NSW Health and Medical Research Strategic Review

Discussion Paper

31 October 2011

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Foreword

Australia has an impressive record of achievement in health and medical research – our researchers have made significant contributions to health and medical discoveries internationally.

A strong and vibrant research enterprise is important to New South Wales (NSW). Research can help deliver better treatments and interventions, improve health services delivery and improve clinical and population health outcomes. A strong research culture within the public health system helps to attract and retain high quality researchers and clinicians and facilitates education and training. Further, investing in research benefits the state's economy.

The NSW Health and Medical Research Strategic Review will recommend a 10-year plan. A 10-year horizon recognises that research is a long-term enterprise that requires a consistent approach to funding and support if it is to deliver the best outcomes for the state.

To date, the Review has consulted more than 400 people and has published a Fact Base of data on NSW's research performance against a number of metrics and an Issues Paper that presents a preliminary framework for the NSW health and medical research strategy.

There have been two consistent messages from these consultations. Firstly, NSW should be a global medical research leader, but it is not fulfilling its potential. Secondly, strong political and organisational leadership is needed to ensure the ongoing development of a rich research culture that supports excellence, attracts, develops and retains the best researchers and ensures evidence from research informs health policy and programs.

This is the final opportunity for public comment on the NSW Health and Medical Research Strategic Review. I encourage all interested parties to provide feedback on the emerging principles and actions to help us refine our work on the Final Report.

Submissions can be made on line at: http://www.health.nsw.gov.au/omr/review/. Submissions close at 5:00 pm on Wednesday 16 November 2011.

Mr Peter Wills, AC
Chairman, NSW Health and Medical Research Strategic Review

SECTION 1

Introduction

The NSW Health and Medical Research Strategic Review (the Review) is being conducted from July 2011 with a final report expected to be released in February 2012.

A Fact Base was compiled to provide data on the state's performance against research metrics, including research funding, research activity and outputs (publication and citations), workforce, research organisations and commercial success. Where data are available, New South Wales (NSW) performance has been compared to other Australian states.

An Issues Paper was released in September. It presented a Preliminary Strategy Framework for a 10-year health and medical research plan for the state and identified a series of options to further develop health and medical research in NSW. The Fact Base and Issues Paper are available at http://www.health.nsw.gov.au/omr/review/.

An overview of the Review process and a summary of the key findings to date is presented in Appendix 1.

This Discussion Paper is a high-level document that forms the basis of the third phase of consultation for the Review (see Figure 1).

Figure 1: The NSW Health and Medical Research Strategic Review Roadmap

The purpose of the Discussion Paper is to provide research workers, managers and others involved in health and medical research with an opportunity to comment on the emerging principles and actions and to inform recommendations for an Interim Report. It presents:

- a vision and refined strategy framework for health and medical research in NSW;
- a brief overview of current issues for health and medical research in NSW; and
- principles and possible actions for the 10-year NSW health and medical research strategy.

Although the issues described in the Discussion Paper are based on evidence collected for the Review, references, exhibits and quotes have not been included nor have timeframes for implementation, performance indicators or budgets. This level of detail will be included in the Interim Report. The Review will continue to gather evidence and feedback to validate the principles and actions presented here.

SECTION 2

Vision for Health and Medical Research in NSW

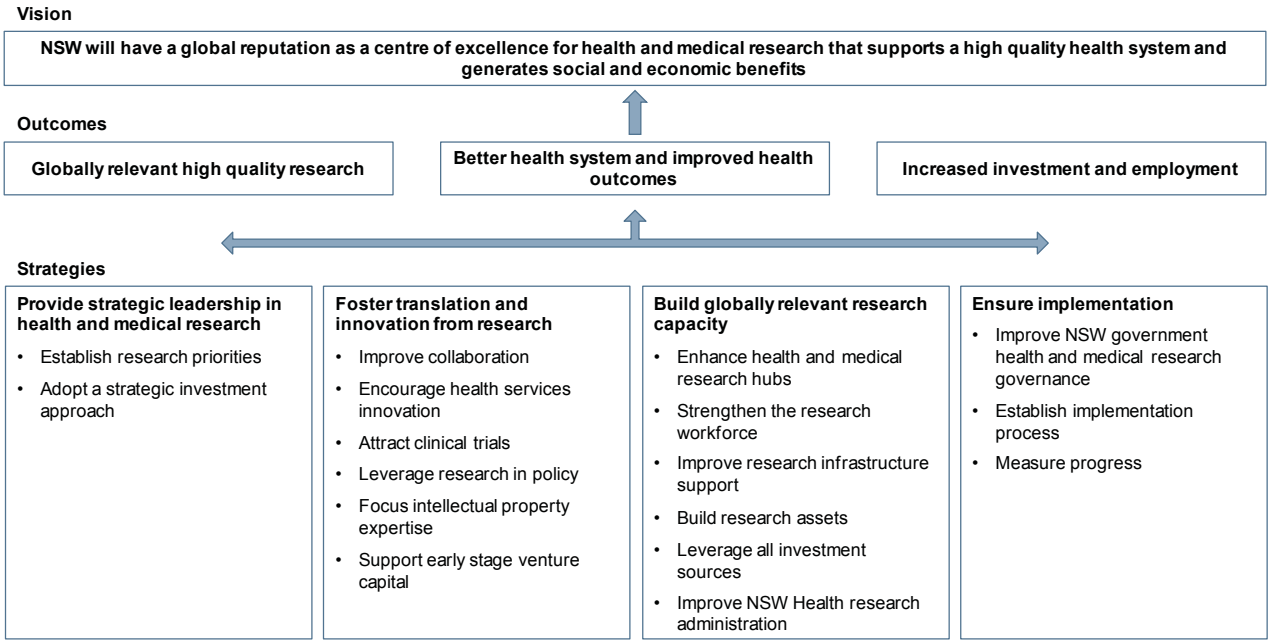
The Review defines health and medical research broadly, to include biomedical, clinical, health services, health policy and population health research. The Review Advisory Committee recognises the importance of balance between investigator-initiated and priority-driven research as well as taking into account the potential impact of current research in other fields (for example, the social sciences, information and communication technology and nanotechnology) on health.

The Review Advisory Committee has established the following vision for health and medical research in NSW.

NSW will have a global reputation as a centre of excellence for health and medical research that supports a high quality health system and generates social and economic benefits.

To achieve this vision, NSW should build on its current strengths and address important areas for improvement. The draft Strategy Framework for Health and Medical Research is presented in Figure 2.

Figure 2: Draft Strategy Framework for Health and Medical Research in NSW



The following sections of the Discussion Paper provide a synopsis of all areas within the framework, including a brief overview of current issues and proposed principles and actions.

Although action is required across all areas, in response to the matters raised during the course of the Review, the Advisory Committee has identified four areas that warrant special attention given their potential to significantly affect the proposed outcomes for health and medical research in NSW. These are:

i. **Encourage Health Services Innovation.**
There is great potential to better leverage the substantial investment of clinician research time to deliver health or productivity benefits across the health system. This research effort includes clinical, health services and population health research and its corresponding translation into policy or practice.

ii. **Enhance Health and Medical Research Hubs.**
Developing and investing in research hubs that bring together several contiguous research organisations to create an operation of optimal scale and scope are likely to deliver globally relevant research.

iii. **Improve Research Infrastructure Support.**
Improving the access of research organisations to sufficient infrastructure support is critical to enabling them to maximise their success in securing competitive grants and building critical mass.

iv. **Provide Strategic Leadership in Health and Medical Research.**
Establishing the vision, structures, resources and processes for research in NSW, such as setting and communicating priorities and resourcing the Office for Medical Research (OMR) is essential to the successful delivery of the NSW health and medical research strategy.

SECTION 3

Provide Strategic Leadership in Health and Medical Research

The case for investment in health and medical research is that it delivers, both directly and indirectly, high returns to the population through improved longevity and health outcomes. According to a recent report by Access Economics, a dollar invested in health and medical research returns two dollars in health benefits.[1]

Most funding for health and medical research comes from the Australian Government. This funding supports the highest quality research and the generation of new knowledge as judged by peer review of research proposals, and to a lesser extent, targeted research and approaches for particular health outcomes.[2]

This Review proposes that NSW Government investment is different and is driven by a practical concern that the people of NSW benefit from life-extending and life-enhancing research discoveries and that NSW Government funds should be invested strategically in a range of programs that are targeted to:

- generate research that answers questions of local relevance for clinical and population health practice, health services management and policy and program development and implementation
- improve the effectiveness and efficiency of the local health system it manages
- leverage and secure high value-added jobs in the research and commercial sector, largely supported by Commonwealth investment.

This Section focuses on:

- establishing research priorities for NSW; and
- adopting a strategic approach to its investment in health and medical research.

3.1 Establish Research Priorities

Given that the rationale for NSW Government investment in health and medical research is primarily to improve the health of the NSW population, research priorities should be informed by health priorities if it is judged that research can make a contribution to the achievement of health goals. This approach does not dismiss the need to strike a balance between discovery and applied or strategic research, but reflects the need for a more strategic investment approach by the NSW Government that complements the substantial Commonwealth investment in health and medical research, much of which is discovery research.

