ESTIMATES

Medical Research Council of Canada

Performance Report

For the period ending
March 31, 1998

Canada

Improved Reporting to Parliament
Pilot Document

The Estimates of the Government of Canada are structured in several parts. Beginning with an overview of total government spending in Part I, the documents become increasingly more specific. Part II outlines spending according to departments, agencies and programs and contains the proposed wording of the conditions governing spending which Parliament will be asked to approve.

The *Report on Plans and Priorities* provides additional detail on each department and its programs primarily in terms of more strategically oriented planning and results information with a focus on outcomes.

The *Departmental Performance Report* provides a focus on results-based accountability by reporting on accomplishments achieved against the performance expectations and results commitments as set out in the spring *Report on Plans and Priorities.*

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Foreword

On April 24, 1997, the House of Commons passed a motion dividing on a pilot basis what was known as the annual *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.*

This initiative is intended to fulfil the government's commitments to improve the expenditure management information provided to Parliament. This involves sharpening the focus on results, increasing the transparency of information and modernizing its preparation.

This year, the Fall Performance Package is comprised of 80 Departmental Performance Reports and the government's "*Managing For Results*" report.

This ***Departmental Performance Report,*** covering the period ending March 31, 1998, provides a focus on results-based accountability by reporting on accomplishments achieved against the performance expectations and results commitments as set out in the department's *Part III of the Main Estimates* or pilot *Report on Plans and Priorities* for 1997-98. The key result commitments for all departments and agencies are also included in *Managing for Results.*

Results-based management emphasizes specifying expected program results, developing meaningful indicators to demonstrate performance, perfecting the capacity to generate information and reporting on achievements in a balanced manner. Accounting and managing for results involve sustained work across government

The government continues to refine and develop both managing for and reporting of results. The refinement comes from acquired experience as users make their information needs more precisely known. The performance reports and their use will continue to be monitored to make sure that they respond to Parliament's ongoing and evolving needs.

This report is accessible electronically from the Treasury Board Secretariat Internet site: http://www.tbs-sct.gc.ca/tb/key.html

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Medical Research Council of Canada

Performance Report

for the Period Ending March 31, 1998

Allan Rock
Minister of Health

Henry G Friesen, MD
President of the Medical Research Council

Canada

MRCRM

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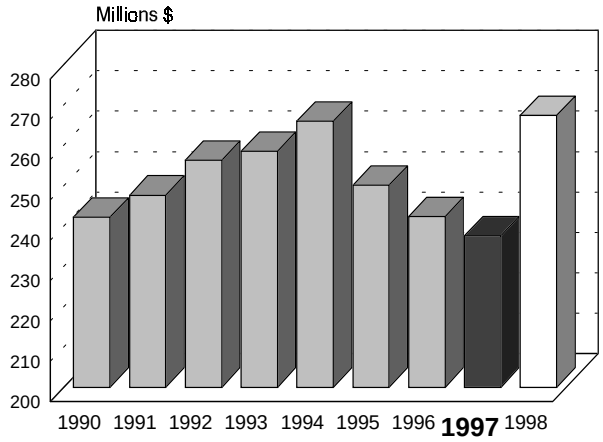
Executive Summary

The Medical Research Council of Canada reports continuing strong performance in meeting its commitment to provide Canadians with:

- world-class research aimed at ensuring good health and well-being
- the social and economic benefits of health research discoveries
- a national capacity to respond to needs for research and development in all areas of health
- a national perspective on issues of health research priorities, ethics and safety.

In fiscal year 1997-98 federal funding for Canadian health science delivered through the Council was lower than in the preceding year. The Council's budget of $237.3 million was below the level reached in 1990-91, and this at a time when research budgets in similar agencies around the world have been rapidly increasing. The Council's principal challenge was thus distributing an inadequate level of funding in a manner that would not further decrease the morale of Canadian health science researchers and their students, our researchers of the future.

MRC Budgets Since 1990-91



Note: Y-axis begins at $200 million

Source: Parliamentary Main Estimates

Despite being one of the most financially difficult years for delivery of the Medical Research Council program, 1997-98 was also an important turning point for Canadian health science. The Canada Foundation for Innovation was launched, thus beginning an extensive, five-year refurbishment of the physical infrastructure for science in universities, hospitals and research institutes across our country. And in its 1998 budget, the government announced that funding for the MRC would be returned to 1994 levels. While we have a long way to go before Canadian science is as well funded and focused as that of other countries, we have taken an essential first step.

Key Results Commitments

The Medical Research Council of Canada is committed to		
providing Canadians with	***as demonstrated by***	***see pages***
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	12 - 13
	special research initiatives on health issues of particular concern to Canadians such as breast cancer, diabetes and AIDS	14
the social and economic benefits of health research discoveries	research results having an impact on illness prevention, identification and treatment of disease, or health services	15 - 16
	commercialization of health research discoveries with resultant creation of jobs and economic opportunity	17
a capacity to respond to needs for research and development in all areas related to health	trained and experienced researchers capable of responding to knowledge requirements in all health areas	18 - 19
	research resources and capacity generated by partnerships between MRC and other organizations	19 - 21
a national perspective on questions of health research priorities, ethics and safety	advice and guidance on research priorities, ethics and safety	22

I PRESIDENT'S MESSAGE

It is a pleasure to report to Parliament on the performance of the Medical Research Council of Canada in 1997-98. While that year represented a low point in terms of the Council's budget for supporting Canadian health science, down to the level of funding it had reached in 1990-91, I am proud of the performance of our agency in difficult times. On behalf of all Canadians, MRC invested the funds available with extreme care after, as always, obtaining wise advice from scientists around the world on the quality of projects submitted to us for consideration.

This report covers our progress in providing Canadians with world-class research in all areas of health, conducted by researchers in universities, hospitals and research institutes from Victoria to St. John's, on topics ranging from molecular processes to the delivery of health care in communities. It examines our continuing efforts to foster research on health problems of particular concern to Canadians, such as breast cancer and AIDS, and to ensure that Canadians receive the social and economic benefits that research brings. We are also pleased to report work on our most challenging goal, helping to ensure that Canada has the resources, most particularly the research talent, required for rapid response to urgent research questions in all areas of health. The report closes with a look at progress in developing a national perspective on the many issues of ethics and safety that arise as humankind's knowledge of natural processes expands.

I am particularly pleased that this report provides a fuller discussion than last year's of the value-for-money offered by health research. It is a difficult subject, because research is intrinsically a voyage into the unknown, a risky business, akin to drilling for oil . . .

. . . but attempts at quantifying the value of research reveal it to be one of the most rewarding activities, economically, socially and intellectually, in which Canadians may invest.

***President's Message**, 1997-98*

I am particularly pleased that this report provides a fuller discussion than last year's of the value-for-money offered by health research. It is a difficult subject, because research is intrinsically a voyage into the unknown, a risky business, akin to drilling for oil. Just as one cannot expect a gusher from every exploratory well, despite the great care taken in choosing a site for drilling, so we cannot predict superb returns from every research project, despite the care taken in ensuring that the researchers are extremely capable and the projects scientifically outstanding. In fact, measuring value-for-money for research is even more complex than assessing an oil exploration program. A research result that ten years ago may have seemed of small value may in retrospect turn out to have been critically

important because it raised a question that led to a new line of research. That new approach may today be claiming headlines and having a tremendous impact on health and the economy. Assessing the worth of research has been an ongoing challenge for economists who seek to measure the value of scientific exploration. Research, the quest for new knowledge, seems to defy precise measurement, but attempts at quantifying value reveal research to be one of the most rewarding activities, economically, socially and intellectually, in which Canadians may invest. The leverage enabled by research proves to be truly outstanding.

