



Do financial incentives trump clinical guidance? Hip Replacement in England and Scotland



Irene Papanicolas*, Alistair McGuire

Department of Social Policy, London School of Economics, Houghton Street, London, UK

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ABSTRACT

Following devolution in 1999 England and Scotland's National Health Services diverged, resulting in major differences in hospital payment. England introduced a case payment mechanism from 2003/4, while Scotland continued to pay through global budgets. We investigate the impact this change had on activity for Hip Replacement. We examine the financial reimbursement attached to uncemented Hip Replacement in England, which has been more generous than for its cemented counterpart, although clinical guidance from the National Institute for Clinical Excellence recommends the later. In Scotland this financial differential does not exist. We use a difference-in-difference estimator, using Scotland as a control, to test whether the change in reimbursement across the two countries had an influence on treatment. Our results indicate that financial incentives are directly linked to the faster uptake of the more expensive, uncemented Hip Replacement in England, which ran against the clinical guidance.

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1. Introduction

Many health care systems are using competition within managed care environments, where for example hospitals face fixed price regulation, to handle the trade-off between cost and delivery in quality of care. While there is a general agreement that the accompanying payment systems adopted to encourage competition do affect provider performance, empirical evidence to support this view remains relatively sparse. The empirical evidence that does exist largely draws on US data relating to the introduction by Medicare of prospective DRG payment to hospitals in the mid-1980s, and even here few studies consider reactions to subsequent changes in fixed prices (see, for example [Cutler, 1995](#); [Gilman, 2000](#); [Dafny, 2005](#))¹. [Moreno-Serra and Wagstaff \(2010\)](#) provides examples of the literature outside of the USA, as well as evidence on system-wide effects of payment reform in Europe and Asia. Of

this literature, few have considered the impact of price increases on activity once a fixed system is in place ([Dafny, 2005](#); [White and Yee, 2013](#); [He and Mellor, 2013](#)). While there has been analysis of payment incentive effects in the UK, once again the empirical literature relating this to changes in activity is limited².

The relative lack of empirical evidence relating to the UK hospital sector and the introduction and operation of fixed payments is surprising given the extensive reforms that have been underway in the UK since the mid-1990s. In NHS England, part of the UK National Health Service (NHS), the introduction of competition amongst hospitals around the mid-2000s has been argued to promote efficiency and improve quality of outcome within the health care sector and has been supported by empirical evidence provided by [Cooper et al. \(2011\)](#) and [Gaynor et al. \(2013\)](#). These findings are in line with a growing literature on competition and case-based payment systems (see [Gaynor et al., 2012](#) for a review)³. Such competition has in fact been accompanied by increased regulation, partly to guarantee that clinical standards are maintained despite competition for funds. In particular national clinical guidelines, as specified by the

* Corresponding author. Tel.: +44 02079556472.

E-mail address: i.n.papanicolas@lse.ac.uk (I. Papanicolas).

¹ An interesting distinction between the effect of incentive changes on the marginal reimbursement effect compared to the average reimbursement effect is made by [Cutler \(1995\)](#), who maps the incentive effects in a move from Medicare cost-based reimbursement to DRG reimbursement. This is similar to the change in the UK from contract-based reimbursement to Payment by Results (PbR) reimbursement; however the UK contract-based reimbursement prior to the introduction of PbR was largely based on block contracts covering populations rather than reimbursement of the volume of care undertaken. This of course renders the analogy to marginal and average reimbursement redundant within the UK setting.

² The literature on related topics within the UK covers, for example, how competition and payment by results has affected outcomes (see [Gaynor et al., 2012](#); [Propper, 2012](#) for reviews of this literature), how it has affected the mix of hospital activity ([Farrer et al., 2009](#)); how regulation has affected waiting times ([Propper et al., 2010](#)); GP doctor behaviour and payment by performance ([Gravelle et al., 2010](#)). See [Busse et al. \(2011\)](#) for discussion of the literature on hospital payment systems in Europe.

³ Although see [Gravelle et al. \(2012\)](#) for a wider view.

National Institute for Health and Clinical Excellence (NICE), form the basis of managing health care within the English NHS. These guidelines cover a wide range of interventions and are based on assessments of the clinical evidence in specific areas to help to ensure that providers are maintaining, or even improving quality standards in the delivery of the care across specific disease areas.

With NICE already in existence, the English NHS introduced case-based payment system in 2003/4, where they linked individual case groupings – or Health Related Groups (HRGs)⁴ – to specific reimbursement rates derived from treatment costs. This case-based payment system is essentially a form of Diagnostic Related Group (DRG) reimbursement, and is referred to as Payment by Results (PbR). The PbR reimbursements are nationally agreed tariffs, set by the Department of Health and used in England by purchasers of health care to reimburse individual providers – mainly hospitals – for the provision of treatment. The tying of interventions to specific levels of reimbursement provides means of testing the importance of financial consideration in a managed care environment, particularly if clinical guidance exists within that specific disease area.

