



MACQUARIE
University

Australian Institute of Health Innovation

ANNUAL REPORT

2019



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Founding Director's Report



At any point in time across the Australian Institute of Health Innovation (AIHI), there's a wide range of research going on. We are studying and evaluating healthcare from many angles at considerable depth and with a great deal of purpose through our efforts on over 100 projects. That is the joy of working here. I invite you to delve into this research across the pages of our 2019 Annual Report.

We are passionate about our work, motivated by the fact there is plenty of evidence that we make a difference. Indeed, that is why we are here: to do innovative, interesting, and meaningful research that improves health services and systems and contributes to healthy populations.

As to that evidence, 2019 provided much to celebrate. To list only a few examples, Professor Johanna Westbrook was named as the 'National Research Leader in Medical Informatics' in a special report by *The Australian*. The Australian Alliance for Artificial Intelligence in Healthcare led by Professor Enrico Coiera increased from 50 member organisations to 90. Our Centre for Health Informatics celebrated its 20th anniversary

as Australia's largest and longest running academic research group in this discipline.

Contributions by the Centre for Health Systems and Safety Research and the Centre for Healthcare Resilience and Implementation Science's CareTrack Aged team to the Royal Commission into Aged Care Quality and Safety were included in the Interim Report of the Commission. The Centre for Healthcare Resilience and Implementation Science completed two large programs of work – the Deepening our Understanding of Quality in Australia (DUQuA) project, involving 32 of the largest hospitals in Australia, and the CareTrack Kids studies examining over 160,000 occasions of care. The National Health and Medical Research Council (NHMRC) Partnership Centre for Health System Sustainability contributed evidence to the national debate on many issues in order to create a health system that is built to last, especially around low-value care and overdiagnosis of cancer.

This year we presented at Macquarie University's TEDx, including curating the event with talks from Dr Robyn Clay-Williams, Professor Enrico Coiera

Benchmarked by SCIVAL's Field-Weighted Citation Impact, AIHI's publications are cited at a rate of 101% above world standard

and myself. There was sustained growth in PhD and Master of Research enrolments and submissions and the Macquarie University Doctor of Medicine Academic Research Program has continued to grow under the coordination of AIHI and led by Professor Frances Rapport.

We collaborated with many people to achieve our results, enjoying long term and newly forged relationships with partners in academia and industry, nationally and internationally. During 2019 we proudly expanded our portfolio to include a new NHMRC Partnership Project, two NHMRC Investigator Grants and a Medical Research Future Fund Project.

Ultimately, we are researchers and we like metrics. A key to quantifying our performance is to ask how we measure up against others internationally. The SCIVAL

Field-Weighted Citation Impact for AIHI stands this year at 2.01, meaning our research articles are cited at 101% above world average.



Professor Jeffrey Braithwaite
FOUNDING DIRECTOR

Who we are

The Australian Institute of Health Innovation (AIHI) is a globally recognised research-intensive centre, with a steadfast commitment to improving healthcare services and health systems in Australia and beyond. We are part of Macquarie University – ranked in the top 1% of universities worldwide – and our work is synergistic with and an integral part of MQ Health, Australia’s first fully integrated academic health sciences centre.

Our partnerships with those providing or receiving health services in real-life contexts ensure that our world-class, high-impact research has a positive influence on patients, health professionals and society more broadly.

AIHI comprises three independent, complementary and highly collaborative university research centres, each of which takes a systems perspective to solve healthcare problems, utilizing highly innovative and wide-ranging research methods.

1. Centre for Health Systems and Safety Research (CHSSR) [↗](#)
2. Centre for Healthcare Resilience and Implementation Science (CHRIS) [↗](#)
3. Centre for Health Informatics (CHI) [↗](#)

Our leadership in translational health services research is further evidenced by the innovative work of our three National Health and Medical Research Council (NHMRC funded) centres:

4. NHMRC Partnership Centre for Health System Sustainability [↗](#)
5. NHMRC Centre of Research Excellence in Implementation Science in Oncology [↗](#)
6. NHMRC Centre of Research Excellence in Digital Health [↗](#)

Reflecting our consistently high value research contribution, in 2019 AIHI managed grants and contracts valued at \$32 million. We also contributed to research associated with a further \$41 million worth of grants administered by other institutions.

Our highly successful approach is contributed by 190 academics and visiting researchers, including a skilled team of professional staff. We supervise 38 higher degree students and are contributing to the Macquarie University Master of Public Health program, and importantly, are involved in teaching and administering the Macquarie University Doctor of Medicine Academic Research Program.

Reflecting our consistently high value research contribution, in 2019 AIHI managed grants and contracts valued at \$32 million.





AIHI at a glance

HEAL. LEARN. DISCOVER.

OUR RESEARCH AND PROJECTS

\$10m

New research funding for 2019

31

Total new projects commenced in 2019

\$32m

Enterprise value of projects under AIHI management

85

Number of research projects under AIHI management

\$41m

Enterprise value of grants administered elsewhere involving AIHI

17

Number of projects administered elsewhere involving AIHI

\$23m

Category 1 Funding for grants under management 2019

190

Researchers, visiting appointees and professional staff

38

PhD, Master of Research and Master of Philosophy students

357

Peer-reviewed outputs

30

Outreach events

344

Media
Print, TV and radio

WHAT WE DO



Improve the safety and quality of care for patients and staff



Support better aged and community care



Enhance services for people with chronic ill-health



Optimise AI and machine learning, for safe, efficient and ethical support



Integrate services, making delivery and access easier



Build a sustainable health system for future generations

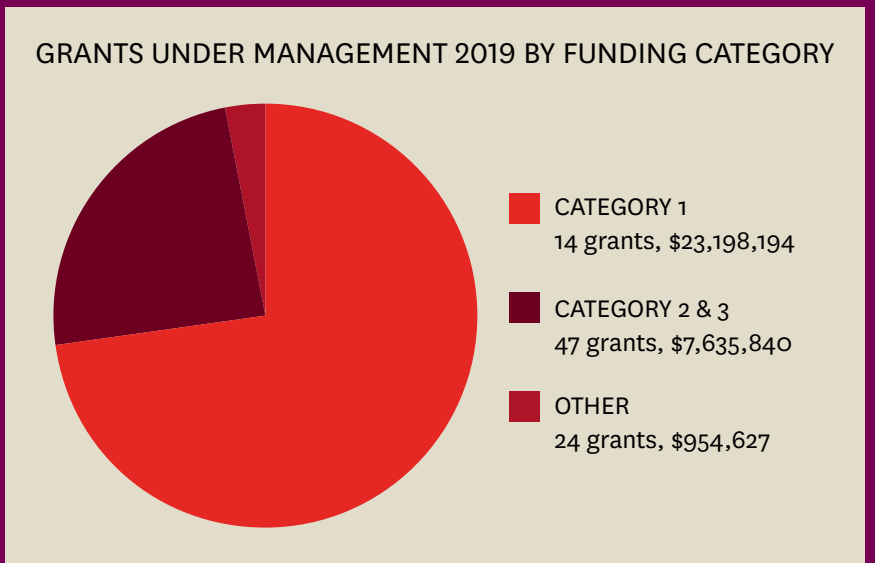
FUNDING HIGHLIGHTS

\$10m

New funding awarded in 2019

\$32m

Under AIHI management



Our Board



CHAIR
Professor
Patrick McNeil



MACQUARIE UNIVERSITY
Professor
Jeffrey Braithwaite



MACQUARIE UNIVERSITY
Professor
Johanna Westbrook



MACQUARIE UNIVERSITY
Professor
Enrico Coiera



MACQUARIE UNIVERSITY
Professor
Cliff Hughes AO



MACQUARIE UNIVERSITY
Professor
Lesley Hughes



NSW HEALTH SYSTEM
Professor
Adam Jaffé



NSW HEALTH SYSTEM
Professor
Chris Cowell



NSW HEALTH SYSTEM
Professor
George Rubin



NSW HEALTH SYSTEM
Professor
Patrick Bolton



NSW HEALTH SYSTEM
Professor
Sally Redman AO



NSW HEALTH SYSTEM
Ms Carrie Marr



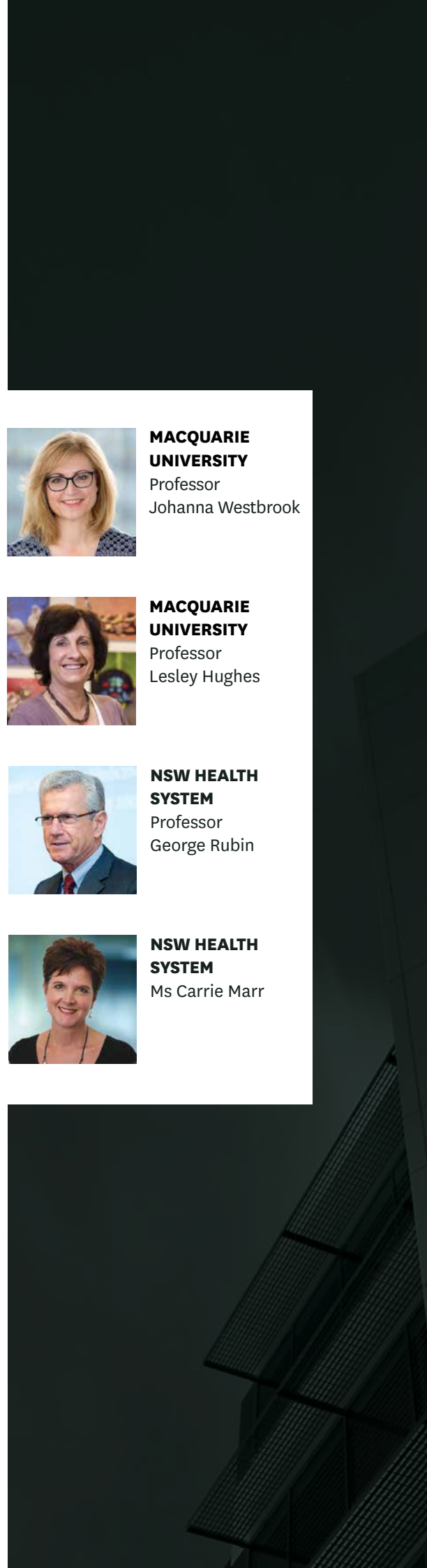
INDEPENDENT MEMBERS
Professor
Les White AM



INDEPENDENT MEMBERS
Dr Karen Owen

BOARD SECRETARIES

Ms Joanna Holt
Ms Sue Christian-Hayes



Our Partners

The Australian Institute of Health Innovation is proud to partner with a broad range of government, industry, health services and research institutions. We also highly value our engagement with health consumers through advocacy groups and clinical trials. A full list of our partners can be found on our website at aihi.mq.edu.au with a selection listed here.



Hospitals



Academia



Clinicians



Industry



Health consumers



Peak bodies



International bodies



Government

- Agency for Clinical Innovation NSW
- Anglicare
- Australasian Association of Clinical Biochemists
- Australasian College of Health Informatics
- Australian Commission on Safety and Quality in Health Care
- Australian Defence Force
- Australian Genomics Health Alliance
- Australian Research Council
- Black Dog Institute
- Bond University
- Bupa Health Foundation Australia
- Bureau of Health Information
- Cancer Institute NSW
- Children's Cancer Institute Australia
- Clinical Excellence Commission (NSW)
- Cochlear Ltd
- Commonwealth Department of Health plus State and Territory departments of health
- Consumers Health Forum of Australia
- CSIRO Australian e-Health Research Centre
- Curtin University
- Dementia Australia Research Foundation Limited
- Harvard Medical School (USA)
- Health Quality & Safety Commission New Zealand
- Healthdirect Australia
- Independent Hospital Pricing Authority
- KPMG Australia
- Local Health Districts - various
- Melanoma Institute Australia
- Mito Foundation Australia
- Murdoch Children's Research Institute
- National Children's Digital Health Collaborative
- National Health and Medical Research Council
- National Library of Medicine (USA)
- NSW Department of Communities and Justice
- NSW Health Pathology
- Primary Health Networks - various
- Research Australia
- Royal College of Pathologists of Australasia
- Sax Institute
- St Vincent's Health Australia
- Sydney Children's Hospital Network
- University College London (UK)
- University of Melbourne
- University of New South Wales
- University of Notre Dame Australia
- University of Oxford (UK)
- University of South Australia
- University of Sydney
- University of Wollongong

Our Directors

PROFESSOR JEFFREY BRAITHWAITE

**Founding Director, Australian Institute of Health Innovation
Director, Centre for Healthcare Resilience and Implementation Science** 

Professor Jeffrey Braithwaite is a leading health services and systems researcher, internationally recognised for his work. He has considerable expertise in researching the culture and structure of acute settings, leadership, management and change in healthcare, quality and safety in healthcare, accreditation and surveying processes in international contexts and the restructuring of health services. He has published extensively, with over 600 refereed contributions and over 17,470 citations.

Professor Braithwaite is the recipient of research funding of over \$142 million spread over 96 grants. New research funding in the last five years amounts to over \$84.9 million; more than 87% of his funding is at the category one level.

His cutting-edge research on culture, reform and resilience has produced an extensive body of work that includes 14 highly regarded books. Professor Braithwaite has also led research laying new underpinnings of the discipline, particularly applying complexity science to healthcare improvement and reform. The International Society for Quality in Health Care has indicated his research is the most valuable international research in the field and, amongst others, the WHO and OECD have made extensive use of his work on quality indicators and Safety-II.

We conduct innovative and meaningful research that improves health services and systems and contributes to healthy populations.

A major breakthrough is represented in papers providing advances in healthcare structural change, and the need to deploy more sophisticated change strategies e.g., culture change or organisational change through collaborative networks. In 2019, he successfully secured, as lead investigator, a \$1.5 million Medical Research Future Fund Grant for keeping people out of hospitals. He was also awarded an NHMRC Leadership Award in the form of an Investigator Grant to examine genomics medicine implementation, creating a genomics learning organisation, valued at \$1.35 million.


PROFESSOR JOHANNA WESTBROOK

Director, Centre for Health Systems and Safety Research 

Professor Johanna Westbrook is internationally recognised for her research evaluating the effects of information and communication technology (ICT) in healthcare.

Professor Westbrook has led important research in the development and application of approaches to evaluate ICT, including new tools and methods which have been adopted internationally. She has extensive expertise in the study of medication safety.

Professor Westbrook has contributed to theoretical models regarding the design of complex multi-method ICT evaluations and conducted large trials of their effects. Integral to assessing the effectiveness of ICT to innovate work, and improve safety and quality of care, is gaining a deep understanding of clinical work and communication processes. Her research has included the development of the Work Observation Method by Activity Timing (WOMBAT) software to support the conduct of observational workflow studies, which is now used by 30 research teams across 12 countries. Her research has led to significant advances in our understanding of how clinical information systems deliver (or fail to deliver) expected benefits and supported translation of this evidence into policy, practice, and IT system changes. Professor Westbrook has over 450 publications, and has been awarded more than \$50 million in research grants.