There are very positive signs of a growing recognition of the wisdom of investing public funds in health research. While 1997-98 was a dark year in terms of the federal government's capacity to support research, it has also proved to be a turning point for health science. The 1998 federal budget announcements included the welcome news that the Council's funding for 1998-99 would be increased by $40 million. We optimistically view this as a first step towards achieving an internationally competitive level of federal funding for health research and a renaissance for Canadian science. What should the funding level be? The National Advisory Board on Science and Technology has indicated that the federal investment in health research in universities, hospitals and research institutes should be at least 1% of the amount that Canadians spend on health care, that is, the investment should be in the order of $766 million (1% of the 76.6 billion health care expenditure). The gap between that goal and the $267.5 million investment through MRC for 1998-99, is large, but I am convinced that it must be bridged if Canada is to maintain the base of research expertise upon which innovation in our health care system depends.

A tripling of Canadians' investment of federal resources in health research is essential ...

but, in the view of the MRC, new resources must be delivered through a national framework in which the funders, performers and consumers in every area of health research have jointly developed strategic priorities and will work together to deliver results to Canadians as efficiently and effectively as possible.

President's Message, 1997-98

A tripling of Canadians' investment in federal funding of extramural health research, is essential but, in the view of the MRC, must be delivered through a system in which the funders, performers and consumers of research in every area of health have jointly developed strategic priorities and will work in concert to deliver research results to Canadians as efficiently and effectively as possible. I look forward to informing all Canadians of progress towards the realization of such a system, which we are calling Canadian Institutes of Health Research, in my next report to Parliament on performance of the MRC.

II AGENCY OVERVIEW

Mandate, Mission and Vision

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

- promote, assist and undertake basic, applied and clinical research in Canada in the health sciences; and
- advise the Minister of Health in respect of matters relating to such research as the Minister may refer to the Council for its consideration.[1]

The MRC Act also authorizes 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".

As Canada's principal health research funding agency, the MRC has a **mission** to build and sustain, in partnership with others, a national capacity to create and use new knowledge for maintaining and improving health and preventing, curing and treating illness, for the social and economic benefit of Canadians and the well-being of people everywhere.

The MRC Vision

The guiding vision of the Medical Research Council is an internationally-competitive Canadian health research community generating new knowledge that contributes to improvements in quality of life and supports the growth and expansion of Canadian industry in the health area.

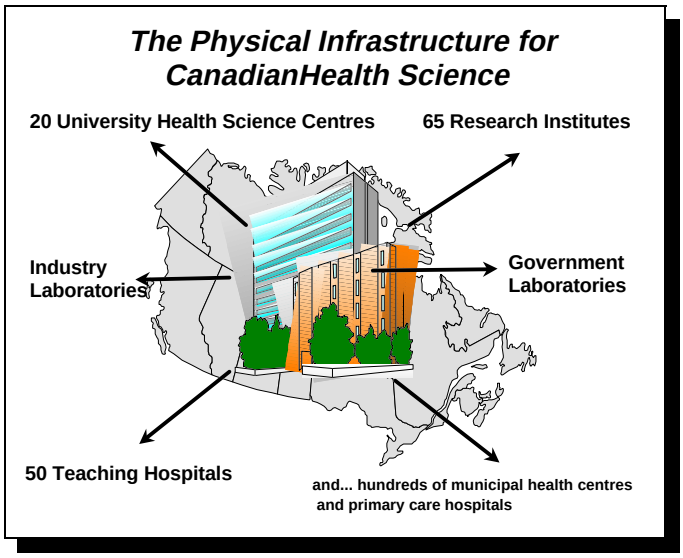
[1] *MRC Act, 1979*. Government of Canada

Operating Environment

• *Objectives*

In fulfilling its mission the Medical Research Council strives to:

- provide the knowledge base required for continuing innovation in health services, health maintenance, diagnosis and treatment of illness
- focus a national research effort on health threats and opportunities
- facilitate the return of the social and economic benefits of health research to Canadians
- diversify and strengthen Canadian health research through partnered funding
- train and develop Canadian scientists with a capacity to address research questions in all areas of health
- provide a national voice on health research issues.



• *Strategic Priorities*

MRC's **strategic** priorities, laid out in its master plan, *Investing in Canada's Health*, are as follows*:*

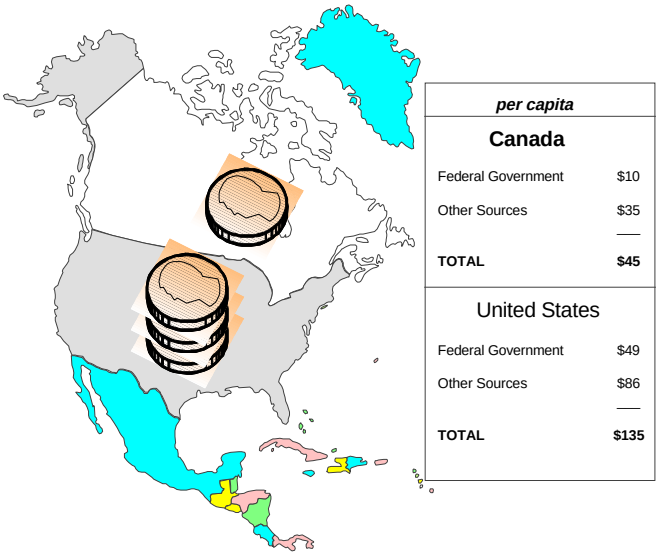
- enlarge the scope of MRC activities, committing to a greater range of health science research;
- continue the pursuit of excellence and innovation in the areas of basic and applied health research; and,
- demonstrate value, the efficient use of scarce resources and accountability in all activities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

• *Challenges*

!n Canada, health research is produced by a complex network of researchers, institutions and funding organizations, which brings many different expectations to bear on the choice of research directions. The research, conducted in universities, hospitals, research institutes, health centres, industrial laboratories and government facilities, is funded by Canadians through their federal and provincial taxes, direct donations to health charities, purchase of health products, their support of higher education and through other channels. The strength of the Canadian system is a diversified funding base and a wide variety of perspectives on research needs and priorities. However, there are two major weaknesses. Addressing them is the MRC's major challenge.

First, the national total of funding from the many sources has not been enough to achieve an internationally competitive level of research activity. A per capita comparison indicates the problem of under-funding quite clearly. When all sources of funding are considered Americans each contribute about $135 per year for health research and development. Canadians invest about one third that amount, $45 per capita. Without adequate funding, Canada does not have enough full-time health scientists working to provide the essential link between new health knowledge and improvements to the health care system. A level of research activity far below that of our largest training partner has put Canada at risk of losing her best and brightest scientists to countries, like the US, that offer environments more receptive to their research ideas. We are too often using scarce resources to train Canadians to be the great researchers of the United States and other countries around the world.

Canadian and US Per Capita Investment in Health R&D



per capita	
Canada	
Federal Government	$10
Other Sources	$35
TOTAL	**$45**
United States	
Federal Government	$49
Other Sources	$86
TOTAL	**$135**

Sources: Statistics Canada, National Institutes of Health, Organization for Economic Cooperation and Development. National currencies have been converted to OECD purchasing power parity dollars. 1995 data.

Since 1991, cumulative annual increases in funding for federal health science agencies in England, France, Germany and the US have reached into the range of 30 to 40%. In Canada, the cumulative increase from 1991 to 1998 was negative, minus 1.4%. We simply are not investing enough. And other countries are not resting, waiting for us to catch up.

While the US Congress has proposed a 9% increase to the current budget for the principal US federal health research agency, the US Senate has proposed an even greater increase, 14.7%!

The second problem with our current approach to supporting Canadian health science is that there is no framework within which the many funders and performers can come together to develop broad, national priorities for research in the different aspects of health. We lack that shared vision of key research directions which, when guiding funders and researchers alike, leads to increased focus, efficiency and cooperative, synergistic effort. Without a national framework for health science, we have no clear points of contact for enquiries from the public, our health professionals or representatives from other countries who want to know about Canadian research, recent health research discoveries and national priorities. Our health research enterprise lacks a unifying framework and integrated structure.

