

2020-21 PRE-BUDGET SUBMISSION

August 2020

ABOUT RESEARCH AUSTRALIA

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 role:

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.

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Summary of recommendations

<p>Bridging funding needed</p>	<p>The Government should establish a modest pool of funding of up to \$100 million for the specific purpose of providing bridging funding to Government-funded health and medical research that will be unable to be completed withing the existing grant budget because of the disruptions and delays caused by the COVID-19 pandemic.</p> <p>This funding would be applied on a contingency basis.</p>
<p>Quantify the impact of COVID-19 on the HMR sector</p>	<p>The Australian Government's response to COVID-19 must include an assessment to properly quantify the impact of the COVID-19 pandemic on the health and medical research and innovation sector.</p> <p>This is critical for our preparedness for the next pandemic and economic recovery and to ensure we have a robust health and medical research sector for our future.</p>
<p>Invest in Innovation</p>	<p>The Government should outline an investment in national innovation and commit to increasing its spending on research and development to at least 0.75% of GDP annually, by the end of its current term.</p> <p>The Government should commit the additional funding required to implement the measures outlined in the Australian Government response to Innovation and Science Australia's Australia 2030: Prosperity through Innovation</p> <p>These include, for example, implementation of a framework to identify and implement additional National Missions.</p> <p>This plan can be supplemented with the work of the National COVID-19 Commission Advisory Board to provide a new direction and drive for Australia's economy.</p> <p>It is vital that we are able to appropriately measure and evaluate the performance of innovation in Australia and the effectiveness of Government programs. The Government should make provision in the 2020-21 Budget for the implementation of the <i>Innovation Metrics Review's</i> recommendations.</p> <p>Research Australia acknowledges the \$1.9 billion announced in the May 2018 Budget over the forward estimates and confirmed in the 2019-20 Budget. We look forward to seeing this funding commitment retained in the 2020-21 Budget.</p>

<p>R&D Tax Incentive</p> <p>These recommendations reiterate Research Australia's position outlined in our Pre-Budget submissions in 2017, 2018 and 2019</p>	<p>In the current economic environment of reduced business expenditure on R&D, the Government should not take action to reform the R&D Tax Incentive that could further dampen R&D activity.</p> <p>The Government should continue with measures to improve compliance with the existing scheme.</p>
<p>Health and Medical Research and Innovation</p>	<p>There is an opportunity to significantly increase Australia's exports in the trillion-dollar global healthcare sector, adding new jobs in advanced manufacturing and other related industries, and helping to diversify Australia's exports and economy. But we need to act now and capitalise on what has been put in place to date and the opportunity provided by COVID-19.</p> <p>We must dramatically 'scale up' our efforts to support health and medical research and development and innovation across the whole economy if we are to make the most of these opportunities.</p> <p>While undertaking the research to establish the best type of care to deliver is essential, it is not enough. We must redouble our efforts to ensure that this knowledge is communicated and implemented more quickly and consistently throughout our healthcare system and the broader community.</p> <p>Make a significant multi-year commitment to fund implementation of the new 10 Year National Prevention Strategy currently being developed.</p>
<p>The MRFF</p>	<p>Research Australia congratulates the Government on its ongoing commitment to the MRFF which has seen the Fund reach the target \$20 billion in capital.</p>
<p>NHMRC and ARC Funding</p> <p>This recommendation reiterates Research Australia's position outlined in our Pre-Budget submissions in 2016, 2017, 2018 and 2019</p>	<p>Funding for the research programs of the NHMRC and ARC must be increased in real terms in the 2020-21 Budget and over the forward estimates.</p>

<p>Indirect Research Costs</p> <p>These recommendations reiterate Research Australia's position outlined in our Pre-Budget submissions in 2016, 2017 2018 and 2019</p>	<p>The cuts to the Research Block grants outlined in the MYEFO on 17 December 2018 and confirmed in the April 2019 Budget must be reversed.</p>
	<p>The pool of funding for the Research Support Program needs to be increased proportionately in the 2020-21 Budget to reflect the inclusion of MRFF competitive grants in the Program.</p>
	<p>In a similar manner, an additional stream of the IRIISS program needs to be funded by the Department of Health to cover the indirect costs associated with MRFF funding incurred by Independent Medical Research Institutes. This funding should be administered by the NHMRC.</p>
	<p>The Chief Scientist should lead a review of the funding of indirect research costs to establish a sustainable and equitable funding program.</p>
<p>Data for better health and prosperity</p>	<p>The Government should commit funding in the 2020-21 Budget to the implementation of the measures outlined in the CSIRO Report, <i>Artificial intelligence: Solving problems, growing the economy and improving our quality of life</i>.</p>
	<p>The Government should make provision in the 2020-21 Budget for the infrastructure needed to support the new Data Sharing legislation in anticipation of its passage through the Parliament in 2020-21.</p>
	<p>The Government should also continue to invest in capacity building in Commonwealth departments and agencies to enhance their ability to capture, manipulate and analyse data, and their capability to link data and to prepare secure, deidentified datasets for public release.</p>
	<p>Ensure the AIHW is adequately resourced to prepare for and undertake the significant new role of preparing and providing de-identified My Health Record data for research and public health purposes.</p>
	<p>The Government should implement an ongoing awareness campaign to emphasise the positive contribution the My Health Record can make to individual and whole of population health outcomes.</p>
	<p>Provide funding to develop and implement an ongoing strategy to improve Australians' health literacy, with a particular focus on disadvantaged groups. This strategy should include ongoing monitoring of Australians' digital health literacy to enable the progress of the strategy to be assessed. It should incorporate the initiatives in relation to the My Health Record proposed above.</p>

2020-21 PRE-BUDGET SUBMISSION

Introduction

Research Australia welcomes the opportunity to make this updated submission to the Treasurer in relation to the 2020-21 Budget.

Established with the assistance of the Federal Government in 2002, Research Australia is the national alliance representing the entire health and medical research (HMR) pipeline, from the laboratory to the patient and the marketplace. Research Australia works to position Australian HMR as a significant driver of a healthy population and a healthy economy.

The focus of our submission is the role of health and medical research and innovation in Australia's response to the medical emergency created by the COVID-19 pandemic and the economic reforms needed as Australia plans its economic recovery.

Our members have played an integral part in Australia's response to the COVID-19 pandemic. Australian researchers were among the first outside China to grow the virus in the laboratory and to share samples worldwide. Our members have been providing the advice and modelling that has guided Australia's leaders in their response to the COVID-19 pandemic. They are developing vaccines and identifying new therapies to help those who are ill. They are working on new tests and diagnostics, and ways to support our health workforce and health systems. They are investigating the impact of COVID-19 on our most vulnerable communities and helping develop strategies to protect them.

While no country can produce everything it needs and its population wants, in a time of crisis a strong capacity in research, innovation and manufacturing enables a nation to shift its capacity to meet areas of critical need, whether these are medical supplies and equipment (including vaccine production), food, fuel, or defence against cyber and military attack.

The COVID-19 pandemic has demonstrated Australia's deficiencies in some critical areas and the need for a long term, integrated strategy to increase our research, innovation and manufacturing capacity. Doing so will not only assist us in responding to future pandemics and crises but help diversify, and thus 'de-risk', our economy.

Research Australia has compiled a report that showcases the breadth and scale of the research response to COVID-19. *COVID-19 How Australia's health and medical research sector is responding* can be viewed and downloaded from the Research Australia website, available [here](#).¹

We have also undertaken a survey of researchers in the HMR sector about the impact of COVID-19 on their research and careers. *The impact of COVID-19 on health and medical researchers* can also be viewed and downloaded from the Research Australia website, available [here](#).²

This survey has shown the devastating effect that the measures to ameliorate the impact of COVID-19 on our population has had on health and medical research, so much of which is funded by the Commonwealth Government.

In unprecedented numbers, health and medical researchers have been rapidly redeployed to work on COVID-19 – but it has come at a cost. This sudden and necessary mass pivoting of so many researchers away from business as usual, coupled with the pandemic lockdowns and restrictions, has thrown existing projects and their funding streams off course.

Laboratory work could not be conducted from home and so experiments had to be stopped. Health and medical research involves interacting with human research participants and this was suspended due to physical distancing requirements. Many researchers are also clinicians and had to suspend their research to focus solely on clinical care; others had university teaching responsibilities and had to devote their time exclusively to preparing for remote teaching.

There is an immediate need for additional funding to enable research that has been disrupted and delayed by COVID-19 to be completed.

Nearly 70% of medical researchers who responded to our survey expect their research to be affected by COVID-19 beyond 2020. Nearly half (47.7%) of those who expect to be affected anticipate they will be unable to complete current projects. This represents a massive loss of effort and a huge opportunity cost for Australia which can be prevented with swift action to allow existing research programs to be extended and provided with additional bridging funding.

A similar proportion (45.8%) expect job losses from their teams and laboratories, because employment is dependent on research funding being available. A majority (54.5%) are employed on fixed term contracts, with this ratio higher for early and mid-career researchers. When research funds are exhausted, jobs are lost along with the research.

Looking beyond health and medical research to the broader, research, innovation and manufacturing sectors, the COVID-19 pandemic has exposed significant gaps and a lack of depth in our capacity.

