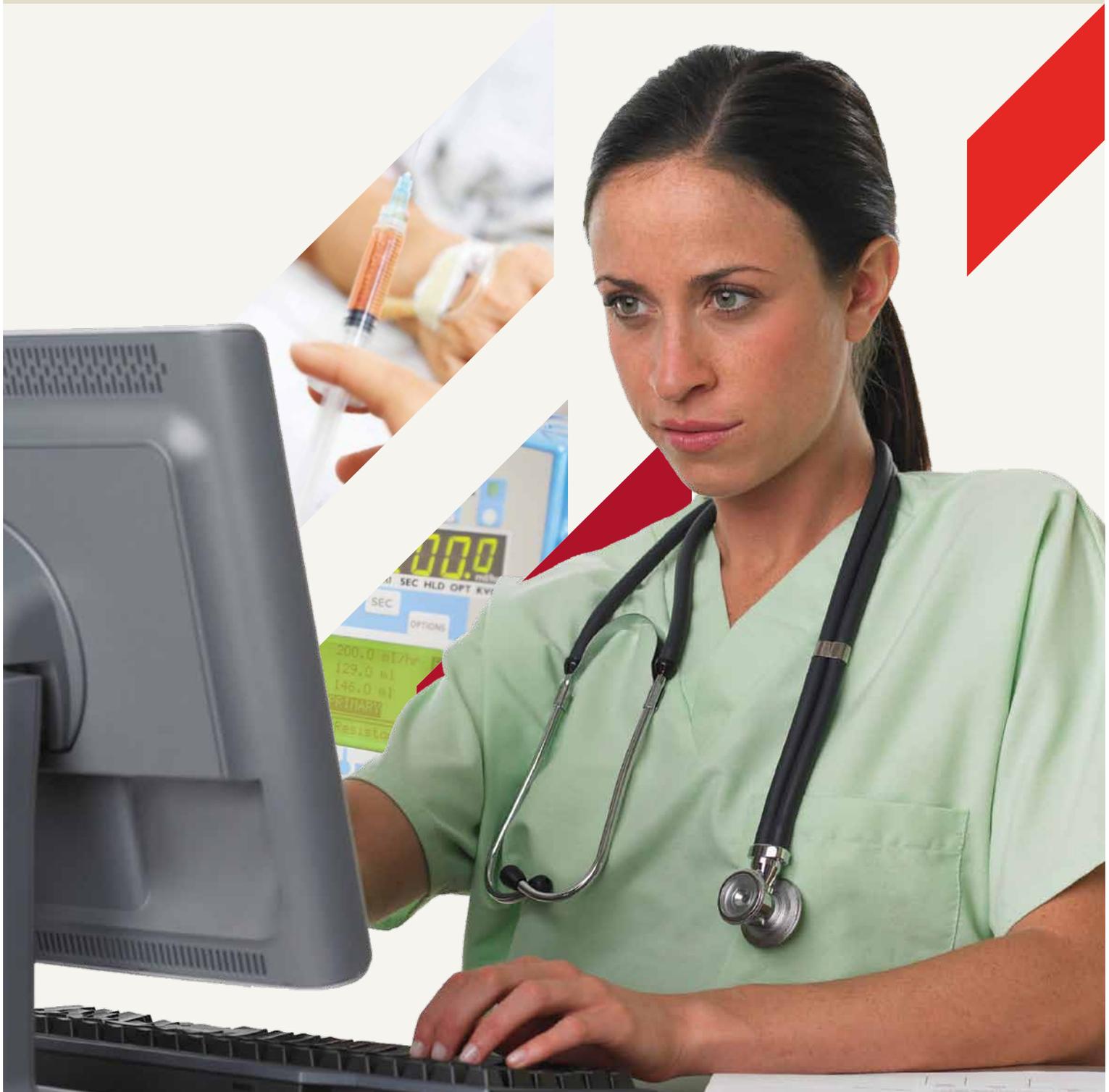


Applying a human factors approach

TO IMPROVE THE QUALITY OF HEALTH CARE



Human factors

In human factors, the first law of design is to ensure things are consistent with people's expectations. To understand how good the fit is between people and their environments AIHI researchers are using a range of methods, for example focus groups, observation and physical measurement. Their research has concentrated on assessing the difference between the way clinicians and others in the health system think they do something, and the way they actually do it.



