



Medical Research Council of Canada



For the
period ending
March 31, 1997



Improved Reporting to Parliament —
Pilot Document

Canada

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Foreword

On April 24, 1997, the House of Commons passed a motion dividing what was known as the *Part III of the Estimates* document for each department or agency into two documents, a *Report on Plans and Priorities* and a *Departmental Performance Report*. It also required 78 departments and agencies to table these reports on a pilot basis.

This decision grew out of work by Treasury Board Secretariat and 16 pilot departments to fulfil the government's commitments to improve the expenditure management information provided to Parliament and to modernize the preparation of this information. These undertakings, aimed at sharpening the focus on results and increasing the transparency of information provided to Parliament, are part of a broader initiative known as "Getting Government Right".

This *Departmental Performance Report* responds to the government's commitments and reflects the goals set by Parliament to improve accountability for results. It covers the period ending March 31, 1997 and reports performance against the plans presented in the department's *Part III of the Main Estimates* for 1996-97.

Accounting and managing for results will involve sustained work across government. Fulfilling the various requirements of results-based management – specifying expected program outcomes, developing meaningful indicators to demonstrate performance, perfecting the capacity to generate information and report on achievements – is a building block process. Government programs operate in continually changing environments. With the increase in partnering, third party delivery of services and other alliances, challenges of attribution in reporting results will have to be addressed. The performance reports and their preparation must be monitored to make sure that they remain credible and useful.

This report represents one more step in this continuing process. The government intends to refine and develop both managing for results and the reporting of the results. The refinement will come from the experience acquired over the next few years and as users make their information needs more precisely known. For example, the capacity to report results against costs is limited at this time; but doing this remains a goal.

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Medical Research Council of Canada

Performance Report

**For the
period ending
March 31, 1997**

Allan Rock
Minister of Health

Henry Friesen, MD
President of MRC

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Executive Summary

The Medical Research Council is the principal instrument of the federal government for making strategic investments in research related to health. The MRC, with a budget of \$242 million in 1996-97, provides the foundational platform for Canada's \$1.6 billion health R&D enterprise. The Council supports world-class health science research projects in universities, hospitals and research institutes and provides awards for the training and development of health scientists. It focuses the national research effort on specific health threats and opportunities, and through a wide variety of partnerships, helps strengthen and diversify research funding across the country. The Council facilitates the use of research discoveries for the benefit of Canadians and provides an international presence and advice on priorities, ethics and safety in research.

This report covers the performance of the Medical Research Council in 1996-97. Some highlights:

- Canadian health science research yielded highly significant advances in basic knowledge, prevention or treatment of a wide variety of health problems including AIDS, Alzheimer's disease, arthritis, cancer, cystic fibrosis, diabetes, heart failure, leukaemia, stroke ... to list but some of the areas in which important discoveries have been made.
- The Canadian Breast Cancer Research Initiative was evaluated and MRC support confirmed for a further five years; also in 1996, MRC helped create two new research networks targeted at juvenile diabetes.
- Through partnerships with other organizations, MRC levered \$56.8 million for Canadian health science in 1996-97 and obtained very substantial commitments for future years. The MRC attracted \$2.80 in outside funding for every dollar it invested.
- Health science venture capital raised by the MRC-inspired Canadian Medical Discoveries Fund grew from \$14 million to \$164 million, and the number of firms benefiting from the Fund's investments in the commercial development of Canadian research discoveries increased from 8 to 22.
- An International Review of the MRC endorsed the Council's strategic direction and lauded its efforts to diversify the funding portfolio for health research in Canada.

The Medical Research Council also contributed to three important developments in health science funding in 1996-97: establishment of the Canadian Health Services Research Foundation; affirmation of the Networks of Centres of Excellence Program as a permanent feature of Canada's science and technology environment; and, creation of the Canada Foundation for Innovation which should result in more than \$2 billion of infrastructure renewal funding for Canada's research base over the next five years.

Section I: The President's Message

It is a pleasure to report to Parliament on the performance of the Medical Research Council of Canada. In 1996, the MRC was formally reviewed by an international panel of scientist-administrators - the first time that one of the three granting councils has itself undergone a peer review process - which strongly endorsed the MRC's strategies to diversify the sources of funding for health research in Canada. Although the international panel noted many ways in which MRC can - and will - be improved, its fundamental conclusion was that MRC is an *"outstanding agency under dynamic and imaginative leadership doing first rate, internationally significant work ... It fully merits the loyalty and support of the research community and the confidence placed in it by the Government and people of Canada"*.¹

The international review panel clearly recognized that the MRC was operating in *"increasingly challenging circumstances"*. Since 1993, MRC has been broadening its research mandate to include all health research, moving beyond traditional biomedical research to encompass all factors that affect the health of Canadians, including social determinants of health, psychosocial and behavioral aspects of health, and health services. As a result, the MRC is today in a better position than ever to contribute to the well-being and health of Canadians. As well, we have continued to champion basic research as the wellspring of innovation, stressing that it provides the foundation for improved health, economic sustainability and recognition within the international research community. Responding to a very challenging economic environment - in 1996 the federal government's contribution to Canada's health R&D was 22% of the national total, down from 28% in 1990 - the MRC has provided leadership in creating innovative vehicles for investment in health research.² As a result of a more diversified and balanced research funding portfolio, a whole new range of employment opportunities has been created, new spin-off companies established, new venture capital companies generated and, most significantly, more research grants awarded in the face of a declining budget.

The present report, revealing the breadth, quality and impact of health science during the year under review, is especially heartening in the context of diminishing budgets - an ever-present concern, particularly as the level of government investment in research in Canada falls further and further behind that of our international competitors. The report shows continuing progress by MRC in partnership development which has allowed the support of 500 more scientists and at least 200 more postdoctoral fellows and graduate students than would have been the case had MRC not used a portion of its base budget to lever funding from other sectors. And the report demonstrates a phenomenal growth in activity surrounding the commercialization of health science discoveries. In 1996 the MRC-inspired Canadian Medical Discoveries Fund alone raised \$150 million for investing in Canadian companies that are bringing academic research discoveries to the commercial market and, in so doing,

¹ Report on an International Review of the Medical Research Council of Canada, September 1996. Cat. No. MR21-17/1996. Page 8.

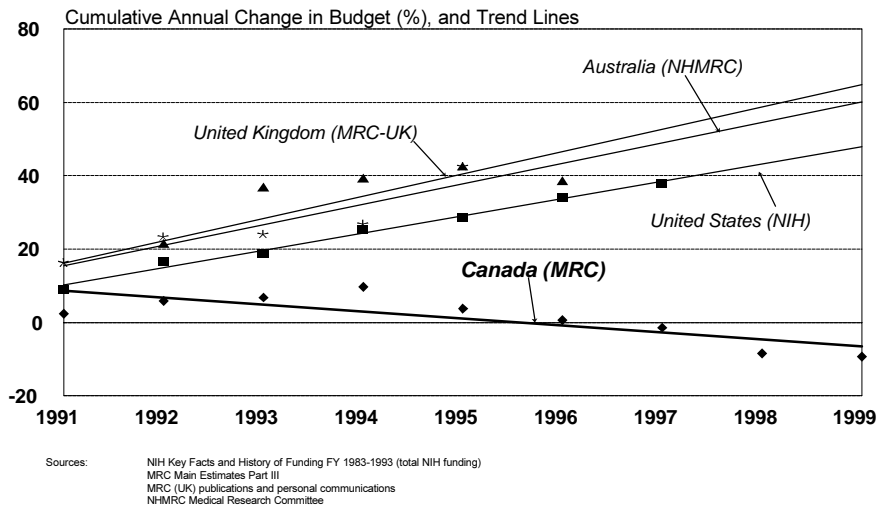
² Gross Expenditures on Research and Development in the Health Field 1970 to 1996. Estimate prepared for the Medical Research Council by Statistics Canada

are creating jobs and growth opportunities for Canadians. There has been a fivefold increase in health science venture capital in this country over the last three years.

