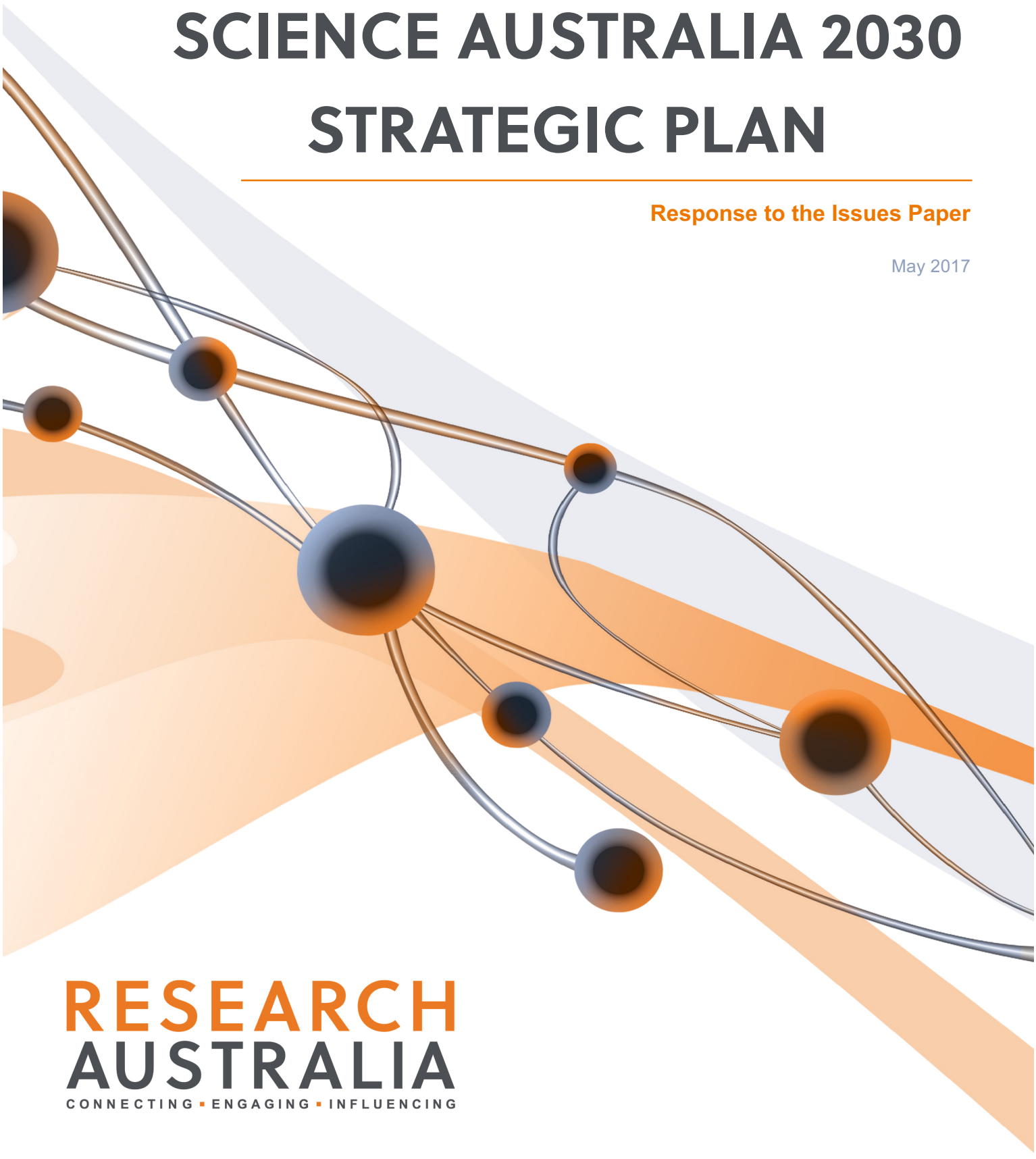
INNOVATION AND SCIENCE AUSTRALIA 2030 STRATEGIC PLAN

Response to the Issues Paper

May 2017



RESEARCH AUSTRALIA

CONNECTING ▪ ENGAGING ▪ INFLUENCING

ABOUT RESEARCH AUSTRALIA

Research Australia is the national alliance representing the entire health and medical research pipeline from the laboratory through to the patient and the marketplace. Research Australia is the trusted, unifying platform for the health and medical research sector's collective voice to ensure health and medical research is a significantly higher national priority.

Our vision: Research Australia envisions a world where Australia unlocks the full potential of its world-leading health and medical research sector to deliver the best possible healthcare and global leadership in health innovation.

Our mission: To use our unique convening power to position health and medical research as a significant driver of a healthy population and contributor to a healthy economy.

Our goals:

Engage

Australia in a conversation about the health benefits and economic value of its investment in health and medical research.

Connect

researchers, funders and consumers to increase investment in health and medical research from all sources.

Influence

government policies that support effective health and medical research and its routine translation into evidence-based practices and better health outcomes.

