



OUR PATHS TO PROSPERITY...

**A POLICY ROAD MAP FOR CANADA'S
HEALTH RESEARCH, INNOVATION
& COMMERCIALIZATION ENTERPRISE**

**SUBMISSION TO THE HOUSE OF COMMONS
STANDING COMMITTEE ON INDUSTRY, SCIENCE AND TECHNOLOGY**

APRIL 18, 2008

WHO WE ARE...

The Association of Canadian Academic Healthcare Organizations (ACAHO) is the national voice of Teaching Hospitals, Academic Regional Health Authorities (RHAs) and their Research Institutes. The Association represents over 45 organizations, with members ranging from single hospitals to multi-site, multi-dimensional regional facilities (also known as “Research Hospitals”).

Members of ACAHO are leaders of innovative and transformational organizations who have overall responsibility for the following integrated activities:

- Provision of, and timely access to, a range of specialized and some primary health care services.
- Provision of all of the principal clinical teaching sites for Canada’s health care professionals including partnerships with all 17 Faculties of Medicine and Faculties of Health Sciences.
- Infrastructure to support and conduct health research in its dimensions – medical discovery, knowledge creation, knowledge translation, and innovation and commercialization.

There are no other organizations in the health system that provide the unique combination of health services that our members do. We consider our institutions to be vital “hubs” in the health system – in addition to being a national resource.

OUR MISSION...

The mission of ACAHO is to advance and promote excellence in the delivery of quality health services, the teaching and educational experience, and the health research and innovation enterprise.

OUR MANDATE...

The mandate of ACAHO is to provide effective national leadership, advocacy, and policy representation in the following three related areas of the:

- Funding, organization, management and delivery of highly specialized tertiary and quaternary, as well as primary health care services.
- Education and training of the next generation of Canada’s health care professionals.
- Infrastructure to support and conduct basic and applied health research, medical discovery, innovation and commercialization.

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

EXECUTIVE SUMMARY

This policy Brief is in support of the federal government's Science and Technology Strategy and ACAHO's three recently developed policy documents that focus on the role of Canada's Research Hospitals in relation to science and technology.

ACAHO commends the federal government for releasing its Science and Technology Strategy in May 2007. Overall, the document is thoughtful and cogent, and identifies a range of key policy issues and solutions, in addition to providing an overarching framework which incorporates thirty-six policy announcements.

ACAHO is very pleased that the federal government has identified the health and related life sciences and technologies sector as a key strategic area that warrants additional focus and investment. That said, the Association is of the view that we must build on the parameters that have been laid out by the federal government that promote maximum *synergies*, improve overall *alignment* and *accountabilities* and to the extent possible, defines anticipated *outcomes and impacts*.

To move the policy yardsticks forward, ACAHO has identified 10 recommendations for the health research community and governments to consider. These recommendations focus on the country's health research, innovation and commercialization enterprise.

In a world that is increasingly competitive, inter-connected and rewards speed, it is clear that if Canada is to strengthen its social and economic fabric as well as its international standing – now and well into the future – it must continue to invest in the elements that support and nurture innovation; that is, people, structures, processes and outcomes. Managed within an integrated strategic framework, it is vital that we find ways in which to fully reap the health, social and economic dividends that come from a supportive and dynamic environment that encourages and embraces innovative behavior.

If we as a country do not embrace innovation as a high priority public policy goal, Canada will not be able to attract the great minds and talent needed to discover the ideas that will transform our society from good to great. Furthermore, any move away from such commitments would result in Canada falling out of step with those countries that place tremendous value on the linkages between creating clusters of knowledge and its spin-off effects.

At the end of the day, it is important to understand that the process of innovation is a race with no finish line. It is relentless and in perpetual motion. It is also clear that countries which continue to invest significant resources in research and development over the long-term are likely to be the knowledge leaders of tomorrow – and will reap the rewards that come with it. In short, standing still is not an option.

What is now required is that we be bold in our vision, focused in our implementation and relentless in our pursuit of excellence. Any country that has not developed integrated and coordinated systems of innovation that produce “value” – in this case improving the health of its citizens, the functioning of the health system and the vibrancy of its economy – will have diminished access to the great minds in the global race for talent, and will be relegated to being a country in decline with lower health outcomes, reduced quality of life and a compromised standard of living.

ACAHO looks forward to working collaboratively with the federal government, and others, with the objective of fully harnessing the potential that comes from investing in Canada's health research in innovation and commercialization enterprise.

SUMMARY OF RECOMMENDATIONS

A summary of the Association's recommendations are below:

Recommendation #1

That the federal government, in close collaboration with ACAHO and other stakeholders, develop a national strategic framework for Canada's health research, innovation and commercialization enterprise.

Recommendation #2

That the health research sector collaborate with the federal government to develop more robust, meaningful and internationally comparable benchmarks on health research which should be released to the public.

Recommendation #3

That the federal government fund the dimensions of health research (i.e., people, operating grants, indirect costs, and infrastructure) in a balanced manner that fully maximizes the value that comes from medical discovery, knowledge creation, knowledge translation and commercialization.

Recommendation #4

That the federal government develop a multi-year fiscal framework for public investments in health research, innovation and commercialization.

Recommendation #5

That the federal government ensure that Canada has an internationally competitive intellectual property protection regime.

