Do Financial Incentives Make a Difference?

A Comparative Study of the Effects of Performance-Based Reimbursement in Swedish Health Care

BY

EWA FORSBERG
ABSTRACT


Financial incentives have become important in health care all over the world. This thesis compares one council implementing a new payment system based on performance-based reimbursement (PBR) with ten councils retaining an annual budget system.

The aim of this thesis was to study the effects of PBR on physicians’ attitudes and behaviours, that may affect the conditions for cost effective care. Aspects highlighted are efficiency, cost awareness, quality of care, professional autonomy and power, job satisfaction and leadership.

This thesis is based on data from seven studies, questionnaires, interviews and register based studies. One instrument, Incentive, Effectiveness, Environment (IEE) was developed within the framework of this thesis. It measures self-reported behavioural changes related to daily clinical work, judgements about work environment factors and the quality of care, and attitudes towards and existence of financial incentives.

Physicians in the council with PBR experienced a greater pressure to improve their efficiency and they did so. The average length of stay decreased more both in relative and absolute numbers. Much of the efficiency increase, however, seems to emanate from “running faster”, not from working more rationally. Cost awareness increased in all councils studied although more so in the council with PBR. PBR was found to create a different financial incentive than an annual budget, stronger and more positive. Effects on quality of care were judged to be negative. Financial reductions were claimed to be the main reason for quality losses, but PBR was found to be more time consuming and therefore contributed to the negative outcome. Work environment factors, especially professional autonomy and power were judged to have deteriorated in all councils studied although more so in the council with PBR. Good leadership was shown to make a difference for quality of care as well as for professional autonomy and job satisfaction, regardless of context.

The results seem, at least partly, to depend on the new payment system, creating an increased efficiency pressure. Additional reasons discussed in this thesis are financial reductions, repeated organisational changes and a size effect.

Key words: Financial incentives, efficiency, work environment, professional autonomy, leadership, cost awareness.

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"Every system is perfectly designed to get exactly the results it gets".

"Every change is not an improvement, but every improvement means change".

Donald Berwick, CEO, Institute for Healthcare Improvement
This thesis is based on the following papers, which are referred to in the text by their Roman numerals:


V. Forsberg, E, Axelsson, R, Arnetz, B. “The relative importance of Leadership and Payment system. Effects on Quality of care and Work environment”. (Manuscript)

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ORIGINAL PAPERS
1. INTRODUCTION

1.1 Background

In recent years, health care systems in many countries have undergone major changes (OECD, 1994). Regardless of the type of system already in operation, many senior managers, economists, politicians and health care professionals suggested that there was room for improvement with regard to effectiveness and efficiency (Ham et al, 1990).

During the past ten years, financial incentives have become more and more important in health care all over the world. This is also the case in countries, such as Sweden, where health care is regarded as a public responsibility. The Swedish health care system is decentralised, with the 16 county councils (until recently 26) being responsible for the financing and provision of health care, whereas the national government has mainly only a supervisory role. In spite of their independence, however, the county councils have been very similar in their organisation until the early 1990s (OECD; 1994). From the early 1950s there was a long period of growth in the Swedish economy and also in the health care system. With this growth came larger and larger organisations which led to a centralisation and bureaucratisation that peaked during the 1970s (Axelsson, 2000).

Since the middle of the 1980s, the Swedish health services have experienced a steady reduction of resources. Sweden differs from most other OECD nations in its major reduction of the proportion of the GNP spent on health care (OECD; 1994). Sweden spent 7.6% (including about 1% for care of the elderly) of the GNP on health care in 1998, compared to 9.6% in 1982 (National accounts, 1998). At the same time, the demands for health care services are increasing due to the ageing population, technological improvements within medicine that have increased possibilities of curing illnesses, as well as more demanding and well informed health care consumers. The current economic situation in health care indicates a risk for an increasing gap between what the medical profession is able to achieve, what health care consumers demand/expect, and what society can afford.

During the 1980s a large-scale process of decentralisation started. The health care sector was viewed as inefficient, and this created interest in new forms of organisation (ESO, 1986). In the light of the new circumstances, many county councils started to reorganise their health services at the beginning of the 1990s. Approximately half of the 26 county councils in Sweden followed international trends, e.g from USA and UK, in instituting a system of purchasers and providers, and performance-based reimbursement measured with a system of Diagnosis Related Groups (DRG) (Saltman, 1995). In the beginning DRG was a system created solely for analysing health care performance and to thereby make it more cost efficient, although it was very soon recreated to be a reimbursement system. DRG is built on the economic theory of "change the financial reward and the behaviour will be changed" (Fetter et al, 1976).

Sweden has a history of performance-based reimbursement until 1972 when a salary based system was introduced (Schöldström, 1999), and the medical community have maintained a positive attitude to performance-related reimbursement. This was probably one explanation as to why physicians in councils with performance-based reimbursement (PBR), in contrast to their colleagues in, for example, Great Britain, adopted the idea of PBR through DRG with relative enthusiasm.
However, even those Swedish councils that did not introduce a performance-based reimbursement system were subject to decisions at a national level, having the potential to increase cost awareness. The most important nation-wide decision in Sweden was a guarantee of care within three months, which was introduced for ten diagnoses in 1992 (Hanning, 1996). Failure to obtain care within three months gives the patient the right to seek care at another hospital, the latter invoicing the hospital with primary responsibility. Another decision concerned the patients' right to choose a hospital even outside the borders of their own county council. This resulted in many hospitals, even without the purchasing and providing system, experiencing competition. Furthermore, many county councils also introduced a system by which the various departments had to pay for diagnostics without having a performance-based system. These nation-wide reforms sometimes gave incentives for change in the same direction as the performance-based reimbursement (Carlsson & Svensson, 1996).

Thus, in this relatively homogeneous country a number of nation-wide changes have been introduced with the expectation that they would influence hospital budgets. At the same time, the councils have chosen different ways in respect of using or not using performance-based reimbursement (Anell, 1995). This affords a unique opportunity to try to separate the effects of performance-based reimbursement from the effects of other changes that have taken place in recent years.

1.2 The Stockholm Model

Stockholm County Council, Sweden’s largest county council with a population of approximately 1.7 million, introduced a new health care organisation (the Stockholm Model) in January 1992. One reason for this was that the former system, with an annual budget, was considered to create wrong incentives for health care clinics. A common, and previously successful, behaviour was to exceed the budget frame in order to obtain a more generous budget the next year. This was a cost driving incentive. Another problem was the lack of correlation between budget and performance, the budget being based on historical data and with little relation to actual performance. This state of affairs was felt to result in an unfair budget allocation (Stockholm County Council, 1991a). Such a system did not contribute to improving efficiency.

The three main principles of the new system were the purchaser/ provider split, a money allocation based on the characteristics of the population in the catchment area, and the introduction of an internal market for health services. The combination of competition (money follows the patient who is free to choose the caregiver, at least within a region or a county), a defined price list (based on DRG) and performance-based reimbursement were important ingredients in the internal market (Stockholm County Council 1991b). The purchasers consist of 9 local political boards (since 1999 only 6) who were supposed to contract, and purchase health services from district physicians and hospitals.

Performance-based reimbursement in the Stockholm Model means that 100% of the hospital budget (except teaching and research) is based on performance. It is a case-based financing system and performance is measured by discharge diagnosis. Each discharge diagnosis generates an income based on the DRG-point connected to the diagnosis in question. Performance-based reimbursement is unaffected by length of stay, and has to cover all costs connected with the stay, as well as administrative costs, e.g. office space and other overheads.
The competition is based either on direct competition within a market, or competition to win a block contract, or a combination of both. A block contract means that purchasers contract the hospitals for a specified number of treatments. There is a ceiling for DRG reimbursement, but no lowest price, which means that there is room for competition between hospitals with regard to pricing (Stockholm County Council, 1991b). If the care volume increased more than 10% the ceiling price would decrease in order to maintain control over total costs. Initially the hospitals could retain half of a generated surplus for the future. The other half was placed in a profit equalisation fund allowing for costs to be spread over a number of years. A budget deficit would follow the hospital to the next year (Stockholm County Council, 1991b).

The new situation entailing competition between providers was expected to give the clinics strong incentives to improve their organisations and performance resulting in an increase in efficiency and quality (Stockholm County Council 1991b).


One aspect not fully covered by these studies, however, was changes in the attitudes and behaviours, of clinically active physicians, as a result of the Stockholm Model. The studies mentioned above were also restricted to Stockholm County Council (except Jonsson, 1996), which means that the grounds for potential change are more difficult to evaluate.
2. AIM OF THE THESIS

The overall aim of this thesis is to study the effects of performance-based reimbursement on attitudes and behaviours of physicians that may affect the conditions for a cost effective care.

On a more detailed level, the aims of this thesis are:

- To assess changes in attitudes and self-assessed behaviour related to efficiency, cost awareness, quality of care and work environment, among two different groups of physicians. The two groups work in councils with or without performance-based reimbursement.

- To examine whether performance-based reimbursement in health care affects the professional power and autonomy of physicians, and if so, whether this has any consequences for the quality of care.

- To examine in more detail how the financial incentive works in the two different groups of physicians and whether it differs between them. To examine whether cost awareness is affected by the differences in strength of external incentives.

- To examine whether the introduction of stronger financial incentives in health care gives rise to such a restrictive context that leadership has only a minor influence. Or whether good leadership, on the contrary, is important to the achievement of both financial and other goals, regardless of contextual factors.
3. THEORETICAL FRAME

To study effects of performance-based reimbursement that may affect the possibilities to provide a cost-effective care is a complex issue with many different views that should be highlighted. The following section will try to provide a theoretical background to the different aspects chosen. The first heading will give a background of The Stockholm Model. The subsequent headings address the different concepts and indices used in this thesis.

3.1 Economic Theories

The construction of the Stockholm Model is based upon a number of “truths” emerging from economic theories about “supply and demand”, and competition.

3.1.1 Supply and demand

A central thesis in "neo-classical balance theory" of political economy is the balance between supply and demand. This thesis has became central also in the construction of the new reimbursement systems for health care. The construction of “internal” or “planned” markets in health care is built on the assumption that the market will adjust supply and demand through pricing (Hansson, 1991). That means, "a health care, based on a purchaser-provider system and a total cost responsibility, obtains, through the pricing system, an awareness of costs". The increased cost awareness "makes health care suppliers act with a cost-utility perspective. If there is an obligation to attain a balance between supply and demand, a reduced profit caused by reduced production necessitates a corresponding reduction in costs". (Anell, 1991). Theories about over consumption also emanate from the neo-classical theory. In the latter, over consumption means that a patient consumes more health care than he/she would have done if the price corresponded to the marginal cost (Hugemark 1994). This is expressed by advocates of the system as: So-called free utilities give rise to an over consumption. Internal pricing gives the incentive for an efficient use of resources (Thomas, 1980, Anell, 1991)

3.1.2 Competition and Purchaser-Provider approach

Competition means that there is more than one competitor. The "Public Choice school" stated that the greater the competition in a market the more efficient, and also more effective the companies. Competition will select and single out less efficient companies. (Vicker & Yarrow, 1988). It is competition, not ownership (publicly owned or privately owned) that increases efficiency. (Millward & Parker, 1983).

There are two principal types of competition, within a market and competition to gain a market. Competition within a market means that producers compete over those customers (patients) who want care. Competition about gaining markets means that producers compete to obtain a block contract for a number of "products". Competition about a market can also mean competition to gain the right to establish a new practice or to take over an already existing practice. Competition over individual customers and over block contracts is relevant for how the purchaser-provider model in Stockholm is designed.