In facing these challenges, the Medical Research Council plans to lead the development of a new approach to the support and coordination of health science in Canada. Work is already under way. The MRC has initiated discussions around a concept of **Canadian Institutes of Health Research** that shows exceptional promise. The concept, which is being enthusiastically discussed across the country, foresees a series of 10 to 12 Institutes spanning all areas of health research. The envisioned Institutes are Canada-wide and will use the physical research infrastructure that is already in place in our universities, hospitals and research institutes and is now being rapidly upgraded through the Canada Foundation for Innovation. The Institutes will provide a framework through which new funds may be channelled, in a focused and coordinated way, to bring Canadian research activity to the level required for support of one of the world's best health care systems.

Facing the Challenges

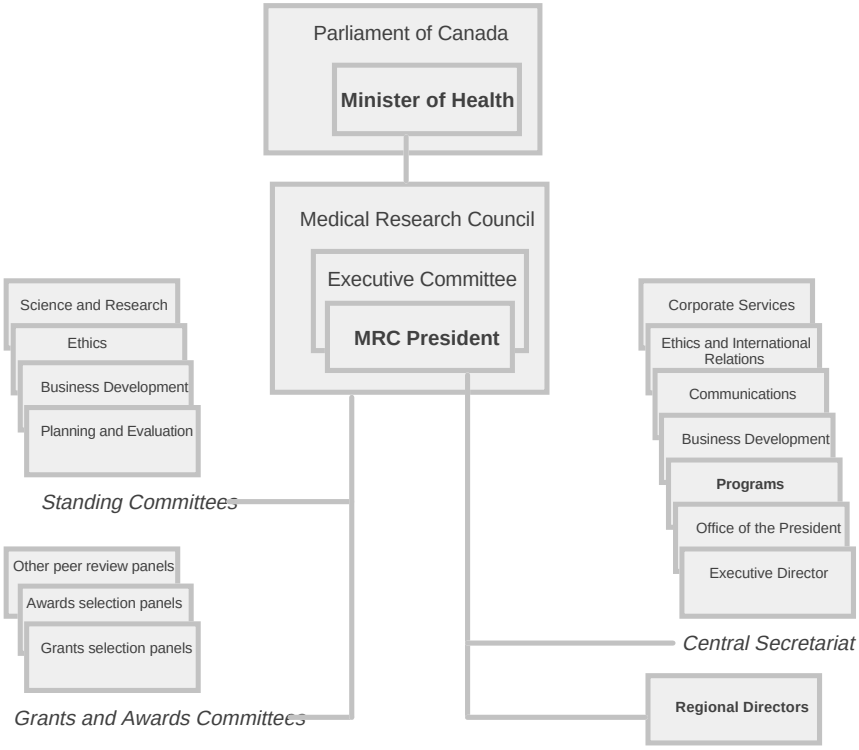
In addressing these challenges, under-funding of health science and lack of a framework for coordination of the national research effort, the Medical Research Council is leading development of a new approach to the support and linkage of health science activities in Canada. Work is already under way. The MRC has initiated discussions around a concept of Canadian Institutes of Health Research that shows exceptional promise.

MRC looks forward to reporting to Parliament next year on progress of this concept which has the potential to do for health research what Medicare did for Canadian health care.

Organization of the Agency

The Medical Research Council is governed by a board of eminent Canadians appointed by Order in Council and serving without remuneration. The Council provides government with advice on how it can best promote, assist and support research for the benefit of Canadians and improvement of the quality of life for all. Members bring to the Council table their wisdom and expertise in matters of science, health, administration, business and ethics. An arms-length agency of government, the Council reports to Parliament through the Minister of Health.

Delivery of the Council's program is supported by a Secretariat of 80 persons based in the National Capital Region. A network of volunteer Regional Directors in health science centres across the country provides the Council with a channel for communication with stakeholders from sea to sea.



The Council receives advice on policy, priorities, strategies and development from Standing Committees of experts drawn from the health research community and other groups of Canadians with special expertise and a strong commitment to health research.

Advice on the quality of research proposals submitted to the MRC, or advice on the merits of proposals for the training and development of research personnel, is provided by panels of specialists. These grants and awards selection committees, involve over 550 Canadians serving voluntarily to ensure that public resources for health research are invested in the most promising projects or training programs.

III AGENCY PERFORMANCE

An International Overview of MRC Performance

In 1996, a review panel comprised of world-renowned scientists-administrators from the United States, Great Britain and Canada examined the performance of the MRC and concluded that:

" the Medical Research Council of Canada 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"

1997-98 Spending by the Medical Research Council of Canada

Planned Spending:	$237,566,000	as in 1997-98 Main Estimates
Total Authorities:	$237,792,304	as in 1997-98 Public Accounts
Actual Spending:	**$237,325,431**	as in 1997-98 Public Accounts

Performance Expectations

The performance expected of the MRC is clearly outlined in the chart of commitments and expected results that introduced this report. To summarize, the MRC is expected to advise government on needs for public investment in health research and, working with the funds that government is prepared to invest, support programs and projects that best serve the needs of the country.

We believe that Canadians expect funding to be delivered fairly and on the basis of the excellence of proposals and the need for new knowledge related to health. It is expected that the research portfolio as a whole will deliver results that have a positive impact on health and the economy. Funding must be delivered with an eye to the future, ensuring that Canada is replenishing a most critical resource, highly-trained Canadians who have both a desire to help improve health by searching for answers to challenging questions and the training to allow them to stand beside the best researchers around the world. And we believe Canadians expect that the research funded by government through MRC adhere to high ethical standards and be conducted with extreme care for the safety of all.

Performance Accomplishments

Council's performance in 1997-98 will be presented under seven headings, reflecting the seven areas of results listed in our chart of commitments to Canadians. Thus, performance will be discussed under:

- world-class research
- focus on priority health issues
- relevance to health
- commercial spin-offs
- development of researchers

Value for Money

The Return on Investment in Research

Research has an impact on productivity, usually through the new products or processes that result from new knowledge and/or through reductions in the cost of supplying an existing service such as health care.

Economists assess the value of this impact by calculating the returns delivered by the research investment. Those specializing in R&D assessment agree that private investment in R&D provides an average 20 to 30% annual rate of rate of return and a much greater return to society overall. Social rates of return from research average about 50%.

A study of the benefits from research that led to a new type of medical equipment (computer tomography scanner) found a social rate of return of 270% per year! That is not to say that every research project has a high or even positive rate of return, but a portfolio of research projects, such as that which Canadians fund through MRC, will yield exceptional returns

What other investment provides an annual rate of return of 50%?

Source: National Science Foundation, Science and Engineering Indicators, 1996. Chapter 8. Economic and Social Significance of Scientific and Engineering Research.

- partnerships: expanding national health research capacity
- a national perspective on research issues

1) MRC is Providing Canadians with World-Class Health Research

In 1997-98 the MRC funded 2,490 outstanding research proposals, down 65 from the number funded the preceding year. It is the stories of each of these projects that really express the extent to which the research supported by Canadians through MRC is world-class, and we will present some of these stories in information boxes throughout the report. The difficulty in choosing a few projects from among several thousand is that they all reflect the excitement of searching for nuggets of knowledge that have the potential of improving health. But we hope that the few selected give a sense of the quality of Canadian's investment and, regrettably, a sense of the opportunity lost when the number of funded projects declined in response to the decline in MRC funding.

World-Class Health Research *. . .*

In Newfoundland, Kevin Keough of Memorial University is trying to identify the cause of diseases related to dysfunctions in the pulmonary surfactant, a watery film that protects the inside of the lungs

. . . just one of the 2,490 projects that MRC supports in institutions across Canada.

