The Importance of Interdisciplinary Co-operation in the Context of the DRGs

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Last edited: May 2006
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Contributing to the Discussion on Optimised Process Control

With the gradual implementation of reimbursement systems for hospital services based on diagnosis-related groups, healthcare institutions are facing major organisational and IT related problems (Führing and Gaumann 2004; Ingenerf et al. 2005). A fundamental aim associated with the introduction of flat rate reimbursement per patient is the economically enforced improvement of treatment processes (Lübke 2001).

This article discusses aspects of interdisciplinary networking concerning cost-related reimbursement. The main focus is on the cost-related documentation of DRG relevant parameters and the quality assurance of services. This article aims to outline the interdisciplinary German-DRG discussion, give a summary of the required organisational and process-related adjustments in hospitals and discuss possible solutions for supporting the nursing service.

1. Overview on the DRG-System

The fundamental characteristic of the G-DRG-system (German Diagnosis Related Groups) is the categorisation of acute inpatients in clinically defined groups which are determined by their cost intensity. This means, that in-patients and day patients are divided into medically relevant cost-related DRG groups. This grouping process occurs automatically, based on the manual entry of the main diagnosis (MDC = Major Diagnostic Categories) or surgical interventions. Degrees of severity are also taken into account by the coding of secondary diagnoses and complications (MCC = Major Comorbidity or Complication). In addition, allowing for other parameters e.g. patient’s age, the cost income weight (CW) of the treatment case is determined. The treatment case income is determined by multiplying the relative cost weight by the base rate. The base rate is the value for one treatment case with the relevant cost weight 1 (CW). The base rate reflects the median cost of all treatment cases, the cost weight stands for the relative economical expenditure of a case group (a DRG). The cost weight is standardised nationally. Length of stay is defined within the DRG system and only within this period of time does reimbursement correspond to the base rate multiplied by the cost weight. If the length of stay is shorter, a reduction is calculated.

The "unidimensional" DRG classification claims to create homogenous case groups, which result in precise regulations (algorithms) necessary for the ascertainment of the DRG case grouping. (Lauterbach and Lüngen 2000; Fischer 2002; Küttner 2004; Wilke 2005)

The base rate is determined by the Federal States. At present the introduction of the DRG system is in its so-called "convergence phase" during which time hospital budgeting will be phased in and be brought into alignment with the Federal States’ standardised rates level by 2009. (Clade 2005) The draft bill "Verordnung zur Bestimmung vorläufiger Landes-Basisfallwerte im Fallpauschalensystem der Krankenhäuser für das Jahr 2005" ("Regulation to determine the provisional base rate of the Federal States as part of the case group system set by hospitals for
the year 2005”) was presented in March 2005 (BMGS 2005) and put into force in May (Tuschen 2005). The aim is, with the aid of the DRG system as a "real uniform case and procedure fee system", to reward those hospitals which demonstrate higher performance and efficiency (Führing and Gausmann 2004, p. 51).

## 2. Homogeneity Problems of the DRGs

The relevant DRG group of a treatment case is primarily determined by the level of use of resources in in-patient services. The interventions/treatments actually carried out by physicians are secondary. To avoid a complete deviation of a case group from a DRG, the main diagnoses (MDCs) and a subdivision between conservative and operational treatments were carried out. In 2002 data from 116 German hospitals were used to calculate relative weights and evaluation relations. The analysis of the results proved sufficient homogeneity of the DRGs. To avoid under- or over-funding sufficient homogeneity within a cost group is of major importance. Ideally, a (Gaussian) normal distribution curve with minimal width is to be achieved. However, there is evidence that many individual DRGs show a considerable inhomogeneity in terms of cost and length of stay (Fischer 2002, p. 57 ff; Reinecke et al. 2003, p. 591; Roeder et al. 2003; Gass et al. 2004; Fürstenberg et al. 2005a; Fürstenberg et al. 2005b). Continuous adjustments of the G-DRG system are therefore necessary to prevent an under provision for certain patient groups.

For example, performance-oriented payment for patients who receive pain control therapy, is only ensured in exceptional cases (Lindena et al. 2005). This is also the case within the oncology DRGs where there are still "performance differences which are difficult to differentiate within the classification system" (Roeder et al. 2005b, p. 186). In the area concerning DRG reimbursement of polytraumatic patient groups a "mean difference of 12893 +/- 15.534 EUR" exists between the DRG related income and the actual costs (Grotz et al. 2004, p. 69).

