



Government of **Western Australia**
Department of **Health**

Health and Medical Research and Innovation Strategy

Discussion Paper

Contents

1. Introduction	1
2. Purpose	4
3. Scope	5
4. Foundations for the Discussion Paper	6
5. Themes	10
<i>Theme 1: Policy and Practice</i>	10
<i>Theme 2: Partners</i>	11
<i>Theme 3: People</i>	12
<i>Theme 4: Platforms</i>	13
<i>Theme 5: Priorities</i>	15
6. Evaluation of impact	16
7. Next steps	17
References	18
Appendix A: Discussion Paper questions	19

1. Introduction

The case for research, innovation and commercialisation

Provision of world-class, economically sustainable health care in Western Australia (WA) faces challenges that arise from multiple factors, including a growing and ageing population as well as new lifestyle and technological demands. Health and medical research, innovation and commercialisation (hereafter all references to research, innovation and commercialisation should be taken as being related to health and medical fields) can make important contributions to addressing these challenges while creating jobs and new industries, and bringing broader economic benefits to the State.

Research and innovation can improve health care through advancements in medical knowledge, policy and practice, the development of innovative technology and contributing to the attraction and retention of a high calibre health and medical workforce. Research discoveries in WA have transformed health and health care. For example, the research of Professor Fiona Stanley and her team resulted in new public health programs to prevent neural tube defects in children, while the ground-breaking research of Professor Barry Marshall and Dr Robin Warren revolutionised therapy for stomach ulcers by discovering an infectious cause.

Many reports have argued that spending on research and innovation can be considered as an investment, not a cost with a recent example being a 2016 study commissioned by the Australian Society for Medical Research. This study showed an estimated economic dividend of \$3.20 for every \$1.00 invested in the research workforce¹. Further downstream from investment in research, benefits continue to accrue. According to a review commissioned by the Medical Technology Association of Australia, as of 2015 there were more than 500 medical technology companies in Australia with a combined annual turnover of more than \$10 billion².

The medical research sector is also an important source of employment in Australia. A 2018 study commissioned by the Association of Australian Medical Research Institutes found that more than 110,000 people were employed in the medical research sector in 2016/17. Of these, 32,000 work in professional, scientific and technical services positions, including medical research institutes, universities and hospitals³. However, this total does not include innovation and commercialisation occupations. By way of comparison, in February 2019 the entire Australian mining sector employed 250,000 people⁴.

State Government funding support for research, innovation and commercialisation

The State Government has in recent years invested more than \$130 million in new research facilities co-located with major hospitals, such as the Harry Perkins Institute of Medical Research, the Telethon Kids Institute and the Ralph and Patricia Sarich Neuroscience Research Institute. The State Government also contributed \$10 million to the establishment of Linear Clinical Research, a now thriving clinical trials facility employing over 100 people.

¹ Deloitte Access Economics. 2016. "Australia's health and medical research workforce: Expert people providing exceptional returns." *Report for The Australian Society for Medical Research*.

² Deloitte Access Economics. 2015. "Medical technology industry workforce and skills review." *Review for the Medical Technology Association of Australia*.

³ KPMG. 2018. "*Economic Impact of Medical Research in Australia*." Report for the Association of Australian Medical Research Institutes.

⁴ Australian Bureau of Statistics. 2019. "Labour Force, Australia, Detailed, Quarterly." Cat. no. 6291.0.55.003, trend.

The WA Department of Health (hereafter referred to as the Department of Health) supports research activities both within the WA health system and more widely across the WA research sector. Since 2014/15, the Department of Health has provided more than \$100 million in research funding support across the WA research sector.

In 2017, the McGowan Labor government committed to establishing the Future Health Research and Innovation (FHRI) Fund. The commitment states that the \$1.3 billion Western Australian Future Fund will be re-purposed, directing investment earnings from the fund to research, innovation and commercialisation. Once the FHRI Fund is established, it promises to provide a secure source of funding for research, innovation and commercialisation in WA, allowing pursuit of long-term objectives. The FHRI Fund will also anchor strategies to leverage major additional funding from the Australian Government, other research and innovation funders, investors, industry, and the private and philanthropic sectors.

