

Alberta Health Services

and

Health Research

Report

Prepared by

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and

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Most importantly, we would like to thank the individuals involved in Alberta Health Research. They made time in their demanding schedules to provide input through meetings and written submissions. This is but one example of their belief in, and their commitment to, the excellence in research for quality clinical care and health promotion.

D. Lorne Tyrrell
Roger Palmer

Executive Summary

Mandate

This report was prepared at the request of the Chief Executive Officer (CEO) and Chair of the Board of Alberta Health Services (AHS). The purpose is to provide a vision and framework for AHS's support of health research within the new structure of AHS, that is coordinated with the ministries of Alberta Health and Wellness (AHW) and Advanced Education and Technology (AET) along with the universities, colleges, and the integrated Research and Innovation Corporations envisaged in Bill 27 ("Alberta Research and Innovation Act" reflecting AET's *Roles and Mandates Framework for Alberta's Provincially Funded Research and Innovation System: Focusing and Accelerating Innovation*).

Background

Health service delivery in Alberta was restructured in April 2008. Services previously delivered by the nine regional authorities, the Alberta Cancer Board (ACB), the Alberta Mental Health Board (AMHB), and the Alberta Alcohol and Drug Abuse Commission (AADAC) were combined under one Provincial board, Alberta Health Services (AHS). This is the largest integrated health system in Canada serving 3.5 million people with over 7000 physicians, 85,000 staff, and over 400 facilities.

At the same time, AET is undertaking a major overhaul of the structure of Alberta's research and innovation system and AHW has begun a process to identify the research priorities for the health sector. With so much change being undertaken in the Alberta research "system", it is especially important for AHS to clarify its role and mandate in relationship to research. In our view, it is vital to integrate the healthcare delivery with research and the education of healthcare providers. Health-Professional Faculties (Medicine, Nursing, Dentistry, Rehabilitation Medicine, Pharmacy & Pharmaceutical Sciences) provide much of the complex healthcare services and so AHS must be an active partner in education and research.

The economy provides another major context for this report. The province has enjoyed 15 years of surplus budgets, primarily as a result of oil and natural gas royalties. However, an anticipated Alberta surplus of 8.5 billion dollars in August 2008 has disappeared and a deficit of 1.4 billion dollars is now predicted as a result of the retraction of the global economy and its effect on the Alberta economy.

As we conducted this review, understandably, there were concerns expressed by researchers related to uncertainty about future direction, the structure of research and healthcare delivery, the authority to make decisions, and the loss of relationships built under the previous structures. There were concerns expressed that Alberta's world-class researchers and clinicians will look for research opportunities outside of Alberta. The "best researchers and clinicians" are often attracted by research opportunities and the best are always attractive targets for recruitment. This concern has been further magnified by the latest round of salary competitions at the Alberta Heritage Foundation for Medical Research (AHFMR), where the message is clear that the AHFMR is moving away from long-term salary support.

However, people believe that along with the challenges, there are opportunities. There are opportunities for better cooperation and coordination under this new centralized healthcare model.

Many stakeholders felt that this may be the opportunity for more intra-provincial cooperation to replace the historical unhealthy competition between Calgary and Edmonton. There was enthusiastic support to build Provincial research databases and access to Province-wide, non-identifiable patient databases. There was also recognition of the value of coordination with other provinces and countries.

Summary of Findings

We strongly support the concept of the Academic Health Centre (AHC) that is founded on the integration of research, education, and patient care. We have adopted the 2004 definition of the United States Academy of Science:

“An Academic Health Centre is not a single institution, but a constellation of functions and organizations committed to improving the health of patients and populations through the integration of their roles in research, education, and patient care to produce the knowledge and evidence base that becomes the foundation for both treating illness and improving health. The integration involves more than the simultaneous provision of education, research and patient care. It requires the purposeful linkage of these roles so that research develops the evidence base, patient care applies and refines the evidence base, and education teaches evidence-based and team-based approaches to care and prevention.”

This definition is often taken as being physician-centered and hospital-based: we don't accept that narrow interpretation. In this report, the expanded definition of AHC refers to the inclusion of all healthcare professionals and in a broad range of sites.

The Alberta government has invested in people and physical infrastructure that is comparable to the best AHCs. A snapshot of operating funding and ongoing salary support from AHS estimates the investment was \$365 million for 2007-08 in support of health research initiatives. The vast majority was from peer-reviewed funding through CIHR and AHFMR. However:

- Alberta does not have an effective system for bringing the findings of research to the bedside to improve care.
- Alberta is strongest in biomedical research (Canadian Institutes of Health Research – CIHR “Pillar” I) but weak in support of research into health systems and prevention/population health (CIHR Pillars III and IV).

There is no common database for health research in the Province. This has been a source of frustration for most who attempt to get an accurate picture of health research funding in Alberta. On a going-forward basis, there needs to be an accurate database of health research funding in the Province. Furthermore, research in Pillars II, III, and IV has been impeded by difficult access to non-identifiable patient databases in Alberta and this must be addressed.

Our study revealed concern when we benchmarked with several Canadian jurisdictions. Alberta's two research-intensive universities are losing ground in winning competitive health research funding. There could be many reasons for this but we do not believe that the quality of the research activity in Alberta has declined. Rather, our initial conclusion is that clear Provincial priorities that are linked with a collaborative approach to providing matching grants and infrastructure support to create teams could reverse this trend. This may be assisted by restructuring the mandate of AHFMR to address the current needs of networking and teamwork approaches – just as the Michael Smith Foundation for Medical Research in British Columbia has facilitated their success. However, AHFMR needs to be retained as a

recruitment tool for students, PDFs and young scientists with establishment grants. Other key issues that will reverse this trend are operating grant funding from the Province, sustainable funding for infrastructure, and a provincial commitment to matching funding for successful CFI, CERC, and Genome Canada grants.

This report recommends a vision and governance framework in which AHS health research can further AHS's potential. The approach to the governance describes three levels: Macro, Meso, and Micro. "Macro" refers to the legislative framework and mandates of Alberta Advanced Education and Technology (AET) and Alberta Health and Wellness (AHW). The "Meso" refers to the AHC relationship between AHS, the universities, and the Provincial Health Corridors. "Micro" refers to health research at zone or university levels which does not logically fit within the AHC Health Corridor, but is important and significant to the specific area. Micro level projects are likely to be Pillar III or IV health research.

We believe that the basic building block of the organization of AHS should be a set of units that each provides Province-wide care integrated with a research agenda and a responsibility for the education of healthcare providers. Our vision sees AHS organized so as to provide patient-centric services which maximize local delivery but also ensure all Albertans have equitable access to the best-of-the-best when that is needed. We call these units "Health Corridors" and see Cancer Care in the Province as closest to the ideal but some recent organizational changes appear to have eroded those strengths and fragmented the accountability.

There is documented evidence that research in health is an investment that pays dividends in quality of health care and long-term financial savings that do not necessarily result in less spending, but more opportunities to use healthcare funding more wisely. To keep the research momentum going, this is not the time to entrench but a time to examine increased operating funds for research (now at 2-3% – target of 5% of healthcare costs), secure Provincial priorities, and provide matching funds where possible to bring our share of federal funding to Alberta and to seriously examine the need for sustainability funding for operation and maintenance of major Provincial research platforms.

Summary of Recommendations

Recommendation 1: That AHW, AET, and AHS and their university partners clearly adopt the model of the integrated (patient care, education, and research) and expanded Academic Health Centre.

Recommendation 2: That AHS expand its vision and mission statements to recognize the important role of AHS in health research and education of healthcare professionals. Similarly, the vision and mission statements of the partners in these activities should recognize the importance of their partnership with AHS. AHS plays a critical role in education for placements and the training environment for health sciences students and residents in Royal College training programs. Pillars II, III, and IV research requires direct and indirect support from AHS.

Recommendation 3: That AHS and its partners establish and maintain a common Province-wide database for health research projects in Alberta. This database will be extremely useful for the AHS and universities including establishing priorities for research institutes in Health Corridors.

Recommendation 4: That AHS should support a coordinated Province-wide strategy to improve our ability to attract federal research dollars to Alberta.

Recommendation 5: That AHS support restructuring of the mandate and roles of AHFMR, but emphasize that the restructuring needs to be done while supporting the following principles:

- The salary burden of Scientists and Senior Scholars should be transitioned to the universities with careful planning by AET, AHW, and the universities. A transfer without this planning would seriously damage the reputation of the Province and make future recruitment very difficult.
- The AHFMR should be retained as an important recruitment tool, but there should not be the expectation of career-long salary support from the AHFMR.
- The endowment of the AHFMR should be protected to support health research.
- The AHFMR decision making must remain on the basis of peer review.
- International standards must be maintained and ensured by periodic reviews.

Recommendation 6: That AHS and its partners establish a working group to improve ethics reviews and contracting processes for clinical trials. The working group can learn much from the Northern Alberta Clinical Trials and Research Centre (NACTRC) and possibly apply much from this model to a Provincial model and possibly to a national strategy. Even before a Provincial-wide model is in place, there should be a transition phase with reciprocity recognition of approvals where applicable.

Recommendation 7: That AHS define its expectations for the impact of SEARCH (Swift and Efficient Application of Research in Community Health) Canada on knowledge translation (KT) and supporting research training capacity in rural Alberta. An evaluation should result in a clear decision whether or not AHS (AHW) will continue to support SEARCH.

Recommendation 8: That AHS recognize its opportunity and responsibility to build a culture of research through Pillars II, III and Pillar IV research on major issues of importance to the quality, safety, and sustainability of the publicly-funded healthcare system. AHS should clearly identify their research priorities in Pillars II, III, and IV and provide direct and indirect support of these pillars.

Recommendation 9: That AHS strongly support the business plan for mental health and addiction research and recruitment to the endowed research chairs established by AMHB should not be delayed.

Recommendation 10: That the Alberta Cancer Research Institute (ACRI) Governance Model and the Business Plan should be fully supported by AHS and the research institute model be seriously considered as a model for additional Province-wide research institutes.

Recommendation 11: That AHS, working with AHW, should establish a non-identifiable patient database to support research in Pillars II, III, and IV. Consultation with successful models outside of Alberta will be invaluable in this process. Access to this database is critical for AHS assessment of effectiveness of clinical services and health research.

Recommendation 12: That AHS continue to recognize the important role played by disease-based and hospital-based foundations by supporting jointly approved initiatives and activities.

Recommendation 13: That AHS encourage AET and AHW to jointly fund Genome Alberta sufficiently well to engage in a genomic research priority-setting process and to fund peer-reviewed grants in “omics” related to human health.

Recommendation 14: That AHS appoint individuals responsible for research in each of the five zones. These appointees should be jointly appointed with universities, where applicable.

Recommendation 15: That AHS support the appointment of the Deans of Medicine as *ex officio* members of the AHS Board. This will improve communication with the medical community which is critically important.

Recommendation 16: That AHS strongly support the Committee for Academic Medicine to build strong research programs in all Health Sciences Faculties in the Expanded Academic Health Centres. This committee should play a key role in joint appointments and evaluation and approval of research institutes and educational roles of Health Corridors (see recommendation 17).

Recommendation 17: That AHS consider the development of “Health Corridors” with tri-partite (research, education, and patient care) responsibilities and building on the Cancer Corridor model.

Recommendation 18: That AHS, with its key partners, support the development of Provincial research institutes to increase Province-wide cooperation and collaboration. These Provincial research institutes should be established and evaluated jointly by AHS and universities through the Committee for Academic Health Centres.

Alberta Health Services and Health Research Report

I. Mandate

This report was prepared at the request of the Chief Executive Officer (CEO) and Chair of the Board of Alberta Health Services (AHS). The purpose is to provide a vision and framework for AHS's support of health research within the new structure of AHS, that is coordinated with the ministries of Alberta Health and Wellness (AHW) and Advanced Education and Technology (AET) along with the universities, colleges, and the integrated Research and Innovation Corporations envisaged in Bill 27 ("Alberta Research and Innovation Act" reflecting AET's *"Roles and Mandates Framework for Alberta's Provincially Funded Research and Innovation System: Focusing and Accelerating Innovation"*).

II. Background

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The review of the AHS research vision and framework must be viewed within the context of other Provincial initiatives. AHS operates under the legislative mandate of Alberta Health and Wellness (AHW). In April 2008, the Premier mandated the Minister of AET to prepare an inventory of current research and innovation activities, identify strengths, overlaps, and gaps and make appropriate observations as they relate to increased effectiveness of research and innovation. The three major areas identified for this review were: a) Health, b) Bio-industries, and c) Energy and Environment. Another context for this project is the Memorandum of Understanding (MOU) signed by the Provosts of the Universities of Calgary and Alberta and the Deputy Ministers of AHW and AET (January 2009). The intention of this MOU is to give a Provincial perspective on academic medicine and to create an accountability and transparency mechanism that considers all of the expenditures in academic medicine. The global, Canadian, and Provincial economies provide another major context for this report. The Province has enjoyed 15 years of surplus budgets, primarily as a result of oil and natural gas royalties. However, an anticipated Alberta surplus of 8.5 billion dollars in August 2008 has disappeared and a deficit of 1.4 billion dollars is now predicted for the 08/09 budget as a result of the retraction of the global economy and its effect on the Alberta economy.

III. General Comments on Concerns and Opportunities

As we conducted this review, understandably, there were concerns expressed by researchers related to uncertainty about future direction, the structure of research and healthcare delivery, the authority to make decisions, and the loss of relationships built under the previous structures. There were concerns expressed that Alberta's world-class researchers and clinicians will look for research opportunities outside of Alberta. The "best researchers and clinicians" are often attracted by research opportunities and the best are always attractive targets for recruitment elsewhere. This concern has been further magnified by the latest round of salary competitions at the Alberta Heritage Foundation for Medical Research (AHFMR) where the message is clear that the AHFMR is moving away from long-term salary support. This, and the restructuring of research including the roles and mandates of the AHFMR under Bill 27, needed to be accompanied by a plan for the transition of AHFMR awardees to stable positions.

At the same time, there was a sense that, along with the challenges, there are opportunities created by the emergence of AHS. There are opportunities for better cooperation and coordination under this new centralized model. Many Stakeholders felt this may be the opportunity for more intra-Provincial cooperation to replace the historical unhealthy competition between Calgary and Edmonton. There was enthusiastic support to build Provincial research databases and access to Province-wide non-identifiable patient databases. There was also recognition of the value of collaboration in Canada and internationally. Science and research often go beyond borders.

This report could not discuss all aspects of health research. In particular, the importance of foundations and philanthropists, system performance measures (Quality Assurance), and details of innovation including knowledge transfer (KT) *versus* technology transfer and commercialization, are not discussed in detail. Nor did we feel it was our role to evaluate the merits of the many research plans we received from individual units, departments, or institutions.

IV. Process

The responsibility for the report was shared by Dr. Lorne Tyrrell and Dr. Roger Palmer. Consultations were carried out jointly by Drs. Palmer and Tyrrell. Dr. Tyrrell is a biomedical researcher and former Dean of the University of Alberta, Faculty of Medicine and Dentistry. Dr. Palmer is former Interim Dean of the newly-created School of Public Health at the University of Alberta and a former Deputy Minister of several Alberta government departments including AHW and Innovation and Science.

Dr. Tyrrell was assigned the lead responsibility for review of the vision and governance framework for AHS and its relationship to the research partners and funders. Dr. Palmer was assigned lead responsibility for the development of the inventory and data base of research projects and funding. Both Dr. Tyrrell and Dr. Palmer shared the view that the mandate for

research was best served in a model where education, research, and patient care are delivered in the integrated model of the Academic Health Centre (AHC). Both Drs Tyrrell and Palmer agree with the recommendations in this report and the report was developed jointly.

The project was overseen by a Steering Committee of Aslam Bhatti (Interim COO, Health Strategy, Research and Design for AHS), Bill McBlain and Bob Sheldon (Interim Co-Leads, Research and Design, AHS), with essential database-development and other support from Huey Chong, (Project Planner, AHS). Stakeholders were identified and face-to-face meetings with Stakeholders were conducted. Questions and topics for discussion were circulated in advance of the meetings. Submissions from Stakeholders were also received and reviewed. Draft recommendations were reviewed with the representatives of the Stakeholders at a special meeting on January 30, 2009. While we have received a large number of submissions including detailed research plans, it is not possible to address each individual plan and concern. Nor could we make specific recommendations with regard to most of these plans. What we have tried to do, is present a vision and governance framework to support a research, education, and service delivery environment that would allow research, education, and service delivery to develop to their full potential. Clearly, our primary focus was on the research mandate.

V. Definitions

a) Academic Health Centre (AHC)

Several definitions and descriptions for an AHC were reviewed. For purposes of this report, we have adopted the definition used by the United States Academy of Science, 2004, in “Academic Health Centres: Leading Change in the 21st Century.”

An Academic Health Centre is not a single institution, but a constellation of functions and organizations committed to improving the health of patients and populations through the integration of their roles in research, education, and patient care to produce the knowledge and evidence base that becomes the foundation for both treating illness and improving health. The integration involves more than the simultaneous provision of education, research and patient care. It requires the purposeful linkage of these roles so that research develops the evidence base, patient care applies and refines the evidence base, and education teaches evidence-based and team-based approaches to care and prevention. [1]

Expanded AHC

In this report, the expanded definition of AHC refers to the inclusion of all healthcare professionals and a broader range of sites. This concept is broader than the original AHC concept that referred to physicians in universities and university-based hospitals.

b) Health Research (The Four Pillars)

In general terms, research refers to the time-limited investigation for the purpose of developing, finding or defining processes, mechanisms and general principles that contribute to knowledge and understanding in a given area.

