

the various methods that have been used to estimate returns to health care R&D, arguing that there is no simple metric in this field. For different objectives, different tools will be required, and various assessment tools are needed for basic and for applied research.

Even for the simplest objective to be evaluated, the scientific return, the report outlines the various problems that may arise through assessing return in terms of citation indices, case studies, systematic reviews of evidence, survey, and peer review. Here at least assessment tools exist. Assessment of health return is more problematic as many innovations are in the form of changes in process or techniques that cannot be patented, making it difficult for the private investor to capture any return. Three further issues are important. Firstly, counterfactual evidence: the measurement of R&D policy requires evidence on what would have occurred had the policy not been undertaken. In the case of R&D in the health care sector the obvious question is: given the impact of lifestyle and environment on health, what health gains would have been achieved even without technical advances in medical care? Secondly, how should spillover effects, either the medical advances imported into the UK or those exported from the UK, be accounted for? Thirdly, over what time span should the effects be measured? Health benefits may have an effect over generations, for example. The assessment of wider social benefit is even more difficult to quantify. Attempts to assess net return, gains in productivity attributable to a healthier workforce, and the societal

willingness to pay for increased health have all been attempted. All have their flaws.

The conclusion of the report is that, in drawing on resources for R&D in this area, the scientific community, in the widest sense, has an obligation to attempt to justify the use of these resources. This can only be done through establishing accepted tools of evaluation and assessment. If the scientific community does not develop such tools they may be foisted on it—in much the same way that the research assessment exercise was foisted on the university sector. Most have argued that the research assessment exercise has been beneficial, but not without substantial cost. This report serves to remind us once again that for all benefits, this time in the form of increased resource for R&D, there are inevitably costs.

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Competing interests: None declared.

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Improving health care through redesign

It's time to shift from small projects to whole systems

The belief that increasing demand for health care will be solved only by increasing capacity remains common in health communities. Yet other industries have developed a greater understanding of demand and capacity and delivered increased productivity while increasing quality. This occurs within an environment that drives cost efficiency by focusing on what customers want and by applying a rigorous approach to systematic business process re-engineering.¹ The improvement methods used in different healthcare systems are often similar yet the drivers, approach, and emphasis differ. Initially the focus of improvement programmes in the United Kingdom has been to achieve targets for patients' waiting times and access to services, while in the United States, through the Institute for Healthcare Improvement (IHI), the focus has been on quality with a recent increased emphasis on patient safety.²⁻⁴ The Institute's latest campaign, to prevent 100 000 deaths in US hospitals over 18 months, reaches its first milestone in mid-June, and is described in this issue (p 1328).⁵ It exemplifies the merging of quality and safety and a widescale approach that looks at improving whole systems of care.

Ideally, evidence based clinical care would be rapidly assimilated into healthcare delivery systems

and processes. This often occurs for technological advances.^{w1} But other simple evidence based practices which could also improve outcomes have been less robustly implemented—for example, early warning scoring systems for identifying the risk of profound deterioration in unwell hospital patients.^{w2} Equally, information that challenges the current system of delivery of care—for example, poorer outcomes for patients admitted at weekends—is not used routinely to facilitate redesign.^{w3}

Quality improvement experts continually remind us that "Every system is 'designed' to achieve the results it achieves." So if you want to improve the results you need to look to design of the whole system and apply continuous systematic process re-engineering to deliver sustainable improvement.^{w4} This often requires small scale incremental change supported by accurate accessible data, linked to credible performance measures.^{w5} The engagement of frontline staff is essential, but that is often difficult because organisations adopt a "business" approach, complicated by jargon and unfamiliar language. Linking the evidence based

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Dimensions of quality^{w7}

Safety—No needless death or disease
 Effectiveness—No needless pain
 Patient centred—No feeling of helplessness
 Timeliness—No unwanted delays
 Efficiency—No waste
 Equity—No inequality in service delivery

quality agenda with efficiency and clinical effectiveness will support ownership and, thus, delivery. Furthermore, we need a common language which helps healthcare professionals to develop systems thinking and apply improvement tools and techniques routinely. Most important is a supportive organisational culture that values and integrates service improvement.

Traditionally, system and process redesign in the United Kingdom has been project or programme based and used to help deliver access targets, a key patient priority. In contrast, clinical practice improvements have often centred on a particular aspect of clinical care or a disease. Redesign principles applied across whole care delivery systems can have a big effect, as exemplified by the emergency services collaborative, which allowed emergency patients to be assessed and managed within four hours. This pan-England change programme, led by the NHS Modernisation Agency, delivered important lessons about the effectiveness of designing healthcare systems around high volume patient flows, rather than disease specific pathways.^{w6} This focus helped to reduce variation in care delivery and improve patients' experiences and outcomes through the design of reliable systems. A similar approach, combined with an emphasis on reliability and quality, is being developed through the unscheduled care collaborative programme across NHS Scotland.

The US Institute of Medicine has developed a framework of six dimensions of quality.^{w7} This framework, translated into the "no needless" principles (box), has been used successfully in the Pursuing Perfection programme,^{w8} an international initiative that aims for perfect care and requires ambition, leadership, and focused improvement activity. The quality framework used within this programme has clearly engaged individuals to drive improvements in clinical and corporate governance.

In this issue McCannon and colleagues outline the "100 000 lives" campaign, a large scale, US-wide, fast

paced programme of improving healthcare outcomes with a more aggressive goal than other campaigns or collaboratives.⁵ They describe how many hospitals throughout the US have reduced deaths in hospital by using agreed high impact interventions (to prevent, for example, central line infections or ventilator associated pneumonia) in the context of a change programme using quality improvements methods. Similar principles have been adopted by the Department of Health Saving Lives programme, which is designed to reduce healthcare acquired infection.

We cannot accept waiting as inevitable, increased risks to patients at different times of the day or week, or the current levels of hospital acquired infection and errors. Indeed, the next decade will bring an even greater challenge to deliver cost-effective high quality care as consumers with higher expectations demand greater safety in health care. Systems and processes of care cannot continue to evolve in an uncontrolled fashion. We must design in quality and reliability and design out waits and delays. As the 100 000 lives campaign and the other quality improvement programmes outlined show, we know how to engage staff and promote improvement through the development of strong clinical champions with a vision that incorporates the pursuit of perfection in patient care. If we can harness this potential with engagement of patients, carers, and staff high quality health services will result.

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Competing interests: None declared.

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Life without COX 2 inhibitors

Doctors need to broaden their approach to pain in older patients

Several cyclo-oxygenase-2 inhibitors (COX 2 inhibitors) have been withdrawn from sale in many countries. The use of other drugs in this class is being limited by their potential to cause cardiac effects. As Kearney and colleagues show (p 1302), this concern is valid, since they have been associated with an increased risk of myocardial infarction with

prolonged use as compared with placebo or other non-steroidal anti-inflammatory drugs.¹

Have we lost a truly superior option? Probably not. Although COX 2 inhibitors were marketed as being

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BMJ 2006;332:1287-8



References w1-w7 are on bmj.com