Other State Government agencies are also providing major investments in research and innovation. For example, the Department of Jobs, Tourism, Science and Innovation established the New Industries Fund (the NIF) in November 2017 as a four-year \$16.7 million fund to support and accelerate new and emerging businesses in WA. Among other initiatives, the NIF committed \$1.2 million over four years to establish a medical technology, biotechnologies and pharmaceuticals innovation hub (WA Med Tech Pharma Connect Hub), \$800,000 over four years to establish the Data Science Innovation Hub and \$800,000 over four years to establish the Joondalup Innovation Hub (Cyber). Each of the WA Med Tech Pharma Connect and Joondalup hubs has also attracted funding from the Australian Government through the Industry Growth Centres program.

Lotterywest and Healthway also support research in WA. For example, Lotterywest contributed approximately \$7 million in grants to new tenants of the Sarich Neuroscience Research Institute and \$7 million for the Biodiscovery Centre in the Harry Perkins Institute of Medical Research (Queen Elizabeth II Medical Centre). In 2017/18, Healthway provided over \$2.2 million in research grants that contribute to health promotion and disease prevention.

Opportunities

Funding for research and innovation in Australia continue to be supported by the Australian Government's National Health and Medical Research Council (approximately \$850 million per annum) and the Australian Research Council (approximately \$900 million per annum). However, major new Australian Government funding opportunities have recently been implemented, including the Medical Research Future Fund (over \$600 million per annum once fully operational) and the Biomedical Translation Fund (\$500 million capital investment fund). Existing and new State Government investments in research and innovation and commercialisation can position WA researchers and innovators to increase their competitiveness for national funding.

Making WA a preferred destination for the conduct of clinical trials is another significant opportunity for the State. Clinical trials provide health benefits directly to the trial participants, generate the evidence required to make new treatments available, help to attract and retain the best clinicians and contribute to the economy by encouraging industry investment.

The WA Health and Medical Research and Innovation Strategy

The FHRI Fund will build on significant State Government research and infrastructure investment, act as a powerful lever to access major Australian Government funding and bring more clinical trials to WA. The expected benefits will accrue to:

- the health and wellbeing of Western Australians;
- the quality of the WA research and innovation ecosystem;
- sustained employment and economic growth; and
- the reputation of WA as a leader in research, innovation and commercialisation.

In order to fully realise these benefits, a coordinated, strategic approach is required in WA. Therefore, the Department of Health is developing a Health and Medical Research and Innovation strategy (the Strategy).

2. Purpose

The purpose of this Discussion Paper is to inform dialogue between WA research, innovation and commercialisation stakeholders, prior to parallel online and face-to-face consultations being conducted in May 2019. Specifically, the Discussion Paper provides:

- context for why the consultations are being conducted;
- guidance regarding the scope of this paper, the Strategy and the consultations;
- a description of preliminary ‘themes’ that will be explored and expanded on during the consultations; and
- focus questions to stimulate stakeholder discussions.

The outcomes from the May 2019 consultations will inform the Strategy for supporting a vibrant research, innovation and commercialisation ecosystem in the State. The Strategy will form the basis for the funding priorities of the FHRI Fund.

A world-class research, innovation and commercialisation ecosystem is diverse and complex, requiring involvement of consumers, the public and private health systems, primary care, investors, the commercial and academic sectors, as well as multiple state and national government agencies. All stakeholders have a role to play in realising the potential outcomes of the Strategy but each will engage with the Strategy to the extent and in the manner that is appropriate for them.

The Department of Health commits to pursuing the objectives of the Strategy and will utilise policy and funding levers, such as the FHRI Fund (see section 4) to achieve them.

3. Scope

The scope of this Discussion Paper includes research, innovation and commercialisation activities aimed at or contributing to, directly or indirectly:

1. *understanding or improving human health and wellbeing;*
2. *enhancing the quality, efficiency or effectiveness of human health or medical care; and*
3. *fostering excellence which contributes to the strategic development and growth of research, innovation and commercialisation in Western Australia.*

Therefore, stakeholders for the Strategy are diverse, including but not limited to, consumers, training organisations, philanthropists, private companies, investors, research institutions, health service providers, the State Government, the Department of Health, other State Government agencies and national and international research and innovation funders. All stakeholders have a role in setting and implementing the themes that will be set out in the Strategy.

The scope and preliminary themes of the Strategy have been developed through consultations and synthesis of other strategies and reports (see section 4).

