

## **Strategic Review of Health and Medical Research in Australia (2012)**

### **Submission from the Bio21 Cluster**

The Bio21 Cluster is Victoria's leading biomedical and health sciences research cluster. Representing twenty two member organisations, the Cluster promotes collegiality and cooperation between its Members and catalyses opportunities for projects that support health and medical research (HMR). In this way, the Cluster leverages the considerable multi-disciplinary capabilities and expertise of its Members to address key scientific and health-related issues beyond the reach of any individual organisation.

In 2011 the value and beneficial impact of Australia's health and medical research sector was brought into sharp relief by the prospect of dramatic government funding cuts. Via the passionate 'Discoveries need Dollars' campaign the research community effectively conveyed why the proposed cutbacks would lead to unacceptable consequences to the health and wealth of Australia: via lost health benefits for Australians; lost jobs; forgone commercial outcomes; and a potentially irreplaceable loss of intellectual capital. With the threat of cutbacks averted for the time being, it is timely that this Strategic Review of the health and medical research landscape in Australia take place.

Australia's health system, while excellent, is currently facing a number of tests. As life expectancy increases due to advances in medical care, new challenges are arising in the areas of mental health, musculoskeletal diseases, diabetes, obesity and cancer.

One such challenge is Alzheimer's, the most common form of dementia. Alzheimer's is a debilitating neurodegenerative disease and the third-largest killer in Australia. Labelled a 'public health priority' by the World Health Organization and Alzheimer's Disease International, Alzheimer's affects more than 65,000 Victorians, with numbers across Australia predicted to soar to almost 1 million by 2050.

The Bio21 Cluster applauds the Australian Government's commitment to optimising Australia's capacity to conduct world-class health and medical research and welcomes the opportunity to contribute to this important Strategic Review which will inform health and medical research policy for the next decade.

The Bio21 Cluster represents Members from universities, independent medical research institutes, CSIRO and hospitals; this submission reflects the shared views of our broad research-based community.

## **1. Why is it in Australia's interest to have a viable, internationally competitive health and medical research sector? (Terms of Reference 1 and 6)**

Australia more than holds its own in the global health and medical research community and is the home of many researchers recognised as international leaders in their fields. Our reputation rests on the high quality of our tertiary education system, the support of governments and the outstanding credentials of our biomedical and clinical researchers.

Health and medical research is a major contributor to the economy. In Victoria, for example, the health and medical research sector, and the life science industries it supports, represents nearly 4% of the economy and employs around 2% of the workforce. This activity is strongly supported by funding leveraged from national and international sources.

Life science companies choose to start-up and/or locate in Victoria, at least in part, because the vibrant health and medical research sector provides them with access to world-class researchers and critical infrastructure.

Active engagement with the world community promotes excellence in Australian health and medical research and drives innovation from the sector.

Commercialisation of the products of Australian ingenuity and innovation, including diagnostics, medical devices, therapeutics, vaccines and manufacturing scale-up and development know-how, either via home-grown biomedical and biotechnology companies or in partnership with multinational firms, results in significant economic benefits to the country.

Being continuously engaged in the global dialogue and exchange of ideas means Australia can identify and adopt world's-best practices to provide clinically-relevant and cost-effective health care for all Australians.

These are compelling reasons for Australia to retain a vital and internationally competitive health and medical research sector.

Australian scientists, clinicians, biomedical and biotechnology industries and the Government can be proud of their collective effort to generate outcomes that improve the quality of life for Australians and for people all around the world.

Some of this country's most well known medical research success stories are:

- Large scale manufacture of penicillin for use by Australian and allied defence forces and for the world-first availability to a civilian population;
- the development of medical devices including the pacemaker and the Cochlear (bionic ear) hearing implant;
- the research that proposed and evidenced the clonal selection theory and described the role of major histocompatibility complex (MHC) proteins leading to dramatic advances in the understanding of some of the complex functioning of the immune system, particularly in the face of infectious and autoimmune diseases;
- the discovery and use of colony stimulating factors (CSFs) that changed the way people throughout the world undergo bone marrow transplantation and receive treatment for leukemia;

- the discovery of a protein in milk that helps fight tooth decay
- the demonstration of the causal link between stomach ulcers and the bacterium *Helicobacter pylori*;
- the discoveries which led to the development of vaccines against rotavirus (dehydrating gastroenteritis in infants and children), human papillomavirus (cervical cancer) as well as the first licensed Hepatitis A vaccine; and
- the development of diagnostics for breast and ovarian cancer, epilepsy, and TB.

