# Submission to the McKeon Strategic Review of Health and Medical Research

CSL™

## *Overview*

CSL welcomes the opportunity to contribute to the 2012 Strategic Review of Health and Medical Research.

CSL is Australia's largest biotechnology company and a global leader in developing bio-pharmaceutical medicines. Our direct and indirect contribution to Australia's national output is nearly $2.4 billion per annum. CSL's success has been supported by a world-class medical research community in Australia.

A world-class medical research community has clear benefits to the long-term health of Australians and the potential to reduce health costs.

Two of Australia's greatest contributions to modern biopharmaceuticals are G-CSF, a growth factor used to treat cancer patients, and Gardasil®, the cervical cancer vaccine. G-CSF was lost to Australia early in development and the multi-billion dollar rewards from its success stayed overseas. Gardasil® was taken further through the pipeline and, as a result, the total royalty streams flowing back into Australia are likely to reach $600 million by the end of this year.

Australia could derive a greater economic return from the community's investment in health and medical research by carefully considering how better to add value in translational research – the bridge between basic research and clinical/commercial application.

Basic medical research incorporates projects across a wide range of disciplines and a relatively small subset of this research delivers drug candidates that have been validated in animal models and which are suitable for novel medicine development. However, human proof-of-principle data is much more valuable than data from animal models. Identifying development candidates and funding their transition from the necessary animal experiment to proof-of-principle in human clinical trials is a huge value-adding step. We need to identify a funding mechanism to bridge this gap.

Our key recommendation is to create significant translational grants to enable more discoveries to reach clinical proof-of-concept stage and to facilitate improved links between the research community and industry.

These grants could enable more discoveries to enter commercial development and more development to take place in Australia – increasing the economic and social benefits flowing from Australia's investment in health and medical research.

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

The major benefits to Australia of having a viable and internationally competitive health and medical research sector have been eloquently described in submissions from the Assocation of Australian Medical Research Institutes, the Australian Society of Medical Research, the Australian Academy of Science and Research Australia, among others.

These powerful benefits include:

- Research conducted in Australia is better tailored to meet the needs of the Australian community.
- A strong Australian research community with international linkages gives Australian clinicians faster access to international discoveries, new medicines and breakthrough medical treatments.
- Investment in health and medical research brings financial benefits to Australia through gains in well-being, reduced healthcare expenditure, increased productivity and commercialisation[1].

We see further benefits. A viable and internationally competitive health and medical research sector can help grow and sustain Australia's sucessful research-based medicines industry, delivering even greater social and economic benefits to the nation. As Australia's largest biotechnology company, and a global leader in the development of speciality biopharmaceuticals, we would like to elaborate on these benefits.

The Australian medicines industry can play a critical role in translating Australian research discoveries into life-saving and life-enhancing products for patients. The bionic ear, Gardasil® and Relenza® are all fine examples of what can be achieved for human health through collaboration between Australia's medical reseachers and the Australian medicines industry.

The industry also generates signficant economic benefit for Australia. It is currently our largest high-technology exporter ($3.8 billion in 2010-11)[2], the highest manufacturing industry investor in R&D ($1 billion in 2009-10)[3] and it employs over 40,000 people Australia-wide[4]. There are significant multiplier effects of this activity which further benefit Australia.

For example:

In 2010/2011 CSL's operations in Australia, comprised:

- total sales of $747 million, including $119 million in export sales;
- $210 million paid in wages and salaries to Australian workers;
- $422 million in goods and services bought from other Australian businesses; and
- 1,742 full-time equivalent jobs.

This activity stimulated in Australia[5]:

- $1,644 million in additional output from other industries for a total contribution to national output of $2,391 million;
- $210 million in household income contributions. The increase in consumption spending from this induced a further $438 million in household income from employment in other industries for a total increase in household income of $648 million; and

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[1] Deloitte Access Economics, 2011, Returns on NHRMC funded Research and Development, report prepared for the Australian Society of Medical Research

[2] Australian Bureau of Statistics, Catalogue 5368.0, International Trade in Goods and Services, Australian 2010-11

[3] Australian Bureau of Statistics, Catalogue 8104, Research and Experimental Development by Socio-Economic Objectives, Australia 2009-10

[4] Commonwealth of Australia, 2008, Pharmaceuticals Industry Strategy Group. Final Report

[5] CSL's Contribution to the Australian Economy, *Synergies Economic Consulting*, 2009

- employment of 6,406 jobs in other industries in addition to 1,742 directly employed, resulting in a total employment contribution of 8,148 jobs.

