2012 McKeon Strategic Review of Health and Medical Research

Submission by the Australian Early-Mid Career Researcher Forum Australian Academy of Science

Early-mid career researchers (EMCRs) are defined by the Australian Academy of Science (Academy) as researchers who are within 15 years post-completion of their research higher degree, usually a PhD. In Australia, the academic career structure comprises five levels: from Level A (Associate Lecturer; early postdoctoral stage) to Level E (Full Professor). Most EMCRs are employed at Level A. It is essential that the EMCR community contributes to this strategic review since, by the end of this national 10 year plan, today's EMCRs will be the future thought-leaders, laboratory heads and experts within the health and medical research sector.

Recognising the significant challenges faced by EMCRs, the Academy recently established the Australian Early-Mid Career Researchers Forum (Forum). The Forum works closely with the Academy to provide EMCRs the opportunity to make a positive contribution to Australian science policy at a national level. This includes advising the Academy on issues pertinent to EMCRs during the development of science policy recommendations; encouraging EMCR participation at *Think Tanks* and *Frontiers of Science* meetings; and organising a national EMCR conference.

The Department of Education, Employment and Workforce Relations Higher Education Data Collection (2011) estimates that EMCRs constitute more than 21.5% of the research workforce in higher education institutions across Australia, in all scientific disciplines[1]. This equates to 20,645 people and of these, 7.7% are in the health and medical research sector (1,590 EMCRs) in higher education institutions alone (private enterprise excluded). These numbers do not include PhD students - our earliest career researchers.

Multiple EMCRs who are active in health and medical research have contributed to this submission. This document highlights the significant challenges currently faced by EMCRs and presents realistic solutions that will help them more readily establish productive careers in scientific research. Training and support of EMCRs is essential for the future of the Australian health and medical research sector which not only contributes significantly to the health and well-being of all Australians but also to the national economy.

<u>Increased support for EMCRs in Health and Medical Research in Australia would result in:</u>

- **Improved efficiency and outcomes from research funding commitments**
- **Retention of extensively trained, highly qualified and skilled researchers**
- **Optimal and efficient translation of health and medical research discoveries into better health outcomes and policies, which will ultimately benefit future generations**

Recommendations

1. ***Better prepare EMCRs for the current challenging environment by augmenting the PhD training period with vocational research and professional skills.***

2. ***To incorporate this additional course work, we recommend extending the PhD scholarship to 4 years, contingent on the host institution incorporating a broad range of professional development courses into the PhD program.***

3. ***Increase the exposure of PhD students to the different types of scientific careers to reduce the bottleneck at the postdoctoral level.***

4. ***Restructure training and career paths with directed funds to support career establishment and the transition to independence.***

5. ***Demarcate the early postdoctoral 'training' phase from the more senior postdoctoral role and provide support for longer-term mid-career researchers as 'staff scientists'.***

6. ***Provide 12-month bridging or 'near-miss' grants from the NHMRC for high-scoring applications that are not funded.***

7. ***Establish standard requirements for universities and institutions to provide increased support for women and establish gender equity policies.***

8. ***Provide technical support during parental/carer's leave through protected funds.***

9. ***Establish EMCR Fellowship programs that focus on the transition from postdoctoral fellow to independent researcher.***

10. ***Increase security for mid-career researchers with longer-term, more permanent positions.***

11. ***Have a more comprehensive assessment of scientific productivity and contribution for both fellowship and grant applications (e.g. publications/citations alone do not suffice).***

12. ***Ensure NHMRC project grants provide dedicated funds for travel to conferences/collaborators.***

13. ***Implement at least one more submission round later in the year (e.g. September), which may be linked to the first submission round for those applications that missed out on funding.***

14. ***Introduce, encourage, support and fund Academic Health Science Centres in Australia.***

15. ***The Government could offer funding/scholarship/loans to PhD students and EMCRs to attend commercialisation/IP management courses as a part of their research training.***

