

FOCUS & ALIGNMENT: THE RESEARCH PRIORITIES OF CANADA'S ACADEMIC HEALTHCARE ORGANIZATIONS



FEBRUARY 2012



ASSOCIATION OF CANADIAN ACADEMIC HEALTHCARE ORGANIZATIONS



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WHO WE ARE...

- ACAHO is the national voice of Canada's Research/Teaching Hospitals, academic Regional Health Authorities and their Research Institutes. The Association represents over 35 organizations, with members ranging from single hospitals to multi-site regional facilities.
- Members of ACAHO are the leaders of innovative and transformational organizations who have overall responsibility for: (1) provision of timely access to a range of specialized and some primary health care services; (2) training the next generation of health providers; and (3) leading in research discovery and the early adoption of innovation in the health system.
- There are no other organizations in the health system which provide the unique integration of patient care, teaching, and research & innovation that our members do. Our members are vital "hubs" in the health system - in addition to being a national resource.
- The mandate of ACAHO is to provide national *leadership*, *advocacy* and *policy representation* when it comes to the role of the federal government in improving the performance of the health system; and advancing the impacts of health research and innovation in the delivery of health care to all Canadians.



OUR MISSION & VISION...

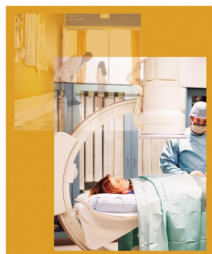
- Vision: *To advance patient care and the health & well-being of Canadians through research discovery and innovation.*
- Mission: *To create an environment in which research discovery, innovation and learning benefit patients, populations, health systems and the economy.*

ACAHO BY THE NUMBERS....

- Total operating budgets of ACAHO members was over \$24 Billion (2008/09)
- Received close to 15 million outpatient visits (2010)
- Treated 5.5 million visits to their emergency departments (2010)
- Had 1.4 million hospital admissions (2010)
- Trained more than 55,000 health providers (2007)
- Employ more than 350,000 Canadians (2008/09)
- Enjoy the support of more than 53,00 volunteers (2008/09)
- Total research budgets stood at \$1.8 Billion (2009)
- Are the primary affiliation for more than 2,700 scientists (2007/08)
- More than 11,000 peer-reviewed publications (2007/08)
- \$5 million in license income from research discoveries was generated (2003/06)
- 312 patents were issued (2007/08)
- 65 spin-off companies were created (2007/08)
- Over 200 licenses were issued (2007/08)
- 415 disclosures were made (2007/08)
- \$340 million in potential revenue from new clinical trial agreements (2007/2008)

Importantly, ACAHO members are the organizations that provide a range of procedures that are exceptionally complex & rare – such as organ transplants, care for trauma patients, and life-saving surgery for neonatal infants. Members also care for a greater proportion of patients who have complex and severe illnesses.

For more information on the activities of the Association, please visit our website at www.acao.org.



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ACAHO
780 Echo Drive
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K1S 5R7
(613) 730-5818

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We thank them for crafting the questions and also for championing health research in Canada on behalf of so many patients, families, clinicians, researchers and Canadians at large.

Dr. Larry Chambers*

President and Chief Scientist
Elisabeth Bruyère Research Institute
Ottawa

Ms. Ellen Chesney

Chief Administrative Officer, Research
Provincial Health Services Authority
Vancouver

Dr. Roger G. Deeley

Vice-President, Research Development
Kingston General Hospital
Kingston

Dr. Geoff Fernie

Vice President, Research
Toronto Rehabilitation Institute
Toronto

Dr Jean-Claude Forest*

Directeur de la recherche
Centre hospitalier universitaire de Québec
Quebec

Dr. Larry Frisch*

Acting Director of Research & Academic Development
Vancouver Island Health Authority
Victoria

Dr. David Hill

Scientific Director
Lawson Health Research Institute
St. Joseph's Health Care &
London Health Sciences
London

Ms. Louise Jones*

Vice President, Research
Eastern Health
St. John's

Dr. Michael Julius

Vice-President, Research
Sunnybrook Research Institute &
Sunnybrook Health Sciences Centre
Ottawa

Dr. Beth Horsburgh

Vice-President, Research & Innovation
Saskatoon Health Region
Saskatoon

Dr. Raymond P. LeBlanc

Vice-President, Innovation, Research & Learning
Capital District Health Authority
Halifax

Dr. Yvonne Lefebvre

Vice-President, Research & Academic Affairs
Providence Health Care
Vancouver

Dr. Colin MacArthur*

Vice-President of Research &
Director of the Bloorview Research Institute
Bloorview Kids Rehab
Toronto

Dr. Stuart MacLeod

Vice-President and Academic Liaison & Research
Coordination
Provincial Health Services Authority
Vancouver

Mr. Bill McBlain

Acting Senior Vice-President, Research
Alberta Health Services Board
Edmonton

Dr. Blake McClarty*

Director of Research
Winnipeg Health Sciences Centre
Winnipeg

Dr. Patrick McGrath

Vice-President, Research
IWK Health Centre
Halifax

Dr. Randy McIntosh

Interim Vice-President, Research &
Director of the Rotman Research Institute
Baycrest
North York

Dr. Robert McMaster

Executive Director, Research Institute
Vancouver Coastal Health Authority
Vancouver

Dr. Zul Merali

President and CEO
University of Ottawa Institute of
Mental Health Research
Scientific Director
Royal Ottawa Health Care Group

Dr. Martin Osmond

CEO and Scientific Director
CHEO Research Institute
Ottawa

Dr. Chris Paige

Vice-President, Research
University Health Network
Toronto

Dr. Vassilios Papodopoulos

Director, The Research Institute
McGill University Health Centre
Montreal

Dr. Bruce Pollock

Vice President of Research
Centre for Addiction & Mental Health (CAMH)
Toronto

Ms. Nancy Roberts

Vice-President, Health Services Planning,
Quality and Research
Horizon Health Network
Miramichi

Dr. Ian Rodger

Vice President, Research & Academic Affairs
Father Sean O'Sullivan Research Centre
St. Joseph's Healthcare
Hamilton

Dr. Guy Rouleau

Directeur, Centre de recherche
Hôpital Sainte Justine CHU
Montréal

Dr. Janet Rossant

Chief of Research, Senior Scientist
Hospital for Sick Children Research Institute
Toronto

Dr. Denis-Claude Roy

Director, Research Center &
Cellular Therapy Laboratory
Hopital Maisonneuve-Rosemont
Montreal

Dr. Robert Sheldon

Acting Senior Vice President, Research
Alberta Health Services Board
Calgary

Dr. Arthur Slutsky

Vice-President, Research
St. Michael's Hospital
Toronto

Dr. Duncan Stewart

CEO & Scientific Director
Ottawa Hospital Research Institute
Ottawa

Dr Jean-Claude Tardiff

Directeur de la recherche
Institut de cardiologie de Montréal
Montréal

Dr. Jim Woodgett

Director, Samuel Lunenfeld Research Institute
Mount Sinai Hospital
Toronto

Dr. Salim Yusuf

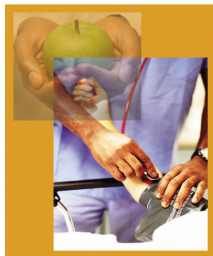
Vice-President, Research
Chief Scientific Officer & Director of the Population
Health and Research Institute
Hamilton Health Sciences
Hamilton

* At time of submission



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This report was written by Ms. Tina Saryeddine (Assistant Vice President of Research and Policy Analysis) and Mr. Glenn G. Brimacombe (President & CEO). Ms. Alexandria Tougui, Executive Assistant at ACAHO formatted the report and assisted with the data.



A MESSAGE FROM ACAHO

In a world that is increasingly driven by the creation, dissemination, and application of knowledge – that is, from research to practice – ACAHO members are engines of health innovation. Our organizations have tripartite mandates of patient care, research and the training of Canada’s future health professionals.

The synergies among these three missions affords a unique role in fulfilling the promise of health research in terms of its impact on the health of Canadians, the performance of the health system, and economic prosperity. This is also important when one considers that close to 80 cents of each public dollar invested in health research is related to research undertaken in our members' institutions. Our members also play a unique and crucial role in not only *generating* new knowledge through the discovery process, but having the capacity to *translate* new evidence into the health system.

That said, as much as we underscore the importance of health research and its direct impact on the lives of Canadians and around the world, generally speaking, there is a need to raise the profile of the depth and breadth of research – and its impact – that is underway within ACAHO member organizations.

Equally important, until now, is a less than clear appreciation as to how our members' research priorities are aligned with the country’s premier health research granting council – the Canadian Institutes of Health Research (CIHR) – as well as with the federal government’s Science and Technology Strategy, and the sub-themes that have since been identified.