¹ Research Australia, 2020, *COVID-19 How Australia's health and medical research sector is responding*, available at <https://researchaustralia.org/covid-19/>

² Research Australia, 2020, *The impact of COVID-19 on health and medical researchers*, available at https://issuu.com/researchaustralia/docs/covid-19_series_report_final

Australian Government's response to COVID-19

Overall, Research Australia believes the Australian Government's response to COVID-19 in terms of limiting the spread of the disease and 'flattening the curve' has been extremely effective. In an environment in which there was significant uncertainty, the Australian Government has acted quickly and has been guided by expert scientific advice.

In our own domain of health and medical research and innovation, the Government has provided additional funding to support promising vaccine candidates and the development of more effective therapies, and it has targeted research funding to other areas of concern such as mental health, however evaluating the effectiveness of this response must also be part of responsible use of public funds. Evaluation is part of directing future funds to response expenditure, such as during a pandemic or similar crisis, as well as ensuring business as usual funding is effectively directed.

Research Australia's survey of more than 1200 health and medical researchers conducted from late April to mid May, asked respondents to assess Australia's response to the COVID-19 pandemic.

95% agreed that Australia's overall response to the COVID-19 pandemic has been effective. 91% agree that Australia's overall response to the COVID-19 pandemic has been timely). On the question of whether 'Australia's politicians have relied on expert health and medical advice in deciding how to respond to COVID-19', 92% agree.

Of course, the Australian Government's response to COVID-19 has involved many decisions across many aspects of our society and economy. While additional funding has been provided to specific COVID-19 related research projects, the combined effect of the response to COVID-19 on the broader health and medical research community has been detrimental.

Adverse effects on Australian health and medical research and innovation

Some key decisions have had an adverse effect on Australian health and medical research and innovation. The combined effect of these decisions has been to disrupt and delay health and medical research being conducted in Australia. Research takes time to deliver outcomes. Even small delays to the research, and disruptions to funding, can mean research is lost for good or the investment to date has been wasted because the research has to start again, which is not easily done and requires new investment. The impact should not be underestimated.

Research Australia believes it is worth examining the impacts of COVID-19 and government decisions on researchers in more detail.

Closing the borders

The first of these decisions was to close Australia's borders. Whilst necessary, this decision has had both direct and indirect consequences for Australian researchers. Research is usually highly interdisciplinary, and travel is essential for building collaborations and for access to laboratories, practices and study cohorts elsewhere. The direct consequences include preventing researchers from traveling to Australia from overseas to collaborate on research, and disruptions to supply chains for research materials being imported from overseas. It also prevented Australian researchers from travelling overseas to commence or continue research fieldwork in other countries or from collaborating with overseas research partners.

Only two months in, 39% of researchers responding to our survey indicated their research had already been disrupted by international travel restrictions. With travel restrictions not expected to be eased for many months, this impact will only grow.

There are also normally large numbers of overseas university students studying in Australia and the revenue generated from the fees these students pay and the other money they spend in Australia make international education Australia's fourth largest export. The start of the university year in Australia is March, which meant that when our borders closed many international students were unable to reach Australia to commence study; consequently universities lost hundreds of millions of dollars in revenue which they were using to fund research. The consequences of this are addressed later in this submission.

Preparing our health system for a pandemic

In the first few months, Australia's health system was focused on preparing for a pandemic; ensuring that it would be able to cope with a massive rise in COVID-19 patients, which threatened to overwhelm our emergency departments and intensive care units. At the same time, we were facing a severe shortage of Personal Protective Equipment (PPE), which led to the suspension of elective surgery and other activities not deemed essential.

Ordinarily, there is a significant volume of clinical research being conducted in Australia's health system. This involves patients participating in clinical trials and other studies to develop new treatments and drugs and better patient management. In the midst of the pandemic, unless directly related to COVID-19 these activities were deemed non-essential and many clinical trials were suspended. 21% of researchers responding to our survey reported their research was disrupted by the inability to access hospital research settings. 6% were unable to access research setting in aged care.

In other cases, the clinical researchers who divide their time between research and patients found their clinical duties overwhelmed their research as we prepared for the pandemic. 11% of survey respondents indicated the increased demands of clinical work necessarily disrupted their research, delaying the improvement in patient outcomes this research would have delivered.

Physical distancing and working from home

Like so many other parts of the workforce, researchers generally had to comply with work from home requirements. Over half of respondents to our survey (51.44%) reported their research was unable to be undertaken remotely. Of course, much health and medical research involves human participants and the restrictions on physical contact imposed as part of the COVID-19 response meant that interviews, assessment and reviews with study participants had to cease. 50% of respondents to our survey reported these measures had affected the recruitment of respondents and 42% reported that it had prevented interaction with existing research participants.

Many researchers also have teaching duties in our universities. The time needed to prepare for remote teaching as campuses closed affected 25% of all the respondents to our survey.

70% of survey respondents expect that their research outcomes will be affected by COVID-19 beyond 2020. A further 22% of survey respondents were unsure, with only 8% of respondents expecting no effects beyond the end of this year.

A broken research funding system exposed

Research Australia accepts that the delays and disruption to research were an unavoidable consequence of managing COVID-19. What they have exposed however, is the gaps and cracks in our system for the funding of health and medical research. In fact, calling it a system is probably an overstatement; it is a number of different and uncoordinated funding sources and schemes, of which only a few are actually connected by design. The funding schemes have grown up and around each other, accommodating each other while pursuing their own objectives. The fragmentation results in duplication of effort and wasted time and money.

The nature of employment

The COVID-19 pandemic has revealed differences in the security of employment of different workers and occupations across our economy. Most people would be surprised to learn that for many, a career in health and medical research and innovation is insecure.

Research Australia's survey included questions about employment status. 54% of researchers at universities and 74% of researchers at MRIs were employed on a contract basis. By far the most common contract term was 12 months. A further 5.27% are employed on a casual basis. The number of respondents on fixed term contracts at universities and MRIs is far higher than the national average across the economy.³

This type of fixed term contract employment is very insecure. These researchers' incomes and careers are dependent on their ability to attract research income such as NHMRC and ARC grants. If the funding they are able to attract is insufficient to fund the research or is exhausted before the research can be completed because of delays and disruptions, they must try to find other funding. If they are unable to do this, the research can't be completed, and they are out of a job. Apart from the loss of income this directly affects their careers, which are driven by being able to publish research findings.

No additional Government funding

Australian Government funding for research through the National Health and Medical Research Council, the Australian Research Council and the Medical Research Future Fund is provided to an individual or group of researchers for a fixed period and for the delivery of specific outcomes.

It rapidly became clear in March and April that COVID-19 was going to significantly disrupt and delay research projects. In our survey we asked respondents to estimate the financial impact of these delays and disruptions to their research. The total financial impact reported just by survey respondents is conservatively estimated at \$75 million; the impact across the whole sector is estimated to be hundreds of millions of dollars.⁴

³ G, Gilfillan, Trends in use of non-standard forms of employment, December 2018, Australian Parliamentary Library

⁴ Research Australia, 2020, The impact of COVID-19 on health and medical researchers, available at https://issuu.com/researchaustralia/docs/covid-19_series_report_final

It is also clear that many research projects will not be able to be delivered on time or on budget and some may not be restarted at all. However, while the NHMRC, ARC and MRFF are in a position to extend the time available for research projects, they have not been able to increase the funding available.

This places research projects at risk of not being able to be completed. It also presents the real risk of these projects' researchers being left without salaries.

Research Australia submits that the Government should establish a modest pool of funding of \$100 million for the specific purpose of providing bridging funding to Government funded health and medical research that will be unable to be completed withing the existing grant budget because of the disruptions and delays caused by the COVID-19 pandemic. This funding would be applied on a contingency basis.

The major benefit of this measure is that it would enable the existing research to be completed, effectively protecting the investment the Commonwealth Government has already made in the research and the outcomes it will deliver for our community. It will also help to preserve jobs at a time of high unemployment and when job creation and protection is critical to both the health and medical research sector and the economy more generally.

It would not address the problem of researchers who are entirely reliant on funding from their institutions, and institutions would still need to cover the continuing 'funding gap'. But it would be a start, and one in which the Commonwealth was leading by example.

So how could this bridging funding be distributed? Like the Australian Research Council (ARC) and the Medical Research Future Fund (MRFF), the National Health and Medical Research Council (NHMRC) is offering extensions to grant periods for the research it funds. Researchers could also be invited to make applications for additional funding when they seek the grant extension. The amount would be calculated to enable the research to be completed.

So how could this bridging funding be distributed? Like the Australian Research Council (ARC) and the Medical Research Future Fund (MRFF), the National Health and Medical Research Council (NHMRC) is offering extensions to grant periods for the research it funds. Researchers could also be invited to make applications for additional funding when they seek the grant extension. The amount would be calculated to enable the research to be completed.

Such a process could allow for a staggered application period, in the last year of the current grant; only research grants due to conclude this year would apply this year and so on. Where researchers were successful in securing other additional funding over the next few years, or in making up time, they may not need to apply for the additional funding, or only for a reduced amount.

Implementation of this measure would require the Commonwealth Government to provide an injection of funds to enable the NHMRC to create a specific pool of funding within the NHMRC's Medical Research Endowment Account for this purpose. This contingency fund could only be used for the outlined purpose and any unexpended funds could be returned to the Commonwealth. Equivalent mechanisms could be put in place for the MRFF and ARC.