The consultations being conducted in May 2019 include a focus on developing a state-wide strategy for cancer research (see section 4). The present Discussion Paper focusses on research and innovation generally and it is expected that the approach to cancer research will build on this discussion and will be synergistic.

4. Foundations for the Discussion Paper

The preliminary themes presented in the Discussion Paper are based on the FHRI policy of the State Government, consultations conducted or commissioned by the Department of Health, as well as recommendations from major reports. The Department of Health is also aware that several stakeholders for the Strategy have developed, or are developing, their own research strategies and plans. Wherever possible, the preliminary themes have been developed to complement such other strategies and plans. Finally, the Discussion Paper is designed to focus both inwards (e.g. WA-specific strengths and needs) and outwards (e.g. current, emerging and potential opportunities).

State Government Future Health Research and Innovation (FHRI) policy

Through the 2017 FHRI policy, the State Government has committed to establishing the FHRI Fund, a strategic approach to cancer research and an Innovation Hub at Royal Perth Hospital.

FHRI Fund

The FHRI Fund will drive research and, ultimately, improve the health and prosperity of Western Australians by providing a long-term, secure source of funding for research, innovation and commercialisation in WA.

The FHRI Fund will include two funding streams: research; and innovation and commercialisation. Disbursements will be strategically targeted and selection processes used will include competitive independent peer review to ensure world class quality.

The FHRI Fund will be created by repurposing the current WA Future Fund, which requires amendments to the *Western Australian Future Fund Act 2012*. The capital of the fund will be maintained and annual investment earnings from the capital will be directed towards research, innovation and commercialisation.

Cancer research

The FHRI policy states that providing a strategic approach to cancer research will attract and retain top cancer specialists in WA, develop the skills of the WA cancer workforce and ensure WA patients get access to world-first treatment trials. In order to deliver coordinated, high standard, consumer-focussed care and in recognition of the critical role research plays in providing and advancing cancer care, a comprehensive five-year Cancer Plan will provide the overall strategic direction for both cancer control and cancer research for WA. This will be in the form of the *WA Cancer Plan 2020-2025*.

Royal Perth Hospital Health and Medical Innovation Hub

The Innovation Hub at Royal Perth Hospital is set to become a leading modern medicine hub that hosts and fosters new research and innovation in WA. To facilitate collaboration and globally significant research, the Innovation Hub will provide facilities and services to emerging and established medical innovation research organisations.

Deputy Premier’s Health and Medical Research Roundtable

In December 2017, the Deputy Premier hosted a roundtable with WA research stakeholders to frame the FHRI Fund’s establishment; discuss WA’s research environment; and explore the future plans for research in WA. Participants in the roundtable included representatives from consumer networks, the Department of Health, Health Service Providers, the Western Australian Health Translation Network, State government, the university sector, research institutes, and eminent researchers. Conversations centred on the themes of People, Platforms, and Partnerships. It was acknowledged that funding models should emphasise health outcomes and societal impact, not just traditional research outputs. Discussions also highlighted the importance of:

- community involvement in research activities;
- support for researchers;
- leadership from Government and the health sector;
- improving data accessibility to attract top researchers; and
- state, national and international collaboration.

Review of research, innovation and commercialisation (2018)

In 2018, the Department of Health commissioned a review of the research, innovation and commercialisation landscape in WA, Australia and internationally. More than 60 consultations contributed to this review, which identified four funding objectives and 11 funding principles with relevance to the FHRI Fund (Table 1) and, therefore, to the Strategy⁵.

Table 1. Funding objectives and principles

Funding objectives	Prioritise disease prevention, improved clinical outcomes and creation of a sustainable WA healthcare system	Grow our research talent and strengthen WA’s research and innovation culture	Maximise the global potential of WA’s research and innovation ecosystem	Support research translation to improve the health and wellbeing of people in WA
Funding principles	Address unmet health need Focus on outcomes Complement existing sources of funding Recognise innovation from other sectors Involve and have the support of the community	Encourage collaborative behaviour Support the research workforce pipeline	Recognise innovation from other sectors Support research and innovation with potential for commercialisation	Address the whole translational spectrum Recognise the need for good data Address unmet health need Recognise balance of risks and potential benefits

⁵ Deloitte Access Economics. 2018. “Baseline Review for the Future Health Research and Innovation (FHRI) Fund – Final Report.” *Report for the WA Department of Health*.

