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DOCUMENTED
BRIEFING

Health and Medical Research in New Zealand

Health Research Observatory

Bruce Scoggins

The research described in this report was prepared as part of RAND Europe's Health Research System Observatory Documented Briefing series, funded by the U.K. Department of Health.

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Preface

This documented briefing provides an overview of health and medical research in the New Zealand. The report is part of a series of country-specific reports available from RAND Europe's Health Research Observatory, funded by the Department of Health, England.

The report is divided into three parts. In the first part, the *Structure of the New Zealand Health Research System*, including funding sources, sectors performing health and medical research, and health research priority setting, is presented. The second part, *Processes and Performance of the New Zealand Health Research System*, focuses on the types of funding available and how funding activities are conducted, and provides exemplars of the system's performance. The third part presents an *Outlook* and considers current and emerging health research issues in the New Zealand.

The report is based on desk-based document review and will be updated on a regular basis. It does not attempt to discuss current policy options, or make recommendations for future strategy. The report will be of interest to government officials dealing with health and medical research policy, medical research councils, health and medical research charities, public and private institutions engaged in health research, and researchers.

The use of $ throughout this report stands for New Zealand dollars, unless stated otherwise.

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Summary

Summary: Key Points

- Government expenditure on health research in 2006–2007 was $136 million (estimate), equivalent to 1.28% of government expenditure on health and 17.2% of expenditure on R&D
- Significant funding, $25 million (estimate) in 2006–2007 was also provided by quasi government agencies, NGOs, and charities
- Growth in government funding for health research over the past five years has increased little in real terms after adjustment for payment of overheads
- Most funding is allocated to investigator-initiated research via a contestable process that uses peer review to meet agency requirements of science merit and relevance
- The two universities with medical schools (Auckland and Otago) are the main providers of well-cited and high-quality health research
- Research "by Maori for Maori" and "by Pacific for Pacific" are priorities for the Health Research Council
- Research training awards are well supported
- Health-related biotechnology is a growing and well-performing sector, supporting many innovative companies

New Zealand has a small health research sector from both national and international perspectives, which is regarded on the basis of citation analysis, bibliometrics, and peer review as being a high-performing sector of the NZ science system. Government, through various investment agencies, is the major funder, with an expenditure of $136.0 million in 2006–2007. Part of the NZ government's education budget also contributes through its investment in Centres of Research Excellence and support of academic institutions.

These funds ($136.0 million) were equivalent to 1.28 percent of total government expenditure on health in 2006–2007. All funds were allocated through contestable processes by use of international best practice peer review for assessment of science merit and agency relevance criteria where appropriate. Significant investment also comes from quasi government agencies, several regional research foundations, nongovernmental organisations (NGOs), and charities. Overall in 2006–2007, approximately $25.0 million was expended on basic, strategic, and applied health research funded by these organisations.

The main agency that deals with health, the Health Research Council of New Zealand, together with the government ministries, develop the national health research strategy. Although the majority of investment goes towards investigator-initiated research, there is an increasing requirement for research to be relevant to the government's health priorities and for increasing investment to provide research training for future scientists. All research proposals receive peer review to meet international best practice standards.

Certain areas of research are given particular attention in New Zealand. Because of inequalities of health outcomes in people of Maori and Pacific origin, investment in research that is "by Maori for Maori" and "by Pacific for Pacific" are priorities.

Health-related biotechnology in New Zealand is a small but growing sector, mainly comprised of private companies, but it does receive significant government funding. Health research is primarily carried out in tertiary education institutions with the majority being conducted at the two main universities (Auckland and Otago). NZ health research is well cited and is recognised internationally as being of high quality. Several research teams are world leading.

With little growth in funding in real terms over recent years, New Zealand has not been able to build research capacity in important research portfolio areas (e.g. health policy and systems research, communicable diseases). Current investments are dominated by biomedical research projects, which, although they are of high quality, are not meeting the knowledge needs of the health sector.

Acknowledgments

The author would like to thank the valuable input of Observatory team members, as well as careful editing by Lucy Bailey. Further constructive comments were provided by Quality Assurance reviewers Jonathan Grant and Charlene Rohr.

Abbreviations and Terms

CIHR	Canadian Institutes of Health Research
CORE	Centre of Research Excellence
FRST	Foundation for Research, Science, and Technology
GAC	Grant Approval Committee
GTAC	Gene Technology Advisory Committee
HRC	Health Research Council of New Zealand
ICRG	International Collaborative Research Grants
MRC	Medical Research Council of New Zealand
NERF	New Economy Research Fund
NGO	nongovernmental organisation
NHMRC	National Health and Medical Research Council of Australia
NZ	New Zealand
RFP	request for proposals
R&D	research and development
RS&T	Research, Science, and Technology
SAC	Specialist Assessing Committee
SCOTT	Standing Committee on Therapeutic Trials
NIH	National Institutes of Health

Introduction

New Zealand has a long history of health research, which dates back to the establishment of a medical research committee within the Department of Public Health more than 70 years ago. In 1951, the Medical Research Council of New Zealand (MRC) was established under legislation, and many of its policies and processes were similar to those in place in the research councils in the United Kingdom and other Commonwealth countries. The MRC remained until 1990 when, following a review, the Health Research Council of New Zealand (HRC) was established under new legislation (HRC Act 1990).[2] The new legislation required the HRC to give explicit attention to public-health research, Maori health, and ethics of health research in addition to what had been a long-standing commitment to biomedical and clinical research. The history of the MRC is described in an excellent review, "Private Troubles and Public Issues; Nutrition Research and the Medical Research Council of New Zealand 1920–1990," written by Ian Carter (University of Auckland) at the time of the transition to the HRC.[3]

New Zealand has had a strong tradition of support for health research from nongovernmental organisations (NGOs) and charities (e.g. Canterbury Medical Research Foundation, Cancer Society, and National Heart Foundation). The NZ health research sector, like that in many other countries, has been very productive in making important

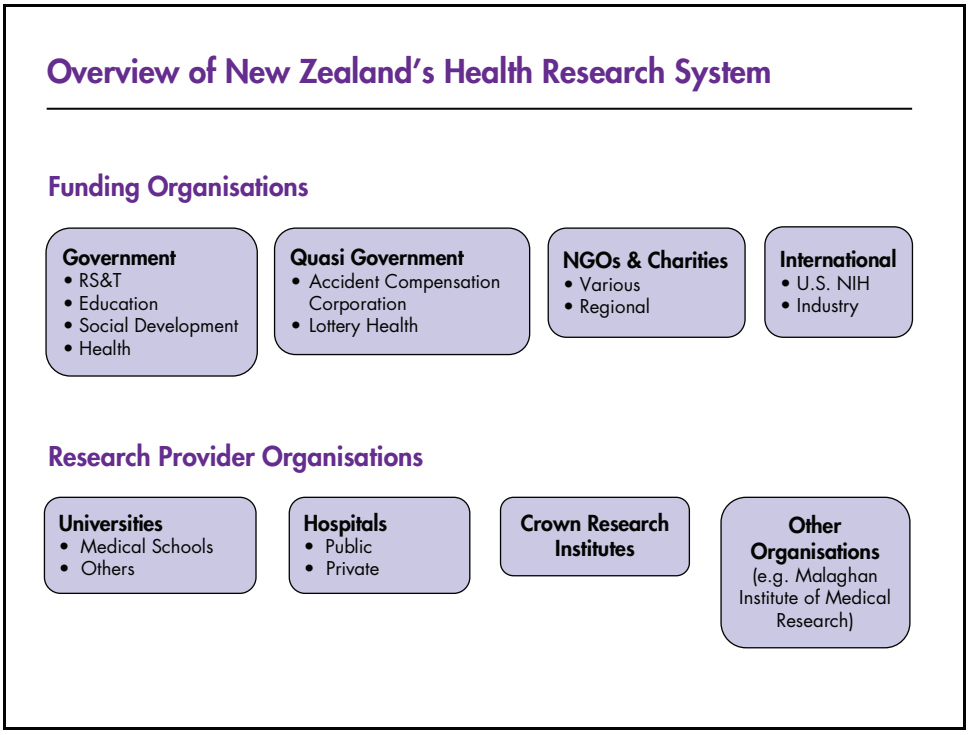
[2] NZ Parliamentary Counsel Office, "Health Research Council Act 1990," http://www.legislation.govt.nz/act/public/1990/0068/latest/DLM213017.html (as of April 9, 2008).

[3] Unpublished report, available from RAND Europe on request (see Preface for contact details).

contributions to knowledge, health outcomes, and more recently, the economy. Health research scientists have embraced globalisation of research activities and international partnerships, and collaborations have become an increasingly important part of health research in New Zealand.

This report is divided into three sections. The first section provides an description of the organisation of health research in New Zealand, as it is today. In addition, a brief overview of the mission and governance arrangements of the key health research and development (R&D) funding organisations is provided. The second section describes how the health R&D system carries out its activities and provides exemplars of how the system is performing. Finally, a brief overview on New Zealand's current and emerging health research issues is provided.

Structure of the NZ Health Research System

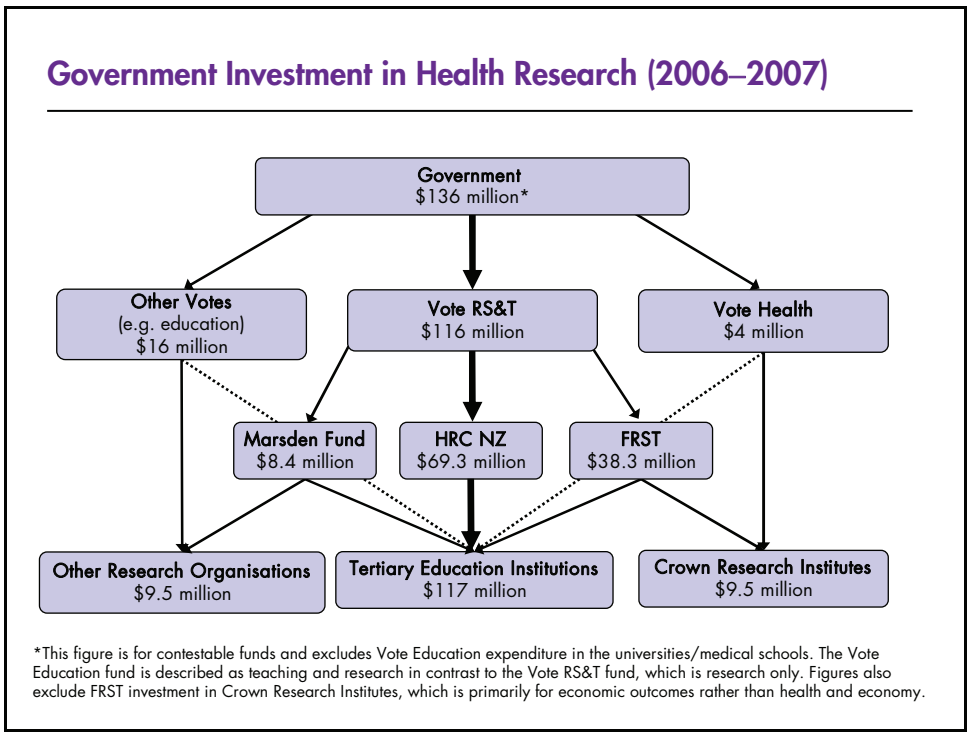


The agencies and ministries that comprise the NZ government are funded through a series of financial packages known as "Votes". Vote Research, Science, and Technology (RS&T) provides the main funding for health research in New Zealand through the following three investment agencies:

- Health Research Council of New Zealand (HRC)
- Foundation for Research, Science, and Technology (FRST)
- Marsden Fund Council

In addition to Vote RS&T funding, several other government ministries also make a significant contribution to the pool available to support research projects and training awards. These include the Education via Centres of Research Excellence (COREs), Internal Affairs via Lottery Health Research Grants, and others, such as Social Development, Health, Environment, Economic Development, Justice, Labour, and Transport via requests for proposals (RFPs) or in partnership with the HRC.

