

Research Australia

An alliance for discoveries in health

Science, Research and Industry Innovation Strategy for South Australia

Submission in response to the Consultation Paper

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About Research Australia

Research Australia is an alliance of 170 members and supporters advocating for health and medical research in Australia. Independent of government, Research Australia's activities are funded by its members, donors and supporters from leading research organisations, academic institutions, philanthropy, community special interest groups, peak industry bodies, biotechnology and pharmaceutical companies, small businesses and corporate Australia. In South Australia our members include The University of Adelaide, Flinders University, University of South Australia and the South Australian Health and Medical Research Institute.

Research Australia reflects the views of its diverse membership and represents the interests of the broader community.

Research Australia's mission is to make health and medical research a higher priority for the nation. We have four goals that support this mission:

- A society that is well informed and values the benefits of health and medical research
- Greater investment in health and medical research from all sources
- Ensure Australia captures the benefits of health and medical research
- Promote Australia's global position in health and medical research

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Introduction

Research Australia welcomes the opportunity to provide comments on the Consultation Paper.

Research Australia endorses the statement in the Foreword that *'Investment in science, research and innovation is vital to the future economic growth and well being of South Australia, and it is important to identify key directions that will focus effort and investment in this important area for the State.'*

A continued and increased investment by the South Australian Government in health and medical research should be a significant component of the Government's future strategy for science, research and innovation for several reasons.

The paper identifies a desire by the South Australian Government to promote collaboration. The existing research expertise in health and medical research in South Australia, and the breadth and depth of health and medical research across Australia, provide ample opportunity for South Australian researchers to collaborate with other researchers within South Australia, in other states and internationally.

The benefits of leveraging Commonwealth funding is also referred to in the Consultation paper. The Commonwealth Government invests hundreds of millions of dollars each year in health and medical research, and is increasingly looking to partner with State governments and other organisations in this investment. This provides an opportunity for the South Australian Government to attract and leverage significant Commonwealth Government investment.

Finally, the South Australian Government is the main provider of health services to the South Australian population. An investment by the Government in research and innovation in basic medical science, public health and health service delivery has the potential to assist the South Australian Government to deliver health services more effectively and efficiently. It also has the scope to increase the well being and productivity of the South Australian population.

The remainder of this submission addresses some of the key questions raised in the Consultation Paper. While Research Australia's focus is on health and medical research, many of our comments and proposals have a broader application to scientific research and innovation generally.

How can we better support our early career researchers?

Research Australia supports the Consultation Paper's recognition that we need to do more to support early career researchers. For many career researchers, employment security is only as long as the duration of their latest grant. Many choose to leave the Australian research sector for better conditions and more certainty in other employment.

To ensure we have a diverse and sustainable research workforce we need to be able to attract Generation Y into research careers, and better manage career interruption for women researchers in particular. We need a workplace and career structure better able to cater for researchers moving from academia to industry, from health delivery to research, working overseas and returning, as well as returning from career breaks to have families. We need a cultural shift to towards greater career flexibility within the sector to avoid skill shortages, build capability and improve productivity. It is cheaper to retain an experienced researcher than to train a new one.

Importantly, not all research is undertaken by individuals for whom research is a full time, life long career. Australia also needs to expand its pool of clinician researchers and encourage academic teacher-researchers.

Research Australia advocates:

- Government grants of longer duration to provide greater employment security and assist retention of talent in the Australian H&MR sector. The South Australian Government can assist in this regard with targeted fellowships to provide longer tenure in key strategic areas.
- The creation of pathways and opportunities for clinicians to engage in research, including making it financially viable to do so. The South Australian Government can influence programs within its own health services; specific examples are provided on page 14.
- Improved pathways for re-entry to pure research from industry/ commercialisation activity, and from parental leave. This could include providing limited term funding of 12 to 24 months for researchers returning from a career break to enable them to develop a body of work that can attract competitive grant funding from other funding bodies such as the Australian Research Council (ARC) and the National Health and Medical Research Council.

