control Research Initiative (\$1.4M)



The Cancer Research Society (\$5.5M)[1]



INVESTMENT LEVEL

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

[1] Distribution includes investment in initiatives, thus total dollars shown in parentheses will be more than 100% of \$254 million.

[2] Data for Cancer Care Nova Scotia excludes \$60,000 in studentships.

TABLE 6.

DISTRIBUTION OF 2005 CANCER RESEARCH INVESTMENT BY CCRA MEMBER AND AFFILIATED ORGANIZATIONS BY CSO CODE

CSO Category	CSO Code[1]	2005 Investment	% Total Investment	% Category Investment
1 - Biology \$115,308,665 45%	1.1 - Normal functioning	\$44,626,179	17.60	38.70
	1.2 - Cancer initiation: alterations in chromosomes	\$7,945,850	3.13	6.89
	1.3 - Cancer initiation: oncogenes and tumour suppressor genes	\$26,418,417	10.42	22.91
	1.4 - Cancer progression and metastasis	\$19,476,215	7.68	16.89
	1.5 - Resources and infrastructure	\$16,842,005	6.64	14.61
2 - Etiology \$25,185,275 10%	2.1 - Exogenous factors[2] in the origin and cause of cancer	\$9,974,300	3.93	39.60
	2.2 - Endogenous factors[3] in the origin and cause of cancer	\$9,904,442	3.91	39.33
	2.3 - Interactions of genes and/or genetic polymorphisms[4] with exogenous and/or endogenous factors	\$3,142,133	1.24	12.48
	2.4 - Resources and infrastructure	\$2,164,399	0.85	8.59
3 - Prevention \$5,794,199 2%	3.1 - Interventions to prevent cancer: personal behaviours that affect cancer risk	\$2,852,166	1.12	49.22
	3.2 - Nutritional science in cancer prevention	\$302,025	0.12	5.21
	3.3 - Chemoprevention	\$394,491	0.16	6.81
	3.4 - Vaccines	\$181,470	0.07	3.13
	3.5 - Complementary and alternative prevention approaches	\$536,868	0.21	9.27
	3.6 - Resources and infrastructure	\$1,527,178	0.60	26.36
4 - Early detection, diagnosis & prognosis \$19,930,952 8%	4.1 - Technology development and/or marker discover	\$8,864,670	3.50	44.48
	4.2 - Technology and/or marker evaluation with respect to fundamental parameters of method	\$4,366,937	1.72	21.91
	4.3 - Technology and/or marker testing in a clinical setting	\$2,326,757	0.92	11.67
	4.4 - Resources and infrastructure	\$4,372,587	1.72	21.94
5 - Treatment \$56,791,007 22%	5.1 - Localized therapies[5] – discovery and development	\$4,547,763	1.79	8.01
	5.2 - Localized therapies – clinical applications	\$2,242,816	0.88	3.95
	5.3 - Systemic therapies[6] – discovery and development	\$31,074,924	12.26	54.72
	5.4 - Systemic therapies – clinical applications	\$5,557,740	2.19	9.79
	5.5 - Combinations of localized and systemic therapies	\$953,030	0.38	1.68
	5.6 - Complementary and alternative treatment approaches	\$287,569	0.11	0.51
	5.7 - Resources and infrastructure	\$12,127,165	4.78	21.35
6 - Cancer control, survivorship & outcomes \$29,346,480 12%	6.1 - Patient care and survivorship issues	\$7,851,778	3.10	26.76
	6.2 - Surveillance	\$1,924,546	0.76	6.56
	6.3 - Behaviour	\$3,873,994	1.53	13.20
	6.4 - Cost analyses and healthcare delivery	\$3,987,298	1.57	13.59
	6.5 - Education and communication	\$2,274,626	0.90	7.75
	6.6 - End-of-life care	\$2,784,191	1.10	9.49
	6.7 - Ethics and confidentiality in cancer research	\$566,219	0.22	1.93
	6.8 - Complementary and alternative approaches for supportive care of patients and survivors	\$628,390	0.25	2.14
	6.9 - Resources and infrastructure	\$5,455,437	2.15	18.59
7- Scientific model systems \$1,211,551 Less than 1%	7.1 - Development and characterization of model systems[7]	\$965,312	0.38	79.68
	7.1 - Application of model systems	\$0	0.00	0.00
	7.3 - Resources and infrastructure	\$246,239	0.10	20.32

[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.

FINDINGS

► CANCER SITES

WHAT WE KNOW

When we speak about cancer, we are not talking about one disease but a complex set of more than 200 diseases.

