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Conceptualising and creating a global learning health system

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ABSTRACT

In any country the health sector is important in terms of human wellbeing and large in terms of economics. The health sector might therefore be expected to be a finely tuned enterprise, utilising corporate knowledge in a constant process of critically reviewing and improving its activities and processes. However, this is seldom the case. Health systems and practice are highly variable and lag behind research discovery. This contrasts strongly with commercial bodies, and particularly service industries, where the concept of the *learning organisation* is strongly seen as the key to optimisation. A learning organisation accesses for analytic purposes operational data, which though captured and recorded for day-to-day transactions at the customer level, become also the basis of understanding changes in both demand and delivery process.

In health care, the concept of the learning organisation is well grounded ethically. Anything which can improve health, including understanding of optimal care delivery processes and how to improve longer term outcomes, should be seized upon to drive service improvement – but currently this occurs haphazardly. The limitations of paper-based systems, priority given to digitalization of financial transactions, concerns about electronic data insecurity, and other factors have inhibited progress towards organisational learning at a national scale. But in recent years, new means of capturing, managing, and exchanging data have created new opportunities, while ever increasing pressures on health systems have produced strengthened incentive.

In the United States, the current policy and investment impetus to electronic health records and concomitantly their ‘meaningful use’ create opportunities to build the foundations for data re-use for corporate learning – and thus for societal gain. In Europe and other settings there are islands of innovation, but not yet a coherent culture or impetus to build foundations for a learning health system. This paper considers how to move forward, in the light of the urgent need for smarter health systems where experience becomes the fuel for rapid improvement, and best practices are routinely identified and applied.

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1. Background

Healthcare provision is arguably the most important service sector in society. The healthcare enterprise may be a single

large entity, as with state managed healthcare systems in many countries globally; a primarily private regulated economy as in the United States; or one of many forms of hybrid usually stabilised by health insurance enterprises interacting with regulatory and professional bodies. At stake are the

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health, life expectancy, and quality of life of all citizens in each nation.

This is a high moral duty, daunting in its human and moral responsibility when considered as an entity to be designed and managed or regulated. Healthcare is also a usually the largest sector in any national economy, consuming between 9% and 12% of national gross domestic product (GDP) in most major economies in 2009 (outliers Japan 8.5% (in 2008), USA 17.4%) [1]. It is a sector also under further intense pressure due to the combined pressures of demographic change, new technologies, and finite economic and manpower resources.

The expectation would therefore be that the healthcare sector should be vigorously seeking to provide the best and most cost-effective treatments and delivery modes appropriate for need and setting. To that end, and to discharge its significant societal obligations, the healthcare sector might be expected to be relentless in seeking to identify and apply what is best in practice. In fact this is far from the case. A mixture of factors works in combination to generate a sector that is frequently performing below its potential. Some of these factors are socio-cultural: innate caution rooted in a principle of *non nocere* (“do no harm”), vested interests, health system complexity, and established professional norms. Others, that will be the focus of this paper, are informational. Very often, the evidence required to guide best decisions is either not available, or if available, not accessed or used by the decision-makers.

2. Challenges to enabling evidence-based practice

The health sector and its component disciplines rightly put emphasis on clinical evidence to guide practice. Indeed, health professionals have embraced evidence as the underpinning of professional practice ever since the time of Hippocrates. In the contemporary world, this emphasis is reflected in the movement to evidence-based practice [2]. However, evidence based practice is an ideal that, for many reasons, is difficult to achieve.

2.1. Imperfect personal updating

One reason is that clinicians’ personal funds of knowledge, inculcated systematically through curriculum and evaluation over many years of primary professional education, decay with a half-life estimated at seven years [3]. Although programs of mandatory recertification contribute to maintenance of each individual’s evidence base, after completion of pre-professional education this process is relatively unsystematic, and traditional modalities of continuing professional education have been shown to be ineffective [4]. A complex set of factors distinguishes the areas where a clinician maintains currency from those where he or she does not. In order to update, clinicians must recognise deficiencies in their personal knowledge or practice, or that a superior alternative exists. Since learning takes valuable time, clinicians are highly motivated to master and adopt diagnostic, therapeutic, and technological innovations when a clear benefit – financial or clinical – exists. All things being equal, they are more likely

to update or change practice within their enduring primary modalities, and less likely to focus on new paradigms of care which they may find alien or threatening to their current pattern of practice.

2.2. Imperfect knowledge availability

Much more important, though, in creating a barrier to evidence-based practice is the non-existence of evidence-based knowledge, its fuzzy nature when it exists, as well as difficulties clinicians face in accessing it and putting it into practice. For example, most nations specify rigorous processes that are mandatory for testing and licensing new pharmaceutical products, new implants and new medical devices. But the evidence required for market entry is only one step towards generating the broader knowledge that clinicians need to put innovative interventions to most effective use in the wider remit of daily practice, and to guarantee their safety and longer term optimisation. The health sector is only just beginning to recognise how little is known about longer term outcomes, how new solutions are put into practice outside the sites or settings where products are tested, about interactions with other conditions and patient milieux, or about drift in practice – the naturally occurring variation over time in how a recognised practice modality will be implemented and changed as contexts change. Some drift may not be detrimental – experience is a potent tool which is difficult to teach or assess, and may thus include advantageous discrimination and adjustment – but drift can also result in adverse degradation of proven wisdom.

There are known limitations to many established formal evidence-building processes. Pharmaceuticals that have proved to be safe and effective in relatively short-term testing will enter the market well before long-term outcomes can be assessed [5,6]. Furthermore, the trials that have demonstrated safety and effectiveness are usually conducted with patients with no co-morbidities. A parallel problem with medical devices including implants is that variants of an approved innovation, even if they comprise significant changes, are not required to undergo the same rigorous evaluation as the initial models. And more recently, there are pressures to introduce the potentially valuable technologies of e-health, based on the promise established by design intention or the results of pilot studies, without consideration of risks and benefits in more general operational settings [7–9].

2.3. Imperfect knowledge creation

Thus, though the health sector is scientifically rigorous in assessing the safety and efficacy of new treatment innovations at the initial patient-product encounter level, there is typically less assessment of the longer term effects, interactions with concurrent conditions and their treatments, or with the health system effects – particularly the human behaviour of professionals or patients. Therefore much which is key to practice and treatment is not comprehensively assessed scientifically, and the underpinning laboratory influenced paradigm of evidence gathering is flawed as real life care delivery does not happen in standardised sanitised environments, and

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