



**Arnie Charbonneau
Cancer Institute**



The Arnie Charbonneau Cancer Institute is meeting the cancer challenge by enabling research that spans the patient journey, from primary cancer prevention to life after cancer, and all health research pillars.

The Arnie Charbonneau Cancer Institute is a university-based institute that conducts and supports cancer research.

Members of the Institute are located in the Faculties of Science, Social Science, Engineering, Nursing, in the Cumming School of Medicine and its academic departments, in the Tom Baker Cancer Centre, and in our teaching hospitals.

The Institute's mission is to 'meet the cancer challenge', a challenge that is simultaneously biological, diagnostic, therapeutic, personal, and societal. We address this challenge by supporting research that spans the patient journey, from primary cancer prevention to life after cancer, and that spans the biomedical, clinical, health services, and population health research pillars of the Canadian Institutes of Health Research (CIHR).

Three themes guide our strategy: accelerating cancer control, improving the lives of patients with cancer, and reducing the burden of cancer in Alberta and beyond. Building research partnerships, fostering a research culture, enhancing competitiveness, supporting recruitment, training the next generation of cancer researchers, building infrastructure and research programs, and connecting with the community of Calgary, are some of the ways in which the Institute will address these goals to 'meet the cancer challenge' and add unique value.

A handwritten signature in black ink, reading "J. Gregory Cairncross".

J. Gregory Cairncross, MD, FRSC
Director, Arnie Charbonneau Cancer Institute
Professor, Clinical Neurosciences
University of Calgary

EXECUTIVE SUMMARY

One of seven health research institutes at the University of Calgary, the Arnie Charbonneau Cancer Institute supports cancer research of all types. Its mission, *Meeting the Cancer Challenge*, embraces the biological and therapeutic challenge of cancer, the personal challenge of cancer, and the societal challenge of cancer. To meet the challenge, the Institute conducts biomedical, clinical, health systems, and population health research spanning the continuum, from prevention to end of life.

Working with the Department of Oncology and other University of Calgary groups that conduct cancer research, the Institute has developed a **cancer research framework** to describe its activities and priorities. Within this framework are three broad areas of research:

- ❖ **Improving Cancer Treatment** by:
 - Identifying and testing *experimental therapies* and conducting *clinical trials*;
 - Understanding the *biology of cancer* and *cancer-related blood disorders*; and
 - Developing new approaches and technologies that foster *precision oncology*
- ❖ **Improving the Patient Experience** by:
 - Understanding the *science of support and caring* for cancer patients and their families;
 - Improving *life after cancer* by understanding and supporting the needs of *survivors*; and
 - Incorporating *patient reported outcomes* to enhance the delivery of cancer care.
- ❖ **Decreasing Cancer in the Population** by:
 - Discovering the mechanisms that ensure *genome stability and health aging*;
 - Developing and testing new tools and technologies for *early cancer detection*; and
 - Identifying and quantifying *risk factors* and finding *prevention strategies*
- ❖ Encompassing this work is the integration of *cancer care delivery science* (health services research), which focuses on the implementation of findings into practice, including understanding gaps in care delivery, improving quality of care and outcomes, and considering economic factors.

The Institute supports research in these domains in the following ways:

- ❖ Fostering **relationships** with academic partners, health service partners, and industry partners;
- ❖ Securing **philanthropy** to help grow research initiatives with significant strength and potential;
- ❖ Increasing the **competitiveness** of the Institute for tri-council funding and other research grants;
- ❖ Building **infrastructure** to ensure our research facilities are modern and our scientists competitive;
- ❖ Providing exceptional **education and training** opportunities that will attract the best trainees;
- ❖ **Recruiting and retaining** top researchers to complement existing strengths and expertise; and
- ❖ Facilitating transformative **collaborations** for institute scientists at the international level.

The Institute's performance and impact are evaluated annually using specific metrics, including research funding, research applications and success rates (especially from tri-council competitions), number of publications and citations, and number of research studies that directly inform patient care and improve outcomes. Additionally, through an annual report, the Institute will describe advances in knowledge in improving cancer treatment, decreasing cancer in the population, and improving the patient experience, and will report progress in attracting new cancer researchers, securing donations to research, and other relevant measures. The Institute will also undergo regular review by its External Advisory Board.

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ABOUT THE INSTITUTE

The Arnie Charbonneau Cancer Institute (the Institute) is one of 7 health institutes at the University of Calgary. The institutes were established to 'create the future of health', and nowhere is this future more challenging than in cancer. Cancer has become the leading cause of death in Canada, eclipsing heart disease (30.2% vs. 19.7%), and the number of new cases in Canada is expected to increase by 40% over the next 15 years.¹ To create a future without cancer, the Institute is supporting research that addresses the biological and therapeutic challenge of cancer, the population and public health challenge of cancer, and the personal, family, and societal challenge of cancer. To guide its decisions, investments, and actions over the next five years, the Institute, in association with its members in the Department of Oncology and Tom Baker Cancer Centre, has identified three overarching research themes (Figure 1):

- **Improving Cancer Treatment:** Our focus on understanding cancer biology will lead to precision therapies and technologies and to practice changing trials that will redefine standards of care
- **Improving the Patient Experience:** Our focus on the psychosocial effects of cancer and challenge of life after cancer will improve outcomes for an increasing number of patients and survivors
- **Decreasing Cancer in the Population:** Our focus on prevention through lifestyle change, earlier detection of cancer and mitigation of inherited risk, will reduce the global burden of cancer

Encompassing these themes is our commitment to better care delivery through *health system science*.