16. ***Establish Government funded science policy fellowships and secondment programs for EMCRs and similar short-term opportunities for more senior investigators.***

17. ***Facilitate roundtable discussions/open forums/meetings between scientists and policymakers.***

18. ***Consider one or two policymakers with scientific training serving on NHMRC Grant Review Panels.***

19. ***Establish funds dedicated for translational and public health research.***

20. ***Provide potential tax-break incentives for businesses investing in health and medical research in Australia.***

21. ***Reduce the cost of doing science by decreasing import tax on scientific reagents and consumables.***

22. ***Provide more public-private partnerships and ARC 'Linkage' style grants within the NHMRC system.***

23. ***Establish a major National Philanthropic Trust, similar to the UK 'Wellcome Trust' as was recommended by Research Australia in 2010.***

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

National health must remain an absolute priority for the Government. Diseases including Alzheimer's, cancer, cardiovascular disease, stroke, infectious diseases, asthma and muscular dystrophy present a huge socioeconomic burden from loss of longevity and quality of life for individuals and the community. The short-term benefits of medical research may not always be obvious, however, in the longer term national health and economic returns are significant. Returns on NHMRC funded research and development have been estimated to be 509% for cardiovascular disease, 170% for cancer and 23% for asthma (measured in average 40 year lagged benefits; realisation 2040 to 2050)[2]. Australian health and medical research expenditure between 1992-93 and 2004-05 was estimated to return a net benefit of approximately $29.5 billion. Put more simply, on average, for every dollar invested in Australian health and medical research, there is a return of $2.17 in health benefits, with a minimum of $0.57 and maximum of $6.01[3]. The net benefits to taxpayers arising from NHMRC funded research are not only manifested by improvements in well-being, but also in commercialisation.

Taking advantage of Australia's relatively strong financial position in the current global economic climate and investing *more* in health and medical research, would allow us to increase our scientific competitiveness across the global research spectrum while improving the health and well-being of all Australians. The NHMRC budget currently represents 0.66% of total health expenditure in Australia; with Australia's total health expenditure as a percentage of GDP in 2009 at 8.7%. This is a gross under-investment in health and medical research compared to other OECD countries in the same year: New Zealand 10.3%, Canada 11.4%, Denmark 11.5%, Germany 11.6%, France 11.8%, The Netherlands 12% and the US 17.4%[4]. If we are to meet Australia's future health challenges and take advantage of the socioeconomic rewards derived from both improved health and an internationally competitive biotechnology sector, the Government must give serious consideration to increasing the NHMRC budget toward the goal of 3% total health expenditure.

Supply of future research leaders – key issues for EMCRs in Australia

EMCRs are a vital element in health and medical research and constitute more than 20% of the research workforce[1]. This equates to 20,645 people in higher education institutions alone and does not include PhD students — our earliest career researchers. In 2008-09, researchers accounted for over two thirds (67%) of the gross human resources devoted to research and development — a total of 91,617 full time employees[1]. Research output would be seriously compromised without these highly trained EMCRs. Standard EMCR responsibilities include writing grant proposals and scientific manuscripts, managing and training staff, supervising and training students, attending institutional and scientific meetings/seminars, community participation, fund-raising activities, contributions to discipline-specific societies and other related associations, all while performing experiments and driving their own research projects. Many will also have their own cost centre and research budget to oversee.

Less than 0.1% of the world's population is presently working as scientists or engineers[6], and only a fraction of this small percentage is involved in the generation of new knowledge. It is on this slender thread that society's future hangs. With the current NHMRC budget, Australian EMCRs are faced with increased competition for available funding and many will be unable to sustain their careers under these circumstances. There is a real risk that Australian researchers will seek opportunities overseas, particularly in the USA and Asia.

a. Improving the quality and breadth of PhD training

Australian institutions need to provide top quality research training to meet future labour force demands. Workforce projections indicate that demand for research qualified people is set to grow at a faster rate than overall employment demand over the decade to 2020, with the number of employed individuals possessing a doctorate by research qualification (PhD) expected to rise by 3.2% per annum over this same period[7]. The high quality research training provided by Australian institutions is essential for our international competitiveness, the careers and futures of our best thinkers and researchers, our innovative capacity and inventiveness and Australia's productivity. Australian research training is currently performing well — our research Masters and PhD graduates readily gain employment domestically and internationally, Australian universities attract talented research students from all over the world, and our researchers produce internationally recognised high quality research.

