

Population Health Research Strategy 2018–2022

Case studies



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Introduction

These case studies have been collated as a companion document to the *Population Health Research Strategy 2018-2022*. The examples have been selected to demonstrate each of the strategies, promoting the generation and use of high quality, relevant research and evaluation across NSW Health to improve policy and program effectiveness, population health and health equity in NSW.

Strategy 1. Facilitate the generation of high quality, relevant population health research

Strategy 1.1:

Focus on NSW Health priorities

Effectiveness of maternal pertussis vaccination in preventing infection and disease in infants: the NSW Public Health Network case-control study

Infants are at the highest risk of severe complications – including death – as a result of pertussis (whooping cough) infection. Controlling pertussis in this group has been challenging, particularly in those too young to be vaccinated. Following revised national recommendations in March 2015, NSW Health introduced a funded maternal vaccination program at 28–32 weeks of gestation using tetanus-diphtheria-acellular pertussis vaccine (Boostrix® GSK).

The NSW Public Health Network aimed to assess the effectiveness of maternal vaccination and add to the growing body of evidence for this strategy by conducting a case-control study. The study was coordinated by Health Protection NSW, and overseen by a working group of officers from the Network, with expert advice from the National Centre for Immunisation Research and Surveillance.

All public health units in NSW participated in the case-control study between 16 August 2015 and 17 August 2016. Cases were NSW infants with confirmed whooping cough and aged under 6 months at onset. Public health unit staff randomly selected a control infant from public hospital births in the same geographical area born in the period up to 3 days before and after the case's birthdate. Odds Ratios (OR) were calculated using conditional logistic regression. Vaccine Effectiveness (VE) was calculated.

In total, 117 cases and 117 controls were recruited. The overall VE estimate was non-significantly protective for infants <6 months old (VE 39%, 95% CI: –12% to 66%). Higher VE was observed for infants <3 months old (VE 69%, 95% CI: 13%–89%) and against hospitalisation (VE 94%, 95% CI: 59%–99%).

The study concluded that maternal vaccination with Boostrix was highly effective at preventing severe whooping cough disease in infants, but was less effective at preventing disease which did not require hospitalisation. The overall vaccine effectiveness reported in this study was lower than in prior studies and suggests that maternal vaccination, while an effective strategy at preventing severe pertussis, is less effective at protecting against infection or mild disease.

The report of the study was published in the international journal *Vaccine*, and contributed to the evidence base reviewed by the Pharmaceutical Benefits Advisory Committee to recommend that maternal whooping cough vaccination be added to the National Immunisation Program. The Australian Government funded maternal whooping cough vaccination in each pregnancy from July 2018.

This Public Health Network statewide research initiative is an example of *Population Health Research Strategy 1.1 (Generation of research: Focus on NSW Health priorities)*, as it evaluated the impact of a NSW Government funded program (maternal pertussis vaccination) and demonstrated that the program was effective in preventing hospitalisation of infants from whooping cough.

Further reading

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Cannabis medicines research

There is growing interest in the community regarding the potential for cannabis medicines to improve the health of people living with serious conditions such as epilepsy and cancer. Medicines derived from the cannabis plant can be legally prescribed in NSW, however the evidence base for the use of cannabis medicines is generally poor. Either the cannabis medicine has not been trialled with modern forms of therapy (for example, anecdotally, cannabis may assist with chemotherapy induced nausea and vomiting, however, it has not been formally evaluated alongside modern evidence-based therapies such as 5HT-3 receptor antagonists or Aprepitant) or, at the time the research commenced, there were not large-scale clinical trials reporting on efficacy (as in paediatric epilepsy). In the area of palliative care, cannabis medicines had been largely found to be ineffective for symptom control in clinical trials, however most trials showed patients reported an improvement in quality of life.

The NSW Government is committed to developing a better understanding of the therapeutic potential of cannabis medicines. \$21 million has been invested, including \$9 million in clinical trials, and NSW Health, through the NSW Office of the Chief Health Officer, is working closely with research partners, local health districts, patients and health professionals.

Following NSW Cabinet approval for the establishment of Government sponsored clinical trials of cannabis for medical conditions in NSW, the Chief Health Officer drew together an Expert Panel in 2014 to identify the areas of research where a NSW Government investment would assist in developing the evidence base. Three areas were chosen: paediatric epilepsy, chemotherapy-induced nausea and vomiting, and palliative care for patients with advanced cancer. The Sydney Children's Hospital Network was asked to lead the research into paediatric epilepsy. An expression of interest process was followed to identify researchers interested in leading research into palliative care and chemotherapy-induced nausea and vomiting.