Sustainable Health Review Final Report

The Government of Western Australia released the Sustainable Health Review (SHR) Final Report in April 2019 to guide the WA health system to deliver patient-orientated, innovative and sustainable health care into the future⁶. The need for a health review focusing on sustainability was born out of the recognition that Western Australia has an ageing population, public expectations of the health system are rising, and the cost of health care is increasing.

The SHR Final Report identifies eight Enduring Strategies to progress the WA public health system's sustainability agenda and 30 recommendations for how the Enduring Strategies can be addressed. The Enduring Strategies are:

1. Commit and collaborate to address major public health issues
2. Improve mental health outcomes
3. Great beginnings and a dignified end of life
4. Person-centred, equitable, seamless access
5. Drive safety, quality, and value through transparency, funding and planning
6. Invest in digital healthcare and use data wisely
7. Culture and workforce to support new models of care
8. Innovate for sustainability.

While all of the Enduring Strategies are amenable to being addressed through research and innovation, three recommendations from two Enduring Strategies have explicit research-related implementation priorities:

Recommendation 21 (Enduring Strategy 6)

Invest in analytical capability and transparent, real-time reporting across the system to ensure timely and targeted information to drive safety and quality, to support decision making for high value healthcare and innovation, and to support patient choice.

Priorities for implementation include:

- Implementation of modern governance for more timely and comprehensive whole-of-government and research access to data linkage services for more effective research, service planning and investment to meet community needs.

Recommendation 28 (Enduring Strategy 8)

Establish a system-wide network of innovation units in partnership with clinicians, consumers and a wide range of partners to quickly develop, test and spread initiatives delivering better patient care and value.

All six priorities for implementation are relevant to research and/or innovation. Key foci include: establishing the FHRI Fund to foster a culture of innovation; creating innovation units in the health system; providing a central coordinating unit for guidance on intellectual property and

⁶ Sustainable Health Review. 2019. "Sustainable Health Review: Final Report to the Western Australian Government." *Department of Health, Western Australia.*

commercialisation matters; the emerging field of precision medicine and public health; and linking to commercial potential in Asia.

Recommendation 29 (Enduring Strategy 8)

Ensure that future research activities and investments are linked to the priorities of the WA health system and are actively translated into practice.

All four priorities for implementation are relevant to research and/or innovation. Key foci include: establishing the FHRI Fund to foster a vibrant research and translation culture in WA; establishing a sustainability research and development function; hardwiring research and translation metrics in agreements and policies; and development of a research strategy.

Other sources

Relevant reviews, strategies and frameworks have contributed to the development of the preliminary themes presented in this Discussion Paper. These include: the 2016 Review of Western Australia's data linkage capabilities, led by Professor Peter Klinken AC, Chief Scientist of WA⁷; the Medical Research Future Fund: Australian Medical Research and Innovation Strategy 2016-2021⁸; the Australian Government's 2016 National Research Infrastructure Roadmap⁹; the 2016 Western Australian Innovation Strategy¹⁰; and research-related plans and strategies for WA public Health Service Providers and functional units within the Department of Health.

⁷ Data Linkage Expert Advisory Group. 2016. "A review of Western Australia's data linkage capabilities". Commissioned by the WA Department of the Premier and Cabinet.

⁸ Australian Government, Medical Research Future Fund. 2016. "Australian Medical Research and Innovation Strategy 2016-2021."

⁹ Australian Government. 2016. "2016 National Research Infrastructure Roadmap".

¹⁰ Government of Western Australia, Office of the Government Chief Information Officer. 2016. "Western Australian Innovation Strategy".

5. Themes

Theme 1: Policy and Practice

Focus 1: Bridging translation and implementation

At its most basic, the purpose of research is to improve the health and wellbeing of people. However, it is a long and multifaceted journey to take a bright idea all the way through to providing an improvement in health and wellbeing. The end part of this journey is called 'research translation', which is the process of moving knowledge into action through the exchange of information and evidence between knowledge producers and knowledge users¹¹. However, research can get 'lost in translation' because knowledge producers may lack funding, incentives, or technical expertise to advance further. Likewise, knowledge research users, including the health system, may not have appropriate pathways to identify and implement new knowledge as it becomes available. Both sides of the research translation divide need to be addressed to ensure investment in research and innovation is as efficient as possible. Mechanisms and infrastructure are required to accomplish translation in a systematic way, so that the sum of the data and information produced by the fundamental science results in tangible public benefit, thereby maximising returns from public investment in research.