Research funding is also provided by two Crown Entities—the Accident Compensation Corporation and the Alcohol and Liquor Advisory Council. Both of these agencies have well-established co-funding relationships with the HRC.

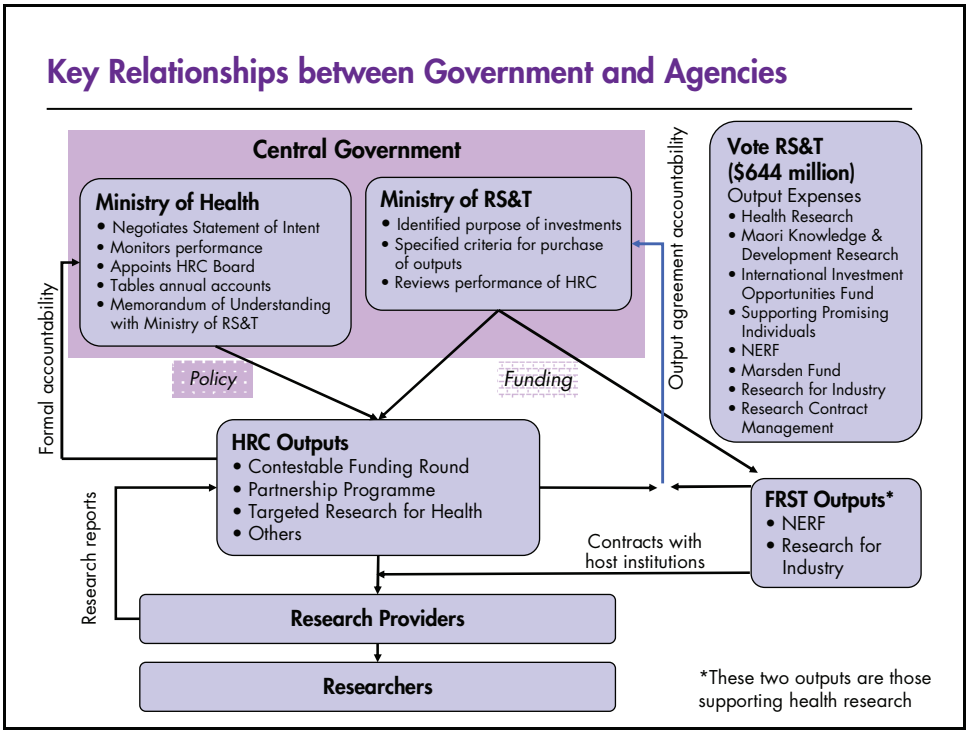


Vote Education also provides significant support for health research to academic institutions, in particular to the two Universities with medical schools (University of Auckland and University of Otago). Vote RS&T, through FRST, provides the majority of the funding for the eight Crown Research Institutes, which provide an increasing amount of health research with a focus on economic outcomes for New Zealand. Vote Health through the Ministry of Health funds $4.0 million of research. It should be noted that funding of HRC was transferred from Vote Health to Vote RS&T in 1997/98. Support from private sources, such as regional research foundations, is a small but growing sector of the NZ health research system.

New Zealand has one independent medical research institute based in Wellington. Established 30 years ago, the Malaghan Institute of Medical Research had an income of $5.3 million in 2007. Of this income, $4.4 million was derived from scientific grants, $0.76 million from donations, and $0.14 million from interest on investments.

Although it would be expected that all government agencies would pay the full costs of research purchased, including a contribution to academic staff salaries, this has yet to be implemented across government, and currently only Vote RS&T agencies use transparent processes for the payment of overheads.

A brief description of the investment policies and processes for the three major government agencies and the COREs follows.



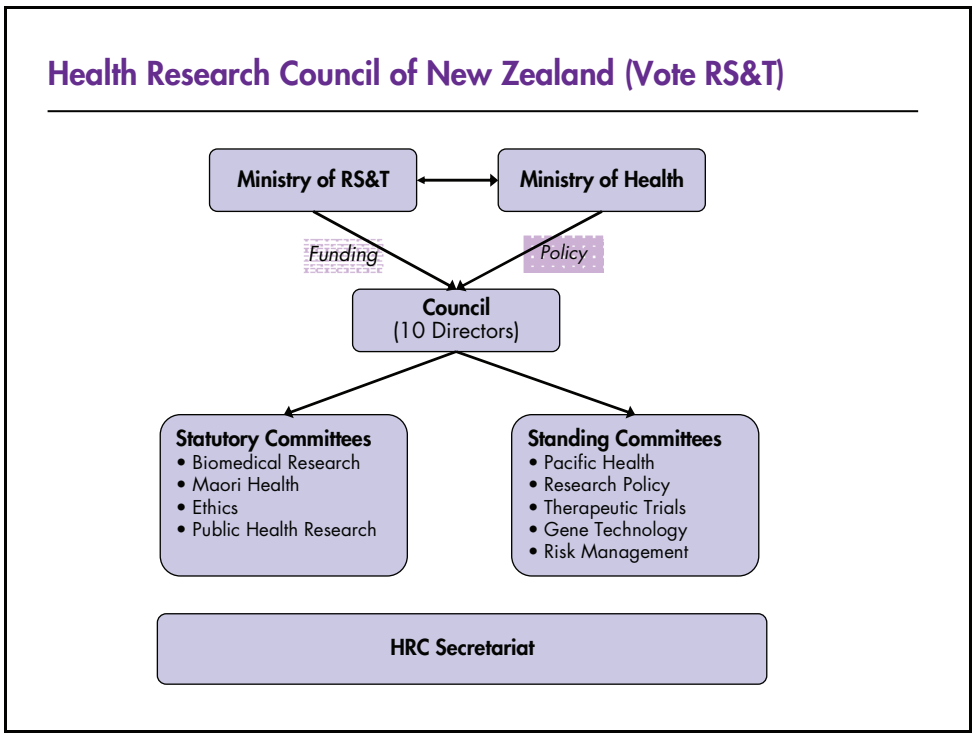
The HRC (since 1997–1998) is accountable to both the Minister of Health (policy) and the Minister of RS&T (funding). This dual accountability is unusual for a crown agency. For example, the FRST is solely accountable to the Minister of RS&T.

The government invests in health research primarily through Vote RS&T.[4] This Vote supports 22 negotiated so-called output expenses (which deliver a common set of goods and services), of which half contribute to health research. Some output expenses have a single agency that invests the funds (e.g. health research via HRC) and other output expenses have two agencies that invest the funds (e.g. International Investment Opportunities Fund via FRST and HRC).

The Ministry of RS&T's output expenses support specified outputs negotiated between the Ministry of RS&T and the HRC. HRC is required to obtain government approval to transfer funds between output expenses or between outputs. However, individual research contracts may be supported from more than a single output class (e.g. New Economy Research Fund [NERF] and Research for Industry via FRST).

The funding agencies contract with host institutions for an agreed set of research outputs and they report twice yearly or annually on progress. The funding agencies report every six months to the Ministry of RS&T (and Ministry of Health for HRC) and are required to table their annual report (includes audited accounts) in parliament within four months of the end of the financial year. Details of how research outputs can be mapped to outcomes, are shown for the HRC below.

[4] NZ Ministry of Research, Science and Technology, "How Funding is Organised," http://www.morst.govt.nz/funding/how/ (as of June 9, 2008).



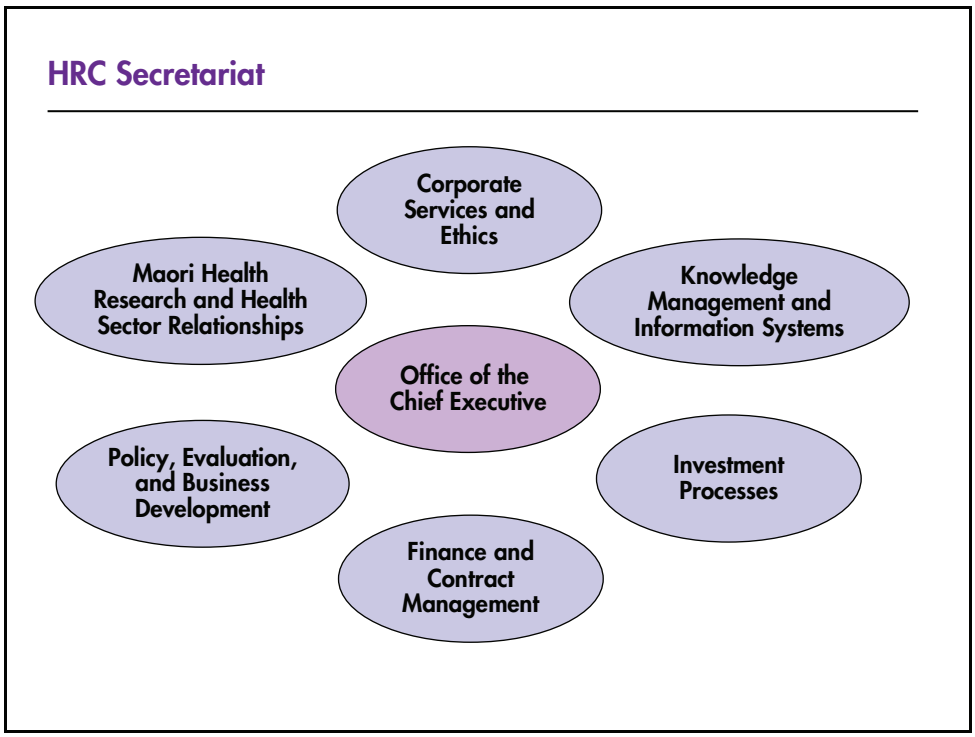
The HRC was established by the NZ government (Minister of Health) in 1990 (HRC Act 1990),[5] replacing the MRC, which had been in place for more than 40 years. The HRC is a crown agent with twelve statutory functions. It is required under the Crown Entities Act 2004 to give effect to government policy.[6] This is achieved annually in the preparation of the HRC's Statement of Intent (see HRC, 2008a), which is tabled in parliament by the Minister of Health. Since 1997–1998, the HRC has been funded by Vote RS&T rather than by Vote Health, and it currently has joint accountability to the two ministers. There is a memorandum of understanding between the two ministers, which sets out their roles and responsibilities with respect to the HRC.

