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Expert Report 3

Building capabilities to drive health system improvements

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This Expert Report was undertaken by the Sax Institute for the NSW Special Commission of Inquiry into Healthcare Funding.

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Key points

The people of NSW would significantly benefit from a more explicit alignment of health system and research priorities, a greater emphasis on research translation and funding to support this, removal of barriers to enable timely access to large data assets and stronger and more transparent partnerships with the academic, non-government and community sectors.

Ensuring research, data and evidence are a core part of the NSW Health system will improve health outcomes, deliver innovative and effective models of care, drive health system efficiencies, help improve the morale of the health workforce and attract key clinician researchers.

- There are innovations and programs within NSW that, if implemented at scale, could improve health outcomes and create health system efficiencies. However, many of these exist in geographical pockets and are not widely implemented.
- Research can provide evidence of the effectiveness of innovations, but the systematic translation of research evidence into clinical practice needs to be implemented at scale across the health system to achieve maximal impact.
- A stronger alignment of research programs and research funding with health system priorities would improve impact of research outcomes by ensuring the findings are actionable and scalable.
- Implementing a portfolio approach to research funding and innovation is a key part of investing in research to ensure the outcomes are ‘fit-for-purpose’ and able to be scaled across NSW, if found to be effective.
- Priority research centres are one proven mechanism for generating policy-relevant research and advice in a timely fashion. These could be expanded to a broader range of health system priority areas.
- NSW could better maximise the benefits of existing partnerships with the academic and research sectors, including existing groups like Research Translational Centres (RTCs), to attract and secure Commonwealth funding to address state and local priorities.
- An important facilitator of evidence translation is the research and evaluation capability and data literacy of the health workforce. Ensuring sufficient resources and time for clinicians to undertake priority research is a critical enabler. Evidence has shown that participating in research enhances clinicians’ attitudes towards research, increases uptake of research evidence into practice and results in better job satisfaction.
- Developing more streamlined access to linked health data and reducing administrative barriers to big data would provide researchers and clinicians with the core information to implement large-scale research and evaluations in a timelier way.

Introduction

1. In formulating its recommendations, the Special Commission of Inquiry into Healthcare Funding (the Inquiry) is interested in the capabilities required to drive health system improvements.

2. To inform the deliberations of the Inquiry, the Sax Institute was commissioned to provide expert advice on:
   a) Building the capability to translate and adopt effective local innovations and new models of care
   b) Ensuring that decision-making is informed by the best available evidence.

Overview

3. In many high-income countries, health systems and the quality of health care have been described as being 'in crisis'.[1] Like many countries, Australia's healthcare system is challenged by growing rates of chronic and emerging diseases, ageing populations, inequities in service access and health outcomes, and rising costs.[2] In Australia, healthcare spending as a percentage of GDP continues to grow and may double over the period 2010–2050.[3]

4. There are many existing policies and programs that are capable of alleviating much of the disease burden.[4] Yet, despite the potential benefits, the translation of effective innovations into clinical practice or health policies and programs often fails.

5. Even when translation efforts are successful, interventions are rarely implemented at scale across health systems, which is required to achieve widespread impact.[5,6] As a result, while new evidence-based knowledge has proliferated, health benefits have not occurred at the same pace or scale.[7]

The gap between evidence and practice – where are we now?

6. Currently, there is considerable variation in the quality of care provided across the Australian healthcare system.[8] Research and innovation occurs in pockets, where the necessary leadership and enabling workforce and infrastructure has been established.[9,10]

7. There have been significant efforts from health services, health system managers, research funders and researchers over recent decades to close evidence-practice gaps in health care.[11,12] Despite these efforts, the gap has been stubbornly persistent not only in Australia, but also in the United States and England, leading to what Braithwaite and colleagues describe as the 60-30-10 Challenge:[13]
   - 60% of care (on average) is in line with clinical guidelines and best evidence
   - 30% is low or no value care
   - 10% is harmful.

8. Of the innovations in health care that have been proven to benefit patients, only 14% end up being embedded and it takes an average of 17 years to do so.[14] The poor rate of translation of beneficial interventions into routine clinical practice and the time it takes to occur comes at a cost to patients, communities, society and the health system.

9. Bridging the evidence-practice gap is a critical challenge for health systems that must respond to relentless change in technology and the evidence on which health care is based, coupled with internal and external pressures and changing fiscal contexts[15]. The sheer volume of change in health systems is also accelerating with advances in precision medicine, genomics, new generation drugs, artificial intelligence, and brain sciences, which are all at different stages of development and uptake in health care systems.[16,17] To illustrate, a recent study suggests that research is making around 7% of 'best practice' obsolete each year.[18]

10. There is an urgent need for a conceptual leap in our understanding of how healthcare systems respond to these challenges. Braithwaite and colleagues suggest we need to marry ideas drawn from complexity science, data science and continuous improvement with proposals for creating a learning health system. This dynamic learning model has the potential to assemble relevant information including patients' histories, and clinical, patient, laboratory, and cost data for improved decision-making in real time, or close to real time.[19]

11. A learning health system of this kind in NSW will require collaborative effort and clear role delineation across the NSW Ministry of Health, Pillar organisations, Local Health Districts and specialty networks. It will also require a plan to improve key elements of learning health systems, including practice data collection and management systems; workforce development and learning communities, and effective governance and organisation processes.[20]

12. To illustrate, the Single Digital Patient Record (SDPR) program will need to be a central pillar of a learning health system in NSW.[21] The SDPR will unify access to patient clinical information in one view. This will help to provide connected, transparent and safe care for any person at any public healthcare setting statewide. It could be a tool to integrate the latest evidence into clinical decision-making and has the potential to be used as a platform for research and quality improvement.

