

THE UNIVERSITY *of York*



The Incentive Effects of Payment by Results

CHE Research Paper 19

The Incentive Effects of Payment by Results

Marisa Miraldo
Maria Goddard
Peter C Smith

Centre for Health Economics, University of York

September 2006

Background

CHE Discussion Papers (DPs) began publication in 1983 as a means of making current research material more widely available to health economists and other potential users. So as to speed up the dissemination process, papers were originally published by CHE and distributed by post to a worldwide readership.

The new CHE Research Paper series takes over that function and provides access to current research output via web-based publication, although hard copy will continue to be available (but subject to charge).

Acknowledgements

We are grateful to Dr Foster Ltd for funding but the views expressed are those of the authors.

Disclaimer

Papers published in the CHE Research Paper (RP) series are intended as a contribution to current research. Work and ideas reported in RPs may not always represent the final position and as such may sometimes need to be treated as work in progress. The material and views expressed in RPs are solely those of the authors and should not be interpreted as representing the collective views of CHE research staff or their research funders.

Further copies

Copies of this paper are freely available to download from the CHE website <http://www.york.ac.uk/inst/che/publications>. Access to downloaded material is provided on the understanding that it is intended for personal use. Copies of downloaded papers may be distributed to third-parties subject to the proviso that the CHE publication source is properly acknowledged and that such distribution is not subject to any payment.

Printed copies are available on request at a charge of £5.00 per copy. Please contact the CHE Publications Office, email che-pub@york.ac.uk, telephone 01904 321458 for further details.

Centre for Health Economics
Alcuin College
University of York
York, UK
www.york.ac.uk/inst/che

© Marisa Miraldo, Maria Goddard, Peter C Smith

Abstract

Recently the English NHS has introduced an activity-based payment scheme for secondary care - the Payment by Results (PbR) policy. In this paper we discuss, from an economic perspective, the main intended and unintended incentives created by this policy. We also outline the role of different NHS institutions in monitoring and analysing the impact of PbR and consider the information and data requirements for such tasks.

Keywords: Payment by results, Prospective Payment System, Incentives

1. Introduction

The NHS has been the subject of constant reform since 1948. A major change affecting financial flows was the introduction of the internal market almost 15 years ago. The separation of the purchasing and providing functions and the introduction of contractual relationships marked a fundamental shift from the previous system whereby providers were allocated resources directly and made decisions about health care provision largely based on historical patterns. In contrast, the internal market introduced the purchasing function and the aim was to encourage provider competition for contracts which was seen as the key to improving quality and efficiency and to widening patients' choice. Money was meant to "follow patients" and providers that were successful would attract patients and therefore income.

In 1997, the Labour government chose not to dismantle the internal market wholesale but to retain some features, including the separation of the purchasing and providing function. The political rhetoric stressed cooperation rather than competition with a strong emphasis on planning and partnership and changes were made to commissioning roles, in particular the creation of Primary Care Organisations (now Primary Care Trusts (PCTs)). However, more recently, the emphasis has shifted back towards encouraging providers to compete (albeit on quality), facilitating the development of a mixed economy of care including the private sector, and enhancing choice for patients.¹

The introduction of payment by results (PbR) is a key element in the general strategy outlined above. It represents another significant change in the nature of financial mechanisms in the NHS and is designed to support related policies of patient choice and practice based commissioning. The PbR policy shares some of the basic characteristics of the prospective payment policy initiated in the USA in 1984, and subsequently adopted in many countries worldwide. However, the PbR framework has been designed in order to address, at least in part, the lessons learnt over the past twenty years by other countries which have experienced drawbacks of a prospective payment system. In principle, the NHS therefore starts one step ahead of many other countries. However, as we outline later some fundamental issues still exist, related to the incentives created by the policy.

Providers are reimbursed on a case mix adjusted tariff determined centrally and based on the average of all hospital costs for that procedure. The tariff is built upon average reference costs for each Health Resource Group (HRG), with separate tariffs for elective and non elective care. Providers are reimbursed on this prospective tariff according to their activity, regardless of their actual cost levels. Adjustments are made in order to account for unavoidable regional differences, cost pressures, technological change, outliers (both positive and negative), critical care work and specialist work.

Implementation of PbR is to be phased in from 2003/04 to 2008/09. Initially the focus is on elective care only. The first stage occurred in 2003/04 with PCTs commissioning a limited number of HRG procedures. From 2004/05 PCTs were asked to use the new arrangements to commission most of the services provided by Foundation Trusts. In the current year, 2005/06, all acute specialist Trusts are participating in the new system. The inclusion of non-elective care and outpatient care services for all non-Foundation Trusts will begin in 2006/07, and by 2008/09 the implementation will be completed with the inclusion of mental health and ambulance Trusts.²

¹ Secretary of State for Health, Annual health and social care lecture, 13 Dec 2005

² Audit Commission (2004)

2. General aims of the policy

The Department of Health and other commentators have indicated a number of different aims of the PbR policy.³ These are summarised below.

Box 1: Stated aims and benefits of PbR

- Increase efficiency in the provision of existing levels of activity
- Where needed, encourage expansion of activity
- Enhance patient choice
- Increase patient satisfaction
- Encourage providers to be responsive to patient and commissioner preferences
- Keep costs under control
- Channel funding where it is most needed
- Introduce fairness and transparency in funding providers
- Encourage the development of new, cost-effective treatment pathways
- Shift patterns of service provision away from historical patterns
- Improve quality

This broad range of objectives is extremely ambitious and if they were all to be achieved, this would translate into substantial improvements in terms of efficiency, responsiveness and patient outcomes. However, some aims are more difficult to achieve than others, some are long-term rather than short-term, and others may conflict to a certain degree. We discuss in greater detail below, some of the economic issues that arise when considering how the key aims and benefits of PbR may be achieved.