Of the total cancer research investment by CCRA member and affiliated organizations in 2005, 44% was not directed towards a particular type of cancer, but relevant to common aspects of many cancers. Half of this non-specific research investment in Canada was in the area of cancer biology. Another 22% was directed toward cancer treatment, and 13% was in the area of cancer outcomes and survivorship. In terms of grant type, not surprisingly, 23% (\$26M) of the non-site specific investment was for equipment/infrastructure.

The highest level of investment for a given cancer type was for breast cancer at 15% (\$38M) of the 2005 research investment. Canada has several internationally renowned researchers working in the area of breast cancer, and this coupled with growing revenues for non-governmental organizations focused on breast cancer may account for this area of strength. The fact that 3 of the 19 CCRA member and affiliated organizations are breast cancer research funders (i.e., Canadian Breast Cancer Foundation, Canadian Breast Cancer Research Alliance and Fondation du cancer du sein du Québec) also contributes to this finding.

About 7% (\$18M) of 2005 cancer research investment of CCRA member and affiliated

organizations was directed towards the study of leukemias, the next largest cancer-specific investment. Over half of this investment was in the cancer biology category.

Lung cancer, the cancer site with the most new cases and the most deaths in Canada each year, received less than 3% of the 2005 research dollars (\$7M). Of note, the lung cancer research conducted in 2005 was quite evenly distributed across six CSO categories (there was no investment in model systems).

The cancer with the poorest five-year survival rate, pancreatic cancer, represented 0.5% of the overall 2005 cancer research investment of CCRA member and affiliated organizations. Of the new cancer cases in 2003, 2.4% were for pancreatic cancer.

WHAT WE DON'T KNOW

The data cannot tell us what the optimal level of site-specific cancer research investment should be. Research of all kinds may lead to developments in the cancer field that are applicable to many different types of cancer, and research into certain types of cancers can produce findings relevant to other cancer sites. In addition, scientific breakthroughs made in other countries influence the research arena in Canada, and are translated into the cancer patient care and treatment systems.

In this report, we opted to look at new cancer cases and cancer deaths as indicators of

the burden of cancer on the health care system. These indicators, however, do not represent the whole cancer burden. In Table 9, a broader range of statistics has been presented for selected cancer sites. Although not a definitive finding, these data seem to suggest that research dollars are correlated with cancers that have higher numbers of survivors.

The burden of disease is only one factor that drives the direction of research. Scientific opportunity, the introduction of new technologies, the researchability of a tumour type, the size and level of expertise in the research community, and the strategic priorities of research funders all shape the direction research will take.

WHAT'S HAPPENING

The core grant from the National Cancer Institute of Canada (NCIC) to the NCIC Clinical Trials Group (CTG) allows this Group to leverage millions of dollars in funding from other sources, not captured in this report, to launch clinical trials in a broad range of cancer sites and with a wide range of novel therapies. In 2006, there were eight clinical trials in lung cancer and two in pancreatic cancer, enrolling patients from Canada and around the world.

Since 2004, the Canadian Tobacco Control Research Initiative, in collaboration with Research for International Tobacco Control (RITC) of the International Development Research Centre (IDRC), the American Cancer Society, Cancer Research UK, and the Institut National du Cancer in France, has provided international tobacco research investigators in low and middle income countries with small grants

designed to support and inform ratification, implementation and/or enforcement of the World Health Organization Framework Convention on Tobacco Control, the world's first public health treaty designed to set broad limits on the production, sale, distribution, advertisement, and taxation of tobacco.

The Canadian Breast Cancer Foundation has funded research that applies innovations in other cancer sites to breast cancer specifically. For example, the Foundation funded a study to investigate how brachytherapy, commonly used in treating prostate cancer, might be adapted for treating breast cancer. This study resulted in the successful completion of the first breast cancer treatments in the world using small beads of palladium in an innovative one-day, outpatient radiation technique with the potential to dramatically change treatment of breast cancer.

Canadian Breast Cancer Research Alliance (CBCRA) funds research pertaining only to breast cancer. Funded projects cover the whole spectrum of breast cancer research: early detection, prevention/risk factors, treatment, fundamental laboratory investigations, quality of life and survivorship issues (including decision making and rehabilitation) and health services. By pooling the resources of its member organizations, CBCRA is able to fund more research than the individual members alone, and is able to mount competitions that support multi-million dollar grants involving several teams of researchers.