The shift in the source of funding to the HRC was associated with a move to the payment of the full costs of research (i.e. payment of overheads). The transition to payment of full costs took 8 years rather than the originally proposed 3–4 years primarily because of delays in the availability of funding and negotiation of the appropriate institutional overhead rates. Today, the HRC and other Vote RS&T agencies pay an overhead rate that is equivalent to about 115 percent of contract salary costs. Full-time equivalent contributions to academic staff salaries and the associated overheads are also paid. The rate used for each institution is calculated using an audited analysis of institutional costs.

[5] NZ Parliamentary Counsel Office, "Health Research Council Act 1990," http://www.legislation.govt.nz/act/public/1990/0068/latest/DLM213017.html (as of April 9, 2008).

[6] NZ Parliamentary Counsel Office, "Crown Entities Act 2004," http://www.legislation.govt.nz/act/public/2004/0115/latest/DLM329631.html (as of April 9, 2008).

The HRC has a board with ten directors appointed by the Minister of Health. Five members are or have been actively engaged in health research and five have skills in areas such as health, law, management, or consumer perspectives. The current board has Maori and Pacific members.



The HRC Secretariat is responsible for the day-to-day management of all the HRC's affairs (includes provision of secretarial support services to all HRC committees). The Chief Executive reports to the Council and is responsible for the employment of the Secretariat's 32 staff. The Secretariat is managed in six groups. Individual activities (e.g. contestable funding round) may involve teams with representation from several groups.

The HRC has both statutory and standing committees that provide advice to the board on policy and processes, and provide recommendations on provision of HRC funds for research and training awards.

The roles and responsibilities of the statutory committees are described in detail in the HRC Act 1990 and the HRC's Statement of Intent (HRC, 2008a). Briefly, they are as follows:

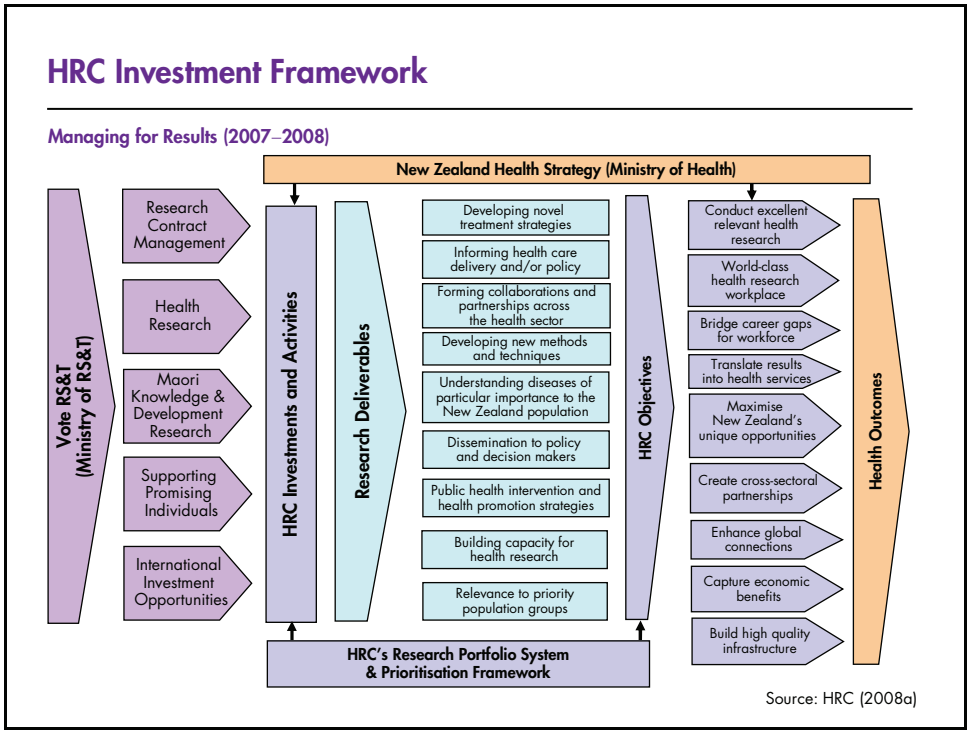
- The Biomedical Research Committee advises the board on biomedical and clinical research. It makes recommendations on research to be supported and monitors and reports on the performance of research providers. It also makes recommendations for HRC career development awards.
- The Public Health Research Committee conducts similar activities to those for the Biomedical Research Committee in the fields of public and population health and health services research.
- The Maori Health Committee has been given the functions of a research committee (like that of the Biomedical Research Committee) by the HRC board. In addition, it advises the board on priorities for Maori health research and on

issues relevant to Maori development and advancement on criteria for assessment of responsiveness to Maori.

- The Ethics Committee develops and reviews guidelines on ethics, provides second opinions and independent comments and advice to ethics committees established by other bodies. It ensures that independent ethical assessment is made of all research funded by the HRC.

The roles and responsibilities of the HRC's standing committees are described in detail in the HRC Statement of Intent (HRC, 2008a). Briefly, they are as follows:

- The Pacific Health Research Committee advises the board on health issues and research needs relevant to Pacific peoples in New Zealand and in their home countries.
- The Research Policy Advisory Committee advises the board on the research portfolio areas for HRC investment, analyses these investments and those to priority populations, and recommends strategies to be used for the implementation of portfolio strategies.
- The Standing Committee on Therapeutic Trials (SCOTT) provides advice, on behalf of the board, to the Director General of Health on the design and safety of clinical trials seeking an exemption under Section 30 of the Medicines Act 1980 to allow them to be conducted in New Zealand.
- The Gene Technology Advisory Committee (GTAC) has a similar role to that of SCOTT and provides advice on clinical studies involving gene products and xenotransplantation.
- The Risk Management Committee reviews and considers matters relating to the identification, analysis, and control of actual and potential losses and exposures to promote and achieve cost-effective management of risk across the organisation.



The HRC's investment framework identifies how the HRC delivers the strategic objectives of the Ministries of RS&T and Health. It does this through its research portfolio and prioritisation framework and investment to deliver research outputs, which contribute to HRC's objectives and health outcomes (HRC, 2008a).

The HRC has identified nine strategic objectives (HRC, 2007a), which are aligned to HRC's investment activities. These objectives are described annually in the HRC's Statement of Intent and are as follows:

- New Zealand's potential to conduct excellent and relevant health research is maximised.
- New Zealand has invested in establishment of a world-class health research workforce.
- New Zealand has created opportunities to bridge the gaps in the careers for the health research workforce.
- Improved health and well-being for New Zealanders through translation of the outputs of health research into health services.
- Taking advantage of New Zealand's unique opportunities and challenges.
- Cross-sectoral research partnerships supporting evidence-based public policy and practice.
- An enhanced international research profile through strengthened networks and increased global connections.

- The capture for New Zealand of the economic benefits arising from health research.
- New Zealand has the infrastructure needed to support high quality health research.

Each objective is linked to one or more HRC outputs (see HRC, 2008a). The government provides funds to the HRC from Vote RS&T ($70.8 million) and Vote Health ($0.2 million) via six output expenses (HRC, 2008a). These funds (2007–2008) are allocated to eight HRC outputs:

- Research contract management ($3.2 million)
- Contestable funding round ($52.3 million)
- Partnership Programme ($1.8 million)
- Targeted research for health ($4.9 million)
- Career development awards ($5.1 million)
- Maori health research ($2.5 million)
- International investment opportunities ($1.1 million)
- Research support activities (Vote Health) ($0.2 million)

For each HRC output, there are annual performance indicators that the HRC reports against in its Annual Report to Parliament (available November for the year ending June 30) (see HRC, 2008b). Excluding research income from partners, the HRC also expects to receive $2.0 million from other sources (interest, bequests, and fees). The majority (86 percent) of HRC's investment is allocated to investigator-initiated research. Total expenditure in 2007–2008 is projected to be $78.4 million, which includes additional funds available from the Ministry of Health for organisations in the HRC's Partnership Programme (not included in the above list).

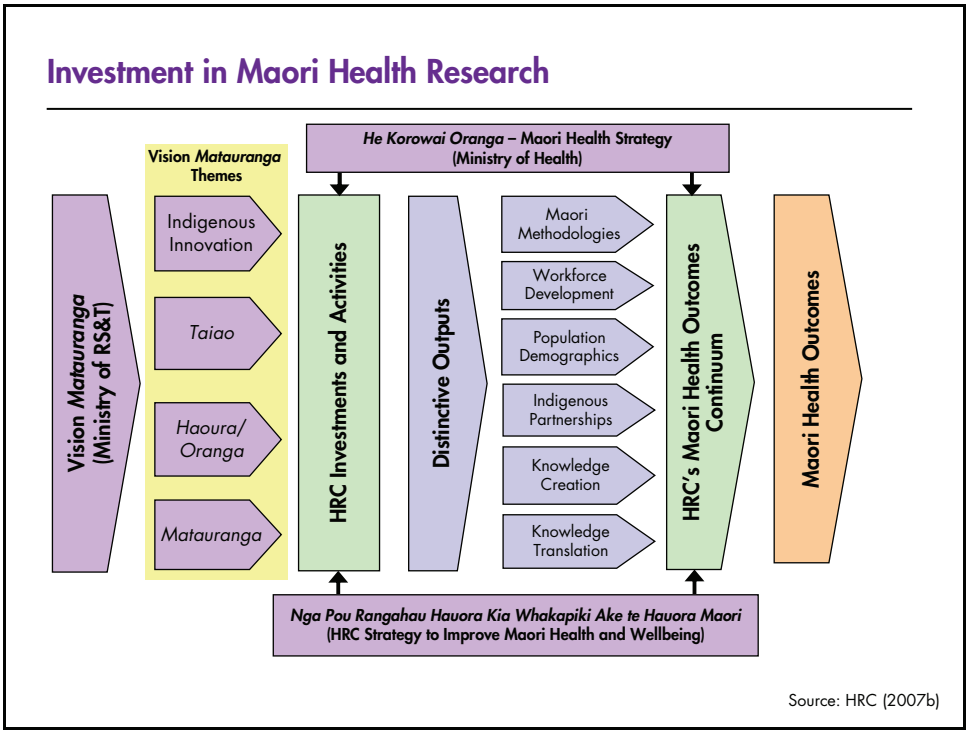
Although the HRC's Investment Framework looks complex, it works well and it is possible for the HRC to negotiate with the two ministers at the time the annual Statement of Intent is prepared. The main weakness is the very short time between the announcement (in the Budget) of the HRC's income for the forthcoming year and the lodging of the HRC's Statement of Intent, both of which occur in May for the year starting on July 1. Although the HRC Act 1990 requires the HRC to negotiate its funding with government every three years, this has not been the practice for the past decade. However, it is anticipated that Vote RS&T will move to providing investment agencies with projected out-year funding for a three-year period.