Clinical trials are now underway for all three conditions, having commenced from 2015. Clinical trials do take time, and in the meantime NSW residents are able to access cannabis medicines through normal channels for unregistered medicines. Research will help:

- develop the evidence for listing on the Australian Register of Therapeutic Goods
- develop the evidence for funding for cannabis medicines through the Pharmaceutical Benefits Scheme
- familiarise clinicians and patients with the use of cannabis medicines.

The trial recruitment will continue until enough participants to allow the data to be analysed have enrolled or until a safety signal suggests that recruitment should not continue. NSW remains an international destination of choice for companies wishing to trial cannabis medicines due to the regulatory frameworks permitting such trials, the quality of researchers and the quality of clinical services.

The NSW Ministry of Health has administered the NSW Therapeutic Cannabis/Cannabinoid Trials. This is an example of *Population Health Research Strategy 1.1 (Generation of research: Focus on NSW Health priorities)*, pertaining to NSW Health Strategic Priorities to *Provide world-class clinical care (Strategy 2)* and *Support and harness health and medical research and innovation (Strategy 5)*.

Further reading

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Strategy 1.2: Fund and commission research

Pedometer-based telephone coaching program for supporting heart disease patients to increase physical activity and achieve healthy weight

Cardiovascular disease (CVD) is the leading cause of death and disability in NSW. Many people with CVD are physically inactive, overweight, and have an unhealthy diet. Exercise-based cardiac rehabilitation can reduce CVD mortality by 31%¹ and physical activity interventions have been shown to be cost-effective in reducing hospitalisations and repeat revascularisations.²

In the Illawarra Shoalhaven Local Health District (ISLHD) less than half of eligible patients referred to a cardiac rehabilitation (CR) program start a program and less than half complete a program. Cardiac patients who do not attend a CR program are more likely to be physically inactive, have a higher risk-factor profile and poorer risk-factor knowledge and are more socioeconomically disadvantaged than those who do attend a CR program. Patients' barriers to attendance at a CR program include work commitments and travel time. Alternative models of CR are needed for people who are unable to attend a CR program.

The Health Promotion Service (ISLHD) conducted innovative pedometer-based telephone coaching interventions aimed at increasing physical activity and reducing weight among cardiac patients in ISLHD and replicated elsewhere in NSW.³⁻⁵ The randomised controlled trials showed that the interventions were feasible, low cost and effective for people who did not attend a CR program, and also for those who did attend a program. These interventions could complement existing CR programs which usually operate at full capacity.

The projects were funded through the Health Promotion Demonstration Research Grants Scheme (NSW Ministry of Health) in 2004 and 2008, and thus provide an example of *Population Health Research Strategy 1.2 (Fund and commission research)*. The project partners included: University of Sydney; Heart Foundation (NSW Division); University of Technology, Sydney; Health Promotion Service Murrumbidgee LHD; George Institute for Global Health Sydney; Illawarra and Shoalhaven Cardiac Rehabilitation Services; cardiac rehabilitation services at Wagga Wagga Base Hospital, St George Hospital, Sutherland Hospital and Goulburn Base Hospital; and NSW Office of Preventive Health.

The pedometer-based telephone coaching interventions could be translated into a state-wide program through the NSW Get Healthy Information and Coaching Service (GHS). The GHS provides telephone coaching and support on healthy eating,

physical activity, and weight management for NSW residents. A tailored program for people with heart disease that includes telephone coaching, a pedometer and step recording calendar which replicates the components of the pedometer-based telephone coaching interventions³⁻⁵ would provide an effective model of care at a population health level.

Engaging management and clinicians, combined with embedding referral pathways in clinical practice, has been shown to be key drivers in successful referrals from LHDs to the GHS. LHDs could refine referral pathways to eliminate barriers for clinicians and improve the ease and efficiency of referrals. This could include embedding referrals into clinical software, pathways and practice. Setting key performance indicators around referrals of patients in the LHD could also improve accountability.

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DTEXT Research Program

Diabetes prevalence is rapidly increasing, with type 2 diabetes predicted to be the leading contributor of non-communicable disease in Australia by 2020. It is anticipated that rates of type 2 diabetes will continue to increase if factors such as overweight and obesity, low physical activity and poor nutrition are not addressed. The majority of Australians with type 2 diabetes do not meet the guidelines for optimal diabetes management, and access to diabetes education is limited. This highlights the need for new interventions that can reduce existing barriers to diabetes education, attain greater population reach and support self-management strategies for people with type 2 diabetes.