Nadia Levin
CEO & Managing Director
02 9295 8547
nadia.levin@researchaustralia.org

www.researchaustralia.org
384 Victoria Street Darlinghurst NSW 2010

TABLE OF CONTENTS

INTRODUCTION **4**

SUMMARY OF SUBMISSIONS **5**

RESPONSE TO THE CHALLENGES **7**

1: Moving more firms, in more sectors, closer to the innovation frontier 7
2: Moving, and keeping, Government closer to the innovation frontier 9
3: Delivering high-quality and relevant education and skills development for Australians throughout their lives 11
4: Maximising the engagement of our world class research system with end users 13
5: Maximising advantage from international knowledge, talent and capital 16
6: Bold, high-impact initiatives 18

CONCLUSION **19**

INNOVATION AND SCIENCE AUSTRALIA 2030 STRATEGIC PLAN

RESPONSE TO THE ISSUES PAPER

Introduction

Research Australia welcomes the opportunity to provide a response in relation to the 2030 Strategy Issues Paper and our submission addresses each of the six identified challenges in turn.

While Research Australia's focus is on health and medical research (HMR) and its utilisation to deliver the best possible healthcare, we recognise that HMR exists within a broader research and innovation ecosystem. Many disciplines are now, and will in the future, be relevant to HMR. Furthermore, we believe many of our comments and proposals have a broader application.

We congratulate the Government on seeking to create a single plan for Science, Innovation and Research. As we are all too aware, Australia scores poorly on the translation of its research discoveries into new products and services. We need to improve the extent to which Australia's research effort is directed to the questions and problems of greatest importance and how effectively our research is applied to provide solutions.

Bringing research and innovation together in the one Strategic Plan provides an opportunity to drive these improvements and to overcome some of the historic divides between programs to invest smartly in research and in programs to support and drive innovation. Clearly the Government cannot achieve the objectives of the Plan alone. In addition to the research, innovation and investment communities, active engagement with the state and territory governments will be vital; it needs to be a 'whole of governments' strategy.

Just as importantly, the 2030 Strategic Plan needs a whole of community communication strategy to ensure all levels of society understand the imperative for a greater and more strategic investment in research, technology and innovation, and the benefits this can bring as we plan for the Australia we want in 2030.

Summary of submissions

Challenge	
1: Moving more firms, in more sectors, closer to the innovation frontier	Facilitating increasing numbers of researchers within Australian businesses is key to improving not only internal R&D capability but R&D collaboration. Adopting a one size fits all process is not suggested, rather a multi-levered approach using proven models as options. Funding for research training must be increased beyond the current planned expenditure.
2: Moving, and keeping, Government closer to the innovation frontier	Implementing the recommendations of the Productivity Commission's report and pursuing the other elements of the Public-Sector Data Roadmap are the most significant steps the Government can take to place itself closer to the innovation frontier. The impact of these reforms and their implications for Australian research and innovation will be wide reaching and should be incorporated into the 2030 Strategic Plan. An overarching strategy for health which sets broad, clear and specific long term goals, would complement the 2030 Strategic Plan and provide strategic direction for health and medical researchers and firms creating health innovations.
3: Delivering high-quality and relevant education and skills development for Australians throughout their lives	The 2030 Strategic Plan needs to inform the development of Australia's higher education strategy in conjunction with the population and workforce needs and aspirations of a future Australia.
4: Maximising the engagement of our world class research system with end users	Promoting and developing innovation in Australia in a meaningful way requires a 'whole of governments' strategy which elevates the importance of innovation as a national deliverable and measurable opportunity and goal. The clinical research fellowship programs must be maintained and expanded as an essential conduit of knowledge and expertise between the research and healthcare disciplines. The 2030 Strategic Plan must identify what success of the Plan will look like in 2030. Just as importantly it needs to ensure that the tools, information and skills are available to assess whether success has been achieved. This includes ensuring, for example, that data collected by the Australian Bureau of Statistics on R&D expenditure and activity is sufficiently detailed and complete to enable the impact of the 2030 Strategy on specific industries and the economy to be determined. The 2030 Strategic Plan needs a focus on increasing Australians' scientific literacy and engagement with science. This should include measures to communicate science to a much broader audience and are not necessarily done solely by the government, rather facilitated by government to identified population segments such as schools and local

Challenge	
	community programmes as well as encouraging such engagement as a natural part of research training.
5: Maximising advantage from international knowledge, talent and capital	The 2030 Strategic Plan must include a plan for future public and private investment in research and innovation. This plan should aim to increase funding in an orderly and sustainable manner over the period to 2030. Australia must remain open to the permanent and temporary migration of researchers if we are to maximise the advantage available from global talent. As part of the 2030 Strategic Plan we need to further develop Australia's existing ties with research programs in India, China and the Asia Pacific more broadly, and build on programs such as the Australia- India Strategic Research Fund, the Australia-China Science and Research Fund and The New Colombo Plan.
6: Bold, high-impact initiatives	Creation of a National Innovation Fund to support the commercialisation of Australian scientific innovation more broadly.

Response to the challenges

1: Moving more firms, in more sectors, closer to the innovation frontier

There are three key statistics that outline the challenges and opportunities for Australia in this regard. Compared to the OECD average, Australian firms have:

- relatively less internal R&D capability;
- relatively lower levels of collaboration on R&D with other businesses; and
- relatively lower levels of collaboration with publicly funded research organisations.[1]

If Australian companies have relatively less internal R&D capability, it would be reasonable to assume that they would necessarily seek to collaborate more with external partners to make up this deficit, but this is not the case. In fact, it appears likely that the lack of internal R&D capacity restricts the scope of companies to engage with external researchers.

