Pan-Canadian Cancer Research Strategy

A plan for collaborative action by Canada's cancer research funders

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

CANADIAN **PARTNERSHIP** AGAINST **CANCER**
PARTENARIAT CANADIEN CONTRE LE **CANCER**

May 2010

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Pan-Canadian Cancer Research Strategy

A PLAN FOR
COLLABORATIVE ACTION BY
CANADA'S CANCER RESEARCH FUNDERS

May 2010

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Foreword by Jessica Hill, Chief Executive Officer, CPAC

The Canadian Cancer Research Alliance's Pan-Canadian Cancer Research Strategy ushers in a new era of collaboration and energy in cancer research.

Over the past decades, billions of dollars have been invested in cancer research worldwide. Significant progress has been made in the treatment and cure of childhood and certain adult cancers, including Hodgkin's lymphoma and testicular cancer, which now have long-term survival rates well above 80 per cent. However, with more than 171,000 Canadians diagnosed and 75,000 Canadians dying of cancer each year, we are clearly just scratching the surface of effective cancer prevention and treatment.

The first of its kind for Canada, the pan-Canadian research strategy brings together the research community to strengthen and coordinate research efforts across the country. It will help to guide cancer research investment in Canada to maximize impact and accelerate discoveries so that fewer Canadians develop cancer – and more Canadians survive it.

The very fact that cancer research funding agencies have engaged in this innovative approach marks an important culture shift in the community. It represents a new commitment to working collaboratively to make stronger, more effective investments in research that will benefit more Canadians than ever.

It is this kind of collaboration – building on the knowledge of others to find new solutions to our pressing cancer challenges – that is at the heart of the Canadian Partnership Against Cancer's mandate. Our work with the Canadian Cancer Research Alliance is putting a pan-Canadian lens on the nation's research activity to harness existing activity and leverage new research opportunities.

Among the novel, high-impact projects advanced through Partnership support is a translational research program, in partnership with the Terry Fox Research Institute, that will enhance our ability to improve cancer screening and treatment and the Canadian Partnership for Tomorrow Project that is recruiting up to 300,000 Canadians to determine who develops cancer and other chronic diseases and why.

The Canadian Partnership Against Cancer is proud to support these landmark programs and the new pan-Canadian research strategy. These developments, made possible through our work with the Canadian Cancer Research Alliance and other research partners, will strengthen the cancer research landscape in Canada for years to come and, ultimately, move us closer towards the goals that anchor our work together – fewer people diagnosed with or dying of cancer and improved quality of life of those affected by cancer.

Jessica Hill

A Message from CCRA

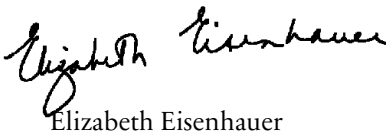
The completion of the *Pan-Canadian Cancer Research Strategy* is an important milestone not only for the evolution of the Canadian Cancer Research Alliance (CCRA) but also for Canada's cancer research community. The primary purpose of this strategic plan is to identify priorities for collaborative investment by Canada's cancer research funders to maximize impact on cancer control and accelerate discovery. As is evident from the specific action items to which we are committing in this strategy, our alliance of 23 organizations is building on existing momentum and extending our collaborative efforts in new and exciting areas to accelerate progress in cancer control.

The CCRA began its work several years ago under the visionary leadership of Dr. Gerry Johnston and, more recently, Dr. Phil Branton. Shortly thereafter, CCRA assumed the role of the Research Action Group of the Canadian Strategy for Cancer Control and subsequently of the Canadian Partnership Against Cancer (CPAC). In this capacity CCRA identified, developed and recommended the support of two large transformative cancer research initiatives now funded by CPAC: the Pan-Canadian Cancer Biomarker Initiative and the Canadian Partnership for Tomorrow Project. As well, CCRA began to document cancer research activity to gain a greater understanding of the funding landscape in Canada. Our analysis of 2005 cancer research funding activities, using an internationally accepted categorization system, provided the first detailed picture of cancer research investments in Canada. In October 2009, we published our third report based on 2007 data drawn from 37 organizations across Canada, including many non-CCRA members that now contribute data to the annual survey.

Assessing the spectrum of cancer research investment in Canada across funding agencies created an opportunity to not only consider how to address the gaps identified through that exercise, but also to begin discussions of research strategy. In addition, CCRA members recognized that there were opportunities for increased impact through collaboration, to reduce duplication and to have individual strategic plans of member organizations informed by a pan-Canadian perspective. Thus began the process that led to the strategic plan described in this document. Although the strategy is designed for use by CCRA member organizations, in time we hope it will provide a framework for all cancer research funders in Canada, as well as cancer researchers, research institutes and industry.

In preparing this strategy, we undertook an extensive consultation process, gathering input from over 1,000 scientists, clinicians, patients, survivors and policy makers. We studied how similar research alliances in other jurisdictions have developed national strategies. We also interviewed leading experts from around the world to ensure our strategy was informed by international perspectives on the future of cancer research. All this input was considered carefully by the member organizations as they formulated the elements of the strategy. As we move forward with implementation, we will monitor our progress on an annual basis. We anticipate that the strategy will continue to evolve over the next five years, with new decision points emerging as we pursue the various priorities set out here.

We would like to thank CPAC for providing the funding and additional support that made the strategy development process possible. We also would like to thank our member organizations and the many individuals who contributed to our deliberations. Lastly, we extend a special thank you to the members of the Strategic Planning Subcommittee, whose guidance and suggestions were invaluable throughout this process.



Elizabeth Eisenhauer
Co-Chair, CCRA

Morag Park
Co-Chair, CCRA

Stuart Edmonds
Executive Director, CCRA

Executive Summary

The Canadian Cancer Research Alliance (CCRA) is comprised of 23 organizations that collectively represent the custodians of the majority of taxpayer dollars and donations devoted to investing in research that will lead to better ways to prevent, diagnose and treat cancer. Its membership includes federal research funding agencies (such as the Canadian Institutes of Health Research), provincial research agencies (such as the Fonds de la recherche en santé du Québec), provincial cancer care agencies (such as Cancer Care Nova Scotia) and national cancer charities (such as the Canadian Cancer Society). Each CCRA member has its own strategic objectives and accountability structures. CCRA acts as the Research Action Group (now the Research Advisory Group) (RAG) of the Canadian Partnership Against Cancer and, to date, its major roles have been to identify, develop and advise on investment in two large transformative cancer research initiatives now funded by CPAC (a 300,000 person cohort called the Canadian Partnership for Tomorrow Project (CPTP) and the Pan-Canadian Cancer Biomarker Initiative), to document cancer research activity in Canada and, most recently, to endeavour to coordinate cancer research at a pan-Canadian level.

CCRA is motivated by the belief that, through effective collaboration, Canadian cancer research funding organizations can maximize their collective impact on cancer control and accelerate discovery. This philosophy is not restricted to CCRA members: it is hoped all funders of cancer research will eventually be engaged in these collaborative efforts over time.

The *Pan-Canadian Cancer Research Strategy* is a framework grounded in the strengths of the Canadian cancer research community and is highly connected to emerging priorities in the international research landscape which will guide cancer research investment in Canada. This strategy sets an agenda of new collaborations between research funding agencies and aims to provide a vision for Canadian cancer research achievement over the next five years. It is important to note that this strategy is not intended to represent a comprehensive catalogue of all cancer research funding priorities in Canada, many of which will continue to be driven by individual CCRA member agencies. Indeed, it is assumed that the major funding programs for investigator initiated research grants and the many ongoing strategic initiatives led by CCRA members will continue. This plan supplements these important activities by providing a series of new priorities and actions that will be implemented collaboratively by CCRA members beginning in 2010. These actions include not only several new research investments but also developmental initiatives to improve Canada's cancer research funding system.

To ensure that this first national cancer research strategy was well informed by relevant stakeholder insights and concerns, CCRA conducted a comprehensive consultation process. The goals for this process were:

- To gather detailed input from researchers, clinicians, patients/survivors and their families, policy-makers and health-care system managers.

- To learn from the experience of similar alliances of research funders in comparable jurisdictions.
- To gather expert advice on the future of cancer research.

Over 1000 participants were engaged in the stakeholder consultation process through:

- Five regional consultation sessions (held in Vancouver, Edmonton, Toronto, Montreal and Halifax) that were attended by scientists, clinicians, patients/survivors, CCRA member representatives, health-care system managers and policy-makers.
- Two Web-based surveys – one addressed to cancer researchers and the other to patients, survivors and the concerned public.
- Over 30 key informant interviews held with both Canadian and international experts in cancer research and cancer research funding systems.

The stakeholder consultation process yielded many important findings, which helped shape this strategy, including:

- There are significant opportunities for Canada's cancer research funding agencies to work more closely together. Key suggestions included developing and sharing research infrastructure and platforms based on shared standards and practices. Realizing our nation's potential in cancer research depends in part on learning how to develop and leverage shared infrastructure that can be accessed by diverse researchers.
- Concerns with an imbalance across types of research funding. There is a perceived imbalance in the amount of funding assigned through different funding mechanisms. For example, in some areas of cancer research it has been argued that there is not enough project funding to match the levels of corresponding infrastructure investment and personnel support.
- The urgent need to take stock of and address concerns regarding Canada's clinical trials infrastructure. From coast to coast, researchers and clinicians raised concerns that our nation's clinical trials capacity is eroding in the face of various pressures. Canada has consistently "hit above its weight" in clinical trials. Losing this edge has far-reaching implications for our ability to lead the work of translating new discoveries into clinical applications.
- The need to ensure the sustainability and utilization of the Canadian Partnership for Tomorrow Project.
- The strong consensus that Canada's cancer research funding organizations must address the need, at a minimum, to sustain, if not increase, project funding for investigator-initiated research.

The stakeholder consultation process, along with critical decision making by CCRA members, resulted in the identification of the 24 key action items found in this strategy. It is important to note that these actions items do not address all the priorities of the member agencies, nor do they

speak to the wide landscape of cancer research underway in Canada. The priorities identified in the pan-Canadian strategy are those that require our collective efforts and shared resources.

Priorities for action were identified because they satisfied at least one of following several criteria:

- First, some priorities were identified based on the opportunity to capitalize on an area of existing research strength where collaborations could accelerate progress. Examples include priorities in areas of genomics, cancer initiating cells and the Canadian Partnership for Tomorrow Project.
- Second, some priorities respond to a recognized gap in research investment or where newly funded initiatives presented an opportunity. Action items in prevention and translational research are examples of these.
- Finally, some action items represent responses to specific issues or concerns within the research system, where action could enable resolution or improvements. Examples include action items in the areas of stakeholder engagement, clinical trials, biobanking and the peer review process, among others.
- Moreover, all actions that appear do so because at least one CCRA member organization agreed to take a leadership role in carrying the action forward. As is evident in the section that follows, in almost all cases several additional CCRA members organizations are partnering with the lead organization.

Some themes across action items are noteworthy: linkages with international partners or other non-cancer research funders in Canada were identified for several initiatives. Second, the importance of engaging practitioners and policy-makers was underscored in several areas as a means of facilitating appropriate and timely knowledge translation, as well as identification of research questions. Finally, industry is also recognized as a key partner for those initiatives that will translate discoveries into products for cancer treatment, personalized therapies or early detection.

We are also committing to launch a new Canadian cancer research conference, addressing a key need identified by our researcher stakeholders and providing an important new forum for cancer research from across the spectrum to explore opportunities for new partnerships.

The final sections of this report address how CCRA will track its strategy implementation process and how this strategic plan aligns with those of CPAC, the Canadian Institutes of Health Research (CIHR) and other national research strategies.

The implementation of this strategy will be monitored annually and, when appropriate, priorities may be reshaped or added to the plan to ensure that it is responsive to emerging knowledge and research opportunities.