Mobile phone text messages have shown promising results as an intervention for people with chronic disease. They have the ability to achieve high levels of engagement and broad population reach, whilst requiring minimal resources. There is however, no evidence on the effect of text messaging to improve the health of people with type 2 diabetes in Australia.

The DTEXT research program is a randomised controlled trial being conducted by the Illawarra Shoalhaven Local Health District and the University of Sydney. DTEXT is funded through the NSW Ministry of Health Translational Research Grants Scheme (2016), and thus is an example of *Population Health Research Strategy 1.2 (Fund and commission research)*. DTEXT also aligns with the Australian National Diabetes Strategy (2016-2020); NSW State Plan: Towards 2021; and Illawarra Shoalhaven Local Health District Strategic Plan 2012-2022.

The DTEXT research program aims to investigate if a 6-month text message intervention can lead to improvements in glycated haemoglobin (HbA1c) and diabetes self-management among people with type 2 diabetes.

This study will provide evidence on the effectiveness and cost effectiveness of a text message intervention to reduce HbA1c and enhance self-management of type 2 diabetes in the Australian population. Community dwelling adults (n=395) from New South Wales (NSW) were recruited, with the primary outcome being change in HbA1c at six months. Secondary outcomes include behaviour change for diabetes self-management, nutrition, physical activity, self-efficacy, quality of life and intervention acceptability.

Preliminary process evaluation data analysis (July 2019) indicates the majority of participants found the intervention helped them change behaviour and would recommend the text message program to people with type 2 diabetes.

Key stakeholders have been involved in the study design and planning stages to ensure that if DTEXT was successful, the program would align with priority areas, be feasible and acceptable for translation into the NSW Health's Get Healthy Information and Coaching Service and/or the Illawarra Shoalhaven Diabetes Service.

The DTEXT research program provides the following benefits to:

- Illawarra Shoalhaven Local Health District: capacity building of the Health Promotion Service through engagement in high quality research and professional development via PhD candidature, building links with key stakeholders such as the University of Sydney and University of Wollongong.
- NSW Health's Get Healthy Information and Coaching Service: DTEXT can provide an alternative method of program delivery through mobile phone text messages.
- People with type 2 diabetes: DTEXT will provide an additional model of care that can complement and enhance existing diabetes care through an equitable, accessible and supportive program delivered to people anywhere in Australia where there is mobile phone coverage.

Further reading

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Strategy 1.3: Plan and undertake research

Get Healthy in Pregnancy

In 2013, the NSW Office of Preventive Health collaborated with the Office of Kids and Families (formerly NSW Kids and Families) to develop an enhancement for the NSW Get Healthy Information and Coaching Service (GHS). Get Healthy in Pregnancy (GHiP) was designed to support pregnant women to achieve healthy gestational weight gain and to support women to adopt or maintain healthy lifestyle behaviours post birth. The service aimed to contribute to the NSW Premier's Priority in 2015–2019 for reducing obesity rates of children by five percentage points by 2025.

To test the effectiveness and acceptability of GHiP, the service was piloted in the antenatal clinics of three rural and two metropolitan NSW hospitals from September 2014 to October 2015 using a pragmatic cluster randomised trial model.

Hospitals were randomised into one of two intervention models: a) information only; or b) information plus 10 telephone-based health coaching sessions with a university qualified coach. In-depth qualitative interviews were held with a selection of participating women, health professionals involved in the trial including midwives and medical practitioners, and the health coaches.

Despite high rates of women lost to follow up in the trial, there was evidence of a positive effect on healthy gestational weight gain among women completing the GHiP service compared with those receiving information only.

Qualitative feedback from participating women, health professionals and coaches was positive about the service. Women found GHiP to be useful and supportive. Midwives and doctors said that it facilitated conversations about weight with pregnant women. No negative consequences of the Get Healthy in Pregnancy service were identified and it was determined that there was reasonable evidence to support its phased roll-out across NSW antenatal clinics. This planning and undertaking research was a demonstration of *Population Health Research Strategy 1.3 (Plan and undertake research)*.