Issues

A lively discourse is growing both nationally and internationally about setting priorities for research. The potential benefit in setting research priorities in NSW is that the government can then guide its research investment to address the most significant health problems in the state and researchers can align their research with state priorities to achieve greater effect.

Setting research priorities is challenging. Not every health and medical problem is amenable to research. The outcome of much research is unpredictable and may have operational limitations. New research challenges can emerge quickly, e.g. vaccine research in response to the 2009 H1N1 influenza pandemic. There are different levels of priorities, e.g. broad topic areas and specific research questions; disease and population priorities; and priority research (e.g. health economics research, intervention research). Furthermore, there can be priorities for the procurement of major research equipment or the development of other research assets.

[1] Access Economics, for the Australian Society for Medical Research. Exceptional returns: the value of investing in health R&D in Australia II. Canberra, June 2008
[2] NHMRC, 2010. Health and medical research and the future in NHMRC's 75th year. Canberra

NSW has poorly articulated health and medical research priorities and there is no clear or coordinated approach to determining or communicating them. Further, the comparative research advantages of NSW have not been clearly defined.

Principles

- NSW research priorities are linked to health problems that are potentially able to be solved through research, relevant to its population
- Priorities build on the strengths of NSW research and clinical and population health practice, where these are in line with research priorities
- Priority setting processes are inclusive and involve policy makers, researchers, clinicians, the community and not-for-profit organisations to ensure wide acceptance
- Priorities are publicly available, periodically reviewed and flexible to respond to new challenges.

Actions: Establish Research Priorities		Responsibility
3.1.1	Establish a process to identify NSW health and medical research priorities, including the formation of a Research Priority Advisory Group ■ Establish robust, transparent criteria for priority setting ■ Convene forums with policy makers, clinicians, researchers and other stakeholders to inform research directions ■ Agree on a priority framework (disease burden, populations, research settings, life-stage, research types, technology, assets)	MoH – OMR
3.1.2	Identify, publish and regularly review NSW health and medical research priorities	MoH – OMR
3.1.3	Undertake a further analysis of NSW current areas of research excellence and competitive advantage to drive strategic investment decisions	MoH – OMR Universities MRIs LHDs

3.2 Adopt a Strategic Investment Approach

Governments face the challenge of deciding how to invest public resources for the maximum benefit. Accordingly, the NSW Government should adopt a strategic approach to its investment in health and medical research.

Research is inherently a long-term enterprise, with researchers requiring many years to reach maximum productivity, and meaningful research projects requiring 3-5 years for completion. The Review considers that the consistent and long-term approach that a 10-year strategy will allow is the best mechanism to deliver optimum returns to the state.

Issues

The NSW Government invests significantly in health and medical research. Between 2005 and 2010, investment was about AUD$188 million each year through programs administered variously by the NSW Ministry of Health (MoH), the Department of Trade, Investment, Regional Infrastructure and Services (DTIRIS), the Cancer Institute NSW (CINSW) and Local Health Districts (LHDs).

Stakeholders noted a lack of coordination among state government funding programs judging the way that the NSW Government directs or funds research to be non-strategic, obscure and at times arbitrary.

Furthermore, numerous stakeholders perceived that research funding in NSW has a strong medical orientation with limited funds available for health services research, primary care research, population health intervention research and research related to the translation of research into improved policy, services and health outcomes for the NSW population. Many of these fields relate closely to the application of research to priorities for health care and prevention.

Principles

- NSW Government invests in health and medical research to meet health priorities and policy goals, and not just to generate untargeted new knowledge
- All research funding programs will have objectives that contribute to the NSW Government's vision for health and medical research
- The criteria applicable to each research funding program are aligned to the overarching health and medical research strategies.

Actions: Adopt a Strategic Investment Approach		Responsibility
3.2.1	Implement the proposed NSW Health and Medical Research Strategy Framework (see page 2)	MoH
3.2.2	Clarify and rationalise current state-level health and medical research funding programs	MoH DTIRIS CINSW
3.2.3	Ensure NSW Government funding is allocated in line with the NSW Strategy Framework and NSW health and medical research priorities	MoH – OMR DTIRIS CINSW LHDs
3.2.4	Encourage the development of research collaborations and programs in important areas such as Aboriginal health, population health and health services research with single-purpose capacity building grants	MoH – OMR

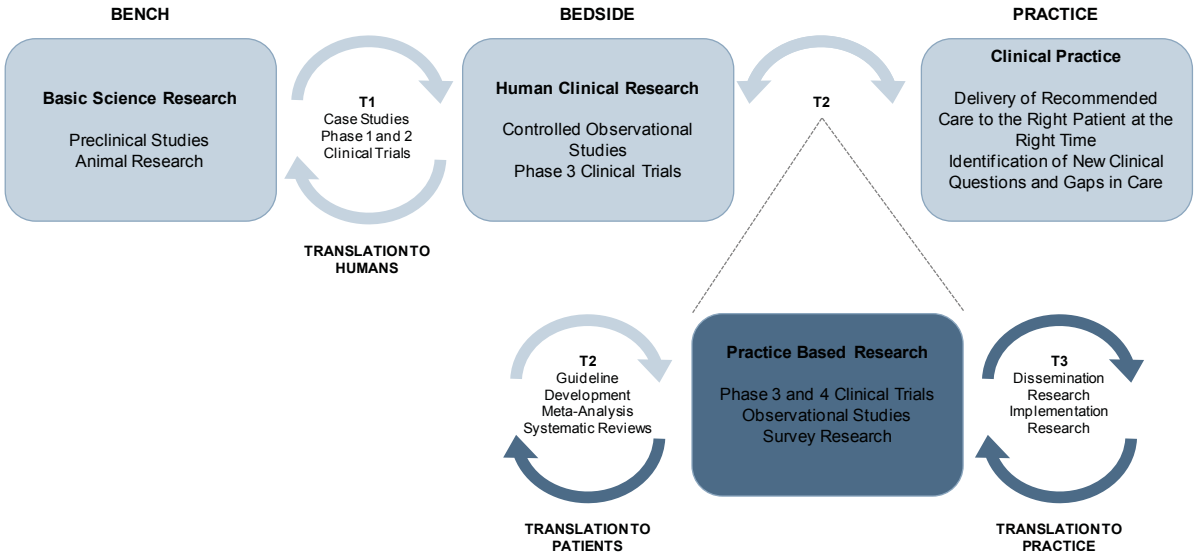
SECTION 4

Foster Translation and Innovation from Research

Using evidence from research to develop and evaluate health policy and clinical and population health practice has the potential to improve health services, health outcomes and resource allocation. While there are many definitions of translational research, for our purposes we are using the term to include the process of researching how to apply information and insights derived from basic, clinical and population research to the provision of health services. The potential for gain in both health and health services to come from translational research is the major driver for increased investment by the NSW Government in health and medical research.

Translation refers to the process of using the findings of research to produce innovation in health-care settings. The US National Institutes of Health Roadmap profiles the various cycles of research translation according to the context within which the research is undertaken (Figure 3). This includes: treatment and intervention development (T1); testing efficacy and effectiveness of treatments and interventions (T2); and dissemination and implementation research for system-wide change (T3).

Figure 3: National Institutes of Health Model for Research Translation



In addition to translation to clinical and population health practice for immediate health gain, some research can generate economic benefits through commercialisation. These benefits can include royalties from licensing intellectual property and high value jobs in internationally renowned companies such as Cochlear and ResMed.

Exploiting the result of health and medical research is difficult. It requires a team effort from many talented individuals in research, clinical settings, not-for-profit organisations and business, who may not have a natural cultural affinity for each other or for the process of translation. Leadership from the sponsors of research, using incentives and building capacity will be critically important, and these will come from the Ministry of Health.

This section focuses on six elements of the research translation cycle:

- Improving collaboration (T1 and T2);
- Encouraging health services innovation (T2 and T3);
- Attracting clinical trials (T1 and T2);

- Leveraging research in policy (T3);
- Focusing intellectual property expertise; and
- Supporting early-stage venture capital.

4.1 Improve Collaboration

Collaboration in research and development is held to provide numerous advantages, when the research topic is complex and multifaceted.

Collaboration is a means to an end. The rationale to collaborate will be driven by what the end is and in NSW the end is to make the best possible use of available research resources to deliver knowledge that best meets the needs of the end-users of the research.

Success in translating advances in science into better medicine demands a wide variety of capabilities, from basic medical sciences to physical sciences and engineering, and creative interdisciplinary thinking and approaches. For example, taking a medical device from concept to a working prototype could require collaboration between scientists, surgeons and engineers.

Issues

The desire to establish strong links between medicine and science is hardly a new concept. However, rapid advances in fundamental biology have required increasing specialisation and highly technical instrumentation used by scientists who increasingly (and appropriately) use specialised language for their purposes. This process increasingly removes scientists and their findings from the places where medicine and health sciences are practised. Therefore, the clinicians and managers use a different language and operate in the uncontrolled world of the patient and his or her illness.

Collaboration comes at a cost, as it: requires more time in planning and negotiation before research commences; generates numerous transaction costs (that increase with the number of partners involved); can diminish the control and recognition of individual organisations; and introduces new risks to the management and performance of a project.