In 2000, the Canadian Institutes of Health Research (CIHR) identified the need to encourage Health Research in areas in addition to the basic sciences which had been the priority of the former Medical Research Council. CIHR research was classified according to Four Pillars which are listed here but expanded upon later in this report:

Pillar I ... Biomedical Research

Pillar II ... Clinical Research

Pillar III ... Health Services Research

Pillar IV ... Population and Public Health Research

We have used these definitions in our organization and development of our inventory of research funding in this report.

c) Knowledge Translation

Knowledge translation is the “exchange, synthesis and ethically-sound application of knowledge – within a complex system of interactions among researchers and users – to accelerate the capture of the benefits of research for Canadians through improved health, more effective services and products, and a strengthened health care system” (CIHR Knowledge Translation Strategy 2004-2009).

d) Stakeholders

For the purposes of this report, “Stakeholder” refers to institutions, programs, research projects that were impacted by the restructuring of AHS. A list of Stakeholders is attached as Appendix A. Invitations were extended to representatives of these groups to organize their respective Stakeholders to provide verbal and written input into this report. A list of participants is attached as Appendix B. This list is based on written submissions, minutes of meetings, individual input and distribution lists of persons invited by their Stakeholder organization, to attend.

We recognize that this is not an exhaustive list of all Stakeholders or all possible Stakeholders. Identified Stakeholders included researchers, research funders, and other funding partners including philanthropists, foundations (both disease- and hospital-based).

VI. The Importance of Health Research

Our mandate included a request to propose a governance framework that will facilitate excellence in research in an integrated model of service delivery, education, and research. Research is important to AHS for many reasons:

- i) Nearly all industrialized countries are facing escalating healthcare costs. Sustainability, access, quality, and safety are key issues for AHS. Simply supplying more money will not solve the key problems. Research is needed to improve quality, improve access, reduce wait times, improve safety, improve management of chronic diseases and care of the elderly, and improve efficiency to address sustainability of our healthcare system.
- ii) An excellent research environment attracts and retains excellent members of the healthcare team. Alberta is already on the national and international research map. We

need to keep it there. It has taken many years to build the excellence and it can be lost in one or two years in the wrong research environment.

- iii) Research makes economic sense. There are numerous studies on the economic and societal benefits of health research – from healthier, more productive citizens, to health industries that support high-quality jobs. The “Families USA” study reports a multiplier effect of 2.2 for each dollar invested by the National Institutes of Health (NIH) in research. [2] The Wellcome study in the UK indicates a return on medical research of approximately 30% in perpetuity. [3] A recent comprehensive study by the Canadian Academy of Health Sciences describes the Impact of Health Research and provides tools for measuring the impact. That report addresses the 66 key indicators for measuring research success in 5 strategic areas: advancing knowledge, research capacity, informed decision-making, health benefits, and social/economic benefits. [4] An impact study of clinical research done by Canadians indicates Canada is a clear leader internationally. [5] There have been many significant Canadian contributions to health research. [6] Health research deserves our continued support.

VII. The Academic Health Centre (AHC)

This section presents the background, history, advantages, and challenges of AHCs. This is to provide a context for our recommendation regarding an integrated model of AHCs and to underscore the importance of the AHC for the vision and governance to support the role of AHS in research.

a) History

The concept of the AHC was first described in 1910 by Abraham Flexner. Flexner was a secondary school teacher and principal who joined the research staff at the Carnegie Foundation for the Advancement of Education. “A Review of Medical Education in the United States and Canada,” was one of several reports he completed on education and teaching for the Foundation. He reviewed almost all medical schools in the United States and Canada, including the University of Alberta. He is credited with the reconfiguration of medical education by closure of inferior medical schools, abolishment of unaccredited apprenticeship programs, and imposition of standards. Using the model at Johns Hopkins, he examined the relationship between each medical school and its respective teaching hospital. His description of an ideal model is synonymous with what today is the AHC. Flexner described the Tri-partite mission of health service delivery, teaching, and research. That is, the integration of teaching and working facilities into the general organization of fundamental laboratories at the medical school – unifying the medical school faculty and the hospital staff. Educational and research elements were what distinguished AHCs from community hospitals at the time of his review.

b) The Tri-partite Mission of the AHC Service Delivery/Education/Research

It is not uncommon for tension to exist between university and hospital components of AHCs. The primary missions of the university are education and research while the primary mission of the hospital is to provide patient care. Clearly, strong AHCs recognize their co-

dependency and the need to partner. The relative importance of education, research, and patient care has varied. In the early development of AHCs, the educational environment in the hospital setting was the focus of AHCs. However, with the increase in federal and provincial research dollars and the development of the more complex tertiary and quaternary healthcare needs, AHCs have often emphasized research and patient care at the expense of education.

c) **The Canadian/Alberta Advantage in Medical Education Standards**

Historically, the AHC concept was developed in association with medical schools. Medical training is still considered a pre-condition for an AHC. Fortunately, today's AHCs are more inclusive and recognize the **importance of all health professions** in the provision of care within an accessible and sustainable healthcare system. Quality health care is provided by a team that supports safety and excellence through research and the application of best practices.

The necessity of the close relationship between the partners in an AHC can best be illustrated by the education of healthcare providers. Although we have used the medical education to illustrate the point, the principles apply to the education of all healthcare providers. In Canada, we have more than 60 family medicine, medical specialty and sub-specialty programs. These programs undergo regularly scheduled rigorous accreditation by the College of Family Medicine and the Royal College of Physicians and Surgeons. Post-MD medical specialty training programs can only be entered through a national matching program operated by the 17 Canadian medical schools.

By contrast, US postgraduate medical training programs are hospital-based programs, of which there are hundreds. These post-MD programs do not go through the same national accreditation as Canadian programs do. In the US system, individuals can advertise and practice as specialists (Board-eligible) without writing and successfully passing national examinations.

In summary, the Canadian medical system is founded on high standards for both the undergraduate and postgraduate training programs. This system is the envy of many countries. The standards and quality of training programs are dependent on hospitals and universities working closely together to provide high quality education, research, and patient care environments that can meet accreditation standards and continue to produce well-trained new clinical faculty.

d) **The Model of Choice: The Academic Health Centre**

Recently, there have been major reviews of models for the delivery of education, research, and patient care. In the United States, there are four academies that advise the nation on Science, Engineering, and Medicine. In 2004, the Institute of Medicine produced a document "Academic Health Centers: Leading the Change in the 21st Century." Like the other documents, it recognized the importance of the AHC in the support of health research. However, it is recognized that healthcare is best provided by a team approach that includes all of the health sciences. It also stressed the need to address a future with very different demands on the health care systems while addressing sustainability. "The AHC of the 21st century includes networks of acute care hospitals, universities, colleges,

primary care networks and physicians, community hospitals, community health centres, home care and long-term care facilities.” [1]

The Commonwealth Fund Report (2003) on “Envisioning the Future of Academic Health Centres” was a seven-year study that clearly recognized the value of retaining AHCs, but recognized their changing nature. [7]

The National Health Service (NHS) in the United Kingdom has completed a major review and has announced the intent to establish 13 AHCs throughout the UK. This is part of a plan for “improving the health and wealth of the nation through research” and is built on the concept of “best research for best health care.” [8] The leading role for the implementation of this research plan has been given to Sir John Bell, Regis Professor of Medicine in Oxford. He was an undergraduate student in the Faculty of Medicine at the University of Alberta and Rhodes Scholar who completed his training at Oxford. On a recent visit to Alberta he reaffirmed the importance of the integrated AHC model to support high-quality education, research, and patient care. The consensus of all of these studies is that the integrated AHC model remains the model of choice.

For the purposes of this report, we felt the definition of the AHC provided in 2004 by the Institute of Medicine of the United States Academy of Science captured the consensus message from Stakeholders on the best model for health research supported by AHS and its key partners. We have adopted that definition including important factors for future success. Those are inclusion of all members of the health team and recognition and inclusion of networks of care.

Recommendation 1: That AHW, AET, AHS, and their university partners clearly adopt the model of the integrated (patient care, education, and research) and expanded AHC.

e) **Vision**

Currently, the AHS vision statement is “**To provide a patient-focused health system that is accessible and sustainable for all Albertans.**” Based on an integrated model of the AHC, the vision statement for AHS would need to be broadened. The vision statement should reflect the role of excellence in research and education in a high-quality and sustainable health delivery system.

Recommendation 2: That AHS expand its vision and mission statements to recognize the important role of AHS in health research and education of healthcare professionals. Similarly, the vision and mission statements of the partners in these activities should recognize the importance of their partnership with AHS.

VIII. Current Funding and Administration of AHS Research Initiatives

a) **Introduction**

Collecting all of the data on research funding was a very large and complex task. We are grateful for the tremendous effort that was put into this process by many people in the

research organizations and for the coordination by Aslam Bhatti, Bill McBlain, Bob Sheldon, and Huey Chong.

Our report on health research funding is extracted with some modifications from the larger report on Health research funding that was prepared by Roger Palmer for AET. For our purposes, we will concentrate on the funding for research without including the one-time research infrastructure investments (\$59 million) or the estimated funding of research by the biotechnology companies in Alberta (\$75 million) as this funding is not directly under the purview of AHS. We have used the 2007/08 year as the one-year “snapshot” of funding.

The estimated total funding for health research was estimated at \$335 million for research grants, salary awards, and contracts in all four CIHR Pillars and \$26.3 million in salaries and honoraria through Alternative Relationship Plans (ARPs) (see Tables 1 - 7 and Figures 1 and 2).

b) Methodology

Incoming data was compiled and managed using SPSS 17.0, which was also the statistical package used for generating summary reports. The inventory dataset was initially populated with Alberta health research data acquired directly from the Canadian Institutes of Health Research (CIHR), the Alberta Heritage Foundation for Medical Research (AHFMR), and the Research Services Offices (RSO) at the Universities of Alberta, Calgary and Lethbridge. Data from these sources were provided at the individual grant/award level (rather than at a project level). The previous 12 health entities were asked to provide data on health research projects for the year 2007/08 as a snapshot of their funding. A “project” can have multiple investigators, multiple funding sources, and multiple sites. In requesting these data, the 12 organizations were asked to query matching or similar data from their existing research or administrative databases. Realizing the limitations of doing data abstraction over primary data collection, we expected varying levels of missing data, specifically for variables that are not routinely tracked at the project level by the various sources including research personnel/trainees, site resources used, and project equipment/infrastructure.

AHFMR and CIHR-funded projects, investigators, and trainees salary awards made up the majority of the funded health research in Alberta, and these two sources were critical in providing the base inventory data. Information from the RSO at the three universities were used to identify remaining health research supported by other provincial and federal government sources, disease-based funding organizations, foundations, industry, and internal funding. PI-initiated, non-funded initiatives are not captured by this process, but many such projects exist and are of importance to AHS. Data from the 12 entities were used to identify additional projects and to add data in the base inventory.

Data from all sources were consolidated at the grant/award level with ‘data-cleaning’ efforts to avoid redundant counting. Specifically, information on projects operating across multiple sites were often submitted by multiple data sources; screening of grants by project title, PI(s), and funding information was required to avoid ‘double-counting’. To help identify areas of strengths and weaknesses in the health research sector, the subsequent

8268 distinct grants entries were assigned research Pillar codes and the 42 research area codes defined by CIHR. The research Pillar coding was done using the four CIHR Pillars of health research classification: (i) biomedical research, (ii) clinical research, (iii) health services research, and (iv) social, cultural, environmental and population health. A maximum of five research areas codes were assigned to each grant, in order of apparent relevance (based upon the title of the grant).

Reports generated from the inventory largely summarized revenue totals for variables of interest, including revenue by funding sources, types of funding programs, administration of funding by institutions, academic affiliations (Faculty and department), and the research Pillars.

Clinical Trials funding was an area that was difficult to assign to individual grants or projects and was often submitted in an aggregated manner. The exception was the University of Alberta/Capital Health – NACTRC under the direction of Richard Fedorak. Clinical trials are discussed in more detail later in this report. We did not attempt to break-down or pro-rate this aggregated funding data for entry into the inventory dataset but chose to include it in the broad-level summary of the inventory (Table 1). We have also estimated the portions of salaries in Alternative Relationship Programs (ARPs) and honoraria that support research. The recently signed MOU, signed by the Provosts (U of A, U of C) and the Deputy Ministers of AHW and AET will provide more clarity on this funding.

c) Findings

Sources of Funding for Health Research in Alberta

There are 876 funding sources identified in the database supporting more than 8000 projects. In addition to the major funding from peer-reviewed sources, these sources include philanthropic donations of all kinds, and other government organizations and NGO sources (from municipalities to international organizations). There is some subjectivity in the classification and, in particular, private sector sources were mostly coded as “industry” if the company was a biotech or pharmaceutical company (but was called a “donation” if its business appeared unrelated to the health industry)(see Table 2, Figure 1).

The major institutions administering the funds are shown in Figure 2, Table 3.

A breakdown of the funding for the four Pillars is shown in Table 4. This clearly shows that the largest proportion of funding flows to Pillars I and II, although there is substantial funding for Pillars III and IV. Within the major universities – Table 5 (U of C) and Table 6 (U of A) and Table 7 (U of L), the data illustrate the sizable portion of health funding flowing to the Faculties of Medicine – U of A (81%) and U of C (89%). These percentages increase if the funding for individuals supported by the Alberta Cancer Board is included. This illustrates the very large proportion of health research funding that flows to the Faculties of Medicine.

Table 1. Alberta Health Research Funding for Fiscal Year 2007-08

	Funding \$	Total No. of Projects	Total No. of Primary Principal Investigators (PI) ^c
Research Funding ^a	\$296,295,179.00	6903	2403
Other Clinical Trials ^b	\$39,614,384.00	1365 (new 07/08)	----
Salaries/Honoraria Prorated for Research	\$26,335,140.00	Appointed MDs paid salary and benefits by AHS 240 (U of A) 302 (U of C) funded through Alternative Relationship Plans (ARP)	----
Total	\$362,244,703.00	8268	

^a Excludes funding classified as 'Infrastructure'.

^b This total includes aggregated revenue provided by ACB and estimated revenues from the University of Calgary and the University of Alberta for Clinical Trials that would not be captured under 'Research Funding'.

^c Co-PI data were not included in the summary reports to avoid 'double-counting' of funding.

Table 2. Sources Providing Health Research Funding for Fiscal Year 2007/2008

Type of Funding Source	Funding Source	2007/08 Funding
Alberta Government Sources	AHFMR	\$64,515,936
	AHS - Capital Health	\$2,200,617
	Alberta Advanced Education and Technology	\$9,168,091
	Alberta Cancer Board	\$19,302,888
	Alberta Government - Other	\$6,095,857
	Alberta Health & Wellness	\$10,710,049
	Alberta Health Services	\$2,611,901
	Alberta Infrastructure	\$4,915,978
	Alberta Ingenuity Fund	\$2,789,652
	ASRIP	\$1,648,365
	University of Calgary	\$334,122
	University of Alberta	\$1,670,446
	University of Lethbridge	\$247,129
Canadian Government Sources	Canada Foundation for Innovation	\$9,940,031
	CIHR	\$82,123,000
	Natural Sciences Engineering Research Council	\$5,189,688
	Social Sciences & Humanities Research Council	\$1,181,653
	Federal Government - other	\$16,882,909
Foundations and donations	Provincial Foundations	\$15,855,520
	National Foundations	\$31,524,980
Industry	Industry	\$29,047,578
Foreign	National Institutes of Health (US)	\$4,143,173
	Foreign sources	\$4,857,253
Other Canadian Universities	Other Universities	\$4,916,692
Other	Other	\$3,409,378
TOTAL		\$335,282,888

