



Queensland University of Technology Submission to the Strategic Review of Health and Medical Research

Why is it in Australia's interest to have a viable, internationally competitive health and medical research sector? (Terms of Reference 1 and 6)

Investment in health research in Australia has generated demonstrable benefits in disease prevention, detection and management. Between 1993 and 2005, every dollar invested in health and medical research returned an average \$2.17 in health benefitsⁱ. However, continued investment is necessary to:

- maintain evidence based gains in health care and population health status evidenced by Australia's achievements in medical research to date;
- build and retain research and clinical capacity and infrastructure;
- continue to respond to emerging challenges in the health of individuals and populations;
- provide an evidence base for health system reform & development;
- respond to global reduction in the burden of disease;
- contribute to national and regional bio-security; and
- secure the economic benefits that arise from a healthy nation e.g: national productivity; reduced health care costs.

Australia faces very specific challenges [eg: indigenous health status; increasing aged population; mental health] with regard to inequity in health. Targeting health issues of growing national importance ie: obesity and age-related chronic diseases, as well as health issues either specific to, or occurring in higher incidence in Australia, such as skin cancer, requires sustained effort.

Continued and increased investment is important to mitigate future projected and unexpected health and economic challenges. Health care represents a major cost to federal and state budgets and currently constitutes more than a quarter of total Federal Government expenditure. Australia's economic burden associated with health and ageing is projected to increase to unsustainable levels of almost half of the total Federal Government expenditure by 2050ⁱⁱ. Health and aged care expenditure is predicted to escalate from 9.3% of gross domestic product (GDP) in 2003 to 12.4% of GDP in 2033ⁱⁱⁱ and is expected to grow from \$113 billion in 2012 to \$3.3 trillion by 2062^{iv}.

Career Sustainability for the Next Generation of Health and Medical Researchers

The past decade has seen a significant increase in the numbers of Australian students undertaking Doctoral studies with Doctorate by Research commencements at Australian Universities increasing from 3,915 in 2000^v to 10,415 in 2010^{vi}. This growth has extended beyond the core sciences to practitioner disciplines. There has not been a commensurate increase in opportunities for postdoctoral scientists to access funding for postdoctoral training and to establish a sustainable career in research. This remains a major challenge for the health and medical research sector and is particularly acute for young women in research.

New models to support early career researchers are required and could include the co-funding, with employers, of part-time researchers who maintain clinical or other professional roles that are of relevance to their research. This may serve a dual purpose of improving opportunities for early career researchers whilst also contributing to greater integration between research and health policy and practice.

IHBI academic staff on NHMRC Career Development Awards review panels note that many excellent applicants will not be funded, due to limitations on the funding pool, and will often leave the research field shortly thereafter. This issue was a major concern of researchers in a recent (2008) Australian Society for Medical Research survey entitled 'Perceptions in health and medical research careers: the Australian Society for Medical Research Workforce Survey'^{vii}. Additional funding for early career research fellowships will aid in improving this situation, as will alternative support models such as those noted above. Furthermore, the fellowship system overall should have a better defined career

structure for new researchers and appropriate mentoring mechanisms and capacity building strategies could be incorporated as part of NHMRC support.

Funding the Full Cost of Research Staff

Personnel Support Packages (PSP) and fellowships provided by the NHMRC do not currently reflect the actual salary costs incurred by employing institutions as they do not align with academic and professional pay scales nor incorporate indirect costs. The current system typically requires that the grantee cross-subsidise the additional salary cost (often up to 25%) from funding that would otherwise be used to support research. This significantly erodes the outcomes of many NHMRC funded grants. The Australian Research Council model for staff support could be considered to improve the current NHMRC approach.

Fellowship Funding to Recruit International Research Leaders

Non-Australian citizens and those without permanent residency are currently unable to apply for NHMRC project funding as CIA or for fellowship support. This creates a barrier to the recruitment of leading international researchers to Australia as they are unable to apply for NHMRC funding prior to their relocation to Australia. Relaxation of these requirements in certain circumstances would allow for greater flexibility for universities and research institutes to recruit talented international researchers and target recruitment in areas of high demand for skills.

