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Standing Committee on Industry, Science and Innovation
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RESEARCH TRAINING IN AUSTRALIA
House of Representatives
Industry, Science and Innovation Committee
– Supplementary Submission –

I would like to thank the House of Representatives Industry, Science and Innovation Committee for the opportunity to appear before the public hearing held in Sydney on Tuesday 5 August. As an early-career researcher interested in innovation policy, I believe that there is a genuine effort on the part of the committee to make long-term improvements to research training in Australia. This supplementary submission is being made in response to pertinent questions that were raised by committee members in relation to the original written submission.

S1 Concerns about the supply of scientists and the 'brain drain'.

The Productivity Commission has recently found that concerns about the supply of scientists – or so called 'brain drain' – are not well founded.[1] Information available from the Australian Bureau of Statistics (ABS) shows that Australian higher education providers devoted an additional 14.5% human resources to R&D in 2004, compared to 2002 – the majority (57.2%) being postgraduate students. This trend was continued, all be it with smaller growth (6.5%) in the period to 2006.[2] Retrospectively, the number of university researchers has increased by more than 28,000 in the period 1978/79 to 2002/03.[3]

[1] Productivity Commission, *Public Support for Science and Innovation*. Commonwealth of Australia, 2007.

[2] Australian Bureau of Statistics, *Research and Experimental Development – Higher Education Organisations* series 8111.0. Commonwealth of Australia, 2006. See: www.abs.gov.au.

[3] Barlow, T. *The Australian Miracle: An Innovative Nation Revisited*. Picador, 2006.

Complementing this was an approximate increase of 17,000 in the number of researchers employed by Australian businesses during the same period. In international terms Australia compares well with approximately 7.5 researchers per thousand people in the workforce compared with the OECD average of 6.5.[3]

S2 The excellent performance of medical research in Australia.

The USA provides a pertinent example of research investment in basic sciences – such as biology and chemistry – at the university level producing a vibrant medical research sector. Indeed, Australia provides its own example of this phenomenon, without necessarily having the equivalent venture capital industry and enabling infrastructure. A high proportion of universities contribute considerably more than 10% of their total R&D expenditures in the biological and chemical sciences. A more detailed investigation of 2004 R&D expenditure in these broad areas shows that the disciplines of Genetics and Cell Biology accounted for 23% and 21%, respectively. Similarly, Organic Chemistry accounted for 27% of R&D expenditure in the chemical sciences.[2] These disciplines form the basis of research applied to medicine at the bench level.

While Australia has established national priorities for publicly-funded research, it has thus far resisted the impulse of many governments in Europe to set highly prescriptive agendas that direct funds away from long-term, high risk research at the basic science level. A clear example rests with Germany, which increased federal government funding nearly ten-fold specifically for biotechnology between 1974 and 1995.[3] The result was actually a reduction in German biotechnology industry capacity, therefore illustrating the negative impact that top-down government intervention may have on research training.

In conjunction with the contribution from basic science research, the excellent performance of Australia's health and medical research sector has been a consequence of a $300 million increase in funding provided by the National Health and Medical Research Council (NHMRC) over the period 1999-2000 to 2006-07 in response to the Wills Report.[4] Expectations for even greater results are justified with the NHMRC to provide an additional increase in annual funding to more than $700 million for the current period 2008-09.[5]

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[4] *The virtuous cycle: working together for health and medical research*. Health and Medical Research Strategic Review. Department of Health and Ageing, Commonwealth of Australia, 1999. [www.health.gov.au/internet/main/publishing.nsf/Content/hmrsr.htm]

[5] Anderson, W. *NHMRC Research Quality*. National Health and Medical Research Council – Presentation to Group of Eight Universities, Canberra 7/6/2007.

Both of these factors have contributed to the growing focus in health-related research across Australian universities. Figure 1 shows that R&D expenditures aimed at health objectives grew faster (126%) in real terms for the period 1996 to 2004 than R&D expenditures across all other research themes (45%). This has enabled Australia to contribute more than 3% of the world's most highly-cited publications in health related disciplines for each of the past five years.

