

Moving towards evidence-based care system design

Physicians understand systems. It is the interplay between different body systems, the environment and social context that is expressed as disease or risk of disease. It is an assessment of these and the benefits and risks of treatments that forms shared management plans, and it is the monitoring of the effects of these plans that modifies ongoing care. Physicians also work on evidence, evidence to support and make diagnoses, evidence of expected effectiveness of treatment, evidence of risks of disease and interventions, and evidence of the effect of treatments and disease on individual patients.

When it comes to designing and improving how we deliver care for patients and populations it is essential that we take an evidence-based systems approach. We have been delighted to guest edit this edition of *FHJ* to highlight the rapidly developing approach to doing just this.

From a patient safety perspective Steve Cross in *The systems approach at the sharp end* reminds us that 'the way in which a system operates is a major determinant of risk and risk can lead to harm'.¹ We not only need to respond to harm or potential harm with a systems understanding, but also should be designing in lower risk, and therefore less potential of harm. This review is pertinent in the light of recent high profile cases, but also highlights the need for considerable training of professionals in a systems approach to patient safety. These training opportunities are very limited currently.

In *A systems approach to healthcare: from thinking to practice* we give a brief overview of work led by The Royal Academy of Engineers in collaboration with Royal College of Physicians and Academy of Medical Sciences, *Engineering Better Care*.² This work brought together experts in systems engineering and health and care improvement, and has developed a framework that can bring together appropriate methods from engineering, and quality improvement for better evidence-based design of care. This approach needs developing in practice, individuals will need training and continuing evaluation is vital. While this framework is in the early stages of testing and development the systems engineering approaches are increasingly being used.

Simon Dodds in *Systems engineering in healthcare – a personal perspective* writes as an engineer and surgeon, and shares experience of using and training systems engineering in healthcare in the UK.³ Tom Bashford *et al*, describe how this approach is being applied in trauma care in the resource-poor setting of Myanmar, perhaps exemplifying that the approaches can be generic but that context is everything when services are to be improved.⁴ Partha Das *et al* illustrate how the systems

engineering approach is being used in one hospital around transfer of care, as part of demonstration projects across the USA.⁵ Young *et al* show how modelling for cost effectiveness should be used in designing system requirements, and evaluating benefits,⁶ and Elameer *et al* show ongoing time series analysis of the benefits of redesigned stroke system.⁷ In the next edition of *FHJ* we will also have examples of using a systems approach to determine acute and chronic care models, system capacity and workforce requirements.

These papers all show how some of the tools and techniques from systems engineering can be used to design safer and improved care in practice, but we need to develop a consistent and more widespread approach.

So we are moving towards using evidence-based methods to design and improve care, integrating systems engineering approaches as part of healthcare improvement activities. This gives us better evidence of what the results of improvement are likely to be, and how we evaluate and adapt services during delivery. ■

References

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