Focus 2: Promoting and enabling commercialisation

Commercialisation is the process by which the benefits available from an innovation are made accessible to a market¹². Relatively few research discoveries have commercialisation potential and success. The path from laboratory to industry is time-consuming, risky and costly. There remains a shortfall of funding, incentives, and systematised processes for translating research into commercial application. A strong commercialisation environment needs clear Intellectual Property (IP) processes, accessible sources of commercialisation expertise, and incentives to commercialise discoveries. Successful commercialisation results in: economic gain, job and start-up creation; career development; positive publicity and awareness of the research and inventions; and a perception of a strong entrepreneurial and innovative culture. Commercialisation successes and the resulting publicity can help to retain and attract researchers, partners and investors to WA.

Focus 3: Legislation and policy

The research and innovation ecosystem in WA is subject to State and Federal laws and policies. However, some of these laws and policies may be outdated, inappropriate, silent or non-existent in regard to enabling research and innovation. A whole-of-system approach to reviewing, amending, and developing necessary legislation will produce many benefits including:

- easier sharing and access to data while maintaining appropriate levels of protection of privacy;

¹¹ Australian Government, Department of Health. 2018. "Research translation." Accessed April 17, 2019. <https://beta.health.gov.au/initiatives-and-programs/medical-research-future-fund/about-the-mrff/research-translation>.

¹² Australian Government, Medical Research Future Fund. 2016. "Australian Medical Research and Innovation Strategy 2016-2021."

- greater consistency and coordination of the ethics and governance processes that human research must adhere to;
- removal of barriers to collaborative workspaces; and
- agreed key performance indicators for research and innovation in the WA public health system.

Theme 1: Focus questions

1. *What action or opportunity has the greatest potential for enhancing translation of research into health care policy and practice, and how can this be realised?*
2. *What action or opportunity has the greatest potential for enhancing translation of research into commercial outputs and how can this be realised?*
3. *What new or amended policy/legislation would provide the most benefit to research, innovation and/or commercialisation?*
4. *In the context of current activities in WA, where are the greatest requirements/needs to aid innovation?*
5. *How can the FHRI Fund engage with the investment community in a structured and equitable way?*

Theme 2: Partners

Successful collaboration with stakeholders across all stages of research can lead to more innovative and meaningful research. Partnerships also provide opportunities to access new markets, leverage new funding and reduce duplication of effort. Potential partners in the research ecosystem include: consumers; national and international funders; industry; research institutes; WA’s private and public health service providers; the education and training sector; and other State Government agencies. The Western Australian Health Translation Network (WAHTN), WA’s National Health and Medical Research Council (NHMRC)-endorsed Advanced Health Research Translation Centre, is already playing a key role in coordinating research effort across the State but more can be done. Identifying and establishing productive partnerships can be a catalyst for realising all aspects of the Strategy.

Theme 2: Focus questions

6. *What are the key strategic partnership opportunities that should be explored through the FHRI Fund?*
7. *What barriers are there to effective partnerships in innovation and/or research?*
8. *What incentives or supports would encourage the development and success of partnerships for the overall benefit of WA?*

Theme 3: People

Focus 1: Empowering health consumers and research participants

Consumer needs are integral to all research questions, decisions and processes. This is because the overall goal of research is to improve the health and wellbeing of health consumers by reflecting their needs and priorities. Whether this is through diagnosing a new genetic disease, testing a new drug or public health intervention, or commercialisation of a new medical device, improving human health is the underlying purpose. However, an active engagement approach is required to ensure research and innovation aims match the needs of the end user of the research or innovation. Such engagement is necessary throughout the research and innovation continuum.

Focus 2: Support for researchers and innovators

Ensuring WA researchers and innovators have support at all career stages is essential to achieving and maintaining an intellectual critical mass. While a fellowships program for key career stages is one useful tool in this regard, training, industry placements and international exchange programs may also be valuable. A WA research and innovation ecosystem with a reputation for providing support at all career stages will enhance the State's reputation as a destination of choice for researchers and innovators and encourage the next generation to take up the study of science.