In 2019, Professor Westbrook was named as the 'National Research Leader in Medical Informatics' by *The Australian* . Between 2016-2019, she was appointed by the Federal Minister for Health to the Board of the Australian Digital Health Agency



and in 2014 was named Australian ICT Professional of the Year by the Australian Information Industry Association. Professor Westbrook is Chair of the Deeble Institute of Health Policy Advisory Board, Australian Healthcare and Hospitals Association, and a member of the Boards of the Sax Institute and the International Medical Informatics Association.

PROFESSOR ENRICO COIERA
Director, Centre for Health Informatics 

Trained in medicine and with a computer science PhD in Artificial Intelligence (AI), Professor Enrico Coiera is Foundation Professor in Medical Informatics at Macquarie University and Director of the Centre for Health Informatics, a group he co-founded in 2000. He is also Director of the NHMRC Centre of Research

Excellence in Digital Health and founder of the Australian Alliance for Artificial Intelligence in Healthcare.

With a research background in industry and academia, Professor Coiera has a strong international reputation for his work on decision support and communication processes in biomedicine.

Professor Coiera spent ten years at the prestigious Hewlett-Packard Research Laboratories in Bristol UK where he led numerous health technology projects. He has overseen the development and trial of multiple

e-Health interventions, including the Healthy.me consumer app and clinical decision support systems.

The third edition of his textbook *Guide to Health Informatics* has been translated into several languages and is widely used internationally.

Professor Enrico has over 350 publications and over 16,100 citations in Google Scholar with an H-index of 63 (Google Scholar). Of these publications, 40 have more than 100 citations, nine more than 300 citations and one has more than 2,050 citations.

CASE STUDY

Providing evidence *that makes the difference*

Reforming aged care

The Royal Commission into Aged Care Quality and Safety incorporated research evidence provided by AIHI into the first Interim Report, titled *Neglect*.

Professor Johanna Westbrook was an expert witness to the Commission and discussed the appropriate use of linked data to make a difference in the lives of older Australians and their carers.

Professor Westbrook presented AIHI's research focusing on the power of information and communication technologies and existing healthcare data in electronic record systems to monitor and improve quality and safety in aged care and reduce the administrative burden on aged care staff. Professor Westbrook commented on the high volumes of routinely collected data in aged care in both electronic and paper-based format, and described how well-integrated electronic data is essential for assessing the impact of policy reforms and increasing transparency.

Professor Westbrook provided insights into how the research undertaken by AIHI, using data from existing sources including integrated electronic medical records and linked aged care datasets, has illuminated important issues relating to appropriate medication administration including in the areas of osteoporosis and antedementia and antipsychotic medications.

In an important first for Australian aged care research, AIHI found that among aged care facility residents with dementia across 68 facilities, 65% used antipsychotics longer than guidelines recommend. This groundbreaking research demonstrates how existing electronic data can be maximised to monitor quality use of medicines in aged care.

These data have also been analysed to examine trends in pressure injuries; the effects of community aged care services on delaying entry into aged care facilities; and the link between aged care services and quality of life for older adults.

Lind KE, Jorgensen M, Gray LC, Georgiou A, Westbrook JI. Anti-osteoporosis medication use in a high fracture-risk population: contemporary trends in Australian residential aged care facilities. *Health Services Insights*. 2019; 2(12). [↗](#)

Lind KE, Gray LC, Raban MZ, Georgiou A, Westbrook JI. Anti-dementia medication use by aged care facility residents with dementia. *International Journal of Geriatric Psychiatry*. 2019; 34(7):1029-40. [↗](#)

Jorgensen M, Siette J, Georgiou A, Westbrook JI. Longitudinal variation in pressure injury incidence among long-term aged care facilities. *International Journal for Quality in Health Care*. 2018; 30(9):684-91. [↗](#)

Lind KE, Raban MZ, Georgiou A, Westbrook JI. NSAID use among residents in 68 residential aged care facilities 2014 to 2017: An analysis of duration, concomitant medication use, and high-risk conditions. *Pharmacoepidemiology and Drug Safety*. 2019; 28: 1480-1488. [↗](#)

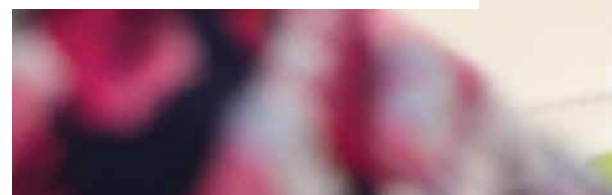
Siette J, Georgiou A, Jorgensen M, O'Donnell CJ, Westbrook JI. Integrating social engagement instruments into Australian community aged care assessments to enhance service provision. *Health and Social Care in the Community*. 2018; 26(6):810-8. [↗](#)

Brett L, Siette J, Nguyen AD, Jorgensen ML, Miao M, Westbrook JI, Lee W, Gow E, Hourihan F, Georgiou A. At the grassroots of home and community-based aged care: strategies for successful consumer engagement. *BMJ Open* 2019; 9: e028754. [↗](#)

Brett L, Georgiou A, Jorgensen M, Siette J, Scott G, Gow E, Luckett G, Westbrook JI. Ageing well: evaluation of social participation and quality of life tools to enhance community aged care (study protocol). *BMC Geriatrics* 2019; 19: 78. [↗](#)

Lind KE, Raban MZ, Georgiou A, Westbrook JI. Duration of antipsychotic medication use by aged care facility residents with dementia. *Alzheimer Disease & Associated Disorders*. 2019; 33(4):331-338. [↗](#)

In August 2019, AIHI brought together community aged care clients and staff, senior management from Uniting, health consumer representatives, Department of Health, and members of our Aged Care Evaluation and Research [↗](#) team for our second annual Ageing Well Stakeholder Forum. [↗](#) Discussions related to social engagement and community aged care services including integrated care and consumer choice. [↗](#)



CASE STUDY

Providing evidence that makes the difference



CASE STUDY

Providing evidence *that makes the difference*

First evaluation of rapid flu test

In a world first review, AIHI researchers confirmed the efficacy of the breakthrough rapid molecular diagnostic test for influenza which delivers results in two hours. The review provided evidence that the test improves patient outcomes and reduces unnecessary resource utilisation both in hospital emergency departments (ED) and inpatient settings.

Influenza poses a substantial health and economic burden every year, with 1,255 deaths in Australia in 2017 alone. After the rapid molecular diagnostic test for influenza was introduced in NSW in July 2017, researchers from the AIHI Diagnostic Informatics [team](#), in collaboration with NSW Health Pathology, conducted a series of large multicentre studies to assess its impact.

As reported in the *Medical Journal of Australia*, 70% of patients can be accurately diagnosed while in the ED, compared to less than 2% using the conventional test. There was also a 4% reduction in the rate of hospital admission. Further, and as outlined in the *Journal of Clinical Microbiology*, the use of the rapid test for adults hospitalised with respiratory illnesses was associated with a shorter hospital stay and a reduction in ancillary laboratory testing.



Wabe N, Li L, Lindeman R, Yimsung R, Dahm MR, Clezy K, McLennan S, Westbrook JI, Georgiou A. The impact of rapid molecular diagnostic testing for respiratory viruses on outcomes for emergency department patients. *The Medical Journal of Australia*. 2019; 210(7):316-320. [↗](#)

Wabe N, Li L, Lindeman R, Yimsung R, Dahm MR, McLennan S, Clezy K, Westbrook JI, Georgiou A. Impact of rapid molecular diagnostic testing of respiratory viruses on outcomes of adults hospitalized with respiratory illness: a multicenter quasi-experimental study. *Journal of Clinical Microbiology*. 2019; 57(4):e01727-01718. [↗](#)

Wabe N, Li L, Dahm MR, Lindeman R, Yimsung R, Clezy K, Thomas J, Varndell W, Westbrook JI, Georgiou A. Timing of respiratory virus molecular testing in emergency departments and its association with patient care outcomes: a retrospective observational study across six Australian hospitals. *BMJ Open*. 2019; 9(8):e030104. [↗](#)

The review provided evidence that the test improves patient outcomes.

CASE STUDY

Providing evidence *that makes the difference*

A landmark study for child health

“One of the most important papers in child health in the last 5 years.”

This is how the Editor-in-Chief of JAMA Network described CareTrack Kids when results were published in the *Journal of the American Medical Association*, one of the world’s prestige medical journals.

CareTrack Kids [↗](#) is a landmark national study into the standard of healthcare provided to children in Australia. Results showed children receive care in line with clinical practice guideline recommendations on average 60% of the time.

By examining 17 common childhood conditions, the study measured adherence by GPs and paediatricians to clinical practice guideline recommendations. Care was evaluated for 6,689 children 15 years of age and younger who had 15,240 visits to emergency departments, for inpatient admissions, or to pediatricians and general practitioners in selected urban and rural locations in three Australian states. These visits generated 160,202 quality indicator assessments.

The outcomes of CareTrack Kids will guide the efficient, safe and effective delivery of healthcare to future generations of Australian children.

Braithwaite J, Hibbert P, Jaffe A, White L, Cowell C, Harris M, Runciman W, Hallahan AR, Wheaton G, Williams H, Murphy E, Molloy C, Wiles L, Ramanathan S, Arnolda G, Ting HP, Hooper TD, Szabo N, Wakefield JG, Hughes CF, Schmiede A, Dalton C, Dalton S, Holt J, Donaldson L, Kelley E, Lilford R, Lachman P, Muething S. The quality of health care for children in Australia. *Journal of the American Medical Association*. 2018; 319(11):1113-24. [↗](#)

Sunderland N, Westbrook JI, Urwin R, Knights Z, Taitz J, Williams H, Wiles L, Molloy C, Hibbert P, Ting HP, Churruca K, Arnolda G, Braithwaite J. Appropriate management of acute gastroenteritis in Australian children: a population-based study. *PLOS One*. 2019; 14(11):e0224681. [↗](#)

Hibbert P, Stephens JH, de Wet C, Williams H, Hallahan A, Wheaton GR, Dalton C, Ting HP, Arnolda G, Braithwaite J. Assessing the quality of the management of tonsillitis in Australian children: a population-based sample survey. *Otolaryngology-Head and Neck Surgery*. 2019; 160(1):137-44. [↗](#)

Children receive care in line with clinical practice guidelines on average 60% of the time.



CASE STUDY

Providing evidence *that makes the difference*

Understanding how quality measures impact hospital care

Deepening our Understanding of Quality in Australia (DUQuA) [↗](#) is the largest study on quality management in Australian public hospitals and one of the largest conducted internationally.

For the first time, hospital quality management systems, leadership and culture were studied for how they relate to healthcare delivery, quality and patient factors.

DUQuA is an NHMRC funded research project and was conducted in 32 large public hospitals around Australia, encompassing 119 participating departments, and 2,387 participants, including clinicians (doctors, nurses, and allied health professionals), hospital managers, and patients.

DUQuA extends the work undertaken in the Deepening our Understanding of Quality Improvement in Europe study, which examined the relationships between quality management systems, clinical processes, and patient factors in 188 hospitals across seven European countries.

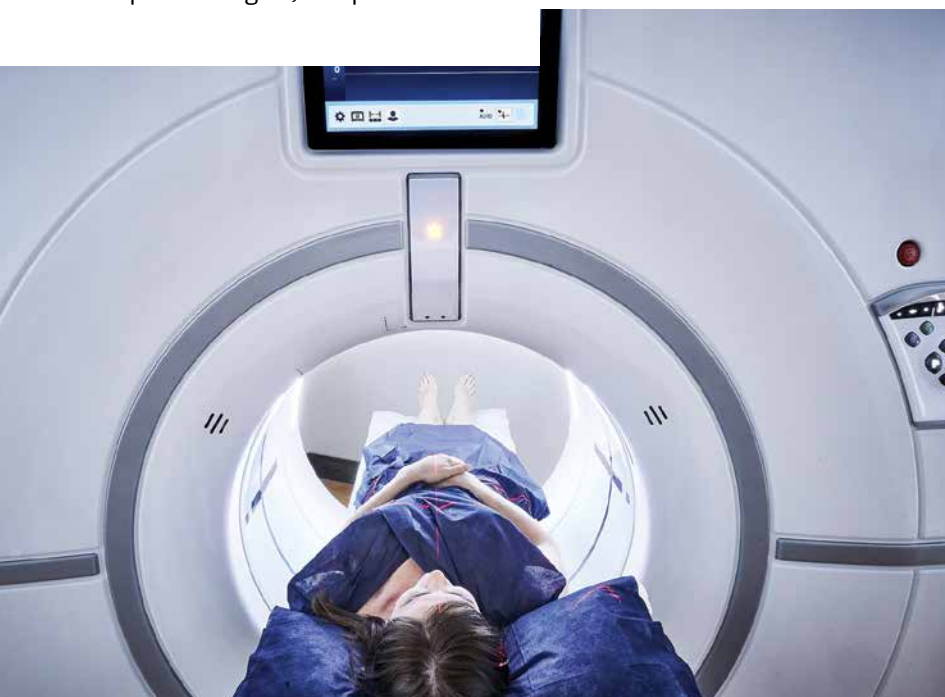
Results were published in the *International Journal for Quality in Health Care* and other peer-reviewed journals, and presented at international conferences and symposiums. Individually tailored benchmarking reports were provided to each of the 32 hospitals and are reportedly being used to assist those preparing for accreditation.

DUQuA is the largest study on quality management in Australian hospitals.

Braithwaite J, Clay-Williams R, Taylor N, Ting HP, Winata T, Hogden E, Li Z, Selwood A, Warwick M, Hibbert P, Arnolda G. Deepening our Understanding of Quality in Australia (DUQuA): an overview of a nation-wide, multi-level analysis of relationships between quality management systems and patient factors in 32 hospitals. *International Journal for Quality in Health Care*. 2020; 32(Supplement 1):8-21. [↗](#)

Braithwaite J, Clay-Williams R, Taylor N, Ting HP, Winata T, Arnolda G, Sunol R, Groene O, Wagner C, Klazinga NS, Donaldson L, Dowton SB. Bending the quality curve. *International Journal for Quality in Health Care*. 2020 Feb 6; 32(Supplement 1):1-7. [↗](#)

Clay-Williams R, Taylor N, Ting HP, Winata T, Arnolda G, Austin E, Braithwaite J. The relationships between quality management systems, safety culture and leadership and patient outcomes in Australian Emergency Departments. *International Journal for Quality in Health Care*. 2020 Feb 6; 32(Supplement 1):43-51. [↗](#)



CASE STUDY

Providing evidence *that makes the difference*

Unlocking AI for healthcare



The Australian Alliance for Artificial Intelligence in Healthcare (AAAiH), [led](#) by Professor Coiera, has grown from 50 organisations at the start of 2019 to over 90 organisations with 250 individual members from Australia, the UK, US, New Zealand and Canada.

AAAiH brings together national and international partners and engaged stakeholders in academia, government, consumer, clinical, industry organisations, and peak bodies to translate frontier AI technologies into real-world health services.

The group has developed a number of initiatives including a green paper on AI in healthcare, an Australia-wide workforce survey, and a national workshop. AAAiH was also an official conference partner of the first AIMed global summit in Australia.