Competition within health care is somewhat different than competition between ordinary companies. The former market place is called a Quasi-market. It is based on a more or less
artificial split between purchasers and providers. The principal mechanisms by which the market operates is that of contracts between purchasers and providers. Providers are independent and there is competition between them. The providers, however, do not need to be profit maximising or private. The purchaser of the product does not have to be the consumer of the product, but can instead be an agent for the consumer. The consumer does not need to pay for the product with real money, instead there can be a "right" to obtain the product or an "obligation" for the provider to supply a service. The purchaser has a financial obligation, which is called third part financing (Enthoven, 1985, Le Grand, 1990).

The benefit of a perfect market means producing at minimum costs and producing goods most highly valued by consumers. The characteristics required for a perfectly competitive market are unlikely to be found in health care systems, and the conditions of perfect competition, are difficult to achieve (Roberts, 1993) It has, however, been postulated that the benefits of perfect competition can be achieved if markets are "contestable", i.e. only one producer who is regularly competing about a block contract. One important criteria for this is that new producers can enter the market and that established producers can be singled out, otherwise the competition will only be illusory (Baumol et al, 1982).

3.2 Effectiveness, Efficiency and Cost effectiveness

Both efficiency and effectiveness are "soft" words with a number of different definitions. Most of these definitions include the following terms: output, defined as the number of performances, input, defined as available resources, and cost.

Effectiveness in health care can be defined as the outcome or impact of health services on the population. (St Leger et al, 1992, Murray, 1987). Effectiveness can also be defined as an answer to the question "Does it work?" including both whether the health care interventions do more good than harm, as well as an acceptance from patients to follow the recommendations (Drummond et al, 1988).

Efficiency can be defined as the outputs for a given amount of inputs, or output per cost. (St Leger et al, 1992, Murray, 1987). Efficiency can also be defined as whether the health procedure does more good then harm to people or as an answer of the question "Can it work?". (Drummond et al, 1988).

Cost effectiveness can be defined as effectiveness per cost or as efficiency * quality. Quality (outcome quality) is, in these terms, defined as effectiveness per output. (St Leger et al, 1992, Murray, 1987).

In the Swedish language there is only one word, "effektivitet", and this word includes, to varying degrees, both efficiency, effectiveness and cost effectiveness. This will sometimes make translation difficult. In this thesis, however, efficiency is defined as the amount of care provided in relation to the amount of resources used, and efficiency in relation to quality of care is defined as cost effectiveness. Effectiveness is defined as the impact of health services on the population.

Experience from other countries shows that a possible effect of performance-based reimbursement is that it is an incentive for a more efficient use of resources (Kahn et al, 1990a).
3.3 Financial incentives and Cost awareness

In this thesis, financial incentive is defined as “An explicit or a non-explicit demand to take financial aspects into consideration, but also some form of reward if you act "correctly"(either appreciation or something more substantial.)” Experience from other countries has shown that financial incentives are of great importance (Hillman, et al 1989, Hemenway et al 1990).

In Sweden prior to 1990, ordinary physicians were only to a minimal extent involved in financial considerations. The best possible care was what mattered and "someone else" was expected to finance it. Through performance-based reimbursement, based on discharge diagnoses, and internal cost debiting as in The Stockholm Model, the responsibility for the clinics’ costs and income were coming much closer to the individual physician (Anell, 1995). Several studies have shown that financial incentives influence medical decision making (Hillman, et al 1989, Hemenway et al 1990, Neuhauser, 1987) and therefore this system was expected to increase cost awareness among physicians (Stockholm County Council, 1991). However, the system does not create personal financial incentives for physicians but rather collective ones, depending on the competitive situation between hospitals, the latter all being interested in the same money.

Experience from other countries led to expectations that one effect of performance-based reimbursement would be an increased cost awareness (Russel, 1989). A heightened cost awareness has been shown to give a number of effects such as a decline in routine test use (Sloan et al, 1988), and a reduced average length of stay (Neuhauser, 1987, Guterman & Dobson, 1986, DesHarnois et al, 1987) e.g. through too early discharge (Cuyler & Posnett, 1990).

3.4 Professional organisations

An organisation can be defined as a number of individuals carrying out some specified activities together or a social system aimed at attaining specific goals, or a structure for the distribution and co-ordination of role tasks (Axelsson, 1998, Hatch, 1997).

Health care organisations are often mentioned as typical examples of professional organisations. A professional organisation is characterised by a high level of education and some sort of legitimisation of the work force. The activities are based on a scientific ground, and there is a quick and continuous development of knowledge and methods. This means a great deal of freedom and autonomy for the professionals, with activities regulated by professional ethics and quality demands rather than the decisions of superiors (Gouldner, 1957, Axelsson, 1998).

Because of the nature of their activities, professional organisations must be structured in a different way than a traditional bureaucracy (Mintzberg, 1983, Axelsson, 1998). Health care services are characterised by “professional” activities that consist of complex problem solving based on advanced knowledge. These activities cannot easily be standardised and they cannot be planned or controlled by the management in the same way as the activities of many other organisations. Instead, professional organisations must rely on the quality of the people they employ (Argyris & Schön, 1978).
At the same time health care consists of many large hospitals organised as a hierarchical bureaucracy in the administrative part of the organisation. It is therefore sometimes called a professional bureaucracy. According to the “domain theory” the professionals and the administrators have different goals and different organisations and steering structures. This causes conflicts and often a power struggle between representatives from the different domains (Kouzes & Mico, 1979). One of the original intentions of the DRG system was to change the balance of power between professionals and administrators in favour of the administrators (Fetter et al, 1976).

3.5 Work environment - Professional autonomy, Professional Power and Job satisfaction

Physicians have historically enjoyed a great degree of autonomy linked to a broad professional responsibility. In Sweden, this professional autonomy has been reduced over the past years. This is partly a result of a nation-wide reform introduced in 1991, which took away the medical responsibility from the consultant physician, regardless of seniority, and transferred it to the chief consultant, i.e. the head of the department, who was supposed to have total responsibility for both medical and financial matters (Charpentier & Samuelsson, 1998). This reform put financial considerations before physicians' autonomy. Over time this emphasis on financial considerations has increased due to harsher economic restrictions in all county councils.

In the social sciences, power and autonomy are often described as two sides of the same phenomenon (Lukes, 1975). In this thesis, however, we have distinguished two different concepts where professional power describes influence on overall and long-term questions, and professional autonomy refers to control over the daily work situation. In previous research, a high degree of professional autonomy and power have been regarded as both necessary and self-evident, for professionals, for preserving a high quality of care (Axelsson, 1998).

One intention when introducing a performance-based system in Stockholm was to increase pressure on health services to deliver a more cost efficient care (Stockholm County Council, 1991b). One way to do so is to increase the control of clinical performance (Fetter et al, 1976). Professional autonomy and power may therefore be at a greater risk to be reduced in councils with performance-based reimbursement. An increased work load may also be expected due to staff reductions.

According to previous research, such a development may entail a number of psychosocial working environment risks, e.g. cognitive stress. The main risk factors, recognised as stressors in health care, are high work load, time pressure (Heim, 1991, Falkum et al, 1997), lack of influence and control (Johnson et al, 1995) as well as perceived stress from organisational factors, such as poor leadership and low efficacy (Arnetz, 1997).

Job satisfaction can be conceptualised as general feelings about one's work or work content, depending on the interaction between a person and the environment (Locke, 1976, Jayaratne, 1993). In their model of organisational healthiness, Cox and Leiter (1992) suggested that the

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1 The third domain being politicians
2 Fetter, the creator of the DRG system
quality of care depends on the "goodness" of its organisational context, but that its impact is modified by staff well-being. A similar result was found by Thomsen (2000) showing that job satisfaction was a mediator between the organisational factors efficiency, autonomy and relationship with managers, and individual factors such as mental energy, although job satisfaction was also affected by satisfaction with quality of care. Quality of care was at the same time affected by the same organisational factors, efficiency, autonomy and relationship with management. Earlier studies have shown that there has been a decrease in health and well-being among physicians and other health care personnel in Sweden (Arnetz, 1999).

3.6 Leadership

Much of the literature on leadership is normative and discusses what makes a good leader, not whether leadership makes a difference or not. The importance of leadership is taken for granted. There is, however, organisational literature dealing with the importance of leadership in organisations and in this literature there are different opinions about the possibilities for leaders to influence the structures and decisions within their organisations.

According to the theory about systems, the decision and structure of an organisation is primarily determined by the contextual framework, those surrounding factors to which the organisation has to adjust itself in order to survive. This is called the "deterministic" view, meaning that the leaders have limited possibilities to influence the organisation. Another view, called the "voluntaristic" view, derives from the theory about rational decision-making. According to this view the structure of an organisation depends on a number of intentional moves by individuals, which means that the leaders have a great opportunity to influence the organisation (Donaldson, 1996, Axelsson, 1992).

In an effort to reconcile these different views, the "strategic choice" view was introduced. This view suggests that, even though contextual factors are of considerable importance for the organisational structure, there is an organisational "slack", that is, the difference between a "good enough use" and an optimal use of resources, within every organisation. This enables leaders to exert a considerable influence. Contextual factors are then only general restrictions and there is considerable scope for structural decisions within this frame (Child, 1972, Nitin & Ranjay, 1997)

In this thesis good leadership was defined as: articulating visions, building trust and relations, involving the work force, empowering the personnel and motivating them to accept change and achieve organisational goals (Bass, 1985 Burns, 1978, Gardner, 1990).

3.7 Quality of care

According to Donabedian (1966) there are three different aspects of quality. Structure, process, and outcome and he suggests that "A good structure increases the likelihood for getting a good process, a good process increases the likelihood for getting a good outcome". Structural quality concerns organisational structure, personnel and other resources, while process quality concerns what happens to the patient during the care and outcome quality concerns the utility of care for the patient.
Much attention has been paid to the quality of the process of care, internationally, as well as in Sweden. Quality improvement, as an explicit term, has been on the agenda of health care reforms in Sweden since 1989 (Palmberg 1997). The introduction of stronger financial incentives by performance-based reimbursement (PBR) in health care created an increased concern about quality issues. It was followed by an expectation of an increased quality as well as a fear for a deterioration in quality (Stockholm County Council, 1991).

From earlier research the expectations from the PBR on quality effects could be both negative and positive. It has been claimed that without quality assurance systems, a block contract based on DRGs, like the PBR system, could be expected to diminish the quality of care (Donaldssen & Magnusson, 1992). Studies about different quality issues show that after the introduction of the DRGs a greater proportion of patients had been discharged in a worse health condition than before (Kahn et al, 1990a, Kosecoff et al, 1990), although no increase in the number of readmissions (Kahn et al, 1990a, Kahn et al, 1990b, Russel, 1989) or in total mortality was found (DesHarnois et al, 1987). Other researchers, however, have found an increase in the numbers of readmissions (Weinberger et al, 1988) as well as an increased mortality (Shortell & Hughes, 1988). Earlier discharge is also considered to have increased the total cost of health care, if nursing home care costs are included (Fitzgerald, 1987). An increased process quality as well as other systematic process improvements were found in a study from the Rand corporation after the introduction of DRG (Kahn et al, 1990b, Kosecoff et al, 1990).
4. METHODS

The evaluation method used in this thesis can be described as a side-effect evaluation. This is an extended goal-achievement evaluation. The purpose is to evaluate whether the goals are achieved and whether the reform has contributed to this goal achievement. It also takes into consideration expected and unexpected side effects of the reform as well as the implementation process (Vedung, 1991).

The five papers in this thesis are based on six different studies:

Study 1: A repeated cross-sectional study of physicians in Stockholm county council 1992 and 1993

Study 2: A study (similar to Study One) of physicians in Stockholm County Council, in eleven Swedish councils without PBR, and in one council (Dalarna) having a PBR system, in 1994


Study 4: A study of physicians in Stockholm County Council and ten Swedish councils without PBR in 1998


Paper I is based on data from studies 1, 2 and 5. Paper II is based on data from Study 2. Paper III is based on data from Study 3 and 4. Paper IV is based on data from Study 3, 4, 5 and 6. Paper V is based on data from Study 4.

Fig. 1. The relationship between studies and papers.

