SafetyNet:

networked information technologies and patient safety

(NIHR Health Services and Delivery Research project 16/53/03)

Introduction

The meeting is part of an NIHR-funded study, called SafetyNet. Its purpose is to help us to identify how networked information technologies work – specifically, how they can help to improve patient safety.

At the meeting we would like you to comment critically on our initial ideas, which are outlined below, and represented in the diagrams in the Powerpoint file attached to the email. You can reject them, modify them, 'zoom in' on key issues and help us to fill in detail, or suggest new ones. We really don't mind if you don't like our ideas – that's what the meeting is for. Equally, if you think particular sequences of events are important, you can help us by explaining why.

Background

There are continuing debates about the value of investments in networked IT systems in the NHS. To supporters, the advantages are obvious, and include access to the whole of a patient's record, and reliable communication with clinicians in other organisations. Yet doubts persist. Clinicians point to poor experiences with 'clunky' IT systems, and promised new systems failing to arrive.

In other areas of health care, NIHCE appraisals can help to remove uncertainty about the value of new drugs and procedures. But NIHCE does not review IT investments. Even if it did, it might not be able to help very much, as published evidence is mixed. For example, some clinical trial evidence shows that medicines reconciliation can reduce the frequency of inappropriate prescribing. But other trials indicate no change, or even modest increases in the risks of adverse events. Similarly, studies of electronic health records have found both positive and no effects.

Commentators have offered possible explanations for these results. One is that too many IT systems really are clunky. Another is that academics have undertaken the wrong type of study, or not observed developments for long enough, and have under-estimated the value of systems as a result. Whatever the merits of these explanations, they don't solve the problem. We need a method for identifying the value of investments in networked IT systems that – ideally – is convincing to all sides.

Our focus is on patient safety partly for this reason. There is evidence of both positive and adverse effects associated with IT investments, and we are in a position to investigate both, and shed useful light on current debates. More generally, patient safety is at the heart of the matter. If networked IT systems are shown to help to make care safer, the evidence can be used to argue for investments. If they aren't, we need to understand why.

The Realist Synthesis Method

Our approach starts with the observation that many practitioners and researchers believe that IT systems have effects on patient safety – but we don't understand how and why those effects occur. In most published health service reesarch studies, everything in between the IT system and safe patient care (or an adverse event) is in a 'black box'. This study is designed to open the black box, and show how IT systems change clinicians' working practices, and how they in turn affect the safety of patient care. We believe that there are useful literatures on what happens inside the black box – including software engineering literatures - and it therefore makes sense to undertake a literature review, to establish what we do and don't know.

We are using a literature review method called realist synthesis. The cornerstone of the method, and the reason for arranging the meeting, is that we need to identify the effects on safety that system designers **intend** to achieve. These can be represented in sequences of steps, that link the design and deployment of networked IT systems to safe patient care. As we explain below,

our early work suggests that systems may work in different ways. Accordingly, we have identified several sequences, which we call **initial programme theories,** which we can use to guide our discussion.

We sense that a number of the relevant literatures are large, and we have limited resources. We therefore also need your help to identify **priorities** for the literature searches that we will undertake over the next few months. The main priority might be one of the programme theories, or possibly a key sequence of steps that several theories have in common.

Initial Programme Theories

The initial programme theories are represented in the diagrams below. On the basis of our reading and thinking to date, we have identified four themes for discussion. They are summarized in the table below. The first three all work by providing clinicians with access to data from IT systems in other organisations: the differences lie in what clinicians do with it. They all involve actively managing patients' risks, and hence ensuring that care is safe and effective.

Co-ordination involves a clinician reviewing a patient's care – perhaps an older frail person's care package – and spotting that some services are not being provided, or that the patient needs a new service. The clinician contacts relevant colleagues, with a view to improving the service to the patient.

We found a number of papers which argue that safeguarding provides an important argument for links between patient records systems. The key idea here is that worrying patterns of use of services can be identified by clinicians – or alerts can be generated by IT systems - and acted upon.