Research Australia submits that facilitating increasing numbers of researchers within Australian businesses is key to improving not only internal R&D capability but R&D collaboration. Adopting a one size fits all process is not suggested, rather a multi levered approach using proven models as options. Two very different programs are provided below as examples of the types of initiatives that can be developed to build research capacity within private firms across all sectors, and to encourage collaboration and engagement with public research institutions.

iPREP WA

iPREP WA is an example of a relatively simple and inexpensive program that provides private firms with access to research expertise and exposure to the skills and capabilities that qualified researchers can bring to an organisation. 32 projects have been completed since the program began in 2015.

> iPREP WA is a unique collaboration between the five WA universities and has been established for PhD candidates who may not have had previous industry experience. The program involves interdisciplinary teams, working on a six-week project (with scholarship) for an industry partner during their thesis examination period. Industry partners range from start-ups and SMEs through to large corporations and government departments and their projects focus on solving authentic workplace problems.
>
> iPREP WA is helping to educate both PhD graduates and industries on the value of research engagement, by providing a platform for organisations to engage in low risk research activities that will hopefully encourage additional collaboration with universities and employ more PhD graduates. iPREP WA is helping PhD graduates to recognise that skills they developed in the PhD, such as problem-solving and critical thinking skills, are applicable across a range of disciplines, providing them with the confidence and experience to apply for jobs outside of academia.[2]

[1] Australian Government Department of Industry, Science and Innovation, Office of the Chief Economist, Australian Innovation System Report, 2016, Chapter 4
[2] https://www.iprep.edu.au/

While the initial engagement is short and is linked to a specific project, it provides the firms, as prospective employers, with the opportunity to 'try out' employing PhD trained researchers before making a longer-term commitment. In some cases, this has led to continuing employment of an iPREP participant by the collaborating partner.[3]

Industrial Researcher Program

Denmark's Industrial Researcher Programme takes a longer-term approach to building research capability in private business, by providing support for PhD candidates and postdoctoral researchers employed in industry. This approach has the benefit of allowing an existing employee to undertake further study while maintaining their employment, and provides the employer with a researcher who understands their business.

> The Industrial Researcher Programme invests in Industrial PhD and Postdoc projects. In both project types the candidate is employed in a private company and enrolled at or collaborates with a public-sector research organisation. The candidate works on the same project at both places. Innovation Fund Denmark invests in research projects within all research fields, provided the research project is of a high quality and is commercially relevant to the company.
>
> Our requirements:
>
> • An Industrial PhD candidate must have a master's degree education
> • An Industrial Postdoc candidate must have obtained a PhD degree within the past five years
> • The same research project is carried out at both the university and the company
> • The Industrial Researcher and the research project must offer the company the possibility of solving specific research and development tasks that create growth and employment
> • The Industrial Researcher and the research project must strengthen the relationship between the business sector and the university, and create the potential for new research[4]

The key to success will be developing a program with clear objectives and a range of initiatives. Attention will need to be paid to how the program interacts with other Commonwealth programs (including the Entrepreneur's Programme and the R&D Tax Incentive) and with state-based and other initiatives.

Research Australia submits that funding for research training will need to be increased beyond the current planned expenditure if we are to achieve these objectives. The following table from this year's budget shows the funding for the Research Training Program, provided to universities to support the training of research higher degree students.

2017/18 Budget estimates of expenditure

$m.	17-18	18-19	19-20	20-21
Research Training Program[5]	**1,019.495**	**1,036.328**	**1,057.073**	**1,079.794**

[3] https://www.iprep.edu.au/single-post/2017/02/21/INDUSTRY-PLACEMENT-PATH-TO-SUCCESS
[4] https://innovationsfonden.dk/en/investment/industrial-researcher
[5] Australian Government, Budget papers 2017-18 Department of Education and Training Budget Statement p.58

There is a slight increase, averaging less than 2%, in the annual funding each year over the next four years. At the same time, however, the number of higher research degree completions is expected to rise from 11,000 in 2017-18 to 12,500 in 2020-21, an average annual increase of 4.3%. The amount per student is therefore reducing.

2: Moving, and keeping, Government closer to the innovation frontier

The Australian Government is a major service provider to the Australian community and there is significant scope for it to be more innovative in how it does this. The digital frontier and encouraging applied health and medical research are two such areas. The first is the Government's relationship to the data it collects and holds, and re-purposing how it uses and shares this data provides a very significant opportunity for the Government to be a more innovative service provider and regulator.

The second is healthcare. With health expenditure in Australia of more than $160 billion per year, even small innovations in efficiency and productivity can provide significant dividends for public and private healthcare providers which can be reinvested in the health system, in further research and innovation, elsewhere in the economy, and in government budgets.[6]

A national healthcare strategy, which sets out a vision for the Australian healthcare system of the future would complement the 2030 Strategic Plan and provide direction for health researchers and innovators. These ideas are explored in more detail below.

Innovation in data

Research Australia is a strong advocate for the gains to Australians' health and the economy that can be derived from making better use of health information and welcomed the Government's decision to provide the Productivity Commission with terms of reference for an inquiry into the availability and use of public data.