The current PhD program equips researchers with skills specific to their field of research and thesis writing, but very few train people to become independent research leaders. One exception is the Balanced Scientist program developed by the Invasive Animals Cooperative Research Centre[8]. During this program, PhD students undertake the equivalent of a Diploma in Research Management, which includes industry placements, courses in intellectual property and budget management, commercialisation and research papers and grants writing; The Australian Technology Network of Universities[9] PhD in Mathematics and Statistics with the aim to 'deliver research solutions to industry and train cohorts of doctoral students with broad capabilities generally not currently acquired during Australian PhD candidature'; and a recently developed program at The University of Queensland[10]. Expanding the PhD training program to include topics such as management and commercialisation would provide significant skills and benefits. Importantly, diversifying PhD training will broaden the application and value of the PhD in society and prepare research trained scientists for a variety of scientific roles within Government, industry and academia, while enhancing their overall career prospects.

Recommendations

1. Better prepare EMCRs for this challenging environment by augmenting the PhD training period with vocational research and professional skills. *This could include financial and people management skills, leadership skills, CV and job interview training, grant and manuscript writing coursework in the degree, intellectual property management, science communication, bioethics as well as support for overseas travel and conference presentations which provide excellent collaborative and networking opportunities.*

2. To incorporate this additional course work, we recommend extending the PhD scholarship to 4 years, contingent on the host institution incorporating a broad range of professional development courses into the PhD program. *This would most likely be regulated by The Tertiary Education Quality and Standards Agency.*

Over the past two decades a severe bottleneck* has developed at the transition from postdoctoral fellow to junior faculty in several research fields, particularly health and medical research. Universities obtain considerable financial and other incentives for enrolling and graduating as many PhD students as possible. However, while these postgraduate students continue to enter the research system, EMCRs are competing for the limited number of independent faculty positions available within academia and industry. Longer-term prospects in research are equally slim with competition for limited funding resources at an all-time high and even fewer senior investigator positions available. This student and EMCR 'surplus' in health and medical research may seem counter-intuitive considering future research workforce projections. It will therefore be important to identify our exact needs in specific disciplines and ensure that PhD programs train graduates to fill these positions.

Recommendation

3. Increase the exposure of PhD students to the different types of scientific careers to reduce the bottleneck at the postdoctoral level. *Research fields with these severe bottlenecks should be identified and fewer PhD students should be trained in these fields to reduce strain on the system.*

* There is evidence in the US, UK and Australia that this bottleneck is self-correcting, with fewer students enrolling in science and PhD degrees. This is <u>not</u> a positive outcome since our brightest minds are now shying away from this career.

b. Improving job security and providing a career structure

The Government invests a large amount in training research students who often become postdoctoral researchers at least for one or two years. In 2009/10, the Commonwealth Government spent approximately $425 million across 63 different research workforce programs at the early-mid career stage. This is compared to nearly $877million spent on research training across 22 programs for higher degree research students[7]. At present many highly qualified mid-career researchers choose to work overseas to further their careers due to lack of opportunities and uncertain future in Australia. Although increased overall funding levels would be ideal, some restructuring and redirecting of funds from training towards postdoctoral fellowships may achieve significant benefits. Many EMCRs do not see a viable career path in the area they were trained and leave research, resulting in a significant loss of valuable expertise. This is not an effective use of research funds.