The Council selects projects of world-class quality through peer review of applications for funding. Proposals are sent to scientists around the world for an assessment of value. The reports of these experts are reviewed by an MRC panel of scientists, also leaders in the research area of the applicant. Only after full discussion of the strengths and weaknesses of a proposal does the committee assign a priority rating. In 1997-98, the MRC received 1,686 applications for new research projects, of which it was able to fund 420, or 25%. When one considers that all applications were prepared by highly-trained researchers based in universities, hospitals and research institutes, and that typically months of work goes into the preparation of a research proposal, it will be clear that a great number of highly meritorious projects could not be funded, and that the quality of those projects for which funding was available is unquestionable.

The Nobel Prize *. . .*

Canadians may be proud of having supported Michael Smith as an MRC Career Investigator. He shares a Nobel Prize for developing a research technique, known as site-directed mutagenesis, which enabled rapid advances in laboratories around the world on research focused on understanding the molecular basis of health and disease.

. . . a powerful Indicator of recognition as one of the world's best.

Researchers often apply for funding to continue successful grant projects, usually after two years of progress. Bearing in mind that the projects had passed extremely stringent review the first time around, we would expect that the vast majority would be renewed. In 1997-98, Council received 490 applications for renewal of projects but was able to fund only 256 or 52%. The disappointment of researchers whose outstanding projects could not be funded, and

who had to tell their graduate students, research technicians and postdoctoral fellows that they must find work elsewhere, is readily imagined.

Information on the international nature of the MRC's process for selecting research projects, and the high quality of the pool of projects from which that selection is made, gives a direct sense of MRC's performance in selecting world class projects for public support. A more remote indicator is provided by the Institute for Scientific Information, an organization which tracks the extent to which scientific papers produced by researchers in a given country are cited by researchers in the rest of the world. The Institute has developed a measure called "relative impact" which indicates the importance of a country's publications relative to the world average. We have examined the relative impact of Canadian science in 45 areas of health research.

Readers should be aware that MRC does not support all health science research projects in Canada. Projects are also funded by provincial health agencies, health charities, industry and other sources. Thus performance of Canadian health science is only partly attributable to the MRC program.

***Health Research**. . .*

At the University of British Columbia, researcher Janice Eng is determining what aspects of balance and gait problems experienced by patients with Parkinson's disease would be helped by surgery.

. . .is highly-trained people with new ideas working to improve our quality of life.

The impact of Canadian health science around the world
. . . has improved

We compared the impact on world science of 45 fields of Canadian health research over two time periods, 1983 - 1987, and 1993 - 1997. For 32 out of 45 fields of Canadian health science (69%), impact on world science has improved.

. . . is now high

For 34 out of 45 fields (76%), the recent impact of Canadian health science was above the world average.

. . . but leaves no room for complacency

Canadian health science had more impact that US health science in only four of the 45 fields of health research (9%).

2) MRC is Promoting Research on Canadian Health Priorities

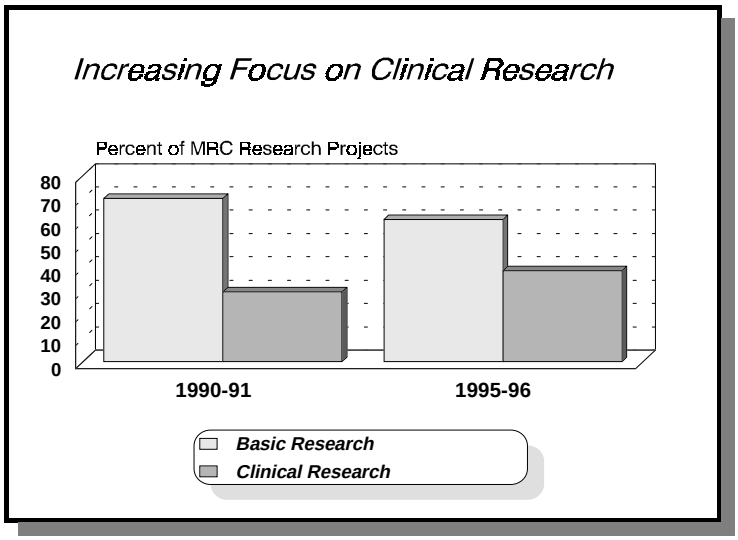
In partnership with other organizations, MRC is helping to focus research on health issues that have been identified as special threats to the health of Canadians (e.g., AIDS, breast cancer and diabetes). In 1997-98, MRC and partners earmarked $17.5 million for research in those areas. It is important to recognize, however, that targeted funding represents only a very small portion of the investment in disease-relevant research. Much of the health research on basic mechanisms of human biology is focused on fundamental questions whose answers will increase understanding of many diseases.

In 1993, the Council took on the challenge of broadening national research capacity in research related to another health priority, ensuring a better knowledge base on issues of direct relevance to the delivery of health services to all Canadians through our health care system. Such research includes studies of population health, health behaviours and health determinants. A recent study examined MRC's progress in broadening its support in these and other areas, such as clinical trials, for which impact on the health care system may have shorter time lines than research which seeks answers to fundamental questions underlying health and disease. Results indicate an increased emphasis on clinical research, both patient-oriented (research on population health, health services, disease management, disease mechanisms and clinical knowledge) and non-patient oriented as well.

Research on HIV / AIDS

Frank Plummer at the University of Manitoba has been characterizing mechanisms of HIV resistance in women whose occupation exposes them to the virus. Understanding why these women do not become infected will provide clues to ways of protecting people from HIV. Dr. Plummer has isolated a gene that may be involved in resistance to the AIDS virus and is exploring the mechanisms through which it provides protection.

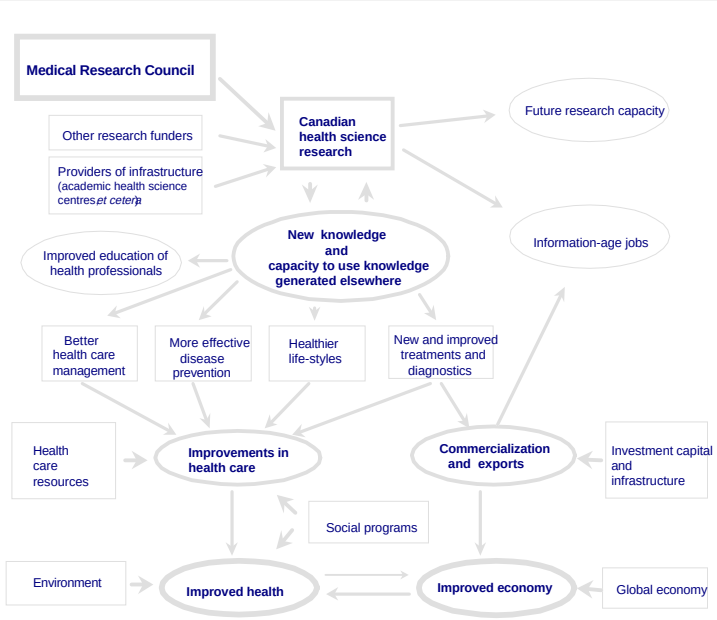
. . . focussing on high priority health risks.



3) MRC Supports Research with an Impact on Health

If the model in the text box appears complex, it is because MRC-supported research has an impact on health, and on the economy, through many pathways, some indirect, but all eventually winding back towards the ultimate goal, improved quality of life for all. Some research projects will add to a long chain of knowledge, of small but carefully formed links of research results, that began far in the past and stretches far into the future. It may be the next generation, or beyond, that benefits from a health innovation appearing at the end of that chain.

