INQUIRY INTO RESEARCH TRAINING AND RESEARCH WORKFORCE ISSUES IN AUSTRALIAN UNIVERSITIES

The Walter and Eliza Hall Institute of Medical Research
1G Royal Parade, Parkville VIC 3050
Tel: 03-9345-2555; Fax: 03-9347-0852

Submission contact: Professor Suzanne Cory, Director (cory@wehi.edu.au)

Submission prepared by Professor Douglas Hilton (Chair, WEHI Education Committee), Dr Julie Mercer and Professor Suzanne Cory (Director).

The Walter and Eliza Hall Institute of Medical Research (WEHI) is one of the world's leading medical research centres. The work of the Institute covers cancer, immunology, haematology, malaria, autoimmune diseases, genetics, bioinformatics, structural biology, medicinal chemistry and drug discovery. Over many decades, the Institute's advances and discoveries have led to significant benefits for patients around the world.

WEHI is a not-for-profit company governed by a strong independent Board, headed by Mr Leon Davis AO. WEHI is affiliated with both The Royal Melbourne Hospital and The University of Melbourne and hosts the Melbourne Division of the Australian Genome Research Facility and the CRC for Cancer Therapeutics.

The ongoing success of WEHI is inextricably linked to a highly skilled Australian research workforce and a dynamic research training environment. WEHI has approximately 650 staff, 66% having science degrees and 36% having Masters degrees or PhDs. WEHI offers postgraduate training as the Department of Medical Biology of the University of Melbourne. At any one time, around 80 full time PhD students are enrolled with WEHI.

Promotion of science education in schools and enhancement of science communication is part of WEHI's core business. WEHI is a co-founder of the Gene Technology Access Centre (GTAC), a life science learning centre for primary and secondary school students (~6000 pa) and their teachers (~600 pa). WEHI has also established a science animation unit, WEHI-TV, to showcase scientific discoveries, raise awareness and increase public understanding of biomedical research.

In this submission we seek to briefly highlight some of the major issues we believe are pertinent to the scientific research workforce in Australia, all of which are highly interrelated:

- Promoting science study in schools
- Promoting science study in universities
- Promoting scientific teaching and research as viable career choices

PROMOTING SCIENCE IN SCHOOLS

The engine house of Australia's future innovation is its primary and secondary schools. In the areas of mathematics and science, this engine is not firing on all cylinders. There is a major shortage of adequately qualified secondary science teachers[1], and the ageing of the existing science teaching workforce will potentially result in an even greater shortage of qualified science teachers in the next decade. There has been a steady decline in the proportion of secondary students studying science and mathematics in their final high school years, leading to a reduction in the proportion of students embarking on science degrees at University. The latter are not only the source of our innovators of the future but also our educators of the future. Unless this vicious cycle can be broken, the situation will only deteriorate further.

We congratulate the government on its commitments in the 2008 budget to reducing the maximum annual student contribution for undergraduate maths and science students to the lowest 'national priority' rate for new students and for the measures aimed at encouraging such students into the teaching workforce.

We encourage the Federal government to work with the States to increase the rate of remuneration to teachers, so that their value to society and our future prosperity is properly rewarded and there is no financial disincentive to embarking on teaching as a profession.

We also encourage the Federal government to support innovative science teaching programs, not only in their pilot phases but also in the longer term.

Recommendations:

- Take the national leadership role in increasing remuneration to secondary science and maths teachers.
- Encourage development of innovative science education programs such as the Victorian Government's Innovation Centres: GTAC, EcoLink and Space Centre.
- Maintain support for the Australian Academy of Science's Primary Connections[2].
- Provide support to allow *Science By Doing*[3], the secondary counterpart of *Primary Connections*, to be extended from its pilot phase.

UNIVERSITY SCIENCE EDUCATION

Attracting the best and brightest students into undergraduate science degrees is imperative if Australia is to have a vibrant and innovative science research and teaching workforce.

The workforce in universities is ageing, with the number of academics in the 50 years or older category representing 48.5% of the overall academic population in 2006[4]. Young graduates need to be attracted to pursue academic careers in the sciences or there will be no-one to train the next generations of innovators.

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[1] http://www.acds.edu.au

[2] http://www.science.org.au/primaryconnections/index.htm

[3] http://www.sciencebydoing.edu.au/

[4] DEST, 2006 data

Recommendations:

- Continue to implement measures that encourage people to train as science teachers and researchers, such as reducing HECS fees for science degrees.
- Make PhD study in the sciences more attractive by increasing the remuneration of Australian Postgraduate Awards (APAs) and ensuring a viable career path in academic teaching and/or research (see below).

TRAINING OF POST-GRADUATE RESEARCH STUDENTS

Quality and Quantity.

We congratulate the Federal Government on its $209 M Budget commitment to double the number of Australian Postgraduate Awards (APA). This measure will certainly help increase the number of students completing postgraduate research degrees.

Quantity is however only part of the story. The challenge is how to attract the *best and brightest* young people into research. For this stellar cohort, the choices are stark: pursue lucrative careers in medicine, law, and other professions or undertake a post-graduate research degree on an APA that is now set *below the poverty line*[5][6]. Our graduating students face challenging financial pressures: repayment of a major HECS debt, a housing crisis that makes renting in capital cities a major challenge and the possibility of owning a house a pipe dream, and inflation continually eroding buying power. An APA that sits below the poverty line is not sending the right message about what we value as a nation.

The second absurdity of the current system is that for a full time PhD student, the duration of their candidature is 4 years, yet APAs fund the student for only 3 years and six months.