Recommendation #6

That the federal government review the current range of tax policy instruments that are designed to encourage and accelerate private sector investment in health research, innovation and commercialization.

Recommendation #7

That the federal government continue to make progress on its regulatory approval times process.

Recommendation #8

That the federal government work collaboratively with the provinces and territories to ensure that both levels of government policy that support research, innovation and commercialization, are aligned.

Recommendation #9

In collaboration with Research Hospitals, Universities and Industry, the federal government consider options to expand its investment in pre-commercialization (i.e., development) gap funding mechanisms.

Recommendation #10

That the federal government continue to support programs that increase the number of graduates with both research and business skills required to bring new goods and products to the marketplace.

1. INTRODUCTION

The Association of Canadian Academic Healthcare Organizations (ACAHO) has developed this policy Brief in support of the federal government's Science & Technology Strategy "Mobilizing Science and Technology to Canada's Advantage".

The Brief builds on the three policy relevant reports that have been recently released by ACAHO:

- *Moving at the Speed of Discovery...From Bench to Bedside to Business* (November 2007)
- *Eureka! World First Discoveries and Other Major Medical Breakthroughs in ACAHO Member Institutions* (March 2008), and
- *From Microscope to Marketplace...Spin-Off Companies from ACAHO Member Institutions* (forthcoming in April 2008)

Combined, the reports focus on the roles and contributions of Canada's Research Hospitals – these are, our Teaching Hospitals, Academic Regional Health Authorities and their Research Institutes – which play a major role in creating knowledge and driving innovation to benefit the health of Canadians, improving the cost-effective delivery of health services, and contributing to sustained economic prosperity.

The ACAHO reports not only identify the different ways in which Research Hospitals provide a "rate-of-return" on health research, but emphasize the importance of developing a more integrated strategic policy framework (i.e., a health research "eco-system"), which promotes a more seamless approach to fully harnessing the many benefits (e.g., health, social and economic) that flow from our public and private sector investments in health research, innovation and commercialization.¹

ACAHO commends the federal government for releasing its Science and Technology Strategy in May 2007. Overall, the document provides thoughtful analysis and cogent directions, and identifies a range of key policy issues and solutions, in addition to providing an overarching framework which incorporates thirty-six policy announcements.

Importantly, the Strategy outlines the advantages of a strong science and technology foundation for Canada, and identifies four "pillars" that are essential to our collective future when it comes to advancing knowledge creation and its translation, innovation, and its contribution to sustained economic prosperity. Specifically, the Strategy links these goals and objectives to the following sectors where the government would like to focus more of its energies and resources:

1. Environmental Science
2. Natural Resources and Energy
3. ***Health and Related Life Sciences and Technologies***
4. Information and Communication Technologies

ACAHO is pleased that the federal government has identified the health and related life sciences and technologies sector as a key strategic area that warrants additional focus and investment. Given that we are in the early stages of a biotechnology revolution, the outputs from health research, innovation and commercialization can have a significant impact on human health, the overall architecture of our health delivery system, and our future wealth as a nation.

Based on the commitments outlined in the federal government's Science and Technology Strategy, the Association views the Strategy as a critical "statement of intent" for our sector. Building on the parameters that have been laid out by the federal government, it is vital that we arrive at a consensus on a series of strategic issues that impact our sector and move forward in a way that promotes *maximum synergies* at the policy level, improves overall *alignment* and *accountabilities* for our investments and, to the extent possible, defines *anticipated outcomes and impacts*.

In recognition of each sectors' unique set of characteristics and circumstances, ACAHO would support additional strategic thinking as it relates to the role of the federal government in relation to science and technology, and the health and related life sciences sector.

Being fully appreciative of the federal government's track record in investing and supporting health research and innovation over the past decade, members of ACAHO offer the following recommendations to the government in the spirit of collaboration and a genuine desire to see Canada move from "good to great".

2. FOUNDATIONAL POLICY PRINCIPLES FOR HEALTH RESEARCH & INNOVATION

Prior to moving to the series of recommendations contained in the Brief that are designed to advance Canada's science & technology strategy for the health and related life sciences and technologies sector, ACAHO has identified a series of *foundational* policy principles. A number of these principles build on those contained in the federal government's Science and Technology Strategy (i.e., promoting world-class excellence; focusing on priorities; encouraging partnerships; and enhancing accountabilities).

Considered as essential building blocks, these principles should be reflected in any future policy framework that is focused on the country's health research, innovation and commercialization enterprise:

