Acknowledgements

This report was prepared by a team of staff at CCSRI including Dr Siân Bevan, Director, Research; Lisa Carney, Research Analyst; Dr Mavis Jones, Research Communications Specialist; and Rudy Valentim, Senior Advisor, Research Monitoring and Evaluation. The report benefited from valuable inputs, comments and feedback from Canadian Cancer Society staff, divisions, and researchers. It was designed by Angus Brown, Manager, Materials Production and Design.

An electronic version of the report is available on the CCSRI website: cancer.ca/research

For inquiries please contact CCSRI at research@cancer.ca
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Message from the Vice-President, Research, and the Scientific Chair of Advisory Council on Research (ACOR)

Research supported by the Canadian Cancer Society will change cancer forever. We are the largest national charitable funder of cancer research, and the 4th largest funder in Canada. As we marked the Society’s 75th anniversary in 2013, we proudly looked back at our history of funding research that has advanced our understanding of how cancer cells work, how to treat cancer in its different forms and sites, how to prevent and reduce the risk of developing cancer in the first place, and how to help more people defeat a cancer diagnosis and live long, full lives.

This research impact report of the Canadian Cancer Society Research Institute (CCSRI) showcases the broad reach of the work we support thanks to the generosity of Canadians. In 2013, we funded 152 new grants and awards, representing new investments of $31.8M over the next 5 years. Our research portfolio extends from coast to coast, including new projects in Prince Edward Island and Newfoundland and Labrador. CCSRI’s research programs support innovative ideas and focus on the potential for the greatest impact for patients and populations. Our investments support Canada's world-class basic, biomedical and clinical researchers, the building of a vibrant prevention research community, and the evidence base for quality of life research and applied knowledge to action programs.

Our membership in the Canadian Cancer Research Alliance (CCRA) and partnerships with other research funders has allowed us to celebrate Canadian scientific excellence by sponsoring and participating in the 2013 Canadian Cancer Research Conference. We supported the career development of over 100 promising young researchers who attended a new principal investigators pre-conference meeting and several targeted sessions throughout the conference. We co-hosted these events with the Canadian Institutes for Health Research (CIHR), one of our research funding partners.

We are excited to introduce new content in this year's report to complement the rigorous evaluation metrics we use to assess all of our research programs. New visuals illustrate – at a glance – the strength and breadth of what donations to Society-funded research accomplish. Testimonials from our peer reviewers and grant recipients outline what their connection to the Society has enabled them to do, and why they are willing to dedicate their time to our research mission.

CCSRI grants and awards are considered a mark of excellence in the research community, and our peer review process remains a gold standard for rigour and efficiency. Many volunteers, both scientists and community representatives, have provided exceptional service to our peer review process. In 2013 we recognized 179 individuals who have committed their time to CCSRI for over 5 years, and 20 individuals who have volunteered for more than 10 years – all to ensure that we fund the best cancer research in the country. We hope you enjoy CCSRI’s 2013 research impact report and will find it a valuable resource to highlight the impact of excellent research that, thanks to you, the Society is proud to support.

Dr Christine Williams  
Vice President, Research  
Canadian Cancer Society

Dr Brian Wilson  
Scientific Chair  
ACOR
Executive Summary

CCSRI is the research arm of the Canadian Cancer Society. Since 1947, CCSRI has supported thousands of researchers by providing more than $1 billion in cancer research funding in Canada.

The mission of the Canadian Cancer Society is to eradicate cancer and enhance the quality of life of people living with and beyond cancer. Through the generosity of donors, CCSRI supports this mission by funding research aimed at reducing cancer incidence, reducing cancer mortality and enhancing the quality of life for those living with and beyond cancer. Through research grants and awards, CCSRI funds work across the research spectrum. In addition, CCSRI supports three research centres: the NCIC Clinical Trials Group at Queen’s University, the Propel Centre for Population Health Impact at the University of Waterloo, and the Canadian Centre for Applied Research in Cancer Control, which is a pan-Canadian network based in British Columbia and Ontario. These research centres focus on clinical trials, population health, and health economics, services, policy and ethics, respectively. CCSRI funding programs also promote opportunities for cross-disciplinary research and bridge the work of the Society, helping to integrate research, policy and programs to have a greater impact on cancer.

This report provides an overview of CCSRI’s research funding investments in 2013 and highlights the impact of the work funded. We explain CCSRI’s peer review and evaluation processes, provide an analysis of CCSRI’s investment portfolio, give a summary of selected research outcomes, and tell 60 stories about the impact that funded researchers are making across the country.

The following are key highlights from the past year.

CCSRI continues to make significant investments in cancer research
• $38.3 million in cancer research across the country
• $23.6 million in research relating to specific cancer types and $14.7 million applicable to multiple or all cancer types
• $29.9 million in basic, biomedical and translational research, $5.1 million in prevention research and $3.3 million in quality of life research
• 294 principal investigators and 504 co-applicants supported
• 385 total investments (327 grants and 58 career development awards) in 9 provinces across 44 research institutions
• 152 new investments (101 grants and 51 career development awards), representing new commitments of $31.8 million over the next 5 years

CCSRI researchers continue to make progress in the fight against cancer
• 5 impacts on healthcare practice and program delivery
• 6 impacts on policy
• 6 patents were issued or licensed
• 824 publications, 1,269 presentations and 1,296 collaborations

1 This report covers the fiscal year February 1, 2013 to January 31, 2014.
2 Investigators may be assigned to more than one research project and may have more than one designation. Principal investigators who were also co-applicants were counted only once as principal investigators. For a list of funded researchers refer to the CCSRI website at cancer.ca/research.
A History of Progress

Funding the best research with the greatest impact on cancer

<table>
<thead>
<tr>
<th>Decade</th>
<th>Percentage</th>
<th>Events</th>
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<tbody>
<tr>
<td>1950s</td>
<td>28%</td>
<td>The Canadian Cancer Society funds research leading to the discovery of vinblastine in 1958 by Drs Robert Noble and Charles Beer in London, Ontario. Vinblastine is still used to treat many cancers. Dr Harold Johns develops the Cobalt-60 Unit or “Cobalt Bomb”. It becomes the most effective cancer treatment and begins the modern era of radiation therapy.</td>
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<tr>
<td>1960s</td>
<td>31%</td>
<td>Drs James Till and Ernest McCulloch discover stem cells in bone marrow, which leads to the development of bone marrow transplantation as a life-saving treatment for many cancers. In 1965, Drs Phil Gold and Samuel Freedman discover carcinoembryonic antigen (CEA). Because of this, a blood test can be used to help detect cancer early or monitor the effectiveness of treatment.</td>
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<tr>
<td>1970s</td>
<td>39%</td>
<td>Dr Anthony Miller evaluated the effectiveness of Pap test screening as a way to reduce the number of Canadian women dying from cancer of the cervix. In 1976, while working in Toronto, Dr Victor Ling finds that p-glycoprotein causes cancer cells to become resistant to chemotherapy drugs.</td>
</tr>
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</table>

The percentages indicate what the survival rate 5 years after diagnosis is for each decade.
Dr Tak Mak clones a white blood cell gene known as a T-cell receptor gene, helping to shape the field of immunotherapy and cancer vaccines.

Dr Anthony Pawson of Toronto discovers that a specific protein molecule can be used to transmit signals within cancer cells. Understanding how cells ‘talk’ to each other helps establish a new research area in targeted therapies.

Drs Helen Chan and Brenda Gallie of Toronto use the drug cyclosporin to improve the treatment of children with an eye cancer called retinoblastoma.

Dr Steven Narod shows that women who inherit specific mutations in the BRCA1 gene have increased risks of breast and ovarian cancer.

In 1995, Dr Patrick Lee discovers that the reovirus can seek out, infect, and attack cancer cells without harming normal cells. Dr Peter Forsyth and others build on this discovery to study how oncolytic viruses can be used to kill or shrink tumour cells.

A clinical trial led by the NCIC CTG finds that women who took letrozole after tamoxifen therapy had a greatly reduced risk of the cancer returning, changing the way breast cancer is treated worldwide.

Dr Mick Bhatia discovers how stem cells can be triggered to become blood cells, paving the way for new therapies for leukemia.

Dr David Malkin finds that some people with the cancer risk vulnerability syndrome Li-Fraumeni (LFS) may have an even higher risk if they carry a specific gene mutation. The discovery leads to a screening method to help people with LFS identify their cancer risk.

Dr Eduardo Franco and several international scientists pinpoint human papilloma virus (HPV) as the cause of cervical cancer. The HPV vaccine, approved in 2006, helps prevent cervical cancer for thousands of women each year worldwide.
How CCSRI Selects the Best Research

Here’s what I tell people: ‘Scientists and clinicians come from all over Canada and even the U.S. while community representatives are brought in to provide a lay perspective. We gather these people for their expertise, and they are all volunteering their time.’ That’s when I get a gasp, when people realize all this work is being done on the reviewers’ own time. I think we have one of the best peer review systems in the world.

Janice Hodgson, Community Representative on CCSRI peer review panels

This is one of the most intelligent, constructive, and helpful processes I have ever seen … Participating in this process has enhanced my belief in the CCSRI and its research committee efforts, and that the fight against cancer might actually be winnable.

Community Representative on CCSRI peer review panels

The hard-earned dollars collected by the Society must be efficiently channeled to fund high-quality scientific research that can have an impact on the burden of cancer in Canada now and in the future. Expert and impartial peer review is central to the success of CCSRI’s funding. ... The quality and overall calibre of CCSRI’s peer review process are broadly admired by agencies in Canada and internationally.

Dr Eduardo Franco, McGill University
Peer review process

One of the most frequently asked questions we receive relates to the quality of the research we fund. How do we know we’re funding the best cancer research in Canada?

Our rigorous peer review system is internationally respected, and we continuously monitor and evaluate the success of our programs. The process is an arduous one.

How peer review works

1. After a competition deadline, each application for funding is assigned to a review panel appropriate for the application’s content. CCSRI receives hundreds of applications per year. In 2013, we received 556 applications across 7 competitions.