In 2007, the Ministry of RS&T commissioned a review of the HRC's business and financial systems (PriceWaterhouseCoopers, 2007). The analysis identified the administration costs for the HRC as a percentage of funds administered. For the contestable funding round (79 percent of funds), administration costs were 3.8 percent. This compares with an administration cost of 3.1 percent for FRST and 4.5 percent for the Marsden Fund. The review recommended that the HRC's annual report should disclose the administrative costs associated with each of its funding programmes. Closer

engagement between the Ministry of RS&T, Ministry of Health, and the HRC in the preparation of the HRC's Statement of Intent was also recommended. The review noted that the HRCs activities were consistent with the functions set out in the HRC Act 1990.

The HRC was assessed for the Ministry of RS&T in 2004 (Garrett-Jones, Turpin, Wixted, 2004). Details of HRC contracts, policies, and processes are described later this report.[7]

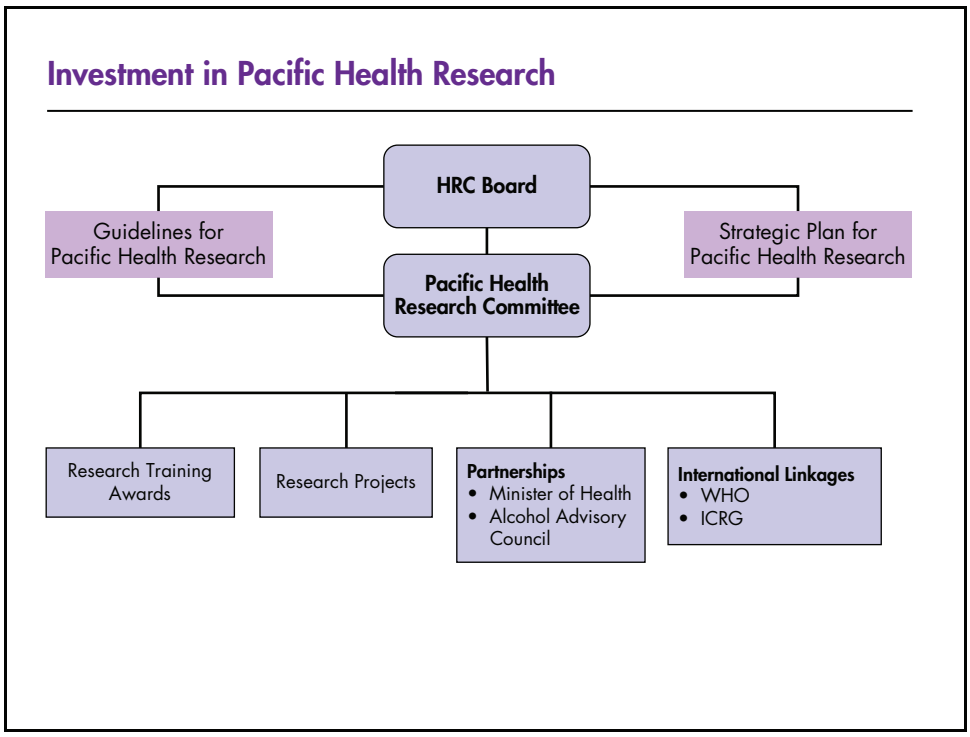
[7] Further details are available on the HRC Web site: http://www.hrc.govt.nz/.



Research into the health and inequalities which face Maori is a priority for the HRC. Funding is primarily "by Maori for Maori", recognising the *Treaty of Waitangi*, the health needs of Maori people, and the need for culturally appropriate research.

HRC have developed an investment framework that brings together and objectives of the Ministry of Health's Maori Health Strategy *He Korowai Oranga* (King, Turia, 2002), the Ministry of RS&T's *Vision Matauranga: Unlocking the Innovation Potential of Maori Knowledge, Resources and People to Assist New Zealanders to Create a Better Future* (Ministry of RS&T, 2005a), and the HRC's Strategic Plan for Maori, *Nga Pou Rangahau Hauora Kia Whakapiki Ake Te Hauora Maori* (HRC, 2004). Maori are a priority population for the HRC and there is also a research portfolio *Rangahau Haoura Maori* (Maori Health Research) as part of the annual contestable funding round. As noted below, there is an international partnership—International Collaborative Indigenous Health Research Partnership—funded by HRC, the National Health and Medical Research Council of Australia (NHMRC), and Canadian Institutes of Health Research (CIHR). The initiative has indicative funding from each country of $5 million over 5 years. Themes to date have been resiliency (2004) and chronic disease (2007). The programme aims to support collaborative research being done in indigenous communities in each of the three countries.

There has been significant growth in the amount of quality research being done by Maori in the past decade. This indicates both the increased investment in Maori research and the success of the HRC's investment in research training through its Career Development Programme. In 2006–2007, HRC investment in Maori health research (includes programmes, projects, and Partnership Programme) was $5.0 million.



The HRC's Strategic Plan for Pacific Health Research (2006–2010) has the following six key goals:

- To fund and promote research that improves Pacific health outcomes,
- To develop Pacific health research capacity and capability,
- To improve the quality of health research that is by and/or for Pacific peoples,
- To demonstrate responsiveness to Pacific communities,
- To build and encourage relationships to advance Pacific research,
- To promote the uptake of research findings.

The HRCs Pacific Health Research Committee advises the HRC Board on the activities to be conducted to achieve these goals. Building the Pacific health research workforce through research training awards (Masters, Ph.D., and postdoctoral fellowships) is a priority for the HRC with investment of $0.5 million per annum.

HRC invests in Pacific Health research projects, and these are managed through the HRC's annual contestable funding round. Pacific people are a priority population. The HRC works closely with the Ministry of Health to ensure that HRC's Pacific priorities reflect those of the Ministry of Health. Pacific people (primarily Polynesian, but also Melanesian) make up 6.5 percent of New Zealand's population.

HRC also supports Pacific health research through its Partnership Programme. International linkages are particularly important. HRC has worked with the World Health Organization and NZ Ministry of Health to run research training courses for Pacific

research staff. In collaboration with NHMRC and the UK Wellcome Trust, HRC has participated in the International Collaborative Research Grants (ICRG) programme. The ICRG supports two large Pacific projects, involving collaboration between research teams in the Pacific and in New Zealand and Australia.

HRC has developed a Pacific research framework which identifies three types of health research relevant to the health of Pacific peoples.[8] These are:

- *Pacific Relevance Research*—Indicators for this type of research are that it addresses a priority health issue for Pacific peoples, involving consultation with Pacific peoples, usually involving some Pacific participants, providing a training opportunity for Pacific, and targeting Pacific dissemination of results. A main stream study such as a Pacific cohort would be an example of Pacific Relevance research.
- *Pacific Governance Research*—Indicators for this type of research are that the research is 'for Pacific – by Pacific' i.e. it has a Pacific led research team, may use Pacific research paradigms, has a Pacific population focus, and outcomes for Pacific peoples. The research would be 'owned' by the Pacific community and have a culturally appropriate, targeted dissemination of results
- *Pacific Partnership Research*—This type of research sits between Pacific Relevance and Pacific Governance. While it goes beyond meeting the requirements for Pacific Relevance if it is not Pacific led it can not be classed as Pacific Governance research. This shared relationship is described by the HRC as Partnership Research.

HRC has developed Guidelines for Pacific Health Research (HRC, 2005). These guidelines, which build on ethical and cultural principles, are widely recognised as an important starting point for those wishing to conduct research in Pacific communities. Overall expenditure by HRC on Pacific health research was $2.5 million in 2006–2007. The majority of this investment was for research that was either relevant to Pacific health outcomes or done in partnership with Pacific research teams. However, little research was led by a Pacific principal investigator. Research led by Pacific principal investigators (Pacific Governance Research) is the long-term goal for the HRC.

[8] Health Research Council of New Zealand. "Pacific research frameworks at the HRC," http://www.hrc.govt.nz/root/Pacific%20Health%20Research/About%20Pacific%20Health%20Research%20at%20the%20HRC/Pacific_research_frameworks_at_the_HRC.html (as of August 7, 2008).

Career Development Awards

- HRC supports research training for Maori and Pacific graduate students for Masters, Ph.D., and postdoctoral studies
- Awards pay tax-free stipend, fees, a *tikanga* (mentor) allowance and a contribution to research costs
- HRC provides Clinical Research Training Fellowships for health professionals to do a Ph.D.
- HRC provides and advanced postdoctoral fellowship ($0.5 million over 4 years) to encourage outstanding graduates to return to New Zealand
- Other agencies and universities also support scholarships and fellowships

HRC invests in specific research training awards in the following areas:

- Maori career development awards (Masters, Ph.D., postdoctorate),
- Pacific career development awards (Masters, Ph.D., postdoctorate),
- Sir Charles Hercus Fellowship (senior postdoctorate),
- Clinical Research Training Fellowships (Ph.D.),
- Disability Research Scholarship (Ph.D.).

The responsibility for the support of Masters, Ph.D., and postdoctorate fellows in all other areas rests with tertiary education institutions, and some of the other health research funding agencies. Where appropriate, research training can be included on a research contract.

In HRC's career development awards programme there are several distinctive features. These include the following:

- Provision of cultural mentorship expenses (Pacific) or *tikanga* (mentor) expenses (Maori).
- Establishment of a Research Placement Programme for training in disability or Pacific health. In this programme, leading research groups apply for and are matched with an appropriate postgraduate (Masters or Ph.D.) student.
- Payment of limited research expenses ($10,000 for Masters to $125,000 for postdoctoral fellow) to support their research.