Research Australia contends that many public sector datasets are an underutilised national resource, and that the failure to make these datasets available to researchers prevents the full economic value of these datasets from being realised. In the case of HMR, the economic benefits from the better use of datasets are threefold:

- more efficient and cost effective research (much of which is funded by the Commonwealth, state and territory governments)
- greater efficiencies in the delivery of health care (again, much of which is funded by the Commonwealth, state and territory governments)
- the development of new and profitable health products and services.[7]

The recent report of the Productivity Commission's Inquiry into Data Availability and Use has highlighted many of the ways that more effective and open use of Government held data can drive innovation. Implementing the Report's recommendations requires the Government to invest in increased capability to use data and to create a new cultural and legal framework for the use and availability of data. The Public-

[6] Australian Institute of Health and Welfare 2016. Health expenditure Australia 2014–15. Health and welfare expenditure series no. 57. Cat. no. HWE 67. Canberra: AIHW.

[7] Extract from Research Austrlaia's submission, available at http://researchaustralia.org/public-sector-data-availability-use/

Sector Data Management Project, overseen by the Department of Premier and Cabinet, has as its objectives, to 'achieve efficiencies for government, foster the digital economy and be helpful outside government to lift productivity and growth.'

By making its data more available to the public and to researchers, the Government has an opportunity to collaborate with academic, not for profit and private sector researchers and innovators in a way that can transform its relationship with the Australian community and provide significant social and economic benefits.

Research Australia submits that implementing the recommendations of the Productivity Commission's report and pursuing the other elements of the Public-Sector Data Roadmap are the most significant steps the Government can take to place itself closer to the innovation frontier. The impact of these reforms and their implications for Australian research and innovation will be wide reaching and should be incorporated into the 2030 Strategic Plan.

A national healthcare strategy – driving innovation in healthcare

Governments are significant providers of health care, and have a central role to play in setting an innovation agenda for healthcare delivery. As healthcare providers, what changes do they want to see in how healthcare is delivered? What is their vision?

A national healthcare strategy would provide a clear agenda for researchers and innovators to engage with the health system to deliver the goals; assist private and public sector researchers and innovators to determine their focus; and provide a direction that small innovative companies can get behind.

The COAG Health Council provides a forum for cooperation between the Commonwealth, State and Territory governments and we have national strategies for several areas, including the management of chronic conditions and mental health. **Research Australia submits that what is lacking is an overarching strategy for health which sets broad, clear and specific long term goals.**

Such a strategy, established with State and territory Governments and other stakeholders across the healthcare sector could address, for example:

- a target level of health expenditure as a percentage of GDP
- target distributions between expenditures on primary, secondary, tertiary and public and preventive health measures.
- goals for better population health outcomes the areas such as obesity, mental health and cancer survival.
- a vision for the role of technology in health, including telehealth, the remote delivery of healthcare, robotics and virtual reality.
- a commitment to a deadline for all health records to be digitised and linkable; a truly uniform national system for clinical trial governance and administration.

This national healthcare strategy would complement the 2030 Strategic Plan and the MTP Connect 10 Year Sector Competitiveness Plan for the medical technology, biotechnology and pharmaceuticals sector. Similar strategic plans could be developed for other areas of significant Government service delivery, such as education, welfare and social security, and would guide innovation in these areas.

Innovation in healthcare

Health is a great example of an area where the Australian Government can be more innovative and work more effectively with other partners to improve the delivery of healthcare, derive greater economic benefits and improve health outcomes for all Australians. Innovation based on HMR provides the opportunity to improve the efficiency and productivity of our health system and its workforce. **The $160 billion per annum healthcare sector, in which the Commonwealth and State Governments are significant stakeholders and service providers, is a fertile ground for innovation to improve the safety, quality and efficiency of healthcare**

When it comes to health innovation, some of the greatest challenges lie in the translation of research findings into evidence based practice. The MRFF is a conscious attempt to fund initiatives to support the implementation of evidence based practice and it is complemented by other measures such as the MBS Review, and the Choosing Wisely campaign, which is being embraced by Australia's healthcare workforce and leaders. Within the States and Territories there are bodies like the NSW Agency for Clinical Innovation, and the Western Australian Health Translation Network are working to promote the translation of new evidence into practice and innovative approaches to healthcare.

A key priority for the Government in this area should be a health system that is more innovative; both in its capacity to generate new ideas and approaches, and the capacity to more rapidly adopt research findings into practice. The role of the MRFF in supporting this goal is explicitly recognised in the inaugural Australian Medical Research and Innovation Strategy; it's vision is 'A health system fully informed by quality health and medical research' and the Strategy states that 'research accompanied by concerted efforts to translate findings into practice has the potential to reduce costs and improve health outcomes.'[8] Ensuring this is reflected in the 2030 Strategy is vital.

3: Delivering high-quality and relevant education and skills development for Australians throughout their lives

Research Australia welcomes the focus on life-long education. It is not possible or even desirable to provide every new graduate of any qualification with all the knowledge, skills and experience that might be relevant throughout their career. The aim of any undergraduate or higher degree should be to provide the core skills and knowledge, augmented where possible by the additional specialised training that is most relevant to the individual and their immediate career aspirations. Further training can be undertaken in the future as and when required as an individual's career changes, or in response to workforce changes driven by technology and innovation both globally and here at home.