Theme	**Key feature**	**Example**	**Managing or avoiding risk**
Co-ordination	Clinicians use records and networks to co-ordinate with one another	Community nurse reviews elderly person's care package, contacts services that have not been attending	Managing

Non-standard patterns of care/alerts	Systems provide data to alert clinicians	Safeguarding	Managing
Reconciliation	Clinicians access data from 'remote' systems	Medicines reconciliation	Managing and avoiding
Designing out risks	'Whole system' approach to the role of networked IT services	Comprehensive re-design of services	Avoiding

Reconciliation is distinctive because, at least in principle, it does not need to involve more than one clinician. Clinicians can review patient records, including records of – for example - current medications in 'remote' systems, and thereby ensure that patients receive the right medication. The risks of giving them contra-indicated medication is reduced.

The right hand column of the table suggests that reconciliation involves both managing and avoiding risks. The column is there to highlight two distinct ways of making care safer. The first, illustrated by the three examples above, involves actively managing patients' risks. The key idea here is that much health and social care is inherently uncertain, so that it's never going to be possible to know when any particular patient falls ill, or deteriorates. The appropriate response is to set the care system up so that clinicians can respond to patients' problems as they arise.

The second approach involves eliminating risks. The Viriginia Mason model, currently being piloted in five English NHS hospitals, is an example of this approach (improvement.nhs.uk/resources/virginia-mason-institute/). The starting point is that, while some aspects of care are inherently uncertain, much can be done to eliminate uncertainty for many patients. Our question is: do you think that networked IT services can be designed and deployed in support of an inherently safer care system? The last diagram

By way of illustration, medicines reconciliation can be interpreted as an example of this approach (as well as of actively managing risks). By providing the means to check current medications, and contra-indicated medication, IT systems can be part of a comprehensive approach to eliminating patients' risks.

This line of thinking has been referred to as the development of 'high reliability' organisations, and as the natural end-point of a 'whole systems' approach. It has also been referred to as Safety II. Roughly, Safety I refers to organisations that proactively manage patients' risks, while in Safety II organisations seek to 'design out' those risks as far as possible.