Calgary Cancer Research Framework

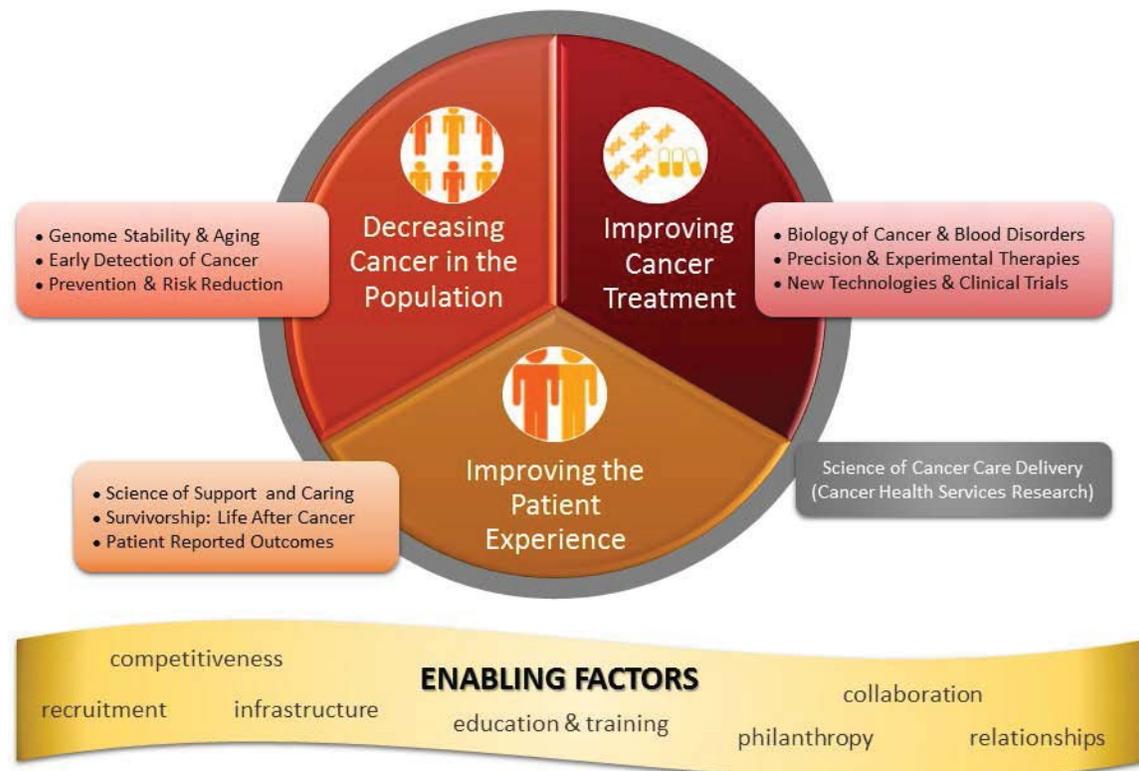


Figure 1. Calgary Cancer Research Framework (2018).

¹ Canadian Cancer Society, Toronto, Ontario, October 2016. ISSN 0835-2976.

A Director, a Deputy Director, a Research Strategy and Partnerships Lead, and an Operations Lead jointly administer the Institute. It has a Communication and Events Specialist and two internal committees, one for research and one for education and training. The Institute Director is the chair of the Institute’s Executive Committee and co-chairs its Strategic Advisory Board. The Institute also has an External Advisory Committee that provides peer review and feedback on performance and new opportunities.

The Institute has 80 full members and 86 associate members. Members can be found in the Faculties of Science, Nursing, and Social Science, the Schulich School of Engineering, Cumming School of Medicine, the Tom Baker Cancer Centre, and the Calgary teaching hospitals of Alberta Health Services (i.e., Foothills, Children’s, Rockyview, Lougheed, and South Campus). The Institute is connected through its activities to the other university health research institutes: the O’Brien Institute for Public Health (health systems research); Alberta Children’s Hospital Research Institute (childhood cancer); the Hotchkiss Brain Institute (brain cancer); the Snyder Institute for Chronic Disease (inflammation and cancer); the McCaig Institute for Bone and Joint Health (sarcomas); and the Libin Cardiovascular Institute of Alberta (cardiotoxicity). At the present time, the strongest research interactions take place with ACHRI, O’Brien, Snyder and Hotchkiss. The Institute is also connected through joint programs and membership to the academic departments of the Cumming School of Medicine, especially the Departments of Oncology and Biochemistry & Molecular Biology, and to the Faculties of Science, Nursing and Engineering on main campus. Most clinical members of the Institute are appointed or cross appointed to the Department of Oncology and most basic science members are affiliated with Biochemistry & Molecular Biology.

These relationships are depicted in Figure 2.

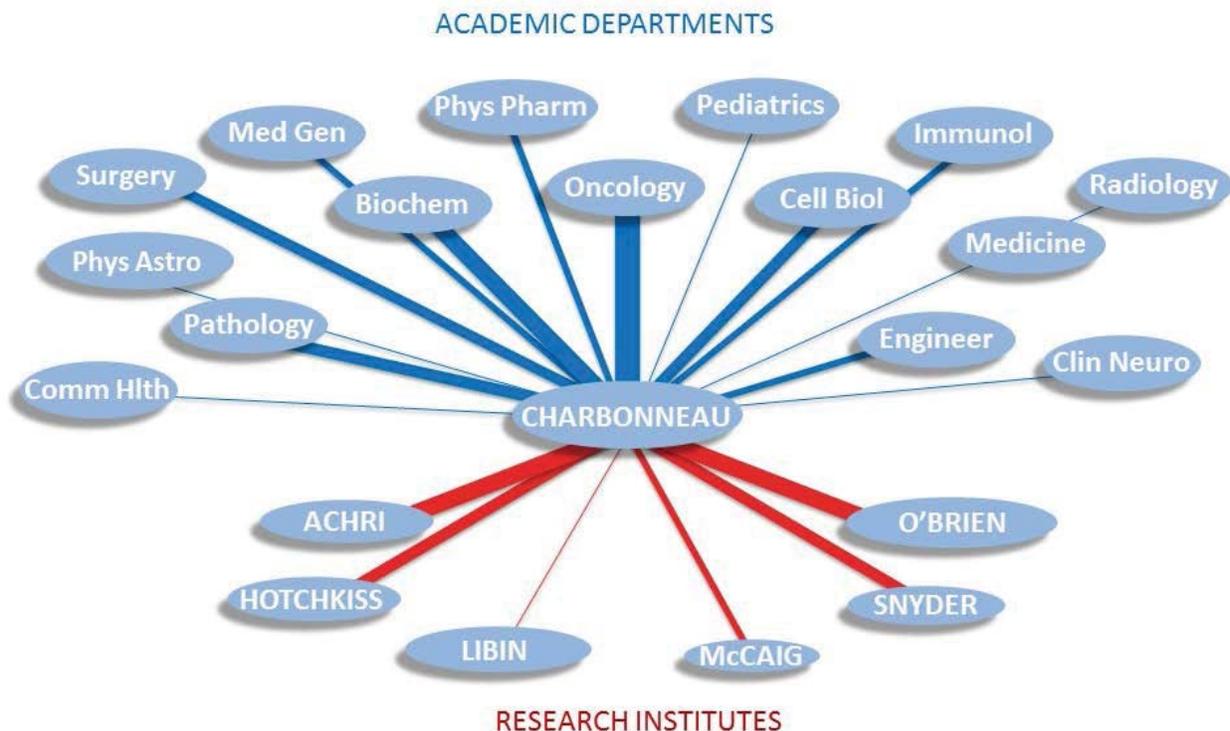


Figure 2. Schema depicting the Arnie Charbonneau Cancer Institute’s relationships to fellow health research institutes and academic departments at the University of Calgary. (The width of the line and the proximity of the institute or department are indicative of the intensity of the research connection.)

