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Inquiry into Australia's Future in Research and Innovation
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To the Members of the Joint Select Committee on Trade and Investment Growth

Thank you for the opportunity to make a submission to the *Inquiry into Australia's Future in Research and Innovation*. Research and innovation are multi-sectoral endeavours and our submission is intended to provide the Inquiry with important contextual material regarding Australia's health and medical research sector.

Yours sincerely

Professor Anne Kelso AO

Chief Executive Officer

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NHMRC Submission to the Inquiry into Australia's Future in Research and Innovation

The National Health and Medical Research Council (NHMRC) is Australia's leading government body for supporting health and medical research. NHMRC's functions come from the statutory obligations conferred by the National Health and Medical Research Council Act 1992 (NHMRC Act). The NHMRC Act provides for the NHMRC to pursue activities designed to:

- raise the standard of individual and public health throughout Australia
- foster the development of consistent health standards between the various States and Territories
- foster medical research and training and public health research and training throughout Australia, and
- foster consideration of ethical issues relating to health.

A summary of NHMRC's objectives, corporate plan and research funding initiatives is attached.

Australian Government investment in health and medical research via NHMRC grew significantly over the last decade and is now in a steady state of around \$800 million per annum. The *NHMRC Corporate Plan 2015-2016* outlines the major health issues likely to arise and a strategy for health and medical research to address these issues under the themes of *investment, translation and integrity*. One major health issue identified is the need to 'Create stronger pathways to capture the economic value of research discoveries' by promoting partnerships between the research sector, industry and the health care sector.

Our main way of doing so is through the Development Grant funding scheme, which provides support to individual researchers or research teams to undertake research at the early proof-of-principle or pre-seed stage in partnership with a Health and Medical Research (HMR) company. Development Grants support the commercial development of a product, process, procedure or service that, if applied, would result in improved health care or disease prevention or provide health cost savings. The Grants are not intended to support the subsequent process of bringing the product to market, which generally involves multiple clinical trials of great expense and complexity and is most appropriately undertaken by industry.

A review of the scheme undertaken in 2012 concluded that recipients of NHMRC Development Grants consistently created intellectual property and were generally successful in attracting commercial investment during and after the grant period. Of 40 grants examined in more depth, 80% had secured a commercial partner and over half were in the pipeline toward commercial development. Copies of the report are available from the NHMRC website at:
www.nhmrc.gov.au/files_nhmrc/file/media/media/rel12/nhmrc_development_grants_review_april_public_121_122.pdf

Programs to promote commercialisation rely on fundamental research to produce ideas of commercial value. Australia is fortunate to have considerable strength in biomedical research but ongoing government support is essential to ensure there is a pipeline of discoveries with commercial potential. Thus, a researcher may make a discovery funded by an NHMRC Project Grant, investigate it further through subsequent NHMRC Project Grants, possibly while supported by an NHMRC Fellowship, and then commence the road to commercialisation through an NHMRC Development Grant.

Australian research has produced significant commercialisation successes, the best known being the first multiple-channel Cochlear Implant, positive airway pressure for sleep apnoea (ResMed), and a cervical cancer vaccine (Gardasil).

Many other exciting and innovative ideas are progressing towards commercialisation. One example is the work of Professor Cook and his colleagues at the University of Melbourne and St Vincent's Hospital (Melbourne) who are working with other groups around the country and internationally to improve their brain stimulation techniques to suppress epileptic seizures. An NHMRC Development Grant provided support to create a more portable system that could be used in different clinical settings. The ultimate goal of the research is to create a portable device that can be implanted in people with epilepsy and prevent them from having seizures.

A further example of NHMRC grants leading to a commercial outcome is research led by Professor Andreas Fouras (Melbourne University) who founded biotech start-up 4Dx in December 2012. Prof Fouras has been a recipient of an NHMRC Career Development Fellowship, Project and Development Grants which supported research into improved lung imaging technologies now being commercialised through 4Dx.