CASE STUDY

Providing evidence *that makes the difference*

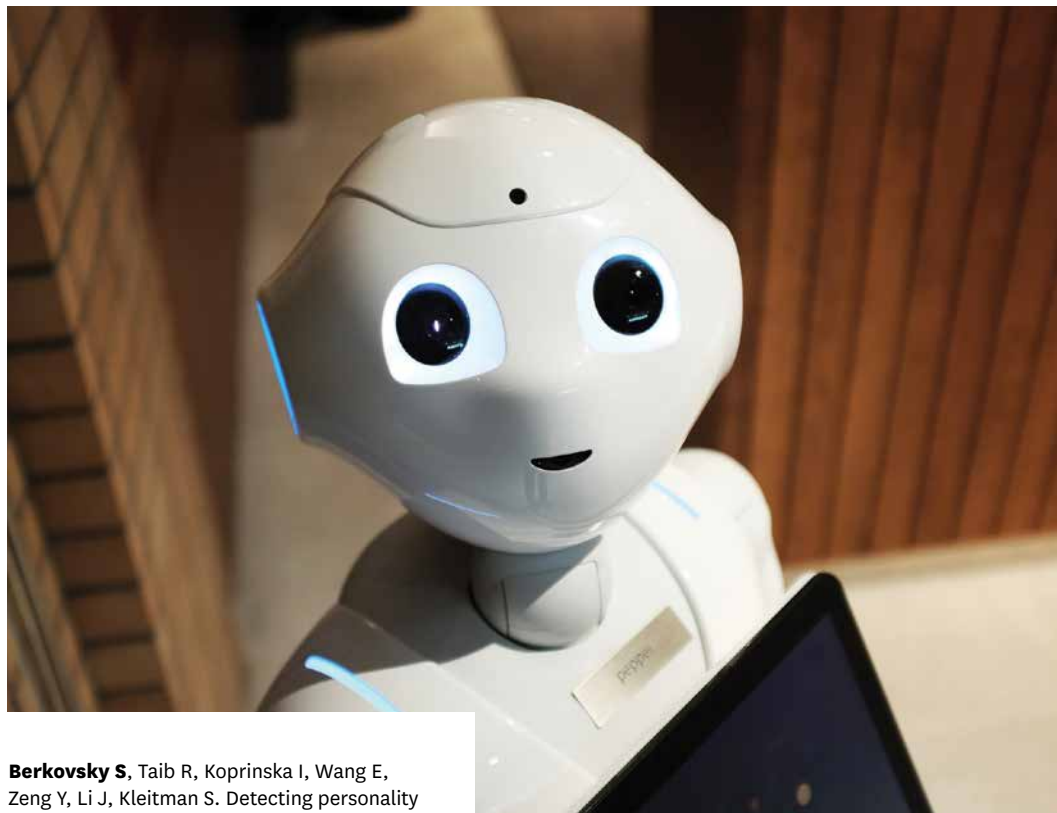
Detecting personality traits using eye-tracking data

In ground-breaking research using AI, personality detection has been made more accurate and may be used to enhance medical care.

Personality detection is an important task in psychology, as personality traits are linked to various behaviours and real-life outcomes. Detecting personality traits traditionally involves the time-consuming analysis of lengthy questionnaires which is frequently unreliable, especially if the respondents do not answer honestly.

This research project used a new framework for objective personality detection using humans' physiological responses to stimuli. These responses were processed and fed into machine learning algorithms capable of accurately predicting personality traits.

Across all the subjects and personality traits, the predictions achieved accuracy of almost 90%. The project resulted in multiple publications, one of them winning the Best Paper Award of the ACM International Conference on Human Factors in Computing Systems (CHI-2019), the premier conference in human-computer interaction.



Berkovsky S, Taib R, Koprinska I, Wang E, Zeng Y, Li J, Kleitman S. Detecting personality traits using eye-tracking data. *CHI Conference of Human Factors in Computing Systems*; 4 May 2019; Glasgow, Scotland UK. 2019. ↗

TEDx

AIHI was proud to be part of the sold-out Macquarie University TEDx in September 2019, resulting in three talks being promoted on the official TED website.

Professor Jeffrey Braithwaite

Turning, breaking, or vanishing point? [↗](#)

Professor Enrico Coiera

Will AI mean we no longer need doctors? [↗](#)

Dr Robyn Clay-Williams [↗](#)

Gender equality requires gender-based design. [↗](#)

The event was organised by members of AIHI including Hossai Gul, Director and Curator, TEDx Macquarie University, and Zeyad Mahmoud, Director and Producer, TEDx Macquarie University. Highlighting the leadership skills that abound in AIHI, other volunteer organisers from AHI included Chiara Pomare, Melissa Miao, Dr Amalie Dyda and Sheila Pham.



Researchers of the future



RABIA BASHIR

Winner of the 2019 Macquarie University Dean's Award for Research Excellence

A NEW PERSPECTIVE ON RESEARCH INEFFICIENCIES

My PhD research examined inefficiencies in the systematic review ecosystem. My background was in software engineering, so I took that perspective and proposed the development of a new method for helping researchers to decide when a systematic review update is warranted. This has the potential to benefit meta-research and clinical research informatics.

I was truly blessed to undertake my doctoral research with two amazing supervisors, Associate Professor Adam Dunn and Dr Didi Surian, who always motivated and encouraged me to become an independent researcher. During my studies, I gained innovative skills, learned new methodologies, and articulated brand new concepts. I am now an Honorary Postdoctoral Associate with AIHI.



ZEYAD MAHMOUD

Cotutelle PhD candidate with University of Nantes, France

RESEARCH ACROSS DISCIPLINES AND CONTINENTS ENHANCES HOSPITAL MANAGEMENT

My PhD, entitled *Hospital Management in the Anthropocene*, was the first multinational interdisciplinary research project designed to address one of the greatest challenges faced by health systems in our modern era: striking a balance between efficiency and human centricity. Building on our existing knowledge in the fields of Management Science, Health Services Research and Big History, I developed a unique management framework that can be easily operationalised for hospitals looking to improve the efficiency of operating theatres while empowering and supporting their nursing staff.

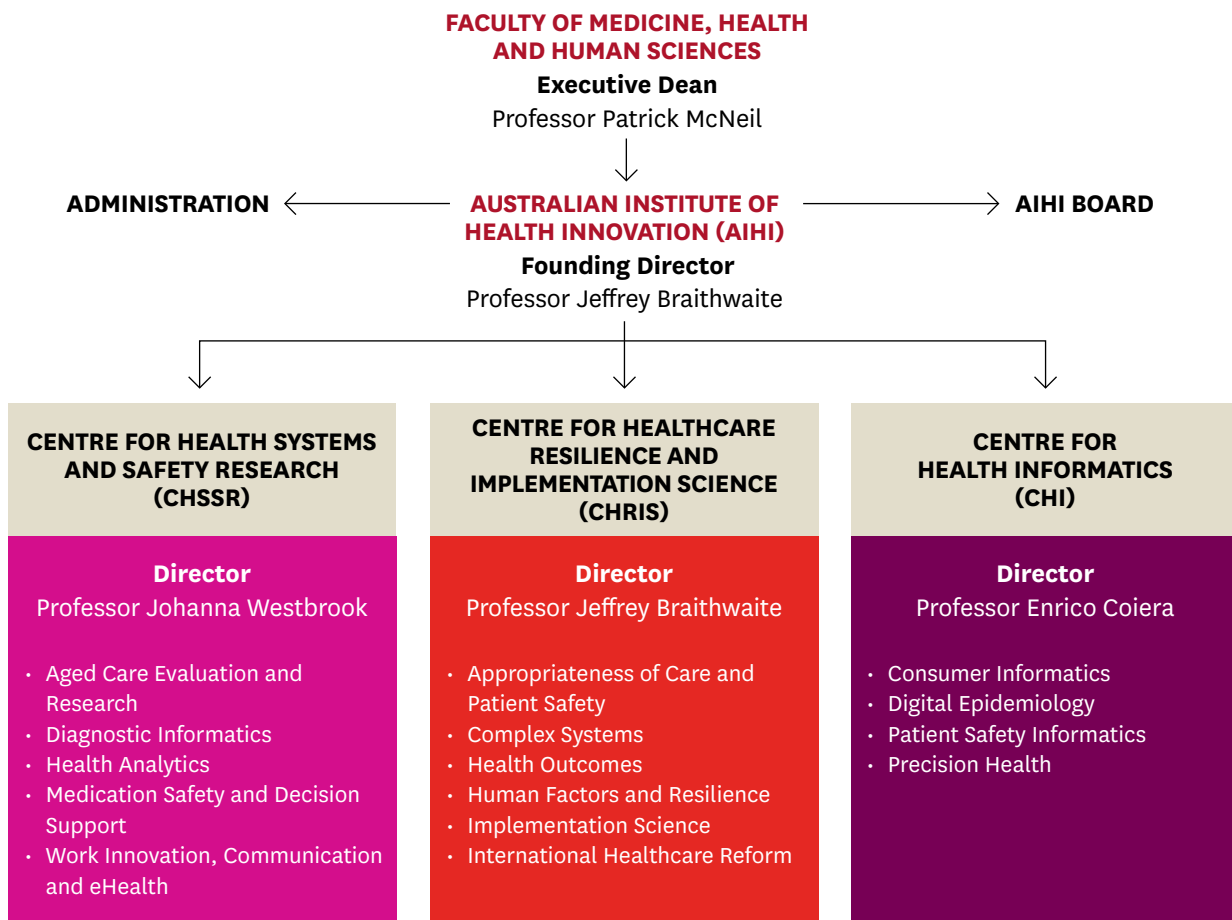
My PhD journey has been extremely rewarding; I have been honoured to speak to academics, clinicians,

health administrators, and policymakers at 12 conferences and seminars in four countries. I am grateful to my supervisors and to the culture at AIHI that provides students with the flexibility and support needed to advance their careers; my colleagues at AIHI have been with me every step of the way. I am now a Postdoctoral Research Fellow with AIHI.

**Our bright and dedicated
PhD students are working
on research projects
that address complex
problems and contribute
real solutions.**



Organisational structure



- NHMRC PARTNERSHIP CENTRE FOR HEALTH SYSTEM SUSTAINABILITY
- NHMRC PARTNERSHIP PROJECT FOR DIGITAL SUPPORT FOR AGED CARE
- NHMRC CENTRE OF RESEARCH EXCELLENCE IN DIGITAL HEALTH
- NHMRC CENTRE OF RESEARCH EXCELLENCE IN IMPLEMENTATION SCIENCE IN ONCOLOGY
- NHMRC PROJECT GRANT CARETRACK AGED

Global themes: Patient Safety; Improvement Studies; Multidisciplinary Teamwork; Behaviour Change; International Health Reform; Digital Health; Aged Care

Introducing our Centres



The Australian Institute of Health Innovation (AIHI) is powered by three complementary Centres dedicated to improving the services and systems that deliver healthcare to patients:

- Centre for Health Systems and Safety Research [↗](#)
- Centre for Healthcare Resilience and Implementation Science [↗](#)
- Centre for Health Informatics [↗](#)

The Centres contribute their collective expertise to explore the big questions of safety, quality, technology and sustainability that challenge health systems nationally and internationally.


The success of AIHI's collaborative approach is apparent in being funded for three additional Centres: the NHMRC Partnership Centre for Health System Sustainability, [↗](#) the NHMRC Centre of Research

Excellence in Digital Health [↗](#) and the NHMRC Centre of Research Excellence in Implementation Science in Oncology [↗](#).

AIHI also contributes to student supervision (PhD and Master of Research candidates) and to the Faculty of Medicine, Health and Human Science's teaching programs. Key teaching responsibilities include supervision of Doctor of Medicine (MD) students' research projects and teaching in the MD and Master of Public Health Programs.

As part of MQ Health, Macquarie's academic health sciences centre, encompassing Macquarie University Hospital, AIHI is at the forefront of bringing together education, biomedical and translational research with state-of-the-art clinical care.

Centre for Health Systems and Safety Research

From hospitals to aged care services, health information technologies are designed to make things better – from greater efficiency to improved patient safety. Challengingly, the implementation of these technologies is complex and often disrupts healthcare delivery. The Centre for Health Systems and Safety Research (CHSSR)  tackles important research questions about how health information technologies can be designed and utilised to deliver improved outcomes for Australians.

Effective information exchange, communication and teamwork are essential elements of the patient safety puzzle. Through our design and application of complex multi-method evaluation models, our research is delivering high quality evidence to inform decision making and drive changes in healthcare policy and practice.

During 2019 the CHSSR team conducted internationally leading studies and were awarded two significant new grants:

\$1.8 million

Funding to undertake an NHMRC Partnership Project aimed at creating a digital dashboard of integrated aged care data to identify and support residents at risk of poor outcomes. The project also aims to address several issues highlighted at the Royal Commission into Aged Care Quality and Safety, including the monitoring of pressure injuries and medication management.

\$2.5 million

Five-year NHMRC Investigator Grant to continue research into how information technologies can improve healthcare services, patient safety and outcomes in the area of medication safety.

“2019 was incredibly rewarding in seeing the translation of key research findings directly influencing policy and practice in the health system, from the management of medications in paediatrics to interim recommendations of the Royal Commission into Aged Care Quality and Safety.”

PROFESSOR JOHANNA WESTBROOK



National media

Sydney Morning Herald and *Fairfax Media* featured Professor Westbrook's opinion piece on "Patient safety put at risk by negative workplace cultures". ↗



Medication management

More than \$500,000 of commissioned work was completed to evaluate and develop guidelines for electronic medication management systems in aged care, for government organisations including ACSQHC.



Paediatric care policy

The NHMRC Partnership Project with the Sydney Children's Hospital Network and eHealth NSW has resulted in reviews of guidelines and changes to electronic systems.



Royal Commission

The Royal Commission into Aged Care Quality and Safety adopted evidence provided by AIHI into its first Interim Report.



Medication error

Systematic review of the impact on medication errors of double-checking during medication administration was listed as one of the top 10 most read papers in *BMJ Quality and Safety*. ↗



WOMBAT

The first cross-country study was completed using the WOMBAT software to quantify the impact of electronic medication management systems on hospital pharmacists' work in Australia and in England. The results were published in the *International Journal of Medical Informatics*. ↗



Sepsis

The first national sepsis epidemiology report established an epidemiological and statistical reference for the Australian Commission on Safety and Quality in Health Care (ACSQHC) to develop national clinical care standards to improve sepsis patient outcomes. ↗



Innovative tool

Development of a tool ↗ for the assessment of potential and actual harm from medication errors, providing a standardised approach to assessing medication related harm.



Parliament House lecture

Professor Westbrook chaired and facilitated the Inaugural John Deeble Lecture and panel discussion at Parliament House, Canberra.