Barriers to the integration of new evidence into health service delivery

13. Translating evidence into sustained system-wide change in complex health systems is not a simple or linear process.[22,23] The barriers to evidence use are well established in the literature and we already know a lot about how to address them.

14. Systemic barriers can include:[24,25,26,27,28,29]
    - Organisational and professional silos that are resistant to change
    - Pervasive competition
    - Lack of collaboration
    - Failure to engage relevant end users in research that results in research disconnected from the realities of clinical practice
    - Gaps in the necessary capacity and capability to undertake translational research and successfully implement changes in health policy and practice
    - Time consuming bureaucratic processes.

15. NSW Health has significant data holdings, and these assets have been linked to a wide range of additional data across Human Service Agencies, Primary Health Networks and research data sets such as biobanks and the 45 and Up Study. There is a wealth of information in these data assets that remains untapped, but that could be used to deliver actionable insights. Access to the data assets by researchers can be opaque and the process time consuming, using legacy data governance policies, thus limiting the ability of researchers to deliver actionable insights in a timely manner.

16. Importantly, the translation of research evidence into better health care appears more likely when it is connected to the needs and priorities of health services.[30]

International perspectives

17. The importance of aligning research with policy and practice has been known for decades. To address this in 2003, the US National Institutes of Health published a *Roadmap for Medical Research* to accelerate the adoption of scientific discoveries into health policy and clinical practice through better prioritisation of research, supporting collaboration and partnerships between researchers and health services.[31]

18. In the United Kingdom, the Office for Strategic Coordination of Health Research was established following a landmark review of health and medical research that identified a range of cultural, institutional and financial barriers to research translation in the country.[32]

19. These events were followed by substantive modifications to research funding schemes and infrastructure to support research collaboration and translation in the United Kingdom, United States and elsewhere. Evaluations of more applied, translation-focused research funding initiatives in Canada revealed they had greater impact on measures of knowledge translation and produced equivalent academic outputs (publications) than traditional open calls for research grants per dollar invested.[33]

20. Some countries also established translation centres, entities designed to build clinician research capacity and engage health systems and their staff in research to improve healthcare and patient outcomes. Examples include Collaborations for Leadership in Applied Health Research and Care (CLAHRCs), funded by the UK National Institute for Health and Care Research (NIHR). While translation centres have numerous case studies of impact,[34] quantification of their benefit requires further evaluation.[35]

21. In Australia, the landmark McKeon Strategic Review of Health and Medical Research was published in 2013.[36] It was commissioned to advance a vision where health and medical research is:

...fully embedded in all aspects of health care to deliver: 'Better Health Through Research' and achieve the aspiration for Australia to build and maintain the world's best and most efficient health system.

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22. The report recognised the disconnect between research enterprise and patient and health system needs. It made a range of recommendations including those aimed at embedding research in the health system (e.g. health workforce development, leadership and governance, clinical trial infrastructure); supporting priority driven research (e.g. national research rarities, dedicated research funding); and maintaining research excellence (e.g. research workforce development; building enabling infrastructure).

23. A range of national initiatives followed the publication of the McKeon Review. The most notable was the establishment of the Medical Research Future Fund (MRFF), which provides long-term strategic funding for translational research in Australia.[37] The scheme operates a perpetual fund, drawing on income generated from a government endowment, and supports a range of schemes aligned with research priorities over five-year investment plans.[38]

24. Significant changes were also made to National Health and Medical Research Council (NHMRC) research funding, including new schemes with an explicit focus on research priorities, supporting workforce development, partnerships and research translation including funding for 'Partnership Projects' and 'Centres for Research Excellence'.[39]

25. The Commonwealth Government also established and accredited:
    - Advanced Health Research Translation Centres (AHRTCs), to bring together hospital academic institutions and health service providers to accelerate the translation of research into health practice. These are now referred to as RTCs.
    - Centres for Innovation in Regional Health (CIRH), which have a similar function though focused on rural and regional Australia.[40]

26. Three such centres exist within NSW: Sydney Health Partners[41] and Maridulu Budyari Gumal - the Sydney Partnership for Health, Education Research and Enterprise[42] (both RTCs), and NSW Regional Health Partners (a CIRH).[43]

What are the key features of the NSW Health system for the generation and use of evidence?