The GHiP service was established and implemented in 2016 as part of the GHS. Feedback obtained from key stakeholders through qualitative interviews was vital in understanding the considerations and opportunities for improvement, ensuring the statewide implementation was successful. Recommendations that were addressed prior to implementation included:

- improving promotional materials, brochures, and videos used for targeted advertising
- changing the service delivery model to offer more flexibility
- developing interactive tools to assist women to stay on track including an interactive [weight gain calculator](#), and integrated resources
- offering bi-lingual service currently offered in Mandarin and Chinese
- providing coach training for identified clinical needs areas.

Service delivery initiatives to enhance engagement with Aboriginal women included the introduction of a female Aboriginal liaison officer, cultural sensitivity training for all coaches, and the development of culturally adapted resources.

Ongoing monitoring, evaluation and reporting is provided on the GHiP service to researchers, local health districts and policy advisors. The service also provides expert advice in the area of gestational weight gain and health coaching outcomes in the maternal health space.

GHiP is now available with maternity services in all 74 public hospitals and 47 Aboriginal Maternal Infant Health Services (AMIHS) and Building Strong Foundations (BSF) sites in NSW. Local health districts have KPI measures for GHiP referrals to further promote GHiP within the public hospital system in the 19/20 financial year.

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Strategy 2. Maximise the use of research to improve population health

Strategy 2.1: Facilitate synthesis of and access to research evidence

Community impact of liquor licensing

Controlling, managing and/or regulating the availability of legal drugs such as alcohol is one of the three pillars of harm minimisation in Australia based on evidence for its effectiveness.^{1,2} Applicants for liquor licences are required by State law to consult with public entities including NSW Health to complete the Community Impact of Liquor Licences process, in accordance with the *Liquor Act 2007 No 90* (NSW). Details of license applications are forwarded by the Ministry of Health's Alcohol and Other Drugs Branch to relevant local health districts to ensure that a truly local response is provided, as sought by the decision makers at Liquor and Gaming NSW.

To ensure that responses are based on the highest quality evidence, *How to Respond to Liquor Licensing Applications – a Guide for Local Health Districts* ('The Guide') has been developed by the Alcohol and Other Drugs Branch. The Guide was informed by a Sax Institute Evidence Check *Community Impact of Liquor Licences*,³ which reviewed the literature on the impacts of density of liquor licences, trading hours and other restrictions on trading, as well as information from recent alcohol harms data from the Rapid Surveillance Team in the Centre for Epidemiology and Evidence. These data look at four indicators that are used as proxies for alcohol health-related harms from the Public Health Rapid, Emergency and Disease and Syndromic Surveillance (PHREDSS) system, emergency department records and NSW ambulance data. The indicators include: (1) Visits to hospital for alcohol; (2) Late night visits to hospital for alcohol; (3) Late night visits to hospital for injury; and (4) Late night ambulance call outs for assault. Variations in the rates of harm by Local Government Areas (LGAs), as well as LGA rates relative to NSW rates, are analysed to provide information about locations where alcohol-related harms are relatively high.

An evaluation is currently underway of The Guide. The evaluation will explore: the relevance, uptake and usefulness of The Guide and its individual components; local level processes to implement The Guide; whether The Guide has enhanced LHD capacity and capability to respond to licence applications; whether The Guide has enabled NSW Health to fulfil its obligations in responding to liquor licence applications; and whether there has been a perceived increase in influence of health system responses to liquor licence applications using The Guide. The outcomes of this evaluation will be made publicly available and will be used to improve The Guide and more broadly NSW Health's approach to responding to liquor licences. The evaluation is due for completion in late 2019.

This work not only maximises the use of research evidence through facilitating the synthesis of and access to research evidence as outlined in *Population Health Research Strategy 2.1 (Facilitate synthesis of and access to research evidence)*, but also meets the requirements of the NSW Government Program Evaluation Guidelines where agencies are expected to prioritise evaluation of programs to maximise insights.⁴

Further reading

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Timing of planned birth in NSW

The Clinical and Population Perinatal Health Research group at The Kolling Institute works closely with the NSW Ministry of Health to: (i) ensure alignment between its research and the Ministry's priorities; and (ii) feedback results of relevance to services and policies. Their research findings have highlighted the need to prioritise strategies that ensure the healthiest possible start to life.