ABOUT HUMAN FACTORS

Human factors is a discipline. It builds evidence and knowledge to design and improve interactions between people and their environments.

Some use the term *human factors* interchangeably with *ergonomics* - but human factors covers both the physical interactions between people and their environment - which is what people usually associate with ergonomics - and also cognitive and organisational interactions.



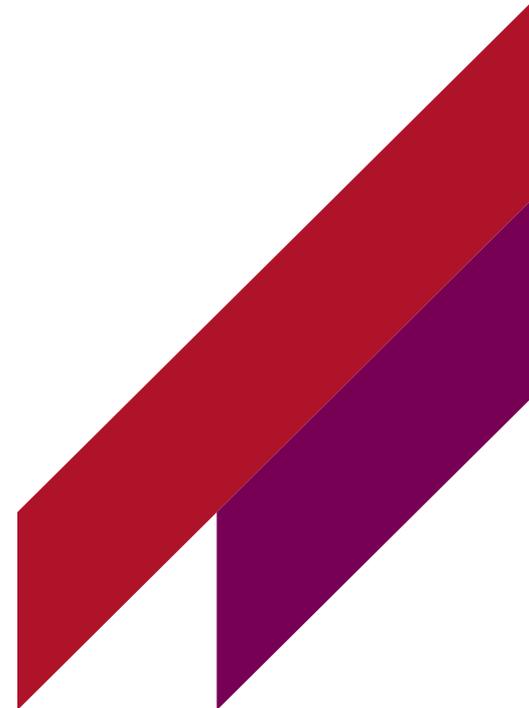
Is health IT a good fit?



Researchers at AIHI have been examining the fit between doctors and IT – specifically, computerised decision support for prescribers. This is information provided to doctors as they make prescribing decisions. It includes an electronic prescribing system's computerised alerts, online resource material and pre-populated orders. Computerised decision support is a deceptively simple concept, but if poorly designed it can create new problems.

AIHI's first study of the fit between doctors and prescribing alerts involved 60 hours of observations of doctors on ward rounds. Researchers found that the senior doctors who made most of the prescribing decisions rarely used the electronic prescribing system, which was managed by junior doctors. Nearly half the prescriptions triggered an alert, but

only 17% of those alerts were read. The result was alert fatigue: doctors tended to dismiss all alerts, even those which were useful. The team concluded that decision support is of limited value when its users are not the decision makers. Alerts may be more useful outside ward rounds, where senior doctors are less influential. AIHI's current research is focusing on how to design effective decision support.



The human factors approach also operates at a system or organisation level.