The performance of the MRC during fiscal year 1996-97, which has been one of a series of difficult and challenging years for Canadian health science, engenders a sense of optimism that Canada will maintain the foundation of knowledge and expertise upon which our health system depends. I am encouraged by the creation of the Canadian Health Services Research Foundation which will use the interest revenue from a \$65 million fund to support research projects that evaluate the outcomes of health interventions. Government's affirmation of the Networks of Centres of Excellence Program as a continuing mechanism of federal support for S&T was most welcome as well; networks in the health area are conducting outstanding research and developing practical innovations in health information systems, repair of nerve damage, treatment of infectious diseases, relief of respiratory distress, medical genetics, and, protein design and function. Perhaps most important is government's announcement in February 1997 that it will invest \$800 million over five years in improvements to the national research infrastructure through the new Canada Foundation for Innovation. This investment, which with contributions from partners could result in \$2 billion for upgrading research facilities in universities and research institutes across Canada, signals a recognition by government that strategic investment in research is essential to maintaining quality of life and international economic competitiveness.

The news in 1996-97 has been good, but as 1998 approaches the need for greater support of the health science base remains a deep and critical concern. While an upgrading of health science facilities will provide the space and equipment necessary for research, it will not supply the operating funds, the research grants, needed by our health scientists if they are to remain internationally competitive in research. The gap between available and required funding is great, and widening quickly. To fund all highly promising health research projects at internationally competitive levels would require that the MRC budget increase by more than \$200 million over the course of the next three years.

Trends in Budgets for Health Research



Section II: Agency Overview ³

Mandate, Roles, and Responsibilities

The **mandate** of the Council is based on the authority and responsibility assigned to it under the Medical Research Council Act which gives the Council authority to:

- promote, assist and undertake basic, applied and clinical research in Canada in the health sciences; and
- advise the Minister of Health of such matters relating to such research as the Minister may refer to the Council for its consideration.

The Act, the sole one administered by MRC, also authorizes the Council to expend any money appropriated by Parliament for the work of the Council or received by the Council through the conduct of its operations; and, to publish and sell or otherwise distribute such scholarly, scientific and technical information relating to the work of the Council as the Council considers necessary.

Three federal granting Councils collectively have responsibility for the support of research in most areas of endeavour, carried out primarily in Canadian universities and their affiliated institutions: MRC, the Natural Sciences and Engineering Research Council and the Social Sciences and Humanities Research Council.

The MRC pursues its mandate guided by a vision of an internationally competitive health research community in Canada generating new knowledge that contributes to improvements in quality of life and supports the growth and expansion of Canadian industry in the health area.

Objectives

The Medical Research Council, as Canada's principal health research funding agency, aims to build and sustain, in partnership with others, a national capacity to create and use new knowledge for maintaining health and treating illness, for the social and economic benefit of Canadians and the well-being of people everywhere.

In pursuing its objective the MRC strives to:

- provide the knowledge base required for continuing innovation in health services, health maintenance, diagnosis and treatment of illness
- train and develop Canadian scientists with a capacity to address research questions in all areas of health
- focus a national research effort on health threats and opportunities

³

See Part III, MRC Main Estimates, 1997-98 for more information on topics covered only briefly in this section.

- diversify and strengthen Canadian health research through partnered funding
- facilitate the return of health research benefits to Canadians
- provide a national voice on health research issues.

Strategic Priorities

MRC's strategic objectives laid out in its Strategic Plan of 1992, *Investing in Canada's Health*, are as follows:

- enlarge the scope of MRC activities, committing to a greater range of health science research;
- continue the pursuit of excellence and innovation in the areas of basic and applied health research; and,
- demonstrate value, the efficient use of scarce resources and accountability in all activities by rigorous measurement of results.

Business Line and Organization

MRC has one business line which relates directly to its legislative mandate. It is:

- **promote, assist and undertake research in the health sciences in Canada.**

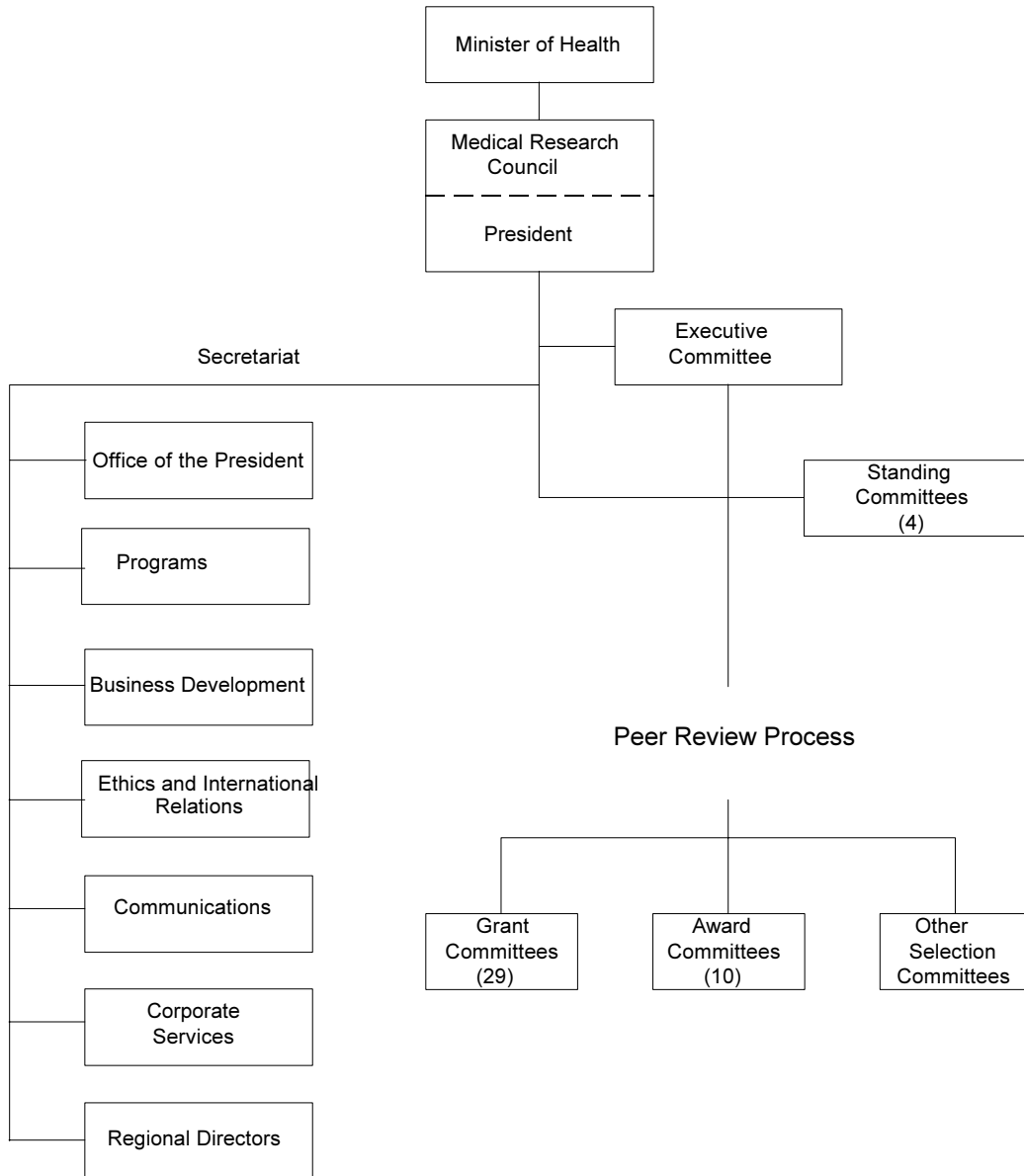
Responsibility for the business line lies with the President of the MRC, who is also Chief Executive Officer of the agency. The President, appointed by Order in Council, reports to Parliament through the Minister of Health.

Business objectives are those articulated for the agency (see above). The clients and beneficiaries of the program are, ultimately, the people of Canada for whom the health and economic benefits of research are intended. The MRC program funding flows primarily to researchers and research teams in universities, hospitals and research institutes, as *research grants* that can be used to hire technicians, buy research equipment and supplies, pay for research services and support research trainees. A portion of MRC funding flows to outstanding students and postdoctoral fellows, as *training awards*, and to researchers, as *salary support* to permit a full-time research effort.