Analysis of the homogeneity coefficient, published by the InEK (Institute for hospital reimbursement Ltd.), indicated that although homogeneity was in fact continuously improved within the G-DRG system, 36 % of the G-DRG case groups still show a homogeneity coefficient of between 50-65 % (InEK 2004; InEK 2005).
Given that, within the single G-DRG groups homogeneity in costs does not exist as desired, *other cost relevant features, apart from the 'medical diagnosis' and 'medical procedures' could account for the cost variance* (Fischer 1999, p. 5). Based on a medical data collection in Switzerland, Fischer argues that it is appropriate to look for these additional variance criteria in nursing. He states that there are "consequences of diseases which are not directly connected to the medical diagnosis and cannot be directly deduced from it" (Fischer 1999, p. 9). These consequences have an effect on the nursing input and are closely associated with the case costs. Hölzer *et al.* also suggest incorporating additional cost relevant classification dimensions. In particular; type of stay, discharge destination, secondary health problems relevant to nursing and rehabilitation, are examples given by the authors as a means of getting homogeneity of costs under control (Hölzer *et al.* 2003).

However, it is not expected that all forms of therapy in hospitals can be delivered on a cost-covering basis (Klask and Schmelzer 2003, p. 893). The revenue possibilities per case are fixed through the G-DRGs. Length of stay, optimising treatment processes, reducing variable costs and improving the coding quality are ways of influencing the expenses aspect regarding hospital revenues. These aspects will be closely examined in the following text and possible strategies put forward for discussion.

<table>
<thead>
<tr>
<th>Homogeneity coefficient costs</th>
<th>G-DRG system Version 2004</th>
<th>G-DRG system Version 2005</th>
<th>Variance of the share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field</td>
<td>Number Share (in %)</td>
<td>Number Share (in %)</td>
<td></td>
</tr>
<tr>
<td>Less than 50%</td>
<td>3 0,4</td>
<td>2 0,2</td>
<td>-38,7</td>
</tr>
<tr>
<td>50 to less than 55%</td>
<td>10 1,3</td>
<td>11 1,3</td>
<td>+1,1</td>
</tr>
<tr>
<td>55 to less than 60%</td>
<td>64 8,4</td>
<td>55 6,7</td>
<td>-21,0</td>
</tr>
<tr>
<td>60 to less than 65%</td>
<td>215 28,4</td>
<td>229 27,8</td>
<td>-2,1</td>
</tr>
<tr>
<td>65 to less than 70%</td>
<td>257 33,9</td>
<td>255 30,9</td>
<td>-8,8</td>
</tr>
<tr>
<td>70 to less than 75%</td>
<td>138 18,2</td>
<td>180 21,8</td>
<td>+19,7</td>
</tr>
<tr>
<td>75% and more</td>
<td>71 9,4</td>
<td>93 11,3</td>
<td>+20,3</td>
</tr>
<tr>
<td>Total</td>
<td>758</td>
<td>825</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1: Comparison between the homogeneity coefficient costs for the G-DRG system, version 2004, and version 2005, basis: Inlier, data of the year 2003 (source: InEK 2005)
3. Strategies and demands for adoption

Overcoming the professional-group perspective in favour of a patient-oriented view and improved interdisciplinary control over treatment and health care processes is one of the central survival strategies for hospitals in the G-DRG age. Groundbreaking aspects for this include interdepartmental cooperation (Lübke 2001, p. 67).

3.1 Calculating case costs

It will be important for hospitals in the future whether the actual occurring costs are covered, in accordance with the DRG reimbursement plans, or not. The comparison between the actual case group costs and the revenues, with statistical data evaluation of patient-relevant and case-specific features, enable an estimation of the efficiency of the delivered services (Ingenerf et al. 2005). An additional aspect for refining the case costs calculation is the need for further research. Research in this field must be based on validated data so that the G-DRG cost weights are adjusted in terms of an adaptable system (Steuer-Vogt et al. 2003). If the costs in the individual institutions are not precisely related to their causes, this can have a reducing effect on services which are more expensive and more complex. Charging for performance procedures in hospitals will lead to deficient case cost calculations, which will in turn lead to distortions within the DRG calculations (Kick 2004). The current situation regarding the lack of data on DRG calculations can certainly explain the variance effects within the DRGs.

