

# INQUIRY INTO AUSTRALIA'S INTERNATIONAL RESEARCH ENGAGEMENT

## *RESEARCH AUSTRALIA SUBMISSION*

**February 2010**

## **About Research Australia**

Research Australia is a unique national alliance of over 170 member and donor organisations with a common mission to make health and medical research a higher national priority. For more information on Research Australia visit [www.researchaustralia.org](http://www.researchaustralia.org)

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## Introduction

International research collaboration is a cornerstone of both the basic and applied research sector in Australia. The world of research is global, competing across national boundaries, facilitated by the movement of researchers, ideas and capital across boundaries, and supported by ICT. The dynamic global health and innovation environment offers Australian medical research rich opportunities for growth, diversity and impact.

This Senate inquiry provides a valuable exercise in collecting information on Australia's international collaboration efforts. It does however highlight the lack of strategic knowledge of what is happening within this sphere and reinforces the timeliness of undertaking a strategic assessment of where Australia's international collaboration efforts should lie.

A major question we raise is how can Australia engage with international partners in order to generate national social and economic benefits to Australia and the world. What contribution can Australian research make to improve global health? How can we build on existing investment in knowledge, people and infrastructure to realise our full research and development potential?

## The nature and extent of existing international research collaboration

Australian medical and health research is renowned for its international focus and research collaboration.. Australian researchers are part of a global community who discover and learn with others through research exchange such as fellowships, workshops and conferences; projects and networks such as exchanging results to interactive participation through sharing of activities across international sites; offering access to and sharing the cost of medical equipment between facilities; long term relationships between laboratories; establishment of subsidiary laboratories in partner countries; sponsorship or participation in national programs.

### ***Case Study: NHMRC and Wellcome Trust fund Australian leaders in research***

Study of HPV-6 L1 virus like particles as a therapeutic vaccine for genital warts and recurrent respiratory papillomatosis

Total grant: £560 000

Wellcome Trust component: £310 000

NHMRC component: £250 000

Principal applicants: Professor Ian Frazer and Dr Jieqiang Lu

Coapplicants: BoBei Chen

Institutions of principal applicants: University of Queensland, Australia; Wenzhou Medical College, China

This project will examine the effectiveness of a vaccine designed to prevent tumours and cancers associated with papillomavirus infection as treatment for existing infections, and will look for predictors of a favourable outcome from treatment.

The nature and extent of international collaboration is both formal and informal. Where collaboration is informal between individuals at institutions we cannot measure the nature and extent of these relationships and what 'in kind' resources move across international borders to support such collaboration.

Research collaboration takes many forms, whether through people, funding and sharing of infrastructure. One measure of Australia's attractiveness internationally is through the receipt of overseas funding, which amounts to around \$121 million (4%) of Australian R&D spending.<sup>i</sup>

#### *Existing activity*

There is currently a range of funding activities that promote the international research experience but we lack data collection to quantify or understand the impact of this activity.

Current federal government funding of health and medical research for international collaboration includes, but is not limited to:

National Health and Medical Research Council (NHMRC) – European Union (EU) Collaborative Research Grants scheme, European Union Seventh Research Framework Program, the Human Frontiers of Science Program, the European Molecular Biology Laboratory

- NHMRC *International Collaborative Indigenous Health Research Partnership (ICIHRP)*
- ARC *Future Fellowships* and *Australian Laureate Fellowships* schemes
- ARC *Discovery Projects* for funding commencing in 2010 have also been changed to add a new internationalisation objective to the scheme
- ARC PhD stipends and Fellowships are open to international candidates
- Australian Postgraduate Award - Industry APA(I) and APA(I-IT) - stipends and overseas higher education organisations can participate as an eligible Partner Organisation.

Non NHMRC Funding through the MREA - Source of Funds									
Funding Arrangement	Source of Funds	2000	2001	2002	2003	2004	2005	2006	2007
Externally Funded	Externally Funded Total	\$3,723,453	\$4,321,064	\$1,920,115	\$1,988,226	\$2,601,921	\$3,429,904	\$4,958,321	\$8,359,163
	JDRF	\$600,000	\$1,090,167	\$4,030,098	\$3,569,600	\$3,569,600	\$3,569,600	\$3,218,933	
Partnership	Wellcome Trust					\$2,467,355	\$2,467,355	\$2,467,355	\$2,467,355
	Wellcome Trust & NZ HRC					\$837,224	\$837,224	\$837,224	\$837,224
	CIHR						\$113,318	\$338,000	\$328,000
	Partnership Total	\$600,000	\$1,090,167	\$4,030,098	\$3,569,600	\$6,874,179	\$6,987,497	\$6,861,512	\$3,632,579