Tracing the Pathways through which Research has Impact



Health research not only contributes to the knowledge chain but also provides future health research capacity as students and postdoctoral fellows learn the art and techniques of research. Having research conducted in our universities ensures that student health professionals, our care providers of tomorrow, are imbued with a sense of continuing search for new knowledge rather than a static dependence on information acquired in the past. And, very importantly, conducting research enables an understanding of discoveries taking place daily around the world, and in that sense provides tremendous leverage. By conducting about four percent of the health research around the world, Canadians researchers, and hence Canadians, have access to the health and economic benefits from the remaining 96%.

The research breakthroughs that we see reported in the media do not reflect the extent of the research that others, all around the world, have conducted for decades in a steady piling up of small advances in knowledge. Nor do they reflect the benefits to science and health education. But they do provide an immediate sense of the health benefits that a full research portfolio provides. The following two stories have been provided for readers by MRC's Regional Director at the University of Calgary. We could just as well have selected similar stories

of important discoveries at any one of the many institutions across Canada where scientists are pursuing health research.

Two breakthroughs in cancer research...

1. Suppressing Growth of Cancer Cells

Igor Garkavtsev and Karl Riabowol have discovered a gene which produces a substance that appears to tell normal cells when to stop growing. It seems be absent in most cancer cells. When the researchers exposed breast cancer cells to high levels of the gene product, the cells stopped growing.

2. Natural Elimination of Potentially Cancerous Cells

Normally, when the DNA of cells is damaged, for example by exposure to ultra-violet light, our cells activate a protein that stops the cell from growing until the DNA is repaired. If the DNA has been so badly damaged as to be irreparable, the protein then triggers destruction of the cell. It is better to lose a cell than to have it function with damaged DNA and possibly enter a phase of uncontrolled growth leading to tumours.

A key research question has been “Why is the ‘safety-valve protein’ (called P53) sometimes not activated following DNA damage?”. Patrick Lee, his research colleagues and a research student have helped provide an answer. They have identified the protein which activates P53.

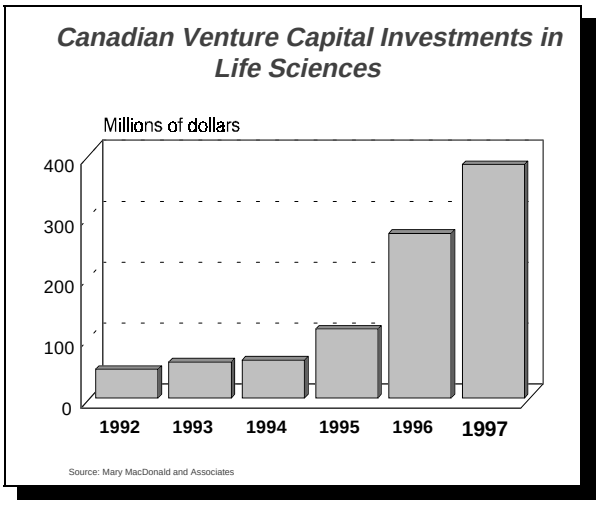
... with an impact on health

Both discoveries have implications for illness prevention, in terms of identifying patients who are at risk because of low capacity to suppress tumours or dispose of potentially cancerous cells. As the technique of gene therapy advances, both have obvious implications for the treating of persons with cancer.

4) Capturing the Economic Benefits of Health Research Discoveries

The graph on this page, demonstrating phenomenal growth of Canadian venture capital invested in the life sciences, has a story to tell about the pay-off from an MRC idea for improving Canada's capacity to reap the benefits from its investments in health research. In 1994, an MRC working group set out to do something about the loss to Canada of the commercial benefits of our discoveries. Commercialization requires substantial funding at the front end of the development process, by companies with capital that they are willing to invest in somewhat uncertain, but potentially very profitable projects. The problem was an inadequate supply of venture capital in Canada, which meant that Canadians with great ideas arising from their research discoveries had to take them to countries, like the US, where investment capital was available.

The exploiting of Canadian discoveries offshore represents a great loss to the country. When commercialization takes place elsewhere, it is foreign investors, not Canadians, who accumulate wealth from betting on financial returns from the discovery. It is people in other countries, not Canadians, who fill the jobs created by the development, testing and production of the new pharmaceuticals, or medical tests or types of diagnostic equipment. And it is other countries, not Canada, that benefit from exports of the new product to the world market. In effect, offshore commercialization of Canadian discoveries means that we have to buy back from others the health products that we should have made ourselves.



MRC's recognition that something had to be done led to the development of the now-famous Canadian Medical Discoveries Fund which has served as a vehicle for over 65,000 Canadians and organizations to invest more than $354 million in developments stemming from discoveries by our health scientists. By 1996, that Fund (the CMDF) was the largest single Canadian investor in health sciences. By 1997, life sciences was the second most popular area for investment of venture capital. A report dated early 1998 indicates that, through CMDF, Canadians have invested in the start-up and early development of 30 companies and the expansion of seven more. The long term impact of these investments in terms of job opportunities for Canadians is truly outstanding.

5) Training and Developing Our Most Critical Resource: Canadian Health Scientists

A key to understanding the business of MRC is recognizing that health research means bright, committed, well-trained people dedicating their talents and abilities to the pursuit of new knowledge. People with ideas. Of course researchers need accommodation, and equipment, and materials and supplies, but without people the research laboratory or office, the magnetic resonance spectrometer or computer, and the boxes of chemical reagents or health behaviour survey forms all stand idle. About two thirds of the typical MRC grant goes towards supporting people: graduate students, research technicians and postdoctoral fellows who assist researchers with their work. MRC is, in some respects, in the business of supporting people with minds full of ideas for finding out more about the maintenance of health and the prevention and treatment of disease.

In 1997-98, MRC invested $17.7 million in programs directly targeted at the training of 1,350 especially promising students and postdoctoral fellows. In addition, it provided support for an estimated 5,100 more who were hired as assistants on projects supported through MRC grants. To get a better sense of the long-term demand for Canadian health scientists, MRC is participating in a national study, with Human Resources Development Canada and other partners, of health research personnel.

The Council also offers programs to provide salaries for some of Canada's very best health scientists, to enable them to work full-time at research. Programs are targeted at all stages of career development, from the recently-trained researcher, setting up her or his first independent research project, to the distinguished scientist who should be recognized both as a superb research contributor and as a role model for young Canadians. In 1997-98, MRC invested $20.5 million in career awards for 429 of Canada's most outstanding health researchers.

Value for Money

The Impact of University Research

Imagine an iceberg.

The visible tip represents the impact of research on employment and the economy. Research means jobs and the economic stimulation that they engender.

The huge hidden portion of the iceberg represents the impact of research on productivity through technological change, the result of highly-trained graduate students and postdoctoral fellows generating ideas and absorbing the new knowledge being created daily around the world. Ideas are the feedstock of innovation.

When both the visible and hidden impacts of Canadian university research were examined, an investment of $4.8 billion was found to yield a positive net increase to GDP of $15.5 billion which corresponds to about 150,000 jobs.

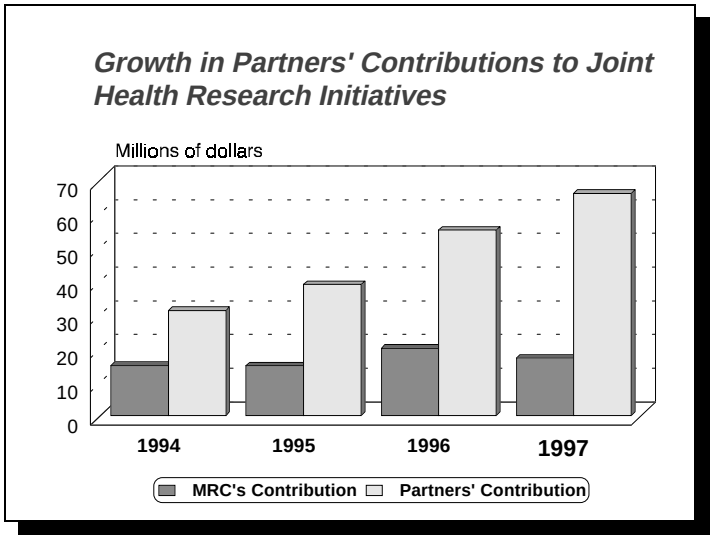
Source: Research File. March 1998. The Economic Impact of University Research. Association of Universities and Colleges of Canada

The decline in MRC's budget over the preceding year forced a reduction in our investment in people. The allotment for training and career development was 5% lower than for 1996-97.

