

March 2012 submission to the *Strategic Review of Health and Medical Research*

Comments are collated from The University of Queensland's Faculty of Science (including the School of Biomedical Sciences and the School of Chemistry and Molecular Sciences), Diamantina Institute, Queensland Brain Institute, Institute of Molecular Biosciences, Australian Institute for Bioengineering and Nanotechnology, and Faculty of Engineering, Architecture and Information Technology.

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

To ensure its long term economic and social viability; to contribute to and benefit from a global knowledge exchange; and to ensure the health and societal benefits to Australians.

- We need capacity. Australia has important health and medical issues that require special attention from Australian researchers, beyond what can be expected from fundamental investigator-initiated research in Australia or around the world. In addition to issues that are over-represented in Australia or more severe than in other developed countries (e.g. skin cancer, asthma, Aboriginal health), there are also urgent problems from time to time, such as emergent or newly threatening infectious diseases (e.g., Australian Bat Lyssavirus), which require an urgent, integrated research approach only made possible from application of a diversity of skills, experiences and infrastructure acquired and maintained at national and international scales.
- We need capability. Growth in this sector means Australia can compete effectively for and retain the best researchers and this brings a broader array of career possibilities to attract the brightest and best students at schools and universities. Furthermore, a robust, dynamic, competitive research and development program attracts and retains well-qualified clinicians and contributes to a culture of excellence and learning within our hospitals and health services, from which our workforce benefits through health, productivity and economic prosperity. The key to our research capability in this sector is the intellectual capacity and scientific training of our emerging and top health and medical researchers. In turn this enables Australia to capture value from its investment because major pharmaceutical, diagnostic and medical device companies in the world are drawn to Australian institutions and companies to outsource research and development work and carry out clinical trials, hence expending a proportion of their research dollars in our country and allowing Australian's access to the latest medicines and health technologies.
- We need consolidation. Greater and ongoing funding ensures Australian researchers continue to build on previous gains and turn both curiosity-driven fundamental and applied research knowledge into new medicines, diagnostics and treatments for potential manufacture in Australia with flow-on social and economic returns, nationally and abroad. In addition, we can evaluate our effectiveness since the pay-offs from investment in the health and medical research sector have proven to be measurable and positive, although in some part, they are also intangible. This latter attribute was well-stated in the Industry Commission 1995 report on research and development: "Knowledge inevitably spreads and may be used in a multitude of ways never envisaged. Its benefits are difficult to constrain or quarantine. When individuals create new knowledge, they do more good for the community than they know or can personally benefit from. Governments therefore need to underpin and supplement the process of knowledge creation, if these wider benefits are to be adequately realised. This is among the most difficult, and important, tasks of government policy."
- We need credibility for national competitiveness. Whilst investment in health and medical research should be an ongoing priority for any government in the developed world, a relatively small nation like Australia must further its competitiveness in the knowledge-based economy of the 21st century through its effective health and medical research sector built on high impact fundamental research and world class workforce and infrastructure. Credibility leads to, among other things, opportunity to broaden the research funding base

with cooperative agreements from major funding agencies in other countries. Ongoing and increased investment in health and medical research and development of a diversified and enduring health industry sector also contributes to future-proofing Australia's economy against diminution in areas such as the mining/resource sectors.

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

Federally managed increased government funds leveraged with those from a wider range of Australian and international public sector, industry and philanthropic sources, contributing in partnership over increased project periods to the real cost of health and medical research for both investigator-led and multidisciplinary/multi-sector teams and international collaborations.

- Coordinate, manage and leverage funds from one federal coordinating entity that holds transparency and equity of access high amongst its values.
- Increase funds to ensure continuing national competitiveness and to allow funding of the real cost of undertaking research in this sector.
- Ensure funds are managed, invested and leveraged in the interest of: attaining long term focus, competitiveness and viability of the sector; ensuring continuing career prospects for pivotal health and medical research individuals; allowing ongoing operation/maintenance of key major infrastructure; permit investigation of emerging opportunities or urgent health issues, but not at the expense of completion of ongoing basic science projects; contribute long term funding to a small number of focused centres/clusters working on complex, difficult problems of importance to Australia; and allow for new initiatives that are cross-disciplinary and perhaps cross-platform. With longer term funding certainty come opportunities for generating not only new sources of value but also, major shifts in value within industries. For example, medical clinical information providers, enabled by increasing outcomes of clinical research but the issue of data sets siloed in individual hospital settings, will undoubtedly adopt new technology to aggregate data and perform analyses necessary to improve health care efficiency and will be potentially be competing as soon as 2020 in a market worth tens of billions of dollars (McKinsey Global Institute Report 2011: *Big Data*).
- Develop a diversity of funding pools. Greater incentives for investment beyond government in research are required – e.g., development of an attractive policy and funding environment, such as through additional tax relief for philanthropists and industry. Fostering an ongoing conversation between the research and financial communities is important in building a mutually beneficial relationship between two vital sectors and to build a new economy. It was reported recently at an Australian Science and Technology Summit (March 2012) that an investment of half of one percent of Superannuation Funds into science and research would amount to about \$6.5 billion – here is an opportunity for the health and medical research sector to nurture.
- Increase collaborative interaction on a multi-stakeholder interface (e.g. researchers, clinicians, pharma and advocacy groups).
- Relax funding restrictions from the ARC and NHMRC that impede those at the interface of basic and applied biomedical research from accessing a wider pool of funding schemes.
- Develop innovative funding models that support multidisciplinary research programs, support of schemes that facilitate linkages with the clinician interface, and support platforms that transcend one project/disease.
- Continue support of large team interdisciplinary activity but not be at the expense of individual investigator-led teams which also innovate and advance science and necessarily require unimpeded access to high-end, cutting edge technology and equipment and resources.
- Support international interactions to develop collaborations that will allow access to international funding pools.