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Research Australia notes the focus of the Senate inquiry may not necessarily elicit an industry perspective, which we consider to be essential given the significant role of industry in supporting domestic R&D. This also potentially underplays the enormous contribution made by the private sector through international investment. Recent restructuring of international pharmaceutical firms has seen a withdrawal of Australian research activity by pharmaceutical companies such as Johnson & Johnson, and increasing concerns about the cost of funding Australian based clinical trials. To date there has been a limited government response to stem the outflow of activity to other countries resulting in a loss of research activity and jobs from our growing knowledge economy.

In light of these comments we do not have a complete picture of what parts of the health and medical research sector are collaborating and the extent of their international capacity.

## **Infrastructure**

While the above examples provide a snapshot of government support, this mainly focuses on research conducted by individuals and specific institutions that compete for limited funding. Outside this activity, there are the collaborative research centres that offer infrastructure support for Australian researchers, frequently administered through state governments. This occurs in different ways. An evaluation of this sector would make a valuable contribution to the development of a better understanding of how Australian and international research are linked..

Examples of current funding by the Federal government that targets international collaboration includes<sup>iii</sup>:

- Expansion of the Walter and Eliza Hall Institute
- A new Australian Centre for Neuroscience and Mental Health Research
- A new Australian Regenerative Medicine Institute
- Creation of a new research 'super institute' Austin Research Institute (ARI) and the Burnet Institute
- A new bio resources facility for the Austin Biomedical Alliance
- Building the Australian Cancer Grid: a flagship eResearch project

## **Benefits of International Collaboration**

*Direct benefits include:*

- Access to complementary expertise, knowledge and skills that enhance scientific excellence. The motivation to find external expertise is particularly strong for smaller countries where national expertise may be absent.
- Access to unique sites, facilities or population groups.
- Sharing costs and risk that may be operational or where one country is the host to a large and expensive scientific endeavour to service regional research centres
- Access to new funding opportunities
- Contributions to solving global health issues
- Accessing large population study cohorts

## The key drivers of international research collaboration at the government, institutional and researcher levels

**Government:** By investing in research and development activity which combines Australian and international research expertise, Australia can build stronger scientific platforms, generate research expertise in areas of competitive strength, and be seen as an international leader. New investment by the Government will ensure we maintain our international reputation for research, attract the best and brightest people and generate commercial and clinical opportunities from a world-class research base. This creates a “virtuous cycle” which will attract the brightest researchers, leverage research investment from public and private sources, and further position Australia as a global contributor to R&D. The social and economic benefits derived from Australian R&D have been clearly documented<sup>ivv</sup>.

**Institutional:** Collaboration across borders provides access to wider expertise, fosters reputation enhancement and access to international capital. The biomedical sector offers a strong basic research base but generally lacks the capacity to undertake major investment support for Phase 2 and 3 clinical trials, along with marketing and commercialisation expertise that can link to global markets. The pharmaceutical sector is a major investor, contributing in excess of \$700million p.a. to research and clinical trial activity in Australia.

### ***Case Study: Australia & New Zealand support innovation research***

An example of international grant making that benefit several countries is Living Cell Technologies being Awarded NZ\$4.04 Million New Zealand Government Grant to advance DIABECCELL® for type 1 diabetes. This grant by the New Zealand government’s Foundation for Research Science & Technology supports development costs to upscale production of DIABECCELL® and conducts the NZ clinical trials.

**Individuals:** International collaboration contributes to the development of research expertise by providing exposure to the international community, contribution to international aid and health priority efforts, recruitment of staff and students. Individuals accessing competitive grants within an Australian setting may need to demonstrate international experience in order to gain funding.