The Review was informed that although there are good examples of research collaboration in NSW, discrete silos and competitive practices remain. Stakeholders consistently commented that collaboration requires incentives for success, particularly when it is multidisciplinary, multi-institutional and cross-sectoral. In Australia, while considerable progress has been made by the National Health and Medical Research Council (NHMRC) and other funding agencies in promoting collaborative research through centres of excellence and partnership grants for example, nevertheless the majority of research is funded using project grants, which may not always cover the costs of collaboration.

Principles

- NSW supports researcher collaboration to facilitate the rapid, effective application of results in the laboratory to patients in the clinic
- NSW researchers collaborate with multidisciplinary and cross-sectoral colleagues.

Actions: Improve Collaboration		Responsibility
4.1.1	Provide assistance to NSW research hubs, research organisations and consortia for large collaborative grant applications with a focus on translating science into medicine	MoH – OMR
4.1.2	Incorporate collaboration and translation performance measures into all research funding agreements with NSW Government	MoH – OMR
4.1.3	Investigate an Industry-Partnered Collaborative Research Grant Scheme	MoH – OMR
4.1.4	Support research networks that address NSW research priorities and link with appropriate clinical networks	MoH – OMR

4.2 Encourage Health Services Innovation

In NSW, health services engage in teaching and research as an essential component of delivering the highest quality health care. This section focuses on the wide range of research undertaken in Local Health Districts (LHDs) by clinicians (nurses, doctors, allied health professionals and population health practitioners) in the clinical, health services and population health spheres. Detail on the use of research evidence in clinical and population health practice is covered in Section 4.4.

Issues

The management of research at the LHD level varies across the state. It is accepted that LHDs by virtue of their location will vary greatly in their capacity to conduct research. However, even among those LHDs that have a tradition of research, many do not have a clear picture of the research undertaken, its purpose or its outcomes. This situation is both a management and a communication problem. The research community may be doing less than it might to communicate what it is that they are doing and may not be required to give an account of the quality and impact of their research. This lack of communication and accountability diminishes its political significance, necessary for sustained investment of government funds.

It is difficult to engage clinicians in research. The Review has been informed that clinician research careers are not promoted, fostered or mentored adequately from the undergraduate period right through to the vocational or specialty training periods. Further, those clinicians with enthusiasm for research find the pressure of clinical work overwhelming with much of their research carried out in their own time.

It is important to fund clinicians to do research. Under the National Health Reform Agreement, funding for teaching, training and research (TTR) will be a separate block funding allocation in the short term, and may potentially move to an activity-based funding model. Amidst these changes, it is crucial that the matter of support for clinician researchers is discussed. The National Health Reform represents a significant change in health funding policy and is a major strategic opportunity for research within the health system if it receives sufficient attention.

LHDs provide a range of support infrastructure for research (e.g. information technology, human resources and financial services). Research workers repeatedly reported their frustration that the clinical and administrative focus of these services was at odds with the requirements for research.

Principles

- LHDs have a clear strategic direction for research, a strong research culture and support the conduct of strategic, high-quality research
- Clinicians have access to time and appropriate research support
- Clinician researchers find it easy to access additional training, expertise or technical skills (e.g. statisticians, health economists and interpreter services) required to conduct high-quality research
- Clinicians use the outcomes of research to improve health services

Actions: Encourage Health Services Innovation		Responsibility
4.2.1	Lead a priority-driven research grant program to support clinicians to generate new evidence with criteria that ensure collaboration between clinicians, policy makers, health service managers and academics	MoH – OMR ACI CINSW
4.2.2	Attract and retain a critical mass of high-quality clinician researchers in LHDs: ■ Establish a NSW Clinician Scientist Program ■ Support NSW clinicians to better access the NHMRC Fellowship program	MoH – OMR CINSW ACI
4.2.3	Foster a dynamic and supportive research culture in LHDs through strategic leadership and governance: ■ Establish and support health and medical research committees to oversee local research ■ Establish or maintain Research Director positions ■ Develop research strategic and implementation plans to address local and state priorities ■ Ensure appropriate governance of LHD-controlled research organisations ■ Provide LHD resources to support priority research programs ■ Publish an annual report on research undertaken	LHDs
4.2.4	Monitor LHD research processes, programs and outcomes ■ Include research measures in the LHD Performance Management Framework	MoH – OMR
4.2.5	Ensure business, Human Resources, Information Technology and financial service processes support research activities ■ Develop guidance for LHDs on research-compatible processes ■ Align business processes in LHDs to effectively support research activities	MoH LHDs
4.2.6	Maximise the state return on investment from the National Health Reform Agreement	MoH
4.2.7	Establish a process to ensure that part of the Ministry of Health's growth funding is invested in research, including the implementation of the priority evidence-based programs	MoH ACI LHDs
4.2.8	Provide training for clinical researchers and facilitate access to technical skills (e.g. biostatisticians, mentoring)	LHDs MoH – OMR

4.3 Attract Clinical Trials

Clinical trials evaluate the safety and efficacy of medications, medical devices or occasionally changes in models of health services delivery that can lead to better treatments and interventions, improve health services delivery and improve clinical and population health outcomes. Furthermore, clinical trials have a significant economic impact, as they are often funded by global pharmaceutical companies.

This section relates to investigator-initiated, cooperative-group and commercially sponsored clinical trials conducted in a variety of settings.

Issues

Australia's competitive advantage for attracting clinical trials includes the quality of our academics and clinicians, a stable, high-quality health system and (to some extent) the cultural diversity of the Australian population. However, Australia-wide, the number of clinical trial sites notified to the Therapeutic Goods Administration (TGA) between 2003/04 and 2010/11 grew by just 2.6%. NSW clinical trial performance compares favourably to other states. Over that period, increased globalisation of industry-sponsored clinical trials has occurred, with pharmaceutical, device and biotechnology companies locating more trials in Asia, Eastern Europe and Latin America.

The barriers reported by stakeholders that inhibit clinical trials in NSW include slow start-up times often due to ethics and governance approval processes, difficulty in recruiting trial participants, inability to engage clinical staff in research and increasing costs and institutional overhead charges. Several pharmaceutical companies have withdrawn support for local clinical trials.

The final report of the Clinical Trials Action Group (CTAG) was published by the Australian Government in June 2011. It recommends several ways to improve support for the conduct of clinical trials in Australia including: implementing a national single ethical review system (whereby one ethics committee would approve the trial for conduct at all study sites); establishing a standard fee-for-service for clinical trials (e.g. site initiation costs, pharmacy fees, institutional overheads); ensuring clinical trials can take advantage of the developing e-health system; improving patient recruitment (e.g. through clinical trial registries and consumer advocacy groups); and facilitating better national coordination and collaboration across clinical trial networks.

Principles

- NSW has an explicit goal to have more high quality clinical trials, and a greater focus on removing the barriers facing them

Actions: Attract Clinical Trials		Responsibility
4.3.1	Establish a clinical trials unit within the Office for Medical Research to: ■ Create a central point of contact for individuals and organisations wishing to undertake trials in NSW ■ Improve research ethics and governance processes (see page 23) ■ Investigate mechanisms to increase patient recruitment ■ Establish a NSW clinical trial coordinator network ■ Monitor clinical trial activity and outcomes and report to the NSW Government, industry and consumers ■ Address barriers for consumers in accessing clinical trials	MoH – OMR
4.3.2	Adopt the NHMRC Harmonisation of Multicentre Ethics Review (national single ethical review) system	MoH LHDs Universities MRIs
4.3.3	Adopt standard costs for clinical trial services developed through the Clinical Trials Action Group (CTAG) process	LHDs
4.3.4	Participate in Australian Health Ministers Advisory Council discussions on access to e-health records for clinical trial participants	MoH

4.4 Leverage Research in Policy and Practice

The use of evidence from health and medical research in the development and evaluation of health policy, programs and clinical practice has the potential to improve health services, health outcomes and resource allocation. When considered alongside other forms of policy-relevant data, it can enhance the rationality of the way health-care dollars are used.

This section focuses on the use of policy-relevant health and medical research evidence at the state level. This evidence requires the generation of policy-relevant research and developing the capacity of the NSW health system to be receptive to research and incorporate it into policy and practice.

Issues

Research funding in Australia largely supports investigator-driven research which may not always provide useful information for policy makers whose concern is to make the best choice about what to do in a specific situation. A review of population health research supported by the NHMRC by Nutbeam et al in 2008 found less than 7% of studies were implementing or evaluating an intervention.[3] There appears to be much more interest in describing problems than solving them.

There is a perception among some researchers that policy relevant research is less rewarding than discovery or investigator-initiated research. For example, research commissioned and funded by policy agencies is not as highly valued as peer reviewed funding.

. The policy environment is not always receptive to the use of evidence. For example, policy development is subject to a range of influences including competing interests, the pressure to act quickly, and by public values and democracy. Policy makers are not always aware of or cannot easily access research evidence. Furthermore, policy makers do not always have access to the relevant skills to find research publications and appraise scientific literature.