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

These are linked to the medical conditions that have the greatest impact on the community and on health care providers in Australia. We need to foster through new funding models more collaboration and communication between those that understand disease and those that understand scientific disciplines underpinning the disease or its treatment.

- Chronic disease is becoming more prevalent both in the elderly and young and costs the economy billions on a national and international scale. Focussing on research, education, awareness and informed policy will be important to address this health state. Biotherapeutics, preventative measures (e.g. vaccine technologies) and understanding the interplay between genome, physiology and environment should be key areas of targeted research to ensure prevention, diagnosis and cure can all be addressed. Investment in the sector should include platform technologies and their application to translational health research
- Major investments should be made particularly in basic, preclinical and clinical research to combat the major diseases of an ageing population, such as neuroscience. For example, next to Japan, Australia has the highest life expectancy world-wide and yet Alzheimer's is the fifth-leading cause of death for those aged 65 and over. Between 2000 and 2008, deaths attributed to Alzheimer's disease increased 66 percent, while those attributed to the number one cause of death, heart disease, decreased 13 percent (www.alz.org/downloads/Facts_Figures_2012.pdf).
- Integration across diseases and disciplines is an imperative. For example, at the level of disease, cardiovascular disease/cancer/Alzheimer's, among others, share a large inflammatory/immunity component. The challenge is in cross-fertilising. For example, at the discipline level, we need to get engineers talking to geneticists, clinicians talking to structural biologists etc. Such disparate people from science and clinical management therefore need opportunities to meet, discuss, analyse and synthesise data and philosophies to explore and work towards solutions for large, complex questions. A focus should therefore be on break-down of the barriers to multi-stakeholder collaborative research and clinical trials (e.g. some of the governance can be better aligned).
- From the perspective of universities, meeting research strategic directions and priorities relies on both a capacity to ensure a critical mass of existing scientists are not lost the system for want of sustainable funds and building future capacity through science education, university places and PhD scholarships by which Australia can grow and nurture our next generation of scientists and other health system workers.

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

Multi-stakeholder partnerships are needed to support researchers, clinicians, biopharma, advocacy groups, community participants and funders working together for strategic alignment and focus of research to ensure outputs into the community commensurate with its needs in terms of health, wellbeing, prosperity and sustainable resource use.

- Enable growth of the pharmaceutical/biotech industries in Australia, for example by providing proof-of-concept and scale-up funding for new discoveries to ensure that the best proceed into a development pipeline. Also required for such industry growth is support for projects and programs linking research groups with industry partners. The NHMRC Development scheme aims to address this but is currently disproportionately small for the

needs of the sector. Greater mobility of researchers between research institutions and industry would aid translation of research but career-progression policies and rewards in research institutions need to be amended to both incentivise researchers and recognise the value of such activities. Given the small venture capital industry in Australia and the global economic climate, we may need public financial policy amendments to allow public investment in start-up companies and fledgling industries in the health and medical sector. Some of the university research institutes already exemplify the success of collocating basic research facilities and scientists alongside commercial expertise to generate an environment that directly supports the development of new discoveries.

- There has been massive investment in buildings/institutes to co-ordinate discovery through drug development to clinic but it is still too early to evaluate the effect of this funding model. Meanwhile, the researchers in these institutes and the university systems that feed them need funding to drive the research machine and operate the infrastructure.
- We need to maintain and grow investment in discovery since it is the underpinning of all translation of health and medical research.
- Health and medical research of the future is limited by availability of clinical data, which is largely sitting on hospital databases and is very hard for researchers to obtain. A properly integrated medical records infrastructure would be a major advance in our ability to research the causes of diseases and develop therapies.

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