How might health and medical research be best managed and funded in Australia? (Terms of Reference 2, 3 and 7)

New Review Mechanisms Required for Complex Multidisciplinary Research

Each of the Major Health Issues Likely to Arise (MIHLA) areas identified by the NHMRC represents a highly complex challenge which is unlikely to be solved by individual disciplines or even those closely related. For example, *'Building a self-improving health system'* will require contributions not only from clinical disciplines, but from a broad array of discipline inputs, many of which may not be commonly associated with health. This could include fields such as economics, workforce planning, process engineering, applied mathematical modelling and simulation, law and social sciences - which can all contribute to informing improvements to the health system that incorporate consideration of clinical aspects along with the many other economic and social factors that influence health policy. Similarly, understanding the *'Health consequences of climate change'* will require the examination of a broad range of issues which extend beyond the traditional health and medical research sector including earth sciences, ecology and complex systems modelling.

The current grant assessment process potentially disadvantages research which spans multiple disciplines due to the assignment of proposals to discipline focused peer review panels. Alternative approaches to peer-review and research appraisal are necessary to enable complex multidisciplinary research proposals to better compete with discipline focused research. The USA National Institutes of Health has made recent progress in this regard and offers a useful model for consideration.

The establishment of the NHMRC Clinical Research Translation Faculty and Public Health Faculty may provide a useful mechanism to inform the re-shaping of funding allocation processes and the setting of priorities to better support research aimed at solving complex and translational challenges.

Apply Scientific Scrutiny to the Allocation of Research Funding

The systems used to fund peer-reviewed science should themselves be based on peer-reviewed science. Rigorous peer reviewed science has a strong record in improving health and medical outcomes. Rigorous peer review could also improve funding processes, which are currently based on expert opinion and reactionary changes to complaints or unanticipated events. Preliminary estimates of randomness and high cost associated with the NHMRC project grant process have been made and published in the *British Medical Journal*^{viii} and *Nature*.^{ix} This same Institute of Health and Biomedical Innovation research team was awarded an NHMRC Project Grant in 2011 entitled *'Building an evidence base for funding evidence-based medicine'*^x and are working to commence the project with the cooperation of the NHMRC. The project seeks to test two hypotheses:

- Decisions made by the current NHMRC Project Grant funding scheme are not sufficiently reliable; and
- A cheaper funding scheme could be created that is similarly reliable as the current system.

We endorse this as a crucial area of future focus as funding processes should be themselves improved based on evidence.

Reducing Application and Funding Timeframes

NHMRC funding processes for most schemes currently involve a single annual submission round and long delays between submission and the commencement of funded research. While it is acknowledged that the funding allocation process is complex and onerous, reducing the time delay between application and acquisition would be of major benefit to the health and medical research sector. The NHMRC's decision to accept applications to the NHMRC Partnerships Projects scheme on a rolling basis is a positive step and perhaps multiple review rounds could be introduced to other schemes in the future.

The decision to reduce the NHMRC Development Grant scheme from two rounds to one is disappointing given the objectives of the schemes and the commercial timelines of HMR companies.

Funding

While the NHMRC has made significant headway in reviewing and refocusing its funding pathways further work is required. Consideration should be given to the consolidation of certain NHMRC funding schemes and other HMR funding schemes supported by the Department of Health and Ageing. This move could potentially increase the quantum of funding available in targeted thematic areas of national and international importance and reduce the transaction costs associated with the pre-and-post award administration of multiple funding rounds delivered by multiple agencies. This move could also potentially lessen the assessment fatigue in the system.

Currently there appears to be a disproportionate allocation of funding to biomedical sciences-focussed research versus public-health / allied-health related research. Consideration should be given to adopting a more balanced approach to funding to ensure the overall research focus and outcomes may be better targeted at early intervention / prevention, rather than "curative" focused research.

Industry, philanthropic and community engagement in health and medical research is critical. Both the ARC and NHMRC currently fund schemes to increase engagement with these key stakeholders. There may be an opportunity to explore a co-funded partnership scheme that can deliver high-end outcomes for universities, the government, industry and the community. A similar approach could be adopted around centres of excellence.