The German hospital organisation (DKG), the central association of the German health insurance companies (GKV) and the German association of the private medical insurance companies (PKV) have published a handbook for the calculation of case costs. This calculation procedure (meanwhile version 2.0, January 2002 (Deutsche Krankenhausgesellschaft et al. 2002), and updated in 2004 (Deutsche Krankenhausgesellschaft et al. Dec. 2004) aim to support the evaluation of the case-related treatment costs within the G-DRGs. The data evaluation of the InEK shows that some requirements from the calculation guide have not been adequately implemented (InEK 2004). Clear revenue allocation and internal budgeting demand an exact representation of the activities performed within the single departments and disciplines (Schnabel et al. 2004). In addition to the often incomplete performance documentation in electronic subsystems, which document personnel working time, difficulties in differentiated case costing also exist.

These are described by experts as follows:
- Offsetting of highly complex activities which are carried out by several departments or external providers.
- Missing hospital IT system support for performance oriented payment.

Referred to here are the limited opportunities of hospital information systems to support the institutions’ cost-calculations. Likewise, basic performance-related compilations of direct costs, which are necessary to achieve fair cause related allocation of the costs, are missing. For example, it is not possible for many hospitals to charge using case-related medication costs, implants, and other consumer goods (Roeder 2003, p. 38; Roeder et al. 2005a). With the use of electronic patient files patient-related medication documentation and activities and materials required for wound management, resulting directly from the wound documentation, can be accounted for in case costing as direct costs. For this an interface with an expert system consisting...
of administrations of materials would be required. Even the actual nursing activities performed can only partly be illustrated using the nursing staff regulation system (PPR) (Deutsche Krankenhausgesellschaft et al. 2002). The work carried out by occupational therapists and physiotherapists is often not credited alone, but incorporated in the total case cost.

At present, it should not be assumed that the quality of case-related cost calculation in hospitals is continuously improving, but simply not yet adequate to establish valid cost weights of the adaptation to the DRG system (Roeder 2003). Kick speaks at this point of a "systematic deficit", also discussed under the term compression effect. This affects all hospitals, because performances with a high resource consumption will lead to a deficit in revenues, whereas performances with a low resource consumption will be too highly assessed (Kick 2004, p. 319). The further development of case-related performance calculation and costing will be the central challenge for hospitals in future months.

Approaches towards improvement shall now be, under selected aspects, presented.

### 3.1.1 Process Costing, Pathway Costing

New approaches to process costing, demanding cost calculation corresponding to service provision, are gaining in importance (Düsch et al. 2002; Weißflog and Kopf 2002). "One of the most important tasks of process costing is to reveal the economic performance factors between the use of production factors, processes and treatments within the hospital" (Miele et al. 2005, p. 11). The activities carried out in hospitals are connected with costs given that procedures are performed on and with the patient. The process costing, also known as pathway costing, defines the treatment and healthcare of a case as a service consisting of individual activities. These individual costs are summed up and add up to an overview of the case costs.

Treatment and healthcare costs consist of several individual activities and sub-processes which turn the complete implementation of process costing into a complex undertaking. For this reason, the Canton hospital in Aarau uses a pragmatic approach by applying the model of an integrated pathway, called "mipp", which values each of these procedures as process costs which decisively affect the treatment process. "These include the medical and nursing performances, medical services (i.e. laboratory, pathology), medical technical services (theatre nurses, operation assistants, radiology assistants, etc.)." (Hellmann 2003, p. 49) The hotel sector, administration and the medical requirements are evaluated in the "mipp"-concept using flat rates.

The important difference in this concept for process costing/pathway costing presented, to that of most of the other hospitals' where full costing is carried out, is in the choice of process quantities. With process costing, the general costs for a service are allocated according to the actual processes carried out with the patient. Full costing means that key figures are used for calculating the costs according to the cost units.