CHSSR Research Streams

AGED CARE EVALUATION AND RESEARCH (ACER)

Dr Mikaela Jorgensen

mikaela.jorgensen@mq.edu.au

Our mission is to improve the health and wellbeing of older Australians through enhancing the delivery of community-based and residential aged care services. As clients and providers begin to use new information technologies, our team is focused on:

- Unlocking and integrating health and aged care data to better understand care journeys.
- Developing new approaches to help care providers improve meaningful outcomes such as quality of life and cognition.
- Evaluating models of aged care service and technology delivery and providing timely feedback to inform policy.
- Co-designing research with aged care clients and the workforce to better suit their needs and preferences. ↗

DIAGNOSTIC INFORMATICS

Professor Andrew Georgiou

andrew.georgiou@mq.edu.au

Diagnostic informatics encompasses major areas of research across the diagnostic analytical process. This ranges from the clinical choice of diagnostic request, the quality and efficiency of the analytical process, right through to the interpretation

and follow-up of test results and their impact on patient care outcomes.

Diagnostic informatics involves laboratory medicine, anatomic pathology and medical imaging. Whilst diagnostic testing may account for a small (less than 5%) proportion of most hospital budgets, it is considered to have a huge influence on medical decision-making. It underpins much of our health care system, generating information that is crucial to the prevention, diagnosis, prognosis, stratification of risk and treatment of disease. ↗

MEDICATION SAFETY AND ELECTRONIC DECISION SUPPORT

Dr Magda Raban

magda.raban@mq.edu.au

The Medication Safety and Electronic Decision Support research team focuses on evaluating and optimising electronic systems and decision support to improve the delivery of healthcare and health outcomes. Our research spans multiple health settings, including hospitals and residential aged care. ↗

WORK INNOVATION, COMMUNICATION AND EHEALTH

Dr Neroli Sunderland

neroli.sunderland@mq.edu.au

Understanding the way clinical care is delivered is central to supporting effective and safe delivery models including the design of new service

models. Our research investigates patterns of clinicians' work, and the factors that influence workflow and workloads, task errors, and patient and staff safety and wellbeing.

We apply a broad range of methods including direct observational methods, social network analysis and qualitative techniques. Projects have included investigation of the relationship between organisational culture and ICT use, the impact of electronic health record systems on workflow and efficiency, and clinicians' actions in response to electronic decision support alerts. ↗

HEALTH ANALYTICS

Associate Professor Ling Li

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Health data analytics provides insights into rich, dynamic data available from electronic health record systems. The Health Analytics team is focused on:

- Developing and applying rigorous, cutting-edge research methods to evaluate the impact of eHealth interventions on patient safety and outcomes.
- Utilising rich dynamic electronic health record data to improve patient care delivery.
- Providing real-time information that can support decisions and deliver actionable insights. ↗

Left to right: Dr Mikaela Jorgensen, Professor Andrew Georgiou, Dr Magda Raban, Dr Neroli Sunderland and Associate Professor Ling Li



Centre for Healthcare Resilience and Implementation Science

Ageing populations, technological breakthroughs, limited resources and consumer expectations all combine to make health system improvement a challenge of the greatest magnitude. The Centre for Healthcare Resilience and Implementation Science (CHRIS) is reconceptualising healthcare research to build more resilient systems to meet this challenge.

CHRIS pursues highly collaborative, multidisciplinary research and is pioneering new approaches to ensure research findings are translated into better and more cost-effective care. By scrutinising the myriad interactions between interconnected webs of professionals, patients and technologies, CHRIS is committed to enhancing understanding of the big picture of healthcare delivery.

The Centre is leading new research into the factors that combine to produce system-wide resilience. Such resilience can be harnessed to ensure organisations are more resistant to costly challenges and are able to improve patient outcomes and reduce wasteful use of resources. CHRIS is also scrutinising the processes of change to help ensure that many more research findings are translated into real world gains for patients, policymakers, healthcare providers and funding agencies.

During 2019, CHRIS secured funding for two major new research projects:

\$1.35 million

NHMRC Investigator Grant to design and implement a real-world learning healthcare system to improve care for children with rare cancers.

\$1.5 million

Funding from the Australian Medical Research Future Fund to develop a program to support best practice care across the New South Wales health system harnessing implementation science, complexity science and evidence-based care.

CHRIS's leadership is expressed in various ways including being involved in the NHMRC Partnership Centre for Health System Sustainability and the NHMRC Centre of Research Excellence in Implementation Science in Oncology. We also work with international bodies including the WHO, OECD, The International Society for Quality in Health Care and The Society for Organisational Behaviour in Health Care to support global healthcare reform.



16 September 2019

Patient safety: a case of constant vigilance

THERE has never been a better time to be admitted to hospital in Australia. Health professionals are highly trained, cutting edge technology is widely available, and the majority of patients recover to live fruitful lives.

While this is reassuring, I (and many of my colleagues researching health systems around the world) argue we still have a long way to go. With the World Health Organization's *World Patient Safety Day* on 17 September, it is timely to reflect on how far we have come and where we are heading.

The patient safety movement began almost 40 years ago – slowly at first. Prior to this, it was considered inevitable that some patients would experience harm while journeying through the system. This was part of the risks of the system, we believed, until we took the time to look closely and realised that there was much more to be understood.

From the 1970s to the 1990s countries such as the US, UK and Australia began leading the way. The idea was to provide evidence-based studies such as the *Quality in Australian Health Care* study published in the *MAJ* in 1995, which could be used to provide unbiased information and be turned into advice to clinicians, policymakers and the general public to reduce the number of adverse events due to medical management.

By the turn of the past century, a seminal report from the US Institute of Medicine caught the world's attention. In 1999, *To err is human* reported that between 44 000 and 98 000 deaths per year in the US could be attributed to preventable errors in the delivery of health care.

Since then, it has become broadly known and much better understood that there is risk to patients when they interact with health services. The dedication of the health care profession is rarely in doubt, but the way care is organised has come under scrutiny. Paradoxically, most care is safe, but cases of harm are much more likely to be newsworthy.

More evidence emerged. The *Kayakawa ICU* and *Making Māngā* interventions in the early to mid-2000s successfully reduced infections when putting in a central line for intensive care patients in the



YVONNE ZUREICKO
Associate Professor,
Health System
Sustainability, Australian
Institute of Health
Innovation, Macquarie
University and the
NHMRC Partnership
Centre in Health System
Sustainability

SUSAN WOOLFENDEN
Associate Professor,
School of Women's and
Children's Health, The
University of NSW and
the Sydney Children's
Hospital Network

CHRISTIE EILEEN
Associate Network
Program Director, Priority
Populations, the Sydney
Children's Hospital
Network

Care coordination for children with chronic conditions

Making life better and saving money for the healthcare system

Having a child frequently admitted to hospital or requiring ongoing medical care is very stressful for families. The worry about the child's health and the diminished attention needed by families to manage our complex health system is a great challenge.

According to the Australian Institute of Health and Welfare, over one-third (37%) of Australian children have long-term health conditions, and frequently need care from multiple providers in diverse healthcare settings. Long-term health conditions include asthma, diabetes and allergies, but some children have very complex conditions including developmental, genetic or chromosomal disorders. These children are frequent visitors to hospital clinics, emergency departments (ED) and

healthcare services in the community. Many families, however, rely on tertiary children's hospitals in metropolitan centres for most of their health care, because that is where their trusted interdisciplinary specialist teams are located. This is not sustainable. Attending tertiary children's hospitals is costly for families due to travel, accommodation costs, family disruption and loss of income for the parents. Further, it is costly for the health system because highly specialised tertiary children's hospitals are high-cost settings. Ideally, families would prefer to receive excellent care for their children closer to home, while keeping them out of metropolitan children's hospitals.

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THE AUSTRALIAN

Paramedics accused of deadly culture of KPIs before care

By LUKE GRIFITHS
10:58AM FEBRUARY 26, 2019 • 2 COMMENTS

Nine people died within five months last year as a result of South Australian paramedics not immediately taking them to hospital or underestimating their clinical risk, a new report finds.

All the deaths have been referred to the coroner, while the paramedics could face disciplinary action following a series of internal investigations.

Health Minister Stephen Wade and SA Ambulance Service chief David Price refused to be drawn yesterday on whether the state could face legal action.

The release of an independent review, conducted by academic Peter Hibbert and focused on events from August to December, comes after The Australian last week revealed a spike in "adverse incidents" during the period.

Associate Professor Hibbert found "preventable patient harm may have occurred" in 14 of the 17 incidents he investigated.

That number is expected to rise as more cases are assessed. Seven "adverse incidents" were recorded in 2017.

Associate Professor Hibbert found an overriding theme was an under-appreciation of the clinical risk posed to patients.

His 14 recommendations, including a call for SAAS to develop a "cohesive and organisation-wide strategy for delivering high quality and safe care", have been accepted by the government.

"The most significant finding across the incidents was a lack of response to abnormal

NATIONAL AGED CARE

All the lonely people: Aged care residents at risk of neglect at Christmas

By Julia Power
December 23, 2019 – 12:06pm

View all comments

TODAY'S TOP STORIES

CLIMATE POLICY

PM accused of using 'fake number' to mislead Australians about cuts to emissions

SYDNEY LOCKOUT LAWS

Sydney faces a flood of drinking venues, but an 'entertainment drought'

MISSING PERSON

Man initially feared to have been taken by crocodile, found alive and healthy three weeks later

TRADE WARS

Trump's trade war and Huawei ban 'wake up' Chinese entrepreneurs

Far from being the most wonderful time of the year, Christmas and the summer holidays can be the worst for the 230,000 residents of aged care: staffing is at a minimum, activities are cancelled, and visitors and families are away on holidays.

Experts are urging families to visit lonely and frail relatives living in aged care over the summer holidays because skeleton staffing levels may result in neglect.

Aged care expert Professor Kathy Eagar, who conducted a review of staffing levels at 89 Australian facilities, said: "Nursing homes have absolute minimum staffing at night, on weekends and public holidays. There might not be any qualified staff



WE HEAR YOU INVESTIGATING ATTITUDES TOWARD HEARING DEVICES

Age 83. They received a hearing aid. They were told to wear it. They didn't. They were told to wear it. They didn't. They were told to wear it. They didn't.

Health Voices

JOURNAL OF THE COLLEGE OF HEALTH FORUM OF AUSTRALIA



Shifting our focus to achieve better care



Jeffrey Braithwaite

Professor Jeffrey Braithwaite is a leading health services and systems researcher with an international reputation for his work investigating and contributing to systems improvement. He is Founding Director of the Australian Institute of Health Innovation, Macquarie University, and President-Elect for the International Society for Quality in Health Care.

Samanthal was admitted to hospital recently. She had abdominal pain, anxiety, and a rash, and the tests suggested she needed exploratory surgery for her abdominal pain. She was understandably worried. Because of this and a couple of problems at work, life had got on top of her.



HEALTHCARE AND HEALTH SYSTEMS • EVIDENCE-BASED ISSUES • WHEN WE MOVE BEYOND OUR USUAL SILOS, WHAT SOLUTIONS CAN WE FIND TO LOW-VALUE HEALTHCARE?



Participants in health system simulation workshop. Image via @FCHSS_ASH

When we move beyond our usual silos, what solutions can we find to low-value healthcare?

By Ben Haines Series Author: Thomas Zureicko on December 11, 2019

As presented at Croakey, a recent health system simulation aimed to generate creative and effective solutions to tackle low-value healthcare.

Five key messages emerged from the discussions, according to Thomas Zureicko, Associate Professor of Health System Sustainability, Australian Institute of Health Innovation, Macquarie University, and the coordinator of the Institute's Partnership Centre for Health System Sustainability. (And you can read a Twitter summary from the day here.)

Twitter summary

20191014



Independent investigation needed into hospital failures

When a patient is harmed in hospital, an independent body that investigates and reports on incidents, the Healthcare Safety Investigation Branch (HSIB), has been recently set up in response to several major reviews into the public handling of patient safety incidents.

HSIB was established to mirror other safety-critical industries such as aviation, which is led by an independent and internationally staffed organisation to investigate serious safety risks.

Such a system does not exist in Australia.

A patient in an Australian hospital suffers serious harm that could have been prevented by better care. It is often an independent review.

Such preventable incidents that occur in a hospital are generally examined by people within the same service. They are almost always investigating themselves, and for some investigators, this just doesn't seem right.

Every such investigation occurs in Australia each year and recommendations for improvements to safety are made. Yet it seems from media reports that patients are still being harmed by events that simply could not happen.

HSIB is a

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recommended actions to gran



FRANCES RAPPOPORT
Professor of Health
Innovation Research,
Australian Institute of
Health Innovation, and
Associate Lecturer, MEd
(Coordinator of Medicine),
Macquarie University

IN DEPTH

Navigating the healthcare maze

A new model of care for epilepsy.

Making up to 17 years before being offered

life-changing surgery is the reality for people

with uncontrolled epilepsy. A new way of caring

for people with this rare severe form of epilepsy

promises to speed up access to treatment.

During the course of the study, researchers

discovered one reason why had refractory

epilepsy for 27 years but had only recently

been fully diagnosed. She had been prescribed

many different medications and had numerous

misdiagnoses and all the while experienced

debilitating seizures that did not respond well

to anti-epileptic drugs, disrupting her work and

family life.

Researchers also spoke to a man who, after

living with refractory epilepsy for many years,

had finally undergone surgery but this had

proven unsuccessful. He was left confused

and disoriented and described the enormous

emotional effort one required to remain hopeful

of future success in the face of more surgery.

Developing this new care model

I was fortunate enough to lead a team from

Macquarie University, Cardiff University (UK) and

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“We welcome health system advocates, research scientists and industry as partners in our efforts to develop innovative solutions and ensure healthcare system efficiency, effectiveness and sustainability.”

PROFESSOR JEFFREY BRAITHWAITE



CareTrack Kids

CareTrack Kids, a NHMRC Partnership Grant project, published papers in the areas of preventive care, autism, acute abdominal pain, croup, depression and anxiety, bronchiolitis, upper respiratory tract infection, asthma and tonsillitis. [↗](#)



Aged care

The Interim Report of the Royal Commission in Aged Care Quality and Safety cited the NHMRC Project CareTrack Aged protocol paper published in *BMJ Open*. [↗](#)



Child injury prevention

The National Child Injury Prevention Strategy, secured with research from the Health Outcomes team, began foundational development and consultations. [↗](#)



Quality management

Results from Deepening our Understanding of Quality in Australia (DUQuA), one of the most important studies of its kind in the world to determine how hospital quality management is related to patient care, have been released and published in a Special Issue of the *International Journal for Quality in Health Care*. [↗](#)



Epilepsy

The Patient Reported Implementation Science Model (PRIME) [↗](#) offers for the first time an overarching vision and framework to explain the delivery of care for people with complex epilepsy.



Female Firsts

Dr Robyn Clay-Williams was featured on SBS TV Insight program titled “Female Firsts”. [↗](#)



Cochlear Implants

Research on cochlear implant use has been integral to the development of a global statement on hearing loss and was the basis of an informative video on the barriers and facilitators to people receiving a cochlear implant. [↗](#)



PhD research

PhD candidates Chiara Pomare, Kristiana Ludlow, Zeyad Mahmoud and Hossai Gul contributed to major studies in health services improvement.