Firstly, there is an expectation that providers will increase activity and this has indeed been the experience in many countries where prospective payment has been introduced. The intention is to tackle waiting lists for elective and out-patient care and to encourage providers to be responsive to patient demand. However, conversely, commissioners will need to guard against increased activity by acute trusts in areas where this is unwarranted (eg where they wish to develop alternative services in the community or outside the acute hospital sector). Providers will have an incentive to increase activity in any area where the tariff is greater than their marginal costs and this may affect the mix of activity unless monitored carefully. From a global perspective, the impact on overall expenditure will need to be scrutinised as the growth in total activity, even at tariff prices, cannot be allowed to develop unchecked without jeopardising fixed budgets. Commissioners will need methods of controlling the pace and pattern of increased activity.

Secondly, the Department of Health expects that PbR will give providers an incentive to find ways of providing services more efficiently.⁴ By reducing their costs below tariff levels, providers will have the opportunity to gain extra income. For commissioners, the key issue will be the means by which providers reduce costs – they will need to be assured that savings are not made by reducing quality. Indeed, one of the stated aims of the PbR policy is to focus commissioner-provider discussions on matters of quality rather than price.

Thirdly, various subsidiary aims are also attributed to PbR policy by the Department of Health although many are to be achieved in tandem with related policies such as the extension of patient choice and the move to practice based commissioning. In particular, there is an expectation that PbR will facilitate choice by encouraging new providers into the market, creating a mixed economy of care and allowing potential competition between providers from both the public and private sector.

³ Department of Health (2003, 2005)

⁴ Department of Health (2003, 2005)

The focus of this report is to consider the incentive effects created by the PbR policy in light of the policy aims described above, and to outline the nature of the information required to monitor such effects. In section 3 we describe the expected impact on behaviour in the following key areas: appropriate and inappropriate changes in activity; cost reducing behaviour and the potential impact on quality; specialisation of services and related access issues, and manipulation and gaming behaviours. Section 4 refers briefly to the implications for financial risk in the system. Section 5 outlines the information requirements for monitoring the behaviours identified in section 3, covering data on: activity, cost, quality, access and general performance. The design of particular features of PbR and the degree to which they may help to forestall some of the potentially negative impacts is discussed in Section 6. Section 7 discusses the roles that might be played by organisations at different levels such as PCTs, Strategic Health Authorities (StHAs), the Department of Health or other central agencies. Section 8 presents the conclusions.

3. Incentive effects of PbR

Incentives can be deliberately designed or can arise as an unintended consequence of a policy. In the following section we base our discussion around the intended and unintended incentive effects of prospective payment systems, with particular attention paid to the specific design features of the PbR policy. We outline the insights that can be gained from the application of economic theory. The key issues we have therefore selected for discussion are ones highlighted as potential “danger areas” by the literature relating to the incentive effects of prospective payment systems. We do not focus a great deal on the empirical evidence, most of which is from overseas and has been outlined in detail elsewhere,⁵ though we refer to recent English evidence where appropriate.

It is important to remember that the way in which providers and commissioners respond to the incentives produced by PbR will also depend on the impact of other related policies that are being implemented at the same time – such as patient choice and practice based commissioning. It is often difficult to disentangle the impact of a single policy.

3.1 Appropriate and inappropriate changes in activity

PbR is intended to reward providers who respond to demand by increasing activity or by changing the mix of their activity. It also offers a degree of security of income to new providers who enter the market in order to meet demand. The expectation is that outpatient and in-patient waiting lists will be reduced through the operation of PbR. If it is the case that patients (or their agents) have faced an under-supply of a particular service in an area, then providers that increase their activity levels in order to meet demand, are also responding appropriately to incentives.

In some instances there may be changes in the distribution of activity without any overall increase. So for example, if the quality offered by a specific provider is sufficiently high to attract demand away from other providers, it is appropriate that their treatment volume increases at the expense of the lower quality provider.

Issues for providers and PCTs: From the perspective of the Acute Trusts, there are strong incentives to increase activity in areas where their marginal costs are less than the tariff. However, unless there are obvious ways of reducing costs (see section 3.2), the incentive to expand in all other areas is rather limited and there is no guarantee that this will coincide with the pattern of demand expressed by commissioners.

Providers currently have an incentive to stimulate demand “artificially” above the levels that may be clinically necessary and above the level that can be afforded by PCTs operating within a fixed budget constraint. For example, providers may take action to encourage unnecessary referrals or follow-up procedures or may expand medical staffing into sub-speciality areas to generate new demand. It is likely that the incentives for acute providers to expand activity or to develop into new acute areas will mitigate against other policy priorities. The latter includes the growth of community services and primary care as an alternative to hospital care, and the development of integrated care. More services are expected to be provided outside hospitals (for example the forthcoming White Paper is

⁵ Street and Hussain (2004)

expected to outline further plans for shifting more services into primary care) and the overall goal of much of government policy is to keep people out of hospital. The PbR policy as it stands at present may make it difficult to achieve this and to attain major shifts in provision from the acute to community sector. Hospital activity will therefore need to be monitored carefully in order to assess both affordability and the appropriateness of patterns of services.

If PbR produces a shift in activity *between* providers, there is a risk to the viability of providers who lose substantial amounts of income over a relatively short period of time. Whilst this might be justified on the grounds of efficiency or quality gains, it may also lead to large deficits and even wholesale withdrawal of a provider if they are unable to reduce their fixed costs in line with reduced income. As many hospital costs are joint costs or are fixed in the medium to long term (eg tenured medical staff), it is clear that this will present a challenge that may only be met over a long period of time with careful disinvestment plans. Providers that are unable to make these changes in the short-term may become unviable and a local population may find itself without core services if a provider exits the market altogether. We consider further the issues of financial risk in section 4.

