# NSW Health and Medical Research Strategic Review

Issues Paper 1 September 2011

#### NSW DEPARTMENT OF HEALTH

73 Miller Street NORTH SYDNEY NSW 2060 Tel. (02) 9391 9000 Fax. (02) 9391 9101 TTY. (02) 9391 9900 www.health.nsw.gov.au

#### Produced by:

Population Health Division NSW Department of Health Tel. (02) 9391 9252 Email. omr@doh.health.nsw.gov.au

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## Foreword



It has been over a decade since the Australian Government's 'Wills Review': *The Virtuous Cycle: Working Together for Health and Medical Research* was completed. This review outlined a long term vision for research excellence in Australia driven by the complementary interaction of Government, research and industry. The case for developing a strong and vibrant health and medical research sector remains just as strong, particularly for New South Wales (NSW).

NSW should be a global medical research leader, but is currently not fulfilling its potential. We have a world class health system, excellent researchers, preeminent universities and research organisations and pockets of excellence in research fields such as neuroscience, cardiovascular disease, cancer, clinical research and gene discovery. We have particular strength in translational research, which can drive innovation in the health system, new companies and jobs. NSW is also the Australian medical device industry leader.

However, NSW wins less than our natural share of competitive domestic grants given the size of our population and economy and has taken a relatively fragmented approach to supporting health and medical research. This Strategic Review is focusing on the current performance of health and medical research in NSW and will recommend a strategy covering the next 10 years. Our vision is that 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 the State. An Interim Report will be submitted to the NSW Government at the end of November 2011.

Having undertaken this Strategic Review, NSW will be well positioned to play a leading role in the forthcoming Review of Health and Medical Research in Australia. The National Review Panel is expected to be announced shortly and is anticipated to report to the Australian Government at the end of August 2012.

This is an exciting period for health and medical research in NSW, and a significant milestone has been reached with the release of this Issues Paper. I encourage all interested parties to provide feedback on our emerging ideas for health and medical research in this State.

Mr Peter Wills, AC

## Purpose

This Issues Paper presents a preliminary framework for a 10-year health and medical research strategy for NSW. It identifies a series of options to address the issues facing health and medical research in NSW. The purpose of presenting options at this early stage in the strategy development process is to allow stakeholders an opportunity to critique the emerging ideas, identify areas for further analysis and provide additional information to support this analysis, thus contributing to the development of robust, evidence-based recommendations for implementation.

The Issues Paper presents:

- the background to the NSW Health and Medical Research Strategic Review
- an overview of NSW's current performance in health and medical research
- emergent themes from the extensive consultations undertaken to date
- a preliminary strategy framework for health and medical research in NSW
- a series of options for action and potential outcomes for health and medical research in NSW.

#### Stakeholders are invited to:

- 1. comment on the information presented in the Issues Paper
- 2. provide feedback on the
  - a. preliminary strategy framework
  - b. options for action
  - c. potential outcomes
- 3. identify the five most important actions needed to improve health and medical research in NSW and provide a rationale or evidence to support these
- 4. suggest facts, case studies or additional references to support the Review.

Feedback on the Issues Paper can be provided via online submission at: <u>http://www.health.nsw.gov.au/omr/review/.</u> Submissions close at 5pm on Monday 26 September 2011.

## Introduction

Australia has an impressive record of achievement in health and medical research. Australian researchers have made significant contributions to health and medical discoveries internationally. Six Australians have received the Nobel Prize in physiology and medicine, and health and medical research undertaken in Australia is highly cited.

Research can help deliver better treatments and interventions, improve health service 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 in NSW and facilitates education and training. Further, investing in research benefits the state's economy.

In recognition of the key role that research can play in improving health, social and economic outcomes for NSW, the *Better Patient Care: Boost for Medical Research* 2011 policy commits the NSW Government to develop a 10-year Health and Medical Research Strategy for NSW that enables the State to develop new treatments, techniques and devices that will drive health reform into the future.

The NSW Health and Medical Research Strategic Review, led by Mr Peter Wills AC, has been established to work with the research community, the health sector, industry representatives and other interested parties to develop the plan. Mr Wills is being supported by an Advisory Committee which has been appointed by the Hon Jillian Skinner, Minister for Health and Minister for Medical Research.

The Strategic Review will define health and medical research broadly, including biomedical, clinical, health services, health policy and population health research. The Strategic Review Advisory Committee recognises the importance of balance between investigator initiated and priority driven research as well as the potential impact of research in other fields (e.g. the social sciences, new materials, information and communication technology and nanotechnology) on health.

### 2.1 The Strategic Review Process

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

A 'Fact Base' has been compiled to provide data on NSW's performance against a number of 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. A full set of these data are available at http://www.health.nsw.gov.au/omr/review/.

The Strategic 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
- a series of Roundtable discussions and individual interviews with a broad range of stakeholders.

The themes emerging from the online survey, group and individual interviews and the key findings from the Fact Base have informed the development of this Issues Paper.

- The second phase of consultation (5 September 26 September 2011) will elicit feedback on the Issues Paper. Key individuals and organisations in Canada, Sweden and Singapore will also be consulted to ensure international best practice perspectives are considered.
- 3. The third phase of consultation (24 October 14 November 2011) will elicit feedback on the Draft Interim Report.

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.

## NSW Current Performance

This section summarises key performance indicators on research funding, research activity and outputs, research organisations and commercial success. These data have been accessed from a range of sources including the National Health and Medical Research Council (NHMRC), Australian Institute of Health and Welfare (AIHW), Therapeutic Goods Administration (TGA) and private organisations. Where comparable data are available, NSW's performance has been compared with data from Victoria, Queensland, South Australia and Western Australia. More data are available at http://www.health.nsw.gov.au/omr/ review/.

There are several gaps in the data presented. For example, the Australian Bureau of Statistics no longer does a breakdown of research expenditure by state due to data quality issues. Data on research undertaken in the health system, workforce and private sector investment have been difficult to obtain.

### 3.1 Research Funding

Research funding for health and medical research is provided by the Commonwealth and State Governments, the private sector and philanthropic sources. This system is complex with a myriad of programs that support different types of research, researchers and research infrastructure. The largest source of funding is provided by the Australian Government through competitive funding via the NHMRC.

**NSW Government funding** for health and medical research is significant (between 2005 and 2010 the average investment was estimated to be approximately A\$188m per annum) but fragmented, with funding provided through a number of programs administered by the NSW Department of Health, the Department of Trade, Investment, Regional Infrastructure and Services and the Cancer Institute NSW (Exhibit 1).



### Exhibit 1: State Government Funding for Health and Medical Research



Exhibit 2: Health and Medical Research Expenditure by Source of Funds (per capita A\$m), 2007 to 2008

Source: Research Australia: Shaping Up Trends and Statistics in Funding Health and Medical Research July 2011, Australian Institute of Health and Welfare: Health Expenditure Australia 2007-08



### Exhibit 3: NHMRC Funding by State (A\$m), 2002 to 2011

2. Cumulative average growth rate Source: NHMRC Grants Funding for the Current Decade - 2002 - 2011, ABS

Between 2007 and 2008, NSW received the second highest quantum of funds (after Victoria) for health and medical research from Commonwealth and State and local sources (Exhibit 2). However, on a per capita basis, NSW receives less funding than Victoria and South Australia and receives similar per capita funding to Western Australia. Note that the data presented in Exhibits 1 and 2 are not directly comparable due to differences in data definition and collection methods.

Between 2002 and 2011, NSW received the second largest amount of National Health and Medical Research Council funding in Australia (Exhibit 3). Between 2002 and 2011, the three largest states (Victoria, NSW and Queensland) have all grown funding at, or greater than, the overall growth in NHMRC funds.



## Exhibit 4: NHMRC Funding by State for University and Medical Research Institutes (per capita, A\$m), 2002 and 2011

Note: 1. Excludes Hospital, Government and Other.

2. Cumulative average growth rate Source: NHMRC Grants Funding for the Current Decade - 2002 – 2011, ABS

### Exhibit 5: NHMRC Medical Research Institutes Funding by State (A\$m), 2011



Note: 1. 'Other' comprises MRIs receiving less than \$5 m in funding Source: NHMRC Grants Funding for the Current Decade - 2002 – 2011, ABS

In 2011, the **NSW per capita share of NHMRC funding** was below the national average (\$33). NSW received \$28 per capita, while Victoria received \$55 per capita and Queensland received \$26 per capita.

NHMRC funding to NSW is at, or below, the national average spend per capita for all categories of research with the exception of health services research, where NSW receives 48% of the total allocation. In 2011, NHMRC per capita funding to universities and Medical Research Institutes (MRIs) in NSW was less than Victoria and South Australia (Exhibit 4).

Notably, NHMRC per capita direct funding to MRIs located in NSW is five times less than MRIs in Victoria (Exhibit 5). The NHMRC data may understate the extent of research funding for MRIs in NSW as some grants are administered by universities, adding further complexity to an already intricate research funding environment.

## Exhibit 6: Independent Research Institutes Infrastructure Support Scheme Funding for Australian Medical Research Institutes (A\$m), 2005 to 2010



Note: 1. Cumulative average growth rate Source: NSW Chief Scientist & Engineer "Understanding the Funding Gap"

In 2011, NSW received a similar quantum of funds from the **Australian Research Council (ARC)** for **biological sciences** as Victoria and Queensland. When examined on a per capita basis, the Australian Capital Territory received significantly more (\$175.4) than the national average (\$29.5). NSW (\$29.4) and Victoria (\$31.6) received close to the national average.

