The Australian Society for Medical Research

Submission

Review of the Australian National Innovation System

April 2008

The Australian Society for Medical Research ACN 000 599 235 - ABN 18 000 599 235
145 Macquarie Street. Sydney, 2000 Ph: (02) 9256 5450, Fax (02) 9252 0294
Email: asmr@world.net, Website: www.asmr.org.au Snr Executive Officer: Catherine West

Declaration of interests

The Australian Society for Medical Research (ASMR) represents members from the health and medical research sector including researchers from universities and research institutes, medical colleges and patient groups.

Some members are recipients of funding from the Australian and /or state government bodies, including the National health and Medical Research Council (NHMRC), and the Australian Research Council (ARC).

ASMR receives direct funding from the NHMRC for Medical Research Week, a public outreach program that raises public awareness of medical research in Australia.

The Australian Society for Medical Research

The Australian Society for Medical Research (ASMR) is the peak body representing health and medical researchers (HMRs) in the country. In addition to the more than 1100 direct members, ASMR represents the sector through 53 affiliated professional societies, medical Colleges and patient groups, representing an additional 15,000 people actively involved in health and medical research. Our corporate and disease related foundation memberships bring a further 100,000 Australians with and interest in health and medical research into association with ASMR. Our mission is to foster excellence in Australian HMR and to promote community understanding and support through public, political and scientific advocacy[1].

It is important to note that ASMR comprises young, future looking researchers who are currently at the bench. This group is best placed to identify new trends and expectations for the next generation of research leaders. The board and membership base of ASMR have minimal vested interest in maintaining the *status quo* rather wish to achieve the best for their country. The unparalleled record of investigating and quantifying the engagement and benefits of research to the Australian community and economy continues with the latest commissioned survey by Access Economics. ASMR members are directly talking to the community and schools about medical research. As such they have an immediate and first hand sense of community perceptions and needs. As young researchers they will be the very individuals who will be charged with implementing innovation for Australia's future and offer their time, extensive data and expertise to any further work on the innovation review.

Introduction

The HMR sector has been an outstanding contributor to Australian innovation. Australian HMR delivers exceptional research output - at twice the Organization for Economic Co-operation and development (OECD) average on a per capita basis[2] - with strikingly high international standing by citation[3-4]. Australia has been awarded five Nobel Prizes in medicine or physiology, and our translational outcomes are impressive in global terms e.g. lithium for treating bipolar disorder, the bionic ear, antibiotic treatment of *Helicobacter pylori* in peptic ulcers, and a cervical cancer vaccine. HMR has dramatically improved the health and wellbeing of Australians, contributing to increased workforce productivity and the significant economic benefit of the nation. The Access Economics Report (*Exceptional Returns – The Value of Investing in Health R&D in Australia*[5]) indicated that for every $1 invested in Health and Medical Research, there is a $5 return to Australia's Economy. Commercialization of HMR in Australia has been growing at 16% and economic benefits include the generation of over 4000 knowledge-based jobs resulting from health and medical research discoveries.

The Australian public strongly supports HMR with over 60% recognizing that (i) new discoveries and inventions create new medicines, devices and vaccines, (ii) HMR creates jobs and new business through discoveries and inventions, and (iii) a lack of funding often results in Australian discoveries being commercially developed in other countries[6].

The ASMR welcomes the Innovation Review and the opportunity to provide input on the future Australian national innovation system. As outlined above, the public benefits derived from HMR in improved health, wellbeing, productivity and wealth, should make HMR a high priority within the innovation system. The national research priority "Promoting and maintaining good health" must be retained. Australia faces many future challenges in health, including the high incidence of disease within aboriginal communities, increasing prevalence of lifestyle diseases, a rapidly ageing population – with associated chronic disease, and the threat of disease linked to climate change. An appropriate focus of HMR including frontier investigator research, innovative multidisciplinary collaborations and partnerships will be fundamental to address these important issues.