This report not only shines a light on the incredibly rich array of health research questions that are being addressed across the country and their potential impact on the health, social and economic dimensions of our lives, but also links them to important thinking that drives CIHR’s strategic planning process, and how we fully leverage investments that support science and technology in our sector.

As you will see in this report, ACAHO member organizations are inextricably linked to the successes of both CIHR’s strategic plan and the country’s science and technology agenda. In this regard, we look forward to continuing to work closely with both to ensure that we are focusing on the most pressing research questions, and are bringing our discoveries to Canadians – our patients and their families, to providers and administrators, policymakers and politicians, and to the marketplace. In other words, from bench to bedside to business!

In closing, we welcome your comments on the content of this report. In this regard, feel free to contact Ms. Tina Saryeddine, Assistant Vice-President, Research & Policy Analysis at Saryeddine@acaho.org.

Chris Power
Chair, ACAHO Board

Glenn G. Brimacombe
President & CEO

EXECUTIVE SUMMARY

The future performance of the health system is largely based on our ability to *innovate*. Our ability to innovate is closely linked to our ability to generate and translate new knowledge into the hands of clinicians, administrators, policy makers and the public that comes from health research.

Given the tripartite mission of ACAHO members – which is to undertake research in the context of caring for patients and populations, and training the next generation of health providers – these organizations are uniquely positioned to discover and drive new knowledge into the health system through their identified research priorities. In this regard, ACAHO members play an invaluable role in contributing to the health of Canadians, the performance of the health system, and sustained economic prosperity.

The purpose of this report is to address the following three questions: what are the top three research priorities that ACAHO members are focused on?; how do these priorities map against the Canadian Institutes of Health Research's (CIHR) four pillars of health research and the emerging health and health system challenges that have been identified by governments, health charities and CIHR?; and how are these priorities aligned with the federal government's Science and Technology Strategy and its sub-themes for health?

In considering these questions, it is important to note that ACAHO members play a dominant role in Canada's health research enterprise, consider that: their total annual research budgets stand close to \$2.0 Billion (2010); about 20,000 staff and scientists are involved in these health research enterprises (2008); they accounted for close to 80 cents of each public dollar invested in health research (2008); they reported potential revenues from clinical trials totaling over \$300 Million (2007/08); and they generated 415 disclosures, 312 patents issued, and 217 licenses (2007/08).

In this context, ACAHO members are *engines* of health research and innovation, and have a key role to play when it comes to the transformation of health and health care in Canada and in meeting the emerging health needs of Canadians.

WHAT IS DRIVING RESEARCH AT ACAHO MEMBER ORGANIZATIONS?

A snapshot of the top three research priorities of ACAHO Member organizations in 2010 is provided in this report. The breadth and depth of research is significant and ranges from a focus at the level of cells and molecules, clinical interventions involving patients and health systems, as well as to the level of entire populations. To assist the reader, the research priorities have been grouped along the following four themes:

1. *Focusing on health conditions* – for example cancer, heart disease and stroke, diabetes, childhood diseases, and mental health and addictions;
2. *Discovering the technologies* – for example biomarkers, new drugs, genomic therapies, non-invasive imaging and surgical techniques, stem cells, regenerative medicine, and transplants;
3. *Enhancing quality of life* - for example by studying how to promote better health in hospitalized patients, how to use technology to keep people in their homes as they age, how to overcome social and physical barriers for people with disabilities;
4. *Improving system performance* - for example by improving access to care and wait times, focusing on health promotion, improving quality of care and facilitating patient safety, improving system performance, improving recruitment and retention of providers.

In all cases, the focus is on many of the most pressing challenges in human health and health care. It is concentrated on how research can lead to real-time innovation in the health system through the introduction of new cost-effective ways of diagnosing and treating patients, improving their quality of life, or helping to prevent them from becoming sick.





ALIGNMENT OF ACAHO MEMBER PRIORITIES WITH NATIONAL AGENDAS

Recognizing that ACAHO member organizations are first and foremost patient care organizations, their research priorities relate to the needs of the patients and populations that they are mandated to serve. They reflect a strategic plan for research that is embedded within the broader strategic plan of the organization. As a consequence, the research priorities also relate to major causes of mortality and morbidity, and to the health goals of patients, families, providers and organizations.

CIHR's Four Pillars

When ACAHO member research priorities are examined according to CIHR's four pillars of health research (i.e., basic research, clinical research, health services research, and population health research), we see that all ACAHO members have at least one priority statement that spans clinical research or research at the level of the patient. For each of the basic sciences pillar and the health services research pillar respectively, 60% of ACAHO members have at least one priority in each. Finally, 47% of ACAHO members have a primary focus on population-level research.

CIHR's Strategic Priorities

In its strategic plan, the Canadian Institutes of Health Research identified 5 priority areas; they are: (1) enhancing patient oriented care by targeting science; (2) supporting a high quality accessible and sustainable health care system; (3) ameliorating health inequities of Aboriginal peoples and vulnerable populations; (4) preparing for and responding to existing and emerging global threats to health; and (5) promoting health and reducing the burden of chronic disease and mental illness

When we map these areas onto ACAHO member priority statements, we see with different relative intensities that 100% of ACAHO members' research priorities align with the priorities of CIHR and the health system challenges that they have identified. Figure 2 shows the number of ACAHO member organizations who have at least one top most research priority aligned with each of CIHR's strategic priorities.

For example, 86% of ACAHO members have a top most research priority that targets science to improve patient care; 89% have a top most research priority that relates to quality and access; 44% have a top most research priority related to addressing health inequities; 20% have a top most research priority related to emerging threats; and 61% have a top most research priority that relates to chronic disease and mental health.

Federal Government's Science & Technology Strategy

While conducting research to improve the health of Canadians is an intuitive proposition, ACAHO members also contribute in a strategic and concrete way to the sustained economic prosperity and wealth of the nation, and to national policy agendas set out by the federal government through its Science & Technology (S&T) Strategy. This occurs in two ways: (1) through a focus on entrepreneurship, knowledge and people; and (2) through alignment of ACAHO member research priorities with the health related subthemes in the federal government's S&T strategy.

The S&T Strategy health related sub-themes are important predictors of areas requiring focus in research in order to achieve strategic and health objectives. These areas include: regenerative medicine, neuroscience, health in an aging population, and biomedical engineering and medical technologies. All (100%) of ACAHO members have at least one research priority that supports one of these themes. When we look at the percentage of organizations with at least one of the top three priorities corresponding to each of the S&T Strategy's health related subthemes, we see that 56% of ACAHO member organizations have a priority in the area of regenerative medicine; 31% of organizations have a priority in the area of neurosciences; 61% have a priority in the area of healthy aging; and 39% have a priority in the area of biomedical engineering.

ACAHO members also address other important areas that supplement or support these subthemes such as: the science behind the use and translation of new knowledge into clinical practice; research on health system design; performance and sustainability; and issues related to population health, among many others.

CONCLUSIONS

In this report, we provide a brief overview of the research priorities of ACAHO member organizations and the manner in which they focus on health, the translation of research-to-practice, and the wealth of the nation. We describe how these research priorities are addressing the most common and challenging health issues: improving prevention, diagnosis and treatment, enabling better quality of life and supporting a more accessible and effective health system.

We also discuss the manner in which ACAHO member research priorities support the broader health system challenges identified by the Canadian Institutes for Health Research (CIHR) and the health-related subthemes in the federal government's Science & Technology Strategy.

ACAHO member organizations, however, are first and foremost patient care organizations. By virtue of their mandate to provide exemplary patient care, train the next generation of health providers, and solve both those health problems to which we have answers and those that are still mysteries, they contain vibrant research and innovation enterprises.

This positions Canada competitively both in terms of the health of its citizens and the wealth of the nation. ACAHO members have both the benefit and the obligation of connecting research from the bench to the patient's bedside, and to both the *health* and *wealth* of the nation.

Finally, the questions provided by the Vice-Presidents of Health Research are those questions that help to shape the research priorities of ACAHO member organizations. Consistent with the tradition of research, it is today's questions that pave the way to the tomorrow's solutions. These could very well shape the future of healthcare and more importantly, the future of human health.





1. THE CHALLENGE BEFORE US...

"Somewhere, something incredible is waiting to be known" – Carl Sagan, Astronomer

When most people think about healthcare organizations, the most frequent image is one of patients receiving care – ambulances, emergency departments, surgeries, rehabilitation, clinics and many other services. There is no shortage of television drama on what happens in hospitals; no dearth of real life experiences; and no question about the role of healthcare organizations in our lives and in our communities.

What people may not know, is that amidst their daily activities, Canada's academic healthcare organizations – our research and teaching hospitals, academic regional health authorities and their research institutes – contain vibrant research enterprises. In 2006, approximately 80 cents of each public dollar invested in health research in Canada was invested in ACAHO member institutions.¹

These research enterprises are co-located at the heart of patient care – often driven by the conversations and needs of the individuals coming through hospital doors and clinics; the conditions diagnosed or still mysterious; and the aspirations that are expressed by clinicians, researchers, patients, and their family members. This has unique implications if you think about what is required for research to have application in real world settings (i.e., the bedside and the health of Canadians).