2. CCSRI assembles specific review panels for each funding competition, and in some cases several panels per competition to cover the spectrum of research represented in the applications. Review panels are made up of top experts from around the world who volunteer their time. One or two community representatives, often cancer survivors, also sit on each panel. They evaluate the importance of the research in the “real world” to consider its potential impact on cancer patients, their families and survivors. In 2013, 323 researchers and 23 community representatives volunteered 8,000 hours (that’s 333 full days) to this process.

3. Before each panel meets, reviewers consider all the applications. Each scientific member is assigned as a primary or secondary reviewer on a selection of applications, and for these they prepare detailed written critiques. These are presented in panel meetings and are used as the basis for an in-depth discussion by the entire panel, led by the panel chair(s).

4. Based on discussions at the panel meetings, scores are assigned to each application. Results of these meetings are presented to the Advisory Council on Research (ACOR), the Society’s most senior scientific advisory group. ACOR then makes a recommendation to the Society on which grants should be funded, based on the quality of the applications and the funding available. In 2013, we funded the top 19% of applications. The peer review panels recommended an additional 38% of the applications for funding, but there wasn’t enough money to fund these.

“A lot of work goes into assembling the peer review panels, identifying the correct combination of expertise from leaders in the field. The community representatives on CCSRI panels are very active and put a lot of thought into their comments. Their comments remind us to consider not only the scientific merit of a project but its applicability in the world.”

Dr Patricia Parker, Chair of the Prevention and Cancer Outcomes review panel
Peer review process

- Gold standard
- Top experts
- Community members

Application submission

Advisory Council on Research recommendation

Best research gets funded
Advisory Council on Research and program development committees

As the Society’s most senior scientific advisory group, ACOR provides strategic advice related to CCSRI’s research programs and ultimately ensures that we fund the best cancer research in Canada. ACOR is made up of national experts who have a superior understanding of cancer research and its relevance to cancer control. ACOR members also have strong ties to CCSRI, having served as peer reviewers or panel chairs in the past. Members help evaluate the peer review process, provide advice to senior leadership on research funding strategies, recommend support for particular grants and programs, and help monitor the overall direction and focus of the research institute. ACOR members volunteer hours of their time to help the Society achieve its mission.

As part of the redesign of the Society’s research program to align with its strategic goals, CCSRI created three program development subcommittees of ACOR – corresponding to the three broad areas in which CCSRI funds research: prevention and risk reduction, basic, biomedical and translational, and quality of life. These subcommittees provide support and advice to ACOR and CCSRI on research funding priorities and programs. The committees are chaired by ACOR members but are primarily composed of experts from the wider scientific community in Canada and internationally.

“...My experience at ACOR has been very positive. This is a collection of knowledgeable, creative, outside-the-box thinkers. ACOR members are sensitive to what researchers go through ... We are all researchers too, so we want to honour the effort and energy put into the application process. When I think of CCSRI, the word ‘integrity’ always comes to mind.

Dr Zeev Rosberger, McGill University

“...The quality of peer review has been outstanding with CCSRI. I’ve been extremely impressed with that process as an applicant, as a peer reviewer, as a member of ACOR and the prevention program development committee. I knew as an applicant I would be fairly reviewed, and the peer review panels would understand the significance of and the context for what I was doing, because the content experts work in the cancer field. I have certainly benefited from that in my career.

Dr Christine Friedenreich, University of Calgary
Current funding programs

Grants and awards

- **Prevention Research Grants** to accelerate risk reduction research up to $600K over 4 years/7-8 new grants per year
- **CCS-Partner Prevention Research Grants** to reduce cancer incidence up to $800K over 4 years/3 new grants every 2 years
- **Capacity Development Awards in Prevention** to provide salary and research support up to $225K over 3 years/6-8 new awards per year
- **Population Health Intervention Research Grants** to support research on rapidly unfolding events up to $200K over 2 years/1-2 new grants per year
- **Innovation Grants** to support high-risk/high-reward creative solutions in cancer research, and feed the scientific idea pipeline up to $200K over 2-3 years/40-50 new grants per year
- **Innovation to Impact (i2I) Grants** to support development of successful findings from a funded Innovation Grant up to $450K over 3 years/10-12 new grants per year
- **Impact Grants** to support well-developed cancer research programs to significantly advance the scientific understanding of cancer up to $1.25M over 5 years/12-15 new grants per year
- **Quality of Life Research Grants** to support research aimed at reducing the burden of disease for patients, survivors, and their families up to $300K over 2-3 years/6-8 new grants per year
- **Knowledge to Action Grants** to close the gap between research evidence and practice, to improve outcomes across the cancer trajectory up to $100K over 2 years/4-6 new grants per year
- **Travel Awards** for trainees attending conferences up to $2K/45 new awards per year

Research centres

- **Canadian Centre for Applied Research in Cancer Control (ARCC)** is a pan-Canadian research centre whose mission is to improve cancer control and the delivery of care through interdisciplinary leadership in health economics, services, policy and ethics research, education and knowledge translation
- **NCIC Clinical Trials Group (NCIC CTG)** is a cooperative oncology group involving more than 90 member institutions across Canada that carries out national and international multicentre trials in cancer prevention, therapy, and supportive care
- **Propel Centre for Population Health Impact** is a pan-Canadian, collaborative enterprise that conducts research, evaluation and knowledge exchange to accelerate improvements in the health of populations, particularly in the area of tobacco control and youth health
Program descriptions

Grants and awards

**Prevention Research Grants** to support and accelerate research and the application of new knowledge. Projects must demonstrate a specific and defined potential for impact on cancer incidence, for example prevention/risk reduction research, programs, and practice, including knowledge translation, best practices and health-related decision making at the individual, organizational or health system levels.

**CCS-Partner Prevention Research Grants** to support research in key prevention and risk reduction areas by working together with the Canadian Cancer Society to inform and influence public policy and programs offered by the Society. Programs must contain a training component to build research capacity in this area.

**Capacity Development Awards in Prevention** to provide salary and research support during the early years of a developing career for cancer prevention researchers.

**Population Health Intervention Research Grants** in partnership with the CIHR to support population health intervention research on rapidly unfolding programs, policies and resource distribution.

"CCSRI awards A-list grants in health research. They get looked at as a fundamental benchmark of a successful scientist. **Having a CCSRI grant marks you as one of the top researchers in the country, possibly the top in your field.** I know this from participating in review of faculty dossiers for promotions … it’s understood that if someone has a CCSRI grant, they must be excellent.

Dr Torsten Nielsen, University of British Columbia"
**Impact Grants** to support the progression of research programs through large-scale and long-term funding. They will accelerate and focus the knowledge gained from scientific findings, in the short or long term, into outcomes that will significantly advance the understanding of cancer and improve scientific knowledge, which will result in optimized patient care, improved cancer treatment or reduced cancer burden.

**Innovation Grants** to support innovative, creative problem solving in cancer research. The goal of this grant program is to accelerate the introduction of innovation into the entire cancer research system and contribute to the scientific idea pipeline.

**Innovation to Impact Grants** to extend the funding pipeline by building on significant findings from successful Innovation Grants. This is an opportunity for investigators to advance their program of research to the point where they can apply for Impact Grants or other funding mechanisms.

“The Innovation Grants program is really asking a different question than traditional funding opportunities which follow the paradigm of incremental research progress. **It’s inviting scientists to take some risks and try things that could lead to a higher reward.**

Dr Michael Moran, SickKids

“Holding a CCSRI grant identifies you as part of the cancer research community. The nature of this funding speaks to the innovation of the organization. The new investigator award which I held years ago, was pioneering at that time, and now everyone offers them. I am so grateful – without that money I wouldn’t have been able to get going.

Dr Linda Penn, Ontario Cancer Institute/Princess Margaret Cancer Centre

Photograph courtesy of Peter Bregg
Quality of Life Research Grants to support research that has the potential to make a significant impact on the burden of disease in patients, survivors and caregivers. These grants explore psychosocial, survivorship, supportive care and end-of-life issues, to address research gaps, needs and opportunities, or models for follow-up care.

Knowledge to Action Grants to support research that will close the gap between what is known from research and what is done with that knowledge. These grants provide funding for projects that build on existing cancer research findings and aim to improve outcomes and experiences through knowledge translation for people and populations at risk, patients, their families and communities across the cancer trajectory.

The CCSRI showed courage and leadership in funding my proposal, which aims to uncover the molecular drivers of the spread of lung cancer to the brain, as this work is truly ‘high-risk, high reward’. It’s a true privilege to be funded by an organization whose mandate matches my own: to improve survival and quality of life for patients with cancer, using the best research models we can develop.

Dr Sheila Singh, McMaster University

Travel Awards are offered to PhD or MD/PhD students, and post-doctoral/clinical fellows to defray the travel costs associated with making a scientific presentation as a first author or presenter at a conference, symposium or other appropriate professional meeting.

Research Centres

CCS currently provides ongoing funding and support to three centre-based research initiatives:

Canadian Centre for Applied Research in Cancer Control (ARCC) is a pan-Canadian research centre, supported in collaboration with the British Columbia Cancer Agency and Cancer Care Ontario, whose mission is to improve cancer control and the delivery of care through interdisciplinary leadership in health economics, services, policy and ethics research, education and knowledge translation.

NCIC Clinical Trials Group (NCIC CTG) is a cooperative oncology group involving more than 90 member institutions across Canada that carries out national and international multicentre trials in cancer prevention, therapy, and supportive care. Based at Queen’s University.

Propel Centre for Population Health Impact is a pan-Canadian, collaborative enterprise that conducts research, evaluation and knowledge exchange to accelerate improvements in the health of populations, particularly in the area of tobacco control and youth health. Based at the University of Waterloo.
I was told by others that my idea couldn’t be done – but I thought, I’ll take the risk because that’s what the science tells me I should do.

Dr Michael Kolios, Ryerson University

CCSRI research investments totalled $38.3M in 2013

$5.1M in prevention

$29.9M in basic, biomedical and translational

$3.3M in quality of life

385 individual investments

across 9 PROVINCES

+ 44 research institutions

294 Principal Investigators + 504 Co-applicants SUPPORTED

1347 new patients enrolled in 41 clinical trials
Investment by research area

CCSRI invested $38.3 million in research in 2013. Basic, biomedical and translational research accounted for the largest share of CCSRI’s research portfolio at $29.9 million (78%), which was broken down into the areas of diagnosis and treatment, fundamental cancer biology, and early detection and screening. $5.1 million (13%) was focused on prevention and risk reduction research including tobacco, obesity, healthy eating and physical activity, fundamental cancer etiology and prevention, and occupational and environmental carcinogens. $3.3 million (9%) was focused on quality of life related to survivorship, end-of-life care, supportive care and the fundamental cancer journey.  