Elements of the European Molecular Biology Laboratory model are worthy of consideration, and some of these are currently being implemented in a modified form by EMBL Australia and by the Australian Regenerative Medicine Institute. (Australia is an Associate member of the EMBL.) The EMBL provides promising young researchers with fixed but longer term funding (up to nine years), with milestones to be achieved but greater freedom to pursue their research than is typically available under existing Australian grants.¹

¹ <http://www.embl.de>; <http://www.emblaustralia.org>

What strategies would improve public and industry appreciation of science and research?

A community that understands and values health and medical research (and science generally) will be:

- Aware of the links between research and improved health and well being.
- Even more supportive of the ongoing public funding for health and medical research.
- More likely to make donations to support research.
- More likely to encourage young people to pursue research careers.
- More likely to participate in clinical trials.
- More realistic in their expectations of the time it takes between discoveries and other 'break throughs' and the availability of new treatments and/or new technologies.

Research Australia believes that consideration should be given to:

- Creating more programs to develop scientific literacy in the community, including programs in schools.
- Incentives for research collaborations that meaningfully engage with relevant community special interest groups and consumers.
- The engagement of community members in governance bodies, and the involvement of consumer groups. This could include creating consumer, media and education positions on the Premier's Science and Education Council, and/or or a dedicated 'Science Engagement' subcommittee of the Council.

Where are the limitations and barriers to national and international collaboration?

Despite advances in communications technology, geographic isolation continues to be a barrier to national and international collaboration. One practical and cost effective way to overcome this is to sponsor travel by South Australian researchers to interstate and international conferences and institutions, and to support measures to bring potential international collaborators to South Australia.

Research Australia proposes that the South Australian Government supplement its existing funding initiatives with grants to facilitate travel by early and mid career researchers to interstate and international conference and institutes.

How could existing collaborations and networks be utilised to attract new business investment to the State?

Research Australia shares the South Australian Government's views about the importance of collaboration in scientific research.

While collaboration already exists between scientists and institutions, more collaboration is needed across historic divides:

- between individual researchers and across different disciplines,
- across Australian state boundaries, and internationally
- between universities, medical research institutes, hospitals and health services and industry,
- between the public, private and philanthropic sectors, and
- between various government agencies and departments.

As a key policy making body and source of research funding, the South Australian government has ample opportunity to encourage and facilitate collaboration. Research Australia proposes the following specific initiatives:

- The provision of research grants to collaborative partnerships or ventures between research organisations, and between research organisations and industry.
- Funding models that recognise and reward the participation of collaborators in addition to Chief Investigators.
- Special acknowledgement and recognition of international collaboration, and additional support for research which attracts overseas funding.
- Removal of barriers to collaboration that exist in funding programs and the recognition/reward systems of academia. (Specific proposals are provided on page 11.)

Are there other clusters we should have?

Public Health

The South Australian Public Health Act was enacted in 2001 and is currently approaching the final stages of its two year implementation. The Act has provided a strong South Australian focus on public health at a time when illness prevention is receiving a renewed focus at the national level, including the creation of the Australian National Health Preventive Agency.

The convergence of these events provide the opportunity for South Australia to create a cluster in public health. Such a cluster could draw on the complementary strengths of the South Australian universities in this field, while augmenting South Australia's own public health institutions and infrastructure in support of the goals outlined in the Public Health Act 2011.

A Public Health Cluster would also provide an enhanced opportunity to attract Australian Government funding for public preventive health research and programs. Strong statewide public health research capabilities coupled with South Australia's relatively small but demographically diverse population could make South Australia a strong contender for piloting national public health initiatives developed by the National Preventive Health Agency. Doing so has the advantage of bringing additional research funding to South Australia as well as providing the opportunity for South Australians to benefit from new and cutting edge public health initiatives.

Bioinformatics investment to support clusters

A cluster could include a group with particular expertise that serves the wider scientific community. For example, bioinformatics is a field of emerging importance, driven by the need to analyse the increasingly large amounts of biological data being generated worldwide. Many research groups need access to bioinformatics expertise and assistance to support them in the interpretation and analysis of data being generated by their experiments. Government-backed infrastructure to help develop bioinformatics capability in South Australia would facilitate collaboration and enhance South Australian research capability, result in major long-term returns.