1. Why a Pan-Canadian Cancer Research Strategy?

1.1 THE VALUE PROPOSITION

1.1.1 Statement of Purpose

This Canadian Cancer Research Alliance pan-Canadian cancer research strategy identifies priorities for collaborative investment and action by Canada's cancer research funders to maximize impact on cancer control and accelerate discovery.

Any effort to spend limited research dollars as wisely as possible must contend with the reality that it is impossible to predict when and where major scientific advances will happen. Canada's cancer research funding organizations realize this and are committed to funding investigator-initiated discovery research across the entire spectrum of cancer research. Open competitions that seek to fund the best curiosity-driven research proposals will continue to be an essential foundation for cancer research in Canada, as will the many successful programs that target specific cancers or types of research.

Nonetheless, there remain many compelling reasons for cancer research funders to collaborate. The value proposition for collaboration across autonomous research funding agencies includes:

1. **Maximizing the impact of targeted funding.** There is value in strategically allocating cancer research funding including developing research capacity in gap areas, incentivizing the development of large, multidisciplinary teams required for certain types of research and striving to tackle specific research challenges in a more organized, more systematic way. Working together avoids duplication and clarifies opportunities for increased leverage through the complementary allocation of limited funds. This will increase the rate and likelihood of research yielding improvements in cancer control.
2. **Investing in shared infrastructure, platforms and resources.** Increasingly, cancer research requires access to infrastructure, platforms and resources that are not easily maintained and sustained by any individual researcher or any single funding agency. By working together, cancer research funding agencies can fund the development of shared resources, which can be made available, via open and strategic funding, to many cancer researchers. Working together ensures that Canadian researchers have access to better, more consistently managed shared resources.
3. **Improving how the Canadian cancer research funding system functions.** By working together, we can tackle overarching issues to optimize Canada's cancer research funding system.

2. Background, Context and Process

2.1 CANCER RESEARCH IN CANADA

2.1.1 Canada's Cancer Research Excellence

Canada has a well-established and successful cancer research community with an outstanding reputation.

In basic research, researchers from Canada have been pioneers in areas such as stem cell research, angiogenesis, studies of metastasis, genomics and cancer cell signaling, to name but a few. In fact the general biomedical research community in Canada has ranked first in the number of scientific publications per dollar invested in research compared to the US, Western Europe, Oceania, Japan and other jurisdictions.[1]

Canadian researchers are also well respected for their contributions to clinical research. For instance, findings from recent Canadian-led trials of new therapies have led to changes in practice for a number of different cancers. Included in this type of research are the considerable contributions made by Canadian investigators in palliative care, survivorship and symptom control research. Indeed, when the mean impact factor of Canadian clinical cancer research publications was compared with that of other countries,[2] Canada came out first indicating that the publications from clinical cancer studies from Canadian researchers are of very high impact.

In the area of cancer prevention, Canadian researchers have also played a leading role. Examples include important studies in tobacco control research, providing evidence to guide policy and investigations into the impact of physical activity on cancer recurrence and quality of life.

Furthermore, Canada has a strong community of researchers involved in health economics and health policy research, which provides not only national but international leadership in this field.

This is a far-from-complete list of Canada's cancer research strengths, but it provides a glimpse of the breadth and scope of excellence that has been fostered by the research investment during the past decades. This excellence underpins and inspires Canada's research funding agencies to collaborate in developing this plan.

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1. Soteriades *et al*. FASEB (2005) **20** 29-34
2. Grossi *et al*., Eur. J Cancer (2002) **39** 106-111

2.1.2 Documenting Canada's Cancer Research Investment

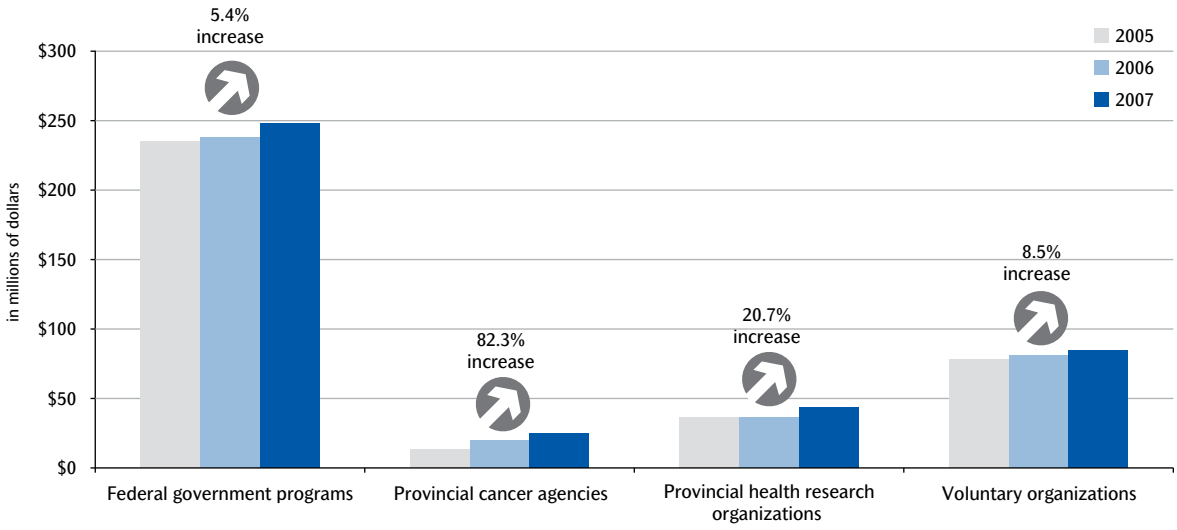
The CCRA began its work several years ago under the visionary leadership of Dr. Gerry Johnston and more recently, Dr. Phil Branton. Shortly thereafter, CCRA assumed the role of the Research Action Group of the Canadian Strategy for Cancer Control and, subsequently, of CPAC. In this capacity CCRA identified, developed and recommended supporting two large transformative cancer research initiatives now funded by CPAC: the Pan-Canadian Cancer Biomarker Initiative and the Canadian Partnership for Tomorrow Project.

Since its inception CCRA has worked to gain a greater understanding of the cancer research funding landscape in Canada by collecting and analyzing data from cancer research funding agencies in the country.

A detailed presentation of the full spectrum of Canada's cancer research investment, based on 2007 data, is contained in *Cancer Research Investment in Canada, 2007*.[3] As noted in this report, the 2007 investment in peer-reviewed cancer research from the 37 funding agencies that contributed data, was more than $400M. Furthermore, as shown in Figure 1 below, annual funding is increasing across all sectors. While overall research funding from federal health research funding agencies increased between 2005 and 2007 by 2.7%,[4] cancer research funding from the same agencies increased by 5.4% over this period.

FIGURE 1

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



3. Cancer Research Investment in Canada, 2007 (see http://www.ccra-acrc.ca/PDF%20Files/CCRA_EN_Main_2009.pdf), released October, 2009.
4. Science Statistics – December 2007 edition, Statistics Canada

The report also presents a detailed description of this investment across research areas, following the Common Scientific Outline (CSO) classification system developed by the International Cancer Research Partners (ICRP). For more information about the CSO, please refer to www.cancerportfolio.org/cso.jsp. Using this classification system, Canada's cancer research investment can be profiled as depicted in Figure 2 below.

FIGURE 2

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

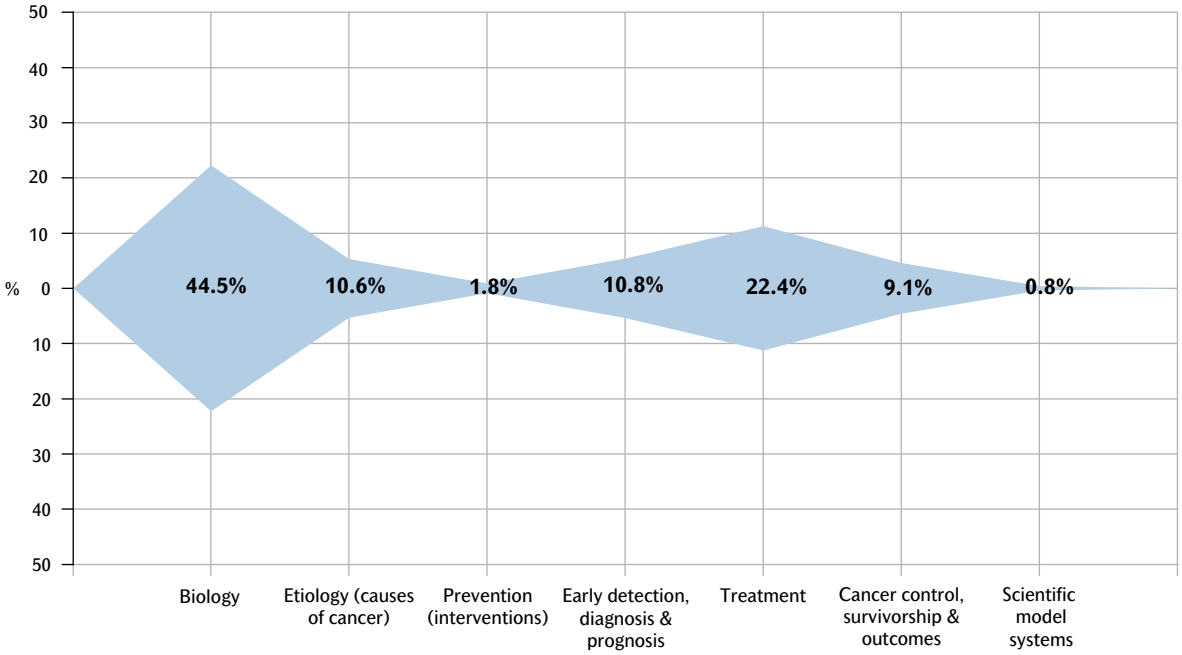
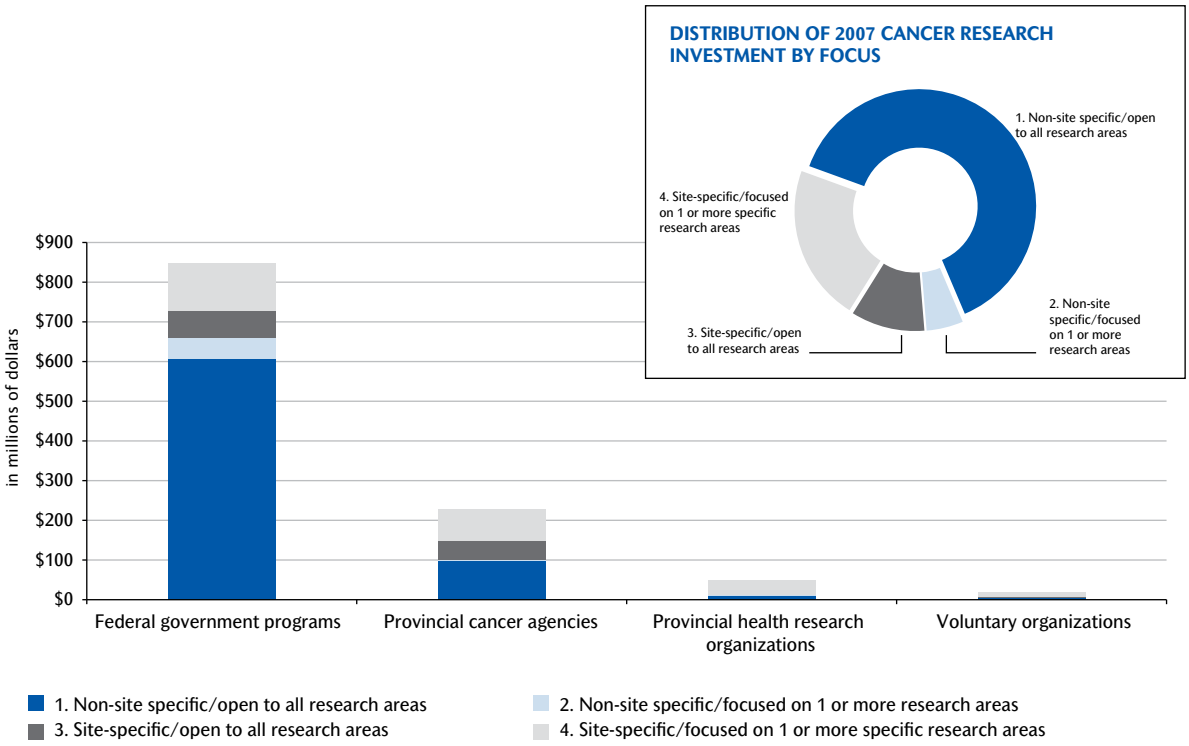


Figure 3 shows the amount of funding from each sector that was open to all research areas versus focused on a specific tumour type or strategic objective.