The Council has conducted studies of the subsequent career outcome of students and fellows whose training had been supported through personal awards. Findings revealed high rates of completion of study programs and showed that large percentages of former award holders went on to careers in research, many of them both brilliant scientifically and influential on the development of future scientists as well. Studies also suggested, not surprisingly, that if Council wished an even better outcome, it should ensure that the criteria it uses in the selection of awardees are good predictors of future research activity. The selection system for a new MRC funding mechanism, Doctoral Research Awards, uses criteria specifically chosen because the correlate with the desired outcome, program graduates with achievements and productivity in research. An intense study of the logic, fairness and flexibility of the outcome-based selection system is nearing completion. We look forward to reporting results, which initially appear very good, next year.

6) Expanding Canadian Health Research Capacity Through Partnerships

Partnerships between MRC and other funders of health research have three major benefits for Canadians. First, partnerships bring more resources to bear in a given research area. They concentrate funding on specific issues, often permitting the development of a critical mass of researchers from which springs results that would never have been achieved if the partners had gone it alone. Thus partnerships can increase the overall impact of the public investment in research through MRC. Second, partnerships help bring funders, researchers, health professionals and interested Canadians together over a common issue, be it the improvement of life for diabetics or the assurance of Canadian capacity in human genetics. Different perspectives on health issues often generate ideas for new research approaches. Third, partnerships can increase the total Canadian health science effort. This occurs when MRC's partner would not have funded the research unless in concert with



MRC, or when the partner would have supported the research, but at a greatly reduced level.

The Council has been investing a significant portion of its budget in partnered programs of research grants and personnel awards. Last year, 9.1% of MRC funding went towards shared initiatives. This year, with the overall decline in MRC's budget requiring protection of the core programs, the percentage dropped, to 7.9, but support from continuing and new partners ensured that the total funding delivered through joint programs still increased, by almost $8 million. Partners have been generous with their contributions to shared health research programs over the years. MRC's investment of $66.3 million for the period 1994 to 1997 has been complemented by a partners' investment of $190.8 million. That is, the ratio of MRC to partners' funding has been 1 to 2.9.

Council is proud of its partners in health science research funding and greatly values the different perspectives they bring to joint initiatives. As the accompanying list indicates, those partners include Canadian and international health charities, provincial health organizations, companies with specialties ranging from pharmaceutics to medical devices to biotechnology, professional organizations and federal departments and agencies. We believe these partnerships, which represent many years of determined development and nurturing, provide a foundation which will enable Canadian health science to become even broader and more interdisciplinary in the years ahead.

Some of MRC's Partners

Alberta Lung◆Arthritis Society◆B. C. Lung Association◆Burroughs Wellcome◆Canadian Hypertension Society◆Canadian Lung Association◆Canadian Anaesthetists' Society◆Canadian Red Cross Society/Bayer◆Canadian Society for Clinical Investigation◆Cancer Research Society◆Easter Seal◆National Cancer Institute◆The Arthritis Society◆The Foundation for Gene and Cell Therapy

3M Pharmaceuticals◆Alcon Canada◆Allelix Biopharmaceuticals Inc.◆Allergan Inc.◆AMGEN Canada Inc.◆Astra Pharma Inc.◆Axcan Pharma Inc.◆Bayer Inc.◆Berlex Canada Inc.◆BioChem Pharma Inc.◆Bio-Méga/Boehringer Ingelheim Research◆Biomira Inc.◆Biopharm◆Bio-Research Laboratories Ltd.◆Biovail Corporation International◆Boehringer Ingelheim (Canada) Ltd.◆Boehringer Manheim◆Bristol-Myers Squibb Pharmaceutical Group◆Cyanimid Lederle◆Du Pont Pharma◆Eli Lilly Canada Inc.◆Fisons Corporation Limited◆Fournier Pharma Inc.◆Fujisawa Canada Inc.◆Genentech Canada Inc.◆Glaxo Wellcome Inc.◆Hoechst Marion Roussel Canada◆Hoffmann-La Roche Ltd.◆Hyal Pharmaceutical Corporation◆Ivers-Lee Limited◆Janssen-Ortho Inc.◆Jouveinal Inc.◆Knoll Pharma Inc.◆Leo Laboratories Canada Ltd.◆Mallinckrodt Medical Inc.◆Merck Frosst Canada Inc.◆NEUROCHEM Inc.◆Ohmeda Pharmaceutical Products◆Organon Canada Ltd.◆Ottawa Heart Institute Research Corp.◆Parke-Davis, Division of Warner Lambert◆Pfizer Canada Inc.◆Pharmacia & Upjohn◆Phoenix International Life Sciences Inc.◆Procter & Gamble Pharmaceuticals◆Purdue Frederick◆QLT Photo Therapeutics Inc.◆Reed & Carnick◆Rhône-Poulenc Rorer Canada Inc.◆Sanofi Winthrop◆Schering Canada Inc.◆Searle Canada◆Servier Canada Inc.◆SGS Pharmaceuticals◆SmithKline Beecham Pharma Inc.◆Solvay Pharma Inc.◆Stiefel Canada Inc.◆The Toronto Hospital Research Institute◆Therapex, Division of E-Z-EM Canada Inc.◆Theratechnologies Inc.◆Wyeth-Ayerst Canada Inc.◆ZENECA Pharma Inc.◆PMAC

Abbott Laboratories◆Amersham Canada◆Angiogensesis Technologies.◆Angiotech Pharmaceuticals Inc.◆Apotex Inc.◆Bard Canada Inc.◆Baxter Corp. Ltd.◆Biochem Therapeutic Inc.◆Biomet/EBI Canada.◆bLES Biochemicals.◆B.C. Decker Inc.◆Clintec Nutrition◆Connaught Laboratories Ltd.◆Cordis Corporation◆CV Technologies Inc.◆Deprenyl Research Ltd.◆Dextram Products Ltd.◆Dow Corning Canada Ltd.◆GE Medical Systems Canada◆Genetech Inc.◆General Electric Medical Systems Inc.◆Haemacure Corporation◆Howmedica/Dow Corning Canada◆Hydro-Québec◆Inex Pharmaceuticals Corp.◆ISG Technologies Inc.◆Kabi Pharmacia Canada Ltd.◆Kellogg Canada Inc.◆Le Groupe Christie Ltee.◆Leddy Exploration Ltd.◆Lipex Pharmaceuticals◆Liposome Technology Inc./Sequus Pharmaceuticals Inc.◆Litton Systems Canada Inc.◆Lunar Corporation◆MDS Health Group Ltd.◆Medtronic of Canada Ltd.◆Micrologix Biotech Inc.◆Neurospheres Limited◆Lobelpharma Canada Inc./Laboratoire Dentachrome Inc.◆Nordion International◆Novartis/Glaxo Wellcome Inc.◆Nova Nordisk Canada Inc.◆N.O. Institute Inc.◆Ontogen Corporation◆Pace Diagnostics Corporation◆PAR Vision Systems Corp.◆Receptagen Inc.◆Resolution Pharmaceuticals◆Rh Pharmaceuticals◆Rhythm Search Developments Ltd.◆Ross Laboratories◆Sohpa Medical Inc (Canada)◆Stellate Systems◆Sultan Chemists Inc.◆Synectics Health Corporation◆Synsorb Biotech Inc.◆Telios Pharmaceuticals Inc.◆Uniroyal Chemical Ltd.◆Vetrogen Corpo.◆Xillix Technologies Corporation◆Zimmer of Canada Limited◆Zymo Genetics