Shared facilities and equipment

Another area where clusters can be useful is in the provision of core facilities and equipment. A more coordinated approach to sharing of equipment and facilities would be valuable. BioSA has made a great contribution to furthering this through the concept of AIB labs.² This could be taken even further by establishing access models to services and equipment across the Adelaide area and a coordinated approach to procuring funds for new equipment. The establishment of the Australian Bio Resources in Moss Vale NSW by the Garvan Institute that supplies murine models ('lines' or varieties of genetically modified mice) to numerous institutes and universities in the Sydney area is an example of this sort of coordinated approach.³

How can we free up researchers to focus on their research, rather than grant applications?

Funding for research in Australia is dominated by competitive grants. While this model has a number of advantages, it is time consuming and makes it difficult for new researchers and new research institutions to obtain the funds required to produce the initial data required for larger, competitive grant applications. There is a role in this regard for block funding to research institutions to give them the discretionary funds needed to support early stage research to the point where they can be successful in obtaining competitive grants. (Please also refer to the related discussion on page 12 about the need for funding to overcome the 'valley of death' in the pre-commercialisation phase.)

² <http://www.bioinnovationsa.com.au/aib-labs>

³ <http://www.abr.org.au>

Can you identify game-changing R&D opportunities that would bring together a consortium of industry and research organisations and be highly competitive for major Commonwealth funding, fit with the State's priorities, and offer a very strong case for innovative industries in SA?

Bioengineering research involves the convergence of a number of different disciplines from the physical and life sciences in the application of research to achieve specific outcomes. It is an area of potential in South Australia given the work currently being done at UniSA (the Ian Wark Institute), which has attracted significant Commonwealth Government funding, and the existence of related facilities across the state that can support this; for example, pre-clinical animal testing facilities.

Should SA focus on building on our strengths and current areas of growth, or should we chase new opportunities? How do we get the balance right?

This is not an either/or situation. In health and medical research (and scientific research generally), new fields of research typically arise from existing research. Focusing on existing strengths provides a strong platform from which to secure external funding and encourage national and international collaboration. This, in turn, provides the opportunity to be involved in cutting edge research and new discoveries, which lead to new opportunities and fields of research.

South Australia's Science, Research and Innovation Strategy needs to identify priority research areas and focus on creating new research ties with colleagues in other strong disciplines across SA and nationally. The strategy also needs to be flexible enough to take advantage of the new opportunities that arise from these priority research areas, and make the appropriate enabling investments.

For example, the acquisition of a cyclotron for South Australia provides the opportunity for a partnership between leading Positron Emission Tomography (PET) clinicians and chemists to develop new radioactive markers for clinical and research use. (It also provides the opportunity to promote collaboration between clinicians and researchers, ensuring that the research addresses real clinical need; and supports the rapid translation of research into clinical practice, to the benefit of the South Australian community.)

How do we get better linkages between industry and universities?

There are several initiatives that can be taken to improve the interaction between industry and universities. Providing greater career opportunities for PHD qualified researchers in the public and private sectors increases the number of PHD researchers employed in industry and would help to increase the indirect links between industry and universities. Increasing the exposure of non-researchers to research activities and methodology can expand the understanding of research in the broader workforce.

Changes to PHD training to include the development of skills and experience that make individuals with PHD qualifications more attractive to industry can help improve the uptake of PHD qualified researchers by industry, which will in turn help to improve the linkages between industry and universities.

Supporting the commercialisation arms/teams of universities and other research institutes can also be a valuable way of improving linkages between industry and publicly funded researchers. While there are aspects that may be competitive in nature, there is scope to support the collaboration and sharing of resources by the various commercialisation teams to assist their engagement with industry.