Of particular interest is the case of Hip Replacement, an extremely common procedure with substitutable treatment options available and where, at least in other systems, patient preferences and financial incentives have been shown to play a role in treatment up-take (Doiron et al., 2014). Hip Replacement presents a unique opportunity to study the incentives created by English PbR payment system. In a Hip Replacement, two main types of prostheses are available: cemented and uncemented. Both types have been around since the 1970s and clinical evidence suggests that both prostheses have comparable rates of success (Abdulkarim et al., 2013). Until recently, the vast majority of Hip Replacements performed in the UK used cemented prostheses, although the number of uncemented Hip Replacements undertaken has increased substantially in the past decade. This change in prosthesis use has coincided with the introduction of separate reimbursement rates for the two types of prostheses, which provide a more generous surplus for the uncemented implant, possibly to cover the longer operating times required to fit the uncemented device. The increase in up-take of the more generously reimbursed implant is in spite of recommendations from the NICE that favour the use of cemented prostheses in Hip Replacements (NICE, 2000; updated in 2013). While NICE guidance and quality standards are not absolutely mandatory, they are used by NHS regulators to establish acceptable levels of care, and if required health care providers must defend any individual treatment decisions which run contrary to NICE guidance.

Hip Replacements are also of interest because individual hospital providers control the procurement practices with respect to prostheses; thus managers have potentially more influence over the type of procedure finally implemented than in other cases. In their analysis of procurement practices in the NHS, Davies and Lorgelly (2013), focused on a case-study of Hip Replacement and the purchasing of hip prosthesis. They note that in the UK NHS, the hospital through its centralised procurement policies – as opposed to the individual surgeon – determines the specific prostheses to purchase and negotiates quantities and prices with the suppliers. Individual surgeons feed their preferences into the procurement process, acting as an agent for their patients by including patient characteristics within their own surgical preferences. The particular prostheses purchased at the hospital level thus reflect individual surgeon preferences, historical procurement practices, prices and reimbursement levels. Davies and Lorgelly (2013) also note that, if volume discounts are available, this may lead to specialisation

in prosthesis type. In other words, characteristics of hospital behaviour, as informed by surgical assessment, will determine the specific prosthesis to be purchased by any hospital, at any point in time. There will inevitably be a trade-off, at the hospital level, between management and surgical preferences. However, it is the ability to centralise procurement decisions and to hold stock that provides a mechanism through which hospitals can control the type of device, and therefore, the revenue generated from this relatively common procedure.

With regards to Hip Replacement prosthesis, we have then a situation in the UK NHS, where England has different fixed DRG-type reimbursement rates (PbR) for two common, substitutable procedures – cemented and uncemented replacements – while at the same time, in England NICE recommends the less expensive cemented replacements above uncemented replacements in their clinical guidance. In Scotland, as providers are not reimbursed for cases treated, no such financial incentive exists to influence choice. This situation provides a means of analysing, in a controlled manner, the impact financial incentives can have on specific procedure up-take at the individual hospital level, for a procedure where prosthesis type does not affect clinical outcome. This provides a unique case-study of individual hospital purchasing decisions, made through managed procurement practices, where decisions may be influenced by revenue generation given that prosthesis type has no influence on patient outcomes.

The 1999 devolution has presented a natural experiment in health care provision within an NHS system as England and Scotland have diverged substantially in the reforms they have implemented to meet their National Health Service objectives—essentially creating two different NHS systems within the UK (Leys, 1999; Pollock, 1999). The English NHS has embraced market mechanisms and cooperation with the private sector, while the Scottish NHS has moved in the opposite direction, and created a highly centralised system that maintains trust in its providers to allocate resources effectively, and strives for improvement through integration (Steele and Cylus, 2014; Greer, 2006).

One of the main differences in health policy that has emerged in the years following devolution has been in the funding of inpatient hospital care. Prior to 1997, England and Scotland funded inpatient care in broadly the same way; health care purchasers and providers negotiated the services that would be provided through bulk contracts (Ham, 2004). Scotland has moved away from this funding system and since 2004 has funded inpatient care through the allocation of global hospital budgets (Scottish Parliament, 2004). England on the other hand has further supported the internal market by moving away from the bulk contract system of funding hospital episodes to a fix-priced activity-based payment system, of DRG-type reimbursement, known as Payment by Results (PbR), introduced in 2003/04.

Given the divergence in funding for inpatient activity across the two nations, we use Scottish NHS hospitals as a control group within a difference-in-difference style estimator, as well as employing a large number of robustness checks, to test whether the up-take of the more expensive uncemented prosthesis in England was influenced by reimbursement levels, at a time when the less expensive cemented prosthesis was being recommended by NICE. Our results add to the literature on the impact of financial incentives on individual providers in a managed care setting by providing a specific example. Our conclusions suggest that English NHS hospitals did indeed have higher up-take rates of the more generously reimbursed uncemented Hip Replacements than the (Scottish) control group providers after PbR had been introduced in England, despite the English clinical guidance recommending cemented Hip Replacements. The ability to hold stock and for hospitals to manage procurement when acquiring prostheses allows individual

⁴ Further specific information on HRGs can be found at (Street and Dawson, 2002; Mason et al., 2011)

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