aamri

Association of Australian
Medical Research Institutes

SUBMISSION TO

REVIEW OF AUSTRALIA'S RESEARCH TRAINING SYSTEM

August 2015

Contact:

Professor Doug Hilton
President
Association of Australian
Medical Research Institutes
ABN 12 144 783 728

PO Box 2097
Royal Melbourne Hospital VIC 3050
president@aamri.org.au
www.aamri.org.au

ABOUT AUSTRALIA'S MEDICAL RESEARCH INSTITUTES

The Association of Australian Medical Research Institutes (AAMRI) makes this submission on behalf of our 46 member institutes. The vast majority of AAMRI's members are *independent* medical research institutes (MRIs), that is, mission-driven medical research charities legally independent of a university or hospital, and co-located with a hospital or healthcare provider. Collectively Australia's MRIs have over 10,000 staff and students and an annual turnover of more than $1 billion. Their research ranges from fundamental biomedical discovery through to clinical research and the translation of research findings from bench to bedside. Together they cover an extensive range of human health issues, from preventative health and chronic disease, to mental health, Indigenous health and improved health services.

MRIs supervise and train over 1,500 Higher Degree Research (HDR) students each year.[1] Through their close links with health service providers, MRIs provide a unique research training environment intimately linked to clinical practice. They also help build links between the health system and the research sector by affording medical students and health practitioners easily accessible, world-class research facilities and training.

[1] Number of HDR students as at 1 July 2013; based on data collected from MRIs.

EXECUTIVE SUMMARY

AAMRI believes there is an opportunity to improve the quality and consistency of HDR training in Australia by requiring mandatory training in key skills areas, such as business development, project management and communication. In particular, if Australian research is to remain internationally competitive, researchers need an improved understanding of technology transfer and business development. We also recommend mandatory training of supervisors. Any increase in training requirements for HDR students needs to consider the financial implications for universities, and impacts on degree length.

In order to improve the international standing, experience and career progression of Australian HDR graduates, AAMRI suggests that the extension of PhD funding to four years be considered. Best practice elements of international systems should also be contemplated, including a viva or oral examination for PhD completion. We recommend more opportunities for students to undertake part of their project outside the academic setting (e.g. through funding for internships or industry-based scholarships), and suggest structural changes to career support schemes for clinician researchers and other professionals to encourage them to undertake HDR training in their industry setting.

Finally, we'd like to highlight that the consultation questions do not comprehensively cover the review's terms of reference, including issues raised in the discussion paper. Of particular importance to MRIs and other non-academic organisations that supervise HDR students is the fact that most Government funding to help meet HDR training costs does not make it outside the university system. In most cases, MRIs and non-academic organisations incur the full research costs of the HDR degree students they train. The current system financially penalises industry, MRIs, government agencies, hospitals and other non-academic organisations for training HDR students, and ultimately limits opportunities for students to undertake industry-relevant training.

We look forward to further discussing these important topics underpinning Australia's research training system.

CONSULTATION QUESTIONS

PRODUCING HIGH QUALITY RESEARCHERS

1. What are the research skills and experiences needed to be an effective researcher?

Regardless of the research setting (whether academic, not-for-profit, government or commercial), skills and experiences that are crucial to be an effective researcher include:

- Understanding and execution of principles, techniques and procedures specific to the research discipline
- Training in code of conduct, ethics, health and safety, and intellectual property arrangements
- Critical thinking, critical analysis and problem solving skills
- Critical evaluation of research literature
- A sound understanding of statistics and their practical application
- Project design and management
- Grant and research paper writing skills
- Communication skills – written and oral
- Time management skills
- Team work and engaging in collaborations
- Student supervision and mentoring.

Beyond this, other skills that are extremely valuable to a researcher, particularly given the increased emphasis in the modern research system on translating and communicating research findings to improve their impact on society include:

- Training in technology transfer and business development
- Public speaking and engagement
- Experience in peer review.

While some of these skills are readily acquired in the undertaking of a HDR project, others (e.g. statistics and business development skills) are more appropriately learnt through coursework.

2. What broader transferable qualities do HDR graduates need to develop to succeed in a wide range of career pathways? Should these skills be assessed, and if so, how?

Many of the skills outlined in Qu 1 are transferable to other career pathways, and would assist HDR graduates in succeeding in a range of professions and employment settings. We note that the review discussion paper uses the fact that doctoral graduates have high levels of employment, including over half outside academia, as an argument that graduates already have skills that employers value. While this might be true, these data do not address whether these graduates are employed in positions commensurate with their level of training or based on the aforementioned skills. As the discussion paper raises, more comprehensive information is required on the skills and employment pathways of HDR graduates.

In particular, AAMRI believes there is an opportunity to improve the skillsets of HDR graduates across Australia by requiring mandatory coursework or training in critical skills areas, such as technology transfer, business development, project management, statistics, critical analysis and communication skills. There are several examples of best practice professional development courses in some of these areas, such as the Molecules2Medicines internship program for Victorian early-career researchers, which provides practical experience in business development and technology transfer, and the Translational PhD Program offered by Monash University's Faculty of Medicine, Nursing and Health Sciences, which includes coursework in clinical trials, biostatistics, bioethics and translational research.[2]

Coursework should provide practical examples and experiences, and may include mandatory components and/or elective modules that students can choose based on their interests and relevance to their project or potential career path.