In 2006–2007, HRC invested $3.7 million in career development awards. As noted above, FRST, Marsden Fund, several of the smaller health research funding agencies, and the universities also support a range of training awards.

Partnerships for Evidence-Informed Policy and Practice

- Partnerships are an important strategy used by HRC to promote research investment into priority areas
- International partnerships exist with NHMRC (Australia), Wellcome Trust (United Kingdom), ICRG (Pacific), CIHR (Canada), and International Collaborative Indigenous Health Research Partnership (Maori)
- HRC Partnership Programme for evidence-informed policy involved more than 20 ministries and organisations to support translational research
- HRC leverages $4–5 for each $1 it invests in the Partnership Programme

The HRC established its Partnership Programme in 2001–2002, and over six years it has established relationships with more than 20 government ministries and departments, and with other organisations and agencies interested in obtaining research-based knowledge that they can use for policy development and planning (HRC, 2008c). At the time the programme was developed, the HRC identified nine guiding principles:

- *Partnership*—Pooling resources across government sectors to address common knowledge goals.
- *Participation*—Partners jointly own the research strategy, set the agenda, and encourage cross-sectoral buy-in.
- *Responsiveness to Maori*—Research proposals and investment process is to be responsive to the needs and diversity of Maori.
- *Quality assurance*—Quality of research is assured through peer review, and tailoring the process ensures applicability.
- *Expertise*—Research projects encourage research providers to coalesce into inter-disciplinary expertise clusters.
- *Policy*—RFPs focus on linking research with policy needs and deliver key policy advice.
- *Adding value*—Partnerships add value through expertise, resources, in-kind support and capacity, and capability building.
- *Independence*—Partnerships are managed by a crown entity, providing objective and independent governance.

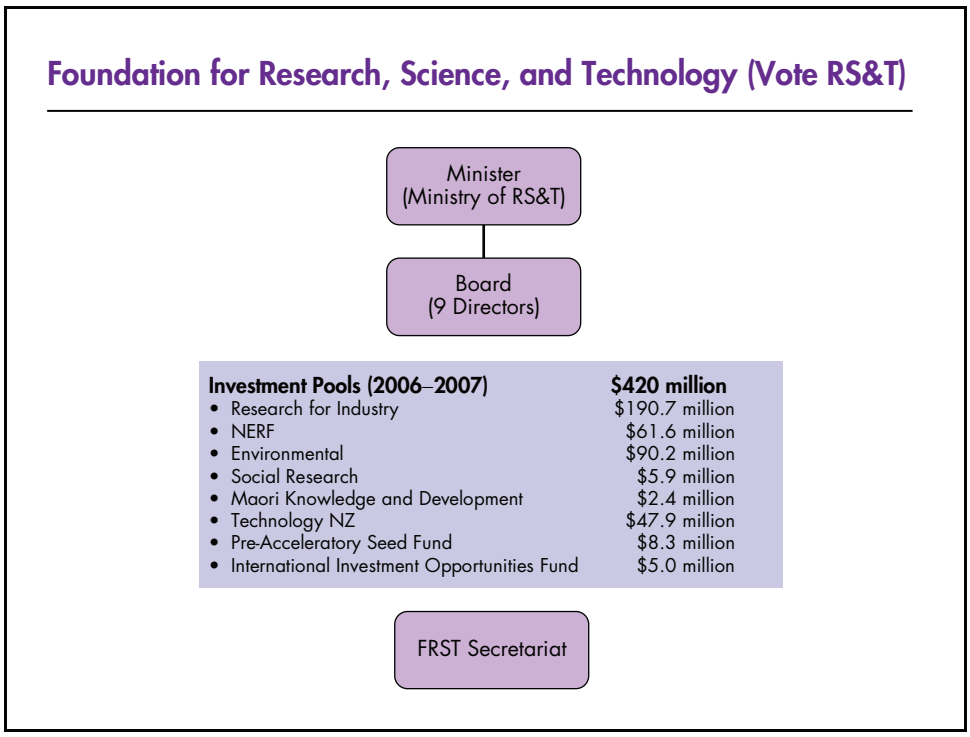
- *Outcomes*—Outcome-focused research meets the needs of our unique populations and a focus on Maori and Pacific peoples.

Whereas in many instances the HRC is a co-funder of an initiative, on other occasions it administers, for a management fee, another agency's funds. RFPs are used to describe the research questions that are developed by the HRC in collaboration with the partner organisations. Access to funding is contestable and international peer review is used to identify the successful contract holder(s). The Partnership Programme has been very successful and it is now funded through its own HRC output. It was evaluated by the HRC in 2006 (HRC, 2007c).

Partnerships of note include Health and Air Pollution in New Zealand, which was a partnership between the Ministry of Transport, Ministry for the Environment, and HRC, with in-kind support from Ministry of Health, two regional councils, and the Occupational Health and Safety Partnership (funded by the Department of Labour, the Accident Compensation Corporation, and HRC). Some partnerships involve the Ministry of Health, including the Evaluation of the 2000 Health Reforms, which involved Ministry of Health, Treasury, State Services Commission, and HRC, and the Evaluation of the Implementation of the Primary Health-care Strategy, which involved the Ministry of Health, the Accident Compensation Corporation, and the HRC.

Maori and Pacific health have been a particular focus of several initiatives. For example, together with FRST, the HRC has a Joint Research Portfolio with a theme of *Whanau Ora* (focuses on the distinct needs and disparities related to the health and social well-being of Maori), which supports Maori research groups.

The District Health Research Fund is a partnership funded by the 21 district health boards and managed by the HRC. The programme has a funding pool of $7 million and it is currently developing RFPs in the following areas: cancer, mental health, diabetes, and access to health services. This initiative has a governance group who are responsible to the chief executive officers of these district health boards and the HRC for the development of RFPs and making recommendations on successful applications based on the results of peer review.



The FRST was established in 1990 by act of parliament to invest in science and technology research for the benefit of New Zealand. This "national benefit" comprises economic benefits from research as well as the benefits to New Zealanders' well-being from environmental and social research. The FRST's roles and responsibilities, and relationships within the RS&T sector are described in detail elsewhere (FRST, 2007).

FRST is the major funder of research in New Zealand, and invested $420 million in 2006–2007.[9] Although FRST's principal focus is investment to contribute to New Zealand's economic performance via NERF, Research for Industry, Pre-Seed Accelerator Fund, and Technology New Zealand, it also invests in research on the environment, social sciences, and Maori knowledge and development. FRST's principal investment in health research is through NERF. NERF supports investigator-led research that is characterised by science excellence and stretch (i.e. future-focused research establishing new RS&T capabilities with a commercial focus). Of significant concern to the health research community is the frequency of the funding rounds for NERF. Unlike the HRC and Marsden Fund, which have an annual funding round, NERF funds to date have only been available on a three-year cycle. Projects with commercial potential can be pursued using other FRST funds (e.g. Research for Industry and Technology New Zealand).[10]

Of the FRST's investment portfolios, Future Human Technologies has been established to lead to generation of knowledge, capture of intellectual property with the potential to

[9] Expenditure on health research was estimated from a review of all contracts funded in 2006–2007. Contract details were obtained from FRST.

[10] Details of contracts, policies, and processes can be found on the FRST's Web site: http://www.frst.gov.nz/.

establish new enterprises or generate market value based on technologies that interact directly with individual humans to improve their quality of life, performance, and well-being, and the associated human capital skills that can create future value for New Zealand.

These investments will support science that will lead to products and services for human use or for use on humans, and are not aimed at medical and health outcomes *per se*. The difference in the focus of the outcomes distinguishes the research in the Foundation portfolio to that funded by HRC. If appropriate, the two agencies work together to support research. Other investment portfolios (e.g. Innovative Foods) may also contribute to economic goals linked to health outcomes.

In 2006–2007, of the $61.6 million invested in NERF contracts, $17.33 million was in research with health outcomes as the focus. Many of the research contracts are held by HRC-funded research groups. Research for Industry, which also supports some health research ($20.94 million), is a fund intended to support the research needs of New Zealand's industrial sector. Overall, FRST contributes 28 percent of the government's investment in health research. NERF was evaluated by the Ministry of RS&T in 2006.[11]

[11] See Ministry of Research, Science & Technology, "New Economy Research Fund (NERF) Evaluation 2006," http://www.morst.govt.nz/publications/evaluations/nerf/ (as of June 18, 2008).

Marsden Fund (Vote RS&T)

- Marsden Fund is managed by the Royal Society of New Zealand
- Marsden Fund supports high quality basic ("blue skies") investigator-initiated research
- Access to funds, via an annual contestable funding round, is very competitive
- $8.4 million of Marsden Funds (25%) supported health research in 2006–2007
- Marsden Fund contributes 6.2% of government investment on health research

The Marsden Fund is the third most significant provider of funds for health research funded from Vote RS&T. Established in 1994, the fund is managed by the Royal Society of New Zealand on behalf of the Ministry of RS&T. The Marsden Fund Council is comprised of ten eminent scientists appointed by the Minister of RS&T.

The Marsden Fund expends its funds ($33.9 million in 2006–2007) on basic ("blue skies") investigator-initiated research allocated through an annual contestable funding round. Health and medical research is a significant component of the research funded by the Marsden Fund Council, and is managed primarily through the biomedical sciences, cellular, molecular, and physiological biology, and social science panels. The objectives of the Marsden Fund are as follows:

- To enhance the underpinning knowledge base in New Zealand and contribute to the global advancement of knowledge,
- To broaden and deepen the research skill base in New Zealand, and
- To enhance the quality of the research environment in New Zealand by creating increased opportunity to undertake excellent investigator initiated research.

Funds are allocated for support of research projects or programmes or for the support of individual researchers including postdoctoral fellows.

Contracts that are to be funded are selected using a two-stage peer-review process by the following criteria:

- Merit of the proposal including originality, insight, and rigour,
- Potential of the researcher to contribute to the advancement of knowledge, and

- Contribution to development or broadening of research skills in New Zealand, particularly those of emerging researchers.

Contracts are fully costed and are usually of three-year duration.

For the 2006 Funding Round, the Marsden Fund received 932 preliminary proposals, of which 240 were asked to submit a full proposal. In total, 78 proposals (8.4 percent) were funded to a value of $39.1 million. Of these, 18 proposals were related to health research.

During the 2006–2007 fiscal year, the Marsden Fund supported 293 contracts ($33.9 million). Of these, 55 (18.5 percent) were in the health and medical sciences. Expenditure on these contracts was $8.42 million.[12]

Many of the Marsden-funded researchers are also funded by the HRC. The majority of Marsden-funded contracts align with the HRC's research portfolios on biological systems and technologies (36 percent) and mental health and neurological disorders (42 percent).

