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Coordinating health care: lessons from Norway

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Abstract

Objective: What influences the coordination of care between general practitioners and hospitals? In this paper, general practitioner satisfaction with hospital—GP interaction is revealed, and related to several background variables.

Method: A questionnaire was sent to all general practitioners in Norway (3388), asking their opinion on the interaction and coordination of health care in their district. A second questionnaire was sent to all the somatic hospitals in Norway (59) regarding formal routines and structures. The results were analysed using ordinary least squares regression.

Results: General practitioners tend to be less satisfied with the coordination of care when their primary hospital is large and cost-effective with a high share of elderly patients. Together with the degree to which the general practitioner is involved in arenas where hospital physicians and general practitioners interact, these factors turned out to be good predictors of general practitioner satisfaction.

Implication: To improve coordination between general practitioners and specialists, one should focus upon the structural traits within the hospitals in different regions as well as creating common arenas where the physicians can interact.

Keywords

integrated care, hospital, primary healthcare, organization, general practitioner

Introduction

In most countries, attempts are being made to enhance interaction between hospitals, the primary care services, and general practitioners, although with variable results.[1] The basic argument has been that a more integrated healthcare system will improve efficiency and patient treatment [1–3]. Kodner and Spreeuwenberg argue that integrated care has become an international health care buzzword with multiple meanings [4]. A comparative study carried out by Leichsenring [5] shows that the issue of integrating health care is high on the agenda in several European countries. Despite receiving increasing attention from decision-makers as well as professionals, he concludes that health and social services in Europe are at best loosely coupled systems that are facing increasing challenges, especially in care for elderly patients. Fragmented delivery of health services is a general problem acknowledged in most health care systems as pointed out in a recent paper from the WHO [6]. Studies from the United States provide examples of the outcomes of strategic alliances between general practitioners and hospitals, acquisitions between general practitioners, and the development of health care maintenance organizations. However, the results are not conclusive [3,7].

This paper explores the interaction between hospitals and General Practitioners in Norway. Norwegian health care services are provided at two governmental levels. Primary health care services (including nursing homes and home health care services) are provided by the 435 municipalities. Secondary specialist health care services, representing approximately 60 somatic hospitals, were run by the 19 counties. Since 1 January 2002, the hospitals are run by five regional state enterprises. Although the services are divided between these two levels of governance, they are mutually dependent. A general practitioner (GP) in primary health care services acts as a ''gatekeeper'' for the hospitals. Patients need to see their GPs before

[1] The results displayed here were presented at the Integrated Care Conference 2005 (14.02–15.02) in Dublin. The authors would like to thank George Freeman for several valuable comments on this manuscript.

they can be referred to the hospital (except in emergencies). GP refers the patients to specialists at the hospital or to private specialists outside the hospital. Based, amongst other things, on the GPs referral, the specialist makes a decision on how acute the condition of the patient is and the necessary treatment. Primary health care and social care services also care for patients recovering after a hospital stay.

As in most countries, the interaction between hospitals and the primary health care services in Norway is based on the principle that care should be provided at the lowest appropriate level, meaning that after hospital treatment a patient should be cared for by the primary health care services. Care at the most appropriate level has proven to be a difficult goal to achieve. There is an ongoing debate about where the responsibility for one service ends and the responsibility for another begins. Both levels, the hospitals (secondary) and municipalities (primary), have incentives to shift patients to the other. An official committee was appointed by the government in 2002 to investigate the current status of integrated health care in Norway and to make recommendations for further improvements [8]. The committee advocated the need for more data on the interaction between providers as a basis for making recommendations that might improve the general coordination of health care between the two levels. This article provides data and results on such interactions. General practitioners play a key role in this interaction and it is critical for the hospital to have a good relation to the GP. Good communication and interaction with the GP ensure that the patients are directed to the appropriate levels in the system and assigned the proper care and treatment.

In Norway, the different care providers have been separated both financially and by management. This requires the hospitals especially to have strategies and specific organizational features meant to enhance the interaction between the two levels of care. Suggested solutions to this problem consist of either increasing the quality of information transfer between the levels, or establishing arenas where physicians at the different levels can interact and establish grounds for mutual learning. Several different measures have been subsequently implemented in different health regions. However, broad evaluations of the effects of these measures are scarce or even absent. In particular, it seems that no overall initiative has been undertaken to estimate the actual effects of these efforts to create linkages between the different levels. In this paper, some of these organizational features are analysed for their effect on general practitioner satisfaction with hospital interaction. We will pay particular attention to the most common types of measures, that is, those measures that aim to increase the quality of the interaction through actual contact or by improving the transfer of information between the levels.