Recommendations

4. Restructure training and career paths with directed funds to support career establishment and the transition to independence. *The aim of the Australian Research Council (ARC) funded Future Fellowship program was to attract and retain the best and brightest mid-career researchers to boost Australia's research and innovation capacity. Future Fellowships finish in 2012, and funding to continue this excellent program is strongly encouraged. Establishment of a program similar to the National Institutes of Health (NIH) 'K99 Pathway to Independence award', which is designed to facilitate a timely transition from a mentored postdoctoral research position to a stable independent research position, would be another way to better support EMCR's careers.*

5. Demarcate the early postdoctoral 'training' phase from the more senior postdoctoral role and provide support for longer-term mid-career researchers as 'staff scientists'. *The average age of NHMRC funded chief investigators is 46.4 years[11], whereas the median age of a Masters/PhD graduate is 31.[12] There is an overall increase in the postdoctoral career phase from 1-3 years to more than ten years. Better support for mid-career researchers would provide greater job security, facilitate continuity in research staffing and training, and significantly reduce the costs associated with high staff turnover. It should also be noted that due to the highly competitive nature of the NHMRC grant funding system, despite their desire to maintain high-skilled staff, Group Leaders are reluctant to include salaries for senior postdoctoral fellows (Level B, more than 5 years post-PhD). They instead opt for graduate students and recently graduated postdoctoral fellows (Level A). This inadvertently leads to the loss of highly experienced researchers in favour of a cheaper workforce.*

6. Provide 12-month bridging or 'near-miss' grants from the NHMRC for high-scoring applications that are not funded. *In 2011, 52% of NHMRC project applications were scored high enough to be considered fundable (>4), but were not funded due to the limited budget[11]. Bridging funds and/or 'near-miss' grants would reduce the need for universities and institutes to cover both the salaries and research costs of these personnel and their staff, and maximise economic investment made in research training. With limited resources, a lack of bridging funds results in many valued researchers being unnecessarily lost from the system.*

c. Gender equity/family friendly research workplaces

Although women receive nearly half of all doctoral degrees, they make up only about 17% of tenured science faculty in the US[13]. Snapshot data from Australia collected in 2007 show that despite relatively high levels of female participation at undergraduate (55-60%) and even postgraduate (50%) phases there are persistently low levels of representation of women at senior levels of academia. The gender inequality is obvious as you progress through the academic levels; Level A (51% females), Level B (40%), Level C (20-25%), above Level C (10-15%). In 2011, there were almost twice as many men (60%) as women (38%) listed as CIA on active NHMRC research grants[11]. A major issue is that the early-mid career stage often coincides with a woman's child-bearing years and is a demanding time for young families. This has become an even more prominent issue as the length of the postdoctoral career phase has increased.

Recommendations

7. Establish standard requirements for universities and institutions to provide increased support for women and establish gender equity policies. *Such policies have been developed and implemented at the Walter & Eliza Hall Institute for Medical Research in Melbourne[14]. Initiatives such as increased access to childcare facilities, flexible working hours and the option to occasionally work from home would provide greater support to women and young parents.*

8. Provide technical support during parental/carer's leave through protected funds. *This would greatly enhance the ability of women and those with family commitments, to remain competitive in science and reduce the gap in their publication record.*

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

The recent allocation of $700 million by the Australian Government toward the building and upgrading of health and medical research training facilities across Australia is greatly welcomed by the Research Community. However, this may be counter-productive unless there is an equivalent investment in people. The Government clearly recognises that Australia is home to some of the best scientific researchers and medical pioneers in the world. Sustaining this international reputation will require continued commitments to research training and salary support.

The National Institutes of Health (NIH) K award system provides a mentored fellowship scheme (both laboratory and clinical fellowships are provided)[15]. This serves as a bridge to independence with 2-3 years in a mentored postdoctoral position followed by 2-3 years as an independent investigator. This is further supported by an extended period of support by the university/institute until tenure is established (this has increased from 3-4 years to 7-9 years at many US universities). In the UK, the Royal Society recognises the challenges EMCRs face and has established 30 new EMCR fellowships that provide 5 years of support for the fellow and one research assistant. This is renewable (dependent on progress reports and letters of reference) for another 3 years, with a final 2 years of support an option also if needed — ten years total for an EMCR and an RA.