Such success has deservedly attracted international accolades for our researchers, including nine recipients of the Nobel Prize for Physiology and Medicine. Serving to mentor and inspire others, the work of these researchers has led to many dynamic collaborations between Australians and their international counterparts. Such interactions drive more discovery research which in turn can result in more health and wealth benefits for Australia including greater understanding of disease processes, the development of new medicines and diagnostics, and growth in the biotechnology sector.

International recognition and reputation also inspires confidence among investors, industry and governments to sustain their investment over what may amount to a considerable length of time given, for example, the average development time for new medicines is 10-15 years and even longer for most vaccines.

Clinical trials are an integral part of improving health care. Australia is viewed by many in the world as an attractive site for the conduct of clinical trials, in part because of our population base in relation to the opportunities for patient recruitment. However, the most important factors are Australia's credibility and reputation in the global health and medical research scene coupled with our world-class expertise in the management and conduct of clinical trials. Maintaining a vibrant clinical trials environment in Australia not only means a share in a high value global industry, but is critical if Australian patients are to potentially receive early access to new medicines and innovative treatments for disease. The clinical trials process contributes significantly to improvements in the quality of service delivery and provides a powerful platform for supporting education and career development for health care workers with the long term view of retaining them within the public health system.

## **2. How might health and medical research be best managed and funded in Australia?** (Terms of Reference 2, 3 and 7)

Australia is blessed with a diverse base for its research workforce. Talented medical and clinical researchers populate the laboratories of universities, medical research institutes and hospitals (public and private) nationwide, often foregoing more lucrative career paths because of a desire to make a contribution to society. Ironically, the current system rewards these committed researchers with job insecurity and poor remuneration.

Better-defined and more secure career pathways should be available and funded appropriately to protect our valuable resource of medical and clinical researchers and attract future generations of scientists.

Public and/or private fellowships should be available for Australian (located here or returning from overseas) and international researchers to encourage them to choose Australia as the place to establish themselves as independent researchers. While fellowships such as those offered nationally by the NH&MRC or in Victoria by VESKI are successful examples of this type of program, they and others like them are insufficient in number to have a dramatic impact.

The Government should consider establishing additional fellowship opportunities that target the best and brightest research minds so as to encourage a net 'brain gain' for Australia. From the time of their transition from post-doc to independent researcher, medical and clinical researchers (including doctors, nurses, and allied health professionals) should have a stable, integrated career path available to them.

Currently there is little incentive for exchange across the HMR sector, nor is there any mechanism for researchers to take planned absences from the workforce for family or other reasons, due, at least in part, to the prohibitive Australian 'publish or perish' system that requires publicly-funded researchers to constantly demonstrate their worthiness for funding based on the number of peer-reviewed publications & presentations.

Little or no importance is placed on an individual's industry-gained understanding of the development cycle involved in bringing a new medicine, therapeutic or diagnostic to the market. Similarly, there is increasing concern worldwide about the future of clinical (i.e. patient based) research and clinician researchers<sup>1</sup>. A range of factors are impacting on the ability of the health system to attract and retain the best minds in clinical research roles. These include inconsistent and fragmented funding models, significantly reduced levels of funding and extended training pathways, the combined outcome of which is a critical reduction in the number of people with advanced academic skills and qualifications seeking clinical research roles. By giving due recognition in funding models for individuals' productivity relative to opportunity as well as to their contribution across different parts of the sector, rather than to academic research measures alone, workforce mobility would be encouraged and opportunities equalised.

No barriers should exist to inhibit talented individuals moving within and between the industry, research and health care sectors. Indeed, it is critical for the delivery of high quality and beneficial health and medical outcomes in Australia that there is a seamless integration of the intellectual capacity between individuals engaged in all three of these sectors.

While the international reputation of Australia's HMR workforce inspires confidence, it is insufficient on its own to sustain investment from private investors and industry. The Government is encouraged to look at how it might re-balance its investment in basic and translational research at the same time as stimulating private investment for the development of new products by providing incentives such as matching funds or taxation benefits for investors together with a regulatory, financial and taxation environment that is conducive to local and international venture capital investors, philanthropists and industry.

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<sup>1</sup> Wilson A [Intern Med J](#), 2007 Nov;37(11):778-81

Given that improved patient care and better health outcomes are the primary drivers for funding health and medical research, the investment of public money in, and the creation of an encouraging environment for private investment for, the development of new tests, devices, therapies and health system strategies is readily justified particularly when it would leverage the considerable amount already invested over many years on discovery research and thus have a significant multiplier effect on the return on investment ROI.