Focus 3: A future-ready workforce

New technological advances such as the availability of extremely large and/or complex data sets (i.e. 'big data'), artificial intelligence and immersive communications have the potential to transform health care and the way it is delivered. Specialist expertise is also required to bridge the gap between research and implementation, and researchers and policy-makers. A critical mass of expertise in these areas, and others, is required to not only keep up with technological advances but to drive their development. Potential areas to build capacity in include data science and management, research ethics, health economics, informatics, technology and engineering, and implementation science. A long-term direction for the jobs and skills that will be needed in the future is required for WA's research and innovation ecosystem to prosper.

Focus 4: Clinician researchers and innovators

Clinicians, including medical doctors, nurses, midwives and allied health professionals, are in a unique position to identify clinical needs and to implement and translate new knowledge and innovations. Therefore, there is a clear value proposition for all clinicians to be involved in developing and testing interventions that address needs they have identified and to help put them into practice. Benefits of a research-active clinical workforce accrue to the health service through workforce attraction and retention, to the clinicians through job satisfaction and skill development, to patients who have access to the best care and new interventions, and to the health system, through improvements in efficiency and effectiveness. Workplace culture, research support systems and resources, training, collaborative opportunities and established career pathways may all be important to elevating the research activity of the clinician workforce.

Theme 3: Focus questions

9. *How can consumers, researchers and innovators be brought together in a systematic and ongoing way?*
10. *How can consumers upskill their understanding of research and health in general?*
11. *What kind of support would be most beneficial to providing career options and confidence to researchers or innovators?*
12. *What research or innovation-enabling skills or professional disciplines are most needed in WA today and will be needed in the future?*
13. *What is the most significant gap or barrier to clinicians participating more in research, innovation and/or entrepreneurial activities and how can this be addressed?*
14. *What cultural barriers are there to thriving research and innovation in health service providers, universities and research institutes (or other workplace)?*

Theme 4: Platforms

Focus 1: Infrastructure

Research infrastructure comprises significant assets, facilities and services that support leading-edge research and innovation. It includes equipment, instruments, knowledge-based resources, and information and communication technology (ICT). High-quality infrastructure can provide a competitive edge to the researchers and innovators who use it, enhancing their productivity and the reputation of the State. Collaboration, multidisciplinary research and attracting international researchers, innovators and companies are all potential benefits of having the right research and innovation infrastructure.

Focus 2: Data

High-quality data have always been fundamental to testing hypotheses and to making clinical decisions. However, due to the massive proliferation in the quantity and complexity of health data, new systems, skills and policies are required to enable, not stifle, research and innovation. The SHR Final Report recommends building capacity and capability in data analytics, while protecting privacy and confidentiality in order to capitalise on emerging technologies such as predictive analytics and big data. Data linkage (connecting pieces of information that are thought to relate to the same person, family, place or event) is an incredibly powerful research tool and WA has been at the forefront of this field for many years. However, enhancing WA's data linkage system through strategic investment and process enhancements is required to ensure demands for linked data can be met, to facilitate research and to maintain robust governance procedures¹³.

Digital health is the electronic management of health data, shared securely between different points of care, to facilitate safer, more efficient and higher quality health care¹⁴. Digital health information can be generated by many means, including by wearable health-related technologies, devices, sensors, apps and test results. Previous consultations have indicated that there is a need for a State-wide electronic medical record to maximise the value of health

¹³ Data Linkage Expert Advisory Group. 2016. "A review of Western Australia's data linkage capabilities". Commissioned by the WA Department of the Premier and Cabinet.

¹⁴ Australian Digital Health Agency, Australian Government. 2016. Accessed 16 April, 2019. <https://www.digitalhealth.gov.au/get-started-with-digital-health/what-is-digital-health>.

data. WA already has a well-developed telehealth service, operated by the WA Country Health Service, but there are many more current and emerging opportunities to use digital health to provide greater equity in the delivery of health services across WA. Other benefits of developing digital health capacity include empowering consumers to take control of their health, avoided hospital admissions, reduced test duplication, improved coordination of care for people with chronic and complex conditions, better informed health decision-making and reduced overall costs of health care.