The question is often asked: how do we attract, develop and retain a skilled research workforce capable of meeting future challenges and opportunities? The answer to this question will require implementation of the initiatives we recommend to adequately train and support researchers (particularly EMCRs) in the future. This may include *(1)* developing PhD training programs that produce world-recognised and highly competitive PhD graduates, *(2)* providing significantly more EMCR fellowships, *(3)* developing a clearer career path and structure, and *(4)* recognising the needs of female researchers with children and providing sufficient support when required. Career establishment, development, progression, security and retention are all key issues that urgently need to be addressed. It is clear that more EMCR awards should be made available and could potentially be drawn from a dedicated funding pool, which may eliminate the issue of competing with established senior researchers who have extensive track records in particular fields.

Recommendations

9. Establish EMCR Fellowship programs that focus on the transition from postdoctoral fellow to independent researcher.

10. Increase security for mid-career researchers with longer-term, more permanent positions.

a. Better measures of productivity

As of 2002, the median age at which PhD researchers receive their first NIH grant in the US was 42 years[16]. The average age for chief investigators in the NHMRC project grant system for 2010/2011 was 50.5 years. The majority of scholarships and fellowships available through various funding agencies are targeted toward PhD students and recently graduated postdoctoral fellows. Fewer fellowships (e.g. NHMRC Career Development Fellowship and ARC Future Fellowships) are available for more senior postdoctoral fellows and they are extremely competitive. In recent years, many of these fellowships have been awarded to investigators running established laboratories containing several postdoctoral fellows and graduate students. The initial main purpose of these awards was to allow EMCRs to establish independent research careers; however, due to the extremely competitive funding environment that now exists, these awards have been used as a stop-gap to help established researchers during times of financial difficulty. For example, 14 of the 66 NHMRC Career Development Fellowships awarded in 2011 went to individuals at the Associate Professor level or higher, while 47 of the 86 NHMRC Research Fellowships awarded in 2011 went to senior investigators at the Professorial level with well-established research careers.

Importantly, a 20+ year gap exists between the relatively well-supported early career stage and the average age at which researchers are receiving independent research funding. For example, the highly competitive Career Development Fellowships support EMCRs up to 12 years post-PhD (approximately age 36-40 years) but the average age of those attaining a Senior Research Fellowship (SRF) has also increased to 45 years. All SRF applicants (100%) who ranked 'excellent' in 2002 were awarded their SRF. This dropped to 0% (zero) in 2010[16]. Even SRFs who rank in the top 10% globally are finding it challenging to obtain salary support. These are all clear indicators of the current strains on the NHMRC funding system.

Inclusion of contributions to community, education and policy development may be considered. Student supervision and mentoring must also be included. This could be tracked on the NHMRC's RGMS system (similar to NIH grants system) where Group Leaders are required to state when an EMCR began in their lab, what they achieved in that time and where they moved on to from there.

<u>Recommendation</u>

11. Have a more comprehensive assessment of scientific productivity and contribution for both fellowship and grant applications (e.g. publications/citations alone do not suffice).

b. Collaboration and networking – travel needs

With increased collaborations nationally and internationally, the need for travel funds has significantly increased. Although modern communication technologies readily facilitate updates, the need for face-to-face contact is increasingly more important, especially when investigators come from different disciplines. Scientific meetings are frequent in single-discipline research, but multiply in interdisciplinary research. Students training in rural and/or regional areas should have the opportunity to travel to collaborating laboratories and scientific conferences. Students attending and presenting their work at scientific meetings is an excellent way for them to network and explore their postdoctoral options.