Using linked NSW administrative hospital and educational data, they have described that timing of birth is critical to maximising infant health and developmental outcomes. As they have reported that over 1 in 4 births in NSW are planned and before the estimated due date, this had relevance to the NSW Ministry of Health's former (2007) Policy Directive: *Maternity - Timing of elective or pre-labour caesarean section*. That Policy Directive recommended that, where there are no compelling medical indications, elective or pre-labour caesarean section should not occur prior to 39 completed weeks gestation due to increased risk of respiratory morbidity in infants born before 39 weeks.

Biostatistics trainees, funded through the [NSW Biostatistics Training Program](#), examined variations in clinical practice. Using Perinatal Data Collection and Admitted Patient Data Collection data that were linked by the Centre for Health Record Linkage, multilevel modelling was undertaken to investigate the impact of patient, intervention and hospital factors on between-hospital variation in caesarean rates and timing of birth. It was clear that there was poor uptake of the policy regarding timing of pre-labour caesareans, with high rates of delivery prior to 39 weeks across hospitals (adjusted average 35%). Large between-hospital variation persisted despite adjustment for casemix and hospital characteristics, suggesting that non-medical factors have been influencing the timing of low risk, pre-labour caesarean sections. This (and prior work) informed development of a new guideline, *Maternity - Timing of Planned or Pre-labour Caesarean Section at Term*, released in 2016.

Researchers at The Kolling Institute have extended this work and contributed important new knowledge that has been incorporated in the major initiative of [The First 2000 Days Framework](#). Appreciation of the importance of timing of planned birth, which has relevance to a quarter of all births in NSW, is being propagated across all NSW local health districts as the First 2000 Days Framework is being presented. Their researchers have produced materials that have translated research findings into a format that has been well received by clinicians and pregnant women and their families. Originally in a paper form, funding from the Prevention Research Support Program has allowed these to be developed into a web form (<https://www.everyweekcounts.com.au>). Through funding from Sydney Health Partners and the NSW Translational Research Grant Scheme this intervention is being evaluated to ascertain whether planned births can be closer to 40 weeks and outcomes improved.

Funding has realised significant mutual benefit. For researchers it has leveraged further research funding and facilitated new collaborations and expertise in research translation, and for NSW Health it has provided high quality evidence from population data that can be used to underpin a major initiative in raising awareness about pregnancy and birth strategies to optimise health and educational outcomes. This body of work demonstrated *Population Health Research Strategy 2.1 (Facilitate synthesis of and access to research evidence)*, and also *Strategy 2.3 (Foster research environments that promote the use of research evidence)*.

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Strategy 2.2: Develop policy and practice environments that value research

BBV & STI Research, Intervention and Strategic Evaluation (BRISE)

BRISE is an integrated program that delivers policy relevant research, strategic advice, capacity building and communications to support the response to blood-borne viruses (BBV) and sexually transmissible infections (STIs) in NSW. BRISE is a collaboration of the Ministry of Health, the Kirby Institute and the Centre for Social Research in Health at UNSW Australia.

BRISE objectives are to facilitate the generation of policy-relevant research and increase the use of research in practice. Strategies include flexible and collaborative research priority setting, making research more accessible and developing workforce capacity to utilise evidence. BRISE maximises awareness of its research outputs and outcomes by regularly reporting on research activity.

BRISE promotes the value of its research outputs and demonstrates use in policy and practice by holding stakeholder workshops to facilitate exchange between researchers and policy makers. 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, developing policy and practice environments that value research, as per *Population Health Research Strategy 2.2*.

The first annual work plan was developed in 2014 through an iterative process of collaborative consultation and review, within a state-wide policy framework. Forums were held over two days to provide opportunities for collaborative priority setting with key stakeholders including non-government organisations, local health districts (LHDs), clinicians, academics and policy makers. Research priorities identified in the forums were graded by stakeholders according to policy relevance, impact and urgency. Results of the consultation were cross-referenced by the Ministry against priorities in each of the NSW BBV and STI Strategies and the Aboriginal BBV and STI Framework. A collaborative approach for setting the first workplan increased the likelihood that research outputs would be coproduced, policy aligned, timely and used in practice.

Over the course of the 5-year research program, the format of the symposiums has changed from face-to-face delivery to topic-specific webinars to increase the reach of the showcases. For instance, webinars have been held on the changing landscapes of biomedical prevention in HIV and on hepatitis C elimination. The aim of these workshops is to share how the results of the BRISE-supported research have informed policy and practice and to encourage future adoption of the results of the research in policy and practice. An additional Research Program has been approved for 2019–2024.