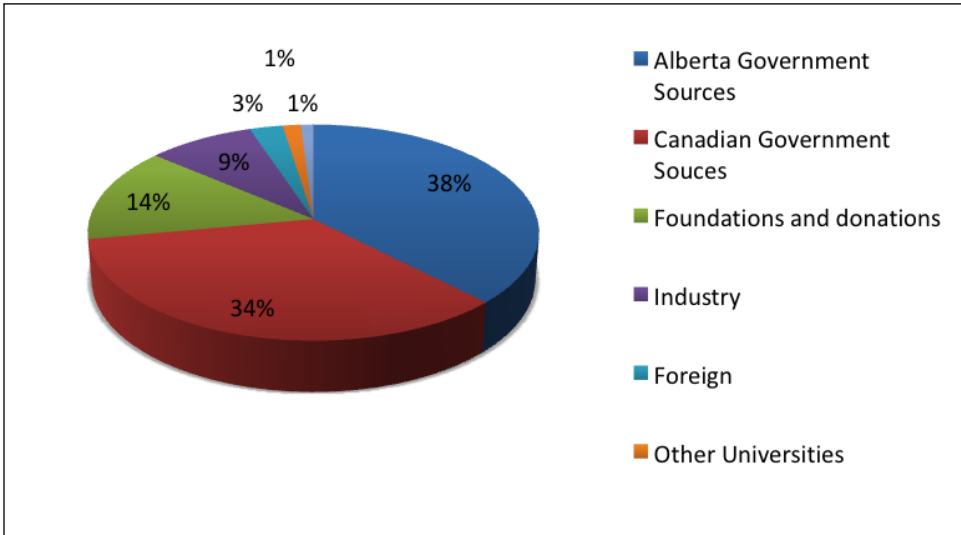


Figure 1. Distribution of Health Research Funding Sources, Fiscal Year 2007/2008

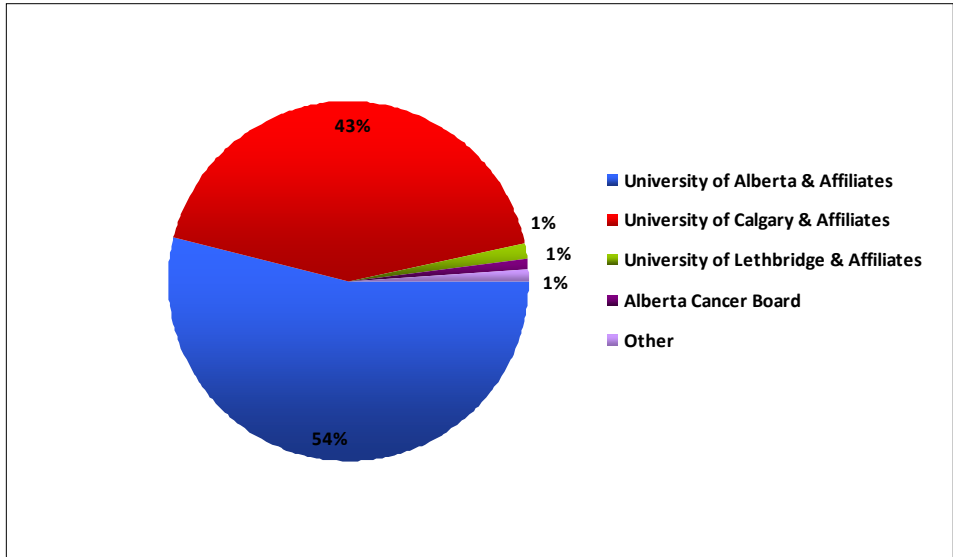


Figure 2. Major Institutions Administering Health Research Funding, Fiscal Year 2007/2008

Table 3. Major Institutions Administering Health Research Funding, Fiscal Year 2007/2008

Institution	2007/08 Funding			
	Count of Awards/Grants	Mean (\$)	Sum (\$)	Sum (%)
University of Alberta	3379	64,503	155,903,768	46.5
University of Calgary	2961	58,578	138,655,244	41.4
University of Lethbridge	165	44,517	4,496,176	1.34
Alberta Cancer Board ^a	894	124,631	17,323,689	5.17
Capital Health ^a	266	89,685	12,017,756	3.58
Calgary Health Region ^b	27	41,478	497,740	0.15
SEARCH Canada	2	1,135,000	2,270,000	0.68
Other Institutions	160	48,055	4,084,662	1.22
Unknown	81	4,828	33,797	0.01
Total	7935	63,694	335,282,833	100.0

^a Most of the ACB-administered and Capital Health-administered funding flowed to University of Alberta-affiliated investigators as shown in an aggregated manner in Figure 2.

^b Clinical Trial funding in Edmonton is administered through Capital Health. In Calgary, clinical trials funding is administered through University of Calgary.

In summary, the snapshot of health research funding indicates that there was an estimated \$335 million in 2007-2008 to support all health research initiatives in Alberta. This increases to \$362 million if salary support provided through ARPs is included. This funding comes from at least 876 sources, funding over 8000 projects; however, the vast majority is from major peer-reviewed funding through the CIHR and AHFMR. There was no common database for health research in the Province until the recent creation of the inaugural database used for our current work. Even within institutions, the funding was very difficult to track. This has been a source of frustration for most who attempt to get an accurate picture of health research funding in Alberta. On a going-forward basis, there needs to be an accurate database of health research funding in the Province. The database needs to include principal investigators, annual amount of funding, total funding over “x” years, funding source, location of research, and key words (up to 5). A user-friendly electronic database information request would have to be completed before release of research funding to the PIs. If this was established, an accurate database could be developed and updated on a going-forward basis. Other provinces have established such databases. In particular, the research database used in Quebec may be a useful model.

Recommendation 3: That AHS and its partners establish and maintain a common Province-wide database for health research projects in Alberta.

Table 4. Health Research Pillar Funding by PI Institutional Affiliation

Institution	2007/08 Funding*					Total
	Pillar I Research	Pillar II Research	Pillar III Research	Pillar IV Research	Unknown	
University of Alberta	\$80,291,086	\$27,920,961	\$19,750,527	\$16,066,956	\$23,296,687	\$167,326,216
University of Calgary	\$65,593,080	\$24,914,262	\$12,469,456	\$12,582,001	\$20,630,147	\$136,188,946
University of Lethbridge	\$2,488,793	\$179,187	\$45,006	\$396,457	\$1,386,732	\$4,496,176
Alberta Cancer Board	\$179,138	\$199,547	\$152,986	\$2,036,334	\$10,000	\$2,578,005
Cross Cancer Institute	\$9,508,286	\$2,259,315	--	\$22,500	--	\$11,790,101
Tom Baker Cancer Centre	\$4,379,551	\$1,494,597	--	\$96,550	\$181,492	\$6,152,190
Other	\$810,899	\$673,709	\$3,295,580	\$738,825	\$1,229,389	\$6,748,402
Unknown	--	--	--	--	\$2,797	\$2,797
Total	\$163,250,833 (48.7%)	\$57,641,578 (17.2%)	\$35,713,555 (10.7%)	\$31,939,623 (9.5%)	\$46,737,244 (13.9%)	\$335,282,833 (100.0%)

* To avoid double counting, grants/awards with multiple research pillar coding were assigned to the highest pillar code applicable.

Table 5. 2007/08 Health Research Funding by PI Faculty by PI Institutional Affiliation: University of Calgary

Faculty	2007/08 Funding			
	Count of Awards/Grants	Mean (\$)	Sum (\$)	Sum (%)
Business	1	150,000	150,000	0.11
Communication & Culture	6	35,469	177,344	0.13
Engineering	42	44,015	1,364,467	1.00
Kinesiology	118	48,092	4,424,499	3.25
Medicine	2460	58,793	117,527,931	86.30
Nursing	39	21,833	785,989	0.58
Science	129	59,808	4,605,205	3.38
Social Sciences	55	32,105	1,412,618	1.04
Social Work	37	30,626	1,041,294	0.76
Veterinary Medicine	14	108,729	761,106	0.56
Unknown/Not Applicable	41	131,283	3,938,493	2.89
Total	2942	57,805	136,188,946	100.00

Table 6. 2007/08 Health Research Funding by PI Faculty by PI Institutional Affiliation: University of Alberta

Faculty	2007/08 Funding			
	Count of Awards/Grants	Mean (\$)	Sum (\$)	Sum (%)
Agriculture, Life & Environmental Sciences	46	47,830	1,052,250	0.63
Arts	9	36,792	183,962	0.11
Business	3	20,405	40,810	0.02
Education	7	10,208	20,416	0.01
Engineering	10	84,394	506,362	0.30
Law	11	53,333	320,000	0.19
Medicine & Dentistry*	2996	69,842	130,674,108	78.10
Nursing	215	50,405	7,157,449	4.28
Pharmacy & Pharmaceutical Sciences	80	38,191	2,558,816	1.53
Physical Education & Rec	40	46,850	1,171,248	0.70
Public Health	209	68,905	10,129,108	6.05
Rehabilitation Medicine	203	31,046	4,687,888	2.80
Science	71	63,470	3,110,013	1.86
Social Sciences	2	10,000	10,000	0.01
Social Work	1	10,000	10,000	0.01
Unknown/Not Applicable	79	158,161	5,693,786	3.40
Total	3982	66,059	167,326,216	100.00

* Adding the ACB-administered funding for Principal Investigators affiliated with the UofA and the CCI would give a total of \$141,973,870.

Table 7. 2007/08 Health Research Funding by PI Faculty by PI Institutional Affiliation: University of Lethbridge

Faculty	2007/08 Funding			
	Count of Awards/Grants	Mean (\$)	Sum (\$)	Sum (%)
Arts & Science	141	50,924	4,277,633	95.14
School of Health Sciences	15	17,029	170,292	3.79
Education	3	5,917	17,750	0.39
Not Applicable	6	7,625	30,501	0.68
Total	165	44,517	4,496,176	100.00

IX. Benchmarking

We have reviewed the recent data from CIHR to compare health research funding in terms of CIHR payments to Canadian universities. This data shows that funding to both of our major universities has fallen relative to other Canadian universities in recent years. The CIHR funding, ranked relative to other universities, for the University of Alberta has fallen from 2003-2004 (5th overall) to 2007-08 (6th overall) and for the University of Calgary 2003-04 (7th overall) to 2007-08 (10th overall). Funding dollars to the U of A and U of C from CIHR have remained almost constant while several other Canadian universities have shown quite remarkable growth (McMaster 82%, UBC 59%, Ottawa 35% and Toronto 34% – see Table 8). *This is further shown by a recent comparison of CIHR funding on a per capita basis which illustrates the growth of CIHR funding in BC and Ontario relative to the Prairies which have Alberta as the major contributor (see Figures 3, 4, and 5).* On analysis, we believe there are several key factors that have contributed to this problem. The Alberta universities have maintained their share of funding for the individual investigator awards (70% of CIHR funding) which strongly suggests that the problem is not the quality of the research activity of individuals – although it would be valuable to attempt a formal evaluation of the outputs of our endeavors. However, it is clear that we have not been as successful in the team and CIHR Institute-initiated grants in the broader mandates of CIHR (Pillars II, III, and IV). Secondly, the funding in many AHCs in Canada is growing most rapidly in research institutes affiliated with hospitals in the AHCs. Examples include: 9 research institutes in hospitals affiliated with the University of Toronto and major research institutes associated with the hospitals in Ottawa, McMaster, and UBC. For example, 82% of the CIHR funding to UBC flows to research at the major affiliated hospitals and the BC Cancer Agency – off-site from the UBC campus.

Table 8. Benchmarking – CIHR Expenditures*

University	Dollars 03/04	Dollars 07/08	% change	Full-time Faculty ** 05/06
Toronto	124,395 (1)	166,345 (1)	34%	2,221
McGill	73,418 (2)	91,712 (2)	25%	1,390
U of Montreal	54,372 (3)	63,168 (4)	16%	755
UBC	49,565 (4)	78,767 (3)	59%	880
U of A	37,342 (5)	41,291 (6)	11%	669
Ottawa	30,917 (6)	41,592 (5)	35%	720
Calgary	30,397 (7)	28,217 (10)	-7%	589
Laval	28,842 (8)	34,735 (8)	20%	679
Western	27,087 (9)	30,419 (9)	12%	824
McMaster	22,528 (10)	41,090 (7)	82%	538

* Data obtained from CIHR and represent “CIHR Expenditures for Grants and Awards including NCE and CRC”

** Data obtained from the Association of Faculties of Medicine of Canada

Another factor in UBC is clearly the impact of the Michael Smith Foundation for Health Research (MSFHR). This foundation was established in 2000 and has been used differently than the AHFMR. It has avoided a pitfall of the AHFMR by limiting the time it would provide salary support. Secondly, it has prioritized funding to support team grants, grant writing facilitators (67 through MSFHR) and has targeted major federal funding for platforms [Genome Canada, Canada Foundation for Innovation (CFI), Centres of Excellence Commercialization and Research (CECR)]. The last competition for \$165 million for 11 CECR grants saw successful applications from BC (4), Saskatchewan (1), Ontario (4), Quebec (2), and Alberta (0) (see Table 9). The recent competition to fund infrastructure of research facilities in hospitals through CFI (\$550 million) saw none of the funding come to Alberta – in fact, none came west of Ontario. Similarly, as will be shown later under Genome Alberta, Alberta has not benefited from Genome Canada nearly as much as BC, Ontario, and Quebec. These are concerns for the long-term success of our research-intensive AHCs.

Factors that could improve our performance as a province include changing the role of the AHFMR with a smooth transition for researchers, an increased role of AHW in health research (particularly in Pillars III and IV), a more coordinated Provincial approach by AHW and AET to capitalizing on federal funding initiatives to enhance health research, introduction of Provincial operating funding for all Pillars of Research, and Provincial funding for sustainability of major infrastructure and platforms.

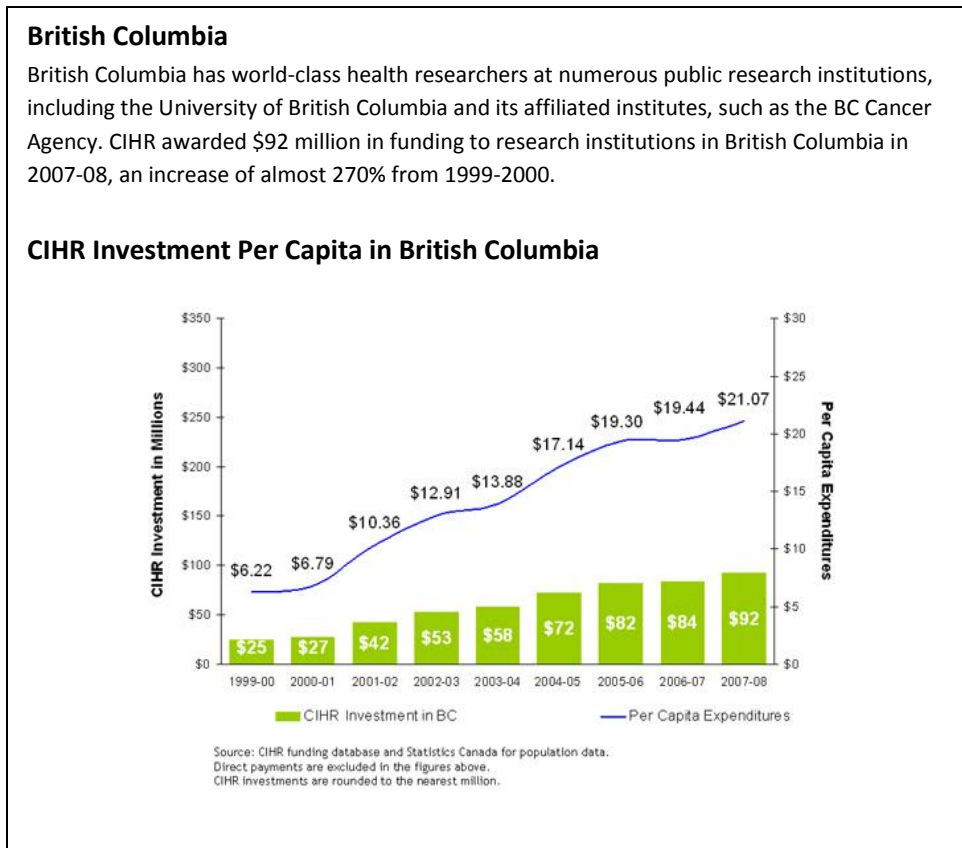


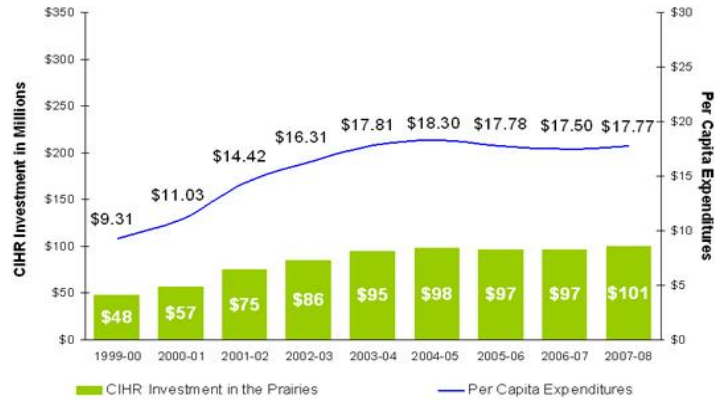
Figure 3. CIHR Investment per capita in British Columbia

The Prairies

Some of Canada's most exciting health research discoveries have their roots in Canada's Prairie provinces, Manitoba, Saskatchewan and Alberta.

In 2007-08, CIHR funded \$101 million of research in Canada's western provinces, a 110% increase since 1999-2000.

CIHR Investment Per Capita in the Prairies



Source: CIHR funding database and Statistics Canada for population data.
Direct payments are excluded in the figures above.
CIHR investments are rounded to the nearest million.

Figure 4. CIHR Investment per capita in The Prairies

Ontario

Ontario receives the largest share of CIHR funding - \$316 million in 2007-08, up from \$114 million in 1999-2000.

CIHR Investment Per Capita in Ontario, a 177% increase since 1999-2000.



Source: CIHR funding database and Statistics Canada for population data.
Direct payments are excluded in the figures above.
CIHR investments are rounded to the nearest million.

Figure 5. CIHR Investment per capita in Ontario

Table 9. Centres of Excellence for Commercialization and Research (CECR) Program Funding, 2008

CECR	SITE	FUNDING
Advanced Applied Physics Solutions Inc. (AAPS)	Vancouver, BC	\$14.95 million
Bio-industrial Innovation Centre (BIC)	Sarnia, ON	\$14.95 million
Centre for the Commercialization of Research (CCR)	Ottawa, ON	\$14.95 million
Centre for Drug Research and Development (CDRD)	Vancouver, BC	\$14.95 million
Centre of Excellence in Personalized Medicine (CEPMed)	Montreal, QC	\$13.8 million
Centre for Probe Development and Commercialization (CPDC)	Hamilton, ON	\$14.95 million
Institute for Research in Immunology and Cancer (IRIC/CECR in Therapeutics Discovery – IRICoR)	Montreal, QC	\$14.95 million
MaRS Innovation (MI)	Toronto, ON	\$14.95 million
The Prostate Centre’s Translational Research Initiative for Accelerated Discovery and Development (PC-TRIADD)	Vancouver, BC	\$14.95 million
Pan-Provincial Vaccine Enterprise (PREVENT)	Saskatoon, SK	\$14.95 million
CECR in the Prevention of Epidemic Organ Failure (PROOF)	Vancouver, BC	\$14.95 million
TOTAL		\$163 million

Recommendation 4: That AHS should support a coordinated Province-wide strategy to improve our ability to attract federal research dollars to Alberta.