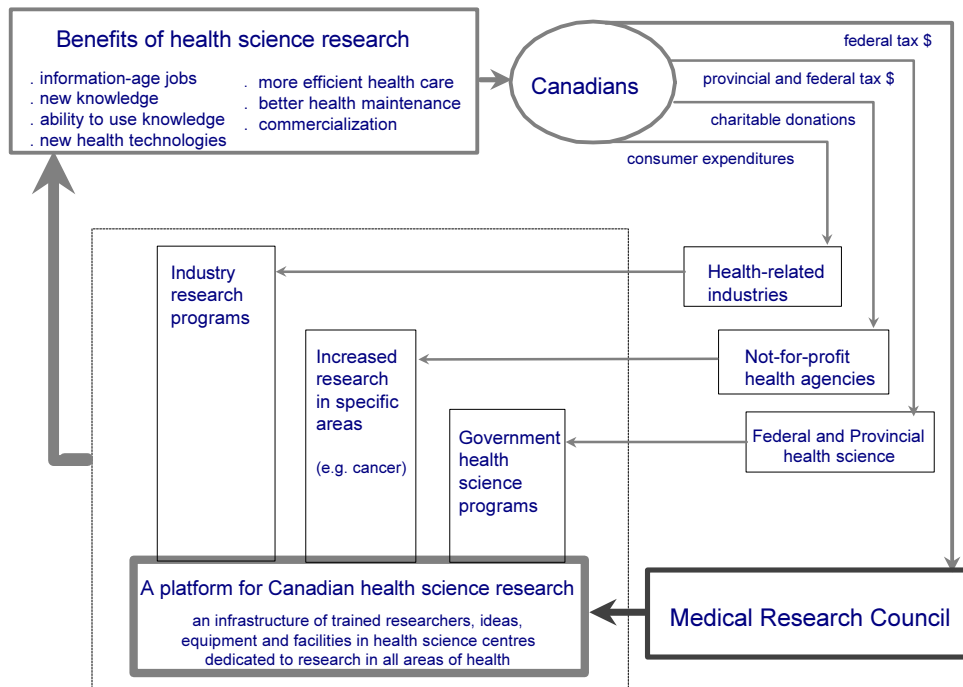
Some of the critical features of the **operating context** for the MRC program are expanding

demands, especially for research in non-biomedical health areas, and a federal investment in health research that is very rapidly falling behind that of our international competitors. Some **key initiatives** include: a broadening of the range of health research (including MRC support for the Canadian Health Services Research Foundation); determined development of funding partnerships such as the five-year, \$250 million Health Program funded by the MRC and the Pharmaceutical Manufacturers' Association of Canada; and, balancing a portfolio of funding mechanisms to ensure a national research capacity in all areas of health and a concerted effort to respond to special threats and opportunities related to the health of Canadians.

Organization Chart



Through the MRC the federal government provides a platform for Canadian health science research



Section III: Agency Performance

A. Performance Expectations

Comparison of Planned Spending to Actual Expenditures, 1996-97 (\$ millions)

Business:	FTE's (#)	Operating ^{1,2}	Voted Grants and Contributions	Subtotal: Gross Voted Expenditures	Total Gross Expenditures	Less: Revenue Credited to the Vote	Total Net Expenditures
Promote assist and undertake research in the health sciences in Canada	76	6.8	235.5	242.3	242.3		242.3
	78	8.6	233.8	242.4	242.4		242.4
<i>Other Revenues and Expenditures</i>							
							-0.5
							-0.4
							0.7
							0.7
							242.5
							\$242.7

Note: Shaded numbers denote actual expenditures/revenues in 1996-97; unshaded denote planned

- Operating includes contributions to employee benefit plans.
- The difference between actual and planned in Operating and Grants is due to a transfer of funds between Votes, and a carry-forward of \$0.3 million in Operating from 1995-96.

Agency's Planned versus Actual Spending (\$ millions)

Business line	Actual 1993-94	Actual 1994-95	Actual 1995-96	Planned 1996-97	Actual 1996-97
Promote assist and undertake research in the health sciences in Canada	258.2	265.2	251.2	242.3	242.4

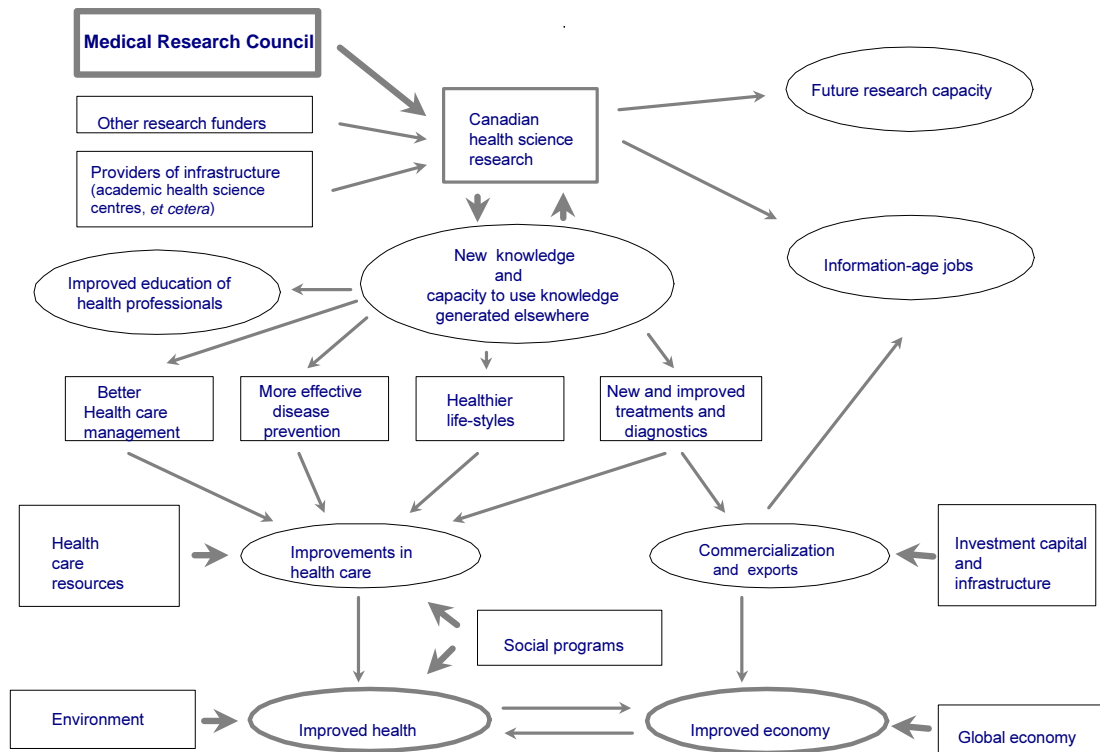
Summary of Performance Expectations ⁴

The Medical Research Council of Canada	
provides Canadians with	as demonstrated by
world-class research aimed at ensuring good health and well being	international calibre research projects in institutions across Canada on: fundamental processes underlying health and illness; prevention and treatment of disease; and, health services special research initiatives on health issues of particular concern to Canadians such as breast cancer, diabetes and AIDS
the social and economic benefits of health research discoveries	utility or impact of research results on illness prevention, identification and treatment of disease or health services commercialization of health research discoveries with resultant creation of jobs and economic opportunity
a capacity to respond to needs for research and development in all areas related to health	trained and experienced researchers capable of responding to research requirements in all health areas research resources and capacity generated by partnerships between MRC and other organizations
a national perspective on questions of health research priorities, ethics and safety	utility or use of advice and guidance on research priorities, ethics and safety

⁴

This table of results commitments was developed in August 1997, and thus did not appear in the 1996-97 Main Estimates as a basis for the present report of agency performance. However, it provides a useful framework for reporting performance and will be used for that purpose here.

Research as One Factor in the Realization of Social and Economic Benefits



B. Performance Accomplishments

World-class research aimed at ensuring good health and well being

demonstrated by

(i) international calibre research projects in institutions across Canada on: fundamental processes underlying health and illness; prevention and treatment of disease; and, health services.