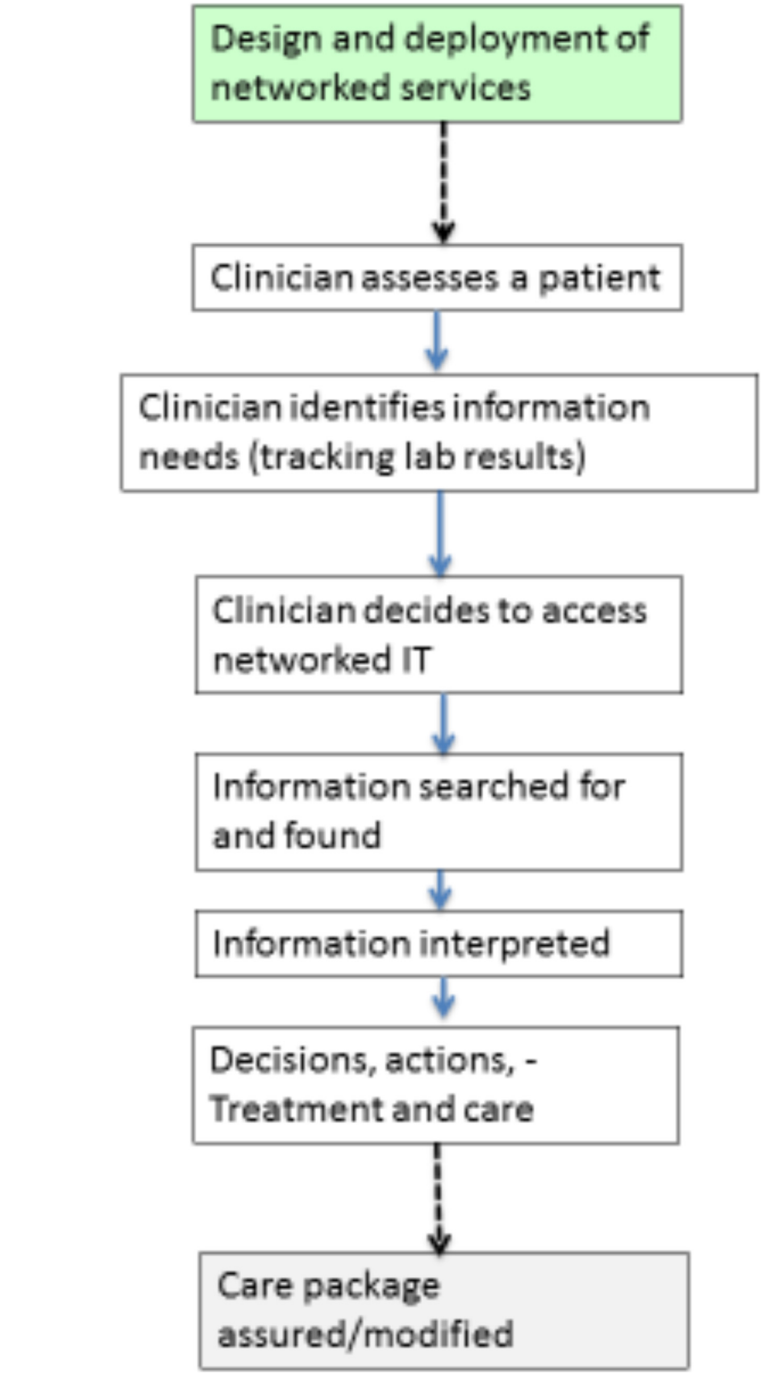
Next Steps

The next step, for us, is to modify the programme theories in the light of your comments, and then use them as the basis for a discussion with national policy makers, and then consultation with frontline clinicians. We will also consult our study patient and public involvement panel. After that we will make a final decision about the theories or parts of theories to focus on. We will send you the final versions of the theories and our search priorities.

We will then design and conduct the searches, for evidence that supports or rejects the selected theories. We will also look for evidence about the events that derail peoples' best intentions – what gets in the way of achieving the intended effects in practice. **We would like to consult you again by email** on two occasions, for your comments on our emerging findings.

