

HealthBasket
Work Package 6:
Approaches for Costing and Pricing in Practice

Germany

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I) Introduction

Objective and terminology

This report is part of the second phase of the HealthBASKET (*Health Benefits and Service Costs in Europe*) Project, which was funded by the European Commission. The primary aim of HealthBASKET is to identify a methodology which allows comparisons of the costs of individual health services between different EU Member States, and which allows to explore the reasons underlying the variations in costs of individual services between or within countries. It is thus essential to describe how the different countries define the health services (Phase I) provided and how cost assessment and price setting (Phase II-III) are used across the participating Member States.

Cost variation of individual services between countries can be due to differences in the service definition. In the report of phase I it became apparent that the explicitness of defined benefits varies largely by sector and among the different health care sectors in Germany. While some health care sectors rather have an implicitly defined benefit catalogue, benefits provided by other sectors are laid down explicitly in one or several catalogues. Most schemes determine their benefits following the Statutory Health Insurance scheme which covers 88% of the population and accounts for 56.9% of Germany's total health expenditure (2002). Cost differences may also reflect differences in the way costs of single services are accounted. The costs of a single intervention can be assessed based on established fees, such as the ones negotiated between providers and third party payers, or on the operational accounting of the provider. The detail of cost accounting and the performance-orientation of the remuneration schemes of the certain health care services have to be considered in this context.

The scope of this *Work Package 6: Approaches for Cost/Price Assessment in Practice* and the corresponding report is to analyse the existing methodologies for cost assessment and the approaches actually practiced when calculating costs or prices in Germany. In this context "Price" is used for the total amount of money that a purchaser (plus the patient when cost-sharing is required) has to pay for a certain service. "Costs" are the monetary value attached to the resources and used by a provider to deliver a certain service. The results of this phase of the project are laying the ground for the following Phase III, an empirical assessment of the actual costs associated with the delivery of care at the micro-level (cost vignettes). In this project phase cost accounting methodologies used for the price setting process in different sectors have been investigated.

The structure of this report follows the OECD framework of health care categories to ensure the comparability across the participating countries. For the main sectors of health care services in Germany (curative care, rehabilitative care, long-term nursing care and ancillary services to health care) and the referring sub-categories, the report collects, describes and analyses the actually practiced costing and pricing approaches in each sector. The report is not only based on the published literature but also on interviews conducted with “decision makers”, “insiders” and generally experts on the federal level (Federal Ministry of Health and Social Security, German Hospital Federation, Federal Association of SHI Physicians, Institute for the Remuneration of Hospitals) and on the regional level (regional physicians’ associations).

The payers and their contractual relationships

A fundamental aspect of the German political system – and the health care system in particular – is the sharing of decision-making powers between the *Länder*, the federal government and legitimized self-governmental organisations. In health care, governments traditionally delegate responsibilities to membership-based, self-regulated organisations of payers and providers that are actually involved in financing and delivering health care covered by social insurance schemes. In the – for health care – most prominent scheme, the Statutory Health Insurance (SHI) covering 88% of the population, sickness funds, their associations and associations of SHI-affiliated physicians and dentists have assumed the status of quasi-public corporations. These corporatist bodies constitute the self-regulated structures that operate the financing and delivery of benefits covered by Statutory Health Insurance within the legal framework. In joint committees of payers (associations of sickness funds) and providers (association of physicians’ and/or dentists’ and / or hospitals) legitimized actors have the duty and right to define benefits, prices and standards (federal level) and to negotiate horizontal contracts, to control and sanction their members (regional level).

Apart from the overall framework for each benefit scheme in the social code books, there are certain catalogues with definitions of items for remuneration. For the Statutory Health Insurance scheme there are four catalogues for different health care sectors: SHI-DRG, SHI-EBM 2000plus, SHI-BEMA, SHI-BEL-II. As these catalogues are primarily designed to set provider remuneration, they mostly describe medical procedures that are provided by them (for example in the SHI: DRG, EBM 2000plus, BEMA, BEL-II). The content and the price structure of these catalogues were determined on the federal between the associations of the

joint committees of third party payers and providers associations. The price level will be defined on the regional level, so the *länderspecific* characteristics will be taken into account.

However, while the majority of the population is covered by the SHI according to the different health care sectors there are different other social insurance schemes involved. The Statutory Retirement Insurance (SRI) is responsible for the payment of pensions to the people eligible. In order to avoid that a person is unable to work and thus receives a pension before the legal retirement age of 63 for women and 65 for men, the SRI finances most of the rehabilitative measures. For already retired insured rehabilitative services are covered by the SHI. To cover the long-term nursing care services in 1994 the Statutory Long-Term Care Insurance (LTC) was introduced. Statutory Accident Insurance (SAI) is responsible for the prevention of work-related accidents and for the provision of health care due to work-related accidents or an occupational disease (§ 1 SGB VII). The Statutory Health Insurance explicitly excludes benefits for these purposes. In case of work-related diseases, the insured are entitled to its treatment, encompassing first aid, care by physicians, dentists and hospital treatment. This also includes – if prescribed by a physician – pharmaceutical care, care by non-physicians, rehabilitative care, medical aids and home-nursing-care (§ 26 SGB VII). The public assistance scheme covers subsidiary the same benefits which are provided by the SHI. Unemployed persons receive either benefits from SHI (if insured) or they receive benefits from the communal governments under the public assistance scheme. Table 1 summarizes the financial responsibilities of payers for different health care sectors

Table 1: Responsibilities of payers for different health care sectors

| Health care sector | Social Insurance schemes | | | | |
|------------------------|--------------------------|-----|-----|-----|-------------------|
| | SHI | SRI | SAI | LTC | Public Assistance |
| Inpatient care | X | | (X) | | (X) |
| Outpatient care | X | | (X) | | (X) |
| Rehabilitative care | (X) | X | (X) | | (X) |
| Long-term nursing care | | | (X) | X | (X) |

II) Costing and pricing in each health care sector

HC.1 Services of curative care

HC.1.1 / HC.1.2 Inpatient curative care (DRGs and others)

1. The German Case Fee System: G-DRG

With the passage of the Statutory Health Insurance Reform Act of 2000, the German legislature approved the introduction of a new system of reimbursement based on an internationally used system of Diagnosis Related Groups (DRGs). This represents the most significant reform in the German hospital sector since the system of dual financing (state is carrying capital costs) was introduced in 1972. The step-by-step implementation of the new reimbursement system also represents an innovative approach to realising political strategies and legal provisions, as the legislature has defined only the goals and tasks, as well as the time frame and roles of the different players – all very much in the sense of a “learning system” (Busse R, Riesberg A 2004: p. 171). Difficulties controlling expenditures in the inpatient care sector were the prime motives for fundamentally reforming the old system of hospital services reimbursement (Lüngen M, Lauterbach KW 2003: p. 2).

After being extensively amended, § 17 b of the Hospital Financing Act [*Krankenhausfinanzierungsgesetz*, KHG] came into force on 1st January 2000. It defines the fundamental features of the German DRG system for the case-based reimbursement of general inpatient services and day cases of curative care. Pursuant to this section of the Hospital Financing Act, the self-governing bodies at the federal level (i.e. the Federal Associations of Sickness Funds, the Association of Private Health Insurance, and the German Hospital Federation) were required to introduce a reimbursement system based on DRGs that would be “uniform in application, performance-oriented, and case-based” and that would also take disease severity into account. The self-governing bodies have thus been entrusted with the task of particularising the provisions of the Hospital Financing Act and continually enhancing the German Diagnosis Related Groups system (G-DRG system).

The uniformity in application demanded by the legislature was taken into account insofar as the G-DRG system has been made equally applicable to all patients, regardless of whether they are members of the statutory health insurance (SHI), private health insurance (PHI), or are self-pay patients (§ 17 para. 1 s. 1 Hospital Financing Act). In addition, the G-DRG

system applies on principle to all hospitals, insofar as certain services types are not expressly excluded. It also applies to all clinical departments with the exception of institutions or facilities providing services in psychiatry, psychosomatic medicine, or psychotherapy (Tuschen KH, Trefz U 2004: pp. 103-104).

On 27th June 2000 the self-governing bodies reached an agreement on the further development of the reimbursement system, approving the use of the Australian Refined DRG system (AR-DRG system) as a foundation for the G-DRG system. The self-governing bodies also agreed that cost weights based on German data should be calculated for use in the G-DRG (§ 2 Agreement on Remuneration System 2000). The newly founded Institute for Hospital Reimbursement [*Institut für das Entgeltsystem im Krankenhaus*, InEK] provides the organisational structure necessary for the maintenance and further development of the German DRG reimbursement system and is, among its other duties, responsible for calculating cost weights. For deriving DRG classifications, the institute relies on cost and claims data collected in German hospitals. Accordingly, every German hospital is required to provide the institute with hospital-related structural data and case-related claims data on a yearly basis. The case-related cost data are calculated using a sampling of data from hospitals participating in this voluntary data sharing programme (Schellschmidt H 2001: pp. 68-70).

1.1 Basic Principles for Valuating DRGs

The new German reimbursement system is based on a patient classification system that selectively assigns treatment cases to clinically defined groups (i.e. DRGs) that are distinguished by comparable treatment costs (Rodrigues JM 1993: pp. 17-18). In the G-DRG system, the procedure used to assign treatment cases to a DRG is based on a grouping algorithm that uses a variety of criteria from the inpatient hospital discharge data set, such as diagnosis, procedure, clinical severity, co-morbidity and age. As such, DRG assignments are always unambiguous: treatment cases that have identical records are always assigned to only one single DRG (Lüngen M, Lauterbach KW 2003: pp. 51-52).

The German case fee system is characterised by a “top down” approach in which the DRGs are created and calculated using predetermined per-case treatment costs. As part of this “top down” approach, DRGs are created empirically based on pre-existing cost data, although criteria of medical relatedness (i.e. the similarity between different clinical conditions) are also considered to a varied extent. Case grouping in DRG systems gives first priority to economic and only second priority to medical considerations. Essential to the quality and thus

the completeness of such a case-based system are the accuracy and scope of the calculation data. For example, cases that are excluded from data collect may not necessarily receive adequate consideration at a later point in time (Rochell B, Roeder N 2003: pp. 471-477).

A fundamental characteristic of DRG systems is the use of relative cost weights (also known as relative weights or cost weights) to measure resource consumption. The relative cost weights represent the average costliness of a particular DRG as related to a reference value. This reference value is either based on the costs of a reference DRG (e.g. an uncomplicated delivery in the French DRG system) or a weighted average of the per-case costs of the cases included in the cost calculation (Anlagen Kalkulationshandbuch 2002: pp. 42-44). Accordingly, cost weights do not express an absolute reimbursement value, but rather only the relative difference between the individual DRGs compared to a reference value.