In addition to the six studies, one interview study was performed in 1995. This study is reported below.
4.1 Design of the questionnaire studies

Study One was a repeated cross-sectional study (about 40% of the respondents, however, participated both times) performed at the five largest hospitals in Stockholm County Council. Data were collected during late autumn 1992 and 1993.

Study Two was a cross-sectional study at the five largest hospitals in Stockholm County Council and in twelve other county councils (one with and eleven without a performance-based reimbursement system) in various regions in Sweden, in 1994.

Study Three was a cohort study performed at the five largest hospitals in Stockholm County Council and in ten other county councils in various regions in Sweden. Data were collected during late autumn 1994 and 1998 simultaneously in Stockholm County Council and the other councils.

Study Four was a cross-sectional study performed at the five largest hospitals in Stockholm County Council and in ten other county councils in various regions in Sweden. Data were collected during late autumn 1998 simultaneously in Stockholm County Council and the other councils.

In all studies the questionnaire was posted to the participants' home addresses, accompanied by a letter asking them to return the questionnaire in a stamped, addressed envelope. Two reminders were sent. Confidentiality was emphasised and guaranteed.

Out of the 333-338-343 physicians approached in Stockholm 1992, 1993 and 1994 respectively, 278-299-281 agreed to take part in the studies. Out of the 566 physicians approached in the other county councils 1994, 447 agreed to take part in the studies. The response rate for Stockholm was 84-88-82% and for the other eleven county councils 79%.

Those participants from the 1994 study who still fulfilled the inclusion criteria formed the cohort, and out of the 262 physicians in Stockholm, 220 agreed to take part in the study in 1994 and 201 in 1998. Out of the 354 physicians in the other ten councils, 288 agreed to take part in the study in 1994 and 273 in 1998. The 1994 response rate was 84% in Stockholm County Council and 81% in the other ten county councils. The 1998 response rate was 77% for physicians both in Stockholm County Council and in the other ten councils. Four hundred and seventy-four physicians participated in 1998, but only 418 of these participated in 1994 and therefore constituted the cohort.

4.2 Participants

The participants were randomly selected physicians employed by Stockholm County Council and by twelve (Study 2) or ten (Study 3-4) other counties across Sweden. The sample was matched according to profession and speciality. Two selection criteria were set for inclusion in this study. The first criterion was being a hospital physician working in a medical (internal medicine, respiratory medicine, nephrology, cardiology) or a surgical (surgery, orthopaedics, gynaecology) department in a public hospital. The second selection criterion was the type of payment system in use. Except for physicians working in Stockholm County Council and Dalarna County Council, only physicians working in councils without a performance-based reimbursement (PBR) system were selected.
The included councils without PBR in Study 2-4 were: Malmö City, and the councils of Jönköping, Norrbotten, Kronoberg, Kalmar, Blekinge, Halland, Värmland, Jämtland, Gotland and Västernorrland (only in Study 2). Västernorrlands County Council was excluded in later studies because it turned out to have a PBR system after all. One more Swedish council without a PBR system could have been included but this council were excluded for other reasons, otherwise the included councils were all councils in Sweden without a PBR system in use in 1994 and 1998. Swedish Pharmaceutical Statistics Ltd. made the random selection and the number of physicians invited from each council was proportional to the actual number of physicians working for the council.

4.3 Instrument development

A questionnaire, called IEE (Incentive, Effectiveness, Environment), that examined physicians’ views of cost awareness, working conditions, efficiency and quality of care, as well as background factors, was created in the spring of 1992. The question construction was based on interviews with six senior physicians, a previous study in Stockholm 1991 examining expectations of the new organisation among physicians, nurses and assistant nurses (Forsberg & Calltorp, 1992), and the author’s own experiences as a clinical physician during the period. The questionnaire was tested on a pilot group of four physicians who had the opportunity to ask for clarifications and suggest improvements. The revised version of the questionnaire was used twice in Stockholm, in 1992 and 1993. Some questions were then removed, due to lack of reliability, prior to the study in 1994 and in 1998.

Additional questions were constructed for the IEE instrument in 1998 to evaluate the existence and effects of financial incentives. These questions were tested on two reference groups. One with health economists and one with physicians, who both had the opportunity to ask for clarifications and suggest changes. Revisions were made according to the suggestions.

The second instrument used in this thesis is the QWC (Quality-Work-Competence). The QWC measures key areas of relevance for organizational and professional well-being, such as leadership, “employeeship”, organizational efficiency, clarity of organizational goals, and participatory management. Items are combined into 10 specific indices or enhancement areas. These enhancement areas have Cronbach alphas of 0.7 or higher and have been validated using biological measures as well as financial performance data and employee health and sickness data. (For further details see Arnetz, 1997). The QWC was used in Study Four.

Questions from both instruments measuring the same concepts were tested for reliability using factor analysis and Cronbach alpha. The indices constructed (Table 1) consisted of questions asked twice or only once (1998). Principal component analyses and the least square method were used to create individual factor scores for indices chosen. The correlations between questions asked both years and those asked only in 1998 are significant in each index (mostly at 1% level, otherwise at 5 % level).
<table>
<thead>
<tr>
<th>Index</th>
<th>Description</th>
<th>No of Items</th>
<th>Paper</th>
<th>Reference</th>
<th>Cronbach alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency (Efficiency pressure)*</td>
<td>Delay before examinations and tests, co-operation with primary health care, premature discharge from caring and intensive care units, discharge patterns. Attitudes about purchasing and providing.</td>
<td>8</td>
<td>I</td>
<td>Developed in Study 2</td>
<td>.70</td>
</tr>
<tr>
<td>Cost-time pressure</td>
<td>Obstacles to work because of lack of resources, sufficient time for work, premature discharge from caring and intensive care units, discharge patterns, degree of decisions suboptimal for patients because of financial considerations.</td>
<td>6</td>
<td>V</td>
<td>Developed in Study 3, 4</td>
<td>.61</td>
</tr>
<tr>
<td>Cost awareness**</td>
<td>Taking economy into consideration when deciding about patient care, refraining from diagnostic measures and treatments because of financial considerations.</td>
<td>3</td>
<td>II, IV</td>
<td>Developed in Study 2</td>
<td>.72</td>
</tr>
<tr>
<td>Resource use (orig. &quot;efficiency&quot;)</td>
<td>At my workplace we: plan our work, work towards a common goal, have functioning decision-making processes.</td>
<td>3</td>
<td></td>
<td>Arnetz 1997</td>
<td>.82</td>
</tr>
<tr>
<td>Financial incentives</td>
<td>Importance of financial aspects, changes in freedom and latitude in decision-making due to financial incentives, consequences of poor clinical results, influence over cost per patient and for clinic, influence over clinic income, changes in professional role.</td>
<td>10</td>
<td>III, IV</td>
<td>Developed in Study 4</td>
<td>.72</td>
</tr>
<tr>
<td>Working conditions</td>
<td>General workload, job satisfaction, well-being, workload based on work linked to emergency department, negative effects on private life, satisfaction with ones salary, changes in clinical freedom, power to control work schedules, time for interaction with colleagues, physicians` organisational influence, balance of power</td>
<td>11</td>
<td>II</td>
<td>Developed in Study 2</td>
<td>.72</td>
</tr>
<tr>
<td>Professional autonomy</td>
<td>Changes in clinical freedom, respondents authority in relation to work, freedom to decide how to carry out their work and what should be carried out, power to control work schedules, time for interaction with colleagues and access to sufficient information.</td>
<td>7</td>
<td>III, IV,V</td>
<td>Developed in Study 3, 4 and 4</td>
<td>.74</td>
</tr>
<tr>
<td>Professional power</td>
<td>Management, physicians` influence within the organisation, balance of power, possibilities to influence clinic decisions, requirements for work.</td>
<td>7</td>
<td>III</td>
<td>Developed in Study 3, 4</td>
<td>.80</td>
</tr>
<tr>
<td>Job satisfaction</td>
<td>Satisfaction with work tasks, well-being, thoughts about changing profession or employer, work pride and professional satisfaction.</td>
<td>5</td>
<td>III, IV</td>
<td>Developed in Study 3, 4</td>
<td>.72</td>
</tr>
<tr>
<td>Work load</td>
<td>Work split, amount of work, contradictory demands, amount of overtime, negative effects on private life</td>
<td>6</td>
<td>V</td>
<td>Developed in Study 3, 4</td>
<td>.73</td>
</tr>
<tr>
<td>Judgements about quality (Org. Quality of care)</td>
<td>Opinions about three different aspects of the process of care, that is, medical treatment, nursing and service to the patients.</td>
<td>3</td>
<td>I, V</td>
<td>Developed in Study 2</td>
<td>.88</td>
</tr>
<tr>
<td>Quality of care</td>
<td>Discharge pattern, premature discharge, intensive care, avoidance of treatments, decisions suboptimal for patients, opinions about quality in service to the patients, nursing and medical treatment.</td>
<td>12</td>
<td>III, IV</td>
<td>Developed in Study 3, 4</td>
<td>.82</td>
</tr>
<tr>
<td>Leadership</td>
<td>Immediate superior: communicates clearly, acts consistently, states how to achieve department goals, creates possibilities to do a good job, is innovative about organisation and methods of working.</td>
<td>6</td>
<td>V</td>
<td>Arnetz, 1997</td>
<td>.89</td>
</tr>
</tbody>
</table>

*Efficiency is called efficiency pressure in Section 8 (impact of size), because this is a better description of the index.

**Scale altered (from 5 to 3 items) in Paper IV.

***The scale in Paper IV was slightly different. Two questions were removed and two were changed because of interaction with other indices.
4.4 Design and procedure of the interview study

An interview study was carried out from May to August 1995. The intention was to interview 20 physicians, four from each of the five Stockholm hospitals included in the questionnaire study. A random selection was made from the physicians in the 1994 cohort. Selection criteria were clinic, gender, age (half below and half over forty years of age) and hospital. Four of those who were contacted declined to take part in the study, two because of lack of time and two because they did not have anything more to say. The non-participants were from different hospitals and of both genders. A total of 16 persons agreed to take part in the study.

A semi-structured interview was carried out during approximately one and a half hours. An interview guide, based upon the questionnaire was compiled. The interviews were tape recorded and transcribed. The interviews were then analysed and categorised according to different themes.

4.5 Design and procedure of register based studies

4.5.1 Mean length of stay

Data about mean length of stay in different county councils were found in official statistics (Annual statistics 1991-1997). Data were obtained separately from each hospital in the twelve county councils from departments of internal medicine, surgery, orthopaedics and gynaecology. The mean value for all hospitals in the eleven (eleven councils in Paper One but only ten councils in Paper Four) councils without PBR, was calculated and compared with the mean values for all hospitals in Stockholm County Council for the years 1991 to 1997. The relative reduction in length compared to 1991 was also calculated. The length of stay in Stockholm was therefore compared with the mean value in the eleven (ten) councils both with regard to absolute and relative values.

4.5.2 Resource reductions

There was also a comparison of changes in net cost for Health Care in Stockholm County Council and the ten other councils. In comparing the exact costs per inhabitant in 1991 with the costs in 1998 the relative resource reduction in per cent was calculated (Annual statistics, 1991-1998). The mean value for resource reductions in the ten councils was compared with the resource reduction in Stockholm by using confidence intervals.

5. STATISTICAL ANALYSIS

The two questionnaires in this thesis produced predominantly ordinal scale data. Non-parametric tests were therefore used in comparing the groups according to single questions. Indices created were treated as continuous scale data, and parametric tests were used for comparisons. Register based data were continuous and parametric tests were used.

The data were analysed by SAS (version 6.12) in Paper 1 - 2 and SPSS (8.0-10.0) in Paper 3-5. The correlation's were measured with a Pearson product-moment correlation or by means of Spearman rank correlations. Chi-square tests and one-way analysis of variance (ANOVA) were used to compare groups. When ANOVA was being used, appropriate post hoc adjustments of the p-value were carried out. Fisher’s Exact Test was used to compare each
outcome in the multiple response questions. Wilcoxon signed rank tests were used to compare the two groups and to compare the data from the two different years in the cohort study.

