Resilience engineering (RE) is an emerging paradigm for understanding complex systems such as healthcare. Resilience can be defined as the ability of a system or an organisation to adjust its functioning to produce successful outcomes even when under pressure and experiencing unexpected disturbances. In recent years an enthusiastic RE community has formed and there has been lively debate about the ideas. However the application of these ideas in practice is not straightforward and examples in healthcare are just beginning to emerge. In this symposium we explore how the principles are being applied in on-going work in Australia and the UK. We focus on the practical challenges of translating the approach into practice and consider its contribution to improving care.

RE proposes that safety and adverse events emerge from the adaptations that healthcare workers make to cope with the pressures and variability they encounter, such as high patient numbers, lack of equipment, or staff shortages. Their ability to adapt to these pressures usually creates successful outcomes, but if their ability to adapt is overwhelmed or their adaptations are not successful, adverse outcomes result. Improvement efforts are currently almost solely based on understanding how things went wrong but the learning from successful outcomes is not harnessed. The goal of an RE approach is therefore to understand the adaptations that people make to ensure successful outcomes and to understand how to increase their ability to make adaptations that lead to success.

The symposium will contain the following presentations:

1. **Resilience and patient safety.** Presenter Professor Jeffrey Braithwaite, Professor of Health Systems Research, Director, Australian Institute of Health Innovation, Macquarie University, Sydney, Australia.

   In patient safety an apparently logical, cause-to-effect paradigm has dominated: safety-I. This approach applies linear models to tackle and reduce harm to patients, focusing on things going wrong. In contrast, safety-II sees performance variation as natural, leading not only to harm, but effective care. Safety-II recognises that clinicians succeed under varying conditions, asking why things go right so often. It represents the situation occurring when health care is being resilient—adjusting, correcting, modifying and fine-tuning care in response to changing circumstances. Supporting safety-II practices alongside safety-I activities could become the preferred model for patient safety.

2. **Modelling resilience to guide quality improvement in emergency care.** Presenter Dr. Janet Anderson, Director, Centre for Applied Resilience in Healthcare, King’s College London.

   A key challenge in learning from how success is created is operationalizing and framing the phenomena of interest. Many RE studies use ethnographic methods to describe sources of resilience but these analyses provide few clues about how to design interventions to improve adaptive capacity. In this paper a theoretical model of resilience will be presented that is guiding on-going work in the Emergency Department and its value in identifying opportunities for interventions will be explored.

3. **Linking hospital data for Resilience Engineering** Presenter Dr. Alastair Ross, University of Glasgow, Scotland.

   This talk describes how longitudinal acute Hospital Trust data from nursing, medical, administrative and other sources are being linked in a single dataset to model how acceptable and unacceptable outcomes emerge from interactions between demand, capacity and adaptation. Data include ED attendance/occupancy, equipment availability/status, patient acuity, staff ‘skill mix’, escalation status, spatial reconfiguration data, incident rates, waiting times, and patient satisfaction ratings. This talk will show examples of data we have integrated to date and some of the associations that are emerging.
4. Resilience and Interruptions in Healthcare. Presenter Tara McCurdie, School of ITEE, University of Queensland.

Researchers examining interruptions in healthcare have often recommended that interruptions be minimised, seldom considering all the downstream effects on workflow or the role of clinicians who must preserve the safety of their work. Guided by some of the principles of resilience engineering, we consider the role that interruptions play in the broader work system. It is important for researchers to move beyond an emphasis on the negative impact of interruptions towards an understanding of how interruptions emerge from the interplay of work threads across a unit. We conjecture that such an approach will lead to more sustainable recommendations for handling clinicians’ reactions to workplace interruptions.

5. Second victims and organisational resilience – Chiara Santomauro, School of Psychology, University of Queensland.

Second victims are practitioners involved in an incident that actually or potentially harms or kills somebody else, and for which the practitioner feels personally responsible. Second victims in healthcare organizations often report serious negative psychological outcomes following adverse events, which raises questions about the quality of support, if any, provided by their organization. There is a probable link between the resilience of an individual involved in an incident and the resilience of the organization as a whole. Therefore, improving organizational resilience may lead to more resilient healthcare workers, in turn leading to better outcomes for both first victim and second victims.