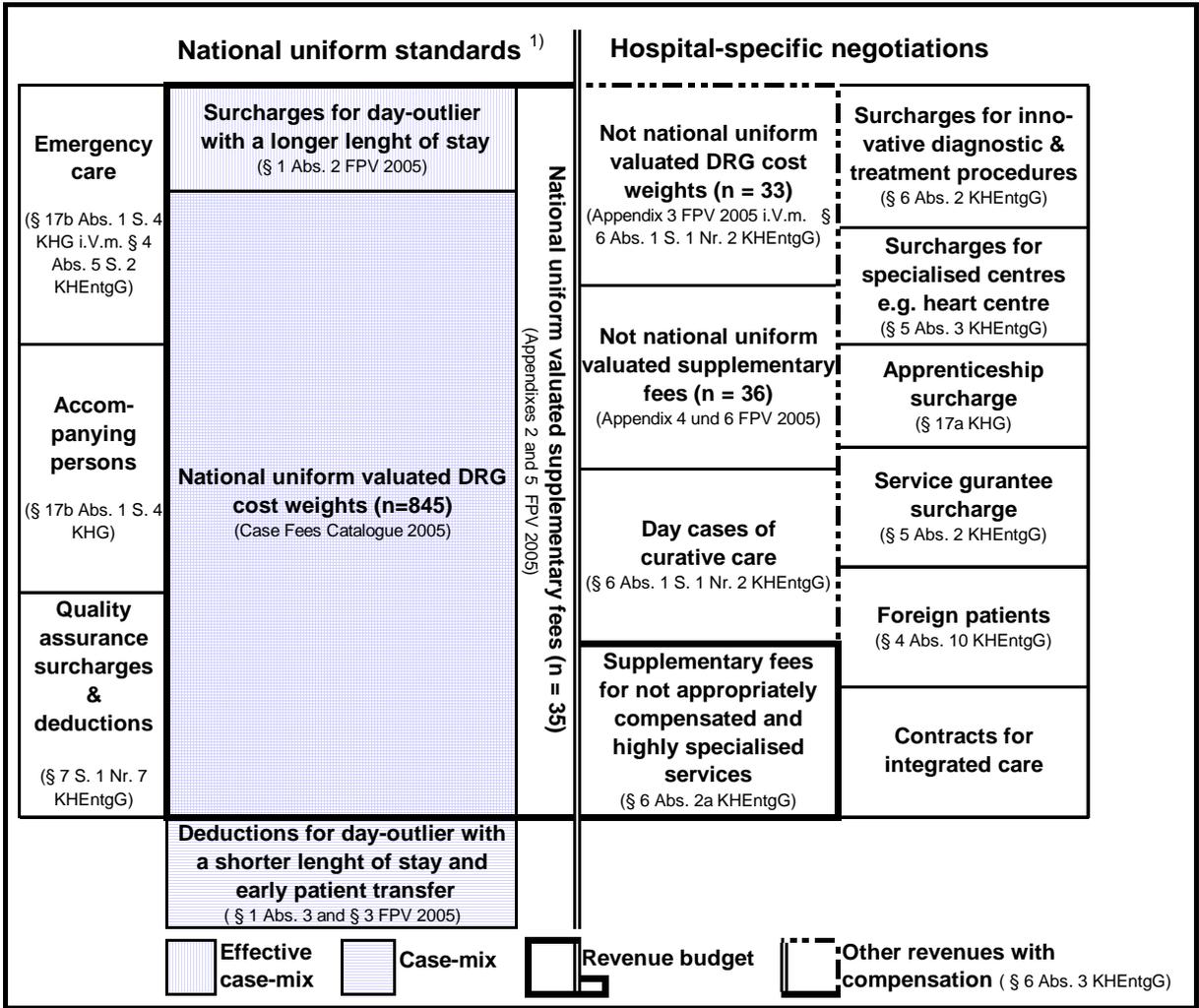
The case revenue for a particular DRG is generally the product of its relative weight and the base rate (i.e. the monetary value of a relative weight of 1.0). The relative weights used in DRG systems make it possible to quantify the average costs per case in relation to a specific unit of time and according to department, hospital, or region. This involves defining the so-called case mix (CM) (Fischer W 2000: p. 40), which is equal to the sum of the relative weights of all DRGs performed during a specific period of time. The average case weight, or so-called case mix index (CMI), is calculated by dividing the CM by the total number of cases. The CMI is thus equal to the average DRG cost weight for a particular health care facility. With this instrument, it is possible to compare the relative use of health care resources in different facilities (Fischer W 2000: p. 40). In turn, the complexity-adjusted, hospital-specific DRG revenue per case – otherwise known as the hospital base rate – is calculated by dividing a hospital's total revenues by the case mix (Lüngen M, Lauterbach KW 2003: pp. 35-39). Currently the hospital base rate varies considerable among hospitals in Germany, which reflects historical differences their financing (despite the fact that they offer a similar range of services). For the year 2004, a nationwide base rate of 2,593 € was calculated; the hospital base rate, however, ranged from less than 1,000 € to more than 4,000 €. For most hospitals the base rate ranged between 2,000 € and 3,200 € (Busse R, Riesberg A 2004: p. 171).

1.2 The Relevance of Additional and Alternative Remuneration Components

It is the intent of the German legislature that, for each case of treatment, all general inpatient hospital services and day cases provided be reimbursed by means of case fees based on DRGs. Pursuant to §17 b para. 1 s. 12ff of the Hospital Financing Act, additional or alternative reimbursement in supplementation of case fees is only permitted in strictly defined, exceptional cases. Contrary to the original intent of the legislature, however, the total amount of reimbursement for hospital services is currently comprised of a number of different revenue elements, as well as of a variety of surcharges and deductions. In part, these are negotiated on a hospital-by-hospital basis; otherwise, they are set in the context of uniform national standards.

The different components of hospital reimbursement in Germany can be seen in Figure 1 below.

Figure 1: Components of hospital reimbursement, including revenue elements, surcharges, and deductions



Source: prepared by the author

1) Exception: classification as a special facility.

The contracting parties in German system of self-governance in health care are authorised to negotiate reimbursement beyond that covered by DRGs by means of supplementary fees for certain cost-intensive services, service complexes, or medications (§ 17 b para. 1 s. 12 Hospital Financing Act). These supplementary fees are generally calculated by the Institute for Hospital Reimbursement in a uniform manner for all of Germany. From a cost-accounting perspective, providing a definition of supplementary fees represents a step along the way to homogeneous classification. With this approach, it is possible to extract cost outliers receiving special and cost-intensive services from the case groups in question and provide reimbursement for services not included in DRGs (Roeder N 2005: pp. 29-30). For the year 2005, the number of supplementary fees was increased from 26 to a total of 71. These include 35 supplementary fees whose amounts were fixed by the Institute for Hospital

Reimbursement and specified in Appendices 2 and 5 of the Case Fees Agreement 2005 [*Fallpauschalenvereinbarung 2005*, FPV 2005]. The other 36 treatment services were included in the list of supplementary fees that are to be negotiated on a hospital-by-hospital basis pursuant to § 6 para. 1 of the Hospital Remuneration Act [*Krankenhausentgeltgesetz*, KHEntgG].

In addition, pursuant to § 6 para. 1 s. 1 no. 2 of the Hospital Remuneration Act, the contracting parties are authorised in the years 2005 and 2006 to negotiate the reimbursement of services by means of case-based or per diem remuneration. The prerequisite for this is that the service in question “cannot yet be appropriately reimbursed through DRGs or supplementary fees”. On this basis, it is also possible, in principal, to negotiate hospital-specific payments pursuant to § 6 para. 1 of the Hospital Remuneration Act for services that would normally be covered by DRGs or supplementary fees. In order to do so, however, it must be proved that the services in question “cannot be appropriately reimbursed” by means of the standard national fees (Roeder N 2005: pp. 19-23). Although the meaning of “proper remuneration” has not yet been qualified or quantified in more detail, a variety of elements within the G-DRG system (version 2005) are nevertheless affected (Figure 1).

These include, amongst other elements of the G-DRG system, DRGs and supplementary fees that have not been valued uniformly throughout Germany, and for which hospitals and health insurance funds thus negotiate hospital-specific payments pursuant to § 6 para. 1 of the Hospital Remuneration Act. The number of DRGs that are not remunerable with a case fee has risen from 18 within the G-DRG system of 2004 to a total of 33 in 2005. The abovementioned DRGs were excluded from the Case Fees Catalogue either because the available data pool was insufficient for calculation or the costs were so variable that it was impossible to determine a lump sum. It was also impossible to calculate day cases of curative care or the 36 supplementary fees (Abschlussbericht InEK 2004: pp. 74-78). Likewise, pursuant to § 6 para. 2 of the Hospital Remuneration Act it is permissible to negotiate special payments for innovative diagnostic and treatment procedures, although it should be noted in this context that the contractual parties at the federal level issue guidelines that serve as the basis for negotiations at the hospital level.

Furthermore, on the basis of the Second Case Fees Amendment Act [*Zweites Fallpauschalenänderungsgesetz*, 2. FPÄndG], separate supplementary fees for highly specialised services that cannot be properly reimbursed by means of the standard national fees can be negotiated

pursuant to § 6 para. 2a of the Hospital Remuneration Act. In addition, the German Federal Ministry of Health and Social Security [*Bundesministerium für Gesundheit und Soziale Sicherung*, BMGS] made it possible to remove certain special facilities and departments completely from the G-DRG system and finance them through individually negotiated fees (Rau F 04/2005: pp. 262-264).

As can be seen in Figure 1, additional and alternative fees – contrary to the intent of the legislature – play an important role in the Case Fees Agreement 2005 and in further regulations for the reimbursement of hospital services. These fees have become increasingly important because of a lack of sufficient data for calculating certain fees and the limited “appropriateness” of the cost weights currently in use. Due to the various remuneration components, the G-DRG system has become highly complex, leading to an increased need for coordination and a greater potential for conflict in budget negotiations between the negotiating parties (Busse R, Riesberg A 2004: p. 175). In addition, the fact that various exceptions have considerably limited the scope of the G-DRG system needs to be viewed in a critical light. Indeed, this development is contrary to the transparency and comparability that were originally intended by the legislature. This is particularly true of hospital-specific components, which are determined locally by the negotiating parties.

The fact that the G-DRG system is based on prices calculated from a business management point of view represents a formidable challenge, as these are determined using data from a sample of hospitals, which means that the representativeness of the sample, the calculation method, the ascertainment of costs in hospitals, and the calculation of case fees are crucial. Furthermore, it is unclear whether hospital services will be remunerated according to standard or fixed prices, or ceiling or target prices once the introductory phase of the new case fee system has come to an end. For these reasons, a price system must meet high standards with regard to pricing methods (Wrabel A, Seidel-Kwem B 2005: pp. 48-50).

This first section of the present project report will focus on the pricing process (Chapters 2-4) and the relationship between costs and prices, on the one hand, and the remuneration of hospital services within the German DRG system, on the other. For this purpose, the project report will provide a precise explanation of the calculation methods and, in the context of the analysis (Chapter 5), will judge these based on the results of the calculation and the quality of the results. In doing so, it will be necessary to distinguish between the calculation of the raw cost data provided by hospitals (Chapter 2) and the statistical calculation of the corresponding

cost weights (Chapter 3) on the basis of this raw cost data. The quality of the cost weights thus depends to a considerable extent on the cost accounting methods used in the hospitals participating in the data sharing programme, as well as on the calculation methods employed by the Institute for Hospital Reimbursement. In this context the term “quality” is to be understood as the extent to which prices truly reflect real cost structures (i.e. in the sense of accuracy of cost data). In other words, it is important to determine whether certain prices reflect actual resource use or are to be regarded as “political prices” that have evolved over the course of negotiations. Chapter 4 will introduce the method for deriving the revenue budget in the course of the transition phase. In this context, we will focus explicitly on the issue of determining price levels at the *Länder* level.