The issue for PCTs and StHAs is therefore to ensure that PbR is used imaginatively to enhance the supply and mix of services (otherwise the opportunity to change historical patterns of service provision will be lost), but with an eye on maintaining the viability of key services locally and managing change over an appropriate period of time. The Audit Commission's report on the early experience of PbR suggests that, in practice, providers and PCTs have had to enter into various agreements such as caps and floors on activity in order to ensure the delivery of key services and avoid the destabilisation of finances locally.⁶ Whilst this may be seen as a necessary interim measure, the effect is to dilute the power of the incentives for facilitating major changes in delivery patterns offered by the PbR policy.

An important monitoring issue for commissioners will therefore be to ensure that providers are not manipulating demand above the levels warranted by clinical need. Manipulating demand might take the form of encouraging patients as inpatients when they could be treated in ambulatory care, admitting patients from A&E unnecessarily, disaggregating hospital stays into multiple admissions, or attempting to attract relatively healthy patients within a given HRG. PCTs will need to monitor activity appropriately as there is already some evidence emerging to suggest that Foundation Trusts have experienced a greater increase in short stay in-patient admissions from A&E than non-Foundation Trusts.⁷ However, other analyses have suggested that there is little evidence of increased admissions amongst hospitals in selected PCT areas.⁸

3.2 Cost reduction and impact on quality

Prospective payment systems have traditionally been implemented in order to control global expenditure and evidence suggests that this aim has generally been achieved. Purely prospective systems based on an average cost across the whole of the patient population create high-powered incentives for providers to undertake cost containment efforts in order to appropriate the difference between average costs and actual costs. However, it would be misleading to restrict evaluation of PbR to success in containing overall costs as the *method* by which costs are contained is also of vital importance. Perverse incentives also exist for "inefficient" cost reduction which have adverse effects on quality.⁹

Issues for providers and PCTs: A reduction in unit costs can be achieved in a variety of ways. There may be a general tightening up of management and organisational processes in the hospital and a reduction in slack: for example, better scheduling of appointments and operations, more efficient discharge arrangements, more efficient procurement of supplies and changes to working hours. Alternatively, the mix of inputs may be reconsidered and altered: for example, better use of ancillary staff, reductions in use of agency staff, use of specialised staff from overseas or investment in new technology. Other possibilities include changes to the actual process of care: for example,

⁶ Audit Commission (2004)

⁷ Rogers *et al* (2005)

⁸ YHEC (2005)

⁹ Cutler, D. (1995)

reduction in length of stay¹⁰ and switching to day case procedures. Changes may also be made to the range of activities and outputs provided: for example, the “unbundling” of services so as to specialise in a particular procedure (eg cataract removal) which can be organised more efficiently. Or decisions may be made to disinvest in certain discretionary activities such as continuing education or research activities.

These actions can be labelled as desirable to the extent that they may reduce inefficiencies and in some cases avoid the over-supply of treatment. However, in almost every example outlined above, there is the potential for unintended and negative impacts to arise as well as positive effects. So, for example, attempts to reduce length of stay may lead to premature discharge (and subsequent readmission); unbundling of services may have detrimental effects on outcome when different services are linked and complement each other; even relatively straightforward actions such as the search for more cost-effective supplies can potentially have a down-side if quality of the product is sacrificed. In addition, although many of the actions will reduce costs in the short-run (eg reducing investment in training), they may not necessarily work towards long-run cost-effectiveness. Evidence from the USA suggests that financial pressures arising from cost sharing rules can negatively affect hospital quality levels in terms of mortality.¹¹ This is similar in the UK, where Trusts are under pressure to compete.¹²

After examining the difference in the number of Trusts with reference costs above and below tariff in 2004 and 2005, the Audit Commission reported that although the gap between high and low cost Trusts had narrowed, there was still a “substantial agenda” of cost improvement for the NHS and a large scale transfer of resources required.¹³ This suggests that it will be important to keep track of the means by which cost reductions are achieved and to ensure that quality does not deteriorate as a result.

3.3 Specialisation and access issues

As outlined in section 3.1, if providers are genuinely unable to reduce unit costs for whatever reason then they may be tempted to withdraw from the service altogether. Indeed, if there are economies of scale in provision, it may be the case that providers will begin to specialise where they can most efficiently provide a service. Alternatively, specialisation may take the form of focusing on the provision of HRGs where the average severity of illness (and therefore cost) is lower.

Issues for providers and PCTs: Although efficiency gains may be made overall through efficient specialisation and exploitation of economies of scale, “localness” may be a desirable feature of some elements of health care provision. PCTs may not gain overall from re-organisation of services along these lines because although the cost of services may be reduced and possibly quality improved, serious geographical access issues may arise for some of their population.¹⁴

If care becomes very compartmentalised, problems may also arise in relation to the intention to provide “seamless” care for patients. Specialists might have the incentive to provide more intensive treatments to less severe patients in order to increase the surpluses or maintain demand for their services.¹⁵

One of the challenges for PCTs will be to balance the need to ensure access for key services to all their local population whilst at the same time encouraging providers to supply services in an efficient way whereby the latter might involve a greater degree of specialisation than the current pattern of services demonstrates. Indeed, if specialisation also improves quality of care (eg the debate about whether greater volume produces better outcomes), PCTs may find that patient choice drives them further down this route.