An innovative research workforce

Australia has a strong tradition of academic health and medical research, but low levels of employment of PhD qualified individuals in the private sector. Industry identifies PhD qualified researchers as lacking key work ready skills, including communication, project management, the ability to work in teams and awareness of the commercial environment.

There is an increasing emphasis on the commercial and non-commercial translation of research, and an expectation that researchers have the necessary skills and knowledge to participate in the translation of their

[8] Australian Government, MRFF Advisory Board, 2016, *Australian Medical Research and Innovation Strategy 2016-2021*, p.2

research. These include better understanding of the economic, financial, legal and social contexts within which research is conducted and how new knowledge contributes to new innovations.

Research higher degree graduates are employed in a range of roles across the public, private and not for profit sectors, and beyond certain core competencies the specific requirements are role dependent. The skills and capabilities that a university requires of an academic researcher with teaching duties differ from those required of a team leader in a medical research institute. The requirements of a researcher engaged in the development of a medical device will differ from those of a clinical researcher in a hospital. The skills required of a science communicator, the research director of a local health network and a clinical trials coordinator are all different.

In the field of health and medical research, we need to encourage and support individuals who come to research with an existing career, particularly health practitioners who are seeking to combine their clinical practice with research to improve the delivery of healthcare.

Training needs to cater not only for career researchers but for the individuals who will facilitate, support, implement and communicate research and innovation. These are the individuals who need to understand research and its practice if they are to effectively communicate science to the broader community, commercialise research discoveries, manage research programs, administer research funding programs, facilitate clinical trials, and develop and implement evidence based policy.

The development of highly specialised knowledge in a particular field needs to be coupled with the skills required to conduct independent research and the ability to share knowledge with others, working collaboratively across scientific disciplines and with non-scientists. The general skills needed include: the ability to articulate problems and break them down into their component parts; problem solving; communication; the capacity to work in teams; and the ability to organise yourself and others. It includes at least an understanding of the principles of project management and risk management.

An equally important consideration is the pre-existing skills and experience of the research higher degree student. In 2011, the average age at commencement of a research doctorate was 33 and in 2012 over 18% of domestic research doctoral candidates were aged over 50[9]. These individuals are not a 'blank slate' and while many will be looking to use their new qualification to change careers, others will use it to progress their existing career.

- A research higher degree student who has spent the last decade working for a medical device manufacturer as part of a product development team may already have a good grounding in commercialisation activity;
- A health professional who wants to pursue a career as a clinical researcher may have an interest in the validation and assessment of changes in clinical protocols, or the development of new medical devices for use in surgery;
- A researcher who will pursue an academic career may need training for the tasks of teaching and supervising students.

In all cases, the individual's current skills and experience and future career plans will play a critical role in determining the outcomes they are seeking from further study.

[9] Australian Council of Learned Academies, Review of Australia's Research Training System, Discussion paper, 2015, p.1

An innovative health workforce

Our research system needs more than researchers if it is to be effective and innovative. Healthcare is delivered in an environment that is becoming ever more complex, technical and specialised, and new understandings of human health and disease are driving new technologies and techniques. There is an increasing need for the healthcare sector to both drive research and to implement the outcomes of research, with an increasing emphasis on the rapid translation of evidence based practice to improve the quality of care, increase the productivity of the health workforce and restrain costs. At the same time, increased specialisation in both research and healthcare is making it increasingly difficult for researchers and clinicians to find the common knowledge and language needed for the exchange of information and ideas.

These developments not only have implications for the training of researchers but for the individuals they work with in the private and public sectors. There is a need for 'research literate' individuals in a range of occupations who can support and facilitate the translation of research.

These individuals require a knowledge of, and familiarity with, research but not the full suite of knowledge, skills and abilities required to undertake independent research. They work in government departments, regulators and funding agencies; pharmaceutical and biotechnology companies; law offices and accounting firms; on hospital wards and in hospital administration; in general practice and the media. Many already have qualifications in their own occupations but would benefit from further structured study in research methods and skills.

For many of these individuals there is a place for research oriented qualifications that better suit their needs than a PhD. Some examples include a Masters by research, or a Masters by coursework with an emphasis on research as the most appropriate option. The range of short courses, workshops, post graduate and Masters Degree qualifications offered by the NHMRC Clinical Trials Centre at the University of Sydney are specifically designed to meet the needs of health professionals working in and with clinical trials in the healthcare setting.[10]

Research Australia submits that the 2030 Strategic Plan needs to inform the development of Australia's higher education strategy in conjunction with the population and workforce needs and aspirations of a future Australia.

4: Maximising the engagement of our world class research system with end users

The identification of engaging researchers with end users as a challenge presupposes an intention that research is to be purposeful, i.e. that it will lead to innovation, because this is where the benefit to the end user lies. Focused as it is on the development of a strategic plan for the innovation, science and research system, the 2030 Plan provides an historic opportunity to look beyond the research phase and to provide a strategy that genuinely takes research discovery into practice and connects research to innovation.

A strategic 'whole of governments' approach to innovation

All too often in the past, our researchers have been confronted by the translation 'valley of death', whether it be in the commercialisation of research, or the non-commercial translation of research into practice and policy.