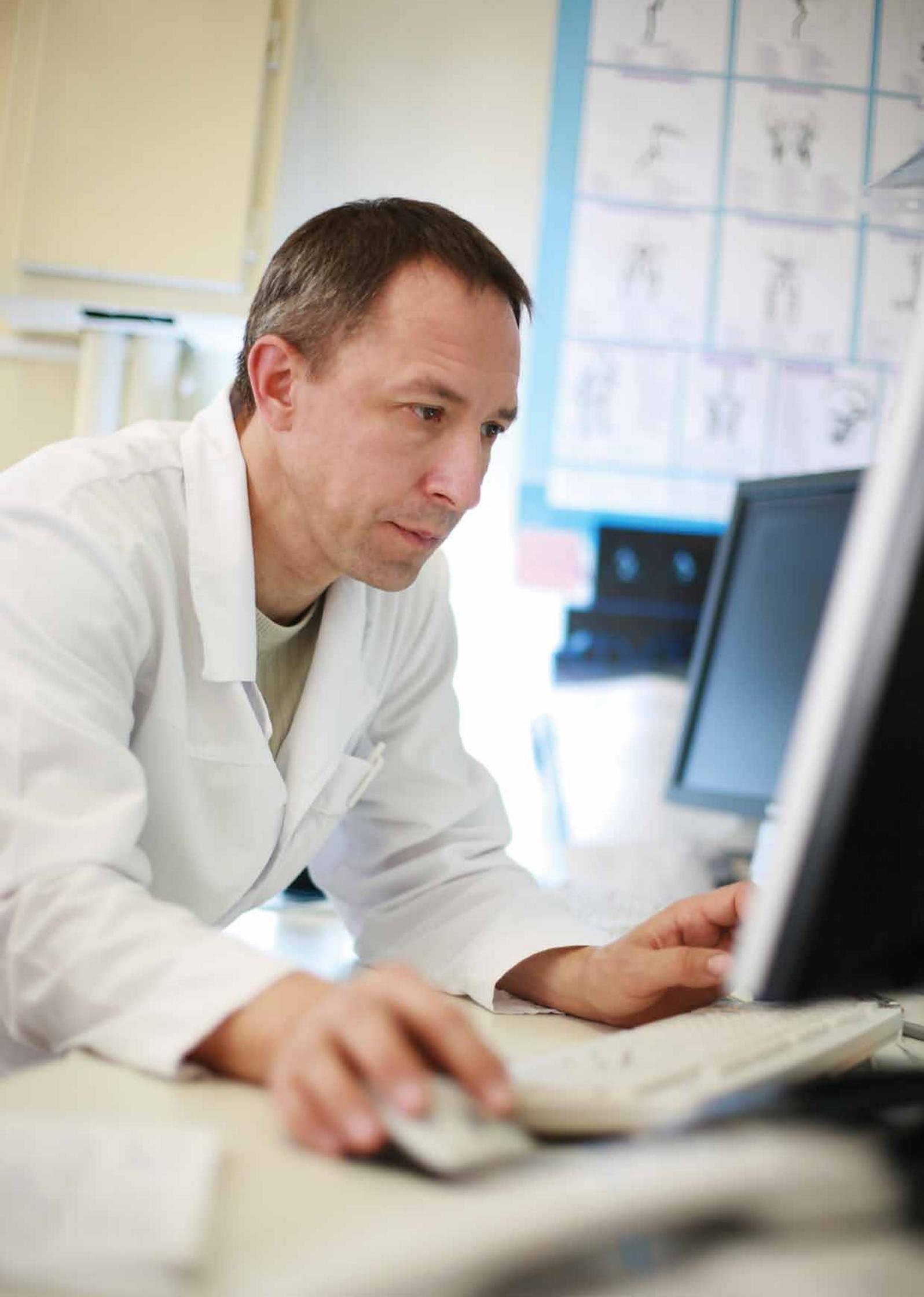
People in organisations

Organisation charts show how managers think a system works; observing real-world operations reveals how it actually works. This difference has major implications when things go wrong. Our mental models of how a system works will affect how we respond to an error. Organisation-chart linear thinking (we call it Safety-I) puts a fix in place to stop the error being repeated. Yet from observation we find the same kind of processes produce satisfactory results far more often than they produce an error. By introducing a block or fix we complicate the system and make other errors possible. And over time, as new errors occur and other fixes are introduced, earlier ones are forgotten or ignored. Despite more than a decade of progress, patient safety remains a problem: on average, one hospital admission in 10 will see a medical error of some sort. To break this impasse

‘... one hospital admission in 10 will see a medical error of some sort.’

and achieve real progress what is needed is Safety-II. This approach is based on understanding resilience – that is, instead of constantly scrutinising what has gone wrong, studying and understanding why most things go right and learning from success, not just failure. A resilient system adapts and keeps functioning in the event of a disturbance in ways that avoid, or circumvent, errors that might otherwise put patient safety at risk. The constituent elements of Safety-II and how healthcare systems build resilience are a major focus of AIHI research.





Who are we and what are we doing?