What are the health and medical research strategic directions and priorities and how might we meet them? (Terms of Reference 5, 12 and 13)

Increasing Emphasis on Strategic Priorities and Impact

The Major Health Issues Likely to Arise (MHILA) identified in the NHMRC Strategic Plan 2010-2012 provide an excellent framework for the targeted allocation of NHMRC funding to areas of strategic priority and national importance. The NHMRC has taken steps to offer targeted funding to projects which address the MHILA and other strategic initiatives:

- The Project Grants scheme offers a mechanism to identify and provide additional support to proposals (ranked above 4) that align with the MHILA and other strategic priorities such as Asbestos-related Diseases, Electromagnetic Fields and Hearing Loss Prevention.
- The Centres for Research Excellence scheme has identified and quarantined funding for proposals in target areas of interest.
- Co-funded project grants and fellowships are available to support research that aligns with the interests of external partner agencies.
- The Partnerships Centres for Research Excellence scheme enables policymakers and clinicians to set research priorities to be investigated by collaborative research centres.

Despite this, it is still likely that the vast majority of NHMRC funding will be awarded to investigator initiated research projects where alignment with national priorities is not a primary consideration. While a balance between investigator initiated research (which may yield valuable and serendipitous outcomes) and targeted research (seeking to address priority issues) must be maintained, a greater

emphasis could be placed on the alignment of research with national priorities and potential for impact when appraising research for funding by the NHMRC. This could be achieved through targeted funding rounds which only accept proposals targeting priority areas and/or through modifications to existing peer review processes to place a greater importance on priorities and impact.

There is little doubt that the innovation and “blue-sky” approach to health and medical research has yielded significant returns to Australian health system relative to cost^{xi}. As such, any increase in funding for priority driven research should not be at the expense of ‘blue sky’ research. Equally there is no doubt that increased expenditure on research into preventative health measures and other priority issues is critical, but to maintain a balance, increased funding for research overall will be required.

An increased emphasis on multidisciplinary, translational research and research that facilitates implementation and utilisation of outcomes would be welcomed.

The process (and underlying data and evidence) that supports decisions on strategic priorities in health and medical research must also be more transparent to avoid any perception of undue influence by lobbyists and other interested parties.

How can we optimise translation of health and medical research into better health and wellbeing? (Terms of Reference 4, 8, 9, 10 and 11)

Greater Investment in Health and Medical Research by the Private Sector is Required

Significant opportunities exist to increase investment in research by private organisations involved in health services delivery and financing. Companies such as private health care providers and health insurers have the potential to gain significantly from applied health services and preventative health research which aims to improve the efficiency of health services and reduce demand through disease prevention. Innovative models of co-investment could be examined to encourage greater engagement and investment by private health care providers in research. The NHMRC Partnerships Projects scheme, with its requirement for matching cash and/or in-kind commitments by partners, is an important platform to stimulate private investment which can be further extended. Greater clarity around how investment in collaborative research interfaces with other Government incentives, such as the R&D tax Concession, may also aid private organisations to participate in research in the short term. Ongoing incentives for investment via schemes and policy require attention. There may be an opportunity for greater collaboration and coordination across the ARC and NHMRC in this area.

Support for International Collaboration

Greater flexibility and availability of NHMRC funds to assist Australian researchers to participate in major international research programs (such as those funded by the European Union and USA National Institutes of Health) is essential. While some funding is available through schemes such as the NHMRC - European Union Collaborative Research Grants, the funding rules are inflexible, funding is limited, and timeframes may not be synchronised with that of international funding agencies. Many Australian Universities and Research Institutes view the development of international collaborations as a strategic priority. While institutional funding is often made available to support international travel, short term sabbaticals, staff and student exchanges and other collaborative initiatives, opportunities to access medium to large scale funding for major international collaborative research initiatives are limited in Australia. This can be a major impediment to formalising new collaborative links between Australian and international research teams. While some Australian State Governments have developed targeted funding initiatives to support international research collaboration (such as the Queensland Government Smart Futures Fund), the NHMRC has a role to play in providing funding support for international research collaborations at a National level.