CHRIS Research Streams

APPROPRIATENESS OF CARE AND PATIENT SAFETY

Professor Jeffrey Braithwaite

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Associate Professor Peter Hibbert

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The Appropriateness of Care and Patient Safety stream investigates the level of evidence-based or best practice healthcare that Australians receive. Our suite of research includes a number of internationally recognised long-term population-based studies including CareTrack Australia, CareTrack Kids and CareTrack Aged. ↗

IMPLEMENTATION SCIENCE

Professor Frances Rapport

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The Implementation Science stream examines how to bring about service improvements, faster patient care pathways, more informed patients and greater shared care services across primary, community and tertiary contexts. The desired outcome is sustainable high-quality and safe healthcare services, informed equally by patients and healthcare professionals, and clear models of professional care delivery. ↗

COMPLEX SYSTEMS

Professor Jeffrey Braithwaite

jeffrey.braithwaite@mq.edu.au

Complex Systems research takes a holistic approach to investigating

the health system, recognising that it is a Complex Adaptive System, with multiple individuals, a network of multidisciplinary teams and patients, complicated technologies and processes, and complex interdependencies of resources. Our diverse work exploring useful ways to capture, leverage and embrace the complexity of our health system, focusses on aspects of organisational culture and how to measure it, implementation of genomic medicine, and implementation evaluation of mental health initiatives. ↗

HEALTH OUTCOMES

Associate Professor

Rebecca Mitchell

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The Health Outcomes research stream examines the burden of injury and disease to determine priorities for prevention efforts and conduct research in the population and within the health system aimed at identifying where health outcomes could be improved. ↗

HUMAN FACTORS AND RESILIENCE

Dr Robyn Clay-Williams

robyn.clay-williams@mq.edu.au

The Human Factors and Resilience research stream provides a vital contribution, nationally and internationally, to understanding how healthcare systems function, and how to make them safer for

patients. We aim to understand how everyday work is done by doctors, nurses, and allied health practitioners on the frontlines of patient care, and we use that knowledge to develop processes and tools for increasing the number of things that go right and thereby making care better for patients and their families. Our work addresses healthcare needs at multiple levels, from local health district, to hospital, to clinical teams. ↗

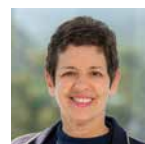
LEARNING HEALTH SYSTEMS

Professor Jeffrey Braithwaite

jeffrey.braithwaite@mq.edu.au

Despite many efforts over 25 years, modern healthcare systems persistently underperform. Errors, suboptimal care and waste come at a high human and economic cost. This ambitious project, sitting at the intersection of technology and human behaviour, aims to help break this impasse. By harnessing information technologies, data mining, machine learning and genomics, the learning system will help drive the transition from today's standardised treatment protocols to precision and personalised medicine.

Left to right: Professor Jeffrey Braithwaite, Associate Professor Peter Hibbert, Professor Frances Rapport, Associate Professor Rebecca Mitchell and Dr Robyn Clay-Williams



Centre for Health Informatics

The Centre for Health Informatics (CHI) celebrated its 20th anniversary in 2019 and is Australia's largest and longest running academic research group in this discipline.

In 2009, CHI joined with the Centre for Clinical Governance Research at UNSW and the Simpson Centre at Liverpool Hospital to establish AIHI which subsequently moved to Macquarie University in late 2014.

Over 20 years, CHI has been awarded more than \$21 million in government funding, over \$5 million from industry and over \$20 million from other sources including university support, published 854 publications, including three editions of *Guide to Health Informatics* (Coiera) which has been translated into several languages. Three commercialisations have also occurred.

2019 was also a year of growth with the addition of a new Precision Health Research stream bringing expertise in human-computer interaction and machine learning for health applications, precision healthcare, evaluating AI technologies, and person-centred health informatics.

During 2019, CHI celebrated three PhD completions:



Dr David Lyell, Automation bias in electronic prescribing: The effects of over-reliance on clinical decision support in relation to errors, cognitive load and verification.



Dr Rabia Bashir, Using software engineering principles to improve the completeness and efficiency of the systematic review ecosystem.



Dr Toby Hodgson, Evaluating the use of speech recognition for electronic health record documentation.

CHI's researchers featured prominently as keynote speakers and facilitators at national and international conferences, workshops and seminars in New Zealand, the UK, Japan and Sri Lanka throughout 2019.



Evidence review

The National Library of Medicine in the United States awarded a National Institute of Health grant to accelerate evidence synthesis by coupling results data from ClinicalTrials.gov and bibliographic databases.



AI safety

Associate Professor Farah Magrabi received a prestigious University of York UK Fellowship and is the only Australian on the international team of a £12 million program to examine safety governance of AI in all domains.



Voice assistants

Research found that that in more than 50% of cases voice assistants like Siri and Alexa did not recognise a crisis situation and offer appropriate direction. Research has led to improvements by developers.



Incident reporting

Work contributing to Australia's first standardised health IT-related incident classification system has been adapted for the Australian Commission on Safety and Quality in Health Care for their Guidance for hospitals: Classifying EMM-related adverse events and incidents.



AI and ethics

The International Network on the Future of AI and Medical Ethics, named Associate Professor Magrabi as a foundation member, and the only informatician.



Vaping

Research found that young people and non-smokers were at risk of taking up vaping when exposed to positive online advertising or social messages about vaping.



Health apps

A review of the safety of consumer health apps, published in JAMIA, has remained in the top 5 most read list since publication.



Clinical predictive tool

Using the "GRASP" tool (for grading and assessment of predictive tools), clinicians increased their correct decisions by 64%. 88% of participants reported GRASP useful.



Vaccinations

Research shows that anti-vaccination messages spread more quickly and have a wider reach than public health messages.



CHI Research Streams

PRECISION HEALTH

**Associate Professor
Shlomo Berkovsky**

shlomo.berkovsky@mq.edu.au

The Precision Health research stream focuses on the use of machine learning methods to develop patient models and personalised predictions of diagnosis and care. In addition, the stream studies how sensors and physiological responses can predict medical conditions, and how clinicians and patients interact with health technologies.

We undertake collaborative projects with leading national research groups, such as the Melanoma Institute Australia, Kolling Institute, and Optus-Macquarie Cyber Security Hub. 📧

CONSUMER INFORMATICS

Dr Annie Lau

annie.lau@mq.edu.au

The Consumer Informatics team investigates the science, design and impact of digital health for patients and consumers. We are passionate about understanding and improving the health of individuals through the use of digital technology.

We work closely with patients, consumers and multidisciplinary colleagues to identify important gaps, and together develop innovative ideas and apply rigorous methods to test the boundaries of how digital technologies can improve health. 📧

PATIENT SAFETY INFORMATICS

Associate Professor Farah Magrabi

farah.magrabi@mq.edu.au

Ensuring patients do not come to harm during healthcare is one of the key aims of health services research. The Patient Safety Informatics program examines how health service delivery can be made safer through the effective use of digital health. We also investigate the risks of current and future technologies including AI. Our work is used nationally and internationally by healthcare organisations, government departments, patient safety agencies and industry. 📧

DIGITAL EPIDEMIOLOGY

Associate Professor Adam Dunn

adam.dunn@mq.edu.au

The Digital Epidemiology team translates the applications of machine learning and network science to solve problems related to the production, reporting, and use of evidence in clinical medicine and public health.



NHMRC Partnership Centre for Health System Sustainability

The NHMRC Partnership Centre for Health System Sustainability (PCHSS) is a \$10.75 million, five-year collaboration involving 17 lead investigators, 20 expert advisors and over 40 system implementation partners from around Australia. PCHSS is led by Professor Braithwaite, founding director of AIHI. In 2019, PCHSS continued to expand its internationally recognised research to improve healthcare services and systems.

PCHSS LEAD INVESTIGATORS AND PARTNER ORGANISATIONS



WESTERN AUSTRALIA

Dr Delia Hendrie^{RL}
 Prof Liz Geelhoed^{RL}
 Dr Darren Gibson^{RL}
 WA Dept of Health*

NORTHERN TERRITORY

Department of Health, NT*

SOUTH AUSTRALIA

Prof Jon Karnon^{RL}
 PHN Country SA*
 PHN Adelaide*

VICTORIA

Prof Tony Scott^{RL}
 Prof Rachele Buchbinder AO^{RL}
 Prof Helena Teede^{RL}
 Circle Health*
 Monash Partners*
 Dept of HHS Victoria*
 PHN South Eastern Melbourne*
 Cabrini Health*

TASMANIA

University of Tasmania*
 Dept of HHS Tasmania*
 PHN Primary Health Tasmania*

QUEENSLAND

Prof Paul Glasziou^{RL}
 Prof Leonard Gray^{RL}
 Prof Robyn Ward AM^{RL}
 Metro South Health*
 Queensland Health*
 PHN Brisbane South*
 James Cook University*

NEW SOUTH WALES

Prof Jeffrey Braithwaite CIA
 Prof Enrico Coiera^{RL}
 Prof Johanna Westbrook^{RL}
 Dr Teresa Anderson^{RL}
 Dr Jean-Frédéric Levesque^{RL}
 Mr George Leipnik^{RL}
 Mr James Downie^{RL}
 Prof Christine Bennett AO^{RL}
 Ms Annette Schmiede^{RL}
 Sydney LHD and Sydney Health Partners*
 Macquarie University Hospital*
 PHN Sydney North Health Network*

ACT

Ms Leanne Wells^{RL}
 ACT Health*

NATIONAL COLLABORATORS

Consumers Health Forum of Australia
 Aged Care Guild
 Independent Hospital Pricing Association
 HammondCare

CIA – Chief investigator first listed
 RL – Research lead Investigator
 * System-based implementation partner organisation

FUNDING PARTNERS



Government of Western Australia
 Department of Health

VISION

Our research findings will significantly influence the development of a resilient healthcare system that is affordable, cost-effective and delivers improved health outcomes for all Australians.

ADDRESSING THE CHALLENGES

The Australian healthcare system is challenged by multiple threats to its capacity to deliver high-quality care. These include ageing populations, increasing rates of chronic and complex diseases, growing cost pressures from new medical technologies and medicines, wasteful spending on low-value care, inefficiencies arising from system fragmentation and limited use of data and evidence to support reform. PCHSS aims to explore these and other challenges to health system sustainability and develop and evaluate a set of practical interventions that are appropriate from clinical, patient, and economic perspectives.

ACHIEVEMENTS IN 2019

The second full year of PCHSS operation provided many opportunities for research, translation and implementation. A key highlight was the public event, "Treatment overload: Lifting the burden of too much healthcare" which was held in Sydney and attended by more than 100 clinicians, researchers, policy makers, journalists and consumers. The Secretary of NSW Health, Ms Elizabeth Koff, opened proceedings and the day featured a dynamic simulation game on healthcare complexity. Videos of the event on YouTube have been viewed over 1,000 times.



Health System Sustainability

NHMRC Partnership Centre

>\$12m

in leverage funding

>60

health system collaborators

>250

publications

27

collaborating health system organisations

>180

media engagements

The three broad themes of our research are:



Using analytics, technology and shared data



Reducing waste and low-value-care



Promoting better value for the health dollar

PCHSS Research Streams

USING ANALYTICS, TECHNOLOGY AND SHARED DATA

Professors Johanna Westbrook, Enrico Coiera and Len Gray

We tackle important questions in informatics and healthcare including using big data to improve care, diagnostic testing and medication management, as well as designing analytics to guide better healthcare decisions.

We are also examining how telehealth might best be deployed and funded to improve healthcare across the country. ↗

HIGHLIGHTS

DEMENTIA CARE

Research on patients with dementia in Australian aged care facilities revealed a dual set of challenges related to medication. On the one hand, some patients were missing out on potentially beneficial medications for reasons that were not clinically relevant (such as the patient's primary language), while on the other hand, some dementia patients were being unnecessarily sedated with antipsychotic drugs for more than 200 days at a time, twice as long as the maximum time recommended. This research was covered by media nationally.

DIGITAL SCRIBES

Research on digital scribes (tools designed to automatically capture clinician-patient verbal interactions) has shown they are not living up to their full potential. Multiple obstacles to the effective use of digital scribes were found and the next step is to develop digital scribes that are fit-for purpose and acceptable to patients and clinicians alike.



The cost of healthcare worldwide is rising unsustainably. To counter this growth, alternative service models that are cost effective and maintain the quality of care are needed.

REDUCING WASTE AND LOW VALUE CARE

**Professors Paul Glasziou and
Rachelle Buchbinder**

While 30% of delivered healthcare is wasteful or of low value, we are finding ways to reduce wasteful expenditure and to deliver needed care more cost-effectively. [↗](#)

HIGHLIGHTS

ALTERNATIVE HEALTHCARE

The cost of healthcare worldwide is rising unsustainably. To counter this growth, alternative service models that are cost effective and maintain the quality of care are needed. A scoping review of systematic reviews (which included more than 550 reviews) was conducted to identify and synthesise evidence on alternative healthcare delivery arrangements in high-income countries. This research aims to support future health system planning, identify new models of care delivery and explore other sustainability initiatives.

OVER-DIAGNOSIS OF CANCER

The lifetime risk of cancer diagnosis and mortality in Australia is overestimated by current calculation methods. New research revealed that many of the most common cancers were over-diagnosed – that is, detected cancers that would likely not have substantially affected a patient's health had they gone undetected or untreated. [↗](#)



PROMOTING BETTER VALUE FOR THE HEALTH DOLLAR

Professors Jon Karnon, Tony Scott and Dr Delia Hendrie

We are developing new frameworks and metrics to improve health system sustainability. ↗

HIGHLIGHTS

BETTER INCENTIVES

Research to guide the design of government incentives, found that current incentives to entice GPs to move from urban to more rural practices were not very effective.

BETTER EVALUATION

Two Primary Health Networks trialled the in-DEPth (Evidence-informed, co-creation framework for the Design, Evaluation and Procurement of Health services) framework to develop evidence-informed procurement specifications for services for people with mental health problems or alcohol and other substance abuse. in-DEPth supports a systematic approach to commissioning services that are evidence-informed, contextually relevant and informed by stakeholder perspectives.



CENTRE COORDINATION AND RESEARCH UNIT

**Professor Jeffrey Braithwaite
and Associate Professor
Yvonne Zurynski**

HIGHLIGHTS

LEARNING HEALTH SYSTEMS

Learning Health Systems are seen as models for the future of healthcare as they bring science, informatics, incentives and culture into alignment, thereby making knowledge generation an integrated part of the day-to-day functioning of health systems. ↗ Professor Braithwaite, Associate Professor Zurynski and colleagues published a working paper on Learning Healthcare Systems. Further, we are currently undertaking a systematic review, which includes more than 190 papers, synthesising the state of knowledge in this field.

NETWORKS

Professors Braithwaite and Westbrook and colleagues put forward an evaluation framework to underpin understanding of the effectiveness and sustainability of clinical and health networks. Drawing on the literature on networks and communities of practice in healthcare, as well as theoretical and evidence-based studies of the evaluation of health and non-health networks, the framework comprises network goals, characteristics and relationships at member, network and community levels.

