

McKeon Review: Strategic Review of Health and Medical Research

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Submission summary:

Australian health and medical research saves lives, as well as saving money in terms of financial returns to the economy. A vibrant health and medical research sector supports Australian families by ensuring access to new therapies, clinical trials and diagnostics. However innovative, strategic investment in the sector is required to ensure that Australia continues to benefit from health and medical research in the future. Of key importance is supporting early-to-mid career researchers who contribute significantly to research output and will be our future research leaders. Current funding models are in drastic need of innovation in terms of supporting the transition of early-to-mid-career researchers to established group leaders. This requires new approaches to funding models with increased access to funding opportunities and policies that address gender equity. New initiatives should include short-term grants that support innovative new projects allowing researchers to generate the preliminary data required to enter longer-term funding streams. Radical approaches that support new investigators are required with increased support for researchers working across disciplines or those entering medical research from other research sectors (eg. maths, engineering, economics, social science). In terms of research priority areas there is an urgent need to close the health and life expectancy gap between Aboriginal and Torres Strait Islander peoples and non-Indigenous Australians. Also, Australia should look to position itself as a regional leader in addressing the health priorities of the Asian-Pacific region. The burden of neglected tropical diseases in our region is immense and Australian research priorities must include building Australia's capacity for tropical medicine and international public health. In order to facilitate translation of health and medical research into practise a new centre for translational medicine and clinical research should be established. Researchers should be encouraged to engage with, and contribute to policy through the creation of formal secondment programs that enhance the dialogue between scientists and policymakers.

1. Why is it in Australia's interest to have a viable, internationally competitive health and medical research sector?

- Having medical research conducted here in Australia ensures that Australian people have access to new therapies, clinical trials and diagnostics.
- There are clear economic benefits that flow from investing in medical research. Most apparent are the financial returns through commercialisation of Australian medical research that provide direct economic gains. However there are substantial cost-benefits to the community that result from investing in medical research. Early diagnosis and intervention reduces healthcare costs and a healthy community has enhanced productivity. Recent economic studies have shown that for

the average dollar invested in Australian health and medical research, \$2.17 in health benefits is returned. Investing in Australian medical research saves money, as well as saving lives.

- Having a vibrant health and medical research sector allows Australia to capitalise on the talents of Australian scientists and build on our substantial knowledge & experience base.

- Medical research supports Australian families. My sister was born with a rare genetic skin disorder, Epidermolysis bullosa, but there is no history of this illness in my family. NHMRC-funded research into my sister's genetic condition revealed that she had a novel spontaneous mutation in her keratin 5 gene. This research had implications for her and the treatment of her disease, but also for myself and other members of my family in terms of genetic testing. I now know that I do not carry this mutation myself, and thus have no risk of passing this condition on to my children. Australian medical research supported my family, and gave me knowledge about my health to help me make informed decisions for my future. And I know I am just one of many Australian's who's life has directly benefited from Australian medical research. Research improves our lives in the present and provides hope for the future.

2. How might health and medical research be best managed and funded in Australia?

If we are to meet Australia's future health challenges, then innovation in the funding space for health and medical research is urgently required.

- The NHMRC budget currently represents 0.8% of total health expenditure in Australia. This is a gross under-investment in health and medical research compared to other OECD nations. The allocation of funds to the NHMRC budget must be increased to a minimum of 3% total health expenditure; This represents an essential R&D investment in the future health of Australia.

- There is a clear need to streamline the grant process; reducing the administrative burden of grant writing and the grant review process will substantially increase researcher productivity.

The success rates for NHMRC project grant applications have fallen, and the time invested in grant writing is significant. Researchers risk a loss of productivity by spending an excessive amount of time writing grants that have low probability of being funded. This risk is magnified for early-to-mid career researchers, who generate a substantial proportion of primary research outputs and are placed in a difficult situation when sacrificing time to write potentially unsuccessful grants rather than conducting research.

A recent evaluation of the NHMRC grant system determined that the total cost of administering the \$359 million dollar project grant budget in 2009 was \$47.9 million dollars. The overwhelming majority of that cost (85%) was borne by the applicants in terms of time and productivity loss. NHMRC applications are extremely long; between 70 and 120 pages, of which the 9-page research plan can represent only 10% of the total paperwork involved. Other granting agencies have a two-stage application process, with an initial call for an expression of interest from applicants, followed by requests for detailed proposals only from those that are selected from the initial application pool. It is clear that in order to be productive the health and medical research sector needs a major rationalisation and overhaul of the grant funding system.

- Health and medical research needs to be an attractive career to ensure the future workforce. However many young scientists are discouraged from remaining in the sector due to the lack of career stability. Many early-to-mid career researchers are on short-term contracts, which create a short-term research focus and careers are extremely vulnerable to periods of low production. This is amplified in the face of the pressure to achieve scientific success within short time frames, which means that early-to-mid career researchers are susceptible to leaving careers in health and

medical research. This is particularly true for women, who seek more stable career options when starting a family, and often leave medical research at the mid-career level. This has resulted in a relative absence of women in senior positions, despite high levels of female participation at the PhD level. Addressing the uncertainty of career progression and improving job security would boost research productivity and also go some way to address gender equity issues in medical research.