CSL also has substantial R&D activities in Australia which can be expected to generate large knowledge spillovers which are not included in the abovementioned figures. Nor are returns to CSL's Australian shareholders, including those from profits earned offshore.

The contributions of the medicines industry to Australia are substantial and are intimately linked to the output of our health and medical research sector. Continued investment in the sector will help protect, grow and sustain industry by ensuring:

- a continuing flow of internationally competitve research discoveries capable of being turned into products; and
- a critical mass of highly trained and skilled medical scientists – both to undertake the research and to work with industry to turn discoveries into therapies and revenues.

The translation of discoveries into therapies is a key value driver for the sector, for industry and for Australia. To enable Australia to fully capitalise on its investment in health and medical research, we recommend a step-change in the way translational research is funded. This is addressed in our response to Question 4.

There are many other factors that impact on the success and sustainability of the medicines industry and its symbiosis with the health and medical research sector. We agree with Medicines Australia's recommendations to the Review that Australian goverments should provide globally competitive incentives to encourage major investment by pharmacuetical companies in Australia, and that such incentives could include either lowering Australia's corporate tax rate or raising the level of tax credits available to companies conducting medical research in Australia, and the establishment of a strategic co-investment fund for large-scale R&D infrastructure, as recommended by the Pharmaceutical Industry Strategy Group in 2009.

## *4. How can we optimise translation of health and medical research into better health and well-being?*

Australia lacks resources and capability in translational research, and this inhibits the potential for Australia's health and medical research investment to be fully maximised.

Translational research includes: preclinical studies in relevant animal models of disease; *in vitro* and *ex vivo* studies using relevant tissues sampled from the target patient population; toxicology studies, manufacturing and scale-up activities; and early stage human clinical trials. In Australia, few of these translational activities occur within the academic research sector.

The process of translating a basic research discovery through to an innovative therapy for patients is challenging and high risk, can take several years to complete and can cost many millions of dollars. Achieving preliminary proof-of-concept in patients, for example via a small Phase IIa study, is an important first step that can reduce the risk of, and justify, the very large investment required to complete subsequent Phase IIb and Phase III studies. However, the steps required to achieve preliminary proof-of-concept are themselves challenging. As noted above they include: preclinical studies in relevant

animal models of disease; *in vitro* and *ex vivo* studies using relevant tissues sampled from the target patient population; toxicology studies; and manufacturing and scale-up activities.

Because of the complexity and expense of translational activities through to proof-of-concept many potentially valuable projects fail to attract the level of resource required to progress further. For example, at CSLwe look at over 100 opportunities each year. Of these, we choose 5-10% for full evaluation and then select only a handful for licensing.

While many opportunities are declined because they are unsuitable for further development and commercialisation, we also have to turn down some potentially valuable and exciting projects simply because our available resources are fully allocated to other R&D projects. Some of these projects may be picked up by international companies but, in the process, opportunities to increase returns to Australia are lost. Others will simply not move forward.

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CSL believes that more Australian discoveries could reach proof-of-concept and progress into later development in Australia with greater and more targeted investment by the Government.

## Current Translational Research Funding Schemes.

Support for translational research in Australia has been limited and somewhat *ad hoc* in nature. There are several schemes from different funding agencies that have met with varying levels of success. They include:

- development grants (NHMRC);
- the Cooperative Research Centre (CRC) program;
- industry fellowships (NHMRC); and
- commercialisation grants – most recently through Commercialisation Australia.

### *NHMRC Development Grants*

NHMRC Development Grants are designed to support individual researchers, research teams, or a company in partnership with a researcher/s to undertake work at the early proof-of-principle or pre-seed stage. While we support the intention of these grants, they are largely ineffective because:

- funding is too little and far too short a term to make a real difference:$100-300K per year over 2 years; and
- there is no requirement for the researcher to form links with a company capable of, and willing to, assist with advancing the project. A scheme like this needs to encourage strong links between the investigator and a commercial partner to drive it forward.