BACKGROUND AND MISSION

The Institute was founded in 2003, originally as the Southern Alberta Cancer Research Institute (SACRI). SACRI evolved from the *Cancer Biology Research Group* in the Cumming School of Medicine to become a university-wide endeavor. Its membership included basic scientists at the University and clinicians from the Tom Baker Cancer Centre and Calgary teaching hospitals; their collective efforts were directed to finding solutions to the growing burden of cancer. In 2014, sparked by a leadership gift from a Calgary businessman and philanthropist, SACRI was renamed the 'Arnie Charbonneau Cancer Institute'. Members of the Institute are engaged in all types of cancer research, from the basic science of cancer to its psychosocial effects, including investigating the potential of lifestyle changes to prevent cancer, developing new ways to detect cancer at an earlier more curable stage, discovering how knowledge of the human genome can be harnessed to improve the precision and effectiveness of cancer treatment, improving health care delivery to ensure affordable high quality cancer care, and understanding the special needs of cancer patients and their families and a growing number of long term survivors.

The Institute's mission – MEETING THE CANCER CHALLENGE – is a biological and therapeutic challenge, a population and public health challenge, and a personal and societal challenge. Such a broad mandate can only be addressed through activities that span all four Canadian Institutes of Health Research (CIHR) research pillars (biomedical; clinical; health systems and services; and social, cultural, and environmental factors that affect the health of populations) and seek to find new ways to reduce the global burden of cancer, to effectively control and treat cancer, and to improve the quality of life for cancer patients and their families. The scope of the Institute is intentionally broad, but with the understanding that to have real impact in any domain, the Institute will need to deploy resources where breakthroughs are possible.

The purpose of this document is to clarify what the Institute will do over the next 5 years to meet the cancer challenge. The research strategy will be shared with the Cumming School of Medicine and its departments, and our research partners. It will also be shared with patients, the community of Calgary, cancer charities, cancer research funders, and our Strategic and External Advisory Boards.

FINANCIAL SUPPORT

The health research institutes at the University of Calgary were designed to be self-sustaining. Although each receives a core grant from the Cumming School of Medicine, the financial engines of the institutes are philanthropy, individual research grants, national and provincial team grants, and awards from the Canada Foundation for Innovation. Two have additional operating funds from a large endowment and a successful local foundation. This financial model for the institutes works because the University of Calgary and Alberta Health Services provide the majority of salaries for the members. Exceptions include several scientists within the Charbonneau Institute whose salaries are derived from philanthropy.

In its formative years, SACRI received an annual core grant from Alberta Health Services, a legacy of the Alberta Cancer Board (formerly an independent health authority), and was the benefactor of gifts and grants. For example, gifts from the Alberta Cancer Foundation (ACF) and the Howard Family helped to construct and equip the Howard Cancer Research Laboratories. The ACF often provided start-up funds for new investigators and unrestricted gifts for education, training, and visiting speakers. Currently, the Institute relies on university-linked philanthropy, which had not featured prominently in the SACRI-era.



The Institute directly oversees physical space and infrastructure within the Health Research Innovation Centre (HRIC) and the Heritage Medical Research Building (HMRB) of the Cumming School of Medicine (University of Calgary) but invests in cancer research that takes place in independently governed facilities in Calgary (e.g., Tom Baker Cancer Centre, Foothills Hospital, Alberta Children’s Hospital). The Institute does not manage or operate cancer research space and programs in its partner organizations. Alberta Health Services manages space for researchers at the Tom Baker Cancer Centre and the Holy Cross Centre. At the University, space devoted to cancer research is managed by the Faculties in which the research is being conducted, namely the Faculties of Nursing, Science, Engineering, and Arts.

STRATEGIC PLANNING

In anticipation of a new cancer center in Calgary in 2023, the leaders of the Institute revisited its strategy to guide its activities through 2022. In crafting this document, a series of informal discussions took place with the Director of the Tom Baker Cancer Centre; Heads of Departments in the Cumming School of Medicine, where cancer research features prominently, including the Departments of Oncology, Biochemistry & Molecular Biology, Pathology and Laboratory Medicine, Medical Genetics, and Surgery; the Dean and Associate Dean of Research, Cumming School of Medicine; the Chairperson of the Institute’s Strategic Advisory Board; and past leaders of the Institute. The Institute also hosted a visioning/strategy retreat where stakeholder interactions were professionally facilitated. Participants were asked to envision a future in which the Institute is making profound contributions to research and describe what had happened to make this possible. Attendees were also asked to describe how the Institute could raise research performance in Calgary, balance research breadth *versus* focus, enrich the quality of education for its trainees, engage the public, and support individual investigators and teams.

The University’s Strategic Research Plan and the Research Plans of the Cumming School of Medicine and the Department of Oncology significantly guided the thinking around the future of the Institute. Alberta’s Cancer Plan 2030, Alberta Health Services’ Strategic Research Plan, the Research and Innovation Plan of the Cancer Strategic Clinical Network™, Alberta Cancer Foundation’s Strategic Plan, and the new Vision and Strategic Plan for Research in CancerControl Alberta also informed our thinking.

The organizational framework for cancer research in Alberta is depicted graphically in Figure 3.



Figure 3. Multiple organizations conduct cancer research in Alberta.

INSTITUTE STRATEGY AND PRIORITIES

BREADTH VERSUS FOCUS; NAVIGATING TO EXCEL

To succeed locally, the Institute must support a range of research interests. This approach ensures that the Institute resonates with the community of Calgary, upon which it depends for support, and also with care providers, upon whom it depends to test new treatments for cancer. To succeed nationally and internationally, the Institute must excel scientifically in order to make discoveries that change the way we think about or treat cancer, and to compete for research funding and talent. To achieve this balance, the Institute will invest in research teams, centers, and programs.

Several areas of specialization have already established a strong record of accomplishment, while others are envisioned as areas for growth. All will require strong leadership, critical mass, continuous achievement, and sponsor engagement. These areas align with the Institute's goals of: 1) *improving cancer treatment*; 2) *improving the patient experience*; and 3) *decreasing cancer in the population*.

1. IMPROVING CANCER TREATMENT

1.1 Biology of Cancer & Blood Disorders

One in two Albertans will develop cancer in their lifetime, and by 2030, the number of new cancer diagnoses will have increased by 60%, an alarming statistic largely explained by our aging population. Over the past 15 years, Charbonneau has developed areas of research strength that distinguish it from other cancer research enterprises and that have potential for significant impact and recognition. These areas of focus and strength have enabled by critical mass, philanthropy, and the ability to leverage other University strengths. Examples include the **Clark Smith Brain Tumor Centre**, the **Myeloma Research Group**, and the **Ohlson Research Initiative** for head and neck cancer. Other emerging teams include the **Lung and Thyroid Cancer Groups**, the **RUBY (breast cancer in young women) Initiative**, the **Colon Cancer Research Unit**, and the **Prostate Cancer Centre**. Cancer is also the second leading cause of death among Canadian children and an increasing number of long-term survivors are suffering life-long physical, emotional, behavioral, cognitive, and social disabilities after treatment. Hence, Institute researchers are studying the unique biology of childhood cancers and finding new ways to improve the quality of life of childhood cancer survivors. The **Childhood Cancer & Blood Disorders Research Program** is a partnership between the Children's Hospital Research Institute, Alberta Children's Hospital Foundation, and Kids Cancer Care. Laboratory-based researchers are located in a new purpose-built space in Charbonneau and clinical scientists work at the Alberta Children's Hospital. There is a special emphasis on leukemia, sarcoma, and brain cancer and a major commitment to tissue and live cell banking to support international research efforts. Areas of unique focus include graft-versus-host disease, metastasis, and disabilities after brain tumor therapy.