In the commercialisation of research, a common criticism is that research funding does not enable a discovery to be developed to the point where it is viable to attract commercial investment which will fund the

[10] http://www.ctc.usyd.edu.au/education.aspx

further development and ultimately be responsible for creating the demand for the product. In the non-commercial space a similar problem exists. Funding is available for the clinical trial, but if a further trial or demonstration project is required to establish the viability of the intervention in the business as usual hospital environment, where does the funding come from, and who is responsible for it?

The state and territory governments are key providers of funding, facilities and infrastructure for research and innovation, particularly in HMR. **Promoting and developing innovation in Australia in a meaningful way requires a 'whole of governments' strategy which elevates the importance of innovation as a national deliverable and measurable opportunity and goal.**

The strategy needs to:

- Clearly articulate the benefits of increasing innovation in Australia. These include higher living standards, higher employment, more satisfying jobs and environmental sustainability.
- Describe the mechanisms by which innovation achieves these benefits, such as improving productivity, increasing efficiency, and creating new products and industries which by extension provide quality of life opportunities including health and employment
- Identify the existing government policies and programs that influence innovation, and the departments and agencies that administer them. These include taxation policy, trade policy, financial regulation, corporate regulation, industrial relations, education policy, research funding, and industry support programs.
- Identify the nexus between:
    - publicly funded research, and
    - innovation and development programs to bridge the gap between research discovery and subsequent innovation.
- Identify the measures against which:
    - Australian innovation generally, and
    - specific programs and policies, will be evaluated.

  These measures need to be weighted appropriately. For example, is an Australian publicly funded research organisation licensing a new discovery to a multinational for manufacture overseas as valuable as the IP being used by an existing Australian company that manufactures overseas, or a new start-up that establishes a manufacturing facility in Australia?
- Bring greater discipline and consistency to the evaluation of the effectiveness of existing programs and initiatives to support and promote innovation. This will include acting to reduce duplication and waste between jurisdictions.
- Encourage, support and measure cross collaboration between government departments themselves in achieving these outcomes.
- Determine an appropriate ratio of public funding for research to funding for innovation support.
- Ensure that the potential impact on innovation is considered when legislation and regulation is developed by Commonwealth, state and territory governments.

Accelerating innovation in healthcare

It can take between 10 and 20 years for proven treatments to be implemented routinely into healthcare.[11] It can take even longer for healthier behaviours to be widely adopted in the community. There are several actions we can take to accelerate this process.

Identifying and adopting the most effective implementation strategies to change the practices of health service providers and the broader community can reduce this period. Participation in research by health providers in all disciplines and in all settings, promotes the more effective and timely translation of research outcomes into practice. The engagement of researchers in healthcare delivery helps direct research to the issues identified by clinicians and the community increasing the likelihood of rapid and effective translation.

Healthcare professionals who are also researchers play a critical role in supporting the engagement of HMR with the health system and in directing research activity to 'real world' issues and problems affecting healthcare delivery. The role of clinical researcher has been very important historically, but has faced a range of challenges in recent decades. There are several initiatives to support this role, including the provision of Fellowships funded by the NHMRC and more recently the MRFF. **Research Australia submits that the clinical research fellowship programs must be maintained and expanded, as they are an essential conduit of knowledge and expertise between the research and healthcare disciplines.**

At the institutional level, we have strong historic ties between our universities and hospitals in respect of teaching, research and healthcare delivery. These ties are being strengthened through the NHMRC accredited Advanced Health Research Translation Centres (AHRTC) and the new Centres for Innovation in Regional Health (CIRH), with partnerships broadened to include medical research institutes and primary and community care providers. As noted in Research Australia's response to Challenge 3, if healthcare facilities are to become more engaged in research there is a need for 'research literate' individuals in a range of occupations who can support and facilitate the translation of research. Many will already have healthcare qualifications in their own occupations but would benefit from further structured study in research methods and skills, or in specific roles, such as the conduct of clinical trials.

If engagement is to be truly successful, the research community needs to be able to demonstrate that the new research findings will actually lead to higher quality, safer and more effective care. This requires greater capacity to measure the effect of the adoption of new practice and products ('did it perform as expected?'); and the ability to design initiatives and interventions in ways that are fit for purpose. The fields of health economics, health services research and implementation science are critical to success in the translation of new initiatives into healthcare and illustrate the multi-disciplinary nature of the teams needed to successfully identify relevant research questions, design, conduct and evaluate research and to implement those findings into practice. In many ways, these disciplines sit at the nexus between research and innovation in the translation of evidence into practice.

There is an equally strong imperative to measure and evaluate the investments we make and policies we adopt to enhance and support innovation. **The 2030 Strategic Plan must identify what success of the Plan will look like in 2030. Just as importantly it needs to ensure that the tools, information and skills are available to assess whether success has been achieved. This includes ensuring, for example, that data collected by the Australian Bureau of Statistics on R&D expenditure and activity is sufficiently detailed and complete to enable the impact of the 2030 Strategy on specific industries and the economy to be determined.**

[11] Research Australia, *10 Strategic Imperatives 2015-2025*

Public engagement and education

The ultimate end users of HMR are patients and health consumers. While their role can sometimes be masked in healthcare by the role of governments and private insurers as the 'payers' for many health services, there is a clear role for the informed consumer in helping to determine the direction research takes and the areas that are important to them.