$5.1M
Prevention

$29.9M
Basic, biomedical and translational

$3.3M
Quality of life

A. $2.33M (46%)
   Tobacco
B. $.95M (19%)
   Obesity, healthy eating and physical activity
C. $.94M (19%)
   Fundamental cancer etiology and prevention
D. $.83M (16%)
   Occupational and environmental carcinogens

A. $20.23M (68%)
   Diagnosis and treatment
B. $8.54M (29%)
   Fundamental cancer biology
C. $.70M (2%)
   Early detection
D. $.41M (1%)
   Screening

A. $2.03M (61%)
   Survivorship
B. $.63M (19%)
   End-of-life care
C. $.58M (17%)
   Supportive care
D. $.11M (3%)
   Fundamental cancer journey

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1 Research projects may cross research areas and relate to more than one category.
**Investment by cancer type**

Sixty-two per cent, or $23.6 million, of CCSRI’s research portfolio was related to over 20 specific cancer types, while $14.7 million (38%) had implications for multiple or all cancer types. Funding for specific cancer types is displayed in the graphic below (similar cancer types are grouped).

**Research targeting specific cancers: $23.6 M**

- Brain: $1.5M
- Digestive tract*: $0.4M (oral cavity, stomach, esophagus)
- Breast: $4.3M
- Liver: $0.1M
- Pancreas: $0.8M
- Urinary tract: $0.9M (kidney, bladder)
- Gynecological cancers: $1.3M (uterus, endometrium, cervix, ovary, vulva)
- Head and neck: $0.5M
- Lung: $3.5M
- Colorectal: $1.8M
- Skin: $1.1M
- Prostate: $2.4M
- Bone: $0.6M (and connective tissue)
- Leukemia, lymphoma and multiple myeloma: $4M

Other cancer types: $0.5M

+ Research applicable to multiple/all cancers: $14.7 M = $38.3 M

**Quick Facts**

In 2013, CCSRI invested:

- $3.1 million in pediatric cancer research
- $2.5 million in genomics research that will lead to more personalized approaches to medicine
- $1.3 million in immunotherapy research to harness the body’s own immune system to fight cancer
Investment by cancer type relative to incidence and mortality rates

CCSRI’s funding of specific cancer types is displayed by percentage and compared to the percentage of new cancer cases and deaths in 2013.  

Investment by province

CCSRI supported 385 individual investments (327 grants and 58 career development awards) across 9 provinces and 44 research institutions.

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Investment by institution

CCSRI provided funding to 44 research institutions in 9 provinces across the country in 2013. Queen’s University in Ontario received the most funding ($5.53 million), with the majority of this funding going to NCIC CTG ($5.12 million). The next most significant investments were to the University Health Network (Ontario Cancer Institute/Princess Margaret Cancer Centre/Toronto General Hospital) ($4.04 million), followed by McGill University ($2.84 million). Of the 44 research institutions, 10 received over $1 million in funding.

<table>
<thead>
<tr>
<th>Province</th>
<th>Research Institution</th>
<th>Total</th>
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<tbody>
<tr>
<td>Alberta</td>
<td>University of Alberta</td>
<td>$801,487</td>
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<tr>
<td></td>
<td>University of Calgary</td>
<td>$369,809</td>
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<td></td>
<td>Alberta Cancer Board (Alberta Health Services, Cross Cancer Institute)</td>
<td>$132,805</td>
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<tr>
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<td><strong>Alberta Total</strong></td>
<td><strong>$1,404,100</strong></td>
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<tr>
<td>British Columbia</td>
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<td><strong>British Columbia Total</strong></td>
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<td>Manitoba</td>
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<td>Manitoba Institute of Cell Biology</td>
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<td>CancerCare Manitoba</td>
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<td>Ontario</td>
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<td>University Health Network (Princess Margaret Cancer Centre, Toronto General Hospital,</td>
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<td>Toronto Western Hospital and Toronto Rehabilitation Institute)</td>
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<td>University of Montreal including: Centre de recherche du CRUM – Hôtel-Dieu, Centre de recherche du CRUM – Hôpital Notre-Dame, CHU Sainte-Justine University Hospital Research Center, Institut de recherche en immunologie et en cancérologie, Institut de recherches cliniques de Montréal, Royal Victoria Hospital (Montreal)</td>
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<td>Sherbrooke university</td>
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<td><strong>GRAND TOTAL</strong></td>
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5 Affiliated institutions have been grouped. Research institutes in Quebec are grouped under the 4 main institutions: University of Montreal, McGill University, Laval University and Sherbrooke University.
Investment by funding program

CCSRI investments were spread across several unique funding programs. Ongoing commitments from the former Research Grants competitions accounted for the largest share of CCSRI’s portfolio ($14.95 million) followed by Innovation Grants ($9.90 million) and Research Centres ($7.75 million). Funding to the former Research Grants program will end in 2014, while investments in CCSRI’s current programs will continue to ramp up.\(^6\)

Clinical trials

CCSRI provides $5.12 million in annual funding to NCIC CTG, which is a cooperative oncology group that carries out clinical trials in cancer therapy, supportive care and prevention across Canada and internationally. In 2013, 1347 new patients were enrolled in 41 NGIC CTG clinical trials across 52 cancer centres reaching communities all across Canada.

In addition, over 1300 patients at centres outside of Canada were newly enrolled in NCIC CTG trials and over 19,000 patients across Canada were included in trials last year.

Some clinical research questions that are of special interest to societal perspectives can only be addressed through an academic prism. This is why the funding provided by CCSRI to the CTG is so essential, especially since some clinical trials are of such large scope that only a funder with a national perspective that includes all forms of cancer is positioned to support this type of research. These very important trials have changed the way we deliver care to cancer patients in Canada, and across the world.

Dr Ralph Meyer, Former Director, NCIC CTG

[A trial can be active in multiple provinces.]
Today we have diagnostic tools and treatments that we would not have dreamed of a decade ago because of scientists who asked the right questions and investors who supported their idea. I am grateful to the CCSRI Innovation Grants program for recognizing the importance of investing in ideas. Continued progress relies on many things, but the true future of medical science hinges on enabling the best ideas.

Dr Lisa Porter, University of Windsor
Monitoring and evaluation framework

The previous section of this report provided an overview of CCSRI’s research investments in 2013. This section provides a summary of selected research outcomes and impacts drawn from 266 progress reports submitted in 2013. Outcomes and impacts are summarized and mapped according to the results chain framework.\(^8\)

Scientific and financial progress reports are submitted by principal investigators of all research grants and awards at various stages during the term of the funding. CCSRI requires annual scientific and financial reports and post-grant reports (submitted two years after completion of a grant). Progress reports allow CCSRI to monitor grants and awards by collecting a variety of quantitative and qualitative information regarding research findings, outcomes and impacts.\(^9\)

CCSRI carefully tracks and monitors the progress, outcomes and impacts of every research program. CCSRI has adapted the results chain framework to demonstrate the many ways in which research activities impact the Society’s mission. It provides CCSRI with a systematic and consistent way of monitoring and evaluating research over time and along the research spectrum. The results chain hierarchy provides a simplified description of a program and is organized according to seven levels of results. It shows the logical relationships between the resources that are invested, the activities that take place and the sequence of changes that result. The ultimate goals of CCSRI’s research programs are often ambitious and long term. As such, it is imperative to develop strong program descriptions providing details not only on the intended long-term outcomes but also the short-term and intermediate outcomes and the sequence in which they are likely to take place.

From my perspective, the redesign was a success. As the result of good teamwork between CCSRI and ACOR, we carefully detailed the cancer impact expectations in both basic and clinical cancer applications. We’re pleased to see the top scientists in the country applying to CCSRI.

Dr Michel L. Tremblay, McGill University

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\(^{8}\) This framework was introduced and adapted for the Society by Steve Montague (PMN).

\(^{9}\) Progress reports collect short-term outcomes and impacts on an annual basis. However, impacts related to level 7 are beyond the scope of this report. They are long-term impacts and generally uncovered through in-depth evaluation studies.
In adapting the framework, CCSRI classifies research performance measures according to the seven levels of results.

1. **Inputs**
   - Project budgets, leveraged funds, fellows, students, and other personnel

2. **Activities**
   - Research and other related activities such as training and teaching

3. **Engagement**
   - Collaborations and multidisciplinary research activities

4. **Reactions**
   - Media coverage, media requests, honours or awards, leadership roles, and dissemination requests

5. **Knowledge, attitude, and skill changes**
   - Development of new knowledge or methods in cancer research, publications of research findings, presentations, consultations and briefings

6. **Practice and behaviour change**
   - Research used by other researchers, healthcare practitioners and program experts, policy makers and advocates, in training of new researchers, trainees launching careers in cancer research and commercialization

7. **End results**
   - Reduction of cancer incidence rates, cancer mortality rates, or enhancement in the quality of life of Canadians living with and beyond cancer

**WHY** do we fund research?

**WHAT** difference is our research making?

**WHO** is influenced by the knowledge generated and how?

**HOW** is research supported?

Outcomes and impacts

**WHAT difference is our research making?**

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<thead>
<tr>
<th>5</th>
<th>Impacts on healthcare and program delivery</th>
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<tr>
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<tr>
<td>Related research impact stories on pages: 33, 34, 50, 51, 52</td>
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<th>Impacts on policy</th>
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<td>Research findings cited in public policy documents, advocacy publications, etc.</td>
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<td>Related research impact stories on pages: 32, 38, 46, 53</td>
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<th>Impacts on work of other researchers</th>
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<td>Research cited in relevant scientific literature, etc.</td>
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<th>10</th>
<th>Impacts on training of new researchers</th>
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<tbody>
<tr>
<td>Research findings cited in text books, reading lists, etc.</td>
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| 6 | Patents issued/licensed |
WHO is influenced by the knowledge generated and how?