The Cancer Research Society awarded its first pancreatic cancer specific research grant earlier this year.

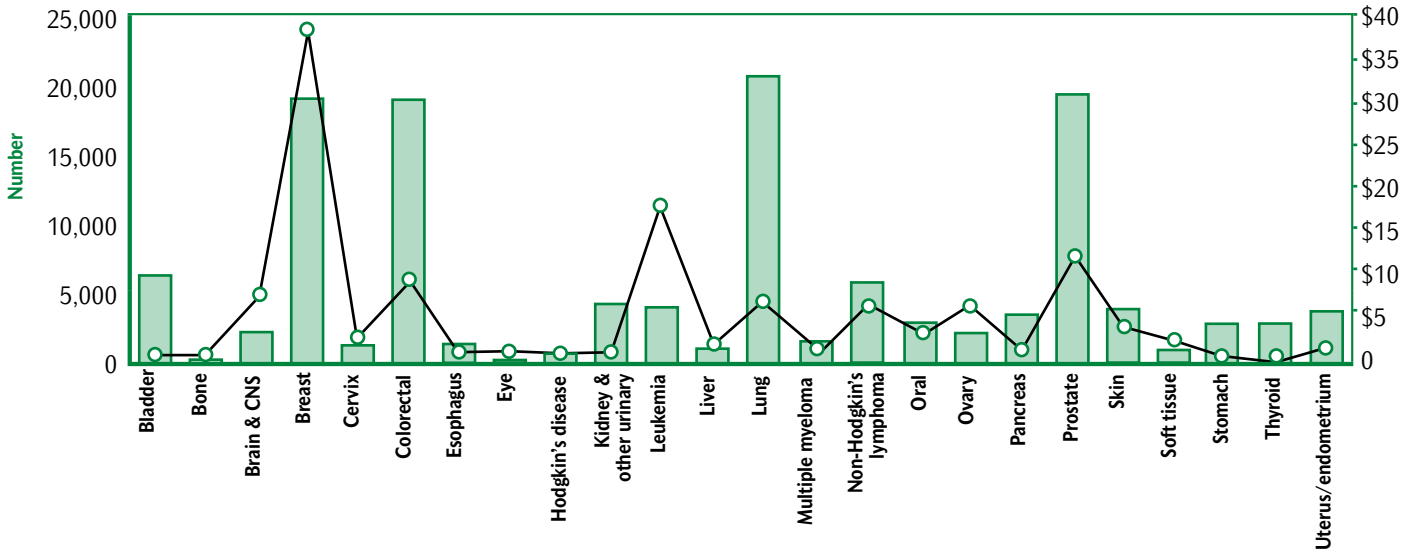
TABLE 7

2005 CANCER RESEARCH INVESTMENT OF CCRA MEMBER AND AFFILIATED ORGANIZATIONS BY TYPE OF CANCER

Cancer Type	GOVERNMENT										VOLUNTARY		MULTI-FUNDED		TOTAL	
	Federal		Provincial Cancer Agency		Provincial Health Research Organization		2005 Investment		2005 Investment		2005 Investment		2005 Investment			
	Investment	%	Investment	%	Investment	%	Investment	%	Investment	%	Investment	%	Investment	%		
Bladder	\$148,489	0.13	\$0	0.00	\$156,578	0.43	\$432,345	0.63	\$0	0.00	\$737,413	0.29				
Bone	\$592,583	0.52	\$7,167	0.03	\$272,651	0.74	\$328,259	0.48	\$0	0.00	\$1,200,660	0.47				
Brain & CNS	\$3,657,178	3.21	\$232,757	1.07	\$1,067,688	2.91	\$3,025,422	4.43	\$0	0.00	\$7,983,046	3.15				
Breast	\$12,882,174	11.32	\$2,626,450	12.07	\$2,074,176	5.65	\$10,893,583	15.94	\$9,870,021	75.97	\$38,346,404	15.12				
Cervix	\$1,694,622	1.49	\$116,283	0.53	\$185,419	0.51	\$1,253,137	1.83	\$0	0.00	\$3,249,462	1.28				
Colorectal	\$5,299,198	4.66	\$254,525	1.17	\$1,138,544	3.10	\$2,907,660	4.26	\$46,375	0.36	\$9,646,302	3.80				
Esophagus	\$491,784	0.43	\$9,625	0.04	\$12,938	0.04	\$359,954	0.53	\$200,502	1.54	\$1,074,803	0.42				
Eye	\$626,871	0.55	\$60,867	0.28	\$343,173	0.94	\$246,524	0.36	\$0	0.00	\$1,277,435	0.50				
Hodgkin's disease	\$273,492	0.24	\$0	0.00	\$294,443	0.80	\$223,403	0.33	\$0	0.00	\$791,338	0.31				
Kidney & other urinary	\$497,870	0.44	\$61,048	0.28	\$136,800	0.37	\$806,896	1.18	\$0	0.00	\$1,502,614	0.59				
Leukemia	\$9,946,590	8.74	\$248,242	1.14	\$3,234,013	8.81	\$4,729,703	6.92	\$0	0.00	\$18,158,547	7.16				