Between 2005 and 2010, NSW received the second highest quantum of funds through the **Independent Research Institutes Infrastructure Support Scheme (IRIISS)** (Exhibit 6). At \$0.90 per capita, NSW is below the national average (\$1.32 per capita) and receives less that Victoria (\$3.20 per capita) and Western Australia (\$1.60 per capita).

Between 2009 and 2011, NSW received the largest quantum of **research block funding** provided to universities. Note that these figures include funding to all research areas. On a per capita basis, NSW is at the national average for this source of infrastructure funds. NSW growth in block funding (10.4%) is higher than the national average (9.2%).

### 3.2 Research Activity and Outputs

Research activity and outputs have been measured by the number of research applications to NSW public health organisation Human Research Ethics Committees (HREC), publication and citation rates and the number of clinical trial notifications to the Therapeutic Goods Administration (TGA).

In the 2010/11 financial year 1,545 **research applications** were submitted to NSW public health organisation HRECs. The number of research applications has grown by 6.5% since 2007.

NSW and Victoria produce a significantly higher **number** of health and medical research publications (2001 – 2011) than other states (Exhibit 7). Citations can be used as a measure of research quality, as more influential research is cited by others. On this measure, Victoria leads NSW slightly, largely due to a higher number of citations for research published by MRIs.

While universities have the greatest publication output, MRIs produce publications with a higher **citation rate** (Exhibit 8). This pattern is consistent across Victoria, NSW and Queensland.

## Exhibit 7: Number of Health and Medical Research Publications and Citations by State and Place of Research, 2001 to 2011





### Exhibit 8: Citations per Health and Medical Research Related Publication, by State, 2001 to 2011

Note: Where output is the result of collaboration across organisations (place) then each place will receive individual accreditation in the data set. This may result in the total for all places being higher than the total number of publications Source: Thomson Reuters

#### Exhibit 9: Number of Articles in Key Journals, 2001 to 2011



Source: Thomson Reuters

## Exhibit 10: Number of New Trial Protocols Notified to Therapeutic Goods Administration by State, 2003/04 to 2010/11



Note: 1. Cumulative average growth rate Source: Therapeutic Goods Administration

Between 2001 and 2011, NSW and Victoria had the highest number of articles appearing in key international journals (Exhibit 9).

Although Australia has just 0.3% of the world's population, our share of publications in these journals ranges between 1.5% and 4.8%, with better performance in clinically focused journals. This reinforces two findings from previous health and medical research reviews: Australia has a comparative advantage in conducting high quality health and medical research due to our highly educated population and advanced health system; and Australia can achieve additional impact by focusing on niches which do not require the scale provided to countries with large populations (i.e. the US in 2011, China and India in 2050).

The number of clinical trials notified to the TGA (through the clinical trial notification and clinical trial exemption schemes) has grown by 2.6% per annum between 2003/04 and 2010/11. On this measure, NSW **clinical trial performance** compares favourably to Victoria and Queensland. Between 2003/04 and 2009/10, NSW and Victoria had the largest number of new trial protocols (Exhibit 10). NSW growth in clinical trials is at the national average.





Source: IBIS World

### 3.3 Research Organisations

Nationally, the bulk of health and medical research is performed by universities. NSW has 11 universities and their NHMRC grants and total funding is close to the national average, although the rate of growth in funding for NSW universities is higher than the national average.

NSW and Victoria have a higher number of MRIs than other states. However, over the past decade, MRIs in NSW have received significantly fewer NHMRC grants and less total funding than MRIs in Victoria. The growth in funding for MRIs based in NSW between 2002 and 2011 was less than the national average. Seven out of the top 10 MRI recipients of NHMRC funding in 2011 are based in Victoria, and for NSW only the Garvan Institute and Victor Chang Cardiac Research Institute are in the top 10.

A significant amount of research is undertaken in NSW public health organisations. Although NHMRC funding to hospitals has decreased by approximately 18% since 2002 (due in part to an increased number of grants being administered by affiliated universities), the number of research projects undertaken in NSW public health organisations has grown by 6.5% since 2007.

### 3.4 Commercial Success

In 2001, NSW had the largest number of listed biotechnology firms and total biotechnology firms. Many of these are very small, with an average of only seven employees per establishment, which is the lowest in Australia (Exhibit 11). Larger biotechnology firms appear to be located in Victoria and Queensland. Employment in biotechnology companies over the last 6 years appears to be stable across all states.





Source: PWC Bioforum June 2011

Australian biotechnology industry revenue has grown by approximately 4.5% per annum between the 2001/02 and 2010/11 financial years. In the third quarter of the 2010/11 financial year, 101 life science indexed companies had a total market capitalisation of A\$38.1bn. Victorian companies have greater commercial success overall; however, NSW is particularly strong in medical devices (Exhibit 12).

Victoria's strong performance is in part due to CSL (formerly the Commonwealth Serum Laboratories which was privatised in 1994). When CSL is excluded from the analysis of biotechnology and pharmaceutical companies, Victorian companies' market capitalisation drops to A\$4bn compared to A\$1.85bn in NSW.

## NSW Strengths and Competitive Advantages, Barriers and Gaps

The first phase of consultations undertaken as part of the NSW Health and Medical Research Strategic Review invited stakeholders to comment on the current performance of health and medical research in NSW and to identify areas for improvement. More than 350 people participated in this first phase of consultation. This section provides a brief overview of the main themes arising from individual and group interviews and submissions. Quotes from the online submissions in most cases illustrate common themes.

## 4.1 Strengths and Competitive Advantages

Health and medical research stakeholders considered that 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.

As a state, NSW is recognised for its excellence and success across a diversity of health and medical research fields. Our universities were rated highly across all of the medical and health-related disciplines in the 2010 Excellence in Research Australia (ERA) evaluation, with NSW universities achieving a rating of '4' (above world standard) or '5' (well above world standard) across 20 health and medical research fields of research...This distribution of achievements represents well the fields of research where NSW researchers are on the world stage. [Academic, University]

Research excellence in NSW (measured by grant success, citations and esteem factors) is considered to be 'good' to 'very good'. NSW MRIs produce high quality publications and are successful in leveraging funds through philanthropic sources.

MRIs produce the highest quality research that is cited almost twice as frequently as that from all other sectors and are singularly successful in commercialising research outcomes as well as in leveraging government funding through sponsorships and donations. [Director, MRI]

Key research strengths include cancer, cardiovascular disease, neuroscience and mental health, HIV/AIDS and other infectious diseases, gene discovery, medical devices, health services research and population health research. Whilst translation of research into policy, practice and programs is a relative strength, it was also noted that there remains much work to be done in this area, including increasing timely access to research findings. NSW has supported translational research through funding relevant organisations.

Given the dramatic increase in preventable chronic disease, population health research and health services research will become increasingly critical for improving the health of NSW citizens. NSW is well positioned to capitalise on increasing Australian Government funding in these areas. Personalised medicine is also an opportunity for NSW in the future, given the high standard of basic research in genomics and proteomics, and NSW leadership in population health cohort studies.

NSW therefore has established strengths in health research and its translation to policy and practice. This is of particular importance because NHMRC has flagged future increases in funding for health research. For example, the proportion of funds invested in health services research has risen from 1% of total research funding in 2001 to 5% of total research funding in 2010. NHMRC has already established new funding schemes like the Partnership Project Awards and Centres of Research Excellence in Public Health and Health Services Research. Large scale Partnership Research Centres have been identified as a future initiative. [CEO, Research Organisation] The location of many pharmaceutical and device companies in NSW is both a strength and an opportunity for health and medical research which is yet to be fully taken advantage of.

Metrics to better understand and monitor the performance of health and medical research in NSW are needed, particularly in relation to workforce, research expenditure by health services and research activity.

## 4.2 NSW Government Funding and Support

There is a perception that the NSW Government and health services do not place the same value on health and medical research as their counterparts in other states, and as a consequence, NSW has a less robust research culture than Victoria and Queensland.

NSW Health should create and foster a "Culture of Research" throughout the entire health system. We suggest that including research goals in the KPIs of senior staff in the health system would assist in this process; ensuring staff are enabled to include research in their jobs, providing investigators and research staff with adequate time and resources for research rather than just "fitting it in" amongst their other duties. Involvement in research should be viewed as an expectation and supported accordingly. [Research Director, MRI]

Stakeholders rated NSW Government support for health and medical research as 'fair', although NSW Government funding for health and medical research in NSW is lagging other states. Queensland in particular has benefited from the public endorsement of its health and medical research from its political leaders.

[There is] a correlation between the level of state government spending on health and medical research and the level of funding awarded to the states through NHMRC grants. Victoria had almost twice the state government investment in health and medical research per capita according to AIHW figures; and correspondingly attracted the highest proportion of NHMRC grant funding. The growth of NHMRC funding to Queensland would seem to support this argument, as the Queensland Government has provided large amounts of funding for fellowships, indirect costs and research commercialisation under the Smart State initiative. [Director, MRI]

Many noted that there was a lack of coordination of research funding and support and that various NSW Government agencies provide funding support in isolation of each other. The processes by which NSW Government directs or funds research are considered to be non-strategic, obscure and arbitrary.

...successive state governments have promoted and supported a plethora of disconnected, poorlycapitalised and poorly funded research institutes, largely driven by ego and political opportunism. This has resulted in an entirely fragmented and dysfunctional research infrastructure in this state, and has meant that NSW languishes below the other main states, despite the apparent success of its lead institutions. [Researcher, University]

It was noted that there is no clear and coordinated process for determining priority research areas in NSW, nor is there clear communication of research priorities. Some stakeholders felt that research priorities should be determined proactively, with input from clinicians, and that these priorities should be based on clinical and health services need.