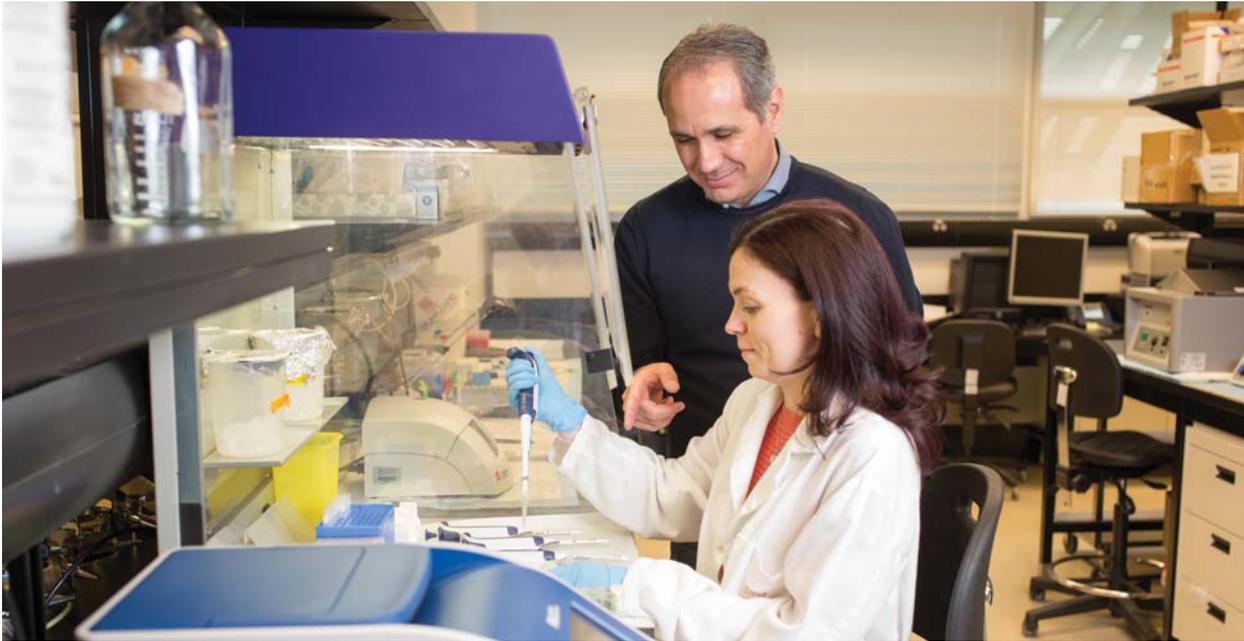


Photo credit: Carmen Coelho/Charbonneau Cancer Institute

1.2 Precision Oncology & Experimental Therapies

Every cancer patient wants treatment that is best suited to them: scientifically selected, timely, likely to be effective, and wherever possible, side-effect-free. They also want access to clinical trials if there is no effective standard treatment for their cancer. Today, the development of technologies to rapidly sequence and analyze DNA has provided oncologists with the unprecedented opportunity to understand the nature of each patient's cancer and either customize their treatment using this information or offer a clinical trial of a new drug that targets the alteration driving their cancer. With diagnostic tools that are increasingly discerning and biomarkers that reveal the truer nature of each cancer, oncologists can provide patients with tailored therapies, increasing the likelihood of benefit, while avoiding ineffective drugs that may have side effects. Increasingly, the molecular features of the cancer are dictating trial eligibility. Hence, support for a new **Precision Oncology & Experimental Therapeutics (POET) Program** at the Tom Baker Cancer Centre is a top priority for the Institute. Successful philanthropy will be necessary to acquire cutting-edge technologies, recruit highly trained personnel, and expand our research capacity so that by 2023, 20% of patients will be able to participate in a clinical trial.

1.3 New Technologies & Clinical Trials

Radiation treatment is a mainstay of modern cancer therapy and over the past 25 years has become increasingly precise and safe because of technological advances. For example, some modern radiation machines combine imaging with treatment delivery to achieve more accurate and precise dosing. These technologies also limit the exposure of healthy surrounding tissue to high doses of radiation. Optimal utilization of these technologies is the major research focus of the medical physics group at the Tom Baker Cancer Centre. Clinical trials are another important research activity at the Tom Baker Cancer Centre. Each year, over 500 patients with cancer have the opportunity to participate in clinical research through trials administered by the Clinical Research Unit (CRU). Most of these industry-sponsored clinical trials are international in scope, increasingly biomarker-driven, and lead to important changes in practice. The CRU also administers investigator-initiated trials associated with the POET program.