Research Australia proposes:

- Programs and incentives to promote greater collaboration of the private sector with academic researchers. This could include an expansion of the existing Innovation Voucher Program with a focus on purchasing the services of researchers and/or a specific program to fund the secondment of researchers to private sector organisations.
- Providing opportunities for undergraduate and non-PhD post-graduates to do research. Victoria's Bio 21 Cluster has recently piloted a scheme called Undergraduate Research Opportunities (UROP). UROP is a paid employment scheme designed to give undergraduate students an early opportunity to experience real life in a research laboratory and gain insight into careers in biomedical research. This is a model that the South Australian Government could consider replicating, and which could be applied across all scientific disciplines.⁴
- Greater engagement with existing and potential private sector employers in relation to the design and structure of undergraduate and postgraduate research training.
- Improved pathways for movement between research careers in the private and public sectors, to encourage exchange and promote research employment in the private sector. This includes providing limited term funding of 12 to 24 months for researchers returning to public sector employment to enable them to develop a body of work which can attract competitive grants from funding bodies such as the Australian Research Council (ARC) and the National Health and Medical Research Council.

⁴ <http://bio21cluster.org.au/undergraduate-research-opportunities-program-urop>

Do our universities need to adjust their policies and reward systems to encourage interaction with industry, particularly with regard to early career researchers?

There are several initiatives that universities and publicly funded research institutes can take to encourage interaction with industry and promote the commercialisation activities of their researchers.

Valuing commercialisation

One is for universities to place a greater value on commercialisation and translation outcomes and experience in their employment and advancement policies. This can be achieved by:

- Academic institutions recognising private sector and commercial achievements when recruiting research staff.
- Academic institutions valuing commercialisation and translation outcomes (such as patents and contracts) in addition to publication history when considering staff for promotion.

Incentives for researchers to commercialise

Another is for universities to provide incentives to academic researchers to pursue commercialisation and translation of their research. While an institution may ultimately benefit financially from commercialisation of research undertaken under its programs, it is often the individual researcher (or research team) which is responsible for pushing the research to the commercialisation stage. Many institutions have arrangements with individual researchers for sharing the financial benefits, such as a percentage of royalties for example. There is evidence that these arrangements are not as widespread or as effective as they could be, and that bad experiences on the part of researchers with receiving expected shares of royalties can act as a disincentive to individuals pursuing commercialisation of research.⁵

In Germany, the law outlines the relationship between an employer and an inventor who is its employee in respect of entitlement to income derived from a patent. This has the benefit of providing certainty to all parties about the arrangement, and provides an incentive for employees to alert employers to potential new inventions as soon as possible and to pursue commercialisation.

The South Australian Government could support the development of uniform principles for universities and research institutions in relation to sharing the benefits of commercialisation with employees whose research leads to commercialisation.

⁵ Yencken & Ralston, Karingal Consultants, March 2005, *Evaluation of incentives for commercialisation of research in Australian universities*, for the Department of Education, Science and Training

Alternative approaches to utilising Intellectual Property

Alternative models for sharing IP also need to be considered as a means of boosting engagement with industry. For example, several Australian research institutions have adopted the EasyAccess IP initiative, where IP that is not going to be commercialised is made available free-of-charge to industry partners. This initiative helps in advancing basic research discoveries to commercialisation and helps foster good relations and collaborations between industry and academia.

Are the current institutional models of commercialisation working? How could they be improved?

It is generally acknowledged that while Australia undertakes a significant amount of world leading research, it falls behind many other countries in its success in commercialisation of research.⁶

Within health and medical research there is the so-called 'valley of death'- the gap between the publicly funded research that results in the publication of research results, and the further development of the research findings to a sufficient level to attract commercial partners to translate the research into new drugs and devices.

This is a critical area in which current models of commercialisation are failing. Part of the difficulty is a definitional one- at what point in the innovation cycle does research (increasing the stock of knowledge) end, and innovation (implementing new products and processes begin)? The reality is that there is no clear delineation, but the creation of separate programs to fund research on the one hand, and to support innovation on the other, require a distinction be made between the two, to determine eligibility for funding.

This distinction between the research and innovation phases is particularly evident in Commonwealth funding programs. Programs such as the project grants offered by the National Health and Medical Research Council and the ARC's Discovery Projects fund research, while commercialisation programs such as the ARC Linkages Program and Commercialisation Australia seek to support the engagement of researchers with private sector commercialisation partners in innovation.

