

AIHI Newsletter

July, 2015

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Understanding modern healthcare systems

IS AS CHALLENGING AS SPLICING GENES OR CURING CANCER AND JUST AS IMPORTANT TO SECURING QUALITY, AFFORDABLE HEALTHCARE INTO THE FUTURE

The relocation to Macquarie University of the **Australian Institute for Health Innovation (AIHI)** – Australia’s foremost healthcare systems research institute – has opened up new opportunities for academic and industry collaboration across a wide range of multi-disciplinary research projects. With healthcare now close to 10% of GDP in most advanced economies, the AIHI is pioneering innovative new models and approaches to help healthcare providers and governments simultaneously improve patient outcomes, prevent medical errors and reduce costs.

The AIHI’s first symposium at MQ introduced the university’s researchers and industry representatives to the Institute’s nationally and internationally significant health systems research, such as the groundbreaking CareTrack Australia project. This first national snapshot of the way healthcare is delivered in Australia found only 57% of care for 22 common conditions was in line with the best available evidence. The equally significant CareTrack Kids follow-on project is now under way. The *Medical Journal of Australia* called Caretrack Australia ‘the most important study’ it had published in 20 years.

The MQ Vice Chancellor, Professor Bruce Dowton, told the symposium: “The capacity AIHI brings to MQ about understanding how health systems work is terribly important. The magnitude of the issues around health care, the scale of spending (on healthcare) and the numbers of interactions around healthcare are truly extraordinary and going up very quickly.”

Professor Dowton, himself a paediatrician, clinical geneticist and molecular biologist, said the AIHI played an essential part in “looking at the big problems” humanity



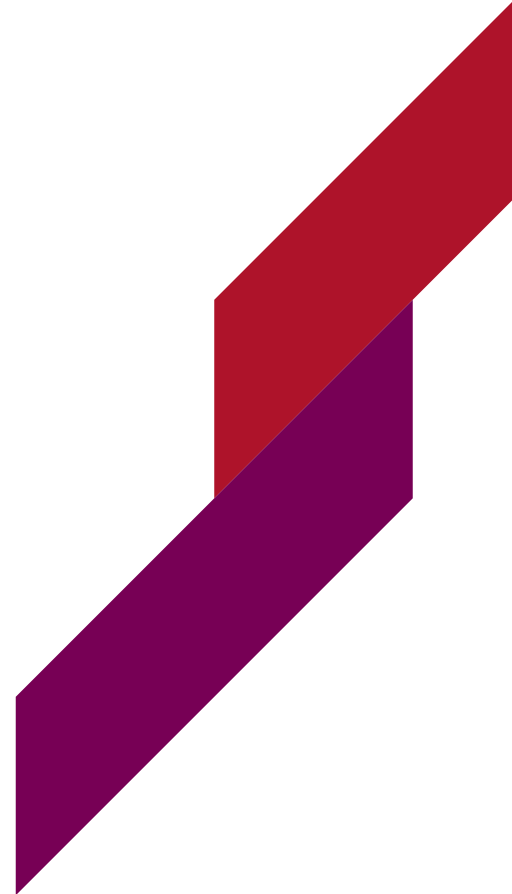
Professor Bruce Dowton

is facing as societies age and pressures on healthcare systems and health budgets intensify.

“The move of the AIHI (to MQ) is part of a move by MQ to set ourselves apart in higher education in Australia by investing a significant amount of our energy around health and healthcare systems,” he told delegates.

As international research indicates that some 20% to 30% of care delivered by modern healthcare systems has no benefit, that the error rate in modern hospitals remains stubbornly high at 10% and that much healthcare does not comply with the latest clinical guidelines, rigorous healthcare systems research promises very significant benefits. 📌

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Closing the gap between research and clinical practice



Professor Jeffrey Braithwaite


Advances in medical science and biomedical and information technology are revolutionising healthcare delivery. But to realise this potential to improve healthcare delivery, we need to understand how care is delivered in our complex, rapidly changing healthcare systems, the Foundation Director of the Australian Institute for Health Innovation (AIHI), Professor Jeffrey Braithwaite, told the symposium.

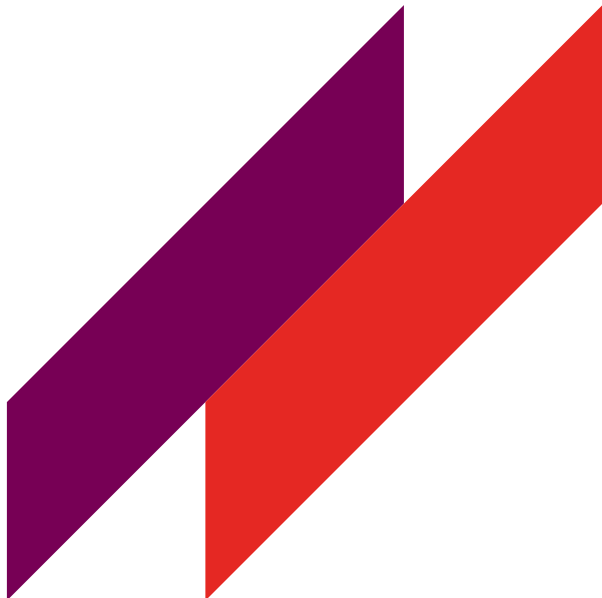
That means understanding how interconnected networks of professionals, the various designs and functionalities of clinical settings, and new technologies to support clinical decision making are interacting to determine the quality and cost effectiveness of care.