The focus of the "mipp" concept is the generation and development of case-related (nursing) care pathways. If the activities (individual performances) are defined within a nursing pathway, the costs can be determined. Minute values are used as reference values for personnel costs which are then converted into costs. In the second step, the costs of the individual procedures are determined. In developing the care pathway the project group focuses on the following questions: which is the
most efficient treatment, nursing procedure and medical care within a case group? How is the case group dealt with at present? Is there any room for improvement? How can the best result under various perspectives (economy, ethics) be achieved? The care pathways, which have been developed in this way, are considered as desired values which will deviate with individual cases. Regular comparisons are carried out between the real case costs of a patient group and the ideal values. Process costing enables systematic cost management, and controlled interventions can be carried out whenever changes in a case group occur. In addition, data for the further adjustment of the DRG system become increasingly important.

In this DRG era, other authors are also calling for case-related product costing. Here it is particularly about cost accounting, which can be attributed to the "patient" as the centre of reference. All individual costs are determined by the respective case. Weiss et al. (2005) argue that the real case-related demands of personnel are a decisive factor of the case cost calculation in the DRG era.

In Marienhospital Herne, the personnel time for process costing was determined on a minute basis using the Multimoment-time measurement method (Miele et al. 2005). Nursing personnel costs amount to a total of approximately 39-40 % of the total costs of a hospital, depending on literature references (Deutsches Institut für angewandte Pflegeforschung e.V. 2004). This amount is confirmed when the cost structure of the InEK data on the individual DRG groups is considered. The nursing time and related personnel costs represent the biggest share of DRG costs. Therefore, it is advisable to take a closer look at the nursing costs.

3.1.2 Refinement of performance data in nursing as the major cost factor within the DRG system

A more precise description of case-related nursing procedures has two interesting aspects which savour the implementation of refined nursing care performance data. Some authors suggest that nursing diagnoses are a clear reason for inconsistency of the DRG system (Saba 1992; Gallen 1997; Kantonsspitale St.-Gallen 1997; Fischer 1999; Molgard 2000; Baumberger 2001; Fischer 2001; Hunstein 2003). However, an exact allocation of the personnel costs, which represent the biggest cost factor of the DRG procedures, can achieve the greatest effect regarding the refinement of data. Calculation of personnel data from the nursing service, is carried out using the nursing staff regulation statistic (Klask and Schmelzer 2003). Other methods for calculating personnel data are also permitted, but because the appropriate tools are not available these are not normally used (Deutsche Krankenhausgesellschaft et al. 2002).

In many respects the nursing staff regulation for calculating personnel data according to the DRG case calculation is not the best solution. The classification system, based on payment for service, is designed to illustrate the daily nursing needs; however, information regarding nursing needs and treatment procedures required during the night are not collected. The cost groups into which the patient is classified are reduced to central nursing procedures of category A (A=general nursing), which includes excretion, mobility, eating and drinking, and body hygiene. All nursing care carried out outside of these four dimensions is not considered. Important aspects e.g. crisis intervention discussions or nursing interventions regarding respiratory problems are missing (Schöning et al. 1993).
No further development on the nursing staff regulation has been carried out since 1996. It can be assumed that the underlying time values and structural conditions from that time have changed. Hunstein and Bartholomeyczik comment on the nursing staff regulation as a basis for performance description within the DRG system: “A categorisation of patients in A/S levels is a result of the individual nursing procedures, the summary of which determines the respective level. As regards the categorisation of nursing procedures, it is of no importance how often an activity is performed and how long it takes” (Hunstein and Bartholomeyczik 2001, p. 25). Using an example, the authors point out that this method can lead to variances regarding the actual performances within the same cost groups.

A further important aspect argues against the nursing staff regulation as an instrument for pathway costing: by categorising patients into cost groups, it is not possible to conclude, whether the nursing procedures performed really meets the nursing needs of the patient. In other words, the question is whether future use of tools should not only illustrate the procedure costs, but also allow for reasons regarding the respective nursing needs of the patient. Therefore, regarding calculations, the possibility to analyse and restructure processes exist. Through benchmarking with other institutions different nursing concepts regarding outcome can be analysed and optimised.

The demand for case-related performance documentation in nursing is increasing (Rehwinkel and König 2002). Present practice for describing care time through the case cost calculation using the nursing staff regulation is too inaccurate. The nursing staff regulation tool is unable to fulfil the important criteria of the classification system’s stability - resulting in inaccurate computations (Isfort and Weidner 2003; Kuhlmann 2003). Which alternatives are available? Are there tools, which can be used without increasing the acquisition costs?