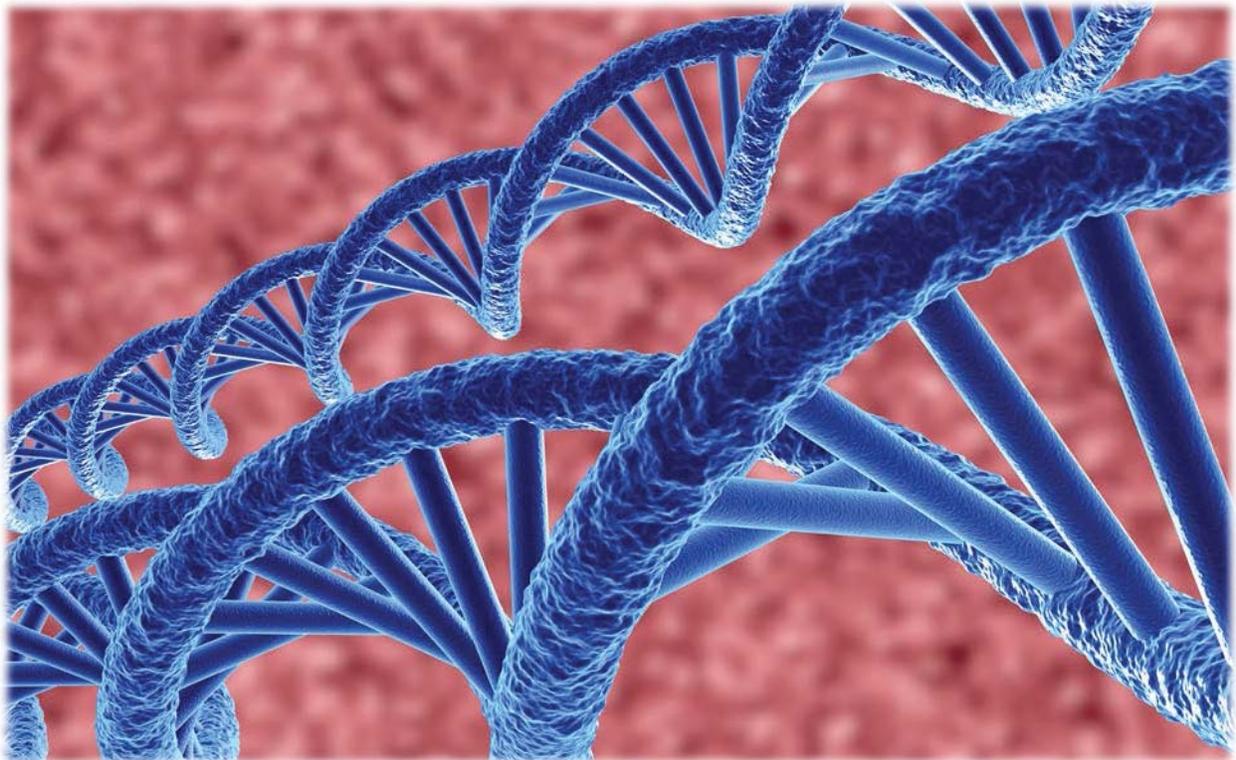
2. IMPROVING THE PATIENT EXPERIENCE

2.1 Science of Support and Caring

The effects of a cancer diagnosis on emotional and psychological health are profound and often under-recognized. Researchers at the Tom Baker Cancer Centre have shown that distress affects up to half of all cancer patients and can negatively impact the success of cancer treatment. Calgary researchers coined the term, the *6th vital sign*, and drew worldwide attention to the importance of screening for distress in cancer patients. Indeed, screening for distress is a new standard of care in many modern cancer centers. This advance is a result of the research conducted by our psychosocial scientists. More recently, the team has focused on the use of complementary and alternative therapies by cancer patients, ways to improve the patient experience during transitions in care, and strategies to mitigate the behavioral, emotional, cognitive, and social consequences of the successful treatment of cancer in childhood. Philanthropy will ensure protected time for our psychosocial scientists and support the expansion of fellowships and other opportunities for advanced training in this field.

2.2 Survivorship: Life after Cancer | 2.3 Patient Reported Outcomes

An increasingly important issue in oncology is the care of patients who have survived a cancer diagnosis and are living with the consequences of the disease and its treatment. Work in this area at the Tom Baker Cancer Centre includes research to understand the needs of survivors of childhood cancer and the needs of women and men who are coping with lifelong side effects of cancer treatment. How best to transition patients' care from an intensive tertiary centre to the community is another research focus. One way to quantifying these needs is to study patient-reported outcome measures. Radiation oncologists at the Tom Baker Cancer Centre are increasingly using this research tool to guide their treatment plans. The Institute is supporting these endeavors through its fundraising efforts, recruitment initiatives, trainee programs, and internal peer review of competitive research applications.



3. DECREASING CANCER IN THE POPULATION

3.1 Genome Stability and Aging (Robson DNA Science Centre)

All mammalian cells, including the estimated 10 trillion cells in the human body, contain a complete copy of our genome, which is copied when our cells divide. The highly regulated process of DNA replication and then cell division, which has stood the test of time for billions of years, is nevertheless, error prone. Most errors are inconsequential or quickly repaired, but some are propagated to daughter cells and lead to cancer and other serious diseases. The **Robson DNA Science Centre (RDSC)**, made possible by Calgary entrepreneur and businessman, Mr. Dave Robson, is home to Institute scientists studying basic mechanisms of DNA damage and repair, the development of genome instability, the process of human cellular aging, and environmental causes of cancer. They are also identifying unique vulnerabilities in the genomes of cancer cells to develop better therapies. The majority of the Institute's CIHR-funded scientists are RDSC scientists. Over the next few years, the RDSC will work towards enhancing the integration of its basic scientists with clinical experts at the Cancer Centre to stimulate investigator initiated clinical trials that are increasing precise, personalized and science driven. The Institute will support RDSC by fundraising for new technologies and international postdoctoral trainees.

3.2 Early Cancer Detection Initiative

Many cancers are not detected early enough for curative surgery or other types of therapy. For this reason, the Institute is championing a new research program in early cancer detection that includes investigators at the Schulich School of Engineering, Cumming School of Medicine, and Tom Baker Cancer Centre. Its mission is three fold: to develop strategies and methods for non-invasive earlier detection of cancer, discover better ways to predict the behavior of individual cancers, and build new commercially-viable cancer detection tests and technologies that will improve patient outcomes. Institute members are currently investigating new ways of negating an inherited risk of cancer, analyzing metabolites and DNA/RNA fragments in body fluids to detect occult biliary and pancreas cancer, and finding ways to differentiate benign from malignant breast lumps, and predict the future behavior superficial growths in the bladder, thyroid, enlarging prostates, and 'coin' lesions in the lung. Institute researchers are also working on non-invasive tests for the early detection of HPV-associated head and neck cancers.

3.3 Prevention & Risk Reduction

Our Cancer Epidemiology & Prevention (CEPR) scientists estimate that up to 45% of all new cancer cases (6,700 per year in Alberta) are preventable through lifestyle changes that include smoking cessation, reduced sun exposure, regular physical activity, lower alcohol consumption, dietary changes to achieve ideal body weight, and HPV vaccination at an early age. Its goal is to reduce the number of new cancer cases through the creation and dissemination of knowledge about cancer risk and through population-wide implementation of research findings. CancerControl Alberta hosts these scientists, whose academic affiliations include the Department of Oncology and the Institute. The team conducts randomized trials, cohort studies, and sophisticated surveys of exercise interventions and habits in women and men at risk for breast, prostate, colon, and other cancers and at risk for recurrence of these cancers. The group also collects study-linked bio-samples for companion biochemical and molecular studies. They are developing methods and tools for linking the data generated from these samples with lifestyle information to identify individuals at risk of cancer and determine how lifestyle changes can prevent disease. CEPR has a strong educational mandate with excellent trainees. The Institute will support its prevention scientists by fundraising for new faculty and for graduate and postdoctoral trainee stipends.



4. Science of Cancer Care Delivery (Health Services Research)

The number of patients diagnosed with cancer continues to grow, placing an increasing burden on a health system that is already strained. To be able to cope with a growing number of cancer cases and to keep pace with cancer diagnosis and treatment that is increasingly complex and costly, delivery systems must evolve to become more appropriate, effective, efficient, and safe. Hence, the Institute, in association with the O'Brien Institute for Public Health, is committed to supporting a provincial cancer health services research program. The **Alberta Cancer Outcomes Research Network (ACORN)** includes cancer-focused health services researchers from across the province. They are working collaboratively to identify new ways to provide better access to cancer care, identify and correct drivers of high cost and waste in the cancer system, identify ways to ensure equitable cancer care for Alberta's marginalized populations, and develop monitoring systems to ensure that care is consistent and aligns with best practice. Over the next three years, the ACORN program will work to develop capacity for health economic analyses, which can help streamline the approval process for new therapies and improve access for patients. They are also advocating for the recruitment of new oncology faculty with expertise in health services research to expand the program. The Charbonneau Cancer Institute will support the ACORN program by providing dry lab space for trainees and directing fundraising efforts towards support for graduate and postdoctoral trainees and university-based research staff and analysts.