- *Excellence-Based:* The starting point for all health research – is that we must focus on the principle of excellence. Embedded in this principle is the critical role that the peer-review process does play in identifying leading-edge research projects that merit support, and produce world-class results.
- *Collaboration and Partnership:* There are many interlocking pieces associated with the health research, innovation and commercialization enterprise that need to be functioning at an optimal level if we, collectively, are to harness their full benefits. With this in mind, it is critical that all components of the research spectrum (e.g., federal and provincial governments, and their respective funding agencies; the private sector, members of ACAHO, Universities and Health Charities) work collaboratively, in partnership so that the sum that flows from research, innovation and commercialization is significantly greater than its component parts.
- *Accountability:* Understanding that members of ACAHO reflect some of the most important public institutions in the country, it is a necessary and sufficient condition that they be accountable and transparent for the manner in which they set their strategic priorities, invest in the health research, innovation and commercialization enterprise, and to the extent possible, identify anticipated outcomes and impacts.
- *Value-for-Money:* If we are to continue to grow Canada's health research, innovation and commercialization enterprise, we must continually strive for new methods in which we can effectively capture and communicate the different ways in which new discoveries, as well as products and services contribute to the advancement of Canadian society and the larger global community.
- *Integration:* It is essential that the health research, innovation and commercialization enterprise, from early-stage, discovery-based research, to knowledge creation and translation, to the process of development, commercialization and market access, be considered within an over-arching integrated framework (i.e., health research eco-system). To maximize our overall "return-on-investment", we must ensure that all policy levers, wherever possible, are mutually reinforcing, and moving in the same direction.
- *Values-Driven:* Any discussion about the research, innovation and commercialization enterprise must be consistent with the core values that Canadians hold. The view of ACAHO is that health research, innovation and commercialization builds on the publicly-funded platform of Medicare, and looks to improve the health of Canadians, the cost-effective manner in which health services are delivered, and how we can contribute to sustained economic prosperity. In short, it is about better health and health care, and a vision for nation-building.

Combined, these six principles should be viewed as being supportive and *complementary* to the federal government's four principles. Furthermore, it is the interplay between these six policy principles that set the stage for the remainder of the Brief, and the recommendations that follow.

3. FROM STRATEGIC VISION TO IMPLEMENTATION

As set out in Section 1, when it comes to Canada's health research, innovation and commercialization enterprise, there are a number of "moving parts" that need to be effectively aligned if we are to fully reap the benefits of discovery, knowledge translation and product development. While, for the most part, they have been identified in the federal government's Science & Technology Strategy, there is no overarching framework for the health and related life sciences and technologies sector that speaks to how they should be maximally aligned.

The Association appreciates and is very supportive of the momentum that has been initiated with the release of the federal government's Science & Technology Strategy – and its focus on three "advantages": (1) entrepreneurial, (2) knowledge and (3) people. However, there remain some critical policy issues that have not been fully addressed that relate to the health research, innovation and commercialization enterprise and the federal role.

With the objective of promoting further clarity around the country's health research, innovation and commercialization enterprise and facilitating the development of a strategic roadmap for the sector, ACAHO would offer the following recommendation:

Recommendation #1

That the federal government, in close collaboration with ACAHO and other stakeholders, develop a national strategic framework for Canada's health research, innovation and commercialization enterprise.

Given the recent creation of the Science and Technology Innovation Council (STIC) chaired by Dr. Howard Alper, consideration could be given to creating a sector-specific Working Group which would report to STIC on developing a national strategic framework for the health and related life sciences and technologies. Alternatively, ACAHO would be pleased to work with the federal government and other stakeholders to further develop and refine a national strategic framework for the health and related life sciences and technologies sector.² ACAHO is also an important contributor to the work of *Research Canada...An Alliance for Health Discovery*.³

4. CONNECTING WITH CANADIANS

Consistent with the strategic roadmap that is developed for the health and related life sciences and technologies sector, it is incumbent that the health research community develop more effective ways in which to communicate to the general public, media, governments and the private sector the many important benefits that come from investing in health research, innovation and commercialization. Specifically:

1. Giving individual Canadians and the media access to state-of-the-art information that is both readily available and understandable so they can have more direct influence on their health status;
2. Driving new evidence through the health system so that providers can make cost-effective decisions that improve patient outcomes, and so that administrators and policy makers can improve the overall architecture, functioning and management of the health system; and
3. Accelerating the speed at which Canadian-owned, leading edge discoveries are converted into innovative products and services that will compete in an increasingly interdependent and competitive global economy; bringing with it highly skilled jobs, income, wealth creation and a growing public revenue stream.

In many instances, however, health research findings are complex (if not revolutionary) and their significant impacts are not always easily understood. While several national organizations have released reports that speak to the notion of “return-on-investment” – in its dimensions (health, social and economic), to date, there has not been a regular and systematic approach for gathering information and releasing it in a user-friendly way.⁴ At the end of the day, it is not only about improving the overall transparency and accountability for our investments in health research, but making sure that as many Canadians as possible – in addition to governments and the media – fully understand the value and potential life-changing impact that comes from research inquiry.

In this context, ACAHO would observe that the health research sector must continue to develop and communicate on a systematic basis, more practical methodologies to Canadians and governments that provide a better understanding of the (health, social and economic) return-on-investment that comes from health research, innovation and commercialization.

Notwithstanding the recent work of ACAHO, the Canadian Academy of Health Sciences is leading a process to determine the most effective set of metrics to measure the different ways in which health research produces a return-on-investment. The Association strongly supports this initiative and is a co-sponsor of the study. At the same time, ACAHO has been supportive of other initiatives that look to improve the overall literacy of Canadians when it comes to science and technology.⁵

Recommendation #2

That the health research sector collaborate with the federal government to develop more robust, meaningful and internationally comparable benchmarks on health research which should be released to the public.

To move the yardsticks forward, ACAHO has developed a funding flow survey tool to capture the full dimensions of funding the health research enterprise. Given the importance of full disclosure and the need to better understand the linkages of funding sources to their intended uses, ACAHO believes the time is right to have such a tool administered in the public interest. For example, this survey tool could be adopted by Statistics Canada or the Canadian Institute for Health Information (CIHI) as part of their annual surveys, with the information released to the public.