Data

Three data sources were combined for the purpose of this study: data from a survey sent to all general practitioners in Norway; data on hospital internal organization (Department of Health Management, University of Oslo); and activity data (SINTEF Health). The data set on the internal organization of the hospitals represents all Norwegian general hospitals with acute care functions, excluding those with more limited or specialized functions. This survey reveals how the hospitals organize in order to enhance the interaction with the general practitioners. Fifty-four of the 59 hospitals surveyed responded. Four hospitals were excluded from this analysis because of the unavailability of activity data.

Each hospital in this study has an assigned catchment area consisting of one or several municipalities, which means that the general practitioners are formally connected to specific hospitals. Information about the internal organization of each hospital was gathered through a questionnaire in 2003, with particular focus on how the interaction between primary care services and hospital services was organized. These data were combined with existing data on hospital activity and resources.

The general practitioner data were collected in the spring of 2004. A questionnaire was sent to all Norwegian general practitioners asking them a variety of questions; however, the principal focus was on their satisfaction with their interactions with the hospitals. The questionnaire was originally sent to a total of 3436 general practitioners. Out of this number, 75 were no longer working as general practitioners or could not be reached, leaving a total of 3388 general practitioners. Altogether, 1637 questionnaires were returned, a response rate of 48.3%, which is relatively low. A further investigation, however, showed that the sample appears to be representative for both gender and age. General practitioners in Oslo were slightly underrepresented.

The activity data used are gathered on a yearly basis at SINTEF[2] Health. These data provide a broad spectrum of information about the activities and expendi-

[2] The SINTEF Group is the largest independent research organization in Scandinavia. SINTEF Health is a part of this research organization focusing on heath related issues.

tures within the hospital sector. For the purpose of this study, hospital size (number of beds), indicator for casemix (Diagnosis Related Groups), average length of hospital stay (LOS) and mean age of the patients at the hospital (AGE) were used.

Method

An ordinary least square model is used to explain general practitioner satisfaction with the coordination of health care between themselves and their local hospital. The OLS method builds upon a sequence of assumptions. The first assumption is that the functional form of the relationship is actually a straight line ($Y = a + bX + \varepsilon$). Second, no measurement error occurs; third, the number of observations n must be greater than the number of parameters to be estimated; and fourth, the predictor is uncorrelated with the error term and non-stochastic. The last fundamental assumption is concerning the random part of the model—the error term. The error term should be normally distributed and the residuals ε (the distance of the data points from the regression line) should be independent, meaning there is no autocorrelation and no heteroskedasticity. The model is tested and we find that the statistical premises for using a linear regression model are fulfilled.

The basic equation of the statistical models is:

$$Y = a + b_1 AGE + b_2 DRG + b_3 INTERN + b_4 SIZE + b_5 EFF + b_6 PROG + b_7 REPTEML + b_8 PRIOR + b_9 LOS + b_{10} INTERN + b_{11} REPTIME + b_{12} CONS + b_{13} PRIOR + \varepsilon$$

In the next section, we will describe the variables that will be confronted with the data.

Explanatory variables

Different model specifications and estimation methods are considered in order to examine the conclusiveness of the results. The first variable describes the hospital size. This (SIZE) is measured by the number of beds. The importance of controlling for hospital size has been highlighted in other studies [9,10]. A large hospital in Norway typically consists of 500 beds or more, has a more complicated infrastructure, is less transparent and we expect it would have more difficulties establishing close contact between primary health care services compared to small local hospitals having close contact with the local communities.