2. Calculating Raw Cost Data Provided by Hospitals

The self-governing bodies in the German health care system have been entrusted by the legislature with introducing and further developing the G-DRG system. In order to fulfil these tasks pursuant to § 17 b paras. 2 and 3 of the Hospital Financing Act, the contracting parties founded the Institute for Hospital Reimbursement on 10 May 2001. The institute is responsible for the practical implementation of the switch-over to a case fee system based on DRGs, as well as for the calculation and further development of cost weights based on the cost and claims data collected in German hospitals. The updated G-DRG system is made available, and the annual adjustment of the classification system is performed, by 30th September of the year prior to that in which the changes are to take effect. The changes are made on the basis of corresponding empirical data delivered by hospitals (see § 4 of the Agreement on Remuneration System 2000).

The raw cost data provided by hospitals consist of the DRG-related per-case treatment costs associated with DRG-related services (Kalkulationshandbuch 2002: p. 1). Knowing the per-case costs and the average costs per DRG (mean value of all per-case costs within a DRG) is especially important in the G-DRG system. The raw cost data provided by hospitals are the basis for calculating the relative weights used in the G-DRG system and thus for pricing (Larbig M, Hennke M 2003: p. 794).

The calculation of data provided by hospitals participating in the data sharing programme is based on the “Manual for Calculating Per-Case Costs – Version 2.0” from 31st January 2002. The calculation manual was created so that cost data delivered by participating hospitals

could be calculated according to a uniform and analysable scheme. The calculation manual defines the standards and minimum requirements for differentiating DRG-related costs and services, as well as for implementing cost element, cost centre, and cost unit accounting in the participating hospitals (Wrabel A, Seidel-Kwem B 2005: pp. 49-50).

By allowing the use of calculation methods with different priorities in different locations, the calculation scheme provides considerable leeway with regard to methodological approach. In doing so, it adapts to the individual conditions encountered at the various participating hospitals and, accordingly, is designed to accommodate a broad array of applications at these institutions (Kalkulationshandbuch 2002: p. 1). In order to verify the implementability and the real-world performance of the calculation method, a preliminary test was conducted in 27 hospitals in the year 2001, based on the results of which the manual was subsequently revised (Projektbericht Methoden-Pretest 2001: pp. 10-12). Experience gained from the calculation cycles since the manual's introduction have led to adjustments that have improved the quality of calculation results. These insights are summarised in the publication "Updates and Addenda to the Calculation Manual Version 2.0 (Updates and Addenda 2004)" of 17th December 2004 (Aktualisierungen und Ergänzungen 2004: p. 3).

2.1 Data Collection

2.1.1 Collecting DRG data pursuant to § 21 of the Hospital Remuneration Act

§ 21 of the Hospital Remuneration Act regulates the collection of data for the further development of the G-DRG system. On a yearly basis, all hospitals in Germany are required to provide the Institute for Hospital Reimbursement with hospital-related structural data and case-related claims data. Pursuant to § 21 of the Hospital Remuneration Act, data for the previous calendar year are to be sent by 31st March. The DRG Data Collection Centre is monitored and regulated by the institute.

The annual data provided by any given hospital include all hospital stays with a discharge date during that data year. The structural data of any given hospital include characteristics such as hospital ownership and the number of beds. The primary identification code for the data delivery is the hospital's institution code. In addition to the personal characteristics of patients (e.g. age and gender), the claims data (reported per case of treatment) include medical

treatment information such as primary and secondary diagnoses, as well as operations and procedures.

2.1.2 Collecting Cost Data

To date, the cost data needed to determine cost weights for the G-DRG system have been calculated using per-case cost data provided on a voluntary basis by selected German hospitals. In principle, any hospital may take part in this data sharing programme, although pursuant to § 17 b para. 5 of the Hospital Financing Act there exists no absolute entitlement to do so. A crucial prerequisite for participation is the quality of the data collected. The Calculation Agreement 2005 [*Kalkulationsvereinbarung 2005*] has therefore defined a number of requirements, the foremost of which is that hospitals must manage their data according to the specifications laid out in the “Manual for Calculating Per-Case Costs – Version 2.0” (Calculation Manual) from 31st January 2002 and in any addenda or corrections published thereafter. In this context, the direct cost allocation of cost-intensive material goods needs to satisfy especially stringent requirements. The case-related cost data from the data year are to be transferred to the DRG Data Collection Centre by the 31st of March of the following year. Thus, the further development of the G-DRG system, version 2005, is based on cost data from the 2003 calendar year (Abschlussbericht InEK 2004: pp. 6-7).

Data collected by the participating hospitals and then transferred to the DRG Data Collection Centre serve as the foundation for all further steps in the calculation of cost weights for the G-DRG system. As part of the Centre’s data acceptance procedures, all data sets are subject to an error checking and correction process. The verified data are then forwarded to the Institute for Hospital Reimbursement.

As of 12th May 2005, a total of 221 hospitals had agreed to participate in the data sharing programme and thus provide cost data for the 2005 data year. These data will serve as a basis for calculating the cost weights for the G-DRG system, version 2007. This corresponds to roughly 12% of the approximately 1,800 DRG hospitals in the Federal Republic of Germany (Rau F 05/2005: p. 393). The medium-term goal set by the self-governing bodies is to be able to collect complete cost data information from all DRG hospitals in the country (§ 2 Agreement on Remuneration System 2000).

Starting with the year 2005, hospitals are to be reimbursed for providing data as part of the data sharing programme (§ 17 b para. 5 Hospital Financing Act). The reimbursement will consist of a basic flat fee for all hospitals plus a variable fee that will depend on the number and quality of the data sets that each hospital transfers to the Data Collection Centre.

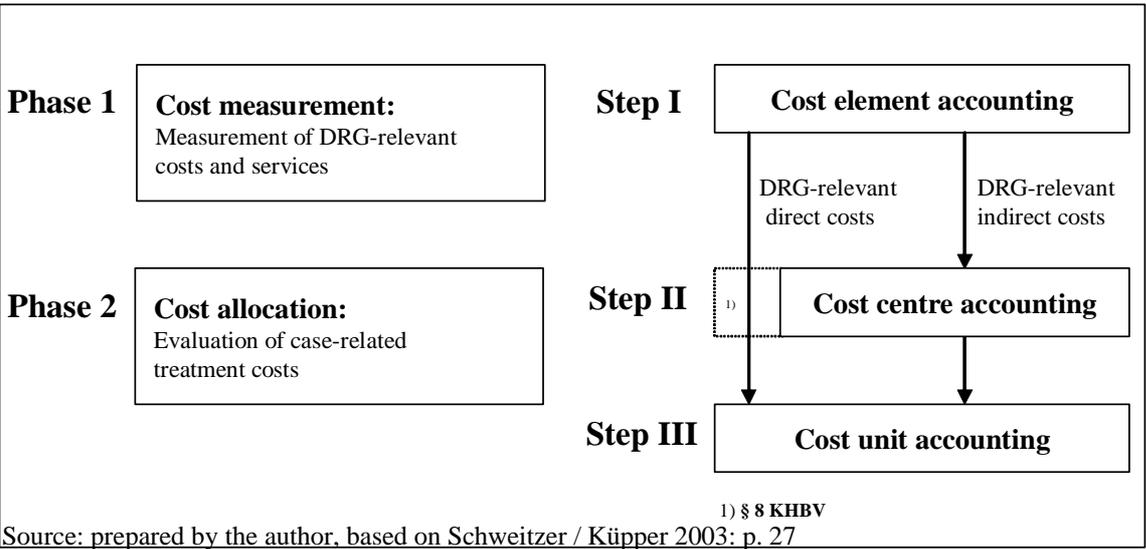
2.2 Main Characteristics of the Cost Accounting System

The characteristics of the operative accounting system for calculating raw costs per case are determined by the calculation methods used. In the hospitals participating in the voluntary data sharing programme, raw costs per case are calculated according to the full cost method using actual costs. This means that DRG-related costs are offset in full against the DRG treatment cases while taking all DRG-related services into consideration (i.e. the 100% method). The participating hospitals’ actual costs are derived from their audited annual accounts. Accordingly, the reference period for calculating raw costs per case is a completed calendar year (Kalkulationshandbuch 2002: p. 2).

Raw costs per case are calculated according to standard cost accounting principles. The calculation can be divided into two phases – cost measurement and cost allocation – which can be further subdivided into three steps: cost element, cost centre, and cost unit accounting. The goal of the first phase is to determine which services and costs are DRG-related; the goal of the second phase is to calculate the case-related treatment costs.

An overview of the calculation process is provided in Figure 2.

Figure 1. Procedure for Calculating Raw Costs per Case



This presentation shows the standard method of assigning direct costs in trade and industry. In contrast, hospitals process all costs using cost centre accounting – an approach based primarily on provisions contained within § 8 of the Hospital Bookkeeping Directive [*Krankenhausbuchführungsverordnung, KHBV*]. As part of the calculation of raw costs per case, a separate company code is created, allowing the hospitals themselves to decide whether to assign the direct costs directly to cost objects (Kalkulationshandbuch 2002: pp. 37-38).

Each step in the process for calculating raw costs per case focuses on a set of specific questions. For example, cost element accounting is used to determine which DRG-related costs were incurred in total, and in what amount, over a specified period of time. Cost centre accounting, on the other hand, asks where the costs occurred. The individual cost elements are assigned to the organisational sub-areas in which the costs occurred (i.e. cost centres). However, although cost centre accounting shows where the costs have arisen, it does not identify the products or services with which the costs are associated. To do this, the last step in cost analysis – called cost unit accounting – is necessary. After determining the activities occurring in any given cost centre, as well as the time spent on each activity over a specified period, the costs for each activity can be calculated by allocating the total costs of the cost centre to the individual activity according to the percentage of time spent on the activity. Dividing the activity costs by the number of product or services then results in the costs for one unit, a unit being a product or service.

The process of calculating raw costs per case is based on a modular approach which entails arranging each set of case-related data in the calculation results according to cost element groups and cost centre groups. Aggregating costs across cost element groups and cost centre groups makes it possible to show the costs per patient or per patient group (DRGs) in a concise manner. Hospitals participating in the voluntary data sharing programme have thus been instructed to aggregate their treatment costs in this way (Kehres E 2005: p. 124).