Support for public research overseas

Overseas governments with similar systems to Australia for funding public research have recognised the impact of COVID-19 on research and have responded with support programs.

Canada

Providing wage support for universities and health research institutes

We are providing wage support for up to 75% of wages for individuals working in universities and health institutes, for a maximum of \$847 per week per employee.

This will ensure that universities and health research institutes can retain research staff.

Covering eligible costs to maintain research activities

We are covering up to 75% of total eligible costs for research activities, and will support activities such as the safe storage of dangerous substances, and restarting data sets that were interrupted during the pandemic.

This will ensure that universities and health research institutes maintain essential research activities and return to full research operations once back to normal.⁵

United Kingdom

From this autumn, UK universities will be able to access a series of government grants and long-term, low interest loans covering up to 80% of their income losses caused by an expected decline in international students, ensuring that their crucial research can continue.

Around £280 million of government funding will be made available to universities impacted by coronavirus. This will fund extensions to grants, allowing them to continue developing ambitious and innovative research projects, funded through UK Research & Innovation (UKRI) and the National Academies, including supporting researchers' salaries and other research costs like laboratory equipment and fieldwork.⁶

⁵ <https://www.canada.ca/en/department-finance/economic-response-plan.html>

⁶ <https://www.gov.uk/government/publications/support-for-university-research-and-innovation-during-coronavirus-covid-19>

Other funding

COVID-19 has dramatically increased the number of researchers whose projects have been delayed and disrupted; and for a range of reasons, universities and MRIs are not in a position to 'pick up the tab' at this point in time.

Beyond research that is partially funded by government grants, there are ramifications for other health and medical research and innovation which is crucial to kickstart economic growth.

In universities, income from international students is used to fund research. This includes funding salaries and infrastructure, maintenance and running costs. For government funded research, it also includes meeting the difference between the total cost of the research and the funding provided by the government funding agency.

The start of the university year in Australia is March, which meant that when our borders closed many international students were unable to reach Australia to commence study. Ordinarily international students account for nearly 40% of universities' student revenue.⁷ Analysis by Curtin University Deputy Vice Chancellor for Research, Professor Chris Moran estimates universities have lost as much as \$2.5 billion in revenue for the 2020 academic year, putting 38% of research salaries at risk.⁸ The Mitchell Institute's modelling suggests Australia's universities face a cumulative loss of between \$10 billion to \$19 billion from 2020 to 2023.⁹ This financial loss over multiple years will occur even if the numbers of international students rebound in 2021 because higher education qualifications are undertaken over several years. A student who did not commence study in 2020 is unable to progress to second year in 2021, to third year in 2022 and so on. Universities are already announcing plans for mass redundancies and cost savings across their whole operations, including research.

The loss of billions of dollars in international student revenue because of restrictions on international travel is hampering the ability of the universities to make up the shortfall on government funded projects, let alone cover the entire additional cost caused by the COVID-19 related delays and disruptions.

In addition to universities, the major recipients of government funded grants for health and medical research are the medical research institutes (MRIs). Like universities, MRIs are required to supplement research grants with additional funds to cover the full costs. MRIs largely rely on philanthropy and their own fundraising efforts (they are registered as charities) to fund this gap. Universities are also dependent on philanthropy and donations. Like the universities, MRI do not have the surplus funds required to cover the whole cost associated with the delays and disruptions to research caused by COVID-19.

⁷ Hurley, P., Van Dyke, N., (2020). *Australian investment in education: higher education*. Mitchell Institute, Melbourne.

⁸ <https://www.universitiesaustralia.edu.au/media-item/investment-in-university-research-an-investment-in-covid-19-recovery/>

⁹ Hurley, P., Van Dyke, N., (2020). *Australian investment in education: higher education*. Mitchell Institute, Melbourne.

COVID-19 has adversely affected the capacity of MRIs and universities to rely on philanthropy. The fundraising efforts of charities large and small have been severely disrupted by the physical distancing and travel restrictions. (Events such as the Mothers' Day Classic, a fun run which raises funds for breast cancer research could not be held this year.) The economic downturn, with increased unemployment and sharp falls in investment markets is also affecting donations, including the ability to raise funds from corporate Australia.

The loss of funding sources from philanthropy and international students severely limits the capacity of universities and MRIs to fund other research. This 'other' research is significant; for example, in 2018 expenditure by universities on health and medical research and innovation totalled \$4.1 billion, significantly more than the contributions to HMR made by the Commonwealth Government.¹⁰

To compound this, it is fairly long-standing government policy to encourage universities and MRIs to engage with industry and this has had the desired effect in recent years. For example, in 2018 businesses were the source of \$521 million of university research spending across all disciplines.¹¹ The financial downturn caused by the COVID-19 epidemic threatens business investment in these research activities and is not going to be a source for universities and MRIs to make up the shortfall. It also threatens private sector investment in its own R&D.

This perfect storm of increased costs due to COVID-19 induced disruptions and delays, a loss of international student income, private sector losses and the loss of philanthropic support has highlighted how fragile a system we have for funding research. The irony is that we are relying on this research to both respond and lead us out of the pandemic and back to activity/productivity.

¹⁰Australian Bureau of Statistics, Cat. No.8111.0, Research and Experimental Development, Higher Education Organisations, Australia, 2018

¹¹ Ibid

The way forward

The COVID-19 pandemic, by putting our society and economy under stress, has highlighted several flaws and areas in need of attention, particularly if our economy and the nation's public finances are to recover.

In a speech to the National Press Club on 26 May, the Prime Minister outlined some of what is required. While his focus in the speech was on industrial relations reform and vocational training, he outlined a broader agenda.

‘And that means focussing on the things that can make their businesses go faster.

The skilled labour businesses need to draw on, the affordable and reliable energy they need, the research and technology they can draw on and utilise, the investment capital and finance that they can access, the markets they can connect to, the economic infrastructure that supports and connects them, the amount of government regulation they must comply with, and the amount and the efficiency of the taxes they must pay, in particular whether such taxes encourage them to invest and to employ.

Now that is the change agenda of our JobMaking plan, to enable Australia to emerge from this crisis and set up Australia for economic success over the next three to five years.

Skills, industrial relations, energy and resources, higher education, research and science, open banking, the digital economy, trade, manufacturing, infrastructure and regional development, deregulation and federation reform, a tax system to support jobs and investment.¹²

Research Australia welcomes the recognition of the importance of research and development and science as areas that are critical to our national economic recovery. Even more than that, these are areas that are also critical to our preparedness for the next pandemic, and for the general wellbeing of our community.

Research Australia submits the Australian Government's response to COVID-19 must include an assessment of Australian research and innovation to properly quantify the impact of the COVID-19 pandemic on the sector.

The case for a broader investment in research and innovation is made in the next section.

¹² Prime Minister's Address to the National Press Club, 26 May 2020

Why invest in innovation?

Per capita, Australia is one of the wealthiest countries in the world. And while it is no longer true that Australia rides on the sheep's back, for a wealthy country our economy remains poorly diversified. This places Australia's long-term future at risk; a decline in the export value of just a few key commodities can jeopardise our whole economy and standard of living. COVID-19 has exposed just how vulnerable Australia is because of our relatively small and narrow manufacturing base.

In general, the complexity of a country's economy, measured in terms of the diversity of its international trade, is a good measure of the economy's strength and resilience, and its capacity for continued innovation and growth.

The *Atlas of Economic Complexity*, developed by Harvard University, rates the complexity of Australia's economy as the 93rd most complex economy in the world, behind Morocco, Uganda and Senegal.

'Australia is a high-income country, ranking as the 8th richest economy per capita out of 133 studied. Its 24.6 million inhabitants have a GDP per capita of \$54,093 (\$49,653 PPP; 2017). GDP per capita growth has averaged 0.9% over the past five years, below regional averages.'

Australia ranks as the 93rd most complex country in the Economic Complexity Index (ECI) ranking. Compared to a decade prior, Australia's economy has become less complex, worsening 22 positions in the ECI ranking. Australia's worsening complexity has been driven by a lack of diversification of exports. Moving forward, Australia is positioned to take advantage of a moderate number of opportunities to diversify its production using its existing knowhow.'

Australia is less complex than expected for its income level. As a result, its economy is projected to grow slowly. The Growth Lab's 2027 Growth Projections foresee growth in Australia of 2.2% annually over the coming decade, ranking in the bottom half of countries globally.¹³

The risk of this lack of diversity evident in our inability to produce basic medical supplies and medicines; at a more sophisticated level, a lack of manufacturing capability for some types of vaccines leaves Australians exposed in the event of vaccines being developed and manufactured overseas. And these are just some of the consequences of our failure to diversify our economy and manufacturing base.

To summarise:

- The key to long term, sustainable prosperity is a more complex economy.
- Greater complexity requires greater diversification of exports.
- Existing knowhow provides a moderate number of opportunities to diversify our production.

¹³ Harvard University Growth Lab, Centre for International Development, Atlas of Economic Complexity, Australia Profile, accessed on 19 November 2019 at <http://atlas.cid.harvard.edu/countries/14>

- The key to diversifying our exports and our economy is new knowledge creation and innovation, that enables domestic advanced manufacturing.

It is clear that we need to do more. While there are signs that Australia is becoming more innovative and the response to COVID-19 has provided some exemplars, a concerted long-term investment in innovation by the Government and the private sector is required over decades if we are to see innovation have a real impact on our exports and permeate our economy.