Questions measuring the same concepts were tested for reliability using factor analysis and Cronbach alpha. Principal component analyses and least square method were used to create factor scores for each index. Regression analyses were carried out to compare all indices built on factors’ scores with each other, and with socio-demographics, and to predict determinants used in our models. Indices were used both as dependent and independent variables in the regression analysis. A student t-test was used to compare the mean length of stay between the councils and between the years 1991, 1994 and 1997. Relative resource reductions in Stockholm and in the ten councils were compared by using mean values with confidence interval.

No differences were found as a function of gender or age except for in the four multiple response questions (what happens with clinical surplus or deficit, personal financial incentives and what to do when threatened by a deficit). All tests were two-tailed. No multicolinearity was found, using tolerance and correlation measures. Levene’s test was used for analysis of variance. The significance level adopted was p<0.05 unless otherwise stated.

Less than 6 % of the 1994 data were lost due to non-response or internal errors. Less than 7% of the 1998 data were lost except for the questions regarding care in intensive care units (17.7% and 10.5% missing in Stockholm County Council and the ten other county councils, respectively), changes in physicians’ professional role (7.7% in the ten councils), and changes in discharge pattern (10% and 8% in Stockholm County Council and the ten other councils, respectively).

For three of the multiple response questions, up to 22% of data were lost due to non response, and up to 51 % of the respondents did not answer the question about what the clinic can do when threatened by a deficit. Women and younger physicians had a significantly lower response rate for the multiple response questions, but no differences were found between different councils.

Missing data were analysed by stepwise comparison. Three groups were constructed depending on when the participant had completed the questionnaire. Group One had sent the questionnaire back at once. Group Two after one reminder and Group Three after two reminders. Group Three was assumed to be more like the non-respondents than the other groups, and was therefore compared with the distribution of the total responses. Four questions showed significant differences across groups. Group Three members were found to be more negative in their judgement of the quality of nursing care but more positive about the quality of medical care. They also, to a significantly higher degree, reported that they made decisions suboptimal to patients and they found it less important that their clinics adhere to their budget. Otherwise no statistical differences were found.
6. PRESENTATION OF PAPERS: AIMS, METHODS AND RESULTS

6.1 Paper I


Aims: To assess changes in attitudes and behaviour, related to efficiency and quality of care, after introduction of performance-based reimbursement.

Methods: The study consisted of three parts. Part One was performed 1992-1994 as a repeated cross-sectional questionnaire study to physicians in Stockholm County Council with a newly introduced performance-based reimbursement system. Part Two was a similar study conducted in 1994 in eleven Swedish councils without performance-based reimbursement. The study population consisted of physicians working in a medicine or a surgical department in public hospitals within the selected twelve councils. Part Three was a register-based study about average length of stay during the period 1991 to 1994 in all the twelve councils.

Results: The majority of the physicians (59%) considered that their own clinic had become more efficient (in terms of shorter waiting time for medical examinations, tests and rehabilitation for inpatients) in contrast to three years ago. There was no statistical difference between physicians from Stockholm and the other councils. A significant difference was found between the two groups of physicians in attitudes concerning changes in quality of care and premature discharge from hospital. More physicians in Stockholm than in the 11 other councils thought that the number of premature discharges from hospital had increased, and more physicians in Stockholm also considered that patients were often discharged prematurely from the clinic. A comparison between physicians from Stockholm and the eleven councils showed that the latter considered the medical care to be better. There were also more physicians in Stockholm from 1992 to 1994 who considered that the quality of care had deteriorated, with regard to quality of service, quality of nursing and quality of medical care. Despite concern about quality and premature discharge, physicians in Stockholm were found to have changed their behaviour in that the average length of stay in 1994 was about one day shorter in Stockholm than in the other eleven county councils.

Discussion and Conclusion: The resource reductions in Stockholm and in the 11 other councils have been about the same. An efficiency increase measured by decreased average length of stay was registered in all participating councils, but was greater in Stockholm than in the others. The study results indicate that the performance-based reimbursement system strengthens the incentive to increase efficiency. With the available data the possibility that the quality of care has deteriorated after the introduction of performance-based reimbursement cannot be ruled out, even if the statistical data on readmissions do not support this conclusion. It is therefore not possible to say anything about an increase in effectiveness (defined as increased efficiency and at least unchanged quality) as a result of the performance-based reimbursement system.
6.2 Paper II


Aims: To prospectively assess the impact of performance-based reimbursement on physicians’ attitudes and self-assessed professional behaviour, related to cost awareness, as well as their working conditions.

Methods: Physicians in Stockholm County Council with a performance-based reimbursement system and physicians in eleven Swedish councils without such system were examined simultaneously in 1994. This was a cross-sectional questionnaire study. The study population comprised physicians working in a medical or a surgical department in public hospitals within the selected twelve councils.

Results: The results showed a heightened cost awareness among physicians in Stockholm. More physicians in Stockholm than in the other councils reported that they had abandoned, due to consideration of costs, tests and examinations that they would have used three years ago. More physicians in Stockholm regarded themselves as being controlled by financial considerations in their everyday clinical work. A higher proportion of physicians in Stockholm than in the other county councils also considered themselves to have less freedom in clinical decision-making compared with three years earlier. More physicians in Stockholm considered that their possibility of controlling their own work schedule had deteriorated. The workload was rated to be equally heavy in all county councils, but more physicians in Stockholm than in the other councils reported a deterioration in mental well-being. Even job satisfaction was reported to have deteriorated to a higher degree in Stockholm than in the other councils.

Discussion and conclusions: There is an important difference between Stockholm County Council and the other county councils studied. The tendency, with regard to an increased cost awareness, is similar but the degree of change is different, without a similar difference in the level of constraints. The conclusion is therefore that performance-based reimbursement has heightened the financial pressure and the result is a larger increase both with regard to cost awareness and efficiency. However, this system seems also to have strengthened the negative occupational effects. All the physicians reported a very heavy workload but more physicians in Stockholm felt that their decision latitude has been curtailed. Job satisfaction and well-being had decreased in both groups of physicians, although more so in Stockholm. The “good” result achieved by performance-based reimbursement thus seems to be an increased cost awareness, while the bad effect seems to be an increased experience of being controlled by financial pressures and, subsequently, a deterioration in job satisfaction and well-being.
Aims: To examine whether performance-based reimbursement in health care affects the professional power and autonomy of physicians, and if so, whether this has any consequences for the quality of care.

Methods: A cohort questionnaire study examined the period 1994-98 in eleven Swedish county councils. Four hundred and eighteen physicians where studied in Stockholm County Council, with a performance-based reimbursement system, and in ten councils without such a system.

Results: Professional power and autonomy are considered to be very limited in all councils, and they have decreased during the period studied. Professional autonomy is, however, more limited in Stockholm and also more related to financial considerations. More than 60% of all physicians experienced a decrease in clinical freedom. They also considered that their possibility for affecting their own working day had diminished. Between 1994 and 1998 the feeling of being controlled had increased for physicians in all councils. A majority of all physicians reported in 1998 that they seldom or only sometimes had the opportunity to influence how they should work or prioritise. This influence was more limited in Stockholm. Eighty-seven per cent of all respondents reported a reduction in physicians’ influence in the health service organisation, and a shift in the balance of power from physicians to other professions. There was no difference between the two groups in this matter. These opinions were, however, shared by a greater number in 1998 than in 1994.

In 1998 approximately 50 % of all physicians reported a deterioration in well-being and 70 % of the physicians stated that their satisfaction with work had deteriorated compared to seven years earlier. Eighty-seven per cent of the physicians were proud of the work they did, but in spite of this about 60%, often or sometimes, contemplated leaving their present job. More physicians in Stockholm than in the other councils considered that the quality in terms of service to, and reception of, patients, nursing quality and finally the quality of medical treatment today had deteriorated in their clinic compared to seven years earlier. More physicians in Stockholm reported having to make decisions which were suboptimal to their patients due to financial considerations, to have been forced to make the stay in intensive care units too short for their patients due to financial reasons and also to have discharged patients too soon. According to the regression analyses, determinants for a high quality health care were: a high degree of job satisfaction, a high level of professional autonomy, influence over financial matters rather than being controlled by them, and a high degree of professional power. The most important determinant for experiencing a positive effect of financial incentive rather than a negative one was found to be a high degree of professional power.

Discussion and conclusions: Professional autonomy and power were found to be important determinants for physician-rated quality of care, and the physicians in Stockholm rated the quality of care lower than their colleagues in the ten other councils. Physicians considered themselves to have sufficient personal authority for daily clinical work. This personal authority, however, seemed to be very restricted with a majority of the physicians reporting
that they have no freedom to prioritise what to do at work or to decide how to do it. They painted a picture of being kept on the sidelines away from organisational influence and thereby having no ability to improve conditions. Physicians in all councils reported that they would like to be able to exert more control over their working situation, but the development seems to move in the opposite direction. Thus, although decreased professional autonomy and power constitute a shared problem for physicians in all of the county councils participating in the study, it seems that the problem is somewhat greater in Stockholm County Council. The results also indicate that financial considerations have penetrated the thinking of the physicians in Stockholm to a greater extent and in more areas, compared to their colleagues in the other ten county councils. Performance-based reimbursement, although providing possibilities to improve professional power, seems more likely to reduce autonomy and power and thereby jeopardise the quality of care. The reason for this seems to be that performance-based reimbursement has made physicians pay more attention to financial considerations, and this has been used to tighten control. The study results suggest that the performance-based reimbursement system might fail to reach desirable results due to its negative impact on professional power and autonomy.
6.4 Paper IV


**Aims:** To examine in more detail how the financial incentive works in county councils with and without a performance-based reimbursement (PBR) system. To examine whether the stronger cost awareness remain in Stockholm County Council (compared to 1994) despite the fact that the external incentives were weaker during the period between 1994 and 1998.

**Methods:** Physicians in Stockholm County Council with a PBR system and in ten councils without such a system were studied. This was a cohort questionnaire study in 1994 and 1998 and a cross-sectional study in 1998. Two register-based studies were conducted in order to compare average length of stay and resource reductions in the two groups.

**Results:** Physicians in Stockholm, as compared to physicians in the other ten councils, were more positively adjusted to financial incentives, indicating that the incentive differs. On the other hand the incentive system entailed slightly tougher consequences for physicians and clinics in Stockholm. The resource reductions in per cent were about the same in all eleven councils from 1991 to 1998. This means that the financial pressure might have been the same, but the financial incentives, based on consequences of failure or success, seemed to be harsher in Stockholm. Cost awareness increased in all councils from 1994 to 1998 but it remained greater among physicians in Stockholm. The regression analysis indicates that financial considerations penetrated the thinking of the physicians in Stockholm in 1998 to a greater extent and in more areas, than their colleagues in the ten other councils. Shorter average length of stay was found in Stockholm indicating an increased efficiency, but at the same time also a greater concern about quality of care.

**Discussion and conclusions:** The PBR system causes a stronger “internal” financial incentive in addition to the external ones. This stronger “internal incentive” remains even after a weakening of the external incentive. The stronger internal incentive can be described as if financial considerations have “got under the skin” of the physicians. This might be the main difference in effect between the two kinds of financial incentives, and this difference is probably due to the different kinds of reimbursement system. A strong cost awareness was, however, found to be a negative predictor for quality of care indicating that it is a difficult balancing act to keep cost considerations at a “good” level in order to retain the benefits of cost awareness without destroying the quality of care.
6.5 Paper V

**Forsberg E., Axelsson R. & Arnetz B. “The relative importance of Leadership and Payment system. Effects on Quality of care and Work environment”. (Manuscript)**

**Aims:** To examine whether the introduction of stronger financial incentives in health care give rise to such a restrictive context that leadership has only a minor influence, or whether good leadership is important to the achievement of both financial and other organisational goals, regardless of contextual factors.