CONSUMERS HEALTH FORUM OF AUSTRALIA

In collaboration with the Consumers Health Forum of Australia and the Royal Australian College of General Practitioners, a roundtable was held about social prescribing – the practice of health professionals connecting patients with social services and community groups to address social determinants of poor health. A report on the outcomes of the roundtable have been published.

MEDIA ENGAGEMENT

A number of editorials were published in outlets such as *Croakey News*, *MJA Insight+* and *The Conversation*. These included articles on patient safety, breaking down healthcare silos, and the relevance of climate to health system sustainability.

For more details visit our website healthsystemsustainability.com.au ↗





The NHMRC Centre of Research Excellence in Digital Health (CREiDH) [✉](#) had a very productive year publishing widely in highly respected journals such as *JAMIA*, *npj Digital Medicine*, *JMIR*, *The Lancet* and *BMJ*, with a strong focus on AI and human computer interaction.

CREiDH is led by Professor Enrico Coiera and administered by AIHI.

NHMRC Centre of Research Excellence in Digital Health

COLLABORATIVE PARTNERS

- Professor Enrico Coiera, AIHI, Macquarie University
- Professor Paul Glasziou, Bond University
- Professor William Runciman, University of South Australia
- Dr David Hansen, CSIRO Australian e-Health Research Centre
- Professor Teng Liaw, UNSW Sydney
- Associate Professor Farah Magrabi, AIHI, Macquarie University
- Associate Professor Vitali Sintchenko, University of Sydney
- Professor Karin Verspoor – University of Melbourne
- Associate Professor Blanca Gallego-Luxan, UNSW Sydney
- Dr Annie Lau, AIHI, Macquarie University
- Dr Teresa Harms, Oxford University
- Professor Ann Blandford, University College London
- Professor Fiona Stevenson, University College London
- Associate Professor Enrico Costanza, University College London
- Megan Forster, National Children's Health Collaborative
- Leandra Hawkins, National Children's Health Collaborative

THE FELLOWSHIP BY TRAINING PROGRAM

In 2019, the CREiDH and Australasian College of Health Informatics welcomed a new digital peak body, the Australasian Institute of Digital Health (AIDH). Lead Informaticians within the Health Informatics Society voted for this new peak body and in 2020 will see the Fellowship by Training Program managed by AIDH, with support from the CREiDH.

In 2019, the Program delivered strong learning outcomes including seven Master Classes and ten Journal Clubs. The Program arranged candidate's participation in conferences and colloquiums, at which some candidates were recipients of prestigious awards.

During 2019, two candidates completed the Program and now have a PhD academic qualification and a portfolio of work with industry contacts.

HIGHLIGHTS

Researchers are working on creating a **Digital Scribe** using speech recognition and AI to transcribe and summarise consultations between doctors and patients and reduce the clinical burden.

The **Advanced Clinical Analytics** team produced a Systematic Review process using 15 different tools to produce reviews within two weeks, normally a one-year timeframe. Research into a 'Green Button' concept supported by Natural Language Processing in the area of chest pain stratification is also being conducted.

The **Safety and Quality** team conducted research into the safety concerns of consumer-facing mobile apps and context-aware systems for chronic disease patients and developed a classification for tracking digital health incidents involving medications in conjunction with the ACSQHC's National Roundtable on Medications Management. The Team has also been working with the Clinical Excellence Commission (NSW) to assist with machine learning methods for analysis of safety incident monitoring data.

The **Consumer Informatics** team is using deep learning to analyse large sets of body camera data collected from participants with multiple chronic conditions – examining what works and doesn't work in self-care.

The **Rapid Response** team is working with the National Children's Digital Health Collaborative in the areas of consumer generated data entered in electronic health records or portals and consumers' engagement with electronic health records, portals and apps.



Implementation Science
in Oncology

NHMRC CENTRE OF RESEARCH EXCELLENCE

NHMRC Centre of Research Excellence in Implementation Science in Oncology

Australian cancer survival rates are amongst the best in the world and are incrementally improving, creating a growing cohort who require ongoing support and management.

This growth in demand for services places stresses on our health system, a system that is also dealing with rapid growth in new treatments and treatment strategies for cancer, along with an increased focus on patient experience.

To address these challenges, the NHMRC Centre of Research Excellence in Implementation Science in Oncology ¹ is working to understand how cancer services are currently delivered. As we proceed, this understanding will inform strategies to improve the adoption of evidence-based practices.

The Centre is administered by AIHI with a central coordinating team comprising: Dr Gaston Arnolda (team leader), Dr Bróna Nic Giolla Easpaig, Dr Yvonne Tran, Dr Klay Lamprell, Ms Teresa Winata and PhD Student Ms Mia Bierbaum. The AIHI team collaborates with the South Australian Health Economics Team led by Professor Jon Karnon.

HIGHLIGHTS

- Building teams with key industry partners, the South-Eastern and South-Western Sydney Local Health Districts.
- Implementing a large-scale qualitative study to characterise multi-disciplinary oncology service provision in two Local Health Districts and to explore patient-reported measures (protocol and methodology papers published).
- Interviewing clinicians to understand their views of oncology clinical practice guidelines and to understand facilitators/barriers to effective multidisciplinary team meetings.
- Performing systematic reviews on clinicians' views of patient-reported measures in oncology, clinicians' views on oncology clinical practice guidelines, and on the use of nudges to alter clinicians' behaviour.
- Exploring predictors of oncology patient satisfaction.
- Exploring oncology outpatient staffing and financing.

Tran Y, Lamprell K, Nic Giolla Easpaig B, Arnolda G, Braithwaite J. What information do patients want across their cancer journeys? A network analysis of cancer patients' information needs. *Cancer Medicine*. 2019; 8(1):155-64. ²



CHIEF INVESTIGATORS

Professor Jeffrey Braithwaite

AIHI, Macquarie University

Professor Robyn Ward AM

University of Sydney

Professor David Currow

Flinders University

Professor Geoff Delaney

South-Western Sydney Local
Health District

Professor Richard Kefford AM

Macquarie University

Professor Ian Olver AM

University of South Australia

Professor Jonathan Karnon

Flinders University

Professor Phil Crowe

University of New South Wales

Associate Professor Winston Liauw

South-Eastern Sydney Local
Health District

Professor Johanna Westbrook

AIHI, Macquarie University

Our staff

At AIHI, we recognise and value the diversity of cultural and professional backgrounds of our staff, gaining collectively from global perspectives in healthcare. We attract highly skilled clinicians, scientists, engineers, epidemiologists, statisticians, psychologists and analysts who are developing expert communities of practice, multi-disciplinary research teams and synergistic networking and co-authorship.

We are proud to have coordinated the Macquarie University International Women's Day event for the past two years as well as celebrating the World Health Organisation's World Sepsis Day (pictured) and World Patient Safety Day.

- 5**
Professors
- 6**
Associate Professors
- 6**
Senior Research Fellows
- 29**
Research Fellows
- 17**
Postdoctoral Fellows
- 56**
Professional and other staff
- 70**
External academics
- 38**
HDR students
- 41**
PACE students







Awards

AIHI CENTRE FOR HEALTH SYSTEMS AND SAFETY RESEARCH AGED CARE EVALUATION AND RESEARCH – DEMENTIA AND AGED CARE SERVICES TEAM

Finalist (Social Inclusion) in The Future of Ageing Awards 2019.

ASSOCIATE PROFESSOR FARAH MAGRABI

Awarded the Assuring Autonomy International Programme Fellowship from the University of York, UK.

ASSOCIATE PROFESSOR PETER HIBBERT AND PROFESSOR JEFFREY BRAITHWAITE

Awarded the Peter Reizenstein Award for Best Paper published in the *International Journal for Quality in Health Care* in 2018.

ASSOCIATE PROFESSOR REBECCA MITCHELL

Awarded joint first prize for the Golden Issue of *Injury*.

ASSOCIATE PROFESSOR SHLOMO BERKOVSKY

Best Paper Award of the ACM International Conference on Human Factors in Computing Systems (CHI-2019).

ASSOCIATE PROFESSOR STEPHANIE BEST, DR JANET LONG AND PROFESSOR JEFFREY BRAITHWAITE

Awarded second best oral presentation at the Australian Genomics Health Alliance National Conference.

CHIARA POMARE

First place in the Higher Degree Researcher Image Prize at the 4th Annual EnCouRage Research Symposium, Macquarie University.

DR JOYCE SIETTE

Received a Conference Travel Award from the NHMRC National Institute for Dementia Research, Dementia Centre for Research Collaboration.

DR MAGDA RABAN

Named most Prolific Tweeter during Health Services and Policy Research Conference for the Health Services Research Association of Australia and New Zealand.

DR MIKAELA JORGENSEN

Outstanding Oral Presentation award at the International Association of Gerontology and Geriatrics Asia/Oceania Regional Congress, Taiwan.

KRISTIANA LUDLOW

Awarded Best NSW-Based Student Presentation at the 18th National Conference of Emerging Researchers in Ageing.

PROFESSOR FRANCES RAPPORT, DR VIRGINIA MUMFORD AND DR ROBYN CLAY-WILLIAMS, DR PATTI SHIH, DR MONA FARIS, PROFESSOR JEFFREY BRAITHWAITE

Named one of the top five best-cited papers published for 2017-2018 in *Epilepsy and Behaviour*.

PROFESSOR JOHANNA WESTBROOK

National Research Leader in the field of Medical Informatics awarded by *The Australian Research Magazine*.

PROFESSOR JEFFREY BRAITHWAITE

Winner Editor's Choice award for *International Journal for Quality in Health Care*.

RABIA BASHIR

Awarded the 2019 Macquarie University Ramy Razavian Dean's Award for Excellence in Higher Degree Research.

Institute engagement

AIHI SEMINAR SERIES

The AIHI Seminar Series provides a public monthly forum for the sharing of ideas, new research and calls to action that invigorate debate and contribute to improving the health system in Australia and internationally. We are pleased to present the most popular of the 24 sessions held during 2019. A complete list of seminars is available on our website. [↗](#)

THE USE OF DIGITAL RESOURCES BY THE AGEING GENERATION
SPEAKER: PROFESSOR HEIKO GEWALD

*Center for Research on Service Sciences
 Neu-Ulm University of Applied Sciences, Germany*

Digital resources like smartphones, fitness trackers and health apps have evolved as ubiquitous powerful media for society. This seminar presented findings from recent studies on technology adoption of senior citizens and discussed avenues for future research.

SAFETY IN HEALTHCARE – STATE OF THE ART OR STATE OF MIND?
SPEAKER: PROFESSOR CLIFF HUGHES AO

Australian Institute of Health Innovation

In recognition of the World Health Organisation's World Patient Safety Day, this seminar highlighted factors to consider when thinking about safety in healthcare. According to WHO, more than 134 million adverse events occur in healthcare settings each year worldwide, leading to 2.6 million deaths.

NSW BUREAU OF HEALTH INFORMATION: OPPORTUNITIES FOR RESEARCH AND COLLABORATION
SPEAKER: DR DIANE WATSON

Chief Executive, NSW Bureau of Health Information

This seminar presented an overview of the NSW Bureau of Health Information's work, in particular the Bureau's Strategic Plan: 2019-21,

and the different ways researchers can work with the Bureau and use its patient-reported experiences and outcomes survey data.

THE POWER OF THE PATIENT VOICE
SPEAKER: MAUREEN WILLIAMS

Patient Advocate

This powerful seminar outlined the importance of patient voices in healthcare quality and safety, exploring the possibilities of including patients in medical research, the pitfalls of informed consent and the power of patient narrative in healthcare.

THE PATIENT DIED – WHAT ABOUT INVOLVEMENT IN THE FOLLOWING REGULATORY INVESTIGATION OF THE ADVERSE EVENT? EXPERIENCES FROM NORWAY.
SPEAKER: PROFESSOR SIRI WIIG

Quality and Safety in Healthcare Systems

University of Stavanger, Norway

Norway does not have a well-established tradition of user involvement when investigating adverse events. This seminar presented results from a one-year process evaluation focusing on the perspectives of patients' next of kin as well as investigators who participated in a new regulatory investigation process related to adverse events causing patient death.

MD Research Program

The new Macquarie University Doctor of Medicine (Macquarie MD) is a four-year, fast-track program designed for students with a first degree who are high flyers; who engage in a variety of experiences and activities; have the interpersonal skills desirable in a medical student and doctor; and the resilience, commitment and desire to help improve the health of Australian and global communities.

Embedded into the Macquarie MD is a rigorous structured research program developing key research skills where the students work on a research project focusing on an aspect of health systems, patient safety and quality, clinical research or public health. AIHI oversees the research program on behalf of the University.



Higher degree researcher program

2019 HIGHLIGHTS



PhD

24 Candidates
3 Thesis Submissions



MRes
(Year Two)

13 Candidates
4 Thesis Submissions



MPhil

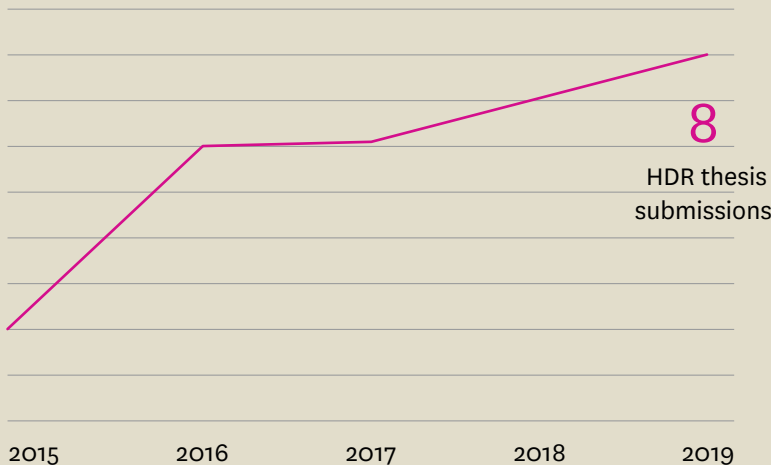
1 Candidate
1 Thesis Submission



38

HDR Candidates supervised by AIHI

CONTINUED GROWTH IN HDR THESIS SUBMISSIONS



Drawing on the expertise of our internationally regarded pool of academics, the AIHI Higher Degree Research (HDR) program represents a key period of training in the career of health systems researchers. Many have gone on to secure senior roles in academia, health services and industry, both in Australia and abroad.

AIHI HDR candidates are valued members of our research community, where we seek to provide them with real-world opportunities to make a difference.

Postgraduate candidates can pursue several qualifications including:

- Master of Research (MRes)
- Master of Philosophy
- Doctor of Philosophy

Read about our programs and see profiles of our PhD and Masters graduates: [goto.mq/aihistudy](https://goto.mq.aihistudy)

E: aihi.hdr@mq.edu.au

We foster an environment of collaborative learning.



REAL WORLD LEARNING WITH PACE

The multi-award-winning PACE (Professional and Community Engagement) program at Macquarie University supports undergraduate students with authentic workplace experiences. In 2019 AIHI hosted 41 PACE students, placing them alongside academics to participate in projects ranging from conversational chatbots to social networks in aged care.