***Cooperative Research Centres (CRCs)***

The CRC Program was established in 1991 to link researchers with industry to focus R&D efforts on progress towards utilisation and commercialisation. While the CRCs have met with some success in certain sectors, since inception they have led to few direct commercial outcomes in the biomedical sector. It has sometimes been difficult to manage the differing needs of the academic and commercial partners, the timeframes and technologies required to generate a clinical candidate and the complexity and expense required to progress the candidate through to proof-of-concept and beyond.

***NHMRC Industry Fellowships***

Under the *Career Development Fellowship* scheme, the NHMRC provides opportunities for postgraduate and postdoctoral researchers to engage in industry-oriented research training and enables postdoctoral researchers to pursue internationally competitive research opportunities in collaboration with industry.

Industry fellowships have been a success from CSL's perspective. They have led to fruitful long term linkages between CSL and research organisations and have often been targeted specifically towards addressing the translational research gap described above. While important and adding significant value, these fellowships cannot be expected to address the full spectrum of translation activities. However, coupled with targeted translational research funding they can help develop specialised skills to support early stage commercial development of potential products. There are currently three staff members at CSL who received their start in the industry through this program.

***Commercialisation Australia***

Commercialisation Australia is a competitive, merit-based assistance program offering funding and resources to accelerate the "business building process" for Australian companies, entrepreneurs, researchers and inventors. Unfortunately the support available is too small, too short term, and not strongly linked with NHMRC.

## A Way Forward

CSL proposes the introduction of new funding that will enable researchers to progress their discoveries through to preliminary proof-of-concept in patients. This will increase the number of potential products that could be accepted by industry for later stage product development including Phase IIb and Phase III clinical trials, maximising benefits for Australia.

**We recommend that:**

- NHRMC Development Grants be abolished and replaced by new government-funded Translational Grants. Funding schemes to support this type of R&D activity operate successfully in the US via the NIH and could provide a useful model in the first instance.
- These new Translational Grants be targeted at projects where a clinical candidate has been identified but resources to progress through to preliminary proof-of-concept in patients are not available.
- The budget for these new Translational Grants be sufficient to fund 10 projects per year, at up to $10 million over the lifetime of each project, and be in addition to the Government's ongoing investment in basic medical research.
- The funding applicant for these new Translational Grants be jointly an Australian academic group and a credible industry partner, allowing Australian

researchers to stay involved in the process and in the science-related aspects of later stage clinical development.

- The new Translational Grants be peer-reviewed with industry input and governed by the NHMRC or a central research funding agency as may be determined by the outcomes of the McKeon Review.
- Industry career development fellowships be expanded (in number and duration) to leverage the increased funding of translational research, forging stronger links between academic and industry-based research teams and developing specialised skills.

While the research activities covered by the Translational Grants may encompass preclinical efficacy studies, *in vitro* and *ex vivo* studies using relevant human tissues, GLP toxicology studies, and manufacturing and scale-up activities, the pre-requisite for a clinical candidate should enable a discreet timeframe for translation in the order of 3-5 years.

***Clinical Trials***

One of the measures of success of the new Translational Grants will be the number of candidates progressing to clinical trials. Further value can be extracted from Australia's investment in health and medical research by encouraging these clinical trials to be conducted in Australia. Australia has a good regulatory framework in place for clinical development and approval of new drugs, but there are aspects that can be improved.

Last year, the Clinical Trials Action Group, part of the Pharmaceutical Industry Working Group, tabled a report entitled *Clinically competitive: boosting the business of clinical trials in Australia* with the Federal Minister for Health and Ageing, and the Minister for Innovation, Industry, Science and Research.

The recommendations include the harmonisation of ethical reviews for multi-centre trials, minimisation of bureaucracy, standardisation of costs associated with clinical trials and more. With the rise in the value of the Australian dollar, Australia is becoming a less attractive destination for clinical trials, so streamlining clinical trials processes and bureaucracy is critical to maintaining momentum.

CSL supports the recommendations of the Clinical Trials Action Group and urges Government to implement them.