



Elizabeth Blackwell Institute for Health Research

## **Research for Health Scheme**

**Stage 1 - Call for Challenges Application Form** 

- This call is open to doctors, nurses and allied health professionals employed by the NHS.
- Please use this form to describe a specific issue or challenge, which you are currently facing in your area of healthcare delivery.
- The deadline for submission is 25 Feb 2014. Please email this application form to Lisa.Wheatley@Bristol.ac.uk
- If your challenge is selected, University of Bristol researchers have the opportunity to bid for funds to help them develop a solution. They will work in partnership with you to make sure the new technology, device or innovation will really work for you, your colleagues and your patients.

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Challenge Title (max 20 Words)

Can information flow be designed to change clinician's behaviour and improve clinical outcomes in the intensive care unit?

Please describe the specific problem which needs addressing

The translation of evidence from controlled trials into clinical practice is often slow and inconsistent and the reliable delivery of evidenced based interventions is a challenge that affects many health care providers. Unwanted variations in clinical care contribute to worse outcomes, increased costs and decisional regret amongst clinicians. Improving the implementation of evidence-based interventions involves understanding why clinicians make the decisions they do and changing their behaviour. Traditional attempts to change clinician behaviour assume that clinicians will act on information available according to their intentions in a highly reliable way. The majority of efforts to change behaviour are therefore targeted at improving knowledge in the form of clinical guidelines, protocols and education campaigns. Unfortunately these efforts often fail or have short-lived benefits.

A vast amount of data is collected and stored in various hospital systems including radiology reports, outpatient letters and laboratory results. University Hospitals Bristol ICU uses an electronic health record (EHR) which includes an electronic charting system. Many aspects of a patient's care on the ICU are charted electronically and stored on our EHR including minute to minute physiological data and details of care processes such as ventilation, renal replacement therapy, medications and fluid input. Although so much data is held in these systems, it is rarely available to clinicians in a format that could help them improve their performance.

The data is available for analysis immediately and can be manipulated by the use of simple rules and algorithms and presented to clinicians as information in real time to help them deliver more reliable care. These insights can be displayed in a number of ways including large dashboards, via automated emails and also via a secure social network. The display of this information is highly configurable and as such the "choice architecture" facing the clinician can be manipulated in order to encourage better decision-making. (E.g. automated alerts can be sent highlighting deviation from desired practice.)

Many health care organisations are investing in electronic health records but there is a paucity of evidence demonstrating that simply computerising clinical information will improve outcomes. We have done some preliminary work that suggests the manner in which information is displayed can influence clinician behaviour in a predictable fashion. We would value input from experts in decision science, statistics, information technology and engineering in order to design the complex information flow within the ICU in a manner most likely to provide benefit to patients.

Our EHR database contains continuous data on thousands of patients and is available for interrogation and algorithm development. It is simple to demonstrate the effect of interventions on behaviour by analysing the data in a before and after fashion.

How does this issue impact on you, your colleagues and your patients?

Intensive care is a complex clinical environment with a high acuity of patient illness. A single patient on the ICU with chronic co morbidities may require 80-200 evidencebased interventions in a single day. Many of these interventions are simple, cost free and low risk. At present we rely on clinicians to implement these interventions with little or no help from our data collection systems. Improved information flow could improve the delivery of these interventions, free up clinicians to treat more patients and improve patient outcomes.

Can you estimate how many patients or staff are affected by this problem? Can you describe any associated financial implications for the NHS or patients? (Don't worry if you are not able to answer this question at this stage – it is not compulsory) Intensive care is an expensive resource within the NHS. In February 2013 there were 3770 adult intensive care beds with an average cost of approximately £1500 per day. The demand for intensive care is growing. Increased intensive care length of stay is costly, leads to the cancellation of urgent elective surgery and an increase in potentially unsafe non clinical transfers. If we can improve the reliability with which interventions are deployed we will reduce length of stay, reduce cost and improve patient outcomes.

If benefit can be demonstrated in ICU, it is likely that similar principles could be deployed throughout the health care system.