The translation of research evidence into policy and practice is complex and evidence for effective strategies to support this process is limited. NSW has growing expertise and demonstrated national leadership in beginning to address the challenge of research translation. For example, NSW has co-funded a number of partnership research centres to ensure close working relationships between researchers, policy makers and service delivery to assist in translation. The Ministry of Health has also invested significantly in the Sax Institute, which has a specific remit to translate health research into policy.

Principles

- The Ministry of Health policy, programs and clinical practice are informed by research evidence
- Clinicians are involved in the identification of research translation priorities and programs
- The Ministry of Health embeds research and evaluation in the implementation of major policies and programs to formalise experience in a manner that informs future policy choices
- The Ministry of Health invests to build capacity to provide policy-relevant research in priority areas.

[3] Report of the review of public health research funding in Australia. Canberra, December 2008

Actions: Leverage Research in Policy and Practice		Responsibility
4.4.1	Assign responsibility for identifying NSW priorities for translating existing research evidence into the implementation of clinical guidelines and population health programs to the Agency for Clinical Innovation and the NSW Population Health Network	ACI MoH – Population Health
4.4.2	Require NSW Ministry of Health policies and major programs to be evidence informed, including an assessment of the quality of evidence	MoH ACI
4.4.3	Commission or undertake research to inform major policy and programs where relevant evidence does not exist	MoH
4.4.4	Adequately fund research and evaluation to support the implementation of major policies and programs	MoH ACI
4.4.5	Support increased collaboration between policy makers and researchers: ■ Establish mechanisms to develop collaborative proposals to better leverage funding schemes such as NHMRC Partnership Project Grants and Partnership Centres and Australian Research Council (ARC) Linkage Grants and Centres of Excellence ■ Hold research-policy forums on priority research issues	MoH ACI Universities MRIs
4.4.6	Ensure ready access to existing research findings and research syntheses ■ Promote existing evidence portals ■ Promote existing mechanisms for commissioning research syntheses	MoH – OMR MoH – Population Health ACI

4.5 Focus Intellectual Property Expertise

Commercialisation of intellectual property typically involves eight phases, encompassing research organisations, commercialisation offices and company formation (Figure 4).

To simplify a complex process, MRIs, universities and LHDs perform the core research; develop papers and the intellectual property. Commercialisation offices play an important bridging role to facilitate institute and university research content by protecting intellectual property or linking intellectual property to companies to be taken to market as a product. These offices identify prospective ideas and their market potential, encourage proper patenting and intellectual property protection, and engage likely commercialisation partners. At the commercial end, they address the knowledge gap in the technical nature of the research product, and assist translation of the science into business language and market-ready products. Companies then develop products from the research and take these products to market.

Most universities and institutes have access to a commercialisation office – in NSW and Victoria it is tied to each university, while in Queensland a larger office (UniQuest) supports multiple institutions. In NSW, commercialisation offices are largely based in universities, for example

- The University of New South Wales operates through New South Innovations Limited
- The University of Sydney operates Sydnovate and has an investment and commercialisation committee
- The University of Technology Sydney has a Research and Innovation Office and a commercial partner, UniQuest, with UniQuest managers of innovation and commercial development embedded within university faculties
- The University of Newcastle operates through Newcastle Innovation.

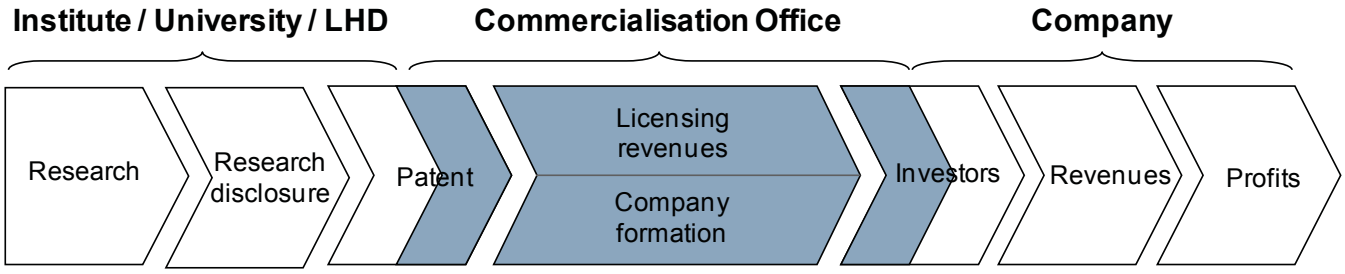
Some larger MRIs (e.g. the Garvan Institute) and teaching hospitals (e.g. Westmead and Royal North Shore) have established business development capacity.

Issues

Commercialisation is an inherently challenging task and the skills required to achieve commercial success in health and medical research are in very short supply, and often specific to quite narrow fields. This requirement would indicate that scaling-up across multiple institutions to leverage scarce skills to maximum effect would be a superior approach to one commercialisation office for each institution.

The first gap in the commercialisation process is a shortage of investment-ready ideas developed from a research base. This scarcity of commercially viable projects is the reason there is a relatively small pool of venture capital available to be deployed. Part of this issue is driven by the different cultures involved: researchers are often not educated in, or connected with, the business, marketing and legal skills required for commercialisation while investors are more concerned about whether there is a market for the innovation, clear intellectual property ownership, and an ability to manage the risks inherent in taking a product to market.

Figure 4: The Research Commercialisation Process



The NSW commercialisation process seems to perform poorly compared to other states, particularly UniQuest in Queensland, which may be partly due to a lack of leadership for public-private partnerships and the existence of different intellectual property policies across the health and medical research sector.

In 2009, the NSW Government committed to resolve the issues surrounding intellectual property ownership and management, while putting in place an effective and efficient system that simplified and clarified the intellectual property negotiation process for stakeholders. A decision framework was developed outlining the supporting criteria (such as inventive contributions). Although it was made publicly available, the framework has not been widely adopted within the research community.

Principles

- A clear intellectual property framework is agreed and implemented across research entities with appropriate guidelines and procedures to clarify ownership and sharing among research participants and contributors
- Universities, MRIs and LHDs have appropriate access to commercialisation expertise from larger scale pools of high talent
- Commercialisation bodies and support networks are simple for researchers to access and use
- Researchers can access training to appreciate and manage the commercialisation implications of their work.

Actions: Focus Intellectual Property Expertise		Responsibility
4.5.1	Develop and implement a common intellectual property framework for NSW Government-funded research	MoH
4.5.2	Undertake a capability audit of existing commercialisation offices	DTIRIS MoH – OMR
4.5.3	Promote greater scale in commercialisation offices for use by multiple institutes, universities and LHDs, through one or more different mechanisms, e.g.: ■ Encourage collaboration or mergers between sub-scale offices ■ Establish a shared, subsidised not-for-profit commercialisation unit using membership fee model ■ Offer a multi-year contract to a current provider to service smaller institutions ■ Streamline access for researchers to commercialisation resources including a single contact and information about service costs	DTIRIS MoH – OMR
4.5.4	Improve opportunities for researchers to acquire business and commerce skills: ■ Scholarships for PhD students for existing business programs ■ Promote existing short courses to researchers in business and commercialisation	MoH – OMR Universities

4.6 Support Early-Stage Venture Capital

Health care and life sciences attract a significant share of venture capital funding, with medical devices the largest recipient. Health care and life sciences made up 42% of total Australian venture capital investments and 53% of venture capital transactions in the past 5 years.

NSW has had good success in the past with commercialisation of medical devices, and this area could be developed further by building on this success (ResMed and Cochlear Ltd are excellent examples).

The skills provided by the venture capital firms are an important vehicle to translate research into economic (and better health) outcomes.

Commercialisation Australia is a merit-based, competitive program provided by the Australian Government that provides services to take products and processes to market for proof of concept and early stage commercialisation activities. Commercialisation Australia has funding of $278 million over the 5 years to 2014.

The Medical Research Commercialisation Fund (MRCF) is managed by Brandon Capital and invests in early stage development and commercialisation opportunities emanating from Australian medical research institutes and allied research hospitals. The MRCF was founded through collaboration between Australia's leading medical research institutes and Statewide and Westscheme superannuation funds, with support from the State Governments of Victoria, NSW, Western Australia and Queensland.

Issues

Venture capital funding for health care and life sciences in Australia has declined 54% from 2008/09 to 2010/11.

NSW has not invested optimally given its leadership in medical device development. Consultation feedback indicates that NSW has been at the forefront of medical device commercialisation in Australia since 1965, but needs to build on this for the future.

There is no reward system that favours commercialisation in NSW. Compared with other states, there has been a lack of consistent, long-term support from government.

Principles

- NSW commercialisation efforts focus on areas where they can sustain a competitive advantage, such as medical devices
- NSW encourages venture capital investment in the state.

Actions: Support Early-Stage Venture Capital		Responsibility
4.6.1	Establish a medical device incentive program, in partnership with venture capital companies, to assist with clinical assessments and trials of innovative medical devices to assist greater uptake of these products by the health system	MoH – OMR DTIRIS
4.6.2	Align NSW research with Commercialisation Australia processes to increase the pipeline of investable ideas for medical devices	MoH – OMR DTIRIS

SECTION 5

Build Globally Relevant Research Capacity

NSW has the potential to be a world leader in several fields of health and medical research.