FIGURE 3

2007 CANCER RESEARCH INVESTMENT FOR EACH FUNDER SECTOR BY FOCUS ($402.4M)



The data in the report also highlight relatively low levels of funding in some areas of research (e.g., prevention intervention) and some tumour types with a high incidence or mortality rate (e.g., lung cancer). Some individual CCRA agencies have launched initiatives to address some of these gaps and these data sparked the initial discussions among CCRA members to begin the strategic planning process.

2.2 PROCESS OF STRATEGY DEVELOPMENT

To oversee the development of the Pan-Canadian Cancer Research Strategy the CCRA constituted a Strategic Planning Subcommittee ("the subcommittee") (see Appendix C for composition). This subcommittee provided overall guidance and oversight to the development of a Pan-Canadian Cancer Research Strategy. This included securing the engagement of the CCRA members, cancer researchers and cancer research stakeholders. The subcommittee reported to the CCRA, through the CCRA co-chairs.

At the outset the subcommittee developed a number of objectives to inform and guide the development process including:

- Assessing the emerging strategic priorities of CCRA member agencies
- Gaining knowledge from national cancer research frameworks developed in other jurisdictions
- Bringing stakeholders together for a national discussion of critical issues in cancer research
- Capturing the unique insights of each stakeholder group and documenting regional differences

To achieve these objectives, the following actions were taken:

- A comparative review of existing strategic plans of Canada's cancer research funding agencies and cancer research plans/frameworks developed in other countries was undertaken.
- Representatives from all key stakeholder groups (researchers, funding agencies, policy makers, patients/survivors) were brought together at five regional consultation meetings to consider high level strategic questions and to provide advice on key research issues.
- More than 30 Canadian and international agency leads, scientists, policy makers and leading patient/survivor voices were interviewed for information-gathering purposes. A number of quotes obtained from these interviews are provided in this document.
- Two Web-based surveys were conducted – one for cancer researchers and a second for patients/survivors and their families, agency volunteers and the general public to allow for broader input.

Following this, the CCRA Board and the subcommittee met for a scenario-planning exercise to consider various options for the strategy. The results were consolidated into a series of action items and reviewed by the entire CCRA, to develop the content of this strategy.

This research strategy is grounded in the aspirations, concerns and insights of Canada's cancer research funding agency leaders, cancer researchers, clinicians, health-care system leaders and cancer patients, survivors and their families. Many of the initiatives that make up the core of the strategy are in response to findings in the stakeholder consultations and are informed by the insights and experiences of global leaders in cancer research.

Actions were prioritized based on whether they satisfied one of several criteria. First, some priorities provide an opportunity to capitalize on an area of existing research strength, where collaborations could accelerate progress. Second, some priorities respond to a recognized gap in research investment or an opportunity presented by newly funded initiatives. Finally, some action items address specific issues or concerns within the research system, where action could enable resolution or improvement. Whenever possible, opportunities for collaboration with international partners or with non-cancer funding agencies within Canada were explored.

Moreover, all actions that appear do so because at least one CCRA member organization agreed to take a leadership role in carrying an action forward. As will be evident, in almost all cases several additional CCRA member organizations have partnered with the lead organization.

3. Priorities for Enhanced Funding and Collaboration

Scope of this plan

The action items that make up the core of this Pan-Canadian Cancer Research Strategy are not intended to represent a comprehensive list of all research of activities of the CCRA members, nor are they an exhaustive list of all CCRA activities for the next five years; rather, the strategy articulates those national or joint priorities that may best be achieved through collaborative investment or actions.

Assumptions behind this strategy

This strategy is built on the assumption that there will continue to be a strong underpinning of open investigator-initiated research across the cancer research spectrum in Canada. The priorities outlined in the plan are meant to supplement, and not be substitutes for, existing open investigator-initiated competitions and other ongoing strategic initiatives. Research programs of individual CCRA members are addressing many important areas of cancer research not specifically referenced in this strategy. In addition, the strategy is designed to be flexible enough during implementation to accommodate new exciting areas of research where collaboration among CCRA members could achieve significant impact.

Lead and partner agencies

For each action item a "lead" agency (or agencies) has elected to be held accountable for that item by providing the required funding or organizational support to reach the articulated milestones, monitoring progress and reporting back to the CCRA Forum on a regular basis. Furthermore, other organizations ("partner agencies") have expressed a willingness to be actively involved in most action items. It is worth noting that these representations reflect the commitment of CCRA members at the time of writing. Increased or enhanced participation by member organizations will be anticipated and encouraged throughout the implementation of the strategy.

Stakeholders and partners

Achieving maximal impact in cancer research requires the involvement of many stakeholders and partners. As this plan developed, linkages with international partners and non-cancer research funders in Canada were identified as key for several initiatives. The importance of engaging practitioners and policy-makers was underscored as a means of facilitating appropriate and timely knowledge translation and identifying research questions. Industry was recognized as a significant partner for initiatives that will translate discoveries into products for cancer treatment, personalized therapies or early detection. Finally and perhaps most important, the

research community itself, through consultations, surveys, interviews and other means provided the ideas on which this strategy is based and on which it depends for success.

3.1 CANCER PREVENTION

3.1.1 Prevention Research

Many CCRA members have identified prevention research to impact population risk as a priority area for investment. Much work is still needed to identify new risk factors, understand the risk mechanism and implement risk reduction interventions. In partial response to the relative lack of funding in prevention (intervention) reported in CCRA's *Cancer Research Investment in Canada, 2005,* a number of new initiatives are underway:

- The Canadian Cancer Society (CCS) has announced a new prevention initiative and funded its first projects focused on modifiable risk factors and conditions. At the time of writing, CCS is in the process of reviewing its second Request for Applications (RFA) on interventions to prevent cancer.
- CPAC launched the CPTP which will provide a cohort platform of 300,000 Canadians, to answer a number of prevention-related research questions using the data collected and with participants followed over time.
- CPAC has funded CAREX Canada, a database of occupational and environmental exposures, to map the presence of workplace and environmental carcinogens across the country.

During the regional consultations undertaken as part of the strategic planning process, a number of views relevant to this area were expressed:

- How prevention research is defined is a general concern. The current CSO coding may be too narrow as it takes a more exclusive view of prevention by including only projects aimed at a prevention intervention. It has been argued that studies aimed at the identification of risk factors should also be included.
- Natural experiments are key opportunities for progress in this area, but funding mechanisms are not set up to support this kind of work.
- Current perceptions need to shift from individual choice to a population health approach for prevention and research in this area is important.
- Researcher capacity is an issue in prevention research that may hinder the success of new funding opportunities in Canada.
- There should be collaboration internationally with other cancer research organizations and with other chronic disease funders to study common risk factors.

> ***"Population intervention research is key to preventing cancer. There is a need for capacity and a total mindset change – we need to have a research system outlook: we need to deliberately generate evidence to guide policies and programs, not just do piecemeal projects."***

With new investments being made in this area, CCRA members have an opportunity to think collaboratively about how they will tackle the various areas of prevention research. Thus the CCRA has identified one major item for action over the next five years.

ACTION ITEM 1

Develop a cancer prevention research plan

Description:	Publish a report on the scope and nature of the investment in cancer prevention research in Canada. The report will include information on the funding of cancer etiology studies, risk identification, risk reduction research, population interventions and other types of prevention research. It will assess the extent to which Canada has the research capacity to effectively utilize increased funding in prevention research. Following the publication of the report, CPAC, Public Health Agency of Canada (PHAC), CCS and other relevant parties will meet to discuss implications for the future of prevention research and start developing a pan-Canadian cancer prevention research agenda.
Milestones:	Early 2010 – Release report on cancer prevention in Canada. 2010 – Convene meeting of partner agencies. 2011 – Draft prevention research plan for eventual dissemination and discussion.
Lead Agencies:	CCRA Secretariat (investment report), CCS/CPAC (research plan)
Partner Agencies:	CBCF, CCAN, CCO, CIHR-ICR, CRS, GC, PHAC

3.1.2 Canadian Partnership for Tomorrow Project

Upon the recommendation of the CCRA acting as the RAG, CPAC approved funding to create the CPTP as a multi-partner prospective cohort study. This population laboratory, composed of five regional cohorts across Canada and currently supported by four funding partners,[5] will follow 300,000 Canadians to explore how factors such as genetics, behaviour, environment and lifestyle contribute to the development of cancer. Participants will be tracked over at least two to three decades. The five regional cohorts will all collect common datasets that can be utilized to answer key questions about cancer and other chronic diseases. Furthermore, by participating in the Public Population Project in Genomics (P^3G) there are opportunities for international linkages.

This legacy project will establish a hugely important platform for research, which must be sustained to fulfill its promise. A number of comments were made during the regional consultations that related to the cohort, including:

5. Current funders are the Alberta Cancer Foundation, the Canadian Partnership Against Cancer, Genome Canada/Génome Québec and the Ontario Institute for Cancer Research

- Increased marketing of the cohort is necessary to engage the research community and support the development of future research proposals, building on the rich datasets that are now being collected.
- A critical aspect of the cohort lies in linking its datasets to health outcome data, however, barriers to linking to health databases currently exist and must be overcome.
- The cohort will look beyond cancer to other chronic diseases; thus, this effort may be linked with other similar initiatives currently being undertaken in Canada (e.g., Canadian Longitudinal Study on Aging (CLSA))
- It is important that the enrolment of 300,000 Canadians be completed by March 2012 and that funding, during and after enrolment, be secured to maintain the platform and to maximize its potential for future impact.

> ***"The cohort is an exciting example of taking a project that has already started at the grassroots level and lifting it to become a national enterprise."***

Some studies have already been funded to capitalize on the rich dataset being collected in the cohort. It is imperative that funding mechanisms are available for researchers to continue to develop research proposals that will identify risk factors for cancer and other chronic diseases making use of the cohort data. A funding plan to support the ongoing costs of maintaining the databases and biobanks is required. In addition, participants can be contacted later to enrich the dataset with additional variables or disease outcome data. The CCRA has identified two items for action over the next five years. An additional action item has been identified and can be found in the *Enabling Activities and Resources* section.