It is no surprise then, that across ACAHO member organizations, nearly 20,000 staff and scientists, and close to \$2.0 billion dollars worth of funding are involved in these research enterprises.² This translates into more than 11,000 peer-reviewed publications, thousands of new clinical trials, hundreds of world-first medical discoveries, and dozens of spin-off companies. These in turn provide dividends not only to the health of Canadians, but also to the economy.³ More importantly however, they translate into lives saved; pain assuaged; function regained, improved quality of life, and important efficiencies in the use of scarce health system resources.

The purpose of this report is therefore to describe what type of research is occurring in ACAHO member organizations. The goal is to make health research being conducted in these institutions known to decision-makers and to the broader health community and public, by describing what priorities have been chosen as subjects of investigation, how they affect all of us as individuals, and their contributions to the nation's broader policy agendas, such as, our goals in science, technology and health innovation.

To accomplish this task, the Vice-Presidents of Health Research of ACAHO member organizations were given the challenge of synthesizing the work of hundreds of researchers, thousands of projects, and millions of dollars into the top three questions that help drive the overall research agendas at their organizations.⁴

What does it all amount to? To help answer this question, we've looked at the research questions in different ways. They were analyzed for recurring themes, and according to:

1. The most likely unit of analysis as reflected in the Canadian Institutes of Health Research (CIHR's) four pillars of health research (basic, clinical, health services, and population health);
2. Health and health system challenges that have been identified by governments, national health charities and CIHR; and
3. The federal government's Science & Technology Strategy sub-themes for health.

We'll begin this report with a primer that contains at least 3 different lenses for looking at health research at ACAHO member organizations. The reader will then find the top three priorities discussed by each Vice-President of Health Research. To get a broader snapshot, an analysis of these priorities for themes related to health and health systems is provided in Section 4. Section 5 provides an analysis of the priorities against Canada's Science & Technology Strategy's Health related subthemes and against the Canadian Institutes for Health Research areas of strategic foci. We conclude the report with some statistics about these research enterprises and some closing remarks.

2. A PRIMER ON HEALTH RESEARCH AT ACAHO MEMBER ORGANIZATIONS

"Eradicating malaria is not a discovery, but an application of discoveries" - Dr Marcus Storch, Chairman of the Board of the Nobel Foundation, 10 December 2009

The *promise* of health research lies in its linkage to health, health care, health systems, and society at large. However, the *process* of health research is complex and multi-dimensional. Not every research project leads directly to a world-first or a discovery – nor should we have that expectation. In order to go from natural or human systems to research discoveries and innovation, there is a multi-faceted process that requires a more sophisticated and patient mind-set.

It is in part because of the natural life-cycle of health research, that it is important to have a variety of frameworks that help researchers to provide accountability and to explain to funders, each other, and to the public how their project contributes to the broader picture and public policy objectives. In this section we describe a few of these possible lenses.⁵

A. RESEARCH AT THE LEVEL OF CELLS, PERSONS, HEALTH SYSTEMS & POPULATIONS

One way to think about health research is to consider the unit of interest or analysis, which is what CIHR's four pillars are predicated upon. The four pillars represent a continuum of research, beginning with the most basic unit of life and sciences (basic sciences), to research related to individuals (clinical research), to applications within and examinations of health systems (health system research), to the health of entire populations (population health research). The pillars are not mutually exclusive. They are described below.

CIHR's Four Pillars of Health Research⁶

"Pillar I - Bio-medical Research: Research with the goal of understanding normal and abnormal human functioning, at the molecular, cellular, organ system and whole body levels, including development of tools and techniques to be applied for this purpose; developing new therapies or devices that improve health or the quality of life of individuals, up to the point where they are tested on human subjects. Studies on human subjects that do not have a diagnostic or therapeutic orientation.

Pillar II - Clinical Research: Research with the goal of improving the diagnosis, and treatment (including rehabilitation and palliation), of disease and injury; improving the health and quality of life of individuals as they pass through normal life stages. Research on, or for the treatment of, patients.

Pillar III - Health Services Research: Research with the goal of improving the efficiency and effectiveness of health professionals and the health care system, through changes to practice and policy. Health services research is a multidisciplinary field of scientific investigation that studies how social factors, financing systems, organizational structures and processes, health technologies, and personal behaviours affect access to health care, the quality and cost of health care, and, ultimately, Canadians' health and well-being.

Pillar IV - Social, Cultural, Environmental and Population Health: Research with the goal of improving the health of the Canadian population, or of defined sub-populations, through a better understanding of the ways in which social, cultural, environmental, occupational and economic factors determine health status"

Source: CIHR, 2009

B. RESEARCH GOALS AT EACH STAGE OF THE KNOWLEDGE CREATION CYCLE

Major research breakthroughs, products, and spin-off companies are preceded by years, if not decades of knowledge development and accumulation. When a breakthrough study occurs, we celebrate the results as a research success. However, when we think about the work that is needed in order to facilitate the breakthrough to occur, the linkage between a research endeavour and the types of return-on-investment (ROI) outcome measures we choose, must reflect the appropriate time horizon and the expected outcomes of research at each phase of the research cycle.

The issue of choosing the appropriate ROI measures for early phase research is described in *Making an Impact*, the report of the Canadian Academies of Health Sciences' Panel on the Return-on-Investment in Health Research.⁷ The panel's logic model for measuring the impact of health research identifies the development of "research capacity" and "knowledge pools" as important phases on the journey towards the traditionally aspired outputs and outcomes.⁸





The issue is illustrated in the context of the Development of a Drug in the vignette below.

Vignette on the Knowledge Cycle for the Development of a Drug⁹

Typically, a definitive randomized controlled trial involves the comparison of a clearly defined intervention with an appropriate alternative. The study is done using accepted research methods and standards, in a manner that is reproducible, and that is adequately controlled methodologically, ethically, and practically with a sufficient and statistically appropriate number of subjects.¹⁰ If such trials are successful, there may be a breakthrough – but consider that before the definitive trial, there were exploratory clinical trials in which the researchers identified what factors might be involved, what the correct dose of the drug should be, and how the study might work both operationally and scientifically. Going further back, there would have had to have been research that identified the various components of the intervention and the underlying mechanisms by which the outcomes would be influenced. Even earlier in the cycle, there would have been important work in identifying the underlying mechanisms causing the disease, in identifying possible targets, in developing drugs, determining whether the drug worked in a model system, and many other steps. This work might also have included studies in patients identifying genetic factors, on samples obtained from patients or even from studies on cells and molecules.

As can be seen from this vignette, only one phase of the research might lend itself to the type of “breakthrough” outcome that we intrinsically seek, but that one outcome is impossible without the painstaking processes that preceded it. While the areas of research described in the research questions will extend far beyond the drug development process, the different stages of knowledge will also be reflected in the range of statements offered.

While this does not reduce accountability on the part of researchers to produce a return-on-investment (ROI), it does require a shift in thinking about goals, outcomes, and what ROI really means in each phase of the research cycle. Importantly, it also requires policy-makers to appropriately identify the evaluation process and the time frame.

C. BEGINNING WITH THE END IN SIGHT – FROM RESEARCH TO PRACTICE

Another way to think about health research is in terms of the outcomes desired from the research – what are the real problems that we need to solve, address or inform? These questions can be of local, national and even international concern. Consider the following national frameworks:

- The federal government’s Science and Technology (S&T) Strategy proposes areas of research where a focus is desired to achieve national objectives. These include, healthy aging, neuroscience, regenerative medicine, and biomedical engineering.
- CIHR’s Strategic Plan also used both the federal government’s S&T Strategy health sub-themes as well as an analysis of other current health and health system challenges to set its own strategic directions and foci.¹¹ It includes a particular interest in research directly related to patient care.¹²

These areas were likely selected because of their potential to improve health & outcomes. This is consistent with the view that evidence generated from research-to-practice will improve health outcomes and system accountability and performance. However, what has also come to be appreciated is that an individual clinician’s intentions to use knowledge, for example, by reviewing and considering the evidence for decision-making, is not sufficient to close the knowledge-to-practice gap;¹³ in many cases organizational support is required.¹⁴

Literature from disciplines ranging from knowledge transfer to innovation and strategic management, all emphasize the need for deliberate management of the contexts in which the knowledge is generated, the context in which it is used, the activities which are used to translate the knowledge, and the relational elements that encompass the entire process.¹⁵

This is where the integration of research and practice as part of a healthcare organization’s patient care agenda is particularly powerful and one of the reasons for which Canada’s academic healthcare organizations play a crucial role.