The same is true of science more broadly. In national polling conducted for Research Australia in 2014, 28% of respondents reported being 'very interested' in science and 51% were somewhat interested. However, less than one third of people thought science was effectively communicated.[12]

In 2015, we asked people about the role of science in national decision making. When we asked them if politicians and public servants should listen to advice from scientists, 56% of respondents said this was very important, and 37% reported that it was important. 90% agreed the Government should assign a higher priority to STEM subjects and 91% believed that the Australian Government should support basic scientific research that advances the frontiers of knowledge even if it brings no immediate benefits.[13]

In polling conducted in 2016, 74% of respondents agreed with the proposition that scientific innovations are improving our standard of living. While 83% agreed that scientific research was important to healthcare, only 59% thought science was important to communications and the internet and 35% thought it was important to transportation and travel.[14]

Research Australia's polling demonstrates strong public support for research and for its role in improving society and guiding decision making. However, general knowledge of the pervasive role of science and innovation in our daily lives is patchy and while people are keen to learn more they do not believe it is effectively communicated. **Research Australia submits that the 2030 Strategic Plan needs a focus on increasing Australians' scientific literacy and engagement with science. This should include measures to communicate science to a much broader audience and are not necessarily done solely by the government, rather facilitated by government to identified population segments such as schools and local community programmes as well as encouraging such engagement as a natural part of research training.**

5: Maximising advantage from international knowledge, talent and capital

As a relatively small nation, Australia's researchers and innovators are accustomed to looking overseas for new ideas, collaborators and markets. We need to ensure that the policy, regulatory environment and funding programs continue to support this international focus. Public funding of research remains critical to the Australian economy and to the innovation pipeline.

Australian researchers are already active in taking advantage of international knowledge and talent. *'Research organisations across Australia have a highly collaborative culture. In the share of the world's top one per cent of highly cited publications attributed to international collaboration, Australia was ranked 7th out of 37 OECD+ countries across all disciplines, 5th in social sciences and humanities, and 8th in natural sciences and engineering.'*[15]

---

[12] Research Australia, Australia Speaks! 2014 Opinion Poll- views of 1000 Australians
[13] Research Australia, Australia Speaks! Research Australia Opinion Polling 2015
[14] Research Australia, Australia Speaks! Research Australia Opinion Polling 2016
[15] Australian Government Department of Industry, Science and Innovation, Office of the Chief Economist, Australian Innovation System Report, 2016, page 61

The key to maintaining and enhancing this level of research collaboration is Australian research excellence. The greatest advantage is to be found in collaborating with the world's best, and to do this our researchers have to be among the world's best. This requires long term sustained and sustainable funding for research, including research infrastructure and indirect research costs.

In recent years, Commonwealth funding for Australia's key contestable research funding programs, administered by the Australian Research Council and the National Health and Medical Research Council has flat lined. Over the four year forward estimates provided in the 2017/18 Budget, funding for these programs and for the Research Support Program continue to decline in real terms. The Government has recently been provided with a Research Infrastructure Roadmap, and we are assured that an investment plan is being developed, but we have yet to see the form this will take or the size of the investment.

2017/18 Budget estimates of expenditure[16]

$m.	17-18	18-19	19-20	20-21
NHMRC MREA	817.990	829.324	843.598	855.407
ARC Project Grants	492.736	493.708	511.540	522.537
ARC Linkage programme	265.319	265.843	275.444	281.366
Research Support Programme	923.709	902.977	959.636	1,017.366

The Medical Research Future Fund and Biomedical Translation Fund in 2030

The MRFF is a visionary initiative which will increase funding for HMR in the next few years. However, it is currently scheduled to reach its capital target of $20 billion in 2020-21. From that point on, and depending on investment returns, its annual disbursements to HMR will plateau; by 2030 they will have been static for a decade.

The Biomedical Translation Fund (BTF) is another great initiative, with $250 million of Commonwealth funding, matched by private sector investment, to be invested over five years, in later stage commercialisation. If the BTF achieves its objective of increasing the commercialisation of Australian HMR, it will provide a model for ongoing investment not just in the commercialisation of HMR but for a similar innovation fund for other research. At the moment, the $250 million Commonwealth investment is a 'one off'

Research Australia submits that the 2030 Strategic Plan must include a plan for future public and private investment in research and innovation. This plan should aim to increase funding in an orderly and sustainable manner over the period to 2030. The question of a target for Australian funding for research and innovation should be part of this strategy and needs further national discussion.

Australia is a wealthy advanced nation with a per capita GDP that is in or around the top 10 worldwide.[17] In the past we have relied on resources and primary industry for our wealth and the current levels of our investment in research and innovation reflect this. If we are serious about making the transition from a resource-based economy to a knowledge-based economy we need to invest accordingly; we must decide how much of our national income we want to invest in research and innovation and set a target to achieve this, through direct public investment and policy initiatives to support and encourage private investment.

[16] Australian Government, Budget papers 2017-18 Department of Health Portfolio Budget Statement, Department of Education and Training Portfolio Budget Statement

[17] IMF World Economic Outlook database April 2017 ranking: 10; World Bank GDP Per capita (current $US) 2015 ranking: 7; UN GDP per capita ($US) 2015 ranking:15

Timing is of the essence here with an ageing population and burgeoning developing world eager to claim territory in the global innovation space.