ACTION ITEM 2

Complete the enrolment phase of the Canadian Partnership for Tomorrow Project and develop a plan for sustainability

Description:	Establish the governance structure for the CPTP, complete enrolment of 300,000 participants and develop a funding model to cover the ongoing project maintenance costs post-2012, which will include opportunities for additional cancer and non-cancer funding agencies to be engaged in this legacy project.
Milestones:	2010 – Establish governance structure. 2011 – Develop sustainability strategy to ensure funding for next phase. 2012 – Complete initial enrolment and commence recontact process.
Lead Agency:	CPAC
Current Partner Agencies:	ACF, BCCA, CCNS, CCO, GC, OICR

ACTION ITEM 3

Provide funding opportunities to support projects utilizing the cohort dataset

Description:	Make mechanisms available to fund projects that utilize the dataset collected in the CPTP or that augment variable collection through nested cohorts. This will be achieved through existing operating grant programs or the launch of specific research funding opportunities.
Milestones:	2012 – Announce funding opportunities. 2013 – Fund new projects that utilize CPTP data.
Lead Agencies:	CCS, CIHR-ICR, CRS

3.2 BASIC DISCOVERY RESEARCH

3.2.1 Genomics

Understanding the full spectrum of genomic and other basic molecular changes in cancer holds the promise of identifying new biological insights with implications for cancer detection, development of new treatments and new prognostic categorizations, among other advances. Canadian scientists are international leaders in cancer genome research. In addition, several major agencies (e.g., Genome Canada (GC), Ontario Institute for Cancer Research (OICR)) have recently made significant investments or commitments in this area.

An important recent development has been the creation of the International Cancer Genome Consortium (ICGC), whose goal is to obtain a comprehensive description of genomic, transcriptomic and epigenomic changes in 50 different types or subtypes of cancer which are of clinical and societal importance across the globe. The ICGC Secretariat is hosted by the OICR and has already announced a number of projects around the world to sequence several common tumour types. Included is pancreatic cancer, led by the OICR. The list of confirmed ICGC projects is not, however, complete. For example, commitments for prostate cancer and some pediatric cancers have not yet been made. In addition to the ICGC activity, Canadian scientists and agencies have a number of other, ongoing, important genomic research programs and projects supported by genomic and other platforms.

> ***“Genomics research and the development of predictive biomarkers will enable us to individualize treatment. There is a common expectation that advances in genomics will lead to more precise tumour diagnosis and the development of predictive biomarkers. This will support the development of new drugs and more individualized treatment plans.”***

During the consultation process, experts underscored Canada’s strength in this area in terms of scientific leadership and funding agency investment. In addition, both genome sequencing research and translational research built on the findings of genome sequencing were identified as important for investment.

In late 2008 CCRA co-hosted two meetings with funders and scientists to identify interest in, and funding support and infrastructure for, additional Canadian ICGC contributions. Following an Expression of Interest (EOI) process, a number of proposals surfaced for tumour types where scientific expertise in Canada would allow us to be competitive as ICGC participants, provided funders could be identified.

In the intervening months, interest from key CCRA members in funding a prostate cancer sequencing project has emerged. Other projects may follow, but the first action item in the genomics arena is based on the interest in prostate cancer.

ACTION ITEM 4

Launch new ICGC sequencing project in prostate cancer

Description:	Request a formal application in prostate cancer to add to Canada's contribution to this important international endeavour, based on the response to the call for EOI and the eagerness of CCRA members to direct funds.
Milestones:	2010 – Issue RFA and review submission(s). 2010 – Initiate funding of new ICGC genome sequencing project in prostate cancer.
Lead Agencies:	OICR, PCC

In meetings to discuss Canadian contribution(s) to ICGC, it was emphasized that, beyond sequencing, the promise of this work will be realized only when appropriate translation of these new genomic findings through to impact can be made, therefore the CCRA identified two additional action items.

ACTION ITEM 5

Provide project funding for cancer genomic studies

Description:	Ensure funding mechanisms are in place to support individual operating and/or team grants to utilize and translate knowledge generated from large-scale cancer genome initiatives, such as the ICGC and The Cancer Genome Atlas. Research will be investigator-initiated but should involve clinicians in relating genomics to clinical outcomes (predictive and prognostic).
Milestones:	2010 – Release of initial genomic sequencing data. 2011 – Commence project funding.
Lead Agency:	CCS
Partner Agency:	OICR

ACTION ITEM 6

Promote the value of ICGC datasets to the Canadian cancer research community

Description:	Ensure a rapid dissemination of bioinformatics tools and the nature of ICGC datasets to the Canadian cancer research community. In addition, articulate the value of ICGC datasets and how to link them to other datasets for the acceleration of translational research. Provide researcher and trainee education through workshops, including both face-to-face meetings and webinars. Organize an educational session as part of the national cancer research conference planned for 2011 (see Action Item #19).
Milestones:	2011 – Start program of research education including a specific session at the national research conference.
Lead Agency:	OICR
Partner Agency:	GC

3.2.2 Cancer Initiating Cells

Canadian scientists have been global leaders in efforts to discover and understand cancer stem cells or cancer initiating cells. The discovery of putative cancer initiating cells in many cancers has led to hypotheses about their potential importance in cancer development and therapy.

> ***"Cancer stem cells and cancer genomics are high yield areas and we are making progress in molecular profiling. We need translational research based on these findings to make inroads into personalized medicine."***

In 2008, to capitalize on this strength, the Cancer Stem Cell Consortium (CSCC) was created in part in response to the Canada-California Strategic Innovation Partnership. Funding was made available for research into cancer initiating cells and their role in the origin of cancer and in the application of these discoveries to new strategies for cancer diagnosis or treatment. In partnership with the California Institute for Regenerative Medicine (CIRM), the CSCC has recently announced funding for two large international Disease Teams with funds initially coming from CCRA members, Genome Canada and CIHR.

Through a resource position paper now under development, the CSCC will explore opportunities and gaps in knowledge that could be addressed through research with additional funding in the future. One potential area is the need for a network of resource and technology platforms across Canada to provide CSCC investigators in Canada with access to the technologies and tools necessary to advance research in the area of cancer stem cells. Another area may be translational research, not only to understand the biological implications of the discoveries, but also to move them forward into clinical application.

In addition to underscoring the importance of the CSCC and its potential to contribute substantially to this area of research, the CCRA identified one item for action in the next five years.

ACTION ITEM 7

Study cancer initiating cells with new technologies, reagents and tools

Description:	Develop new technologies, reagents and tools to study cancer initiating cells. Part of this activity may be the creation of a network of resource and technology platforms that could spearhead methods development and provide scientists working on cancer initiating cells access to the tools and technologies needed to advance research. The analysis being done by the CSCC in the form of a resource position paper will inform development of the precise mechanism needed to address this. In general terms, this action item may eventually be pursued through an RFA process.
Milestones:	2010 – Complete CSCC analysis. 2011 – Possible launch of RFA.
Lead Agency:	CSCC
Partner Agencies:	A number of CCRA members are part of CSCC including CIHR, GC and OICR. Other non-CSCC agencies interested include ACF, NRC and PCC. There is also a critical role to be played by industry and different research domains, such as NSERC and CFI.

Finally, establishing standards in the banking of cancer initiating cells is needed to facilitate future translational research efforts. An action item related to this is described in section 5.

3.3 RESEARCH TO TRANSLATE DISCOVERIES INTO BENEFITS FOR PATIENTS AND HIGH RISK POPULATIONS

Translational research – in particular research which takes basic scientific discoveries into clinical applications – was identified as a key area for enhanced investment in almost all the strategic research plans reviewed as part of the development of this strategy. The term *translational research* can be interpreted many different ways and CCRA members have different objectives and definitions with respect to translational research.

Two areas of translational research are highlighted in this plan: (a) the drug discovery pathway, from target validation to first in-human studies and (b) the development of biomarkers, quantifiable biological markers that can be used as measures of diagnosis, prognosis, or prediction of treatment effects. The section concludes with what is the next step for many translational programs: clinical trials. Finally, action items to support biobanking aspects of translational research are also found in the section *Enabling Activities and Resources*.

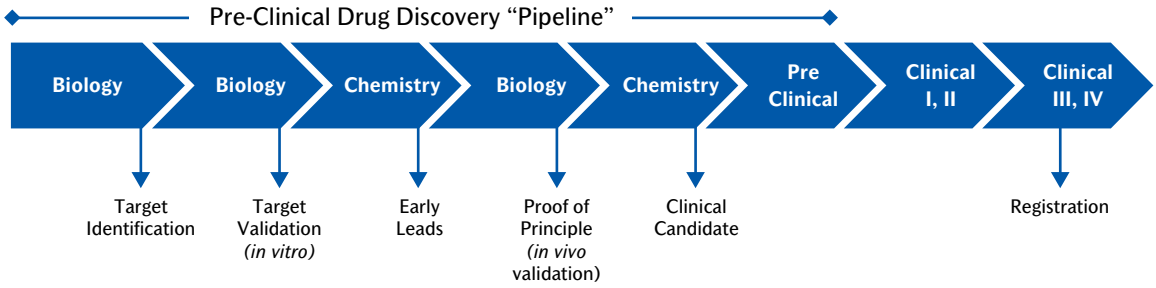
> ***“What needs to be facilitated/assisted strategically is translational research – moving basic science into clinical applications.”***

> ***“Discovery has to be investigator-driven. Translational research needs to be performed in partnership.”***

3.3.1 From Target Discovery to Clinical Application: New Agent Discovery

An abundant investment in discovery research in Canada over many years has enhanced the understanding of the biology of cancer, including the identification of genetic and other abnormalities that could give rise to new cancer therapeutics. In 2007 the National Cancer Institute of Canada (NCIC) hosted a national workshop, "Pathways to Patients", in which the drug discovery and development pipeline from target identification through "lead" compound drug to first in-human studies was discussed (Figure 4). It became clear that, within Canada's academic sector, there was considerable expertise in some areas of the pipeline, but there were gaps and a perceived need for greater collaboration. Canada has rather limited experience in new agent discovery compared to other countries, in part because of the limited presence of the pharmaceutical industry in Canada from a research and development perspective. Nevertheless, this particular area of translational research is one of high priority for several funders and research groups.

FIGURE 4
DRUG DISCOVERY AND DEVELOPMENT PIPELINE



In the regional consultations that led to this plan, participants encouraged further development of the pipeline in this area with enhanced coordination and project (or program) funding across several steps.

> ***"Major impact will not come from researchers working away in their own labs, but from bringing chemists, biologist, physicists, oncologists and others together to address a problem, devise a critical path to affect change, using the right technologies."***

Recent new funding initiatives in this area include the investment by The Terry Fox Research Institute (TFRI) in a selective therapeutics program in collaboration with OICR. The OICR has also recently recruited a team of experienced medicinal chemists who work in the critical area of transforming "hits" into "lead" compounds with the potential for further pre-clinical and clinical development. These new platforms add to several other key existing platforms in the drug development pipeline, including those available at British Columbia's Centre for Drug Research and Development (CDRD) (drug screening, formulation, pharmacology and toxicology) and National Research Council of Canada (NRC) (protein-based therapeutics). Another example is the Disease Team funding mentioned in section 3.2.2 which were recently funded through the partnership between CIRM and the CSCC (with CCRA members CIHR and Genome Canada providing the initial

funding). The work of these two disease teams is expected to result in cancer initiating cell-based therapies and investigational new drug filings by project end. Although this catalogue of available elements of the pipeline in Canada is not exhaustive, it illustrates that we now have many of the critical components in place to consider a pan-Canadian programmatic approach to moving validated new targets into therapeutic discovery and development. The CCRA has identified one major item for action over the next five years.