Liver	\$866,870	0.76	\$2,600	0.01	\$174,717	0.48	\$1,043,086	1.53	\$0	0.00	\$2,087,273	0.82				
Lung	\$3,283,234	2.89	\$323,890	1.49	\$1,369,239	3.73	\$1,397,491	2.05	\$693,340	5.34	\$7,067,193	2.79				
Multiple myeloma	\$679,822	0.60	\$126,261	0.58	\$413,645	1.13	\$738,409	1.08	\$0	0.00	\$1,958,136	0.77				
Non-Hodgkin's lymphoma	\$2,212,130	1.94	\$87,403	0.40	\$923,071	2.52	\$3,245,029	4.75	\$0	0.00	\$6,467,633	2.55				
Oral	\$1,332,085	1.17	\$78,302	0.36	\$750,572	2.05	\$1,176,473	1.72	\$200,502	1.54	\$3,537,934	1.40				
Ovary	\$2,334,485	2.05	\$243,191	1.12	\$1,010,324	2.75	\$2,697,789	3.95	\$129,913	1.00	\$6,415,701	2.53				
Pancreas	\$450,008	0.40	\$22,633	0.10	\$263,539	0.72	\$585,375	0.86	\$0	0.00	\$1,321,555	0.52				
Prostate	\$3,666,794	3.22	\$393,499	1.81	\$1,870,297	5.10	\$4,651,564	6.81	\$1,430,538	11.01	\$12,012,692	4.74				
Skin	\$1,623,337	1.43	\$27,619	0.13	\$511,761	1.39	\$2,063,020	3.02	\$0	0.00	\$4,225,737	1.67				
Soft tissue	\$1,810,653	1.59	\$0	0.00	\$185,864	0.51	\$434,320	0.64	\$0	0.00	\$2,430,837	0.96				
Stomach	\$273,743	0.24	\$20,717	0.10	\$355,907	0.97	\$195,497	0.29	\$0	0.00	\$845,863	0.33				
Thyroid	\$199,609	0.18	\$0	0.00	\$0	0.00	\$6,064	0.01	\$0	0.00	\$205,672	0.08				
Uterus/ endometrium	\$683,863	0.60	\$17,500	0.08	\$256,831	0.70	\$942,425	1.38	\$0	0.00	\$1,900,619	0.75				
Other sites	\$3,102,156	2.73	\$142,895	0.66	\$230,722	0.63	\$3,635,927	5.32	\$200,502	1.54	\$7,312,202	2.88				
Non-specific/ All sites	\$55,171,337	48.48	\$16,653,982	76.54	\$19,462,683	53.04	\$20,302,721	29.72	\$220,337	1.70	\$111,811,060	44.10				
TOTAL	\$113,800,975	100.00	\$21,757,453	100.00	\$36,695,596	100.00	\$68,322,077	100.00	\$12,992,030	100.00	\$253,568,130	100.00				

FIGURE 4.

