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Economic evaluation of integrated new technologies for health and social care: Suggestions for policy makers, users and evaluators

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ABSTRACT

With an ageing population there is a move towards the use of assisted living technologies (ALTs) to provide social care and health care services, and to improve service processes. These technologies are at the forefront of the integration of health and social care. However, economic evaluations of ALTs, and indeed economic evaluations of any interventions providing both health benefits and benefits beyond health are complex. This paper considers the challenges faced by evaluators and presents a method of economic evaluation for use with interventions where traditional methods may not be suitable for informing funders and decision makers. We propose a method, combining economic evaluation techniques, that can accommodate health outcomes and outcomes beyond health through the use of a common numeraire. Such economic evaluations can benefit both the public and private sector, firstly by ensuring the efficient allocation of resources. And secondly, by providing information for individuals who, in the market for ALTs, face consumption decisions that are infrequent and for which there may be no other sources of information. We consider these issues in the welfarist, extra-welfarist and capabilities frameworks, which we link to attributes in an individual production model. This approach allows for the valuation of the health component of any such intervention and the valuation of key social care attributes and processes. Finally, we present a set of considerations for evaluators highlighting the key issues that need to be considered in this type of economic evaluation.

1. Introduction

In the face of an increasingly dependent population there is a need to find solutions to the associated increases in health and social care costs. The OECD projects that the proportion of individuals over 80 will increase from 4% to 10% by 2050 (Colombo et al., 2011), with the projection that health care spending will rise from 6.7% of GDP in 2007 to 13% by 2060 for the 27 European Union (including Norway) countries (Appleby, 2013).

Technology, in the form of assisted living technologies (ALTs), has become a focus for health systems and researchers as a potential solution to increasing costs. ALTs cover interventions such as telehealth, telecare and technology items. They can be home and environmental modifications that may promote independence and safety, and so improve wellbeing and reduce the demand for health and social care services. Such interventions are aimed at older and potentially vulnerable younger populations.

ALTs may be provided by the market or by the public sector. However, there have been concerns regarding the ability of the market to provide scalable ALTs to consumers (Li et al., 2014). Further, it is believed that perceptions of the effectiveness of ALTs are mixed (de Leonibus et al., 2013). For the time being it may be preferable for ALTs to be provided by the public sector in which case the benefits, and more pertinently, the cost-benefit of ALT interventions need to be demonstrated. This is important for ensuring that public money is spent efficiently. Furthermore, robust evaluation of ALTs may help to provide information for individuals in the private market, helping the market to grow by overcoming the problems surrounding the perceptions of the effectiveness of ALTs.

Evaluating ALTs is challenging. Graybill et al. (2014) find that economic evaluations of ALTs are rare, and those that have been conducted are often of poor quality. One area where rigorous evaluations have been conducted is the 'Whole Systems

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Demonstrator' project (Henderson et al., 2013; Steventon et al., 2013), a large randomised controlled trial of telehealth and telecare. However, the cost-effectiveness results were largely inconclusive.

The problem for evaluations may not be the way they are conducted so much as the way current methods are applied. This paper addresses the issue of whether the standard evaluation methods used in health care are suitable when considering ALTs and indeed any intervention where there are multiple outcomes, including processes, that may extend beyond health. The key contribution of this paper is the development of an approach to evaluation that combines current methods in order to value health outcomes and outcomes beyond health alongside one another. The approach retains the CUA basis of valuing health that has been widely used and accepted in the economic evaluation of health care interventions (Drummond, 2005). We suggest the use of qualitative and quantitative elements that combine cost-utility (CUA) for valuing health with cost-benefit analysis (CBA) for valuing outcomes and processes beyond health. We also suggest that robust evaluations can benefit both the private sector and the public sector and may help to overcome the problems that currently affect the private market.

This approach has several innovative elements: firstly, we combine existing methods from economic evaluation while maintaining the extra-welfarist approach to valuing health outcomes. Secondly, we show how it is possible to link economic theory regarding attributes to a capabilities approach, allowing the new method to encompass wider elements of capabilities than has already been achieved. Thirdly, our process would allow individual attributes to be valued, revealing which elements are important in services providing a range of outcomes and how they are traded-off against each other. Finally, the approach is highly flexible because the use of a consistent numeraire (either monetary or health) means that programmes can be compared even if the underlying attributes differ.