Funding for HMR in Australia is derived from a range of organizations across the public and private sectors, including the Commonwealth, state and local governments, the not-for profit sector, and industry. The largest single funding body of HMR is the Australian Government, with the National Health and Medical Research Council being the primary source. Almost half of NHMRC funding is directed to basic medical research with universities and medical research institutes being the main recipients. The Commonwealth Government has demonstrated a steady increase in funding for HMR since 1995. In response to the Will's strategic review in 1999, the Australian Government doubled funding to HMR from 2000-2005, and in the 2006 federal budget an additional $905 million was committed, that will result in a funding base of $695 million by 2009-10. This increased investment in HMR

is already producing substantial health and economic benefits. ASMR has recently commissioned Access Economics to update the 2003 study in order to estimate the returns following the recent funding increases, and the data to date suggests continued exceptional returns (details will be announced with the release of the report in June 2008).

Despite these increases, government funding for HRM in Australia still ranks amongst the middle of similar OECD countries as we are facing significantly increased competition from other developed countries that are investing heavily in biomedical science and providing substantial investment incentives to the private sector. To take full advantage of the significant government investment in HMR by Australia we must be mindful of sustainability beyond 2010, especially in light of the effects of the recent flat-lining of the US National Institutes of Health budget[7]. The prospect of NHMRC funding for HMR plateauing in 2009-10 puts at risk Australia's investment to date and its position as a leader in the very competitive global HMR market. It is vital that we the capture the returns on the investments placed and continue the momentum with a long-term ongoing commitment.

To address these issues, the ASMR suggests the following be considered in the context of the future Australian National Innovation System.

1. A sustained funding mechanism for HMR

For HMR to contribute to the development of a dynamic knowledge-based Australian economy it is important that the sector is supported with a sustained commitment. HMR funding in Australia is currently not indexed and is cyclical. As such HMR funding is vulnerable to fluctuation, thus placing at risk key investments and creating the potential for loss of innovation capacity and associated health and economic benefits. The long lead-up time required for securing increased investment is a particular concern. To ensure the sector remains strong to meet current and future health challenges it needs insurance against decreases in funding. Australia has experienced strong economic growth over the past 10 years and support for HMR is currently high. This trend is unlikely to continue indefinitely. A sustainable funding model is imperative for the Australian HMR sector to continue to conduct innovative research, train the next generation of researchers, and to build on the knowledge gains for translation into new treatments and improved health.

As described above, there are multiple sources of funding and multiple factors that impact on this funding for HMR. Sources of funding include Federal Government support, State Government support, philanthropic support, pharmaceutical, biotechnology, private investment and venture capital.

Federal support for HMR includes the National Health & Medical Research Council (NHMRC), Australian Research Council (ARC), Cooperative Research Centres (CRC) and the CSIRO.

The NHMRC is Australia's peak body for supporting health and medical research. In addition it develops health advice and provides advice on ethics in health care and ethical conduct of health and medical research. As mentioned, in the May 2006 budget, there was a $905 million increase in spending towards HMR, including $500 million over four years to increase NHMRC support for medical research, $170 million over nine years for the Australia Fellowship Scheme to support Australia's best researchers, and one-off $235 million infrastructure funding to support medical research institutes.

Although the ARC does not directly support medical research, its support of basic research can have flow on effects in HMR and underpin HMR advances. There are also flow on effects to HMR from funding from CRCs and the CSIRO. Funding is cyclical and sustained Federal funding for HMR remains uncertain.

Philanthropy: Philanthropy in Australia is increasing although lags substantially behind that of other developed countries[8]. Individuals on average give $424 per year. Health non-profit organizations receive approximately one sixth of all dollars donated. These same organizations also receive about 20% of the total value of business giving. This compares with one in every twenty dollars being donated by individuals and businesses for environmental and animal welfare purposes.

The strength of the economy influences giving and with sustained economic growth, high employment, increasing wages, the amount of disposable income, and business prosperity are all factors that have influenced the growth in giving. Giving is influenced by many factors that vary from individual to individual and business to business.