The Marsden Fund was evaluated by the Ministry of RS&T in 2005 (Ministry of RS&T, 2005b).[13,14]

[12] Expenditure on health research was estimated by a review of all contracts funded in 2006–2007. Contract details are available from the Marsden Fund Web site: http://marsden.rsnz.org/research/ (2006 contracts) and http://marsden.rsnz.org/research/latest.php (2007 contracts).

[13] Ministry of Research, Science & Technology, "Marsden Fund Evaluation 2005," http://www.morst.govt.nz/publications/evaluations/marsden-fund/ (as of June 17, 2008).

[14] Further details of Marsden Fund contracts, policies, and processes are available on the Marsden Fund Web site: http://www.marsden.rsnz.org/.

Centres of Research Excellence (Vote Education)

- Centres of Research Excellence (CORE) Fund supports research that is:
  - World class
  - Focused on New Zealand's future development
  - Leads to significant knowledge transfer activities
- Centres are hosted by a tertiary education institution
- Contracts provide operating and capital expenditure
- Three of the seven COREs have a health research component
  - The Maurice Wilkins Centre for Molecular Biodiscovery
  - The National Centre for Growth and Development
  - *Nga Pae o te Maramatanga* (Horizons of Insight)

In 2002 and 2003, the government established the COREs through contestable processes administered by the Royal Society of New Zealand on behalf of the Ministry of Education.

The government's vision for the CORE Fund is that it:

- Establishes and promotes excellent, collaborative, strategically focused research,
- Provides opportunities for the creation and diffusion of knowledge that are not available through existing funds, and
- Encourages tertiary education institutions to develop relationships and linkages with other research organisations, enterprises and communities that they serve.

The vision is embodied in the three objectives for the fund, which are that it will support research that:

- Is excellent (world-class) quality,
- Is focused on New Zealand's future development, and
- Leads to significant knowledge transfer activities (including the training of future researchers).

In total, there are seven COREs, across a range of research disciplines.[15] The COREs are primarily but not exclusively inter-institutional research networks with researchers working together on an agreed programme. COREs are hosted by a university with a range of

[15] See Tertiary Education Commission, "Centres of Research Excellence," http://www.tec.govt.nz/templates/standard.aspx?id=587 (as of June 18, 2008).

partner organisations including other universities and Crown Research Institutes. The COREs also received $31.4 million in capital as part of their establishment. In 2007, the existing COREs and new applicants competed for a new round of six-year contracts with funding (additional $10 million of operating funds and $20 million for capital purchases) that provided an opportunity to fund one or two additional centres.

Of the COREs running in 2006–2007, three (hosted by the University of Auckland) have a significant health research component:

- The Maurice Wilkins Centre for Molecular Biodiscovery
- The National Centre for Growth and Development
- *Nga Pae o te Maramatanga* (Horizons of Insight) — The National Institute for Research Excellence in Maori Development and Advancement

Of the $21.4 million invested in the COREs in 2006–2007, 37 percent supported health research.[16]

[16] Data from Tertiary Education Commission at http://www.tec.govt.nz/upload/downloads/CORE-operational-funding.pdf (as of June 17, 2008).

NGOs and Charities

- New Zealand has seven regional medical research foundations (Auckland, Canterbury, Palmerston, Southland, Taranaki, Waikato, and Wellington)
- There are also major disease specific organisations (e.g. Cancer Society, Heart Foundation, Child Health Foundation, Neurological Foundation).
- New foundations have recently been established (e.g. Breast Cancer Foundation, Genesis Cancer Trust)
- Overall annual expenditure on research by this group is estimated at $15 million

Apart from the government funding of health research in New Zealand, there are four other additional pools of funding:

- NGOs and charities
- International funding agencies
- Pharmaceutical industry
- Internal tertiary educational institution funds

New Zealand has about 20 significant NGOs that invest in health research and run competitive funding rounds that use peer review for assessment. Many have a specific health focus (e.g. National Heart Foundation, Child Health Research Foundation, Cancer Society), others have a regional focus (e.g. Auckland Medical Research Foundation, Canterbury Medical Research Foundation, Wellington Medical Research Foundation), and some provide invaluable support to emerging researchers (e.g. Maurice Paykel Trust). These NGOs make an invaluable contribution to the overall funding, often providing a contribution to major equipment purchases, cost sharing with agencies such as HRC, support for overseas travel, and bridging support for post-doctoral fellows. Total annual funding from these organisations is estimated to be $15 million.

Other Sources of Investment

- HRC has established two international research funding partnerships with Australia, United Kingdom, and Canada
- NZ researchers receive funds from U.S. National Institutes of Health and other U.S. agencies
- International pharmaceutical companies contribute $20 million to clinical trials in New Zealand
- There is also significant investment of private funds by start-up biotechnology companies

Several leading research groups in New Zealand, either in collaboration with colleagues overseas or in their own right, receive funding from major international funding agencies, such as the National Institutes of Health (United States), the Wellcome Trust (United Kingdom), European Framework Programme, and Human Frontier Science Programme.

The HRC has established two international partnership programmes:

- ICRG scheme with the UK Wellcome Trust, and the NHMRC of Australia, which supports research in the developing countries of the Asia Pacific region.
- International Collaborative Indigenous Health Research Partnership with the CIHR and NHMRC, which supports research into the health of indigenous peoples in the three sponsoring countries.

Excluding the two collaborative programmes whose funding appears in the HRC total, it is estimated that total annual income from major international funding agencies is $20 million.

The majority of pharmaceutical industry investment in New Zealand supports clinical trials initiated by large international pharmaceutical companies. There are many excellent clinicians in New Zealand able to attract significant clinical trials investment to their research groups (e.g. cardiovascular disease, diabetes, bone disease asthma, cancer). There are also international clinical trials initiated from New Zealand and conducted in collaboration with colleagues overseas.

With the establishment of start-up biopharmaceutical companies (e.g. Neuren Pharmaceuticals, ProActa, Protemix, Pacific Edge Biotechnology, Blis Technologies) in New Zealand, local and international investment funds are being invested into early-stage

clinical trials. Details of the total investment in New Zealand into clinical trials or research funded by international pharmaceutical companies is difficult to ascertain, but annual expenditure is likely to be in the order of $20 million.

In addition to their contribution to infrastructure, supported by overheads from government Vote RS&T contracts, universities provide significant support to health research groups, primarily though provision of competitive funding pools for equipment and research training awards. The Performance Based Research Fund contributes funds to institutions based on an assessment of academic staff performance in research. A small proportion of these funds add to the pool of resources available to support health research.

Private sector investment in health research in New Zealand is small. This may be linked in part to the lack of tax incentives for charitable donations. The support of charities is important both at a regional level (e.g. there a number of active regional medical research foundations) and for specific health issues (e.g. child health, cancer, heart disease, asthma). Their contributions are important for salary support of emerging researchers and for the support of small grants.

Payment of the Full Costs of Research

- In 1997–1998, HRC funding was transferred from Vote Health to Vote RS&T
- Transition of HRC from a marginal to full cost funder of research was initiated
- Transition took a decade
- Overheads are paid to host institutions based on a negotiated audited rate that is calculated as a percentage of contract salaries
- Rates for institutions range from 110–125% of contract salaries for institutions
- All RS&T contracts funded by government pay the full costs of research

Over the past decade, government funding of health research through the HRC has increased from $22.36 million in 1996–1997 to $69.08 million in 2006–2007. Of the additional $47.28 million obtained in 2006–2007, $25.00 million (53 percent) contributed to institutional overhead costs. The HRC's transition from a marginal to a full cost funder of research took place during this decade. An audited overhead rate has been negotiated for each institution and they equate to 110–120 percent of the costs (including academic staff time) on a research contract.

The transition to full cost funding was difficult and took three times longer than the anticipated three years. During the decade of transition, the HRC negotiated with research institutions and the Ministry of RS&T to ensure that the amount of research (and the workforce) supported by the HRC was not reduced. A similar transition has taken place at Marsden Fund. Since inception, the FRST has paid the full costs of research.

The process at the HRC did result in the responsibility for research support services (e.g. animal services, biostatistical support, and research methods support), and support for postgraduate and postdoctoral fellowships for biomedical and public health, becoming the responsibility of the academic institutions.

Structure of the NZ Health Research System: Conclusions

- Total contestable funding available for health research in New Zealand in 2006–2007 is estimated to approach $180 million
- Government through Vote RS&T and other Votes contributes 75%
- The increasing costs of research and the lack of any significant real increases in government funding has been identified by the research community as a major concern
- In 2008-2009, the government increased funding by $205.4 million over the next four years. An additional $16 million over the next four years will be administered by the HRC

The increases in the costs of health research over the past decade and the lack of any significant real increases in government funding has been identified by the research community as a major concern. Whereas the principal focus of the typical health researcher is on the amount of funding available through the HRC's annual contestable funding round for investigator-initiated research, there are significant opportunities, particularly in the field of population health, to obtain funding from the large number of government and non-government agencies that fund health research. There is concern among the research community about the time and transaction costs of accessing funding, given the large number of funding sources available in New Zealand.

In 2001, the HRC developed a case for a single investment agency for health research (HRC, 2002), which recognised the convergence of biological science outputs and the need to conduct high quality research in humans to achieve the desired health and economic outcomes. Although a single agency was not implemented, the HRC and the FRST work together to maximise outcomes from research.

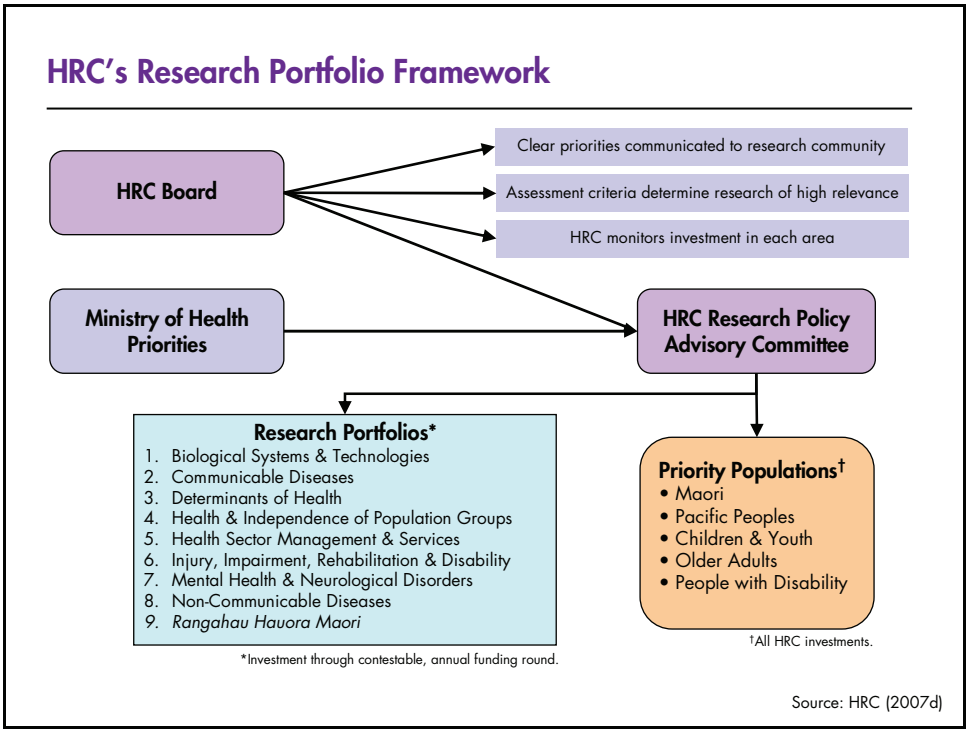
In 2006–2007, it was estimated that total funding from government for health research was approximately $136 million, with total funding approaching $180 million. The majority of these funds (70 percent) support investigator-initiated research with the remainder solicited via an RFP.