Significant economic benefits to Australia accrue from HMR via pathways apart from commercialisation. Health care is a large part of the economy, with expenditure estimated at 9.8% of GDP (\$154.6 billion) in 2013-14 by the Australian Institute of Health and Welfare¹. More people work in the health care and social assistance industry than any other sector². Research can improve the cost effectiveness of community health and patient care through improved treatments and devices, options to prevent ill-health such as vaccines, or diagnostics to inform treatment decisions earlier in the course of a disease. Such advances can have a major economic benefit through health care savings and by increasing the productivity of both those working in the sector and patients.

Some examples of these advances include: using intravenous saline brings better outcomes compared to intravenous albumin in critically ill patients with potential for cost savings of \$700 million per year; and research demonstrating that vertebroplasty is ineffective for the treatment of spinal fractures in osteoporosis patients led to the removal of this treatment—which had cost up to \$1500 per patient—from the Medicare Benefits Schedule.

More recently, Prof James Cooper and his team at Monash University have compared decompressive craniectomy plus standard care to standard care alone for the treatment of severe neurotrauma. The study showed that the group of patients who received surgery were more likely to have a poorer outcome (death or dependency) than those who received best medical care. Most of the traumatic brain injury cost burden relates to rehabilitation costs of survivors with severe disability, and the researchers have estimated savings to Australia of choosing intensive medical therapies instead of craniectomy in appropriate patients at greater than \$100 million annually.

These benefits rely on the translation of the knowledge generated by research into evidence-based practice and policy. NHMRC's Advanced Health Research and Translation Centres initiative, Partnerships for Better Health,

¹ Australian Institute of Health and Welfare 2015, *Health Expenditure Australia 2013-14*. Health and welfare expenditure series no. 54. Canberra.

² Australian Bureau of Statistics 2012. *Year Book Australia, 2012*. 1301.0. Canberra.

Centres of Research Excellence and Translating Research into Practice Fellowships are examples of NHMRC initiatives that support translation of research into improved health outcomes for patients and the community.

Excellence in research is an essential feature of innovation. Australia contributes around 3% of the world's biomedical research effort and the value of our contribution is dependent on maintaining a high level of excellence against international benchmarks. NHMRC research funding schemes, which select applications for funding based on an open and competitive system of expert peer review, are a strong driver of excellence across the HMR sector.

Excellence in research is also critical to ensuring Australian researchers are able to engage internationally to access the benefits of research undertaken overseas. NHMRC has a significant interest in promoting international research engagement and collaboration across all fields of HMR and particularly clinical practice and health systems research. Our grant schemes encourage collaboration between Australian researchers and their international counterparts by allowing overseas investigators to be named as co-investigators on NHMRC Project Grants. Out of 516 NHMRC Project grants announced in 2015, 189 (36.6%) include a level of international research collaboration.

NHMRC also directly fosters international collaboration by supporting joint research initiatives with our international counterparts. One long-standing example is our program of support for Australian researchers to participate in health research funded under the European Commission's *HORIZON 2020 - the EU Framework Programme for Research and Innovation*. Similarly, in 2015 NHMRC entered into a collaborative arrangement with the US National Institutes of Health (NIH) which provides support for Australian researchers participating in international collaborative research that has been selected for funding through the NIH BRAIN Initiative.

In addition to new products that emerge from research, trade in health system and clinical expertise will be increasingly important. Australia already has a record of achievement in exporting health and medical expertise to developing countries in our region and beyond. The anticipated uptake of telemedicine and advances in precision medicine will create growth in this trade. Australia should position itself to take advantage of these trends.

Major breakthroughs arise through the passion for discovery exhibited by research teams and individuals. Australia's prosperity relies on attracting great minds to research, and supporting their imagination and hard work through competitive granting schemes. There is strong international competition for researchers and a vibrant research sector is required to retain our best talent in Australia, so that they may help educate, mentor and develop the next generations, and work in policy and practice settings to support innovation and evidence-based care. NHMRC's People Support Schemes build Australia's research capacity by providing support to individual researchers at all levels of experience.

NHMRC's Postgraduate Scholarships, Early Career Fellowships and Career Development Fellowships schemes provide financial support to those at the early and middle stages of their research careers. These grants allow them to gain experience in conducting research that is internationally competitive and original, and to develop research leadership capabilities in their chosen field of endeavour. NHMRC's Overseas Early Career Fellowships provide for health and medical researchers of outstanding ability to undertake two years of advanced training at a research institution located overseas. NHMRC Research and Practitioner Fellowships provide support for senior researchers who are leaders in their field.