Consider that all ACAHO member organizations have a publicly-stated tripartite mandate of patient care, research and training. In addition, many ACAHO member organizations have also espoused the deliberate integration of research and innovation in practice as a means of improving excellence and safety in patient care as one of their top strategic directions.

What might having the integration of research, training and patient care in a strategic direction or an area of focus mean in the accountability context of large, complex and resource-intensive organizations? Since the strategic directions are usually guideposts for decision-making, they are also important ways of harnessing and expressing to the public, staff and funders the rationale for many resource, structure, and operational decisions.¹⁶ When there is a commitment as strong as a strategic direction, there is a clear expectation of the potential for the management of the contexts in which this will occur.¹⁷

Therefore, when we begin with the end in sight, we consider not only the areas in which research is pursued, but the manner and the contexts in which it will be used. This was a recommendation made when Sir David Cooksey was asked to undertake a review of research funding in the United Kingdom.

In the Cooksey review, two primary translational problems formed the impetus for a renewed focus on the country's academic health sciences centres. They included: (1) the translation of ideas from basic sciences; and (2) clinical research into the development of products and approaches to be used in the treatment of diseases and illnesses and the ability to implement these products and approaches into practice.¹⁸

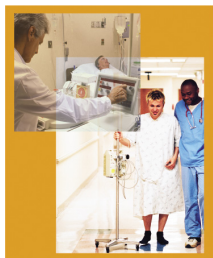
These are also a key consideration in recent work by the *National Task Force on the Future of Canada's Academic Health Sciences Centres*¹⁹ and in the Canadian Institutes for Health Research's Strategy on Patient-Oriented Research.²⁰ Most recently an international study on research impact has identified factors associated with high impact research, many of which are common in ACAHO member organizations.²¹ These are shown in Table 1.

Table 1
Factors Associated with High-Impact and Low-Impact Research²²

Factor	Policy Implication
Basic biomedical research with a clear clinical motivation is associated with high academic and wider impacts	When seeking to achieve high academic and wider impacts, encourage and support clinically motivated basic biomedical research
Co-location of basic biomedical research in a clinical setting is associated with high wider impact	When seeking to achieve high wider impacts from basic biomedical research, encourage and support the co-location of basic biomedical researchers with clinicians in a clinical setting (e.g. a teaching hospital or health organization)
Strategic thinking by clinical researchers is associated with high wider impact	When seeking to achieve high wider impacts from clinical research, focus clinical research funding on PIs or teams who think strategically about translation into clinical practice
Research collaboration is associated with high academic and wider impact	When seeking to achieve high academic and wider impacts, encourage and support research collaboration for both basic biomedical and clinical research
International collaboration is associated with high academic impact	When seeking to achieve high academic impact, encourage and support international collaboration for both basic biomedical and clinical research
Engagement with practitioners and patients is associated with high academic and wider impacts	When seeking to achieve high academic and wider impacts, encourage and support clinical researchers who have a record of engaging with practitioners and patients
Basic biomedical research collaboration with industry is associated with high academic and wider impacts	When seeking to achieve high academic and wider impacts from basic biomedical research, encourage and support collaboration with industry
Negative or null findings are associated with low academic and wider impacts	Research funders should acknowledge the importance and potential significance of negative or null findings when assessing the impact of research
Initial rejection of a subsequently accepted basic biomedical research grant may be associated with low academic and wider impacts	Further research is needed to confirm whether initial rejection of a research proposal is associated with low impact. Until this finding can be confirmed or refuted, funders may want to carefully consider such proposals

Source: RAND Europe, 2011 (used with permission)





3. A SNAPSHOT OF THE RESEARCH PRIORITIES AT ACAHO MEMBER ORGANIZATIONS

"There is no medicine like hope, no incentive so great and no tonic so powerful as expectations of something better than tomorrow" - Orioson Swett Marden, Writer.

A. A NOTE ON THE PRIORITIES

With a few frameworks for thinking about health research in mind, we now turn to the research priority statements. In this section, you will find the list of the overarching research questions for each ACAHO member organization, as provided by the ACAHO Vice-Presidents of Health Research (see Table 2). The organizations are grouped by province.

As you read through these questions, the following should be noted:

- This list is a snapshot as taken in 2010. It reflects only the top three priorities.
- The questions themselves reflect hundreds if not thousands of individuals and projects. They may reflect any of the most current, the largest, or the most top of mind areas.
- ACAHO member organizations usually situate their research priorities in the context of the academic healthcare organization with which they are affiliated. As such, the priorities may be driven by the needs of the local population, the organization, and the resources available.
- Research programs and institutes across the country are at different stages of development. For example, some research programs or institutes have been recently developed, whereas others have been in existence for decades. This will affect their depth, breadth, focus and scope.
- The reader will note that this report focuses on research priorities. A number of other publications by the Association focus on research impacts, outputs and outcomes. We encourage the reader to visit the ACAHO website for other research-related reports (www.acao.org).

B. A NOTE ON THE ANALYSIS

An analysis of the research priorities will help to synthesize what they mean when we look at them from coast-to-coast. While we hope the analysis will be useful, it is important to note the limitations:

- In most cases, the analysis is subjective and decisions had to be made about the single best grouping for the statement for each type of analysis.
- We have focused only on the top three priorities which means that if we expand to the top five or ten the analysis could look very different.

Given these considerations, these statements and the analysis that follows are best used for descriptive purposes only.²³ On the ACAHO web-site (www.acao.org), you will also find links to the website of each organization. We encourage you to visit these sites and learn more about the important work that is ongoing.

Table 2
What are the Top Three Research Priorities of ACAHO Member Organizations? (2010)

Prov.	Organization	What is Driving Health Research at your Organization?
NL	Eastern Health  Eastern Health	- Does the Healthy Beginnings Program, a public health intervention program for high-risk children improve the rate of priority children achieving appropriate developmental milestones? - Is there a link between wait time for diagnostic imaging procedures and outcomes for clients? - How can we use large data banks on staff absenteeism to identify factors that predict staff absenteeism and use these to develop effective policies and programs?
NS	IWK Health Centre  IWK Health Centre	- How can we develop, evaluate and implement vaccines for the full range of diseases including infectious diseases and cancers? - How can we detect and intervene effectively with autism and child mental health problems? - How can we ensure that scientific evidence influences all decisions in the health centre?
NS	Capital Health  Capital Health	- How can we integrate health outcomes research in our daily clinical care and learning environments in a meaningful way? - How can we broaden the scope of our research activities to include all health care providers (i.e. away from the medical model only)? - How do we build more infrastructure to support broad based research?
NB	Horizon Health Network  Horizon HEALTH NETWORK	- How can we identify new/alternative treatments for cancer patients? - How can we identify new/alternative treatments for heart disease? - How can we improve system performance (i.e. spread of evidence-informed practice and models, improved patient outcomes, increase throughput, decrease wait-times, etc.)?
QC	Centre Hospitalier Universitaire de Québec  CHUQ CENTRE HOSPITALIER UNIVERSITAIRE DE QUÉBEC	- How can we optimize vaccines against epidemic strands of human, bird or pig influenza with pandemic potential, better understand the mechanisms of resistance to existing antivirals, and refine the evaluation criteria for new treatments? - How can we better target the prevention and individual treatment of cancer through the identification of susceptibility factors for developing cancer and of therapeutic resistance mechanisms? - How can we ensure that research results are diffused and applied in health-related decisions and practices?
QC	Centre Hospitalier Universitaire Sainte-Justine  CHU Sainte-Justine Mother and Child University Hospital Center <i>For the love of children</i>  Université de Montréal	- How can we use innovative diagnostic tests to better predict the outcomes of scoliosis and develop new tools to provide optimized treatments tailored to fit individual needs? - How can we use the wealth of knowledge from genomics and neuroscience to optimize brain development in order to maximize function leading to healthier and more productive people? - How can we ensure that newborn babies are born healthier and with the best chances to become healthy adults?