In the 2008–2009 Budget, the NZ government increased funding to RS&T by $205.4 million over the next four years. Expenditure in 2008–2009 will be $725.7 million. An additional $16 million over four years for health research will be administered by HRC. In

2008–2009, government expenditure on health research by the HRC will be $73.97 million.[17]

[17] Ministry of Research, Science and Technology. "The Budget for Vote Research, Science and Technology. Improving Health and Social Well Being," http://www.morst.govt.nz/publications/a-z/b/budget/2008/#health (as of June 2, 2008).

Processes and Performance of the NZ Health Research System



Although the HRC is only responsible of 51 percent of government funding of health research, it is the agency responsible for delivery of research outputs that contribute to health outcomes. Of the other agencies, the FRST primarily invests in health research to deliver economic outcomes and the Marsden Fund invests to contribute to knowledge outcomes.

Many health research groups receive funding from all three agencies and many individuals' health research studies contribute to knowledge, health, and economic outcomes. Because of the central strategic role of the HRC in New Zealand, this section of the report focuses on the HRC. Although the criteria used by the three agencies for funding are different, reflecting their different investment priorities, all agencies use contestable peer-review-based processes to identify fundable health research. All three agencies are unable to fund all the research recommended for support.

The development of the HRC's portfolio investment was described in 1999 (HRC, 1999). Although there have been some changes (e.g. addition of rehabilitation, impairment, and disability to the injury portfolio), the framework is still in place. The use of outcome-focused research portfolios to guide HRC's investments through the annual contestable funding round has been in place since 1999–2000. It replaced the allocation of funds

based on a 2:1 split between biomedical and clinical research and public-health research after making provision for fundable Maori research.

The HRC reviews the research portfolios as and when required. A comprehensive review of all portfolios is conducted after three years, and subsequent reviews have indicated either a need to assess priorities or to clarify portfolio content.

HRC's Research Portfolio Expenditure 2006–2007

Details of the HRC's Research Portfolios and the 2006–2007 expenditure in each portfolio

	$ million (%)
Biological Systems and Technologies	19.5 (31.5%)
Communicable Diseases	1.4 (2.2%)
Determinants of Health	7.5 (12.1%)
Health and Independence of Population Groups	5.9 (9.6%)
Health & Disability Sector Management & Services	1.8 (3.0%)
Injury, Impairment, Rehabilitation & Disability	2.4 (3.9%)
Mental Health & Neurological Disorders	4.1 (7.0%)
Non-communicable Diseases	14.9 (24.1%)
Rangahau Hauora Maori	3.7 (6.9%)

Source: HRC (2008b)

At the time the portfolio framework was established, it was assumed that there would be growth in funds for investment. Although HRC was able to increase expenditure from $37.27 million to $61.76 million in the six years between 2000–2001 and 2006–2007, the majority of the funds had to contribute to the payment of the full costs of research (i.e. overheads). Competition for research funding has been intense, and it is of concern from a health sector perspective that the expenditure in several important portfolios has fallen both in nominal terms and as a percentage of total expenditure (HRC, 2008d). For example, expenditure in the communicable diseases portfolio has fallen from $2.86 million (7.7 percent) to $1.38 million (2.2 percent) from 2000–2001 to 2006–2007. Similarly, there has been falls in health and disability sector management and services from 5.8 percent to 3.0 percent, mental health and neurological disorders from 14.4 percent to 7.0 percent, and noncommunicable diseases from 36.0 percent to 24.1 percent. The declines in the share of investment going to the above portfolios has been taken up by a doubling (from 16.1 percent to 31.5 percent) in the biological systems and technologies portfolio.

This important shift in investment from research into specific health issues (e.g. communicable diseases) to investment in basic biomedical research has been driven by several factors, such as the relative lack of growth in investment in health research in real terms, the increasing numbers of excellent biomedical research groups (many recruited from overseas), and a need to build research capacity to do high quality research in areas such as health policy and health services research.

Reviews of Performance

- In 2004, a major review of HRC concluded the NZ health research investment system was performing well but was underfunded
- Annually, HRC accountability documents (Statement of Intent and Annual Report) are tabled in the NZ Parliament
- HRC conducts regular reviews of its research policy and investment framework and of outputs arising from its investments

Reviews of HRC and the outputs of the health research sector are done on an ongoing basis. The HRC submits its Statement of Intent and Annual Report (the latter reports on the performance indicators in the Statement of Intent) to parliament. It also participates in system and sector reviews done by the Ministry of RS&T. It prepares reports for the Ministry of Health that link NZ health research outputs to health sector priorities. The HRC also reviews its own investment activities. It also reviews policies and activities of overseas sister agencies and, where appropriate, these reviews are used by the HRC to change policies and processes to ensure the HRC's processes meet international best practice standards.

A number of policy changes are being introduced by the Ministry of RS&T. These include the requirement that the HRC do technical reviews of HRC-funded research groups, which could over time provide an evidence base for future funding decisions, in turn leading to the HRC being less dependent on contestability and international best practice peer review. Given the excellent quality of HRC-funded researchers and their outputs (publications and intellectual property), however it would seem to be inappropriate for the HRC to move away from its current investment processes.

As part of its accountability to the Ministry of RS&T, the HRC (and the other investment agencies) are required to provide information on a range of performance indicators (HRC, 2008b). Examples of performance indicator results for 2006/07 are outlined below:

- *Staff ratio*—(investment funds / full-time equivalents). The ratio is $1.98 million/ full-time equivalents.
- *Investment efficiency*—($ contract management budget / $ investment funds). The percentage is 4.85%.

- *Contracts*—($ contract management budget / number of contracts let). $3.19 million/114 contracts = $0.028 million/ per contract.
- *Overbidding*—(number of applications / number of contracts issued), split by relevant output expense. Applications that were triaged before the peer review process are not included. The ratio is 290 applications/ 59 funding offers made. 4.94:1
- *Overbidding*—($ applied for / $ available per investment round), split by relevant output expense. The figure does not include the budgets of proposals that were triaged before the peer review process. The ratio is $233.07 million/ $57.926 million. 4.02:1.
- *Processing time*—(date of application / date of contracting), split by relevant output expense. Processing time is a total of 7 months or 212 days.

While these indicators may be useful in tracking agency performance over time they have to be used with great care in making inter-agency comparisons.

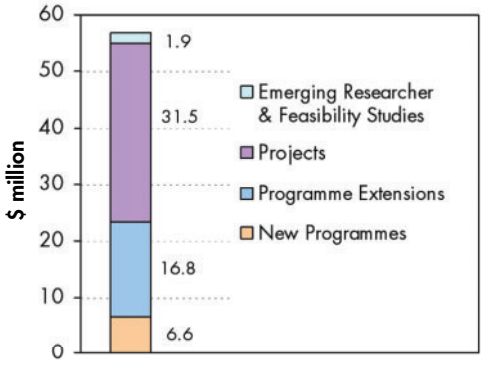
The implementation of Roadmaps for Science, such as the one recently developed for biotechnology research (Ministry of RS&T, 2007a), may also require the HRC to change its investment priorities. There are also several strategies (e.g. research to support the Healthy Eating Healthy Action Strategy) that need an evidence base currently being established by the Ministry of Health.

Annual Contestable Funding Round Allocation

Investment by Field of Research (2007)

Type of Research	$ million (number of contracts)
Biomedical/Clinical	32.0 (33)
Public Health	18.0 (17)
Maori Health	6.8 (9)
Total	*56.8 (59)*

Funding Allocation by Contract Type (2007)



Source: HRC (2007d)

The HRC invests most of its funding through an annual contestable funding round for investigator-initiated research. In the 2008 round (applications received November 2007), the HRC will allocate $57.0 million. Of this, $28.5 million will be allocated to project grants, Emerging Researcher First Grants, and feasibility study contracts. The remainder will be allocated to new programme grants ($3.5 million) and to year 4–6 extensions of existing programmes ($15.0 million). The slide shows actual funds allocated in the 2007 round.

The HRC has set an indicative target of 50 percent of investment in six-year programmes that support world-class research teams. On average, a programme contract is equivalent to three projects, and to obtain such a contract, research teams have to submit three to five proposals, of which a minimum of three are approved for funding over two funding rounds. Research teams with an eligible portfolio of projects are then reviewed by a programme assessment committee to establish whether the programme will deliver more than the sum of the individual projects. Access to programme funding is very competitive. In the 2007 round, the HRC funded three new programmes, with expenditure of $6.58 million over three years. Six existing programmes received a three-year extension (total value $16.85 million). Details of the assessment process for extensions and new programmes are described in the *Assessment Processes Handbook* (HRC, 2007e).

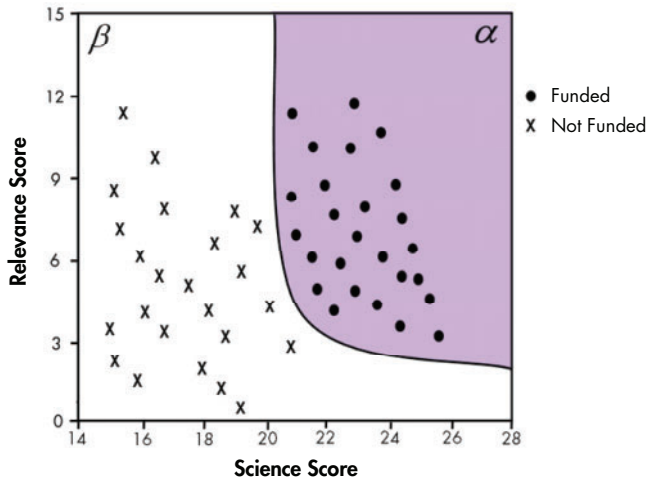
Access to HRC project funding is very competitive and in the 2007 funding round there was a 19 percent success rate (42 new contracts allocated $31.5 million for expenditure over three years). Details of the peer-review processes used by the HRC are described in the *Assessment Processes Handbook* (HRC, 2007e).