Increased Funding for Health Services Research

Over the past decade (2002-2011) the NHMRC has awarded a total of \$196,574,904 to health services research representing just 4% of total NHMRC funding over that period^{xii}. The annual health budget represents approximately 10% of GDP and health services research holds enormous potential to not only improve the efficiency with which this funding is expended, but to also improve the quality of health services and the health outcomes experienced by patients. As such it is essential that new health services research capacity is developed in Australia over the next decade and a greater proportion of NHMRC funding must be directed to this critically important area of research.

Greater Support for Research Translation Within Government

Many health and medical researchers perceive that the degree to which NHMRC funded research is considered in Government policy development appears to be limited and on an ad-hock basis. Given the degree of Commonwealth investment in research, more effective routine mechanisms within Government Departments should be developed to ensure that research outcomes which are of direct relevance to policy are considered in the policy development process. While researchers have a responsibility to disseminate their results, the NHMRC should have a greater role in facilitating the process of knowledge transfer.

Ideally, Australia requires a group to make strong policy recommendations about how scarce resources should be used to maximise the health of populations. The recommendations would be designed to improve efficiency and would emerge from cost-effectiveness research. These recommendations are likely too difficult for politicians; instead a non-political decision making agency could endure the negative and knee-jerk media response from good but difficult decisions. The same group could also aim to improve public understanding of scarcity and health care decision-making. In the longer term this would raise the quality of the public debate on health rationing and make explicit rationing more acceptable. Remaining with current implicit rationing, and short-term decision making is reducing efficiency and will reduce health outcomes while wasting health resources. Current demographic and fiscal pressures on health budgets mean explicit rationing must be achieved.

Improving Access and Utilisation of Existing Health Data Sets

Significant opportunities exist for the large data sets collected by Australian Health Departments to be better utilised by researchers to evaluate health services and develop new models of care. New mechanisms to freely share de-identified data within the research community are essential to better utilise this significant untapped resource of health and medical data.

Commercialisation

It has been reasoned that the key to attaining leadership in innovation as a nation lies in the success of higher education institutions and research providers in enhancing the commercial and social value of their intellectual property and successfully translating the outcomes of their research. This has been recognised by successive Commonwealth Governments and now forms the heart of Australia's Innovation Policy^{xiii}.

As a result, it has followed that several universities and institutes (but not all) have adopted strategic objectives that embody the successful translation and commercialisation of these research outcomes. This value creation is aimed at creating direct positive effects for social and economic development in Australia, and spill over effects in many forms over the longer term.

Despite this premise, the policies, objectives and level of commitment demonstrated in support of the rhetoric is fragmented and inconsistent. Most institutes and universities go about this activity in different fundamental ways, and the commercialisation sector may be characterised by continual change and upheaval imposed by changing governmental and institutional policy shift.

There are arguably three main reasons for this inconsistency.

Firstly, there are no clear guidelines or benchmarks provided by successive Federal or State Governments as to what is expected by way of commercialisation from the institutions and universities to which they provide research funding by way of grants. The Federal Government, by contrast, is making a clear statement as to its expectation for research excellence by way of its ERA initiative, but there is a clear vacuum in respect to translation/utilisation of research outcomes and commercialisation and what is expected at an institutional level. Is it therefore surprising that the sector lacks a considered and consistent framework? A clear expectation and mandate provided unambiguously by the Federal Government would greatly assist in having disparate organisations focus seriously on this objective, rather than the rhetorical support it currently receives by the majority. One such approach was adopted by the United States of America by way of the Bayr-Dole Act in 1980. Under that Act, each federally funded research organisation was required to comply with various undertakings:

- Report each disclosed invention to the funding agency
- Elect to retain title in writing within a statutorily prescribed timeframe
- File for patent protection
- Grant the federal government a non-exclusive, non-transferable, irrevocable, paid-up license to practice or have practiced on its behalf throughout the world
- Actively promote and attempt to commercialize the invention
- Not assign the rights to the technology, with a few exceptions
- Share royalties with the inventor
- Use any remaining income for education and research
- Give preference to U.S. industry and small business

Currently, in Australia, all of these activities are left to the discretion of each individual institute and university. This has led to confusion as to mandate, lack of consistency and ineffective commercialisation from federally (and state) funded research.