X. Alberta Heritage Foundation for Medical Research (AHFMR)

It is impossible to talk about Health Research support in Alberta without recognizing the important role that has been played by the AHFMR. On March 5, 1979, Premier Peter Lougheed announced the establishment of the Alberta Heritage Foundation for Medical Research (AHFMR). On that day, he announced:

This action should attract outstanding scientists to locate in Alberta, enable young Albertans and others to seek research training and careers in health research in Alberta, and make Alberta a worldwide centre for research in health sciences. The program we are announcing should build the Health Sciences Centres in Alberta into those of international status. The government has made commitments to invest in the future of healthcare through the development of first-class Health Sciences Centres in Edmonton and Calgary.

There is no doubt that the words of a visionary premier were realized. The AHFMR has been instrumental in building excellence in Alberta’s universities. The AHFMR has enhanced the reputation of the Province, attracted outstanding researchers, enhanced patient care through the research and the recruitment of healthcare professionals and clinician scientists, improved

the educational experience of undergraduate and graduate students, played a major role in the quality of training and research experience of highly qualified personnel, and fostered the establishment of a biotechnology industry in Alberta. Prior to the establishment of the AHFMR, Alberta was receiving approximately 7.4% of the Medical Research Council of Canada funding. In the 1980s and 1990s, Alberta's performance on a national scale continued to improve, reaching a peak of 13.4%. In 2004, principal investigators supported by AHFMR accounted for less than 3% of the full-time funded assistant, associate, or full professors at Alberta's three universities, but they attracted approximately 25% of the peer-reviewed funding at the three universities. Currently, the 249 AHFMR-supported investigators, scholars, and scientists account for a very significant per cent of the funding from competitive grants to our universities. The AHFMR has allowed our health Faculties to remain competitive with health Faculties at other Canadian universities. As the role and mandate of the AHFMR changes with the introduction of Bill 27, it is very likely that long-term salary support for Senior Scholars and Scientists will decrease significantly. It is vitally important that a clear transition plan be developed to maintain the stability of salary support for many excellent researchers. If not, over the next two to three years, our AHC can lose what has taken years to build and this will hurt our reputation as research-intensive AHCs.

The impact of the AHFMR was viewed very positively by almost all of the Stakeholders interviewed and has been the envy of other provinces. This sentiment was captured well by Dr. Karl Riabowal:

The AHFMR is the main reason that I returned to Canada from the USA where I undertook my Doctoral and Post-Doctoral training. I held a junior Staff Associate position at Cold Spring Harbor Laboratory (a prestigious research institute in New York) but based upon the opportunities afforded by AHFMR I accepted a position here at the U of Calgary in 1991. Since that time I have developed an appreciation for the degree of professionalism, objectivity and pursuit of scientific excellence under which the AHFMR has operated. I believe that this was due, in part, to the fact that it was designed to operate at arms length to the government and I hope that the proposed amalgamation does not eliminate this aspect of AHFMR. I also believe that basic research is absolutely essential to maintaining cutting edge medicine and medical services as evidenced by the close link between excellent basic and clinical biomedical research and advanced patient treatment as evidenced by locations such as the Mayo Clinic, Johns Hopkins, MD Anderson, Toronto Sick Children's and others. This association between cutting edge research and the best patient care is not coincidental since it is repeated in many different locations and centers.

In my opinion, the AHFMR is a clear "made-in-Alberta" success story made possible by Mr. Lougheed's vision and those subsequently who have supported its operations, that should be maintained and possibly refined, but should not be amalgamated into a larger entity if it loses its autonomy. It should absolutely maintain its financial integrity since a stable source of funding is a necessity for growing programs of basic and clinical research excellence.

Karl Riabowal "AHFMR Scientist – University of Calgary"

But there was also concern that the impact of the AHFMR on Alberta’s health profession facilities has diminished over the last five to seven years. There is no question that the burden of Senior Scholar and Scientist salaries has limited the ability of the AHFMR to respond to the changing environment of health research. The AHFMR budget has been increasingly committed to maintaining salaries of established researchers. This has seriously affected the original vision to support new careers and trainees in health research. Support for graduate students and postdoctoral fellows has fallen and important programs such as the support of visiting scientists (speakers program) has been cancelled and the equipment grant competition has been postponed. Establishment grants that were awarded to newly-recruited Investigators, Scholars, and Scientists were once considered a major recruiting advantage and are now considered comparable to start-up packages being offered at other Canadian universities. The current investments made by AHFMR to support research are shown in Table 10.

Table 10. AHFMR Budget Information

2008-09 Fiscal year

	EXPENSES	% TOTAL
Investigator programs (incl. Polaris)	44,000,000	54%
Training programs	8,250,000	10%
Infrastructure (including Major Equipment)	7,750,000	10%
* Partnerships (incl. Teams Grants support)	6,500,000	8%
Knowledge Transfer activities	6,500,000	8%
Communication, Outreach and Education	3,500,000	4%
Operations (including peer-review)	4,500,000	6%
	81,000,000	

Numbers are approximations and rounded

About \$75 to 77 million are from endowment draws

* Additional support is provided through partnerships

The majority of those interviewed were in agreement that the role and mandate of the AHFMR needs to be re-examined. As career-long funding through the AHFMR is decreased, there needs to be a reasonable transition of funding of senior researchers through careful planning by Stakeholders including AET, AHW, AHFMR, and the universities. The responsibility for these salaries cannot simply be a transfer from the AHFMR to the universities or Faculties. A suggested model may be to plan “off-loading” senior salaries at 20%/year to lessen the impact of the off-load all at once. A suggestion to avoid this problem in the future would be that new research appointments could be fully funded by AHFMR for the first seven years and shared 50/50 with the universities in the second seven-year term and fully assumed by the universities after 14 years. This would allow the AHFMR to be retained as an important recruitment tool. However, this model and the off-loading of the senior salary burden would require additional

university salaries targeted for this purpose. This is not unreasonable as the current hard- and soft-funded (AHFMR) positions are well within the norm of major Canadian university Faculties of Medicine. This suggests that expansion of health Faculties at Alberta’s universities has been primarily carried by AHFMR and the “Alberta Advantage” that was so evident in the 1980s and 1990s has been eroded. The AHFMR is still a very valuable asset but could be more effectively used with more flexibility (e.g., Michael Smith Health Research Foundation in BC).

Recommendation 5: That AHS support restructuring of the mandate and roles of AHFMR, but emphasize that the restructuring needs to be done while supporting the following principles:

- The salary burden of Scientists and Senior Scholars should be transitioned to the universities with careful planning by AET, AHW, and the universities. A transfer without this planning would seriously damage the reputation of the Province and make future recruitment very difficult.
- The AHFMR should be retained as an important recruitment tool, but there should not be the expectation of career-long salary support from AHFMR.
- The endowment of the AHFMR should be protected to support health research.
- The AHFMR decision making must remain on the basis of peer review.
- International standards must be maintained and ensured by periodic reviews.

XI. Overview of The Four Pillars of Health Research in Alberta

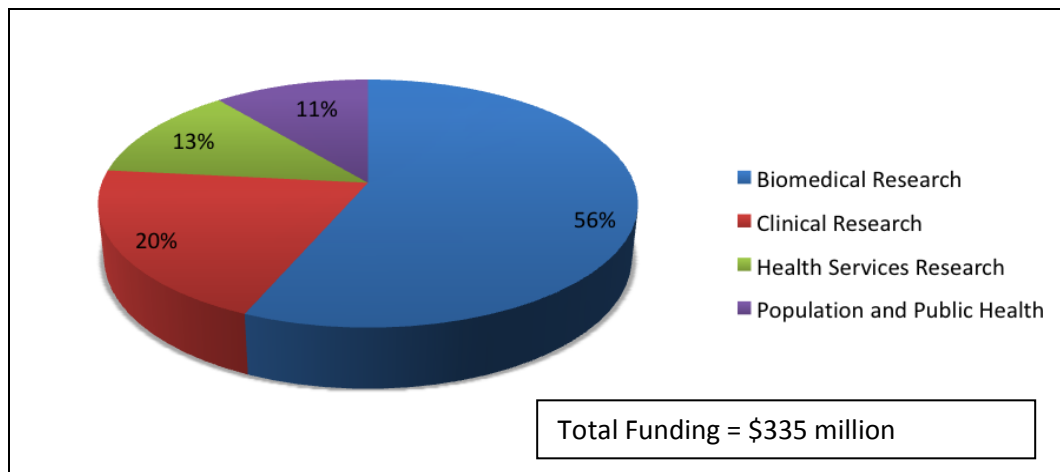


Figure 6. Distribution of Research Funding in Alberta by the Four CIHR Research Pillars, Fiscal Year 2007/2008

a) Expanded Definitions (adopted from the Alberta Bone and Joint Institute)

Pillar I: Biomedical Research

The goal of biomedical research is to understand normal and abnormal functioning at the molecular, cellular, organ system and whole body levels. This includes the development of tools and techniques that can be applied for this purpose, and the development of new therapies or devices that can improve health and quality of life up to the point where they are tested on human subjects.

Pillar II: Clinical Research

Clinical Research is focused towards improving the diagnosis and treatment, (rehabilitation and palliation) of disease and injury and improving the health and quality of life of individuals as they pass through normal life stages. This also includes research on animal models of human disease, clinical trials and other therapeutic interventions.

Pillar III: Health Services/Systems Research

The multidisciplinary field of Health Services/Systems Research seeks to improve the efficiency and effectiveness of health professionals and the health care system through changes to practice and policy.

Pillar IV: Social, Cultural, Environmental and Population Health

Pillar IV Research explores the way in which our social and physical environment impacts our health. The ultimate goal is to use this information to improve the health of the population, or defined sub-populations, through a better understanding of the ways in which social, cultural, environmental, occupational, and economic factors determine our health status.

b) Pillars

i) Pillar I – Biomedical

Pillar I research is the basis of discoveries that have, and will have, the most transformative effects on health care. Without biomedical research, there would be little to translate or commercialize. Approximately 70% of patents cite discovery research at universities as the source of the initial discovery and most of these discoveries are not the result of targeted research [9]. The time from discovery to knowledge translation for Pillar I research is long (average: 12 – 17 years), but the impacts are often transformative. In Alberta, most of Pillar I research is done in universities and supported by AET and major peer-reviewed funding agencies, whereas Pillars II, III, and IV occur frequently in hospitals and requires increasing direct and indirect support from AHS (AHW).

Examples of Pillar I Research

In 1948, Enders discovered how to grow cells in culture (cell culture). Within a short period of time, cell cultures were used to grow viruses, including the polio virus. Most people associate the eradication of polio in North America and Europe with Sabin or Salk, but neither received the Nobel Prize for this achievement. In fact, it was Enders who received the Nobel Prize. It was his basic biomedical research that provided the

crucial step to facilitate the development of the polio vaccine. The result of his discovery was that iron lungs and polio wards became unnecessary. Without Enders' discovery, polio could have crippled the sustainability of the healthcare system.

In 1976, the most common major surgical procedure was surgery to treat stomach/duodenal ulcers. An Australian pathologist, Barry Marshall (Nobel Laureate), observed an unusual bacterium growing near a stomach biopsy that had been placed on a culture plate. His tenacious follow-up of this observation led him to discover that a bacterium, and not stress, was the major cause of ulcers. Today, ulcers are treated with antibiotics on an out-patient basis. Ulcer surgery has fallen by approximately 99% since 1976.

Closer to home, in the 1960s, two scientists from the University of Toronto were the first to describe "stem cells." It was still believed in the 1990s that brain cells could not divide. However, in 1995, Dr. Sam Weiss, an AHFMR Scientist from the University of Calgary, was the first to discover brain "stem cells" and currently, early stage studies are applying this discovery to humans with neurological diseases such as stroke, Parkinson's disease, and possibly spinal cord injuries. An important ethical issue has been the source of stem cells. However, a major step in solving this problem occurred in 2006 when a Japanese scientist, Yamanaka, discovered a way to convert skin cells to stem cells. It has been 50 years since the discovery of stem cells. This is a very long incubation period from discovery to practice. However, this is a discovery that now holds tremendous potential for treatment of many diseases.

The well-heralded islet cell transplantation using the "Edmonton Protocol" was preceded by 25 years of basic research on isolation treatment and preservation of islet cells and animal studies to improve treatment of type I diabetes. This work led to the world's first successful islet cell transplants in humans (June 2000).

ii) Pillar II – Clinical Research

Clinical research covers a broad range of research from discovery to translation and application to the clinical setting. It involves working with patients and/or human tissue. A significant component of this research includes clinical trials. Clinical trials may be investigator-driven or industry-sponsored. **This is the research that requires extensive direct and indirect support from AHS.** Most of this research occurs in acute care hospital settings and utilizes clinical space or dedicated clinical trials space to see and evaluate patients entered into studies. Many of the clinical investigators have salary support through AHW/AHS via Alternative Relationship Plans (ARPs). The importance of this work cannot be overestimated. For example, in the *New England Journal of Medicine*, approximately 80% of the major publications required access to patients or patient material and approximately 35-40% of the publications were the result of carefully conducted clinical trials.

Examples of Pillar II Research

There are many outstanding examples of Alberta clinical research results that have been translated into excellent clinical outcomes for Albertans and beyond. Two examples are in the treatment of heart attacks, acute myocardial infarction (AMI), and stroke

outcomes through the Province-wide Stroke Program. Improved outcomes for both of these major diseases have occurred as a result of excellent collaborations between investigators at the two AHCs. In the treatment of AMI, the time from vessel occlusion to restoration of blood flow is critical. The occluded vessel is opened by the administration of “clot-busting” drugs, by angioplasty, or coronary bypass surgery. Traditionally, this therapy was started after the patient is admitted to a tertiary care hospital. Collaborative studies in cardiology have shown that pre-hospitalization diagnosis (electrocardiograms transmitted by cell phones) and administration of clot-busting drugs by paramedical personnel under the supervision of a physician is both safe and effective. This work is particularly germane to the vision of AHS that Albertans should have equitable access to care. This approach has led to a steady improvement in AMI outcomes (see Figure 7) and has allowed Alberta to lead the nation in the treatment of AMI (see Figure 8).

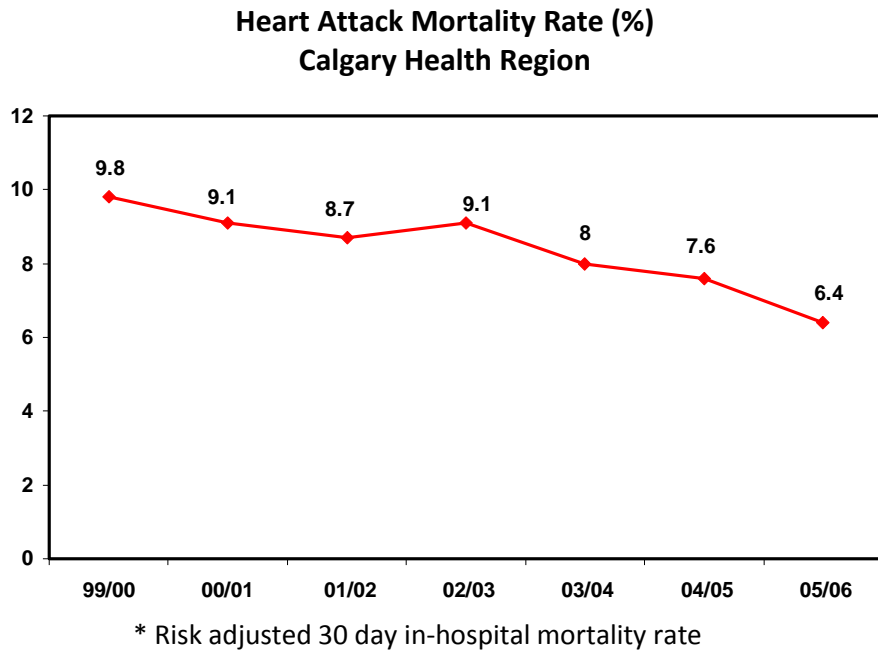
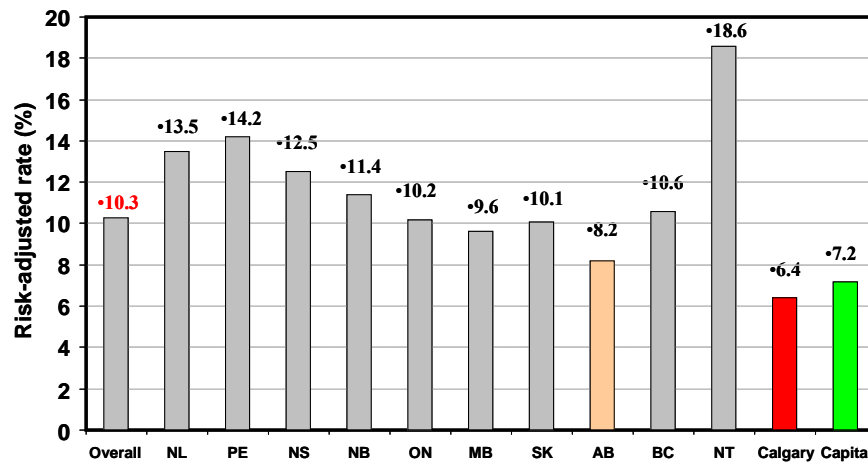


Figure 7. The Declining Mortality Rates from AMI in Alberta from 1999 to 2008.
Used by permission of Stafford Dean
Health Quality Council of Alberta

**AMI Mortality Rate
By Province, Capital, and Calgary (2003-2004 and 2004-2005)**



* Risk adjusted 30 day in-hospital mortality rate

Figure 8. The 2004/05 Mortality Rates of AMI in Canadian Provinces and Territories. Also note Calgary (red) and Edmonton (green) rates. Used by permission of Stafford Dean Health Quality Council of Alberta

Clinical Trials

Clinical trials are a major component of Pillar II Research internationally, nationally, and in Alberta. Approximately \$1.2 billion is spent on research by the pharmaceutical companies in Canada. Alberta receives approximately \$34 million or 3%, less than our share. However, these total research dollars include “in-house” research by companies and most of the companies have their research facilities in Ontario or Quebec. An estimate of the total number of **active** clinical trials in Alberta is 4300 (1800 in Edmonton, 1600 in Calgary, 500 in the former ACB, and 400 others in other former Regions). There are approximately 1200-1300 **new** approvals for clinical research each year. There are approximately 1500 physicians, 600-700 study coordinators (often nurses), and an estimated 25,000 patients enrolled in studies. There is a net cost-benefit to AHS and AHW in having patient care provided for 25,000 patients by nurses (study coordinators) and clinicians doing the trials, and having medications provided by the pharmaceutical companies for patients on studies. Research has shown outcomes are better for patients treated in hospitals that participate in clinical trials. [10] The number of clinical trials being done in Alberta is more than we expected when we began this project. It was beyond our scope to review the quality and value of all of the clinical trials. However, we know there is a range in the quality and value of trials. Bringing more uniformity to the review, administration, and approval of clinical trials will likely ensure optimal value and quality of the clinical trials.

