

## *Project Description*

# Incentives and Quality in Hospital Care

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28th June 2010

## 1 Introduction

The quality of hospital care has gained increasingly larger focus on the policy agenda during the last decade. With the aim of improving quality, initiatives such as pay for performance (P4P) and public reporting have been introduced or planned in the health care sector of many countries (Kaarboe and Siciliani, 2010). By making information on hospitals performance on certain quality indicators publicly available or by linking rewards to performance on quality indicators, third party payers intend to induce hospitals to focusing on quality improvement (Lindenauer et al., 2007). However, it may be argued that the multidimensional nature of health care quality make it difficult to increase quality by rewarding performance on certain dimensions only (Holmstrom and Milgrom, 1991; Eggleston, 2005). Likewise, the hierarchical structure of hospitals may impede the effectiveness of rewards given to hospitals as organisations and not closer to the individuals who are to react on them (Rosenthal et al., 2002). Furthermore, it has been suggested that the effectiveness of such incentive schemes might depend on how the incentive is perceived by the hospital staff (Frey and Jegen, 2001; Frey, 1997). Finally, for health care professionals strong professional norms may overrule financial incentives (Andersen, 2009). As the above examples illustrate many research questions about on how to incentivise hospitals to provide better quality need further investigation.

Prior to the present focus on the quality of health care, increasing hospital

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productivity and efficiency and incentivising cost containment had high priority on the policy agenda of many countries (Kimberly et al., 2008). Although not the only explanation, it has been suggested that the use of pay for performance systems appear necessary because current payment schemes do not reward hospitals for providing higher quality (Robinson, 2001; Rosenthal and Frank, 2006). Especially Activity Based Funding (ABF) schemes in which hospital funding is linked to activity through a fixed price per admission have been employed in many countries' health care systems to induce hospitals to focus on cost containment and higher productivity and efficiency although naturally ABF have been introduced for a different of reasons across nations.. Research on whether ABF schemes have been successful in raising hospital efficiency is inconclusive (Jakobsen, 2009). As regards quality considerations, concerns have been raised, that hospitals operating under ABF might lower quality in the pursue of cost containment. This means that in response to ABF, the hospital would lower unobserved dimensions of quality (moral hazard), underprovide treatment to high severity patients (skimping) and/or avoid treating of high severity patients (dumping/selection) (Ellis, 1998; Ellis and McGuire, 1996). Critics of this view have argued that the effect of competition among hospitals for patients (e.g. Pope, 1989; Rogerson, 1994) as well as strong professional norms (Andersen, 2009) can prevent this from happening or even raise quality instead.

It is the aim of this project to investigate the interplay between using incentive structures as a management tool and the quality of hospital care. Specifically the aim is to address whether ABF indirectly have an adverse effect on the quality of health care, and to study whether pay for performance is successful in increasing quality, given the multidimensional nature of health care quality, the hierarchical setting, and the possible importance of employee perception of the payment scheme for the motivational effect of incentive systems .This can be expressed in the following two research questions:

- *Has activity based funding schemes for hospitals indirectly affected the quality of hospital care?*
- *Can pay for performance successfully be used to increase the quality of hospital care?*

By approaching these questions it is the aim of the project to contribute to the literature on the effects of ABF of hospitals on quality as well as the literature on the use and effectiveness of P4P in health care. At the same time, results

from the project can hopefully find use in the policy question of how to increase the quality of health care as well as the policy debate on the consequences of ABF on the quality of care. The overall research questions are addressed in two subproject which are described in greater detail below. Full abstracts of all mentioned studies can be found in the appendix.

## 2 Activity Based Funding and the Quality of Hospital Care

This part of the project takes point of departure in the first research question mentioned in the introduction, i.e. whether Activity Based Funding (ABF) schemes for hospitals indirectly has affected the quality of hospital care.