Secondly, given the apparent importance of translation and commercialisation (at least to the Federal Government), it is somewhat paradoxical that no funding is directly targeted in support of this activity within institutes and universities funded by Government. As a result, the higher education sector is forced to support this activity out of operating funds thereby creating tensions where multiple activities are competing for the same funds, especially in financially challenging times. Government commitment to this activity could easily be demonstrated by financially supporting this as a distinct activity separate to operating and research grants.

Thirdly, universities and institutes generally are encouraged to use approaches that balance legitimate commercial needs against the universities' goals (based on their educational and charitable mission and the public interest) of ensuring broad practical application of the fruits of its research programs. Given that the primary purpose in commercialising research is often to maximise the effective dissemination of our research outcomes, activities in this field must always remain consistent with these fundamental academic principles. Key drivers include protecting each university's ability to broadly disseminate their research findings, freedom to undertake further high-quality research in the same area, and to maximise the social impact of each university's research outcomes. Important University values which underpin most commercialisation activities are reflected in the Association of University Technology Managers document *In the Public Interest: Nine Points to Consider in Licensing University Technology*,^{xiv} although these principles are yet to be formally endorsed by many universities and institutes. This tension between academic freedoms and commercial interests may always exist, however, it will continue to operate to the detriment of commercialisation whilst it remains the status quo.

It is recommended that the NHMRC Development Grant Scheme be reviewed and where appropriate, refocused to ensure it remains an effective investment vehicle for proof-of-principle and pre-seed stage work.

ⁱ Deloitte Access Economics, 2012, Extrapolated returns on investment in NHMRC medical research, <http://www.asmr.org.au/ExtrapolatedNHMRC12.pdf>

ⁱⁱ Australian Government, The Treasury 2010. Australia to 2050: future challenges The 2010 Intergenerational Report.

ⁱⁱⁱ Access Economics, 2008. Exceptional Returns: The value of Investing in Health R&D in Australia II. <http://www.asmr.org.au/Publications.html>

^{iv} Access Economics, 2003. Exceptional Returns: The Value of Investing in Health R&D in Australia. <http://www.asmr.org.au/Publications.html>

^v Department of Education, Training and Youth Affairs, 2001, Higher Education Students Time Series Tables - Selected Higher Education Statistics, Commonwealth of Australia, <http://www.deewr.gov.au/HigherEducation/Publications/HEStatistics/Publications/Documents/2000TimeSeries.pdf>

^{vi} Department of Education, Employment and Workplace Relations, 2011, Students: Selected Higher Education Statistics, Commonwealth of Australia, <http://www.deewr.gov.au/HigherEducation/Publications/HEStatistics/Publications/Pages/2010StudentFullYear.aspx>

^{vii} Kavallaris M et al. 2008 Perceptions in health and medical research careers: the Australian Society for Medical Research Workforce Survey. MJA 188:520-524

^{viii} Graves., N., Barnett, A., Clarke, P., 2011, Funding grant proposals for scientific research: retrospective analysis of scores by members of grant review panel, BMJ 2011; 343 doi: 10.1136/bmj.d4797, <http://www.bmj.com/content/343/bmj.d4797.full>

^{ix} Graves., N., Barnett, A., Clarke, P., 2011, Cutting random funding decisions, Nature 469, 299 (20 January 2011) doi:10.1038/469299c, <http://www.nature.com/nature/journal/v469/n7330/full/469299c.html>

^x Barnett, A., Graves, N., Clarke, P., 2011, Building an evidence base for funding evidence-based medicine (1023735), \$ 308,510.00

^{xi} Goss J 2008. Projection of Australian Health care expenditure by disease, 2003 to 2033. Cat. No. HWE 43. Canberra: AIHW.

^{xii} NHMRC Outcomes of Funding Rounds, <http://www.nhmrc.gov.au/grants/outcomes-funding-rounds>

^{xiii} See "Powering Ideas: an innovation agenda for the 21st century" and "Venturous Australia – building strength in innovation" reports at <http://www.innovation.gov.au/innovationreview/Pages/home.aspx>

^{xiv} See http://www.autm.net/Nine_Points_to_Consider.htm