The next variable included in the model indicates the mean severity of the condition of the patients being treated. Moreover, the importance of such a casemix effect has been shown in other studies [9,11,12]. In this study, casemix is described by the Diagnosis Related Groups (DRG) index, which is measured as the average DRG points per patient at the hospital. Hospitals with a high DRG index treat on average more complicated cases with a subsequent need for a longer hospital stay. In 1999, the DRG index was improved and a new adjusted indicator, used in this article, was established [13]. The DRG index is deemed an adequate indicator for the differences in the patient mix. Although the use of DRG points in the activity-based financing system of the hospitals is disputed because some hospitals have been trying to systematically correct the diagnostic codes to increase their revenue [14], this would not affect the analyses in this article. In addition, to Diagnosis Related Groups, a variable describing the mean age of the patient mix is included (AGE).

A variable measuring *cost-efficiency* at the hospital level is also included. Since hospitals are multi-productional organizations, the data envelopment analysis (DEA)[3] is used to generate the measurement of cost-efficiency [15,16]. The DEA methodology is used to generate the measurement of cost-efficiency. DEA handles settings with multiple inputs and outputs more easily than other models do. Also, this approach does not require a specific functional form for the technology or specific distributional assumptions about the efficiency measure. DEA defines an efficiency frontier and relates other hospitals to that frontier. Following other studies of cost-efficiency on Norwegian data [15,16], hospital input is described by total operating expenses. Hospital production (output) is described by two variables:

- *Inpatient care*: Inpatient care is measured as the number of discharges adjusted for case-mix by weighting discharges according to Diagnostic Related Groups (DRG).
- *Outpatient care*: Outpatient care is measured as the number of outpatient visits weighted by the fee paid by the state for each visit. Thus, a hospital's revenues from outpatient care are an approximation of the volume of outpatient care adjusted for case-mix.

The efficiency frontier is based on a pooled set of observations. This is done in order to compare efficiency between hospitals [15,16].

[3] For a more detailed description of the DEA-technique see Biørn, Erik et al. The effect of activity-based financing on hospital efficiency: a panel data analysis of DEA efficiency scores 1992–2000. Health Care Management Science 2003:(6) 271–283.

Our hypothesis is that the general practitioners are less satisfied with the coordination of care if the hospital on average is more cost-efficient. Cost-efficient hospitals spend less time on non-productive behaviour such as activities to enhance coordination with primary care. Another way to increase cost-efficiency from the hospital management point of view might be to release patients quickly, thus reducing the resources spent per patient. If this were the case, it would create a higher caseload for the municipality health care system, and thus also for the general practitioners. To investigate this further, we have also included in the model the *average stay per patient* (LOS) in the hospital; a comparison of the effects of cost-efficiency and length of stay will give us indicators of whether the argument laid out above is plausible.

We have also included a set of variables which measures different organizational features at the hospital level, these include: consultations outside the hospitals (CONS), regular symposia and courses for the general practitioners at the hospitals (PROGP), and the establishment of the possibility for general practitioners to observe and audit practice in hospitals (INTERN). In addition, to these a variable measuring the average time it takes from discharge until the general practitioner receives the patient report (RTIME) is included.

One of these variables describes whether physicians in selected specialities at the hospitals regularly work outside the hospitals together with the general practitioners (CONS). This variable is given the value 1 if specialists in the hospital regularly work outside the hospital with the general practitioners. Whether the hospital regularly offers symposia, conferences or academic meetings for the general practitioners at the hospital (PROGP) is scored from 0 to 4, with a higher score indicating more regular meetings. The establishment of the possibility for general practitioners to observe and audit practice in hospitals (INTERN) is defined as a dichotomy (yes/no). The hospital may contact the general practitioner prior to the discharge of the patient (PRIOR) to discuss the need for special arrangements for the patient; this variable is also defined as a dichotomy (yes/no). Routines regarding the final patient report (epikrise) are measured by the average time it takes to send the final report to the general practitioners (RTIME).

These variables are all directly set up by the hospital to enhance general practitioner satisfaction with the hospital interaction and we expect that the variables will show a significant positive effect on the dependent variable.

In addition, to these, a group of variables gathered from the GP survey is included. These variables are (TENURE), (RTEMPL), and (ATTEND).

The length of a general practitioner's experience as a user of the hospital's services is included in the model measured in years worked at the current place of employment (TENURE). The rationale here is that long service in the same place helps the general practitioner to get to know the hospital better, so the general practitioner is more likely to be satisfied with the coordination. In a broader perspective, this illustrates that the informal aspects of the relationship between general practitioners and the hospital/specialists are likely to improve the coordination between them. Such factors are not easily measured, but time seems to be an acceptable proxy.