27. In NSW, recognition of the need to better align research with efforts to improve the efficiency and impact of health services became evident more than 30 years ago as part of the NSW Health Outcomes Initiative.[44]

28. A notable shift in government action also occurred following the 2012 NSW Health and Medical Research Strategic Review. The review acknowledged the value of research for the NSW Health system and the state's economy more broadly, and was enacted, in part, because NSW was attracting less than its population share of NHMRC funding at the time.[45]

29. The review recommended the NSW Government undertake activities aligned with the virtuous cycle (a continuous gain of knowledge) and two broad strategies, many consistent with those to be recommended in the McKeon Review. First, fostering translation and innovation from research (e.g. leadership, clinical trials, supporting venture capital); and second, building globally relevant research capacity (e.g. via research hubs, workforce development, research infrastructure).[46]

Office for Health and Medical Research

30. The Office for Health and Medical Research (OHMR) was established to implement the key findings of the NSW Health and Medical Research Strategic Review.[47,48] It has since achieved each of the key actions outlined in the NSW Government's response to the review. Namely, it has overseen:
    - Significant changes to the Medical Research Support program that provides critical research infrastructure for the sector
    - The establishment of the Medical Devices fund, offering grants of up to $5 million to facilitate the development of new technologies[49]
    - The establishment of 'Research Hubs' to foster collaboration and coordinate the activities of Medical Research Institutes, Local Health Districts Universities and Medicare Locals
    - The establishment of a research capacity-building program.

31. Further, OHMR now provides a range of other vital services and infrastructure including:
    - A range of research funding schemes, such as the Translation Research Grant Scheme to provide funding for priority research for the state that can be directly implemented at scale, thus significantly reducing the time from evidence generation to impact
    - The purpose-built, state-of-the-art NSW Health Statewide Biobank supports clinical research by storing biospecimens and linking the information to historical personal health information, providing unique access to information to identify and improve prevention diagnosis, support precision medicine and treatment of life-threatening illness
    - A Clinical Trial Management System
    - Initiatives to strengthen and streamline research ethics and governance.

Agency for Clinical Innovation

32. The Agency for Clinical Innovation (ACI) was established in 2010. The ACI partners with the NSW Ministry of Health, Local Health Districts, clinicians, consumers and other stakeholders to achieve better value in health care through innovative models of care and by improving the experience and outcomes of healthcare services.[50] It has contributed to a number of significant improvements in patient care, including those leading to the establishment of Stroke Reperfusion services across NSW,[51] and the expansion of telehealth and virtual care.[52]

33. ACI also has a critical role in supporting the integration of evidence and innovation into the NSW health system. It fosters research translation via a range of strategies including supporting more than 40 clinical networks; establishing a clinical redesign program to facilitate the use of evidence in improving health care; a small grants scheme; and platforms including the ACI Innovation Exchange that support health services to share innovations and research findings across the health system.[53]

Funding schemes and support infrastructure

34. NSW supports a broad portfolio of research funding schemes and research infrastructure, including:

35. **NSW Medical Research Support Program**:[54] Provides critical infrastructure funding (up to $40 million per annum) to independent medical research institutes to cover some of the indirect costs associated with medical research with the aim of supporting research excellence. The funding provides opportunities for investment in critical medical research equipment, technologies, and human resource.

36. **Priority research centres and services**: NSW Health currently funds research institutions designed to undertake research considered of priority by the health system, or to provide speciality expertise and capacity to support research translation. For example, NSW Health supports research centres in Blood Borne Virus and Sexually Transmitted Infections.[55] The Sax Institute is commissioned to support the use of high-quality evidence and insights to guide decision-making. The Sax Institute focuses on improving health and wellbeing by driving the use of research in policies, programs and services. It works collaboratively to embed evidence into policies, programs and services by developing, testing and delivering best practice approaches to working at the interface of research and health decision-making. Typically, this work involves synthesising evidence, undertaking complex modelling and developing approaches to measure the effectiveness of interventions and policy change.

37. **Medical Research Institutes, Translational Research Centres and other centres**: Provide infrastructure to support local improvement initiatives. For example, the Hunter Medical Research Institute[56] brings together the University of Newcastle and the Hunter New England Local Health District, providing a number of accessible 'platforms' (e.g. health economics, biostatistics, etc) and equipment (biobanking, imaging, etc) to support research and local innovations.

38. **Research funding**: NSW supports several research schemes to undertake priority research for the health system. The schemes foster partnerships between researchers and NSW Health and/or Local Health Districts and have been found to be effective in facilitating innovation and impact. For example, the Translational Research Grants Scheme[57] was designed to support practitioner-led research that can be directly translated into practice in the state. Similarly, the Prevention Research Support Program[58] funding is awarded to build capacity and support prevention research aligned to NSW Health priorities. The scheme provides stability and flexibility and supports translation activities not possible via other funding schemes.[59,60]

39. **Clinical Trial Management System** (CTMS): NSW has a statewide CTMS available to support the conduct of all clinical trials in NSW public health organisations and provides an online repository for clinical trial management, supporting better and supports hospitals meet accreditation obligations under the National Clinical Trials Governance Framework.[61]

Case example 1: Investment in clinical researchers

NSW Health has a number of schemes to support clinician researchers, including the Early-Mid Career Grant program designed to support front line researchers by providing grants of up to $500,000 over 3 years for salary, professional development and research costs.

The initiative has been found to yield a range of beneficial impacts to health care, policy, community and the economy. For example, the return on investment was almost $7 for every dollar in NSW funding; the scheme produced 44% greater publication yield that similar career stage researchers; 30% of projects led to policy changes and 46% to research or health practice change in NSW.[62]

Case example 2: Sax Institute

In 2021 and 2022, the Sax Institute worked with hospitals across NSW to develop a sophisticated modelling tool to support decisions in managing COVID-19.

The tool drew on the emerging evidence base and simulated the movement of patients through 25 hospitals in NSW during a surge in COVID-19 cases. It showed the impact of COVID-19 across the hospital, including emergency departments and intensive care units as well as on the number of surgeries performed and elective surgery waitlists.

