



SUBMISSION

Strategic Review of Health and Medical Research

On behalf of the Western Australian Institute for Medical Research (WAIMR) please accept this submission to the Strategic Review of Health and Medical Research.

WAIMR is an independent, not-for-profit medical research Institute, incorporated under the Associations Incorporation Act WA, and is affiliated with The University of Western Australia. The Institute has Deductible Gift Recipient status from the Australian Tax Office and is a recognised charitable organisation under the Charitable Collections Act WA.

Why is it in Australia's best interest to have a viable, internationally competitive health and medical research sector?

The core business of Health and Medical Research (HMR) is to generate new knowledge that improves the health of the community, nationally and internationally. By many criteria Australia performs extremely well internationally in HMR and it has been demonstrated that Australia consistently “punches above its weight” in its contribution to solutions to the global disease burden. This is especially true when considering the size of the population, and the amount actually invested in research, compared to other developed economies.

It is in Australia's best interests to enhance this viable, internationally competitive HMR sector. There are numerous reasons to support HMR, including:

- Building on Australia's success and innovation in HMR.
- Decreasing the burden of disease, and securing economic and social returns on investment.
- Employment of a highly skilled workforce.
- Inter-relationship with the healthcare system.
- Public support.

Building on Australia's Success and Innovation

Australia has a very proud history and tradition in HMR with six Nobel Laureates in Physiology or Medicine. Recent Laureates include Peter Doherty (Immunology), Barry Marshall and Robin Warren (peptic ulcers) and Elizabeth Blackburn (Telomerase). The discovery by Marshall and Warren created a paradigm shift in the understanding and treatment of one of the most expensive chronic medical conditions in Western nations at the time. This innovation had a profound effect on the wellbeing of sufferers as antibiotics were now used to cure the disease. It has also had a major impact economically through savings in the Health budget.

Other examples of Australian HMR outcomes that have delivered significant healthcare benefits to Australia, and the international community include:

- cervical cancer vaccine
- bionic ear

- blood cell hormones used in cancer treatment .

By being internationally competitive, Australian researchers continue to make a significant contribution to the generation of new knowledge globally - every piece of the jigsaw puzzle is crucial in solving extremely complex health problems. It also allows international collaborations to flourish, and exchange of vital information that accelerates the development of new solutions.

This nation faces numerous health issues, from chronic diseases, to new epidemics, re-emergence of old diseases and unforeseen challenges (e.g. appearance of new viruses like SARS and HIV). New solutions do not magically appear to solve these problems – they can only be overcome with research. Each health problem requires an understanding of the complex issues involved with that particular disease and development of novel solutions. This can only occur via research.

Money has to be invested in research to develop new solutions, based on better understanding of the problems. Research alone will achieve this, nothing else. HMR must, therefore, be viewed as an investment, which will provide excellent dividends, particularly in community health benefits.

However, for a wealthy nation, Australia does not spend sufficient funds on HMR. Other countries have invested heavily in this area for a considerable period (eg North American and European nations), and now the emerging Asian countries are investing much more in HMR than Australia. Clearly, these countries see the benefits of this investment.

As a nation, Australia has always been proud of its pioneering spirit, and being able to solve the problems it faces. Australia needs to maintain, and encourage, this culture of innovation. HMR should be at the forefront of Australia's innovation capacity, as it affects the health and wellbeing of the population. Rather than becoming a risk-averse society, which simply implements discoveries made by others, Australia should be promoting innovative new approaches to solve current, and future, health challenges.

It has been stated, "Knowledge is power". If we do not support our own research, we run the serious risk of becoming powerless importers of knowledge and technology. This will be extremely costly to the nation.

Burden of Disease and Economic and Social Returns on Investment

Australia is facing a major increase in the cost of delivering health care over the next 40 years. This is due in part to an ageing population, increased prevalence of chronic diseases, and the costs associated with advanced diagnostic and treatment technologies. The Commonwealth Government has estimated that approximately 67% of increases in Government spending to 2050 will be health related. According to a report from the Australian Institute for Health and Welfare, by 2033, 12.4% of Gross Domestic Product (GDP) will be spent on health and residential aged care.

In light of this anticipated increase in the economic burden of disease, a recent Deloitte Access Economics report demonstrated the economic value of HMR in Australia. The report focused on the benefits arising from National Health and Medical Research Council (NHMRC) funding in specific disease areas, and demonstrated that the expected net returns on investment were:

- avoiding almost 100,000 Disability Adjusted Life Years (DALY - a measure of the reduction in burden of disease and injury across a population)
- the savings from these DALYs improvements was estimated to be \$6 billion
- almost \$600 million savings in direct health expenditure
- a further \$400 million savings in indirect costs

- the benefit / cost ratio was estimated to be between 2 to 6, depending on the specific disease.