While acknowledging that a mixture of private and public funding for research is vitally important, so too is getting the 'split' of that funding right to ensure that both the direct costs of conducting research (eg, salaries and on-costs, specific items of equipment, and the cost of reagents) well as the indirect costs (eg, the costs to provide a safe, functional laboratory space in which to conduct research) are met. Not surprisingly, private investors may prefer to tie their investment to direct costs. Yet just as the current fragmented approach to funding individual researchers fails to provide secure and defined career paths, current government policy causes the National Health and Medical Research Council (NHMRC) to only fund direct research costs. Frequently the granted funds fall short of the total direct costs; moreover, they completely fail to support the myriad of indirect costs associated with conducting research.

The indirect costs of research should be funded irrespective of the type of institution (ie, university, medical research institute or hospital) carrying out research.

Established by the Bio21 Cluster, the Hospital Research Director's Forum (HRDF) comprises clinician researchers from across Victoria. The HRDF describes translational research as a 'two-way street' where (i) evidence-based therapies and effective primary care practices arise from basic biomedical research including epidemiology studies and clinical investigation and (ii) clinical practice throws up questions best addressed by basic science. While some institutions have the ability to cross-subsidise the indirect costs of conducting such research with income generated by other activities, this is not possible in the hospital environment where researchers including doctors, nurses and allied health professionals have neither protected time nor the infrastructure necessary to adequately support their involvement in translational research.

The Australian Government should continue its support of HMR and also take necessary steps to create an environment that stimulates private, including philanthropic, investment in HMR in this country. The Government should consider (i) amending its policies to allow grant applicants to apply to the public purse for support to cover both the direct and indirect costs of doing research as well as for items of major infrastructure; and (ii) providing earmarked research infrastructure support to hospitals and/or incentivise hospital CEOs to align their thinking around the importance of research with that of clinician researchers and thus be encouraged to specifically allocate a percentage of core hospital budget to be spent on infrastructure and other enablers for clinicians to carry out research informed by the primary care setting.

The commonly held view that to obtain adequate levels of funding to undertake research in Australia requires 'multiple shots on goal' compels researchers to spend significant amounts of time away from the lab bench writing multiple grant applications each year – notably scheduled at the most family-unfriendly time possible over the summer months which also

coincides with the time those with academic appointments might otherwise be engaged in research.

If grant applicants were confident that the review process was rigorous and transparent, that the quantum of monies granted would align more closely with requested amounts, and if the overall success rates were higher, fewer submissions would need to be made. Such changes alone would reduce the administrative, valueless, burden on applicants and restore significant productivity to the sector. Further enhancement could derive from harmonisation of the application process across different agencies including use of a common automated mechanism to capture an applicant's personal and project details on the first occasion only with minimal updates required on the second and subsequent applications.

A challenge to ensure the best management of health and medical research in Australia is to achieve widespread agreement on the measures of success used to assess the return on each research dollar invested and at the same time make allowance for the necessarily longer term nature of investment in this sector than in many others.

The Star Metrics program<sup>2</sup> being developed by the US National Science Foundation “to enable participants to use consistent data, models and tools to generate analysis and reports for their respective stakeholders while minimizing agency costs and respondent burden” deserves consideration as a potential model for adoption in Australia.

In any event, it will be critical that appropriate measures of ROI be established and agreed in good time to assess performance arising from implementation of recommendations coming from this Review. Such measures need to be of both qualitative outcomes such as improved public health and well being as well as quantitative outcomes such as publications, citations or patents.

### **3. What are the health and medical research strategic directions and priorities and how might we meet them? (Terms of Reference 5, 12 and 13)**

Strategic directions and areas of endeavour (not in priority order) should be developed for health and medical research in Australia to:

- (i) capitalise on our research capabilities and workforce skills and strengths in order to deliver demand-led products and thereby drive productivity and stimulate economic growth;
- (ii) leverage our considerable international standing and collaborations in the global health and medical research community to support Australia's diplomatic and strategic interests in the region, identify emerging disease and health issues, stay abreast of research trends and generate and share knowledge;
- (iii) ensure a greater proportion of relevant discoveries lead to products;
- (iv) respond strategically to the health and wealth challenges facing the population as a result of a shift in the burden of disease;

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<sup>2</sup> [http://readidata.nitrd.gov/star/about\\_starmetrics.php](http://readidata.nitrd.gov/star/about_starmetrics.php)

(v) adopt a systems biology approach to understanding the biology and molecular determinants of disease including utilisation of the extensive new knowledge generated via the ‘-omics’ revolution and from the convergence of life sciences with computing and engineering;

(vi) focus resources and research effort on areas and issues that are informed by the needs of particular community sectors, eg, women’s health; early parenting; and indigenous health;

(vii) focus on disease prevention; and

(viii) investigate and understand the social and economic impacts of disease on the population and the country

#### **4. How can we optimise translation of health and medical research into better health and wellbeing? (Terms of Reference 4, 8, 9, 10 and 11)**

To achieve better health and wellbeing for the Australian and global population, future health and medical research strategies in this country should focus on integrating education (including the secondary and tertiary years), discovery and clinical research (inclusive of fundamental and proof of concept studies, clinical trials, scale up and manufacturing) with application in the clinical setting.