¹⁰Ellis, R.P., and T.G. McGuire, (1986), Frank, R.G and J.R. Lave (1989), Hodgkin, D. and T.M. McGuire (1994), Newhouse, J.P. and D.J. Byrne (1988)

¹¹Shen, Yu (2005), Staiger and Gaumer (1992) and Cutler (1995)

¹²Propper, Burgess and Green (2004)

¹³Audit Commission (2004) and (2005)

¹⁴Newhouse (1989)

¹⁵Dranove (1987), Ellis and McGuire (1986, 1996, 1998)

3.4 Manipulation and gaming

Prospective payment systems are associated with the potential for manipulation and gaming by providers and PbR is no exception. From an economic perspective the potential for manipulation is related to the characteristics of the environment in which PbR is implemented and in particular the existence of asymmetry of information, the multi-task nature of health care treatment and the structure of the coding system.¹⁶

The existence of asymmetry of information implies that providers will always have more information than the PCTs about the nature of some of the tasks they are meant to undertake. However, if incentives are attached to those areas in which observation and measurement are easier, then effort may well be driven towards these tasks at the expense of others.¹⁷ McClellan (1997) points out that the HRG system (and the PbR system is similar) is not actually fully prospective. A fully prospective payment would imply that once the patient is admitted in the hospital, the tariff received by the provider cannot be influenced by the decisions and behaviour of the provider. However, providers can indeed influence the tariff received through the process of “up-coding”, that is, reporting of the more intensive and expensive treatments,¹⁸ causing “HRG drift”. Providers can select an unnecessary diagnosis or the most expensive diagnosis for a patient. Most of the expenditure growth in the Medicare Program seems to be attributable to the increase in the use of more intensive treatments during hospitals admissions.¹⁹ Providers may also misclassify patients into specialist HRGs which are funded through other arrangements: discharge them early in order to attract another payment when they are readmitted later, or manipulate length of stay in order to push the patient into a higher paying category.²⁰

A recent study by Becker et al (2005) based on data from the Medicare Program, 1994 to 1998, looks at the impact of enforcement laws on the abusive behaviour by providers (abusive behaviour defined as the supply of treatment without a counterpart health benefit). The authors find evidence of the existence of such behaviour and conclude that stricter enforcement laws are necessary in order to control them. In England, there is no firm evidence at present that “HRG drift” is a serious concern²¹ but it will be necessary to keep reviewing trends in HRG recording. A recent analysis of trends in casemix for the top 20 HRGs (by volume) in a sample of hospitals did not find systematic evidence of upcoding attributable to PbR, but did find trends that suggested further investigation may be warranted.²² For example, in one hospital, the proportion of procedures coded as “with complications” increased by almost 300% over a five year period. Some issues may be best dealt with at a central level when assessing changes to the design of the tariff. For example, one potential way to tackle the up-coding problem is to develop a larger number of HRGs to account for the large cost variations found within some HRG groups. This amounts to a second generation of HRGs or constant HRG refinement. However, in order to address the problem completely, one would eventually need as many HRGs as individual cases which would clearly not be feasible. Such a process would also eventually dilute the incentives for cost reduction as it gets closer to pure cost reimbursement.

Other problems deriving from information asymmetry, relate to the selection of patients, rather than to what happens to them once they are admitted to hospital. Dumping (explicit avoidance of high severity patients) and deliberate attempts to attract relatively low severity patients has been noted in the literature although it is not easy to see how providers in the NHS could do this on a widespread basis, at least for most types of care.²³ However, for some conditions where it may be possible to manipulate treatment thresholds or where a good deal of clinical discretion exists about decisions to admit, this may be a serious issue. For example, there may be an incentive to treat low cost patients earlier where there is a waiting list and where patients can be selected on the basis of likely severity; or to reduce thresholds so that low severity patients receive treatment that they would not previously have received. Conversely, for conditions such as mental illness, there may be opportunities to avoid costly in-patient admissions by re-interpreting the thresholds for admission at a higher level than is

¹⁶ Laffont and Tirole (1993)

¹⁷ Laffont and Tirole (1993)

¹⁸ Carter, Newhouse and Relles (1990), McClellan (1997)

¹⁹ McClellan (1997), Becker et al (2005)

²⁰ Frank and Lave (1989), Carroll and Erwin (1987), Fitzgerald et al. (1988)

²¹ Rogers et al (2005)

²² YHEC (2005)

²³ Ellis (1998), Newhouse (1996)

warranted clinically. Such decisions are often matters of judgement and are therefore difficult to challenge.

Theory suggests that perverse outcomes and poor quality care arising from dumping activities may be avoided by making payments depend on the number of patients wanting treatment and the number who actually receive it.²⁴ Thus it might be possible to withhold payments from providers if it can be demonstrated that there are patients who should have been treated but instead were excluded. However, this does not work very well if there are dimensions of “quality” other than just whether treatment was delivered or not. Where other aspects of quality are also relevant, monitoring is the only way of avoiding perverse outcomes. The implication is that population admission rates should be monitored for relevant key conditions in order to detect changes over time or between providers. If such changes appear to be significant and have no alternative explanation (eg reductions in admission rates for mental illness could be the result of improved substitute services in the community) they may be indicative of inappropriate provider behaviours and more detailed investigation would be warranted.

4. Financial risk

The collective impact of many of the potential actions and behaviours induced by PbR that we have outlined above will increase radically the degree of financial risk and potential instability in the health care system, for both providers and PCTs. This is to be expected as the impact of the policy on services would be very limited if there were no significant changes in financial flows through the system. Forcing organisations to bear a greater degree of risk may also induce better financial discipline and accountability.

One key to balancing these costs and benefits will be for providers and PCTs to work together to plan and monitor activity, ensure affordability and develop contingency plans for unforeseen circumstances. However, early experience suggests that perhaps the rapid pace of change may not be conducive to such collaborative working, and where local health economies are struggling financially, PbR appears to polarise interests and force institutions into a narrow focus on their own interests.²⁵ Other solutions may be found centrally through changes in the design of the tariff or the pace of the roll-out of the policy. The challenge here will be to ensure that the power of the incentives introduced by PbR is not completely diminished through constantly tweaking the system in order to avoid major upheaval and change.