MEET JOSH JUNG

Josh Jung is one of the first graduates of the Bachelor of Clinical Sciences at Macquarie University, joining AIHI via the PACE program with Dr Annie Lau and Dr Kathleen Yin. After the 12-week program, Josh stayed on as a part-time Research Assistant. He gained valuable skills including pre-screening and interviewing patients and writing up interview summaries along with carrying out thematic analysis to support the principal researchers. In 2019, Josh was accepted into the Macquarie University Doctor of Medicine.

Each year Macquarie University holds a 3 Minute Thesis competition. Here students at AIHI attend an "elevator pitch" preparation workshop. In the Faculty heat, AIHI's Chiara Pomare secured second place and Kristiana Ludlow placed third.

Our publications

1 JANUARY TO 31 DECEMBER 2019 ↗

1

Books

3

Books edited

34

Book chapters

230

Peer-reviewed
journal articles

78

Conference
abstracts/posters

11

Full conference
papers

BOOKS (1)

1. **Berkovsky S**, Cantador I, Domonkos T. *Collaborative recommendations: algorithms, practical challenges, and applications*. Singapore: World Scientific Publishing; 2019.

BOOKS EDITED (3)

1. **Braithwaite J**, Hollnagel E, Hunte GS, editors. *Resilient Health Care Volume 5: Working Across Boundaries*. Boca Raton, Florida: Routledge: Taylor & Francis Group; 2019.
2. Scott P, de Keizer N, **Georgiou A**, editors. *Applied Interdisciplinary Theory in Health Informatics*. Amsterdam: IOS Press; 2019. (263).
3. Zheng K, **Westbrook JI**, Kannampallil T, Patel V, editors. *Cognitive Informatics: Reengineering clinical workflow for more efficient and safer care*. New York: Springer International Publishing; 2019.

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1. **Braithwaite J**, **Churruca K**, Wells L, **Rapport F**, Lawson T, Arro P, Watson J. *Partnering with patients for change and improvement: an Australian perspective*. In: Pomey MC, Denis JL, Dumez V, editors. *Patient Engagement: How Patient-provider Partnerships Transform Healthcare Organizations*. London, United Kingdom: Palgrave Macmillan; 2019. (Published Online First 11 October 2019) p. 169-98.
2. **Braithwaite J**, Hollnagel E, Hunte GS. *Introduction: the journey to here and what happens next*. In: **Braithwaite J**, Hollnagel E, Hunte GS, editors. *Resilient Health Care Volume 5: Working Across Boundaries*. Boca Raton, FL: Routledge: Taylor & Francis Group; 2019. (5) p. 3-8.

3. **Braithwaite J**, Hollnagel E, Hunte GS. *Discussion, integration and concluding remarks*. In: **Braithwaite J**, Hollnagel E, Hunte GS, editors. *Resilient Health Care Volume 5: Working Across Boundaries*. Boca Raton, FL: Routledge: Taylor & Francis Group; 2019. (5) p. 165-72.
4. **Braithwaite J**, Hollnagel E, Wears RL. *Bon voyage: navigating the boundaries of resilient health care*. In: **Braithwaite J**, Hollnagel E, Hunte GS, editors. *Resilient Health Care Volume 5: Working Across Boundaries*. Boca Raton, FL: Routledge: Taylor & Francis Group; 2019. (5) p. 9-14.
5. **Braithwaite J**, **Rapport F**. *Predicting the future for ideas, systems and solutions: the fifth research paradigm and beyond*. In: **Rapport F**, **Braithwaite J**, editors. *Transforming Healthcare with Qualitative Research*. Abington, United Kingdom: Routledge; 2019. (In Press).
6. **Churruca K**, **Long JC**, **Ellis LA**, **Braithwaite J**. *Looking back over the boundaries of our systems and knowledge*. In: **Braithwaite J**, Hollnagel E, Hunte GS, editors. *Resilient Health Care Volume 5: Working Across Boundaries*. Boca Raton, FL: Routledge: Taylor & Francis Group; 2019. (5) p. 81-92.
7. **Clay-Williams R**, **Austin E**, **Braithwaite J**, Hollnagel E. *Qualitative assessment to improve everyday activities: work-as-imagined and work-as-done*. In: **Rapport F**, **Braithwaite J**, editors. *Transforming Healthcare with Qualitative Research*. Abington, United Kingdom 2019. (In Press).



8. **Coiera E.** *Assessing technology success and failure using information value chain theory.* In: Scott P, Keizer Nd, **Georgiou A**, editors. *Applied Interdisciplinary Theory in Health Informatics: IO Press Ebooks*; 2019. (263) p. 35-48.
9. Elkady T, Rees A, **Khalifa M.** *Nurses acceptance of automated medication dispensing cabinets.* In: Mantas J, Hasman A, Gallos P, Kolokathi A, Househ M, Liaskos J, editors. *Health Informatics Vision: From Data via Information to Knowledge 2019.* (262) p. 47-50.
10. Gabarron E, Luque LF, Schopf TR, **Lau A**, Armayones M, Wynn R, Serrano JA. *Impact of facebook ads for sexual health promotion via an educational web app: a case study.* In: Khosrow-Pour M, editor. *Healthcare Policy and Reform: Concepts, Methodologies, Tools, and Applications: IGI Global*; 2019. (2) p. 990-1003.
11. **Georgiou A, Hardie R-A, Dahm MR, Li J, Thomas J, Sezgin G, Li L, Westbrook JI.** *Diagnostic Informatics: its role in enhancing clinical excellence, patient safety and the value of care.* In: Ohno-Machado L, Séroussi B, editors. Volume 264: MEDINFO 2019: Health and Wellbeing e-Networks for All: IOS Press Ebooks; 2019. (264) p. 591-5.
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14. **Khalifa M.** *Improving patient safety by reducing falls in hospitals among the elderly: a review of successful strategies.* In: Mantas J, Hasman A, Gallos P, Kolokathi A, Househ M, Liaskos J, editors. *Health Informatics Vision: From Data via Information to Knowledge: ISO Press Ebooks*; 2019. (262) p. 340-3.
15. **Khalifa M.** *Using PubMed to generate email lists of participants for healthcare survey research: a simple and practical approach.* In: Mantas J, Hasman A, Gallos P, Kolokathi A, Househ M, Liaskos J, editors. *Health Informatics Vision: From Data via Information to Knowledge: IOS Press Ebooks*; 2019. (262) p. 348-51.
16. **Lamprell K, Rapport F, Braithwaite J.** *Narrativizing cancer patients' longitudinal experiences of care: qualitative inquiry into lived and online stories of melanoma.* In: **Rapport F, Braithwaite J**, editors. *Transforming Healthcare with Qualitative Research.* Abington, United Kingdom: Routledge; 2019. (In Press).
17. **Lamprell K, Rapport F, Braithwaite J.** *Look the other way: patient-centred care begins with care for our physicians.* In: **Rapport F, Braithwaite J**, editors. *Transforming Healthcare with Qualitative Research.* Abington, United Kingdom: Routledge; 2019. (In Press).
18. **Li L, Rathnayake K**, Green M, Fullick M, Shetty A, Walter S, **Braithwaite J**, Lander H, **Westbrook JI.** *Improving the performance of clinical decision support for early detection of sepsis: a retrospective observational cohort study.* In: Ohno-Machado L, Séroussi B, editors. Volume 264: MEDINFO 2019: Health and Wellbeing e-Networks for All: IOS Press Ebooks; 2019. p. 679-83.
19. **Lichtner V**, Franklin BD, **Westbrook JI.** *Researching collective mindfulness and health IT: a framework and translation to context-specific questions.* In: Marcilly R, Kuziemsy CE, Nohr C, Pelayo S, editors. *Context Sensitive Health Informatics: Sustainability in Dynamic Ecosystems: IOS Press*; 2019. (265) p. 31-6.

20. **Lichtner V, Westbrook JI.** *Collective mindfulness and processes of sensemaking in health IT implementation.* In: Scott P, de Keizer N, **Georgiou A**, editors. Volume 263: Applied Interdisciplinary Theory in Health Informatics: IOS Press; 2019. (263) p. 98-108.
21. **Miao M, Georgiou A, Dahm MR, Li J, Thomas J.** *Shared decision-making in emergency departments: context sensitivity through divergent discourses.* In: Marcilly R, Kuziemsky CE, Nøhr C, Pelayo S, editors. Volume 265: Context Sensitive Health Informatics: Sustainability in Dynamic Ecosystems: IOS Press; 2019. (265) p. 128-33.
22. Orbell S, Allom V, Caudwell KM, **Smith J.** *Changing patterns of health and illness.* In: Van Teijlingen E, Humphris G, editors. Psychology and Sociology Applied to Medicine. 4 ed. Edinburgh, Scotland: Elsevier; 2019. p. 40-1.
23. Orbell S, Allom V, Caudwell KM, **Smith J.** *Disease prevention and health promotion.* In: Van Teijlingen E, Humphris G, editors. Psychology and Sociology Applied to Medicine. 4 ed. Edinburgh, Scotland: Elsevier; 2019. p. 60-1.
24. **Prgomet M, Georgiou A, Callen J, Westbrook JI.** *Fit between individuals, tasks, technology, and environment (FITTE) framework: a proposed extension of FITT to evaluate and optimise health information technology use.* In: Ohno-Machado L, Séroussi B, editors. Volume 264: MEDINFO 2019: Health and Wellbeing e-Networks for All: IOS Press eBooks; 2019. (264) p. 744-8.
25. **Rapport F, Braithwaite J.** *The fourth research paradigm.* In: **Rapport F, Braithwaite J**, editors. Transforming Healthcare with Qualitative Research. Abington, United Kingdom: Routledge; 2019. (In Press).
26. **Rapport F, Braithwaite J.** *Introduction to transforming healthcare with qualitative research.* In: **Rapport F, Braithwaite J**, editors. Transforming Healthcare with Qualitative Research. Abington, United Kingdom: Routledge; 2019. (In Press).
27. Scott P, de Keizer N, **Georgiou A.** *Preface.* In: Scott P, de Keizer N, **Georgiou A**, editors. Applied Interdisciplinary Theory in Health Informatics. Amsterdam: IOS Press; 2019. (263) p. i - xvi.
28. Scott P, de Keizer N, **Georgiou A.** *Reflecting and looking to the future: what is the research agenda for theory in health informatics?* In: Scott P, de Keizer N, **Georgiou A**, editors. Applied Interdisciplinary Theory in Health Informatics Amsterdam: IOS Press; 2019. (263) p. 205-18.
29. Shih P, **Rapport F, Long JC, Auton E, Bierbaum M, Faris M, Braithwaite J, Clay-Williams R.** *Resilient healthcare in refractory epilepsy treatment: illuminating successful people-centred patient care.* In: **Rapport F, Braithwaite J**, editors. Transforming Healthcare with Qualitative Research. Abingdon, United Kingdom: Routledge Publishing; 2019. (Accepted 6 September 2019).
30. Tiroshi A, Kuflik T, **Berkovsky S**, Kaafar MA. *Graph based recommendations: from data representation to feature extraction and application.* In: Khalid O, Khan S, Zomaya AY, editors. Big Data Recommender Systems: Recent Trends and Advances. London, UK: The Institution of Engineering and Technology; 2019. (2).
31. **Walter SR, Dunsmuir W, Raban MZ, Westbrook JI.** *Understanding clinical workflow through direct continuous observation: addressing the unique statistical challenges.* In: Zheng K, **Westbrook JI**, Kannampallil T, Patel VL, editors. Cognitive Informatics. New York: Springer, Cham; 2019. (Published Online First: 26 July 2019).
32. **Westbrook JI, Raban MZ, Walter SR.** *Interruptions and multitasking in clinical work: A summary of the evidence.* In: Zheng K, **Westbrook JI**, Kannampallil T, Patel VL, editors. Cognitive Informatics. New York: Springer, Cham; 2019. (Published Online First: 26 July 2019) p. 103-14.
33. Wiig S, **Braithwaite J**, Braut GS. *Politics, accident research and analysis.* In: Gould KAP, MacRae CA, editors. Inside High-Risk Systems – Perspectives on Safety and Accident Research. Boca Raton, Florida, USA: CRC Press: Taylor & Francis Group; 2019. (Accepted 24 December 2019).
34. Zhuravsky L, Lofquist EA, **Braithwaite J.** *Creating resilience in health care organisations through various forms of shared leadership.* In: **Braithwaite J**, Hollnagel E, Hunte GS, editors. Resilient Health Care Volume 5: Working Across Boundaries. Boca Raton, FL: Routledge: Taylor & Francis Group; 2019. (5) p. 53-66.

PEER-REVIEWED JOURNAL ARTICLES (230)

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1. **Berkovsky S**, Taib R, Koprinska I, Wang E, Zeng Y, Li J, Kleitman S. Detecting personality traits using eye-tracking data. *CHI Conference of Human Factors in Computing Systems*; 4 May 2019; Scotland UK. 2019.
 2. Brown K, **Zurynski Y**, Altman L. Families as Partners: co-design of a localised model of care for children with medical complexity living in rural Australia and evaluation using the Paediatric Integrated Care Survey (PICS). *ICIC19 -19th International Conference on Integrated Care*; 1-3 April 2019; San Sebastian, Spain. 2019.
 3. Jabin MSR, **Magrabi F, Hibbert P**, Schultz T, Runciman W. Identifying clusters and themes from incidents related to health information technology in medical imaging as a basis for improvements in practice. *IEEE International Conference on Imaging Systems and Techniques (IST)*; 8-10 December 2019; Abu Dhabi, UAE. 2019.
 4. Jabin MSR, Mandel C, Schultz T, **Hibbert P, Magrabi F**, Runciman W. Identifying and characterizing the 18 steps of medical imaging process workflow as a basis for targeting improvements in clinical practice. *IEEE International Conference on Imaging Systems & Techniques (IST)*; 8-10 December 2019; Abu Dhabi, UAE. 2019.
 5. Lehnbohm EC, **Baysari MT, Westbrook JI**. Pharmacists' expectations and perceptions of electronic medication management. Lessons from Australia. *Proceedings of the 17th Scandinavian Conference on Health Informatics*; 12-13 November 2019; Oslo, Norway. 2019.
 6. Markandeya M, Abeyratne U, **Sharan RV**, Hukins C, Duce B, McCloy K. Severity analysis of upper airway obstructions: Oesophageal pressure versus snoring sounds. *2019 IEEE Biomedical Circuits and Systems Conference (BioCAS)*; 17-19 October 2019; Nara, Japan. 2019.
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 8. Swarnkar VR, Abeyratne UR, Duce B, **Sharan RV**, Hukins C, McCloy K. Night-time brain inter-hemispheric asynchrony in sleep apnea patients carry information on neuropsychological impairment. *2019 IEEE Biomedical Circuits and Systems Conference (BioCAS)*; 17-19 October 2019; Nara, Japan. 2019.
 9. Taib R, Yu K, **Berkovsky S**, Wiggins M, Bayl-Smith P. Social engineering and organisational dependencies in phishing attacks. *21st International Conference on Human-Computer Interaction*; 26-31 July 2019; Orlando, Florida. 2019. p. 564-84.
 10. Yu K, **Berkovsky S**, Taib R, Zhou J, Chen F. Do I trust my machine teammate? An investigation from perception to decision. *International Conference on Intelligent User Interfaces (IUI)*; 16-20 March 2019; Los Angeles, USA. 2019.
 11. **Zurynski Y**, Breen C, Altman L, Woolfenden S, Ging J. Care coordination for children with medical complexity results in savings for the healthcare system and for families. *ICIC19 -19th International Conference on Integrated Care*; 1-3 April 2019; San Sebastian, Spain. 2019.