The Government commissioned Innovation and Science Australia to develop a plan for innovation, which was delivered to the Government in 2017.¹⁴ *Australia 2030: Prosperity through Innovation* outlined a plan for how the Australian Government could drive innovation across the whole economy through investment at the medium term average level of 0.63%.

While Research Australia contends that this level of Government investment in R&D is too low, even this modest target has not been achieved, with the **Government's expenditure on R&D across all areas having fallen to less than one half of one percent of GDP.**

Australian Government investment in R&D as a percentage of Gross Domestic Product¹⁵

Financial Year									Forecast		
09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	Average
0.64	0.63	0.67	0.64	0.62	0.61	0.58	0.54	0.56	0.48	0.48	0.61

This underinvestment by the Government in innovation will condemn Australia to a low growth future, highly dependent on just a few key exports. It is essential that we act now, while we still have relatively high levels of wealth, to invest in developing the export industries that can sustain our wealth in the future.

Research Australia submits that the Government should outline an investment in national innovation and commit to increasing its spending on research and development to at least 0.75% of GDP annually, by the end of its current term.

¹⁴ Innovation and Science Australia 2017, *Australia 2030: prosperity through innovation*, Australian Government, Canberra.

¹⁵ Australian Government, Science, Research and Innovation (SRI) Budget Tables, 2019-20, Australian Government investment in R&D by sector and sub-sector, and other analyses Table 6, Australian Government investment in R&D as a percentage of Gross Domestic Product

National Innovation Strategy 2030

The National Innovation Strategy is an important piece of public policy; it will set the direction for Australian science, research and innovation through to 2030, at a time when this has arguably never been more important to Australia's future. If we get this right it will help establish Australia as a leading player in Industry 4.0, the fourth industrial revolution, and lay the foundation for prosperity for decades to come. And, of course, this will only happen if the Strategy's implementation is supported by sustained national investment in:

- our education system,
- our publicly funded research organisations, institutes and universities; and
- an innovation system that supports private sector investment and innovation.

While the Government provided a response to the report accepting the majority of the recommendations in principle, there has been little progress since in implementing the report's recommendations.

In the 2020-21 Budget the Government should commit the additional funding required to implement the measures outlined in the Australian Government response to *Innovation and Science Australia's Australia 2030: Prosperity through Innovation*. These include, for example, implementation of a framework to identify and implement additional National Missions. (Recommendation 28)

This plan can be supplemented with the work of the National COVID-19 Commission Advisory Board to provide a new direction and drive for Australia's economy.

Measuring Innovation performance

With innovation so central to Australia's future, it is essential that we are able to measure Australian research and development activity across the economy.

The Australian Bureau of Statistics undertakes two-yearly surveys of Research and Development activity in Government, Higher Education, Business and the Private Non-profit sectors. (It undertakes two surveys each year alternating between the sectors, so that each sector is measured every second year.) While the surveys are useful, the two-yearly 'staggered' nature of the data collection and analysis makes it difficult to capture an accurate snapshot of progress.

More significantly, the data are not reported in enough level of detail to enable an assessment of the performance of particular sectors, or the impact of particular Government programs. Data on research and development are reported by the Australian Bureau of Statistics using the Standard Research Classification Codes of Socioeconomic Objective (SEO) and Field of Research (FOR). These codes use a system whereby activity is initially grouped at a high level; for example, the broad activity of Manufacturing is assigned the Code 86. Specific industries within Manufacturing are assigned a specific code within this division; for example, Human Pharmaceutical products is 8608.

Human Pharmaceuticals manufacturing is a strategic target of the Australian Government's investment in innovation, however the ABS does not provide data on R&D at the four-digit code of 8608. Data is only available at the level of Manufacturing, making it impossible to distinguish expenditure on pharmaceuticals from any of the other 18 categories in the Division. A similar issue arises with Fields of Research, with data on research and development only reported at the two-digit code level. It is not possible, for example to distinguish expenditure on

biochemistry and cell biology from expenditure on genetics, physiology, plant biology or zoology. All are simply reported in the ABS statistics as expenditure on '06 Biological Sciences'.

This issue was identified in *Australia 2030: Prosperity through Innovation*, and the Government has acted on the report's recommendation to commission a review of how innovation is measured. The Innovation Metrics Review, originally due to publish its report in December 2019, is expected to make recommendations for improved collection of data around Australian innovation.

It is vital that we are able to appropriately measure and evaluate the performance of innovation in Australia and the effectiveness of Government programs to ensure transparent and efficient use of public funds with the highest possible positive impact and outcomes. Research Australia urges the Government to make provision in the 2020-21 Budget for the implementation of the Innovation Metrics Review's recommendations.

This is particularly critical now, when Australia's private sector is being so badly affected by the COVID-19 induced recession and it will require significant attention to not only kickstart it again but enable it to compete globally.

Funding for research infrastructure

Commissioned by the Australian Government, the 2016 National Research Infrastructure Roadmap outlines national research infrastructure required over the coming decade so that Australia's research system continues to improve productivity, create jobs, lift economic growth and support a healthy environment.

The Plan was provided to Government by the Chief Scientist in February 2017. Jointly releasing it to the public in May 2017, the Minister for Education and Training, and the Minister for Industry, Innovation and Science, committed to the development of a research infrastructure investment plan.

"Key to our consideration will be the development of a research infrastructure investment plan to develop a broad understanding of the range and scale of the infrastructure required for the future so that Australia continues to deliver cutting edge research outcomes.

"The plan will inform how we approach future investment in national research infrastructure and equipment needs across the sector consistent with the 2016 Roadmap, including in the publicly funded research agencies. It will be developed in consultation with Innovation and Science Australia and the Commonwealth Science Council," Minister Sinodinos said.¹⁶

Research Australia acknowledges the \$1.9 billion announced in the May 2018 Budget over the forward estimates and retained in the 2019-20 Budget. **We look forward to seeing this funding commitment retained in the 2020-21 Budget.**

¹⁶ 'National roadmap for research infrastructure shows the way', Joint media release with the Minister for Education and Training, Senator the Hon Simon Birmingham, 12 May 2017

R&D Tax Incentive

In 2018 the Government introduced a Bill to Parliament to:

- impose a cap on the refundable R&D Tax Incentive;
- exempt clinical trials from the cap;
- lower the rate of the refundable and non- refundable R&D Tax offsets; and
- create an intensity measure for the non-refundable R&D Tax Offset.

The Bill was the subject of an Inquiry by the Senate Economics Legislation Committee, which recommended ‘the Senate defer consideration of the bill until further examination and analysis of the impact of schedules 1–3 is undertaken. In particular, the committee recommends that:

- the approach to the cap on the refundable portion of the Research and Development (R&D) tax incentive is refined, noting investment decisions already taken; and
- the formula for R&D intensity is refined, noting inherent differences in R&D intensity across industries and impacts on businesses with large operating costs.’

The Bill subsequently lapsed with the prorogation of Parliament before the election, but a new Bill, the *Treasury Laws Amendment (Research and Development Tax Incentive) Bill 2019* was introduced on the last sitting day of Parliament in 2019. It differs slightly from the earlier Bill, but the changes do not address the sector’s concerns.

The ABS has reported that annual Australian R&D expenditure by businesses (BERD) declined by more than \$2 billion (12%) between 2013-14 and 2015-16.¹⁷ While there was a slight improvement in 2017-18 in dollar terms, it is still lower than in 2013-14. BERD as a proportion of Gross Domestic Product (GDP) **decreased from 1.0% in 2015-16 to 0.9% in 2017-18.**¹⁸

Business Expenditure on Research and Development 2008-09 to 2017-18

2007-08 (\$m.)	2008-09 (\$m.)	2009-10 (\$m.)	2010-11 (\$m.)	2011-12 (\$m.)	2013-14 (\$m.)	2015-16 (\$m.)	2017-18 (\$m.)
15,047,360	17,291,228	16,759,641	18,006,887	18,321,322	18,849,438	16,659,296	17,437,585

¹⁷ Australian Bureau of Statistics, Cat. No. 8104.0 - Research and Experimental Development, Businesses, Australia, releases for years 2007-08 to 2017-18

¹⁸ Australian Bureau of Statistics, Cat. No. 8104.0 - Research and Experimental Development, Businesses, Australia, 2017-18 Summary

This decline in activity is evident in recent expenditure on the R&D Tax Incentive, which in inflation adjusted terms, peaked in 2015-16 as the below table illustrates.¹⁹

Research and Development Tax Incentive Expenditure (\$m inflation adjusted, 2017-18 dollars)

Program/activity	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19*	2019-20 ⁺
RDTI-Refundable	1603.6	1818.0	1953.6	2126.3	2179.6	2002.4	1929.0	1690.5	1706.3
RDTI-Non Refundable	1131.1	1227.5	1011.7	872.0	823.7	712.6	650.0	358.2	275.8
Total	2,734.8	3,045.5	2,965.3	2,998.3	3,003.3	2,715.0	2,579.0	2,048.8	1,982.2

*estimated actual ⁺Budget estimate

The Government's proposed changes to the R&D Tax Incentive, if enacted, will further reduce private sector R&D, and do so at a time when business activity and revenue generally have been affected by the COVID-19 induced recession. For example, by linking the non-refundable R&D Tax Incentive to the value of R&D as a percentage of total expenditure, the proposed intensity measure not only provides an incentive to increase R&D, but to reduce other expenditure, including moving other expenditure, such as manufacturing, to other countries.