The general practitioners also indicate whether the final patient report is based on a template (RTEMPL); this variable is a yes/no dichotomy. This issue has been generally debated in Norway and it is often assumed that a template may improve information flow between hospitals and general practitioners, thus improving coordination of health care. Analysis carried out on the same data material used here confirms that the general practitioners themselves are highly positive towards receiving final patient reports based on a template.

(ATTEND) measures the degree to which the general practitioner is reporting how often he has participated in formal meetings at his local hospital. ''Formal'' is explicitly defined as consisting of a summons to and/or a report from the meeting. Here, more contact is assumed to increase learning and mutual understanding, which again will show empirically as a positive effect upon general practitioner satisfaction.

Descriptive statistics

Table 1 presents the descriptive statistics for the response and explanatory variables in the models. The descriptive statistics for the variables are shown as non-standardized means with the standard deviation in brackets.

Results

The overall level of general practitioner satisfaction turned out to be relatively high. Table 2 shows that 55% of Norwegian general practitioners are satisfied with ''the coordination of care between the hospital and the municipality health system for patients in need of follow ups from the general practitioner''. This question was answered on a four-point scale ranging

Table 1. Descriptive statistics, Mean (Standard Deviation)

Variable	Definition	Data source	M (SD)
General Satisfaction	General practitioners' satisfaction with their coordination of care with the hospital. 0: very little satisfied, 10 very satisfied.	GP data	6.12 (2.10)
EFF	Measure of cost-efficiency based on DEA analysis.	SAMDATA	84.02 (6.30)
LOS	Mean length of stay in 2003 for each hospital.	SAMDATA	3.91 (0.44)
SIZE	Number of beds	NPR	383.08 (227.58)
DRG	Produced DRG-equivalents (Diagnostic Related Groups) for the total hospital production. The DRG index is a casemix indicator expressing the average severity of the patient population in the hospital.	NPR	1.00 (0.10)
AGE	The mean age of the total patient population at the hospital.	NPR	51.41 (4.10)
CONS	A dummy coded 1 if physicians in selected specialties at the hospitals regularly work outside the hospitals together with the general practitioners.	INTORG	0.20 (0.40)
INTERN	A dummy coded 1 if the hospital provides internship for general practitioners.	INTORG	0.77 (0.42)
PRIOR	A dummy coded 1 if the hospital contacts the GP on a regular basis prior to discharge of patients in need of primary healthcare.	INTORG	0.23 (0.42)
RTIME	The average time between patient discharge and the general practitioner receiving the final patient report (epikrise)	INTORG	4.80 (0.90)
RTEMPL	A dummy coded 1 if the final patient reports from the hospital are based on a template.	GP-data	0.23 (0.42)
TENURE	Number of years the GP has been in practice at the current place of employment.	GP-data	13.12 (9.30)
ATTEND	How often the GP has attended formal meetings at the hospital (seldom or never, yearly, once every 6 months, on a monthly basis)	GP-data	2.48 (0.84)

from very dissatisfied, dissatisfied, satisfied to very satisfied.

This result suggests that coordination between the levels is not viewed as a problem by general practitioners. All in all, the general practitioners seem to be fairly satisfied. GP satisfaction as it is measured here is of course not the only possible indicator of the way the coordination between the hospital and the GPs functions, but it seems reasonable to argue that this coordination cannot be well functioning if the GPs say that it does not and vice versa. We will, therefore, use the GPs evaluation of the coordination of care between him/herself and his/her primary hospital as an indicator of the quality of the coordination in that area.

Table 2. General practitioner satisfaction with the coordination of health care between themselves and their primary hospital for patients in need of follow up from a general practitioner. Percent (n).

	Percent (n)
Very dissatisfied	5.8 (92)
Dissatisfied	39.1 (619)
Satisfied	53.2 (843)
Very satisfied	1.9 (30)
N	100 (1584)

In the next section, we use a regression-based approach where the question measuring general satisfaction is used as a dependent variable.[4] Table 3 shows the result of an ordinary least squares regression where the dependent variable is based on the question: ''All in all, how satisfied are you with the collaboration between yourself as a general practitioner and your primary hospital?''