Since 1989, a group of nursing researchers has in co-operation with RECOM GmbH & Co. KG developed the classification system ENP® (European Nursing care Pathways). The aim of this development has been the description of nursing procedures with the aid of a standardised professional language. The ENP nursing intervention formulations along with LEP (nursing performance documentation) AG (Switzerland) were refined through a joint development during a co-operation period with LEP (the joint development refers to LEP Nursing 3). By documenting nursing activities performed the nurse collects the patient's nursing diagnoses, characteristics, etiologies, resources, objectives and nursing interventions. A link from the nursing intervention level with the LEP performance figures produces, through confirmation of a performed nursing intervention, the corresponding deposited performance ratings. This way the LEP patient-related nursing time per case is determined and is available for case cost calculations (Odermatt 2004).

At present projects and research are taking place in hospitals in Switzerland, Austria and Germany in order to evaluate the use of performance ratings produced by the nursing care plans. An improved data status for case cost calculation has already become apparent. An explanation for this is that nurses’ performance evaluation is less liable to subjective influences from the nurses performing the care, and is linked to defined formulated interventions. A qualitative improvement in the nursing documentation has also become apparent. The use of ENP® as a classification system, to illustrate the nursing documentation using a standardised language, can also be used for the generation of nursing staff regulation (PPR) data, as ENP® is also linked with PPR. Using the PPR categorisation in this way, the subjective assessment of staff members in the hospital service (which is also a reason for the instability of the instrument) is reduced, as the PPR is also firmly
allocated to the interventions. The other problems already described above cannot be corrected through the use of PPR. More information on the classification system ENP® for the illustration of the nursing process with a standardised professional language can be found under http://recom.dyndns.org/typo3/index.php?id=44&L=1.

3.2 Cost-related documentation and data collection
A further central strategy concerning revenue improvement in the hospital is the accurate coding of the main and secondary diagnoses. A false medical coding of the ICD-10 and gaps in the documentation lead to inadequate revenue situations. Assuring a high coding quality and the input of all relevant main, as well as secondary diagnoses, and ICPM codes are central preconditions for the correct categorisation in the G-DRG-system and are therefore cost-related. The economic existence and competitive ability of the hospitals will be crucially affected by the coding quality of the institutions. Not only the coding quality, but the ability to understand the reasoning behind the codes, recorded in the patients’ files, will be of central importance (Roeder et al. 2005b).

An increase in secondary diagnoses has to be reckoned with as a result of the multi-morbidity due to the demographic development in Germany. The already increasing number of coded secondary diagnoses is probably not only due to an improved recording practice by the physicians. In the past, secondary diagnoses "were collected depending on the physician's time and/or willingness sometimes more, but mostly less, or not at all" (Königer 2003, p. 55). A sharp increase recently in secondary diagnoses has been observed. A rise has also been noticed in other countries, the base rate was therefore corrected downward accordingly. If the average secondary diagnoses from a hospital are under comparable performance figures, then the revenue situation will be lower in comparison to other hospitals.

3.2.1 Interdisciplinary co-operation to optimise the coding quality
The rising work load within the medical service, caused by the reduction in the length of stay and increased documentation will lead to the situation where physicians will have still less time for ward work and therefore less time for the patient. Therefore, direct, interdisciplinary information exchange about treatment processes and possible additional diseases will gain in importance (Königer 2003) as will interdisciplinary co-operation: "It is essential to integrate non-medical professions of nursing and therapists to ensure complete recording and also to distribute the documentation load" (Quanz 2005, p. 284). The development of an interdisciplinary and interprofessional concept for the implementation of a process-orientated workflow is necessary for the structured data collection and documentation of all treatment and performance activities (Schnabel et al. 2004): "Through superior profound documentation as well as the assignment of specifically trained, non-medical personnel for coding, the economical result can surely be improved" (Grotz et al. 2004, p. 75).

Therefore, Schnabel et al. (2004) stipulate the identification of documentation gaps as well as the examination of the coding quantity and quality through case examinations at the end of a treatment period. As the examination of the documentation and coding quality by Schnabel et al. (2004) shows, coding errors are revenue relevant. Furthermore, it is to be expected that during further differentiation of the G-DRG system even slight coding errors gain in importance regarding the revenue situation (Schnabel et al. 2004, p. 1019).
Charité Hospital chose an interesting way to improve the coding quality. Here, persons from the nursing service were specially trained and used as MDAs (medical documentation assistants). The MDA codes the patients' secondary diagnoses and procedures and passes the proposal list on to the treating physician for examination and confirmation. Through this approach the coding time of the physician can be reduced by 15 to 20 minutes per day (Hansen and Grasse 2004).