NSW is recognised for its excellence and success across a diversity of health and medical research fields. Our universities are on the world stage across 20 health and medical research fields of research, according to the 2010 Excellence in Research Australia (ERA) initiative.

Nurturing and supporting these current areas of expertise makes sense in building globally competitive research.

This section focuses on a range of strategies that will build the international relevance of NSW health and medical research:

- Identifying and investing in hubs that more effectively generate and translate innovation in health and medical research
- Attracting, retaining and supporting leading Australian and internationally recognised researchers
- Improving research infrastructure support so that Commonwealth and state programs are aligned, and reward excellence, scale and collaboration
- Building shared research assets and services
- Improving NSW leverage of all available investment sources
- Improving the efficiency and effectiveness of NSW research administration.

5.1 Enhance Health and Medical Research Hubs

Research hubs are geographically close or contiguous research enterprises in a functional relationship, with or without satellite research groups that work as parts of a virtual hub. They enhance the efficient sharing of expensive equipment, accommodation and support services. Research workers who are members of a hub have the opportunity to interact with one another and to stimulate creative thinking.

Three features appear necessary for a successful hub:

1. There are established, strong research groups that have high national and international standing, located close to one another with sufficient goodwill towards one another to perceive the value of collaboration, especially sharing of expensive infrastructure
2. Research institutes, teaching hospitals and a university presence are represented in the hub
3. The potential for linking with academic teaching and commercial development is present.

In 2008, the former Office for Science and Medical Research indentified eight primary research hubs at Central Sydney, Darlinghurst, Hunter, Illawarra, Northern Sydney, Randwick, Liverpool and Westmead. Several of these research hubs are acknowledged as world class in specific fields of research.

Issues

Funding constraints ultimately mean that NSW can only support a limited number of hubs; supporting too many hubs could reduce the impact and quality of output.

Not all hubs have the necessary features for success. Leadership is critically important. Formal agreement among the hub partners is a necessary prerequisite for growth and development.

Some existing hubs lack a clear strategic plan that identifies and addresses critical gaps such as composition, governance or focus.

The Review was consistently informed that hubs help build critical mass, foster excellence and provide an effective mechanism to support collaborative research. Further, there was strong support for centres of excellence consistent with the NHMRC proposed Academic Health Centres.

Principles

- NSW promotes hubs: that are internationally renowned; that are Australian leaders in particular fields; where NSW has an advantage
- NSW promotes hubs that have strong physical co-location and include universities, MRIs, teaching hospitals and have the potential for engagement with industry
- NSW Government supports a defined number of hubs
- Hubs have 5-year strategic plans, including a clear benefit for investment by the NSW Ministry of Health.

Actions: Enhance Health and Medical Research Hubs		Responsibility
5.1.1	Encourage and support hubs through existing funding programs targeted to reward hubs that are, or can be, internationally recognised in a particular field	MoH – OMR
5.1.2	Assist existing research hubs to develop strategic plans that: ■ Specify the research fields of pre-eminence; ■ Ensure involvement of universities, MRIs, teaching hospitals and industry ■ Ensure sound governance management and accountability that delivers integrated approaches and not simply individual units operating in isolation	MoH – OMR Hubs

5.2 Strengthen the Research Workforce

There are around 23 500 research and research support staff across Australia in medical research institutes and universities of whom 6300 are estimated to work in NSW.

Issues

The lack of career pathways, poor remuneration in relation to other health and medical careers, lack of support for early to mid-career level researchers and job insecurity were identified as pressing issues by many informants to the Review.

The number, age and skill profile of research staff in NSW are not available.

The composition of the workforce is a concern. As fewer people are attracted to health and medical research, the workforce will age, with no clear career structure or career mentoring for younger researchers. Based on current attrition rates over the 10 years to 2019, 6250 members of the Australian health and medical research workforce will retire.

NSW must ensure that the quality of researcher flow is in its favour; both internationally and from other states. Young researchers working overseas should be confident of support to return to Australia. Internationally, there are many highly talented researchers who wish to work in Australia, both from established economies and emerging nations. NSW should adopt strategies to ensure a migration rate of international researchers to this state. This flow of international researchers could help strengthen international research partnerships.

Principles

- NSW attracts and retains the best researchers
- NSW supports the careers of researchers early in their career
- NSW monitors researcher numbers, demographics and skills with findings made publicly available.

Actions: Strengthen the Research Workforce		Responsibility
5.2.1	Establish an elite researcher scheme to attract leading Australian and international researchers to NSW linked to hubs and NSW research priorities	MoH – OMR Universities
5.2.2	Establish a Research Fellowship Program targeted to early career researchers linked to hubs and focused on NSW research priorities	MoH – OMR
5.2.3	Provide additional financial incentives through a Scholarship Top Up Program to attract high quality PhD students in NSW research priority areas	MoH – OMR
5.2.4	Work with Australian Bureau of Statistics (ABS) to track and report on state health and medical research workforce numbers	MoH – OMR

5.3 Improve Research Infrastructure Support

Research infrastructure comprises the assets, facilities and services that support organised research across the innovation cycle and that maintain the capacity of researchers to undertake organised research. This definition excludes salaries for the investigators and their indirect costs such as travel and consumables, normally covered by research grants. This section also excludes discussion of capital investment for major research assets and capital (building) infrastructure which is covered in section 5.4.

Research infrastructure funding for universities and MRIs is provided through Commonwealth programs that are tied to competitive research grants, including:

- IRIISS - Independent Research Institutes Infrastructure Support Scheme
- SRE - Sustainable Research Excellence
- RIBG - Research Infrastructure Block Grants Scheme
- JRE - Joint Research Engagement

The NSW Government provides research infrastructure funding through several programs:

- MRSP - Medical Research Support Program (for independent MRIs)
- CBIG - Capacity Building Infrastructure Grants (for public health and health services research organisations)
- Cooperative Clinical Trials Infrastructure Grants (for national cancer cooperative groups)

The NSW Ministry of Health also builds a component of infrastructure funding into core funding for several health and medical research organisations in priority areas, e.g. the Sax Institute and the Physical Activity, Nutrition and Obesity Research Group at The University of Sydney. Further, research commissioned by the Ministry of Health often includes a component for infrastructure.

Issues

There is a lack of coordination of the NSW Government research infrastructure programs.

There has been a decline in value for both the MRSP and the CBIG. At its inception, MRSP provided around 40c in the dollar for NHMRC peer review grants; in recent years, this amount has fallen to 24c – 30c in the dollar. This decrease in value occurs because fixed funding is shared across all grant winners; the more MRIs are collectively winning research grants, the less infrastructure funds each MRI receives per grant dollar. This impact is compounded as the MRSP allocation is retrospective. CBIG awards grants of up to $500,000 each year; funding has not changed since the program's inception in 2003.

Until 2011/12, recurrent funding for the MRSP has been $17.3 million and enhancements have been ad hoc and one-off. Funding for the last 3 years was allocated on an annual basis, which does not allow for long-term planning. Further, the eligibility criteria for the MRSP have become more complex over time with many exceptions to the funding rules.

Defects in the research infrastructure funding system undermine the long-term interests of the research community in NSW. Time that could be spent doing research is wasted on efforts to procure research infrastructure from multiple sources (estimated to be 60c – 100c in the grant dollar, depending on the type of research).

Principles

- NSW research organisations have the infrastructure required to undertake excellent research, build scale to leverage funding and attract a high quality workforce
- NSW Government has an integrated and transparent approach to delivering health and medical research infrastructure funding that complements the Commonwealth system
- Infrastructure funding is structured to reward excellence and build capability, wherever that research is undertaken
- The criteria for infrastructure funding reduce perverse incentives and the opportunity for manipulation and encourage optimal leveraging from all sources.

Actions: Improve Research Infrastructure Support		Responsibility
5.3.1	Establish a rational roadmap of NSW Government infrastructure support for health and medical research and align funding programs	MoH – OMR MoH – Population Health CINSW
5.3.2	Restructure the MRSP program to reward excellence, promote critical mass and support other strategic goals: ■ Establish a tiered system with eligibility tied to peer review grant income and research expenditure, and type of research organisation ■ Link selection criteria to collaboration, translation and the priority relevance of research undertaken ■ Establish funding targets of up to 60c in the dollar for the indirect costs of research from all government sources ■ Introduce a 4-year funding cycle	MoH – OMR
5.3.3	Enhance the CBIG program: ■ Provide a funding boost for the CBIG program ■ Index funding to Consumer Price Index on an annual basis ■ Introduce a 4-year funding cycle	MoH – Population Health
5.3.4	Work with the Commonwealth government to: ■ Ensure reporting of grant performance reflects the institution conducting the research as well as the administering institution ■ Clarify infrastructure funding for health and medical research and ensure parity across all parts of the health and medical research sector	MoH – OMR Office of Chief Scientist and Engineer

5.4 Build Research Assets

Research assets include buildings, major equipment and research platforms and facilities such as biobanks, cohort studies, data linkage capability, genomics sequencing and microarray technology. Shared research assets can be accessed by researchers across organisations and can increase resources and capabilities to maximise cost-effective research activity.