5. HOW DO THE PIECES COME TOGETHER?

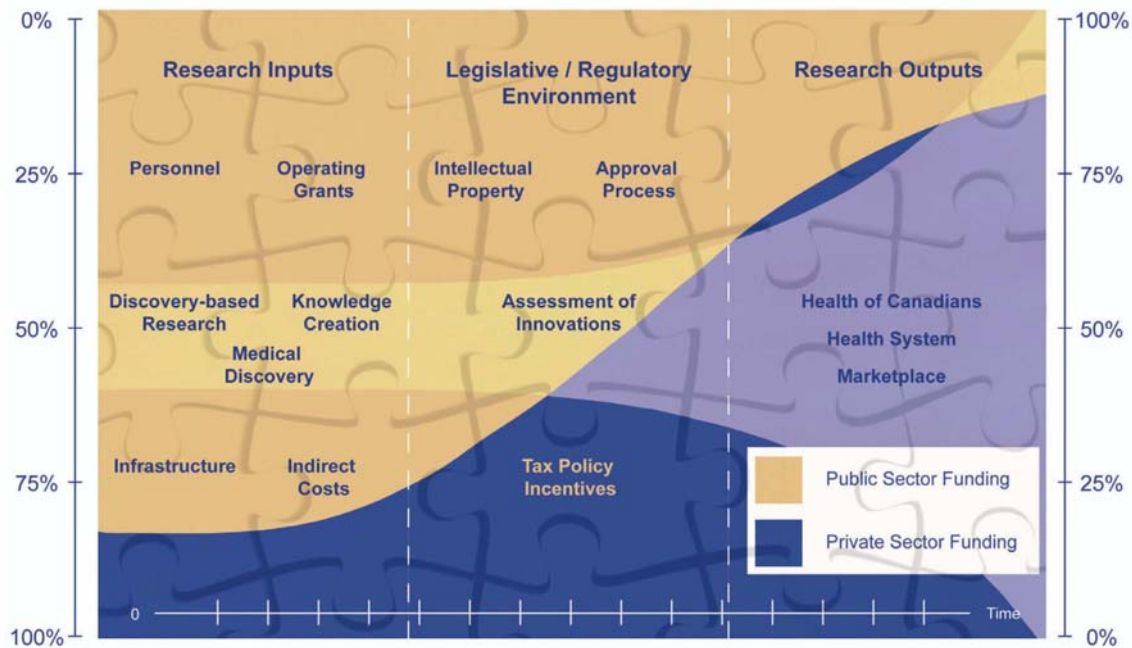
ACAHO continues to applaud the federal government for its growing and significant strategic role in nurturing the health research, innovation and commercialization enterprise in Canada. Specifically, it is important to recognize that the government occupies many critical roles when it comes to supporting health research in Canada: as a legislator, regulator, performer, funder, user and evaluator.

Equally important is the fact that the federal government provides 75 cents of each public dollar that is invested in health research.⁶ Clearly, the government has an essential leadership role to play with ACAHO members – our Teaching Hospitals, Academic Regional Health Authorities and their Research Institutes and affiliated Universities (and Faculties of Medicine and Health Sciences) – who, on a national basis, conduct close to 80 per cent of all publicly-funded health research across the country.⁷

In addition to the federal role, there are a number of other players who have important strategic roles and responsibilities to play when it comes to health research (e.g., Universities and their Faculties of Medicine and Health Sciences, Industry, and the Health Charities).

As set out in Exhibit 1, ACAHO views the health research, innovation and commercialization enterprise as an “eco-system” – comprising a number of areas and programs which cut across both the public and private sectors. In the view of the Association, this value-chain must exist across a seamless continuum, and as research moves from its infancy to a mature product or service, there are a number of pieces of the innovation puzzle that must be aligned or “in sync”.

Exhibit 1
The Structure & Funding of Canada's
Health Research, Innovation and Commercialization Eco-system



Source: ACAHO

ACAHO has identified three stages of Canada's health research ecosystem: (1) Research Inputs; (2) the Legislative/Regulatory Environment; and (3) Research Outputs. While these three stages are framed horizontally, they are closely linked, if not inseparable, to the "advantages" of *entrepreneurialism*, *knowledge* and *people* set out in the federal government's Science and Technology Strategy.

Given the range of different policy instruments that are at the disposal of the federal government, it is our view that if we are to fully maximize the value (i.e., impact) that we extract from medical discovery, knowledge creation, knowledge translation and commercialization in the health sector, we need to ensure that we "invest" in the range of moving parts – for each stage of the health research ecosystem – in a *balanced* manner.

Research Inputs

In many respects, early-stage, discovery-based research – which is largely publicly funded with the federal government playing a predominant role – is the precursor to the creation and translation of knowledge and the development and commercialization of products and services. In this context, the phrase "you cannot commercialize what you have not discovered" has important meaning, and emphasizes the vital linkages between the public and private sectors.

The Association is of the view that there are four prerequisites for sustaining the early stages of the health research, innovation, commercialization enterprise:

People – the development, recruitment and retention of world-class health researchers is fundamental to our future success. This requires that we carefully consider our training requirements and the programs (e.g., Canada Research Chairs, Canada Global Excellence Research Chairs) that develop, retain and attract world-class researchers so that Canada – and the global community – will benefit from their expertise and potential.