Victoria is seen to lead NSW in leveraging funds from Australian Government, business and philanthropic sources.

## 4.3 Research Infrastructure

Stakeholders rated the ability to access infrastructure (major scientific equipment, basic equipment and basic building infrastructure) to be 'fair'. Although NSW Government research infrastructure funding was seen to be very valuable, there is strong dissatisfaction with the inconsistent application of this funding within the research sector. For instance, the Medical Research Support Program was considered limited in scope because it excludes research groups that are not independent. Some respondents commented that this is divisive and is an impediment to cross-sectoral collaboration.

Infrastructure support funding within Australia is complex because of the different providers and intermediaries (Commonwealth: RIBG, IGS, SRE; NSW: MRSP and Population Health support; University sector: University based grants) and There is a significant danger in the current climate that silos in government will continue to place more emphasis on the boundaries between the entities rather than recognising the gains of making it easy for us to collaborate. Universities, MRIs and hospitals have different primary functions, and different primary roles in research, and yet research is equally core to our success in each case. Funds to support the real cost of research is also essential to fostering collaboration between these three vital partners in health and medical research. [Academic, University]

Many stakeholders commented that infrastructure is still underfunded compared to the recommended levels (60c in the dollar) or the likely real costs (100c in the dollar) and needs to be increased. Better coordination of State and Australian Government infrastructure support was also raised.

.....adequate and secure indirect infrastructure cost funding remains a critical element for the survival of the MRI sector. While the recent announcement by the Minister confirming enhanced funding for the MRSP must be commended, the level of funding still leaves a significant financial gap. Further coordination on state and federal levels is required to ensure that such costs can be covered. [Associate Director, MRI]

Health service research infrastructure is ageing and although there is some new building infrastructure, this investment has been seen as politically motivated rather than strategic. Some buildings remain underutilised because capital for fixed assets has been provided without funding for operating costs. Further, although Local Health Districts provide a range of support infrastructure for research (e.g. information technology, human resources and finance services) some respondents commented that the clinical and administrative focus of these services can be at odds with the requirements for research. For example, recruitment of staff can be delayed or not approved due to staff freezes even though a research position has been funded from an external source, and unexpended grant funds may be difficult to rollover at the end of a financial year.

The sharing of equipment and appropriate governance arrangements for managing this were recommended. An acute shortage of equipment maintenance funding and funding for personnel operating sophisticated equipment was also raised.

Some stakeholders commented that NSW has a range of high quality research assets, including data linkage capability, the 45 and Up Study and the NSW-based Australia and New Zealand Clinical Trial Register, and that these require ongoing support.

### 4.4 Workforce

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 by many stakeholders as pressing issues.

The most urgent issues facing the health and medical research workforce include: low attractiveness of research as a career due to increased casualisation of the workforce, over reliance on short term grants, lack of a sustainable career path and low salary scales relative to industry and other professions..... [Director, MRI]

The poor funding opportunities make it difficult to stay in Australia, and for students like myself about to finish their PhDs and enter the workforce, the lack of jobs and pressure to go overseas in order to have any form of progressive, successful career is disheartening. [Researcher, MRI]

Many stakeholders reported that clinician researchers are a limited resource and that the time that clinical staff specialists dedicate to research has been eroded over time. Further, many considered that clinical research careers are not adequately fostered or supported. Clinical research careers are not promoted, fostered or mentored adequately from the undergraduate period right through to the vocational or specialty training periods. There needs to be a complete rethink of how clinical research careers can be promoted, developed and funded plus, most importantly, integrated with and embedded within the health care delivery sector. [Clinical Academic, Hospital]

Although many NSW Health staff have conjoint positions with universities, the proportion of these who are involved in research is small. It is estimated that 8,000 allied-health, nursing and medical staff presently hold such adjunct or conjoint appointments within NSW universities. Most are involved in teaching or professional support of teaching programs and only a small proportion (less than 1,000) are undertaking research projects.

Although the weather and lifestyle in Sydney are considered drawcards, the high Australian dollar, the cost of living relative to wages and the lack of internationally competitive funding and infrastructure make NSW a less attractive destination for overseas researchers.

An increasing demand for biostatistics, bio-mathematics and health economic expertise was noted, as was the need to increase skills in implementation and translational research and community involvement (particularly in Aboriginal health research).

### 4.5 Collaboration

Although stakeholders considered that the level of local, national and international research collaboration is good, there is still a lack of collaboration between the different research sectors.

I have enjoyed good experiences in collaboration with Universities, Research institutes and industry within NSW; between universities in NSW and Victoria, and with two universities in USA. [Researcher, Hospital]

Huge investments have been made in research buildings in NSW in the past 5 years but the risk is the old dividing lines between Universities, medical research institutes and health services will be entrenched rather than transcended. [Company Director, Private Company] In response to a relative lack of resources, it was thought that much has been achieved through collaboration in NSW. There are increasing numbers of research networks and clinical trial groups which facilitate collaboration.

Australian researchers often find it easier and more productive to develop international collaborations than local ones, partly due to the small research population in Australia. It is also likely that real or perceived competition between universities is a cultural barrier to collaboration within NSW.

The extent of collaboration is very project/field dependent, based on mutual gain and the researchers involved.

Public health and health services researchers in NSW are very generous with their time and are highly collaborative with the goal to achieve the best gains in knowledge for the health system and to improve the population's health. The collaboration is really outstanding. [Academic, University]

Although there are pockets of excellent collaboration, there are barriers to collaboration.

Research is extremely competitive, and collaboration takes time and energy. There are a number of barriers to collaboration including the competitive nature of grants, as well as the difficulty in establishing trusting relationships, difficulty in agreeing on appropriate contributions and appropriately acknowledging the contributions of each partner. [Policy Maker, NSW Department of Health]

There is a particular need to improve research-practice collaboration and research-industry collaboration. Opportunities for the future include links between health and medical research and other fields.

Opportunities are from the increased output of the physical sciences informing medical therapies - e.g. nanotechnology, new materials, microscopy and microanalysis, imaging etc. [Research Network Director, Non-government Organisation]

### 4.6 Clinical Trials

Although NSW does relatively well in clinical trials when compared to other states, Australia faces increasing competition from countries in regions such as Asia and Eastern Europe.

A range of barriers for doing clinical trials in NSW were reported by stakeholders, including slow start up times, difficulty in recruiting trial participants, inability to engage clinical staff in research, increasing costs and institutional overhead charges. Research ethics and governance processes (site authorisation) are considered to be onerous and slow and in the case of site authorisation, inconsistent and uncoordinated.

Clinical research has been hampered in NSW in recent years due to the immense bureaucracy that has crept in under the new ethics review system. The delays to getting research started, especially multicentre trials, is completely unacceptable. The whole system needs to be overhauled to allow a sensible approach to be established. [Researcher, Hospital]

The benefits of clinical trials were also thought to be undervalued by health service management and community members, even though people involved in drug and device trials generally get better care and better health outcomes than those not involved in trials. Drugs supplied in trials are also a hidden saving to the health system.

A lack of capacity for early phase trials was considered by a few stakeholders to be a barrier to pharmaceutical industry investment in NSW.

Historically, NSW has been at the forefront of clinical trial activity. However, early phase clinical trial facilities have been developed in other states and our capacity in this area has been eroded. [CEO, Research Institute]

The establishment of an international state-of-the-art Clinical Trials Centre at a major teaching hospital in Sydney which will include an FDA-compliant Phase 1 (i.e. firstin-man), the first of its kind in NSW, is a model that has potential merit. Such an activity would make a huge impact on progress towards turning around NSW's poor record in offering participation in clinical trials to appropriate patients. [Academic, University].

Although there are some clinical trial networks in NSW, there is potential to enhance these existing groups and develop new networks.

### 4.7 Commercialisation

Commercialisation success varies according to field and entity. Some perceive that Australia and NSW rate well in this regard (particularly in relation to the low level of investment in health and medical research compared to other countries that are part of the Organisation of Economic Cooperation and Development), some consider that commercialisation is improving, while others believe that NSW has failed to exploit commercialisation and failed to collaborate effectively with industry.

The NSW biotech and biomedical industry, which drives innovation, provides improvements to health services and delivers exports worth an estimated \$3 billion annually to the state's economy. NSW leads the nation in the biomedical industry, with 75 per cent of multinational pharmaceutical companies in Australia headquartered in the state. Almost half of all medical device firms are based in NSW. However, despite the presence of private industry in NSW, innovative businesses in Victoria are far more successful than NSW and other states in attracting MRCF funding and commercialising their research. [Director, MRI]

.....it is clear when compared with other states that the sector has suffered from the lack of consistent, long-term support from the government, particularly in the areas of innovation and industry development. Whereas other leading states have clearly defined 10-year plans for their local medical research/biotechnology industries, whilst there has been good efforts and intent in NSW, sustained commitment and support has not been evident. [Anonymous]

Issues include the lack of early stage pre-commercialisation funding and a reward system that does not favour commercialisation. The perspective on commercialisation is highly correlated with the role in bringing research to market, indicating that there are still significant cultural hurdles to understanding the commercial world among researchers and vice-versa.