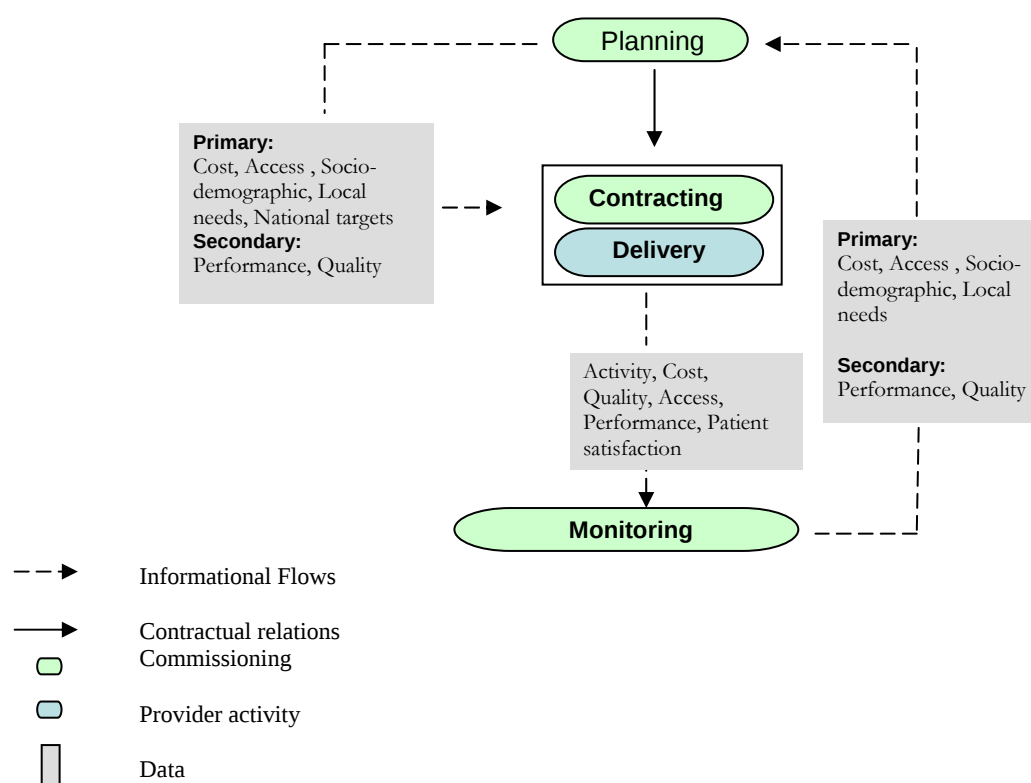
5. Information requirements

In the sections below we consider the information requirements - mainly from the PCT perspective (as requested in the brief) – in order to monitor the various potential positive and negative impacts of PbR as outlined in section 3. It is beyond the scope of this exercise to determine the details of information systems and variation in information available nationally at PCT level as this would require a separate exercise.

Gathering information is not an end in itself and its value is not confined to the monitoring function alone. The information collected at each stage of the commissioning activity feeds into the next. So information collected for planning will be crucial for efficient contracting. After delivery, the information collected will be essential for monitoring and, then again for planning, and so on.

²⁴ Chalkley and Malcomson, (1998)

²⁵ Audit Commission (2005)



Before outlining the information requirements for monitoring the impact of PbR, we first consider two general issues – (i) data quality and (ii) nature of comparative data.

5.1 Data quality

An underlying theme of the following discussion on information requirements is the importance of having high quality data that is timely and accurate and in which providers and commissioners (and the Department of Health) can be confident. It is beyond the scope of this report to outline all the relevant data quality issues but it is sufficient here to note the Audit Commission's early findings from PbR which concluded that the introduction of the policy highlighted the inadequacy of much of the existing data on which decisions are based.²⁶ In itself, the introduction of PbR will drive up data quality but as the Audit Commission noted, experience elsewhere suggest this has taken "time, effort and investment in information systems and people to achieve this ..." (p23). The poor quality of coding in Trusts has been noted recently.²⁷ At the Department of Health, attention will need to be given to how organisations are to be incentivised to improve quality, and this may involve some degree of central oversight and monitoring for quality assurance, local implementation policies and penalties for poor performance in this area. It will also entail investment in appropriate infrastructure, including a commitment to fund high calibre coders. We return to this issue in section 7.

5.2 Comparative data

Trusts, PCTs, Strategic Health Authorities and central organisations will require comparative data in order to monitor the impact of PbR. The relevant comparators will vary depending on the type of data examined and the context. In some cases it will be appropriate to study trends over time by single provider or groups of providers, looking for consistency or for shifts in behaviour and activities. Similarly, trends over time in population data may be relevant in some instances (eg mortality rates, admission rates). In other circumstances, comparisons between providers or between PCTs may be more appropriate, either between organisations within a geographical area or nationally between organisations with similar characteristics. Benchmarking against other organisations could therefore be a useful activity undertaken by StHAs, the Department of Health or by other organisations. Local,

²⁶ Audit Commission (2005)

²⁷ YHEC (2005)

regional or national comparisons will be appropriate in different circumstances. Analysis can be undertaken at aggregate level or at specialty or HRG level.

5.3 Basic activity data

In order to track trends in the level and type of activity undertaken by Acute Trusts it is necessary to consider data in the following areas, ensuring that a picture of trends over time and between providers can be built up:

- Elective and non-elective in-patient spells and days
- A&E and out-patient and day patient contacts – first attendance plus follow up
- In total, plus disaggregated by speciality and HRG
- Number of HRGs coded as with and without complications in each area of activity (IP, OP etc)
- Number and nature of outliers eg patients with very long stays
- Day case rates
- Admission volumes and thresholds for all types of care
- Admissions from outpatients
- Admissions via A&E
- Total A&E admissions
- Referrals between Trusts and nursing homes¹
- Referral patterns from PCTs

Using this data, it is possible to identify growth areas, areas where reductions are occurring, in-patient/day case ratios, admission rates by specialty etc. Changes can be detected in admission rates from out-patients and A&E departments and changes in case-mix and case-mix complexity which may indicate up-coding behaviour. As well as examining trends over time, such data will also allow effective benchmarking at the trust or PCT level.