Higher average age of the patients in the general practitioners primary hospital has a negative effect on satisfaction with the coordination of care. Older patients are more likely to be users of both the municipality health care system and specialist health services and thereby trigger greater need for coordination between the two levels of care.

If the hospital has reported that hospital physicians have specific days for consultations in the municipalities (CONS), this has a positive effect on GP satisfaction. By having specific days where the specialists treat patients in cooperation with the general practitioners, increased learning and a more general mutual

[4] For a more detailed description of the DEA-technique see Biørn, Erik et al. The effect of activity-based financing on hospital efficiency: a panel data analysis of DEA efficiency scores 1992–2000. Health Care Management Science 2003:(6) 271–283.

Table 3. General practitioner satisfaction with the coordination of health care between themselves and their primary hospital. Standardized regression coefficients (p value)

	Standardized regression coefficients (p value)
(Constant)	13.63 (<0.001)
Mean age of the patients at the hospital (AGE)	–0.10 (<0.001)
The number of years of the GP practice (TENURE)	0.08 (0.015)
The frequency of the GP attending meetings with the hospital (ATTEND)	0.13 (<0.001)
Hospital physicians do consultations outside the hospital (CONS)	0.09 (0.029)
Hospital offers internship (INTERN)	0.05 (0.252)
Hospital contact GP prior to patient discharged (PRIOR)	0.08 (0.013)
Mean time from discharge to receiving written final report (RTIME)	–0.13 (0.004)
Formal final report template (RTEMPL)	0.07 (0.031)
The DRG index (DRG)	0.05 (0.212)
Mean length of hospital stay (LOS)	0.07 (0.224)
Number of beds in the hospital (SIZE)	–0.21 (0.001)
Cost efficiency score based on the DEA analysis (EFF)	–0.10 (0.023)
F–statistic	9.196 (<0.001)
Adjusted R^2	0.09

understanding may develop. It is, therefore, hardly surprising that this also has a positive effect on integration of care seen from the general practitioners point of view. It also turns out that the extent to which general practitioners report that they attend formal meetings in the hospital has a positive effect. Increased contact may be a factor which increases identification based trust [17] and thereby improves the climate for mutual cooperation between personnel in the hospital and the general practitioners.

The variable measuring the average time from discharge of a patient from the hospital to the GP receiving the patient report has a negative effect. The longer the GP has to wait for this report, the less satisfied he is with the coordination of care between himself and the hospital. Furthermore, the use of templates when composing discharge reports has a positive effect, meaning that general practitioners prefer to receive discharge reports based on a template.

Both hospital size and hospital cost-efficiency have a negative effect on GP satisfaction. In other words, general practitioners tend to be less satisfied with the coordination of care when they have larger and more cost-efficient hospitals as their primary hospital.

Discussion

It is generally assumed that high integration will increase cost-efficiency and the outcome of the treatment [1–3]. It seems plausible that the overall efficiency of the health care system will improve if the coordination between the levels is integrated in a manner that improves treatment. The results from our study show that organizational properties and organizational constraints, as well as demand for health care services, have an impact on the interaction between general practitioner and hospitals. This indicates that interaction is affected by a complicated structure of variables in both levels of care.

Efficiency in one level does not necessarily lead to better interaction and thereby increased overall efficiency. General practitioners tend to be less satisfied with the interaction with highly cost-efficient hospitals as compared to less cost-efficient hospitals. An explanation could be that highly cost-efficient hospitals have reduced slack and time used on ''non-productive'' behaviour such as teaching, research, administration, as well as leisure, but probably also time spent on communication and interaction with the general practitioner. It is possible that these hospitals are less prone to establish activities that are targeted at generally increasing information transfer or coordination with general practitioners. These types of efforts are not likely to be viewed as part of the organizations' core activity and are probably, therefore, more likely to be considered in processes such as budget cuts. In addition, a cost-effective hospital would discharge patients faster and would expect faster handling of patient transfer between levels. This would create a greater need for integration efforts between the hospital and the primary care system. General practitioners also tend to be less satisfied with hospitals with more elderly patients. In sum, this indicates that hospital capacity and amount of slack affect the interaction between general practitioners and the hospital. These effects follow other studies showing how the capacity in one level of health care affects the other. Kjekshus has shown that lengths of hospital stays are affected by the amount of expenditure on care for

elderly and the average age of the population in the hospital catchment area [18]. When one level of care is experiencing higher demand and also increases efficiency, the pressure for coordination of care between these levels will increase.