We do not believe it necessary that these skills be assessed. However, as outlined further below, we support the requirement for a viva or oral presentation for HDR completion. This provides students with critical experience in communicating and defending their work.

3. What other broader capabilities should HDR graduates develop during their research training?

Clearly, those researchers with hands-on experience in industry, clinical, government or policy settings will acquire a unique set of 'industry'- and research-relevant skills. Opportunities for such industry or applied work experience is lacking in the Australian HDR training system. It is unlikely that such experience could be made available to all HDR students. However, there is scope to improve access for a greater number of students through Government funding for internships and industry-based travel scholarships. Care should be taken to ensure that the definition of 'industry' experience is not limited to commercial industry, but recognises other non-academic settings such as government agencies, non-government organisations and clinical settings, as well as a range of research-relevant work experiences (e.g. in regulatory and business development).

CONTRIBUTING TO AUSTRALIA'S FUTURE PROSPERITY AND WELLBEING

4. What skills and capabilities do employers in Australia need from HDR graduates?

See Qu 1-3. Clearly, many of the skills gained by HDR graduates, such as critical analysis, written and oral communication skills and project management skills, are valuable to a range of professions and sectors. Another important factor is real-life job experience, for example, from internship opportunities.

5. What research skills and capabilities are needed to ensure Australia's research system remains internationally competitive?

The international competitiveness of Australia's research system needs to look beyond the academic setting and traditional academic output measures to the broader research system (including industry, government, not-for-profit organisations and health settings) and measures of research impact. It is well recognised that Australia's performance in the translation of research into new products and services falls short of international benchmarks. Australia is well below the OECD average in the number of triadic patents per GDP, and the level of collaboration between business firms and

[2] http://molecules2medicine.org/; www.monash.edu.au/pubs/handbooks/aos/translational-research-phd-program/

universities/public research institutions.[3] And while Australia ranks 10th out of 143 countries in innovation input in the 2014 Global Innovation Index report, we rank 22nd in innovation output.[4] The proportion of Australian researchers employed in industry is also less than half the OECD average.[5]

If Australia's research system is to remain competitive, researchers need a better understanding of and training in intellectual property (IP) capture, technology transfer and business development. These skills are as relevant to the academic researcher in recognising the potential applications of their research findings as they are to researchers in an industry setting.

Multi-disciplinary research is also becoming increasingly important in opening up new frontiers in research. The future competitiveness of Australia's research system will rely on more researchers having knowledge and skillsets that span multiple disciplines, such as mathematics and biology, engineering and medicine, or economics and health. Therefore, the Australian research training system should include more multi-disciplinary HDR projects, with co-supervisors from different disciplines and academic faculties.

Finally, for Australia's research system to remain competitive, research groups also need to be run by capable managers. Emphasis should be given to bolster researchers' people and organisational management skills. These are not always easily learned and are also applicable in other industry settings.

6. What research skills and capabilities are needed from HDR graduates to ensure Australia is ready to meet current and future social, economic and environmental challenges?

In addition to improved skills in technology transfer and more multidisciplinary HDR projects (see Qu 5), the capacity of Australia's research community to meet future social, economic and environmental challenges requires the embedding of research in industry, government and not-for-profit sectors. Some potential drivers of this are an increase in HDR student opportunities to undertake part or all of their research outside of the academic setting (e.g. through internships), as well as providing professionals in non-academic settings better opportunities to undertake HDR.

For example, in the health arena, research-active health professionals are in a unique position to identify needs to drive innovative solutions in Australia's health system, and to translate research findings into clinical practice. However, there is a deficiency in clinicians and health professionals who have HDR training or strong research backgrounds. This is where MRIs play a crucial role, by providing clinicians and other health professionals with an organised environment conducive to research training and excellence. However, there remains little incentive – and a significant financial disincentive – for health professionals to take time out to complete HDR training. Career support schemes for clinician researchers require development, including training programs that allow concurrent research and medical/specialist training, and remuneration commensurate with clinical activities.

[3] OECD Science, Technology and Industry Scoreboard 2013; OECD Main Science and Technology Indicators Database
[4] Global Innovation Index Report 2014; www.globalinnovationindex.org/content.aspx?page=gii-full-report-2014#pdfopener
[5] OECD Main Science and Technology Indicators Database

RESEARCH TRAINING SYSTEM

7. What features of the research training system should be retained to ensure our graduates are internationally competitive?

Based on the Higher Education Standards Framework, the aspects of learning environment, teaching, and research and research training are all strong in the Australian research training system, although improvements can be made, as outlined throughout this submission.

The primary failing is in governance and accountability. In particular, we would like to use this opportunity to address issues with the funding system underpinning the quality of Australia's research training system, otherwise not covered by the consultation questions.