**Collaborating countries:** Collaboration provide access to experience that may not exist within their own finite research market, PhD scholarships for students within an Australian health setting, wider access to patient cohorts beyond local boundaries. Supporting the diffusion of knowledge globally improves targeting of research dollars to maximise impact. A useful example is Australia’s contribution to research funded by the Gates Foundation. (See box below<sup>vi</sup>)

## ***Case Study: Australian research excellence attracts significant international philanthropic funding***

The Bill & Melinda Gates Foundation in 2009 awarded seven US\$100,000 grants to Australian researchers who are investigating ways of diagnosing, preventing and treating infectious diseases. The grants are a part of the Grand Challenges Explorations program run by the foundation, which offers a total of 76 US\$100,000 grants to combat disease in the developing world. This included:

- The Walter and Eliza Hall Institute, who is working on a live malaria vaccine that will elicit a strong immune response against diverse strains of the parasite
- The Macfarlane Burnet Institute for Medical Research and Public Health is researching a newly discovered mechanism in the malaria parasite that exports proteins into host red blood cells in an effort to develop compounds that block this transfer and inhibit parasite growth
- The Menzies Research Institute at the University of Tasmania is investigating mutations that lend resistance to malaria after exposure in the hope of developing drug therapies that can mimic these protective effects
- The University of Queensland is using nuclear magnetic resonance to develop a new diagnostic technique for malaria
- Griffith University is researching compounds that bind to proteins in malaria when dormant which may lead to new drug therapies
- University of Queensland is using microphones attached to mobile phones and portable music players to record coughing and sleep sounds, which can be used to diagnose pneumonia
- University of Melbourne is investigating an attenuated influenza virus vector with an adjuvant that stimulates natural killer cells. The goal is to induce robust immunity at mucosal surfaces to HIV

## **Impediments to international research collaborations and practical measures for addressing these**

Collaborative international research is more than groups of people getting together around a shared idea or research topic.

**Human Research Ethics Committees across national borders:** Within the current environment researchers already experience delays in gaining access to patients within the clinical environment. Until the existing streamlined process for HREC is accepted, utilised and evaluated, Australia will encounter problems in attracting collaboration from countries where these problems have already been addressed.

**Data sharing:** while acknowledging the potential benefit for patients of high quality research through the use of patient data, the context and assurance of doing so must be communicated to patients within the context of an appropriate regulatory framework. There must also be recognition of the public concerns over the security and confidentiality of personal data of all kinds. Some vital medical research cannot be conducted without access to identifiable information about patients. Researchers are concerned about the disproportionate time, effort and cost currently required to obtain access to personal medical data. The current law on data

sharing is extremely complex and is open to differing interpretations with respect to use of identifiable medical data in circumstances where consent is not available.

**Contractual agreements:** These are perhaps one of the most challenging barriers to collaboration, despite its large role in facilitating collaboration. Many contractual arrangements are based on the in-house and available expertise of Australian research organisations. We acknowledge for smaller institutions this may present a challenge. Commercialisation Australia goes some way to addressing these needs.

***Case Study: Australian biotech is recognised leader attracting NIH funding from the USA.***

Fibrotech therapeutics is a Victorian based biotech, spun out of the University of Melbourne, to develop anti fibrotic drugs. Fibrotech has built a solid and well resourced research program, building upon relationships with the Juvenile Diabetes Research Foundation (JDRF) in the USA, which successfully lobbied Congress to secure funding for early preclinical trials in diabetes. (the Rapid Access to Interventional Development (RAID)). Fibrotech therapeutics has received the first international grant from the program. Under this arrangement, the contractual arrangements and IP provisions are clear. Fibrotech retains the IP and the NIH (National Institutes of Health) provide indemnity.

Fibrotech believes the keys to success are its stable and strong collaborative arrangements, and a broad based, highly skilled team of experts that are internationally competitive, and supported by clear cut IP arrangements with the University of Melbourne. Should Australia co-invest in schemes such as the RAID initiative, leveraging international funding and accessing to a larger pool of available investment funds?

**Indemnity of researchers and institutions:** Within a collaborative environment each country brings differing expectations regarding indemnifying themselves and their organisation. In the past this has occasionally led to expectations that Australian stakeholders will indemnify their foreign collaborators. We therefore flag that there is a need for assistance and advice regarding indemnity that will improve access to collaboration and the speed at which collaborative activity can take place.

**Australian research grants available offshore:** there is a lack of parity between funding schemes within Australia and the ability for researchers to use their grant monies to facilitate international participation and patient recruitment in research activities. An example of this is Cancer Australia funding which may be used within an Australian setting but not to facilitate patient recruitment in countries with which our own researchers are collaborating. This differs from NHMRC endowment funds that allow Australian researchers to support recruitment of overseas patients

**Mapping international/ major collaborator research priorities:** Researchers need to determine mutual national research priorities in order for international collaboration to be truly successful. Additionally, they need to establish ways to leverage research funding and agencies need to encourage leveraging. Project funding may need to commence with one agency and then move to another agency for project completion..