Researchers, Healthcare Practitioners, Policy Makers, Public, and Other Stakeholders

824 Publications

- 713 peer reviewed publications
- 111 non peer reviewed publications

1269 Presentations

250 Consultations/briefings

148 Honours and awards

315 Media mentions

86 Press releases

1296 Collaborations

- 813 with researchers
- 148 with policy makers
- 190 with healthcare practitioners
- 145 with other stakeholders
### HOW is research supported?

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<th>Investments</th>
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<td><strong>385</strong></td>
<td><strong>1628</strong></td>
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<tr>
<td>- 327 grants</td>
<td>- 294 principal investigators</td>
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<td>- 58 career development awards</td>
<td>- 504 co-applicants</td>
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<td></td>
<td>- 191 PhD/MDs</td>
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<td></td>
<td>- 376 students</td>
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<tr>
<td></td>
<td>- 260 highly qualified personnel</td>
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Research impact stories

Each impact story is accompanied by a set of keywords indicating the cancer type or focus of the research; the principal type of research under which the project falls – prevention, basic, biomedical and translational, or quality of life – and the nature of the impact the research has had.

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<tr>
<th>Name</th>
<th>Institution</th>
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</table>
Impact stories

= Impact on healthcare or policy = Top research story

Safer therapies from sponges

Dr Raymond Andersen, University of British Columbia

By studying marine invertebrates such as sponges, Dr Andersen’s team has discovered several substances which could be used as non-toxic chemotherapy treatments for different types of cancer, including prostate, pancreatic, and breast. They recently discovered a type of steroid found in marine sponges, and were able to synthesize it in the lab. This is important as the potential for these compounds to be tested in preclinical work is often limited by their availability.


Keywords: prostate; breast; pancreas; drug development; biomedical; new knowledge

Connecting care providers

Dr Michèle Aubin, Laval University

After people have completed active treatment overseen by a cancer specialist, their care is normally transferred back to a family doctor. During this transition process each health practice may assume that patients are receiving instructions for monitoring their health from the other practice, which can be challenging and stressful for patients receiving incomplete information. Dr Aubin is developing a coordinated approach between specialists and family doctors to address this gap. Her research team has recruited 203 patients diagnosed with inoperable lung cancer, 113 family caregivers and 163 family physicians to test a new intervention involving routine communication between health professionals every 3 months. Their early assessments are positive and have led Dr Aubin to a collaboration that was recently awarded funding from the Canadian Institutes of Health Research for a Team Grant in Community-Based Primary Healthcare.

Keywords: lung; quality of life; healthcare practice; collaboration; leveraged funds

Boosting the immune system to stop the spread of cancer

Dr Rebecca Auer, Ottawa Hospital Research Institute

Natural killer (NK) cells are part of the immune system that play an important role in eliminating cancer cells from the body. But these NK cells lose their ability to work well after a patient has cancer surgery, which may mean an increased risk for metastasis in some patients. Dr Auer has shown that a vaccine can boost NK cells (shown first in mice, and then in a small number of patients). The finding provides the basis for a clinical trial that will test a novel approach to reducing the spread of cancer in patients requiring surgery.


Keywords: metastasis; oncolytic virus; biomedical; new knowledge; clinical trial
◆ Easing the pain of breakup

**Dr Bruce Baskerville**, Propel Centre for Population Health Impact, University of Waterloo

Although there is extremely strong evidence of the link between smoking and cancer, many people still smoke because nicotine addiction is one of the toughest dependencies to fight. Young people who smoke have a great chance of recovering their health after quitting, but conventional smoking cessation programs created for older audiences may not be as effective with this group. Dr Baskerville collaborated with the Society’s Smokers’ Helpline to design a program with young smokers in mind. “Break It Off” uses the metaphor of a bad relationship to characterize the dependency aspect of smoking. A social media campaign and a free smartphone app help make cessation more convenient and appealing. Health Canada invested in the project nationally, which included the development of a smartphone app called “Crush the Crave”, which is currently being tested in a randomized controlled trial.

**Keywords**: lung; tobacco; youth; prevention; policy; collaboration

◆ Reaching more people with cancer screening

**Dr Nancy Baxter**, St Michael’s Hospital

The effectiveness of organized cancer screening programs relies on how well they are implemented. Dr Baxter has been involved in the rollout of the ColonCancerCheck program run by Cancer Care Ontario, the agency responsible for the province’s screening programs. In a recent study examining participation in colorectal cancer screening programs, she and her research team found that while there was an initial boost after ColonCancerCheck was launched in 2008, these participation rates returned to previous levels a few years later. They also observed that certain population groups are consistently underscreened, and that some models of primary care – patient enrolment models and family health teams – are more effective than others in ensuring that patients get screened. As these researchers are working directly with the policy and program designers, their work has the potential to reduce inequities in cancer screening and raise the participation rates in organized screening programs. In the last year, they presented their findings at a Research Rounds for the Ministry of Health and Long-Term Care.


**Keywords**: colon; prevention; screening; new knowledge; healthcare practice; policy
The right dose

Dr Luc Beaulieu, Laval University

Brachytherapy is a cancer treatment that involves implanting radioactive sources in or near tumours. Aware that international guidelines on dosage had not been updated since the 1990s, Dr Beaulieu knew that advances in the science of dosage – dosimetry – could be applied to these guidelines to make them more accurate, leading to better outcomes for patients. Dr Beaulieu chairs an international task group, which this year published new guidelines for calculating brachytherapy dosage. These guidelines could improve the accuracy of this treatment for patients throughout the world.


Keywords: radiation therapy; biomedical; leadership; healthcare practice

Spotting the differences

Dr Ryan Brinkman, BC Cancer Research Centre

Leukemias and lymphomas are among the most common cancers in Canada, and leukemia leads to more deaths than any other cancer in children, adolescents and young adults. Yet these diseases have so many different sub-groups that it is difficult to determine exactly which one the patient has and how to treat it. Knowing that pathologists who study tumour cells were seeking help to accurately diagnose these cancers, Dr Brinkman challenged research teams to test new automated (computer-driven) methods to analyze different lymphoma cells. They found that new automated computational approaches to analyzing samples and matching them to clinical outcomes are now as accurate as older manual methods, which could improve the speed and accuracy of diagnosis and treatment for patients. These findings were published in the prestigious journal Nature Methods.


Keywords: lymphoma; bioinformatics; biomedical; new method; multidisciplinary research

A simple therapy to help survivors with post-treatment fatigue

Dr Tavis Campbell, University of Calgary

After completing cancer treatments such as radiation and chemotherapy, many patients experience an overwhelming sense of tiredness, which cannot be cured with sleep and may even cause sleep disruption. Existing treatments for this condition, known as cancer-related fatigue (CRF), are complicated and time-consuming. Dr Campbell designed a study to test the effect of a simple intervention, light therapy, on CRF – recognizing that this strategy had been used successfully in similar fatigue disorders. His efforts to inform local health professionals of the potential benefits of this treatment has resulted in many referrals to his program, suggesting that there is a recognized need for this kind of therapy to assist cancer survivors.

Keywords: survivorship; quality of life; healthcare practice
Simple question helps restore patient dignity

Dr Harvey Max Chochinov, CancerCare Manitoba

Terminally ill cancer patients need caregivers to see beyond their illness and understand who they are as individuals. Dr Chochinov, an international expert in palliative care, has developed and tested a simple approach to help healthcare professionals build greater empathy with their patients. The Patient Dignity Question (PDQ) asks, “What do I need to know about you as a person to give you the best possible care?” By helping healthcare providers feel more connected to their patients, the PDQ helps patients maintain their dignity – a fundamental principle of palliative care. This innovation has been piloted in palliative care settings and select outpatient cancer clinics at CancerCare Manitoba and is the subject of a clinical trial taking place in Dundee, Scotland.

One question may help provide dignity at the end of life. Study July 2013

Keywords: palliative care; quality of life; new knowledge; healthcare practice; clinical trial

Stopping the spread of cancer

Dr Jean-François Côté, University of Montreal

Dr Côté has shown that the DOCK1 protein plays a key role in the metastasis of breast cancer. In mouse experiments, Dr Côté found that removing DOCK1 significantly decreased metastases, while higher levels of DOCK1 were found in human breast cancer patients with a poorer prognosis or a recurrence of the disease. This discovery will lead to more targeted breast cancer treatments.


Keywords: breast; metastasis; basic biology; biomedical; new knowledge
Protein packagers

Dr James Davie, University of Manitoba

Proteins called histones act as packagers of DNA; how tightly or loosely they package DNA can determine whether or not genes that cause cancer will be expressed. Dr Davie has made important contributions to understanding this process, in particular regarding the role of an enzyme known as MSK (mitogen- and stress-activated protein kinase) in the survival of cancer cells. Dr Davie's team recently showed that MSK1 and MSK2, close relatives of each other, are both involved in modification processes required for the spread of breast cancer. Even though they are located in different parts of the cell, either can be stimulated by the TFF1 protein to support breast cancer metastases. This reveals a new potential target to prevent the spread of cancers.


Keywords: breast; metastasis; basic biology; biomedical; new knowledge

Killing cancer cells with designer viruses

Dr Jean-Simon Diallo, Ottawa Hospital Research Institute

Using an approach known as synthetic biology, Dr Diallo and his colleague Dr John Bell designed two oncolytic viruses with great potential. By blocking antiviral proteins in cancer cells, these viruses are better able to attack cancer cells while leaving normal cells unharmed.


Keywords: oncolytic virus; biomedical; new knowledge

Blood cell gene signatures

Dr John Dick, Ontario Cancer Institute/Princess Margaret Cancer Centre

People diagnosed with acute myeloid leukemia (AML) are currently assigned to one of two treatment groups: standard or intensive (generally offered stem cell transplantation). Unfortunately, even patients in the same treatment group can experience very different outcomes depending on their specific genetic mutations. Understanding how normal blood cells develop is key to understanding what goes wrong in these cancers. In the high impact journal Nature Immunology, Dr Dick has mapped how gene expression changes as blood stem cells mature into specific cell types. This work revealed a carefully coordinated network of activity and master regulators that are essential at different steps. These gene expression “signatures” in stem cells could help clinicians provide more individualized treatments for patients, leading to better outcomes.