2005 CANCER RESEARCH INVESTMENT BY CCRA MEMBER AND AFFILIATED ORGANIZATIONS AND NUMBER OF NEW CANCER CASES IN 2003[1,2]



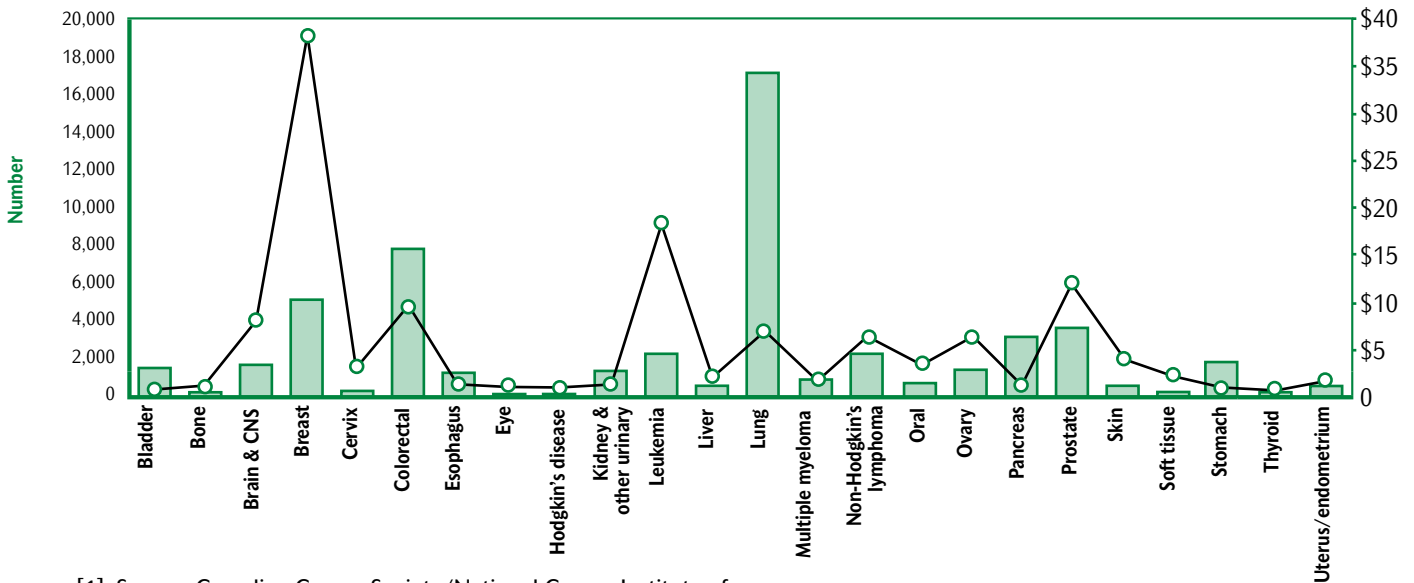
[1] Source: Canadian Cancer Society/National Cancer Institute of Canada. *Canadian Cancer Statistics 2007*. Toronto, Canada, 2007.

[2] Actual number of new cases for 2003 is the latest data available.

■ New Cases in 2003
○ 2005 Investment (in millions of dollars)

FIGURE 5.

2005 CANCER RESEARCH INVESTMENT BY CCRA MEMBER AND AFFILIATED ORGANIZATIONS AND NUMBER OF CANCER DEATHS IN 2003[1,2]



[1] Source: Canadian Cancer Society/National Cancer Institute of Canada. *Canadian Cancer Statistics 2007*. Toronto, Canada, 2007.

[2] Actual number of deaths for 2003 is the latest data available.

■ Deaths in 2003
○ 2005 Investment (in millions of dollars)

TABLE 8.

DISTRIBUTION OF 2005 CANCER RESEARCH INVESTMENT OF CCRA MEMBER AND AFFILIATED ORGANIZATIONS FOR SELECTED CANCERS BY CSO CATEGORY

Cancer Type	CSO CATEGORY															
	Biology		Etiology		Prevention		Early detection, diagnosis & prognosis		Treatment		Cancer control, survivorship & outcomes		Scientific model systems		TOTAL	
	2005 Investment	%	2005 Investment	%	2005 Investment	%	2005 Investment	%	2005 Investment	%	2005 Investment	%	2005 Investment	%	2005 Investment	%
Bladder	\$86,733	11.76	\$92,579	12.55	\$3,460	0.47	\$34,579	4.69	\$465,494	63.13	\$54,567	7.40	\$0	0.00	\$737,413	100.00
Breast	\$15,681,161	40.89	\$5,689,079	14.84	\$600,481	1.57	\$4,844,637	12.63	\$5,813,469	15.16	\$5,365,099	13.99	\$352,478	0.92	\$38,346,404	100.00
Colorectal	\$3,507,109	36.36	\$1,845,906	19.14	\$127,062	1.32	\$1,316,420	13.65	\$1,435,259	14.88	\$1,414,546	14.66	\$0	0.00	\$9,646,302	100.00
Leukemia	\$10,272,800	56.57	\$1,947,590	10.73	\$116,510	0.64	\$857,492	4.72	\$4,374,021	24.09	\$492,551	2.71	\$97,583	0.54	\$18,158,547	100.00
Lung	\$1,043,134	14.76	\$1,206,744	17.08	\$1,143,389	16.18	\$835,785	11.83	\$1,287,132	18.21	\$1,545,384	21.87	\$5,625	0.08	\$7,067,193	100.00
Non-Hodgkin's lymphoma	\$2,959,019	45.75	\$1,559,052	24.11	\$135	0.00	\$234,279	3.62	\$1,497,965	23.16	\$201,556	3.12	\$15,626	0.24	\$6,467,633	100.00
Pancreas	\$611,604	46.28	\$106,935	8.09	\$140	0.01	\$10,699	0.81	\$383,653	29.03	\$208,524	15.78	\$0	0.00	\$1,321,555	100.00
Prostate	\$3,133,383	26.08	\$858,617	7.15	\$220,161	1.83	\$1,164,944	9.70	\$5,166,312	43.01	\$1,341,504	11.17	\$127,773	1.06	\$12,012,692	100.00
Non-specific /All sites	\$60,159,562	53.80	\$4,632,849	4.14	\$2,201,942	1.97	\$5,816,584	5.20	\$24,147,546	21.60	\$14,278,438	12.77	\$574,140	0.51	\$111,811,060	100.00