ACTION ITEM 8

Establish a funding mechanism for projects that move from target discovery to clinical application through new agent development

Description:	A number of agencies have either interest in or have developed platforms or infrastructure relevant to the pre-clinical drug discovery pipeline including NRC, BC-CDRD, OICR, GC, TFRI and CIHR-ICR. Convene a working group composed of the agency leads and individuals who manage the relevant drug development platforms to discuss how best to work together. Representation should include those with expertise in commercialization and member(s) with an international perspective on this topic. The working group's initial task will be to assess the current catalogue of expertise in drug discovery, which will include not only the platforms and programs currently funded, but also analysis from the soon-to-be-published CCRA translational research investment report. Gaps and areas of complementarity will be documented and the working group will recommend to CCRA whether there is interest in proceeding to develop more formal models of collaboration. If agreement is reached to progress further, the working group will then, with appropriate additional members, develop model(s) of a collaborative Canadian cancer drug development program. Model(s) described will address issues of how applications will utilize pipeline infrastructure, sources of project funding, project management (how critical go/no go decisions will be made) and how intellectual property issues will be dealt with when several institutions are involved. The results of these activities, including the catalogue of drug discovery platforms and the working group recommendations, will be communicated to the scientific community using appropriate communication vehicles.
Milestones:	2010 – Convene the first working group meeting and report to CCRA by end of year. 2011 – If agree to proceed, develop models. Following action to be determined once models are reviewed and funding needs are known. 2012 – Develop and implement plan to communicate working group report and broaden use of platforms.
Lead Agencies:	OICR, CDRD
Partner Agencies:	ACF, CCS, CIHR-ICR, FRSQ, GC, NRC, TFRI

3.3.2 Biomarkers

Within the research community in Canada there is a growing interest in two types of biomarkers in cancer research:

1. Biomarkers that may provide a method for early detection/diagnosis of cancer (imaging and serological or other measures).
2. Biomarkers that may provide important prognostic or predictive information for treatment selection (imaging, tissue, serological or other measures).

> ***"Early detection based biomarkers and better imaging technology that can find small tumours will save lives."***

Parallel with the rise in interest in biomarker research, is increasing investment in translational research efforts. In particular, CPAC, OICR and TFRI have major new programmatic investments. As well, the Canadian Breast Cancer Research Alliance (CBCRA) has recently announced an RFA for predictive markers in breast cancer. Furthermore, CIHR held a national biomarker workshop in November 2009 across its institutes to look at possible opportunities for new investments. As a result, new platforms and multidisciplinary groups are being formed to accelerate the development of biomarkers with clinical utility.

Despite the new infusion of funds, challenges to the process of biomarker development in Canada remain. For example, once a researcher has identified a promising biomarker, the pathway to clinical validation is not as clearly delineated as that for new drug development. The academic community has little experience or training in the rigorous process of biomarker development. Finally, because all these innovations require adoption by the health-care system, it will be important to integrate economic evaluations of new biomarkers in detection or prognostic/predictive settings as part of their development path.

Leadership from CCRA to address some of these issues and, in particular, to enhance the understanding of the process, or pipeline, is required to move early biomarker discoveries forward through to evaluation in the clinic and assessment of their utility for use in practice. The CCRA has identified two items for action over the next five years.

ACTION ITEM 9

Monitor progress of TFRI/CPAC Pan-Canadian Cancer Biomarker Initiative

Description:	TFRI and CPAC are collaborating on a major biomarker initiative in lung cancer, ovarian cancer, breast cancer, prostate cancer and possibly other types of cancer. This is one of the two legacy projects recommended by CCRA for funding when CPAC was created. These agencies will report on progress of this initiative on an annual basis to the CCRA. The report will be an update on the launch of the individual projects, the progress made in meeting the predefined milestones of each project and ultimately the success in linking these translational studies to clinical applications.
Milestones:	2010 and annually thereafter – Report of progress.
Lead Agency:	TFRI
Partner Agency:	CPAC

ACTION ITEM 10

Develop biomarkers and novel imaging technologies for early detection, treatment prediction and prognosis

Description:	Assemble a think tank of key agencies and researchers to clarify the research pathway for development of tools for the early detection of cancer and prognosis or predictive information for treatment selection. Work will be focused on such things as selection of best biomarkers or imaging technologies, ways to support biomarker research in a more opportunistic way (associated with a clinical trial, for example, or based on the CPTP) and testing and validating uses of new technologies/biomarker/tools including economic analyses. Action item will likely be best accomplished by convening a national/international workshop and will be building on the planned TFRI biomarker development workshop aimed at informing the TFRI-CPAC Pan-Canadian Cancer Biomarker Initiative. The subsequent workshop will have a broad attendance including relevant scientists, clinicians, pathologists, health economists and leaders from regulatory bodies. Following the workshop, the think tank will develop a report on the optimal pathway for biomarker development and an assessment of gaps and opportunities to build on research and funding programs already ongoing in Canada.
Milestones:	2011 – Workshop to share understanding of the pipeline approach in biomarker development and the platforms currently existing in Canada to define gaps in infrastructure, research personnel and funding to enable this important area to succeed. 2012 – Report on recommended biomarker development pathway, gaps and opportunities.
Lead Agencies:	CIHR-ICR, TFRI
Partner Agencies:	ACF, CBCF, CBCRA, CCO, CCS, CRS, FRSQ, GC, OICR, PCC

3.3.3 Clinical Trials

Canada has earned an international reputation for its contributions to cancer therapeutics development from phase I to phase III which have resulted in changing clinical practice and international collaborations. This reputation largely, but not exclusively, stems from studies conducted by academic research consortia, such as the NCIC Clinical Trials Group (CTG) (core funding from CCS with institutional members from across the country), the Ontario Clinical Oncology Group (OCOG) (core funding from Cancer Care Ontario (CCO) and Hamilton Health Sciences) and the Princess Margaret Hospital Phase II Consortium (core funding from the US National Cancer Institute (NCI) with institutional membership from across Canada). This area of strength has, in turn, led to the pharmaceutical industry's growing interest in bringing opportunities to participate in clinical trials in their global studies to Canadian sites, with an overall increase in the numbers of trials being conducted in the past two decades. Accurate data on the proportion of cancer patients enrolled in clinical trials and on the types of trials in which

they are enrolled remains elusive; a widely quoted estimate is that about 3% of cancer patients are enrolled in clinical trials. Recent initiatives to increase enrolment on cancer clinical trials include establishing province-wide research ethics boards for multi-centre trials in some provinces and, in Ontario, an OICR infrastructure and training program that demonstrated how infrastructure support and networking can increase enrolment and the number of active trials. Not only are clinical trials important vehicles for evaluating novel therapeutics or biomarkers that emerge from translational research activities, but evidence also suggests that institutions with high participation rates in academic clinical trials have better cancer outcomes than institutions with low participation rates.

> ***"Policy makers, government and other funders need to be convinced that clinical trials should become an integral part of clinical care for adults and for children. The infrastructure to make these sorts of trials an essential part of the health system will allow a focus on research."***

Regional consultations and other findings suggest that cancer clinical trials in Canada are under threat. The reasons appear to be multifactorial and may include the declining ability of hospitals/cancer centres to support core clinical trial infrastructure, emerging international competition, increasingly complex studies, the regulatory and administrative environments and the lack of funding for clinician researchers. No comprehensive study, however, has systematically assessed the problem. Additionally, there are concerns, both in Canada and internationally, about how best to cooperate with pharmaceutical companies in funding and conducting clinical trials.

At this same time, CIHR is planning a Strategy for Patient-Oriented Research (SPOR), which aims to enhance clinical research across all major disease types, including cancer. This strategy presents an opportunity for the cancer clinical research community to align its actions on this point with CIHR. CCRA has already initiated dialogue with the leaders of the SPOR to explore opportunities to align activities. The CCRA has identified one item for action over the next five years.

ACTION ITEM 11

Report and make recommendations on cancer clinical trials in Canada

Description:	Clearly outline the issues facing cancer clinical trials in Canada and make recommendations on how these issues can be resolved. The report should examine jurisdictions with healthy and growing cancer trials enterprises, consider how to engage the pharmaceutical industry and recommend ways to maximize the interaction with the CIHR SPOR. The audience includes funding agencies, academic clinical trials groups, such as CTG, provincial cancer agencies, provincial ministries of health and industry and patients.
Milestones:	2010 – Convene meeting of interested CCRA members to define scope of report. 2010 – Deliver report with recommendations for next steps to CCRA.
Lead Agencies:	CCRA Secretariat, CCS
Partner Agencies:	ACF, BCCA, CAPCA, CCO, FRSQ, OICR, TFRI

3.4 RESEARCH TO MEET THE NEEDS OF CANCER SURVIVORS AND TO ENHANCE CANCER HEALTH SERVICES DELIVERY

3.4.1 Research to Meet the Needs of Cancer Survivors

Both the 2007 NCIC/CCS process for defining research priorities and the March 2008 CPAC survivorship forum highlighted cancer survivorship as an area for enhanced research investment. These initiatives were followed in November 2008 by a Research Priority Setting Workshop hosted by BCCA and funded by CIHR-ICR, CPAC and CCS, and then in April 2009 by a small CCRA meeting of funders (all of those above plus the PHAC, OICR and CCO), researchers and survivors. At the latter meeting it was concluded that the main goals for research in this area were to identify risk factors for adverse survivorship outcomes, create strategies to modify risk and tailor patient management. Three topics were highlighted to address gaps in knowledge:

(a) **Preventing and ameliorating (late) effects of cancer and its treatment.** Better understanding of the mechanisms and biomedical interactions of treatment and organ function is required. Further, the possibility of employing innovative interventions that use existing knowledge of the effects of cancer and its treatment to develop and test programs aimed at altering the trajectory of adverse survivor outcomes in childhood and adult cancer survivors should be explored.

(b) **Optimal models of follow-up care.** This work could largely be achieved using information garnered from current models of care (in Canada and internationally) and would need to consider endpoints such as best value for cost and models which have the greatest impact on quality of life, regaining health and management of late effects.

(c) **Interventions:** There is a need to develop and test rigorously interventions to improve the outcomes of cancer survivors. These efforts would build on the ample descriptive research that is underway or already exists

Findings from regional consultations underscored the work noted above: stakeholders agreed that cancer survivorship requires more investment and focus. With the aging population there are more survivors and a greater need to ensure that we use our resources effectively in addressing quality of life issues. In addition, more patients are surviving but suffer late effects of treatment.

> ***“There is now a greater need for emphasis on survivorship – we are learning more in this area but more and more issues facing survivors need to be better understood.”***

In this area, a set of goals for research to fill gaps in knowledge and to inform treatment and survivorship care has been identified. One or more CCRA members have an opportunity to lead or co-lead a national effort to address these knowledge gaps through appropriate new programs of funding.

In the meantime, two items have been identified for action in the next year. First, address the gap in knowledge articulated in point (a) above by initiating a new research initiative on late effects and survivorship. Second, determine the current scale of survivorship research activity ongoing in Canada.

ACTION ITEM 12

Develop research on late effects of treatment

Description:	Understand late effects arising from cancer therapy requiring additional research. New funding may be made available to support research to understand further the biomedical mechanisms of treatment that can then be used to develop innovative approaches to ameliorate late effects in adult and childhood cancer survivors.
Milestones:	2010 – Possible launch of new funding opportunity. 2011 – Review of proposals followed by commencement of possible funding with ongoing monitoring of progress in future years.
Lead Agency:	CIHR-ICR
Partner Agencies:	C[17] Research Network, CRS, OICR, PCC, TFRI

ACTION ITEM 13

Highlight strengths and identify gaps in survivorship research in Canada

Description:	Publish a report on scope and nature of the investment in survivorship research in Canada as a basis for CCRA members to consider next steps, gaps and opportunities.
Milestones:	2011 – Release CCRA report on survivorship research in Canada. 2012 – CCRA members to consider future collaborative funding opportunities.
Lead Agency:	CCRA Secretariat
Partner Agencies:	All CCRA members

3.4.2 Health Services/Health Economics

As new technologies and new interventions are being developed, the key role of health services and health economics research to assess and interpret the data leading to application is becoming more apparent. A number of research agencies have recognized this change and have launched new research initiatives in these areas. These include the CCS Canadian Centre for Applied Research in Cancer Control, the OICR Health Services Research Program, the CIHR Access to Quality Care Initiative and the CCO Health Services Research Network. Although many of these programs are in their embryonic stages, there seems to be a high degree of collaboration, likely because of the relatively small but well-connected community of researchers in this area.