Keywords: leukemia; stem cells; basic biology; biomedical; new knowledge
When your own blood cells turn against you

**Dr Lorenzo Ferri, McGill University**

White blood cells are normally a key part of the body’s defences against cancer, but research has shown they may be responsible for helping cancer spread after surgery. Dr Ferri has studied structures in cells, called neutrophil extracellular traps (NETs), which are a defence mechanism to trap and kill bacteria and other pathogens to avoid infections (as may happen after surgery). He found that these NETs also catch cancer cells, but instead of killing them, activate them and promote their spread. This finding could lead to new treatments to improve the outcomes of cancer patients requiring surgery.


**Keywords**: immune system; basic biology; biomedical; new knowledge

Treat one disease, slow down another

**Dr Neil Fleshner, Ontario Cancer Institute/Princess Margaret Cancer Centre**

Prostate cancer is the most commonly diagnosed cancer in Canadian men, and some of the treatment options can have serious implications for quality of life. Effective ways to prevent this disease would have an enormous impact on the health of Canadians. Dr Fleshner analyzed data from several large databases to study a possible connection between prostate cancer and the anti-diabetes drug metformin. He found that although metformin does not lower the risk of getting cancer, men who are already on metformin for diabetes and then develop prostate cancer have a better chance of survival the longer they have been on the drug.


**Keywords**: prostate; metformin; biomedical; new knowledge

Investigating a cancer-causing virus

**Dr Lori Frappier, University of Toronto**

Epstein-Barr infection has been identified as a cause of some cancers, including B cell lymphomas, nasopharyngeal cancer (cancer of the tract joining the nose and throat) and stomach cancer. Dr Frappier has been working to identify how these infections lead to cancer. Her team has shown that two proteins, NAP1 and TAF-I, help switch on genes that make Epstein-Barr virus spread. These proteins may be good targets to help prevent cancers caused by the virus.


**Keywords**: lymphoma; head and neck; stomach; basic biology; biomedical; new knowledge; prevention
The right profile

Dr Guri Giaever, University of Toronto

Unexpected findings often result from the search for new cancer therapies, such as the discovery of anticancer effects of drugs used to treat other conditions, or that anticancer drugs may have unintended effects (either positive or negative). Dr Giaever has found a rapid, sensitive, and cost-effective approach to identify and catalogue the interactions between drugs and the proteins they target. This new platform will help explain how drugs work in cells, and could identify new ways to use current drugs.


Keywords: leukemia; bioinformatics; biomedical; new knowledge

Mapping the obesity problem

Dr Carolyn Gotay, University of British Columbia

Despite growing concern about Canadians’ waistlines, it had been over a decade since maps showing obesity rates in the country were published. But now, Dr Gotay has updated this important information. It shows that obesity rates have climbed in the last 11 years, providing the evidence needed to promote action from the public, healthcare providers and decision-makers to improve the health of Canadians. It is estimated that diet, obesity and lack of exercise are responsible for about one-third of all cancers.


Keywords: obesity; prevention; new knowledge; healthcare practice; policy

The picture of prevention

Dr Rebecca Haines-Saah, University of British Columbia

Smoking cessation can dramatically improve health outcomes, particularly for cancers. Although quitting younger is connected with significantly lower health risks, very few smoking cessation programs are targeted to youth or young adults. Dr Haines-Saah has developed a program called Picture Me Smokefree, which uses social media and online photogroups to help young smokers quit. It has been so successful that healthcare practitioners from other jurisdictions, such as Scotland, Ireland and the United States, are working with Dr Haines-Saah to try and implement their own versions. Dr Haines-Saah is currently developing a new program that builds on Picture Me Smokefree and uses digital photography to engage young adults in user-generated and gender-sensitive cancer prevention messaging.

Keywords: lung; tobacco; youth; prevention; healthcare practice; collaboration
Warning: contents may cause cancer

Dr David Hammond, Propel Centre for Population Health Impact, University of Waterloo

Warning labels on cigarette packages have been used in Canada for many years. Other countries have also adopted this practice more recently to encourage smoking cessation and, ultimately, prevent more cancers. Dr Hammond’s research on effective health communication strategies, such as labelling on tobacco, food products and restaurant menus, has led him to be recognized as an international expert in this field. In 2013, he was an expert advisor on labelling policies for both the European Commission and the Australian government and contributed to a US Surgeon General’s report on tobacco use in youth. His work is influencing tobacco policies worldwide, which could have a significant impact on cancers caused by smoking.

Keywords: lung; tobacco; prevention; policy; leadership

Interpreting the signals

Dr Chi-Chung Hui, SickKids

The Hedgehog signalling pathway is one way that messages get communicated inside cells and can play an important role in tumour development. In the last year, Dr Hui has made tremendous contributions to understanding how this pathway is controlled, including the discovery that one protein (Ter94 in flies, p97 in humans) specifically degrades other proteins to control the pathway. His team also studied basal cell carcinoma, the most common type of cancer, where problems in the Hedgehog signalling pathway have been shown. Using mouse models Dr Hui focused on how two genes that control the pathway, Ptc1 and Sufu, are involved. Cancers developed in mice when Ptc1 was not expressed, however removal of Sufu did not lead to cancer. To explain this, they showed that the cell cycle was stopped in cells without Sufu, but went on in cells without Ptc1. This work helps explain why mutations in the same genetic pathway can have different effects, and could influence treatment across a wide spectrum of cancers.


Keywords: skin; basic biology; biomedical; new knowledge

Sifting through the genetic causes of lung cancer

Dr Rayjean Hung, Mount Sinai Hospital

While smoking is the leading cause of lung cancer, some patients that are diagnosed with the disease have never smoked. In these cases, their family genetics could be putting them at higher risk. Inflammation could be playing a role in the development of lung cancers, but exactly how is unclear. By studying large gene-expression datasets representing almost 10,000 people, Dr Hung and her research team found a genetic variation on chromosome 8 that was associated with lung cancer risk. This part of the chromosome is known to participate in inflammation pathways in cells, and this was the first time it was implicated in lung cancer. The techniques and tools Dr Hung’s team has developed are being used by the US National Cancer Institute, where Dr Hung is a member of the Steering Committee for the Cross-Cancer Genetic Associations and Mechanisms in Oncology (GAME-ON) initiative.

Keywords: lung; genetics; biomedical; new knowledge; collaboration
Helping Newfoundland families prevent a deadly cancer

Dr David Huntsman, BC Cancer Agency

Newfoundland and Labrador has the highest incidence of upper gastrointestinal (GI) cancer in Canada. Dr Huntsman has shown that stomach cancer can be prevented through surgery to remove the stomach in 45% of families with mutations in the CDH1 gene. In collaboration with other leading researchers in the area, he has identified additional mutated genes in these families and linked them to previously identified mutations that were thought to be unrelated. They have used this knowledge to screen the general Newfoundland and Labrador population. By screening 110 people in 80 families who have hereditary risk, they have established a list of 55 susceptibility genes, and they continue to search for more. This list of genes, or “panel,” could be used as the basis for predictive testing to help people better understand their risk of developing GI cancers and inform their decision about preventative surgery. For his contributions to understanding the pathology and molecular genetics of tumours, Dr Huntsman received the Canadian Cancer Society William E. Rawls Award for 2012.

Keywords: stomach; genomics; biomedical; prevention; new knowledge; healthcare practice; collaboration

An artificial cell to study proteins

Dr Mitsuhiko Ikura, University of Toronto

Many different proteins live on the surfaces of cells, and some of these are involved in cancer. A protein called Rheb can be turned on or off with the help of other proteins, and its activity can contribute to the growth of cancer cells. It has been difficult to study exactly how this works due to the challenges of studying proteins on real cells. Dr Ikura has used a type of surrogate cell surface called a “nanodisc” to which proteins like Rheb can attach, allowing researchers to study its function in an environment that is similar to how it exists in the body. This strategy will help researchers study proteins more thoroughly to understand how they contribute to cancers.


Keywords: basic biology; biomedical; new method

Hitting cancer’s “off” switch

Dr Russell Jones, McGill University

Like the rest of our bodies, cancer has a metabolism that dictates its speed of growth and movement. Dr Jones has been studying an enzyme called AMPK, which is a “master regulator” of cell metabolism. It can interact with many proteins and can choose the right ones for its goals. This year, Dr Jones’ team found that AMPK can flip a switch that slows down a tumour’s ability to process the glucose it feeds on, to suppress its growth. These important findings could lead to treatments that could help slow down a tumour’s growth.


Keywords: basic biology; biomedical; new knowledge
The costs of cancer survivorship

Dr Murray Krahn, Toronto General Research Institute

Dr Krahn has published new work assessing costs, in terms of patient time and out-of-pocket expenses, for long-term prostate cancer survivors. While the costs were generally modest and manageable, they could represent a substantial burden for low-income prostate cancer survivors. Dr Krahn’s research team also developed a method for estimating health care costs based on linking data within administrative databases and patient charts. They identified which prostate cancer treatments were the most and least costly during immediate treatment and after-treatment states.


Keywords: prostate; survivorship; economics; quality of life; new knowledge

Preventing workplace cancer

Dr Jérôme Lavoué, University of Montreal

Exposure to cancer-causing substances at work can be reduced with the right assessment tools. Dr Lavoué is developing a toolkit to collect and use information on cancer-causing substances in the workplace. He recently published a list of the professions most at risk for silica exposure, which can lead to lung cancer. He is also collaborating with international experts to analyze exposure data from around the world.


Keywords: lung; occupational exposure; prevention; new knowledge; new method; collaboration
Tracking prostate cancer

Dr John Lewis, University of Alberta

Dr Lewis has discovered that a protein called CD151 can serve as a biomarker (a molecule that is a sign of a disease) for prostate cancer. Since the protein is involved in the movement of cancer cells around the body, tests that specifically measure CD151 could predict the spread of prostate cancer and help doctors determine the right treatment for patients.