Activity Based Funding of Hospitals (ABF) was first introduced as a way of paying hospitals for their services in 1983 with the Prospective Payment System (PPS) under the U.S. Medicare programme. Since then, similar payment systems have been implemented or are under planning in several countries around the world (Forgione et al., 2004).

ABF introduces a fixed price per admission, linking the funding of hospitals closely to their level of activity. The price is adjusted for case mix through a patient classification system – most often the Diagnosis Related Groups (DRG) system or variations of this system. In the US, PPS was introduced with the aim of containing hospital costs as a response to a period of rising medical costs (Chilingerian, 2008). The global diffusion of DRG may have different explanations from country to country. Among the often stated reasons are improving efficiency and productivity and containing health care spending Kimberly et al. (2008). The possible incentive effect of linking funding to activity through DRG is dependent on the a priori funding scheme and the actual implementation of ABF.

From the early days of ABF, the academic literature as well as the medical profession have voiced concern, that ABF might adversely affect the quality of hospital care (Forgione et al., 2004; Chilingerian, 2008). Because prices are fixed per admission, hospitals might try to lower unobserved dimensions of quality (moral hazard), underprovide treatment to high severity patients (skimping) and/or avoid treating of high severity patients (dumping/selection) (Ellis, 1998; Ellis and McGuire, 1996).. However, because hospitals cannot compete in prices under ABF, it might as well be hypothesised that providers compete on qua-

lity instead (to Albert Ma, 1994; Rogerson, 1994; Pope, 1989). In this case, health care quality might actually benefit from the introduction of ABF, as possible slack might be converted to quality enhancing initiatives in order to attract patients. The empirical evidence on the subject is mixed, and a tentative conclusion from a preliminary study seems to be that the conclusion is very sensitive to the operationalisation of quality, i.e. how the quality of health care is defined and measured. This project deals with this problem through aiming to answer the following research question:

- *Has Activity Based Funding indirectly affected the quality of health care and how is the definition of quality in the health economic literature related to the conclusion.*

The aim of this subproject is to contribute to a clarification of the academic discussion of the quality concern through a literature review that addresses the theoretical basis for the concern and reviews the empirical literature on the subject (see full abstract in section A.1 in the appendix ).

From a Non-U.S. perspective, a potential shortcoming of the current empirical evidence on the quality concern is that it is mainly based on U.S. experiences. In the U.S. ABF replaced a retrospective system of cost-based reimbursement. However, as pointed out by Biorn et al. (2003) in many European countries, the policy choice is rather whether to use ABF or global budgets, i.e. between two prospective payment systems. This means that the incentive implications are less clear cut than under a shift from a retrospective to a prospective payment system. A second policy initiated question is whether different degrees of ABF matter for effects of the scheme. The provision of health care is often decentralised to a regional level which has a considerable degree of freedom in designing the actual implementation of ABF. In Denmark for example, central government lets the regions freely design the specific payment mechanism to hospitals used in the region as long as at least 50 percent of hospital funding is based on activity. Knowledge on how such difference might impact the quality of health care is very sparse. Finally, it may be asked whether the formal payment mechanisms as described in policy documents are actually followed, or whether deviations from the prescribed rules hurt the credibility of payment system, undermining the incentive mechanisms of the system (Jakobsen, 2009). This part of the project seeks to shed light on this problem empirically through the assessment the following research question:

- *Has the switch from global budgeting to a partly ABF scheme affected the*

*quality of health care as measured by mortality and readmission rates?*

This question is investigated using in-hospital mortality, 30 day post treatment mortality, and 30 day readmission as quality indicators for the quality of Danish hospitals from 2007-2009.(see full abstract in the appendix section A.2).

