Murdoch Childrens Research Institute
Healthier Kids. Healthier Future.

14 July 2014

Senate Standing Committees on Economics
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Dear Committee Secretariat,

Submission to the Inquiry into Australia's Innovation System

The Murdoch Childrens Research Institute welcomes the opportunity to make a contribution to the Senate Inquiry into the Australian Innovation System.

Background - Murdoch Childrens Research Institute

Our Institute is located in a world-class Melbourne Children's campus, an academic health centre incorporating clinical care, research and teaching. It is a major contributor to the creation of knowledge for paediatric disease prevention and treatment through research, educating health professionals and the community, and by applying this knowledge clinically and through appropriate population interventions.

The partner organisations of the Melbourne Children's Campus are The Murdoch Childrens Research Institute, The Royal Children's Hospital and the University of Melbourne through its Department of Paediatrics. The Royal Children's Hospital is the major specialist paediatric hospital in Victoria treating an average of around 35,000 inpatients per year and 230,000 outpatients. With over 200 staff, the Department of Paediatrics is a multi-disciplinary department within the Faculty of Medicine, Dentistry and Health Sciences at the University of Melbourne, Australia's leading University. The Murdoch Childrens Research Institute (MCRI) is the largest child and adolescent medical research institute in Australia, with more than 1,500 staff and 70 large research teams. MCRI also includes and runs the Victorian Clinical Genetics Service (VCGS) which is the major provider of specialist clinical genetics care for Victoria, Tasmania and the Northern Territory. Through VCGS, we also provide the major diagnostic laboratory services for molecular genetics, cytogenetics, prenatal and newborn screening.

As a hospital-university campus linked to a medical research institute with a strong international reputation and impact, we have critical mass (clinical cohorts, clinicians and researchers), strong research outputs (publications, peer-reviewed grant funding, translational outcomes and commercialisation), and are capable of leading translation of research into improved clinical outcomes. Our expertise is in building multidisciplinary teams to promote effective translation and health outcomes. Our campus was highlighted in the 2013 report of the McKeon Review of Health and Medical Research as an example demonstrating that integration of research and healthcare delivers better health outcomes.

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Case for Innovation in Health and Medical Research

Recent benchmarking by the NHMRC "*Measuring Up 2013*" has reinforced the global standing of Australia's health and medical research sector, and the critical contribution that Australia's medical research institutes make, with medical research institutes outperforming all other Australian biomedical research sectors (i.e. hospitals, universities, CRCs, government) in terms of paper citation impact.

It is also in Australia's interest to be globally competitive in health and medical research for demonstrated health, social and financial gains.[1,2,3] Australia is in a unique position to remain innovative for several reasons including:

- The interaction and integration of Medical Research Institutes and University Departments on Hospital Campuses and the opportunity this affords to bring together investigators in the basic sciences with clinical and public health researchers in working teams;
- The flourishing Medical Research Institute sector via the "virtuous cycle" of Peter Wills, with effective medical research leading directly to better health through discovery and encouraging a higher standard of academic medicine which also improves general standards of health care and hence health of children - both are particularly important in children as their health is an investment in the future health and wealth of the nation;
- State and Federal Government health and welfare databases and the enormous potential for linkage of health information.

The McKeon Review has affirmed the importance of embedding health and medical research in the health system. We strongly support the implementation of its recommendations as a priority. In particular, as well as improving health outcomes, investment and support for research and innovation in health and medical research will enable Australia to develop new knowledge-based products and services that are relevant to global markets. A case in point is the growing importance of genomics to the national innovation system and its relevance in improving social, economic and health outcomes.

Genomics and the case for national innovation

Genetic information is increasingly influencing diagnosis and healthcare. The volume and breadth of this activity will continue to increase with the rapid acceleration in our understanding of the role genetic variants play in determining health, the course of a disease and response to treatment. At the same time, new technologies have made it possible to look at large amounts of genetic material rapidly and increasingly cheaply. Clinical practice is on the verge of entering the genomics era. Advances in genomic technology are driving a transformation in how we deliver healthcare, yet Australia (along with most countries) is unprepared.

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[1] Extrapolated returns on investment in NHMRC medical research, Report from Deloitte Access Economics commissioned by Australian Society for Medical Research 2011
[2] The Economic Value of Australia's Investment in Health and Medical Research: Reinforcing the Evidence for Exceptional Returns. A report from Access Economics, commissioned by Research Australia, 2010
[3] Exceptional Returns, the Value of Investing in Health R&D in Australia prepared for the Australian Society for Medical Research by Access Economics, 2008

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Despite the promise of genomic healthcare in offering a more rapid path to diagnosis, an emphasis on prevention and early intervention, and an increase in therapies targeted to the individual, there are significant challenges to national implementation.

By taking a proactive and future-oriented approach, we can progressively:

- replace multiple more expensive tests with a single, more informative and ultimately cheaper tests;
- rapidly introduce new genomic tests for better, quicker diagnosis and treatment, as evidence for their benefit becomes available;
- reduce adverse events by tailoring treatments to the individual;
- lead, internationally, in investigation of the economic evaluation and comparative, effectiveness of genomics in healthcare,
- focus early detection and prevention activities on those with the highest risk of disease.