Operating Grants – We need to ensure that our Granting Councils (such as the Canadian Institutes of Health Research) are funded at internationally competitive levels so that we can continue to support research excellence and a growing number of cutting-edge health research initiatives. For example, if one were to adopt the “1%” solution for CIHR (as proposed by the Kirby Committee Report) – their base funding would currently stand at \$1.6 Billion annually, rather than their current \$917 million annually.⁸

Indirect Costs – Support for the ongoing costs that are associated with health research (for example, through the federally funded Indirect Costs program), is a critical link in continuing to support the country’s capacity for health research.

Infrastructure – Appreciating the increasing complexity of infrastructure and technology that are required to support leading-edge research, such as through the Canada Foundation for Innovation, it is critical that we continue to invest in developing world-class research facilities.

Importantly, all of the four areas are clearly recognized in the federal government’s Science and Technology Strategy.

In past submissions to the House of Commons Standing Committee on Finance, ACAHO has offered a series of specific recommendations to the federal government.⁹ These recommendations are important, and speak to the order-of-magnitude of investments that are needed; however, what is equally important is that the right *structures, processes, outcomes, environment* and *balance* are in place that allow research, innovation and commercialization in the health and related life sciences and technologies sector to flourish on an unprecedented basis.

In this context, the Association would offer the following recommendations to the federal government:

Recommendation #3

That the federal government fund the dimensions of health research (i.e., people, operating grants, indirect costs, and infrastructure) in a balanced manner that fully maximizes the value that comes from medical discovery, knowledge creation, knowledge translation and commercialization.

Recommendation #4

That the federal government develop a multi-year fiscal framework for public investments in health research, innovation and commercialization.

As it stands, each Federal Budget provides funds for each federal instrument dedicated to health research, innovation and commercialization. To facilitate a more rational policy conversation and planning process that fully leverages our investments in health research, innovation and commercialization across the country, it is vital to develop a sustainable, multi-year federal fiscal framework. In its absence, we continue to run the risk of lurching from year-to-year funding in an environment plagued by uncertainty.¹⁰

Legislative/Regulatory Environment

As outlined in the federal government’s Science and Technology Strategy, the Association would agree with the assessment that we need to review how we attract increased private sector investment. While part of the answer lies in the fact that we have growing clusters of world-class scientists and public sector investments in health research infrastructure, we must also reflect on the kind of *environment* that is in place and which will attract pools of private sector capital – facilitating the development and commercialization of products and services in Canada.

This is a particularly important point if Canada is going to compete and win in an increasingly interdependent and competitive knowledge-based global economy where speed matters. We must consider ways in which we can build on the publicly-funded platform of Medicare and own the factors of production

(i.e., capital, entrepreneurship, land and labour) that drive innovation and commercialization and allow Canada to capture the health, social and economic benefit that comes with the creation, ownership and dissemination of new knowledge.

In the view of ACAHO, this is where the federal government has a powerful role to play, with a number of policy levers at hand (e.g., legislative, regulatory, fiscal, funding, evaluative) to consider and address the following interlocking policy issues:

1. *Intellectual Property Protection* – do we have an internationally competitive intellectual property protection regime?
2. *Tax Incentives* – do we have the right mix of tax policy instruments that will encourage the private sector to expand investment in Canada?
3. *Regulatory Approval Processes* – are we satisfied that our approval processes are both thorough and carried out within efficient timelines?
4. *Technology Assessments* – How can we balance the introduction of cost-effective new technologies in a world of scarce public dollars invested in the health system?

ACAHO respectfully recommends:

Recommendation #5

That the federal government ensure that Canada has an internationally competitive intellectual property protection regime.

As we continue to develop our capacity to discover new knowledge and develop leading-edge innovations, and attract private sector investment, it becomes increasingly important that we ensure that our intellectual property regime is internationally competitive.

Recommendation #6

That the federal government review the current range of tax policy instruments that are designed to encourage and accelerate private sector investment in health research, innovation and commercialization.

While there is a number of tax policy levers to be considered (e.g., corporate tax rates, and capital cost allowances), the federal government must consider how the current mix of tax rates, deductions and programs act as a (dis)incentive on capital formation and the derivative economic benefits that flow from investment. The announced changes to the Scientific Research & Experimental Development program in Budget 2008 are welcomed for both the assistance to small firms and for improved administrative procedures.

Recommendation #7

That the federal government continue to make progress on its regulatory approval times process.

Based on the most recent public information available, the federal government should be applauded for the reduction in time to approve new products.¹¹ That said, good should not be the enemy of better and we should look for ways in which we can continue to decrease review times that are in the best interest of the Canadian public when it comes to accessing innovative goods and products.

Recommendation #8

That the federal government work collaboratively with the provinces and territories to ensure that both levels of government policy that support research, innovation and commercialization, are aligned.

As much as the federal government's Science and Technology Strategy is an important statement of policy, it is less than clear on the mechanism(s) it will use to consult and work with the provinces and territories.

While the overarching science and technology strategy is federal, this is a particularly important point given that all of the authority and responsibility of purchasing and diffusing innovative goods and products occurs at the provincial and territorial level, given their constitutional responsibilities.