A focus on efficiency, or high efficiency in only one of the levels, may impair the quality of the coordination between the different levels, but further analysis, perhaps also with several different measures of cost-efficiency, is needed in order to achieve more precise interpretations. It should also be emphasized that we are measuring the effect of cost-efficiency at the hospital level on GP satisfaction with the coordination of care, thus we are not investigating whether increased integration will increase efficiency. It may very well be the case that increased integration will increase efficiency, as previous studies also indicate [1–3]. But it might also be the case that if the general focus and more specific reforms which are implemented are limited to one of the levels alone, this might have other consequences. In the Norwegian case, an increased focus has been put on either increasing efficiency at the hospital level or increasing efficiency at the municipality level. Therefore, increased integration between levels may very well increase the overall efficiency, but if reforms are not adapted in a sufficiently holistic manner, this may have negative effects on the overall integration.

In addition, to the effect of cost-efficiency, hospital size also has a negative effect. This means that general practitioners are more satisfied with smaller and less cost-efficient hospitals. It should be noted that the correlation between these two variables is relatively high (0.57), however, we do not regard this correlation to be sufficiently high to conclude that colinearity is a problem. There also seems to be no interaction effect present between these two variables. The negative effect of size supports our hypothesis that general practitioners who have smaller hospitals as their primary hospital are more satisfied with the coordination of care between him/herself and the hospital. This may indicate that smaller hospitals in general are better at developing a climate for mutual cooperation. Proximity and a local focus may be the crucial factor underlying this effect, although other explanations cannot be ruled out. It is worth noting that this is also an argument which has been used in order to promote a decentralized hospital structure in Norway. Larger hospitals offer a broader variety of services and are probably less tuned to local needs and demand for health care, but smaller hospitals may be better integrated in local structures and, therefore, also better suited to handle local needs and demands. The result should, however, be interpreted with some caution. The existence of smaller rather than larger hospitals in a area may in itself be a result of factors which promote coordination between general practitioners and specialist in the hospitals. Thus, the effect of hospital size may be a result of other factors which also influences the general climate of cooperation between GPs and the hospital. Coordination may be easier in smaller areas, and in smaller areas large hospitals are less likely to be present. The negative association between hospital size and GP satisfaction may, therefore, be an indirect effect.

The last, but not the least important finding in this study is that relatively simple and low cost measures, undertaken by the hospital to increase contact between the general practitioners and the specialists, turn out to be important factors in explaining general practitioner satisfaction. For example, improving patient reports is highly significant in explaining general practitioner satisfaction. In an instrumental perspective, findings such as this are important. By increasing the focus on integration and undertaking relatively cheap and simple measures such as this, one may be able to increase the coordination of care. These findings indicate which steps may be taken if the goal is to improve the coordination of health care as it is valued by general practitioners. Despite the fact that traits such as the average age of the patients in the hospital, size, and cost-efficiency all turned out to have a negative impact in our analysis, the results also point to several effects which may be important in an instrumental perspective. It may be possible to simultaneously achieve some of these goals by implementing relatively simple and low cost measures such as creating arenas for common learning and interaction between the two levels of the health care system.

Conclusion

The result from this study shows how traits in one level affect another level's satisfaction with the coordination. This raises the question whether the one-sided focus on cost-efficiency on each level separately, without acknowledging how the two levels affect each other, impairs the quality of this interaction. Although no decisive answer can be based on these results, the negative association between general practitioner satisfaction and hospital cost-efficiency alone is sufficient to signal the importance of addressing this issue.

The finding that cost-efficiency and demand in one level affects the coordination between the levels is an important factor when designing the budgetary models for the hospital sector in Norway. This means that demographic traits within the different areas should

be used when estimating the costs for the hospitals. In other words, it should be generally assumed that such factors contribute to the hospital's costs. The results shown here indicate that these factors may also contribute to the quality of the coordination of health care, which in itself may also contribute to reducing efficiency/lowering costs. This raises the question of who should pay for integration. In the Norwegian case, these expenses are for the most part situated at the hospital. Thus, it is the hospitals that will have to take the initiative, as well as bear the costs of implementing integration efforts. This was also discussed in the governmental commission assigned to discuss possible initiatives towards improving the coordination of care in Norway [8].