**Distribution of benefits of research:** All countries collaborating in the research need access to the benefits of research rather than acting as laboratories for Australian researchers. This can be couched in terms of distributive justice and viewed as part of Australia's commitment to supporting developing nations.

**Intellectual property:** Similar to our point regarding contracting, intellectual property rights are consistently flagged as a concern for researchers and their institutions. Some institutions are viewed as having inflexible and aggressive IP rules and contracts that can be viewed as a disincentive for participating at an international level. Once more there are differing international expectations regarding intellectual property rights and how these are linked to contracting. Best practice guidelines and external support for smaller agencies would speed up the collaborative process.

## **Principles and strategies for supporting international research engagement**

Research Australia presents a range of principles for international engagement that are consistent with our mission and aims:

- Building Australia's knowledge base through transfer of skills, expertise, knowledge and resources within the domestic economy
- Providing government, industry and the research community with more economic information, a business case and the cost benefit of international collaboration. This would include analysis of how international research collaboration contributes to GDP and other socioeconomic benefits..
- Better national information regarding the depth and breadth of collaboration. The use of Australian publication information is a poor surrogate for measuring international collaboration<sup>vii</sup>. We recommend that more transparent and sophisticated measures be developed in order to facilitate long term decision making.
- Capacity building: Greater travel funding and international fellowships to provide Australian researchers with international exposure and experience and improved visa and immigration processes to enable uptake of research positions within an Australian setting from internationally recognised experts.

### ***Case Study: George Institute and China collaborate on chronic disease research to tackle a global health problem.***

"New China research Centre to address threat of chronic disease."

Delivering high-quality health research evidence is now a priority in China, in order to tackle what has fast become the leading cause of death - chronic disease. Many of these deaths are preventable, and a new Center recently launched in China marks an important milestone in improving health care in this booming nation.

The Center, hosted at The George Institute, China in partnership with Peking University Health Science Center, conducts high-impact, targeted research to address the threat of chronic disease in China.

As Professor Han Qide, Vice Chairman of the Standing Committee of the National People's Congress and President of Peking University Health Science Center noted when launching The George Institute in China in 2007, chronic disease now causes 80 percent of deaths in China. The new Center is intended to address the need for more appropriate, effective and efficient health policy and research for the control of conditions such as stroke, heart disease, high blood pressure, kidney disease and diabetes.

## Conclusion

Beyond the scoping exercise of this Senate inquiry, Research Australia believes that more challenging and fundamental questions should be addressed to inform Australia's internationally competitive position in research:

In the currently grant making process, do we have the flexibility to identify opportunities for international research? Do we have the capacity to re-direct funding from established grant making programs to respond to these opportunities?

Is there a lack of specific policy direction in relation to international research collaboration? If this is the case, how can this be addressed, under which jurisdiction and against what timelines?

What national attempts are being made to attract international philanthropy to fund health and medical research? Current efforts are focussed on individual relationships and networks. Can a national approach be developed in order to make this a less opportunistic activity?

## References

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<sup>ii</sup> NHMRC (2009) NHMRC Core trend data set <http://www.nhmrc.gov.au/grants/dataset/rmis/index.htm>

<sup>iii</sup> Business Victoria (2009) *Science and Technology Action One: Leading the world* [www.business.vic.gov.au/BUSVIC/STANDARD/1001/PC\\_61419.html#IntNav2](http://www.business.vic.gov.au/BUSVIC/STANDARD/1001/PC_61419.html#IntNav2)

<sup>iv</sup> Cutler, T (2008) *Review of the National Innovation System*. Canberra: Dept. of Innovation, Industry, Science and Research

<sup>v</sup> Access Economics (2003) *Exceptional returns: the value of investing in health R&D in Australia*. Report Commissioned by the Australian Society for Medical Research

<sup>vi</sup> Life Scientist (2009) *Seven Aussie researchers win Gates Foundation grants* [www.lifescientist.com.au/article/322967/seven\\_aussie\\_researchers\\_win\\_gates\\_foundation\\_grants](http://www.lifescientist.com.au/article/322967/seven_aussie_researchers_win_gates_foundation_grants)

<sup>vii</sup> Matthew, M et al. (2009) *A bibliometric analysis of Australia's international research collaboration in science and technology: analytic methods and initial findings* FEAST discussion paper 1/09