Aggregating Cost Elements Across Cost Element Groups

After cost centre accounting has been completed, the cost elements are separated into cost element groups. This reduces the computational costs of cost unit accounting in the hospitals and of calculating relative weights at the Institute for Hospital Reimbursement. The following cost element groups have been defined:

- *Cost element group 1*: Labour costs of the clinical staff
- *Cost element group 2*: Labour costs of the nursing staff
- *Cost element group 3*: Labour costs of the administrative and technical staff
- *Cost element group 4a*: Drug costs
- *Cost element group 4b*: Drug costs (individual costs/actual consumption)
- *Cost element group 5*: Costs of implants and grafts
- *Cost element group 6a*: Material costs (without drugs, implants or grafts)
- *Cost element group 6b*: Material costs (individual costs/actual consumption; without drugs, implants or grafts)
- *Cost element group 7*: Medical infrastructure costs
- *Cost element group 8*: Non-medical infrastructure costs

Aggregating Direct Cost Centres Across Cost Centre Groups

In cost unit accounting, all DRG-related costs are assigned to their corresponding treatment cases. To ensure the comparability of the data sets from different hospitals, the per-case costs in the data sets are arranged in a uniform manner. For this purpose, the cost centres in each set of case-related data are aggregated across cost centre groups:

Hospital units with beds:

- *Cost centre group 1*: Standard care unit
- *Cost centre group 2*: Intensive care unit
- *Cost centre group 3*: Dialysis unit

Diagnostic and treatment areas:

- *Cost centre group 4*: Operating rooms
- *Cost centre group 5*: Anaesthesia
- *Cost centre group 6*: Maternity room
- *Cost centre group 7*: Cardiac diagnostics/therapy
- *Cost centre group 8*: Endoscopic diagnostics/therapy
- *Cost centre group 9*: Radiology
- *Cost centre group 10*: Laboratories
- *Cost centre group 11*: Other diagnostic and therapeutic areas
- *Cost centre group 12*: Central cost centre

Central Cost Centre

Only non-medical infrastructure costs from cost element group 8 may be assigned to the central cost centre. The central cost centre is thus irrelevant for all of the other cost element groups. Furthermore, the central cost centre is only set up for hospitals that base their cost centre accounting on the gross-costing method or a mixed calculation method that combines

step-down accounting and gross-costing approaches. Costs booked to the central cost centre are classified as “bed occupancy days” in the sets of case-related data as part of an unweighted calculation of allocation bases.

2.3 Calculating DRG-related Services and Costs – Cost Element Accounting

When assigning cost elements to cost element groups, participating hospitals are required to follow the provisions of the Hospital Bookkeeping Directive (particularly § 8) to be read alongside the chart of accounts provided in Appendix 4 of that directive. The calculation of raw costs per case is thus based on the expense accounts in account categories 6 and 7 of the Hospital Bookkeeping Directive, or the most recent list of account balances provided by the hospital’s administrative accounting department and used to complete the hospital’s audited annual accounts (Kalkulationshandbuch 2002: p. 5).

The goal of cost element accounting is to define and calculate DRG-related costs and services. These serve, in turn, as the basis for calculating costs per case and should be differentiated from the total output volume and total cost volume. Costs that are not related to DRGs are excluded both at the cost element level and the cost centre level. The procedures described in the Calculation Manual are based on the principle that costs which are not related to DRGs should be excluded at the highest aggregation level possible. Thus those costs that, overall, are not related to DRGs are already excluded at the level of cost elements. At the cost centre level, costs are excluded to an extent that is analogous to the proportion of non-DRG services that are performed there. A further step in the exclusion process occurs in the context of cost centre accounting, in which proportionately calculated costs are taken into consideration (Janiszewski J, Pfaff M 2001: p. 223).

2.3.1 Determining Whether Services Are DRG-related

Pursuant to § 17 b of the Hospital Financing Act, the general inpatient and day patient services for each treatment case are to be remunerated according to the G-DRG system, with the exception of psychiatry, psychosomatic medicine, and psychotherapy (i.e. until suitable remuneration methods have been developed for these areas) (Tuschen KH, Trefz U 2004: p. 103).

In general, hospital services can be divided into standard and elective services, the former of which includes both inpatient and day patient treatment services. Pursuant to § 2 para. 2 of the Federal Hospital Reimbursement Ordinance [*Bundespflegesatzverordnung*, BPfIV], standard hospital services are those services which, in consideration of the level of care any given hospital is able to provide, are necessary to provide individual patients with appropriate and sufficient treatment. These services include medical treatment, nursing care, the provision of pharmaceuticals, cures, and therapeutic appliances, as well as board and accommodation (§ 2 para. 1 Federal Hospital Reimbursement Ordinance).

Elective services are defined by the Federal Hospital Reimbursement Ordinance (§ 22) as services other than these. Such services are not covered by the G-DRG system. However, individual hospitals may at their own discretion offer elective and convenience services which are covered by private insurance schemes or paid for out-of-pocket by the patients themselves.

Pre-care and after-care treatments are also included in the calculation of raw costs per case, insofar as these services are related to an inpatient stay. In this event, the inpatient, pre-care, and after-care services are included together in one single data set (i.e. one data set per case). Services provided to a patient’s companion or family member whose stay is not medically necessary are not covered. Table 1 below provides an overview of services that are to be classified as DRG-related.

Table 1. Classification of DRG-related and Non-DRG Services

| DRG-related services | Non-DRG services |
|--|---|
| <ul style="list-style-type: none"> • Inpatient services • Day case services • Pre-care and after-care services associated with inpatient stay | <ul style="list-style-type: none"> • Services provided in psychiatric departments. • Services provided in facilities for psychosomatic medicine or psychotherapy • Non-hospital outpatient services • Pre-care services without subsequent inpatient stay |

Source: Modified presentation based on the Calculation Manual 2002: p. 29

2.3.2 Extracting DRG-related Costs

When calculating raw costs per case, the only costs to be taken into consideration are those that arise due to the performance of the DRG-related services described above. As previously described, these costs are extracted from the expenses (expense accounts of account classes 6 and 7 of the Hospital Bookkeeping Directive) – or, in other words, from the profit and loss statement of the audited annual accounts. The DRG-related costs that are extracted from the expenses represent basic costs with regard to cost accounting. Because imputed costs are not generally related to DRGs, the basic costs equal the operating expenses. As a result, the cost calculation can be described as a form of historical cost accounting and thus also as a process that treats expendable goods (e.g. medical supplies) as historical costs (Kalkulationshandbuch 2002: pp. 30-44).

Overview of the different expenditures to be excluded at the level of cost elements:

- Extraordinary expenses and expenses relating to other periods
- Capital costs (exception: depreciation of fixed assets)
- Core business expenses, insofar as these are not related to general hospital services
- Taxes, charges, insurance for operational sections of the hospital that do not provide general hospital services, as well as tax on profits
- Specific and long-term allowance for bad debts
- Interest payable, insofar as this is not related to capital loans
- Imputed costs

DRG-related Direct Costs

Direct costs are those costs that can be identified specifically with a particular cost object and can be directly assigned to this cost object with a high degree of accuracy (Schweitzer M, Küpper HU 2003: pp. 62-63). When calculating raw costs per case, the individual treatment case is considered the cost object. The direct costs for cost-intensive material goods are either directly matched to this cost object, or indirectly matched to it by means of cost centre accounting. The matching principle (also known as the cause-and-effect principle, or “Verursachungsprinzip” in German) represents a fundamental standard in cost allocation. The costs are matched with the place (cost centre) where they occurred or the product (cost unit) for whose production they were incurred. This means that a cost object may only be matched with the costs that caused it (Hentze J, Kehres E 1999: p. 17).

The extremely cost-intensive drugs, implants, or other material goods required for a large number of today’s medical treatments represent a large percentage of total costs. As a result,

direct cost allocation has come to play an important role in the further development of the G-DRG system. The requirements placed on cost allocation methods have thus been continually revised in the updates made to the Calculation Manual, allowing for more precise differentiation between the DRGs according to their costliness. As part of these updates, Appendix 10 was added to the Calculation Manual. This new appendix lists individual products for which direct cost allocation is mandatory.

Direct cost allocation is the prerequisite for preparing a detailed breakdown of highly specialised and complex services so that these may be remunerated separately (e.g. through supplementary fees). For the calculation of data from the year 2005, direct costs are to be allocated according to actual consumption. If an exact case-related allocation of direct costs is not possible, then allocation can be performed in certain instances on the basis of a hospital-specific clinical allocation model [*klinisches Verteilungsmodell*, KVM]. This approach requires special approval from the Institute for Hospital Reimbursement, which must confirm that the allocation methods used are sufficiently differentiated. The uniform allocation of direct costs across all cases was performed for the last time in data year 2004 (Aktualisierungen und Ergänzungen 2004: pp. 7-17).

DRG-related Indirect Costs

Indirect costs are those costs that are incurred for common or joint objectives and thus cannot be readily identified with specific cost objects (Hentze J, Kehres E 1999: p. 12). DRG-related indirect costs are apportioned across the individual treatment cases via cost centre accounting and, subsequently, using cost rates in the context of cost unit accounting (Kalkulationshandbuch 2002: p. 36).

2.4 Cost Centre Accounting

In cost centre accounting, all DRG-related indirect costs and, if applicable, all DRG-related direct costs are allocated to the place where they occurred (i.e. to the corresponding cost centre). In addition, the exchange of services and of benefits in kind between the various centres is recorded by means of step-down accounting. Pursuant to § 8 of the Hospital Bookkeeping Directive, cost centres are either described as sender cost centres or receiver cost centres. This differentiation is made so that the costs of these in-house services can be allocated according to their actual utilisation by receiver cost centres. In the allocation process, the sender cost centres are credited and the receiver cost centres debited. The

allocation rates used to do so are dependent on suitable allocation bases (Schweitzer M, Küpper HU 2003: pp. 727-728). With regard to calculating raw costs per case, the goal of allocating costs in this manner is to distribute indirect costs equitably across the direct cost centres (Kalkulationshandbuch 2002: pp. 72-73).

2.4.1 Defining Cost Centre Categories

Within the company code for calculating of raw costs per case, the various cost centres are distinguished by their relationship to the cost object. There are direct and indirect cost centres, as well as mixed and non-DRG cost centres (Kehres E 2005: pp. 124-125).

Direct cost centres (also known as “final cost centres” or “revenue-earning cost centres”) provide services directly to the patient, especially in terms of diagnostics, therapy, and nursing. Indirect cost centres (also known as “intermediate cost centres” or “non-revenue-earning cost centres”), on the other hand, provide services to the direct cost centres without engaging directly with patients. Indirect cost centres are related to a hospital’s medical infrastructure (e.g. hospital pharmacy, central sterilisation unit) and non-medical infrastructure, especially the accounting, supply, and administrative areas. Mixed cost centres provide DRG-related services to inpatients, but also provide non-DRG services to outpatients and other cost objects. Mixed cost centres can be found among the direct and indirect cost centres. Distinguishing between DRG-related and non-DRG costs in these cost centres represents a challenge when calculating raw costs per case. In addition, there are non-DRG cost centres that exclusively provide non-DRG services. In other words, non-DRG cost centres do not provide services that are reimbursed as part of the G-DRG system.

2.4.2 Allocation of Labour Costs

Allocating labour costs represents an important preparatory step in the costing process. In order to ensure the accuracy of cost data, labour costs should be allocated prior to crediting the mixed cost centres with the non-DRG costs.

The labour costs of employees who work in activities in multiple cost centres are often allocated to a collective cost centre (Janiszewski J, Pfaff M 2001: p. 224). A number of methods may be used to do so; these will be described in more detail below. When allocating personnel costs, an employee’s performance potential may be defined by his or her target annual work hours (minus inactive periods due to illness, further education, etc.). If the number of working days per year is defined as 250 and holiday entitlement is 30 days, the

annual productive capacity of a full-time employee with 38.0 weekly hours of work thus equals a total of 1,650 working hours.