BRISE projects include the hepatitis C webinar which showcased the results of the research project, *Estimates and Projections of the Hepatitis C Virus Epidemic*, which produced estimates for hepatitis C prevalence, incidence and morbidities in NSW by LHD over 2016–2030, and identified annual treatment targets required for each LHD to achieve the NSW strategy goal of hepatitis C elimination by 2028. Speakers at the webinar provided a response to the research to discuss how they are using it in practice, and included representatives from drug and alcohol in Central Coast LHD and Central and Eastern Sydney Primary Health Network.

Further reading

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Strategy 2.3: Foster research environments that promote the use of research evidence

Research informing policy for a healthier food environment

The consumption of unhealthy food and drinks is a major contributor to obesity in both children and adults. The resulting non-communicable diseases, including heart disease, diabetes and stroke, are the biggest killers. With one in two adults, and more than one in five children overweight or obese in NSW, The George Institute for Global Health and NSW Health have partnered on a range of evidence-based initiatives to improve the food environment and prevent obesity. This work is a demonstration of *Population Health Research Strategy 2.3 (Fostering research environments that promote the use of research evidence)*.

Examples of collaboration between The George Institute and the NSW Ministry of Health include conducting research that assessed the alignment of the Health Star Rating system with the Australian Dietary Guidelines. This research directly informed the development of the revised [NSW Healthy School Canteen Strategy](#) and the [Healthy Food and Drink in NSW Health Facilities for Staff and Visitors Framework](#). The George Institute has also worked with NSW Health on developing legislation around menu labelling and assisted in plans for evaluation and ongoing surveillance of this initiative.

The research to inform these initiatives included the systematic collection and analysis of food composition data. Research methods included the analysis of quantitative and qualitative research, including stakeholder consultation with government, industry and consumers.

The George Institute's findings demonstrated that the Health Star Rating system could be used to support classification of food for hospitals and schools. The research identified important opportunities for improving the food environment throughout NSW, and in the food provision guidelines that inform major institutions, including the Australian Catholic University and UNSW Sydney.

Thanks to this partnership, findings from the research have been integrated successfully into flagship programs launched throughout NSW, such as the state-wide initiative to remove sugary drinks from vending machines in health facilities.

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Strategy 3. Build population health research capability

Strategy 3.1: Build skills for population health research

Population health traineeships

The Centre for Epidemiology and Evidence, NSW Ministry of Health coordinates three postgraduate workplace-based training programs in population health; the [Aboriginal Population Health Training Initiative \(APHTI\)](#), [Biostatistics Training Program](#) and [Public Health Training Program](#), demonstrating *Population Health Research Strategy 3.1 (Building skills for population health research)*.

The programs aim to develop public health professionals with a broad range of capabilities relevant to population health research, including data management and analysis, study design, monitoring and surveillance, qualitative research, critical appraisal, evaluation, project management, and policy development. Trainees undertake three years of supervised work placements within the NSW Health system and relevant population health research centres. Current research-based placements include the Aboriginal Health and Medical Research Council of NSW, Kolling Institute of Medical Research, Prevention Research Collaboration, Sax Institute and School of Rural Health, University of Sydney.

In addition to work placements, trainees participate in regular capability building activities including training in evaluation and research methods, management and leadership, scientific communication, health economics and information systems including SAPHaRI (Secure Analytics for Population Health Research and Intelligence) and HealthStats NSW.

More than 300 trainees have been recruited across the three programs, and there are currently around 50 trainees. Trainees recruited since 2009 have contributed to more than 350 publications (approximately three per trainee), including 273 peer-reviewed journal articles, as of July 2019.

As a direct result of their training, 160 people have been awarded a postgraduate qualification. This includes 16 Doctor of Public Health degrees, 63 Master of Biostatistics degrees, 12 Master of Public Health degrees and 69 Graduate Diplomas of Applied Epidemiology.

The programs have produced 186 graduates who typically remain employed within the NSW Health system, where they apply their skills in a range of population health research, development, policy and planning roles. The programs demonstrate the sustained dedication and contribution of NSW Health to building workforce capacity and capability in the area of population health research.

The programs also play an important role in supporting research and evaluation in Aboriginal health. In particular, the NSW Aboriginal Population Health Training Initiative (APHTI) facilitates the development of research leadership capability of Aboriginal people. The three-year traineeships are open only to Aboriginal Australians, and involve a combination of workplace learning within a NSW Health service and postgraduate study in public health. Trainees study research methods as part of their master's degree, and directly apply this learning through workplace projects, typically in Aboriginal health. The program also addresses regional and rural research capacity and capability issues associated with access to training; since the program commenced in 2011, 18 (64%) of trainees have been based in health services in regional or rural areas of NSW.