Issues

We lack a clear picture in NSW of research assets, including capital stock and recurrent infrastructure support.

Submissions to the Review convey a perception that funding for capital infrastructure and assets in NSW has been low and ad hoc, and that some opportunities have been lost because Commonwealth-funded projects have not won state support.

Many small research units operate independently. For example, the CINSW recently reviewed biobanking facilities in NSW and identified 17 tissue banks constituted as non-profit organisations or as departments within hospitals or research institutions.

Sustainability of research assets should be informed by a clear policy because a lack of long-term funding creates instability for researchers and research organisations. For example, funding to expand the Centre for Health Record Linkage to include additional data sets has not been secured. The skilled technicians who operate research assets are hard to find and, when they are, they need career security and support. Furthermore, charges for access to shared assets do not always cover the full cost of the service provided and compensatory fee-for-service support always raises questions of equity.

Principles

- NSW has comprehensive, quality research assets to support high quality, efficient research
- NSW Government-funded research assets are shared
- Shared research assets and access rules are highly visible to researchers
- Research assets are at an appropriate scale, efficiently run, have clear governance and long-term plans for sustainability.

Actions: Build Research Assets		Responsibility
5.4.1	Develop a register of major research assets in NSW	MoH – OMR MoH – Health System Support
5.4.2	Identify research asset gaps relating to NSW research priorities and develop a plan to address them	MoH – OMR MoH – Health System Support
5.4.3	Encourage scale and funding sustainability for existing research assets: ■ Identify future resource requirements for a NSW biobank network or state-wide facility ■ Provide the long-term, sustainable resourcing required to expand data linkage to include a greater range of data sets including from other government departments, registries and research data sets ■ Support the ongoing maintenance and follow-up of NSW cohort studies and disease registers of state and national significance	CINSW MoH
5.4.4	Require organisations which hold NSW Government-funded major assets to develop plans and protocols covering governance arrangements, access, cost recovery and long-term funding	MoH – OMR MoH – Health System Support

5.4.5	Establish a 10-year capital plan for health and medical research which aligns with the 10-year NSW health and medical research strategy	MoH – Health System Support MoH – OMR
5.4.6	Establish a Health and Medical Research Leveraging Fund for hubs, research organisations and consortia for major equipment, facilities and major Commonwealth infrastructure funding schemes	MoH – OMR Office of Chief Scientist and Engineer

5.5 Leverage All Investment Sources

NSW health and medical research should maximise the funding it obtains from non NSW Government sources, such as philanthropy, Commonwealth funding, overseas grants and industry investment.

Issues

The flow of health and medical research funding (source and destination) is not accurately known at either a national or state level. To ensure that we are leveraging NSW health and medical research optimally, it would help to know the investment amount and all investment sources.

Several philanthropic organisations and individuals generously contribute to the Australian health and medical research sector. Other states attract a greater share than NSW; since 2001, Atlantic Philanthropies grants awarded to Australia have totalled $230 million, of which $135 million has been awarded to Queensland-based MRIs and universities.

Though investment from overseas sources is small compared to Commonwealth and state funding (the US National Institutes of Health (NIH) awarded $19 million to Australian states from 2008 to 2011), NSW has also underperformed in awards from this source of funding. Victoria has been awarded $9.7 million of NIH grants compared with NSW's $2.2 million since 2008.

Principles

- NSW understands the flow of health and medical research funding and is aware of new investment opportunities and, where appropriate, ensures cooperation in securing this investment
- NSW is the most attractive investment proposition for philanthropic funding
- NSW is a natural destination in business health and medical research investment, particularly in priority areas.

Actions: Leverage All Investment Sources		Responsibility
5.5.1	Work with ABS to track source and destination of health and medical research funding: ■ Commonwealth government ■ State and local government ■ Business and overseas ■ Private non profit	MoH – OMR
5.5.2	Co-invest in large philanthropic donations that have state-wide significance and are linked to a research priority	MoH – OMR

5.5.3	Provide assistance to hubs, research organisations and consortia for large competitive grant applications	MoH – OMR
5.5.4	Develop, refine and implement programs to attract corporate investment in health and medical research	DTIRIS MoH – OMR

5.6 Improve NSW Health Research Administration

This section addresses research ethics and governance processes within the NSW Health system. All human research must meet ethical and scientific standards codified by The National Statement on Ethical Conduct on Human Research developed by the NHMRC and endorsed by the ARC and the Australian Vice-Chancellors' Committee. State-based legislation applies to the ethics of animal experimentation.

Each research proposal involving human participants in NSW is assessed by a Human Research Ethics Committee (HREC). Governance authorisation is then provided after an assessment by each site where the research is to be conducted (site-specific assessment).

Issues

Review stakeholders reported that research ethics and site authorisation processes in NSW are onerous and slow and in the case of site authorisation, inconsistent between LHDs.

Researchers often raise delays in ethics and governance approval as a major frustration. Site authorisation as part of the governance review of proposed research is generally a more significant contributor to delays as the governance requirements often concern matters of detail over contracts, research record-keeping, intellectual property and liability and these matters, frequently legal in nature, are slow.

Research workers find the requirements of completing the ethics and governance applications cumbersome; application forms are often poorly understood which also leads to delays.

Research offices that handle ethics and governance vary in the number and experience of their staff, their grading, and the scope of duties. Such offices often speak of work overload and the stress of dealing with frustrated research workers.

The Ministry of Health has committed to public reporting of ethical approval and site authorisation timeframes. However, inconsistent data entry and technical impediments to generating reports from the IT system used to track these applications cause system problems. Data for other states in Australia are not publicly available.

Principles

- Ethics and governance are of high quality and meet established benchmarks
- Data on the timeliness of ethics approval and site authorisation are publicly available.

Actions: Improve NSW Health Research Administration		Responsibility
5.6.1	Review the system of site authorisation: ■ Review state level policy and guidelines for site-specific assessment ■ Audit LHD practices and resources ■ Assess business processes to identify opportunities for simplification ■ Make recommendations for change to NSW policy and practice	MoH – OMR
5.6.2	Appropriately resource LHD research offices to undertake research ethics and governance functions	LHDs
5.6.3	Enhance research ethics and governance data collection management and analysis capabilities	MoH – OMR
5.6.4	Include research ethics and governance metrics as a monitoring measure in the LHD Performance Management Framework	MoH – OMR
5.6.5	Publicly report average time to ethics approval and site authorisation	MoH – OMR

SECTION 6

Implementation

Experience from the 1998 Strategic Review of Health and Medical Research in Australia (the Wills Review) suggests that an implementation committee is necessary to drive change, especially where multiple parties must cooperate to achieve success. Several helpful observations were made by the 2004 review of progress of the Wills Review (also known as the Grant Review after its chairman):

- *The rapid appointment of an implementation Committee is critical to sustain momentum and meet expectations generated by the Review*
- *The composition of the Implementation Committee and Secretariat is critical for success*
- *The Implementation Committee should, as far as possible, use the same language, structure and numbering to describe and manage implementation to avoid recommendations 'falling between the cracks'*
- *Where restructuring is necessary, the Implementation Committee should provide an audit trail to maintain clear accountability*
- *Once the Implementation Committee has completed its brief, responsibility for completing specific actions can be diluted by the machinery of government, unless ... [there is] a clear mandate and accountability for delivery.*

In this case, the NSW Government has created a new body, which we recommend is renamed the Office for Health and Medical Research, to oversee its investment in health and medical research. Once the NSW Government has adopted the recommendations of this Review, the implementation pathway should include three sets of activities:

1. **Establish Implementation Process.** *Provide additional resources for 12-18 months to kick-start the implementation process.*
   This process should comprise setting up an Implementation Committee, supported by a secretariat. The Implementation Committee should consist of 10-12 people with a mix of skills in research and research management, health services and commercial interest and the executive authority required to implement the accepted Review actions.
2. **Improve NSW Government Health and Medical Research Governance.** *Establish Office for Health and Medical Research leadership, Advisory Board, resources and processes to achieve the aims of the NSW health and medical research strategy, including communication and advocacy.*
   In parallel, a leader should be recruited to report to the Director General, with an appropriate organisation structure and resources. The core roles of the Office for Health and Medical Research should be to ensure that the investment strategy is aligned with pre-determined outcomes, administer the grant processes and communicate the NSW health and medical research strategy within and outside NSW. An Advisory Board should be established to advise the Office for Health and Medical Research leadership team, and could be achieved by transitioning the Implementation Committee into this role.
3. **Measure Progress.** *Agree on a comprehensive set of key result areas and key performance indicators to measure progress against strategic objectives.*
   The Office for Health and Medical Research should produce an annual report card of key performance indicators identified in the Review, or subsequently, that will collectively monitor the state's performance against the strategic objectives in the strategy.

APPENDIX 1

The NSW Health and Medical Research Strategic Review

Review Process

The NSW Health and Medical Research Strategic Review is being conducted from July 2011 with a final report expected to be released in February 2012.