**Methods:** Physicians in Stockholm County Council with a performance-based reimbursement (PBR) system, and in ten councils without such a system were studied in a cross-sectional questionnaire study. A regression analysis with cost/time pressure as dependent variable and the other indices including payment system (different councils) and leadership as independent factors, was carried out. The indices were recoded into dichotomy variables and then cross tabulated separately in the two groups to study the association between quality of care, professional autonomy, job satisfaction, work load, and leadership and cost/time pressure

**Results:** Cost and/or time pressure correlated more strongly to different payment system than to leadership. Cost and/or time pressure was greater in Stockholm County Council with the PBR system than in the ten councils with an annual budget system. However, even though the contextual situation was the most important for cost and time pressure, higher leadership ratings created an experience of a less restrictive frame, within the same context, than did a lower leadership rating. There was also a positive correlation between good leadership and higher ranking on quality of care, job satisfaction and professional autonomy. The same result was found in Stockholm and in the ten councils.

**Discussion and Conclusions:** The context created by the payment system was found to be more important than leadership for the experience of cost and/or time pressure. PBR itself seems to give rise to a more restrictive frame with greater pressure on the work process of the organisation studied. Physicians in the county council with PBR also experienced a lower professional autonomy and rated a lower quality of care. However, although contextual factors were of substantial importance there is scope for leaders to act, and their actions make a considerable difference, both for the experience of the work process and for the outcome in terms of work environment and quality of care. A good leadership may be able to shield the health care organisation from unwanted side effects of increased financial pressure.
7. INTERVIEW STUDY

In order to reach a deeper understanding of the effects of the PBR system in Stockholm an interview study was carried out. Using three different methods (triangulation) increases the possibilities to capture “the truth”. The themes used to analyse and categorise the interviews are marked in **boldfaced type**. Citations are marked in *italics*

7.1 Effects of the Stockholm Model

Most of the physicians, although not all, considered the **working situation for physicians to have changed**, mainly because nowadays they were more strictly governed by financial considerations. Most of them also felt that they had become "more efficient for better or for worse, we throw the patients out earlier". There was total agreement about work having become more intensive and stressful. The reasons for this were several. One was the increased patient turnover. Another was the flow of referrals from GPs to hospitals having increased. Some of the hospital physicians blamed the system with its free choice of family doctors for this, GPs being dependent on satisfied patients. A third change that had led to an increased amount of work was that all the operations on the operation lists are nowadays performed regardless of whether this can be achieved within normal working hours. The pressure to do so was greater because there was an increased demand to speed up patient turnover. There was also strong pressure from the purchasers to reduce the number of patients at outpatient clinics in favour of referring patients to GPs for follow-ups. These changes had made the work at the outpatient clinics more trying, primarily because the physicians disagreed with the decision, which they felt to have been made on non-medical grounds. They themselves judged many of the referred patients as warranting specialist care. There had been an increased co-operation between GPs and hospitals in creating treatment guidelines, which was judged as progress. However, in spite of this, many hospital physicians considered some patients too sick for GPs to cope with and felt that such cases consequently received poorer quality of care. GPs seem to agree because they often referred the patients back to the outpatient clinics.

The decreased average length of stay was mentioned as creating a demand for an increase in the number of patients in need of specialist outpatient care, in direct opposition to the demands to diminish this service, e.g. many newly operated patients are discharged too early to be capable of understanding complicated instructions about future care, and many heart failure patients are treated as outpatients very quickly and therefore need a specialist to suggest the right combination of drugs. The reduced outpatient clinics resources at hospitals had, in this situation, created an extensive traffic of "on the side" outpatient consultations on wards and by telephone, which had increased work intensity. Clinical freedom was considered not to have changed. The use of guidelines had increased but this was judged as being something positive and not regarded as a threat to clinical freedom.

Heightened cost awareness was often mentioned as a positive result of the Stockholm Model. Agreement was almost total, "Above all, those who were totally unaware of costs are no longer so. This (cost awareness) was non-existent earlier". Before the change in the system only medical considerations guided the choices. Heightened cost awareness was judged to have facilitated reductions in health care expenditure. There has been an increased acceptance among physicians about adhering to the budget. Most respondents considered this to be something positive although some considered the increase in cost awareness to be negative, and stated that the hunt for “unnecessary” costs only created irritation and inefficiency. In
some hospitals the hunt for costs was reported to have led to serious encroachments in everyday clinical work, e.g. for financial reasons the hospital administration had ordered very strict restrictions with regard to certain examinations conducted outside of normal hours (on emergency wards).

Another effect judged as positive was increased efficiency. Almost all respondents considered their own clinic to have become much more efficient, mainly through the incentive to increase the number of patients but also by changing routines, that is, no waiting time for treatment (better planning), shorter period of time between two operations, changed routines before operations and more decisions being decentralised. Efficiency was defined by some physicians as "doing more", or "more swiftly establishing the correct diagnosis". Negative consequences were also reported as a result of increased efficiency, for example, research work and teaching of trainee doctors had diminished because of lack of time. No one reported that very efficient physicians are rewarded by increased salary, although some expressed the wish that this would happen.

Many of the respondents reported a negative effect of the Stockholm Model as being that they were subjected to more inconvenience in their work and that this had made the health care less efficient. Examples given were connected to internal debiting. For example, a patient on a gynaecology ward is also found to have another surgical problem. This will lead to a fight between the two clinics about the responsibility for paying for the treatments ordered by the consultant physician from the surgical clinic. Another complaint was that the number of referrals had increased. Patients can not, as before, be referred from one specialist clinic to another but must have a referral to their primary care physician requesting that he/she write a referral to the second clinic. Otherwise, the first specialist department will get a bill for the second period of care. Before, this was dealt with by simply making a phone call to the other clinic. Previously, when a patient was discharged he/she was given all the necessary referrals for further follow-ups in his/her hand. Nowadays the specialist sends a referral to primary care proposing that referrals are made for further investigations. It is, in the new situation, more important to decide who will pay for the care than making it smooth and easy.

Criticism was frequently levelled at the way in which the reimbursement system works in practice. In the initial construction there were clear incentives to increase efficiency. This was then rewarded, but according to the respondents, since 1994/95 or even earlier, cost is the only issue that counts. “We have left the system” Increased efficiency is thus regarded as a burden “One has a feeling of not being allowed to be efficient, the purchaser boards make the decisions”. A further criticism of the reimbursement system’s construction was that many diagnoses were considered to be incorrectly weighted in terms of reimbursement. “An unsatisfactory and ill-conceived reimbursement system that creates preposterous situations". Even the DRG registration for outpatient care (KÖKS and KÖMS) was considered to be too superficial as well as measuring the wrong things. Another complaint from many of the respondents was that, nowadays, too much time is used for talking about money. Meetings previously used for discussing medical problems now concentrate on financial discussions.

Many of the physicians were upset about the fact that clinics generating a surplus are not allowed to keep it. This is considered to have been one of the initial prerequisites of the system, which was quickly altered, “The clinic was not even permitted to keep the surplus. That sort of reasoning is hard to understand and sell to the personnel” “The only reward is to save even more". The hospitals are usually allowed to retain a part of the surplus but one respondent reported that some clinics had been ordered to retroactively pay the surplus back
to the purchasers. The reimbursements are also adjusted at the end of each year with reference to the total production. “Initially we thought that we would generate more income but when we increase production by 15% then the reimbursement level is reduced so...negative at the end of the day”. However, there is seldom a surplus. According to the respondents this is because of the discount system stipulating that production over the ordered level is reimbursed at only 10-30% of the original DRG level. These contracts, only including ordinary (those providing care) clinics not ancillary (e.g. laboratory services etc.) clinics, have, more or less, been forced upon the clinic by higher political bodies. “From October the whole surplus is swallowed up”, “Ancillary clinics ought also to be forced to give discounts.

Some of the respondents considered that DRG administration and DRG classification took too long at the beginning of the Stockholm Model, although not any more. Others reported that it still takes too much time. “The steering instrument has almost totally lost its meaning now (1995) when we have reintroduced the mixed economy, but despite this we have to use 10-20% of our working hours to complete forms”, “Five full time jobs, devoted to only working with meaningless papers, at the same time nurses are being dismissed”. Two respondents reported not having experienced any financial incentives. “The buying and selling is not for real”. The reasons for this was that to be real there would have to be a working competition, with some winners and some losers, and a system whereby it is beneficial to succeed. One respondent considered that the clinic, not the hospital, should be the financial unit in order to get clear incentives. Another considered that, “It is not market forces that rule but other things entirely”. One example mentioned was that it is too expensive to let one clinic stand empty or to expand another irrespective of the clinic’s performance. In addition, activities are being governed by those patients coming to the emergency department, irrespective of whether the hospital has already fulfilled its obligations for the year’s contracted care.

Most of the respondents were of the opinion that it would be good for the patients to stay somewhat longer in hospital than that permitted nowadays, but they did not think that the earlier discharge was so premature as to constitute a medical risk. However, follow-up care was criticised by some of the respondents. “If one considers the care provided at the places to which they are being discharged, then they are prematurely discharged”. The short mean length of stay has consequences. It was pointed out that investigations have a tendency to be more superficial when much of the work is being carried out at outpatient clinics or in a primary care context, “One doesn’t have the time to ponder so much about the investigations".

The main reason reported, for earlier discharges, is a lack of beds. Other reasons mentioned are a changed attitude among patients, they want to be discharged earlier. Also, developments within medical-technology, for example, the use of laparoscopy techniques, reduce the length of stay.

One respondent reported that his clinic had investigated the readmission of their patients without finding any increase compared to previous years. Many of the respondents, however, reported an increasing number of patients being discharged the day before, or within a week of, showing up at the emergency department. This has consequences for the workload. Mostly the patients are not readmitted but they consume the time of the physicians on duty needing more information as well as further investigations. The workload on wards is also
increased due to more work with patients having been discharged in a condition making it difficult for them to understand the information given.

Most of the respondents expressed the opinion that cost considerations have an impact when deciding upon investigations, whereas others reported that they think about the costs but that this does not have any impact on their decisions. Examples of consequences are “I do not initiate expensive investigations for fun any more, out of pure curiosity”, “One hesitates sometimes before conducting expensive or doubtful investigations”, “One refrains, or carries out a cheaper investigation”. “Refrain from expensive emergency investigations. Some of the respondents considered this to be a good development,” Sometimes we carried out unnecessary tests,” whereas others were more doubtful about the merits of the present situation. Most of the respondents reported that they do not refrain from any essential treatments for financial reasons.

Most of the respondents considered their own influence over costs for care of individual patients to be small. The reason for this is that they considered most of the costs to be fixed costs. They also felt that medical necessity governs what is to be done and that therefore the scope for individual decisions is small.

7.2 The relative importance of other changes

Although most of the respondents considered the new reimbursement and steering system to be of great importance, other changes were also considered to have been important. “The chief consultant reform”, in which the chief consultant physician is responsible for both financial and medical decisions, came at the same time, and give the same signals about a joint thinking regarding administrative/financial and medical issues. Real competition was stimulated in the knowledge that one of the ten hospitals would be closed. Those employed at St. Göran’s hospital considered the reconstruction of the hospital as a stock-holding company, owned by the county council, to be an important factor. This new construction was considered to have created short pathways for decision-making as well as having encouraged a team spirit, together with an increased pressure to adhere to the budget.

One of the respondents considered that the most important factor for daily clinical work was that the decision making process at the large hospitals was so centralised that it was an uphill struggle to gain a hearing with the decision makers. The respondents representing the two largest hospitals were in general more negative about their opportunity to influence, “The differences between the hospitals are greater than (the difference) before and after the model,” “I think that the model has accentuated the differences.”