Similarly the Larkins' report on medical research in Western Australia reported that for every dollar the Victorian government provided for medical research, \$2-\$3 was added to gross State product. Other health economics reports have demonstrated similar, or better returns, on investment from HMR.

Employment of a Highly Skilled Workforce

Another very important aspect of HMR is the research workforce, which is well trained and highly skilled. This country invests heavily in the training scientists and medical students to be the researchers of the future. In 2010, the NHMRC supported more than 8,000 highly skilled jobs in Australia.

We encourage our talented young researchers to gain more experience overseas, where they are highly regarded and valued. It is essential we ensure that these emerging researchers are able to return to Australia, otherwise other nations will benefit from our investment in their training, and their ability to make new discoveries. This loss of this talent would be tragic, expensive and hard to replace.

Given the economic challenges facing the northern hemisphere currently, there is also a great opportunity to recruit excellent researchers from Europe and USA, provided Australia is seen as a viable destination where their careers can flourish. This can only happen if the nation invests more in HMR.

Australia is currently experiencing a once-in-a-lifetime resources boom, with the economic development of China and India fuelling our resource exports. The nation is once again riding on the back of primary industry, in the same way it "rode on the sheep's back" during much of the twentieth century. Like all booms this one will end, and the country will be forced to find alternative sources of wealth generation. It is highly unlikely that the need for advanced health care solutions will ever diminish. Therefore, Australia has a unique opportunity to use its current wealth to create a sustainable industry based on its strong foundation of research innovation.

Inter-relationship with the Healthcare System

Australia has an excellent healthcare system – this has always been underpinned by high quality research. There has always been an innate comprehension that the provision of great health care for the population requires high caliber research. It is essential for the future health of the nation that top quality research continues to underpin the delivery of health care. Anything that places research in jeopardy undermines the entire health care system of the country.

Indeed during a recent sitting of State Parliament in Western Australia the Deputy Leader of the Opposition and Shadow Minister for Health, Hon Roger Cook, argued:

"The key to retaining our medical specialists and attracting the best people in Western Australia is to make sure that our medical specialists and our young specialists coming through the system have the opportunity to extend themselves and undertake research These are people hungry for the scientific endeavour that drives their particular discipline."

"Some members in this chamber might not get the fact that medical research is a very important part of our health system. It is not a drain on our system. It is actually a contributor to our economy."

This inter-relationship is well recognized overseas with the advent of Academic Health Science Centres throughout the USA, Canada, parts of Europe, the UK and Singapore. A recent article in

the Medical Journal of Australia describes the importance of such Centres in fostering close links between research, teaching and clinical care. The paper states:

“Simply put, the best doctors treat patients, do research and train tomorrow’s health care providers.”

Furthermore, success at HMR provides Australia with a “seat at the international table”, enabling greater exchange of information with the global community, and quicker access to new treatments and therapies. It also serves as an important adjunct for recruiting and retaining our brightest doctors to the national health system.

Public Support

One of the most striking features of the recent “Discoveries need dollars” campaign was the overwhelming support provided by the community for HMR. The community definitely views HMR as vital for the health of the nation. Many people said publically “I wouldn’t be alive if it wasn’t for medical research” and “Medical research gives us hope”. Having a research system performing at the cutting edge gives the community increased confidence in the health system, as well as hope for the future.

It is imperative that the HMR sector engages better with the community to explain its work and maintain their on-going support. These conversations will also identify champions, who can act as advocates for HMR, providing independent third party endorsement without the perception of self-interest. The sector must also engage with politicians, the corporate sector and philanthropists to demonstrate the value of HMR to the community. The opportunity also exists to educate wealthy individuals of the benefits of HMR, and increase philanthropic support. In addition, there is a pressing need to convince Federal and State Government officials that funding of medical research is an investment of the health of the nation, enabling greater productivity, and social wellbeing – funding of research is not a black hole into which money disappears, with no benefits for the community.

Importantly, there is a desperate need for unity with the HMR sector. The challenges faced during the “Discoveries need dollars” campaign brought everyone involved with research together, to confront a common threat. A fragmented sector, besieged with internecine warfare, is doomed – it is well recognised politically that “disunity is death”. Therefore, it is essential that tensions be reduced between Universities, Medical Research Institutes and Hospital-based researchers, and a unified co-operative approach presented.

How might health and medical research be best managed and funded in Australia?

One of the strengths of the Australian HMR sector has been the NHMRC, which has had a reputation for rigorous peer-review. Over several decades, the NHMRC has provided funding for researchers through a variety of schemes that have operated at different times, e.g. Institute block grants, Fellowships, Program grants, Project grants etc. The Project grant scheme remains the cornerstone of investigator-driven research.