The process of non-medical personnel supporting the coding of secondary diagnoses can be encouraged by other means. In some hospitals the use of ENP® (European Nursing care Pathways) for standardised nursing process documentation is being tested. The nursing language is based on standardised nursing diagnoses in accordance with the respective nursing pathway, which is used by the nurse for the nursing process documentation. These nursing diagnoses are linked to ICD-10 diagnoses. The nurse carries out the nursing process care plan according to the documentation standards and automatically generates possible case-related ICD-10 lists of probable nursing-related secondary diagnoses. These are displayed, case-related, to the physician in the coding system over the interface (interface between maintaining and coding software). The advantage of this approach is that no training of nursing staff concerning the medical coding is required and that there are no missing nursing personnel due to coding work. The physician however, receives a list of possible relevant nursing diagnoses which can used as coding support (more on the link of ENP® with ICD-10 see the following text in German: http://recom.dyndns.org/typo3/fileadmin/enp_rnd/pressezentrum/pdf/Verknuepfung_ENP_mit_ICD_10-OPS.pdf).

Competence gaps related to organisational shortcomings can also lead to the loss of grouping-relevant data. A clear regulation of the ward-, department-, and profession-specific contributions for coding must be made. For example, the collection of "nursing-relevant secondary diagnoses" which can decisively affect the revenue situation is of central importance. Interdisciplinary treated cases, which are transferred internally within the institution, require an organisation of systematic information exchange and a coding regulation (Schnabel et al. 2004, p. 1018; Quanz 2005). Above all, timely control of the coding as well as its continuous validation are central in avoiding errors and unnecessary additional tasks during the coding (Quanz 2005). In this area, requests for appropriate IT software and hardware solutions, which support the coding processes, have risen enormously.

3.2.2 Adapte  

Adapted report system for clarity

The reporting system used for the costing and revenue situation should be adapted to meet the reorganised general conditions of the G-DRG age. An important future evaluation analysis is the presentation of the coded secondary diagnoses per case from all wards as well as departmental-specific monthly and annual surveys.

The aim is that hospital staff members receive a rapid overview of the performances and can take corrective measures (Metzger and König 2002, p. 204; König 2003). The development of parameters to examine the coding quality is necessary. These also include rapid clarity regarding performance figures from the personnel responsible for completing the coding. The plausibility of the coding within individual departments can be supported with the use of statistical samples (Mansky 2000, p. 166). Case mix and case mix indices as well as information on the composition of the coding of individual case groups belong to these parameters. At this point, it should be noted
that a clear reporting system should not only contain features of the coding quality, but also the case costs, quality indicators and risk factors.

With reference to the previous discussion on case cost calculations the following demands on a reporting system can be defined. The calculated budget costs should be compared as soon as possible to the actual costs which are based on the nursing pathways developed within the hospitals (Düsch et al. 2002). Additionally, a rapid comparison of individual case groups with the InEK data or with nursing pathway results from other hospitals regarding these particular case groups offers the possibility of initiating optimisation processes. The adjustment and extension of the reporting system concerning quality indicators and risk factors is highlighted under “Healthcare control and optimisation”.

3.2.3 Rapid case-related documentation and coding

The prompt documentation and coding from all professional groups involved in the treatment process is of central importance in achieving a high coding and documentation quality. All DRG relevant aspects (surgery, x-ray, pathology, laboratory, services from different specialist departments) should be promptly collected. The treating physician must be able to examine the process as soon as possible in order to check its completeness. A systematic coordination of the hospital information system’s workflow is here of significance.

At present, the inefficient IT support and the combination of all G-DRG relevant data in an electronic patient file represent major obstacles (Linczak 2004). The barrier thinking of hospital information systems providers often prevent data exchange over clean interfaces of different provider companies (Schnabel et al. 2004). However, working with one provider only is dissatisfying due to the lack of expertise in specialist areas. In the medical field, hospital information system providers have developed in certain areas where they are strongly represented (organisation of operations, intensive care monitoring, administration and cost centre accounting, nursing process documentation, DRG grouping, electronic patient files), other departments are under represented and processes therefore, are not so ideally described.