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Strategy 3.2: Develop and maintain research infrastructure

The value of data linkage for evaluating Australia's childhood immunisation program

A national research partnership developed a program of work around evaluating Australia's National Immunisation Program through the linkage of birth, perinatal, death, hospital, emergency department, disease notification, and immunisation records for a cohort of about two million births in NSW and Western Australia (WA). This represents the first time cross-jurisdictional linkages have occurred between datasets from multiple Australian states and a Commonwealth Government dataset under new Commonwealth arrangements for statistical data integration.

The project includes collaborators from the University of NSW School of Public Health, the National Centre for Immunisation Research and Surveillance, the University of Western Australia Telethon Kids Institute, Curtin University, Menzies School of Health Research, Australian National University National Centre for Epidemiology and Population Health, WA Health and NSW Health.

This project involved the established data linkage centres in WA (WADLS: WA Data Linkage System) and NSW (CHeReL: Centre for Health Record Linkage) and the approved Integrating Authority, the Australian Institute of Health and Welfare (AIHW).^{1,2} The study cohort was live births in WA and NSW between 1 January 1996 and 31 December 2012, based on registrations from the Register of Births in WA and NSW. The WADLS and CHeReL used existing linkages between the birth registers and the respective state datasets (hospital admissions, perinatal records, emergency department data, infectious disease notifications and routine laboratory data [WA only]) to assign state project-specific linkage keys to each dataset. The AIHW was responsible for linking birth records to immunisation records from the Australian Childhood Immunisation Register (ACIR) and the National Death Index. This three-way linkage resulted in the creation of national project-specific linkage keys that connected individuals from each state to their corresponding immunisation records via the Secure Unified Research Environment (SURE) system.

To date the linked dataset has been used to examine the effectiveness of pneumococcal vaccine in children,³ the impact of childhood pneumococcal vaccine on non-notifiable pneumococcal disease,⁴ on-time vaccination coverage in population sub-groups,⁵ and predictors of delayed vaccination.⁶ Additional analyses are planned to look at vaccine effectiveness in sub-groups such as children born prematurely and Aboriginal children.

The research collaboration has contributed to *Population Health Research Strategy 3.2 (Build population health research capability: Develop and maintain research infrastructure)* by demonstrating the value of CHeReL and that linkages of cross-jurisdictional population-wide datasets can be achieved and used to successfully answer a wide range of policy relevant questions.

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Health Equity Research and Development Unit (HERDU) – Population Health Research

Access and equity are core values of NSW Health and underpin the Sydney Local Health District's (SLHD) strategic plan. Some populations and places in the District have shorter lives, and higher levels of disability than the NSW average.¹

SLHD and the University of New South Wales (UNSW) are collaborating to pursue an equity agenda. Both are committed to addressing health inequities, to genuinely engage with the community, and to conduct high quality research that informs policy and practice. The Health Equity Research and Development Unit (HERDU) is an embodiment of that collaboration as a unit of the SLHD Clinical Services Integration and Population Health Directorate and a Research Hub of the Centre for Primary Health Care and Equity (CPHCE) at UNSW.

Ministry investments in population health research include the Prevention Research Support Program (PRSP) which supports the CPHCE in its resource capacity. This enables HERDU to conduct research, direct application and translation of its research activities into District services. This is in alignment with *Population Health Research Strategy 3.2*, to *develop and maintain research infrastructure* and support service development and quality improvement, including the update of evidence-based interventions and approaches to healthcare.

HERDU contributes to the implementation of SLHD's commitment to equitable access to quality health services for the community and creates opportunities and environments that improve health. HERDU also provides a platform to conduct equity focused research, translate research findings into practice and to support the broader workforce to conduct equity and action-oriented research.

HERDU's flagship, project 'Can Get Health in Canterbury' is a place-based intervention, developed in partnership with UNSW, SLHD and Central and Eastern Sydney Primary Health Network (CESPHN) to improve access to comprehensive primary health care, increase individual and community health literacy, and work with stakeholders to address important social determinants of health.² Key achievements include the employment of a Bangla-speaking and an Arabic-speaking Community Researcher, establishment of the 'Rohingyan Little Local', which allocated \$10,000 to the Australian-Burmese Rohingya Communities to spend according to community priorities, and delivery of numerous community education programs, including a Bangla women's circle. The evaluation demonstrates that improving access to comprehensive primary health care in disadvantaged, urban locations is possible through evidence-informed approaches in partnership with major stakeholders in the region. Building this infrastructure and trust requires genuine community engagement, academic leadership and health services committed to addressing health inequities and provide an investment of resources over decades rather than years.