The “Ädel reform”(1991), in which the municipalities took over responsibility for the care of the elderly not in need of emergency care, was an important reform. One of the respondents considered this to have been the most important change compared with the Stockholm Model whereas others considered the Ädel reform to be an important prerequisite for making the purchaser-provider system work. The Ädel reform was initially considered to have failed in its mission but has contributed to the current situation whereby health care services now concentrate on providing specialist medical care. This is regarded as a very positive effect. It was, however, pointed out that the Ädel reform may have increased the number of elderly patients on the emergency wards since the municipalities have reduced the number of
physicians working in nursing homes compared to the period when the county councils were in charge.

Most of the participants considered both reductions and the new steering model to have had an impact on the development. “It was very lucky that they came at the same time, first the purchaser-provider system and then the cutbacks, if the cutbacks had not come... I presume we would not have been as efficient”. For most respondents it was the cutbacks that were considered to be the main reason for early discharges due to lack of beds. At the same time the new system was considered to have created a new attitude with regard to when patients should be discharged. The Stockholm Model is considered to be the most important factor for heightened cost awareness. Some felt, however, that the heightened cost awareness emanated from financial reductions and that the DRGs had not been that important.

7.3 Quality of care

Opinions varied among respondents about developments with regard to quality of care. Many considered that there is no difference in the quality of care currently offered, especially regarding the quality of medical care. Some others reported that quality is worse and others that it is better. “Worse and worse if quality means getting an appointment at the outpatient clinic or having an operation within a reasonable time”. Most of the respondents pointed to the financial cutbacks as responsible for the decrease in quality. One reason for a deterioration in the quality of medical care was thought to be that, “People have to work too hard and there have been more incidents, plus the fact that one is not allowed to carry out essential investigations out of office hours”. “If one wants an acute pulmonary X-ray, it is so expensive that one thinks twice about ordering one”. This is considered to increase medical risks. Increased emergency department resources and competence, introduction of quality assurance systems, and medical advances are, on the other hand, considered as having improved the quality of medical care.

8. ADDITIONAL FINDINGS

Data in this section emanates from Study two and three, but are not included in any of the papers

8.1 A study of the impact of size

Stockholm is the capital of Sweden with 1.7 million inhabitants. The councils in the comparison group in this thesis are all smaller than Stockholm. One can argue that the differences found in this thesis may be due to the difference between larger and smaller councils or hospitals and not only because of the different payment systems. According to organisational theories the size of organisations is an important factor e.g. for efficiency and outcome (Axelsson, 1998). To test this hypothesis about “size-effect” a comparison was made with a third group of physicians. The latter worked in Dalarna County Council, which has a payment system quite similar to the one in Stockholm, but is much smaller than Stockholm. The data from Dalarna was gathered in 1994, in Study two, together with data from the other councils in this study. Malmö (one of the councils in the comparison group) was excluded from this comparison. The reason for excluding Malmö was that Malmö could
be considered as a large council and the hospital in Malmö is as large as those in Stockholm. A comparison was made between Malmö and the rest of the councils as well as between Malmö and Stockholm. The number of physicians from Malmö, however, was limited and made it hard to obtain significant results. Some disparities were found between Malmö and the rest of the reference councils according to judgements about quality. Physicians in Malmö scored the quality of medical care lower than the others, 31% compared to 14% in the other nine councils judged the quality to have decreased ($\chi^2(4)=9.5$, $p<0.05$). Otherwise no significant differences were found. Therefore the comparison with Dalarna was chosen.

All four indices used in Paper One and Two were compared between the three groups (Table 2).

<table>
<thead>
<tr>
<th>Index</th>
<th>Council Compared councils</th>
<th>Mean score/ Compared councils</th>
<th>Mean difference</th>
<th>Std Error</th>
<th>Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency pressure</td>
<td>Stockholm Nine councils Dalarna</td>
<td>.3749702 4.637E-02</td>
<td>-3.760659 -4.75E-02</td>
<td>.770E-02</td>
<td>.1161598</td>
</tr>
<tr>
<td></td>
<td>Dalarna Nine councils Stockholm</td>
<td>.3749702 -1.10E-03</td>
<td>-3.285963 4.75E-02</td>
<td>.1139053</td>
<td>.1161598</td>
</tr>
<tr>
<td>Cost awareness</td>
<td>Stockholm Nine councils Dalarna</td>
<td>.1403696 -4.85E-02</td>
<td>-1.195737 -6.91E-03</td>
<td>.769E-02</td>
<td>.1160055</td>
</tr>
<tr>
<td></td>
<td>Dalarna Nine councils Stockholm</td>
<td>.1403696 -5.54E-02</td>
<td>-1.1888274 6.91E-03</td>
<td>.1137539</td>
<td>.1160055</td>
</tr>
<tr>
<td>Quality of care</td>
<td>Stockholm Nine councils Dalarna</td>
<td>.1853578 -5.74E-03</td>
<td>-3.325075 -1.339756</td>
<td>7.43E-02</td>
<td>.1121325</td>
</tr>
<tr>
<td></td>
<td>Dalarna Nine councils Stockholm</td>
<td>.1853578 -1397173</td>
<td>-1.1910995 1339756</td>
<td>.1099561</td>
<td>.1121325</td>
</tr>
<tr>
<td>Working conditions</td>
<td>Stockholm Nine councils Dalarna</td>
<td>.3760937 1.961042</td>
<td>-3.3778907 -1.979013</td>
<td>8.38E-02</td>
<td>.1265379</td>
</tr>
<tr>
<td></td>
<td>Dalarna Nine councils Stockholm</td>
<td>.3760937 -1.80E-03</td>
<td>-1.1799894 1.979013</td>
<td>1240819</td>
<td>.1265379</td>
</tr>
</tbody>
</table>

A low score on the index **Efficiency pressure** means that one experiences a strong and more negative efficiency pressure, that is a high degree of pressure to decrease the average length of stay in hospital or on an intensive care unit too much, because of financial considerations, but a low degree of co-operation. Stockholm and Dalarna had significantly lower scores than the ten councils. No significant difference was found between Dalarna and Stockholm. This indicates that physicians both in Stockholm and Dalarna seem to be under a stronger efficiency pressure.

A low score on **cost awareness** means that one often takes financial considerations into account, and that one has altered one’s behaviour accordingly. Stockholm had a significantly lower score than the nine councils. Dalarna was in between with no significant difference
from either the nine councils or Stockholm (although the p-value for comparison with Stockholm was 1.00, indicating a very similar score).

A low score on quality of care means that the respondents judge the quality in service to patients, nursing and medical care, to be worse than three years ago. Stockholm had significantly lower scores than the ten councils. Dalarna was in between with no significant difference with regard to Stockholm or to the nine councils.

A low score on working conditions means that the respondent experiences that the conditions for physicians have altered for the worse, job satisfaction has decreased and influence, power and clinical freedom are reduced. Stockholm had a significantly lower score than the ten councils. Dalarna was in between with no significant difference in relation to the nine councils or to Stockholm.

8.2 Impact on administration
In 1998 physicians in Stockholm County Council devoted on average 52% of their working hours to "direct patient work (i.e. patient sessions, examinations, operations etc. as well as writing of case-notes)", 20% to "administrative work (include even DRG grouping, writing certificates etc)", 14% to "conferences/meetings (include meetings/conferences which are correlated to both patient and administrative work but exclude teaching, courses and research)", and 13% to "teaching, courses and/or research".

Physicians in the other ten councils used more time for direct patient work (64% vs. 52%, F1,410=31, p<0.001), same amount of time for administration (19/20%), less time for administrative conferences concerning own patients or clinic (11% vs.14%, F1,401=6, p<0.05), and less time for teaching, courses and/or research (5% vs. 13%, F1,406=48, p<0.001)

The proportion of work time spent in direct patient work had decreased from 1994 to 1998 for both examined groups, from 63% to 52% for clinicians in Stockholm County Council (F1,349=23, p<0.001) and from 71% to 64% in the other ten councils (F1,477=20, p<0.001) At the same time the proportion spent on administrative work had increased in both groups from 1994 to 1998. From 15% to 20% for clinicians in Stockholm County Council (F1,348=13, p<0.001) and from 14% to 19% for physicians in the ten councils (F1,471=18, p<0.001).

Also, the time spent at administrative conferences and meetings related to patient- or clinical work had increased, from 10% of work time to 14% for physicians working in Stockholm County Council (F1,345=12, p<0.01) and from 9% to 11% for physicians in the ten councils(F1,464=7, p<0.05)
9. METHODOLOGICAL CONSIDERATIONS

During the period of the study there have been a number of nation-wide reforms, which sometimes gave incentives for change in the same direction as the performance-based reimbursement. However, since they have been nation-wide it may be presumed that they have affected Stockholm and the compared group in a similar way. The performance-based reimbursement system has remained in operation in Stockholm but the strength of the incentives have differed during the period, which may be a problem when comparing longitudinal data.

Another difference affecting the cost/time pressure would have been if the resource reductions in Stockholm had differed from that in the compared group. To answer this question a register based study was conducted and no statistical difference was found regarding resource reductions between the councils. Despite this there may have been a difference in the degree of reductions due to "system effects". This is discussed more in detail in section 10 "Discussion", under the heading "The relative importance of reductions and increased administration".

An alternative study design would have been to collect data in Stockholm before and after the intervention (introduction of PBR). With such a study design, however, it would have been more difficult to eliminate the influence of other organisational reforms as well as more general changes in society during the period. The pre-post design has been used in a number of other studies but it leaves itself open to a lot of weaknesses, making it complicated to draw conclusions from the results. This is especially true in the field of medicine, where changes have been many and rapid during the past decades. Instead, it was decided to use a design in which a comparison was made with all councils in Sweden that did not introduce PBR. The underlying belief was that they would be like Stockholm would have been without the intervention.

This is a questionnaire study and some objections might be raised against the use of this method of collecting data. One objection may be that there is sometimes a discrepancy between words and action (LaPiere, 1934, Deutscher, 1973). A further objection may be that other factors may influence the answers. There have been many discussions in the literature about the relationship between the environment, the individual’s perception of, and attitudes towards it, and the outcome. Self-reported data are criticised for exaggerating the connections between environment and outcome. In a literature review, Spector (1992) suggested that possible influences, affecting the answers, could be categorised into five groups: social signals (norms in the environment), cognitive processes, (changing responses on the basis of signals about “right” performance), personality, mood and attitudes about one’s job. He concluded, however, that there was “surprisingly little evidence that the observed relations are attributable to the self-report method” (Spector, 1992: p.143).

Why then use a questionnaire to measure physicians’ attitudes? Physicians enjoy a great deal of independence in daily clinical work. Efficiency in health care depends therefore to a large extent on physicians' behaviour. This is the case both with regard to the number and kind of diagnoses and treatments, and it is due to the fact that medicine is not an exact science. There is, for example, a "grey area" in diagnostics, which means that a patient can be on the border between having, or not having, a specific diagnosis. When this is the case, physicians may choose different strategies. Also, there is often more than one way to cure a disease. Routines vary between clinics, and this has been shown to generate different costs although not
significantly different results (Eckerlund & Håkansson, 1989). Physicians are governed by their attitudes about what constitutes "the best possible care". However, as almost all decisions are partly subjective, they may be affected, positively or negatively, by financial considerations. It is therefore important to ascertain physicians’ opinions about having to take financial aspects into consideration and whether or not this affects their decisions. This is one reason for using a questionnaire.