5.4 Basic cost data

The aim is to assess whether and how cost reductions are being made by providers. Ideally the data would also shed light on whether cost shifting is occurring, but some of this data is harder to collect. It might include:

- Average cost per spell across elective and non-elective inpatient, A&E, day case and outpatients. This is tariff cost (national) and reference cost (local) data. Changes in costs compared over time and across providers.
- Other useful pieces of information would include changes in the costs of services that might be considered substitutes for or complements to, in-patient care.
- Trends in costs for activities covered by PbR compared with trends in costs of excluded services, in order to flag up potential cost-shifting behaviour
- Comparative data on total volume and cost by HRG by provider size, location, type of hospital, teaching status and region

Whilst it would be useful to explore trends in marginal versus average costs, especially for HRGs where significant activity changes are expected, it is unlikely that these can be monitored effectively and accurately by PCTs or other organisations on a routine basis. Such data will be very vulnerable to variation in accounting practices and are more likely to make sense within the context of a detailed examination of a specific clinical area at a local level.

5.5 Data on quality

The identification of trends in certain activities may flag up potential quality issues although in almost all cases further in-depth investigation would be required to determine if the trends were a cause for concern:

- Length of stay
- Discharge patterns and readmission rates
- Data relating to clinical thresholds¹
- Data on “frequent flyer” patients (including demographic indicators, specialities, type of care, etc.)
- Staffing levels and staff/patient ratios per speciality and by HRG
- Mortality rates – in-patient and post-discharge, risk adjusted where possible¹
- Health status data if available
- Waiting times¹
- Changes made to physical facilities and technologies used and changes in the type, number and qualification of health professionals employed (eg number of doctors per bed; proportion of bank nurses)
- Results of patient satisfaction surveys
- Data on effectiveness and safety of new technologies after a period of use

Some of the above would need to go beyond the bare minimum for example, on length of stay (LOS), it would be necessary not only to look at average LOS but to check distributions and to examine whether hospitals are keeping patients until they reach standard thresholds beyond which the tariff changes.

5.6 Data on access

Potential access problems might be suggested by examination of the following data:

- Trends in the number and geographical distribution of hospital beds
- Changes in geographic distribution of beds by specialty
- Size distribution of hospitals
- Distribution of consultants
- Transfer of patients between providers and between providers of different types (eg to nursing homes)
- Availability of follow-up services
- Specific data on high risk patients who may be selected out by providers
- Changes in the patterns of care available at local level (eg loss of a service)
- Access to ambulatory care (given that it is one of the major modes of entry the health delivery system)
- Waiting times
- Distance travelled to key services

Particular attention should be paid to services where a local element is important, either because of the nature of the service or because of the socio-economic characteristics of the local population served.

5.7 Performance

Performance data will be crucial not only to check the impact of PbR but also to allow PCTs to effectively manage local demand, allow providers to focus on efficiency improvement and provide patients with the necessary tools to make informed choices.

Many of the measures mentioned already can be used to indicate performance of providers (or performance within a specific HRG or speciality) either over time or relative to other providers locally or nationally. So for example, readmission rates, risk adjusted mortality rates and waiting times are relevant as are any data arising from patient surveys of satisfaction or health outcome surveys. Providers and commissioners can use such information to target areas for improvement or to identify areas where PbR appears to positively or negatively affect performance.

5.8 Other data

PCTs and StHAs will want to combine data from some of the above sources with information from other sources such as evidence on patient choice, “marketing” activities of providers, changes in care pathways, trends in activities covered under payment by results and excluded services that are funded at cost. Effective local management will involve combining the above data with socio-demographic data at neighbourhood level. All data will need to be considered in the local context with full information about the links within and between local health economies.

6. Avoiding negative impacts

We outlined in section 3 some of the strategies that may be taken in order to offset, or at least to monitor, some of the potential negative impacts of PbR. However, PbR has been designed in such a way to avoid some of the known weaknesses of other prospective payment systems that might otherwise jeopardise achievement of the benefits outlined in section 2. We consider these briefly in turn.

On the supply side, PbR has been formulated to allow for local realities such as the existence of local specific costs and high cost outlier cases. Prospective payment policies that pay providers according to a centrally determined fixed tariff ignore “localness” and unavoidable differences in costs and may therefore discriminate against providers (and ultimately patients) in affected areas. In these circumstances, providers may reduce quality or skimp on provision if they are unable to cover the higher costs they incur simply because of their location. PbR as implemented in England adjusts the tariff through the use of a Market Forces Factor and by adjusting for the number and nature of outliers. However, in the longer-term it will be necessary to revisit such adjustments in order to ensure they relate only to *unavoidable* cost variations. Otherwise there is a danger that inefficient providers will be subsidised at the expense of those who manage to adjust their costs over the longer-term.

Another potential weakness of prospective payment systems is the perverse effect they may have on the capacity of providers to take up new cost-effective technologies. If the fixed tariffs do not account for the initial large investment costs required for the adoption of a new equipment or technology, providers might refrain from adopting them in order to avoid (short run) financial losses. In order to address the issue of the adoption and diffusion of cost effective technology the Department of Health is considering alternative mechanisms of adjusting the cost weight for specific technologies in order to ensure that tariffs reflect the higher initial costs.