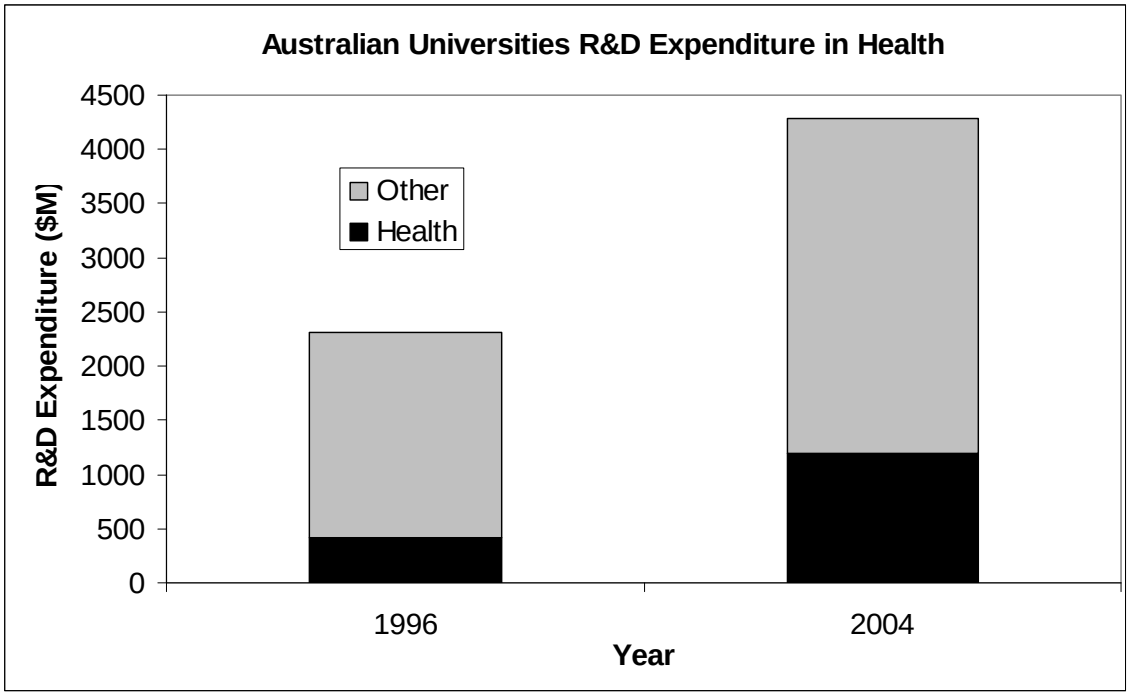

Figure 1: R&D expenditure for health in Australian universities for the years 1996 and 2004 (Data provided by the Australian Bureau of Statistics[2]).

S3 Collaboration in Australian research.

An important issue raised by the committee with reference to future success in medical research was the need for collaboration. Two points need to be clarified for the committee's deliberation:

1. There is significant potential for collaboration to improve comprehensive cancer care in Australia. These 'bench to bedside' models currently exist as centres of excellence in the USA and have been promoted locally by Professor Chris O'Brien. The effectiveness, however, of collaboration in this setting is determined by linking disciplines of cancer research – public health, basic science, clinical, and psycho-social/behavioural oncology – to enable translational outcomes for patients. It is obvious that collaboration in the form of many researchers each performing similar tasks is not an effective means of training in Australia, which leads to a broader discussion;

2. There has been an over-emphasis on 'collaboration' in Australian research. Indeed, almost every major research funding initiative from Australian

governments over the past twenty years has emphasised the importance of adopting a collaborative approach. What needs to be considered first and foremost, however, is that individuals innovate – not organisations and communities. A multidisciplinary approach is undoubtedly important in areas of increasing focus (e.g. biotechnology and nanotechnology) but it is the ability for an individual to access additional expertise from other disciplines that will enable improved research training. The recent ethos of Australia's research institutions that collaboration is an end in itself is contradictory to the fundamental outcome required from research training – that an individual develops the skills to translate an idea to concept. Teamwork is important, but not essential, for the development of concepts in discovery research.