ENABLING FACTORS

In order to be successful in supporting these programs of research, the Institute has identified several key enabling factors or actions it will undertake over the next five years to advance its members' research. These include building strong relationships with local and international stakeholders, garnering the support of Calgarians, enhancing the competitiveness of our researchers, building cutting-edge research infrastructure, working with our University partners to attract the best and brightest young scientists and trainees, and fostering the types of collaborations that often fuel the major discoveries.



Factor 1: Strong relationships

To ensure the success of our research endeavors, particularly those that touch the provincial health system and have the potential to be global in impact, the Institute will emphasize strong partnerships with other Alberta entities that support cancer research, including CancerControl Alberta, the Cancer Strategic Clinical Network™, CRINA (the Cancer Research Institute of Northern Alberta) at the University of Alberta, and cancer researchers at the University of Lethbridge.

Factor 2: Successful philanthropy

Philanthropy is a major driver of research initiatives, as evidenced by recent transformative gifts from Mr. Arnie Charbonneau, Mr. Dave Robson, the Ohlson, Smith, and Daniel Families, the Alberta Children’s Hospital Foundation, the Kids Cancer Care Foundation, and the Calgary Health Trust. The Institute is committed to working with Fund Development at the Cumming School of Medicine to articulate the need for strong cancer research programs in Calgary. The Institute will continue to support programs funded by past gifts, while expanding its fundraising efforts to new areas that align with its key themes: improving cancer treatment, improving the patient experience, and decreasing cancer in the population.

The Institute will engage with community members about new and important funding opportunities. Through careful stewardship of donated funds, including communicating new advances and supporting opportunities for stakeholders to leverage donated funds through grants and partnerships, the Institute commits to developing and maintaining transparent and respectful relationships with its donors. The Institute welcomes the opportunity to fundraise jointly with non-university partners because *improving cancer treatment, improving the patient experience, and decreasing cancer in the population* are priorities that resonate for many universities and foundations.

The Institute is also committed to articulating the many advances in cancer care that have occurred as a result of continuous investment in cancer research. It will promote its activities and successes with the public-at-large and with businesses and governments, while seeking means to promote its achievements internationally. The Institute will strengthen its ability to communicate the successes of its members.

Factor 3: Increased competitiveness

The Institute is committed to helping its individual researchers and teams achieve greater success in all applications for funding, especially from national and tri-council (i.e., CIHR, Natural Sciences and Engineering Research Council [NSERC], and Social Sciences and Humanities Research Council [SSHRC])

agencies. To enhance competitiveness, the Institute has established two vehicles that have been shown to be highly effective ways to improve research grant quality:

- A forum for the early vetting of research ideas by peers (i.e., monthly ‘chalk talks’) will be open to all Institute investigators in all domains of cancer research. Investigators will be encouraged to share new ideas with their colleagues in an environment that is constructive and safe.
- In association with the Office of the Associate Dean of Research at the Cumming School of Medicine, the Institute will facilitate sophisticated internal peer review of research grants. Peer review will be available for both basic scientists and clinical scientists preparing grants.

Pre-submission support is provided with no requirement or expectation that Institute personnel be included on the grant or subsequent publications. The Institute can also provide post-funding support (see ‘Infrastructure’), and under special circumstances, bridge funding for ‘near-miss’ proposals.

The Institute is also a resource for navigating the Alberta research landscape and can provide advice on applications to new funding opportunities, ethics application submissions, sub-grant agreement set-up, data acquisition from Alberta Health and Alberta Health Services, translating knowledge into practice, and other aspects of the research process. Finally, the Institute is committed to working with partners, including the research ethics boards (i.e., CHREB and HREBA-CC), to explore the development of a single consent process that could be presented to all new cancer patients entering the health care system.

Factor 4: Building research infrastructure

The Institute invests in core units that provide tissues, data, equipment, and other supports for research, such as the Clark Smith Brain Tumor Bank, Alberta Cancer Research Bio-repository, ACHRI Sequencing and Bioinformatics Core, Translational Research Laboratories, Microscopy Unit, and Centre for Advanced Technologies (CAT). These and other resources are available to Institute investigators and trainees to further their research activities. The Institute also maintains a list of equipment that investigators, trainees, and others can share² and is working to develop new space within the Heritage Medical Research Building (HMRB) for childhood cancer and cancer detection research and is advocating for space in the Cumming School of Medicine for a cancer health services research unit.



Photo credit: Riley Brandt/University of Calgary

² Arnie Charbonneau Cancer Institute. Institute Resources. URL: charbonneau.ucalgary.ca/files/sacri/charbonneau-shared-equipment.pdf.

Factor 5: Exceptional education and training

The Institute, through the Cumming School of Medicine and University of Calgary, offers graduate, post-graduate, and postdoctoral training programs in cancer science and clinical oncology. Trainees are provided with opportunities to present their research to Calgary's cancer community at weekly 'work-in-progress' seminars and yearly research symposia. These opportunities promote constructive feedback on research ideas and data and stimulate collaboration among Institute trainees and others. The Institute also funds an annual trainee awards program on a competitive basis, as well as a periodic pilot project granting competition aimed at trainees.

To support career development, the Institute offers a mentorship program for trainees and provides opportunities for them to meet internationally renowned senior investigators, through an invited speaker series. Trainees can discuss opportunities to obtain additional training in exceptional environments. The Institute will also create the capacity to commercialize the products of its research and develop creative spaces where its biomedical and clinical scientists and trainees can share ideas.

Factor 6: Recruitment and retention of top researchers

The Institute actively supports the recruitment and retention of top researchers by identifying outstanding individuals, participating in search committees, fostering a research-intensive culture across the campus, and providing start-up packages and laboratory space, as needed.