The project involved bringing together a large amount of data from 25 hospitals and consultations with clinicians and hospital managers to consider their priorities and where additional evidence was needed. Discrete event simulation technology – which models a system over time as a series of separate events – was then used to investigate different scenarios.

Multiple COVID-19 scenarios were tested with varying levels of patient numbers and severity of illness. Hospital responses to these scenarios were also tested, to see how the impact of a COVID-19 wave could be minimised by reducing or outsourcing elective surgeries or increasing the hospital beds available to patients leaving the emergency department.

Embedding evidence in health care in systematic and sustainable ways

40. In recent years, there have been several attempts from health organisations, researcher funders, and research organisations to better embed evidence in health care in more systematic and sustainable ways by matching health system needs and priorities with researcher capacity.[63,64,65,66]

41. At a more local level, interventions to support effective research translation have included greater engagement between researchers and decision makers,[67, 68, 69] improving access to research findings,[70] and skills development for translation among researchers and users of research.[71,72]

Research funding that targets health system priorities

42. In recognition of the need to close the evidence-practice gap in health service delivery, the past decade has seen the introduction of more focused research funding programs targeting health system priorities, for example, through the NIHR in the UK,[73] Agency for Healthcare Research and Quality in the United States[74] and the MRFF in Australia.[75] The NHMRC has also provided policy and practice focused research funding through its Partnership grants scheme.[76]

43. In NSW, there are several research funding schemes with an explicit focus on research translation of population health and health services research including the Translational Research Grant Scheme (TRGS)[77] and Prevention Research Support Program (PRSP).[78]

44. The TRGS aims to reduce the time between research generation and translation to policy and practice. The TRGS is also an important part of NSW Health's efforts to harness and strengthen research capacity to improve health service delivery.

45. A review of the initial funding rounds of TRGS found that the scheme has been successful in supporting health services-led research and enhanced a culture of inquiry and innovation within the NSW Health system. The requirement for links with clinical and policy networks at the outset of TRGS and throughout the research project appears to have further embedded research within the NSW health system.[79]

46. The PRSP supports NSW research organisations that conduct prevention and early intervention research that aligns with NSW Health priorities. The objectives of the PRSP are to: increase high-quality and internationally recognised prevention research in NSW; support the generation of research evidence that addresses NSW Health prevention priorities, including cross-government priorities; encourage the adoption of research evidence in relevant policies, programs and services in NSW; and build the prevention research capability of NSW Health staff.

47. PRSP funding recipients demonstrate considerable increases over time on several indicators of research excellence, including peer-reviewed journal publications, grant income, and research students supervised.[80] Recipients use a range of strategies to ensure dialogue with health system partners, and report research impacts at the local, state, national and international levels.

48. PRSP funding also supports the development of research capability. The PRSP is a unique scheme that is highly valued by both funding recipients and health system stakeholders.[81] The continuity of funding provided under the scheme enables recipients to

adopt a strategic approach to their research and develop innovative strategies to support its conduct and use.

49. Evaluations of the PRSP suggest that it has increased research productivity (e.g. publications), training (e.g. student supervision) and policy and practice impacts/improvements across NSW.[82]

Engaging clinicians, health decision makers and consumers in identifying research priorities

50. Involving stakeholders including clinicians, health decision makers, consumers and researchers in an explicit manner in research priority setting can help to ensure that funding decisions and research meet critical evidence gaps to inform decision-making; facilitate shared responsibility and accountability in implementing the research agenda; improve the relevance and legitimacy of research; and contributes to achieving better health outcomes.[83, 84, 85, 86]

51. Despite the potential benefits, research priority setting is not widely adopted in practice and the choice of research topics tends to reflect the priorities and requirements of agencies that award peer-reviewed research grants, the curiosity and interests of individual researchers, or clinical trial opportunities led by industry.[87]

52. Although some of the national and local strategies have sought to re-orient research to health priorities, the motivations and incentives for researchers to respond to the more immediate priorities of those responsible for health services delivery remain limited.[88]

53. At the same time, interviews with local health service executives in NSW including chief executives, directors of medical services, nursing, allied health, research and others in executive leadership roles, have found that they value research, but want more research that aligns with their needs and priorities.[89] The authors concluded that making research a more integrated part of health care will require strong and broad executive leadership, resources and infrastructure, and investing in capacity- and capability building across health clinicians, managers and executive staff.

54. Encouragingly, NSW Health has developed a practical guidance on how to conduct research prioritisation,[90] but there is little evidence of its broad application in practice. Effective research priority setting requires a commitment of time and resources to identify priorities and for these priorities to inform decision-making about the types of research that health organisations will fund, commission or support.

Formal partnerships between research institutions and health services: Research Translation Centres

55. Recent years have seen a proliferation of formal partnerships between research institutions and healthcare organisations through Academic Health Science Centres (AHSCs) in North America and the United Kingdom and, more recently, through the NHMRC-accredited RTCs in Australia.[91]

56. These entities have been established with the explicit purpose of increasing the translation of research into clinical practice.[92]

57. A unique feature of the RTCs in Australia is that they have developed a national alliance – the Australian Health Research Alliance (AHRA). The Australian Federal and state governments have since invested in these RTCs across the AHRA.