New information technology is offering unprecedented opportunities to bridge the traditional gap between research and clinical practice by enabling real-time research in wards and clinics. AIHI's current research suggests that our future healthcare systems

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will be supported by learning systems that instantly mine vast banks of health data to help clinicians make high-quality care decisions as they work.

AIHI's relocation coincides ideally with MQ's latest strategic push to build and integrate world-class health and health systems education and research on campus, with a new Faculty of Medicine and Health Sciences now working closely with the on-campus private Macquarie University Hospital and Clinics. 



How AIHI is helping future proof our healthcare systems

As multi-billion dollar investments in healthcare technology boom in Australia and worldwide, AIHI is seeking to improve the quality of decision-making using new technologies.

“Healthcare is an information business. Research tells us that one thing we can do to make a big difference is by supporting decisions. High-quality decisions make a real difference,” said Professor Enrico Coiera, Director of the AIHI’s Centre for Health Informatics (CHI), one of the three research centres under the AIHI umbrella.

Professor Coiera’s research teams are harnessing the data stored in our health records to make predictions about everything from a patient’s length of stay in hospital to his or her risk of infection or an adverse event and the likely effectiveness of a particular treatment.

At the same time, the group is looking at technological supports for clinicians that reflect real life. While current clinical guidelines focus on a single condition, many patients present with various combinations of chronic and acute co-morbidities. Using data mining, much more accurate and useful information can be extracted from data banks. By entering multiple indicators, clinicians will be able to learn from the experiences of patients with similar combinations of risk factors. Ultimately, clinicians will have access to a so-called green button on a computer interface. This will enable them to find records from virtual cohorts of similar patients so their treatment decisions are informed by the latest information – in ‘real time’ during a consultation.

The group is also investigating how consumer informatics can help people make better lifestyle and healthcare decisions. New information technologies and social

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media networks can deliver readily accessible health information and the power of those networks can be harnessed to drive health-related behavioural change, particularly with preventable diseases like obesity.

As new health-related technologies often come online before rigorous research into their impact on healthcare delivery is undertaken, there are also new risks that may be overlooked. Professor Coiera and other AIHI researchers have gained unique access to adverse-events reports, enabling them to build a clear, evidence-based picture of the role of new technology in medical errors and to propose solutions.

CHI is also scrutinising the quality of the evidence provided in studies funded by large pharmaceutical companies that will better inform prescribing decisions and provide early evidence, for example, of any emerging issues that may result in the withdrawal of a drug. 📌



Professor Enrico Coiera



Saving money

SMARTER, SAFER WORK PRACTICES

The AIHI's Centre for Health Systems and Safety Research is investigating changing work patterns in healthcare systems and the role of technology in frustrating or enabling high-quality care. The centre, led by Professor Johanna Westbrook, is, for example, investigating electronic prescribing systems as a potential solution to persistently high medication error rates in modern healthcare systems.

'... shifting from paper-based systems to electronic prescribing systems in hospitals reduces errors by at least 50%'

"Medication safety is a major problem for all healthcare systems. In Australia we have about six prescribing errors per hospital admission and 25% of all drugs are administered with at least one error," said Professor Westbrook.

Working with two major Australian hospitals, Professor Westbrook's teams have to date demonstrated that shifting from paper-based systems to electronic prescribing systems in hospitals reduces errors by at least 50% – especially those errors with the potential to cause harm. In one cardiac ward alone, that meant 80 serious medication-related incidents were avoided, which saved the hospital \$63–68 per admission, or more than \$100,000 a year. For an entire hospital this could translate to annual savings of \$2.5m. Electronic systems, however, can also introduce new errors, such as inaccurate selections from drop-down menus.



Professor Johanna Westbrook

Professor Westbrook's teams also have large research programs in communication and innovation aimed at supporting workplace change. Their WOMBAT model – Work Observation Method By Activity Time – has been adopted internationally to help researchers study concurrently multiple aspects of people's work.

Importantly, the centre goes beyond healthcare to include aged and community care – a largely overlooked, but increasingly important, area of care delivery worldwide. 📌

Re-imagining the big picture in healthcare

Reconceptualising healthcare systems research is critical if we are to confront important challenges such as medical errors and other iatrogenic harm and provide a new evidence base to inform policy making and clinical governance.

In doing so, Professor Jeffrey Braithwaite's Centre for Healthcare Resilience and Implementation Science (CHRIS), aims to build more resilient healthcare systems that cope better with increasing demands and rapid technological and organisational change to better care more cost effectively.

One key research priority is the development of alternatives to the limited 'find-and-fix' approach that unpicks medical errors based on the flawed assumption that learning from our mistakes will prevent the same error being repeated in future.

Today's clinical work is carried out within dynamic, constantly interacting webs of health professionals supported by increasingly complex healthcare technologies, communication systems and

equipment. These long, complex chains of decision-making and events mean virtually no serious error ever recurs in the same way, undermining conventional 'reverse engineered' solutions to costly errors.

On the other hand, about 90% of the time healthcare systems "do everything right", said Professor Braithwaite. This suggests more useful lessons could be learned "by determining what a health systems looks like when it's performing at its resilient best, allowing us to improve safety by replicating success".

AIHI's broader mission to improve the healthcare delivery system has led to another cutting-edge area of research – implementation science. Many research teams work to identify and understand problems, then envisage a solution. However, understanding how and why large organisations resist or embrace change is also essential to achieve real-world improvements in healthcare delivery, Professor Braithwaite said. 📌

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