Another effect of short-term contracts is that researchers are assessed in terms of short-term achievements, rather than considering the cumulative achievements of an individual. This discourages long-term collaborative work and favours conservative research approaches that provide only modest, incremental knowledge gains. As the nature of medical research moves toward “big science” approaches involving coordinated multidisciplinary groups, the metrics used to measure the output of individuals need to be re-defined.

- To ensure future innovation in Australian health and medical research there needs to be more funding opportunities for novel “out-of-the-box” approaches.

In 2009 I applied for and was granted a Grand Challenges Exploration grant from the Bill and Melinda Gates Foundation (BMGF). This grant program seeks to fund innovative ideas, soliciting a short two-page application with no preliminary data required. Initial grants of \$US100,000 are awarded with a second application process to receive a follow-on grant of up to \$1 million. This is an example of an agile and accelerated grant-making process, unlike any initiative that exists in Australia. Although I was not successful in my second-stage application to the BMGF the 12 months of funding provided has generated sufficient preliminary data to enable me to apply for further longer-term project funding.

Short-term seed funding could also be used to support early-to-mid career researchers experiencing funding-gaps during difficult career transition periods. In 2010, 75% of NHMRC project grant applications were deemed fundable, however less than one third of these funding-worthy applications were actually funded. Providing one-year “near miss” grants to early-to-mid career researchers and new investigators whose grants are ranked as fundable but for which complete funding is not available, will allow researchers time to generate further data and be more competitive in future funding rounds. This will also prevent these experienced, highly trained researchers from leaving the sector due to funding-gaps, which will lead to overall productivity gains in the sector. In addition, one-year seed grants could be made available to researchers moving outside their traditional research focus area, to encourage cross-discipline fertilisation of ideas.

- Currently many researchers are dependant on a single funding agency, the NHMRC, and there is a clear need to diversify the sources of funding available for health and medical research in Australia.

Australia lacks large-sale philanthropic investment in health and medical research, as compared to institutions such as the Wellcome Trust in the UK or the Howard Hughes Medical Institute in the USA. A recent report commissioned by Philanthropy Australia has shown that the giving levels of Australia’s high-net worth individuals are much lower than those in nations such as the US and Canada. Also, measured as a percentage of taxable income, philanthropic donations across most of the high-net worth population was only marginally higher than those among lower income Australians. Creating legal and regulatory environments that incentivise philanthropic investment in health and medical research would create additional funding streams and alleviate reliance on a single funding body for the support of research.

Another significant way to increase the diversity of funding sources is to create strategic alliances with international funding bodies to achieve health goals. The Bill and Melinda Gates Foundation (BMGF) work a range of partners, including governments, to fund health and medical research. For example, the BMGF has recently partnered with the Spanish government in a Meso-American malaria elimination/eradication campaign. More could be done by the Australian government in partnership with the BMGF to support integrated R&D in Australia, as well as public health program implementation, monitoring and evaluation in the Asia-Pacific region.

3. What are the health and medical research strategic directions and priorities and how might we meet them?

Australia is currently in an enviable economic situation, and it is important that the strategic directions for research strike a balance between domestic priorities and those of our wider community. Australia should look to position itself as a regional leader in addressing the health priorities of the Asian-Pacific region, while planning for the health needs of an ageing domestic population.

- There is an urgent need to close the health and life expectancy gap between Aboriginal and Torres Strait Islander peoples and non-Indigenous Australians. It is essential to invest in health and medical research initiatives that improve health outcomes and break the cycle of ill-health. Research initiatives must work in absolute equal partnership with Indigenous communities, and must enable cross discipline research approaches that includes health services, social sciences, economics and public health.

- The burden of neglected tropical diseases in our region is immense. Approximately one-third of the world's intestinal helminth infections, most of the food-borne trematode infections, one-half of the active trachoma infections and a significant number of cases of lymphatic filariasis, schistosomiasis and arboviral infections occur in Southeast Asian countries. Malaria is endemic in our closest neighbouring countries, and multi-drug resistant tuberculosis is a growing threat. Australian research priorities must include building Australia's capacity for tropical medicine and international public health.

4. How can we optimise translation of health and medical research into better health and wellbeing?

- In order to facilitate translation of health and medical research into improved health outcomes Australia should establish a new centre for translational medicine and clinical research. This centre would be devoted to accelerating the progression of therapies from bench to bedside and would make translational research a top priority. This would emulate the recently established NIH National Center for Advancing Translational Sciences (NCATS) in the US. The Canadian Institutes of Health Research Knowledge Translation and Commercialisation strategies provide further examples of international initiatives for delivering health research benefits.

- Researchers should be encouraged to engage with, and contribute to policy through the creation of formal secondment programs that enhance the dialogue between scientists and policymakers. This project could emulate successful schemes overseas, such as the American Association for the Advancement of Science (AAAS) Science & Technology Policy Fellowships in the US, which gives researchers an opportunity to undertake internships with politicians and government departments. Scientists would benefit from experiencing the non-linear process of policy development, and could directly contribute to the policy, while gaining firsthand experience in how government works.

- There is a growing need for researchers to work across disciplines to meet future health challenges. Mechanisms for funding diverse interactions with researchers in the fields of maths, computer science, engineering, economics and social science will be required to fully optimise translation of health and medical research into better health and wellbeing. For the health and medical research sector to access researchers with these skill sets a clear funding mechanism for researchers entering medical research from other sectors will be required.