On the demand side, the potential for quality to be reduced in order to contain costs, may in part be tackled through the mechanism of patient choice. By facilitating choice for patients as well as encouraging entry of new providers and enhanced competition, providers may be incentivised to improve quality in order to attract a higher share of patient demand. The extent to which this proves to be an effective mechanism depends on the degree to which choice is exercised effectively, by or on behalf of patients. This is linked directly to the nature of the commissioning role. PCTs need to develop appropriate commissioning techniques that effectively coordinate planning, purchasing and monitoring activities in order to ensure the local provision of (efficient) care whilst meeting national targets and staying within allocated budgets. PCTs will decide on the patterns of service provision required to meet local demand, including care that will be supplied by the PCTs themselves. They will

need to be aware of the capacity of each provider and the quality of the service they provide. Negotiation and contracting will need to be designed to reflect incentives for quality and efficiency and risk pooling arrangements. They will also need to develop methods of monitoring activities in order to ensure that services are actually being delivered and that outcomes and patient satisfaction are satisfactory. We return to the key role of commissioners in section 7 below.

7. The role of organisations at different levels

In this report we have focused, as requested in the brief, mainly on the role and information requirements of PCTs in assessing the impact of PbR. However, the issue of where responsibility should rest for different elements of monitoring and analysis, is a matter of debate. Some functions may be best undertaken at the level of the StHA, centrally at the Department of Health, or by other bodies such as the Audit Commission, Monitor or Dr Foster.

PCTs will of course be most aware of the local context in which services are provided and will be best placed to identify and investigate apparent anomalies and unwanted behaviours. As well as detailed local information they would also benefit in some circumstances from having access to the broader picture in which to place the local situation – eg they may wish to know what is happening to activity in orthopaedics across the whole StHA area or even nationally to determine whether local trends are a cause for concern. PCTs could also utilise benchmarking data across a wide range of areas (eg admissions from A&E) either by provider or by PCT. This suggests there is a role for the StHAs or for national bodies to make such comparative data available in a format that would be useful for local and national monitoring purposes. The latter is important as the Department of Health will be interested in the system-wide effects of PbR, not just local issues. So for example, data on the changes in the proportion of HRGs coded as with and without complications (which may indicate up-coding behaviour) would be better understood by PCTs and StHAs if they were presented with the national picture across all providers rather than just examining their own local providers.

The StHAs are probably best placed to organise collection of data where routine information is not available and where an issue becomes important locally. For example, they might look at referral patterns and distance travelled by patients from all the PCTs in the StHA if access is likely to be reduced by re-organisation of acute services in their area.

Whilst a variety of different arrangements for reporting and monitoring are possible, it is worth remembering that the re-organisation of the NHS under the “Shifting the Balance of Power” sought to clarify roles of different agencies.²⁸ The NHS is meant to resemble a pyramid of layers of accountability and responsibility, differing in terms of the degree of “localness” – with the Department of Health at the top, StHAs in the middle, followed by PCTs and on the bottom the providers. Each agent is responsible for assuring the good performance of the agents in the layer below in the hierarchy and checking adherence to national policy goals. Thus StHAs are meant to play a key role in creating a strategic framework for PCTs and NHS trusts, agreeing on performance thresholds, planning strategies by which they can be achieved and monitoring that they are actually achieved. PCTs are held to account through the StHAs. This suggests that one of the StHA’s key tasks would be to ensure that the implementation of PbR is going forward as expected and that the power of the incentives created by the policy are not diluted by local arrangements that inhibit change inappropriately.

The role of the PCTs is similar to that of the StHAs but with a different span of control. PCTs are charged with ensuring that the local network of providers is meeting the PbR targets. By managing resources, commissioning services across providers and monitoring performance of the providers, PCTs will secure the provision of high quality care according to the needs of the (local) population. In order to achieve this goal PCTs will need to effectively develop capacity management and build strong local co-operative partnerships among providers. They will need to monitor for the positive and negative impacts of PbR whilst ensuring that the local health economy is not destabilised to the detriment of patients. However, as mentioned previously, this is a matter of balance because if PCTs act too conservatively and fail to challenge the status quo, there is little chance of them securing major change in the provision of secondary care, facilitated by PbR. There has already been some

²⁸ Department of Health (2002)

debate about the failure of PCTs to “punch their weight” in this respect and their future role may change again with the development of practice based commissioning and the move to a mixed economy in the provision of primary care.²⁹

In practice, the precise nature of the data collection, analysis and monitoring tasks best allocated to PCTs, StHAs, the Department of Health or other organisations is likely to depend not only on the definition of role boundaries, but also on the availability and quality of the capacity for data collection, processing and analysis. Local organisations will have less capacity for detailed analytical work which may be better undertaken at the Department of Health. The principles that can be used to guide decisions in this area include:

- the need to ensure consistency in the definition and methods of data collection where national-level data are required;
- the imperative of collecting data only once and at the most appropriate and cost-effective level;
- the importance of having a system for quality assuring data – which includes routine activity and cost data but also the vital issue of the quality of clinical coding underpinning PbR;
- a system of incentives to encourage improvements in the quality of data collected and penalties for persistent errors;
- a coherent strategy for monitoring the positive and negative impact of PbR which is underpinned by data and processes which all parties believe to be robust and reliable.

8. Conclusion

The success of payment by results in delivering the policy aims outlined in section 2, will depend heavily on the ability of PCTs, StHAs, the Department of Health and other national agencies to effectively monitor and address the potential positive and negative impacts described in section 3.

The key issues on which we have focused are those that economic theory suggests are the main priorities - because there is potential for prospective payment systems to create perverse incentives and encourage unwanted behaviours from providers. Thus we would expect that monitoring efforts are directed accordingly. In some cases this is relatively straightforward and the data will be available routinely, for example, recording activity trends over time and between providers in HRG groupings. Whilst in other cases, more detailed local knowledge and possibly special data collection exercises will be required, for example, investigating whether shifts in service provision cause access problems. Similarly, agencies at different levels will take on different responsibilities, as discussed in Section 7, and care will be needed to ensure an appropriate allocation of tasks, avoiding overlap and duplication of effort. Investments will need to be made in creating robust quality assurance processes. However, as we have described in Section 6, there are some design features of the PbR policy that will in principle help to offset some of the potentially negative impacts, making the achievement of the positive outcomes more likely.