The Institute also:

- Seeks out creative funding mechanisms to support recruitments
- Develops successful recruitment strategies for critical faculty recruitments
- Attaches graduate studentships or spousal support to enable key recruitments
- Invests in the future by placing top trainees in acclaimed laboratories, elsewhere
- Negotiates protected time (i.e., time dedicated to conducting research) for new recruitments



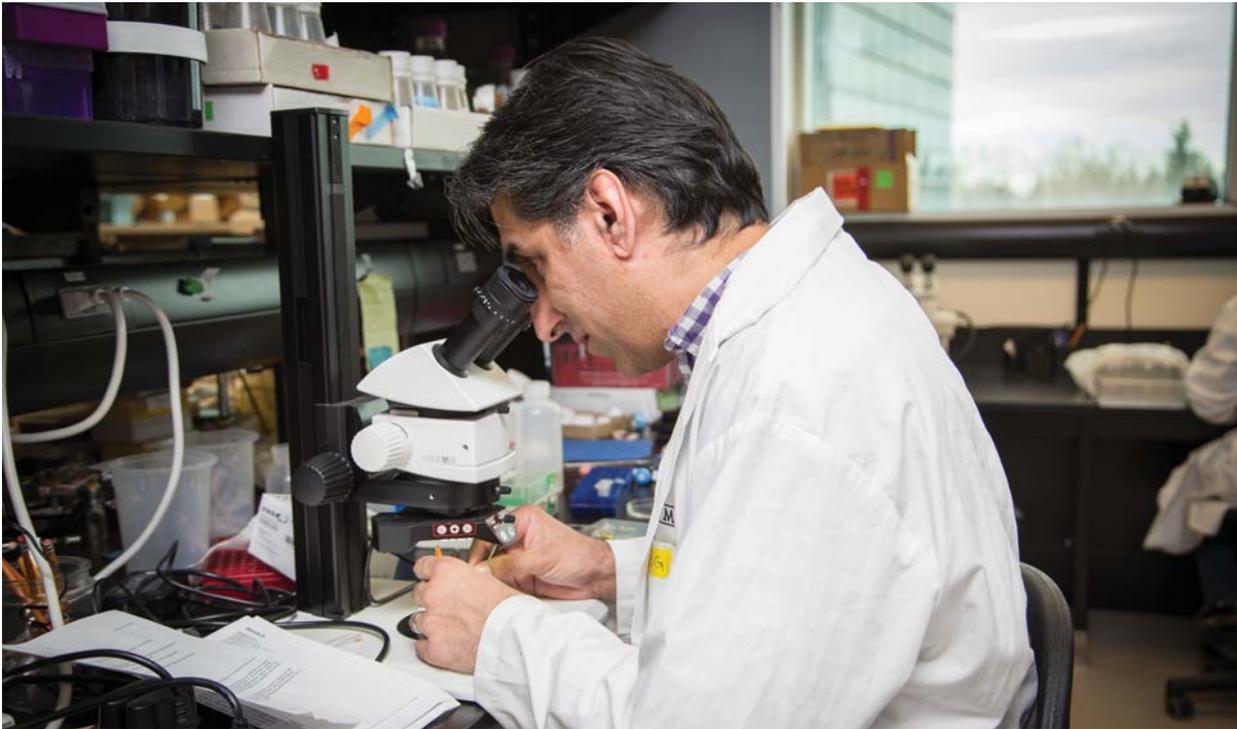


Photo credit: Carmen Coelho/Charbonneau Cancer Institute

Factor 7: Facilitating transformative collaboration

The Institute will enable a collaborative environment for research by facilitating strategic alignment between investigators from multiple disciplines, across the pillars of research (e.g., basic, clinical, health services, and population health), at various facilities (i.e., Tom Baker Cancer Centre, Foothills Hospital, Cumming School of Medicine, Schulich School of Engineering, etc.), and across the province and beyond.

Collaboration will be fostered by these mechanisms:

- Identifying and supporting local and international initiatives where efficiencies and strength can be achieved through collaboration;
- Working with the Cumming School of Medicine to encourage team-based translational research to complement independent initiatives;
- Working to maintain and develop forums for knowledge dissemination, including work-in-progress seminars, invited speaker series, and research symposia, with particular emphasis on the integration of the basic and clinical research communities;
- Establishing a forum in which researchers can connect with patients, advocates, and the community, to disseminate their findings and receive broad-based feedback;
- Identifying and supporting opportunities for commercialization and knowledge translation;
- Creating funding opportunities to catalyze activity in emerging areas and promote collaboration;
- Establishing and maintaining a catalogue of researchers, areas of interest, and key activities;
- Utilizing provincial forums and meetings to highlight areas of specialization and increase participation from clinical, health services, and population researchers; and
- Providing competitive funding for students and postdoctoral fellows to attend important cancer research meetings and present their work.

STRATEGIC ALIGNMENT

The Institute's strategy has been developed to align with the aspirations and priorities of the University of Calgary and the Cumming School of Medicine. The University has reaffirmed its *Eyes High* strategy through 2022, with a focus on becoming a global intellectual hub and one of Canada's top five research universities. The Institute will contribute to this goal through its emphasis on enhancing research competitiveness and attracting the best young cancer researchers and trainees to Calgary. The Cumming School of Medicine will pursue its vision to 'create the future of health' with a focus on 'precision medicine'. In this regard, the Institute's plan to work with the Department of Oncology to establish a major research program in 'Precision Oncology and Experimental Therapeutics' and to spearhead a pan-university 'Centre for Early Cancer Detection' directly align with the Cumming School of Medicine. Likewise, the Institute's goals are congruent with those of the other health research Institutes to bridge the gap between science and medicine and accelerate advances in health and health care.

The goals of the Institute also align the research mission of Alberta Health Services (CancerControl), through its efforts to draw attention to and attract philanthropic support for psychosocial oncology and survivorship research, epidemiology and prevention research, and research in clinical effectiveness and health system performance. This alignment is purposeful and ensures that the Institute adds value to cancer research in Alberta.

REVIEW AND EVALUATION

The Health Research Institutes at the University are evaluated annually using pre-determined metrics:

- Research revenue, including total revenue, CIHR revenue, and clinical research revenue;
- Research applications and success rates, including number of NSERC and CIHR grants; and
- Number of research publications and citations, including total number, average number, number per institute member, and number of papers cited > 50 times in the first 5 years

Performance is tracked year over year for each Institute and is compared to the overall performance of the School of Medicine. Performance is normalized by the amount of space allotted to each Institute. Additionally, through an annual report, the Institute will describe advances in knowledge in *improving cancer treatment, decreasing cancer in the population, and improving the patient experience*, and will report progress in implementing its critical success factors, including new recruitments, the successes of its trainees, donations to the Institute, and other relevant measures. The Institute will use this data to understand how to support its members, improve its performance, and serve the Calgary community.

The Institute will also undergo regular review by its External Advisory Committee to receive feedback on performance and ensure that it is positioned to excel at an international level.

CONCLUSION

The Institute has identified three key areas of specialization, ***improving cancer treatment, decreasing cancer in the population, and improving the patient experience***, and is building research programs that directly address these areas of focus and societal need. The Institute has also identified actionable strategies (i.e., success factors), for advancing its mission of 'meeting the cancer challenge'. By implementing this strategy, in collaboration with partners, the Institute will contribute to the development of new and innovative ways to control and cure cancer, decrease cancer in the population, and improve the cancer experience for patients and families. These advances are expected to translate into better outcomes for patients with cancer, new clinical practices, and better-informed health policy.