Consultations revealed a number of findings relevant to health services research, including concerns that access to data and linkage to datasets continue to impede research when outcome data is key (see Action Item #18) and the recognition that improving cancer control across the country will need to be tied closely to providing consistent, cost-effective cancer care, a key goal of CPAC. Furthermore, economic impact and cost effectiveness must be considered during the research and development of new imaging or other biomarkers for early cancer detection or prognostic/predictive use. Health services and health economics research are important in relation to the dissemination, adaptation and adoption of cancer prevention interventions and effective screening and early detection strategies.

> ***"Innovation is key to better and more cost-effective health care. Cancer research programs should integrate cost reduction as a value…to study both outcomes and cost, you need good health informatics. Canada should be able to become a world leader in this given its publicly funded system."***

Given the interest of CCRA members in this area and the stage of development of new programs, opportunities exist to establish coordinated approaches. Further, the rising interest in translational research and the importance of prospective economic evaluation of new technologies offer an opportunity to integrate these two domains of research early in the pipeline for evaluation of utility and adoption. To promote work in this area, CCRA has identified the following action item over the next two years.

ACTION ITEM 14

Increase support for health economics research to study cost/benefit of new interventions for treatment, prevention and early detection

Description:	Engage the Canadian Agency for Drug and Technology in Health and bodies established by provincial ministries of health, such as the Ontario Health Technology Assessment Committee, regarding the assessments of the clinical impact in terms of economics, ethics, etc., of early translational and clinical studies to inform decision making early in the development of new drugs, biomarkers and technologies. The cost of therapies is a major concern for cancer patients, particularly when it relates to unequal access. Increased efforts in health economics research are needed to conduct unbiased cost/efficacy analysis of cancer therapeutics. Because new programs are being funded to address health economics/health services issues, this area of need will be highlighted to the research community by those agencies funding the programs.
Milestones:	2010/2011 – Call to research community for action.
Lead Agencies:	CCO, CCS, OICR

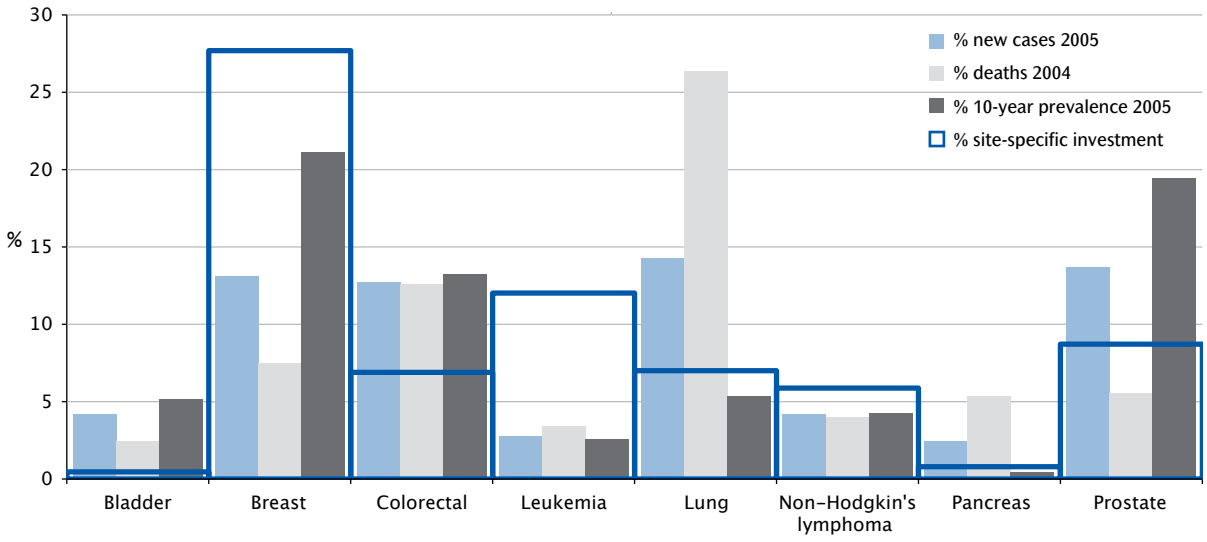
4. Tumour-Specific Partnered Initiatives

Most cancer research strategic priorities focus on areas of research rather than on disease sites. There are two main reasons to consider developing a disease site-specific strategy:

1. When there appears to be a gap in funding relative to the disease burden. The report, *Cancer Research Investment in Canada, 2007*, highlighted some disease sites (e.g., lung and pancreatic) with relatively low research investment and poor survival outcomes that could meet this criterion (Figure 5).

FIGURE 5

DISTRIBUTION OF 2007 SITE-SPECIFIC CANCER RESEARCH INVESTMENT BY NEW CANCER CASES, CANCER DEATHS AND TEN-YEAR PREVALENCE RATES FOR SELECTED CANCERS



2. Where multiple funders are investing in a specific disease and where collaborative efforts to define priorities may result in greater overall impact.

Breast cancer is an example of this latter situation. Indeed, the Canadian Breast Cancer Research Alliance (CBCRA) has recently led the development of a National Breast Cancer Research Framework which highlights the areas of highest priority research investment for this disease. This process was extremely robust, engaged all funders in CBCRA and many others who are CCRA members as well as patients/survivors, researchers and international leaders. The Framework is available at http://www.nationalframework.ca/. CCRA members funding breast cancer research are encouraged to examine their new initiatives in the light of this Framework

and to provide as many opportunities as possible to have the priority questions addressed within the next five years.

ACTION ITEM 15

Monitor adoption of the National Breast Cancer Research Framework

Description:	Review new initiatives in breast cancer research to determine how they address the priority questions in the framework. CBCRA will report back to CCRA Forum annually on the adoption and impact of the National Breast Cancer Research Framework.
Milestones:	2010 and annually thereafter – Report on progress.
Lead Agency:	CBCRA

When this report was written, no multi-agency planning was underway to address specific cancers, though some funders were interested in further developing research plans in pancreatic cancer, lung cancer and prostate cancer. Developing a framework similar to that of the CBCRA for other tumour types would require a funder to champion the process and to engage other interested funders. The CCRA provides a venue where such joint planning can easily be launched and it is expected that one or more such initiatives may develop over the course of this five-year plan.

As this report went to print, CBCRA announced that it would be concluded in its present form. The breast cancer research community is very optimistic that a new approach to managing the framework will be in place in the next few months.

5. Enabling Activities and Resources

Better coordination and standardization of tissue banking are critical for translational research activities. This topic is relevant to several areas of basic, translational, clinical and prevention research, thus, the CCRA has identified two items for action over the next five years.

ACTION ITEM 16

Establish national standards for biobanking for cancer research

Description:	Support the Canadian Tumour Repository Network (CTRNet) in developing or refining Standard Operating Procedures (SOPs) for consistency in the collection of high quality biological samples and associated data, across Canadian tissue banks.
Milestones:	2010 – Convene a workshop/webinar, engaging CCRA members, the CPTP leadership and other key stakeholders (including representatives from university ethics review, P^3G and the CLSA) to assess the current status across existing biobanks in Canada. 2011 – Review the workshop findings before deciding on next steps.
Lead Agency:	CIHR-ICR as funder of CTRNet
Partner Agencies:	All CCRA members

ACTION ITEM 17

Enhance banking of cancer initiating cells

Description:	Engage with the CSCC to improve and share understanding of how to bank cancer initiating cells, following the generation of a resource position paper described in section 3.2.2.
Milestones:	2010 – Complete CSCC analysis. 2011 – Build inventory of current cancer initiating cell banks. 2012 to 2014 – Develop SOPs.
Lead Agency:	CSCC
Partner Agencies:	A number of CCRA members are part of CSCC, including CIHR, GC and OICR. Other non-CSCC agencies interested include CTRNet (CIHR-ICR as funder) and PCC. CFI may also play a critical role.

Access to rich datasets and poor data linkage within and across provinces were identified as significant barriers to conducting health services and prevention research where outcome data are key. Provincial datasets are housed and released by the authorities in the provinces and there can be significant issues in obtaining the necessary data for intraprovincial and pan-Canadian studies. This limits our ability to understand such things as what models of cancer care delivery work best, equity issues and health outcomes. CCRA has identified the following action item over the next five years.

ACTION ITEM 18

Improve access to cancer-relevant administrative datasets

Description:	CAPCA will seek the individual policies for data access from its members and provide a current state analysis report to CCRA. Based on the findings of this report, CCRA will consider developing a position paper on the need to harmonize and/or improve data access regulations for cancer researchers.
Milestones:	2010 – Compile current state analysis report. 2011 – Develop CCRA position paper.
Lead Agency:	CAPCA
Partner Agencies:	ACF, CCAN, CCO, CCS, CPAC, OICR

It has been a number of years since Canada regularly held its own national conference on cancer research. The Canadian Cancer Research Conference used to take place every two years at Honey Harbour, Ontario from 1954 to 1972. Although many cancer research meetings are convened across the country, they tend to focus on particular tumour sites, a distinct area of cancer research or research conducted in a certain province.

The last national, general cancer research meeting commemorated the 60th anniversary of the NCIC in November 2007. More than 500 researchers attended. The meeting spanned the whole spectrum of cancer research, from basic discovery research to policy research, from discovery to palliation and all tumour types; it was very favourably received by the research community.

To promote the exchange of scientific information in Canada across the research spectrum, to encourage coordination and collaboration, thus accelerating progress in cancer research and to provide the opportunity to connect with patients, survivors and the public, it has been proposed that a national conference be held biennially, starting in 2011. CCRA has identified the following action item.

ACTION ITEM 19

Convene a national cancer research conference, combining the annual meetings of several cancer research funding agencies

Description:	Plan a national conference, featuring a broad range of Canadian cancer researchers and other key stakeholders. This first conference will combine the already-planned meetings of at least three CCRA members (CIHR-ICR young investigators meeting, TFRI annual meeting and the OICR annual scientific retreat). The meeting will showcase research efforts in Canada, provide a forum for networking among the broader cancer research community in Canada, create an opportunity to connect with the public and media in a variety of ways to report on the impact of Canada's cancer research investment and provide a means for funding agencies to connect with their research communities to promote existing programs or effectively launch new programs.
Milestones:	2010 – Plan 2011 conference. 2011 – Convene 1st national conference.
Lead Agencies:	CCRA Secretariat, CIHR-ICR, OICR, TFRI
Partner Agencies:	All CCRA members

6. Creating an Optimal Cancer Research System

6.1 ACHIEVING BALANCE IN CANCER RESEARCH FUNDING

A number of dynamic polarities in research funding generate tension that is fundamentally irresolvable. Some examples include:

- Funding areas of strength *versus* filling gaps in a research portfolio
- Concentrating funding in centres of excellence *versus* dispersing funds widely across multiple institutions
- Offering more smaller grants *versus* fewer larger grants
- Funding open, investigator-initiated proposals *versus* grants targeted at strategic priority areas
- Balancing research funding across three main funding categories: (a) project grants, (b) infrastructure and (c) research personnel

In each case, there is no perfect balance.

Through the consultation process, CCRA gathered detailed information on stakeholder opinions regarding the current state of these polarities in cancer research in Canada.

Key findings reveal that:

- Stakeholders from across the country are concerned about an imbalance across types of funding. Currently there is a relative lack of project funding in comparison with personnel support and infrastructure investments. This appears to be especially true in basic discovery research.
- Opinions vary as to the optimum balance between the percentage of funds that should be awarded through open, investigator-initiated competitions in comparison with strategically directed funding. There was, however, clear consensus that funding for new strategic initiatives should not come at the expense of operating grants awarded for discovery research across the research continuum.

> ***“There are irresolvable polarities in research funding; balancing these depends on your overarching objectives.”***

To optimize balance going forward, CCRA encourages its members to discuss new, major initiatives with the rest of the membership to (a) determine whether there is an opportunity for collaboration and (b) identify the potential impact on other funding programs.