However, the NHMRC system is in need of a major overhaul, or even complete restructuring, to best serve the needs of the nation. There has been significant erosion in confidence in the NHMRC, which is increasingly seen as remote from the research sector, and not necessarily working in the best interests of researchers. In addition, better co-ordination between major funding bodies viz the NHMRC and ARC is essential. These agencies should be working together in the national interest, and engaging with other sectors, e.g. agriculture.

There are numerous problems associated with the current funding schemes. We shall highlight some that are most urgent:

- (i) Insecurity of funding is a major problem facing the sector, especially with short-term project grants that essentially provide 2 years funding to solve complex problems, before facing the daunting prospect of grant renewal. Longer grants (e.g. 5 year grants), and a formal renewal process used by several countries, would be a much more efficient means of funding, allowing:
 - a. greater security
 - b. less time spent on grant writing
 - c. increased capacity to take calculated risks
 - d. addressing the hard questions
 - e. greater productivity.

One result of short-term funding is that groups that have taken some time to bring together can easily be split up, and never recover. This is quite wasteful and represents a loss of research investment.

- (ii) While every researcher would argue that their project could use more funding, one consequence of inadequate funding is that researchers then spend an inordinate amount of time cobbling together money from different sources to defray the costs of the project, salaries, enterprise bargaining gaps, infrastructure etc. This is extremely inefficient. Many researchers feel the pressing need to secure funds from a variety of sources and constantly seek different avenues of funding, rather than focus on solving their specific research problems.

- (iii) There needs to be a clear career path for talented young researchers. The current system has failed a generation of emerging researchers, as they do not have a real and attainable career path. Smart people will make the major discoveries of the future – we need to support these talented and dedicated young people. That means more positions and greater security. It also includes high quality facilities, which allow these committed individuals to be productive, as well as supportive environments that encourage them to take more risks and be more creative.

In addition, it should be recognised that not all researchers want to be independent team leaders – within a research team there are crucial roles for long term postdoctoral Fellows, laboratory managers, and laboratory technicians. Currently, these key individuals are not valued, or supported, by the system.

- (iv) There is a critical need to fund the “hidden” costs of research. Adequate infrastructure funding is vital to cover the “indirect” costs of research. This is currently being covered by a multitude of sources, and is unlikely to be sustainable. Many research organisations rely on philanthropic support, the corporate sector and funding from commercial activities. This is a particularly inefficient way of conducting research as they are constantly forced to behave as mendicants, seeking external funding to prop up underfunded core research activities. Philanthropic and corporate funding should be the icing on the cake, which allows new initiatives to be explored, rather than provide core infrastructure support. Some State Governments are more supportive than others in covering “indirect” research costs.

- (v) The current funding philosophy needs serious re-evaluation, as it is highly risk averse. Presently, the system favours incremental improvements, rather than bold initiatives that make quantum leaps. Instead of encouraging the research equivalent of James Cook’s search to discover new continents, we have taken the Matthew Flinders approach of fine mapping already discovered continents. Rather than promoting “safe science”, we must develop a system that encourages “asking the big questions”, and increase support for blue-sky research that is high risk, but may provide huge rewards in the form of major breakthroughs.

(vi) One important way to improve research productivity is to reduce the hurdles to research, and the administrative burdens placed upon researchers. It is generally accepted that accountability is important – however, increasing amounts of time are spent on accountability, rather than creativity. More and more time is spent on obtaining approvals for research (eg ethics committees for animal or human research) and reporting, than on productive research activities. These interventions are invariably slowing progress.

In addition, we are facing reviewer burnout, as researchers are constantly being asked to assess grants, manuscripts, theses, as well as participating in site visits to evaluate research organisations, and so on. Streamlining grant applications would also be enormously beneficial – to save time and effort, perhaps some thought could be given to filling the multitude of forms only after a grant has been awarded. Constant changes to funding schemes, application forms, RGMS, etc, create more inefficiency and frustration. Increasingly researchers feel they spend more time applying for funding, seeking approval to conduct their research and reviewing than actually doing their work.

(vii) Critical mass, together with centralised core facilities, is vital for modern research. Concentrating large numbers of researchers within Institutes or Centres is recognized internationally as the most efficient way to conduct research. This is especially important for the purchasing and use of expensive equipment, developing collaborations and multi-disciplinary approaches. The plethora of small, individual-based institutes are inefficient and not cost effective. Funding models should be developed to reward consolidation of research endeavours.

What are the health and medical research strategic directions and priorities and how might we meet them?