58. The NSW-based RTCs work independently and together to drive improvements in health services and research across NSW in collaboration with health service partners. At inception, these RTCs were funded by the NHMRC and now they are funded from contributions from Local Health Districts, university partners and affiliated medical research institutes.

59. RTCs have great potential as vehicle to operationalise learning health systems and a place where priority research can be implemented through established governance structures with health service partners.

Case example 3: The learning health system

First identified as an important approach to delivering effective health care by the US Institute of Medicine in 2007, a learning health system is one where '…science, informatics, incentives, and culture are aligned for continuous improvement and innovation, with best practices seamlessly embedded in the delivery process and new knowledge captured as an integral by-product of the delivery experience'.[93,94]

Learning health systems recognise the considerable potential within health systems for discovery and improvement by leveraging clinical expertise, knowledge and innovation as well as vast amounts of clinical and healthcare data.[95]

An effective learning health system uses data-driven approaches to efficiently build knowledge for health system improvement. It does this by undertaking research with and within health and services as part of business-as-usual, leveraging expertise and resources to facilitate innovation, safety, quality and value in health care.

Within a learning health system, health services recognise key knowledge gaps, integrate research methods into their usual practice to address them, and use the findings to improve care and patient outcomes. Often, this is operationalised through 'learning cycles' such as plan-do-study-act cycles.[96] This integrated process eliminates the 'translation lag' as research is conducted in contexts where it is immediately applied.

Optimally, learning health systems are multilevel, where efforts to improve health care are coordinated and support improvement at an individual (clinician), service team, organisation, community and policy level.[97] They support innovation and knowledge generation 'bench' to 'bedside' through a range of basic science, clinical trials, implementation and dissemination research.[98]

Case example 4: Sydney Health Partners

Sydney Health Partners (SHP) is an RTC established in 2015 by a consortium of partners to build research translation capacity within health services, enhance adoption of evidence-based practices, and improve the health of patients and communities.

Health service partners include four major health services (Sydney, Nepean Blue Mountains, Northern Sydney, and Western Sydney Local Health Districts and the Sydney Children's Hospital Network at Westmead), 10 affiliated medical research institutes, and the University of Sydney, which is the administering institution. The reach of SHP is substantial, with health service partners covering 3.1 million people living in greater Sydney, representing 34% of the NSW population.

The partnership conducts translational and implementation research across this network. SHP prioritises action in four operational areas: i) supporting people by capacity and capability building, ii) optimising innovation by linking promising ideas to clinical priorities identified by its health partners; iii) enabling research by streamlining research governance and data sharing, and supporting consumer involvement and clinical trials; and iv) advancing the science of research translation to improve patient outcomes. Together, the partnership is advancing the development and practical application of a learning health system, where local information is integrated with research evidence to improve health outcomes.[99]

SHP delivers practical support for research translation through its 12 Clinical Academic Groups, which combine the expertise of clinicians, academics, health services professionals and consumers across its partner organisations. Their structure and focus on research translation enables them to be distinctive from, and add value to, existing collaborative research groups and networks among our partners. The Clinical Academic Groups provide a unique mechanism for the delivery of health service priorities and capacity-building activities within the larger health and medical research community. They cover major health priorities (cancer, cardiovascular health, child and adolescent health, diabetes and obesity, musculoskeletal health and sleep health); health service priorities (child development and mental health, geriatric care of the frail elderly, perioperative care of surgical patients, reproductive, maternal and newborn health); and innovations in health care (genomics and precision medicine, virtual care). Each Clinical Academic Group is funded through partners' financial commitment to SHP to undertake research translation capacity-building activities and to undertake proof of concept work that will position the group to apply for larger competitive grants.

SHP has an established track record in supporting the development, testing, transfer and scale up of health services innovations of proven effectiveness. To illustrate, the Sydney Health Partners Emergency Department (SHaPED) trial slashed opioid prescriptions by 12% for low back pain by implementing the ACI evidence-based model of care with emergency department clinicians across 4 hospitals. These results were sustained three years after the intervention was introduced and the model of care is being further expanded across NSW.[100, 101]

SHP has also built a research-enabling program of clinical trials support, consumer and community involvement, and streamlined ethics, governance and data sharing processes through a Data Sharing Accord.[102] The partnership has also funded the creation of the Implementation Science Academy (ISA) that trains clinicians and researchers in implementation science methods through its Implementation Science Masterclass, seminar series and drop in sessions, and also funds pilot research grants in partner health services.[103] The ISA has provided pathway for testing innovations and building partner capability in implementation science supporting over 100 research projects in partner organisations.[104]

Priority Research Centres

60. Formal research collaborations between researchers and policy agencies, otherwise known as 'Priority Research Centres', have been shown to be effective in generating policy-relevant research, particularly when policy agency funders drive the strategic directions of research programs to deliver on priority outcomes.[105,106,107,108]

61. The NSW Ministry Health has historically funded several Priority Research Centres, including the Physical Activity, Nutrition and Obesity Research Group,[109] The Australian Prevention Partnership Centre,[110] and the Blood Borne Viruses & Sexually Transmitted Infections Research, Intervention and Strategic Evaluation Program (BRISE).[111]

62. Priority Research Centres provide a coherent and integrated research program that delivers policy-relevant research, strategic advice, capacity building and communications.[112, 113,114]

63. Priority Research Centres are a proven mechanism to facilitate the co-production of research, where researchers and policy makers are meaningfully involved in all stages of research priority setting and codesign from development to application, building an understanding of the way evidence is generated to allow for greater integration between research and use of evidence.[115, 116,117] These collaborations also play an important role in building research literacy and capability of policy teams involved in co-producing research with academics.[94-98]

Case example 5: Blood Borne Viruses & Sexually Transmitted Infections Research, Intervention and Strategic Evaluation Program (BRISE)

BRISE has five key objectives: generate high-quality research; maximise the use of research; build research capacity; communication and marketing; and governance and management.