6.2 TRACKING CANCER RESEARCH EXPENDITURE

As noted in the *Background, Context and Process* section of this report, an early and important undertaking of the CCRA was to collect, collate and report on the spectrum of cancer research investment across Canada. The data revealed gaps and sparked the discussion about joint strategic planning. The database can, however, provide an in-depth examination of critical areas and provide a mechanism for examining funding trends over time. CCRA will maintain and update the funding investment database and has identified two main action items for the next five years.

ACTION ITEM 20

Continue to release the Annual Cancer Research Investment Report

Description:	Continue to publish an annual report on cancer research investment in Canada based on submissions by CCRA members.
Milestones:	2010 and annually thereafter – Publish report.
Lead Agency:	CCRA Secretariat
Partner Agencies:	All CCRA members, as well as numerous other non-member cancer research funding agencies

ACTION ITEM 21

Provide an analysis of Canada's cancer research human resources

Description:	Prepare a report to describe current cancer research capacity across the spectrum (by specific expertise area i.e. clinician scientists, pathologists, health economists, trainees and other technical positions), articulate areas of strength and identify areas where specific gaps may exist. During consultations, a number of concerns were expressed about the low research capacity in a number of areas within the cancer research community. This should aid CCRA members in evaluating the impact and timing of strategic initiatives designed to enhance research capacity in gap areas. The findings of this report will complement those of the reports on prevention and survivorship research, the translational research workshops and other actions within this plan where gaps in research personnel may be identified.
Milestones:	2011 – Publish report on Canada's cancer research human resources. 2012 – Develop an human resource plan to address key issues identified in the report and identify strategies for targeted training and recruitment.
Lead Agency:	CCRA Secretariat
Partner Agencies:	All CCRA members

6.3 TEAM SCIENCE

Because cancer research is becoming more complex, greater emphasis has been placed on establishing large multidisciplinary research teams. For example, to make a difference in cancer control, it is imperative that biologists and clinicians are encouraged and supported to work collaboratively. The need to create research teams involving experts from across the cancer control spectrum and beyond (such as engineers, mathematicians and physicists) is clear.

> ***"Physical sciences may provide useful models for researcher recognition and career advancement in the context of multidisciplinary and multi-site research teams."***

Given the current need for large research teams, the research community is concerned about the recognition individual researchers may receive for their efforts in the context of a research team. This lack of recognition may not only influence the ability of a researcher to retain an academic position in an institution, but it may also affect his or her ability to obtain peer-reviewed funding. This situation poses a particular challenge for junior investigators establishing their independent research programs.

To begin to address this, CCRA has identified the following action item.

ACTION ITEM 22

Encourage appropriate academic recognition for researchers involved in large multidisciplinary teams

Description:	Send letters, on behalf of the CCRA membership, to universities, hospitals and research institutes to underscore the importance of team science and to encourage revisions of guidelines for academic recognition to reflect this position.
Milestones:	2010 – Send and publish letter regarding academic recognition.
Lead Agency:	CCRA Secretariat
Partner Agencies:	All CCRA members

6.4 ENGAGING KEY STAKEHOLDER COMMUNITIES

6.4.1 A Multiplicity of Stakeholders

Cancer research has multiple constituencies. As a widespread and serious source of illness, cancer is of great concern to the general public. With the number of cancer patients and survivors increasing, virtually every family is affected. As a significant driver of health-care system costs and as a detriment to economic productivity, cancer is of concern to policy-makers. As a scientific endeavour, cancer research is a focus of intense efforts, engaging a wide range of scientific disciplines.

Individual CCRA member organizations interact with these various constituencies in a number of ways, for a variety of purposes, advancing a diversity of key messages. In developing this strategy, CCRA members wanted to determine whether shared messaging and more consistent forms of engagement might further collective objectives. For an alliance of autonomous organizations of different types, developing shared core messages or collaborating on the engagement of specific constituencies is complex. Some CCRA member organizations have accountability and governance responsibilities that limit the range and nature of their stakeholder engagements and their advocacy. Other member organizations have a high degree of freedom in this regard. CCRA will need to ensure that any stakeholder engagement activities that are branded as CCRA initiatives are acceptable to all CCRA members.

6.4.2 Researchers

A key audience for all CCRA members is the research community. Through the regional consultation and in the Web survey, Canadian researchers highlighted a need for a national meeting of researchers to increase opportunities for collaboration, enhance awareness in progress across the entire spectrum and to provide a venue to report to the public on the progress in cancer research. As described in the section *Enabling Activities and Resources*, CCRA has agreed to convene a national cancer research conference beginning in 2011 (see Action Item #19 in section 5).

6.4.3 Policy-makers and Practitioners

Translating research findings into policy and clinical practice is still a significant challenge. The key to a successful translation of knowledge (KT) from research to policy and practice lies in a better understanding of how, as a community, researchers and research funders can better engage with policy-makers, practitioners and other stakeholders, who are key to knowledge translation and from whom important research ideas emerge. Certainly linking knowledge creators with knowledge users throughout the lifetime of a project is critical to successful KT. This approach is described in a number of action items in this strategy, most notably those related to drug discovery and biomarker development, where key policy-makers from federal and provincial government agencies will participate in setting the research agendas. The recent launch of the Coalition Linking Action and Science for Prevention (CLASP) initiative by CPAC serves as an excellent model of how to engage multiple stakeholder groups to facilitate KT into policy and practice.

Research investigating effective methods of promoting the uptake of knowledge is not represented in this strategy. This is an important area of investigation for which several CCRA members have special research programs, but no collaborative initiative was identified for inclusion in this plan. Efforts are being made in Canada to overcome KT challenges through research via the programs of CIHR's Knowledge Translation Portfolio and the research funded by the Canadian Health Services Research Foundation, however, neither has a specific focus on cancer. It is hoped that as this strategy evolves, opportunities to develop new collaborative research into KT will arise.

6.4.4 Industry

For many of the action items in this strategy to have the desired impact it is imperative that effective partnerships be promoted and supported between academia and industry.

> *"The challenge is finding projects where the interests of pharma and funding agencies coincide. They do exist."*

Controlling cancer will not be possible without the involvement of the pharmaceutical and biotechnology industries but the challenge lies in developing productive and timely collaborations that add critical expertise. Therefore, many action items described in this strategy stress the importance in reaching out to industry and involving the sector in workshops and other mechanisms to further our collective goals.

6.5 THE PEER REVIEW PROCESS

Peer review is at the core of most research fund granting decision-making processes. Across CCRA member organizations, it is universally acknowledged that with respect to fundamental concerns such as the scientific merit of a research proposal, peer review is the only way to ensure that research funds are allocated to the most promising application and is currently the most effective way to evaluate research excellence.

Questions arise, however, in relation to the mechanics of peer review. The most challenging concern is the volume of work required on behalf of both researchers who prepare proposals for consideration and the scientists who assess the merits of the competing proposals. Initiatives to make the processes more efficient, such as the Common CV Network, have been met with mixed reviews from the cancer research community.

In the stakeholder consultation process, researchers expressed significant dissatisfaction with the current application processes, noting that the task of applying for research funding is becoming so onerous that it is limiting the time available for conducting the research. A key issue seems to be the unique requirements associated with each CCRA member organization's process. Researchers expressed the desire for a more standardized process to decrease the amount of time reformatting and reorganizing research proposals.

ACTION ITEM 23

Establish a task force to discuss opportunities for collaboration in peer review

Description:	Set up a task force to provide a vehicle for dialogue between funding agencies on this issue and look for specific opportunities to coordinate part(s) of the peer review process. One example could be improving access/expanding use of ResearchNet to other agencies.
Milestones:	2011 – Assemble task force to begin dialogue on collaboration in peer review.
Lead Agency:	CCRA Secretariat

7. Evaluating and Monitoring the Strategy

7.1 CONDITIONS FOR AND MEASUREMENT OF SUCCESS

For this strategy to be successful it must be viewed as a strategy for all the individual CCRA member organizations. The action items are not intended to represent a comprehensive list of all programs of cancer research conducted by CCRA members; rather, the strategy articulates national or joint priorities that may best be achieved through collaboration. This does not in any way preclude individual agencies from pursuing additional research directions and indeed it is assumed each CCRA member will continue to invest in its own portfolio of research. Nonetheless, to ensure success, it is critical that CCRA members and other funders of cancer research look towards enhanced collaboration or coordination to achieve mutual or collective goals in an efficient, cost-effective manner. This strategy will provide a mechanism to do this and, it is hoped, to enhance the environment and opportunities at the level of the individual cancer researcher.

Equally important is ensuring that the organizational structure of the CCRA is appropriate to implement and deliver what is proposed in the strategy. The CCRA recently voted to broaden its membership to include more funders of cancer research. In addition, it was agreed that a soon-to-be reconfigured CCRA Board will oversee strategy implementation and report regularly on progress to the entire CCRA. The CCRA Board may also make recommendations regarding the CCRA Secretariat and operating support needs if increased resources are required to implement aspects of the strategy.

ACTION ITEM 24

Monitor progress of the strategy and prepare an annual report to the CCRA

Description:	Evaluate the Pan-Canadian Cancer Research Strategy on an ongoing basis using clearly defined metrics.
Milestones:	2010 and annually thereafter – Publish progress report on strategy.
Lead Agency:	CCRA Secretariat

7.2 ASSESSING RESEARCH RETURN ON INVESTMENT

It is difficult to fashion good indicators for research return on investment (ROI). New work, however, is emerging that addresses this problem and there is developing literature on this issue (e.g., Canadian Research Knowledge Network, UK Research Assessment exercise). The National Alliance of Provincial Health Research Organizations (NAPHRO) is studying the impact of health research investment; ideally, their work will be leveraged to support this same activity for CCRA. Furthermore, the work of Canadian Academy of Health Sciences (http://www.cahs-acss.ca/e/assessments/completedprojects.php) and others is relevant to this topic. This situation presents an opportunity for CCRA and its members to expand the literature on research ROI and to take a leadership role. Further discussion on how CCRA may wish to lead in this area is needed and the CCRA Board will be discussing this issue and developing options for future activities.

In addition to providing leadership in terms of tracking and evaluating research investment, an opportunity to develop an approach to evaluating national research strategies remains. The challenge is to define appropriate, measurable indicators that evaluate the impact and value of the strategy as it unfolds and to understand how the strategy may (or may not) affect the alliance and its members.

8. Alignment with CPAC Strategy and other National Strategies

8.1 ALIGNMENT WITH THE CPAC STRATEGIC PLAN

Since its creation in 2007, CPAC has been working steadily to accelerate cancer control initiatives across Canada. One of the key objectives for the partnership as laid out in its 2008 strategic plan was to reduce gaps in knowledge to enhance cancer control. This CCRA strategic plan, by highlighting areas for enhanced research, will address knowledge gaps in many spheres of relevance to cancer control.

More specifically, the CPAC strategic plan highlighted three areas of action for research: to establish and maintain a pan-Canadian research network promoting integration of research across Canada, to coordinate funding on translational clinical research to foster the rapid transfer of new knowledge between the scientific community and health professionals, and finally to coordinate funding for a groundbreaking cancer cohort study to understand better risk factors for cancer and to create a legacy population laboratory.

As is evidenced by the content of this CCRA strategic plan, substantial progress has been made in all three areas. Indeed, the plan itself is evidence that the pan-Canadian research network is growing in strength and the many action items related to translational research, prevention research and the CPTP underscore the progress made in the other areas.

CPAC strategic initiatives also intersect with this Pan-Canadian Cancer Research Strategy in other areas: for example, the Primary Prevention Advisory Group (PPAG) of CPAC, which launched the CLASP and CAREX initiatives, will be a key player in the development of the prevention research agenda (Action Item #1). Clinical trial enrolment (a topic of Action Item #11) is being explored as a measure of system performance by CPAC, which feeds into CCRA's work to understand and remove barriers to enrolment in trials. Finally, research into survivorship issues is going forward in close alignment with the Cancer Journey Advisory Group activities at CPAC.

