



Science & Technology AUSTRALIA

Medical Research Future Fund 2018-2020 Priorities

31 August 2018

To the Australian Medical Research Advisory Board,

Thank you for the opportunity to provide feedback regarding the Medical Research Future Fund 2018-2020 Priorities.

Science & Technology Australia (STA) is the peak representative body for more than 70,000+ scientists and technologists in Australia through our member organisations, including associations and societies, research institutes, and research strategy bodies such as councils of deans. Our mission is to connect science and technology with governments, business, and the community, to enhance the role, reputation and impact of science.

The Medical Research Future Fund (MRFF) represents an important mechanism for federal investment in medical research and is vital for securing better health and wellbeing for all Australians. The MRFF has successfully supported many of the funding priorities from 2016.

However, while the MRFF is helping researchers achieve commercialisation of medical technologies, it is limited in its capacity to foster collaboration - both between the private sector and research bodies, and amongst researchers working on separate projects funded by the MRFF.

Furthermore, in consultation with our members we have come to the view that there is a need to increase the scope of funding so that it considers the research pipeline and expands its reach to support the work of the digital and technical research workforce.

With rapid developments in big data in medical research, as well as in new technologies such as multi-dimensional printing and robotics, a digitally-equipped workforce that understands and supports the needs of biomedicine is essential to ensure these technologies are developed quickly and safely and implemented effectively.

More specific feedback regarding the consultation questions outlined in the discussion paper is outlined below.

Kind regards,



Professor Emma Johnston
President
Science & Technology Australia



Kylie Walker
CEO
Science & Technology Australia

Are there any outstanding priorities from 2016-2018 that need to be extended or re-emphasised?

Antimicrobial resistance

There has been some investment in research into antimicrobial resistance, but this must be maintained as a priority area due to its current and potential future impact on health in Australia, and globally. According to a report commissioned by the UK government, this issue could result in a global cost of US\$100 trillion and 10 million deaths by 2050 if left unaddressed¹.

Currently, funded research is focused on identifying and treating the problem, which is important. Equally important is the development of preventative measures to reduce the incidence of initial infection, such as hygiene practices and vaccination rates.

It is also important for any continued focus on the issue of antimicrobial resistance to take into consideration the current and future Antimicrobial Resistance Strategies² and the World Health Organisation Global Action Plan on antimicrobial resistance³.

Industry exchange fellowships

The MRFF has supported opportunities for commercialisation of research, but there is still a shortfall in the way collaboration between academia, research and industry is incentivised. One of the issues affecting this collaboration is the inability for researchers to move between academia and industry-led research.

Establishment of private sector exchange fellowships, particularly at the PhD and postdoctoral level, provide an opportunity for researchers in academia to focus directly on the commercialisation of their work. Such a fellowship would also enable the movement of researchers between academia and the private sector.

Public good demonstration trials

While the priority of “public good demonstration trials” has been partially addressed in initiatives funded between 2016-18⁴, there is still a need to extend clinical trials to at-risk groups. These trials are essential in examining the clinical aspects of treatment for both sufferers of rare diseases and patients with complex comorbidities.

Given this priority is yet to be fully addressed, STA recommends its continuation.

¹ [“Review on antimicrobial resistance: tackling a crisis for the health and wealth of nations”](#) J O’Neill, 2014

² [“National Antimicrobial Resistance Strategy 2015-2019”](#) Department of Agriculture and Water Resources, 2015

³ [“Global action plan on antimicrobial resistance”](#) World Health Organisation, 2015

⁴ [“Australian Medical Research and Innovation Priorities 2016-2018”](#) Department of Health, 2016

Clinical Trial Network

The clinical trial network initiative, run by the Australian Clinical Trials Alliance⁵, provides a valuable resource across the sector, strengthening capability and enhancing collaboration. This network ensures that the most recent results of clinical trials are available for all medical practitioners and researchers, resulting in the latest and best care for patients.