- All 610 projects approved by MRC in 1996-97 for research operating grants were rated above 3.5 on a scale of 0 to 4.9 by panels of experts. These ratings indicate that all funded projects were considered highly meritorious, with the majority rated around 3.9 by the scientific reviewers.
- The 610 projects were selected from 2,187 proposals from highly qualified health scientists across Canada.
- Projects were conducted in 32 universities (and in their affiliated hospitals and research institutes) from Memorial University of Newfoundland to the University of Victoria.
- The 2,096 MRC operating grants funded in 1996-97 (continuing, new and renewal grants) spanned 26 health subject areas.
- Samples of promising research projects recently approved by MRC:

There is concern that the rising rate of prostate cancer - now 1 in 11 men - may be linked to substances in the environment. The MRC has awarded project support to a Queen's University researcher who will be comparing demographics, diet, occupational and environmental factors across a large group of men. She will also measure participants' blood for pesticides, PCBs, cadmium, zinc, lipids and Vitamins A and E **to determine whether the risk for prostate cancer changes with the concentration of each of these substances in the blood.**

Few of us have been spared the sight of a loved one in constant pain which cannot be alleviated. The MRC is supporting the work of a health scientist at the University of Toronto that provides **hope for chronic pain sufferers.** He will be working with surgical patients to determine what exactly is going on in the thalamus - a part of the brain - to create the sensation of pain. By understanding the factors which cause the sensation of pain, the researcher hopes to eventually be able to intervene directly with the neuronal mechanisms that cause it.

As our population ages, the number of seniors experiencing progressive dementia is growing, as is the enormous challenge they pose to their caregivers. The MRC has awarded a grant to a health researcher at McMaster University who is **studying the long term physical and psychological effects of primary caregiving** on family members. His team is evaluating both the common and the unique challenges of caring for seniors with dementia, and the types of support available. The ultimate goal of the five year study is to develop services to help both patients and their caregivers.

Insulin injections are an unhappy reality for many people with diabetes. Vanadium is a natural element found in most plants and animals, which, taken orally, seems to protect the pancreas and help it produce its own insulin as the body needs it. At the University of British Columbia, one

researcher is trying to determine how exactly vanadium works, while another is synthesizing a variety of versions of vanadium, trying to increase effectiveness while decreasing toxicity. They hope vanadium will **reduce the long term complications common to diabetes.**

Cancer cells frequently travel through the bloodstream, to end up in the liver. In certain areas of the liver, the growth of the cancer cells is nurtured, causing a new tumor. In other areas, the cancer cells are attacked and destroyed. A research team at the University of Manitoba believes that the liver can control where the cancer cells go. His team is trying to design drug therapies which will control this mechanism, and **ensure that cancer cells which enter the liver are destroyed rather than supported.**

Ironically enough, our lungs' ability to breathe air is dependent on their being covered with liquids. The lungs are lined with a watery layer, and a substance called pulmonary surfactant. On the surface of the lungs, this surfactant becomes a protective film which acts as a barrier between the water layer and the air in the lungs. At Memorial University, a researcher is trying to find out how this film works. He hopes to identify the cause and **possible treatments for diseases caused by dysfunctions in the lung's surfactant.**

(ii) special research initiatives on health issues of particular concern to Canadians such as breast cancer, diabetes and AIDS.

- Funding delivered by MRC and partners through initiatives targeted to areas that offer special threats or opportunities to Canadians (see table for 1996-97 estimates)

Targeted Research Initiatives	1996-97 funding (\$ thousands) *	
	MRC Funding	Partners' Funding
Canadian Breast Cancer Research Initiative	2,000	7,000
MRC-Juvenile Diabetes Foundation International	425	1,000
National AIDS Strategy (research component)	2,903	5,796
Canadian Genome Analysis and Technology Program	3,012	1,310
* Note that this funding relates only to the special initiatives listed and therefore does not include all funding that MRC, partners or other Canadian sources are providing for research in the areas in question through basic, clinical and applied projects supported by other research programs.		

- Report of an evaluation of the Canadian Breast Cancer Research Initiative (CBCRI):
 - "... the program appears to have changed the balance of research effort: far more work is being done through CBCRI on **patient and population studies** than would otherwise have been the case."
 - "... the data indicate that the CBCRI has indeed provided substantially **increased levels of breast cancer funding** to grant holders - the average increase is roughly 50%."
- An important advance in knowledge from research supported through the Canadian

Breast Cancer Research Initiative.

Susceptibility to breast cancer appears to vary with the amount of dense tissue in the breast. Women who have a large proportion of dense tissue are up to five times more likely to develop breast cancer than those who have little or none dense tissue. Researchers at the Ontario Cancer Institute, supported by the CBCRI, have found that **women can significantly reduce the proportion of dense tissue in their breasts by shifting to a low-fat, high carbohydrate diet.**

- Creation of new research networks targeting diabetes.

Two new Research Networks on Juvenile Diabetes have been established in Canada. A group of researchers based at the University of Western Ontario is studying the mechanisms that cause insulin-dependent diabetes and seeking ways to prevent the disease. Another major team of researchers, based at the University of Toronto, is trying to understand what causes the kidney damage that is often associated with diabetes and how it could be avoided.

- Report of an evaluation of the Canadian Genome Analysis and Technology Program.

"... **international reviewers were favourably impressed with the Canadian program.** They spoke highly of the way the program had been managed... mention was made of the importance of CGAT funding for projects in the social sciences and humanities, especially as a signal to other countries of the need for a medical, ethical, legal and social perspective [on the human genome project]."

Social and economic benefits from health research discoveries

demonstrated by

i) utility or impact of research results on illness prevention, identification and treatment of disease, or health services.

- Examples of high impact results from health science research

Impact on prevention and treatment. The devastating after effects of stroke, such as impairments to bodily movements and mental faculties, are caused by the blockage of blood flow to various parts of the brain. Deprived of the oxygen delivered in blood, brain cells will die quickly. Researchers funded by the MRC at the University of Ottawa have found a gene that produces a protein which works towards preserving nerve cells. That finding has led to the identification of an experimental drug which stimulates production of the protector protein and could thus provide a means of **reducing brain damage caused by stroke.**

Impact on treatment. For quadriplegics, many of the simple movements that we tend to take for granted are virtually impossible. A researcher at the University of Alberta has developed a **bionic glove** that can allow them to make their thumb and forefinger come together in the critical pinch grip essential for so many human activities. The bionic glove will pick up a very slight motion in the arm and translate it into signals which stimulate muscles and nerves in the wrist to trigger the opening and closing of the pinch grip. The MRC has supported the underlying research since 1989.

gene which produces a protein **which appears to tell normal cells when to stop growing**. The protein is absent from most cancer cells, but when applied to them it effectively stops their growth as well.

Impact on relief of pain, treatment and health services. Aspirin, and similar non-steroidal anti-inflammatory drugs which provide refuge from pain for people with **arthritis**, have a major drawback. Approximately 20% of arthritics will develop ulcers from their use. An MRC-funded researcher at the University of Calgary reasoned that the ulcers were caused by two factors. First, aspirin (and similar drugs) draw blood away from the gut, leaving it more vulnerable to stomach acids, food and drink. Second, these drugs activate white blood cells which, while good at destroying bacteria in the blood, can sometimes damage our own tissue. He then sought out a compound which prevents these two unwanted side effects and combined it with standard pain-killers. The resulting new family of drugs, patented and now to be tested in clinical trials, not only **avoids the unwanted side effects of aspirin but is nearly ten times more potent**.

Impact on treatment. MRC-funded researchers at McMaster University have produced new evidence that an enzyme, telomerase, is present in multiplying cancer cells but not in normal cells. This find is relevant to the search for **drugs that attack cancer cells without harming healthy ones**.

Impact on prevention and treatment. Each year, about 10,000 Canadians survive heart attacks but develop arrhythmias which greatly increase their chance of a future fatal seizure. Researchers at McMaster University have shown that a drug, amiodarone, can **reduce the occurrence of serious arrhythmias** by nearly fifty percent in a two year period following a heart attack.

