

Westmead Speech – October 5, 2016

Research Excellence and Commercialisation Excellence – can the HMR sector lead the way in Australia?

Bill Ferris AC

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INTRODUCTION

It's a pleasure and a privilege to have been invited to speak today. The vision and tenacity required for a Westmead research and innovation hub is inspiring and exhilarating.

Thank you Lucy, an experienced biotech investor and a long time champion of the HMR sector in this city, in NSW, and indeed nationally.

Better translation of research into commercial outcomes underpins economic growth and global competitiveness, which is central to the National Innovation and Science Agenda's (NISA) framework and ambitions announced by the PM in December last year.

Innovation and Science Australia (ISA), which I chair, was re-invigorated as part of NISA. Our remit is to advise government on all science, research, and innovation matters – from infrastructure to tax incentives and co-investment, and other support programmes.

ISA is an independent statutory board composed of a mix of members drawn from industry and science with extensive experience in innovation and entrepreneurship – including in the HMR field –with high public profiles and influence in their sectors - Dr Alan Finkel, Australia's Chief Scientist, is deputy Chair.

We have just appointed two new members who will bring an international perspective to the Board: Beth Comstock, Vice Chair of General Electric and based in New York City, and Israeli author Saul Singer who co-wrote "Start-up Nation: The Story of Israel's Economic Miracle."

A key deliverable for ISA is to develop a strategic plan for improving and enhancing Australia's innovation, science and research system that reaches out to 2030. This work is already under way with an audit of our existing innovation systems that will be provided to government in December 2016. We intend this to be a public document and its mapping will provide the base line from which our strategic plan will be developed with recommendations to government by October 2017.

The strategic plan is an important and exciting challenge: how would you go about making the case for continuing or perhaps expanding taxpayer support for health and medical research? And how would you allocate and balance support among competing sectors of the economy to develop a long-term plan for the country?

Last year's OECD health report shows Australia's health expenditure is 8.8% of GDP, about the same as the OECD average of 8.9%. With an expanding but ageing population, rapid technological advances and demand for higher standards of care, expenditure is set to substantially increase. Given fiscal realities, we will need to mitigate the effects of this demographic scenario... we need

to make changes that add value. This can be in the form of invention-based innovation or through new or improved processes and services.

RESEARCH AND COMERCIALISATION EXCELLENCE

Statistics also tell us that Australia's innovation and science ecosystem performs very well in the quality of research – The National Health and Medical Research Council (NHMRC) reports that Australia contributes approximately three percent of the world's published biomedical research yet we constitute just 0.3 per cent of the world's population.

If we fail to translate research into commercial outcomes, we will sell Australia short on jobs, economic growth and quality of life. I think most Australians now understand this imperative, that no longer will our natural resources sectors underwrite prosperity A future Australia must be propelled by its knowledge intensive sectors. One such stand-out sector is HMR.

So what do we need to do to elevate our standing and deliver commercialisation excellence on par with HMR research excellence? I believe there are six essential ingredients:

1. Collaboration
2. Critical mass of scientists with entrepreneurial spirit
3. Talent and skills in the business development offices of our universities and research organisations
4. Market access
5. Infrastructure
6. Risk capital

In the time available today I will speak only about three or four in this list of six.

1. Collaboration

First, collaboration. Despite Australia's geographic isolation, about half of research publications list an international co-author. So collaboration among researchers is not the problem. At Westmead, you also have a co-localisation advantage – clinicians who can identify problems and who have the ability and support to co-create the solutions by drawing on multidisciplinary expertise and facilities around them. I'm thinking here of people like James Chong, a practising cardiologist, who is also developing stem cell therapies for heart failure and as viable alternatives to heart transplants. And Geoff McCowage and Belinda Kramer who are trialling gene therapy to protect the bone marrow of children with cancer during chemotherapy treatment – it's a critical element of care that is based on clinical need. The team was recently honoured with the Excellence in Translational Cancer Research Awards for Outstanding Cancer Research. Also, the collaboration between Westmead hospital and the Westmead Institute that led to the highly successful clinical pancreatic islet cell transplant program - in which more than 50 patients to date have received insulin-producing pancreatic islet cells from donor organs enabling more than half of them to do away with daily insulin injections. Tony Cunningham, who I have known for many years, clearly has longstanding industry relationships dating back over two decades to when GSK invited him to be on a vaccine advisory board. Tony's work in improving the efficacy of the shingles vaccine is particularly significant given it is a condition that will be experienced by one in every two adults if they reach the age of 85. And now of course Tony, you have recently developed a new formulation with over 90% efficacy including in people aged 70 or older rendering it the most effective adult vaccine. These are inspiring research stories.