Dr Justine Gatt's research at the University of Sydney is one example of the research being supported by an Industry Career Development Fellowship. In June 2014 Dr Gatt received an NHMRC Excellence Award and is also

the recipient of the 2014 Commonwealth Health Minister's Award for Excellence in Health and Medical Research. Dr Gatt's work focuses on mental health and understanding the characteristics that define resilience in people who are able to adapt positively in the face of adversity. In collaboration with industry partners, Dr Gatt is working to develop efficient e-health online tools that will promote resilience easily and effectively across large community samples.

The increased investment by successive governments in health and medical research has greatly expanded the capability and capacity of Australia's HMR sector, placing Australia in a positive position to pursue the economic benefits of innovation. The Australian Government's Medical Research Future Fund, Biomedical Translation Fund and the National Innovation and Science Agenda (NISA) will build on this significant investment.

In summary:

- the health and medical research and innovation sector is positioned to play an important role in overcoming Australia's economic challenges through the discovery and development of products with commercial potential and by informing improvements and cost savings in health care;
- NHMRC fellowship and grant schemes ensures that a high quality research health and medical research labour force exists in Australia;
- Continued government support for a highly quality health and medical research labour force in Australia is essential to ensure there is a pipeline of discoveries with commercial potential, and that Australia is positioned to export health expertise and take advantage of developments occurring overseas.

ATTACHMENT – Information on NHMRC

The National Health and Medical Research Council (NHMRC) is Australia's leading government body for supporting health and medical research. NHMRC's functions come from the statutory obligations conferred by the National Health and Medical Research Council Act 1992 (NHMRC Act). The NHMRC Act provides for the NHMRC to pursue activities designed to:

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NHMRC brings together, within a single national organisation, the functions of research funding and development of advice. One of its strengths is that it draws upon the resources of all components of the health system, including governments, medical practitioners, nurses and allied health professionals, researchers, teaching and research institutions, public and private program managers, service administrators, community health organisations, social health researchers and consumers.

The themes of investment, translation and integrity represent NHMRC's strategy for health and medical research for the period covered by the Corporate Plan. NHMRC will:

- invest in high quality health and medical research and build research capability, supporting the best research and researchers
- support the translation of health and medical research into clinical practice, policy and health systems and the effective commercialisation of research discoveries
- maintain a strong integrity framework for research and guideline development, underpinning rigorous research and relevant and accurate guidelines and promoting community trust.

In 2015 NHMRC funded new health and medical research grants to a value of around \$880m (which includes a portion of the 2014 Boosting Dementia Budget Measure). Due to increasing demand for research support from a growing health and medical research sector, the funded rate for NHMRC's main avenue for support of research, the Project Grant Funding scheme, fell to 13.7% in 2015.

A detailed description of how we will fulfil our mission and deliver against our strategy and major health issues can be found in our Corporate Plan. Over the life of the Corporate Plan, NHMRC will identify projects to progress these priority areas while also continuing to fund high quality health and medical research on broader health-related topics.

NHMRC Research Funding Schemes

Create New Knowledge	Program Grants
	Project Grants
Accelerate Research Translation	Centres of Research Excellence (CRE)
	Development Grants
	Targeted and Urgent Calls for Research
	Dementia Research Team Grants
Build Australia's Future Capability	NHMRC-ARC Dementia Research Development Fellowships Scheme
	Postgraduate Scholarships
	Early Career Fellowships
	Career Development Fellowships
	Research Fellowships
	Practitioner Fellowships
	Translating Research Into Practice (TRIP) Fellowships
	Independent Research Institutes Infrastructure Support Scheme
Equipment Grants	
Work with Partners	Partnership Projects
	Partnership Centres
Collaborative Grants	NHMRC National Institute for Dementia Research Grants
	NHMRC - EU Collaborative Research Grants
	Global Alliance for Chronic Diseases (GACD)
	Human Frontier Science Program
	NHMRC - NIH Brain Collaborative Research Grants