Private prescribed funds (PPF) are a relatively new source of philanthropic support that can be established by businesses, families and individuals who can make tax deductible donations. PPF are prescribed by law and funds can only be distributed to other tax deductible gift recipients endorsed by the ATO or are listed by name in the income tax law.

Biotechnology in Australia: Australia has a growing globally competitive biotechnology industry. Innovations in Australia include the bionic ear, human Papilloma Virus vaccine, cause and treatment for stomach ulcers, and influenza drug. Relative to the USA and European nations our industry is relatively small. We have a strong international reputation for quality of science, well-trained graduates and current strong Federal and State[1] government support. Australia also has an emerging reputation in the conduct of cost effective clinical trials.

Government support for the biotechnology sector has contributed to the growth in the biotechnology through strong basic research support, in particular, increases in NHMRC funding, NHMRC program Grants and

Centres of Excellence. Support for translational research programs such as CRCs, ARC Linkage grants, NHMRC Development grants and infrastructure funding have been a positive influence on the sector. The Federal Government 'Backing Australia's Ability' has positively influenced innovation and commercialisation. There has also been recognition and support of top researchers through Federation and Australia Fellowships.

Strong support for venture capital investment in the biotechnology sector has been encouraged in the past by a number of schemes including the Innovation Investment Fund, Pre-Seed Fund, and Venture Capital Linked Partnerships. The Federal Government's compulsory employer superannuation contributions have led to billions of dollars in superannuation investments. There may be opportunities in Australia to encourage funds to apportion a small proportion of their funds on venture capital investment and the US experience could be a model to look towards. Generally these types of investments carry a higher risk but if targeted appropriately they may generate returns.

An example of such as scheme is the California Public Employees' Retirement System[9] (CalPERS). CalPERS is the world's largest institutional investor and has 1.2 per cent of funds in venture capital. The investment is expected to generate significant returns for the fund by helping CalPERS build profitable investment relationships with large pharmaceutical companies. CalPERS established its California Biotechnology Program in June 2000. The program aims to capitalize on the advent and convergence of new technologies in the California biotechnology industry. CalPERs believes that the biotechnology industry is poised for tremendous growth in the next 5-20 years. "The biotechnology sector offers many compelling investment opportunities," said William D. Crist, President of CalPERS Board of Administration. "New technologies are allowing for the development of better and more cost-effective products and drugs. These advancements, backed by CalPERS capital, can produce significant returns for the Fund while addressing unmet patients needs."

The European Union in its recent 7th Framework model[10] has recognized the importance of sustained funding for R&D. The aim of the model is to create a stable funding environment to drive a knowledge-based economy by "locking-in" 3% of GDP to science R&D, including that for HMR. This involves 27 European countries and involves increased overall investment (2/3 from the private sector - thus raising the share of research funded by business - and 1/3 from the public sector) including the increasing of human resources (from the present 6 researchers for every 1000 of the labor force to 8 per 1000). The model has been devised to make Europe more attractive for investments in research and to increase the effectiveness of research systems by improving framework conditions and increasing the leverage effect of public spending on private R&D.

Recommendations: Cement Australia's commitment to HMR and science and innovation by implementing a long-term model of sustained R&D investment for Australia along similar lines to the EU 7th Framework, that will provide a

generous base level for growth and support of HMR funding locked-in as a % of GDP or the health budget.