Impact on prevention and treatment. Teams funded by MRC at Queen's University and Dalhousie University, have developed a drug that reduces the self-destruction of nerve cells. While the drug is only a prototype, it points the way to **treatments for neurogenerative disorders** like Alzheimer's disease and Multiple Sclerosis.

Impact on treatment. A protein, calmodulin, found in all cells, but in a higher concentration in cancer cells, appears to play an important role in regulating cell growth. The drug, trifluoroperazine, which binds with calmodulin, appears to slow down cancer growth. MRC-supported researchers at the University of Saskatchewan have identified the specific site on calmodulin where this beneficial binding of drug and protein takes place. This knowledge of the characteristics of the binding site will be useful in the **development of better anti-cancer drugs**.

Impact on health services, prevention and treatment. Mental disorders cause grief not only for those afflicted but also for those who love and care for them. Using new imaging technology, researchers at the University of Western Ontario funded by the MRC, are examining levels of neurotransmitters in the brains of people with schizophrenia. They have found marked metabolic disturbances in a front part of the brain which is important in thinking. These disturbances are the likely cause of some of the symptoms of schizophrenia, such as hearing a voice when no one is physically present. By mapping the parts of the brain associated with various illnesses, the researchers are providing information that will help **guide the development of new treatments of mental disorders**.

(at the end of this report there are additional examples of high impact discoveries dealing with antibiotic resistant bacteria; treating prostate cancer; recovering from spinal cord injuries; health decision guides; more on cancer treatments; a bionic neuron; new possibilities for treating leukaemia; and, help with severe intestinal problems)

ii) commercialization of health research discoveries with resultant creation of jobs and economic opportunity.

- As of July 1996, the market value of Canadian public companies in the life sciences sector was \$11.2 billion.
- Health science venture capital raised by the MRC-inspired Canadian Medical Discoveries Fund grew from \$14 million to \$164 million in 1996-97. The CMDF became the largest venture capital investor in life sciences in Canada.
- The number of firms benefiting from investments by the Canadian Medical Discoveries Fund in the commercial development of research discoveries increased from 8 to 22 in 1996.
- As of September 1996, firms receiving venture capital from the Canadian Medical Discoveries Fund employed 444 people of whom 324 (73%) were working in science and technology.
- There has been a fivefold increase in Canadian health science venture capital over the last three years. For the period 1994 to 1997, MRC has identified \$670 million in health science venture capital and 1,097 jobs in firms benefiting from investments.
- In 1996-97 MRC invested over \$21.5 million in university-industry research programs and networks that link the generation of knowledge by investigators in universities, hospitals and research institutes with firms that can realize the health and economic potential of that knowledge.
- The Networks of Centres of Excellence program was evaluated and found to be effectively linking knowledge creation and technological development. Government has decided to continue the program indefinitely.
- Examples of marketable products and processes arising from health science discoveries:

Vasoflux, a drug that can prevent the formation of life-threatening blood clots without disrupting the normal clotting process, has attracted investments in Vascular Therapeutics, a company based in Hamilton, totalling \$17 million. The recent growth in Canadian health science venture capital is credited with the repatriation of this Canadian discovery which, for lack of investment capacity here some years ago, was being developed by U.S. investors.

McGill University, Eli Lilly and Company and Eastern Virginia Medical School have established a licensing agreement regarding a gene whose products stimulate the **regeneration of cells which produce and regulate insulin**.

The Canadian Medical Discoveries Fund, in collaboration with The Canadian Genetics Disease Network, the University of Ottawa and The Children's Hospital of Eastern Ontario has invested \$950,000 through Aptogen Inc. for the design of therapies using **genes that prolong the life of human cells**.

*A capacity to respond to needs for research and development in all areas
related to health*

demonstrated by

(i) trained and experienced researchers capable of responding to research requirements in all health areas

- In 1996-97 the MRC invested over \$25.9 million in personnel awards to promote and assist the training of future generations of health researchers. In addition, an estimated \$18.1 million of MRC research grant funding was used to support research students and postdoctoral research fellows. MRC partnerships raised a further \$7.3 million for research training, bringing the total investment to over \$51 million.
- The MRC funding for research training assisted over 2,500 potential future Canadian health scientists.
- Salary support from the MRC assisted the research career development of 365 outstanding health scientists. This investment in human resource development amounted to \$21.5 million.
- Examples of outstanding health researchers recognized by Distinguished Scientist awards from MRC in 1996:

Dr. Robert French. Dr. French has specialized in study of the channels in cell membranes that are responsible for generating and passing on signals along nerve fibres or within muscles. He is especially interested in the effect of drugs or natural toxins on these channels and has shown that local anesthetics can tend to close the channels in heart muscle cells, possibly accounting for abnormal heart rhythms that sometimes follow their use. Current projects may provide insights that will lead to **antidotes against toxins** and drugs to increase **resistance to heart attacks**. Dr. French is a professor in the Department of Medical Biochemistry at the University of Calgary.

Dr. Fernand Labrie. One of Canada's most cited scientists, Dr. Labrie is a world expert on enzymes which stimulate or inhibit the production of androgen and estrogen. His work in this area has opened vast possibilities for treatment of breast cancer and prostate cancer, illnesses in which the sex hormones figure prominently. Dr. Labrie and colleagues discovered that androgen is produced not only by the testes but also by the adrenal gland, a finding which led to **new treatment for prostate cancer** that blocks androgen from both sources. Dr. Labrie heads the Department of Physiology at Laval University and directs a hospital based research centre.

Dr. Janet Rossant. Dr. Rossant is an international expert on the development of embryonic cells and a leader in the use of new techniques and approaches in their study. In early work, she showed that during the first few days of development the cells of a fertilized egg start to become either placenta or embryo; every embryonic cell retains a capacity to become a complete animal. Subsequently, Dr. Rossant has grown lines of embryonic cells in culture and has been able to offer new insights into gene function by studying the effects that genetic changes in the embryo have on the whole animal. Her current work focuses on the development of the placenta and the signals that control the orientation of embryonic cells, two areas **relevant to the understanding and prevention of birth**

defects. Dr. Rossant is a professor in the Department of Molecular and Medical Genetics at the University of Toronto.

Dr. Nahum Sonenberg. Dr. Sonenberg is one of the world's leading investigators of the complex process through which cells, and viruses, produce proteins. He has shown that parts of the cell which help regulate the creation of new protein can sometimes act as cancer-causing genes. His work has also revealed the behaviour of a protein produced by HIV, an important contribution of **knowledge relevant to the development of anti-HIV drugs.** Dr. Sonenberg is a professor of biochemistry at McGill University.

(ii) research resources and capacity generated by partnerships between MRC and other organizations

- The national research platform supported by the MRC provided the foundation for a \$1.64 billion Canadian investment in health research and development in 1996.
- Through partnerships with other organizations in 1996-97, the MRC program levered \$56.8 million for Canadian health science.
- The MRC attracted \$2.80 of outside funding for every dollar invested through partnerships.
- MRC's partnership development has allowed support of the projects of 500 more scientists and at least 200 more postdoctoral fellows and graduate students than would otherwise have been the case.
- Examples of partnered research projects:

The Clinical Trials Atlantic Corporation was created three years ago with funding from MRC and several members of the Pharmaceutical Manufacturers' Association of Canada. The initiative was also supported by the Atlantic Canada Opportunities Agency and three provinces. Among several major clinical trials attracted by the Corporation is a \$1.5 million study aimed at **improving the recovery of patients suffering from depression** by finding ways of helping them continue their medication.

Project HOPE (Heart Outcomes Prevention Evaluation), based at McMaster University, is the largest ever Canadian effort to test an intervention for preventing heart attacks and stroke. The \$17 million trial, funded by MRC and two pharmaceutical firms and involving 9,000 people, is testing the effectiveness of Vitamin E and ramapril (a blood pressure medication) in **reducing heart attack and strokes in persons at high risk.**

A researcher at the University of Montreal has characterized **drugs that interfere with HIV replication in cells.** A patent for these drugs was recently approved. MRC, and a member company of the Pharmaceutical Manufacturers' Association of Canada (Theratechnologies Inc.) are investing a total of \$496,000 in continuation of the research.