Alberta has been relatively successful in attracting pharmaceutical trials in the past. Increasing costs and competition from other countries, particularly Eastern Europe and

Asian countries, are making Canada and Alberta less attractive to the pharmaceutical industry for clinical trials. Inefficient ethics approvals and contracting processes must be eliminated if we are to remain competitive. This is happening in other locales. For example, the United Kingdom (UK) and France have moved to centralize the process for large-scale multi-site trials. The UK has gone further to create a national agency, the UK Clinical Research Collaborative, to “establish a world-class environment for clinical research.” Part of its mandate is to streamline the regulatory and governance processes across the independently-operated health systems of the four countries in the UK. In Canada, British Columbia, Ontario, and Quebec have improved their efficiency on a province-wide basis. We need to do the same in Alberta. In order to be competitive, the infrastructure and approval processes must be efficient.

Dr. Bob Sheldon and Dr. Bill McBlain have attempted to identify key issues affecting the clinical trials and have identified five main issues for follow up:

1. Ethics and science review
2. Resource impact assessment
3. Contract and legal services
4. Indirect cost recovery and distribution
5. Employment of research coordinators

The following is a summary of some of their comments.

1. Ethics and Science Review

Protection for the public is provided by a respected and reliable ethics and science review process for all clinical trials. The guiding principles of the ethical reviews are: respect for human dignity, respect for free and informed consent, respect for vulnerable persons, respect for privacy and confidentiality, respect for justice and inclusiveness, and minimizing harm and maximizing benefit (as required by the Tri-Council Policy Statement [TCPS]). The Research Ethics Boards (REBs) have massive tasks to review all of the research that is undertaken in their institutions; hence, repeated reviews of essentially the same protocol at multiple sites are inefficient. While individual REBs strive to provide excellent reviews, from a Provincial point of view, the review process may be seen as fragmented, redundant, and frequently slow. This frustrates investigators and sponsoring companies and undoubtedly affects our ability to attract our share of clinical trials to Alberta. The frequency of the REB meetings or the number of REBs may not be sufficient for the workload. A review and harmonization of ethics review processes within the Province will assist in the identification of opportunities where efficiencies can be gained (the use of an electronic database and on-line processes may be one component). Alberta is also participating in a national initiative to establish national standards for ethics review and needs to be well positioned for the implementation of new requirements.

2. Resource Impact Assessment

Our review clearly indicated that the resource impact assessment was done with variable diligence. Direct costs above standard-of-care assessments can be easily identified and recovered. Resource impact assessments for clinical trials should

follow a uniform policy regarding direct and indirect costs and applied equitably across the Province.

3. Contract and Legal Services

The handling of contracts (legal review and risk assessment) by AHS and its partners varies throughout the Province. The overhead on research contracts (clinical trials) varies and needs to be standardized. Contract templates vary and there should be a concerted effort to develop a single contract template for all sponsors.

4. Indirect Cost Recovery and Distribution

The overhead collection and distribution on research contracts for clinical trials should be uniform (probably 30%) and there should be transparent negotiations between the investigators, Faculties, universities, and AHS on the distribution of the overhead. Distribution should be aligned with the costs. In our review, this was being done best by the Northern Alberta Clinical Trials and Research Centre (NACTRC), a legal joint venture between the former Capital Health (now AHS) and the University of Alberta under the leadership of Dr. Richard Fedorak.

5. Employment of Research Coordinators

Research coordinators play a vital role in the success of clinical trials. However, their employment arrangements vary and across the Province they belong to a variety of unions. This may be putting them and institutions at some risk (e.g., they often work in AHS, but may not be employees of AHS and this could have implications for insurance).

Recommendation 6: That AHS and its partners establish a working group to improve ethics reviews and contracting processes for clinical trials. The working group can learn much from Northern Alberta Clinical Trials and Research Centre (NACTRC) and possibly apply much from this model to a Provincial model and possibly to a national strategy.

iii) Pillar III – Health Services Research (Health Systems Services)

Research in this Pillar is highly relevant and applicable to AHS. This is research that can be used to translate evidence to action. It is research that can be done by a broader range of health professionals. This is also research that can be targeted to address specific problem areas in health services delivery.

The expansion of health services research is relatively new, but there were numerous excellent researchers in all health Faculties involved in health services research in all three universities. We also heard from a number of groups and investigators about their desire to expand their Pillar III research.

Pillar III health services research produces evidence for improvements in healthcare systems with relatively short time frames from “knowledge to action.” There has been investment by AHS in major health services research units in both Edmonton and Calgary. The Calgary Health Region of AHS led by Dr. Sid Viner produced a paper

“Embedded Research”: A Knowledge Exchange Strategy for Health System Improvement. This document advocated for issue-based research that is of strategic importance to AHS and to generate research evidence to inform decision-making with which we agreed. While this paper pointed out some of the weakness in academic medicine, it failed to recognize some of the critically important advances that academics working in Pillars II, III, and IV have brought to AHS. We believe that there are important aspects of the paper on “Embedded Research” that can be captured, such as closer collaboration between researchers and decision-makers. It will be important for AHS managers and decision-makers to identify the areas of need for 1) evidence to guide policy or treatment decisions, 2) greater cooperation and collaboration and less duplication of effort and 3) improved dissemination of knowledge across the AHS.

Examples of Pillar III Research

There have been very significant investments in Pillar III health systems research in targeted areas to produce evidence to improve specific aspects of our healthcare delivery system. For example, the waiting times for hip and knee surgery (time to see the orthopedic surgeon, and time to surgery) were all improved by a study of the system and improvements to access (led by the Alberta Bone and Joint Institute, Dr. Cy Frank, U of C).

Another example is the delivery of eye care and consultation to ophthalmologists by tele-ophthalmology. Tele-ophthalmology has made patient care easier and faster for patients with risks of losing vision from diabetes, cataracts, glaucoma, and macular degeneration. Patients in rural areas do not need to travel to urban centres for diagnosis and follow-up of their disease unless seeing an eye specialist is absolutely necessary. This is an excellent example of more effective and efficient healthcare delivery that received a national award from CIHR and is being adopted elsewhere in Canada (Drs Greve, Tennant, and Rudnisky – U of A).

These are but two examples of the many examples we received that illustrate how health services research is improving healthcare for Albertans.

Pillar III research is well suited to study the efficiency and improvement of health services delivery by interdisciplinary teams. For example, more than 60% of family physicians in the province are practicing in Primary Care Networks (PCN). However, almost all of the PCNs differ in significant ways, but there is little evaluation of “what is working well” and very little knowledge translation from successful PCNs to others. These are very important issues for the AHS; however, we found the Departments of Family Medicine at U of A and U of C lacked the training, time, and funding to do the evaluation studies on PCNs.

SEARCH Canada (Swift, Efficient Application of Research in Community Health) may be an instrument capable of enhancing Pillar III research in Alberta.

SEARCH Canada began as an Alberta-based, not-for-profit organization dedicated to improving patient care by applying evidence from research to decisions in practice and in the management of health care. In several of our meetings, we heard of the positive

impact of SEARCH on knowledge transfer, support of front-line staff and physicians (particularly in rural areas), and the training of front-line staff in knowledge transfer. It was clear that in the rural regions, SEARCH was highly valued. In the urban areas, its impact was not as evident because urban areas have substantial support from other institutions.

Since its inception, SEARCH has had as its Provincial mandate and goal to create equitable capacity for using research in knowledge transfer and decision-making processes across the system. SEARCH also provides an on-line library and a curriculum on how to access critical resources. This has been valued by the health workforce in rural and remote areas of the Province. SEARCH connects front-line researchers and academic faculty across the Province.

When we began our review of research, SEARCH was in a crisis mode. It had been initiated with five years of support from AHFMR, with the expectation that after five years, the ongoing funding would be primarily from the nine RHAs. However, with the creation of AHS, it was not clear that funding would be forthcoming to support SEARCH. AHW has provided one year's funding (\$2.5 million) for SEARCH while its value to AHS is evaluated. We heard that SEARCH Canada was adding value in knowledge translation from a number of provincial and national sources, but AHS needs to define its expectations of SEARCH and do a more complete evaluation of its value.

Recommendation 7: That AHS define its expectations for the impact of SEARCH (Swift and Efficient Application of Research in Community Health) Canada on knowledge translation (KT) and supporting research training capacity in rural Alberta. An evaluation should result in a clear decision whether or not AHS (AHW) will continue to support SEARCH.

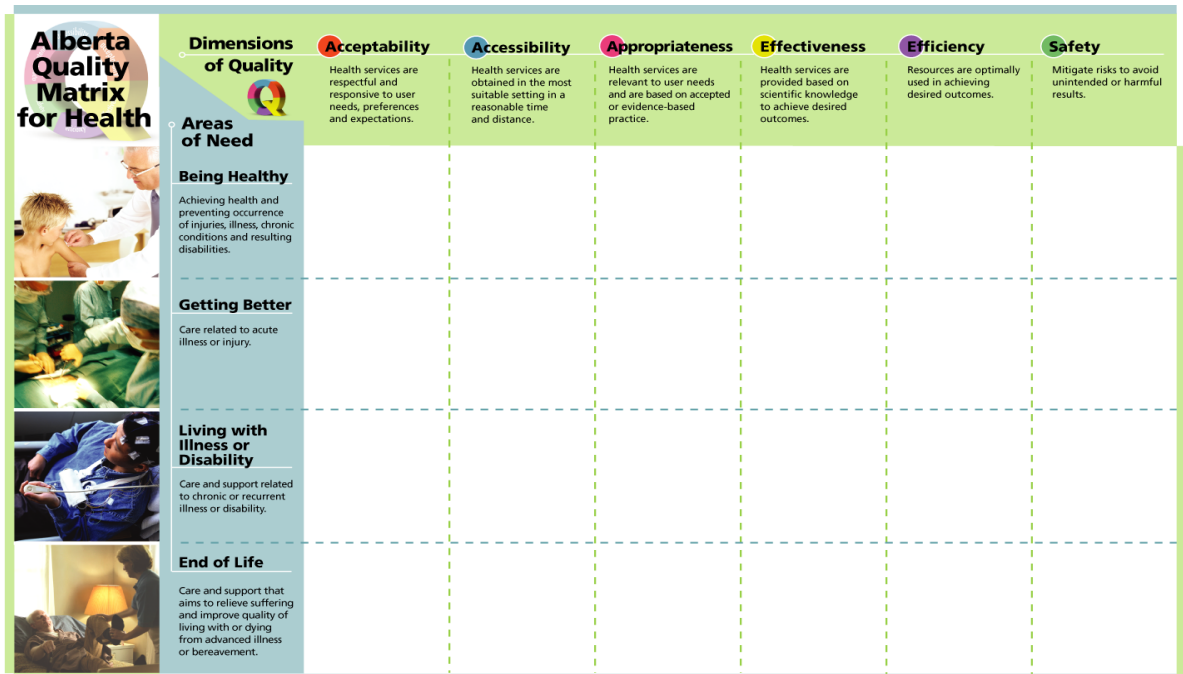
Inter-regional Rural Research and Evaluation Network (IRREN)

IRREN was created in 2006. Many of those involved in IRREN received training in research and knowledge translation from participation in the SEARCH training program. Through our interview with IRREN, we learned that the David Thompson region approved approximately 100 research projects over two years. About 15% (30) were clinical trials. Ethics approval was through the College of Physicians and Surgeons or the AHFMR Ethics Committees. However, little was standardized with respect to overhead and cost recovery, resource impact, or contract administration. The recommendations we have made for improvement of clinical trials are relevant to the administration of clinical trials by IRREN.

Health Quality Council of Alberta (HQCA)

[Formerly Health Services Utilization Commission (HSUOC)]

This is another organization that is a resource for AHW and the AHS in support of Pillar III Research in the area of health services quality and safety. The HQCA published its health quality and safety matrix that was adopted from the Institute of Medicine matrix (see Figure 9). The matrix has been utilized by a number of programs in Alberta when examining aspects of access, quality, safety, and sustainability of the healthcare system.



Adopted June 2005 by the Health Quality Network, an HQCA collaborative consisting of: Alberta Association of Registered Nurses, Alberta Cancer Board, Alberta Health and Wellness, Alberta Medical Association, Alberta Mental Health Board, Alberta College of Pharmacists, Aspen Regional Health, Calgary Health Region, Capital Health, Chinook Health Region, College of Physicians & Surgeons of Alberta, David Thompson Health Region, East Central Health, Federation of Regulated Health Professions, Health Quality Council of Alberta, Northern Lights Health Region, Palliser Health Region and Peace Country Health.

Adapted from the Agency for Healthcare Research and Quality, U.S. Department of Health and Human Services under contract to the Institute of Medicine.

Figure 9. Alberta Quality Matrix for Health

In 2004, the HSUOC became the Health Quality Council of Alberta (HQCA). It receives a budget of approximately \$4 million annually from AHW to fulfill its mandate to promote and improve health service quality and safety across Alberta. The HQCA completes surveys that focus on the public’s experience and perceptions of the healthcare system and reports its findings to Albertans. HQCA also does reviews of issues of quality or safety under Section 13 (as requested by AHW) or Section 14 (as requested by AHS). The HQCA established the Health Quality Network as a tool to disseminate findings from surveys and reviews to all zones of the Province.

In 2005, the HQCA launched its annual summer studentship program. In 2006, the HQCA received one-time funding of \$500,000 to support research on quality and safety. Legislative changes in 2007 further strengthened the HQCA commitment to quality and safety research; however, its current budget is sufficient only to conduct surveys, carry out reviews and continue its educational mandate including the identification of health quality indicators. We believe the HQCA is a resource that could have a more important role in quality and safety research.

iv) Pillar IV Health Research: Public, Population and Community Health

Pillar IV research refers to the investigation of how systemic, environmental, social, and economic factors are influencing the health of the whole population. Alberta Health & Wellness defines public health as “the science and art of promoting health, preventing

disease and prolonging active life through the organized efforts of society.” Whereas much of medicine focuses on the treatment of acute or chronic illness, public health is about preventing people from getting sick. The 2006 Report on the Health of Albertans opens with the statement that “Albertans can expect to receive high-quality care and services designed to prevent disease, manage disease, and promote and protect their health.” Such an expectation can be met only if a strong commitment is made to develop health promotion programs that are truly effective and their effectiveness must be rigorously evaluated through research.

Research has demonstrated that there are tremendous opportunities to improve health by taking action on broad determinants of health such as education, socioeconomic status, supportive physical and social environments, healthy child development, gender, culture, and various lifestyle and personal health factors that affect health. We know that many of the major causes of early death and disability are either preventable or can be substantially reduced through appropriately designed and implemented public health interventions at a population level. Research produces the evidence to develop public policy that enables Albertans to make healthy lifestyle choices within the context of a healthy and prosperous province. If AHS adopts such a research strategy, it would position Alberta as a leader in dealing with the growing incidence of health issues such as asthma, autism, cardiovascular disease, obesity, diabetes, arthritis, injury, and pregnancy exposure to toxins such as alcohol that put such a strain on health care budgets.