In order to approach the issue pragmatically, activities performed on a small scale by an employee for other cost centres may be ignored when distributing labour costs (Kalkulationshandbuch 2002: pp. 74-82). The main criterion for allocating labour costs is the extent to which tasks performed by an employee have been utilised by the receiving cost centre. It should be noted here that only the following types of labour costs may be included in labour cost allocation:

- Clinical staff costs
- Nursing staff costs
- Technical staff costs
- Administrative staff costs

Allocating Labour Costs Using Employee Time Tracking

Labour utilisation is often determined by measuring the time an employee spends performing a task for the receiving cost centre. If employee time tracking has been used in the service area in question, then working hours may be used as the basis for equitably distributing the labour costs in question.

Allocating Labour Costs By Calculating Manpower Requirements

Labour costs can also be allocated by calculating manpower requirements. This approach entails defining the relationship between the activities performed in a cost centre and labour utilisation (according to duty type and cost centre). The following ratios are used for this purpose:

Minutes/activity: Here, activities are valued by determining the manpower (in minutes) required to perform each activity. The product of the total number of activities per year and the average amount of manpower (in minutes) required per activity equals the total labour utilisation (in minutes) over the entire year. Subsequently, the total annual labour utilisation (in minutes) is offset against the annual working time of a full-time employee, which translates into the number of full-time employees required per cost centre (i.e. also known as full-time equivalent labour, or FTE labour).

Activities/employee and year: It is still possible in Germany to evaluate hospital-specific situations by means of external guidelines. These guidelines refer to a pre-determined

measure of performance per full-time employee and year (e.g. a clerical assistant writes 5,000 discharge letters per year). The number of full-time employees needed per cost centre is calculated by comparing the total of activities performed in each cost centre per year with the pre-determined performance potential of one employee per year.

In principle, when using these ratios, hospitals are to include only those activities which are performed during standard working hours. Activities performed while physicians are on standby duty need to be given special consideration. This is because these activities are carried out by full-time employees in the form of additional working time.

Allocation of Labour Costs Using Other Statistics or Estimates

If employee working time has not been recorded, labour costs may be allocated using other statistics, such as evaluations of staff appointment schemes or duty rosters. If these statistics are also unavailable, then collective cost centres may be credited by estimating the working time of the employees in the individual services areas.

2.4.3 Excluding Non-DRG Services from Mixed Cost Centres

In principle, individual hospitals may use any method of their own choosing to exclude non-DRG expenditures from mixed cost centres, as long as they follow the general procedures described below (Kalkulationshandbuch 2002: pp. 50-53). Non-DRG expenditures are excluded from a mixed cost centre based on the percentage they comprise of the total number of services performed at that cost centre. This percentage can be calculated from the cost centre's service or activity statistics. In order to give proper consideration to actual resource consumption, the number of services rendered should also be weighted. Medical services can be weighted, for example, using point catalogues, such as the German Catalogue of Tariffs for Physicians [*Gebührenordnung für Ärzte, GOÄ*] or the Uniform Value Scale [*Einheitlicher Bewertungsmaßstab, EBM*].

Should it not be possible to operationalise the services performed in a cost centre in the manner described above, costs may also be excluded using other allocation keys common to cost centre accounting. However, if the costs cannot be excluded in a differentiated fashion, it is permissible to estimate the proportion of non-DRG services for a given cost centre. In turn, the cost centres in question are credited proportionately in the amount of the non-DRG services. Crediting particular cost elements is only possible under exceptional circumstances. The offsetting entry for the accrued values is posted in each case to an accrual cost centre.

Non-DRG expenditures must be excluded prior to cost centre accounting. Using this approach, services that mixed cost centres received from other indirect cost centre are not taken into consideration. However, the exclusion of non-DRG expenditures takes place after the calculation of labour costs described above. The following summary provides an overview of the various types of expenditures to be excluded from mixed cost centres (Kalkulationshandbuch 2002: pp. 53-69).

Overview of the various types of expenditures to be excluded from mixed cost centres:

- Costs of psychiatric services pursuant to § 17 b para. 1 of the Hospital Financing Act, as well as services in psychosomatic medicine and psychotherapy
- Costs of non-hospital outpatient services including outpatient operations pursuant to § 115b SGB V
- Costs of services provided to a patient's companion or family member whose stay is not medically necessary
- Costs of blood-clotting factors for haemophiliacs
- Costs of services provided to third parties
- Costs of providing staff to third parties
- Costs of board and lodging for staff members
- Costs of non-core business operations (e.g. restaurant, kiosk or flower shop)
- Costs of rent and lease
- Costs of ambulance staff
- Costs of supplementary service areas, such as short-term nursing care, old people's home, welfare centre, etc.
- Costs of academic teaching hospitals
- Costs of scientific research and teaching
- Costs of training centres and costs or additional costs of trainee remuneration

2.4.4 Implementation of Cost Centre Accounting

Cost centre accounting can be based on three different methods:

1st priority: step-down accounting

2nd priority: mixed calculation between step-down accounting and gross-costing

3rd priority: gross-costing

In order to ensure that the calculations performed in each hospital are as differentiated as possible, the step-down accounting method has first priority. The mixed calculation method listed above has second priority. Finally, the gross-costing method should only be used if the base data is not sufficient to allocate costs using a differentiated approach like these (Kalkulationshandbuch 2002: pp. 73-74).

In each of these three methods, medical infrastructure costs are distributed according to allocation rates that are dependent on the presence of suitable allocation bases. In contrast, non-medical infrastructure costs are only apportioned to direct cost centres in the context of step-down accounting (or apportioned in part using the mixed calculation method) by means of an allocation key. In principle, the participating hospitals are responsible for defining the allocation bases and deriving the allocation rates, although it should be noted here that the Calculation Manual specifies a number of exemplary requirements. The important consideration is that the matching, or cause-and-effect, principle be given due consideration so that cost allocation may remain as equitable as possible.

When using the gross-costing method (and, in part, when using the mixed calculation method) the non-medical infrastructure costs are posted to a central cost centre which is created especially for this purpose and functions similarly to a collective cost centre. The costs posted to the central cost centre are distributed evenly across all treatment cases in the context of cost unit accounting. With regard to cost allocation, neither of these two methods takes into account the exchange of services or activities between various indirect cost centres. As before, only direct cost centres and accrual cost centres that can be described as receiver cost centres may take part in cost allocation.

The mixed calculation method represents a combination of the step-down accounting and gross-costing approaches. It was included in the Calculation Manual following the abovementioned preliminary test conducted in 27 hospitals in the year 2001 because it takes into account the real-world accounting practices of hospitals in Germany (Projektbericht Methoden-Pretest 2001: pp. 67-69). When allocating non-medical infrastructure costs according to this method, it is necessary to decide on one of two courses of action. If accurate allocation bases or allocation rates are available for indirect cost centres with non-medical infrastructure costs, then these costs are assigned to the direct cost centres to the same extent as medical infrastructure costs are assigned to these cost centres. The remaining non-medical infrastructure costs are then posted to the abovementioned central cost centre and, from there, are distributed across the treatment cases in a uniform manner.

2.5 Cost Unit Accounting

When calculating raw costs per case, cost unit accounting is needed to determine the costs that were incurred in the production and utilisation of one unit of the cost object. This means

that the DRG-related costs allocated to the direct cost centres in the context of cost unit accounting need to be associated as accurately as possible with the treatment cases (Schweitzer M, Küpper HU 2003: p. 159). Indirect costs are assigned to treatment cases with the help of calculation rates based on equitable allocation bases. The methodology described in the Calculation Manual requires that there be a proportional relationship between the allocation bases used to develop the calculation rates and the costs shown in the cost centres. From a cost theory standpoint, the calculation assumes that the cost functions are linear. As a result, the Calculation Manual has set in advance which allocation bases are to be used depending on the cost centre and cost element in question. In this context, the Calculation Manual prescribes authoritative alternatives, each with a different priority. These requirements are the prerequisites for the quality, validity, and comparability of the calculation results. For every direct cost centre, each hospital chooses a suitable method based on the quality, type, and extent of its data and considering the requirements set forth in the Calculation Manual. In contrast, direct costs are usually assigned directly to the treatment cases (Kalkulationshandbuch 2002: pp. 108-109).

2.5.1 Unweighted Calculation of Allocation Bases

When performing an unweighted calculation of allocation bases, the first step is to determine a calculation rate for each cost centre. The calculation rate per cost centre is derived from the relationship between the costs shown in the cost centre and the activities performed in that cost centre. Using division, one may then determine the amount to be assigned to a particular case when a service in a particular cost centre is utilised (Hentze J, Kehres E 1999: pp. 97-100). The costs shown in the cost centre that are to be assigned to the treatment case are thus derived by multiplying the number of completed activities in the cost centre with the calculation rate. In the areas of diagnostics and treatment, assigning costs to cases within the context of an unweighted calculation of allocation bases and using the classification “number of cases” is considered insufficient according to the requirements laid out in the Calculation Manual.

This type of division calculation represents the most simple calculation method. Its use is distinguished by the fact that each treatment case is assigned an equal amount of costs, without having taken into consideration the actual utilisation of resources (i.e. in the sense of varying treatment complexity). Generally, this simple form of division calculation is used in businesses that produce a homogenous mass product. When calculating raw costs per case,

however, the heterogeneity of activities or services in the direct cost centres is not given due consideration if this method is used (Schweitzer M, Küpper HU 2003: p. 160).

2.5.2 Weighted Calculation of Allocation Bases

Performing a weighted calculation of allocation bases involves division calculation with equivalence numbers (i.e. equivalence number accounting). This method in cost unit accounting is used when a business produces distinct, but related products. This method is based on the assumption that, due to workflow-related similarities, the costs of activities in any given cost centre are related to each other in some way that corresponds to the causes of the costs. This relationship is determined by means of observations or measurements and is expressed as a corresponding equivalence number. This equivalence number indicates which cost relationship exists between the individual activities or services (Hentze J, Kehres E 1999: p. 92)

The weighted calculation of allocation bases used when calculating raw costs per case is thus distinguished by the fact that the activities or services performed by direct cost centres are weighted by the resource utilisation associated with them. This gives greater consideration to the matching principle when assigning costs to treatment cases. To assign costs to treatment cases in the context of a weighted calculation of allocation bases, two requirements must be fulfilled: 1.) there must be a valuation standard that can ensure the equitable assignment of costs per activity or services; and 2.) the activities or services performed by the cost centre in question must be documented in a case-based manner. When weighted allocation bases (e.g. performance points according to the Catalogue of Tariffs for Physicians) are used to distribute costs in the areas of diagnosis and treatment, this is done based on the hospital-specific cost structure. Hospital-independent valuations of performance points (e.g. point revenue according to the Catalogue of Tariffs for Physicians) are not permissible when calculating raw costs per case. Taking into account the predetermined allocation bases in the Calculation Manual, it can be seen that it is primarily the weighted calculation of allocation bases that is used when calculating raw costs per case (Kalkulationshandbuch 2002: pp. 110-116).

3. Analysis of Raw Per-case Cost Data

Pursuant to § 21 of the Hospital Remuneration Act, the further development of the G-DRG system is based on the hospital-related structural data and case-related services data (i.e.