Hence, the challenge is not only to ensure that the federal government creates an environment where innovation can flourish, but in the context of health research, the provinces and territories also have a critical role to play in terms of *enabling* market access. As we move forward, it will be important to square the circle between nurturing the development of innovative goods and products – where the federal government plays such a large role – and their diffusion into the health system – where the provinces and territories play such a large role. Depending on its terms of reference and work plan, there might be a role for the Science, Technology and Innovation Council in this regard.

In the view of ACAHO, this underscores the need for the federal, provincial and territorial governments to establish a process through which they can find common ground so that the policy levers which support and nurture health research, innovation and commercialization are maximally aligned.

Research Outputs

The final piece in the research eco-system outlined in Exhibit 1, and also identified in the federal government's Science and Technology Strategy, is how we *convert* new knowledge into a range of innovative goods and products that are available in Canada and the global marketplace.¹²

The route from a nascent medical discovery to a commercially successful product passes through several extremely different financial eco-systems. The funding environment from which the discovery emerged is usually characterized by significant government funding through academic granting agencies such as the Canadian Institutes of Health Research (CIHR). With rare exceptions, this environment funds the discovery itself but not the subsequent research required to *develop* the discovery into a good or product.

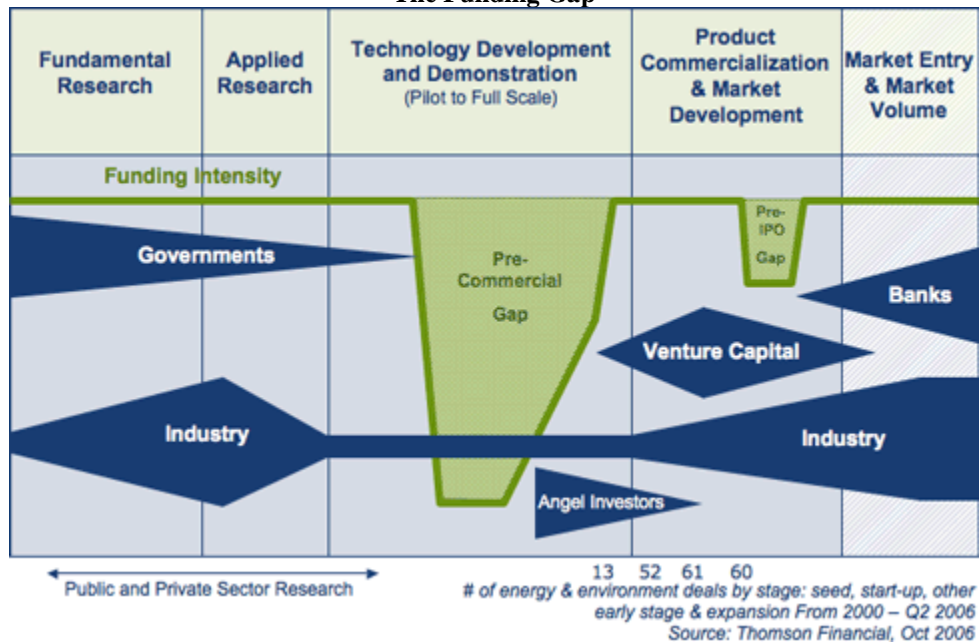
At the other end of the spectrum, a discovery that has been turned into a good or product will receive private sector support to get it into the market place and generate revenue. The private sector is willing to invest heavily in goods or products that have reached a stage of the development process where they carry an acceptable level of risk.

As set out in Exhibit 2, the problem is that the point where discovery research stops is not the point where private sector research begins. In other words, the lack of maturity (or development) of new technologies and the risk-aversion of the financial sector, there is a structural breakdown in the innovation chain. This occurs in the stage prior to commercialization and market development funding.¹³

Discovery-based research effectively stops when something is discovered, characterized, and understood. At this stage, the ability to convert a discovery into a good or product carries high risk – for example, the good or product development phase may reveal instabilities, toxic side-effects, lack of efficacy in clinically relevant models, prohibitive cost issues and a host of other challenges. Most medical discoveries do not lead to commercially successful products. Because of this, private sector companies do not pick up projects until they have gone through a risk reduction phase. This is the (pre-commercial) gap between discovery and successful commercialization (see Exhibit 2). With the existence of this gap, many good ideas leave Research Hospitals and their Research Institutes too early, and/or Canadian companies in their second stage of funding are at the same stage of development as American companies at their first.

The development of effective innovative processes are important to the improvement of our health care system. Improved models of commercialization of processes within the health system and for export need to be developed to ensure maximum value is obtained from these forms of innovation.

**Exhibit 2
The Funding Gap**



To date, governments have initiated programs focused on some of the elements related to the commercialization of discoveries.¹⁴ In some cases, however, rather than funding “the gap” they fund commercialization officers – people with expertise to move products down a developmental pipeline. While this is a necessary and important step, investing in people alone cannot close the gap – they are needed, in fact, only when the gap is closed and funding is available to drive products down the commercialization pipeline.

An exception to this is the POP (Proof-of-Principle) program initiated by CIHR.¹⁵ Alternatively, in some cases, government has created matching programs that encourage industry and academics to work on joint projects.¹⁶ This, however, also misses the gap because as noted above, industry is reluctant to invest in early stage (i.e., high risk) projects even when their funding is matched.