I should of course mention the recent Cancer Moonshot MOUs signed by VP Joe Biden on behalf of the National Cancer Institute (NCI) and the National Institutes of Health in the US. I refer here to the MOU that involves Bioplatforms Australia, Macquarie University, Garvan Institute of Medical Research and the Children's Medical Research Institute (CMRI) that will lead to sharing of an international dataset that will significantly advance cancer research and care. Also the MOU that was signed with the NSW Govt, with a programme of deliverables based on work conducted at Garvan Institute and CMRI.

There was also a similar MOU signed between the Victorian government and the NCI. These are all contemporary examples of great collaboration among researchers.

But, when it comes to collaborations between research organisations and businesses, be they large or small, we don't do well: indeed in the table of OECD member countries, we are at the bottom: number 32 out of 32.

There are some wonderful examples of collaboration and commercialisation at Westmead. For example, David Little's range of novel orthopaedic implants – one of which was designed in partnership with American company OrthoPediatics. I understand David has received funding via the NSW medical devices fund and from the federal government's Accelerating Commercialisation scheme and that Sydney Children's Hospitals Network has filed patents for a suite of orthopaedic devices that are in various stages of development – the prototypes for which will be printed onsite in Westmead's EPIC 3D Laboratory.

There are important and direct grants available to instigate greater collaboration. The NISA included Innovation Connections which expands and refocuses support for placement of graduate and postgraduate researchers in businesses, and to place business researchers in publicly funded research organisations.

The Academy of Technology Sciences and Engineering have an industry mentoring network (IMNIS) in STEM and USyd participates in the AMSI Intern programme that effectively co-funds PhD students to take a minibreak and work in industry for a few months without affecting their postgrad studies. It's a great initiative and I hope to see more of these types of exchanges in the future.

Why I mention these initiatives is because of this: only 30% of our researchers are employed by business compared to 60% in our more successful nation competitors.

2. Critical mass of scientists with entrepreneurial spirit

Not all researchers have the desire to be entrepreneurs but a successful innovation system requires a mix of both. There needs to be more development and clinical trialling, much greater enthusiasm and respect for funding spin-offs and commercialising ventures and for those who take this risk. Australians need to see improvements in health outcomes via better preventative measures, diagnostics, therapies (drugs and devices) and cures that are demonstrably attributable to your work. It was great to hear that Christine Clarke and Dinny Graham at the Westmead Institute have developed a companion cancer diagnostic, soon to be licensed to a US pharmaceutical company. By looking for characteristic patterns in biopsied cancer cells from uterine cancers, they can predict whether treatment with antiprogestin drugs is likely to be effective. I believe they are now looking to see if the test can be applied to breast cancers. And David Gottlieb's leukemia research has led to therapies to help reduce infections in patients who

have received bone marrow transplants - these are people whose immune systems have been weakened. David is collaborating with an Australian biotechnology company on this front and a commercialisation agreement is imminent.

Only if much more of this commercialisation happens should any of us expect taxpayers and philanthropists to continue to fund at current levels, let alone at increased levels. But we need to be open to other ways of judging research success otherwise the culture will not change. We need entrepreneurial and industry experience to count just as importantly as publications and citations. This will require shifts in entrenched cultural positions. . A challenge for the Westmead precinct is the current absence of a vital venture capital and biotech entrepreneurial ecosystem – (possibly compare with Melbourne Parkville environment) It's something to think about. Perhaps we can come back to this in the Q&A.

3. Talent and skills in the business development offices of our universities and research organisations

A great idea that is ahead of its time may fail to be commercially successful... Like a solution looking for a problem. Equally, ideas left to languish because IP agreements can't be reached are irresponsible handbrakes on commercialisation.