To achieve this we will need to re-train and educate the workforce at all levels. To manage this paradigm shifting technological advance we will need to innovate and this will require capacity building. In particular, we will need genome literate bioinformaticians and clinicians, electronic medical record specialists, data storage and retrieval specialists and genetic counselors. Dedicated private and public investment to transform the health workforce is required.

Importance of integrating population health studies, biobanks and Big Data

The MCRI is the custodian of more than two thirds of Australia's most important longitudinal cohort studies of the health and well-being of children and young people. These studies cover a range of important topics ranging from allergic disease, obesity, hearing impairment, temperament, language and literacy, and the health and wellbeing of our adolescents and young people. In 21 cohorts we house data on more than 20,000 participants with over 40,000 biospecimens. We are strengthening these and housing them in our Children's Bioresource Centre. This biobank development mirrors those being undertaken internationally and will permit exciting international comparison and possible data sharing in the future. Not only will we be able to make much better use of the rich and detailed resources that we have gathered over many years but we will also be able to utilise these resources to inform the way new studies might be carried out.

For example, one of our new platforms being developed is called Generation V, a project that will connect research with clinical care and service delivery to children in Victoria with projected nodes in Western Australia and NSW. Central to Generation V is the use of existing big data sets to link social economic, health, genetic and environmental data to participant outcomes in childhood. Whereas in the past many longitudinal studies have focused on individual diseases, we recognize that there are many common pathways or precursors for common high burden diseases. Therefore in Generation V we will address the top five high burden and common child health conditions including obesity, allergy, cardiovascular disease, mental health problems and infection and immunity.

Importance of research and research infrastructure funding

Continued biomedical research investment is critical to Australia's future. As demonstrated by the NHMRC's analysis in the *Measuring Up 2013 Report*, the scientific returns on NHMRC investment

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are substantial. However, this is no time for complacency. Australia's biomedical research is undertaken in a global context, and it is critical that both public and private investment remains internationally competitive. The Murdoch Childrens Research Institute therefore strongly supports the Medical Research Future Fund which will provide the opportunity to further develop critical mass in biomedical research and deliver better clinical and translation pathways leading to improved health outcomes. We urge that these funds focus on research that will be potentially game-changing for Australia and that as well as building on research excellence, high risk – high return research is also supported. An international outlook and approach is also critical.

The Murdoch Childrens Research Institute also urges the continuation of the Cooperative Research Centre program for both public good and applied/ commercial research. The impacts of health-focused CRCs have been tremendous, with the Hearing, Vision and Oral Health CRCs being three exemplary case studies. We are particularly disappointed by the delay of the CRC Round 17, as we with national partners were developing a Genomics Healthcare CRC which would have transformed our approach to the diagnosis and treatment of genomic disorders.

It is also essential that the medical research institute sector is also appropriately supported with respect to indirect costs of research. There is currently a significant funding gap of 20-30 cents of indirect costs per direct research dollar for peer-reviewed research. This issue has been recognised and addressed for the Australian higher education sector. Australian medical research institutes face similar cost burdens: we therefore urge that this is addressed.

Strategic international engagement in science, research and innovation

As discussed earlier, Australian researchers are undertaking research in a global context. It is vital that our researchers engage and collaborate with their peers internationally. Mechanisms that encourage such engagement must be supported, and disincentives that inhibit collaboration reduced or eliminated. One of the key challenges for Australia is that many of our traditional research partners in Europe and North America are now seeking to partner with institutions and researchers in Asia (particularly China) and South America. Whilst Australia should also look towards China, it is vital that we maintain strong relationships at individual, institutional and governmental levels with our longstanding research partners. International science diplomacy led by the Australian Government is essential. We also encourage open, non-country-specific, Australian government funded calls for international research collaboration. This is particularly important in biomedical research where we are seeing the development of international consortia to address global health challenges. Australia must be a part of these initiatives.

A seamless innovation pipeline

Innovation driven through national and international collaboration, skills and workforce development, and an environment conducive to new technology and new industry development will strengthen Australia's position in the global knowledge economy. Australia's research sector and international leadership and research excellence fuels its innovation pipeline, from both a discovery and workforce perspective. However, there is an ongoing need for policy to drive translation of research across the funding "valley of death", that will attract further investment and derive maximum benefit from our strong research base.

Schemes that enable access to skills, and facilitate prototyping and early testing of projects, such as the NHMRC Development grants scheme and the past Commercialisation Australia program, are

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crucial to enable early triaging of projects and allocation of resources to technologies with the greatest chance of success. There is a need for more schemes like these that have a high risk tolerance and a remit to cover broader health areas, including fast moving sectors such as Digital Health, while ensuring that delivery of grants are streamlined and simple to remain competitive. We welcome the new Entrepreneurs' Infrastructure Program and hope that this will support the above activity.

We believe there should an ongoing focus on encouraging collaboration between industry and academia. Schemes such as ARC Linkage grants and Cooperative Research Centres provide leverage to attract industry interest and investment. The presence of industry provides global market context and the "market-pull" required for outcome-driven research. It also enables access to commercial and research capabilities that would be otherwise unavailable. These schemes also act as a flagship by drawing global industry attention to Australia's research discovery and translation capability.

I am most pleased to discuss the health, biomedical research and innovation challenges referred to in our submission with the Committee further.

Yours sincerely,

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