DRG data) provided each year by all German hospitals. These data are then supplemented with per-case cost data provided on a voluntary basis by selected German hospitals. In the year 2004, a total of 1,748 hospitals delivered DRG data on 17,883,256 cases. These DRG data were supplemented by per-case cost data (a total of 2,909,784 data sets) delivered by 148 hospitals participating in the voluntary data sharing programme (Abschlussbericht InEK 2004: pp. 5-8). Altogether, 42 of the hospitals in the data sharing programme participated for the first time in 2004. However, an additional 141 hospitals that had agreed to participate in the programme failed to provide any data. An overview of the DRG data and per-case cost data provided in 2004 for the further development of the G-DRG system in the year 2005 can be found in Table 2.

Table 2. Overview of DRG data (collected pursuant to § 21 Hospital Remuneration Act) and per-case cost data (from the data sharing programme) (as of 8th June 2004)

| Category | DRG data collected pursuant to § 21 Hospital Remuneration Act | Per-case cost data from hospitals in data sharing programme |
|---------------------|--|--|
| Number of hospitals | 1,748 | 148 |
| Number of beds | 499,333 | 75,908 |
| Number of cases | 17,883,256 | 2,909,784 |

Source: Abschlussbericht InEK 2004: p. 8

The data in Table 2 are from 8th June 2004, following the Data Collection Centre's error checking and correction process, but prior to the data verification procedures implemented by the Institute for Hospital Reimbursement. After going through the Institute's verification procedures, the per-case cost data from the data sharing programme serve as the basis for the further development of the G-DRG classification system. The DRG data collection pursuant to § 21 of the Hospital Remuneration Act, on the other hand, give an almost complete overview of the inpatient and day patient services provided in Germany. These data sets are used, among other purposes, to standardise cost weights. The task of the DRG Data Collection Centre is to conduct an electronic error checking and correction process which consists of three-steps and examines the data sets for formal errors. Subsequently, the Institute for Hospital Remuneration subjects the data from the hospitals participating in the data sharing programme to a content-based data verification procedure.

Because the goal of the Institute for Hospital Remuneration is to provide valid base data for the further development of the G-DRG system, the plausibility tests conducted by the Institute have resulted in a substantial number of the treatment data sets being excluded from further calculations. In the base data for the year 2005, for example, a total of 15.1% of the 2,738,002 data sets tested by the Institute were eliminated, which is equivalent to 414,614 cases (Abschlussbericht InEK 2004: pp. 30-36).

Such measures taken in the context of data preparation serve to compensate for distorting influences resulting from the different situations of different hospitals; they also serve to establish a uniform period of time for reference. The process of cleansing the base data used in 2005 led to the exclusion of 7.2% of the 2,738,002 data sets (Abschlussbericht InEK 2004: pp. 37-40). The data sets that remain following such plausibility tests and data cleansing procedures serve as the basis for determining the cost profiles.

3.1 Identifying Inliers and Outliers

Because DRG systems attempt to combine inpatient cases into medically coherent and cost homogeneous groups, so-called outliers distort the arithmetic average. The term “outlier” denotes cases in a DRG with unusually long or costly hospital stays compared to the case group mean. Such deviations may be due to inefficient working methods or procedures on the part of the care provider. However, they may also be the result of patient or treatment characteristics that were not taken into proper consideration. If such deviations occur frequently, then this is an indication that the DRG in question is inhomogeneous (Fischer W 2000: pp. 40-41). Because remuneration through case fees is, in principle, based on treatment services that are provided in the context of a standard length of stay (LOS), cases in which the cost of treatment greatly exceeds the case value represent an operational risk for individual hospitals. In order to reduce this risk, most patient classification systems define threshold values (also known as “trim points”) between which the treatment cases are expected to be located. Furthermore, outliers distort the reimbursement of inliers, leading to an inflated reimbursement of all standard cases in a particular DRG. Because of this, a number of mathematical procedures are used to exclude outliers, with varying results (Sáez M 2003: pp. 27-28).

The term “inlier” denotes cases that are treated within the standard LOS. The standard LOS is demarcated by a low trim point and a high trim point. After the process of data cleansing, the total cost of inlier cases are determined for each DRG. Based on this, the average costs are

calculated and related to the total average costs (allocation bases) to determine the cost weight for the DRG in question (Abschlussbericht InEK 2004: p. 48).

In order to account for the lower treatment expenses incurred by short-stay outliers (i.e. located below the lower LOS-threshold) or who are transferred early, remuneration in these cases is reduced by means of per diem deductions pursuant to § 1 para. 3 and § 3 of the Case Fees Agreement 2005. Long-stay outliers (i.e. located above the upper LOS-threshold) are reimbursed by means of per diem surcharges pursuant to § 1 para. 2 of the Case Fees Agreement 2005 in addition to the DRG case fees.

The relevant population of inliers is determined by calculating the lower and upper LOS-threshold. This is a preparatory step for determining the average costs per case and for deriving DRG classifications. Because of its characteristics, the arithmetic mean (AM) is used to calculate both the average length of stay and the average costs per case. The general characteristic of the AM is that the number of items in a class times their mean value is equal to the sum of all the values in that class. With regard to the case fee system, if all cases in a DRG are remunerated using a case fee, then the number of cases times their mean cost equals the sum of the costs of all the cases, and the number of cases times the average length of stay equals the sum of treatment days (Abschlussbericht InEK 2004: pp. 42-45).

Calculating the lower LOS-threshold

Pursuant to the norm contained in § 7 para. 1 of the Ordinance on the Case Fee System for Hospitals [*Verordnung zum Fallpauschalensystem für Krankenhäuser*, KFPV] of 19th September 2002, the lower LOS-threshold continues to be calculated as followed:

Lower LOS-threshold = round [max (2, AML / 3)]

AML = arithmetic mean of length of stay

The lower LOS-threshold is thus one-third of the mean value of the length of stay or at least two days.

Calculating the upper LOS-threshold

The upper LOS-threshold also continues to be calculated pursuant to the rule prescribed in § 6 para. 1 of the Ordinance on the Case Fee System for Hospitals:

Upper LOS-threshold = round [min(AML + 2 * SDL, AML + 17)]

AML = arithmetic mean of length of stay

SDL = standard deviation of length of stay

The upper LOS-threshold is thus equal to the sum of the mean length of stay and two standard deviations from the mean. If two standard deviations from the mean exceeds a pre-selected maximum value then the upper LOS-threshold is to be calculated as the sum of the mean length of stay and the pre-selected maximum value. Pursuant to § 6 para. 2 of the Ordinance on the Case Fee System for Hospitals, the maximum value is to be chosen in such a way that the surcharges for long-stay outliers equal approximately 5-6% of the total amount to be reimbursed via case fees.

Accordingly, calculating the upper LOS-threshold by introducing a maximum value is directly related to the reimbursement of long-stay outliers. The fixed portion of the total budget is determined by multiplying the sum of all the long-stay outliers' treatment days by the sum of the per diem cost weights of the long-stay outlier surcharge. The amount of the surcharge is thus hypothesised at first in order to determine the upper LOS-threshold. At the same time, the amount of the surcharge is dependent on the upper LOS-threshold. Following a multi-step simulation, the maximum value was set at 17 days (Abschlussbericht InEK 2003: pp. 35-36).

3.2 Method for Identifying Inliers

In the first step, the upper and lower LOS-thresholds are calculated for all cases upon which a DRG is based. For the cases selected in this first step, another LOS-threshold calculation is then carried out in the same manner. This means that the thresholds are delimited even more narrowly by means of a further variance reduction. The inliers for whom the cost profile is subsequently created are defined through the LOS-thresholds determined in this second step (Abschlussbericht InEK 2004: pp. 35-37).

3.3 Calculation of Case Costs

According to the so-called "One Hospital Model" [Einhaus-Modell], all participating hospitals' cases for a particular DRG are included in one single file, as if they had all come from the same hospital. A set of statistical indices are then calculated for all cases and for the inliers that were calculated in the second step described above (Abschlussbericht InEK 2004: p. 44).

- Number of cases (data from hospitals in the data sharing programme, DRG data pursuant to § 21 Hospital Remuneration Act)
- Costs (arithmetic mean, median, variance, standard deviation)
- Length of stay (arithmetic mean, median, variance, standard deviation)
- Homogeneity coefficient of costs

These calculations serve as the starting point for determining the length of stay and cost values reported in the Case Fees Catalogue, whereby the mean per-case costs provide the main foundation for the derivation of the DRG classifications. If necessary, DRG-specific changes to the classification may be made prior to calculating the individual statistical indices, the goal of which is to achieve variance reduction in the entire system and to promote cost homogeneity in the individual case groups.

3.4 Evaluation Changes in the Classification System

For the further development of the G-DRG classification system, suitable units of measurement have been defined as a basis for decision-making when creating new DRGs or changing existing ones. For every DRG that needs to be modified, these units of measurement denote the best alternatives available (i.e. best for the system as a whole). Above all, it is the statistical measure of variance reduction (R^2) which allows decision-makers to compare the alternatives and decide on the optimal solution for the system. R^2 measures the amount of cost variability that can be explained by the classification. As the proportion of explainable variation within the classes decreases compared to the variation between the classes, the overall quality of the class system increases. The extent of variance reduction has proved itself to be a suitable parameter for evaluating improvements made to the system. Based on the calculations performed, there may arise a variety of different alternatives for change. Because of this, the extent of variance reduction achieved is the primary criterion by which the result of the simulation is evaluated. In addition, the change in the cost homogeneity of the individual case groups is analysed, because the separation of a numerically small, very homogenous case groups has a positive effect on the extent of variance reduction. It is possible, however, that the larger remaining quantity of the original case group might remain problematic in its composition. This is why the homogeneity coefficient of costs is used to examine and evaluate the effects a change to the classification system might have on the composition of the newly created or modified case group. The homogeneity coefficient is a measurement of variation that can be used independently of the empirical distribution of data

(Abschlussbericht InEK 2004: pp. 46-49). In its final report on the G-DRG system, version 2005, the Institute for Hospital Reimbursement did not publish exact limits (in the sense of split criteria) for variance reduction or for the homogeneity coefficient. Rather, it simply described the methodological procedure.

One possibility for the different parties involved to influence the classification system and changes made to the system is the so-called suggestion process [Vorschlagsverfahren]. The respective legislation distinguishes between suggestions for optimisation, which do not increase the number of DRGs (“non-complexity-changing suggestions”), and suggestions that increase the number of DRGs. The former are processed in their entirety, whereas the latter are processed only up to a certain number of DRGs. An example of a non-complexity-changing suggestion would be reassigning a medical procedure from one group to a different group. An example of a suggestion that would increase the complexity of the system would be the introduction of a new severity split. Task packets are formed based on the various suggestions and analyses; these are then processed according to a weighted variation coefficient. As such, frequent, cost-intensive, and heterogeneous groups are processed first. Subsequently, of all possible changes, those are chosen that will result in the greatest variance reduction. In this context, splits need to meet the following requirements (Leber WD 2003: p. 5):

- the difference between mean costs must be greater than 10% of the higher mean cost or they must exceed €500.
- the number of cases to be calculated must be greater than 30, and the number of cases from all hospitals (DRG data pursuant to § 21 Hospital Remuneration Act) must be greater than 500 in every newly created DRG.