Is there a strategic plan for HMR in Australia? If so, has that been clearly articulated to the research community? While there are national priorities for research, have these been implemented or supported with specific funding initiatives? Has an analysis been conducted of Australian strengths, weaknesses, opportunities and threats?

The HMR sector is in need of a well-defined national plan, and better co-ordination and linkage between Federal and State Governments would be advantageous. The Victorian and Queensland Governments have shown great leadership by investing in HMR, and have drawn the benefits from this investment, unlike other States such as Western Australia.

In considering strategic directions and priorities for HMR, we should remember that Australia is a relatively small, albeit wealthy, nation that needs to invest its funding wisely. A balance needs to be drawn between strategic or targeted research, and curiosity-driven research that allows exploration, flexibility and serendipity.

Australia should also consider carefully how it reacts to new opportunities as they emerge. Horizon scanning at a national level should be performed proactively and continuously, rather than reactively and in an *ad hoc* manner. Technology is changing very rapidly and Australia is in real danger of not being able to keep up with other countries that have invested heavily in HMR. While important new technologies (next generation sequencing, proteomics, etc) are definitely expensive, can we afford not to be involved when others are surging ahead? Australia has traditionally been able to do fantastic science on “the smell of an oily rag” - unfortunately times have changed. We are in the new era of “big science” and unless we invest more in HMR, we will not be able to participate in the changing paradigm of research. In addition to the “hardware” associated with new technologies, it is essential that Australia has the expertise to analyse the

new data being generated. A classic example in this regard is the explosion in genomic and proteomic data, and the critical need for a synchronous increase in bioinformatics capacity.

How can we optimize translation of health and medical research into both commercial and social outcomes?

It is important to recognise that translation cannot occur unless there are new discoveries. It is essential, therefore, that Australia continues to generate new knowledge that underpins ideas from all sources of a robust HMR sector, i.e. basic, population health, and clinical research. In the absence of new discoveries there is nothing to translate - new knowledge is the key to translation.

The next vital step is communication between researchers and clinicians. As the word translation suggests, researchers and clinicians speak different languages and often do not understand their respective needs. Researchers need to be more mindful of the diseases they are working on, and clinicians need to understand the rapidly evolving world of science. Herein lies a crucial role for the clinician / scientist, someone who can bridge the two areas by understanding both languages. It is important that scientists understand the community's desire for new discoveries that actually improve health – this is not simply an exercise in mental gymnastics, before moving on to the next question.

One way to improve translation is through better co-ordination between Hospitals, Universities and Medical Research Institutes. In this regard, the concept of Academic Health Science Centres is extremely appealing. These Centres, which have been successfully implemented in the USA, UK and the Netherlands, have the potential to bring together clinicians, researchers and academics in an unprecedented manner, facilitating an exchange of information that will allow greater transfer of new knowledge into clinical utility. High quality Academic Health Science Centres will attract high caliber clinicians, providing an important secondary benefit in the provision of health care.

Research needs to be deeply, and inextricably, imbedded in the delivery of health care. This involves a cultural change, which accepts that research is an integral part of the health system, capable of providing solutions to problems. In addition, service overload is an obvious impediment that prevents clinicians from spending time on research. It has been suggested that a generation of clinicians has been lost to research-orientated activities – they do not have the time to pursue research questions and do not readily implement new discoveries. However, Practitioner Fellowships have been a great success, enabling a number of research-orientated clinicians to spend time doing research. The value of research should be instilled into medical students during their training, enhancing evidence-based approaches to medical practice. Medical students should also be encouraged to enroll in PhD programs if they are research-orientated, as occurs in many countries (eg USA, UK).

Another mechanism to improve translation is to vigorously support public health or population health research. This important area of research can often identify problems and develop solutions very rapidly. Greater investment in health economics research will also allow more focus to be placed on pressing health issues.

It is essential that we have a realistic understanding of how long it takes to translate basic research observations into clinical practice. However, if you do not start somewhere, you will never develop new solutions. One excellent example of the time taken from bench to bedside is Glivec, the “wonder drug” used to treat Chronic Myeloid Leukemia. This remarkable drug was generated after many years of painstaking basic and clinical research, beginning with the discovery of chromosomal abnormalities in the 1960s and 1970s, followed by identification of genetic translocation in the 1980s and new drug discovery pathways in the 1990s and 2000s. It, therefore, took 40 years of research for Glivec to become an overnight success. Increasingly, big

pharmaceutical companies are turning to basic researchers to develop new drug pipelines, in an attempt to overcome the paucity of new therapeutic approaches.

Australia simply cannot afford not to invest in HMR – this is a most important area of human endeavour. The HMR sector supports a highly talented workforce that is dedicated to improving our quality of life, and to generate economic benefits for the nation. HMR is a vital activity that has a huge impact on the health of community nationally and internationally.