Table 2 Continued

Prov.	Organization	What is Driving Health Research at your Organization?
QC	Centre hospitalier universitaires de Sherbrooke  Centre hospitalier universitaire de Sherbrooke	• Leverage our exhaustive administrative databases to improve health-care delivery. • Improve interactions between research facilities and clinics by fostering exchanges from bench to bedside and vice versa. • Use imaging to improve diagnostics and treatment follow-ups to develop a medical approach based on biological markers specific to certain physical diseases such as cancer, metabolic and cardiovascular diseases, etc.
QC	McGill University Health Centre  Centre universitaire de santé McGill McGill University Health Centre <i>Les meilleurs soins pour la vie The Best Care for Life</i>	• To exploit existing technologies and develop novel means to provide care tailored to the individual patient? • To understand the biology of healthy cells, organs and organisms to prevent infections, damaging inflammation, allergies and cancer? • To explore how genetics and the environment influence both health and disease across the lifespan?
QC	Hôpital Maisonneuve-Rosemont  Hôpital Maisonneuve-Rosemont Centre affilié à l'Université de Montréal	• How can we enhance the translation of basic discoveries from our researchers to clinical applications in the field of hematology-oncology, immunology and cell therapy? • How can we identify the pathological mechanisms of neuro-degenerative and other eye diseases to develop diagnostic and therapeutic strategies to combat blindness? • How do we best use our epidemiological, pharmacological, genetic, molecular and therapeutic tools to improve the quality of life of patients with renal failure?
QC	Hôpital Sacré Cœur  HÔPITAL DU SACRÉ-CŒUR DE MONTRÉAL HSCM <i>Doués pour la vie</i>	• How can we use innovative approaches to better understand, prevent and treat traumatism? • What are the physiological mechanisms regulating normal sleep and sleep disorders and their impact on emotional, cognitive and physical health? • How can we improve the obstructive lung disease outcomes by using innovative and integrated scientific approaches combining pharmacology, epidemiology, behavioral sciences, clinical and basic research?
QC	Institut de Cardiologie de Montréal  INSTITUT DE CARDIOLOGIE DE MONTRÉAL	• How can we integrate innovative and cross-sectional scientific approaches to dynamic and solid thematic areas of cardiovascular research to establish a translational research approach bridging genomic and large clinical studies and patient observations back to basic research? • How can we develop the tools and approaches required for personalized medicine, integrating the diagnostic, therapeutic and prevention perspectives? • How can we pursue the development of state-of-the-art medical imaging, in close link with innovative and non-invasive medical services? • How can we pursue the development of clinical research (e.g.: large-scale clinical trials) at the national and international levels as a means to expand patient-oriented research?



Table 2 Continued

Prov.	Organization	What is Driving Health Research at your Organization?
ON	Baycrest 	- How can we use our knowledge of the brain and cognition to better ameliorate or rehabilitate cognitive decline associated with normal aging as well as neural disease or damage? - How do different brain areas work together in functional networks to produce normal cognitive abilities, and how do these networks change over time in response to age, injury or activity? - How do we best translate our knowledge of brain function, dysfunction and recovery into practices that improve the health of tomorrow's elderly while at the same time care for and enhance the quality of life of the elderly today?
ON	Bloorview 	- What treatments optimize the outcomes for children with disabilities? - What assistive technology products optimize the lives of children with disabilities? - How can we overcome the barriers (social, economic, environmental) facing children with disabilities and their families?
ON	Centre for Addiction and Mental Health 	- How can we use bioinformatics to synthesize data from genetics, epigenetics, brain imaging and clinical research to improve the prevention, diagnosis and treatment of mental health and addictions disorders? - How can we improve health care service delivery, policy and programming for mental health and addictions problems? - How do we bring our research knowledge to underserved populations including adolescents, the elderly, remote and First Nations communities?
ON	Children's Hospital of Eastern Ontario 	- What are the basic fundamental mechanisms behind childhood disease (with a focus on cancer, neuromuscular disease, and rare genetic disorders)? - How can we translate findings of basic research and clinical trials into improved health for children? - How can we best promote and support child and adolescent health and healthy lifestyles (with a focus on obesity, maternal-child health and mental illness)?
ON	Bruyère Continuing Care 	- What are the ways of promoting the health of patients and residents in continuing care organizations to enable them to live with their health problems? - How can the organization of primary health care be improved to assist patients in managing their chronic illness(s)? - How can we improve the quality of life of patients receiving palliative care?

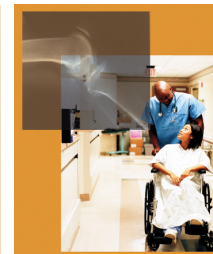


Table 2 Continued

Prov.	Organization	What is Driving Health Research at your Organization?
ON	Hamilton Health Sciences  Hamilton Health Sciences	- How can we efficiently and rapidly evaluate new treatments and preventive strategies for cardiovascular diseases, diabetes, thrombosis and cancer, and use these to mitigate global burden of such diseases? - How can we understand the environmental and genetic factors for chronic diseases of adulthood such as cardiovascular disease, diabetes and cancers, including the early life determinants of these diseases? - How can we understand the factors that influence childhood development?
ON	Kingston General Hospital  KINGSTON GENERAL HOSPITAL	- How can our advances in surgical technology allow patients to live fuller and more mobile lives while reducing length of stay? - How can we identify existing and novel treatment modalities that optimize the outcome for patients suffering from common chronic diseases? - How can we optimize critical care and end-of-life care for elderly patients?
ON	London Health Sciences Centre & St. Joseph's Health Care (Lawson Health Research)  LAWSON HEALTH RESEARCH INSTITUTE	- How can we improve surgical technologies so that complicated operations can be done with the minimum incision, the shortest stay in hospital, and the most rapid recovery? - How can your individual genetic make-up be used to optimize drug selection and dosage and avoid adverse reactions? - Can we develop non-invasive medical imaging techniques that inform us about body biochemistry and genetic changes for more effective and appropriate treatment of diseases such as cancer?
ON	Mount Sinai Hospital  MOUNT SINAI HOSPITAL Joseph and Wolf Lebovic Health Complex	- How can we identify the most appropriate treatments for patients with diseases like cancer? People respond very differently to therapies but we do not know why in most cases. The answers to this question will emerge from personal genomics and proteomic analysis. - There is a lack of fundamental knowledge of the causes of most developmental and disease-related health problems. What are the genes and protein variations that pre-dispose to health complications? - What are the mechanisms that control cellular fate? If we knew the key processes, we would be able to generate specific cell types and tissues and obviate the need for organ and tissue transplants. This exciting area holds enormous potential via stem cell research.
ON	The Ottawa Hospital  Ottawa Hospital Research Institute OHRI IRHO Institut de recherche de l'Hôpital d'Ottawa	- How can we control the activity of stem cells and enhance their ability to repair and regenerate tissues and organs? - How can we ensure that clinical evidence is used by practitioners and the health care system to improve quality of health care delivery? - How can we apply advances in understanding the biology of blood vessels to the prevention and treatment of diseases such as heart attack, stroke and thrombosis?



Table 2 Continued

Prov.	Organization	What is Driving Health Research at your Organization?
ON	The Royal Ottawa Health Care Group Services de santé Royal Ottawa Health Care Group 	- How can we combine drugs to achieve better outcomes for depression? - How can we translate basic discoveries (bench) to better treatment outcomes for mental illness (bedside)? - How do psychological and social factors influence genetic expressions of mental illness?
ON	St. Michael's Hospital St. Michael's Inspired Care. Inspiring Science. 	- How can we improve the translation of knowledge gained from research into practice to improve the health of Canadians? - How can we influence the development of policies to prevent premature death due to HIV/AIDS, tuberculosis and chronic diseases in developing countries? - How can we better understand the complex social and health issues of inner-city vulnerable populations, such as the homeless, refugees and people living with mental illness? - How can we generate new knowledge of fundamental mechanisms of organ injury that is readily amenable for translation into improvement in patient outcomes?
ON	St. Joseph's Healthcare Hamilton  St. Joseph's Healthcare Hamilton	- How can we better understand and treat patients with asthma and chronic obstructive pulmonary diseases? - How can we refine and enhance usage of non-invasive imaging technologies to better diagnose disease, tailor therapies to individuals and track therapeutic responses? - How can we better understand kidney disease and dysfunction and improve therapy?
ON	Hospital for Sick Children SickKids 	- How can we use new stem cell and regenerative medicine technologies to drive early treatment of childhood diseases which adversely affects organ development (heart, lung, kidney, urogenital, craniofacial and musculoskeletal syndromes which begin at birth or with early onset diseases)? - How can we effectively leverage the incredible wealth of genomic data we are generating to improve not just accurate diagnosis of childhood diseases but also to drive more effective treatments? - How do we use our growing knowledge of cancer stem cells to develop better treatments and ultimately cures for often fatal childhood cancers such as AML, metastatic solid tumours and most brain tumours which occur in childhood?
ON	Sunnybrook Health Sciences Centre  Sunnybrook RESEARCH INSTITUTE	- How can we develop technologies to improve the way we prevent, detect, diagnose and treat disease? - How can we better harness the potential of cell-based and regenerative medicine to develop new ways to repair, regenerate or replace damaged cells and tissue? - How can we better integrate research and clinical care, and move discoveries from the lab to the medical marketplace, and ultimately to the patient?