In the Australian DRG system, the prerequisite for creating a new DRG is that at least 250 cases be treated in this DRG per year. An existing DRG may only be split if at least 10% of the cases from the original DRG are taken over by the new DRG. Also, splitting a DRG must result in a 5% improvement in variance reduction (Lüngen M, Lauterbach KW 2003: p. 83).

3.5 Standardisation of Cost Weights

The cases upon which the classification is based represent only a subset of all the cases treated within the scope of the G-DRG system. For this reason, the relative frequencies for each DRG from the participating hospitals’ data are compared to those from the DRG data

collected pursuant to § 21 of the Hospital Remuneration Act. In order to compensate for frequency distributions that deviate from the norm in the totality of cases in each DRG, the allocation base used to derive the classification is corrected or standardised using the actual number of cases in the DRG data collected.

This procedure is based on the requirement that the cost weights of any given DRG must be oriented toward a case with average costs from the DRG data, which by definition is assigned a cost weight of 1.0. This means that the average cost weight of all cases in Main Hospital Departments from the DRG data and which are subsequently reimbursed according to the cost weight for inliers, have the value of 1.0. For this purpose, it is necessary to divide the arithmetic mean of the costs of inliers in each DRG by an allocation base that corresponds to this requirement. Accordingly, the standardised allocation base is defined as the weighted arithmetic mean of the costs of all inliers in Main Hospital Departments. For each DRG, the mean of the costs is weighted by the number of inlier cases in the DRG data. In this manner, the frequency distribution of the DRGs in the DRG data of the Hospital Remuneration Act is reflected in the standardised allocation base. In the context of care provided by Main Hospital Departments, the cost weight of a DRG is calculated by dividing the arithmetic mean of the costs of inliers in Main Hospital Departments by the allocation base.

3.6 Calculating Surcharges and Deductions

Deductions for Short-stay Outliers:

A deduction is calculated for all DRGs that have a lower LOS-threshold of 2 days while taking into consideration the mean costs of the cases with a one-day stay, insofar as there are at least 30 cases that can be included in the calculation. The deduction is calculated in such a way that, after the deduction is made from the DRG cost weight, the result is precisely the mean costs of cases with a one-day hospital stay.

$$\frac{AM(costs_{Inlier}) - AM(costs_{1-day\ cases})}{allocation\ base}$$

In all other cases, the differential costs between the costs of the primary service and the totals costs for inliers are calculated. The costs of the main service are equal to the sum of the cost values in the cost centre groups 4, 5, 6, 7, and 8, plus the cost values in the remaining cost

modules of cost element group 5. The average differential costs are distributed by means of division across the treatment days below the lower LOS-threshold. Dividing these average costs per day by the respective allocation base determines a per diem cost weight, which is used as the basis for deductions in the Case Fees Catalogue:

$$\frac{\text{AM (differential costs)}}{\text{lower LOS-threshold}} / \text{allocation base}$$

Surcharges For Long-stay Outliers

The purely analytical derivation of surcharges has been superseded by a DRG-specific calculation that focuses on the actual cost situation of long-stay outliers. In order to approach the problem of long-stay outliers in a differentiated manner, three different methods are used to determine the surcharges:

- the analytical calculation already used in the G-DRG version 2004:

$$\frac{\text{AM (differential costs)}}{\text{AM (length of stay)}} * 0.7 / \text{allocation base}$$

- a modified form of this analytical derivation:

$$\frac{\text{AM (differential costs)}}{\text{AM (length of stay)}} / \text{allocation base}$$

- a calculation using the median of the per diem costs of long-stay outliers :

$$\frac{\text{median (per diem costs of long-stay outliers)}}{\text{allocation base}}$$

The modified form of the analytical derivation does not predefine a marginal cost factor. This derivation is used when it is not possible to calculate the surcharge by using the median of per diem costs incurred by long-stay outliers, and when using the analytical calculation from the previous year would lead to significant and relevant underfunding of long-stay outliers in this DRG. When using the median of per diem costs incurred by long-stay outliers, the DRG-specific cost distribution must be taken into account. The median of per diem costs is used if 1.) the cost distribution of long-stay outliers clearly points to a structural funding gap, 2.) the

attributes of a classificatory solution for the funding gap are not present, 3.) not considering the cost distribution of long-stay outliers would lead to deficiencies in the provision of services or 4.) a relevant DRG-specific percentage of long-stay outliers are present.

Deductions in the Event of Patient Transfer

According to the guidelines set forth in § 3 of the Case Fees Agreement, deductions are to be made from the cost weight of a DRG if a patient is transferred before his or her length of stay reaches the mean length of stay and the DRG in the Case Fees Catalogue is not designated as “flat fee for patient transfer”. In the G-DRG from the year 2005, the deduction normally made in the event of patient transfer is suspended if the mean length of stay of transferred patients is significantly shorter than the mean length of stay of non-transferred patients, and the mean costs of the transferred patients are significantly higher than the mean costs of the non-transferred patients, and both differences and the proportion of transferred patients are relevant.

4. Determining Pricing Levels and Deriving Revenue Budgets in the Transition Phase

The revenue budget of a hospital represents the sum of revenues from DRG case fees and certain supplementary fees (§ 3 para. 3 s. 4 no. 1 Hospital Remuneration Act). Budget negotiations for hospital revenue agreements are based on a new DRG system, which is no longer distinguished by a focus on costs, but rather on performance (Leber WD 2004: p. 18). The formula “price x quantity” serves as the general basis for the revenue budget. More specifically it is the product of the number of cases, the effective case-mix index, and the base rate. The effective relative weight per case deviates from that indicated in the case fees catalogue because it accounts for deductions in the case of patient transfer or short-stay outliers, and surcharges for long-stay outliers. In this way the effective relative weight is commensurate with the actual calculated amount for case fees.

The G-DRG system is being introduced to hospitals within the framework of a so-called transition phase under protective conditions designed to avoid economic hardship in hospitals whose base rates are clearly above average. The legislature has provided for this adjustment phase in the restructuring of hospital financing using DRGs in order to guide hospital budgets incrementally toward a national pricing standard (Hensen P, Roeder N, Rau F 2005: p. 96). In order to make sure hospitals have adequate time to convert their historically based budget to a

nationally standardised pricing system, the First Case Fees Amendment Act shifted full implementation of the DRG pricing system, which was originally planned for 2005, to the year 2007. The Second Case Fees Amendment Act again shifted the deadline so that full national implementation of the DRG pricing system would be initially effective in the year 2009 (Rau F 2004: p. 979).

In keeping with the previous levels of negotiation, sickness funds and hospitals negotiate on site about the type and number of services expected to be performed, using a prospective and performance-oriented approach. For this reason, case fees will initially retain the character of partial payments with which hospital will be remunerated on a pro-rata basis by statutory or private health insurance (Tuschen KH, Trefz U 2004: pp.116, 203).

4.1 Determining Statewide Base Rates

Beginning with the transition phase in 2005, individual hospitals have begun adjusting their budget in order to orient themselves toward a statewide base rate, which since the beginning of 2005 is contractually approved at the state level in accordance with § 17 b para. 3 s. 5 of the Hospital Financing Act. With the approval of a statewide base rate, pricing levels for DRG case fees will also be determined at the state level. Accordingly, the G-DRG case fee system represents a uniform pricing system or fixed pricing system, in which the only elements left to be negotiated are the type and quantity of the case fees and supplementary fees to be applied. In reaching an agreement about a statewide base rate, the basic process involves open negotiations amongst self-governing bodies at the state level. An increase in the statewide base rate is limited by § 10 para. 4 of the Hospital Remuneration Act using the so-called base wage in accordance with § 71 para. 3 s. 1 together with para. 2 s. 3 of the Social Code Book V [*Sozialgesetzbuch V, SGB V*]. As a result of the elimination of the contribution rate stability stipulated in § 6 para. 1 s. 3 of the Federal Hospital Reimbursement Ordinance, which pertains to individual hospital budgets, the maintenance of contribution rate stability is now the responsibility of the negotiating partners in the process of determining a statewide base rate. In accordance with § 10 para. 2 of the Hospital Remuneration Act, securing contribution rate stability became especially important for the year 2005. At the beginning of 2005, the statewide base rate was to be set in such a way as to preclude contribution rate increases. This directive was meant as a one-time calibration of the pricing level in the new reimbursement system; the goal was to ensure that the transition from a mixed reimbursement system to a DRG system would not result in additional costs for the statutory health insurance system (Tuschen KH, Trefz U 2004: p. 118).

In many of the German states, negotiations in determining statewide base rates were plagued by conflict. Without statewide base rates it is not possible to make positive or negative budget adjustments, which could result in not being able to complete budget negotiations with individual hospitals. In order to avoid persistent delays or even a halt in the introduction of the DRG system, and furthermore to create pressure on the contractual partners, the Federal Ministry of Health and Social Security issued an ordinance based on § 10 para. 8 of the Hospital Remuneration Act that set a preliminary statewide base rate for the affected states for the year 2005. The fixed values do not affect the requirement for state governments to reach agreements about statewide base rates. The provisions serve to avoid logjams in negotiations with individual hospitals in the event that a statewide base rate is not approved. To equalise profits and losses resulting from deviations in the preliminary and approved statewide base rates, a simple and formalised equalisation procedure has been instituted (Rau F 05/2005: p. 390-395).

4.2 Deriving Revenue Budgets

The incremental equalisation of an individual hospital base rate with a statewide base rate and the resulting revenue volume occurs on January 1 of each year between and including 2005 and 2009, based on a clearly defined system stipulated by the legislature. The essential rules for adjusting the revenue budget during the transition phase are found in § 4 of the Hospital Remuneration Act, last modified by the Second Case Fees Amendment Act. This means that the differences compared to historical hospital revenue budgets approved in accordance with previous legislation will be successively reduced. For 2005, the average base rate was €2785, whereby the negotiated statewide base rate ranged from €2585 in Mecklenburg-Western Pomerania to €3000 in Berlin. The main goal of the new system is that at the end of the four-year transition phase, the same price will be paid for comparable hospital services – independent of the level of care, hospital structure, or other factors (Hensen P, Roeder N, Rau F 2005: p. 96).

Based on the current timeline indicated in the Second Case Fees Amendment Act, the base rates for hospital reimbursement in 2005 will be calculated as a ratio between statewide base rates (15%) and individual hospital base rates (85%). The ratio will shift to 35:65 in 2006, to 55:45 in 2007, and to 75:25 in 2008. If the law is implemented within the time specified, hospitals will calculate services based on the statewide base rate (100:0) beginning 1st

January 2009 (see Table 4), whereby the “learning system” that will take legislative effect in 2010 must still be specified (Busse R, Riesberg A 2004: p. 173).