APPENDIX

Arnie Charbonneau Cancer Institute Committees and Boards

Executive Committee:

- Dr. Greg Cairncross (Chair), Director, Arnie Charbonneau Cancer Institute
- Dr. Sunil Verma, Head, Department of Oncology and Medical Director, Tom Baker Cancer Centre
- Dr. Sean Grondin, Professor and Head, Department Head of Surgery
- Dr. Christopher Naugler, Associate Professor, Department Head, Pathology and Laboratory Medicine
- Dr. Jonathan Lytton, Professor and Head, Department of Biochemistry & Molecular Biology
- Dr. Francois Bernier, Associate Professor and Head, Department of Medical Genetics
- Dr. Joseph Dort, Senior Medical Director, Cancer Strategic Clinical Network
- Dr. Barry Bultz, Director, Division of Psychosocial Oncology
- Dr. Jennifer Chan, Deputy Director, Arnie Charbonneau Cancer Institute
- Ms. Donna Wray, Director Business and Operations, Arnie Charbonneau Cancer Institute
- Ms. Carmen Coelho, Communications & Events Coordinator, Arnie Charbonneau Cancer Institute

Strategic Advisory Board:

- Ms. Gail O'Brien (Chair)
- Mr. Dave Robson
- Dr. Sunil Verma
- Ms. Heather Culbert
- Mr. Marvin Romanow
- Dr. Gerald Zamponi
- Mr. Patrick Daniel
- Mr. Allan Ross
- Dr. Jennifer Chan
- Dr. Chen Fong
- Ms. Sharon Siebens
- Ms. Donna Wray
- Mr. Keith MacPhail
- Mr. Tony Smith
- Dr. Gregory Cairncross

External Review Committee:

- Dr. Fabrice Andre, Professor, Department of Medical Oncology, Institut Gustave Roussy, France
- Dr. Samuel Aparicio, Nan & Lorraine Robertson Chair in Breast Cancer Research and Head of the BC Cancer Agency Department of Breast and Molecular Oncology
- Dr. Cheryl Arrowsmith, Senior Scientist, Princess Margaret Cancer Centre and Professor of Medical Biophysics, University of Toronto
- Dr. Susan Block, Chair of the Department of Psychosocial Oncology and Palliative Care at Dana-Farber and Brigham and Women's Hospital
- Dr. Eduardo Franco, James McGill Professor, Departments of Oncology and Epidemiology & Biostatistics; Director, Division of Cancer Epidemiology; and Chairman, Department of Oncology, McGill University
- Dr. Donald William Parsons, Associate Professor, Pediatrics-Oncology, Baylor College of Medicine
- Dr. Geoff Porter, Professor of Surgery and Ramia Chair in Surgical Oncology, Dalhousie University
- Mr. Patrick Sullivan, President and Founder, Team Finn Foundation
- Dr. Ali Tehrani, President and CEO, Zymeworks

MEETING THE CANCER CHALLENGE

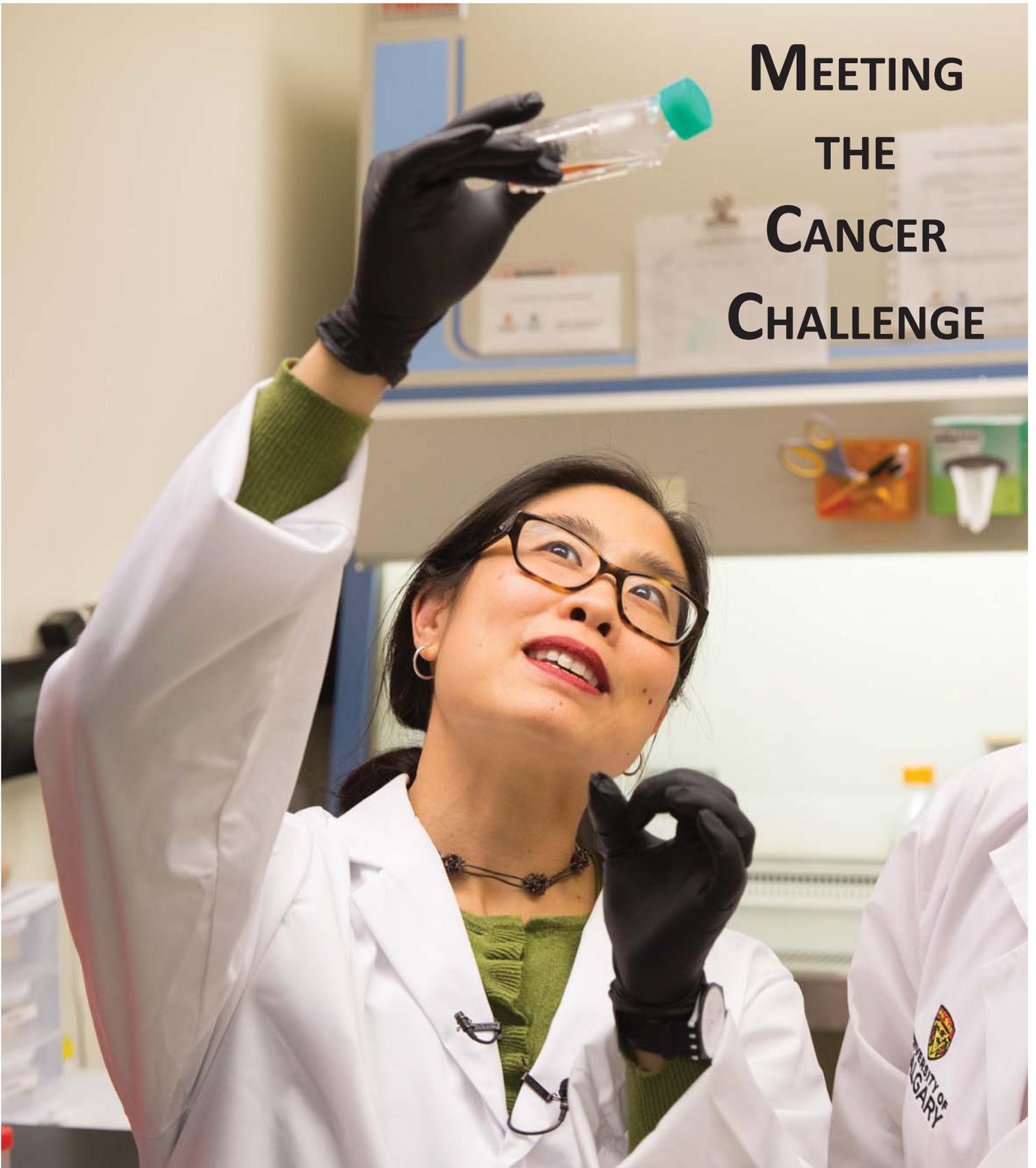


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