Keywords: prostate; basic biology; biomarker; biomedical; new knowledge

Targeting hard-to-treat breast cancer

Dr Shawn Li, Western University

Triple-negative breast cancer can be extremely hard to treat and has a poor prognosis. Dr Li has discovered that when a cell protein called Numb interacts with another protein called Set8, Numb loses its ability to hold on to p53, a protein that suppresses the growth of tumours. This complex cellular pathway could explain why chemotherapy is ineffective against some cancers and could provide a strategy to reverse chemo-resistance.


Keywords: breast; basic biology; biomedical; new knowledge

Unravelling leukemia metastasis

Dr Aaron Marshall, University of Manitoba

When leukemia cells move from the bloodstream into bones or lymph nodes, they are less vulnerable to chemotherapy - with poor outcomes for patients. Dr Marshall has been investigating the processes that allow these cells to migrate. He discovered that the movement of malignant cells depends on two conditions: the presence of a protein called TAPP2, found in large amounts in leukemia cells that are good migrators; and signals sent by another enzyme called PI3K. This knowledge could lead to the development of more effective treatments to prevent the migration of leukemia cells, so that patients with a leukemia diagnosis have a lower risk of their disease progressing to an untreatable stage.


Keywords: leukemia; basic biology; biomedical; new knowledge
Tools to improve the quality of life of cancer survivors

Dr Rosemary Martino, University of Toronto

Cancers of the head and neck can have consequences even after successful treatment. Some survivors experience ongoing problems with swallowing, which can lead to complications like pneumonia, malnutrition and anxiety. Dr Martino has developed a way to assess how these swallowing problems – known as dysphagia – affect those who suffer from it. This new assessment tool, currently undergoing testing, has generated significant interest from other healthcare practitioners and researchers. Dr Martino is now engaged in a collaborative network to develop additional supports for people affected by head and neck cancer, such as a needs assessment tool and a directory of rehabilitation resources. She has also contributed to the development of published cancer rehabilitation recommendations.


Keywords: head and neck; survivorship; quality of life; new knowledge; new method; collaboration; healthcare practice

Supporting survivors of childhood cancers

Ms Mary McBride, BC Cancer Agency

The impact of a diagnosis of cancer in childhood doesn’t end when the disease has been beaten. With the Childhood, Adolescent, Young Adult Cancer Survivorship (CAYACS) research program, Ms McBride has been investigating the long-term medical, psychological, educational and social effects experienced by survivors, and how these translate into medical and educational needs. She and her team are completing a child cancer survivor care report in consultation with content experts, decision-makers and institutions with the capacity to implement changes in health and education in British Columbia. They have established a collaboration with researchers in Ontario and New Brunswick and submitted a funding request to explore two priorities identified in the report: the development and evaluation of a treatment summary and care plan for survivors; and a pilot study of an electronic medical information sharing platform for medical care providers. Ms McBride has leveraged her work funded by the Society to obtain support from the federal government through her involvement in the only Canadian Institutes of Health Research team grant awarded in 2013 to explore a community-based primary healthcare initiative for cancer survivors.

Keywords: pediatric; survivorship; quality of life; new knowledge; collaboration; leveraged funds
Working together to guide treatment decisions in lung cancer

**NCIC Clinical Trials Group (NCIC CTG), Queen’s University**

NCIC CTG collaborates with investigators around the world to run clinical trials testing new cancer therapies. NCIC CTG researchers shared patient samples with international colleagues to test whether antibodies could be used to show that the ERCC1 protein is an effective biomarker to predict response to chemotherapy in non–small cell lung cancer. Currently available tools could not distinguish different forms of the protein, questioning how useful they will be to guide treatment decisions. This finding highlights the limitations of some current tools and will affect the development of future technologies and trials.


**Keywords:** lung; biomarker; biomedical; new knowledge; collaboration

Improving the odds for non-Hodgkin lymphoma

**NCIC Clinical Trials Group (NCIC CTG), Queen’s University**

A large clinical trial involving 40 sites in the United States and Canada, including sites run by NCIC CTG, tested whether early stem cell transplants would improve survival in patients with non-Hodgkin lymphoma. They found that for a subgroup of patients who had the very highest risk of their cancer returning after remission, early transplants significantly decreased that risk and significantly improved their chance of survival.


**Keywords:** lymphoma; stem cells; biomedical; new knowledge; collaboration; clinical trial

Reducing side effects for men with prostate cancer

**NCIC Clinical Trials Group (NCIC CTG), Queen’s University**

Androgen deprivation therapy is a standard course of treatment for many men with prostate cancer. However, the risks and benefits need to be weighed in the context of the quality of life for patients. A clinical trial led by NCIC CTG focused on men with progressive prostate cancer (detected by rising prostate-specific antigen, or PSA, levels) and showed the same overall survival rates in those who received continuous versus intermittent therapy. Importantly, those on intermittent therapy experienced fewer side effects related to physical function, fatigue, urinary problems, hot flashes, libido and erectile function. This work will inform future treatment recommendations for men with progressive prostate cancer.


**Keywords:** prostate; quality of life; new knowledge; collaboration; clinical trial
Hope for young people with a devastating cancer

**Dr Torsten Nielsen**, University of British Columbia

Synovial sarcomas are rare cancers usually diagnosed in young adults. They normally start near a joint such as the knee or elbow and they are difficult to treat. Dr Nielsen found a gene mutation linked to synovial sarcoma and is using this knowledge to explore diagnostic tests and conduct a Canada-wide clinical trial to test whether a drug called an HDAC inhibitor can reverse some of the mutation’s effects. This year, he has identified two new treatments that could be tested in clinical trials and is studying three related cancers where they might also be useful. To better understand synovial sarcoma at the molecular level, Dr Nielsen also contributed to studies of how a typical genetic abnormality found in the disease involving the fusion of the SS18 gene on chromosome 8 with the SSX gene on the X chromosome, influences how other genes are expressed. This revealed a new class of drugs to test in synovial sarcoma. For his outstanding research, Dr Nielsen was a co-recipient of the Canadian Cancer Society Bernard and Francine Dorval Award for 2012.


**Keywords**: sarcoma; musculoskeletal; basic biology; biomarker; biomedical; new knowledge; clinical trial; award

Cancer cell assassins

**Dr Hanne Ostergaard**, University of Alberta

One of the ways cells of the immune system fight cancer is to recognize cancer cells in the body, latch on to them, deliver a toxic “hit” to kill them, and then detach and move on to the next cancer cell. To find ways to enhance this process, Dr Ostergaard is studying how these cells are programmed to move from cell to cell. Her research focuses on proteins, including one called paxillin, which helps cells move and stick (adhere) to each other. Existing knowledge said that removing an enzyme called CD45 would lead to higher levels of paxillin, but Dr Ostergaard’s team was surprised to find that the opposite was true. Further investigation led them to find that restricting another protein, Pyk2, allowed paxillin to increase. This work is the first to reveal this mechanism of cell movement and adhesion, contributing to knowledge about how to strengthen these processes in immune cells and weaken them in cancer cells.


**Keywords**: immune system; basic biology; biomedical; new knowledge
An invisible killer

**Dr Louise Parker**, Dalhousie University

Arsenic in drinking water is a known cause of kidney and bladder cancers. While this causal link is established, it is difficult to determine individual risk unless there is clear data connecting arsenic exposure levels, arsenic in the body (body burden), and cancer rates. In Nova Scotia, where arsenic and other chemicals are commonly found in well water, Dr Parker is creating maps of arsenic exposure and risk using geographic information systems (GIS) technology. These maps link together levels of arsenic in different well water locations, body burden of arsenic measured through toenail samples, and population-level estimates of bladder and kidney cancers. Dr Parker collected and analyzed 3,800 water samples and is analyzing 5,200 toenail samples. In the last year, her team has found significant variation in cancer deaths depending on where people live in the province, highlighting the need to search for environmental factors – like arsenic levels in water – that are contributing to these trends.

**Keywords**: kidney; bladder; environmental exposure; prevention; new knowledge

Economics of cancer care

**Dr Stuart Peacock**, Canadian Centre for Applied Research in Cancer Control (ARCC), BC Cancer Agency

When introducing treatments into the healthcare system, their potential benefits to patients must be carefully weighed against potential limitations, including the costs of providing a drug. These issues are especially relevant in a publicly funded health system like Canada’s. Dr Peacock, co-director of the Society-funded ARCC, studied the use of the drug trastuzumab (Herceptin), which is recommended for women with high-risk, HER2-positive breast cancer. This was the first study to show the cost-effectiveness of trastuzumab in the Canadian context, providing evidence to support a decision to continue making the drug available to Canadian women.


**Keywords**: breast; economics; biomedical; new knowledge; policy

A sharper image

**Dr David Perrin**, University of British Columbia

Positron emission tomography (PET) scanning is an important imaging technique used to diagnose cancer and monitor the effectiveness of treatment. Dr Perrin has tested a new compound that improves the quality of PET imaging, making it faster, more specific and more accurate at detecting cancers. His research quickly became a highly cited paper in *Nuclear Medicine and Biology*.


**Keywords**: imaging; diagnosis; biomedical; new knowledge
Candy-flavoured tobacco study influences government policy

Propel Centre for Population Health Impact, University of Waterloo

A recent survey led by Dr Steve Manske at the Propel Centre found that high school students who use tobacco choose flavoured products over unflavoured more than half the time. The findings caught the attention of the Ontario and Alberta governments, which subsequently introduced legislation to prohibit the sale of candy-flavoured tobacco products, and of advocates in other provinces who can use this research to support their efforts.


**Keywords:** lung; tobacco; youth; prevention; new knowledge; policy

Age matters

Dr Janusz Rak, McGill University

Dr Rak has shown that cancer cells metastasize differently in young and old mice. Understanding how the aging process affects cancers – a relatively understudied area – could influence how patients of different ages are treated.


**Keywords:** metastasis; basic biology; biomedical; new knowledge

Exercise is prevention – start them young

Dr Ryan Rhodes, University of Victoria

Physical activity and a healthy body weight are important components of reducing the risk of cancer and other diseases; yet this knowledge is not always enough to motivate individuals to be active. As obesity is an increasing concern (even an epidemic) among youth, there is an urgent need to find ways to combat this problem. Dr Rhodes has taken an innovative approach to encouraging young people and their families to be active and healthy by combining an old standby – the exercise bike – with a new, more engaging platform – the interactive video game. This ongoing randomized controlled trial, with 44 families in Victoria and Halifax, has already shown promising preliminary results and received media attention as a result. Because of this work, Dr Rhodes has been asked by the federal government to serve on research and policy advisory boards, and the British Columbia Ministry of Health has invited him to write the provincial physical activity strategy.