Focus 3: Precision health

Precision health is an approach to health care in which healthcare professionals and policy makers can tap into technology and quality data to provide targeted, predictive and personalised health care. Precision health aims to equitably, effectively and efficiently improve health at the population level, by harnessing the potential for data linkage, big data, spatial technology, machine learning, and various -omics platforms to be utilised in combination with existing methods. Precision health considers individual lifestyle, genetic, behaviour and environmental factors and goes beyond the treatment of existing diseases and conditions to predicting and preventing disease manifestation and facilitating earlier intervention¹⁵. This could eventually allow for a transition from reactive to proactive health care, with improved health outcomes for consumers and economic benefits for WA. Precision health captures biological, clinical and behavioural outputs which could influence how clinicians educate patients about risk of disease and illness so that healthcare services are delivered to the right patient, in the right place at the right time. Precision health is a unique and emerging strength of the WA research and innovation ecosystem, as reflected by the development of the Australian National Phenome Centre on the Fiona Stanley Hospital campus, by WA hosting the first Precision Public Health Asia conference in 2018 and the establishment of the Ministerial Precision Health Council in 2019. Therefore, there is an opportunity to build capacity in this area, placing WA to become a global leader in cutting-edge precision health capability.

Focus 4: Clinical trials

Clinical trials are a vital means to evaluate the effects of an intervention on health outcomes in humans¹⁶. Clinical trials may study new drugs or drug combinations, surgery methods, medical devices, new uses for existing treatments and behavioural methods to promote health. As described previously in this Discussion Paper, clinical trials have benefits for immediate and future consumer health, the clinical workforce, health care efficiency and effectiveness, and the economy. The State Government is already investing in support structures for clinical trials, including by establishing and funding the WAHTN Clinical Trials and Data Management Centre, creating Clinical Trial Liaison Officer positions in partnership with the Commonwealth Government and WA Health Service Providers, and development of a research governance information technology system. However, with increased focus on clinical trials by the Australian Government and major opportunities to bring early-phase and large multi-site trials to WA, further investment may be warranted. Supporting new trial methodologies and enabling technology such as artificial intelligence-aided recruitment, may give WA a competitive advantage in this regard.

¹⁵ CSIRO. 2018. "Precision Health- Transforming Australia's Health." Accessed 17 April, 2019. <https://www.csiro.au/en/Research/Health/Future-Science/Precision-Health>.

¹⁶ Australian Government, National Health and Medical Research Council, Department of Industry, Innovation and Science. 2015. "What is a clinical trial?." Accessed 17 April, 2019. <https://www.australianclinicaltrials.gov.au/what-clinical-trial>.

Theme 4: Focus questions

- 15. What infrastructure could WA invest in to assist in securing a position as a world-leader in a particular area of research or innovation (note: may include infrastructure to remain a world-leader in a particular area)?*
- 16. What is the most important data-related challenge WA research and innovation sectors will face and how can it be addressed?*
- 17. What emerging areas of digital health research should WA seek to build expertise in and why?*
- 18. How can precision health research best improve health service delivery and health outcomes in WA?*
- 19. What system or support structure will be most useful to improving the quality and quantity of clinical trials in WA?*

Theme 5: Priorities

Health, research or innovation issues and opportunities can arise where a rapid response is required. A flexible and dynamic approach can be used to fast-track solutions to a health-related issue, or to enhance prominence in an area of strength or unique opportunity. By building a reputation for adaptive problem solving, more opportunities for funding, partnerships and business investment will follow for the WA research and innovation ecosystem.

Theme 5: Focus questions

- 20. What pressing need or opportunity would be amenable to being addressed through short-term research or innovation activities?*
- 21. How can a funding program be designed to allow diverse and 'out of the box' approaches to addressing an issue, involving interdisciplinary collaborations, including between atypical disciplines?*
- 22. What mechanisms can be used to identify priorities?*
- 23. How should funding be allocated between different priorities?*

6. Evaluation of impact

In the context of health and medical research and innovation, 'impact' can be considered to occur when the research or innovation activity generates health, cultural, or economic benefits, including through contribution of new knowledge in regard to these areas. However, measuring research impact in a meaningful way is challenging and it is important to assess the success of the Strategy and the FHRI Fund by considering various factors that contribute to 'impact' in a contemporary context. It is also noted that many desirable impacts, such as better health or economic prosperity, may take many years to reach a stage that can be measured quantitatively. Measures of impact could include:

- health care delivery outcomes (e.g. quality and efficiency measures);
- long-term population behavior outcomes (e.g. economic outcomes and behavior changes);
- policy outcomes (e.g. changes to policies, pathways and guidelines);
- translational outcomes (e.g. public engagement, commercialisation and implementation of interventions);
- academic outputs (e.g. publications and new research funding).