A national perspective on questions of health research priorities, ethics and safety

demonstrated by

utility or use of advice and guidance on research priorities, ethics and safety

- *Priority: assessing the effectiveness of health interventions.* The MRC has contributed to the conception, creation, funding and implementation of the Canadian Health Services Research Foundation. This Foundation will use the proceeds from a \$65 million fund to support research projects that evaluate the outcomes of health interventions, an area of great importance to the continuing renewal of the health care system.
- *Priority: providing the tools for scientific research.* Advice from the MRC helped in the design of the Canada Foundation for Innovation, the largest ever single Canadian initiative in science and technology. Through the Foundation the federal government will invest \$800 million over five years in improvements to the national research infrastructure. This investment, with contributions from partners, could result in a \$2 billion upgrading to scientific facilities in Canadian universities and associated institutions.
- *Priority: health research funding.* In 1996, MRC convened a first international conference "Innovation in Funding Health Research in the New Millennium" to examine the changing nature of health research funding. Representatives from 15 nations exchanged views on funding trends and innovative approaches for ensuring resources for health science.
- *Ethics and safety in research.* The MRC has advised government on research issues surrounding new reproductive technologies and has supported a tri-Council working group that has produced a code of ethical conduct for research involving humans.

C. Key reviews

Program Evaluations and Other Reviews

Recent Program Evaluation Studies

Evaluation of the Canadian Breast Cancer Research Initiative

Organizations involved: Health Canada, **Medical Research Council**, National Cancer Institute of Canada. Lead organization: National Cancer Institute of Canada

Significance of review: Through the Canadian Breast Cancer Research Initiative, approximately \$36 million is being invested in research related to breast cancer over the period 1993 to 1998. The Canadian Cancer Society has committed \$10 million to the initiative through its research arm, the National Cancer Institute of Canada. The federal government, through the Medical Research Council and Health Canada, contributed \$20 million. A corporate fund raised \$5.6 million of private sector support. The committee which steered evaluation of the program included representatives of the funding organizations and breast cancer survivors. Results of the mid-term review were considered when the partners' decided to continue the initiative beyond 1998.

Evaluation of the Eco-Research Program

Departments and agencies involved: Environment Canada, **Medical Research Council**, Natural Sciences and Engineering Research Council, Social Sciences and Humanities Research Council, Treasury Board. Lead agency: **Medical Research Council**

Significance of review: Eco-Research is a \$27 million research and development program commenced in 1992 and ending in 1997. Part of the federal Green Plan, the program aimed to strengthen Canadian capacity for research on the environment, particularly in the area of managing human impact on ecosystems. Grants, Chairs and Fellowships were provided to support cross-disciplinary research, contribute and disseminate new knowledge, train environmental research specialists and encourage the formation of alliances and partnerships. Studies indicated that the program had increased cross-disciplinary research on the environment and had provided over 475 advanced training opportunities. The review documented the lessons learned from this innovative program. Results may guide the development of future programming for cross-disciplinary research.

Other Key Reviews

International Review of the Medical Research Council

The Council commissioned a seven member international panel of experts to conduct an independent review of the performance of the **Medical Research Council**. The panel was provided with a broad mandate to review the effectiveness of MRC programs and policies, and to provide an opinion on the Council's success in achieving the objectives of its Strategic Plan. The Panel's Report was received by Council in the fall of 1996 and can be reviewed at the MRC site on the Internet (wwwmrc.hwc.ca).

Significance of review: The international reviewers confirmed the appropriateness of MRC's strategic approaches and its achievements under conditions of seriously restrained funding. They recommended special, continuing attention to the research base as the wellspring of new ideas that will lead to improvement in health care and opportunities for development of new products and processes. The panel suggested that Council re-articulate its strategies for increasing investment in health science to ensure better understanding and appreciation by stakeholders. The name Health Sciences Research Council of Canada was suggested as better reflecting the Council's broad legislative mandate and its recent expansion of programs in non-biomedical research areas. Studies were proposed on the exodus of researchers to other countries and the human resource requirements of the health research sector. MRC was encouraged to work with other entities to develop extensive "industrial-scale" research programs in selected fields in Canada. Some specific suggestions for program mechanisms were also offered.

The MRC has had the recommendations of the panel discussed in regional retreats across Canada and will be developing action plans based on the broad range of advice received.

Review of the MRC-PMAC Health Program

Organizations involved: **Medical Research Council** of Canada (MRC), Pharmaceutical Manufacturers' Association of Canada (PMAC)

Significance of review: The MRC-PMAC Health Program is a five-year, \$250 million research funding initiative to increase Canadian capacity for high-quality research related to the discovery and development of new or better products for maintaining health and treating illness. The Pharmaceutical Manufacturers' Association has committed \$200 million from its member companies; the MRC will provide \$50 million and a national peer review system for ensuring the quality of research supported through the program. A mid-term review of the program, conducted by a task force with representation from both partner organizations, focused on identifying measures to ensure that funding targets and objectives would be met within the time frame of the original agreement. The review led to better understanding of the various issues faced by the two partners and pointed to useful modifications of program process. The review was one factor leading to renewed enthusiasm for the partnership and increased confidence that its funding targets and objectives will be met.

More examples of high impact results from health science research

Impact on health services, prevention and treatment

The emergence of strains of bacteria which are resistant to antibiotics poses a tremendous challenge for the health care system. The rapid spread of an antibiotic-resistant bacteria in a hospital can quickly transform it from a place of healing to a health threatening environment. Research funded by MRC at Laval University since 1989 has revealed a **mechanism by which antibiotic-resistant genes spread** among different species of bacteria commonly found in hospitals and the community. A rapid test for identifying these genes has been developed.

Impact on health services, prevention , identification and treatment

It is important that prostate cancer be detected early, before it has spread to bone, and that it be treated with the best combination of therapies available. A group of researchers funded by the MRC at Laval University have shown: 1) that a particular test is extremely effective at **identifying prostate cancer** in its earliest stages, before complications have set in; and, 2) that a combination of androgen blockage (blocking release of the hormone androgen) and radiation treatment leads to **longer survival** than does radiation alone.

Impact on treatment

Work within the MRC-funded Spinal Research Centre at the University of Manitoba has shown that a chemical, baclofen, can **eliminate some of the muscle spasms that make movement difficult for patients with spinal cord injury**. An innovative pump has been developed to make delivery of baclofen simple and timely.

Impact on health services

A Health Decision Centre, funded by the MRC at the University of Ottawa and Loeb Medical Research Institute, is investigating how to **help consumers and health providers make decisions about health treatments**. Areas for which decision guides would be very useful include: hormone replacement therapy, breast cancer screening, drug therapy to prevent strokes, genetic screening, cancer treatments and the use of alternative blood products.

Impact on treatment

One of the major obstacles to curing many cancers is their ability to develop resistance to a wide range of drugs. A team at Queen's University, funded by the MRC, have found a gene that makes a protein which appears to be responsible for this drug resistance. It is thus conceivable that the gene might be turned off, or the hormone blocked, so that **cancer cells are rendered more vulnerable to treatment with drugs**. However, the protein is found not only in cancer cells, but in other tissues of the body as well, where it may be performing important positive functions. The researchers are now determining what those other functions might be.

Impact on treatment

A researcher at Queen's University, with funding from the MRC, has developed a **bionic neuron**, a tiny device that can be implanted under the skin and activated by radio waves from an external transmitter. Acting as a nerve would, the bionic neuron can be used to stimulate muscle contraction and expansion. At the outset, the device will be used in situations where it is difficult to **exercise and strengthen essential muscles**. For example, in some cases of urinary incontinence, the device could help strengthen bladder muscles. Patients with knee or hip replacements could also benefit from low impact stimulation of essential muscles. In the future, microstimulator technology could evolve to deal with much more complex muscle actions, such as actual movement of limbs.

Impact on treatment

An international research team, headed by an MRC-funded scientist at the University of Toronto, has provided new information on a bone marrow cell which produces new blood in the body. This finding is a major step forward in the development of **new therapies for diseases of the blood such as leukaemia**.