BRISE activities engage a range of researchers with experience in HIV, STI or viral hepatitis from the University of NSW, with each BRISE research project being jointly managed by a policy officer from the NSW Ministry of Health. All projects are overseen by a project committee including organisations who represent affected communities and clinicians where appropriate.

This structure provides an opportunity for policy officers to codesign the research project from development to application, building a closer understanding of the way evidence is generated to allow for a greater integration between research and use of evidence.

BRISE supports research projects of policy relevance, including the Evaluation of the NSW Dried Blood Spot HIV and HCV Testing Pilot Program and The HIV Stigma Discovery Project.

BRISE reports and research findings are disseminated through different approaches including peer-reviewed academic journals and conference presentations, but also through policy exchanges. The BRISE website hosts a list of projects and publicly available reports (www.brise.com.au/projects). Each year, BRISE hosts a series of interactive symposiums with practitioners and policy makers to showcase research and how it is being used in practice.

Building research and evaluation capability of the health workforce

64. An important facilitator of research translation is the research and evaluation capability of the health workforce.[118] Participating in research enhances clinicians' attitudes towards research,[119] increases uptake of research evidence into practice,[120] helps to develop critical thinking skills and a culture of evidence-based practice[121] and clinicians who participate in research experience greater job satisfaction.[122]

65. Research capacity building is defined as 'a process of developing sustainable abilities and skills enabling individuals and organisations to perform high-quality research'.[123] Elements

for successful research and evaluation capacity building include: a tailored strategies based on needs assessment, an organisational commitment to research and evaluation, opportunities for experiential learning, training with a practical element, and some form of ongoing technical support within the workplace.[124]

66. There are several important strategies in place in NSW Health to support research and evaluation capability, including providing access to research literature for clinicians and policy makers through the Clinical Information Access Portal (CIAP). CIAP provides information and resources to support evidence-based practice at the point of care.[125] CIAP is available to all nurses, midwives, doctors, allied health, community health, and ancillary staff working in or for NSW public health system including students. CIAP provides clinicians with information to support patient care processes and enhance clinical decision-making. However, CIAP does not provide complete access to full text articles.

67. NSW Health also provides access to research syntheses and strategic research through its Critical Intelligence Unit (CIU). The CIU was developed during the COVID-19 pandemic as a mechanism for rapid evidence synthesis within NSW Health.[126] Outputs of the CIU include evidence digests, rapid evidence checks and living evidence tables. These products have been widely disseminated and used to inform policy decisions in NSW Health, making valuable impacts.[127] The Sax Institute also conducts reviews of evidence for NSW Health through its Evidence Check program.[128]

68. NSW Health has produced and disseminated best practice guides to assist health policy makers, practitioners and researchers to commission, undertake and use policy and practice-relevant research. Guides focus on a wide range of topics including program logic, commissioning evaluations, commissioning economic evaluations, research priority setting, scale up and study design.[129] There is great potential to increase the use of these resources and associated training across NSW Health.

69. NSW Health Pillar organisations also provide a wide range of tools and resources aimed at building the capability of NSW Health workforce to conduct research and evaluation, develop and implement evidence-based models of care and conduct quality improvement initiatives.

70. ACI provides guidance on implementation of new models of care through its *Implementation Guide Putting a model into practice' guide and offers training in Accelerating Implementation Methodology* (AIM) as well as a Graduate Certificate in Health Care Redesign.[130]

71. The Clinical Excellence Commission (CEC) provides a range of quality improvement toolkits that support local healthcare teams to start and sustain quality improvement projects focusing on clinical areas where the risk of harm is well recognised.

72. The Health Education and Training Institute (HETI) offers a broad range of online training modules in research, research ethics, program evaluation, quality improvement and implementation methods. HETI also offers the Rural Research Capacity Building Program, which aims to increase the number of rural and remote health workers with knowledge and skills in evaluation and research methods in order to contribute to both innovation and evidence-based practice in rural and remote health care.

73. Maximising health system performance requires investment in developing and enabling its workforce.[131] This includes developing, acquiring or partnering to ensure the availability of a diverse skill set across the health system needed for developing and scaling-up of health innovations.