An important and related component in answering the above research question is how to operationalise the ABF scheme. As mentioned, ABF schemes may vary at a regional level. For example hospital funding schemes may vary with respect to at what levels of activity ABF is applied (e.g. ABF is only used above and/or below a given activity threshold), and whether different tariffs are applied for different levels of activity. Furthermore, different tariffs may be used for different treatments and there may be a maximum payment above which the hospital does not receive further funding. Similarly different budget rules may make a hospital payment scheme more or less credible. A hitherto unexplored research question concerns the difference between the official payment scheme and the extent to which this scheme is adhered to in day-to-day use. Thus, the research question of this part of the project is

- *How can a set of indicators be developed for describing ABF schemes for use in quantitative analyses?*

### **3 Paying for Quality in Health Care**

In 2001, the report Crossing the Quality Chasm (of Medicine (U.S.), 2001) suggested that the quality delivered by the American health care system was not as good as it could or should be. The Institute of Medicine suggested the need for fundamental change in the delivery of health care. Among the suggestions were the provision of easier access to data on the performance of health care providers as well as alignment of the incentives in the payment systems used to reimburse health care providers so that these payment systems to a larger extent would encourage or support the provision of high quality health care.

Pay for performance (P4P) rewards providers based on their performance on certain quality indicators. Thus, it may be seen as the *quality* counterpart to *activity* based funding. Although widespread in use, the empirical support for the effectiveness of such programmes is mixed(Rosenthal and Frank, 2006; Petersen et al., 2006). Regardless, pay for performance schemes have become widespread in the U.S. and the U.K., and is emerging in other countries as well

This project collects and analyses data from the first large scale experiment with P4P for improving patient experienced quality in Denmark. Since 2001, all inpatients and outpatients in long term treatment must be assigned a case manager. Data on hospital compliance with the case management scheme (CMS) has been made publicly available since 2004. In 2009, at the same time as adherence to the CMS was made a legal requirement, the Region of Southern Denmark initiated a P4P programme in which hospitals are rewarded for goal attainment on the CMS. Hospitals in the region are free to design the internal distribution of the reward. Two hospitals in the region redistribute the financial incentive to the ward level, paying wards a larger share of the hospital reward the better they perform. At two other hospitals, performance payment received by the hospital was not redistributed directly to the ward level on the basis of performance. The variation in incentive schemes across regions and within the region of Southern Denmark provides the basis for investigating a number of research questions.

As all financial incentive schemes, P4P programmes rely on the prerequisite that health care personell are in fact motivated by financial rewards. The effectiveness of providing incentives for a given effort is a standard assumption in economics. However, recent developments in the economic literature inspired by psychology and sociology has begun to recognise the importance of intrinsic motivation when evaluating incentive schemes (Benabou and Tirole, 2003, 2006). Likewise, it has been suggested that health care professionals are also motivated by the patient's outcome (Mooney and Ryan, 1993). By what has been termed the hidden cost of reward it is suggested that incentive may sometime have the opposite effect of what was intended . For example Gneezy and Rustichini (2000) showed that a low incentive payment may reduce performance compared to a situation without incentive pay, but that this effect changes as the incentive payment is raised. Thus, providing incentive payments may in some cases actually lead to a reduction in performance. Likewise, strong professional norms may overrule the impact of financial incentives on the performance of health care professionals (Andersen, 2009). Frey (1997) suggests that intrinsic motivation may be crowded out by the use of extrinsic motivation schemes such as P4P systems. He proposes that the direction of the crowding effect depends on whether the incentive system is perceived by employees to be controlling or supportive . This project uses questionnaire data on the perception of the contact person performance pay scheme to answer the research question (see section B.1 for abstract):

- *Does employee perception of the P4P scheme affect ward performance on the incentive scheme?*

A second question addressed in this thesis is whether it matters for the effectiveness of an incentive scheme what hierarchical level of an organisation is being rewarded. A design question regarding P4P schemes is which organisational level to direct the performance payments towards to get the largest effect on performance Ryan (2009). In this project the effectiveness of directing a P4P scheme towards hospital level is compared to the effectiveness of an incentive scheme in which performance payments are redistributed to ward level with the aim of answering the research question (see appendix B.2 for full abstract):

- *Are financial incentives at ward level more effective in increasing goal attainment than financial incentives at hospital level?*