Nevertheless, the objection may be raised that sometimes there is a discrepancy between words and action. What is studied in this thesis, however, are not really attitudes but merely self-reported retrospective behavioural changes. The answers may, however, be interpreted as reflecting attitude changes. The retrospective question construction was intended to make the answers more robust and less influenced by expectations of giving the "right" answer. Sociologists often study attitudes related to behaviour in sensitive issues like, for instance, race and gender, but in this study there were no simple "right" answers to the questions. This might mean that the answers are more reliable. The self-reported subjective data have also been related to objective measures, such as length of stay in hospital, which has also increased the reliability.
10. DISCUSSION

10.1 Efficiency and Financial incentives - Does PBR increase or decrease efficiency?

According to Paper One of this thesis and the interview study, physicians in Stockholm have become "more efficient for better or for worse". The system presented in Stockholm was based on straight incentives, with performance-based reimbursement and a possibility of retaining profits for further investment. When the PBR system was introduced there was a clear incentive to be more efficient, and since physicians are used to being capable, many seem to have been satisfied with being, and feeling, more efficient. Especially so when there has been a long period, before the introduction of PBR, with complaints that the health care system was inefficient.

There are a number of different definitions of efficiency and cost effectiveness. In this thesis efficiency is defined as the amount of care given in relation to the amount of resources used, and cost effectiveness is defined as effectiveness or outcome/cost. This seems to be an appropriate definition with reference to the definition given by the physicians themselves in the interview study, in which efficiency was defined as "doing more", or "more rapidly establishing the right diagnosis". The definition of efficiency used in this thesis was also used in the questionnaire.

The results from the questionnaire studies showed no differences between physicians in Stockholm and in other councils according on the direct question "Do you consider your own clinic to have been more efficient compared to 3/7 years ago. 59/58 % said yes. Even so, almost all physicians in the interview study in Stockholm stated that they had become much more efficient. As is shown in Paper Two, physicians in Stockholm are more aware of costs than physicians in the other ten councils. In the interviews most of the physician considered this to be a positive effect of the PBR system although it has also increased the pressure on them. According to Paper Four this increased cost awareness seems to have been internalised as an “inner incentive” in the physicians meaning that it remains even when the external incentives are weakening.

While most of the physicians in Stockholm stated that they had become more efficient, they also stated in the interviews that they had become less efficient. This decrease in efficiency is related to the DRG system itself, especially to the handling of patients in need of care at more than one clinic, which has been more complicated in the new system. This is an earlier criticised limitation of the DRG system (Weiner et al, 1987). Another part of the efficiency loss is linked to the internal debiting system. Physicians are more reluctant to conduct all necessary tests and treatments in connection with the (hospital) stay. Instead they arrange analyses to be carried out one by one in order to avoid making too many, or send a referral to primary care for further investigations. The physicians themselves judged this to be less efficient and more time-consuming, but felt forced to do so because of financial pressure. The existence of such an efficiency loss is supported by the findings about x-ray examinations during the first year after the introduction of the Stockholm Model, during which an unchanged number of x-rays were taken over an increased number of occasions (Forsberg & Calltorp, 1994). This suggests that investigations of patients were more fragmented and thereby perhaps more inefficient.

These findings together led to the conclusion that Stockholm County Council had become both more efficient (by definition of producing more) and less efficient (by sometimes using...
more resources than necessary) than the ten other councils, and that the effect on cost effectiveness (outcome/cost) might therefore be zero. This may be the explanation as to why there was no difference in how the two groups judged the efficiency in the questionnaire.

As was shown in Paper Five the PBR system seems to lead to greater pressure to increase efficiency, which was the intention, and has probably pushed the development of organisational performance forward. Unfortunately, it seems that the efficiency losses counteract some of the benefits from performance developments. At the same time, it seems that the efficiency increase caused by working in a more rational way has not been enough, and that instead, a great deal of the efficiency increase is related to ‘running faster’.

The definition of doing a good job has, through increasing cost awareness, partly shifted from being a skilled clinician to being a skilled clinician within the existing financial frame work. At the same time there is a great frustration that work has become more complicated. This has made many physicians feel more inefficient.

10.2 The relative importance of reductions and increased administration.

At the same time as the introduction of the new payment system in Stockholm in 1992, a substantial financial reduction was made. The DRG points were set at a level with a 10% reduction in health care resources already carried out, meaning that an efficiency increase was necessary in order to reach status quo. These reductions resulted in administratively ordered reductions in the number of hospital beds available. Also, the Ädel-reform, when municipalities took over nursing homes and caring responsibility for the elderly without need of emergency hospital care, resulted in a reduction in hospital beds

As stated in the Section on “the impact of size” and in Paper One, Stockholm experienced a greater pressure to work more efficiently with regard to reducing mean length of stay in hospitals and on intensive care units, because of financial incentives.

Physicians, both in Stockholm and in the other councils, claim the reductions, and thereby a reduced number of hospital beds, to be the greatest pressure to reduce average length of stay, and the reason for possible "too early discharges". Reductions, however, can not be taken out of the context in which they are made. The context may affect the results of the reduction. In the interviews, physicians claim that the introduction of PBR has contributed to an increased understanding and acceptance of reductions, based on an increased financial insight.

Reduction in the average length of stay was also, due to earlier findings, an expected effect of PBR. According to the interviews, the Ädel-reform has contributed to allowing hospitals to concentrate on specialist care. It is, however, also considered to have intensified the problem with the limited number of beds in Stockholm. The reason was the lack of medical resources available at nursing homes. This means that the elderly more often need hospital care. This has created an increased pressure on the emergency department. The work performance might be different in different municipalities i.e. different amount of caring resources at nursing homes and might therefore have contributed to the differences between the councils studied.

According to the examination of resource use, described in Paper Four, there was no difference in resource reduction between Stockholm and the ten other councils. The reduction was about 10 % between 1991 and 1998 in both groups. Despite this, it might be the case that
physicians in Stockholm feel that they have more restricted resources. This is linked to the amount of "extra" time spent doing DRG-related work. According to the interviews this administrative work takes a great deal of time and this finding is supported by questionnaire data about work content. The number of physicians per capita, working in the included specialties, is the same in Stockholm County Council as in the other ten councils (Swedish Pharmaceutical Statistics Ltd, 1998). At the same time, physicians in Stockholm spend a smaller percentage of their working time in direct patient work. Instead they spend a significantly greater proportion of their working hours on administrative and other ancillary work tasks and teaching, courses and/or research. A heavier burden of work concerning teaching is expected in Stockholm. All the Stockholm hospitals studied, but not all hospitals in the ten councils, have medical students. The other differences are more likely to be explained by system differences. There are, therefore, indications that the PBR system calls for somewhat more administrative work, by increased documentation as well as by causing more administrative aggravation. This is also supported by earlier research (Roberts, 1993). If not only the proportion of direct patient work but also absolute time are less for physicians in Stockholm County Council this ought to have a negative impact on the possibilities to provide a good quality of care.

10.3 Comparison with international experience

The effects of the introduction of DRGs on the care of Medicare patients were studied in New Jersey in 1979-1984 (Weiner et al, 1987), which were the first five years after the introduction. This study found a general effect of financial pressure, rather than a specific effect on physicians’ behaviour based on the incentive in a single DRG diagnosis. One effect was a reduced average length of stay, which was stated to be a more general effect. The support for this statement was that hospitals that easily achieved a financial surplus reduced their average length of stay less than those that had financial problems. There was also no correlation between reduction in average length of stay and money-losing DRGs. There was an expectancy in the DRG concept that hospital administrators would monitor ancillary use in order to reduce costs (Hubell et al 1985, Stoughton 1982). The study in New Jersey however, found, few examples of this.

The results in this thesis are slightly different from those reported in New Jersey. The effects on average length of stay are similar, but the effect on ancillary use in Stockholm seems to be more in accord with what the DRG reformers believed (Hubell et al 1985, Stoughton 1982). Physicians did reduce ancillary use a great deal themselves, but there are also reports in the interview study, that the hospital administrators were intervening in these matters. One reason for this administrative intervention, also suggested in the study mentioned (Weiner et al, 1987), might be the situation in Stockholm, with persistent deficits in hospital budgets. Possibly caused by the initial reduction of 10%.

Another interesting comparison is with the development in the UK, after the introduction of an internal market within the National health Services (NHS) in 1991. There are some differences between the British system and the Stockholm Model. One difference is the existence of GP Fundholders or Primary Care Trusts (PCTs), being responsible for a considerable part of the purchasing of inpatient care, in Britain. Another difference is the lack of cost data available for hospitals in UK. Hospitals in Stockholm have access, although far from perfect, to such data. The two systems, however, have many similarities, both before the reforms took place as well as afterwards. A 1998 review of the UK reform by LeGrand and...
other researchers found an efficiency increase attributable to the reform, based on activities in relation to resources. They found changes in indicators of quality difficult, either to interpret or, to attribute to the reforms. They point out a culture change but otherwise "measurable changes were not as great as was predicted(or feared)...Competition within the market was limited" (LeGrand et al, 1998).

The culture changes mentioned were a legitimisation of seeking value for money and a wish to evaluate cost effectiveness. This may be compared to the increased cost awareness in Stockholm. Also, incentives are judged to have been improved by the internal market (Enthoven, 2000). The description of the "perverse" incentives in UK before the reform were very similar to the description of wrong incentives in Stockholm (Enthoven, 1985, Stockholm County Council, 1991a). Another interesting similarity between Stockholm and the UK is the experience that after a couple of years the NHS retreated from market mechanisms to more central control, just as in Stockholm where much of the external financial incentive was judged to have been removed after about two years (Enthoven, 2000, Charpentier & Samuelsson, 1998, see also Interview study). In Stockholm, however, a "reintroduction" of the Stockholm Model was effected in late 1998, outside the scope of this thesis (Sandlund et al, 2001).

10.4 Competition and Purchaser-Provider approach

Another important aspect has been the existence of real competition in Stockholm County Council. Fetter expected "a direct linkage between the practices of individual physicians and the financial consequences for the hospital" (Fetter et al, 1980). In the study in New Jersey referred to above this was not the case and the researchers proclaimed that this is generally unlikely to happen. The reason for this was that "society's desire to control hospital costs is counterbalanced by its desire to improve the access to, and the quality of, hospital care" (Weiner et al, 1987). Also in UK the competition were judged as limited. The situation in Stockholm in 1992, however, was different because there was a general conviction that there was an over capacity in the acute care sector. PBR is based on discharge diagnoses given by individual physicians and this reimbursement makes up one hundred per cent of the hospital’s budget. At the same time, hospitals realised a real competition. In this situation there was "a direct linkage between the practices of individual physicians and the financial consequences for the hospital" just as Fetter predicted (Fetter et al, 1980).

One of the intentions with the Stockholm Model was that competition would serve to identify inefficient clinics and result in their closure. However, the political system failed to fulfil this intention. Since the political system did not reduce the capacity of care and the system initiated a huge productivity increase, the county council very soon lost control over total costs. Since the global budgeting system sets limits for total costs, politicians and administrators in charge searched for another solution. They created a discount system. The purchaser-provider system used a block contract system, but the hospitals were no longer free to offer their services at any price below the price ceiling. Instead, discounts were often not possible to negotiate, but were stipulated by the political system (Charpentier & Samuelsson, 1998). Because of this and a number of partly retroactive changes within the reimbursement system, both the credibility of and the enthusiasm for the system decreased and the straight incentives were undermined.
10.5 Organisational changes

Physicians in Stockholm seem to be under a greater pressure than their colleagues in the ten other councils and they are also more frustrated about inefficiencies created by the system. They want to be efficient, but instead of working more rationally the great pressure makes them run faster. A statement from one chief physician in a study in 1998 supports this conclusion “We are running fast, fast in a treadmill. When will we ever find the energy to have any ideas and when will we find the energy to be creative. I think this is the core problem. We have got to have more resources to reduce our speed to a pace that allows creativity and ideas. We shall then be able to start working in a good environment and gradually make the care more efficient, thereby reaching the same cost levels as today. We are so incredibly unproductive because we are so badly organised. Everybody runs and runs and nobody manages to organise what we do.”(Sandlund et al, 2001).