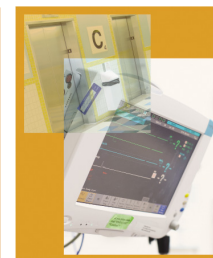


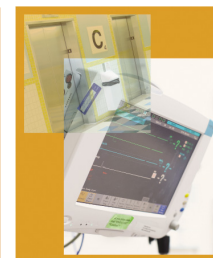
Table 2 Continued

Prov.	Organization	What is Driving Health Research at your Organization?
ON	Toronto Rehabilitation Institute  Toronto Rehab Everything Humanly Possible	• How can we improve rehabilitation so that people can return more quickly to more enjoyable and productive lives? • How can we help more people fulfill their wish to continue living in their own homes as they age? • How can we use technology to make care-giving easier and safer for professionals and family?
ON	University Health Network  University Health Network Toronto General Hospital Toronto Western Hospital Princess Margaret Hospital	• What is the fundamental basis of disease? • How can we use trans-disciplinary team research to develop new and effective treatments for patients? • How can we develop the commercial potential of new innovations?
MB	Winnipeg Regional Health Authority  Winnipeg Regional Health Authority Office régional de la santé de Winnipeg Caring for Health À l'écoute de notre santé	• How can we ensure that our institutional research agenda optimally contributes towards improved patient-care at our hospital? • How can technology advances in image-guided radio-surgery be used to replace conventional surgical procedures, effecting better outcomes for our patients and reduced inpatient stays? • What are the key emerging technologies that will impact the neurosciences in the next 5-10 years and how can our hospital position itself to be a leader in these fields?
SK	Saskatoon Health Region  Saskatoon Health Region	• How can we use synchrotron light to understand, image and eventually treat animals and human disease? • How can we best protect animals and humans against infectious disease (across the lifespan)? • How can we reduce health disparities in Aboriginal, rural, and remote northern communities and poor neighbourhoods?
AB	Alberta Health Services (Edmonton)  Alberta Health Services	• How do we improve the effectiveness and success of transplantation of tissues and organs? • How do we encourage healthy lifestyles that improve the nutrition and decrease the obesity in our populations? • How do we better use information at the molecular level to improve the prevention, diagnosis and treatments of various diseases in adults and children?
AB	Alberta Health Services (Calgary)  Alberta Health Services	• How can we measure and improve the quality of care, and safety of care, in patients and people served by Alberta Health Services in Calgary using evidence-informing principles? • What changes in policy and practice will improve access to health care for patients and people served by Alberta Health Services in Calgary using evidence-informing principles? • How can we improve access to care and quality and safety of care in a sustainable fashion for patients and people served by Alberta Health Services in Calgary using evidence-informing principles?



Table 2 Continued

Prov.	Organization	What is Driving Health Research at your Organization?
BC	Provincial Health Services Authority 	- How can we apply our knowledge of human genomics to improve prevention, diagnosis or treatment of disease states and to better understand the origin of adult conditions in childhood and adolescence? - How can we enhance our capacity in translational research to improve health outcomes for the populations we serve including children, women and patients with cancer, communicable disease, renal failure and mental health conditions? - How should we build our capacity in applied and population health research in order to best contribute to optimal health outcomes and to foster sustainability of the healthcare system?
BC	Providence Health Care 	- How can biomarkers help predict outcomes and allow medical therapy to be tailored? - Can Highly Active Antiretroviral Therapy be used as prevention against HIV/AIDS in vulnerable populations? - What system-wide approaches to mental health and addiction need to be implemented?
BC	Vancouver Island Health Authority 	- How can we assess and improve best strategies to recruit, teach, and retain workers at all levels, but particularly those with clinical expertise, within healthcare settings? - How can we best focus health services research to improve the quality of services provided within the Health Authority? - How can we best use the healthcare needs and experiences of the defined population of Vancouver Island to determine best practices in primary, secondary, and tertiary prevention of cardiovascular morbidity and mortality?
BC	Vancouver Coastal Health 	- How do we continue to integrate research across Vancouver Coastal Health and translate research innovation into clinical practice across BC and Canada? - How do we position ourselves among the leading international translational research centres as well as ensuring the translation and integration of research knowledge into practice at all levels within our own organization? - What infrastructure is needed to continue building research training and development capacity across health disciplines? How do we attract and retain top young researchers and trainees, to develop a new generation of knowledge and innovation leaders?





4. OUR RESEARCH PRIORITIES AND THE HEALTH OF CANADIANS

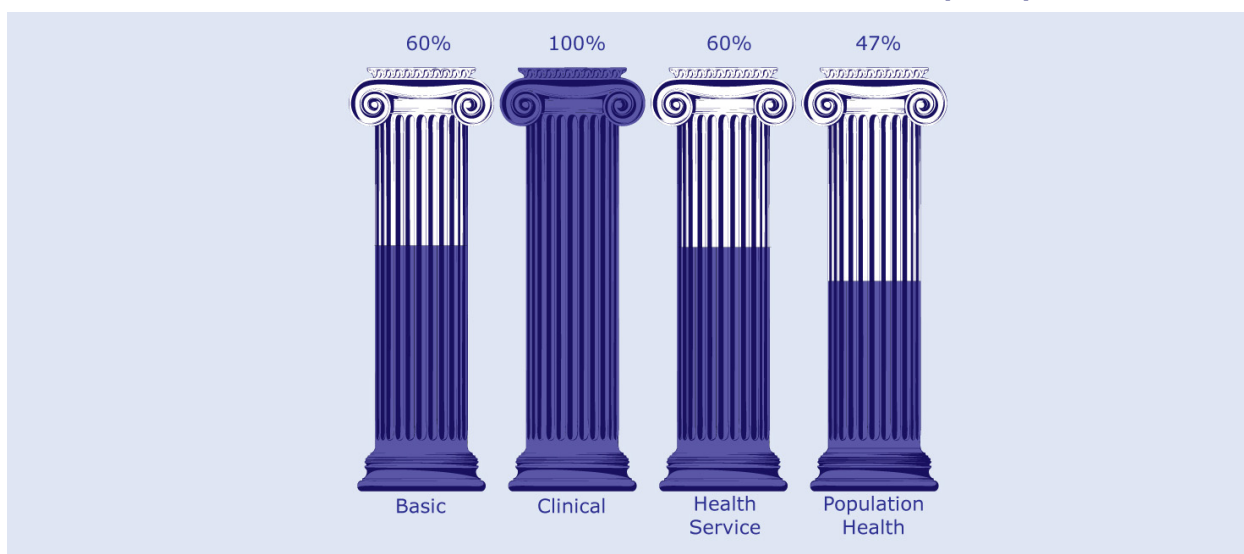
"Medical science has proven time and again that when the resources are provided, great progress in the treatment, cure, and prevention of disease can occur." - Michael J. Fox, Actor

The research of ACAHO member organizations focuses at the level of cells and molecules, clinical interventions involving patients and health systems, and at the level of entire populations (i.e., the four pillars of health research)

By integrating the results of different pillars of research, in environments that deliver patient care and train new professionals, we increase the capacity for and likelihood of a dynamic relationship between research and practice. In this way, real health problems can influence the nature of research that is pursued and decision makers at all levels within the organization can either look to the research that is occurring for insights and information or benefit from the culture of learning & inquiry that results in such environments. As such, the tripartite mandate of ACAHO Members creates an ideal setting in which to trail-blaze the application of research to solve real problems.²⁴

For example, when we look at the priorities of each of the 36 organizations that made a submission, we see that in all 36 cases (100%), at least one priority statement spans clinical research or research at the level of the patient. For each of the basic sciences pillar and the health services research pillar respectively, 22 (60%) out of 36 organizations have at least one priority in each of these pillars. Finally, in 17 of the 36 organizations (47%), there is a primary focus on population-level research. This reflects all four of CIHR's pillars of health research that were discussed earlier in this report (see Figure 1).

FIGURE 1
PERCENTAGE OF ORGANIZATIONS WITH AT LEAST ONE OF THE THREE TOP RESEARCH PRIORITY STATEMENTS IN EACH OF THE FOUR PILLARS OF HEALTH RESEARCH (N=36)



About Figure 1: This figure shows the percentage of participating organizations that have at least one of the top 3 research priorities aligned with each of CIHR's four pillars of health research. The reader should note the limitations discussed on page 8 and that in many cases, the pillars overlap.

Consequently, when we look at the priority statements themselves, we see how research occurring in these settings is related to: common health conditions; diagnosis and treatment; quality of life; and the improvement of health systems and population health. We discuss each and then provide examples in Table 3.