To support the sector long-term, it is critical to capture the imagination of young people in the 15 – 24 year old bracket to science and health and medical research. Science schools programs already in existence should be strengthened. At the tertiary level, the Undergraduate Research Opportunities Program (UROP), managed by the Bio21 Cluster and offered across all Victorian biomedical research organisations, is a strategy to introduce bright young undergraduates to the medical and clinical research sector with a view to encouraging them to choose a research career. UROP contributes significantly to skills development especially in emerging areas of need. For example, as moves toward a systems biology approach to health and medical research occur, the need for mathematicians, informaticians, computer scientists, physicists and engineers is accelerating. UROP is providing an important training ground for these non-traditionally skilled biomedical researchers to become involved in HMR.

A national program to encourage outstanding students to consider a career in health and medical research would seem to make eminent sense.

Another initiative of the Bio21 Cluster is the Victorian Clinician Researcher Network (VCRN). In 2011, the VCRN conducted an online multisite survey of health care professionals in 15 hospitals across Victoria. The survey elicited 1027 responses from doctors, nurses and allied health workers and, despite a majority who indicated that they were either currently involved in research or were interested to become involved in future, a number of barriers to translating research to beneficial patient outcomes emerged, including: lack of time due to clinical commitments; lack of funding for research; absence of protected research time; lack of management and institutional support; no seed funding to support pilot research projects;

absence of mentoring; and competing commitments to family life. A substantial clinician researcher fellowship scheme implemented in Queensland should now be yielding data to demonstrate its value. If successful, wider adoption of such schemes may offer greater opportunity for translational research in the future.

Although still in the formative phase, Advanced (Academic) Health Research Centres (AHRC) promise to bring together the highest standards in education, research and patient care to translate advances made in HMR to improved health outcomes for the community.

While there is a level of uncertainty around where AHRCs sit (with the NH&MRC or with federal or state governments), what is clear is that there is a serious deficiency in funding for AHRCs which places the primary objective of achieving better health outcomes at risk.

The Government is encouraged to provide dedicated funding to create a limited number of AHRCs and to ensure that the governance structures adopted are such that they will deliver outcomes that reflect and meet government and community priorities.

It is suggested that the Federal Government could ensure the success of a comprehensive translational research process by supporting the establishment of AHRCs as well as conducting critical evaluation of their impact over time. The effectiveness of collaborations between researchers and industry to drive the application and/or commercialisation of outcomes from our HMR sector should also be measured.

Translational research outcomes could be further improved if hospitals were funded by the Federal Government and / or they were to become eligible to bid for infrastructure funding to support medical research in the same way as can universities and medical research institutes. Either scenario should include mechanisms to ensure that funding for research infrastructure once made available to hospitals is 'quarantined' for that purpose alone and is not allowed to be absorbed into hospital general revenue.

Access to accurate data underpins the delivery of an efficient and high-quality health care system. The establishment of an e-health system and universal access to electronic medical records (with appropriate privacy safeguards) will provide a solid baseline for research, especially within clinical trials facilities. For such a system to work effectively, a reliable and secure network infrastructure will need to be built between hospitals and general practice to support improved communication strategies. The establishment of electronic systems to facilitate collaboration and reciprocal communication between primary care providers and the hospital, university, and/or medical research institute will also require development of shared platforms including biobanks, databases, e-health and bioinformatics.

The Bio21 Cluster welcomes the opportunity to meet with the Review Panel to discuss this matter further.

Any questions about this submission may be directed to me at [jtennent@unimelb.edu.au](mailto:jtennent@unimelb.edu.au) or on (03) 8344 1937.

Yours sincerely



Assoc Professor Jan Tennent, on behalf of the Board of the Bio21 Cluster and its Members  
CEO, Bio21 Australia Limited

## **Membership of the Bio21 Cluster - 2012**

### Founding Members:

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- The University of Melbourne
- Walter and Eliza Hall Institute of Medical Research

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- Austin LifeSciences
- The Bionic Ear Institute
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