One aspect of this is that it might be the organisational changes themselves that obstruct performance improvements. Sometimes organisational changes have to be made to achieve a good structure for improvements. However, repeated changes at the macro-level may very well be a hinder for changes at a micro-level, for example, at a clinic. This might happen because the macro level consumes all the energy. It also causes insecurity that makes people think it is better to wait with micro changes until the new structures are established. Sometimes macro changes destroy micro-level networks important for initiating and accomplishing changes. Since 1991 there have been almost one macro level organisational change each year in Stockholm County Council (Forsberg et al, 1998, Sandlund et al, 2001).

10.6 Size effect

One important issue when comparing groups is whether they are comparable. Stockholm is a large council whereas most of the others councils studied are smaller ones, which may cause various problems. The differences may depend on inhabitants being different in smaller and larger councils e.g. more demanding in Stockholm thereby creating a worse work environment for physicians. It may also depend on different size of hospitals in smaller and larger councils. According to the interview study, physicians working in the two largest hospitals, were more negative about their opportunity to influence organisational and decision making processes.

As was found in the "study of the impact of size” the situation with Dalarna in between the two other groups indicates that the effects studied have a complex causation. Both of the reasons studied, payment system as well as “size effect” seem important. An increased pressure for efficiency seems to be an effect mainly caused by the payment system. The larger city, however, seems to contribute to more negative effects by the payment system. The finding that physicians from Malmö (the largest council in the group of then councils) rate quality of care significantly lower than the other nine councils supports the conclusion that at least the lower rating of quality of care in Stockholm is partly a “size effect".
10.7 Leadership

Despite contextual factors being most important for efficiency pressure, leadership was, as reported in Paper Five, found to be important in shielding the professionals from negative side effects of the system chosen. There was, as shown in Paper Five, a positive link between having higher (better) leadership scores and a higher professional autonomy, as well as a higher quality of care. It therefore seems to be important to continuously support and improve the quality and competence of the leaders in the organisation. This might be a key issue for health care improvement.

A reimbursement system has to encourage increased efficiency through development and better ways of working rather than through forcing staff to work faster. The originator of the DRG system expected improvements in the performance process and these expectations are also shared by the system makers in Stockholm. These expectations, however, seem not to have been met. DRG’s have not, so far, been the solution for creating better clinical practices. Reasons discussed above are lack of resources and obstructions on micro-level improvements due to repeated macro-level organisational changes. The reason might also be that a system construction, despite its good points, is not enough. One of the most important issues for a leader is to improve work performance. Perhaps this is the window of opportunity for leaders to make a difference.

In Paper Five good leadership was shown to create a less restrictive frame for professionals as well as having other positive effects. This might have something to do with how the work is performed. Both leaders and systems, however, need to have reasonably good conditions in order to be successful. Here the savings in combination with the more time consuming, and therefore more expensive, DRG system may have created restrictions that are too tough to allow scope for enough performance improvements (Forsberg et al, 1998, Sandlund et al 2001).

10.8 Work environment – Professional autonomy and power, and job satisfaction.

We stated earlier in this discussion that the total cost effectiveness effect of the PBR system might have been zero. Despite the shorter average length of stay in Stockholm this may be the case. The impact on work environment and quality of care must be taken into account and this may possibly even tip the balance over to the negative side.

Professional autonomy and power were judged to be limited in all councils, and more limited in 1998 than in 1994. The difference between the two groups of physicians was greater in 1994, as reported in Paper Two, than in 1998, as reported in Paper Three, but still the professional autonomy was more limited in Stockholm. One purpose of the origin DRG system was, to diminish the power and influence of physicians in favour of the administrators (Fetter et al, 1976). What would create this shift in the balance of power was an increased emphasis on economic issues. As is reported in this thesis, there has been an increased emphasis on economy in all councils although greater in Stockholm County Council. A decrease in power and influence of the physicians is thus in keeping with the theory and ought not to be surprising. Nevertheless, it was unexpected. Many physicians in Stockholm instead expected, and some also experienced, that their influence would increase through the decentralised system. However, the majority evidently did not have this experience and seem to be dissatisfied with the development. Theories about professionals state that one important
requirement for the physicians as professionals, producing good quality in work, is a high
degree of professional autonomy and power (Axelsson, 1998). Also according to earlier
findings about the connection between professional satisfaction and quality of care (Arnetz,
1999, Thomsen, 2000), this ought to be taken into consideration when deciding about
potential changes in future reimbursement systems.

One administratively ordered change in Stockholm was a strong pressure to reduce access to
and availability of the outpatient clinics at hospitals. This change was initiated from the
political system and was probably easier to fulfil in a purchaser provider system by simply not
contracting this kind of care. It emanated from a political ideology of having a strong primary
health care service, partly due to a conviction that this change would reduce the total
expenditure for health care. The construction of the reimbursement system, however, was not
supportive to these changes. Primary health care was reimbursed per capita and had therefore
weak incentives to take over this kind of visit. Furthermore, many of those referred to primary
health care were assessed, both by specialists and GPs, as being "specialists’ patients ".
According to the interviews, many of these patients were also re-referred to the outpatient
clinics. At the same time, earlier discharges and more rapid patient flow have created an
increased need for information and follow-up after discharge. Altogether this has caused an
imbalance between the time available for specialist surgeries, and needs. Patients therefore
make more telephone calls and doctors also have a sort of informal outpatient clinic on wards
This could be one explanation for the increased work load and the decreased job satisfaction
among hospital doctors in Stockholm, according to the questionnaire studies. Another
problem is that this unofficial work is sometimes unregistered, both in the production
statistics and in the reimbursement data.

10.9 Quality of care

An important quality issue is whether patients are prematurely discharged from hospitals.
According to the questionnaire, more physicians in Stockholm than in the other councils
consider this to be the case. Statistical data about readmissions (Paper One, Stockholm's
Health and Medical Care Committee, 1998), as well as interview data, indicate that the
discharges are not so early as to constitute a medical risk. Nevertheless, physicians judged the
quality to have deteriorated. One explanation might be that physicians’ opinions give an
earlier warning, as to forthcoming problems, than statistics, which are usually produced with a
period of delay. Another explanation might be linked to the earlier mentioned relation found
between personal well-being, job satisfaction, and judgement of quality of care (Arnetz, 1999,
Thomsen, 2000), with physicians in Stockholm scoring lower on work environment factors as
well as on quality of care.

As was mentioned earlier, the introduction of stronger financial incentives by PBR in health
care created an increased concern about quality issues. What was earlier taken for granted was
now in doubt and must be assured. The political board in Stockholm County Council created
a new department, responsible for developing a system for quality assurance. This was
considered to be a positive effect of the new payment system. There have been a number of
performance development projects at Stockholm hospitals during the period covered by this
thesis, although the intensity increased at the end of the measurement period. The opinions of
physicians in Stockholm about the quality of the medical treatment process were also a little
more positive in 1998 as compared to 1994 and this may be linked to the potential advantages
of these projects.
Disparities in the two compared groups of physicians may, however, explain a part of the different judgements about quality of care. As was seen in the discussion of size effects, there is not the same concern about quality failures in the smaller Dalarna County Council, with a PBR system. Comparing Malmö (the largest city in the reference group) with the rest of the reference group also shows that physicians in Malmö are significantly more concerned about quality of medical care than the others. Consequently, a part of the concern about quality failure may be a size or maybe a “big city effect”.

As a point of discussion, however, it might be possible, to look at quality of care also in a broader perspective and not only as process quality. Quality of health care could, in this case, include not only those patients currently receiving care but also potential patients. From this perspective, reduced length of stay improves quality by making room for patients who are queuing for care. If this is considered, the greater decrease in average length of stay in Stockholm could be regarded as positive also for quality.

10.10 Non-financial incentives

According to organisational theory, hospitals are complex, professionally dominated organisations. Such organisations can be expected to resist external pressure to change in a direction that threatens important values and relations (Perrow, 1965). As was shown in Paper Three a too strong cost awareness may be a negative predictor for quality of care. It is therefore important that financial incentives are being balanced by other incentives like ethical rules and professional values. In some aspects highlighted in this thesis, it seems that the financial incentive has not been stronger than other incentives. In the interviews, all respondents claimed that despite discharges being judged to be too early they were not so early as to constitute medical risks. This is also supported by findings in Paper One that there was no increase in readmissions. Also, the limited frequency of refraining from referring patients to therapeutic treatments indicates that, in some cases, other incentives are more important than financial ones.

10.11 Normative considerations

Despite problems and concerns, there is something positive with PBR that is worth nurturing. Stockholm physicians repeatedly stated that they liked the approach of reimbursement being linked to performance, (see "Interview study", Forsberg et al, 1998, Sandlund et al, 2001). Furthermore, according to Paper Four, the physicians in Stockholm are more positive to the experienced financial incentives than their colleagues in the other councils. This indicates that PBR is a more stimulating way of cutting costs than pure constraints because it also creates possibilities. This positive attitude is worth preserving for the future although the councils and the "system makers" must create better conditions for improvements. The original concept, without ordered (in contrast to negotiated) contract discounts and with a possibility to retain a profit for future needs, contained more straight incentives. These straight incentives are what many of the providers of care want to see back. This concept is what caused the positive attitude. Changes made afterwards seem to have removed much of the positive part leaving all of the inconveniences.
There is therefore a need for a system that eliminates the problems with efficiency loss due to the system’s construction. One possible avenue to take is to make a combination of capitation and PBR to hospitals. One early criticism of the DRGs was their problem in coping with patients in need of different specialities (Weiner et al., 1987) and this is what one of the “inefficiencies” mentioned in the interviews refer to. Having a capitation “buffer” may make it easier for clinics to treat these people with greater flexibility. Another reason for having a capitation “buffer” is to create a reasonable cost awareness. An heightened cost awareness is regarded as a positive effect of the Stockholm Model. However, since it was shown in Paper Four that a strong cost awareness was a negative predictor for quality of care, too great a cost awareness seems to be a problem for creating an optimal cost effectiveness.

11. CONCLUSIONS

It seems likely that the PBR system, not unexpectedly, has both advantages and disadvantages. The heightened cost awareness and the pressure to develop quality assurance systems are two of the advantages. One obvious disadvantage is the increased concern about quality of care among physicians in Stockholm. The physicians’ concern has, however, not been supported by statistical facts. Otherwise, the most important disadvantages, seem to be increased administrative aggravation and a diminishing of professional autonomy and job satisfaction. The financial reductions together with the withdrawal of the original incentives for increased efficiency, but the remaining of a more time consuming system, may at worst have created a system in Stockholm with a greater financial pressure but with a more inefficient way of working.

What is needed are not incentives for “running faster”, which seems to be what has happened in Stockholm, but incentives for working more rationally. It was believed that the PBR system would create just these incentives. However, it seems that the pressure caused by resource reductions has been so dominating that the result is merely more of the same, but at a greater speed.

With respect to average length of stay, the health care in Stockholm is more efficient than in the ten other councils but the price seems to have been considerable in terms of a poorer work environment and possible reduced quality. The present situation seems to exist partly due to the new payment system, creating an increased cost awareness and efficiency pressure. Supportive to this assumption is the fact that similar effects have been reported in both the USA and the UK. Additional reasons discussed in this thesis are financial reductions, repeated organisational changes in Stockholm County Council and a size effect. In this context, leadership may be of great importance, since a good leadership is shown to make a difference for quality of care as well as for professional autonomy and job satisfaction.

What would be desirable in the future, is therefore a reimbursement system creating a sufficient cost awareness, allowing health professionals to maintain a high professional autonomy as well as a good quality of care. There is also a need for a greater emphasis on knowledge about organisational development, as well as a continuous investment in good leadership. A key issue is to attain financial efficiency through performance development, not by forcing personnel to run faster. In an ideal world, a hospital should have an assigned time period, two years for example, during which to change its organisation in a more efficient way before decisions about reductions are implemented.
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Swedish Pharmaceutical Statistics Ltd: 1999. Number of physicians (younger than 65 years) working in medical and surgical specialities in each county council. Number of inhabitants in each county council.