2. Ensure a strong and highly skilled HMR workforce

A strong highly skilled workforce is fundamental to innovation. Australia's highly trained and diverse HMR workforce has been the basis of impressive advances in the nation's health, wellbeing, and productivity. Despite recent increases in government HMR funding, a number of indicators including the results of a recent survey commissioned by ASMR of its members to address employment conditions and career structures, have suggested that there remains a significant degree of dissatisfaction and anxiety among the Australian HMR workforce, particularly in regards to the insecurity of employment in the sector and lack of financial support for research[11]. Most striking was the statistic that the majority of respondents indicated that as a result of perceived employment insecurity and/or lack of funding that they had considered leaving HMR or moving overseas. Additional tangible evidence that there is a "Brain Drain" problem in the Australian HMR sector is the well-publicized departure overseas of many leading researchers. It is also clear that many young researchers see a career in HMR as high risk and financially unstable, particularly when compared to many other career options in the present strong economic climate. These data indicate that the significant investment in Australia's HMR workforce is at risk of being lost if funding is not sustained. This has major implications for the attraction and retention of our best and brightest researchers. Australia is clearly at risk of a diminishing HMR workforce and the loss of the necessary skills for generating knowledge and innovation that will impact on future health and economic gains. The provision of adequate resources for an attractive, feasible and sustainable career structure for Australian medical researchers is a national imperative.

In the current richly competitive international research environment it is imperative that Australia attracts and retains its talented medical researchers. Many major economies such as Europe and Singapore have implemented large HMR funding initiatives in recognition of the significant benefits of a strong HMR sector to health and economic wellbeing. These initiatives include substantial programs to attract and retain HMR researchers. Similar programs including the Federation Fellowships and Australia Fellowships have been implemented in Australia, however these are very few and aimed at only the very experienced and highest achievers.

Australia is unique in the global HMR community in that it has a national career fellowship scheme supported by the NHMRC. This scheme provides a national "people support" career program that underpins much of the HMR in this country. The research output by the fellows is impressive and certainly more than justifies continuation of the scheme. However, many of Australia's best and brightest have been missing out on NHMRC fellowship support.

A particular area of concern in the HMR workforce is support of the mid-career researcher (7-12 years postdoctoral). The mid-career researchers

comprise the up and coming workforce and represent the future of HMR. Currently, the NHMRC supports mid-career researchers through a Career Development Award (CDA) program that feeds into the senior Research Fellowship scheme. In the 2006 round there was a 26% success rate for applicants. For 2007 the number of applicants more than doubled from 180 to 380 and despite the injection of additional funds into the program, the success rate dropped to 19%. This was in part a result of the introduction a new 2-tiered CDA award that expanded eligibility from 9 years postdoctoral to 12 years postdoctoral, however it clearly reflects the increasing pressure on the system. It should be noted that the number of NHMRC project grants is increasing, however the short-term nature of employment on these grants (3 years maximum) is certainly not an attractive career option for mid-career researchers.

The introduction of the second CDA tier was aimed at reducing the recognized significant "jump" required to gain entry into the senior Research Fellowship scheme. There are currently less than 300 NHMRC Senior Research Fellows and the standard for entry into the scheme is extremely high, with only the outstanding (top 5%) and ~7.5% of the excellent (top 10%) ranked applicants being successful. The difficulty of breaking into the Fellowship scheme is creating a "logjam" of some of our best mid-career researchers unable to progress their careers in the traditional NHMRC people support scheme, which as outlined above is generating dissatisfaction and insecurity that has permeated down the system and is discouraging to younger researchers. The results of the ASMR workforce survey clearly indicate that "Brain Drain" in the HMR sector is a very real problem and will continue to be a threat unless the NHMRC CDA and Research Fellowship schemes are better supported. The ASMR applauds the Federal Government in their recognition of the difficulties of not only HMR mid-career researchers but of those across all research fields with the recently announced initiative to provide 1000 mid-career research fellowships. However, this scheme being across all research fields is expected to provide only minimal relief to the high attrition rate of very talented mid-career researchers in HMR.

Recommendation: A feasible and sustainable career structure for the nation's best health and medical researchers. ASMR recommends an expanded NHMRC CDA and Fellowship scheme capable of supporting at least the top 10% of all applicants ranked in their field internationally.

3. The necessity to fully fund HMR

A major restrictive factor in the HMR sector is that research salaries and infrastructure costs are not fully supported by funding.