The R&D Tax incentive is relied on heavily by the small innovative start-up companies. Because they are often 'pre-revenue' many of these have been ineligible for JobKeeper and have relied instead on the R&D Tax Incentive.

In the current economic environment of reduced business expenditure on R&D, the Government should not take action to reform the R&D Tax Incentive that could further dampen R&D activity. Instead, the Government should continue with measures to improve compliance with the existing scheme.

¹⁹ Australian Government, Dept. of Industry, Science and Innovation, SRI Budget Tables 2018-19, Table 2. Australian Government R&D programs and activities valued at over \$100 million in 2019-20, inflation adjusted

Why invest in Australian health and medical research and innovation?

Research Australia represents the whole pipeline of health and medical research and innovation, from the new ideas that power basic research through to the application of this knowledge to improve human health. This is an important part of the knowledge economy, which is reliant on new ideas and discoveries, and new ways of looking at things and doing things to drive economic progress. This is Research Australia's particular focus within the broader innovation ecosystem and the basis for our observations and advocacy.

While COVID-19 has drawn a spotlight to our health and medical researchers and given them an unprecedented public profile, its role extends far beyond COVID-19 and the immediate efforts to develop a vaccine and flatten the curve.

Healthcare is a sector in which governments, the private sector and not for profit service providers are all key stakeholders and this has been brought into stark relief in the COVID-19 pandemic. The risk of our health system being overwhelmed was a problem for everybody and the response has come from everyone, with levels of cooperation and collaboration rarely seen across governments, business, and the not for profit sector. Healthcare is the perfect exemplar of the need for the Commonwealth Government to work and invest strategically, responsively and proactively with other sectors of our community. This is the only way we can deliver the healthier population and higher quality, safer and more efficient healthcare system Australia needs to be able to prosper in the future.

We have a rare opportunity to use this crisis and the response to drive longer term, sustainable change.

Health and Wealth

All Australians benefit from strong investment in health and medical research and innovation.

Improving the health of the Australian population is central to improving national productivity. Australian health and medical research leads to new medicines, technologies and treatments that cure us when we are ill or injured. It plays a significant role in disease prevention through the development of vaccines, as well as technologies for early disease diagnosis. More immediately, health and medical research in Australia continues to tackle how to best deliver healthcare, providing critical evidence that addresses clinically important unanswered questions.

COVID-19 has provided examples of the critical role played by Australian researchers and the quality of the research. Epidemiologists supporting government decisions in relation to COVID-19 and modelling the effects of different policy responses. Rapid work commenced in Australia to analyse the virus genome, and work to developing vaccines and treatments. Research Australia has already referred to our report, *COVID-19 How Australia's health and medical research sector is responding* which outlines more than 200 such responses.²⁰

²⁰ Research Australia, 2020, *COVID-19 How Australia's health and medical research sector is responding*, available at <https://researchaustralia.org/covid-19/>

Health and medical research and innovation can lead to efficiencies that help constrain health expenditure; reducing the call on the taxpayer, and the cost to consumers through health insurance premiums and out of pocket expenses. For every dollar invested in Australian health research and development, an average of \$3.90 in health benefits is returned.²¹

Australian health and medical research has traditionally been world class, but our record in translating our discoveries into new products, treatments and medicines has not been as good. An assessment by Innovation and Science Australia for the Australian Government identified that fewer than 10% of Australian companies across all industries introduced new-to-market product innovations (new products and services) compared to 21% for the top five performing OECD countries.²²

The encouraging news is that this percentage is increasing. In the health and medical research and innovation sector, the last decade has seen the development of greater expertise in the commercialisation of new discoveries and more sources of funding for the long process of bringing new medicines, vaccines and medical technologies to market.

This expertise has been in the national spotlight during the COVID-19 pandemic, and while we are progressing well with clinical trials for several Australian developed vaccines, gaps further down the pipeline, for example in our capacity to manufacture and commercialise some vaccine types, are emerging. These gaps prevent us from capitalising on our world class research and building industries of the future.

There is an opportunity to significantly increase Australia's exports in the trillion-dollar global healthcare sector, adding new jobs in advanced manufacturing and other related industries, and helping to diversify Australia's exports and economy. But we need to act now and capitalise on what has been put in place to date and the opportunity provided by COVID-19. We must dramatically 'scale up' our efforts to support health and medical research and development and innovation across the whole economy if we are to make the most of these opportunities.

Data as a national resource

Research Australia believes that when it comes to improving Australians' health and our healthcare system, the key is harnessing the transformative power of data to accelerate advances. Digitisation of healthcare is already occurring, but continued support from Government through initiatives like the Australian Digital Health Strategy and the proposed Digital Economy Strategy is essential to accelerate and guide this activity, and to promote the more systematic adoption that will enable the greatest benefits to be derived. It also provides an opportunity to encourage the crossover of technologies from other sectors of the economy such as banking, which is a leader in the use of technology to interact and transact with consumers.

Once again, the importance of data has been highlighted by COVID-19; where and how infections are spreading, who is recovering, the numbers of patients in ICU. All of these numbers represent individual patients, and large volumes of patient data are being analysed to better understand the effect COVID-19 is having on individuals and the community as a whole.

²¹ KPMG, Economic Impact of Medical Research in Australia, October 2018, commissioned by the Australian Association of Medical Research Institutes

²² Innovation and Science Australia, Performance Review of the Australian Innovation, Science and Research System 2016, p.xi.

Embedding research in the health system

The greatest opportunities for improvement and innovation in our healthcare system lie in the systematic application of evidence-based healthcare, driven by the best research. COVID-19 and the search for treatments and vaccines have highlighted the vital link between research and health care. All the advice has been evidence based, including around the role of masks, physical distancing, and the use of Personal Protective Equipment.

Beyond COVID-19, with Australian healthcare expenditure in 2017-18 estimated to be \$185 billion, even relatively small efficiency improvements can have significant economic benefit.²³ For example, adverse events in hospital are events that lead to harm to patients. Approximately 5% of patients experience an adverse event, and these patients stay an average of 10 days longer in hospital. Screening for risks such as falls and medication errors are recognised ways of reducing adverse events that that can be addressed with digital solutions, leading to millions of dollars in annual savings.²⁴

According to the Australian Commission on Safety and Quality in Healthcare, there is a \$5.80 return on each dollar invested in clinical trials conducted by Australian networks.²⁵ For example, a clinical trial conducted in Australian intensive care units demonstrated that it was just as effective to treat patients with normal saline rather than the far more expensive human albumin solution. This discovery has led to a change in international guidelines and practice, saving hundreds of millions of dollars per year, not only in Australia but also worldwide.²⁶

The Productivity Commission has reported that the healthcare sector is ripe for significant productivity improvements. Health and medical research and innovation will be one of the key drivers of this change- providing new technologies and approaches to improve efficiency, and new platforms to support the quicker uptake of new practices into healthcare.

The Third Atlas of Healthcare Variation, published in December 2018, continues to highlight unwarranted variation in the delivery of healthcare, pointing to a lack of consistent adoption of evidence-based care across the system.²⁷

While undertaking the research to establish the best type of care to deliver is essential, it is not enough. We must redouble our efforts to ensure that this knowledge is communicated and implemented more quickly and consistently throughout our healthcare system and the broader community.

In some ways, the urgency associated with COVID-19 has shown us we can do this; we need to make sure we capture the lessons we have learned in a crisis and implement these new approaches across the whole interface between research and healthcare delivery.

²³ Australian Institute of Health and Welfare 2019. Health expenditure Australia 2017–18. Health and welfare expenditure series no.65. Cat. no. HWE 77. Canberra: AIHW

²⁴ <https://www2.health.vic.gov.au/hospitals-and-health-services/patient-care/older-people/resources/improving-access/ia-adverse>

²⁵ <https://www.safetyandquality.gov.au/our-work/clinical-trials/>

²⁶ See ACTA and NHMRC, 2015, Report on the Activities & Achievements of Clinical Trials Networks in Australia 2004 – 2014 for this and other examples

²⁷ The Australian Commission on Safety and Quality in Healthcare, 2018, *The Third Australian Atlas of Healthcare Variation*

Investing in Prevention

One of the most cost-effective ways of improving Australians' health outcomes is through investment in prevention.

Research Australia congratulates the Health Minister and the Government on the current initiative to develop a 10 Year National Health Prevention Strategy. This strategy will bring together existing initiatives as well as lead to new programs, and preparatory workshops have already identified areas where new resources will be required, for example in better data collection to ensure that we can effectively monitor and evaluate new programs.

While there are many elements to a Health Prevention Strategy, changing Australians' behaviour is key. And while we know this is difficult, we also know that we have been successful in doing so in the past, for example with reducing smoking rates and sun smart campaigns to reduce the risk of melanoma.

Research Australia conducts annual polling of the Australian public on matters relating to health and medical research. In our 2019 Poll we asked people about managing their own health. While individuals reported a high awareness of what they need to do to maintain their health physical health (97%) and mental health (83%) a majority of Australians would welcome more information and practical advice about what they can do to maintain their own health, again with a greater emphasis on mental health (58%) than physical health (52%).²⁸

There is clearly a role for more health prevention measures as part of a new National Health Prevention Strategy, and while cost effective in the long term, effective national prevention programs need to be adequately funded. We also need to ensure we have the resources in place to develop effective programs and to monitor and evaluate the outcomes.