2. Assisted living technologies

ALTs can benefit individuals in need across the whole age range. Generally, ALTs fall into two categories: *Home and Environmental Modifications,* technologies installed to promote independence and mobility and to mediate the risk of injury; and *Telemedicine*, technologies that provide remote communication between people in their home and healthcare, social care or security professionals (Graybill et al., 2014).

Demonstrating value for money is important for any intervention that requires public funding and there may be good reasons for publicly funding ALTs even though they may fall outside the traditional remit of health care systems (Li et al., 2014). Firstly, the market for ALTs is not well developed because ALTs are in their infancy. Secondly, the market may be affected by the presence of large public sector health and social care providers that may crowd-out private providers. Individuals may have an expectation, in systems that rely on social insurance or taxation, that technologies providing health and social care should be provided by public funds. Thirdly, the provision and market for ALTs may not be trusted due to consumers having little experience of interacting in such a market. Indeed such markets have been highlighted as potential areas for scams, hindering market development (http://www.bbc.co.uk/news/business-15097985). Finally, for markets to work it is important for consumers to have information. Due to the novelty of many ALTs there may be little information regarding their quality and efficacy as interventions. A recent report on the market for ALTs did find a public perception that ALTs may not be effective (de Leonibus et al., 2013). In fact many individuals go to (traditionally public sector) health care and social care professionals in order to obtain information regarding effectiveness. These information gaps mean that individuals may not be willing to pay for ALTs that they would otherwise purchase had full information been available.

The evaluation of ALTs may provide a benefit to the private market if evaluation becomes a source of information that highlights the efficacy of ALTs. Evaluations would build a body of evidence regarding which interventions are value for money. This may filter into the private market, which, as it develops, may reduce the need for public provision. However, public provision may always be necessary due to equity concerns, although we will not cover these in this paper.

3. Economic evaluations

The concern is whether methods of economic evaluation that are commonly applied in health care - cost-effectiveness analysis (CEA) and CUA - are appropriate for new technologies where there are multiple outcomes, including process value, that extend beyond health. While CEA and cost-consequence analysis (CCA) are useful forms of evaluation they may not be appropriate, either because they are only partial economic evaluations or because they are restricted in the measures of outcomes and focus on issues of technical efficiency. Our focus is on broader approaches such as CBA or CUA.

3.1. CBA and welfarism

Economics approaches evaluation through the paradigm of welfare economics - benefits are restricted to those accruing to the individual (in terms of utility gains). The welfarist approach applies CBA, comparing the discounted future streams of incremental programme benefits with the incremental programme costs to measure the net social benefits (Drummond, 2005).

CBA considers issues of allocative efficiency across and within sectors and may be suitable when the outcomes are varied and process, such as the method of delivery (eg whether at home or at a provider), may also be of value. However, CBA can be difficult to undertake as the values can be confounded by ability-to-pay (Donaldson, 1999), and in the case of social care and health care interventions, confounded by potentially increasing expectations of the role of the state in their provision (Ham et al., 2012). Furthermore, in practical application, it seems that traditional CBA-based welfare economic analysis has not been widely accepted as the evaluative method of choice in the health care setting.

3.2. CUA and 'extra-welfarism'

In rejecting the traditional welfarist approach to health care evaluation, the predominant evaluative technique to emerge is the 'extra-welfarist' approach, which focuses on the benefits from fundamental goods and their distribution and underpins most of the economic evaluations in health (Culyer, 1989; Hurley, 2014). According to Coast et al. (2008b) extra-welfarism grew from the work of Sen (1980, 2002) focusing on functionings and capability – the ability of individuals to function. Sen has suggested functionings such as 'moving' or 'being in good health' and it is the focus on the latter and the ability for an individual to be in good health that has led to the development of extra-welfarism. This notion of extra-welfarism is quite narrow (Coast et al., 2008b) and meant that in economic evaluations of health interventions the fundamental good is health. This has led to a focus on using quality adjusted life years (QALYs) as the main currency of outcome measurement (for an excellent discussion of welfarism, extra-welfarism and capabilities see Coast et al., 2008b). This approach, using QALYs in