A Fact Base was compiled to provide data on the state's performance against research metrics, including research funding, research activity and outputs (publication and citations), workforce, research organisations and commercial success. Where data are available, NSW performance has been compared to other Australian states.

An Issues Paper was released in September. It presented a Preliminary Strategy Framework for a 10-year health and medical research plan for the state and identified a series of options to address the issues facing health and medical research in NSW.

The Fact Base and Issues Paper are available at http://www.health.nsw.gov.au/omr/review/.

The Review is undertaking widespread consultation with health and medical research experts and members of the public. The consultation spans three phases:

1. The first phase of consultation (21 July – 15 August 2011) included an online survey open to all stakeholders and a series of Roundtable discussions and individual interviews with a broad range of stakeholders.
   More than 350 people participated in the first phase of consultation. The themes emerging from the online survey, group and individual interviews and the key findings from the Fact Base informed the development of an Issues Paper.
2. The second phase of consultation (5 September – 26 September 2011) elicited feedback on the Issues Paper. Key individuals and organisations in Canada, Sweden and Singapore were consulted to ensure international best practice perspectives were considered.
   Eighty-seven people provided feedback on the Issues Paper and people from 16 international research organisations were interviewed.
   The findings from the first two phases of the Review have informed this Discussion Paper.
3. The third phase of consultation (31 October – 16 November 2011) will elicit feedback on the Discussion Paper.
   This feedback will be used to finalise an Interim Report to the NSW Government, which will be submitted to Government in late November 2011.

An implementation plan will be developed after the recommendations from the Interim Report of the NSW Health and Medical Research Strategic Review have been considered by government.

Key Themes Emerging from the Review

The first phase of consultation focused on current performance, strengths and areas for improvement:

- NSW has many strengths and competitive advantages including: a large and diverse population; a high-quality health system; excellent researchers and clinicians; outstanding medical research institutes; and universities with strong track records in a broad range of health and medical research.
- The NSW Government provides a range of support to research organisations. There are some good collaborative models between research institutes, universities and health services and there are several examples of strong research networks and collaborations.
- A large number of pharmaceutical and device companies are headquartered in NSW and there is a high concentration of not-for-profit organisations supporting health and medical research in this state.
- Key research strengths include cancer, cardiovascular disease, neuroscience and mental health, HIV and other infectious diseases, gene discovery, medical devices, health services research and population health research.

- Key opportunities for NSW include genetic research, bioinformatics and research collaboration in the Asia-Pacific region.

The research performance of NSW was assessed using metrics for competitive grant funding, publications and commercial success:

- With the exception of health services research, NSW does not attract its expected share of funding from the NHMRC
- NSW produces a high number of highly cited publications
- NSW biotechnology companies' market capitalisation is second to Victoria; however NSW is particularly strong in medical devices.

The second phase of consultation elicited feedback on the Issues Paper and in particular the proposed options for action.

- Most respondents considered the Preliminary Strategy Framework presented in the Issues Paper to be comprehensive (91%) and useful (98%). Respondents considered the options for action addressed the key issues for health and medical research in this state (84%) and the potential outcomes were considered to be appropriate (93%).
- Many respondents noted that the list of actions was ambitious and needed to be narrowed into a manageable plan that could be implemented. Respondents were asked to nominate the top five actions to improve health and medical research in NSW. The priority actions (and the percentage of respondents who cited this action as one of their top five) were:
  - Strengthen the research workforce (51%);
  - Improve research infrastructure to reward success (50%);
  - Foster links and partnerships for multidisciplinary and cross-sector collaboration (37%);
  - Strengthen and focus health and medical research hubs and networks (31%);
  - Support knowledge-led innovation in clinical practice, health services delivery and population health programs (29%);
  - Improve the efficiency of research ethics and governance processes (24%); and
  - Provide clear political and organisational leadership to ensure the successful implementation of the NSW 10-year health and medical research strategy (22%).
- Strong feedback was received to broaden the scope and to include more emphasis and actions related to:
  - The spectrum of health care researchers (Issues Paper is very medically focused)
  - Biomedical, health services, population health and policy research (Issues Paper is very clinically focused)
  - Research conducted in hospitals and community settings (Issues Paper is MRI and university focused)
  - Discovery research (Issues Paper is very priority focused)
  - Rural and international research (Issues Paper is very metropolitan focused)
- Respondents also suggested the need for a stronger focus on community and consumer involvement in the decision-making and conduct of research; a whole of government approach; and stronger involvement of non health agencies that have relevance for health. Furthermore, consideration of implications of the National Health and Hospital Reforms and how the Review relates to these reforms was recommended.

Sixteen international research organisations were visited in Canada, Sweden and Singapore. Key ideas generated by the site visits included:

- **Attract, retain and support careers in health and medical research across the sector:** A career program could be developed to attract the world's leading researchers to NSW, which may be able to capitalise on the global financial crisis by offering desirable relocation packages. This approach was used by the Alberta Government in Canada, which has established a program over 3-5-year period to attract 35 of the best researchers in the world.
  A 'PhD plus' program to provide an additional year of scholarship for management training could help to develop a generation of researchers with an understanding of management and the process of innovation.
- **Maximise economic benefit to NSW:** A not-for-profit commercialisation unit to service multiple entities, may benefit research organisations, particularly those that do not have commercialisation capacity.
- **Build capacity and critical mass:** Two international examples highlighted how funding can be structured to build capacity and critical mass; Singapore has redirected some infrastructure funding to entities into shared platforms. In Canada, program and project grants are given a higher weighting if they are collaborative and interdisciplinary.

APPENDIX 2

Overview of Actions and Responsibilities

Strategy: Provide strategic leadership in health and medical research

Actions: Establish Research Priorities		Responsibility
3.1.1	Establish a process to identify NSW health and medical research priorities, including the formation of a Research Priority Advisory Group ■ Establish robust, transparent criteria for priority setting ■ Convene forums with policy makers, clinicians, researchers and other stakeholders to inform research directions ■ Agree on a priority framework (disease burden, populations, research settings, life-stage, research types, technology, assets)	MoH – OMR
3.1.2	Identify, publish and regularly review NSW health and medical research priorities	MoH – OMR
3.1.3	Undertake a further analysis of NSW current areas of research excellence and competitive advantage to drive strategic investment decisions	MoH – OMR Universities MRIs LHDs

Actions: Adopt a Strategic Investment Approach		Responsibility
3.2.1	Implement the proposed NSW Health and Medical Research Strategy Framework (see page 2)	MoH
3.2.2	Clarify and rationalise current state-level health and medical research funding programs	MoH DTIRIS CINSW
3.2.3	Ensure NSW Government funding is allocated in line with the NSW Strategy Framework and NSW health and medical research priorities	MoH – OMR DTIRIS CINSW LHDs
3.2.4	Encourage the development of research collaborations and programs in important areas such as Aboriginal health, population health and health services research with single-purpose capacity building grants	MoH – OMR

Strategy: Foster translation and innovation from research

Actions: Improve Collaboration		Responsibility
4.1.1	Provide assistance to NSW research hubs, research organisations and consortia for large collaborative grant applications with a focus on translating science into medicine	MoH – OMR
4.1.2	Incorporate collaboration and translation performance measures into all research funding agreements with NSW Government	MoH – OMR
4.1.3	Investigate an Industry-Partnered Collaborative Research Grant Scheme	MoH – OMR
4.1.4	Support research networks that address NSW research priorities and link with appropriate clinical networks	MoH – OMR

Actions: Encourage Health Services Innovation		Responsibility
4.2.1	Lead a priority-driven research grant program to support clinicians to generate new evidence with criteria that ensure collaboration between clinicians, policy makers, health service managers and academics	MoH – OMR ACI CINSW
4.2.2	Attract and retain a critical mass of high-quality clinician researchers in LHDs: ■ Establish a NSW Clinician Scientist Program ■ Support NSW clinicians to better access the NHMRC Fellowship program	MoH – OMR CINSW ACI
4.2.3	Foster a dynamic and supportive research culture in LHDs through strategic leadership and governance: ■ Establish and support health and medical research committees to oversee local research ■ Establish or maintain Research Director positions ■ Develop research strategic and implementation plans to address local and state priorities ■ Ensure appropriate governance of LHD controlled research organisations ■ Provide LHD resources to support priority research programs ■ Publish an annual report on research undertaken	LHDs
4.2.4	Monitor LHD research processes, programs and outcomes ■ Include research measures in the LHD Performance Management Framework	MoH – OMR
4.2.5	Ensure business, Human Resources, Information Technology and financial service processes support research activities ■ Develop guidance for LHDs on research-compatible processes ■ Align business processes in LHDs to effectively support research activities	MoH LHDs
4.2.6	Maximise the state return on investment from the National Health Reform Agreement	MoH

4.2.7	Establish a process to ensure that part of the Ministry of Health's growth funding is invested in research, including the implementation of the priority evidence-based programs	MoH ACI LHDs
4.2.8	Provide training for clinical researchers and facilitate access to technical skills (e.g. bio-statisticians, mentoring)	LHDs MoH – OMR