The positive effect of several relatively low cost initiatives gives reason for optimism. Based on our findings, measures undertaken to increase contact and knowledge transferral from the hospital to the general practitioner are likely to be well worth the effort.

Reviewers

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References

1. Wan TTH, Ma A, Lin BY-J. Integration and the performance of health care networks: do integration strategies enhance efficiency, profitability, and image? International Journal of Integrated Care [serial online] 2001 June 1; 1. Available from: URL:http://www.ijic.org/
2. Newhouse RP, Mills ME, Johantgen M, Pronovost PJ. Is there a relationship between service integration and differentiation and patient outcomes? International Journal of Integrated Care [serial online] 2003 Nov 10; 3. Available from: URL: http://www.ijic.org/
3. Wan TTH, Lin BY-J, Ma A. Integration mechanisms and hospital efficiency in integrated health care delivery systems. Journal of Medical Systems 2002;26(2):127–43.
4. Kodner DL, Spreeuwenberg C. Integrated care: meaning, logic, applications, and implications – a discussion paper. International Journal of Integrated Care [serial online] 2002 Nov 14; 2. Available from: URL: http://www.ijic.org/
5. Leichsenring K. Developing integrated health and social care services for older persons in Europe. International Journal of Integrated Care [serial online] 2004 Sep 3; 4. Available from: URL: http://www.ijic.org/
6. Gröne O, Garcia-Barbero M. Integrated care: a position paper of the Who European office for integrated health care services. International Journal of Integrated Care [serial online] 2001 Jun 1; 1. Available from: URL: http://www.ijic.org/
7. Burns LR, Pauly MV. Integrated delivery networks: a detour on the road to integrated health care? Health Affairs 2002;21(4):128–43.
8. Fra stykkevis til helt. En sammenhengende helsetjeneste [From partly to completely. An integrated healthcare]. Helse-og omsorgsdepartementet [Ministry of Health and Care Services], 2005; 3. (NOU [Royal commission report])
9. Thomas JW, Bates EW, Hofer T, Perkins A, Foltz-Murphy N, Webb C. Interpreting risk-adjusted length of stay patterns for VA hospitals. Medical Care 1998;36(12):1660–75.
10. Heggestad T. Do hospital length of stay and staffing ratio affect elderly patients' risk of readmission? – a nation-wide study of Norwegian hospitals. Health Services Research 2002;37(3):647–65.
11. Wiley M, Tomas R, Casas M. A cross-national, casemix analysis of hospital length of stay for selected pathologies. European Journal of Public Health 1999;9(2):86–92.
12. Lee AH, Yau KKW. Determining the effects of patient casemix on length of hospital stay: a proportional hazards frailty model approach. Methods of Information in Medicine 2001;40(4):288–92.
13. Rønningen L. Samdata sykehus: tabeller: sammenligningsdata for somatisk fylkeshelsetjeneste 2000 [Comparative statistics on hospital activity]. Trondheim: SINTEF Unimed NIS SAMDATA; 2001.
14. Midttun L. Er det sammenfall mellom journalopplysninger og innrapporterte data? En studie av 500 pasientopphold ved norske somatiske sykehus i 2001 [Are information from medical journals comparable to activity reports? A study of 500 hospital stays in Norwegian hospitals in 2001]. Oslo: SINTEF Unimed; 2003.
15. Biørn E, Hagen TP, Iversen T, Magnussen J. The effect of activity-based financing on hospital efficiency: a panel data analysis of DEA efficiency scores 1992–2000. Health Care Management Science 2003;(6):271–83.
16. Kjekshus LE, Hagen TP. Ring fencing of elective surgery: does it affect hospital efficiency? Health Services Management Research 2005 Aug;18(3):186–97.

17. Nauta, AP, von Grumbkow J. Factors predicting trust between GPs and Ops. International Journal of Integrated Care [serial online] 2001 Sep 1; 1. Available from: URL: http://www.ijic.org/
18. Kjekshus LE. Primary healthcare and hospital interaction: effects for hospital length of stay. Scandinavian Journal of Public Health 2005;33(2);114–22.