In addition, most coding systems do not sufficiently take into consideration the working methods of the users. Most coding software presumes a proficiency in coding systematics and inadequately supports the physician’s search access, as he works with compound terms. New coding software developments which work with semantic text analyses give hope for improvements (Linczak 2004). The difficulty with the conventional search of codable terms in a thesaurus is that the physician has to examine and evaluate lists of applicable terms. This approach can be clearly simplified using expert systems which are based on a semantic language. The physician’s entry is searched for according to derivable references of the ICD-10 coding, and appropriate solutions are suggested (Hellwig-Kühn 2004).
3.3 Healthcare control and optimisation
Collective interdisciplinary efforts to improve the structure, process, and result quality are necessary to ensure the economic survival of individual hospitals. Best possible treatments for the patient should be at the centre of these efforts (Knieapfel et al. 2003). A higher standardisation of postoperative treatment to optimise the length of stay and reduce complications is to be recommended. It could be identified, by analysing several defined case groups from a medical-economic perspective, that the cost variance within the G-DRG could be further improved (Klask and Schmelzer 2003, p. 897). Roeder et al. (2004) call for a systematic analysis of treatment procedures and the development of optimised and standardised treatment procedures. The development of clinical pathways is discussed in relation to the demands of a higher standardisation.

The DRG era requires that during the development of the (nursing) pathways outcome indicators for controlling the pathway’s desired effects are also considered. The outcome indicators should include: quality improvement, increased customer and staff satisfaction, as well as the effects on the case costs (Küttner 2004). The literature provides e.g. project descriptions which can improve operating theatre utilisation by process optimisation (Möllmann et al. 2004).

The results of a process analysis of 80 endoscopy departments in German hospitals show that there is room for improvement. This process analysis states that inefficient procedures result in long waiting periods of hospital in-patients as well as to “pathway congestion”. In this analysis, the average utilisation periods of the examination rooms were analysed and the productivity of the endoscopy departments examined. The result is that only 20 % of the patient's time spent in the endoscopy department of the analysed institutions are to be assigned to the actual examination. 80 % of the time are used for the preparation of instruments necessary for the work, the obtaining of missing information necessary for the examination, disorganisation in obtaining materials, multiple documentation, waiting periods due to physicians not being available, etc. There is room for potential improvement in the areas of equipment management, the linking of the IT system with the electronic patient files, scheduling software as well as the restructuring of personnel working hours (Lenz et al. 2005).

Gastmeier et al. describe the positive effects of a systematic, standardised surveillance of hospital acquired infections. Through the standardised data collection of selected hospital-acquired infections, carried out by physicians or hygiene specialists, comparisons with appropriate guideline data from other institutions is possible. In the article a cost benefit calculation is drawn up. The analysis shows that the infection rate in the collected risk groups can be clearly reduced. The costs saved, through compliance with the length of stay and a lower medical expenditure neutralises the costs of the additional data collection several fold. The investment for the specialist departments amount to 2-3 hours. Normally, hospital-acquired infection data collection is carried out by a hygiene specialist.

It is advisable for institutions to collect case-related risks and complications and to evaluate the performance through comparison with other institutions. A continuous illustration of current risks occurred and the use of projections can indicate change and therefore make a valuable contribution in the area of risk management. Using a systematic information management with quality characteristics for case groups, the need for action can be quickly recognised and appropriate process measures for improvement can be taken (Niemann and Wohlers 2005).
Not all possible process and outcome optimisations can be discussed here. Below is an example of how nursing process data, resulting from the nursing process documentation, could be used for process optimisation of nursing procedures. As highlighted in the example regarding standardised monitoring of hospital acquired infections, a systematic evaluation of data collected during the nursing process performance and the systematic comparison of data of comparable cases in other institutions can deliver valuable information on areas improvement. With this in mind, it is beneficial to use the case data collected during the nursing process documentation and to compare them with other institutions. The great advantage of using ENP® nursing process documentation is that no additional data collection effort is necessary.