Equitable funding of RHD students throughout the sector

Universities receive approx. $25,000 pa funding for RHD students via some of the DEST block grant schemes, primarily the RTS. In the biomedical research field, a significant proportion of RHD students train in independent medical research institutes (MRIs) such as WEHI, where they have the opportunity to work in advanced research-concentrated environments. These students are enrolled through partner universities. Medical research institutes receive only a fraction (approx. 10 – 15%[7]) of the funding received by their affiliated universities for a PhD completion. However, they bear the full burden of the considerable overhead and infrastructure costs required to support such students' research. MRIs have long held the view that funding for these students should be paid directly to the institutions providing the training.

Recommendations:

- Increase the level of APAs from $20,007 pa to $30,000 pa for a full time student.
- Extend APAs from 3 years 6 months to 4 years, with the extension contingent on student completion.
- Funding for RHD students should be paid directly to the institution hosting the student.

[5] http://www.melbourneinstitute.com/labour/inequality/poverty/

[6] http://www.capa.edu.au/media-releases/2008/apas-break-poverty-line

[7] Data from the Association of Australian Medical Research Institutes

CAREER PATHS FOR SCIENTIFIC RESEARCHERS

One of the major issues facing young people who have completed a PhD is the uncertainty and degree of difficulty of the career path of research scientists. Compared to other professional career paths such as medicine, law, business or plumbing, a career in scientific research is underpaid, under-appreciated and a lifelong struggle to obtain research funding. Opportunities for scientists in Universities and at organizations such as CSIRO have been reduced in the last decade as funding cuts have cut deep. With increased teaching loads for academics[8], academia is perceived as unattractive and it has become much more difficult to establish a research profile and thus secure research funding.

PhD graduates wishing to pursue an investigator-driven, research-only path, compete for salary funding through schemes administered by ARC and/or NHMRC. Both NHMRC and ARC offer postdoctoral fellowships (APDs and Training Awards) and mid-career fellowships (QEII, ARF and CDA) but these have a very low success rate and are extremely competitive. The next step to APF or the NHMRC Research Fellowship Scheme has become increasingly difficult to achieve: for example, NHMRC Fellowships now have an average age of entry in the mid 40's and applicants need to be ranked as *outstanding* to be funded - being merely excellent does not guarantee funding.

The new mid-career Future Fellowships funded in the 2008 Budget are most welcome and they should be made available to all research sectors – universities, medical research institutes and government research organisations. The addition of 200 of these fellowships each year for the next five years will significantly boost opportunities for young scientists and increase confidence at a critical career-point where many have opted out of the research workforce in the past. Without further attention, however, one blockage will have been removed from the career opportunity pipeline simply to be replaced by another blockage further along. What will happen to these young investigators if the number of competitive fellowships for established investigators (Australian Professorial Fellows (ARC-funded) and NHMRC Senior, Principal and Senior Principal Research Fellowships) is not also increased?

It is of concern that ARC Federation Fellowships, which were set up to retain the best researchers and innovators in Australia, are available to scientists in universities but not in MRIs. Although not explicit, the prohibition has effectively operated to exclude MRI candidates. We believe that there should be equal opportunity for people in MRIs to achieve success with these fellowships. Of note, the new NHMRC Australia Fellowship scheme is open to candidates in both universities and MRIs.

Recommendations:

- All ARC and NHMRC Fellowships should be tenable in both universities and medical research institutes.
- The number of competitive career investigator fellowships should be increased.

GENDER IMBALANCE IN SCIENCE AND MEDICINE

For many years now the percentage of women entering and graduating from university courses has been slightly higher than the percentage of men. At the lowest level of academic appointments, Level A, women outnumber men; however, the number of women

[8] Universities Australia, 2005

in senior positions in academia remains embarrassingly low, with only 11% of Level E positions in Australian universities in 2005 being held by women[9].

A significant cohort of women who have been through PhD and post-doctoral training do not progress further. These young innovators are being lost to the scientific disciplines in particular. They are not being lost because of a lack of success in the (fierce) competition for positions/grants. Rather, they are simply not competing. The principal reason for opting out is that it is just too difficult to balance the demands of a research career with that of a family.

Retaining women in the scientific workforce is essential if Australia wishes to hang on to, let alone increase, its innovation performance in the face of increasing competition from large science and technology-focussed countries such as India and China – we simply cannot afford to lose 50% of our talent.

The current parlous situation will not be turned around simply by requiring institutions to have Equal Employment policies – indeed, most already have such policies and act on them. The single most important factor that would improve retention of women in a research career is to increase the availability of high quality, readily accessible and affordable child-care facilities.

Research institutions should also be encouraged to implement more effective mentoring programs for women and opportunities for funding after career interruptions should be increased. We note, however, that it is very difficult to regain career impetus after an interruption and therefore it is preferable that job-sharing and flexible hours are offered and that child-care facilities are available close to the workplace.

Recommendations:

- EOWA, in partnership with DEST, could provide funding for mentoring programs in the research workforce.
- Introduce a child-care funding system that is flexible in its recognition of provider (e.g. relative, au pair, crèche, etc).
- Introduce a broad government-paid parental leave system that encourages both parents to participate in the family and their professions – the Swedish system of 12 months leave to be shared as agreed between the parents should be considered.
- Introduce flexibility in research grants to hire a replacement when a researcher takes parental leave. The academic research system is largely supported by grants, and maternity leave imposes significant stress on laboratories because the research must go on but there is no financial flexibility in the grant to hire an additional researcher.
- Opportunities for funding after career interruptions should be increased.

[9] AVCC, University Staff Profile, 2007