Systems engineering for healthcare improvement 101

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Aims

The Royal Academy of Engineering (RAEngineering) has joined forces with the Royal College of Physicians (RCP) to explore how systems engineering can be applied to healthcare, with the aim of transforming the system in a scientifically sound and managed way. Their study aims to identify a framework for a systems approach that improves patient care.

Systems engineering is well established in engineering theory and practice. It is described by NASA as:

A methodical, disciplined approach for the design, realisation, technical management, operations, and retirement of a system. A 'system' is a construct or collection of different elements that together produce results not obtainable by the elements alone. The elements, or parts, can include people, hardware, software, facilities, policies, and documents; that is, all things required to produce system-level results.

Methods

The project's strength is the range of input and evidence gathered from relevant stakeholders. Project partners and working group members are continually seeking input from interested parties throughout the project's duration. We are seeking the views of those who are active in quality improvement and systems change. This includes academic experts, those in service delivery, and views from across the health and care system (including outside acute care) and from different levels of seniority. Patient involvement is being managed by the Patient and Carer Network of the Royal College of Physicians.

To bring key stakeholder evidence together, the project is running a suite of workshops in autumn 2016:

> systems thinking
> design thinking
> risk thinking.

Each workshop will focus on a different perspective of systems engineering, with the aim of scrutinising the key principles and how they might be applied to healthcare with the aim of improving care for patients.

The output of the workshops will look to demystify the use of systems engineering in health and care settings and showcase examples of good practice. The output will be a co-designed framework and narrative based on appropriate case studies. This is what will be brought to the Improvement Academy conference. We would welcome the opportunity to share the framework with a wider audience to further explore is validity and ideas for application.

Results

By bringing together experts from engineering and healthcare provision, the study will identify a framework for healthcare improvement that addresses system thinking, design thinking and risk thinking. The framework will be scrutinised by engineers, physicians and other healthcare professionals and patients, to ensure its ready application in healthcare.

At the time of Medicine 2017, a joint report will have been published by the RAEngineering and RCP. The report will identify a framework for the application of systems approaches in healthcare, using case studies to both highlight where application can be of benefit and where it is already making change.

Conclusions

Engineers, working with healthcare professionals, have insights that can make systems safer. These insights are different from the current understanding and guidance available in the health and care profession and may be able to build on existing practices. Engineering can help healthcare professionals to manage complexity better, have better processes for managing risk and safety, and can ensure the patient voice is better embedded in change. ■

Conflict of interest statement

None apparent at this time.

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