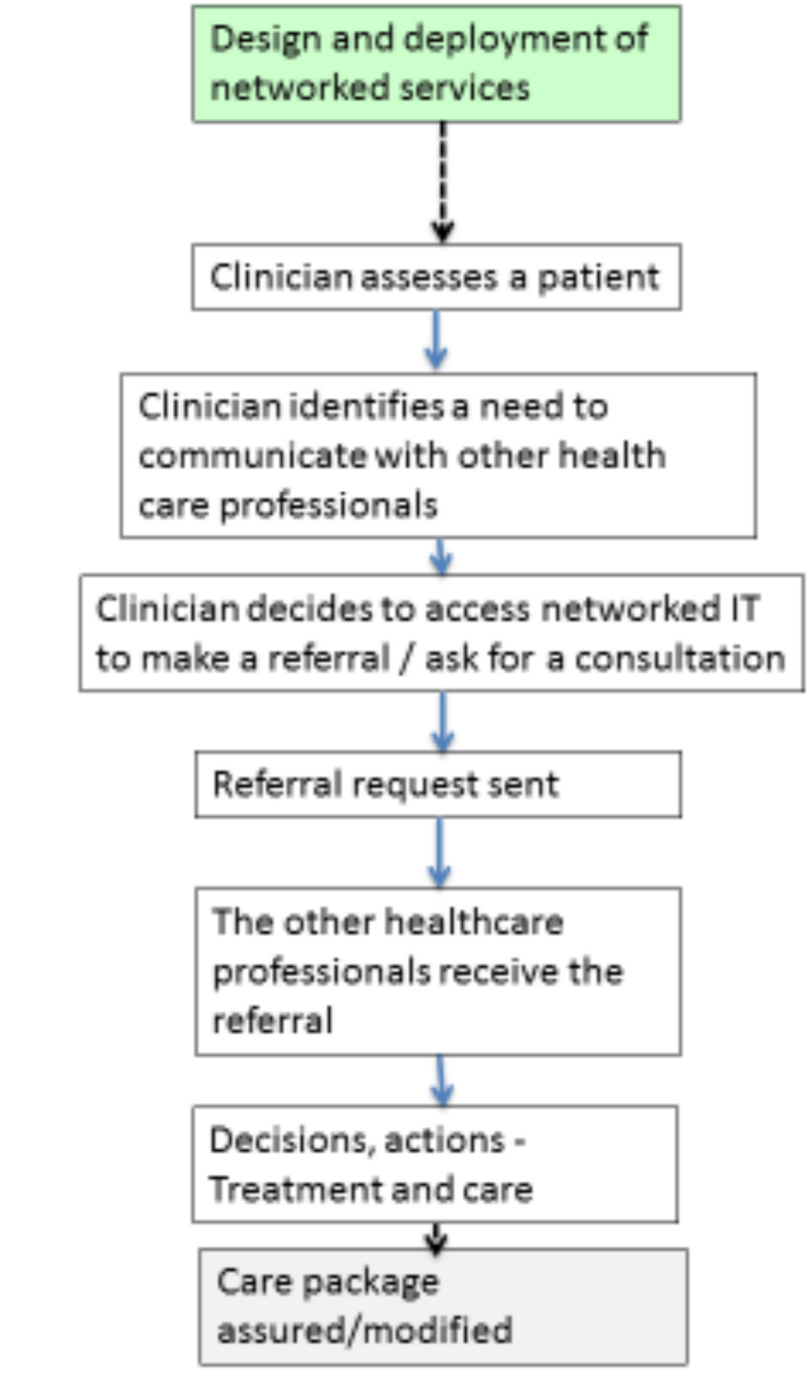
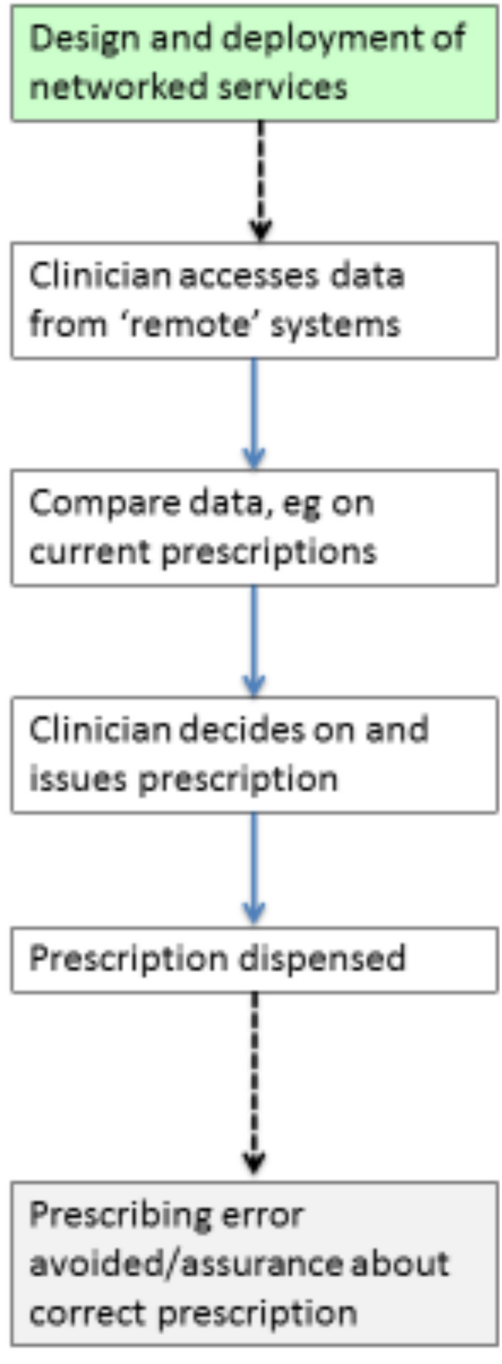
SafetyNet: Initial Programme Theories

ACCESS TO INFORMATION



SafetyNet: Initial Programme Theories

COMMUNICATION



RECONCILATION