Lack of early stage pre-commercialisation funding leaves an important gap. [Research Manager, University]

Australia has a trade deficit in medical technology. Nearly all medical technology products manufactured in Australia are exported, while the majority of medical technology products used in Australia are imported. The review should include mechanisms to improve translational research. The system as it stands has a focus on intellectual property (IP) sales and rewards universities without maximising returns that might be achieved through commercial engagement and product development. [CEO, Non-government Organisation]

Sharing of ownership and Intellectual Property (IP) is considered fair in some cases, particularly where there is sufficient support from the institution's commercial/research office. However, some researchers have had difficulty with IP negotiations and others do not expect to retain IP when working with industry. Issues include limited resources for IP identification and protection, industry and venture capital providers being perceived as 'greedy' with IP, lack of understanding of IP issues within the research community and amongst most administrators, university and research institute lawyers, and lack of an overarching strategy to support IP in the state. This is likely to result in significant resources wasted by protecting IP with no commercial value.

Some universities and local health services are perceived to have cumbersome and time consuming systems in place to deal with IP which involve multiple cross-sector parties that act as a disincentive to researchers to protect IP and pursue commercial applications. Given the skills to exploit IP are relatively scarce, greater focus on linking those with the right skills to the right opportunity is required. While securing funding for commercialisation is difficult, this does not reflect a lack of venture funding per se (otherwise the few firms specialising in early stage commercialisation would be generating extraordinary returns). Rather there is shortage in the skills required to translate research output into investment ready opportunities or business plans. Further, the NSW Government supports research organisations to apply for available funding.

## **Options for Action**

In response to the issues raised in the consultations and the Fact Base, the Strategic Review Advisory Committee proposes 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 the State.

The Strategic Review Advisory Committee has identified several themes that require particular attention:

- 1. **Infrastructure funding.** How can institutions secure sufficient infrastructure support to enable them to maximise their success in securing competitive grants?
- 2. **Multi-disciplinary and cross-sector collaboration.** How can NSW develop hubs and clusters with sufficient scale and scope to deliver globally relevant research, particularly in areas that have the potential for rapid health or commercial benefits?
- 3. Clinical, health service and population health innovation. How can NSW better leverage the substantial investment of clinician and practitioner research time into innovation that will deliver health or productivity benefits across the health system?
- 4. **Commercialisation.** How can NSW translate its research output into commercial success that creates jobs, innovation and wealth?
- Governance. What governance framework is appropriate to guide the substantial NSW Government investment and increase the capacity to deliver the 10-year strategy?

A preliminary strategy framework for health and medical research in NSW is presented in Figure 1.

The options for action in the framework are currently broad and in this first iteration have not yet been subject to a rigorous feasibility examination, nor have they been appraised for potential impact. Over the coming months, the Strategic Review Advisory Committee will continue to explore these and other ideas, with the intention of building a strong evidence base to develop fewer, but more specific recommendations for the NSW Government. Part of this analysis will include considering stakeholder critique elicited through this second phase of consultation.

Proposed recommendations will be documented in the Draft Interim Report, which will be available for stakeholder comment in late October to early November 2011.



### Figure 1: Preliminary Strategy Framework for Health and Medical Research in NSW

### 5.1 Invest Strategically

The NSW Government provides significant funding and support to health and medical research, but this investment is currently fragmented, thus reducing its impact. A more strategic approach to investment requires a greater focus on NSW Government priorities and health needs, a greater ability to leverage funds from other sources including the Australian Government and increasing investment from industry and not-for-profit organisations.

- 5.1.1 Develop a strategic approach to NSW Government investment in health and medical research
  - a. Clarify and coordinate existing research funding and support programs within the Department of Health
  - b. Clarify and align Department of Trade, Investment, Regional Infrastructure and Services science support programs relevant to the NSW Health and Medical Research Strategy

- c. Ensure NSW Government investment is aligned with the NSW Health and Medical Research Strategy
- 5.1.2 Establish health and medical research priorities for NSW Government
  - Develop a health system priority framework of goals to be addressed by research (e.g. improve mental health, prevent chronic and infectious disease, close the gap in Aboriginal health outcomes, cure diabetes) including principles and criteria for priority setting
  - b. Convene two-yearly one-day forums with policy makers, clinicians and other health practitioners, researchers/facilities, public and private, to discuss research directions in each priority area
  - c. Adjust funding mechanisms to align with priorities

- 5.1.3 Attract and retain industry research investment in NSW
  - Establish a single point of contact within NSW Government to attract existing pharmaceutical, medical device or clinical innovation companies
  - b. Facilitate co-location of industry resources in health and medical research hubs (see 5.2.2) (e.g. spare office capacity, rent-free periods, communication infrastructure) where benefits can be clearly identified
  - c. Increase attractiveness of NSW as a location for clinical trials
    - i. Improve the efficiency of research ethics and governance (see 5.4.4)
    - ii. Adopt consistent pricing for services associated with clinical trials
    - iii. Consider feasibility of remote access to electronic medical records to facilitate rural patient involvement in trials
    - iv. Develop NSW Government programs to promote the value of participation in trials
    - v. Establish mechanisms to increase the involvement of Medicare Locals in clinical trials
    - vi. Co-fund research clinical trial network coordinators with industry and not-forprofit groups
  - Explore the potential of social bonds as a mechanism to facilitate business investment in health and medical research
- 5.1.4 Leverage more external competitive grant funding (national and international)
  - a. Support high quality and relevant Cooperative Research Centres, ARC linkage and NHMRC partnership grants
  - b. Facilitate the equitable access of health and medical researchers to the NSW Government

Science Leveraging Fund to provide leverage and competitive advantage for major Australian Government grants

- c. Support applications for National Institute of Health grants
- 5.1.5 Attract philanthropic support for research
  - a. Leverage philanthropy donations through NSW Government matching or other incentives
  - b. Promote corporate philanthropy through incentives
  - c. Support access to major global philanthropy (e.g. Gates Foundation)
  - d. Establish a philanthropy recognition program

## 5.2 Build Globally Relevant Research Capacity

The development of research capacity underpins the ability of research organisations in NSW to plan and undertake high quality, globally relevant research. Funding for research infrastructure support, strengthening research hubs and networks and building research assets will help position NSW to build on its current strengths.

- 5.2.1 Improve research infrastructure to reward success
  - a. NSW Government to advocate for full funding of research at the national level
  - b. Increase NSW infrastructure funding to support the full cost of research
  - c. Restructure infrastructure funding programs
    - i. Include 'rules and criteria' to ensure institutes deliver outcomes of use to the health system
    - ii. Establish tiered grants to incentivise critical mass of research organisations
    - iii. Include state and federal grants in assessment of infrastructure funding

- iv. Consider mechanisms to allow infrastructure funding to flow with grant money
- v. Establish grant cycles to 3 years at the minimum
- d. Index research infrastructure support programs to keep pace with inflation
- e. Catalogue major capital infrastructure and make available across organisations
- f. Establish clinical trial (phase 1) infrastructure support
- g. Establish a long term strategic infrastructure plan (linked to the Australian Government plan) including capital works and shared equipment plan
- h. Establish competitive capital infrastructure funding
- i. Competitively fund research centres in NSW Health priority areas
- 5.2.2 Strengthen health and medical research hubs and networks
  - a. Identify, develop and encourage focused hubs for the research community and create an environment for multi-disciplinary innovation
  - Build consortia of research organisations and promote mergers of research organisations to create critical mass
  - c. Form disease-specific research centres through a competitive process
  - d. Provide seed capital for new institutes, with a pathway to independence
  - e. Use incentives for geographical co-location of facilities with a similar focus
  - f. Support use of technology to overcome the 'tyranny of distance' to deliver the innovation benefits of co-location

- 5.2.3 Increase the strategic focus of research undertaken in NSW Health
  - a. Clarify research funding and expenditure at Local Health District level
  - Establish guidance on use of NSW Health general funds by Local Health Districts to support research
  - c. Develop a clinical innovation process so the right research is undertaken by the right people, including central oversight and decentralised research concept generation
  - d. Establish Local Health District health and medical research committees to oversee local research, ensure alignment with priorities and undertake reporting
  - e. Increase local health and medical research funding support programs, including competitive clinician grants
- 5.2.4 Build state or national shared research assets, including data linkage, bio-banking and informatics
  - a. Support and expand data linkage capability, including the Centre for Health Record Linkage
  - Facilitate timely access to administrative data sets, including NSW Government agency data, MBS, PBS etc
  - c. Support NSW population cohort studies (e.g. 45 and Up)
  - d. Support the development of shared tissue and bio-banks
  - e. Support shared IT platforms, data management systems and operating procedures
  - f. Train researchers in the use of shared research assets

## 5.3 Build an Innovative Research Culture

A strong workforce, research collaboration, fostering a knowledge-led health system and improving IP capture and commercialisation will enhance the development of an innovative research culture in NSW. An innovative, forward looking research sector will help to transform health systems and improve health outcomes by applying scientific and technological advances to clinical practice, health services and programs.