HRC Peer Review Process

1. Assignment of proposals by Specialist Assessing Committee (SAC) members to referees
2. Written assessment and grading of the proposals by external referees; applicant rebuttal of external referee reports
3. Triage of lower-ranking proposals;
   discussions and scoring of proposals by SAC;
   SAC results forwarded to the appropriate research committee (Biochemical, Public Health, Maori Health)
4. Research Committees review and rank proposals for recommendations of fundable proposals forwarded for overall review by the Grant Approval Committee (GAC)
5. GAC considers research committee recommendations, HRC prioritisation score against relevance criteria and research portfolio balance of funding
6. GAC recommendations are forwarded to the HRC Board; HRC Board makes final funding decisions

The HRC uses an electronic grants system for submission of proposals and for communication with peer reviewers (referees and assessing committee members) and host institutions. Proposals are sent to three referees in New Zealand or overseas for review. The top 75 percent are then sent to a Specialist Assessing Committee for review. Only the top 30–35 percent are approved, based on scientific merit, to go forward to the assessment of relevance by the Grant Approval Committee, a subcommittee of the HRC Board (Chairs of Biomedical, Public Health, Maori Health, Pacific Health, and Research Policy Committees).

Science–Relevance Matrix



All proposals are evaluated by criteria for assessment of scientific merit. Referees and assessing committee members score the proposal (A–D for referees; 1–7 for assessing committee members) on each of the following criteria:

- Health significance
- Scientific merit
- Design and methods
- Expertise and track record of research team

Highly fundable proposals (on the basis of scientific merit) are assessed for relevance using the following criteria:

- Relevance to HRC research portfolio priorities
- Relevance to HRC priority populations (Maori, Pacific, children and youth, older adults, and people with disability)
- Contribution to development and retention of HRC's health research workforce
- Relevance to the priorities of the NZ Health Strategy, NZ Disability Strategy, and *He Korowai Oranga* (Maori Health Strategy)

The relevance review ensures that HRC's investments respond to national health priorities and are in line with the policy directions identified by the Ministries of Health and RS&T. The relevance and science merit scores for all proposals that make it through to this stage of the process are plotted on a matrix that is used by the grant approval committee in making their final decisions (HRC, 2007e). Other factors taken into account include the

allocation to individual research portfolios and HRC policy regarding portfolio growth, the split between biomedical, clinical, Maori, public health, and health services research, and the duration of contracts. The HRC Board may also identify the need for proposals in particular research areas (e.g. Pacific health, disability) to be given special consideration.

The HRC provides applicants with referee comments and their scores and incorporates the applicant rebuttal into the assessing committee process. Applicants also receive a report of the assessing committee's discussions and the percentile ranking of their proposal.

Other features of the HRC's contracting process include the following:

- Ethics and other regulatory approvals must be obtained before release of contract funds;
- All contracts are awarded to host institutions and fully costed (i.e. including overheads calculated on a manpower rate: approximately 120 percent of contract salary costs, including contributions to academic staff salaries);
- Academic staff time is bought out (i.e. HRC funding is not providing a cross subsidy for teaching) and must be accounted for;
- In general, contracts must start within four months of the award; and
- Investigators are required to report annually using the HRC's electronic database.

Outlook

Outlook

- For a high-performing RS&T sector, health research in New Zealand is relatively poorly funded, creating investment challenges for HRC
- Current investment in health sector priorities is low and will need to increase to meet ministerial expectations
- As a crown agent, HRC is required to give effect to government policies, and this will put pressure on HRC's investment strategy to deliver research outputs that are relevant to the sector
- Maori, Pacific, and Asian health issues are of increasing importance and will need greater investment in capacity and relevant research
- New Zealand must encourage the brightest and the best graduates to careers in health research and attract them back from overseas
- International and national research partnerships will continue to be important if New Zealand is to build an evidence-informed health sector

Development of the NZ national health research strategy is ultimately the statutory responsibility of the HRC. For this reason, this section focuses on the HRC and reflects the author's view on the future of health research in New Zealand.

Although health research is a high-performing sector, as measured by impact factor and citations for publications and development of intellectual property, this is not reflected by the NZ RS&T system's overall share of government funding, which remains low in comparison with many other countries in the Organisation for Economic Co-operation and Development.

Research inflation is estimated to be 5 percent per annum in New Zealand, and in real terms, investment in health research has barely matched the increase in costs after correcting for the transition to full-cost funding (i.e. payment of overheads) over the past decade. The government and other relevant agencies will need to look closely at the funding issue if New Zealand is to remain competitive and if health research is to contribute to an evidence-informed health sector. Success rates for funding of new contracts continue to decline and there is ongoing risk of a so-called brain drain, particularly among the next generation of research leaders.

Another major challenge for the HRC will be a requirement for it to meet the expectations of the health sector, and the government in general, with respect to investment in research that is directly relevant to the government's health priorities. As a crown agent, the HRC is

required "to give effect to" government policy. This contrasts to the situation before the passing of the Crown Entities Act in 2004, in which HRC was required "to have regard to" government policy. Although funded by Vote RS&T, the HRC reports to the Minister of Health, and in his "Letter of Expectations for 2007–2008" to the HRC's Board, he sets out his priorities (HRC, 2008a):

- *Relationships and information flows*—Developing effective working relationships with Ministry of Health and Ministry of RS&T to feed knowledge into policy and to respond to signals from the health and wider research sector.
- *Prioritisation processes*—Continue to develop and refine a robust and transparent prioritisation framework to target new research funding in response to government priorities signalled by the Minister of Health and Minister of RS&T.
- *Transformational research*—Increase the emphasis on funding research that will increase the effectiveness and efficiency of health service delivery.
- *Effectiveness and efficiency review*—Plan for and implement the recommendations of the review being undertaken by the Minister of RS&T.
- *Organisational capability*—Continue to develop and improve the framework and capability for measuring the impact of funding and other activities, including research impact so as to inform future investment.

The HRC, in its briefing to the new Ministry of RS&T in late 2007 (HRC, 2007f), identified strategic directions for the next three years. These build on the HRC's Strategic Plan and focus on translational research, innovation, partnerships, recruitment, and retention of the research workforce, and conduct of high-quality research that contributes to health outcomes for New Zealanders.

The briefing goes on to note that the Ministry of Health are working closely with the HRC and the Ministry of RS&T to articulate their knowledge needs to achieve their vision of greater innovation, efficiency, and cost effectiveness in the health sector. The HRC identifies that it will need to address these goals to ensure the maximum possible value is gained from the national investment in health research.

Innovation in health delivery has recently been identified by the Ministry of RS&T as an area for development as transformational RS&T (Ministry of RS&T, 2007b). Projected outcomes include creation of innovative RS&T enabled solutions for better health delivery that improve productivity and cost effectiveness of New Zealand's health and disability system. Four changes for HRC and the broader health sector are proposed by the Ministry of RS&T (Ministry of RS&T, 2007b):

- Increased support for knowledge production through "better funding for RS&T in innovation in health delivery";
- Increased support for knowledge production transfer, reception and use through "provision of robust career support for the right people";
- Increased support for knowledge production and transfers through "improving access to supporting information for innovative health professionals"; and

- Increased support for knowledge transfer, reception and use through "improvement in the uptake of innovation in health delivery".

The Ministry of RS&T conclude that to be successful there will need to be a significant allocation of resources to achieve the desired outcomes. Increased investment in investigator-initiated health services research and research into effective interventions will be needed.

In the absence of a significant increase in funding to address these priorities, and others such as those in the government's *Road-Map for Biotechnology* (Ministry of RS&T, 2007a), the HRC may be required to move investment from areas of traditional strength such as investigator-initiated biomedical research to those areas that will deliver the health sector's priorities. In this regard, the fall in investment in the HRC's health and disability sector management and services research portfolio from 5.8 percent of expenditure in 2000–2001 to 3.0 percent in 2006–2007 (a 15 percent reduction in nominal terms) is a particular concern. Over the same period, investment in the biological systems and technologies research portfolio increased from 16.1 percent to 31.5 percent (a 324 percent increase in nominal terms over the 7 years).

The HRC will also need to balance the increasing demand from biomedical scientists with the demands for increased funding for investigator-initiated population health and health services research. There will also be an increasing demand from the rapidly growing Maori and Pacific research workforces. The population growth in these two populations and in the Asian population in New Zealand will require the HRC to continue to invest to build research capacity and to conduct research relevant to their priority health issues. The HRC has sought additional funding for translational research, but to date this initiative has not been funded other than through the District Health Board Research Fund, which the HRC manages for the 21 district health boards.

These investment tensions raise the issue as to whether having two ministers (Health and RS&T) accountable for the HRC is appropriate, particularly as the majority of government investment in RS&T is linked to economic goals. Also relevant to this discussion is whether the overall government investment in health research would be more effectively managed through a single agency (e.g. HRC) rather than three agencies, as occurs today.

Ethical issues and use of animals in research and the regulation of new technologies will continue to be a challenge. There will be significant advantages for New Zealand to work closely with Australia to harmonise policies and processes wherever possible. The proposal to establish a joint Australia–New Zealand therapeutics regulatory agency (currently on hold) was consistent with that proposed for scientific review of new technologies (e.g. xenotransplantation and gene therapy).

HRC has been very successful in establishing research funding partnerships both within New Zealand and with international agencies (e.g. UK Wellcome Trust, NHMRC, and CIHR). New Zealand health research scientists have a good record of success with international funding agencies and they will need to continue with this approach and with international collaborations if New Zealand is to remain competitive in health research.

There is likely to be pressure on the HRC to move away from fully contestable funding processes by peer review to investment processes based on the technical review of current research projects and negotiation of future research contracts. Given the current quality and quantity of outputs from the health research sector in New Zealand and in other countries that use contestable processes and peer review, it would be inappropriate for New Zealand to move away from what is considered international best practice.

Over the next few years, the HRC will face significant challenges that in the absence of increased funding might require them to reduce funding in other key areas if the priorities of the Minister of Health are to be met. This would be unfortunate, because assessment has shown that, across all of HRC's research portfolios, there is still a need to build capacity if New Zealand is to conduct all the research needed to achieve an evidence-informed health sector and to retain world-class research groups.

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