With an expected increase in spending on clinical trials resulting from changes to the Research and Development Tax Incentive⁶, it will also be important to ensure the results of these trials are accessible, and STA believes this would be best achieved through the continuation of the Clinical Trials Alliance⁷.

Disruptive technologies

Assessment of disruptive technologies and their applications to medicine and medical research should be an ongoing priority for the MRFF. New technologies such as artificial intelligence, autonomous robotics and genomics are still in the early stages of development and adoption, and there is no way of knowing what other future technologies lie ahead.

The MRFF has a goal to ensure the medical sector is on the cutting edge of research and development. Maintaining a focus on current and future disruptive technologies best positions the MRFF to achieve this aim.

While not specifically outlined as a focus of the Medical Research Future Fund, it is essential to outline the role that research infrastructure plays in biomedical research and, in particular, disruptive technologies. Without access to advanced manufacturing facilities or supercomputers much of the disruptive technologies that will aid medicine cannot be developed.

What are the unaddressed gaps in knowledge, capacity and effort across the healthcare continuum and research pipeline?

Collaboration between organisations involved in MRFF initiatives

One of the principles for engagement outlined in the MRFF consultation paper is the need to “*leverage opportunities through collaboration with the purpose of maximising impact*”⁸.

STA believes there is value in making this a priority in itself, in order to ensure that collaboration is incentivised where ever possible. To enhance collaboration between MRFF funded initiatives a collaboration plan should be developed for all initiatives. This plan could outline what aspects of the project will be shared with fellow MRFF funded initiatives while retaining intellectual property rights for developed technologies. This would allow for collaboration and still limit

⁵ [Australian Clinical Trials Alliance](#), Accessed 2018

⁶ “[Research & Development Tax Incentive Amendments](#)” The Treasury, 2018

⁷ “[Medical Research Future Fund- Clinical trial funding set to deliver significant benefits to Australian patients and the economy](#)” Australian Clinical Trials Alliance, 2017

⁸ “[Medical Research Future Fund 2018-202 priorities consultation](#)” Department of Health, 2018

duplication of research and development by those initiatives that are funded by the MRFF.

A digital medical workforce

With the advent of new technologies such as high-powered computing, autonomous robotics and multi-dimensional printing - all of which have medical applications - the medical workforce no longer consists of only doctors and researchers.

The importance of a digitally confident and technologically trained medical workforce is becoming more apparent. While the MRFF already prioritises research fellowships, it does not include fellowships that engage interdisciplinary researchers in areas such as mathematics and computer sciences. With digital technologies playing a larger role in medicine and medical research a digitally and biomedically trained workforce is needed now and in the future.

Climate change related health issues

The changing global climate will result in challenges for both Australia and the globe, including an increase in the prevalence of diseases. Increasing temperatures and changing rainfall patterns have been shown to result in a rise in mosquito born illnesses, such as Zika virus and malaria⁹. According to the World Health Organisation a global temperature increase of 2-3 °C will increase the risk of malaria alone by 3 – 5%¹⁰.

As a nation with an extensive tropical and Mediterranean climate, malaria and other mosquito born diseases are a greater risk in Australia. The federal government recently announced \$16 million for five projects that would tackle the issue of malaria¹¹. While this is a positive step forward, a targeted strategy on all diseases that are predicted to increase in occurrence and severity should be considered as a priority for future medical research.

Regional health priorities

In 2017, \$300 million was made available to fund the Indo-Pacific Centre for Health Security¹². This initiative was setup to address the challenge of building the region's resilience to health security threats. With issues such as bird and swine flu, as well as SARS being prevalent in nations close to Australia, the importance of our national health has been shown to be intrinsically tied to that of our neighbours.

Australia has an extensive research capacity compared to much of the Indo-Pacific region, and therefore has a moral obligation to focus on areas of medical research that aid others in our region. There is also a benefit for Australia in focusing on regional specific health research, as much like herd immunity can protect individuals through vaccinations, regional health research can protect Australia against disease.