Migration

The recent changes to temporary work visas have highlighted the ongoing sensitivities about both temporary and permanent migration. While we tend to focus on immigration, it is important to recognise that when it comes to research the talent exchange between Australia and the rest of the world is two way. Modern research is highly specialised, and Australia's population is only a small fraction of the world research population. For many Australian researchers, the best opportunities in their field for collaboration and advancement lie overseas. Similarly, many overseas researchers find their best opportunities to advance their research lie in Australia. Despite modern advances in communications, physical co-location is still the most effective means of collaboration. **Research Australia submits that Australia must remain open to the permanent and temporary migration of researchers if we are to maximise the advantage available from global talent.** Put simply, we cannot achieve innovation in a global vacuum.

Regional engagement

The Issues Paper notes the rise of China and India as a megatrend. This megatrend has been evident for a decade or more in higher education in the increasing numbers of international students from these and other countries in the Asia Pacific region. More recently it is becoming evident in increasing research collaborations between Australia's universities and research institutes and their Chinese and Indian counterparts. When it comes to research and innovation, this is a megatrend from which Australia can benefit. **As part of the 2030 Strategic Plan we need to further and rapidly develop Australia's existing ties with research programs in India, China and the Asia Pacific more broadly, and build on programs such as the Australia- India Strategic Research Fund, the Australia-China Science and Research Fund and The New Colombo Plan.**[18]

We also need to investigate how we can do more to develop links within our region in respect of innovation, including making better use of regional supply chains and the opportunities for two-way investment in emerging technologies. In this way, we can build on our increasing research ties to meet the needs of Asia Pacific populations in response to merging challenges such as climate change, energy and food security and ageing populations, as well as emerging markets being driven by increased prosperity.

6: Bold, high-impact initiatives

Research Australia welcomes the call for bold, high impact initiatives and recognises the role that these can play in energising the research and innovation communities around clear and worthwhile goals. It is also an opportunity to galvanise relationships across sectors, with the business community, entrepreneurs and other leaders to foster courageous and critical thinking in a true knowledge economy. Innovation cannot be the sole responsibility of governments.

However, fostering and facilitating an environment for innovation is a vital role that can be expected from national leadership and seeing such play out in the national public arena could be extremely useful as a way of encouraging collective participation by all levels of the broader community.

With specific reference to health and medical research, the key to such initiatives is a focus on better health outcomes and encouraging innovation through applied research.

[18] http://www.science.gov.au/international/CollaborativeOpportunities/Pages/default.aspx

While there are several initiatives underway to encourage HMR investment, Research Australia proposes that a longer-term view to encourage investment is required. Currently, the Biomedical Translation Fund (BTF) provides a model for funding to support the commercialisation of Australian scientific innovation more broadly.

National Innovation Fund

Research Australia proposes that a model similar to the BTF be developed in conjunction with the private sector, with the $130 billion Australian Future Fund as a cornerstone investor, and with the potential for matched funding from the private sector.

The Future Fund Board of Guardians already has significant international investments in venture capital through a range of external overseas managers. **Research Australia proposes that the Government engage the Future Fund Board of Guardians in a discussion about the type of investment structure that would make participation in a National Innovation Fund commercially viable for the Future Fund and other investors.** This could involve, for example, the Australian Government bearing some of the costs associated with establishing the National Innovation Fund and subsidising its ongoing operating costs, recognising that in the initial stages at least it is likely to be small scale and have relatively high investment management costs compared to investments with a similar risk return profile available to the Future Fund internationally.

Conclusion

The proposal for a 2030 Strategic Plan does not exist in a vacuum; there are already many actions being taken to improve Australian research and innovation. In universities, we are seeing the piloting of an impact assessment measure, and changes have been made to the funding of indirect research costs to encourage greater engagement with the private sector. The MRFF is an initiative to ensure we derive greater value from our investment in HMR, and the BTF has been created to improve our track record in commercialisation. The programmes offered by the Department of Industry, Science and Innovation to support business have been redesigned, and a significant investment has been made in Industry Growth Centres. The National Innovation and Science Agenda has created a national focus on how we harness new sources of growth to deliver the next age of economic prosperity in Australia.

The 2030 Strategic plan provides the opportunity to consolidate these existing initiatives and expand on them while providing a more strategic approach and driving greater and faster advances.

If the 2030 Strategic Plan is successful, by 2030 the translation and commercialisation of research will have become part of the lifeblood of a transformed and united research and innovation community; the current chasm that exists now between publicly funded research and private sector innovation will be a thing of the past.

Australian scientific innovation will be the backbone of our economy, significantly contributing to a healthy population and a healthy economy.

Research Australia's membership, which spans the whole research and innovation pipeline, is well placed to assist in reaching into the HMR community to find bold ideas through collective thinking. We would be pleased to provide further information or assist in the further development of the 2030 Strategic Plan, including convening forums to further test ideas and support the drafting of the Plan.

RESEARCH AUSTRALIA LIMITED
384 Victoria Street, Darlinghurst NSW 2010
P +61 2 9295 8546 **ABN** 28 095 324 379
www.researchaustralia.org