**Keywords:** obesity; youth; prevention; new knowledge; leadership; policy
Better care for cancer patients

Dr Danièle Roberge, Hôpital Charles LeMoyne

Dr Roberge is interested in improving the care experience in cancer clinics. A study of over 1,300 patients and 155 professionals at outpatient oncology clinics in Quebec showed that impressions of the current quality of care were largely positive in both groups. However, specific areas for improvement were identified such as how long patients had to wait to book an appointment with clinic professionals and the time spent in the waiting room for scheduled appointments. Understanding the views of both patients and health professionals is an important aspect of delivering patient-centred care, and this study highlights specific areas for quality improvement.


Keywords: patient-centred care; quality of life; new knowledge; healthcare practice

Customizing screening for a high-risk group

Dr Irving Salit, Toronto General Research Institute

Dr Salit has made an important contribution to clinical prevention by developing and piloting an anal cancer screening program for men who have sex with men (MSM). This group is at higher risk for cancer-causing HPV than the general population of women, who (unlike men) have access to Pap tests that can detect many cancers caused by HPV. Using “anal Paps” and high-resolution anoscopy (similar to colposcopy), Dr Salit’s team detected and treated precancerous lesions in over 400 HIV-infected gay men, a known high-risk group for anal cancers. In recent work he has conducted long-term follow-up with men who had previously been screened through his research program, to continue monitoring them for precancers and cancers. He has also trained family doctors to use this screening method.

Keywords: anal cancer; HPV; screening; prevention; new knowledge; healthcare practice

Killing cancer cells with clutter

Dr Aaron Schimmer, Ontario Cancer Institute/Princess Margaret Cancer Centre

Cancer therapies are often based on strategies designed to either cause cancer cell death by enhancing the body’s ability to fight cancer, or inhibiting processes that protect cancer cells. Dr Schimmer has taken the innovative approach of targeting an enzyme that helps cancer survive by “cleaning house” – removing excess or broken down proteins in cancer cells. When this protein debris is normally allowed to accumulate, they lead to the death of the cancer cell. He and his research team have identified a drug target related to this process, and have advanced their research to the point where they are receiving additional support from industry to develop the drug. Other researchers have cited their early work on this drug, the enzyme inhibitor ML4924. Dr Schimmer was a co-recipient of the Canadian Cancer Society Bernard and Francine Dorval Award for 2012.

Keywords: drug development; biomedical; new knowledge; leveraged funds; other researchers; award
Making gene mutation data manageable

**Dr Sohrab Shah, BC Cancer Agency**

Advances in gene sequencing technology have exponentially increased the ability to read and understand genetic information, but data management and analysis methods have had a hard time keeping pace. Dr Shah and his colleague Dr Samuel Aparicio are developing a computer program to quickly link data on genes with how they are expressed. This will help scientists have more rapid access to information on the so-called “driver” mutations in genes, which contribute to cancers. This program, DriverNet, will work behind the scenes to speed up the processes that take an idea from basic experimentation to drug development. They have already published their early success in applying DriverNet to four cancer datasets, where they identified the prevalence of mutations in cancer that affect gene expression networks. DriverNet is a free tool available to the research community that will help identify driver gene mutations in a wide-range range of cancers.


**Keywords**: genetics; bioinformatics; biomedical; new knowledge

Keeping chromosomes in check

**Dr Frank Sicheri, Mount Sinai Hospital**

Normal cells have built-in mechanisms that prevent them from becoming cancer. Telomeres – the end sections of DNA chromosomes – become shorter each time a cell duplicates, and limit cell growth. Some cells are able to bypass this mechanism and the resulting cancer cells are free to continue multiplying. Dr Sicheri has been studying a recently discovered group of proteins called KEOPS, which help control telomeres. His team has made a significant advance by being able to reproduce how KEOPS functions in a test tube – which allows them to break down the exact role that KEOPS’ central protein, KAE1, plays in supporting cell death (through modifying tRNA). Their ultimate goal is to develop sufficient understanding of how KEOPS work to see if these proteins could be restored in cancer cells (and cause them to die).


**Keywords**: cancer cell death; basic biology; biomedical; new knowledge; new method
Brain cancer detectives

Dr Sheila Singh, McMaster University

Up to half of lung cancer patients develop cancers that metastasize to the brain. But little is known about what promotes metastasis, and few treatment options are available. Dr Singh has identified a group of tumour-initiating cells in brain metastasis from the lung, along with a set of genes in patient samples that could predict survival outcomes. These may be useful targets for drugs to block metastasis and could have a powerful impact on the treatment and prognosis of cancer patients.


Keywords: lung; brain; metastasis; stem cells; biomedical; new knowledge

Cell protectors

Dr Vuk Stambolic, Ontario Cancer Institute/Princess Margaret Cancer Centre

The PTEN protein protects cells from developing cancer and since many patient tumours lack PTEN, it’s important to understand how the protein works. In the prestigious journal Science, Dr Stambolic showed how the location of the protein is controlled in cells and that in its absence cells are particularly sensitive to agents that damage DNA, like carcinogens and radiation. This provides new opportunities for personalized therapies for patients with PTEN-deficient tumours.


Keywords: DNA damage; personalized medicine; basic biology; biomedical; new knowledge

A culture of communication

Dr Sally Thorne, University of British Columbia

From the moment they learn of their cancer diagnosis, people are thrust into a network of health professionals, hearing vital yet often unfamiliar information about their condition and prognosis. In the midst of this, each cancer patient has unique communication needs and responds differently to difficult information. Dr Thorne has been interviewing patients and healthcare professionals to develop a comprehensive picture of communication needs. Her team has identified four different categories of communication needs and three common errors in caregiver communication. Her research suggests that training an individual nurse or doctor in effective patient communication is insufficient, and organizational culture shifts are necessary to promote better communication among healthcare practitioners.


Keywords: healthcare delivery; communication; quality of life; new knowledge
Root of the problem

Dr Roger Tiedemann, University of Toronto

Multiple myeloma treatment can shrink tumours and extend patient survival, but Dr Tiedemann has uncovered a group of cells within tumours that could be preventing them from being cured. These immature cells that are resistant to current drugs can mature and cause relapses, highlighting the need for therapies that target them while also eliminating the rest of the tumour.


Keywords: multiple myeloma; basic biology; biomedical; new knowledge

Quality control for colonoscopy

Dr Jill Tinmouth, Sunnybrook Health Sciences Centre

Colonoscopy is an effective screening tests for colon cancer, and is available in most Canadian provinces through organized screening programs. Although colonoscopy providers collect data on completed procedures, there currently is no systematic way to use this data for quality assessment. Dr Tinmouth’s team looked at three databases used in Ontario, and reviewed the accuracy of records from 1845 colonoscopies performed by 28 Ontario providers. They found that records were accurate across many elements reviewed and could therefore be a resource for a central assessment of quality for colonoscopies performed across the province. Their findings were presented to Cancer Care Ontario and are being used to improve the delivery of colon cancer screening programs.

Keywords: colon; screening; prevention; healthcare practice; program delivery

Helping mammography do its job

Dr John Valliant, McMaster University

Many women have been helped by mammography, a highly effective way to detect breast cancers. However, some women have denser breast tissue, which makes it harder for mammogram equipment to detect lumps – a problem both for diagnosis and for monitoring the effectiveness of treatment. Dr Valliant has developed a better way to image dense breast tissue. Taking advantage of the fact that insulin receptors (IRs) occur in greater numbers when the cancer is more aggressive, he and his team have developed a probe that attaches to IRs on cancer cells, thus making cancers easier to spot in imaging. Their tests on this probe have been so promising that they have received funding from the federal government to start a clinical trial.

Keywords: breast; detection; biomedical; new knowledge; leveraged funds
**Strength of heart**

**Dr Sean Virani,** University of British Columbia

Chemotherapy is life-saving for many people with cancer. Unfortunately, it can have side effects including, in some cases, weakening of the heart. Dr Virani is studying a drug called eplerenone, which is known to protect and even strengthen the heart. He tested whether this drug could protect the hearts of patients being treated for breast cancer at Vancouver General Hospital. He developed a protocol for use in hospital, and implementation of this protocol has increased the number of referrals to the hospital’s cardiology-oncology program – which in turn has increased the number of patients monitored for heart problems related to cancer treatments.

**Keywords:** breast; quality of life; new knowledge; healthcare practice

**Casting a light on cancer**

**Dr Brian Wilson,** Ontario Cancer Institute/Princess Margaret Cancer Centre

Photodynamic therapy (PDT) is a type of cancer treatment where drugs are activated by light. This method increases both the safety and accuracy of treatments, as the drugs are only activated in cancer cells (which limits negative effects on normal cells). Dr Wilson has been working on ways to improve PDT, specifically by measuring how well the given dose matches its effect on tumours. His important advances in the last year include the finding that a type of molecule created during PDT can be measured to show if a tumour is responding to treatment. Furthermore, his team, in collaboration with researchers in the United Kingdom, developed a tool to measure this molecule that can be adapted for clinical use to help personalize treatments. Dr Wilson was honoured this year with the inaugural Michael S. Feld Biophotonics Award from the Optical Society of America for his 30-year career of contributions to research, application and training in the field of biophotonics.


**Keywords:** personalized medicine; physics; biomedical; new knowledge; collaboration; award
The right dose for liver cancer

Dr Eugene Wong, Lawson Research Institute

New techniques that deliver a precise and high dose of radiation are emerging as safe, non-invasive methods to treat liver tumours. However, little is known about the ideal dose of radiation required. Dr Wong has determined the amount of radiation required to control primary liver cancer as well as colorectal cancers that have spread to the liver – their most common site of metastasis. These results will guide what doses are prescribed for patients in the future.