DR MELISSA BAYSARI
PHD PSYCHOLOGY, BPSYCHOLOGY

Melissa Baysari is a human factors researcher experienced in both qualitative and quantitative evaluations of health information technology. She is a Senior Research Fellow at the Centre of Health Systems and Safety Research. Melissa's research has primarily focused on examining and improving decision support for prescribers. She is particularly interested in understanding how clinicians use and interact with technology in their everyday work, and in improving that interaction.

DR ROBYN CLAY-WILLIAMS
PHD PUBLIC HEALTH, BENG ELECTRONICS

Robyn Clay-Williams is a former military test pilot and engineer. As a Research Fellow, Robyn conducts health services research in the field of human factors. Current projects include applying engineering resilience to healthcare to improve patient safety, usability of medical devices and IT systems, system dynamics modelling of health care systems and processes, and analysis of behaviours of healthcare professionals.

DR BRETTE BLAKELY
PHD NEUROSCIENCE, MA BIOETHICS, BA (SUMMA CUM LAUDE)

Brette Blakely has university teaching and research experience in a variety of disciplines, including neuroscience, chemistry, bioethics, professional ethics, business, and organisational communication. Currently she is a Postdoctoral Research Fellow at the Centre for Healthcare Resilience and Implementation Science, working on projects related to system thinking and

system dynamics modelling as they relate to patient safety, health reform, human factors in health care and health care resilience.

PROFESSOR JOHANNA WESTBROOK
DIRECTOR OF AIHI'S CENTRE FOR HEALTH SYSTEMS AND SAFETY RESEARCH (CHSSR)

Professor Westbrook's research expertise centres on the design and execution of complex multi-method evaluations in the health sector with a particular focus on the effective use of information and communication technologies. She has lead research on measuring interruptions and their impact on healthcare delivery.

DR AMINA TARIQ
PHD, ENGINEERING (SOFTWARE), MSC (BUSINESS IT SYSTEMS)

Amina Tariq is a human factors researcher with a software engineering background. She is a Post Doctoral Research Fellow at the Centre of Health Systems and Safety Research and her areas of research expertise includes design of information systems for collaborative healthcare processes, usability evaluation of healthcare technologies and its implications on patient safety.

PROFESSOR JEFFREY BRAITHWAITE
FOUNDATION DIRECTOR, AIHI AND DIRECTOR OF AIHI'S CENTRE FOR HEALTHCARE RESILIENCE

He is a leading health services and systems researcher with an international reputation for his work investigating and contributing to systems improvement. Professor Braithwaite areas of research expertise include: Patient Safety, Quality of Care, Health Systems, Clinical Governance, Health Services Management, Health Services Research, Health Policy, Population Health

OUR CURRENT WORK:

- 1 Evaluating and improving computerised decision support for antibiotics
- 2 A systematic investigation of alert override – how can we prevent alert fatigue?
- 3 Developing measures of organisational resilience
- 4 Development and evaluation of the TenCs healthcare resilience model
- 5 Using Functional Resonance Analysis Method (FRAM) to develop usable guidelines
- 6 Usability evaluation of patient controlled analgesia pumps
- 7 Evaluation of a surgical innovation checklist
- 8 Exploring how interruptions and multi-tasking impact on clinicians' work and errors

EXAMPLES OF WHAT WE'VE PUBLISHED

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3. **Clay-Williams R**. Restructuring and the resilient organisation: Implications for health care. In: Hollnagel E, **Braithwaite J**, Wears R, eds. *Resilient Health Care*. Farnham, Surrey, UK: Ashgate Publishing Ltd., 2013.
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11. **Westbrook JI**, Li L, Lehnbohm E, **Baysari MT**, **Braithwaite J**, Burke R, Conn C, Day RO. What are incident reports telling us? A comparative study at two Australian hospitals of medication errors identified at audit, detected by staff and reported to an incident system. *International Journal for Quality in Health Care* 2015;27(1):1-9.
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14. Walter SR, Dunsmuir WTM, **Westbrook JI** (2015) Studying interruptions and multitasking in situ: The untapped potential of quantitative observational studies. *International Journal of Human Computer Studies* doi:10.1016/j.ijhcc.2015.01.008



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