Research Australia urges the Government to use the Budget to make a significant multi-year commitment to fund implementation of the new 10 Year National Prevention Strategy currently being developed.

²⁸ Research Australia, 2018, *Australia Speaks! 2018 Opinion Polling for Health and Medical Research*, p.16 available at <http://researchaustralia.org/reports/public-opinion-polling/>

Smarter investment in health and medical research

The Australian Government makes a substantial investment in health and medical research every year, and one that is set to increase as the Medical Research Future Fund reaches its full potential.

There is an opportunity to make this investment more effective, yielding better returns to Australia's population and taxpayers alike; balancing resources with need, capacity and opportunity.

Medical devices, diagnostics and therapeutics continue to feature strongly in non-health specific government programs such as the Cooperative Research Centres and commercialisation grants. The success of these products in programs designed to boost commercialisation across the economy is a pointer to the significance of the health technologies and pharmaceuticals sector to Australia's future and our increasing ability to capitalise on our world class health and medical research.

Continuing to invest in and support Australia's world class capacity and expertise in health and medical research and innovation is a key element of positioning Australia as a knowledge-based economy, able to make the most of the information revolution.

The remainder of our submission addresses specific initiatives to achieve our ambition of a healthier and more prosperous Australia and a sustainable health system.

The Medical Research Future Fund

Research Australia congratulates the Government on its ongoing commitment to the MRFF which has seen the Fund reach the target \$20 billion in capital. The MRFF is one of the Government's signature policy initiatives and enjoys strong support from the public and multi-partisan support; in Research Australia polling conducted in June 2018, 88% of poll respondents expressed support for the MRFF²⁹.

The MRFF also has the strong backing of the health and medical research and innovation sectors. They have embraced the MRFF's potential to improve the translation of research into new drugs, therapies, interventions and practices that will:

- improve health outcomes;
- enhance the quality, safety, and efficiency of our health system; and
- boost exports.

The funding provided so far has responded to a range of different needs and strategic priorities, and utilised different approaches to the disbursement of funding. It has also successfully leveraged contributions from other sources. The Fellowships Program is giving health professionals the opportunity to establish their careers as researchers, while the Missions are supporting large multidisciplinary programs that have the potential to transform the delivery of healthcare to Australians and around the world. The Frontiers Program is an innovative two stage program, supporting long term collaborations to explore bold and innovative ideas in the health and medical research sector and/or make discoveries of great potential and global impact.

The MRFF has funded several initiatives in response to COVID-19, demonstrating its importance as a pool of funding that assists the Government to respond to rapidly emerging priorities.

Research Australia looks forward to these investments making a material difference to the health and wellbeing of Australians, and contributing to a safer, more effective and efficient healthcare system and a vibrant home-grown medical technologies and pharmaceuticals sector.

²⁹ Research Australia, 2018, *Australia Speaks! 2018 Opinion Polling for Health and Medical Research*, available at <http://researchaustralia.org/reports/public-opinion-polling/>

NHMRC and ARC funding

Australia's universities and medical research institutes are the foundation on which Australian health and medical research and innovation is built, and the Commonwealth Governments' premier funding bodies are the National Health and Medical Research Council (NHMRC) and the Australian Research Council (ARC).

The NHMRC's funding programs are clearly aligned with health and medical research; the importance of the Australian Research Council's own programs to health and medical research is less obvious but just as real. While the ARC does not fund 'medical and dental research', it funds basic life sciences research. It also funds the application of research in a range of disciplines, including biochemistry, engineering, computing and the social sciences, which directly and indirectly support health and medical research and its application.

Examples of ARC funding that is relevant to health and medical research and innovation

The **ARC Training Centre for Medical Implant Technologies** aims to train a new generation of interdisciplinary engineers and to transform the orthopaedic and maxillofacial implant industry in Australia. In collaboration with industry, universities and hospitals, the Centre will build a dynamic training environment for interdisciplinary engineers to develop and evaluate personalised implants and surgeries. It will create new networks, international collaborations and a generation of industry-ready researchers critical for growing Australia's industry. The advances in materials and savings in time for procedures will reduce costs.³⁰

ARC Future Fellow Dr Cameron Bracken is researching hidden complexity in microRNA function. Dr Bracken's project aims to determine the extent to which microRNAs function through 'non-canonical' mechanisms within cell nuclei, how their roles are expanded by naturally occurring sequence variation and how their activity is controlled by little known families of genes that sequester and inhibit their availability. The knowledge generated is significant as microRNAs regulate the expression of virtually all genes and biological processes, yet these mechanisms of function remain poorly characterised and seldom considered. The expected outcome of better understanding mechanisms through which microRNAs work should provide significant benefit to safe and effective development of microRNAs for future agricultural or therapeutic application.³¹

ARC Laureate Professor Kaarin Anstey aims make a significant advance in our understanding of cognitive ageing through the adult life course by discovering how contemporary lifestyles and experience impact on cognitive resilience and cognitive function. Through assessment of adults aged 18-90 (across the life course), her research will evaluate the impact of technology, life space and sensory function on brain structure and function, and cognition. Intended benefits include provision of evidence to inform interventions and policies that optimize cognitive resilience and reduce cognitive decline.³²

³⁰ <https://www.arc.gov.au/news-publications/media/media-releases/personalised-medical-implants-improve-health-australians>

³¹ ARC Funding announcements 2019 funded research, selected grants, <https://rms.arc.gov.au/RMS/Report/Download/Report/a3f6be6e-33f7-4fb5-98a6-7526aaa184cf/204>

³² <https://www.arc.gov.au/news-publications/media/funding-announcement-kits/2019-australian-laureate-fellowships/2019-laureate-profile-professor-kaarin-anstey>

NHMRC Programs

The 2019-20 Budget reveals funding for the NHMRC's programs falling in real terms. Funding to the Medical Research Endowment Account (MREA) for the NHMRC's research programs is \$842.766 million for 2019-20. The estimates for the following three years have the funding remaining virtually stable with increases of roughly 1.5% each year.

The CPI was 1.8% for the year to 31 December 2018, and the 2019-20 Budget forecast CPI to be 2¼ per cent through the year to the June quarter 2020 and 2½ per cent through the year to the June quarter 2021.

So, in real terms Government funding to the MREA was forecast to continue to decline over the forward estimates, as it has for several years now.

NHMRC MREA Funding 2019 Budget

\$m.	18-19	19-20	20-21	21-22	22-23
	829.324	842.766	856.250	869.950	883.870

ARC Programs

Over the forward estimates provided in the 2019-20 Budget, the funding to the ARC for the Discovery Program declines slightly in later years compared to the estimates in the May 2018 Budget, a trend that has continued for the last three years. The increases year on year are a little greater than the current inflation rate of 1.8% and around the forecast range for CPI of 2¼ per cent to 2½ per cent.

ARC Funding 2019 Budget

\$m.	18-19	19-20	20-21	21-22	22-23
Discovery	493.951	507.044	513.542	525.537	538.350

The Linkage Program was singled out in the Government's National Innovation and Science Agenda (NISA) as an important component of Australia's innovation system, and it was announced that from 1 July 2016 the Program would be open to continuous applications and decision making would be fast tracked. Once again, funding in the 2019-20 Budget was lower than forecast in the 2018-19 Budget and shows increases at around the forecast rate of CPI.

ARC Funding 2019 Budget

\$m.	18-19	19-20	20-21	21-22	22-23
Linkage (2019 Budget)	265.974	279.168	288.788	295.246	301.741
Linkage (2018 Budget)	273.990	285.432	293.492	297.862	N/A

July 2020 Budget Update

In July the Budget update provided a revised CPI estimate of 1.25% for 2020/21, roughly the same as the indexation applied to the NHMRC and ARC funding programs in the forward estimates referred to above. The July Budget update did not provide a forecast for years beyond 2020/21. It is difficult at this stage to know whether, if the above levels of expenditure are retained in the next 2020-21 Budget, this will mean the funding will continue to decline in real terms or may be closer to 'break even'.

The recent trend of funding NHMRC and ARC research program increases' at less than inflation cannot continue if Australia is to develop the more diversified and knowledge driven economy that we need to secure our future. We are currently missing a real opportunity to capitalise on the sector's expertise to make technological advances and address current and emerging issues, such as our ageing population. We are also at risk of jeopardising the 'golden opportunity to become a leader in future medical research and clinical trials, bringing not only new medicines but new jobs to the country', outlined by Health Minister Greg Hunt in July.³³

We also know that COVID-19 is creating a range of issues for our community, directly through the impact of the virus but also through the economic disruption it is causing. These include the long-term effects of COVID-19 post recovery and evaluating the impact of new innovations such as telehealth. All of these are areas that could benefit from new research, and additional funding.

And if the MRFF is to achieve its full potential it is essential that the financial assistance it provides 'complements and enhances' existing government funding sources, as specified in the MRFF's enabling legislation. It was not designed to, and nor should it be seen as, instead of or the panacea to existing funding challenges. Sustainable and consistent funding at the basic end of the pipeline must occur if there is to be a research for translation at the other end, including via the MRFF.