### 5.3.1 Strengthen the research workforce

- a. Develop career paths for researchers
  - i. Attract the best students into health and medical research
  - ii. Increase support for early to mid-career researchers
  - iii. Strengthen post-doctoral fellowships
  - iv. Establish 5-year personal funding, with personnel support to attract high flying researchers
  - v. Develop Chairs in intervention research
  - vi. Establish senior clinical fellowships (modelled on Queensland program)
  - vii. Establish modest financial prizes to help make Curriculum Vitae more competitive for major funding rounds
- b. Provide a range of support for clinician and health service researchers
  - i. Protect clinician research time
  - ii. Establish competitive clinician grants to 'buy' clinician time
  - Encourage conjoint appointments and secondments between health services and universities

- Offer Research Masters programs to clinicians and other researchers in the health system
- v. Establish industrial awards for research coordinators and researchers within the health system
- vi. Recognise research within health service employment conditions
- vii. Provide incentives and recognition for further study and years of service to research
- viii. Institute sustainable capacity building models such as clinical, health service and population health chairs
- ix. Exempt researchers funded by external grants from the NSW Health staff establishment 'cap'
- x. Partner with universities to offer joint scholarships to support PhDs so that clinicians do not have to more than halve their salary to do research training to get into the research workforce
- xi. Provide clinicians with access to research support (PhDs, post doctoral researchers, senior oversight as appropriate)
- xii. Establish nurse 'recruiters' attached to the large and high performing clinical academic units
- xiii. Build clinical innovation implementation capacity at NSW Health/Local Health Districts
- c. Fill emerging skill gaps
  - i. Establish fellowships in bio-mathematics
  - ii. Increase opportunities for health economics training
  - iii. Increase support for the NSW Biostatistical Officer Training Program

- iv. Identify other potential skills gaps with a5-year research workforce survey
- d. Attract researchers to NSW from/back from interstate and overseas by establishing health and medical research prizes
- 5.3.2 Foster links and partnerships for multidisciplinary and cross-sector collaboration
  - Provide NSW Government incentives to enhance collaboration between researchers, health care providers, business schools, policy developers and others through a competitive process
  - b. Develop and encourage research networks around specific diseases or priorities
  - c. Tailor funding schemes to encourage collaboration (at application and reporting stages) and provide funding to cover direct costs of collaboration (travel – including international travel, technology, administration etc)
  - d. Establish Health, University and MRI alliances/ academic health centres
    - i. Support the development of affiliation agreements
    - ii. Establish programs to support the movement of staff between sectors
- 5.3.3 Support knowledge-led innovation in clinical practice, health service delivery and population health programs
  - Task the Agency for Clinical Innovation to work with researchers and clinicians to identify priorities for translating local and international research evidence into policy and practice and rollout of clinical guidelines
  - b. Task the NSW Population Health Network to work with researchers and practitioners to identify priorities for translating local and international research evidence into policy and practice and rollout of prevention and health protection programs

- c. Facilitate the timely synthesis of and access to research evidence
- d. Strengthen the receptivity of NSW Government agencies to use research evidence in policy and programs
- e. Establish research positions in policy agencies to increase the capacity to conduct high quality research
- f. Procure 'knowledge brokers' to translate research into practice and bridge the gap between research and policy/interventions
- g. Conduct and/or commission health services and intervention research to inform policy, services and programs
- h. Facilitate exchange between researchers, clinicians, managers and policy makers
- 5.3.4 Build expertise in developing commercial-ready Intellectual Property
  - Develop an overarching strategy to support IP in the state with clarity around commercialisation pathways
  - Develop a single IP policy across NSW Government, universities and MRIs to cover ownership and commercialisation pathways
  - c. Establish a centralised portfolio of IP to enable better management with a simpler process to identify new Intellectual Property
  - Provide a single commercialisation office for NSW universities, MRIs, and health services via a competitive tender (5-year contract)
  - e. Develop a 10-year commercialisation framework and plan with clear principles (e.g. 2:1 matching) and secure bipartisan support to provide confidence to investors
  - f. Provide commercialisation training and mentoring

- 5.3.5 Support early stage venture capital
  - a. Establish NSW tax breaks and supporting infrastructure for commercial development, close to each research hub
  - b. Establish a medical device fund, co-funded by national and international partners
  - c. Work with Commercialisation Australia to increase the pool of investment-ready ideas originating from NSW research
  - Link researchers with other skill sets required for commercialisation (e.g. engineering, business, legal) in both teaching and research settings

## 5.4 Improve Governance and Accountability

The establishment of appropriate governance structures is critical for driving the implementation of the Review recommendations and will enable appropriate monitoring and evaluation.

- 5.4.1 Provide clear political and organisational leadership to ensure the successful implementation of the 10-year NSW Health and Medical Research Strategy
  - a. Establish an Implementation Committee to oversee implementation of the 10-year NSW Health and Medical Research Strategy for the first 12 months
  - Task and adequately resource the Office for Medical Research to implement the 10-year NSW Health and Medical Research Strategy
  - c. Develop a research compact/agreement that is signed by all sectors of the research community (NSW Government, NSW Health, universities, MRIs, industry)
  - d. Establish a NSW Health and Medical Research Committee to report annually on progress and provide ongoing oversight (handover from Implementation Committee)

- e. Establish research activity and outputs in Local Health District Chief Executive service level agreements
- f. Promote the excellence, successes and opportunities for health and medical research in NSW
- 5.4.2 Make NSW Government funding support more transparent and accountable
- 5.4.3 Establish metrics and regular reporting on strategy implementation
- 5.4.4 Improve the efficiency of research ethics and governance processes
  - a. Establish an ethics review central coordination system
  - Establish 'mutual acceptance' of ethics review for clinical trials conducted in NSW, Victoria and Queensland public health organisations
  - c. Implement the NHMRC initiative 'Harmonisation of Multicentre Ethics Review' (national single ethical review) when established
  - d. Streamline governance (site authorisation) processes
  - e. Improve ethics and site authorisation IT platform for data collection and reporting
  - f. Ensure adequate funding for Local Health District Research Offices
  - g. Require registration on a clinical trial register a condition of ethics approval for all trials being conducted in NSW

## Potential Outcomes for NSW Government

The Strategic Review Advisory Committee has identified three potential outcomes for health and medical research in NSW that are linked and reinforcing: high quality, globally relevant, research; research that supports a high quality health system; and research that generates health, social and economic outcomes.

Indicators to measure progress against the outcomes will be developed when the NSW Health and Medical Research Strategy has been finalised. These will be monitored to assess NSW's performance in health and medical research over time. This will be one of the mechanisms used to evaluate the effectiveness of the Strategy.

## 6.1 High Quality, Globally Relevant, Research

High quality research, performed by talented individuals with contemporary infrastructure is a prerequisite for the success of the NSW Health and Medical Research Strategy. Such research will naturally attract increased funding from NHMRC and National Institutes of Health grants, and should also attract NSW Government support. The anecdotal and empirical evidence being collected by the Strategic Review shows that high quality research is more likely to occur in close proximity to teaching hospitals. In addition, it is more likely to be commercialised or absorbed into policy, practice and programs if it occurs in close proximity to skilled entrepreneurs, financiers, lawyers, leading clinicians, practitioners and their managers. This means the State should consider investing disproportionately in hubs that combine the skills, scale and critical mass to achieve globally relevant insights into specific areas of research.

Some of the metrics that could indicate success are:

6.1.1 Increased share of competitive NHMRC and other peer-reviewed grants to NSW.

- 6.1.2 Increased NSW Government funding for health and medical research in NSW, benchmarked to the growth of the health system
- 6.1.3 Ongoing growth in publications and citations
- 6.1.4 NSW wins more major international health and medical research prizes
- 6.1.5 Citations from research continue to be at or leading the Australian average (which meets or exceeds relative Australian investment)

## 6.2 Research that Supports a High Quality Health System

NSW Government investment in health and medical research represents the research and development arm of NSW Health. A much greater emphasis needs to be placed on the translation of research into policy, practice and programs. This focus has three implications:

- There should be greater engagement between researchers and clinicians and other health professionals to identify research questions that have clinical, health service and population health relevance.
- 2. There should be greater investment in translational research that can convert novel knowledge into clinical, health service and population health innovation.
- 3. There should be increased activity in developing an evidence base for clinical, health service and population health interventions.

It is also entirely appropriate that the State invest disproportionately in solving health problems that are relevant to the people of NSW. Some of the metrics that could indicate success are:

- 6.2.1 Health needs inform research activities for an increased proportion of NHMRC grants
- 6.2.2 Better integration of research, health care delivery and policy development leading to more publications on health innovations and citations in leading clinical journals
- 6.2.3 Improved collaboration between MRIs, universities and hospitals to achieve research and health outcomes
- 6.2.4 Research identifies ineffective and expensive interventions allowing disinvestment and redeployment of health budgets

## 6.3 Research that Generates Health, Social and Economic Outcomes

The commercialisation of research produces significant additional benefits that directly impact on the health system. The products and services sold contribute to Australia's balance of payments by displacing imports and creating exports. High value-added jobs can be created in Australia, which further up-skill the workforce with the skills to commercialise the next generation of research IP.

Some of the metrics that could indicate success are:

- 6.3.1 Improved health among all people in NSW and a closing of the gap in health outcomes for Aboriginal people (indicators to be developed)
- 6.3.2 NSW-developed products and services purchased by NSW Health
- 6.3.3 Increased employment in health and medical research in NSW
- 6.3.4 Increased private and not-for-profit investment in NSW health and medical research
- 6.3.5 New bio-medical company formation and growth in established companies
- 6.3.6 Income from patents, licensing and royalties

## Next Steps

Feedback on the Issues Paper is being sought between5 September and close of business on 26 September 2011.To make a submission, please go to<a href="http://www.health.nsw.gov.au/omr/review/">http://www.health.nsw.gov.au/omr/review/</a>.

The Strategic Review Advisory Committee will continue to analyse the options for action and outcomes, including consideration of the feedback received through this current round of consultation.

The next milestone for the Strategic Review will be the release of the Draft Interim Report which will be subject to further consultation between 24 October and 14 November 2011.

For more information about the Review process, please visit the Office for Medical Research website at <u>http://www.health.nsw.gov.au/omr/</u>.

## Appendices

## 8.1 NSW Health and Medical Research Strategic Review Terms of Reference

The Strategic Review is focusing on the current performance of health and medical research in New South Wales (NSW) and will recommend a strategy covering the next 10 years.