<u>Recommendation</u>

12. Ensure NHMRC project grants provide dedicated funds for travel to conferences/collaborators.
The inability to use NHMRC funds for travel would disproportionately affected mid-career researchers, with limited opportunities to access external travel grants to present their work and has resulted in the loss of valuable networking opportunities. Perhaps funds designated specifically for travel should be incorporated into project grants, PhD scholarships and NHMRC fellowships.

c. Increased rounds of grant applications

The NIH has four submission rounds per year. It is a mentored system where an investigator can receive feedback, address the issues raised and resubmit to the same committee. The NHMRC has only one submission round, placing significant pressure on the entire research community at the same time of the year, every year. Though the mentored system may be challenging to achieve in Australia with fewer investigators to serve on grant panels, we believe that one additional round per year for project grants is valid. This would alleviate 'whole community' stress, but also facilitate funding overlaps and/or bridging support that can be important in maintaining personnel until new funding can be attained. Bridging funds could be provided to more individuals if the time period was reduced from 12 months to 6 months. One possibility could be that 'near-miss' grants in the first round are invited for resubmission to the same panel in the second round. To reduce the assessment and administrative burden, the number of applications allowed could be reduced to 3 Project Grants per round.

<u>Recommendation</u>

13. Implement at least one more submission round later in the year (e.g. September), which may be linked to the first submission round for those applications that missed out on funding. *This would reduce stress of 'waiting a year' for the next round and improve continuity of research funding and personnel. It may also reduce the administrative burden on the NHMRC. However, we acknowledge that it would require more time from grant review panel members.*

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

a. Interdisciplinary research and collaborations

It is also essential that we continue to improve National and International interdisciplinary collaboration between education, research, clinical and other public health related sectors. A recently mooted initiative of the proposed Academic Health Science Centres (AHSC) should be supported in order to answer some of the larger public health questions. An AHSC is a partnership between a tertiary health care provider, medical research institute(s) and a university. Together they drive a 'care continuum' from innovation, to bedside, to the community, aiming to deliver the latest advances and highest standards to patients. This ensures that there is a critical mass of experts that are brought together, rather than all competing for the same pot of money. We understand that there is a culture clash between federally funded autonomous universities and state funded hospitals managed as a separate conglomerate in each state and subject to local politics and regional priorities. The emphasis in state health departments is generally more on homogeneity than the excellence strived for in academia. This engenders turf wars between universities and hospitals over their diverse missions, priorities, operational frameworks and employment conditions, with process and contracts frustrating attempts to bridge the gap. Cost shifting replaces what should be cost sharing. One major barrier to the establishment of AHSCs is that the three pillars — research, education and health care — are overseen by three separate federal government departments and thus three separate ministers. Finally, Australian health care is delivered in a pluralistic mix of private and public funding. None of these issues are unique to Australia or insurmountable[17].

<u>Recommendation</u>

14. Introduce, encourage, support and fund Academic Health Science Centres in Australia. *Initially only one AHSC may be awarded for each State, to facilitate collaboration between traditional 'competitors'. There may also be opportunity for funding from Non-Government Organisations (NGOs) who are almost forcing scientists to collaborate and communicate in an interdisciplinary fashion. They will not fund duplicate research after working so hard for the funding. These NGOs also want to see senior scientists mentoring EMCRs, which is excellent and something that the NHMRC should also focus on.*

b. Research Innovation

Australians are doing extremely interesting and valuable research but often their ideas are publicised and commercialised outside Australia. At the recent 'Science meets Superannuation' Summit held in Melbourne[18] thought leaders from the science and innovation sector and the superannuation industry were brought together for the first time to discuss barriers and opportunities to investing in

Australian knowledge and innovations. It was acknowledged that research findings lead to the development of innovative new industries as well as productivity benefits through better health outcomes. It is important that we improve Australia's capacity to capitalise on its investment in health and medical research through commercialisation. By increasing the commercialisation skills of Australian researchers, the government has an opportunity to change that. This would facilitate the link between the business sector and research/academia in the future. There are great examples of where this works quite well; one is CSIRO which has an excellent track record of translation of basic research/science/inventions/discoveries to practical/lucrative/financial outcomes.