Research Australia submits that funding for the research programs of the NHMRC and ARC must be increased in real terms and in their own right, in the 2020-21 Budget and over the forward estimates.

³³ <https://www.abc.net.au/news/2020-06-14/coronavirus-opportunity-australia-medical-research-global-leader/12353754>

Indirect research costs

The funding from the ARC, NHMRC and MRFF meet only part of the costs of the research to which they are directed. They are a contribution to the direct costs of research, such as paying researchers' salaries and purchasing necessary equipment and experimental materials. They do not cover the cost of 'keeping the lights on', quite literally and metaphorically: paying utility bills, administrative staff, maintenance on buildings and facilities.

Securing appropriate levels of funding for the indirect costs of research conducted in Australia's higher education institutions and medical research institutes is a longstanding problem and far from international best practice. It has been exacerbated by recent developments, including an emphasis on universities partnering with industry on research projects and reductions in the revenue of higher education institutions. It is widely recognised that teaching revenues from domestic and international students subsidise research expenditure, including covering indirect costs. The impact of COVID-19 on universities' international teaching revenues has further limited the ability of universities to contribute to these costs.

Universities

Currently, universities receive funding from the Department of Education and Training's Research Support Program (RSP). The RSP distributes a pool of money to universities in proportion to the research income each university received in the reporting period.

In the 2019-20 Budget the RSP suffered significant cuts compared to the forecasts in the 2018-19 Budget. Funding for 2019-20 is more than \$50 million lower than forecast in 2018, and nearly \$100 million lower in 2020-21.

Research Support Program 2019 Budget

\$m.	18-19	19-20	20-21	21-22	22-23
2019 Budget	894.016	902.062	920.573	941.748	962.455
2018 Budget	903.425	959.816	1,018.879	1,042.302	

Funding for the indirect costs of research funded by the MRFF is now to be provided from the Research Support Program, on the same basis as NHMRC and ARC funding. With the MRFF providing hundreds of millions of dollars in funding to universities in future years, **a substantial increase in the Research Support Program is needed just to maintain the levels of research support funding for research projects at their current, if already inadequate level.** The cuts to the Research Support Program represent a real threat to the capacity of our universities to undertake vital health and medical research, and indeed research in all disciplines.

Medical Research Institutes

While their circumstances and funding for indirect costs are different, the situation is at least as difficult for Independent Medical Research Institutes (IMRIs), those not affiliated with a university. IMRIs are ineligible to participate in the RSP or to receive funding from the ARC. IMRIs receive funding to partially subsidise indirect research costs from the NHMRC through the Independent Research Institute Infrastructure Support Scheme (IRIISS). IRIISS provides funding to IMRIs to assist with indirect research costs, at a rate of up to 20% of the value of NHMRC grants awarded to IMRIs. **No funding support for indirect research costs associated with MRFF grants is available to IMRIs.**

Funding for indirect research costs was raised as an issue during the public consultation on the Inaugural five-year strategy and two-year priorities for the MRFF conducted by the MRFF Advisory Board in 2016. While the MRFF Advisory Board subsequently drew attention to the issue of funding for indirect research costs, it did not offer a solution:

A whole-of-government approach is needed to address the issue of research costing to ensure the research sector can continue to thrive. MRFF funding cannot in isolation solve the conundrum that surrounds indirect costs and may with the injection of new funds increase the need for a solution. The Advisory Board, while advocating for a whole-of-government and research sector agreed solution, must therefore abstain from implementing yet another funding model. In the short term MRFF program investment should adhere to existing costing approaches. Collaboration between Government and funded bodies to identify an equitable solution should be prioritised.³⁴

Indirect research costs were also examined by the House Standing Committee on Education, Employment and Training at the request of the Minister for Education. The Committee's report, tabled on 26 November 2018, recommended that 'the administration of research block grants be reviewed to provide more timely and adequate support for the indirect costs of research.'

Research Australia looks forward to the outcome of the Roundtable of University Vice Chancellors convened by the Minister for Education to address a sustainable path to university research funding.³⁵ The following four recommendations reiterate Research Australia's position outlined in our Pre-Budget submissions in December 2016, 2017, 2018 and 2019. They remain valid.

The cuts to the Research Block grants outlined in the MYEFO on 17 December 2018 and confirmed in the April 2019 Budget must be reversed.

The pool of funding for the Research Support Program needs to be increased proportionately in the 2020-21 Budget to reflect the inclusion of MRFF competitive grants in the Program.

In a similar manner, an additional stream of the IRIISS program needs to be funded by the Department of Health to cover the indirect costs associated with MRFF funding incurred by IMRIs. This funding should be administered by the NHMRC.

In the longer term, Research Australia supports the call of the MRFF Advisory Board for a whole of government approach to the issue of funding indirect research costs. **Research Australia proposes that the Chief Scientist lead a review of the funding of indirect research costs to establish a sustainable and equitable funding program.**

³⁴ Australian Government, MRFF Advisory Board, 2016, Australian Medical Research and Innovation Strategy 2016-2021, p.7

³⁵ <https://ministers.dese.gov.au/tehan/research-sustainability-working-group>

Data for better health and prosperity

The potential value of publicly held data has been recognised by the Australian Government and action is being taken to improve the value Australia derives from this data.

Initiatives in this area include the Department of Prime Minister and Cabinet's work on the Public-Sector Data Management Strategy, the creation of the Australian Government Public Data Policy Statement, and the Government's response to the Productivity Commission Inquiry into the Availability and Use of Public Data.

The experience in 2017 with the opt out period for the My Health Record illustrates the need to ensure the Australian population is better engaged with and informed about both the risks and benefits of the digitisation of healthcare.

Artificial intelligence for insights in health

Advances in computing power and the development of artificial intelligence are powerful tools that can be utilised to improve health outcomes and build future export industries but are reliant on the data being made available to provide the insights. The 2019 CSIRO report, commissioned by the Government, *Artificial intelligence: Solving problems, growing the economy and improving our quality of life* has identified health, ageing and disability as one of the high potential areas of artificial intelligence specialisation for Australia.

*'This involves the use of AI to improve human health (either via prevention or treatment), achieve healthy ageing and support people living with disability. Solutions relating to this proposed AI specialisation are of high value considering rising or high rates of chronic illness, ageing populations and unsustainable growth healthcare expenditure. Disability support enabled by AI will benefit the 4.3 million Australians who live with disability, as estimated by the Australian Bureau Statistics. AI can be transformative for disabled people by improving their life opportunities and helping them get good jobs. Australia already has world-leading capabilities in AI for health, ageing and disability support. These issues are shared by countries worldwide and we can export our solutions into the global marketplace.'*³⁶

The Report outlines a range actions that need to occur over the next decade and beyond to support this development, including:

- developing an AI specialist workforce;
- upgrading the skills of the broader workforce;
- access to high quality datasets;
- strong Data Governance to enhance public trust;
- research to apply the insights from AI in the real world (e.g. engineering solutions for surgical robots, bionics and automated cars;
- digital Infrastructure and cybersecurity; and
- standards for interoperability and Ethics.³⁷

³⁶ Hajkowicz SA1+, Karimi S1, Wark T1, Chen C1, Evans M1, Rens N3, Dawson D1, Charlton A2, Brennan T2, Moffatt C2, Srikumar S2, Tong KJ2 (2019) Artificial intelligence: Solving problems, growing the economy and improving our quality of life. CSIRO Data61, Australia., page 2

³⁷ Ibid, Chapter 9

Making the most of the opportunities outlined in the Report will require significant leadership and investment from the Australian Government and we are pleased that the Minister for Industry, Science and Technology, the Honourable Karen Andrews, has welcomed the report, and we look forward to a more detailed response.

Research Australia submits that the Government should commit funding in the 2020-21 Budget to the implementation of the measures outlined in the CSIRO Report, *Artificial intelligence: Solving problems, growing the economy and improving our quality of life*.

We also acknowledge the MRFF initiative for Applied Artificial Intelligence Research in Health as a positive step in this direction.

Government capacity to share and release data

A critical part of the Government's response to the Productivity Commission report is the work it has undertaken to encourage Government departments and agencies to share and release data, and to build their capacity to do so. This includes the appointment of a National Data Commissioner and the development of new legislation.

Research Australia has been actively involved in the consultations to develop the new Data Sharing legislation. In addition to supporting Government departments and agencies to share and release data, it will implement a process for accrediting researchers and research institutions as 'trusted users' of data. Draft legislation is expected to be released for consultation in the next few months before being finalised and ready for introduction to the Parliament.

Research Australia submits the Government should make provision in the 2020-21 Budget for the infrastructure needed to support the new Data Sharing legislation in anticipation of its passage through the Parliament in 2020-21.

The Government should also continue to invest in capacity building in Commonwealth departments and agencies to enhance their ability to capture, manipulate and analyse data, and their capability to link data and to prepare secure, deidentified datasets for public release.

This funding will complement the legislative steps being taken with the Data Sharing Act and build on the investment the Government has already made in modernising Government Departments through the Data Integration Project for Australia (DIPA), which concluded on 30 June 2020.³⁸

Utilising Health Data

The Government has made a significant commitment over many years to the development and implementation of the My Health Record. This is an important initiative with the potential to save lives, improve the delivery of healthcare and increase efficiency and productivity.