Impact on treatment

An MRC-funded researcher at the University of Toronto has discovered a peptide, occurring naturally in the body, which **promotes the growth of the lining of the small intestine**, vital to digesting food. The discovery could benefit people with severely compromised intestinal function.

Impact on treatment

One of the hottest new technologies to hit the biotechnology industry is *liposomal drug delivery systems*. Liposomes are essentially bubbles of fat. When filled with a toxic agent, **the liposome will hold the toxin safely away from healthy tissues until it enters cancer cells**. Only two liposomal drugs have been approved for use so far: credit for the first, doxorubicin, goes to a research group at the University of Alberta. With this enormous success under their belt the group are working on new liposomal cancer drugs.

Impact on health services

A research team at the University of Montreal is searching for the best **vaccination strategy to stop the growing spread of Hepatitis B** among cocaine and heroin users. Based at the Centre Hospitalier de l'Université de Montréal, the team hopes to achieve successful immunization in only 4 weeks instead of the traditional 6 months, and believes a double dose of vaccine will counteract the challenges of immunizing intravenous drug users. A range of vaccination strategies will be sought for users of different drugs, as well as people exposed to Hepatitis C and HIV.

Section IV: Supplementary Information

A. Listing of Statutory and Departmental Reports

The following publications are available from MRC. Those marked *WEB are available at the MRC web site: <http://wwwmrc.hwc.ca>. All publications are free of charge unless otherwise indicated.

BUSINESS DEVELOPMENT

(To receive these publications, please contact 613-941-6696)

Canadian Medical Discoveries Fund (CMDf) Newsletter

Canadian Medical Discoveries Fund Information Brochure

Health Research and the Jobs Agenda

Medical Research Council of Canada Estimates Part III Expenditure Plan *WEB

University Medical Discoveries Inc. Brochures

COMMUNICATIONS

(To receive these publications, please contact 613-954-1972)

Automated Health Research Information System (AHRIS)

This is an electronic version of the Reference List of Health Science Research in Canada.

It is available on CD-Rom.

Dealing with the Media (1992)

Decisions *WEB

Distinguished Scientist Awards booklet (1996,1997)

Grants and Awards Guide (annual) *WEB

Investing in Canada's Health - A Strategic Plan for the Medical Research Council of Canada (1992)

Journey into Genetics - A voyage of discovery and hope (1996)

List of MRC Grants & Awards

Please see Automated Health Research Information System (AHRIS)

Medical Research Council - brochure *WEB

MRC Communiqué (quarterly) *WEB

Michael Smith Award for Excellence - brochure

Reference List of Health Science Research in Canada

Please see Automated Health Research Information System (AHRIS)

Report of the President (annual) *WEB

Report on an International Review of the Medical Research Council of Canada (1996) *WEB

Road to Discovery (1993)

ETHICS AND INTERNATIONAL RELATIONS

(To receive these publications, please contact 613-954-1972)

Code of Ethical Conduct for Research Involving Humans (Draft document - July 1997) This publication, once finalized, will replace 1987 Guidelines on Research Involving Human Subjects.
*WEB

Guidelines for Research on Somatic Cell Gene Therapy in Humans (1990)

Guidelines for the Commercialization of Medical Research (Draft document) *WEB

Guidelines on Research Involving Human Subjects (1987)

This publication is currently under revision.

Integrity in Research and Scholarship - A Tri-Council Policy Statement (1994)

MRC/PMAC HEALTH PROGRAM

(To receive these publications, please contact 613-954-1972)

MRC/PMAC Health Program Annual Report (1994 - 1996)

Please see <http://www.pmac-acim.org>

MRC/PMAC Health Program and You - brochure

MRC/PMAC Health Program Update (1997)

The following publications may be purchased from your local bookstore which handles Federal Government publications by mail from:

Canada Communication Group

Publishing

Ottawa, Ontario

K1A 0S9

Telephone orders: (819) 956-4802

Terminology Series (English-French, French-English vocabularies; joint project of MRC and of the Department of the Secretary of State of Canada).

- a) Enzyme Engineering (1989)
- b) Genetic Engineering (1990)
- c) Medical Signs and Symptoms (1990)
- d) Signs and Symptoms of the Musculoskeletal System Volume I: Clinical Findings (1990)
- e) Signs and Symptoms of the Musculoskeletal System Volume II: Medical Imaging Signs (1992)
- f) Cell Engineering Volume I: Cell Structure (1992)

Also with equivalents, but no definitions:

- g) Glossary of Health Services (1992)

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C. Financial Summary Tables

1. Summary of 1996-97 Voted Appropriations (\$ millions)

Vote (millions of dollars)	1996-97 Total Main Estimates	1996-97 Actual
Medical Research Council Program		
20 Operating expenditures	6.3	8.1
25 Grants	235.5	233.8
(S) Contributions to employee benefit plans	.5	.5
Total Department	242.3	242.4

2. Transfer Payments by Business Line (\$ millions)

Business Lines	Actual 1993-94	Actual 1994-95	Actual 1995-96	Total Planned 1996-97	Actual 1996-97
Grants					
Promote, assist and undertake research in the health sciences in Canada	251.3	257.6	243.2	235.5	233.8
Total Grants	251.3	257.6	243.2	235.5	233.8
Total Transfer Payments	251.3	257.6	243.2	235.5	233.8

3. Transfer Payments by MRC Program Mechanism

(millions of dollars)	Actuals 1993-94	Actuals 1994-95	Actuals 1995-96	Planned 1996-97	Actual 1996-97
Research Grants					
Operating	135.1	137.3	134.8	131.7	133.1
Maintenance	2.9	2.9	2.8	2.7	2.5
Equipment	5.2	1.5	0.8	3.0	0.9
Health Services Research Fund	-	-	-	-	2.0
Special Projects	2.0	2.7	2.2	2.3	2.5
University-Industry Grants	5.6	6.4	5.3	7.6	5.2
	150.8	150.8	145.9	147.3	146.2
Multi-Disciplinary					
MRC Groups	14.3	13.8	15.0	17.0	16.0
Program Grants	15.0	14.9	11.5	6.3	7.0
Development Grants	1.4	2.4	1.4	1.7	1.0
	30.7	31.1	27.9	25.0	24.0
Salary Support					
MRC Groups	3.6	3.6	3.5	2.5	2.7
Development Grants	3.1	3.3	2.9	2.6	2.6
Career Investigators	2.6	2.0	1.3	0.7	0.9
Distinguished Scientists	-	-	0.1	0.5	0.4
Senior Scientists	-	-	0.2	0.5	0.5
MRC Scientists	3.1	3.2	3.6	3.9	3.9
Scholarships	8.7	8.8	8.8	8.7	8.7
Clinician Scientists 2	1.0	1.0	1.1	1.2	1.0
University-Industry Salary Support	0.7	0.7	0.9	2.0	1.0
	22.7	22.7	22.6	22.5	21.8
Research Training					
Clinician Scientists 1	1.2	1.5	1.4	1.5	1.2
Centennial Fellowships	0.7	0.7	0.7	0.6	0.7
Fellowships	14.5	12.8	11.5	11.2	10.1
Dental Fellowships	0.3	0.3	0.2	0.1	0.2
Studentships	6.2	5.9	5.3	6.1	5.2
Undergraduate Scholarships	1.0	0.8	0.8	0.8	0.4
University-Industry Training Awards	0.8	0.7	0.6	1.4	0.6
	24.8	22.8	20.4	21.6	18.3
Travel and Exchange					
Visiting Scientist and Professorships	0.3	0.2	0.1	0.1	0.2
Travel Grants, Symposia and Workshops	0.1	0.2	0.1	0.2	0.1
	0.4	0.4	0.2	0.3	0.3
Other Activities					
General Research Grants	1.1	-	-	-	-
President's Fund	0.2	0.6	0.3	0.5	0.6
Other Grants	1.7	2.7	2.7	3.0	4.4
	3.0	3.3	3.0	3.5	5.0
Total Core Budget					
	232.5	231.1	220.1	220.3	215.5
Networks of Centres of Excellence	16.5	23.1	17.8	14.7	14.7
Human Genome Program	2.3	3.5	5.2	0.5	3.5
Total Grants and Scholarships	251.3	257.6	243.2	235.5	233.8