AAMRI supports the retention of Australian Postgraduate Award and International Postgraduate Research Scholarships to help the most competitive HDR students to meet living expenses. The review discussion paper raises the option of including the cost of tuition fees in these scholarships. However, because the charging of tuition fees is left to a university's discretion, including funding for these fees in Government scholarships might unintentionally encourage universities to charge the maximum fee when they otherwise might not do so.

The Government also provides funding to universities through the Research Training Scheme (RTS) and the Joint Research Engagement (JRE) scheme to help meet the training and research costs of HDR students. Funding levels provided through the RTS and JRE scheme are based on a range of metrics, including, respectively, HDR student completions (50% weighting) and HDR student load (30% weighting).[6]

AAMRI supports the retention of a Government funding scheme that comprehensively meets the costs of training HDR students. However, we strongly recommend changes to the current framework so that funding for the training of HDR students is split equitably across those organisations responsible for training the HDR students. The current system financially penalises organisations outside the university system for training HDR students.

This issue arises because the Government directly provides RTS and JRE funding to universities, even for those students who undertake their research project and training at an external organisation, such as an MRI, hospital, business or government agency. Universities are under no obligation to pass on funding they receive for the training and indirect/direct research costs of HDR students to the external organisation. Consequently the extent to which these organisations are reimbursed by affiliated universities for HDR costs varies dramatically, and is rarely commensurate with the costs incurred. Compounding this issue is the fact that RTS and JRE funding can be expended at universities' discretion. Because universities (like MRIs) are chronically under-funded for the indirect costs of research, they often rely on RTS and JRE funding to cross-subsidise the indirect costs of other university research.

Ultimately, the current research training funding system limits the ability of MRIs and other non-academic organisations to provide opportunities to HDR students to gain experience in settings outside the university sector and broaden their industry-relevant skills. It also has the potential to hinder links and workforce flows between universities and other sectors.

[6] https://education.gov.au/research-block-grants-calculation-methodology

8. How should the research training system be structured to produce high quality researchers who can contribute to Australia's future prosperity and wellbeing?

As outlined earlier, there is an opportunity to improve the quality and consistency of HDR training by requiring formal coursework in key skills areas. This should include training in technology transfer, business development, project management and communication skills. Of course, any increase in HDR training requirements would need to consider the financial implications on universities, as well as the impact on the average length of a HDR degree. We also recommend more opportunities for students to undertake part of their research experience outside the academic setting (e.g. through funding for internships or industry-based scholarships). Structural changes to career support schemes for clinician researchers and other professionals are also needed to encourage more individuals to undertake HDR training in their industry setting.

Consideration should also be given to extending funding for PhD students to four years. While the length of a PhD will be affected by the research discipline, project and a range of other factors, it is rare for a student in the lab-based biological disciplines to be adequately trained and to be producing the research publications and outputs necessary to help set her/him up for a successful career progression in less than 3.5 years; four years is the norm.

To improve the experience, international standing and career progression of Australian HDR graduates, best practice elements of international systems should also be considered. In particular, we support the requirement for a viva or oral examination for completion of the PhD degree. This encourages students to read outside their own immediate area of research focus and gives them the only real opportunity to defend their research in detail. It also gives them valuable experience for future grant and paper review rebuttals, job interviews, and seminar presentations. Consideration might also be given to aspects of the PhD system in the UK, where the student first enrols in an MPhil course, with progression to the PhD course requiring successful completion of an oral examination and a 'mini thesis' within the first 12-18 months. This offers a checkpoint on the student's research, writing and critical thinking skills without affecting the length of the overall HDR course.

Finally, AAMRI strongly supports mandatory training of HDR supervisors.

9. How can entry and exit pathways to and from research training be better structured?

See Qu 6 regarding providing professionals working in non-academic settings more opportunities and better support to undertake HDR.

In addition, the fact that domestic students have a single entry point each year can cause entry pathways issues for those individuals out of alignment with the academic year. Clinical students have a number of potential entry points into HDR, but may drop out if they are accepted into a specialised clinical training scheme due to competing priorities and motivations. This can have adverse effects on the research group providing the student a training environment.

A barrier to attracting the best international HDR students to Australia is the high international student fees charged by some universities. This limits the international competitiveness of Australia's research system. If these fees were passed on in full (or almost in full) to MRIs and other external organisations for those HDR students they train, the MRI/organisation could choose to refund the fees to the student and effectively remove this barrier.

Exit pathways from HDR training would likely be improved by obtaining input from relevant stakeholders (i.e. non-academic employers) on the structure of HDR. Financial support for internships might also help offset the current lack of industry experience of many HDR candidates.

10. How can barriers to participation in HDR programs be overcome so that more candidates from non-traditional backgrounds, including indigenous students, undertake research training?

Targeted scholarships may help improve the participation of individuals from non-traditional backgrounds in HDR. Credit for workforce experience and non-university training courses could also assist. Ultimately, one of the biggest barriers to participation in HDR programs (for candidates from all backgrounds) is the lack of financial stability of a career in research. Even before they embark on a PhD, students are very aware of the difficulties researchers face in securing sufficient funding.

AAMRI MEMBERS