Enhanced pre-commercialization “gap funding” would allow institutions to take seriously the “D” in R&D and drive products to the point where industry was interested in spending their funding to finish the job by incubating ideas to a greater level of maturity, and avoid the situation where new discoveries leave a Research Hospital too early. Institutions would have to respond by ensuring that they hired experienced project managers who had the know-how to undertake product development rather than the more traditional discovery research approaches.

As it stands, the federal government has a combination of policy levers (e.g., evaluative, tax policy, direct funding) with which it can focus on addressing the current pre-commercialization gap funding challenges.¹⁷ With a view to expanding the development capabilities of members of ACAHO and working collaboratively with government and Industry, the Association would offer the federal government the following recommendation.

Recommendation #9

In collaboration with Research Hospitals, Universities and Industry, the federal government consider options to expand its investment in pre-commercialization (i.e., development) gap funding mechanisms.

As noted earlier, in addition to the challenge of enhanced access to development capital, we need to ensure that we have an adequate supply of “human capital”; the talented people who can move innovative discoveries through the research to product development to the marketplace value-chain. As vital as scientists are to the discovery process, they may not have all of the requisite skills to develop a business case, access financing and address all required legal/regulatory issues.

Recommendation #10

That the federal government continue to support programs that increase the number of graduates with both research and business skills required to bring new goods and products to the marketplace.

6. THE CONSEQUENCES OF INACTION

In today’s fast-paced world, the creation, translation and application of knowledge represent the lifeblood of discovery, and the currency of an increasingly information-driven global economy. While the discovery of new knowledge is the forefather of innovation, our future quality of life and overall standard of living depends on our collective ability to harness the many benefits that come from new discoveries.

In our view, Canada needs to ensure that it has a health research eco-system that is fully functioning in terms of its ability not only to create new knowledge, but to translate that knowledge to Canadians, into the health system and via the marketplace.

In a world that is increasingly competitive, inter-connected and results-oriented, it is clear that if Canada is to strengthen its social and economic fabric as well as its international standing – now and well into the future – it must continue to invest in the elements that support and nurture innovation; that is, people, structures, processes and outcomes. Managed within an integrated strategic framework, it is vital that we find ways in which to fully reap the health, social and economic dividends that come from a supportive and dynamic environment that encourages and embraces innovative behavior.

If we as a country do not embrace innovation as a high priority public policy goal, Canada will not be able to attract the great minds and talent needed to discover the ideas that will transform our society from good to great. Furthermore, any move away from such commitments would result in Canada falling out of step with those countries that place tremendous value on the linkages between creating clusters of knowledge and its spin-off effects.

Specifically, we could jeopardize the important gains we have made in attracting world-class scientists and our ability to lay claim to new knowledge and innovations that are highly prized, bringing with them highly skilled jobs, growing incomes, wealth generation, capital formation, robust public revenue streams, a higher quality of life and sustained economic prosperity. We would also compromise Canadians’ access to state-of-the-art discoveries that could have a significant impact on their health status.

Clearly, members of ACAHO look forward to continuing to contributing to our country’s dynamism, and our ability to push the boundaries of innovation – to the benefit of all.

7. IN CLOSING

At the end of the day, it is important to understand that the process of innovation is a race with no finish line. It is relentless and in perpetual motion. It is also clear that countries which continue to invest significant resources in research and development over the long-term are likely to be the knowledge leaders of tomorrow – and will reap the rewards that come with it. In short, standing still is not an option.

In closing, ACAHO believes that the health research, innovation and commercialization enterprise is a key component of Canada’s Science and Technology Strategy and presents Canada with a unique opportunity to improve the quality of life of Canadians while advancing our standard of living by:

- Creating a nimble and well-educated workforce that can compete on a global scale in attracting talent and resources.
- Developing clusters of knowledge-based industries that support the health sector.
- Providing access to state-of-the-art, world-class research infrastructure.
- Ensuring the skills and processes are in place to translate knowledge to Canadians, into the health system, and across the global marketplace.
- Nurturing more effective relationships and programs between the public and private sectors, that accelerate technology transfer and commercialization.
- Creating jobs and revenues, owning the factors of production, and generating predictable public revenue streams.

Any country that has not developed and coordinated integrated systems of innovation that produce “value” – in this case, improving the health of its citizens, the functioning of the health system and the vibrancy of its economy – will have diminished access to the great minds in the global race for talent, and will be relegated to being a country in decline with lower health outcomes, reduced quality of life and a compromised standard of living.

What is now required is that we be bold in our vision, focused in our implementation and relentless in our pursuit of excellence.

ACAHO looks forward to working collaboratively with the federal government, and others, with the objective of implementing the Science and Technology Strategy and fully harnessing the potential that comes from investing in Canada’s health research in innovation and commercialization enterprise.

END NOTES

¹ We refer to the terms “health research”, “innovation” and commercialization” separately only to distinguish the fact that while they are all closely related to one another, health research does not always produce commercialized goods, or innovations. That said, advances that come from science and technology are related to investments in health research along a continuum that *produce* new innovations that may or may not be commercialized.

² From the perspective, its recent release “*Moving at the Speed of Discovery – From Bench to Bedside to Business*” (December, 2007) provides an important point of departure not only in terms of a strategic framework in which to consider the health research, innovation, commercialization enterprise, but also how we think of a “rate-of-return” that flows from our investments in health research.