AIHI grants awarded or under management in 2019

Title	Funding source	Investigators	Total awarded
NHMRC			
NHMRC Partnership Centre in Health Systems Sustainability (Includes partner funds from WA Health, Bupa, NSW Health)	NHMRC	Braithwaite J Coiera E Westbrook J Glasziou P Karnon J Scott A Buchbinder R	\$8,750,000.00
NHMRC Centre of Research Excellence in Digital Health	NHMRC	Coiera E Glasziou P Runciman W Hansen D Liaw S Magrabi F Sintchenko V Verspoor K Gallego Luxan B Lau A	\$2,498,649.00
NHMRC Centre of Research Excellence in Implementation Science in Oncology (CRE-ISO)	NHMRC	Braithwaite J Ward R Curren D Delaney G Kefford R Olver I Karnon J Liauw W Westbrook J	\$2,495,783.00
NHMRC Partnership Project: A dashboard of predictive analytics and decision support to drive care quality and person-centred outcomes in aged care (Includes partner funds from Anglicare and Sydney North PHN)	NHMRC	Westbrook J Georgiou A Lord S Gray L Day R Ratcliffe J Baysari M Braithwaite J	\$1,836,150.30

Title	Funding source	Investigators	Total awarded
Medical Research Future Fund (MRFF) Keeping Australians Out of Hospital	NHMRC	Braithwaite J Westbrook J Day R Levesque J Mitchell R Rapport F Cutler H Tran Y Clay-Williams R	\$1,505,612.00
NHMRC Partnership Project: Creating a culture of safety and respect: a controlled, mixed methods study of the effectiveness of a behavioural accountability intervention to reduce unprofessional behaviours (Includes partner funds from St Vincent's Health Australia)	NHMRC	Westbrook J Braithwaite J Day R Middleton S Scott D Rapport F Mitchell R Baysari M Li L Taylor N	\$1,225,978.00
NHMRC Project Grant: CareTrack Aged: appropriate care delivered to Australian living in residential aged care	NHMRC	Braithwaite J Cameron I Kitson A Reed R Georgiou A Gray L	\$1,157,721.70
NHMRC Partnership Project: Delivering safe and effective test result communication, management and follow-up (Including partners funds from South Eastern Area Laboratory Service)"	NHMRC	Georgiou A Westbrook J Greenfield D Horvath A Wakefield D Li L Hillman K	\$1,133,359.00
NHMRC Partnership Project: Delivering safe and effective care for children in hospital with eHealth systems (Including partners funds from Sydney Children's Hospitals Network, eHealth NSW, NSW Office of Kids and Families)"	NHMRC	Westbrook J Georgiou A Day R O'Brien T Karnon J Dalla-Pozza L Cowell C Li L Baysari M Ambler G	\$1,082,805.00

Title	Funding source	Investigators	Total awarded
NHMRC Project Grant: Enabling personalised cohort studies from large repositories of clinical practice data	NHMRC	Gallego Luxan B Shah N Verspoor K Liaw S	\$520,967.50
NHMRC Project Grant: New methods for tracking the influence and geospatial clustering of vaccine misinformation	NHMRC	Dunn A Leask J	\$476,648.00
NHMRC Early Career Fellowship: Optimising eHealth systems to improve medication safety and patient outcomes	NHMRC	Raban M	\$347,952.00
NHMRC Centre of Research Excellence: Protecting the public from emerging infectious diseases	NHMRC	Sorrell T Sintchenko V Cheng A Gilbert G Holmes E Howden B Smith D Coiera E Iredell J Jones C	\$87,004.00
NHMRC Project Grant: Preventing chronic disease in patients with low health literacy using e-health and teamwork in primary health care	NHMRC	Harris M Stocks N Nutbeam D Zwar N Karnon J Denney-Wilson E Noakes M Liaw S Lau A	\$79,564.00
OTHER			
Coupling Results Data from ClinicalTrials.gov and Bibliographic Databases to Accelerate Evidence Synthesis	National Library of Medicine	Bourgeois F Dunn A Mandl K	\$599,505.00
Person, tumor and system-focussed knowledge to drive better outcomes in melanoma	University of Sydney	Braithwaite J Rapport F	\$589,707.00
Murdoch Children's Research Institute Placement Agreement	Murdoch Children's Research Institute	Braithwaite J	\$525,000.00
Enhancing patient outcomes through evaluation of the appropriateness and quality use of pathology in general practice	Commonwealth Department of Health	Georgiou A Westbrook J Li L Pont L Pearce C Reinhart N	\$522,824.00

Title	Funding source	Investigators	Total awarded
Health implementation research strategy/Towards understanding complexity	Australian Genomics Health Alliance	Braithwaite J Long J Taylor N	\$365,868.00
Using a life course approach to examine the influence of individual and psychosocial characteristics on individual trajectories through the health and aged care systems	NSW Health	Mitchell R	\$360,939.00
Productive safety in the Emergency Department (ED): developing ED safety capacity when responding to high patient demand and unexpected events	NSW Health	Clay-Williams R	\$360,929.00
Redesigning patient experience in health service navigation using digital technology	NSW Health	Lau A	\$360,541.00
PSRACS participation in the CareTrack Aged research, a NHMRC-funded Project Grant	Victoria Department of Health and Human Services	Braithwaite J Hibbert P Wiles L	\$357,603.00
Paediatric Precision Oncology Implementation Science	Children's Cancer Institute Australia	Rapport F Braithwaite J Long J O'Brien T Tyrrell V	\$293,840.00
Evaluation of the Delirium Clinical Care Standard	NSW Health	Mumford V	\$293,506.00
Developments that support innovation in aged care: Ageing well - A social participation and engagement tool to enhance consumer choice and the delivery of quality, person-centred community aged care services.	Commonwealth Department of Health	Georgiou A Westbrook J Jorgensen M Siette J	\$265,976.00
Mackenzie's Mission	Australian Genomics Health Alliance	Braithwaite J Long J Best S	\$250,000.00
Health System Sustainability	Independent Hospital Pricing Authority	Braithwaite J	\$240,103.33
Active Implementation of Australian Consensus Guidelines for the effective delivery of ethical services to patients with Mitochondrial Disorders	Mitochondrial Foundation Board	Christodoulou J Braithwaite J Long J Best S	\$238,685.00
Independent file review to monitor the minor injury definition and threshold in the new CTP scheme	State Insurance Regulatory Authority	Mitchell R Braithwaite J Hibbert P	\$173,997.00
LifeSpan: An implementation evaluation	The Black Dog Institute	Zurynski Y Ellis L Long J	\$165,264.00

Title	Funding source	Investigators	Total awarded
The impact of electronic clinical systems on medication safety and workload in oncology	Cancer Institute NSW	Westbrook J Baysari M Mumford V Li L	\$160,000.00
Behavioural and Attitudinal Responses to Cochlear Implantation in Australia and the UK	Cochlear Ltd	Rapport F Hogden A	\$160,000.00
From bedside to the bench: Bringing Macquarie University Hospital data to researchers	Australian National Data Service	Tsafnat G	\$160,000.00
Evaluation of My Health Record and Healthdirect Australia after hours GP helpline	Healthdirect	Westbrook J Baysari M Koyama A Nguyen A Van Dort B	\$149,181.00
Data analysis and evaluation of the clinical outcomes of the electronic National Residential Medication Chart trial	Commonwealth Department of Health	Westbrook J Lind K Nguyen A Gates P Raban M	\$116,015.00
WOMBAT iOS development (DVCR and MQ IT funded)	Macquarie University	Westbrook J	\$100,000.00
Sydney North Health Network Digital Test Beds Evaluation	Sydney North Health Network	Georgiou A Jorgensen M Siette J Nguyen A	\$89,991.00
Systematic Review Automation Pipeline Pilot Study	U.S. National Institute of Environmental Health Sciences (NIEHS)	Tsafnat G	\$80,256.00
Impact of chronic illness and injury on school performance	Macquarie University	Mitchell R	\$77,639.00
Comparison of outcomes with hearing aids and cochlear implants in adults with moderately severe to profound bilateral sensorineural hearing loss (COACH study): Qualitative arm.	Cochlear Ltd	Rapport F Hogden A Boisvert I	\$72,480.00
Perceived improvement in quality of care	University of Wollongong	Mitchell R Wadolowski M Goodenough B Watts J	\$69,614.05
Epidemiology of sepsis in Australian hospitals	Australian Commission on Safety and Quality in Health Care	Li L Rathnayake K Sunderland N Westbrook J	\$69,353.00

Title	Funding source	Investigators	Total awarded
Person-centred care evaluation project	St Vincent's Health Australia	Rapport F Hibbert P Baysari M Braithwaite J Long J	\$67,513.00
Sepsis Analysis and Epidemiological Interpretation	Australian Commission on Safety and Quality in Health Care	Li L	\$63,049.00
Review of the Southern Adelaide Local Health Network Continuous Improvement Program	Southern Adelaide Local Health Network	Hibbert P Braithwaite J Gardner C Wiles L Clay-Williams R	\$62,256.00
Incident Management Systems - A national approach to enhance patient safety	Australian Commission on Safety and Quality in Health Care	Hibbert P Braithwaite J Clay-Williams R Blakely B	\$56,036.00
Research on approaches for clinical governance of consumer digital health	Healthdirect	Magrabi F Coiera E	\$54,657.00
MindSEIS: Resilience, Mindfulness and Medication Safety with Electronic Systems	European Commission H2020 MSCA International Fellowship	Lichtner V Westbrook J	\$53,346.00
Trauma Journey Day of Difference	University of Sydney	Mitchell R	\$50,085.00
Evaluating social engagement services for older adults in community care: Role of social networks in cognitive decline	Dementia Australia Research Foundation Limited	Siette J	\$50,000.00
MQ Restart Grant	Macquarie University	Siette J	\$50,000.00
Macquarie MINDS: Monitoring of injury and psychosocial health outcomes, career trajectories and continuing education, LiveD experiences and Social connectedness	Macquarie University	Lystad R Peters L Johnstone M Ellis L	\$49,994.00
Preventing patient harm in hospitals: automatic real-time detection of adverse drug events using datasets from electronic clinical information systems	Macquarie University	Li L	\$49,806.00
Electronic medication management systems in residential aged care facilities – a literature scan	Australian Commission on Safety and Quality in Health Care	Raban M	\$44,544.50

Title	Funding source	Investigators	Total awarded
iConnect: Capturing social interactions using wearable technology in residential aged care	Macquarie University	Siette J	\$43,875.00
Townsville Hospital and Health Services SPUR Project	Townsville Hospital and Health Service	Clay-Williams R Lane P Johnson A	\$40,000.00
Personalised anticoagulant therapy for patients with acute coronary syndrome	Macquarie University	Wendling T Gallego Luxan B Coiera E	\$40,000.00
Evaluation of a hospital based optometry clinic model	Centre for Eyecare UNSW	Blakely B Long J Clay-Williams R Braithwaite J	\$38,027.00
IT Safety at Telstra Health	Telstra Health	Magrabi F	\$37,188.00
List of validated patient reported outcome measures	Australian Commission on Safety and Quality in Health Care	Ellis L Churruca K Pomare C	\$36,243.00
Evaluation of Community Connections Program	Enrich Living Services	Siette J	\$34,595.00
Development of national guidance for classifying health IT related incidents	Australian Commission on Safety and Quality in Health Care	Magrabi F Baysari M	\$34,125.00
Evaluation of a peer support program at the Townsville Hospital	Townsville Hospital and Health Service	Clay-Williams R Austin E Ellis L Blakely B Lane P	\$26,343.00
Effectiveness of mental health EMRs on usability, uptake and clinician and patient safety and quality outcomes	Sax Institute	Zurynski Y Clay-Williams R Ellis L	\$26,000.00
Scoping barriers and finding solutions to research knowledge translation and implementation into the Australian health care system	Research Australia	Zurynski Y Braithwaite J Holt J	\$25,272.00
The lived experience of post-surgical following resective surgery for refractory epilepsy: a phenomenological study	Macquarie University	Shih P	\$25,000.00
An evaluation of the literature on assessing safety and quality culture in an organisation	Australian Commission on Safety and Quality in Health Care	Hogden A Ellis L Churruca K Bierbaum M	\$23,095.00

Title	Funding source	Investigators	Total awarded
Safety audit of Communicare	Telstra Health	Magrabi F	\$20,250.00
Improving outcomes from high risk surgery: patient-centred advanced care planning	Townsville Hospital and Health Service	Clay-Williams R Senthuran S Lane P	\$20,000.00
Trialling the revised Macquarie surgical innovation identification tool (MSIIT) in five Australian Hospitals: Phase One	Macquarie University	Blakely B	\$19,980.00
Understanding the impact of dementia on rehabilitation following hip fractures to improve health outcome for older people	Macquarie University	Mitchell R	\$19,973.85
Improving long-term health outcomes for Australians with traumatic brain injury	Macquarie University	Lystad R	\$19,916.00
Case studies on patient reported outcome measures	Australian Commission on Safety and Quality in Health Care	Ellis L Churruca K Mahmoud Z	\$17,352.00
IT safety workshops	Telstra Health	Magrabi F	\$16,938.00
Research plan for the validity and reliability testing of two patient safety culture surveys	Australian Commission on Safety and Quality in Health Care	Tran Y Ellis L Churruca K	\$16,494.50
Review of the Child Death Register	Ombudsman New South Wales	Mitchell R	\$15,045.00
Evaluation of a family support collaborative using a social network approach	The University of New South Wales	Long J	\$15,000.00
Investigating a new and innovative approach to using the Work Observation Method By Activity Timing (WOMBAT) tool: a proof of concept study in paediatric oncology	Macquarie University	Prgomet M	\$14,000.00
CMCRC Supervisors Research Support Allowance-Gallego Luxan, B	Capital Markets Cooperative Research Centre	Gallego Luxan B	\$10,000.00
Establishing the role of social networks in older adults in residential aged care	Macquarie University	Siette J	\$10,000.00
Patient work conducted by individuals with type 2 diabetes and chronic co-morbidities: a mixed-method, multi-staged, observational study	Macquarie University	Lau A	\$10,000.00

Title	Funding source	Investigators	Total awarded
National injury prevention strategy - Literature Review	NSW Families and Child Services	Hunter K Ivers R Clapham K Curtis K Keay L Vallmuur K Brown M Mitchell R Scott D Cullent P	\$6,000.00
Social factors associated with the intention and use of e-cigarettes	Macquarie University	Amin S	\$5,000.00
A framework for evaluating and improving the efficiency of the systematic review endeavour	Macquarie University	Bashir R	\$4,651.86
Grand total funding			\$31,788,660.59
Grants awarded			85



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