However, at present there is a gap between the point at which grants for research end and the point at which research is sufficiently developed to benefit from commercialisation support programs- the aforementioned 'valley of death'. The activities required to develop the published findings to a point where a commercial proof of concept exists are often not eligible for funding as either research or commercialisation activities. There is an evident need to fund research activities and innovation support activities in such a way that this gap is eliminated.

⁶ Refer for example, to the *National Survey of Research and Commercialisation 2008 and 2009*, Department of Innovation, Industry, Science and Research, May 2011

The South Australian Government could assist in this regard by creating a pool of funds that universities and research institutes could use to fund the experiments needed to develop research findings to a sufficient level to attract commercial partners. The eligible institutions, using an assessment panel with representation from each of the institutions involved (and suitable industry representatives), could jointly administer such a pool. This model would streamline the grants process while ensuring an adequate level of review of the applications.

Should industry have a role in advising on government investment in R&D given their better understanding of commercial viability?

Industry representatives have a key role to play in improving the coordination of R&D, identifying opportunities and gaps, and assisting in developing a coherent and effective innovation strategy. This could be achieved, for example, by including industry representatives as members of a Strategy Advisory Board to support the Premier's Science and Education Council.

What could the State Government do to foster more effective collaboration and R&D?

The South Australian Government currently administers four programs under the Premier's Research and Industry Fund. While valuable, there would appear to be significant scope for expansion of the existing programs.

Research Australia proposes the following:

- A targeted review of these programs be undertaken, including surveying successful and unsuccessful applicants, as well as potential applicants in priority industry sectors about their awareness of the programs, and any issues or difficulties that exist with the current eligibility guidelines.
- Following the review, consideration should be given to modifying and expanding the programs.
- Include a grants program to facilitate travel by early and mid career researchers to interstate and international conference and institutes.
- Create a pool of funding for the experiments needed to develop research findings to a sufficient level to attract commercial partners (addressing the 'valley of death'- refer to previous page).

What could the State Government do (or stop doing) to improve innovation?

A key area where the South Australian Government can promote and improve innovation is in the State's health system. The State Government can directly benefit from innovation, in the health system, through improved healthcare delivery to the South Australian community with greater efficiency. It will also boost the State's research and innovation capabilities, providing benefits for other parts of the economy.

There are two distinct areas in which innovation can support the health system. One is translating new discoveries in health and medical research, including public health, into practice. The second is research to improve the effectiveness and efficiency of South Australia's health systems and infrastructure.

Research Australia proposes:

- Building capacity and investing in implementation research, including comparative effectiveness research, to assist health care providers to adopt better practice.
- Investment by the health system in 'change management' expertise and practice to incentivise and support professionals to adopt new practices and create behavioural change.
- Collecting data and creating feedback mechanisms for clinicians on their practice and performance.
- Creating an 'evidence' portal for practitioners.
- Measurement of success for health and medical research. This includes evaluating the likely impact and outcomes of new or proposed research activities, to ensure all types of research have a long term goal of translation.
- The creation of more roles in health services across medical, nursing and allied health professions that have a dedicated time and resource allocation to research (i.e. clinician researcher roles).
- Career structures that support moving between research and health delivery roles, and the provision of support to health care practitioners who are participating in research projects on a short-term temporary basis.
- Programs to fund research involvement by primary care providers.
- Using actual change in practice and policy as part of the 'track record' of research success.
- Increasing capacity in the health economics field to predict and assess the economic impact of implementing a particular change in health services. Research Australia supports a specific post graduate program as a means of building capacity, as well as integrating more health economics subjects into regular undergraduate economics courses as a way of exposing students to the field.

Conclusion

Research Australia supports the general direction of the *South Australian Science, Research and Industry Innovation Strategy* and believes that the focus of the consultation paper on promoting collaboration, enhancing innovation and supporting commercialisation activities is appropriate. Health and medical research should remain a key component of South Australia's Strategy; an increased investment in health and medical research will boost research and innovation and support South Australia's health system and the broader economy.

Research Australia has appreciated this opportunity to make this submission, and is, of course, willing to discuss any aspect of this submission further with members of the Council or its representatives.