³ *Research Canada – An Alliance for Health Discovery* is in the process of developing a “functional innovation system” which is a framework for considering our sector’s policy issues and challenges as they relate to science and technology.

⁴ Several documents have been released that focus on the different ways (i.e., health, social and economic) in which health research provide a rate-of-return: “*Moving at the Speed of Discovery – From Bench to Bedside to Business*” (November, 2007, ACAHO); “*Your Dollars at Work, 2006-2007*” (Canadian Institutes of Health Research); “*Discovery. Innovation. Our Future*” (November 2006, Council of Academic Hospitals of Ontario); “*Health Research – An Investment in Canada’s Well-Being*” (January, 2003 Health Research Advocacy Network – now Research Canada...An Alliance for Health Discovery).

⁵ ACAHO was a co-sponsor and member of the Steering Committee of a Media Science Forum, led by Research Canada...An Alliance for Health Discovery. The purpose of the Forum was to raise awareness about the gap between science and the media with the aim of fostering fair, accurate and easy-to-understand information and messages about health research for Canadians.

⁶ Statistics Canada. Science Statistics – Science, Innovation and Electronic Information Division. Catalogue Number 88-001-XIE/ISSN1209-1278, March 2007.

⁷ ACAHO Research Funding Flow Survey, 2006. The national figure of close to 80% recognizes that there will be variations in funding for health research in ACAHO member institutions across the country.

⁸ *The Health of Canadians – The Federal Role*. Final Report on the State of the Health Care System in Canada. October 2002, page 211.

⁹ In its September 2006 Brief submitted to the House of Commons Standing Committee on Finance, ACAHO made the following recommendations: (1) *That the federal government take the appropriate steps to invest \$1.0 Billion in support of world-class research infrastructure through Canada Foundation for Innovation (CFI) in 2007*; (2) *That the federal government – as it continues to support initiatives that accelerate the commercialization of (health) research – must take into account the unique characteristics of Canada’s Teaching Hospitals/Centres and their Research Institutes, and the role they play in the commercialization process*; (3) *That the federal government increase funding available for the indirect costs associated with research funded by the three federal Granting Agencies from \$300 million to \$450 million (40%), effective 2007/08*; (4) *That the federal government increases the base budget of the Canadian Institutes of Health Research (CIHR) by \$350 million over the next 3 years, and consider targeted funds that are issue-specific and strategically focused*.

¹⁰ While it is recognized that in most federal budgets, estimates for the following year are often included, there are often flat-lined. Conversely, the 2004 First Ministers Agreement (“A 10-Year Plan to Strengthen Health Care”) sets out a ten-year fiscal framework for the health system, with a built in 6% escalator via the *Canada Health Transfer*.

¹¹ Industry Canada, Canada’s Pharmaceutical Industry Scorecard. Presentation to Canada’s Pharmaceutical-Based Research Companies, November 14, 2007.

¹² Some important thinking in the Canadian context has been undertaken by the Expert Panel on Commercialization “*People and Excellence: The Heart of Successful Commercialization*”. Volumes I and II, 2006.

¹³ Sustainable Development Technology Canada – The Funding Gap. www.sdte.ca.

¹⁴ For example, at the federal level: the government created the \$350 million Centres of Excellence for Commercialization and Research (CECR), and reviewed the objectives of the SR&ED program in 2007; allocated \$50 million over 5 years in 2004 to further strengthen the commercialization of University and Research Hospital research; and invested \$250 in the Business Development Bank of Canada to increase the amount of early-stage and late-stage venture capital available for innovative Canadian companies in 2004.

¹⁵ Many of the inventions/discoveries arising through academic research are at a stage beyond discovery-driven research and yet are often of uncertain commercial utility or insufficiently developed to be of interest to relevant receptor companies and potential investors. Such intellectual property may never be licensed or commercialized, or take years to do so, without additional targeted research, market research, investment and business development activities. These activities are of paramount importance, because they serve to validate, better define and add value to the intellectual property, particularly proof-of-principle research and prototype development. Such activities require resources that typically cannot be obtained through the traditional funding mechanisms. CIHR’s Proof of Principle Program aims at filling part of this funding gap. CIHR Proof-of-Principle Phase I (POP-I) Grants will fund proof-of-principle research projects of up to 12 months duration designed to advance discoveries/inventions towards commercializable technologies, with a view to attract new investment and create new science-based businesses. Proof-of-Principle Phase II (POP-II) Grants will fund proof of principle research projects up to 12 months duration at the co-investment stage undertaking follow-on proof-of-principle activities in partnership with a non-academic investor. This funding opportunity is aimed at providing a platform to better enable the academic institution/researcher to move the discovery/invention further down the innovation pipeline.

¹⁶ Programs include NSERC’s “Idea to Innovation” program, NSERC Industrial Research Chairs, Collaborative Research and Development Grants, and the Industrial Research Assistance Program (IRAP).

¹⁷ As an illustration, in its recent submission to the federal government’s review of the Scientific Research & Experimental Design (SR&ED) tax incentive program, ACAHO recommended that “*That the federal government extend the SR&ED tax incentive program to cover pre-commercialization activities, including patenting, prototyping, product testing*”. This, in part, would assist in reducing some of the risk absorbed by the private sector in developing and introducing new goods and products to the marketplace.