Finally it may be asked which dimensions of quality to rewarded. The provision of good quality may be seen as a multidimensional task of which the different dimensions may not be equally measurable. Rewarding one dimension is therefore likely to reduce the effort of the agent on other just as important dimensions which may be less easily measured (Holmstrom and Milgrom, 1991; Baker, 1992). In the CPS mentioned above, both a process and an outcome indicator of performance exists. The process indicator measures whether health care staff has made a registration in the patient's medical record of the name of the contact person. The outcome indicator measures whether patients are in the knowledge of having a contact person. As stressed by Donabedian (1966), the case for process indicators is the expectation that they are correlated with outcome. In this project the correlation between the two quality indicators is examined, and the effect of rewarding the process indicator is evaluated at the effect on outcome compared to a payment scheme rewarding both process and outcome. The research question investigated in this question is (full abstract in in A.5):

- *Is there a correlation between the process and outcome indicator on the case management scheme and does it matter for goal attainment whether the outcome or process indicator is rewarded?*

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# Abstracts

## A Activity Based Funding and the Quality of Hospital Care

### A.1 The Quality Concern: A clarifying review of the economic literature on the potential adverse effects on the quality of health care from activity based funding of hospitals

Since the introduction of the first activity based funding scheme towards hospitals, concerns have been raised that this method of reimbursement might adversely affect the quality of health care. Economic theory does not provide an unambiguous response to that concern and the empirical research on the matter is diversified due to a number of different ways of operationalising quality. It is the aim of this paper to contribute to a clarification of the academic discussion of the quality concern. We aim to do so by 1) discussing the theoretical arguments for and against the quality concern and 2) review the empirical literature on the subject based on a systematical research of major databases.

### A.2 The Quality Concern II: An empirical study of the impact of activity based funding on the quality of health care

Activity Based Funding (ABF) schemes rewards hospitals for activity by a fixed price per admission incentivising hospitals to contain costs. It has been argued that this funding scheme might adversely affect the quality of health care, as hospitals may underprovide quality as a consequence of the incentive induced cost containment strategy. On the other hand, strong professional norms and competition between providers may impede the moral hazard effect of ABF and even stimulate hospitals to provide higher quality. Danish regions can freely design their funding mechanism for hospitals as long as at least 50 percent of the hospital funding is activity based. This study uses the variation in payment schemes to assess the impact of ABF on the quality of health care using both process and outcome indicators. The key explanatory variables describes the different regional funding schemes. Additionally, factors affecting the credibility

of the the funding scheme are included in the description of the different funding schemes. Quality is measured as in-hospital mortality, 30 day post treatment mortality, and 30 day readmission from 2007-2009.

### **A.3 Measuring Activity Based Funding**

The effects of Activity Based Funding (ABF) of hospitals have been the topic of numerous studies for the past 30 years. However, the implementation of ABF can seldom be adequately described as a binary variable. Rather, hospital funding schemes may be only partially based on activity, and may vary between regions in a country. Variation may concern at what levels of activity ABF is applied (e.g. ABF is only used above and/or below a given activity threshold), and whether different tariffs are applied for different levels of activity. Furthermore, different tariffs may be used for different treatments and there may be a maximum payment above which the hospital does not receive further funding. Similarly different budget rules may make a hospital payment scheme more or less credible. A hitherto unexplored research question concerns the difference between the official payment scheme and the extent to which this scheme is adhered to in day-to-day use. Studies that intend to assess the effect of ABF and fail to take these variations into account may lead to faulty conclusions. This paper suggest a way of operationalising ABF schemes that take into account the possible variations outlined above. Besides from being usefull when assessing effects at a national level, such operationalising also pave the way for better cross-national effect studies of ABF and for a deeper understanding on how the different components of ABF schemes interact and the implications for the effectiveness of the schemes in reaching policy goals. .