Recommendations

15. The Government could offer funding/scholarship/loans to PhD students and EMCRs to attend commercialisation/IP management courses as a part of their research training. *One great example of this is the Melbourne Business School Graduate Certificate of Commercialisation[19]. Under this scheme, PhD students study four commercialisation subjects at Melbourne Business School during their higher degree. The Commonwealth government subsidizes the tuition fees, and provides a $10,000 cash stipend to each student. This sort of initiative should be encouraged and continue to be supported.*

c. Translation of research into policy

Translation of health and medical research into better health and wellbeing can be improved by greater and more constructive interaction with Parliament members and in particular the Department of Health who establish the policies. It is essential that science/PhD graduates are intimately involved in the establishment and implementation of Government health policies and programs.

Recommendations

16. Establish Government funded science policy fellowships and secondment programs for EMCRs and similar short-term opportunities for more senior investigators. *The American Association for the Advancement of Science has had Science Policy Fellowships for postdoctoral fellows since 1974. There would need to be formal recognition of the value of these secondments on grant/fellowship review panels, otherwise it could be seen as detrimental to an individual's research track record.*

17. Facilitation of roundtable discussions/open forums/meetings between scientists and policymakers.

18. Consider one or two policymakers with scientific training serving on NHMRC Grant Review Panels.

d. Translation of research into medicine

Translation of health and medical research into better health and wellbeing can be optimised through increased funding to medical research. With a bench-to-bedside focus, cutting-edge translational research plays a key role in developing novel medical treatments.

Recommendation

19. Establish funds dedicated for translational and public health research. *Streamline the process of moving a therapeutic treatment from bench-to-bedside, this would reduce the amount of time senior investigators and EMCRs spend administrating ethics/regulatory protocols. For example, pharmacological companies aim to expedite translation of bench research into the clinic by reducing ethical approval time, reducing regulatory needs, streamlining pharmaco-vigilance and reducing TGA/FDA approval time. More support for clinically trained researchers to encourage more clinicians into the lab.*

4. How can we optimise translation of health and medical research into better health and wellbeing?

Whilst the 2011 Federal Budget provided a 4.3% increase in funding to the NHMRC, the NHMRC website states that commitment to new projects across its funding schemes dropped from $767 million in 2010 to $757 million in 2011[20]. A 4.3% increase barely covers the health-related Consumer Price Index for 2011 of 3.6%, let alone the increased direct and indirect costs of research. This has resulted in a very small increase in the number of new projects funded (2010: 1243; 2011: 1254), which peaked in 2008 at 1353[7]. It is essential that there be at least sufficient research funding made available by the Australian government in order to maintain a healthy and internationally competitive research community. Currently, NHMRC funds only support base salary with no provision for indirect costs. It is illogical that the greater an investigator's success in obtaining grants, the greater the resulting burden on the institution. The gap or shortfall ranges from 17 to 33%, depending on the institution where the researchers are employed and the research is performed. It is then up to individuals or organisations to cover the shortfall. Both the Review of Australian Higher Education 'Bradley Review' and the Review of the National Innovation System 'Cutler Review' stated that this is not sustainable. Furthermore, given the current economic climate, there can no longer be a reliance on additional funding coming from NGOs and philanthropy.

The current NHMRC budget is still not adequate given that approximately 75% of submitted NHMRC project grant proposals in 2011 were assessed as being fundable, but just under 23% were actually funded, down from 30% in 2000[7]. Adding an extra burden an already stressed NHMRC system is the fact that the ARC has a policy that 'A research proposal will be deemed ineligible for funding under the Discovery Projects, Discovery Indigenous, Discovery Early Career Researcher Award, Australian Laureate Fellowships and Centres of Excellence schemes if it is primarily and substantially aimed at understanding or treating a human disease or health condition'[21].