A major tension we have identified is the need for a balance to be struck between exploiting the high-powered incentives of PbR to facilitate major service innovation and challenge historical patterns of delivery, with the need to avoid wholesale destabilisation of local health economies that would adversely affect patients. PCTs may struggle to achieve this balance when faced with short-term delivery issues and this is probably a major task for the centre to tackle in conjunction with StHAs.

²⁹ Smith and Mays (2005)

References

- Audit Commission (2004), *Introducing payment by results. Getting the balance right for the NHS and taxpayers*, Audit Commission publications, London
- Audit Commission (2005), *Early lessons from payment by results*, Audit Commission publications, London
- Becker, D., Kessler, D. and M. McClellan, (2005), Detecting Medicare abuse, *Journal of Health Economics* 24 (1) 189-210
- Carroll, N.V., Erwin W.G. (1987), Patient Shifting as a response to Medicare Prospective Payment, *Medical Care*, 25:1161-1167
- Carter, G.M., Newhouse, J.P., and D.A. Relles, (1990), How Much Change in the Case Mix Index is DRG Creep?, *Journal of Health Economics*, 9:411–428.
- Chalkley, M. and J.M. Malcomson (1998), Contracting for health services with unmonitored quality, *The Economic Journal*, 108 (449) 1093-1110
- Cutler, D. (1995), The incidence of adverse medical outcomes under prospective payment, *Econometrica*, 63 (1) 29-50
- Cutler, D. (1990), *Empirical evidence on hospital delivery under prospective payment*, mimeo, MIT, November.
- Cutler, D.M. and R.J. Zeckhauser, (2000) The anatomy of health insurance, in: A.J. Culyer and J.P. Newhouse, eds, *Handbook of Health Economics*, Elsevier, Amsterdam, chapter 11
- Department of Health (2002), *Shifting the Balance of Power: The Next Steps*, Department of Health Publications, London
- Department of Health (2002), *Reforming NHS Financial flows: introducing payment by results*, Department of Health Publications, London
- Department of Health (2003), *Payment by results consultation: preparing for 2005*, Department of Health Publications, London
- Dranove, D., (1987), Rate-setting by DRG and hospital specialization. *Rand Journal of Economics* 18 (3) 417–427
- Ellis, R.P., and T.G. McGuire, (1986), Provider behaviour under prospective reimbursement: cost sharing and supply, *Journal of Health Economics* 5:129–151
- Ellis, R.P. and T.G. McGuire (1996), Hospital response to prospective payment: moral hazard, selection and practice-style effects, *Journal of Health Economics*, 15: 257-277
- Ellis, R.P. (1998), Creaming, skimping and dumping: provider competition on intensive and extensive margins, *Journal of Health Economics*, 17(5) 537-555
- Fitzgerald, J.F., Moore, P.S. and R.S. Dittus (1988) The care of elderly patients with hip fracture: changes since the implementation of the prospective payment system, *New England Journal of Medicine* 319 (21) 1392-1397
- Frank, R.G. and J.R. Lave, (1989) “A comparison of hospital responses to reimbursement policies for Medicaid psychiatric patients, *RAND Journal of Economics*, 20 (4) 588-600
- Hodgkin, D. and T.M. McGuire, (1994), Payment levels and hospitals response to prospective payment, *Journal of Health Economics* 13: 1-24

- Laffont, J.J., and J. Tirole (1993), *A Theory Of Incentives in Procurement And Regulation*, MIT Press, Cambridge, Massachusetts
- McClellan, M., (1997), Hospital reimbursement incentives: an empirical analysis, *Journal of Economics and Management Strategy* 6 (1) 91–128
- McGuire, T., (2000) Physician Agency, in: A.J. Culyer and J.P. Newhouse, eds, *Handbook of Health Economics* (Elsevier, Amsterdam), Chapter 9
- Newhouse, J.P., and D.J. Byrne (1988) Did Medicare's Prospective Payment System cause length of stay to fall? *Journal of Health Economics*, 7 (4) 413-416
- Newhouse, J.P. (1989) Do unprofitable patients face access problems?, *Health Care Financing Review* 11 (2) 33-42
- Newhouse, J.P. (1996), Reimbursing Health Plans and Health Providers: Efficiency in Production versus Selection, *Journal of Economic Literature* 34 (3) 1236-1263
- Propper, C., Burgess, S. and K. Green (2004), Does competition between hospitals improve the quality of care?: Hospital death rates and the NHS internal market, *Journal of Public Economics*, 88, (7-8) 1215-1665
- Rogers, R., William, S., Jarman B. and P. Aylin, (2005), 'HRG drift' and payment by results. Dr. Foster's Case Notes, *British Medical Journal*, 330: 563
- Secretary of State for Health, Annual health and social care lecture, 13 Dec 2005
- Shen, Yu-Chu (2003), The effect of financial pressures on the quality of care in hospitals, *Journal of Health Economics*, 22: 243-269
- Smith, J. and Nicholas Mays (2005), Primary care trusts: do they have a future?, *British Medical Journal*, 331:1156-1157
- Staiger, D. and G. Gaumer, (1992), Quality of care in hospitals: post admission mortality under Medicare's Prospective Payment System, manuscript, McGill University, Montreal, Canada
- Street A., Abdul Hussain, A. (2004), Would Roman soldiers fight for the financial flows regime? The re-issue of Diocletian's edict in the English National Health Services, *Public Money and Management*, 24:301-309
- York Health Economics Consortium (YHEC) (2005) *NHS Financing – is there evidence of gaming following the introduction of PbR?* YHEC Monitor Issue 4, 2005. University of York.