Aids Initiative◆Canadian Breast Cancer Initiative◆Canadian Council for Animal Care◆Canadian Genome Analysis & Technology Program◆Canadian Space Agency◆Canadian Medical Discoveries Fund ◆Foreign Affairs◆Health Canada ◆Human Resources Development Canada◆Human Science Frontier Program◆Industry Canada◆Life Sciences Investment Promotion Initiative◆National Cancer Institute◆National Council for Bioethics & Health Research◆Networks of Centres of Excellence◆Technology Partnerships Canada

MRC Partnerships for Canadian Health Science

Partners Involved (1996-97 data)		**Estimated Financial Contributions of Partners**				
		1994-95	1995-96	1996-97	**1997-98**	*4-year*
		(thousands of dollars)				
	Partnerships with Industry					
39	MRC-PMAC Health Program	7,617	14,070	19,336	**31,155**	72,178
41	University-Industry Program	10,613	3,897	4,409	**3,068**	21,987
	Partnerships with Voluntary Health Organizations					
1	Juvenile Diabetes Fnd International			1,000	**1,000**	2,000
1	Burroughs Wellcome Fund			663	**709**	1,372
12	Other voluntary health organizations	479	792	886	**924**	3,081
	Partnerships with Other Types of Organization					
2	Canadian Health Services Research Fnd			11,000	**11,000**	22,000
1	AIDS Strategy Research	6,107	6,575	5,796	**5,500**	23,978
2	Canadian Breast Cancer Research Initiative	2,960	5,576	7,246	**6,423**	22,205
1	Human Frontiers of Science	700	2,313	1,864	**1,864**	6,741
4	Genome Analysis and Technology	445		1,310	**3,001**	4,756
3	Eco-Research	500	787	450		1,737
10	Other	1,710	4,786	981	**1,239**	8,716
127	***Totals***	31,131	38,796	54,941	**65,883**	190,751
	MRC Contribution to these Partnerships	14,761	14,676	19,908	**16,990**	66,335
	Ratio of MRC Funding to Partners' Funding	1 to 2.1	1 to 2.6	1 to 2.8	**1 to 3.9**	1 to 2.9
	Percent of MRC Budget Invested in Partnerships	6.4	6.7	9.1	**7.9**	6.7

Note: These data were prepared to give the MRC a sense of progress in its Partnerships development. As Partnerships can take many possible configurations, the level of precision of financial data will vary. For example, in some cases data reflects amounts expended through the partnership whereas in others it reflects amounts that have been contributed to the partnership but have not yet been fully invested though research grants or awards.

7) Providing a National Perspective on Canadian Health Research

The MRC believes that Canadians expect not only that the research they fund be world-class and beneficial but that it also respect high ethical standards. We all know too well those instances in the history of mankind when basic human values and needs were ignored by those who sought new knowledge at any cost. One of the most important roles of a national agency like the Medical Research Council is to ensure that Canadian values are reflected in the research that it supports. The challenge facing the MRC, and the other federal granting councils, the Natural Sciences and Engineering Research Council (NSERC) and the Social Sciences and Humanities Research Council (SSHRC) has been to express those values, a difficult task when we know that in a million people there will be a million shades of perception regarding what is right and fair.

It is thus especially gratifying to be able to report to Parliament that the Councils, after many years of committee work, open consultations, debate and review of standards used in other countries, have released a joint policy on ethical principles and practices with respect to research involving people. A clear enunciation of fundamental ethical values is not only essential for judging what research should be done or not, but also for helping societies set the right course in its use of new technologies.

Health science is of course an international activity and rare is the Canadian health scientist who is not in some way closely connected with researchers in other countries. One of the national roles of the MRC is to expand and fortify these natural collaborations through special programs and projects developed with funding agencies in other countries. MRC has been actively exploring new models for international interaction that move beyond the traditional reciprocal exchange of researchers between one country and another. For example, the Council has been participating in a complex series of scientific orientations with Japanese counterparts to identify specific areas in which joint research efforts would be exceptionally productive. In many areas, such as neuroscience, the excellence of Canadian scientists is recognized and valued world-wide.

Tri-Council Policy Statement

Ethical Conduct for Research Involving Humans

The people of Canada. . . have created and funded the MRC, NSERC and SSHRC... The Councils wish to promote research that is conducted according to the highest ethical standards... As a condition of funding, we require that researchers and their institutions apply the ethical principles and articles of this policy.

Guiding Ethical Principles

Respect for Human Dignity
Respect for Free and Informed Consent
Respect for Vulnerable Persons
Respect for Privacy and Confidentiality
Respect for Justice and Inclusiveness
Balancing Harms and Benefits
Minimizing Harms
Maximizing Benefit

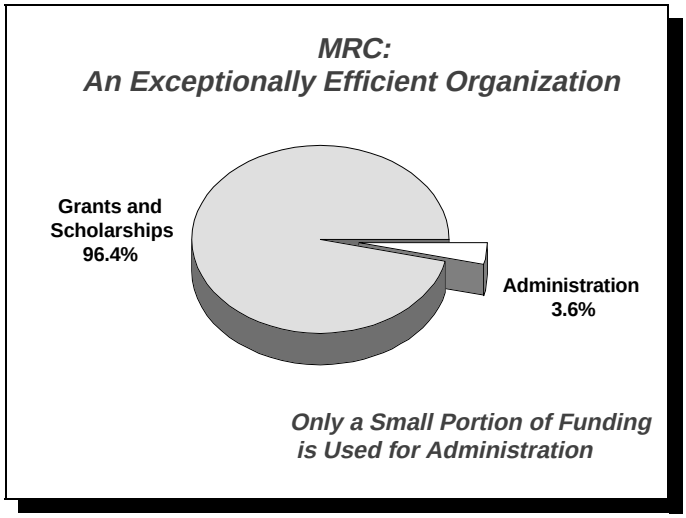
Maintaining Links With Health Science Agencies Around the World

IV FINANCIAL PERFORMANCE

Financial Table 1

Summary of Voted Appropriations				
Vote		**1997-98 Spending**		
		Planned	***Authorized***	**Actual**
	Medical Research Council			
20	Operating expenditures	8.3	*9.1*	**8.6**
25	Grants and Scholarships	228.6	*228.1*	**228.1**
(S)	Contribution to employee benefit plans	0.6	*0.6*	**0.6**
	Totals	237.6	*237.8*	**237.3**

Note: Figures in the table may not appear to add correctly because of rounding.



Financial Table 2

Comparison of Planned and Actual Spending, 1997-98

Medical Research Council of Canada

	Planned	*Authorized*	**Actual**
Full-time Equivalents (number)	76	*76*	**80**
Millions of dollars			
Operating	8.9	*9.7*	**9.2**
(includes contributions to employee benefit plans)			
Capital	-	-	**-**
Voted Grants and Contributions	228.6	*228.1*	**228.1**
Subtotal (Gross Voted Expenditures)	237.6[2]	*237.8*	**237.3**
Statutory Grants and Contributions	-	-	**-**
Total Gross Expenditures	237.6	*237.8*	**237.3**
Less: Revenue Credited to the Vote	-	-	**-**
Total Net Expenditures	237.6	*237.8*	**237.3**
Less: Revenue Credited to the Consolidated Revenue Fund	-0.5	*-0.5*	**-0.9**
Plus: Cost of Services Provided by other Departments	0.6	*0.6*	**0.6**
Net Cost of the Program	237.7	*237.9*	**237.0**

[2] Figures in the table may not appear to add correctly because of rounding.