It is important that as researchers, we are accountable to our key stakeholders (taxpayers/general public). It is understandable that in the current highly competitive environment the safest option is to fund grant proposals submitted by established senior researchers who can clearly show feasibility and have a proven track record in a particular field. However, in the long term this is not sustainable since it is extremely difficult for EMCRs (who do not have a proven track record) to establish independent careers.

Greater philanthropic engagement

Philanthropy is an under-utilised avenue of funding in Australia and one which must be pursued more vigorously and facilitated with tax relief plus incentives for major private donors. The US and UK research establishment rely heavily on the generosity of philanthropic donors. This is an under-utilised avenue of funding in Australia and one which could be pursued more vigorously. Indeed the establishment of a philanthropic fund (similar to the Wellcome Trust, UK or the Howard Hughs Medical Institute, US) would contribute significantly to the future growth of the Australian research community.

<u>Recommendations</u>

20. Provide potential tax-break incentives for businesses investing in health and medical research in Australia.

21. Reduce the cost of doing science by decreasing import tax on scientific reagents and consumables.

22. Provide more public-private partnerships and ARC 'Linkage' style grants within the NHMRC system.

23. Establish a major National Philanthropic Trust, similar to the UK 'Wellcome Trust' as was recommended by Research Australia in their 2010 'Vital Research for a Vital Australia' document.[22]

References and Notes

[1]DEEWR Higher Education Data Collection, 2011 http://www.deewr.gov.au/HigherEducation/Publications/HEStatistics/Publications/Pages/Staff.aspx
[2]Returns on NHMRC funded research and development; Deloitte Access Economics & Australian Society of Medical Research (ASMR), October 2011
[3]Exceptional Returns - The Value of Investing in Health R&D in Australia; Deloitte Access Economics & ASMR, 2003. www.nhmrc.gov.au
[4]OECD Health Division (June 30, 2011). 'OECD Health Data 2011 — Frequently Requested Data'
[5]ABS Research and Experimental Development, All Sector Summary, cat No. 8112.0
[6]Fang & Casadevall, Infection and Immunity Editorial 80: 897-901, 2012
[7]Research Skills for an Innovative Future, Research Workforce Strategy, Department of Innovation, Industry, Science and Research 2011
[8]http://www.invasiveanimals.com/education/
[9]http://www.atn.edu.au/IDTC/about/background.htm
[10]http://www.uq.edu.au/grad-school/career-advantage-phd/about
[11]Warwick Anderson, NHMRC Overview: Western Australian Funding Profile in NHMRC Funding Schemes. Feburary 24, 2012. UWA.
[12]http://www.graduatecareers.com.au/Research/GradJobsDollars/MasterResearchPhd/LifeSciences/index.htm
[13]Goulden M et al. Keeping women in the science pipeline. Ann Am Acad Pol Soc Sci 638:141-162, 2011.
[14]http://www.wehi.edu.au/about_us/gender_equity/
[15] www.nih.gov
[16] www.nhmrc.gov.au
[17]Academic health science centres in Australia: let's get competitive, Medical Journal of Australia, Vol 194(2), 2011
[18]http://scienceandtechnologyaustralia.org.au/uncategorized/register-now-science-meets-superannuation/
[19]http://www.mbs.edu/go/degree-programs/phd-and-research-programs/graduate-certificate-in-commercialisation/graduate-certificate-in-commercialisation
[20]http://www.nhmrc.gov.au/grants/research-funding-statistics-and-data
[21]http://www.arc.gov.au/applicants/md_research.htm
[22]Vital Research for a Vital Australia, Health and Medical Research Federal Election Policy Proposal, Research Australia 2010

Key abbreviations

AHSC – Australian Health Science Centre; ARC – Australian Research Council; ASMR – Australian Society for Medical Research; EMCRs – Early-Mid Career Researchers; NGOs – Non-Government Organisations; NHMRC – National Health & Medical Research Council; NIH – National Institutes of Health

Declaration

Some members of the Forum are, or have been, recipients of funding from Government, including the NHMRC and ARC.