Keywords: liver; radiation therapy; biomedical; new knowledge; healthcare practice

New dimensions in imaging

Dr Martin Yaffe, Sunnybrook Research Institute

Tomosynthesis is a relatively recent improvement in mammography. It creates a 3-dimensional image, allowing for earlier and more accurate detection of breast cancers. Dr Yaffe has developed a method for assessing the quality of images from tomosynthesis, which his team has tested on almost 3,000 mammograms. This method can be used to help benchmark the quality of tomosynthesis and has already been incorporated into standards of practice in some laboratories. A large clinical trial is being planned to test the technology against conventional 2-dimensional imaging for avoiding false-positive findings. By examining measures to analyze breast tissue density and improve image quality, Dr Yaffe has also found other ways to improve imaging for accurate detection of breast cancers.

Keywords: breast; imaging; biomedical; new knowledge
A catalogue for kidney cancers

**Dr George Yousef**, St Michael’s Hospital

One of the many important contributions basic science is making to the treatment of cancers is how to distinguish its many forms so that doctors can tailor treatments to be more successful for each individual patient. Dr Yousef has identified several proteins involved in different types of kidney cancer, which can be used to predict how aggressive the cancer will be and customize treatment strategies. He has shown that expression of one protein, BAF250, correlates with the stage and grade of kidney cancer, revealing a potential biomarker for the prognosis of cancer.


**Keywords**: kidney; personalized medicine; biomedical; new knowledge

Quality of life – important for caregivers as well as patients

**Dr Camilla Zimmermann**, Ontario Cancer Institute/Princess Margaret Cancer Centre

Cancer affects not only patients but also the quality of life of their caregivers. Dr Zimmermann has shown that the quality of life of caregivers is worse if they are women, simultaneously care for other dependents, care for patients who are particularly ill, spend more hours providing care, or have changed their work situation (for example reduced or stopped work). Her research was recognized by the Psychology Progress series for its contributions to advancing the field of psychology.


**Keywords**: caregiver; quality of life; new knowledge; honour; policy
Since 1993, the Canadian Cancer Society has recognized outstanding Canadian cancer science by awarding “Canadian Cancer Society Awards for Excellence” to deserving Canadian researchers. This year we celebrated the achievements of the following scientists for their contributions to our understanding of how cancers work, and how to defeat them. The 2012 Awards for Excellence that were presented in 2013 are listed below.

Robert L. Noble Award
The Robert L. Noble Award is given for outstanding achievements in basic, biomedical cancer research. It honours Dr Noble, an esteemed Canadian investigator whose research in the 1950s led to the discovery of vincristine, a widely used anticancer drug.

Awarded to
Dr Michel Tremblay, McGill University, in recognition of his contributions which have led to significant advances in cancer research, specifically in the field of protein tyrosine phosphatases.

Bernard and Francine Dorval Award
The Bernard and Francine Dorval Award is given to a promising young Canadian investigator whose outstanding contributions to basic, biomedical research have the potential to lead to, or have led to, better understanding of cancer, improved cancer treatments, cures or new advances in cancer control. The recipient must be doing laboratory work as the principal investigator in activities that are conducted in Canada, must be permanently residing in Canada, and have begun their independent research career within the previous 10 years.

Shared by
Dr Torsten Nielsen, University of British Columbia, in recognition of his contributions to biomedical research that have resulted in significant advances in the diagnosis and treatment of sarcomas and basal-like breast cancers.

and

Dr Aaron Schimmer, Ontario Cancer Institute/Princess Margaret Cancer Centre, in recognition of his contributions to chemical biology and drug discovery that have resulted in significant advances in this field.
0. Harold Warwick Award

The O. Harold Warwick Award is given to a scientist whose research has had a major impact on cancer control in Canada. The prize is named after Dr Warwick, a pioneering researcher in cancer control and treatment, who became the first executive director of both the former National Cancer Institute of Canada and the Canadian Cancer Society.

Shared by

Dr Steven Narod, Women’s College Research Institute, in recognition of his research in breast and ovarian cancer genetics which has had a major impact on cancer control in Canada.

and

Dr Michael Pollak, McGill University, in recognition of his research in understanding the risk of cancer as a function of metabolism which has had a major impact on cancer control in Canada.

William E. Rawls Award

The William E. Rawls Award is given to a young investigator whose work has led to important advances in cancer control. The recipient must be doing laboratory work as the principal investigator in activities that are conducted in Canada, must be permanently residing in Canada, and have begun their independent research career within the previous 10 years.

Awarded to

Dr David Huntsman, BC Cancer Agency, in recognition of his contributions to research that have resulted in significant advances in understanding the pathology and molecular genetics of tumours.
Appendices

2013 ACOR members:

Brian Wilson, Toronto (Scientific Chair)
Carolyn Gotay, Vancouver (Vice-Chair)
Zeev Rosberger, Montreal (Vice-Chair)
Cal Roskelley, Vancouver (Vice-Chair)
Rob Bristow, Toronto
Keith Humphries, Vancouver (Term Complete)
David Huntsman, Vancouver
Martin Kabat, Toronto
Michael Moran, Toronto
Hanne Ostergaard, Edmonton
Michael Moran, Toronto
Morag Park, Montreal
Louise Parker, Halifax
Jolie Ringash, Toronto
Stephen Robbins, Calgary
Gary Rodin, Toronto
Jeremy Squire, Kingston (Term Complete)
Michel Tremblay, Montreal
Ming-Sound Tsao, Toronto
Pamela Fralick, Canadian Cancer Society (Ex-officio)
Christine Williams, Canadian Cancer Society
2013 Program Development Committee members:

**End 1 Development Committee**

Rachel Ballard- Barbash, Rockville, MD  
Deborah Bowen, Boston, MA  
Gillian Bromfield, Canadian Cancer Society  
Angela Brooks-Wilson, Vancouver  
Paul Demers, Toronto  
Eduardo Franco, Montreal  
Christine Friedenreich, Calgary  
Carolyn Gotay, Vancouver (Chair)

David Hammond, Waterloo  
Barbara Kaminsky, Vancouver  
Jon Kerner, Toronto  
Will King, Kingston  
Louise Parker, Halifax  
Rowena Pinto, Canadian Cancer Society  
Barbara Riley, Waterloo  
Jill Tinmouth, Toronto

**End 2 Development Committee**

Rob Bristow, Toronto  
David Huntsman, Vancouver  
Michael Moran, Toronto  
Hanne Ostergaard, Edmonton  
Morag Park, Montreal

Stephen Robbins, Calgary  
Cal Roskelley, Vancouver (Chair)  
Michel Tremblay, Montreal  
Ming-Sound Tsao, Toronto  
Brian Wilson, Toronto

**End 3 Development Committee**

Shabbir Alibhai, Toronto  
Lynda Balneaves, Vancouver  
Michael Brundage, Kingston  
Lise Fillion, Quebec  
Jeffrey Hoch, Toronto  
Dan Holinda, Canadian Cancer Society

Line Lafontaisie, Canadian Cancer Society  
Patricia Parker, Houston, TX  
Gary Rodin, Toronto  
Zeev Rosberger, Montreal (Chair)  
Lillian Sung, Toronto
Recognition of long service

Many experts have volunteered hundreds of hours for over five years – some, for over a decade – to support CCSRI’s peer review process. The following individuals were recognized this year for their outstanding support of the Society’s research programs.

Serving 5 years or more

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Serving 10 years or more

R. Christopher Bleackley  R. Keith Humphries  Zeev Rosberger
Philip Branton  John Koval  Calvin Roskelley
Robert Bristow  David Litchfield  Jeremy Squire
Ralph Durand  Fei-Fei Liu  Michel Tremblay
Christine Friedenreich  David Malkin  André Veillette
Vincent Giguère  C. Jane McGlade  Brian Wilson
Peter Greer  Michael Moran  Peggy Olive
Holger (Hal) Hirte
Named research grants, programs and funds

The Canadian Cancer Society Research Institute and its research programs are funded entirely through donations to the Canadian Cancer Society. We are pleased to list here the grants, awards and programs that were named in recognition of donors’ generous gifts to research in 2013.

Research Grants/Awards

Bernard and Francine Dorval Prize
Bill and Kathleen Troost Innovation Grants of the Canadian Cancer Society
GIVETOLIVE Research Scientist Award in Prevention Research
Glentel Innovation Grant of the Canadian Cancer Society
Great-West Life, London Life and Canada Life Junior Investigator Award in Prevention Research
John Matthew Innovation Grant of the Canadian Cancer Society
Lois Savoie Innovation Grant of the Canadian Cancer Society
Lotte & John Hecht Memorial Foundation Innovation Grants of the Canadian Cancer Society
Louisa Gale Scholars
Marilyn Hopper Innovation Grant of the Canadian Cancer Society
Marjorie Sheridan Innovation Grant of the Canadian Cancer Society
Mary Burleigh Stewart Cancer Research Scholarship
Minor Hockey Fights Cancer/Mannarn Family Innovation Grant of the Canadian Cancer Society
Mrs. Grace Limbert Innovation Grant of the Canadian Cancer Society
Nick Natale Innovation Grant of the Canadian Cancer Society
Pedal for Hope Innovation Grant of the Canadian Cancer Society
A Quality of Life Grant of the Canadian Cancer Society in memory of Edna Goebel
A Quality of Life Grant of the Canadian Cancer Society in memory of Frank Tyrrell
A Quality of Life Grant of the Canadian Cancer Society in memory of James Tyrrell
Rachelle Archambault Innovation Grant of the Canadian Cancer Society
Ramona Rull Karson Innovation Grant of the Canadian Cancer Society
W. Gary Rowe Innovation Grant of the Canadian Cancer Society
WICC Ontario Ottawa Region Innovation Grant of the Canadian Cancer Society
Women in Insurance Cancer Crusade Alberta Innovation Grant of the Canadian Cancer Society

Funds

Helen Mary Storey Ovarian Cancer Research Fund
Marion Dorothy Pauderis Innovation Fund
Hodgson Family Ovarian Cancer Research Fund
Susan and Steven Horvath Cancer Prevention Research Catalyst Fund
Sarcoma Steps Fund
Canadian Cancer Society Research Institute

impact • ideas • research • grants and awards
knowledge • gold standard in peer review • innovation
discovery • prevention • quality of life • patients and families

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