Examples of Pillar IV Research

Much of the research in this area is applied research. Pillar IV research is “pulled” by the health system much more than being driven by curiosity and the excitement of discovery typical of Pillar I research. In addition, Pillar IV research is intrinsically interdisciplinary requiring teams of researchers from physicians to nutritionists to economists to sociologists to examine the multi-faceted approach to public health problems such as obesity. The obesity epidemic in Alberta includes 600,000 Albertans classified as obese and 50,000 to 75,000 as severely or morbidly obese and this contributes to a wide range of health problems including heart disease, diabetes, cancer, depression, and osteoarthritis. Excellent multi-disciplinary team approaches to the obesity problem in Alberta have been proposed. Furthermore, the university research communities have been proposing an enhanced strategy to support Pillar IV research for several years. The University of Calgary has a strong policy/community health team and has proposed a much expanded relationship with the Calgary Zone. The University of Alberta created a new Faculty, the School of Public Health—the first in Canada—to invigorate the research initiatives and give greater recognition to Pillar IV research. In May 2006, the universities signed a Memorandum of Understanding acknowledging the need to collaborate to create a critical mass to become world-class in public health research. So far, Government has provided little encouragement to the proposed strategy but the re-organization of AHS should provide an opportunity to move this agenda forward. It is central to the long-term sustainability of the healthcare system.

University of Lethbridge

We had an excellent visit at the University of Lethbridge. It is well known for its strong neurosciences program led by Dr. Brian Kolb, and, in fact, has the first AHFMR Polaris awardee, Dr. Bruce McNaughton. The clinical interaction of the neurosciences program is primarily with researchers and clinicians at the University of Calgary.

However, there are strengths at the University of Lethbridge in Pillars III and IV, particularly in primary care and Pillar IV research in First Nations populations. Health issues unique to First Nations populations include diabetes, obesity, and several other diseases that require special attention and a unique ability to work with these populations. There is some strong research in epigenetics, relating particularly to cancer research through the Alberta Cancer Research Institute. There were concerns expressed that the University of Lethbridge had a good relationship with the Chinook Regional Health Authority and the “good” relationship had gone to “no” relationship. “The School of Health Sciences doesn’t know who to talk to.” They felt this was a short-term issue that needs to be corrected quickly.

To capture the full potential of Pillars III and IV research, collaboration and inclusiveness are critically important, not competition and exclusiveness. The creation of AHS has provided an excellent opportunity to improve the quality and quantity of Pillars III and IV research with a clear focus on major health issues that threaten the access, quality, safety, and sustainability of our publicly-funded healthcare system.

Recommendation 8: That AHS recognize its opportunity and responsibility to build a culture of research through Pillars II, III and Pillar IV research on major issues of importance to the quality, safety, and sustainability of the publicly-funded healthcare system. AHS should clearly identify their research priorities in Pillars II, III, and IV and provide direct and indirect support of these pillars.

XII. Research Activities in the Three non-RHA Institutions – AADAC, AMHB, and ACB

a) Alberta Alcohol and Drug Abuse Commission (AADAC)

AADAC is one of the 12 entities amalgamated under the AHS on April 1, 2009. AADAC is a heavily service-orientated organization with an annual budget of approximately \$104 million. AADAC is now working on integration within the Mental Health Program.

AADAC has done research in three areas: Surveys, Evaluation, and Client Assistant Studies. The surveys are Provincial in scope or are part of national surveys on alcohol, tobacco, gambling, and drug use. AADAC also carries out youth and school surveys. These surveys are done by in-house staff or through specific research grants or contracts. The evaluation studies of the programs offered by AADAC have been done through tender of contracts. The client assistance surveys are conducted on populations attending AADAC programs for treatment. AADAC currently spends about \$900,000 on in-house research staff and \$600,000 on research grants and contracts. The research component of AADAC is now being integrated into the Mental Health Program.

b) The Alberta Mental Health Board (AMHB)

The AMHB had just completed a well-developed three-year business plan to support mental health research in Alberta. The plan focused on four principal areas of research:

1. Effectiveness of mental health services and system;
2. Child and adolescent mental health;
3. Mental health in the workplace;
4. Mental health and addictions (linked with AADAC).

The research agenda cut across themes of aboriginal and multicultural populations, and suicide prevention. The research agenda is well aligned with support from all of the universities and funding is in place for the recruitment of researchers to endowed chair positions at the University of Alberta and the University of Calgary, to accelerate the research agenda. From our review, we felt that mental health research is being coordinated on a Province-wide basis, and is poised to transform mental health research in the Province. This should be a high priority area for health research in all four Pillars.

Recommendation 9: That AHS strongly support the business plan for mental health and addiction research and recruitment to the endowed research chairs established by AMHB should not be delayed.

c) The Alberta Cancer Board (ACB)

In 2002, the ACB commissioned an external review of cancer research activities in Alberta. The external review recommended that cancer research activities operate through a single entry on multiple sites with pooled resources and single leadership. This was accepted by the ACB and, by 2004, the Alberta Cancer Control Action Plan was developed by the Alberta Coordinating Council for Cancer Control (membership from nine RHAs, Alberta/NWT Division of the Canadian Cancer Society, AHW, and the ACB). This led to the creation of the Alberta Cancer Research Institute (ACRI) to pull Alberta's resources in cancer research under a single entity that would compete with the best in North America. The ACB established a vision of a Cancer-Free Future with aggressive targets for the year 2025:

- i) Decrease the projected number of Albertans developing cancer by 35%;
- ii) Reduce the number of projected cancer deaths by 50%;
- iii) Dramatically ease the suffering of patients living with cancer.

In late 2007, three parties, the Alberta Cancer Board, the University of Alberta, and the University of Calgary, agreed to a Business Plan describing the Governance Model and Operating Principles of ACRI. We understand that this Business Plan for ACRI was accepted and approved by AHS in August, 2008. We also liked the Business Plan with one exception or need for clarification. According to the Business Plan, the Director of ACRI would also serve as "Vice-President Research for AHS." If there is only a single VP Research for AHS, this would be inappropriate. However, if there was a VP Research for each major research theme or care corridor within AHS, then each Director could also serve as one of the several VP Research for AHS.

The Business Plan for ACRI reflects the unique position that cancer research enjoys in Alberta. With the establishment of the Legacy Fund, a \$500 million endowment to support

cancer research and prevention, this has provided approximately \$12 million for cancer prevention and \$13 million for cancer research per year. The cancer research program is matched by funding from the Alberta Cancer Foundation bringing the total Provincial funding for research and prevention to approximately \$40 million/year. In addition, cancer research attracts additional funding from CIHR and the National Cancer Institute of Canada – NCIC (estimated \$5 million annually).

The governance structure of the ACB, being responsible for patient care, education, and research in cancer, made sense. This can be captured in the creation of the “cancer corridor” under AHS. Within the cancer corridor, the ACRI is an excellent model to develop and monitor cancer research in the Province, with expert external peer review of research proposals and an outstanding International Advisory Board on Research (IACOR) providing advice to the Governing Council, the ACRI Director and AHS VP Research. We recognize the ACRI model is visionary and ensures high standards for a major focus on cancer research in the Province. We like the Research Institute Model for collaboration and coordination of research strengths on a Provincial scale. This could serve as a model for other “research institutes” in the Province. However, it has to be recognized that the tremendous Provincial support for cancer research puts this institute in a privileged position when it comes to the International Advisory Board on Research (11 international members) and funding to recruit and retain an outstanding director (\$10 million endowed Chair and \$5 million/year for 5 years operating).

In general, the AHS does not have much involvement in Pillar I research. The exception is in cancer research where the Alberta Cancer Board (ACB) has supported basic researchers at both the Tom Baker (Calgary) and the Cross Cancer Institute (Edmonton) centres. We clearly heard concerns expressed at both sites about the need to maintain the support of these researchers. As the ACB transitions to AHS, there must be a clear plan to continue to support these individuals (about 25 in total). This should be done in consultation with AET and the Universities of Alberta and Calgary. We recommend that the responsibility for support remain with AHS until satisfactory arrangements can be made between AHW (AHS), AET, and the universities for alternative support. This issue includes 13 individuals at the U of C in the Prevention Program who receive salary support from the ACB. The transfer of researchers' salaries to the Legacy Fund would seriously jeopardize the impact and the intent of the Legacy Fund. We need to learn a lesson from the effect of salary burdens on the flexibility of research support from the AHFMR.

Recommendation 10: That the Alberta Cancer Research Institute (ACRI) Governance Model and the Business Plan should be fully supported by AHS and the research institute model be seriously considered as a model for additional Province-wide research institutes.

XIII. Key Resources Supporting Health Research

a) Non-identifiable Patient Database

Health research in Alberta can be significantly enhanced by improved access to a non-identifiable patient database. Health research, particularly Pillars II, III, and IV, requires timely access to healthcare data. Such data are needed to objectively assess the performance of the healthcare system. This includes identification of problems, measurement of the impact of changes in healthcare policy, and identification of opportunities for further improvement.

The Institute for Clinical Evaluative Sciences (ICES), based at Sunnybrook Hospital in Toronto is the gold standard model for health service research in Canada. It is a partnership between the Ministry of Health, the Government of Ontario, and the University of Toronto. There are now about 160 staff and scientists at ICES. The government of Ontario provides \$5 million per year in base funding and also pays for contract research. Investigators bring grant funding to the Institute. The Institute publishes about 50 reports per year – these are available to the public at <http://www.ices.on.ca> Key to the success of ICES are the healthcare databases that are provided yearly by the Ontario Government. Legislation has been proclaimed by the Government of Ontario to enable ICES to house this information. A similar successful non-identifiable patient database has been established in the Manitoba Centre for Health Policy.

Partners Health Care in Boston is a partnership between Massachusetts General Hospital, Brigham and Women’s Hospital, and with primary care in the Boston area, providing care to about 3.5 million people (a similar population to Alberta). The health analytics arm of this organization resembles ICES in that it is base-funded with \$5 million and scientists from Harvard and the two hospitals carry out contract and grant-funded research on the databases that Partners have on their patient population. They also have a relationship with the computer science department at North Eastern University. Researchers using an Alberta non-identifiable patient database could establish similar relationships with computing science departments at our universities or another site to house our non-identifiable databases. Base funding will need to be provided to establish the database.

Alberta is positioned to expand the field of Health Services research. Bill 52, or a similar Bill, will provide enabling legislation to access healthcare administrative data. Healthcare administrative data needs to be made available to researchers. There are at least 60 researchers currently at the Universities of Alberta, Calgary, and Lethbridge who need access to a non-identifiable patient database to support their research. Such infrastructure will support health services research that will be invaluable to the Government of Alberta and AHS in providing information that they need to manage the day-to-day activities of the healthcare system. There is urgency to putting such a database in place and it should be done as soon as possible.

Recommendation 11: That AHS, working with AHW, should establish a non-identifiable patient database to support research in Pillars II, III, and IV. Consultation with successful models outside of Alberta will be invaluable in this process.

b) **Foundations**

We had limited consultation with foundations. The following is a brief summary of our impressions on this important resource.

Foundations are either disease based or hospital based. Foundations that are disease based function at a Provincial or national level, and often support peer-reviewed funding after a call for applications. Hospital-based and university-based foundations are often very effective advocates for particular institutions and raise money for specific initiatives in hospitals or universities. They establish very important relationships with donors. Within the AHS there are several very large foundations that raise money to support research, education, and/or patient services at specific sites. The major foundations include (this list is not exhaustive):

- a) Alberta Children’s Hospital Foundation
- b) The Calgary Trust
- c) The University Hospital Foundation
- d) The Stollery Children’s Foundation
- e) The Royal Alexandra Hospital Foundation
- f) The Covenant Hospital Foundation
- g) The Alberta Cancer Foundation
- h) The Norlein Foundation

AHS should allow the Foundations to develop and nurture donor relationships and market specifically approved causes. Additional messaging for donor support from AHS at this time would likely contribute to donor confusion and foundation frustration.

AHS can best support foundations by providing the following:

1. Regular, clear direction on funding priorities from AHS programs that can be met through philanthropy.
2. A mechanism for AHS to hear about donor priorities – there may be unanticipated opportunities for AHS programs.
3. Clear reporting to the Foundations on how their dollars were spent – this provides the information they need to build further donor support.
4. Direct links between the Foundations and staff in the facilities and programs they support.
5. Office and marketing opportunities within the facilities and program areas that the foundations support.

Recommendation 12: That AHS continue to recognize the important role played by disease-based and hospital-based foundations by supporting jointly approved initiatives and activities.

c) **Institute of Health Economics (IHE)**

(IHE) is a unique non-profit organization which provides policy relevant research and programs to support evidence-informed healthcare decision making and priority setting. It is governed by a board of health care partners including Alberta Health Services, Alberta

Health and Wellness, Alberta Advanced Education and Technology, University of Alberta, University of Calgary (including both Departments of Economics and Faculties of Medicine), Alberta Heritage Foundation for Medical Research, and five private sector partners. Much of the IHE work is done in collaboration with the University of Alberta and University of Calgary. The IHE is a technical member of the World Health Organization Health Evidence Network, operates the secretariat for Health Technology Assessment International, is the editorial office for Journal for Technology Assessment in Health Care, and is the core provincial agency for health technology assessment. The IHE participates in and encourages collaboration at the provincial, national and international level. The key programs at the IHE are: *Health Economics: Technology Assessment & Comparative Effectiveness; Evidence Uptake and Policy Impact.*

The IHE provides economic analysis at both a system-wide level (in broad areas of health sector management/strategy/priority setting) as well as economic evaluation of individual technologies and therapeutic interventions. The IHE focuses on gathering, producing, and disseminating health research findings from health economics, health policy, technology assessment, and “comparative effectiveness” research to benefit patient care. It also has been expanding capacity in economic evaluation and decision analytic modeling and provides an ongoing link to national and international innovations in the fields of health economics and technology assessment.

The flexible structure has allowed IHE to focus on timely and policy-relevant production in its research initiatives and partnerships with Alberta’s universities and other organizations. The areas of research priority are identified on a regular basis by its Board and funding partners. Significant attention has been paid over the past number of years at the IHE to the development of knowledge transfer activities associated with its research to ensure an impact is made on health policy and practice. This has included traditional approaches of publications and workshops as well unique strategies such as the Ambassador Program, the Consensus Development Conference series and support for a Health Evidence Network of Alberta (HENA).

IHE is an important research organization, particularly in Pillar III, and its strength has been to focus on problems which are relevant to health system decision makers. The work of the IHE is funded through multiple project-specific grants and contracts which comprise an overall annual operating budget of approximately \$5.5 million.

d) **Genome Alberta**

The human genome was sequenced in 2000. The potential impact on health research is tremendous. Examples include: personalized medicine, pharmacogenomics, genomic markers of disease susceptibility (cancer, heart disease, schizophrenia and others). The founder of the Institute of Systems Biology, Dr. Leroy Hood, refers to the new era of medicine as P4 Medicine (Predictive, Personalized, Preventative, and Participatory). Genomic studies of human diseases have been very actively pursued in many Canadian centres since the federal government responded with a major (post-sequencing) research funding program, Genome Canada, in 2001. Provincial equivalent programs were created in: Genome BC, Genome Prairie (Alberta, Saskatchewan, and Manitoba), Genome Ontario; Genome Quebec; and Genome Atlantic.

In 2005, Genome Alberta was created by Alberta (AET) and Genome Canada. The intent of Genome Alberta was to strengthen “omics” research in Alberta without necessarily having to wait for Genome Canada or other federally driven initiatives. Since Genome Canada was created, there has not been a single competition in human health. This is disappointing given the expectations for Genome Alberta when it was created. The amount of genomic funding attracted to Alberta is far behind the federal and provincial investments in Genomics in BC, Ontario, and Quebec (see Table 11) Funding for Genome Alberta is required so it can hold open and peer-reviewed competitions for genomics research funding. This is clearly an area where joint funding from AET and AHW is warranted given the nature of genomics studies and their potential impact on human health.

Recommendation 13: That AHS encourage AET and AHW to jointly fund Genome Alberta sufficiently well to engage in a genomic research priority-setting process and to fund peer-reviewed grants in “omics” related to human health.

Table 11. Genome Canada Funding Summary - Current Funding Only

CENTRE	For ALL Fiscal Years	
	APPROVED BUDGET	GC CONTRIBUTION
A. Large-Scale Projects		
Genome Alberta Total	\$22,184,889	\$10,419,595
Genome Atlantic Total	\$27,485,298	\$13,473,184
Genome British Columbia Total	\$89,924,380	\$44,928,070
Genome Prairie Total	\$33,771,302	\$12,802,663
Genome Québec Total	\$78,561,709	\$34,386,473
Ontario Genomics Institute Total	\$178,346,495	\$88,461,551
SECTION SUBTOTAL	\$430,274,073	\$204,471,536
B. Science & Technology Platforms:		
Genome Alberta Total	\$1,184,404	\$1,184,404
Genome Québec Total	\$3,970,323	\$3,970,323
Genome British Columbia Total	\$3,132,130	\$3,132,130
Ontario Genomics Institute Total	\$2,019,578	\$2,019,578
Genome British Columbia Total	\$1,645,575	\$1,645,575
SECTION SUBTOTAL	\$11,952,010	\$11,952,010
C. International Consortium Initiatives:		
Genome Québec	\$64,148,564	\$14,999,711
Other	\$110,000	\$110,000
SECTION SUBTOTAL	\$64,258,564	\$15,109,711
D. Genome Centre Operations		
Genome British Columbia Total	\$14,000,000	\$7,000,000
Genome Alberta Total	\$6,940,000	\$3,470,000
Genome Prairie Total	\$8,140,000	\$4,070,000
Ontario Genomics Institute Total	\$12,000,000	\$6,000,000
Genome Québec Total	\$12,000,000	\$6,000,000
Genome Atlantic Total	\$8,340,000	\$4,170,000
SECTION SUBTOTAL	\$61,420,000	\$30,710,000
GRAND TOTAL	\$567,904,647	\$262,243,257

XIV. Communication

In any large organization such as AHS, communication is of critical importance. Since the creation of AHS, many of the strategic partners have expressed concern with their decreased ability to communicate with AHS and to identify who the “contact person” is within AHS for their research questions. This is an issue more at the zone level than senior management level and this concern was raised more often in areas outside the urban centres of Edmonton and Calgary. There is a need to clearly identify individuals responsible for research in the five zones. In the

Calgary, Edmonton, and Lethbridge zones these individuals will play an important role for interaction with the universities and would be best selected through a joint selection process with the universities (as are the Health Sciences Deans) and hold appointments in the university as well as AHS.