74. Health system leaders cite the need for healthcare staff to be data literate,[132] and to understand the role of data in driving healthcare improvements.[133]

75. Embedding staff with highly skilled analytical, evidence synthesis and data management skills within various levels of a health system and those (such as clinical academics) who can bring together different disciplines to support innovation and the application of evidence to health care has also been suggested.[134]

76. Formal partnerships and collaborations with academic institutions are also seen as critical, providing access to specialist skills and other infrastructure and equipment.[135]

77. Workforce development includes fostering a culture of continuous learning, collaboration and adaptability, and enabling innovation and improvement by providing sufficient time and resources. This may include articulation of the role of innovation, research and evidence in achieving health system objectives (vision); inclusion of this in organisational strategic plans, leadership responsibilities, and providing dedicated time, personnel and resources to support such activities.[136] However, it is important to recognise that lack of time is consistently cited by clinicians as a major barrier to continuous learning.[137, 138] In line with learning health system principles, health services can enhance continuous learning for clinicians by integrating training into daily workflows with flexible, accessible resources; providing structured time for professional development; fostering a culture that values learning; and establishing regular feedback mechanisms to support knowledge sharing.[139,140,141,142]

78. Demonstration of the relationship between these activities and improvements to patient outcomes is also important to secure the engagement of healthcare staff, and establish supportive professional norms.[143] For example, an explicit and shared methodology and culture of continuous quality improvement (e.g. plan-do-study-act) is seen as a foundational component of Kaiser Permanente.[144]

79. Common strategies to build workforce capacity to support innovation, and the generation and application of evidence within health systems, include training and mentoring; networks and communities of practice; and developing clinician scientists.

Training and mentoring

80. Training programs ensure researchers and healthcare staff have the necessary skills, knowledge and tools to understand, generate, interpret and apply evidence and research. Mentoring provides more individualised guidance from those with experience to help navigate professional challenges.

81. Workforce development may also be supported through identifying the training needs of the workforce; incentivising knowledge and skill acquisition, for example by including it in position descriptions, mandatory training, and performance reviews; and providing training opportunities.

82. A range of high-quality training or professional development opportunities are available in NSW. The Sydney Health Partners' Implementation Science Academy provides a masterclass program that includes mentored training to approximately 40 researchers, clinicians, and staff of the NSW ACI and CEC aimed at supporting the conduct and use of research to improve the translation of research into practice.[145]

83. NHMRC Centres of Research Excellence (CRE), a number of which are NSW-based, have an explicit focus on supporting research translation and workforce development. For example, the National Centre of Implementation Science provides training across NSW LHDs to improve health promotion research and practice. It hosts the annual US National

Cancer Institute-developed mentored training program in implementation science for researchers and clinicians.[146]

84. NSW Health provides training to its workforce through its online e-Learning platform (HETI), and face-to-face education programs including initiatives to support quality improvement. It also supports a range of training programs, including the NSW Public Health Trainee program.[147,148]

Networks and communities of practice

85. Networks and communities of practice provide opportunities for knowledge exchange between those with a common interest. Reviews demonstrate they are effective in improving healthcare quality and safety.[149,150]

86. While professional networks provide expanded professional contacts and facilitate collaboration and learning, communities of practice provide a more focused form of engagement dedicated to collective problem-solving, and formal processes of exchange. Both provide a critical function in health systems to support the establishment and evolution of professional standards and norms, develop culture and facilitate learning.

87. A broad range of research-practice networks exist in NSW, often organised by specialty. For example, the NSW Cancer Institute and NSW Regional Health Partners supports the NSW Regional Cancer Research Network to improve cancer outcomes in rural and regional NSW.[151]

88. The Research in Practice Network brings together physiotherapists, researchers and other stakeholders to advance innovation and improve care.[152]

89. ACI also supports communities of practice that seek to foster research translation and practice improvement.[153,154]

Clinician researchers

90. Clinician researchers hold a unique place within the health system, given their expertise in research and responsibilities for providing health care. The duality in their roles can help them identify opportunities for research and innovation to improve care and patient outcomes.

91. For example, controlling for technological, scientific and individual factors, licensed inventions (e.g. drug discoveries) are more likely to originate from clinician researchers than traditional academia; and teams led by clinician researchers are more likely to develop therapeutic innovations.[155, 156] Clinician researchers may also be better equipped to identify health interventions that can more feasibly be adopted and integrated into health systems.

92. Having clinical or health practitioner researchers in positions of leadership has been identified as critical to improvements in health system performance.[157] As such, high performing health systems internationally invest in the development of clinician researchers.[158]

93. In recognition of the importance of clinical researchers in health system performance, the Australian Department of Health and Aged Care recently announced the creation of the Clinician Researchers initiative, which will provide $200 million over 10 years between 2024–25 and 2033–34 for healthcare professionals to carry out research projects[159]. This scheme presents an opportunity for NSW Health to strengthen its clinician research

workforce and to engage NSW-based clinician researchers in answering questions of system significance.

Leveraging strategic research partnerships to attract research funding to NSW Health priorities and create 'implementation laboratories'

94. Research-practice partnerships provide opportunities for NSW Health to leverage the intellectual and financial resources of both universities and health services to simultaneously achieve scientific, service delivery and policy objectives. These partnerships differ from Priority Research Centres as they are not formal contracts for service. Rather, they are time-limited partnerships driven by common research interests and mutual benefit. These partnerships provide a vehicle for attracting state and national funding for research that is aligned with NSW Health system priorities.

95. Large initiatives such as RTCs have been successful in attracting significant MRFF and NHMRC research funding, however, the creation of research-practice partnerships remains elusive across the NSW health system.[160]

Case example 6: Embedding researchers within health services

A novel approach to embedding university researchers in health service organisations that has improved research translation and health service performance and attracted significant research funding is a 15-year partnership between the University of Newcastle and Hunter New England Local Health District Population Health.