Actions: Attract Clinical Trials		Responsibility
4.3.1	Establish a clinical trials unit within the Office for Medical Research to: ■ Create a central point of contact for individuals and organisations wishing to undertake trials in NSW ■ Improve research ethics and governance processes (see page 23) ■ Investigate mechanisms to increase patient recruitment ■ Establish a NSW clinical trial coordinator network ■ Monitor clinical trial activity and outcomes and report to the NSW Government, industry and consumers ■ Address barriers for consumers in accessing clinical trials	MoH – OMR
4.3.2	Adopt the NHMRC Harmonisation of Multicentre Ethics Review (national single ethical review) system	MoH LHDs Universities MRIs
4.3.3	Adopt standard costs for clinical trial services developed through the Clinical Trials Action Group (CTAG) process	LHDs
4.3.4	Participate in Australian Health Ministers Advisory Council discussions on access to e-health records for clinical trial participants	MoH

Actions: Leverage Research in Policy and Practice		Responsibility
4.4.1	Assign responsibility for identifying NSW priorities for translating existing research evidence into the implementation of clinical guidelines and population health programs to the Agency for Clinical Innovation and the NSW Population Health Network	ACI MoH – Population Health
4.4.2	Require NSW Ministry of Health policies and major programs to be evidence informed, including an assessment of the quality of evidence	MoH ACI
4.4.3	Commission or undertake research to inform major policy and programs where relevant evidence does not exist	MoH
4.4.4	Adequately fund research and evaluation to support the implementation of major policies and programs	MoH ACI

4.4.5	Support increased collaboration between policy makers and researchers: ■ Establish mechanisms to develop collaborative proposals to better leverage funding schemes such as NHMRC Partnership Project Grants and Partnership Centres and Australian Research Council (ARC) Linkage Grants and Centres of Excellence ■ Hold research-policy forums on priority research issues	MoH ACI Universities MRIs
4.4.6	Ensure ready access to existing research findings and research syntheses ■ Promote existing evidence portals ■ Promote existing mechanisms for commissioning research syntheses	MoH – OMR MoH – Population Health ACI

Actions: Focus Intellectual Property Expertise		Responsibility
4.5.1	Develop and implement a common intellectual property framework for NSW Government-funded research	MoH
4.5.2	Undertake a capability audit of existing commercialisation offices	DTIRIS MoH – OMR
4.5.3	Promote greater scale in commercialisation offices for use by multiple institutes, universities and LHDs, through one or more different mechanisms, e.g.: ■ Encourage collaboration or mergers between sub-scale offices ■ Establish a shared, subsidised not-for-profit commercialisation unit using membership fee model ■ Offer a multi-year contract to a current provider to service smaller institutions ■ Streamline access for researchers to commercialisation resources including a single contact and information about service costs	DTIRIS MoH – OMR
4.5.4	Improve opportunities for researchers to acquire business and commerce skills: ■ Scholarships for PhD students for existing business programs ■ Promote existing short courses to researchers in business and commercialisation	MoH – OMR Universities

Actions: Support Early-Stage Venture Capital		Responsibility
4.6.1	Establish a medical device incentive program, in partnership with venture capital companies, to assist with clinical assessments and trials of innovative medical devices to assist greater uptake of these products by the health system	MoH – OMR DTIRIS
4.6.2	Align NSW research with Commercialisation Australia processes to increase the pipeline of investable ideas for medical devices	MoH – OMR DTIRIS

Strategy: Build globally relevant research capability

Actions: Enhance Health and Medical Research Hubs		Responsibility
5.1.1	Encourage and support hubs through existing funding programs targeted to reward hubs that are, or can be, internationally recognised in a particular field	MoH – OMR
5.1.2	Assist existing research hubs to develop strategic plans that: ■ Specify the research fields of pre-eminence; ■ Ensure involvement of universities, MRIs, teaching hospitals and industry ■ Ensure sound governance management and accountability that delivers integrated approaches and not simply individual units operating in isolation	MoH – OMR Hubs

Actions: Strengthen the Research Workforce		Responsibility
5.2.1	Establish an elite researcher scheme to attract leading Australian and international researchers to NSW linked to hubs and NSW research priorities	MoH – OMR Universities
5.2.2	Establish a Research Fellowship Program targeted to early career researchers linked to hubs and focused on NSW research priorities	MoH – OMR
5.2.3	Provide additional financial incentives through a Scholarship Top Up Program to attract high quality PhD students in NSW research priority areas	MoH – OMR
5.2.4	Work with Australian Bureau of Statistics (ABS) to track and report on state health and medical research workforce numbers	MoH – OMR

Actions: Improve Research Infrastructure Support		Responsibility
5.3.1	Establish a rational roadmap of NSW Government infrastructure support for health and medical research and align funding programs	MoH – OMR MoH – Population Health CINSW
5.3.2	Restructure the MRSP program to reward excellence, promote critical mass and support other strategic goals: ■ Establish a tiered system with eligibility tied to peer review grant income and research expenditure, and type of research organisation ■ Link selection criteria to collaboration, translation and the priority relevance of research undertaken ■ Establish funding targets of up to 60c in the dollar for the indirect costs of research from all government sources ■ Introduce a 4-year funding cycle	MoH – OMR

5.3.3	Enhance the CBIG program: ■ Provide a funding boost for the CBIG program ■ Index funding to Consumer Price Index on an annual basis ■ Introduce a 4-year funding cycle	MoH – Population Health
5.3.4	Work with the Commonwealth government to: ■ Ensure reporting of grant performance reflects the institution conducting the research as well as the administering institution ■ Clarify infrastructure funding for health and medical research and ensure parity across all parts of the health and medical research sector	MoH – OMR Office of Chief Scientist and Engineer

Actions: Build Research Assets		Responsibility
5.4.1	Develop a register of major research assets in NSW	MoH – OMR MoH – Health System Support
5.4.2	Identify research asset gaps relating to NSW research priorities and develop a plan to address them	MoH – OMR MoH – Health System Support
5.4.3	Encourage scale and funding sustainability for existing research assets: ■ Identify future resource requirements for a NSW biobank network or state-wide facility ■ Provide the long-term, sustainable resourcing required to expand data linkage to include a greater range of data sets including from other government departments, registries and research data sets ■ Support the ongoing maintenance and follow-up of NSW cohort studies and disease registers of state and national significance	CINSW MoH
5.4.4	Require organisations which hold NSW Government-funded major assets to develop plans and protocols covering governance arrangements, access, cost recovery and long-term funding	MoH – OMR MoH – Health System Support
5.4.5	Establish a 10-year capital plan for health and medical research which aligns with the 10-year NSW health and medical research strategy	MoH – Health System Support MoH – OMR
5.4.6	Establish a Health and Medical Research Leveraging Fund for hubs, research organisations and consortia for major equipment, facilities and major Commonwealth infrastructure funding schemes	MoH – OMR Office of Chief Scientist and Engineer

Actions: Leverage All Investment Sources		Responsibility
5.5.1	Work with ABS to track source and destination of health and medical research funding: ■ Commonwealth government ■ State and local government ■ Business and overseas ■ Private non profit	MoH – OMR
5.5.2	Co-invest in large philanthropic donations that have state-wide significance and are linked to a research priority	MoH
5.5.3	Provide assistance to hubs, research organisations and consortia for large competitive grant applications	MoH – OMR
5.5.4	Develop, refine and implement programs to attract corporate investment in health and medical research	DTIRIS MoH – OMR

Actions: Improve NSW Health Research Administration		Responsibility
5.6.1	Review the system of site authorisation: ■ Review state level policy and guidelines for site-specific assessment ■ Audit LHD practices and resources ■ Assess business processes to identify opportunities for simplification ■ Make recommendations for change to NSW policy and practice	MoH – OMR
5.6.2	Appropriately resource LHD research offices to undertake research ethics and governance functions	LHDs
5.6.3	Enhance research ethics and governance data collection management and analysis capabilities	MoH – OMR
5.6.4	Include research ethics and governance metrics as a monitoring measure in the LHD Performance Management Framework	MoH – OMR
5.6.5	Publicly report average time to ethics approval and site authorisation	MoH – OMR

APPENDIX 3

List of Abbreviations and Acronyms

ABS	Australian Bureau of Statistics
ACI	Agency for Clinical Innovation
ARC	Australian Research Council
CBIG	Capacity Building Infrastructure Grants Program
CINSW	Cancer Institute New South Wales
CTAG	Clinical Trials Action Group
DTIRIS	Department of Trade and Investment, Regional Infrastructure and Services
ERA	Excellence in Research Australia
HMR	Health and Medical Research
HR	Human Resources
HREC	Human Research Ethics Committee
IRIISS	Independent Research Institutes Infrastructure Support Scheme
IT	Information technology
LHD	Local Health District
MoH	Ministry of Health
MRCF	Medical Research Commercialisation Fund
MRI	Medical Research Institute
MRSP	Medical Research Support Program
NHMRC	National Health and Medical Research Council
NIH	National Institutes of Health (US Department of Health and Human Services)
NSW	New South Wales
OMR	Office for Medical Research
RIBG	Research Infrastructure Block Grants Scheme
SRE	Sustainable Research Excellence
SSA	Site specific assessment
TGA	Therapeutic Goods Administration
TTR	Teaching, training and research

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