- **Focusing on health conditions** – “What diseases do ACAHO member research priorities help to diagnose, treat, and prevent?” Analysis of the research statements for frequently mentioned diseases yielded a number of conditions that are included in either or both of Canada's top ten reasons for hospitalization and the most expensive health conditions.²⁵

- **Discovering the Technologies** - “What tools are being studied that are improving the ability to find the causes and cures of common health problems?” Part of the research promise is to conduct research that makes diagnoses and treatments less invasive, more reliable, less painful and ultimately more successful. This includes a wide variety of technologies and methods.
- **Improving Quality of Life** - “How does health research at ACAHO member organizations improve the quality of life?” While research can occur by looking ‘under the microscope’, it can also address questions related to quality of life and how people age, live, manage disabilities, and improve their health.
- **Improving Health System Performance** - “How does health research at ACAHO member organizations help to yield a better health system?” Closing the loop between research and its promise often involves looking at the performance of the health system. As such, research priorities also relate to health system management and measurement. This can include research in areas of knowledge translation, the diffusion and uptake of innovation, the reduction of stress and injuries in the workplace among many others etc.^{26 27 28 29 30}



TABLE 3

EXAMPLES OF RESEARCH AREAS COVERED IN THE RESEARCH PRIORITIES OF ACAHO MEMBER ORGANIZATIONS

Focusing on Health Conditions	
• Cancer • Infectious Diseases (H1N1, HIV/AIDS) • Kidney Disease • Diabetes • Urogenital Diseases • Heart Disease & Stroke	• Lung & Respiratory Diseases • Critical Care • Craniofacial Syndromes • Neurological and Musculoskeletal Syndromes • Childhood & Early Onset Diseases • Mental Health & Addictions
Discovering the Technologies...	
• Antiretroviral therapy, vaccines and viruses • Biomarkers • Cellular mechanisms • Physiologic approaches • Drug therapy • Genomics	• Molecular information • Non invasive imaging and surgical techniques • Proteomics • Stem cells and regenerative medicine • Synchrotron light • Transplants
Improving Quality of Life...	
• Studying how to overcome social and physical barriers for people with a disability • Learning how to achieve the best possible death and dying experience	• Determining how to promote better health in hospitalized patients • Using assistive devices to help people with a disability meet their life goals and technology to help the elderly age safely at home
Improving Health System Performance...	
• Improving access to care and wait times • Focusing on health promotion & disease prevention • Improving the quality of care • Facilitating patient safety efforts	• Understanding and improving system performance • Improving recruitment and retention • Learning to better use and integrate evidence • Developing products and services based on research



5. THE ALIGNMENT OF ACAHO MEMBER RESEARCH PRIORITIES & NATIONAL AGENDAS

"... We recognize that all Canadians — not just our scientific, technical, and business communities— have a stake in us getting it right" - The Right Honourable Stephen Harper, Prime Minister of Canada on Canada's Science & Technology Strategy.

In addition to presenting a summary of the top research questions that ACAHO members are addressing, we thought that it would be useful to overlay the priorities against those of the Canadian Institutes of Health Research (CIHR)'s strategic plan and the sub-themes that were identified as part of the federal government's Science & Technology Strategy. We discuss each in turn.

A. STRATEGIC PRIORITIES OF CANADIAN INSTITUTES OF HEALTH RESEARCH (CIHR)

If an organization is mandated to care for patients and populations, it is not surprising that its research priorities focus and align with the patient care, health system and population health needs of the communities in which it is embedded. This translates in concrete ways. For example, many ACAHO members:

- Have the integration of research to practice as a top strategic priority;
- Integrate strategic planning for research within the context of the organization's strategy;
- Allocate resources to enable knowledge to practice activities;
- Have formal linkages between research and the quality improvement, risk management and planning departments of their organizations.³¹

It also happens, however, that the research priorities of ACAHO member organizations have applications to a range of other communities across the country. In its recent strategic plan, the Canadian Institutes of Health Research (CIHR) identified a number of major health and health system challenges which are already confronting Canadians from coast to coast.³² These include:

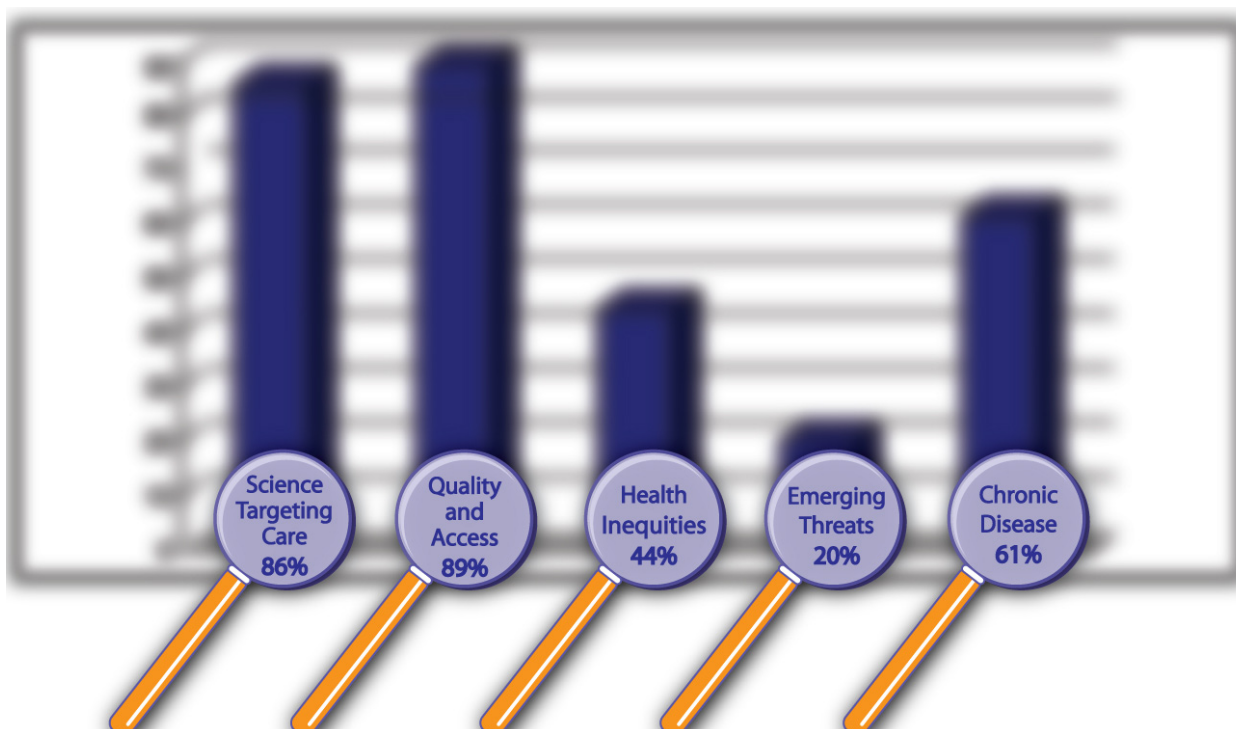
- Increased demands and pressures on Canada's health care system;
- Health inequities faced by Aboriginal peoples and other vulnerable populations;
- Existing and emerging global threats to health;
- Effects of climate change on the Arctic and Northern populations; and
- Growing prevalence and burden of chronic diseases, including mental illness and neuro-regenerative diseases in an aging population.

It is not surprising then, that CIHR has suggested that it will focus its research efforts on the following five priorities and integrate these five areas into its granting programs. These include:³³

1. Enhancing patient oriented care by targeting science;
2. Supporting a high quality accessible and sustainable health care system;
3. Ameliorating health inequities of Aboriginal peoples and vulnerable populations;
4. Preparing for and responding to existing and emerging global threats to health;
5. Promoting health and reducing the burden of chronic disease and mental illness.

How do ACAHO member research priorities align with these key areas? When we compare the areas and the priority statements, we see that 100% of ACAHO members' research priorities align with the priorities of CIHR and the health system challenges that they have identified. Figure 2 shows the number of ACAHO member organizations who have at least one top research priority aligned with each of CIHR's strategic priorities.

FIGURE 2
PERCENTAGE OF ORGANIZATIONS WITH AT LEAST ONE OF THEIR TOP THREE RESEARCH PRIORITIES ALIGNED WITH EACH OF CIHR'S STRATEGIC AREAS OF FOCUS (N=36)



About Figure 2: This figure shows the percentage of organizations that have at least one of the top three research priorities aligned with each of the five areas of CIHR's strategic plan. The reader should note the limitations discussed on page 8. However, in spite of the caveats, the distribution is likely intuitive. ACAHO member research occurs in the context of academic healthcare organizations, that are conducting research as part of a tripartite mandate, with the primary responsibility being for the delivery patient care and population health. This may explain the heavier emphasis in certain areas.

B. FEDERAL GOVERNMENT'S SCIENCE & TECHNOLOGY STRATEGY

While conducting research to improve the health of Canadians is an intuitive proposition, ACAHO members also contribute in a strategic and concrete way to the sustained economic prosperity and wealth of the nation, and to national policy agendas set out by the federal government through its Science & Technology (S&T) Strategy.