We also believe that communication would be significantly enhanced by the Deans of Medicine being *ex-officio* invitees to AHS Board meetings. **We believe this, based upon the very significant amount of health care delivered through medical Faculties and the fact that the Faculties of Medicine are responsible for the majority of health research funding within the Province.**

Recommendation 14: That AHS appoint individuals responsible for research in each of the five zones. Where applicable, these individuals should be jointly appointed with universities.

Recommendation 15: That AHS support the appointment of the Deans of Medicine as *ex officio* members of the AHS Board. This will significantly increase communication with the medical and academic communities which we heard as a critically important issue.

XV. Governance Models

a) Vision

As stated under Section VI of this report, it is important that there is evidence of commitment at all levels to the value and importance of research for Alberta's health care system. This starts with a vision statement that reflects that commitment. The current AHS vision statement is **"To provide a patient-focused health system that is accessible and sustainable for all Albertans."** Based on an integrated model of the AHC, the vision statement for AHS would need to be broadened. The vision statement should reflect the role of excellence in research and education in a sustainable health delivery system. The governance for health research must be based upon the vision.

b) Governance Considerations

In developing a governance model to sustain and enhance health research, the model needs to address:

- Size and complexity of the organizations involved
- The tri-partite mission of AHC (health service delivery, education, and research)
- The desire to build on established or potential strengths
- A commitment to Provincial coordination and collaboration
- Recognition of the multiple partners involved including AHW, AET, universities, the team of healthcare providers and educators, and networks of care.
- Fragmentation in reporting relationships of Provincial healthcare corridors (see below) should be minimized. This is a significant challenge in the current administrative structure of AHS.

c) Approach

We have considered three levels of governance for the integration of service delivery, research, and education. We refer to these three levels as: Macro, Meso, and Micro. Draft Governance structures for the Macro and Meso level are shown below.

Macro refers to government level, and, in particular, the relationship between AHW and AET. Meso refers to the relationship between the Universities and AHS. This will also include a description of healthcare corridors. Micro refers to projects or research activities that are significant, address specific issues from particular zones, but do not logically fit within a Provincial research institute. In the AHS, this type of research would be more common for Pillars III and IV.

i) Macro Level of Governance (see Figure 10)

As mentioned in Section II (Background), AET was mandated to review Government research funding and mandates of many research-related institutions and organizations. Bill 27 was introduced into the legislature in April 2009. It redefines the responsibility, structure, and funding of health research. The governance model at the macro level shown below reflects our current understanding of that structure. The key Ministries responsible for Health Research are AET and AHW and they operate within the broad framework of government priorities. AET has primary responsibility for the universities. AHW has primary responsibility for health service delivery. Both have had mandates for funding of Health Research. A cornerstone of the successful AHC is partnership, coordination, and collaboration of AET, AHW, AHS, and the universities.

The recent major restructuring of research, primarily under the mandate of AET, has created four key “boxes”: Health, Bio-industries, Energy and Environment, and Support for Knowledge-based Industries. The “Health Box” has now evolved into the “Health Research and Innovation Corporation.” AET will have an important role in the support of Pillars I and II. That is, basic and applied research at universities and in the maintenance of critical platforms (e.g., bio-informatics, “omics” – genomics, proteomics, and metabolomics) will rest with AET. Conversely, AHS will have an important role in providing both direct and indirect support for health research in Pillars II, III, and IV.

At the Macro level, there will be joint representation on the Health Research and Innovation Corporation from both AHW and AET. Our review identified key issues that will need to be addressed at this Macro level. These include:

- preserving the vision of the AHFMR which has focused on excellence. However, its roles and mandates will be reviewed within the new structure. The AHFMR has been an extremely important recruitment tool and this should be maintained. However, the AHFMR should not be viewed as a career-long source of salary support and more flexibility in the use of its funding should result – but always based on peer review and excellence by international standards.
- Considering the introduction of provincial funding for operating grants. This is important for **all** four Pillars and provides an opportunity for AHW and AHS to maintain

an excellent research base in Pillar I and to address targeted research, particularly in Pillars II, III, and IV. This research in Pillars II, III, and IV will produce the evidence that needs to be translated into action to improve access, quality, and sustainability in health care.

- Increasing Health Research funding in Alberta which is now between 2-3% of healthcare spending and should move toward 5% in order to remain nationally and internationally competitive.
- Address sustainability funding of major research infrastructure in universities and hospitals.
- Establish clear Provincial priorities and better mechanisms to capture Alberta's share of federal funding opportunities

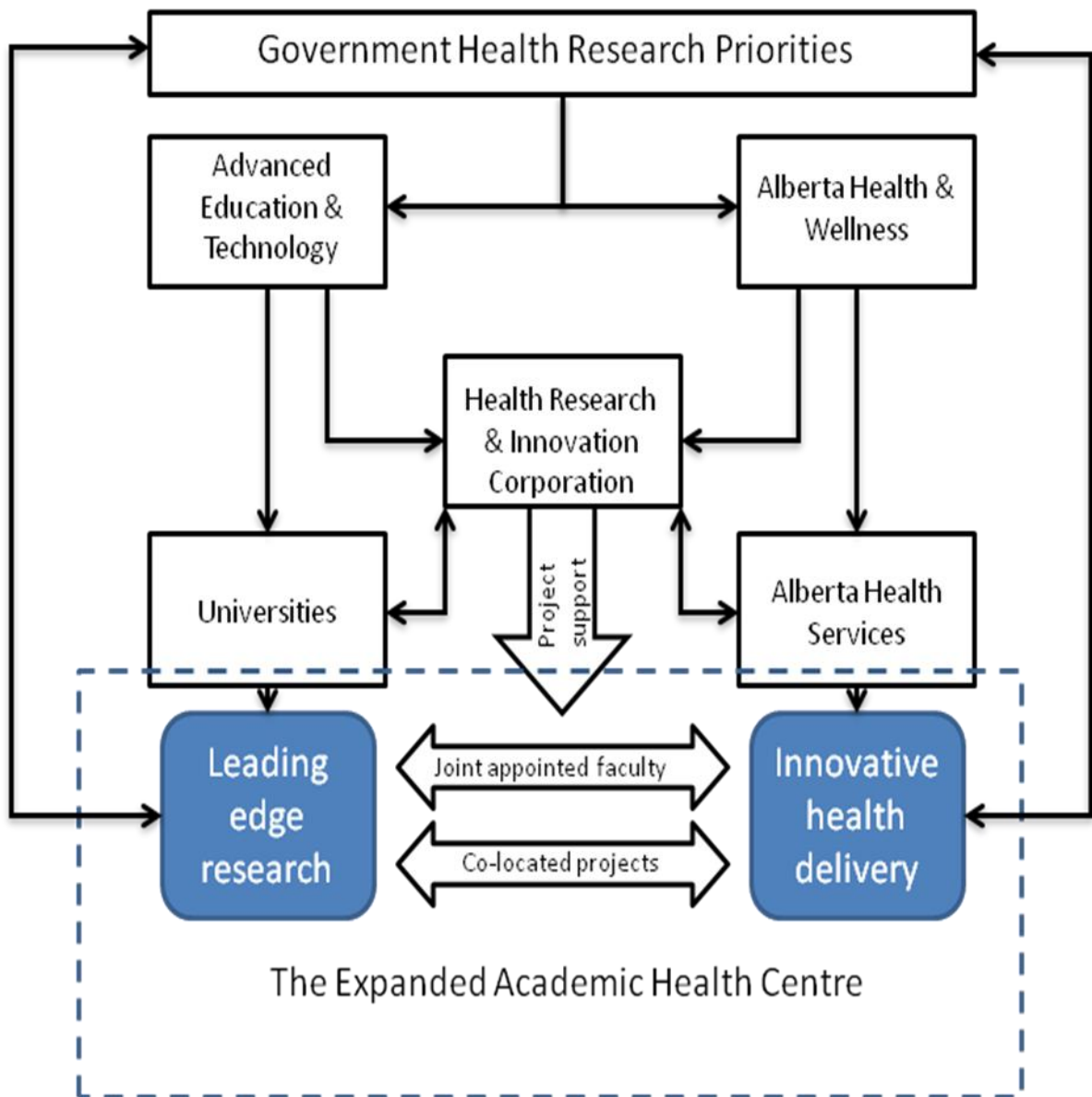


Figure 10. Macro Governance Model with a Focus on Health Research and Innovation

ii) Meso Level of Governance

This level of governance refers to the relationship between the universities and AHS. It is designed to strengthen the interaction and cooperation between the two major research-intensive universities and AHS. It also builds on the Memorandum of Understanding (MOU) that was signed in early January 2009 solidifying the membership and roles of the Committee for Academic Medicine. The committee membership includes deputy ministers, provosts, deans of medicine, and representatives from AHS, but should also include opportunities for other universities and colleges to be included in the expanded Academic Health Centres in Southern and Northern Alberta.

Figure 11 shows the integrated relationship of the macro and meso governance structure.

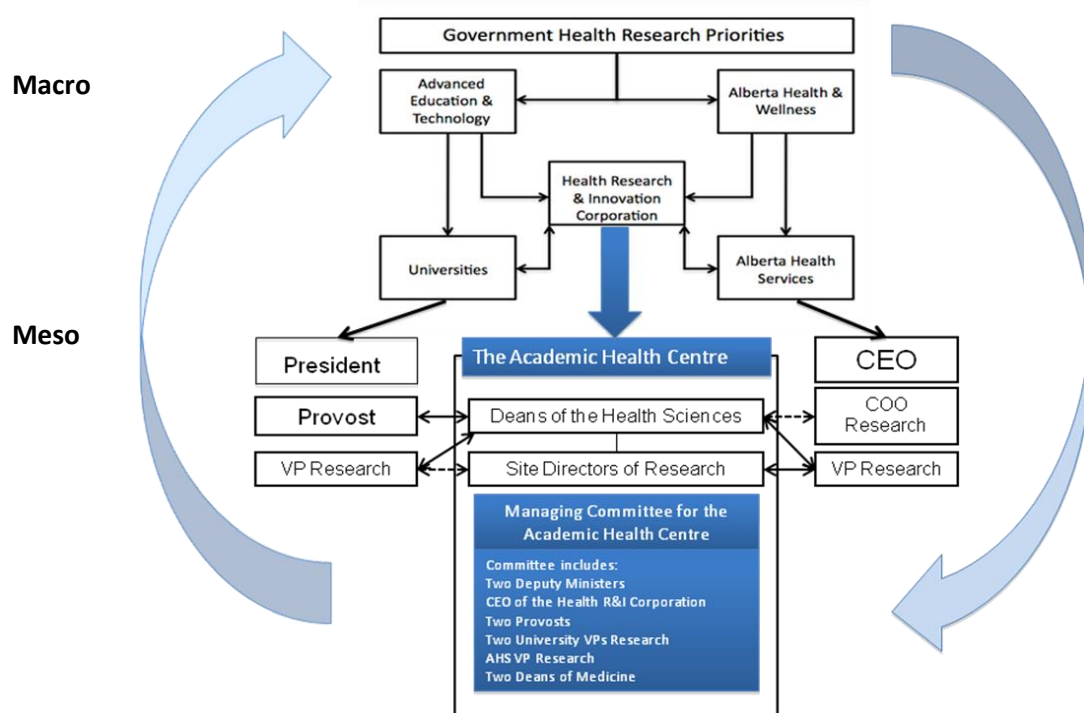


Figure 11. Meso Governance Model – Focus on the Academic Health Centres

Recommendation 16: That AHS strongly support the Committee for Academic Medicine to build strong research programs in all Health Sciences Faculties in the Expanded Academic Health Centres.

Health Care Corridors and Research Institutes

We believe the basic building block of the AHS organization should be a structure that has Province-wide responsibility for patient care, research, and education. We refer to the unit as a “Health Corridor.” Many of the corridors will integrate Province-wide services delivered by specialists in a particular area of medicine/health, but others could co-ordinate care given by generalists, laboratory medicine, radiologists, or primary care. The diagram shown in Figure 12 is not intended to imply that all Health Corridor leaders will report directly to the CEO as the numbers may make that impossible. However, we see corridor leaders having a parallel tri-partite role similar to a department or institute leader at a university; corridor leaders would have administrative responsibility for patient care, research, and education. Many of the Health Corridors will have Provincial Research Institutes in their core. The Cancer Corridor and ACRI provide an excellent working model of how this might function. ACRI has the special advantage of the Legacy Fund and it is unlikely that other Health Corridors will have operating funds of that magnitude. However, carefully developed business plans and research agendas for the Health Corridors would enable the research institutes to maximize infrastructure support, team grants, government, industry, and philanthropic support. The Health Corridors should not stifle local initiatives, but enhance Province-wide approaches where possible. The model assumes an important role for the VP Research in AHS to facilitate and co-ordinate the research institute as a critical partner in the development of a strong Academic Health Centre. There are many examples of major services that could be developed into Health Corridors. These include (alphabetically):

- a) Bone and Joint – already functioning at a Province-wide level with strong leadership; Cy Frank, Alberta Bone and Joint Health Institute;
- b) Cancer – Cancer Corridor and ACRI already in place as models;
- c) Cardiovascular Diseases – Mazankowski Alberta Heart Institute and VIGOUR (U of A), and Libin Cardiovascular Institute (U of C) are major strengths at the two major universities and builds on existing collaborations;
- d) Diabetes and Obesity – major health problems in Alberta – excellent research and leadership in place in the AHCs;
- e) Imaging – very large investment in Provincial infrastructure – strong research programs;
- f) Infection and Immunity – strong research and leadership in both major universities. Snyder Institute (U of C), Alberta Institute for Virology & Immunology and Centre of Excellence for Viral Hepatitis (U of A);
- g) Maternal and Child Health – strong research in both major universities, multiple health Faculties involved – tremendous potential to expand Pillars III and IV. Children’s hospitals with complementary quaternary programs. ACADRE – major research strengths in comparative effectiveness with significant NIH funding and a major participant in the Cochrane collaboration.

- h) Mental Health and Addictions – poised to build on the research plans of the former Mental Health Board. Funding is in place for several research chairs which should be filled. Amalgamation with AADAC should enhance additional research. Area of high need and high potential development;
- i) Neurosciences and Brain Research – strong programs at three universities – Hotchkiss Brain Institute (U of C), Neurosciences (U of L), and Neurorehabilitation (U of A);
- j) Population and Public Health – School of Public Health (U of A), CHAPS – Institute of Population and Public Health (U of C) – complementary research initiatives;
- k) Others. There are several other areas of excellence that may be further developed to the level of Health Corridors including Biomedical Engineering, Rehabilitation Medicine, etc.

Obviously, the introduction of Health Corridors is a proposed mechanism of coordinating patient care, education, and research mission under a single mandate. If Health Corridors are to be introduced, they would require the development of careful business plans. Such an approach would allow the phasing in of Health Corridors. The education and research mandates of the Health Corridors should be evaluated and approved jointly by AHS and the universities. A mechanism for this approval may be through the Council on Academic Medicine. Some guidance to the readiness of the development of Provincial-wide health corridors and research institutes can be found in the research support currently in these areas (see Appendix C)

Recommendation 17: That AHS consider the development of “Health Corridors” with tri-partite (research, education, and patient care) responsibilities and building on the Cancer Corridor model.

Recommendation 18: That AHS, with its key partners, support the development of research institutes to increase Province-wide cooperation and collaboration.