Central to the success of the partnership has been the embedding of researchers in the health service organisational facilities, processes, and structures resulting in an integration of research and service delivery initiatives.[161]

The Hunter New England Local Health District have created a learning health systems approach to implement chronic disease prevention programs. In this approach, health systems undertake data-driven improvement processes that fall into three phases:

1. Knowledge to practice
2. Practice to data, and
3. Data to knowledge.

This approach is accompanied by three pillars:

1. Practice data collection and management systems
2. Workforce development and learning communities, and
3. Governance and organisation processes.

The Hunter New England Local Health District learning health system approach has yielded significant improvements in the implementation of chronic disease prevention programs and reduced the costs of implementing such programs.[162,163,164]

96. Established research-practice partnerships in NSW provide a unique opportunity to conduct research on the implementation of the large-scale reforms needed to achieve system-wide change.[165]

97. The vast majority of intervention research conducted in Australia and internationally is focused on early phases of the translational continuum (efficacy and replication studies), rather than tests of system transformation at scale.[166]

98. NSW-based RTCs could be used as implementation laboratories to test rollout of new models of care and or larger system transformations, across multiple Local Health Districts, simultaneously with research and evaluation efforts funded by MRFF and NHMRC.[167]

Learnings, gaps, challenges for NSW Health

99. There is an opportunity for NSW Health to build on its existing investments, capabilities and infrastructure to strengthen the use of evidence and drive health system improvements. By routinely undertaking research impact assessments, cost-benefit analyses and other evaluation methods, NSW Health can systematically develop a better and more agile understanding of the impact of current investments and identify processes and projects that work and interventions that can be scaled.

100. Understanding, identifying and supporting research areas of excellence can assist in driving impactful research and enhanced co-investment from partners such as the Australian Government, non-government agencies and philanthropic organisations. Increased funding and partnerships aligned with health system priority areas has the potential to deliver better outcomes for the health system, for researchers, patients and wider communities. This strengths-based approach can also act to attract leading international scientists to NSW who bring with them highly skilled teams, global partnerships and additional funding streams.

101. A coordinated and system-wide effort to reduce the barriers described above could include:
- Delivering a new whole-of-health research strategy and implementation plan that clearly identifies health system priorities, and the research required to deliver on these
- Enhancing current efforts to better connect researchers, clinicians and policy makers and increase meaningful dialogue
- Developing streamlined and timely access to linked health data and reducing administrative barriers such as legacy systems and policy directives
- Implementing a coordinated research and data literacy capability program to ensure the health workforce can identify and use research evidence to deliver quality services, models of care and interventions.

Strengthening capabilities in implementing innovations and using evidence in health services in NSW

102. There are several opportunities the Inquiry might consider to strengthen capabilities in implementing innovations and using evidence in health services in NSW:

Opportunity 1: Facilitate research on system transformation

103. Focusing research activity on the most significant areas of health system reform and areas of greatest challenge could include:

- Implementation research that addresses large-scale system changes, utilising Local Health Districts as 'living labs', where innovative models of care can be tested in different settings, such as rural and remote. This would involve implementing and expanding implementation science approaches to study how new interventions or care models can be adopted at scale across NSW. Recent examples of the success application of living lab approaches in NSW Health have included the development and implementation of NSW Telestroke Service[168] and value-based health care initiatives.[169]
- Medium to long-term collaborations with research-practice partnerships to accelerate system transformations by testing and refining new care models in real-world settings, ensuring that research is deeply connected to practice.
- Engaging health sector stakeholders in setting and refining transparent research priorities to ensure more research funded by NSW aligns with the strategic goals of NSW Health.
- Developing and communicating areas of research interest to articulate areas of evidence need across the health sector. This provides the opportunity for researchers to focus on areas with the greatest potential for real-world impact, aligning their work with the priorities of health providers and funders.

Opportunity 2: Enhance collaborative research efforts at local levels

104. Providing further opportunities to involve health services directly in the conduct and generation of research evidence which could include:

- Increasing the involvement of health services in research prioritisation and decision-making to better reflect community needs. This can be undertaken through joint planning workshops, structured feedback sessions, and collaborative advisory panels where health services representatives play a key role in shaping research agendas. By ensuring that health services have an active voice, research outcomes will more likely align with local health challenges, increasing relevance and impact.
- Promote and incentivise co-production between researchers, policy makers and end users. This could involve frameworks that encourage collaboration at various stages – defining the problem, designing the research, implementing solutions, and translating findings into practice. This could include setting up ‘co-production hubs’ or working groups that foster ongoing dialogue between research teams and policy stakeholders to create research that is actionable, timely and directly aligned with policy needs.

Opportunity 3: Leverage strategic partnerships to drive translation

105. Building on the established research-practice infrastructure in NSW to increase engagement with research findings including:

- Develop new long-term strategic partnerships between academic institutions and healthcare organisations to tackle emerging health challenges, with a particular focus on translating research into practice. These partnerships can attract competitive research funding by demonstrating a clear pathway from discovery to implementation.
- Embedding more researchers within health services to enable research undertaken to be more responsive and practical.

- Encouraging the appointment of clinical academics in leadership roles. Their dual expertise – both as researchers and clinicians – positions them uniquely to drive innovation in health care. Clinical academics can act as bridges between research and practice, ensuring that academic priorities align with the needs of health services.

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