Clinical pathways are not only interesting from the perspective of the case cost calculation, but are also increasingly being discussed regarding their potential for improvement. Within the context of pathway discussions, optimal sequencing and scheduling of the most important interventions and treatments are central. The development of (nursing) pathways aims at describing the quality and treatment objectives of defined case groups, improving the structure processes and quality of the outcomes, ensuring resources, reducing unnecessary effort, evaluating the outcomes under the perspective of quality and economy, reducing documentation, and to give support to the discussion costs within the DRG structure (Führing and Gausmann 2004).

From these objectives it is obvious that only an interdisciplinary perspective can contribute to the pathway development. The application of a standardised nursing language is beneficial for the description of nursing procedures within a care pathway.

4. Conclusion

With regard to the discussion contributions concerning healthcare performances and reimbursement within the hospital, the complexity of the services taking place becomes obvious. However, it is also obvious, that decisions should be made based on data. The rising demands on hospitals in the future regarding process optimisation, case cost calculation and the accuracy of coding, require systematic adjustments and improvement in IT requirements. The demands on IT use have risen and can only partly be met by providers of hospital information systems. Above all, the interdisciplinary networking of data and an exact as possible representation of the interdisciplinary care pathway (= core processes) along with a detailed transfer of data to the case cost accounting office will gain in importance. The "digital patient record" is becoming more and more important (Trill 2005). The foundation for data-based decisions is the interdisciplinary use of standardised terminologies, classifications (ICD-10, OPS, ENP®, list of available medicines, standardised wound documentation, standardised risk assessments, hospital-acquired infections, structured case history, etc.) in all therapeutic fields. The simple presentation of reports through visually illustrated forms and documents from physiotherapists, nurses and other therapeutic areas using the electronic patient file supports the flow of information and can improve healthcare processes. However, regarding data evaluation in terms of case cost calculations or evidence based medicine, as well as benchmarking to achieve best practice, this mere visual illustration of forms and fields is not sufficient.
A unidimensional use of collected data has no future. There is an increasing call for an additional use of collected data for professional groups (Trill 2005). Why is it that the patient-related documentation of physiotherapy cannot be linked with performance catalogues with corresponding performance ratings (minutes, Euros, material consumption) and contribute to the case-related cost calculation? Why is it currently impossible that the physician (or the nurse on the physician's order) orders the medication by use of a medication tool and receives a warning if there are incompatibilities? Case history data could be used regarding indications of allergies and present medication to check for combinative effects. The next step would be to ask why medication tools do not integrate this information in form of a cost figure in the case cost calculation. Why is there no link to a pharmacy to manage the orders and purchases? Or why should the data from the nursing process documentation and other process information from the clinical pathway (antibiotic therapy, laboratory results) not be used additionally for the recording (OR ascertainment) of hospital-acquired infections? A lot of information regarding the evaluation of a hospital-acquired infection within the different expert systems (documentation opinions of the professional groups) can be passed on automatically and forwarded to the hygiene officer.

The list of data networking and its usage can be improved in many fields, depending on the amount of interdisciplinary co-operation. To date IT developments raise hopes that the use of a standardised language and terminology in medicine, nursing, and other professional groups will simplify data management and the flow of information between the professional groups.

Through the IT use of networked structures and the meaningful linking of process data between professional groups, resources can be optimised and data for the improvement of treatments can be generated. These possibilities give an optimistic look into the future regarding the solving of healthcare problems.

Changes in perspective – problems, in hospitals and healthcare in general which must be solved in the future. Along with ever decreasing resources within healthcare, fairness of distribution and the ethical moral dimensions of rationing and rationalisation are reflected and discussed (Schreiner 2000; Schultheiss 2001). Under this perspective the "assessment of quality of medical and nursing measures" regarding the outcome of activities is called for (Bahro et al. 2001, p. 49).

A basic requirement for the attainment of a "frank rationing and rationalisation debate" (Schultheiss 2001) is the clarity regarding activities, which are and/or should be performed. Through using standardised terminologies and/or classifications to describe the treatment process, there exists the possibility to obtain clarity of medical and/or nursing activities within different institutions. It is conceivable to use this information meaningfully for a productive rationing and rationalisation's debate and to use the data for a just and qualitatively high medical and nursing care. It should be remembered that behind each shortcoming by a member of the professional groups occurring during the care process, lies the individual fate of a patient. This aspect alone should encourage everybody to optimise processes and to avoid risks.
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