Provisions for supporting research staff on NHMRC grants is significantly below the actual cost of salaries at host institutions. The NHMRC does not use host institute salary scales and instead provides its own salary scales system (Personnel Support Packages – PSPs). The NHMRC appears to be the only funding body in the world that funds salaries in this manner. This commonly results in up to a 30% shortfall in salaries for researchers

supported on an NHMRC grant. The "PSP gap" is crippling the ability to fully perform research projects and is impacting on the innovation capacity of the NHMRC granting system.

Recommendation: To maintain the current success rate of NHMRC grants, the NHMRC needs to be provided with additional funding to enable salaries to be paid at host institution levels. Alternatively, a universal funding mechanism needs to be established for host institutions to fund the salary gap.

Similarly, funds for research infrastructure have not kept pace with that required to adequately perform HMR in many Australian universities and research institutes. The cost of supporting HMR is escalating and Australia is at risk of the erosion of its research capacity and therefore international competitiveness. Infrastructure support via direct public funds to organizations or institutions or via schemes such as the National Collaborative Infrastructure Scheme (NCRIS) are essential for HMR to remain at the cutting edge of technology. Infrastructure funding for HMR has been provided in recent Federal budgets (e.g. $235 million in the 2006 budget to be shared among 18 research facilities to support infrastructure and capital works programs) however the allocation of these funds is often not a transparent process.

Recommendation: Funding mechanisms that provide opportunities to apply for and obtain infrastructure support in a transparent manner for all high-performing medical research facilities need to be developed.

4. Education

ASMR is directly and more intensely engaged with secondary schools than any other body in Australia. Each state has a dedicated group of researchers whose mission is to inform and inspire young Australians about science and in particular medical and health research. It is our strongest view that the decline in University support over the last decade is deeply damaging the ability to attract new science students and their ongoing commitment for post-graduate study. Without such educational training Australia will fail to meet any challenge in innovation and will be ill-equipped to implement innovation(s).

Recommendations:

(i) The ability to meet the erosion of academic salaries and the elimination or staff positions which collectively lead to an over-burden of teaching responsibilities and impairment of research capacity. It is fundamental to the training of the next generation of scientists that academic staff and research-connected and research engaged.

(ii) There is a growing gap between medical research focused organizations and undergraduate teaching. The need to reconnect excellent researchers with the training process is essential.

Concluding remarks

Australian HMR has a proven track record of outstanding innovation and economic returns. In order for Australia to sustain its HMR sector at the forefront of international competitiveness and continue to provide better health and productivity, it must be a priority in the National Innovation System. A sustainable funding mechanism for the HMR sector, the training and support of a strong highly skilled medical research workforce, and the full funding of research programs and required infrastructure support, are all fundamental issues that need to be addressed. The ASMR would like to thanks the Australian Government for the opportunity of contributing to the review of the National Innovation System, and would be delighted to provide clarification on the above or any additional information.

References

1. www.asmr.org.au

2. Grant J (Chairman). Sustaining the virtuous cycle – for a healthy, competitive Australia. Investment review of health and medical research. Canberra: Australian Government Department of Health and Ageing, 2004.

3. Wills PJ (Chairman). The virtuous cycle. Working together for health and medical research. Health and medical research strategic review. Discussion document. Canberra: Commonwealth of Australia, 1998.

4. Garret-Jones S, Wixted B, Turpin T. Some international benchmarks for evaluating Australian health and medical research. Res. Eval. 2004; 13:155-166.

5. Access Economics. Exceptional Returns: the value of investing in health R&D in Australia. 2003.

6. Research Australia public opinion polls 2005

7. Bishop JM, Varmus H, Re-aim blame for NIH's hard times. Science 2006; 312:499

8. Giving Australia: Research on Philanthropy in Australia, Dept. Family and Community Services, Australian Government.

9. www.calpers.ca.gov

10. http://cordis.europa.eu/fp7/home_en.html

11. Kavalaris M. et al. *Perceptions of Health and Medical Research Careers: The Australian Society for Medical Research Workforce Survey.* (In Press, Medical Journal of Australia).