⁹ [“The effect of climate change on mosquito-borne disease”](#) P Deichstetter, 2017

¹⁰ [“Climate change and human health”](#) World Health Organisation, Accessed August 2018

¹¹ [“Australian government announces more than \\$16 million for malaria research”](#) Doherty Institute, 2018

¹² [“About – Indo-pacific centre for health security”](#) Australian Government, 2017

As a leader in the Indo-Pacific region we are also positioned strongly to undertake internationally collaborative research. A focus on regional health issues not only benefits Australia's health and wellbeing, but also the nation's research capacity and our standing within the region.

What specific priority or initiatives can address any of the above deficits?

To address the deficits outlined above, we recommend the following specific priorities to target the diversification of the medical research workforce. This diversification requires biomedically trained researchers with a better grounding in mathematics and technology, as well as non-medical STEM professionals tasked to tackle biomedical problems.

The MRFF already provides the capacity to fund fellowships for biomedical researchers and clinical trial researchers. It is STA's recommendation that this capacity be expanded to encourage the diversification of the biomedical workforce.

Quantitative biomedical research degrees (PhDs)

An issue for the medical workforce is a lack of quantitative research training provided for those undertaking biomedical research degrees. Currently biomedical research degrees are centred around coursework in medicine and anatomy.

While this is essential to the program, it limits the future capacity of biomedical researchers to naturally shift their focus to translational technologies. One possible solution for this is a 4-year biomedical PhD program that has, as its first year, courses on quantitative analysis.

MRFF funding could be used to cover the cost of these courses (after accreditation), which would greatly assist in developing a medical research workforce that has the digital skills required for future research and innovation.

Fellowships for mathematics, statistician and computer science researchers

Beyond providing broader training to the medical research workforce in digital and new technologies, there is a need to encourage greater participation in medical research by experts in areas like mathematics, statistics and computer science.

A concern for biomedical research and clinical trials has been the reproducibility of the results, one study found 56% of clinical research examined was not clinically reproducible¹³. Addressing this issue is often a matter of ensuring correct statistical design of experiments in order to avoid errors¹⁴. Find a more

¹³ ["Reproducibility of clinical research in critical care: a scoping review"](#) Daniel J. Niven et Al, 2018

¹⁴ ["Why most clinical research is not useful"](#) John P. A. Ioannidis, 2016

meaningful role for statisticians in biomedical research is one way to improve the repeatability of biomedical and clinical research.

To produce the best outcomes for patients and achieve ground breaking innovations, the medical sector must build stronger, more collaborative ties with experts in areas of research such as big data analysis, bioinformatics and artificial intelligence.

To address the mathematical and technological skill shortages in areas of medical research, specific fellowships could be funded through the MRFF to encourage multi-disciplinary work and incentivise cross-disciplinary collaboration.

How can current research capacity, production, and use within the health system be further strengthened through the MRFF?

Support for clinical trials

Some past initiatives and priorities have recognised the importance of funding and incentivising clinical trials in medical and health research.

STA is conscious of the expected growth in clinical trials due to better incentives provided by recent changes to the Research & Development Tax Incentive¹⁵. There have also been recent calls for more direct corporate R&D support¹⁶ which could include direct funding for clinical trials.

Clinical trials in Australia equate to a \$1.1 billion industry¹⁷, and it is important that this work is incentivised. There are calls from within the sector to directly fund clinical trials from the MRFF, and while STA thinks supporting clinical trials is essential, it may not be necessary to directly fund them through the MRFF at this time.

However, STA does recommend that should the proposed changes to the R&D Tax Incentive fail to effectively incentivise clinical trial investment in Australia, that the MRFF be considered as a source for strategic funding to provide a boost to clinical trials.

¹⁵ [“Research & Development Tax Incentive Amendments”](#) The Treasury, 2018

¹⁶ [“Bill Ferris calls for more direct corporate R&D support”](#) Australian Financial Review, 2018

¹⁷ [“Clinical trial in Australia: The economic profile and competitive advantage of the sector”](#) MTPConnect, 2017