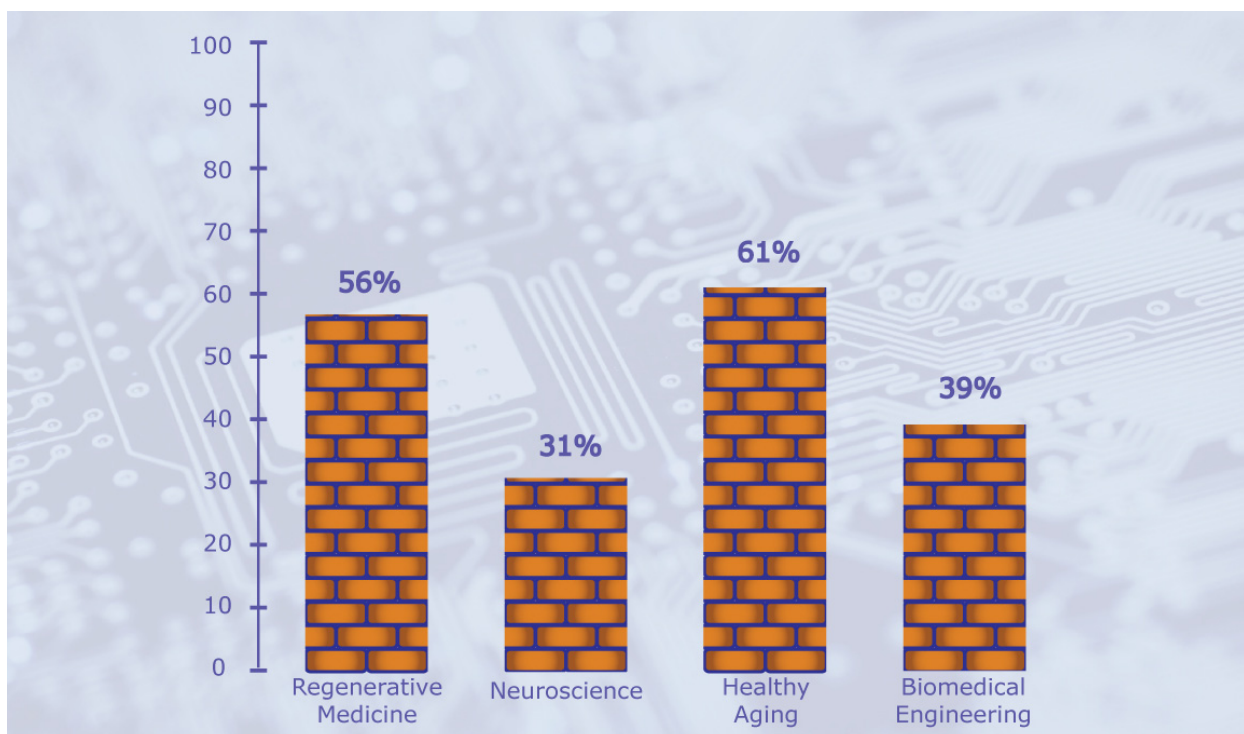
Industry Canada's Science, Technology and Innovation Council (STIC) has outlined an important vision for the relationship of research and innovation to Canada's prosperity.³⁴ This type of framework provides pathways to the future both implicitly and explicitly by virtue of the areas of the funding and focus that they propose. Using these lenses it is possible to have a clearer sense as to how ACAHO member research aligns with and gives flight to many of these aspirations.

For example, the federal government's S&T strategy sub-themes are important predictors of areas requiring focus in research in order to achieve strategic and health objectives. These areas include: (1) regenerative medicine; (2) neuroscience; (3) health in an aging population; and (4) biomedical engineering and medical technologies.

When we map ACAHO member research priorities against these areas, over half of the research statements fit in the federal government's S&T health and related technologies sub-themes and 100% of members have at least one research priority that supports one of these themes (see Figure 3). In addition, ACAHO members also address other important areas, such as: the science behind the use and translation of new knowledge into clinical practice; research on health system design; performance and sustainability; and issues related to population health, among many others.



FIGURE 3
PERCENTAGE OF ORGANIZATIONS WITH RESEARCH PRIORITIES ACROSS THE FEDERAL GOVERNMENT'S SCIENCE & TECHNOLOGY HEALTH AND RELATED TECHNOLOGIES SUBTHEMES³⁵ (N=36)



About Figure 3: This figure shows the percentage of organizations that have at least one of the top three research priorities aligned with each of the four health related subthemes in Canada's Science and Technology Strategy. The reader should note the limitations of the analysis listed on page 8, and that the analysis is based only on the top 3 priorities (the results may look different we had chosen the top 5). With these caveats, the reader will note that the distribution of research priorities reflects the mandates of organizations caring for patients and populations.

However, the linkage to the federal government's S&T Strategy, is not only through direct support to these sub-themes, but ACAHO members are also contributing to the wealth of the nation by supporting the advantages that the strategy identifies through a focus on entrepreneurship, knowledge and people.

For example, ACAHO members' research budgets total approximately \$1.8 Billion. These budgets typically result from leveraging a base budget through the grants and industry partnerships that they attract. Potential revenues from new clinical trials were estimated at at least \$340 Million (2007-08); technology transfer income yielded a minimum of \$27 Million (2003-06); and income from licenses yielded an additional \$5 Million (2003-06).³⁶

As a consequence, ACAHO member research not only engages individuals with high levels of skills, but they also provide employment opportunities that are, by the definition of research, learning environments. The research budgets of these organizations employ thousands of people and contribute to both the number and type of highly skilled workers in the economy. In addition, the close to 2,700 scientists and researchers for whom these organizations are a primary affiliation, supervise close to 2,600 masters and doctoral students and provide post doctoral fellowships for an additional 1,600 individuals (see Table 4).

To understand the size of this collective potential consider that in 2007-08, the ACAHO Vice-Presidents of Research reported a minimum of at least 11,000 peer reviewed publications attributable to the scientists at their organizations.³⁷ At least 8,900 new ethics review submissions were made and at least 1,600 new clinical trials were initiated (see Table 4).^{38,39}

TABLE 4
ACAHO MEMBER CONTRIBUTIONS TO TRAINING AND EMPLOYMENT OPPORTUNITIES (2007-08)

Minimum number of researchers for whom AHSC is primary affiliation ⁴⁰	2,791
Minimum number of post doc researchers (2007-2008) ⁴¹	1,644
Minimum number of PhD and MSc candidates supervised by AHSC scientist/researcher ⁴²	2,570

In many cases both basic and clinical research is resulting in products and services that also play a role in stimulating market impacts in an economy that benefits from these products and services and from the spin-off effects of new companies and jobs. Consider that since 1996, ACAHO members have yielded over 100 world first medical discoveries and have resulted in over 70 established spin-off companies. In 2007-08 alone, there were 65 new start-ups, more than 400 disclosures, 300 patents, and over 200 licenses (see Table 5).^{43 44 45}

TABLE 5
ACAHO MEMBER DISCLOSURES, PATENTS & LICENSES (2007-08)

Minimum number of disclosures (2007-2008) ⁴⁶	415
Minimum number of patents issued (2007-2008) ⁴⁷	312
Minimum number of licenses (2007-2008) ⁴⁸	217

While these figures are concrete demonstrations of how ACAHO members contribute to the wealth of the nation, there is yet another more subtle but still powerful enabler that accrues to the economy through the research enterprises and priorities of ACAHO member organizations. One of the major challenges that Canada will be facing over the next decade is an aging population that lives longer and experiences more complex health conditions. This will occur in the context of a labour force that will need to advance productivity in the context of a shrinking taxpayer base, a challenged pension system, and as they potentially take on the care of both aging family members as well as younger ones. These are yet more reasons to better leverage research - to ensure that it not only contributes to improved health system performance, but also to the best possible health and wealth for all.





6. CONCLUSION

Every great advance in science has issued from a new audacity of the imagination." John Dewey

In this report, we have provided a brief overview of the research priorities of ACAHO member organizations and the manner in which they focus on health, the translation of research-to-practice, and the wealth of the nation.

We have described how these research priorities are addressing the most common and challenging health issues: improving prevention, diagnosis and treatment, enabling better quality of life and supporting a more accessible and effective health system.

We have also discussed the manner in which ACAHO member research priorities support the broader health system challenges identified by the Canadian Institutes for Health Research (CIHR) and the health-related subthemes in the federal government's Science and Technology Strategy.

ACAHO member organizations, however, are first and foremost patient care organizations. By virtue of their mandate to provide exemplary patient care, train the next generation of health providers, and solve both those health problems to which we have answers and those that are still mysteries, they contain vibrant research enterprises.

This positions Canada competitively both in terms of the health of its citizens and the wealth of the nation. ACAHO members have both the benefit and the obligation of connecting research from the bench to the patient's bedside, and to both the *health* and *wealth* of the nation.

Finally, the questions provided by the Vice-Presidents of Health Research are those questions that help to shape the research priorities of ACAHO member organizations. Consistent with the tradition of research, it is today's questions that pave the way to the tomorrow's solutions. These could very well shape the future of healthcare and more importantly, the future of human health.

NOTES

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