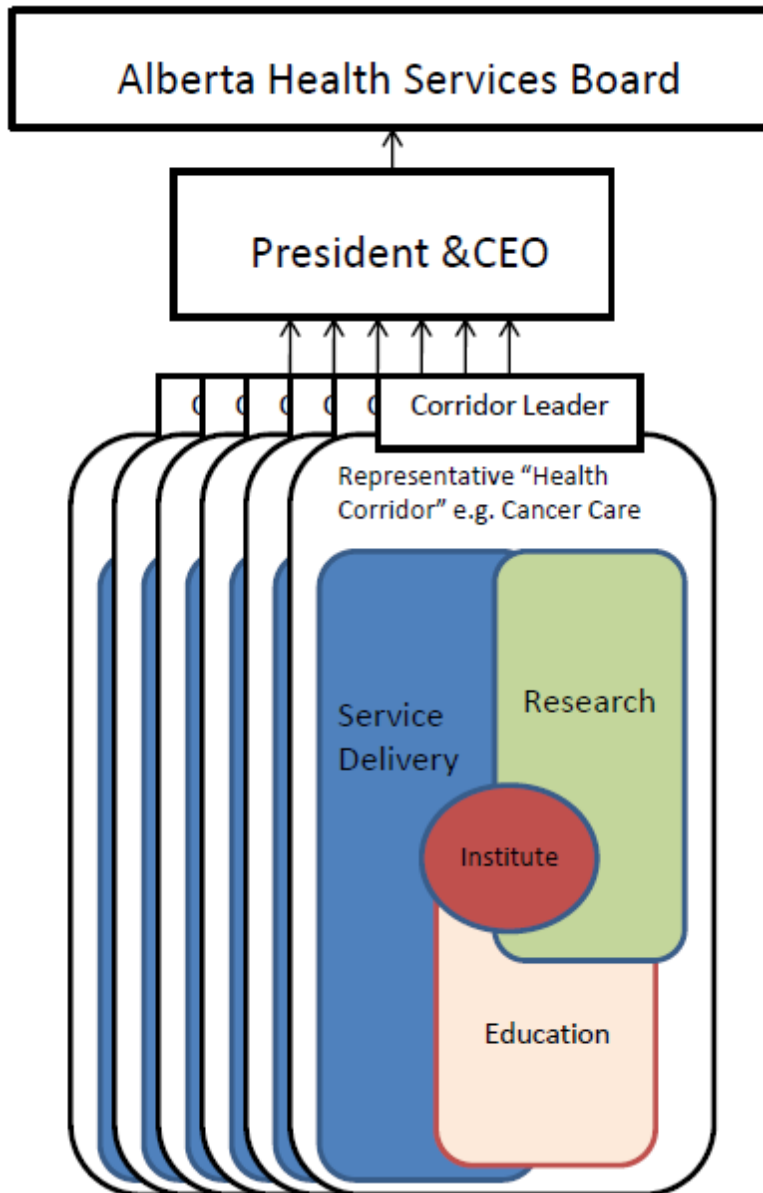


Figure 12. Health Corridor – Tri-partite Mission with Embedded Research Institutes

iii) Micro Level of Governance

The micro environment applies to the daily work of the researcher and the interaction of researcher with trainees, patients, and local administration at both universities and hospitals. This includes researchers in proposed research institutes in Health Corridors, but there is a large body of research that needs to be supported that will not fall under a research institute in a Health Corridor. This includes the major support of discovery research themes at the universities under Pillars I and II. In addition, a lot of quality research is being done by “small people with small grants, but very active minds.” The structures and individuals assigned to oversee research activities cannot forget about these people and their projects; they, too, need encouragement to support their enthusiasm for research.

XVI. Conclusions

We are honored to have been asked to address the important issue of research in the new structure – Alberta Health Services. We recognize the complexity and tremendous scope and challenges presented by the creation of AHS. We have been privileged to meet with many highly-committed individuals with their passion for research and the desire to improve the system. We feel the timing is critical to stabilize and give encouraging signals to researchers. While AHS has most of its research interest focused on Pillars II, III, and IV, it is critical that AHW and AET understand the current concern and insecurities felt by many researchers in Pillar I. These need to be addressed for the good of all health research, education, and patient care. The ability to attract the best clinician scientists depends on strengths across the full spectrum of research. Best research leads to best care. A tremendous effort has been put into building strong research programs in the Province. What has taken decades to build can be lost rather quickly in times of uncertainty. We hope our report will be of assistance and guidance to those responsible for the continued support and enhancement of health research in Alberta.

XVII. Appendices

Appendix A

List of Stakeholders that Provided Input Into this Report (Verbal and/or Written Submissions)

1. Alberta Health Services

- Cancer
 - Alberta Cancer Research Institute (ACRI)
 - Southern Alberta Cancer Research Institute
- Alberta Alcohol and Drug Abuse Commission (AADAC)
- Alberta Provincial Mental Health Board
- Calgary Health Services
- David Thompson Health Services (Inter-regional Rural Research Evaluation Network)
- Aspen Health Services
- Glenrose Rehabilitation Hospital
- Continuum of Care
- Capital Health Services

2. Universities

- University of Alberta
- University of Calgary
- University of Lethbridge

3. Institutes or Platforms

- Alberta Cancer Institute
- Institute for Continuing Care (ICCER)
- Institute for Reconstructive Sciences in Medicine (IRSM)
- Institute of Child and Maternal Health (ICMH)
- Institute for Continuing Care Education and Research (ICCER)
- Centre for Health and Policy Studies (CHAPS)
- Libin Cardiovascular Institute of Alberta (LCIA)
- Mazankowski Alberta Heart Institute
- McCaig Bone and Joint Institute
- Institute of Health Economics (IHE)
- Canadian VIGOUR Centre (CVC)
- Northern Alberta Clinical Trials and Research Centre (NACTRC)
- Snyder Institute for Infection, Immunity and Inflammation (SII)
- Hotchkiss Brain Institute (HBI)

4. Alberta Science and Research Authority (ASRA)

5. Alberta Heritage Foundation for Medical Research (AHFMR)

6. Alberta Ingenuity Centre for Carbohydrate Science

7. Calgary Economic Development Authority

8. Genome Alberta

9. Health Quality Council of Alberta

Appendix B

Participants (in alphabetical order)

Based on written submissions and minutes of meetings, individual input and distribution lists of persons invited to attend by their Stakeholder Organization.

Allen, Peter	Charlton, Lorin	Fong, Helen
Anderson, Lori	Cheeseman, Chris	Forsyth, Peter
Andres, Barry	Chong, Huey	Fritzler, Marv
Andrew, Gail	Clanachan, Sandy	Gibb, Robin
Armson, Heather	Clelland, Steven	Gibney, Noel
Armstrong, Denise	Coleman, Heather	Giles, Wayne
Armstrong, Glen	Collister, Barbra	Gill, Ron
Armstrong, Paul	Conly, John	Golder, Valerie
Ashworth, Nigel	Connolly, Carol	Goldstein, Rosie
Austen-Wiebe, Val	Cook, Al	Golsteyn, Roy
Babiuk, Lorne	Cowell, John	Graham, Jean
Bailey, David	Craighead, Peter	Grant Kalischuk, Ruth
Baker, Glen	Cross, Albert	Greenshaw, Andy
Bamforth, Fiona	Cumming, David	Gregory, David
Befus, Dean	D'Agnone, Penny	Halloran, Phil
Bergman, June	de Gara, Chris	Hawkes, Richard
Bertagnolli-Hansen, Alexa	Dean, Stafford	Hayward, Rob
Besner, Jeanne	DeCoster, Carolyn	Hayward, Sarah
Bhatti, Aslam	Devlin-Moses, Marni	Hebert, Jacqueline
Bocksnick, Jochen	Doan, Jon	Hedden, Douglas
Briggs, Tom	Dobbs, Bonnie	Heiden, Elfrieda
Brown, Lesley	Donoff, Michael	Henderson, Isabel
Buckley, Richard	Drummond, Garry	Hill, Michael
Bundle, David	Drummond, Jane	Hiscock, Barbara
Burrell, Robert	Drummond, Neil	Hoar, Sharleen
Butt, Richard	Dyck, Jason	Hodges, Mary
Butzner, J. Decker	Eagle, Chris	Holroyd, Brian
Cairncross, Greg	Elio, Renée	Hosgood, Chris
Calhoun, Avery	Epp, Roger	Hunter, Gordon
Cardinal, Clifford	Evans, David	Jhamandas, Jack
Casebeer, Ann	Feasby, Tom	Wieden, Hans-Joachim
Casey, Joe	Fedorak, Richard	Jonsson, Egon
Cass, Carol	Ferguson-Pell, Martin	Kay, Cyril
Caulfield, Tim	Finegan, Barry	Kelenchuk, Tammy
Cave, Andrew	Fiske, Jo-Anne	Kelley, Helen
Cawthorpe, David	Fitzpatrick, Dennis	Kellner, Jim
Chan, Ming	Fliegel, Larry	Kennelly, John

Klassen, Terry
Kolb, Bryan
Kortbeek, John
Kothe, Ute
Kovalchuk, Olga
Kreptul, Dennis
Kubes, Paul
Kulig, Judith
Lacaze, Thierry
Legendyk, Laura
Lambert, Robert
Lee, Bonnie
Lehner, Richard
Lewis, Jacqueline
Libben, Gary
Lopaschuk, Gary
Woodhead-Lyons, Sandra
MacDonald, Ian
Mackay, Elizabeth
MacLean, Cathy
Magnan, Jacques
Mahon, Michael
Manco, Donna
Marrie, Tom
Marshall, Dru
McBlain, Bill
McEwan, Sandy
McNaughton, Bruce
McNeil, Debbie
Meddings, Jon

Michalak, Marek
Mickelson, Linda
Milos, Nadine
Modry, Dennis
Molzahn, Anita
Moores, David
Moreau, Marc
Musto, Richard
Myers, Nicholas
Nimmock, Madeline
Nicol, Chris
Noseworthy, Tom
Oelke, Nelly
Osinchuk, Myka
Parks, Greg
Pasutto, Franco
Pearson, Keir
Perlow, Richard
Perreault, Mark
Piquette-Tomei, Noëlla
Preiksaitis, Jutta
Rachubinski, Rick
Rancourt, Derrick
Rasmussen, Carmen
Raso, Jim
Reynolds, John
Reynolds, Nancy
Rocier, Gayla
Ross, Shelley
Ross, Sue

Rowe, Marguerite
Saucier, Deborah
Schurman, Don
Scott, Brent
Scott, Cathie
Seidel, Judy
Sharma, Arya
Sheldon, Bob
Snider, Jonathan
Spooner, Rick
Stafford, Melissa
Stewart, Darlene
Swat, Sue
Szafran, Olga
Tapp, Diane
Thiessen, Lorrene
Thomas, James
Tingle, Aubrey
Velke, Nelly
Violato, Claudio
Walji, Anil
Walter, Michael
Waugh, Earle
Weiss, Sam
White, Deb
White, Patrick
Wiebe, Sam
Wilson, Doug
Wulff, Vivien
Zamponi, Gerald

APPENDIX C

Alberta Health Research Inventory Template

Identification of Principal Investigator

PI Name*:

Faculty: _____

Department: _____

*For Co-PIs, only one form should be completed by the alphabetically first PI.

Identification of Co-Principal Investigators

Name:	University:	Faculty/Department:

Research Project

Project Title: _____

Pillar (Type) of Research*

- 1. Bio-medical Research (Y/N): _____
- 2. Clinical Research (Y/N): _____
- 3. Health Services Research (Y/N): _____
- 4. Social, Cultural, Environmental & Population Health Research (Y/N): _____

Area(s) of Research**:

(Please list all applicable codes)

Clinical Trials (Y/N): _____ Trial Phase (if yes): _____

* The four CIHR research pillars

** Please see the list of codes for research areas attached. **Please list all applicable codes.**

Funding Information (Please List all Funding Sources)

Examples of funding sources include: provincial agencies, federal agencies, industry contracts, philanthropic donations, hospital foundation funding, Alberta Health Services funding, internal university funding, etc.

#	Funding Source	Funding Agency Grant Reference #	Amount/year (for each year of funding)	# of years	Start Date	Organization Administering Funds	Funding Program*	# of Personnel Supported**	# of Trainees Supported***
1									
2									
3									
4									
5									
6									

* operating, personnel, trainee, infrastructure – platforms

** e.g., technicians, Research Associates, Research Assistants, etc.

*** e.g., graduate students, PDF, residents, fellows, etc.

University/Institution Site Resources

#	Site(s) of Research	Site Department/Program (including lab, clinic, office)	Site Resources Used <i>(see coding instructions below)</i>	Space Utilized (square footage)
1				
2				
3				
4				

Coding Instructions for Site Resources:

Please list all numbers that correspond to the resources used for each site:

- 1 = University wet lab
- 2 = University dry lab space
- 2 = University office space

Alberta Health Services Site Resources

#	Site(s) of Research	Site Department/Program (including lab, clinic, office)	Site Resources Used <i>(see coding instructions below)</i>	Space Utilized (square footage)
1				
2				
3				
4				

Coding Instructions for Site Resources:

Please list all numbers that correspond to the resources used for each site:

- 1 = AHS clinic, lab or other space (including exam areas for seeing or testing patients)
- 2 = AHS office space
- 3 = Patient medical records, lab or diagnostic imaging results from AHS
- 4 = Identification and/or recruitment of patients from AHS sites
- 5 = Tissues or specimens from AHS patients (collected or discarded)

Major Equipment/ Infrastructure

#	Site(s) of Research	Year Acquired	Major equipment used for this research	Source of Funding (e.g. CFI, ASRA, AHFMR)	Cost when purchased
1					
2					
3					
4					

Appendix D – Grants and Awards by Research Area by Institution

Research Area ^a	Number of Health Research Grants/Awards (2007-08) ^b					TOTAL	
	University of Alberta	University of Calgary	University of Lethbridge	Alberta Cancer Board	Other		
1	Aboriginal Peoples Health (ABH)	60	17	7	0	1	85
2	Behavioral Sciences - animal studies (BSA)	158	54	10	2	24	248
3	Behavioral Sciences (BSB, BSC)	234	87	15	10	26	372
4	Biochemistry and Molecular Biology (BMA, BMB)	440	240	15	13	10	718
5	Biological and Clinical Aspects of Aging (BCA)	48	21	3	2	2	76
6	Biomedical Engineering (BME)	69	44	0	8	2	123
7	Cancer Biology and Therapeutics (CBT)	25	25	6	76	3	135
8	Cancer Progression and Therapeutics (CPT)	161	78	1	549	1	790
9	Cardiovascular System (CSA, CSB, CSC)	496	265	0	4	4	769
10	Cell Biology and Mechanisms of Disease (CBM)	230	177	9	3	5	424
11	Cell Physiology (CP)	163	153	0	4	6	326
12	Children's Health (CHI)	318	66	4	3	8	399
13	Clinical Investigation (CIA, CIB)	364	229	8	62	11	674
14	Dental Science (DS)	34	0	1	0	0	35
15	Developmental Biology (DEV)	117	150	4	3	4	278
16	Endocrinology (E)	139	66	3	154	0	362
17	Experimental Medicine (EM)	408	254	0	101	4	767
18	Gender, Sex and Health (GSH)	71	54	8	1	1	135
19	Genetics (G)	141	90	13	15	7	266
20	Genomics (GMX)	60	38	0	9	3	110
21	Health Ethics, Law and Humanities (ELH)	24	7	1	0	3	35
22	Health Policy and Systems Management Research (HPM)	197	124	0	15	25	361
23	Health Services Evaluation and Interventions Research	187	79	0	30	14	310
24	Humanities Perspectives on Health (HUP)	8	2	0	2	0	12
25	Immunology and Transplantation (IT)	382	198	0	32	2	614
26	Knowledge Translation and Exchange (KTE)	203	61	0	14	22	300
27	Medical Physics and Imaging (MPI)	146	101	4	136	6	393
28	Metabolism (M)	292	106	0	7	0	405
29	Microbiology and Infectious Diseases (MI)	177	158	6	0	5	346
30	Molecular and Cellular Biology of Cancer (MCC)	83	73	6	139	5	306
31	Movement and Exercise (MOV)	160	120	18	28	3	329
32	Neurosciences (NSA, NSB)	456	429	37	38	23	983
33	Nutrition, Food and Health (NUT)	60	47	4	3	0	114
34	Palliative and End of Life Care (PLC)	34	2	0	24	1	61
35	Pharmaceutical Sciences (PS)	58	13	0	2	2	75
36	Pharmacology and Toxicology (PT)	79	21	0	12	8	120
37	Public, Community and Population Health (POP, PUB)	374	149	2	71	9	605
38	Psychosocial, Socio-cultural & Behavioral Determinants of Health	134	127	17	31	8	317
39	Randomized Control Trials (RCT)	244	217	0	390	9	860
40	Respiratory System (RS)	182	95	0	58	4	339
41	Social Dimensions in Aging (SDA)	29	8	2	0	4	43
42	Virology and Viral Pathogenesis (VVP)	206	87	0	8	9	310

^a To identify areas of relative research activity, the titles of grants and awards, regardless of funding source, were coded according to research areas used by CIHR for their peer-review committees.

^b Grants/awards may be coded under multiple research areas; counts are of individual grants/awards rather than counts of individual projects.

XVII. References

1. Krohn, L.T. *et al. Academic Health Centres: Leading Change in the 21st Century*. National Academy of Sciences. National Academics Press, 2004.
2. Families USA Foundation. *In your own backyard: How NIH funding helps your state economy*. 2008.
3. Wellcome Trust. *Medical Research: What is it worth? Estimating the economic benefits from medical research in the UK*. 2008.
4. Frank, C., *The Impact of Health Research*. Canadian Academy of Health Sciences, 2009.
5. King, D.A., *The scientific impact of nations*. *Nature*, 2004. **430**: p. 311-316.
6. Roy, D., Cranston L, Slutsky A and Feasby T, *Moving at the Speed of Discovery: From Bench to Bedside to Business*. Report of Association of Canadian Healthcare Organizations, 2007.
7. Thier, S.O. *et al. Envisioning the Future of Academic Health Centres. The final report of the Commonwealth Fund Task Force on Academic Health Centres*. 2003.
8. *Best Research for Best Health: A New National Health Strategy*. The NHS Contribution to health research in England. Department of Health 2006, Revision and re-issue January 2009.
9. Comroe, J., and Dripps R.D., *Scientific basis for the support of biomedical research*. *Science*, 1976. **192**: p. 105-111.
10. Majumber, S.R. *et al. Better outcomes for patients treated at hospitals that participate in clinical trials*. *Arch Inter Med*, 2008. **168**: p. 657-662.