4. Transfer Payments By University

(millions of dollars)	Actual 1996-97	Actual 1995-96	Actual 1994-95
British Columbia	18.8	22.9	28.9
Simon Fraser	0.4	0.4	0.3
Victoria	0.7	0.9	0.8
Alberta	15.8	17.2	14.8
Calgary	12.7	11.0	11.7
Lethbridge	0.1	0.1	-
Regina	0.1	0.1	0.1
Saskatchewan	2.4	3.0	3.3
Manitoba	8.2	9.1	10.2
Carleton	0.1	0.1	0.1
Guelph	1.1	1.2	1.2
McMaster	11.8	11.4	10.9
Ottawa	8.1	8.3	8.1
Queen's	5.6	6.0	6.0
Ryerson	0.1	0.1	0.1
Toronto	43.9	44.5	46.0
Trent	0.1	0.1	0.1
Waterloo	0.3	0.2	0.3
Western Ontario	10.8	11.4	12.3
York	0.4	0.5	0.3
Concordia	0.5	0.4	0.4
Laval	9.4	10.5	10.2
McGill	36.0	38.7	43.2
Montreal	21.4	22.1	23.5
Quebec à Montréal	0.7	1.0	1.1
Quebec à Trois-Rivières	-	-	0.1
Sherbrooke	4.9	5.0	5.0
Dalhousie	4.9	5.1	5.6
New Brunswick	0.1	0.1	-
Prince Edward Island	0.1	0.1	0.1
Memorial	1.6	1.5	1.6
	220.8	232.8	246.4
Other Grants - non-institutional	7.3	3.0	3.1
Outside Canada	5.7	7.4	8.1
	233.8	243.2	257.6

5. Number of Operating Grants Funded in 1996-97 by Research Area

(millions of dollars)	No.	Amount	%
Bacteriology	45	3.1	2.1
Biochemistry	154	12.5	8.3
Blood	42	3.1	2.1
Cancer	88	5.0	3.4
Cardiovascular	190	14.1	9.5
Cell Biology	173	10.9	7.3
Dental Science	33	2.7	1.8
Drug Research	93	4.6	3.1
Endocrinology	89	7.8	5.2
Gastrointestinal and Liver	60	4.4	2.9
Genetics	100	7.8	5.2
Health Research	26	1.7	1.1
Hearing	9	0.5	0.3
Imaging and Nuclear Medicine	38	2.7	1.8
Immunology and Transplantation	103	7.5	5.0
Metabolism incl. Diabetes	65	4.6	3.1
Molecular Biology	159	10.9	7.3
Musculo-Skeletal	52	3.6	2.4
Nephrology	30	2.8	1.9
Neurosciences	333	22.8	15.3
Nursing	1	0.1	0.0
Nutrition	15	0.8	0.5
Reproduction incl. Pregnancy	50	5.2	3.5
Respiration	84	5.7	3.8
Virology	35	2.9	1.9
Vision	33	1.5	1.0
Not Classified	2	0.1	0.0
	2,102	149.3	100.0

The data displayed above represent 1996-97 forecast expenditures as at December, 1996. Included are regular operating grants, group grants and program grants which account for approximately 87% of the Council's regular Research Funding Programs. **The assignment of dollar value to specific research areas must be interpreted with a degree of caution.** For example, research in biochemistry, molecular biology, cell biology, and genetics may relate equally well to any of a number of other categories. Similarly, research in cancer or clinical trials may explore the determinants of health, health outcomes, or population health phenomena. Figures may not add exactly because of rounding.

D. MRC Partnerships

(See accompanying notes, next page)	<i>Partners Involved</i> <i>(1996-97 estimates)</i>	<i>Estimated Financial Contributions of Partners</i> <i>(thousands of dollars)</i>			
		<i>1994-95</i>	<i>1995-96</i>	<i>1996-97</i>	<i>3-year total</i>
<i>Partnerships with Industry</i>					
MRC-PMAC Health Program	39	7,446	13,670	21,421	42,537
University-Industry Program	41	10,613	3,897	4,409	18,919
<i>Partnerships with Voluntary Health Organizations</i>					
Juvenile Diabetes Foundation International	1			1,000	1,000
Burroughs Wellcome Fund	1			663	663
Other voluntary health organizations	12	479	792	886	2,157
<i>Partnerships with Other Types of Organization</i>					
Health Services Research Foundation	2			11,000	11,000
AIDS Strategy Research	1	6,107	6,575	5,796	18,478
Breast Cancer Research Initiative	2	3,200	6,502	7,000	16,702
Human Frontiers of Science	1	700	2,313	1,864	4,877
Genome Analysis and Technology	4	445		1,310	1,755
Eco-Research	3	500	787	450	1,737
Youth Experience Pilot	1		4,000		4,000
Other	9	1,265	786	981	3,032
<i>Totals</i>	117	30,755	39,322	56,780	126,857
MRC's Contribution to these Partnerships		14,676	14,676	19,908	49,260
Ratio of MRC to Partners' Contributions		1 to 2.1	1 to 2.7	1 to 2.8	1 to 2.6

Notes To Table On MRC Partnerships

MRC has used the data in the preceding table to report on its progress in meeting financial targets established through its partnerships strategy. Because of the unique nature of each partnership, and the varying levels of direct control exerted by MRC in each arrangement, the financial contributions of partners reflect varying levels of precision. Estimates, where they are used, are based on MRC's best judgement after analysis of available data.

Partnerships with Industry

MRC / PMAC Health Program

The data reported under this program reflect the commitments of the various PMAC member companies towards personnel support and research projects supported in partnership with MRC. All of the projects are funded over a period of two to three years (for research projects), and up to five years for personnel support. During the support period, companies make actual cash contributions as they deem appropriate. These actual cash transfers are not tracked by the Program. The contributions of PMAC companies are reported by fiscal year, by prorating their contributions on the same basis as MRC's contributions for each funded project. Also, program data as reported in the table do not include PMAC commitments towards approved projects in future years (some of which now extend to year 2003). If these "future year commitments" were to be included, the total committed investment by PMAC through this program as at March 31, 1997 would be over \$90 million.

University / Industry Program

This program works in essentially the same way as the MRC/PMAC Health Program. Company contributions however, are not tracked to the same level of precision as the Health Program. For example: suppose an application which requests a total of \$100 K in funding, on a 2:1 company to MRC ratio, is reduced to \$75 K when assessed by a peer review committee. Although MRC's contribution is known exactly (\$25 K in this instance), MRC does not track whether the company's contribution is likewise reduced. The company does agree however, to fund the proposal on a ratio of *at least* 2 to 1, and that is the basis for reporting on this program.

Partnerships with Voluntary Health Organizations

Data reported for the voluntary sector are actual investments made by the organizations in the years reported. No estimates are used. Partnerships with the voluntary sector are aimed primarily at supporting research personnel through studentships, fellowships and salary support.

Partnerships with Other Types of Organizations

Canadian Health Services Research Foundation

The data represents the payments made by Health Canada to the CHSRF in 1996-97. In the same year, MRC's contribution was \$2 million. This funding arrangement will extend over a five year period to a maximum of \$65 million (\$10 M from MRC and \$55 M from Health Canada). Note therefore that the reported figures do not represent actual investments made in direct research, but rather contributions to the Foundation. In 1996-97, the Foundation had not yet made any direct investments in research projects.

AIDS: Data is as has been reported by Health Canada

Canadian Breast Cancer Research Initiative

Reported data represents contributions of partners to the initiative, not actual investments in research made by the Program. Actual investments would be in a different profile than seen in the table.

Genome Analysis and Technology Program

Data represents actual expenditure of National Cancer Institute contributions towards this program.

Eco-Research and Human Frontiers of Science Programs

Data has been derived from analysis of reports and other information from these organizations.

E. Statutes Administered by MRC

MRC does not administer any legislation.

MRC was created by the Medical Research Council Act (R.S., C. M-9).