In particular the Review will:

- Identify how well the health and medical research profile meets the health needs across the metropolitan and regional areas of the State and how it may contribute to the evolving health system in the future.
- Identify the current profile of the NSW health and medical research workforce and assess its capacity to support the State's future research developments.
- 3. Making recommendations on measures which might be taken to ensure NSW's research capacity is matched to the need.
- 4. Develop an economic framework to support the recommended strategic strategy.
- 5. Ensure appropriate links with industry to ensure commercialisation of new discoveries.

In addressing its Terms of Reference the Review will also give consideration to:

- benchmarking NSW's health and medical research performance against other Australian states and relevant international comparisons
- how the current NSW research infrastructure and support funding system may be structured in order to provide the required support and encourage greater efficiencies through critical mass and economies of scale within the sector

- how the NSW health and medical research sector can expand its current capacity in population health, clinical and health services research and align with the future health needs
- how NSW can leverage its capacity in biotechnology, medical and health outcomes and attract national and international public and private sector support
- how the State support for health and medical research is optimised in terms of leveraging funding from the Commonwealth, overseas funding bodies and philanthropic donations
- how to structure more efficient, coordinated and productive outcomes from within the health and medical research sector entities
- examining present and potential links to industry to develop commercialisation of health and medical research discoveries; and will
- specifically comment on the development of a clinical trials infrastructure for NSW, including how NSW can increase its attractiveness as a location for conducting clinical trials, including streamlined ethical review, patient recruitment and costs.

### Members of the Strategic Review Advisory Committee

Peter J Wills, AC	Strategic Review Committee Chairman
Professor John Shine, AO	Executive Director, Garvan Institute of Medical Research
Professor Mary O'Kane	NSW Chief Scientist and Engineer
Professor S. Bruce Dowton	Harvard University Medical School, Boston, USA
Professor Don Iverson	Executive Dean, Faculty of Health & Behavioural Science, University of Wollongong
	Director, Illawarra Health & Medical Research Institute
Professor Nick Saunders	Vice Chancellor, University of Newcastle
	Director, Hunter Medical Research Institute
Dr Christine Bennett	Chair, Research Australia
	Former Chair, National Health & Hospitals Reform Commission
Professor Stephen Leeder, AO	Director, Menzies Centre for Health Policy, University of Sydney
	Chair, Western Sydney Local Health District
Hon Ron Phillips	Chair, Sydney Local Health District
Ms Elizabeth Carr	Chair, Macular Degeneration Foundation
Professor Margaret Harding	Pro-Vice Chancellor (Research), UNSW

### **Project Management and Secretariat**

### NSW Health

Dr Kerry Chant	Deputy Director-General Population Health and Chief Health Officer
Associate Professor Sarah Thackway	Director, Centre for Epidemiology and Research
Ms Anne O'Neill	Associate Director, Office for Medical Research
Dr Jo Mitchell	Associate Director, Centre for Epidemiology and Research
Ms Beth Stickney	Principal Analyst, Centre for Epidemiology and Research
Ms Amy Cohen	Project Support Officer, Office for Medical Research
Ms Margie Scott-Murphy	Office Coordinator, Centre for Epidemiology and Research

### **Pacific Strategy Partners**

Mr Andrew Wilson	Director
Mr Ian Clarke	Director
Mr Robin Collis	Associate
Mr Brad Loder	Associate

### 8.2 Individuals and groups who participated in the first consultation phase

### Individual interviews

Professor Bruce Dowton*	Dowton Consulting International Inc.
Professor Margaret Harding*	University of New South Wales
Professor Mary O'Kane*	NSW Chief Scientist and Engineer
Professor John Shine*	Garvan Institute of Medical Research
Hon Ron Phillips*	Sydney Breast Clinic
Ms Elizabeth Carr*	Macular Degeneration Foundation
Mr Mike Hirshorn	Four Hats Capital
Dr Anna Lavelle	AusBiotech
Dr Christine Bennett*	University of Notre Dame
Professor Stephen Leeder*	Menzies Centre for Health Policy, University of Sydney
Professor Penny Hawe	Population Health Research Initiative of Canada
Professor David Currow	Cancer Institute NSW
Ms Jane Halton	Department of Health and Ageing

National Health and Medical Research Council Professor Warwick Anderson Mr Graeme Head Department of Health and Ageing Professor Andrew Wells Australian Research Council Ms Patricia Kelly Department of Innovation, Industry, Science & Research Hon Mark Butler Minister for Mental Health and Ageing Mr Doron Ben-Meir Commercialisation Australia Professor Don Iverson\* University of Wollongong Professor Richard Head Director, Preventative Health Flagship Mr Neville Stevens (AO) **Cooperative Research Centres** Dr Chris Roberts Cochlear Mr Alex Harvey Macquarie Bank \*Member of NSW Health and Medical Research Strategic Review Advisory Committee

### Group interviews

### University Deputy and Pro Vice Chancellors

Professor Mike Calford	University of Newcastle
Professor Jill Trewhella	University of Sydney
Professor Attila Brungs	University of Technology, Sydney
Professor Les Fields	University of New South Wales
Professor Margaret Harding	University of New South Wales
Professor Jim Piper	Macquarie University
Professor Andrew Cheetham	University of Western Sydney
Professor Judy Raper	University of Wollongong
Professor Sue Thomas	Charles Sturt University
Professor Annabelle Duncan	University of New England
Professor Neal Ryan	Southern Cross University
Professor Thomas Martin	Australian Catholic University

### Research Australia

Dr Christine Bennett Ms Elizabeth Foley Ms Rebecca James

#### NSW Health Senior Executive Forum

Ms Amanda Larkin Mr Chris Crawford Mr Danny O'Connor Ms Elizabeth Koff Ms Lyn Weir Mr Matthew Daly Mr Matthew Hanrahan Mr Maxwell Alexander Mr Mike Wallace Mr Nigel Lyons Mr Robert Rust Professor Steven Boyages Mr Steven Rubic Mr Stewart Dowrick Mr Stuart Riley Mr Susan Weisser Dr Teresa Anderson

South Western Sydney Local Health District Northern NSW Local Health District Western Sydney Local Health District Sydney Children's Hospitals Network Far West Local Health District Northern Clinical Support Cluster Central Coast Local Health District Southern NSW Local Health District South Western Sydney Local Health District Northern Clinical Support Cluster Health Infrastructure NSW Clinical Education and Training Institute St Vincents and Mater Health Sydney Mid North Coast Local Health District Far West Local Health District Murrumbidgee Local Health District Sydney Local Health District

University of Notre Dame Research Australia

Research Australia

Ms Vicki Taylor Mr Terry Clout Ms Kim Browne

#### Westmead Research Hub

Professor Tony Cunningham Ms Helene Abouyanni Professor Chris Cowell Mr Mark Dado Ms Karyn Joyner Mr Ralph Mitchell Professor Roger Reddel Professor Stephen Leeder

#### Medical Research Institutes

Professor Tony Cunningham Mr Nick Pearce Professor Maree Gleeson Professor Robert Baxter Professor Peter Schofield Professor David Handelsman Dr David Andrews Professor Roger Reddel Associate Professor Vlado Perkovic Professor Bob Graham Dr Peter Wejbora Professor Paul Seale

#### Pharmaceutical companies

Ms Deborah Monk Ms Cheryl Townsend Ms Kerry Strydom Mr Mitch Kirkham Ms Kathy Connell Mr David Lloyd Ms Jane Frost Ms Pip Palmer Ms Charles Kent Ms Lynn Montgomery

### Sydney Children's Hospitals Network

Professor Bruce Robinson Professor Peter Smith Professor Chris Cowell Mr Roger Corbett Ms Elizabeth Koff

### Population Health Research

Professor Bruce Armstrong Professor Ian Caterson Professor Michael Farrell Professor Mark Harris Central Coast Local Health District South Eastern Sydney Local Health District Hunter New England Local Health District

Westmead Millennium Institute Western Sydney Local Health District Kids Research Institute Westmead Millennium Institute Kids Research Institute Children's Medical Research Institute Children's Medical Research Institute Western Sydney Local Health District

Westmead Millennium Institute Centenary Institute Hunter Medical Research Institute Kolling Institute of Medical Research, University of Sydney Prince of Wales Medical Research Institute ANZAC Research Institute Woolcock Institute Children's Medical Research Institute George Institute Victor Chang Cardiac Research Institute Children's Cancer Institute Australia Woolcock Institute

Medicines Australia Merch Serono Australia Quintiles Novartis Janssen Southern Start Research Pfizer Merck Sharp & Dohme Roche Products Roche Products

Kolling Institute of Medical Research, University of Sydney Faculty of Medicine, University of NSW The Children's Hospital at Westmead Sydney Children's Hospitals Network Sydney Children's Hospitals Network

School of Public Health, University of Sydney Boden Institute of Obesity, Nutrition & Exercise, University of Sydney National Drug & Alcohol Research Centre Centre for Primary Health Care & Equity, University of NSW Professor Guy Marks Professor David Cooper Dr Greg Stewart Associate Professor John Wiggers Professor Andrew Penman Catherine Holliday Vitali Sinchenko Annemarie Hennessy Ms Julieanne Mitchell Professor Simon Chapman Professor Raina MacIntyre Professor Rob Sanson-Fisher A/Professor Kate Conigrave Professor Susan Thompson **Professor David Perkins** Professor Peter McIntyre Professor Stephen Lord Kim Browne Professor Wayne Smith Ms Gabriel Moore