8.2 ALIGNMENT WITH OTHER NATIONAL STRATEGIES

In addition to being integral to the success of CPAC strategic plan, the work of CCRA has a bearing on other national strategies including:

1. **The Government of Canada's "Mobilizing Science and Technology to Canada's Advantage" Strategy** (2007, progress report 2009)

   The Pan-Canadian Cancer Research Strategy is closely aligned with this broader federal

strategy that aims to "make Canada an even more attractive international destination for research, investment and work in the fields of science and technology."[6] The federal plan notes a series of investments in genomics (e.g., through Genome Canada), infrastructure (e.g., through the Canadian Foundation for Innovation (CFI)) and continued human resource support (e.g., through Canada Research Chairs). Through the collaborative efforts set out in this document, CCRA members are leveraging these federal investments, notably in the areas of genomics, cancer-initiating cells and translational research.

2. **The Federal/Provincial/Territorial "National Pharmaceutical Strategy" (2006)**

   The Pan-Canadian Cancer Research Strategy also picks up on important themes from the National Pharmaceutical Strategy, such as the need for more health economics studies to guide considerations regarding which new cancer drugs should be added to provincial formularies. Furthermore, the call to action for research on the cost/benefit of new therapies (Action Item #14) fits well with this.

3. **The CIHR Roadmap**

   The Pan-Canadian Cancer Research Strategy is well aligned with several of the priorities on the new CIHR Health Research Roadmap.[7] The first priority in this roadmap is to focus on world-class excellence. Numerous examples in the CCRA plan (for example those in genomics and cancer initiating cells) reflect the world-class excellence of Canadian science in these areas and the new collaborations and initiatives articulated in the CCRA plan will reinforce and accelerate the fields. CIHR priority No. 2 is to address health and health-system research priorities through a number of activities including enhancing patient-oriented care and improving clinical results through scientific and technological innovations. These themes run strongly through Action Items 8-11 in the CCRA plan, specifically, those emphasizing translational research and clinical trials research. CIHR priority No. 3, to accelerate the capture of health and economic benefits of health research to focus more on solutions-based research is also closely aligned with several of the themes and actions under translational research in the CCRA plan. Finally, CIHR priority No. 4, to achieve organizational excellence, foster ethics and demonstrate impact is captured in the CCRA plan in subsections of *Creating an Optimal Cancer Research System*.

   Finally, new national and regional strategies for many of the CCRA member organizations, including CCS, OICR, CBCRA and Prostate Cancer Canada (PCC), are being developed, with the knowledge and content of this plan serving as a reference point so that Canada's cancer research funding agencies will provide not only a wide array of programs and opportunities for scientists, but also with increasing harmonization to maximize opportunities for impact.

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6. *Mobilizing Science and Technology to Canada's Advantage: Progress Report 2009* (located at www.ic.gc.ca/eic/site/ic1.nsf/eng/h_04709.html on December 21, 2009)
7. http://www.cihr-irsc.gc.ca/e/40490.html

Appendix A Acknowledgements

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Appendix B Glossary of Acronyms

ACF	Alberta Cancer Foundation
BCCA	British Columbia Cancer Agency
CBCF	Canadian Breast Cancer Foundation
CAPCA	Canadian Association of Provincial Cancer Agencies
CBCRA	Canadian Breast Cancer Research Alliance
CCAN	Canadian Cancer Action Network
CCM	CancerCare Manitoba
CCNS	Cancer Care Nova Scotia
CCO	Cancer Care Ontario
CCRA	Canadian Cancer Research Alliance
CCS	Canadian Cancer Society
CDRD	Centre for Drug Research and Development
CFI	Canada Foundation for Innovation
CIHR	Canadian Institutes of Health Research
CIHR-ICR	Canadian Institutes of Health Research – Institute of Cancer Research
CIRM	California Institute for Regenerative Medicine
CLASP	Coalitions Linking Action and Science for Prevention
CLSA	Canadian Longitudinal Study on Aging
CPAC	Canadian Partnership Against Cancer
CPTP	Canadian Partnership for Tomorrow Project
CRS	The Cancer Research Society
CSCC	Cancer Stem Cell Consortium
CSO	Common Scientific Outline
CTG	NCIC Clinical Trials Group
CTRNet	Canadian Tumour Repository Network
EOI	Expression of Interest
FRSQ	Fonds de la recherche en santé du Québec
GC	Genome Canada
ICGC	International Cancer Genome Consortium
ICRP	International Cancer Research Partners
KT	Knowledge Translation
MSFHR	Michael Smith Foundation for Health Research
NAPHRO	National Alliance of Provincial Health Research Organizations
NBCN	New Brunswick Cancer Network
NCIC	National Cancer Institute of Canada
NCI	National Cancer Institute (US)
NCRI	National Cancer Research Institute (UK)
NRC	National Research Council of Canada
NSERC	Natural Sciences and Engineering Research Council
OCOG	Ontario Clinical Oncology Group
OICR	Ontario Institute for Cancer Research
P^3G	Public Population Project in Genomics
PCC	Prostate Cancer Canada
PHAC	Public Health Agency of Canada
PPAG	Primary Prevention Advisory Group of CPAC
RAG	Research Advisory Group (formerly the Research Action Group) of CPAC
RFA	Request for Applications
ROI	Return on Investment
SCA	Saskatchewan Cancer Agency
SOP	Standard Operating Procedure
SPOR	Strategy for Patient-Oriented Research
TFF	The Terry Fox Foundation
TFRI	The Terry Fox Research Institute

Appendix C CCRA Strategic Planning Subcommittee Membership

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SUMMARY OF ACTION ITEMS

The table below illustrates the action items laid out in the strategy. Many of the items may lead to future actions, to be determined at a later date (indicated with dotted lines) and CCRA members as well as other funding agencies are anticipated to extend their participation more broadly during the lifetime of the strategy. Refer to Appendix B for Glossary of Acronyms.

Priority	Action	Lead	Partner	2010	2011	2012	2013	2014
Cancer Prevention	Develop a cancer prevention research plan	CCRA Secretariat, CCS/CPAC	CBCF, CCAN, CCO, CIHR-ICR, CRS, GC, PHAC	Release report on cancer prevention in Canada; Convene meeting of partner agencies	Draft prevention research plan for eventual dissemination and discussion	Next steps informed by prevention research plan		
	Complete the enrolment phase of the Canadian Partnership for Tomorrow Project and develop a plan for sustainability	CPAC	ACF, BCCA, CCNS, CCO, GC, OICR	Establish governance structure	Develop sustainability strategy	Complete initial enrolment and commence recontact process		
	Provide funding opportunities to support projects utilizing the cohort dataset	CCS, CIHR-ICR, CRS				Announce funding opportunities	Fund new projects that utilize CPTP data	
Basic Discovery Research	Launch new ICGC sequencing project in prostate cancer	OICR, PCC		Issue RFA and review submission(s); Initiate funding of new ICGC genome sequencing project in prostate cancer				
	Provide project funding for cancer genomic studies	CCS	OICR	Release of initial genomic sequencing data	Commence project funding			
	Promote the value of ICGC datasets to the Canadian cancer research community	OICR	GC		Start program of research education			
	Study cancer initiating cells with new technologies, reagents and tools	CSCC	ACF, CIHR-ICR, GC, NRC, OICR, PCC	Complete CSCC analysis	Possible launch of RFA	Possible new funded programs		
Research to Translate Discoveries into Benefits for Patients and High Risk Populations	Establish a funding mechanism for projects that move from target discovery to clinical application through new agent development	OICR, CDRD	ACF, CCS, CIHR-ICR, FRSQ, GC, NRC, TFRI	Convene the first working group meeting	If agree to proceed, develop models	Develop and implement plan to communicate working group report and broaden use of platforms		
	Monitor progress of TFRI/CPAC Pan-Canadian Cancer Biomarker Initiative	TFRI	CPAC	Progress report	Progress report			
	Develop biomarkers and novel imaging technologies for early detection, treatment prediction and prognosis	CIHR-ICR, TFRI	ACF, CBCF, CBCRA, CCO, CCS, CRS, FRSQ, GC, OICR, PCC		Workshop to share understanding of pipeline approach	Report on recommended biomarker development pathway	Next steps informed by report	
	Report and make recommendations on cancer clinical trials in Canada	CCRA Secretariat, CCS	ACF, BCCA, CAPCA, CCO, FRSQ, OICR, TFRI	Convene meeting to define scope of report; Deliver report with recommendations	Develop mechanisms to resolve identified issues			
Research to Meet the Needs of Cancer Survivors and to Enhance Cancer Health Services Delivery	Develop research on late effects of treatment	CIHR-ICR	C[17] Research Network, CRS, OICR, PCC, TFRI	Possible launch of new funding opportunity	Review of proposals followed by commencement of possible funding with ongoing monitoring of progress in future years			
	Highlight strengths and identify gaps in survivorship research in Canada	CCRA Secretariat	All CCRA members		Release CCRA report on survivorship research in Canada	CCRA members to consider future collaborative funding opportunities		
	Increase support for health economics research to study cost/benefit of new interventions for treatment, prevention and early detection	CCO, CCS, OICR		Call to research community for action				
Tumour-Specific Partnered Initiatives	Monitor adoption of the National Breast Cancer Research Framework	CBCRA		Report on progress	Report on progress	Report on progress	Report on progress	Report on progress
Enabling Activities and Resources	Establish national standards for biobanking for cancer research	CIHR-ICR as funder of CTRNet	All CCRA Members	Convene a workshop/webinar	Review the workshop findings before deciding on next steps			
	Enhance banking of cancer initiating cells	CSCC	CIHR-ICR, GC, OICR, PCC	Complete CSCC analysis	Build inventory of current cancer initiating cell banks	Develop SOPs		
	Improve access to cancer-relevant administrative datasets	CAPCA	ACF, CCAN, CCO, CCS, CPAC, OICR	Compile current state analysis report	Develop CCRA position paper			
	Convene national cancer research conference, combining the annual meetings of several cancer research funding agencies	CCRA Secretariat, CIHR-ICR, OICR, TFRI	All CCRA Members	Plan 2011 conference	Convene 2011 conference	Future conferences based on evaluation of 2011 meeting		
Creating an Optimal Cancer Research System	Continue to release Annual Cancer Research Investment Report	CCRA Secretariat	All CCRA Members	Publish report	Publish report	Publish report	Publish report	Publish report
	Provide an analysis of Canada's cancer research human resources	CCRA Secretariat	All CCRA Members	Publish report on Canada's cancer research human resources	Develop an HR plan	Next steps informed by HR plan		
	Encourage appropriate academic recognition for researchers involved in large multi-disciplinary teams	CCRA Secretariat	All CCRA Members	Send and publish letter regarding academic recognition				
	Establish a task force to discuss opportunities for collaboration in peer review	CCRA Secretariat			Assemble task force to begin dialogue on collaboration in peer review	Identify mechanisms to improve cost effectiveness and efficiency of peer review		
Evaluating and Monitoring the Strategy	Monitor progress of the strategy and prepare an annual report to the CCRA	CCRA Secretariat		Publish progress report on strategy	Publish progress report on strategy	Publish progress report on strategy	Publish progress report on strategy	Publish progress report on strategy

Our Members

Alberta Cancer Foundation

Alberta Innovates Health Solutions

BC Cancer Agency
Care & Research

CAPCA

Canadian Breast Cancer Foundation
Fondation canadienne du cancer du sein

Canadian Cancer Society
Société canadienne du cancer

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The Cancer Research Society
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A single dream. A world of hope.
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CCRA
ACRC

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

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