I've heard the story about Jacob George's collaboration with Roche and the development of tests to predict treatment response in patients with chronic hepatitis C. But, with the hospital and university taking too long to come to an agreement about IP sharing and filing a patent, they lost their chance (by a month) to become a commercialisation success story. I was reading that these tests, which are offered by Quest and LabCorp in the US, are priced at several hundred dollars and since 2011 hundreds of thousands of people have been tested. These can be the hardest lessons, but also the best lessons.

If you don't keep pace with the rate of innovation it is easy to be left behind. Those tasked with business development have to balance the interests of many, be aware of market forces and demand, know which companies would be interested in the technology and always be thinking of their exit strategy. It's not easy and, in the past, many commercialisation entities in Australia were probably too small, didn't work well enough with the scientists to make it easy for them to commercialise their discoveries, and didn't articulate the benefits of doing so. But I think that's changing. My own view is that universities are more rapidly learning how to reach out to business than businesses are reaching in to academia.

4. I'd like to spend some time now talking about money.

In launching NISA, the government committed to undertaking a review of the R&D tax incentive (RDTI) programme, which is a very substantial part of the government's annual \$10 billion R&D investment; the RDTI runs at about 30% of this at approximately \$3 billion per year and provides an important incentive for private sector research and development,. It helps with cash flow for start-ups and pre-revenue SME's including biotechs. The government invited me, Alan Finkel and John Fraser to conduct what is colloquially known as the '3Fs review' of the RDTI. I am pleased that what I regard as an extremely important report will now enjoy some sunshine and robust critique. The report was released late last week and is publicly available with an opportunity for consultation and submissions to government until the 28 October 2016

The Report's six recommendations seek to improve the performance of the RDTI and maximise its benefit to the nation. Three of the six recommendations deal with ways to improve additionality ie to encourage research that would otherwise not take place.. These include providing extra incentives for businesses to hire PhD graduates and to collaborate with Australia's world-class research institutions, like Westmead. This recommendation is a carrot not a stick for businesses to reach into our publically funded research excellence. Another recommendation calls for a cap of \$2m in the cash refundables part of the RDTI. This means that start-ups and SMEs not yet in profit can receive up to \$2m cash back on their R&D expenditure up to \$4.6m p.a. Less than 1% of the almost 10,000 companies now accessing this refundables pool would be impacted and their expenditures above \$4.6m p.a. would be carried forward in terms of tax offset entitlements once profitable.

There's also a new tax-based incentive for angel investors from July 2016 and new and less restrictive arrangements for venture capital limited partnerships (VCLPs) and early stage venture capital limited partnerships ESVLCPs.

When taken altogether, I see no more generous a set of government support for start-ups and early stage enterprises anywhere in the world.

Some of you may have been to the information sessions that ISA held around the country earlier in the year about the new \$500m biomedical translation fund (BTF). The BTF is a for-profit venture capital fund targeting investments in companies with projects at advanced pre-clinical and phase I and Phase II stages of development. It's designed to assist biotechs and medtechs with the multiple 'valley of death' funding problems that hold back the commercialisation effort in the health and medical research sector. These investments are expected to require in the range of \$5 million to \$20 million per project.

The BTF is being setup with \$250 million in government funding drawn from the Medical Research Future Fund. It will be matched by at least \$250 million from private and institutional investors. Competitively selected life sciences fund managers will manage it ... their applications are currently under review.

Also delivered is funding for incubators and accelerators to strengthen the entrepreneurial ecosystem to the tune of \$28m and five international landing pads (Berlin, Shanghai Singapore, San Francisco, Tel Aviv) to help Australian entrepreneurs test their ideas in key ecosystems and markets offshore. And these initiatives aren't the end of the story. The Minister for Industry, Innovation and Science, Greg Hunt, is already flagging NISA 2.0 focussing on ideas for additional investment in innovation, followed by NISA 3.0, which will focus on business simplification and implementing ISA's 2030 strategic plan.

So there's a lot happening and more planned to propel our knowledge based sectors in a future Australia. Matching our research excellence with translation and commercialisation excellence is the greatest challenge and opportunity of our time. I have great confidence that the HMR sector will prove to be a quintessential example of how to grasp this opportunity. It will be at special places like the Westmead innovation district that will show what is possible ... with potentially many thousands of jobs created by 2030 on the back of continuing medical discoveries, clinical demonstration of improved health outcomes and success in the domestic and world markets for new medical products and services. Thank you.