### Health Services Research

Professor Jane Hall Professor Ken Hillman Professor George Rubin Associate Professor Stephen Jan Dr James Gillespie Professor Mary Chiarella Professor Sally Redman Professor Jeffery Braithwaite Professor Clifford Hughes Ms Julieanne Mitchell Woolcock Institute of Medical Research, University of Sydney National Centre in HIV, Epidemiology & Clinical Research Population Health, Western Transition Northern Transition Organisation & Hunter Medical Research Institute Cancer Council NSW Cancer Council NSW Centre for Infectious Diseases Microbiology, Westmead Hospital School of Medicine, University of Western Sydney National Heart Foundation School of Public Health, University of Sydney School of Public Health & Community Medicine, University of NSW Health Behaviour Research Centre, Newcastle University Addiction Medicine, Central Clinical School, University of Sydney Healthy Built Environment Program, University of NSW Australian Rural Health Research Collaboration, University of Sydney National Centre for Immunisation Research & Surveillance, University of Sydney Neuroscience Research Australia Northern Transition Organisation & Hunter Medical Research Institute Environmental Health Branch, NSW Department of Health Public Health Association of Australia

Centre for Health Economics, University of Technology, Sydney Simpson Centre for Health Research, University of NSW South Eastern Sydney Local Health District George Institute Menzies Centre for Health Policy Sydney Nursing School, University of Sydney Sax Institute Australian Institute of Health Innovation, University of NSW Clinical Excellence Commission National Heart Foundation

### **Biotechnology and Medical Device Companies**

Dr Anna Lavelle Mr Arthur Brandwood David Irving Greg Roger David Radford Alan Robertson Ron Weinberger Alan Liddle Stephen Pattillo Victor Sklandnev Neil Anderson Hamish Hawthorn

### Early Stage Commercialisation

Dr David Fisher Dr Chris Nave Ms Deborah Kuchler Warren Bailey AusBiotech Brandwood Medical Australian Red Cross Australian Surgical Design & Manufacture Nanosonics Pharmaxis Nanosonics Immune System Therapeutics AusBiotech AI Medics Waterfall Commercialisation Group ATP Innovations

Brandon Capital – Medical Research Commercialisation Fund Brandon Capital – Medical Research Commercialisation Fund Biomed North Limited Enterprise Partnerships & Commercialisation Fiona Cameron Gavin Dixon Randal Leeb-du Toit Jim Henderson

### NSW Research Networks

Mr Peter Neilson Professor Peter Gunning Professor Carol Pollock Dr Kristina Cabala Dr Stephanie Williams Mr Duncan Wallace Professor Bernie Tuch Dr Lilian Jackson Dr Ruth Hadfield Mr Jeremy Wright University of Western Sydney University of Wollongong University of Sydney NewSouth Innovations

Oncology Children's Foundation Oncology Children's Foundation Cardiovascular Research Network Cardiovascular Research Network Australia and New Zealand Spinal Cord Injury Network Australia and New Zealand Spinal Cord Injury Network Stem Cell Network Stem Cell Network Multiple Sclerosis Research Network Multiple Sclerosis Research Network

### Information Communication Technology

Suresh Rao Dr Michelle Cretikos Ms Helen Waddell Dr Ian Gibson

### Philanthropic Organisations

Mr Mike Wilson Ms Julie White Dr Noel Chambers Ms Elizabeth Foley Mr Andrew Giles Mr Eric d'Indy

### **Research Organisations**

Professor Gordon Parker Professor Ian Hickie Professor David Cooper Mr Daren Draganic Professor Miles Davenport Professor Michael Barton OAM Professor David Cooper Professor David Cooper Professor Frank Billson AO Professor Frank Billson AO Professor Mark Willcox Professor Chris Cowell Mr Philip Bert Professor Nico van Zandwijk Professor Michelle Haber

### **Online Submissions**

- Name
- 1 Neil Anderson
- 2 Vaughan Carr
- 3 Michael Lodge
- 4 Julie Charlton

Sax Institute NSW Department of Health NSW Department of Health Intersect

Juvenile Diabetes Research Foundation Macquarie Group Foundation Research Australia Philanthropy Research Australia Philanthropy Garvan Foundation Westmead Medical Research Foundation

Black Dog Institute Brain and Mind Institute Kirby Institute (University of NSW) Kirby Institute (University of NSW) Centre for Vascular Research Ingham Health Research Institute National Centre in HIV and Epidemiology & Clinical Research Save Sight Institute Vision Cooperative Research Centre (CRC) Kids Research Institute, The Children's Hospital at Westmead Asthma and Airways CRC Bernie Banton Institute (Asbestos Disease Research Institute) Children's Cancer Institute Australia

#### Organisation

Waterfall Commercialisation Group University of NSW and Schizophrenia Research Institute Mental Health and Drug and Alcohol Office, NSW Health St Vincent's Hospital

5	Howard Gurney	Westmead Hospital, Medical Oncology
6	Philip Cunningham	Institute of Virology
7	Peter Todaro	Multicultural Health Communication Service
8	Maureen Ryan	Royal Prince Alfred Hospital
9	Craig Godfrey	Western Sydney Local Health District
10	Anonymous	Anonymous
11	Professor Henry Brodaty	University of NSW
12	Professor Terry Campbell	University of NSW
13	Roy Byun	South Western Sydney Local Health District
14	Associate Professor Tony Lower	Australian Centre for Agricultural Health & Safety
15	Kay Tennant	Health Reform Transition Organisation Western
16	Lionel Hebbard	University of Sydney, Storr Liver Unit
17	Paul van den Dolder	Illawarra Shoalhaven Local Health District
18	Brian Draper	Prince of Wales Hospital
19	Assoc Professor Jim Greenwood	University of NSW Rural Clinical School and School of Psychiatry
20	Julie Redfern	The University of Sydney; The George Institute
21	Dr Anne M Jensen	University of Oxford, UK
22	Lisa Keay	The George Institute for Global Health and University of Sydney
23	Katie de Luca	Chiropractor
24	Alex Fielding	Private Practice
25	Dr Dennis Richards	Richards Chiropractic
26	William L Ledger	School of Women's and Children's Health
27	Larissa McGlade	Carers Advisors Association of NSW
28	Sharon Clark	The Tweed Hospital
29	William Bonney	Black Dog Institute
30	Prof. Hans Peter Dietz	Sydney Medical School Nepean
31	Andrew Giddy	Nucleus Network
32	Lea Kirkwood	NSW Health
33	Jason Parkes	Boambee Chiropractor
34	Anthony Zehetner	Central Coast Local Health Network
35	Margaret Murphy	SWAHS
36	Michael Roche	University of Technology Sydney
37	Sharon McKinley	University of Technology Sydney and Northern Sydney Local Health District
38	Dr Chris Nave	Medical Research Commercialisation Fund / Brandon Capital Partners
39	Prof. Rodney J. Scott	Hunter New England Health Service and the University of Newcastle
40	Pip Palmer	Merck Sharp and Dohme (Australia)
41	Scientia Professor Philip Mitchell AM	University of New South Wales (School of Psychiatry)
42	Sarah Dennis	University of New South Wales
43	Jacqueline Close	Prince of Wales Hospital and Neuroscience Research Australia
44	Bryce Conrad	Reliance Medical Centre
45	Vlasios Brakoulias	Nepean Blue Mountains Health Service
46	Robyn Ward	University of NSW
47	Nicholas Hawkins	University of NSW
48	Professor Levon Khachigian	Centre for Vascular Research
49	Jessica Stewart	Centre for Aboriginal Health, NSW Health
50	Nicole Raschke	Northern NSW & Mid North Coast Local Health Districts
51	Andrew Thirlwell	Lupus Association of NSW Inc
52	Caroline Homer	University of Technology, Sydney and St George Hospital
53	Bryce Vissel	Garvan Institute
54	Dr Anne Vertigan	Hunter New England Allied Health
55	Children's Cancer Institute Australia	Children's Cancer Institute Australia

56	Caron Bowen	NSW Department of Health
57	Elizabeth Kepreotes	John Hunter Children's Hospital
58	Patricia O'Riordan	NSW Department of Health
59	Caitlin van Holst Pellekaan	NHMRC Clinical Trials Centre, University of Sydney
60	Stacy M. Carter	University of Sydney
61	Guy Lyons	University of Sydney/Royal Prince Alfred Hospital
62	Margaret Smith	Kolling Institute
63	John Dodson	University of Sydney Physiology
64	Kristof Mikes-Liu	University of Sydney
65	J. P. Seale	Woolcock Institute of Medical Research
66	John Fletcher	University of Sydney, Westmead Hospital
67	Tony Roscioli	School of Women and Children's Health, University of Sydney
68	Robert Loblay	University of Sydney & RPAH
69	Mark Graham	Children's Medical Research Institute
70	Professor Philip O'Connell	Westmead Hospital
71	lan Seppelt	Department of Intensive Care Medicine, Nepean Hospital
72	David Hunter	University of Sydney
73	Lowenna Holt	Garvan Institute of Medical Research
74	Geraldine O'Neill	The Kids Research Institute, Children's Hospital at Westmead
75	Robert Welachinger	Westmead Millennium Institute
76	Dr Robert Tynan	Sydney University School of Medicine
77	Kim Moran-Jones	Garvan Institute of Medical Research
78	Kharen Doyle	Garvan Institute of Medical Research
79	Greg Sutherland	University of Sydney
80	William Phillips	University of Sydney
81	Dr Antony Harding	University of Sydney
82	Ewan Millar	Garvan Institute and St George Hospital
83	Dr Bevan Hokin	Sydney Adventist Hospital Pathology
84	Professor Ewa M. Goldys	MQ BioFocus Research Centre, Macquarie University
85	Georgia Frangioudakis	Garvan Institute
86	Dr Anne Grunseit	Prevention Research Collaboration, University of Sydney
87	Dr Amina Khambalia	University of Sydney
88	Anthony Harris	University of Sydney
89	Tri Phan	Garvan Institute
90	Pamela Johnson	University of Sydney
91	Heather Lee	Garvan Institute
92	April Davis	Westmead Millennium Institute
93	Kristina Cabala	NSW Cardiovascular Research Network
94	Philip Pogson	The Leading Partnership
95	Spring Cooper	University of Sydney
96	Phyllis Butow	Psycho-Oncology Co-operative Research Group and Centre for Medical Psychology and Evidence-based Medicine, University of Sydney
97	Camille Raynes-Greenow	University of Sydney
98	John Grigg	University of Sydney
99	David Allen	University of Sydney
100	Stuart Fraser	University of Sydney, Discipline of Physiology
101	Professor Judy Simpson	University of Sydney
102	Jaiprakash Gupta	South Eastern Sydney Local Hospital District
103	Hunter Watt	Agency for Clinical Innovation
104	Dr Michelle Cretikos	NSW Department of Health
105	Jennifer Smith-Merry	University of Sydney