HERDU is developing a program to improve organisational, professional and community health literacy.³ For example, walking interviews conducted at Canterbury Hospital identified the navigation issues experienced by people who speak a language other than English.⁴ HERDU works with SLHD and Healthdirect to assess the feasibility and effectiveness of a bilingual health literacy intervention for new mothers and grandmothers.

HERDU is also working as part of the Primary and Community Health Cohort Study which involves the innovative use of the 45 and Up data in a de-identified linked set. This enables us to research integrated approaches to primary health care in collaboration is CESPHN and SESLHD.

One of the ways we are translating research into policy and practice is by conducting reviews on the proposed redevelopment of the Waterloo Public Housing Estate. The first focuses on psychological distress associated with redevelopment announcements and waiting to be rehoused. Further topics include social mix, and living with and through demolition and construction. These reviews will be synthesised into Health Impact Assessment reports at different points in the redevelopment of Waterloo.

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Strategy 3.3: Foster partnerships for collaborative research

HIV prevention revolution: the NSW HIV Prevention Partnership Project

The NSW HIV Prevention Partnership Project is a priority-driven population health research project. This project was successful in attracting competitive grant funding in the NHMRC Partnership Project Grants Scheme, and additional funding from UNSW, to leverage the investment from NSW Health. It was established to undertake monitoring and evaluation activities to assess progress and inform the implementation of the 2012-2015 and 2016-2020 NSW HIV Strategies. The principal partners are NSW Health and the Kirby Institute at UNSW Sydney. Other project partners are the AIDS Council of NSW (ACON) and Positive Life NSW, The Australasian Society for HIV, Viral Hepatitis and Sexual Health Medicine (ASHM), and the Centre for Social Research in Health at UNSW Sydney.

The *NSW HIV Strategy 2016-2020* set an ambitious goal for the virtual elimination of HIV transmission in NSW. The realisation of this goal requires maximising the benefits of new biomedical approaches to HIV prevention, such as rapid HIV testing, pre-exposure prophylaxis (PrEP) for people at high risk of HIV infection, and antiretroviral treatment for people diagnosed with HIV. NSW Health has invested heavily in these HIV prevention strategies and improved monitoring systems were needed to assess the targeting of prevention strategies, and to identify and address gaps.

The project has built population health research capability among project partners through enhancing existing data collection systems and supporting the creation of new systems. One example was to expand coverage of the existing ACCESS network and support the implementation of software at publicly funded sexual health clinics and general practices that anonymously links patients between different services. This network has extremely high coverage of gay and bisexual men and people living with HIV, two key groups for HIV prevention programs. The linkage process has enabled the creation of virtual population-level cohorts to monitor key prevention indicators, such as HIV testing frequency and the proportion of people with HIV who maintain an undetectable HIV viral load, which renders them non-infectious. This system then formed the basis of data collection for the EPIC-NSW trial of HIV PrEP, allowing clinics to enrol a large number of trial participants rapidly, and so making a major contribution to the falling rates of HIV infection in NSW.

Working groups with representatives from project partners meet regularly to review and advise on monitoring data in key HIV prevention modalities: HIV testing, PrEP, HIV treatment, behavioural risk surveillance, and molecular epidemiology. The involvement of policymakers, program implementers, clinicians and researchers in all aspects of the project has enabled rapid research translation into policy and practice change. A culture of collaboration between the key organisations has flourished, cementing partnerships for the implementation of the HIV Strategy and extending to other projects, including the HIV pre-exposure prophylaxis trial, EPIC-NSW, demonstrating *Population Health Research Strategy 3.3 (Foster partnerships for collaborative research)*.

Some key outputs from the project have been the ongoing contribution of data to the *NSW HIV Strategy Quarterly Data Reports*, which publish all key HIV monitoring data in NSW, and a paper published in the peer review literature which demonstrated that in 2016 NSW was, after Sweden, the second jurisdiction in the world to meet the UNAIDS 90-90-90 targets for the diagnosis and treatment of people living with HIV. Several other publications are currently being written that will describe the project processes and outcomes.

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