## **B Paying for Quality in Health Care**

### **B.1 Pay for performance and employee motivation: Does the intrinsic motivation of health care personnel explain the effectiveness of a pay-forperformance scheme?**

In recent years, pay for performance (P4P) schemes have become increasingly popular for quality development in the health care sector. Motivation Crowding Theory suggests that the intrinsic motivation of employees affects the effectiveness of external incentive systems such as P4P. This paper tests the motivation

crowding hypothesis on a case of P4P for hospitals in the Region of Southern Denmark. Hospitals were rewarded according to their performance on a quality indicator measuring to what extent patients were assigned a contact person, which should promote quality, patient's feeling of safety, and continuity of care. We test the hypothesis that wards where the P4P scheme is perceived to be controlling exhibit lower performance than wards where the scheme is perceived by the staff as being supportive. The hypothesis is tested using both a process and an outcome indicator of performance. The data for the process indicator originates from quarterly internal audits over a period of 3 years. Data for the outcome indicator originates from a cross-section national survey of patient satisfaction. 90 hospital wards in the Region of Southern Denmark were included in the analysis. The intrinsic motivation of employees was included in the regression through an index constructed on the basis of a questionnaire that was sent out to ward managements in the Region of Southern Denmark in January 2010.

## **B.2 Paying for quality in hospital care: Who should be paid?**

Pay for performance (P4P) schemes seek to improve performance or quality through the alignment of interests of payer and provider. However, when incentive schemes are aimed at hospitals, performance payments are disbursed to organisations, not the individual physicians and staff whose incentive structure is sought to be aligned by the P4P scheme. This is often the case in the public sector hospital setting of many European countries. Thus, the question naturally arises – should incentive payments be redistributed to lower organisational levels, e.g. wards, in order to maximise the effectiveness of the P4P schemes? This study uses a natural experiment to test whether the organisational level receiving the performance payment matters for the effectiveness of the incentive scheme. The P4P scheme studied was designed to improve quality in the delivery of health care by providing patients with a contact person. In a Danish health region, four hospitals competed for 8 million DKK (approx 1 million EUR) which was distributed according to performance on an indicator measuring the degree of goal attainment on the contact person scheme. At two hospitals, the financial incentive was redistributed to the ward level, paying wards a larger share of the hospital reward the better they performed. At two other hospitals, performance payment received by the hospital was not redistributed directly to the ward level on the basis of performance. The analysis

is based on ward level data on goal attainment from 83 wards observed quarterly from 2007 to 2009, equal to 996 observations. If organisational level does matter, the incentive scheme is expected to be more effective at the hospitals redistributing the incentive to the ward level. This hypothesis is investigated through panel data analysis comparing the increase in goal attainment between hospitals with different incentive structures using a dummy variable indicating whether performance payments was redistributed or not. Until now, in the scholarly debate on applying incentives in the publicly funded health sector, the importance of organisational level has lacked attention. Similarly, empirical evidence of this question has been limited. The results from this study will contribute with empirical knowledge on how to provide incentives for quality improvement most efficiently. Furthermore, the results will have relevance to policymakers when designing incentive schemes to improve the quality of health care.

### **B.3 Paying for quality in hospital care: Rewarding process or outcome?**

When aiming to increase quality by means of a pay for performance (P4P) scheme, the designer faces the task of choosing an appropriate indicator of performance reflecting the multidimensional nature of quality. Process indicators are often easier to measure than outcome indicators, but the case for using outcome indicators is their expected correlation with outcome. The P4P scheme analysed in this paper rewards quality through providing patients with a contact person. I analyse the correlation between a process indicator measuring registration of information about the contact person in patients' medical records and an outcome indicator based on patients' knowledge of having a contact person. Furthermore the difference between rewarding the process and outcome indicator is tested with respect to the effect on outcome. Data on the process indicator is on ward level from approximately 500 Danish hospital wards observed quarterly from 2007 to 2010. The outcome indicator is based on questionnaire data of approximately 230,000 patients measured yearly in 2009 and 2010. Casemix is adjusted for using a dataset with patient level data for all wards throughout the period.