Financial Table 3

Historical Comparison of Total Planned Spending to Actual Spending

Medical Research Council of Canada

(millions of dollars)

1995-96	**1996-97**	**1997-98**		
Actual	**Actual**	Planned	*Authorized*	**Actual**
251.2	**242.4**	237.6	*237.8*	**237.3**

Tables Not Applicable to the Medical Research Council:

Financial Table 4 — *Crosswalk Between an Old and New Structure*

Financial Table 5 — *Resource Requirements by Organization and Business Line*

(The MRC is a single organization with one business line: promote, assist and undertake research in the health sciences in Canada)

Financial Table 6 — *Revenues to the Vote*

Financial Table 7

Revenues to the Consolidated Revenue Fund

Medical Research Council of Canada

(millions of dollars)

1995-96	**1996-97**	**1997-98**		
Actual	**Actual**	Planned	*Authorized*	**Actual**
0.6	**0.4**	0.5	*0.5*	0.9

***Table Not Applicable to the Medical Research Council*:**

Financial Table 8 *Statutory Payments*

Financial Table 9

Transfer Payments

Medical Research Council of Canada

Grants and Scholarships

(millions of dollars)

1995-96	**1996-97**	**1997-98**		
Actual	**Actual**	Planned	*Authorized*	**Actual**
243.2	**233.8**	228.6	*228.1*	**228.1**

Tables Not Applicable to the Medical Research Council:

Financial Table 10	*Capital Spending*
Financial Table 11	*Capital Projects*
Financial Table 12	*Status of Major Crown Projects*
Financial Table 13	*Loans, Investments and Advances*
Financial Table 14	*Revolving Fund Summaries*

Financial Table 15

Contingent Liabilities

Medical Research Council of Canada

(millions of dollars)

Claims and Pending and Threatened Litigation	
Litigations	**0.1**

V CONSOLIDATED REPORTING

The Medical Research Council is not listed among the Departments and Agencies required to report on Sustainable Development, Storage Tanks, Regulatory Initiatives or Special Travel Policy. However, we would like to comment on 1) the idea of consolidating our annual Report of the President with the Performance Report and 2) on our Year 2000 preparedness.

MRC considered using one document to serve the purposes of both the annual report and the performance report and decided not to attempt consolidation this year. The idea of a single document is attractive, but there needs to be more flexibility in the guidelines for preparing Performance Reports, and the possibility of using colour and other communication aids, before we could meet the objectives of the two current documents in a single presentation.

Senior managers at the MRC are aware of the Y-2000 issue and are satisfied that progress is being made in ensuring that Council systems will meet the challenge imposed by two digit year codes. The contractor engaged in a major upgrading of the MRC secretariat's information technology is committed to supplying Y-2000 compliant systems.

VI OTHER INFORMATION

Contacts for Further Information

Role	Name	Telephone (area 613)	e-mail	Fax (area 613)
President	Henry G Friesen, MD	954-1809	hfriesen@hpb.hwc.ca	954-1802
Executive-Director	Carol Clemenhagen	954-1813	cclemenh@hpb.hwc.ca	954-1802
Directors (alphabetic listing of branches)				
Business Development	Marc Lepage	941-2725	mlepage@hpb.hwc.ca	941-1040
Corporate Services	Guy D'Aloisio	954-1946	gdaloisi@hpb.hwc.ca	954-1800
Communications	Marcel Chartrand	954-1812	mchartrand@hpb.hwc.ca	954-6653
Ethics and International Relations	Francis Rolleston, D. Phil.	954-1801	frollest@hpb.hwc.ca	954-6653
MRC-PMAC Health Program	Robert Dugal, PhD	941-6706	rdugal@pmac-acim.org	946-0885
Programs	Mark Bisby, PhD	954-1959	mbisby@hpb.hwc.ca	952-2277

Web Site

Legislation Administered

The MRC is not the specific administrator of legislation. However, the Council was created by an Act of Parliament through the Medical Research Council Act (R.S., C. M-9).

Agency Reports

The Council is required to submit to Parliament an Annual Report of the President.

A full list of MRC publications appears in our annual Report of Plans and Priorities which is available at the MRC web site. The list is also available from the MRC Communications Branch.

Additional Information

Grants and Awards by Type, 1997-98

Category of Support	Type of Grant or Award	Number	Amount
			$ thousands
GRANTS	Operating	2,185	131,649
	Maintenance	57	3,694
	Equipment	32	3,388
	Health Services Research Fund	1	2,000
	Breast Cancer Research Initiative	1	1,962
	Special Projects	10	2,251
	MRC Genome	3	390
	University-Industry Grants	135	5,340
	subtotal	*2,424*	*150,675*
MULTI-DISCIPLINARY	MRC Groups	34	18,856
	Program Grants	13	3,787
	Development Grants & Regional Partnerships	19	528
	subtotal	*66*	*23,170*
SALARY SUPPORT	MRC Groups	29	1,847
	Development Grants	43	2,037
	Career Investigators	9	673
	Distinguished Scientists	17	762
	Senior Scientists	20	863
	MRC Scientists	75	4,256
	Scholarships	168	7,997
	Clinician Scientists Phase 2	14	1,060
	U-I Salary Support Programs	54	1,007
	subtotal	*429*	*20,502*
RESEARCH TRAINING	Clinician Scientists Phase 1	29	1,119
	Centennial Fellowships	25	787
	Fellowships	391	8,731
	Dental Fellowships	3	85
	Studentships	478	5,936
	Burroughs Wellcome Student Research Fund	303	404
	U-I Training Awards	121	654
	subtotal	*1,350*	*17,717*
TRAVEL AND EXCHANGE	Visiting Scientists	44	163
	Symposia & Workshops	25	119
	subtotal	*69*	*282*
OTHER ACTIVITIES	President's Fund	31	550
	Grants to Other Organizations	6	1,677
	subtotal	*37*	*2,227*
	TOTAL, CORE PROGRAMS	*4,375*	214,573
	Networks of Centres of Excellence	6	*13,518*
	TOTAL ALL PROGRAMS	*4,381*	228,091

Some additions may not agree due to rounding

Distribution of MRC Expenditures by Province, 1997-98

Province	$ (000)	Percent
British Columbia	19,292	8.5
Alberta	28,225	12.4
Saskatchewan	2,315	1.0
Manitoba	7,511	3.3
Ontario	80,821	35.4
Quebec	71,818	31.5
New Brunswick	91	<0.1
Prince Edward Island	62	<0.1
Nova Scotia	5,383	2.4
Newfoundland	1,342	0.6
Other	6,505	2.9
Outside Canada	4,722	2.1
Total	228,091	100.0

Some additions may not agree due to rounding

Operating Grants by Area of Research, 1997-98

Area of Research	Amount	Percent
	$ 000	
Bacteriology	3,563	2.0
Biochemistry	15,154	8.9
Blood	2,921	1.9
Cancer	7,890	3.7
Cardiovascular	15,336	9.7
Cell Biology	11,503	6.8
Dental Science	2,833	1.7
Drug Research	5,541	3.1
Endocrinology	7,595	4.8
Gastrointestinal and Liver	4,450	2.6
Genetics	10,583	5.9
Health Research	3,835	1.7
Hearing	416	0.3
Imaging and Nuclear Medicine	2,242	1.8
Immunology and Transplantation	8,887	5.1
Metabolism	4,519	2.6
Molecular Biology	12,034	7.1
Musculo-Skeletal	3,587	2.8
Nephrology	2,417	1.7
Neurosciences	27,002	15.0
Nursing	184	0.2
Nutrition	1,266	0.8
Reproduction (incl Pregnancy)	5,936	3.8
Respiration	6,523	3.7
Virology	3,552	2.0
Vision	1,666	1.0
Total	171,435	100.0

Some additions may not agree due to rounding.

Includes Research Grants, Program Grants and Groups

Note: Research in a given category (e.g. Biochemistry, Neurosciences, etc) may be relevant to a wide variety of diseases (e.g., cancer, cardiovascular disease, etc.)