TABLE 9.

SELECTED STATISTICS FOR CANCERS[1] WITH BOTH HIGH NUMBERS OF NEW CASES AND DEATHS AND 2005 CANCER RESEARCH INVESTMENT OF CCRA MEMBER AND AFFILIATED ORGANIZATIONS

Cancer Type	2005 Investment	% Total 2005 Investment	Prevalence[2]	% Total Prevalence	New Cases [3]	% Total New Cases	Deaths [4]	% Total Deaths	Lifetime Probability (%) of Developing Cancer[5]		Lifetime Probability (%) of Dying from Cancer[6]		Potential Years of Life Lost[7]	% Total Potential Years of Life Lost	Relative 5-Year Survival Ratio (%) [8]	Health-adjusted life years lost to cancer (HALY)[9]
									Male	Female	Male	Female				
Bladder	\$737,413	0.29	n/a	n/a	6,301	4.39	1,586	2.41	3.5	1.2	1.0	0.4	18,000	1.79	79	18,692
Breast	\$38,346,404	15.12	162,600	19.52	18,996	13.24	5,097	7.73	-	10.9	-	3.7	95,300	9.47	86	105,896
Colorectal	\$9,646,302	3.80	107,000	12.84	18,880	13.16	8,124	12.33	7.1	6.3	3.6	3.2	111,300	11.06	60	105,217
Leukemia	\$18,158,547	7.16	n/a	n/a	4,049	2.82	2,303	3.49	1.7	1.2	1.1	0.8	37,000	3.68	47	29,416
Lung	\$7,067,193	2.79	37,600	4.51	20,560	14.33	17,374	26.36	8.5	6.1	8.1	5.2	266,800	26.52	16	220,745
Non-Hodgkin's lymphoma	\$6,467,633	2.55	n/a	n/a	5,823	4.06	2,550	3.87	2.1	1.8	1.1	0.9	40,600	4.04	58	38,608
Pancreas	\$1,321,555	0.52	n/a	n/a	3,449	2.40	3,441	5.22	1.2	1.4	1.3	1.4	50,300	5.00	6	37,700
Prostate	\$12,012,692	4.74	122,400	14.69	19,472	13.57	3,658	5.55	13.2	-	3.7	-	33,400	3.32	92	46,950

n/a = not available

[1] All indicators except for the HALY are from: Canadian Cancer Society/National Cancer Institute of Canada. *Canadian Cancer Statistics 2007*. Toronto, Canada, 2007. Please note that all percentages are calculated using data for both men and women.

[2] Estimated number of people in the population living with cancer in 2003.

[3] Number of people diagnosed for the first time with cancer in 2003.

[4] Number of people who died from cancer in 2003.

[5] Estimated percent likelihood that a person in Canada will develop cancer [based on 2003 data].

[6] Estimated percent likelihood that a person in Canada will die from cancer [based on 2003 data].

[7] Number of years of life lost for people who died prematurely of cancer in 2003 [difference from expected average life expectancy].

[8] Estimated percent of people diagnosed with cancer who are expected to live for five years. Based on cases diagnosed from 1996-98 across Canada, except for Quebec.

[9] HALY combines the impact of mortality and morbidity into a single indicator. This measure was developed as part of the Population Health Impact of Disease (PHI) research program at the Public Health Agency of Canada, and is based on 2001 data. For more information, please consult <http://www.phac-aspc.gc.ca/phi-isp/cancers.html>.

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