The report of the Productivity Commission Inquiry into Data Availability and Use has highlighted the significant social and economic benefits to be derived from making public data more available. The relative importance of health data was highlighted by the Commission's Report.³⁹ It concluded that across all of Government, some of the greatest gains could be made through

³⁸ <https://www.pmc.gov.au/public-data/data-integration-partnership-australia>

³⁹ Productivity Commission 2017, *Data Availability and Use*, Report No. 82, Canberra Pp. 509

making health data more available.⁴⁰ Many of these recommendations relate to better access to data for researchers and innovators.

An earlier report of the Productivity Commission looking at the opportunities for productivity improvements in health highlighted the role of data in this regard:

*'More generally, administrative data — including performance data, patient health records and government-held datasets on patients' use of medications or procedures — can support development of a more rigorous evidence base on the clinical and cost effectiveness of health interventions. Among other things, these data (subject to appropriate privacy safeguards) enable researchers to investigate the burden of disease, access to health care across the community, and the effectiveness of specific health interventions. This can help health care providers to choose the best treatments for individual patients. It also helps governments and insurers to make better overall funding decisions by directing funding to where the greatest health benefits can be achieved (including to preventive health measures), and away from interventions with low or no clinical value.'*⁴¹

Some of the greatest opportunities for better health outcomes lie in preventive health measures and public interventions. The burden of non-communicable disease has increased rapidly in the last two decades, linked to obesity and population wide changes in daily activity. Health data can be used to monitor changes in populations and sub-populations, and to identify emerging issues and solutions.

Access to reliable and current health data makes public health interventions both more effective and more cost effective, making it possible to respond more quickly to emerging issues. In addition to making the data available, it requires a commitment to use this data and a meaningful commitment by governments to evidence-based policy development and implementation.

The secondary use of My Health Record data for research and public health purposes is central to achieving this ambition and is supported by the Australian public. In public polling undertaken on behalf of Research Australia in mid 2018, ninety percent of respondents supported the use of patients' medical records for research purposes.⁴²

The Australian Institute for Health and Welfare (AIHW) has been appointed to manage and release datasets for the My Health Record secondary use of data. The first data releases are expected to occur as early as 2020.

Research Australia urges the Government to use the 2020-21 Budget to ensure the AIHW is adequately resourced to prepare for and undertake the significant new role of preparing and providing de-identified My Health Record data for research and public health purposes.

⁴⁰ Productivity Commission 2017, *Data Availability and Use*, Report No. 82, Canberra Pp. 5-6

⁴¹ Productivity Commission 2015, *Efficiency in Health*, Commission Research Paper, Canberra. p.75

⁴² Research Australia, 2018, *Australia Speaks! 2018 Opinion Polling for Health and Medical Research*, available at <http://researchaustralia.org/reports/public-opinion-polling/>

An informed Public

The public controversy surrounding the commencement of the opt out period for the My Health Record, culminating in amendments to the legislation, illustrates the importance of ensuring the public is well informed about how the My Health Record will be used, and why it has been introduced.

In many ways the My Health Record is an extension of what we see in society more broadly, where many (but not all) individuals consent to the collection and use of their personal data in exchange for the ability to transact online, to access information and to make and maintain social relationships. In each of these cases individuals consciously or unconsciously evaluate the risks and benefits to them of using a particular application and decide whether or not they will use it. The relative value they assign to the risks and benefits, their assessment of the likelihood of adverse events and the impact it will have are very individual. A victim of online identity theft, for example, is likely to make a very different assessment of risks and benefits of being online to someone whose experience has only been positive.

COVID-19 has highlighted for all of us the importance of having access to up to date and accurate health information when responding to a pandemic. While the COVIDSafe app has achieved the support of a large proportion of the population it has not been adopted universally by all smart phone users, highlighting the ongoing concerns about data and privacy, even in the midst of a very real health emergency.

Research Australia submits that Government should implement an ongoing awareness campaign to emphasise the positive contribution the My Health Record can make to individual and whole of population health outcomes. Such a campaign needs to acknowledge that individuals are being asked to provide the MHR system with their personal information and give them balanced information about this risk; acknowledging that while steps are being taken to mitigate the risk there is no guarantee. **The benefits and utility of the My Health Record should also be presented- both for the individual and for the broader community, to ensure the social licence remains current.**

Recognising that the risks and the benefits are perceived and valued differently across the population, we need many different messages and they need to be delivered through different channels on a regular and ongoing basis. This includes showing the ways that data from individuals can be used to improve the safety, quality and effectiveness of health care, and provide better health outcomes for all Australians.

Improving Australians' digital health literacy

The National Digital Health Strategy notes that 'Digital information can transform the quality and sustainability of health and care. Used effectively, it can help save lives, improve health and wellbeing and support a sustainable health system that delivers safe, high quality and effective health services for all Australians.'⁴³

Australia's ability to make the most of initiatives like the My Health Record and to fulfill the promise of the National Digital Health Strategy is dependent on a population that is able to take advantage of, and use, digital applications to communicate with their healthcare providers and to monitor and better manage their own health.

This requires a combination of digital literacy (the ability to utilise technologies like smart phones and health monitors) and health literacy (the ability to use and understand health information to make informed decisions about our health, our illnesses and our lifestyles).

Access to and utilisation of digital technologies also varies widely across the population; older Australians, those on lower incomes, Indigenous Australians and people with a disability score lower than the national average on the Australian Digital Inclusion Index 2018.⁴⁴ These are also some of the population groups with poorer health, high levels of interaction with the health system and the greatest need for healthcare.

While the Australian Digital Health Strategy is focused on improving the availability, security and quality of health information, and expanding the capacity of the workforce to use digital health information, it does not address digital health literacy in the general community.

Improving digital health literacy has the capacity to increase the number of Australians able to take advantage of digital health technologies to better manage their own health and their interactions with healthcare providers.

This requires not only understanding the benefits and risks of electronic health records but how digital health technologies can assist them and how to identify technologies that are effective and evidence-based; so they can be savvy digital health consumers.

Greater digital health literacy also offers the promise of higher quality healthcare and improved health outcomes and increased efficiency in the delivery of services.

Without increased digital health literacy we will fail to take full advantage of the opportunities that digital health technologies present in the coming years and decades. We will also see a growing disparity in health across the population, with those who are unable to engage digitally with their health left behind and experiencing poorer health outcomes.

Research Australia submits that the 2020-21 Budget should provide funding to develop and implement an ongoing strategy to improve Australians' health literacy, with a particular focus on disadvantaged groups. This strategy should include ongoing monitoring of Australians' digital health literacy to enable the progress of the strategy to be assessed. It should also incorporate the initiatives in relation to the My Health Record proposed above.

43 Australian Digital Health Strategy, 2018, Safe, seamless and secure: evolving health and care to meet the needs of modern Australia.

Australia's National Digital Health Strategy, page 5

44 Thomas, J, Barraket, J, Wilson, CK, Cook, K, Louie, YM & Holcombe-James, I, Ewing, S, MacDonald, T, 2018, Measuring Australia's Digital Divide: The Australian Digital Inclusion Index 2018, RMIT University, Melbourne, for Telstra.

Conclusion

The COVID-19 pandemic has highlighted the world leading health and medical research being undertaken in Australia and the critical role has played in helping us navigate this health crisis.

At the same time, it has highlighted the Australian Government's underinvestment in health and medical research, leading to an over reliance on the capacity of universities to generate intentional student revenue and direct it to funding research, and on philanthropy to fill the gaps. It has also highlighted the precarious nature of the whole health and medical research enterprise, with well over half of researchers reliant on short fixed term contracts for their livelihoods.

In the middle of a pandemic there is an urgent need to address immediate concerns, and the Government has responded in both a timely and effective manner to ameliorate some of the worst consequences of the COVID-19 pandemic for our community and economy.

It is also important however to not lose focus on the longer-term recovery and the opportunity to create a healthier and more prosperous Australia. The opportunity provided through the health, medical research and innovation sector are immense for both the health and wealth of our nation.

The 2020-21 Budget provides the opportunity for the Australian Government to consolidate the reviews and policy changes it has initiated in the last few years to improve the health and wellbeing of the Australian population and to reposition Australia as a modern and innovative nation with a knowledge-based economy. However, this requires a renewed commitment to significant investment in innovation to reverse the declines in recent years that are evident when investment in R&D is considered as a proportion of GDP.

In addition to raising national prosperity and diversifying our economy, smarter investment in health and medical research and innovation can improve the effectiveness of our health system; constraining the rise in health costs that accompany an ageing population. It can also provide a sustainable pathway to addressing modern lifestyles factors such as obesity. Smarter investment also drives skilled employment in vibrant new pharmaceutical, medical device and biotechnology industries.

We must invest in raising the digital health literacy of all Australians, particularly the most disadvantaged and vulnerable. The promise of the digital revolution to make more information available to more people is only useful if those people are equipped to use that information to make decisions about their healthcare and lifestyle that will improve their health.

This investment will ensure that more Australians benefit from this revolution, transforming our health system and the way we manage our own health and wellbeing and providing Australia with a viable path through the COVID-19 pandemic and into a post COVID-19 future.

Research Australia is pleased to have had the opportunity to make this submission on behalf of our broad membership which is drawn from across the health and medical research pipeline. We are also willing to provide further information and/or contribute further.

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