Evaluation of impact: Focus question

24. What measures are most important to determining if the Strategy, and the FHRI Fund, have been successful?

7. Next steps

The online and face-to-face consultations being held in May 2019 will test and refine the five potential themes proposed in this Discussion Paper. Focus questions have been provided to guide discussion at the face-to-face forum and written responses submitted through the online consultation space. Stakeholders attending the forum are welcome to submit a written response via the online consultation space.

The online consultation space allows stakeholders to describe up to two research or innovation priorities that do not already feature in this Discussion Paper. Submitted priorities should be critical to improving human health and wellbeing, capturing an emerging opportunity, or building the research and innovation ecosystem in WA.

Responses received through the online consultation space and outputs from the forum will be carefully considered by the Department of Health before being synthesised into a Health and Medical Research and Innovation Strategy (the Strategy), which will be presented to the Minister for Health for endorsement.

The approved Strategy will form the basis from which priorities for the FHRI Fund will be developed.

References

- ¹ Deloitte Access Economics. 2016. "Australia's health and medical research workforce: Expert people providing exceptional returns." *Report for The Australian Society for Medical Research*.
- ² Deloitte Access Economics. 2015. "Medical technology industry workforce and skills review." *Review for the Medical Technology Association of Australia*.
- ³ KPMG. 2018. "*Economic Impact of Medical Research in Australia*." Report for the Association of Australian Medical Research Institutes.
- ⁴ Australian Bureau of Statistics. 2019. "Labour Force, Australia, Detailed, Quarterly." Cat. no. 6291.0.55.003, trend.
- ⁵ Deloitte Access Economics. 2018. "Baseline Review for the Future Health Research and Innovation (FHRI) Fund – Final Report." *Report for the WA Department of Health*.
- ⁶ Sustainable Health Review. 2019. "Sustainable Health Review: Final Report to the Western Australian Government." *Department of Health, Western Australia*.
- ⁷ Data Linkage Expert Advisory Group. 2016. "A review of Western Australia's data linkage capabilities". Commissioned by the WA Department of the Premier and Cabinet.
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Appendix A: Discussion Paper questions

Number	Question
1	What action or opportunity has the greatest potential for enhancing translation of research into health care policy and practice, and how can this be realised?
2	What action or opportunity has the greatest potential for enhancing translation of research into commercial outputs and how can this be realised?
3	What new or amended policy/legislation would provide the most benefit to research, innovation and/or commercialisation?
4	In the context of current activities in WA, where are the greatest requirements/needs to aid innovation?
5	How can the FHRI Fund engage with the investment community in a structured and equitable way?
6	What are the key strategic partnership opportunities that could be explored by the FHRI Fund?
7	What barriers are there to effective partnerships in innovation and/or research?
8	What incentives or supports would encourage the development and success of partnerships for the overall benefit of WA?
9	How can consumers upskill their understanding of research and health in general?
10	How can consumers, researchers and innovators be brought together in a systematic and ongoing way?
11	What kind of support would be most beneficial to providing career options and confidence to researchers or innovators?
12	What research or innovation-enabling skills or professional disciplines are most needed in WA today and will be needed in the future?

13	What is the most significant gap or barrier to clinicians participating more in research, innovation and/or entrepreneurial activities and how can this be addressed?
14	What cultural barriers are there to thriving research and innovation in health service providers, universities and research institutes (or other workplace)?
15	What infrastructure could WA invest in to assist in securing a position as a world-leader in a particular area of research or innovation (note: may include infrastructure to <i>remain</i> a world-leader in a particular area)?
16	What is the most important data-related challenge WA research and innovation sectors will face and how can it be addressed?
17	What emerging areas of digital health research should WA seek to build expertise in and why?
18	How can precision health research best improve health service delivery and health outcomes in WA?
19	What system or support structure will be most useful to improving the quality and quantity of clinical trials in WA?
20	What pressing need or opportunity would be amenable to being addressed through short-term research or innovation activities?
21	How can a funding program be designed to allow diverse and 'out of the box' approaches to addressing an issue, involving interdisciplinary collaborations, including between atypical disciplines?
22	What mechanisms can be used to identify priorities?
23	How should funding be allocated between different priorities?
24	What measures are most important to determining if the Strategy, and the FHRI Fund, have been successful?

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