106	Belinda Platzer	Garvan Institute of Medical Research
107	Professor Andrew Cheetham	University of Western Sydney
108	Dr William E. Hughes	The Garvan Institute of Medical Research
109	Elizabeth Foley	Research Australia
110	Colin Sutton	NHMRC Clinical Trials Centre
111	Helen Achat	Epidemiology, former Sydney West Area Health Service
112	Chris Rissel	University of Sydney
113	Prof Barry J Allen	St George Hospital
114	Dr David Lloyd	Southern Star Research Pty Ltd
115	Peter Middleton	Westmead Hospital
116	Tony Thirlwell	Heart Foundation
117	Dr Rosalie Pockett	University of Sydney
118	Kate Curtis	Sydney Nursing School and St George Hospital
119	Dr Lisa Askie	Australian New Zealand Clinical Trials Registry
120	Christopher Levi	Hunter New England Health; University of Newcastle; Hunter Medical Research
		Institute
121	Christopher Oliver	Blackmores Ltd
122	Chris Williams	The George Institute, School of Public Health, University of Sydney
123	Christiane Klinner	Centre for Values, Ethics and Law in Medicine, University of Sydney
124	Sue Baker-Finch	Illawarra Health and Medical Research Institute
125	lan Caterson	Boden Institute of Obesity Nutrition Exercise and Eating Disorders,
		University of Sydney
126	R Yeow	Medical Student
127	John B. Ziegler	Sydney Children's Hospital
128	Helen Englert	Westmead Hospital
129	Alan Brotherton	ACON
130	Norbert Berend	Woolcock Institute of Medical Research
131	Assoc Prof Janette Burgess	The Woolcock Institute of Medical Research
132	Daron Green	Agricultural and Life Sciences Group
133	Eui-Soo Choi	NSW Health
134	Gilles J Guillemin	University of NSW
135	Julie Tall	Population Health Western Transition Organisation
136	Prof Robert Graham	Victor Chang Cardiac Research Institute
137	Jane Hall	Centre for Health Economics Research UTS
138	Sally Josh	Southern NSW Local Health District
139	Sally Crossing AM	Cancer Voices NSW
140	Nicholas Manolios	Westmead Hospital
141	Professor Roger Daly	Garvan Institute of Medical Research
142	Richard Epstein	St Vincent's Hospital
143	Rajesh Puranik	University of Sydney
144	Peter Williamson	Personal Submission
145	Gerard Cudmore	Amgen Australia
146	Trevor Biden	Garvan Institute of Medical Research
147	Paul	RPA Hospital/University of Sydney
148	Anna deFazio	Westmead Hospital / Westmead Millennium Institute
149	Catherine Holliday	Cancer Council NSW
150	Professor Rob Herbert	The George Institute for Global Health
151	Diana Adams	Macarthur Cancer Therapy Centre
152	Dr Lorraine Chantrill	SSW Local Health District Department of Oncology Clinical Trials
153	Patricia Boow	Department of Health
154	Paul Field	Bio-Link Australia Pty Ltd

155	Gerald Edmunds	Brain Foundation
156	Naomi	Belrose Chiropractic
157	Louise Stone	Centre for Values, Ethics and the Law in Medicine, University of Sydney
158	Lesley King	Prevention Research Collaboration, University of Sydney
159	Professor Peter R Schofield	Neuroscience Research Australia
160	Stephanie Williams	Spinal Cord Injury Network
161	Leslie White	NSW Department of Health
162	Christina Dryden	NSW Department of Health
163	Gabriel Moore	The Public Health Association NSW Branch
164	Prof Michael Barton	Ingham Institute
165	Tegan Cox	Northern Sydney Local Health District and University of Sydney Incorporating the Kolling Institute of Medical Research
166	Mrs Sue Browbank	Illawarra Shoalhaven Local Health District
167	Carla Saunders	General Practice NSW
168	Rod MacQueen	The Lyndon Community, and the Murdi Paaki Drug and Alcohol Network
169	Clare Walsh	The Heart Research Institute
170	Professor Sally Redman	The Sax Institute
171	Joanna Knott	Spinal Cure Australia
172	Mark Harris	Centre for Primary Health Care and Equity, UNSW
173	Mr Terry Clout	South Eastern Sydney Local Health District
174	Mark Lacey	Central Coast Local Health District
175	Rob Cummins	Macular Degeneration Foundation
176	Will Delaat	Pharmaceuticals Industry Council
177	Janet Hiller	Australian Catholic University
178	The George Institute for Global Health	The George Institute for Global Health
179	Professor Julie Byles	Australian Association of Gerontology, NSW Division
180	Elizabeth Koff	Sydney Children's Hospitals Network
181	Amanda Sainsbury-Salis	Garvan Institute of Medical Research
182	Andrew McLachlan	University of Sydney and Concord Hospital
183	A/Prof Gideon Caplan	Prince of Wales Hospital
184	Marion Haas	Health Services Research Association of Australia and New Zealand
185	Dr Anna Lavelle	AusBiotech Limited
186	David Currow	Cancer Institute NSW
187	Professor Maree Gleeson	Hunter Medical Research Institute
188	Helen Waddell	Public Health Intelligence Unit, Centre for Epidemiology & Research, Population Health Division, NSW Department of Health
189	Kristina Cook	UNSW Lowy Cancer Research Centre
190	Rod Cook	NSW Department of Health
191	Professor Chris Cowell	Sydney Children's Hospitals Network
192	Mr Jeremy Wright	MS Research Australia
193	A/Prof Geoffrey Morgan	Northern Local Health District / University Centre for Rural Health - North Coast
194	Professor Mike Calford	The University of Newcastle
195	Rosalie Viney	Australian Health Economics Society
196	Professor William O Tarnow-Mordi	NHMRC Clinical Trials Centre, University of Sydney and Westmead Hospital
197	Hamish Hawthorn	ATP Innovations Pty Ltd
198	Dr Nick Pearce	Centenary Institute of Cancer Medicine and Cell Biology
199	Kim Russell-Cooper	NHMRC Clinical Trials Centre
200	Professor Jill Trewhella	University of Sydney
201	Anne Trimmer	Medical Technology Association of Australia
202	Annemarie Hennessy	School of Medicine, University of Western Sydney

### 8.3 Definitions

### **Biomedical research**

Laboratory research with the goal of understanding cell functioning at the molecular, cellular, organ system and whole body levels, including development of tools and techniques to advance this goal; and developing new therapies that improve health or quality of life of individuals, up to the point of human trials.

### **Clinical research**

Research for the purpose of improving the diagnosis and treatment of disease (including rehabilitation and palliation) and injury and improving the health and quality of life of individuals.

### **Clinical trials**

Set of procedures in medical research conducted to allow safety (or more specifically, information about adverse drug reactions and adverse effects of other treatments) and efficacy data to be collected for health interventions (e.g. drugs, diagnostics, devices, therapy protocols).

#### Commercialisation

The process of patenting research findings, forming companies to own patents, and creating drugs, devices or therapies that generate revenue, jobs and improve health outcomes.

### Health policy research

Concerns itself with how health policy is created, the critical appraisal of the evidence that is adduced in the formation of policy, the application of research evidence from clinical medicine and public health in the formation of policy, the behavioural and political science elements in the policy process, what enables, and what militates against, the formulation of quality policy and its implementation. It also includes evaluation research that concentrates upon assessing the achievements, failures, costs and consequences of health policy.

### Health services research

Multi-disciplinary research activity with an implicit objective of improving the health services patients receive. Thus it is an area of applied rather than 'basic' research - it uses theories of human behaviour from contributing disciplines, along with evidence from the medical sciences, to generate and test hypotheses about the delivery of health care. The focus on services is what distinguishes health services research from other multi-disciplinary health research activities.

#### Infrastructure

Infrastructure for research consists of the essential institutional resources underpinning research that are not covered by research grants.

#### Innovation

The application of fresh ideas that enable a business to better compete in the future. Such ideas can include any new or significantly improved goods or services and operational processes or managerial processes.

### Population health research

Investigation and analysis of factors that influence the health status of groups or whole populations, as well as the testing and evaluation of policies and interventions to improve population health outcomes.

### Translational research

Refers to the process of using the findings of research to produce innovation in health care settings. 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).

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