Table 3. Progress of DRG introduction (status subsequent to Second Case Fees Amendment Act)

| Year | Number of DRGs | Equalised to statewide base rate (based on initial values for 2004) | Equalised to statewide base rate (based on previous year) | Weight of negotiated budget | Limit on budget reduction (based on previous year) |
|------|----------------|---|---|-----------------------------|--|
| 2003 | 664 | - | - | - | - |
| 2004 | 824 | 0% | 0% | 100% | - |
| 2005 | 878 | 15% | 15% | 85% | 1% |
| 2006 | ? | + 20% = 35% | 23.5% | 65% | 1.5% |
| 2007 | ? | + 20% = 55% | 30.8% | 45% | 2% |
| 2008 | ? | + 20% = 75% | 44.4% | 25% | 2.5% |
| 2009 | ? | + 25% = 100% | 100% | 0% | 3% |

Source: prepared by the author

Budget reductions will be subject to limitations during the transition phase. The Second Case Fees Amendment Act controls budget losses by enforcing limits, in order to minimise the risk of unjustifiable budget reductions influenced by an underdeveloped DRG case fees catalogue. The absolute value by which the individual budgets of affected hospitals may be reduced in 2005 may not be greater than 1% of the modified initial value from 2004. The limit increases from 1% in 2005 successively in 0.5% increments to 3% of the modified initial value in 2009. There is no provision for an upper limit on budget increases within the transition period (Rau F 2004: p. 979).

4.3 Corrections for Changes in Services Provided

One of the basic new concepts in the negotiation process is that hospitals can agree with payers on a greater numbers of services, which then are financed by the rates determined by the legislature. The equalisation mechanism designed for the transition phase only provides for a partial reimbursement of additional services. Budget frameworks negotiated in the transition phase would be obsolete if approved or unapproved profits or losses were to have a full effect on the budget. When profits are completely paid by sickness funds and losses are

completely compensated by hospitals, reimbursement follows a pure pricing system in which remuneration is made dependent on services performed (Tuschen KH, Trefz U 2004: p. 118).

In this context, the legislature has provided for a compromise by allowing the prospectively approved revenue budget to be adjusted using specified quotas in the event of any fluctuations in performance. The result of this flat rate approach is commensurate with the procedures used hitherto to reach revenue budget agreements, insofar as they accounted for additional services only in the amount of variable costs. Equalisation rates approved on the national level will correspond initially to the proportion of labour costs. This means that, in the event that additional services are performed, the resulting material costs are covered, but the percentage of labour costs already paid needs to be refunded (Rau F 2001: p. 571-573).

For additionally approved services, only a third of the DRG price will go into the hospital revenue budget in 2005. In 2006 this will increase to half of the DRG price. The same applies in the case of unperformed services. This means that in the year 2005, both positive and negative case mix changes will be accounted for in the revenue budget with 33% of the respective cost weight. In the following years, successively increasing percent rates will take effect, starting with 50% in 2006, then 65% in 2007, 80% in 2008, and 100% in 2009 (Eberle M, Groß F, Heumann M 2005: p. 112).

These agreements will be supplemented by rules for cases in which a hospital performs or must perform more or fewer services than originally approved. In this context, profits and losses will occur with respect to approved prospective hospital budgets. Within the transition phase, actual revenue changes in a budget year as compared with the approved revenue budget will be equalised either partially or fully using defined profit and loss equalisation quotas. In the area of case fees, § 4 para. 9 of the Case Fees Amendment Act provides losses to be compensated at a rate of 40%; the so-called miscellaneous profits will be split, with 65% going to statutory and private health insurance and 35% remaining with the hospital.

The following system is used to determine profits: all additional treatment cases handled, as compared to the approved number of treatment cases, will be multiplied by the mean of the approved cost weight per case. This mean is derived by dividing the sum of the cost weights by the sum of the approved treatment cases. The product of the additional treatment cases and the mean approved cost weight is then multiplied by the hospital-specific base rate approved for that year. The final amount calculated using this method is then subtracted from the sum

of the total profits earned from case fees. The remaining amount is then subject to the equalisation rate for other profits, with 35% remaining for the hospital. (Hensen P, Roeder N, Rau F 2005: pp. 102-103).

The law does not currently provide a regulatory framework for the period following the transition phase. Accordingly, there are no stipulations addressing a hospital's performance of additional services following the transition phase. It is possible that they will be billable at a full DRG price or that they will continue to be covered within budget frameworks (Tuschen KH, Trefz U 2004: p. 103).

5. Accuracy of Cost Weight Data

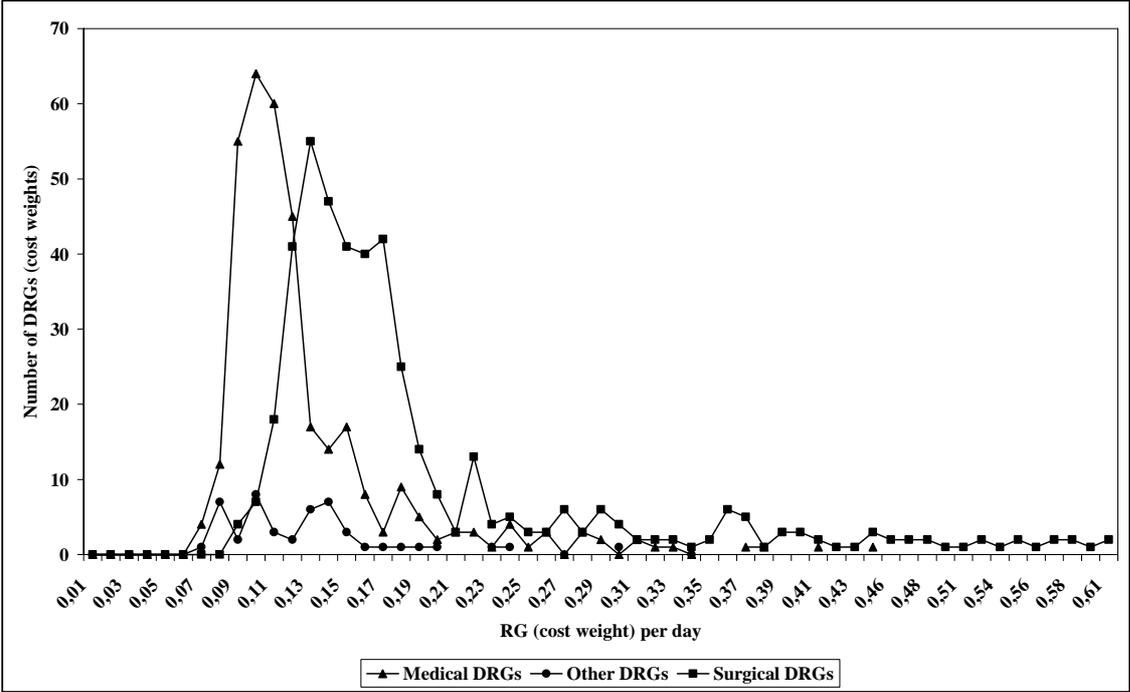
For the Institute for Hospital Reimbursement to determine cost weights, it is absolutely necessary that the base data from the hospitals participating in the voluntary data-sharing programme be reliable. This is only possible if case-related treatment costs have been assigned accurately by the participating hospitals. The validity of the results of the per-case cost calculation is heavily dependent on the quality of information about resource utilisation at the case level (Janiszewski J, Larbig M 2002: p. 248). Calculating the raw costs per case is therefore an important starting point in the satisfactory refinancing of hospital services. If, however, a significant portion of costs is calculated across patient days without using a differentiated allocation formula, the results will not produce cost weights equivalent to the complexity of service. Accordingly, the calculation results correlate very strongly to the length of stay, a parameter which has been used for cost allocation.

The calculation of cost weights for the 2005 version of the G-DRG system was predominantly influenced by the length of stay, such that differences were not adequately represented between complex and less complex cases unrelated to the length of stay. Cost distribution among the patients in the various participating hospitals is thereby strongly associated with length of stay for a number of DRGs (i.e. and not just for individual ones). This is proved in the following analysis.

The cost of a single DRG for the purposes of cost weighting, divided by the mean length of stay indicated in the Case Fees Catalogue, results in a per diem rate that varies only insignificantly between the individual DRGs. More specifically, the result is a per diem cost weight, which is practically identical among many conservative, medical, as well as surgical

DRGs. The G-DRG system distinguishes between the different partitions of surgical case fees, medical case fees, and other case fees. Figure 3 below shows the mean per diem cost weights in the various partitions and the corresponding number of DRGs. The cost weights are grouped in increments of 0.01 and the number of all DRGs in the individual groups is indicated on the Y-axis.

Figure 3. Cost weight proportion per day and partition



Source: prepared by the author

Here, it can be seen that medical DRG cost weights for a single day of stay show only a very narrow span. Most of the DRGs in this partition have a cost weight of 0.8 to 0.15 per day. In contrast, the per diem cost weights for the surgical partition are not so heavily concentrated. The DRGs in the “Other” partition (predominantly interventional diagnostics and therapies) indicate a wide spectrum of day-related cost weights. The cost weight here appears to be mostly independent of the length of stay.

These findings confirm the hypothesis that the cost weights of many DRGs are essentially influenced by the length of stay. This is probably due to the fact that when there are no other more specific allocation criteria, many costs are allocated to patients using the criteria of length of stay. In this way the length of stay determines cost allocation and thereby also the reimbursements made by the G-DRG system for 2005. The clear orientation toward length of stay in the calculations leads to a concentration of cost weights and to a performance evaluation that is not timely, since changes can only be understood two years after the fact,

owing to the calculation methodology. The raw costs per case from the 148 hospitals participating in the data-sharing programme therefore reflect treatment patterns used in 2003. This would still be dominated by the incentive system of the Federal Hospital Reimbursement Ordinance, in which the orientation toward length of stay can be recognised by the way it configures the case group system and its fiscal evaluation (Roeder N 2004: p. 34). Because of the way the former incentive system was financed based on days of care, it led to a very LOS-oriented approach to treatment in German hospitals (Roeder N, Bunzemeier H, Glocker S 2004: pp. 254-255).

Based on an in-depth assessment, few hospitals in Germany have access to the quality data required by the Calculation Manual, or the know-how and necessary resources needed to undertake an adequate calculation of raw case costs. The quality of cost and performance calculations in hospitals, like the number of hospitals participating in the calculations, all have a direct influence on the continued development of the G-DRG system. With this in mind, it is problematic that the apparently larger portion of German hospitals have no access to valid cost unit accounting and therefore do not take part in the calculation process.

One possibility of dealing with the problem of hospitals not documenting case-related utilisation information is the application of a cost-modelling approach based on the Australian model. The Australian calculation model takes advantage of the fact that some hospitals have access to very disaggregated case-related documentation of resource utilisation. The costs in the rest of the hospitals are distributed based on the same proportioning that had previously been determined in the reference hospitals. This procedure allows for a cost allocation to the individual DRGs that is differentiated by service complexity, even if there is no available case-related service data.

Use of the so-called “One Hospital Model” [*Einhaus Model*] when calculating the cost weights further increases blurring in the calculations. This methodology presents an additional problem for determining the cost weights. With this procedure the raw case cost data from all participating hospitals are summarised as if the data had come from a single hospital. The final evaluation is made without additional differentiation between various levels of care and specialties. Depending on the dominance of the various levels of care for the corresponding DRG case groups, the result in terms of actual fee amounts will be distorted in one way or another. This improper allocation of funds is caused by the current calculation methodology for the entire case group, which calculates only a uniform mixed price in the form of a DRG

cost weight. This mixed price accounts for the heterogeneous mixing from all cases according to their percentage of occurrence in a random sample calculation. If a random sample of a DRG is dominated by standard caregivers with a less complex patient spectrum, the resulting cost weight for the standard case is appropriate. However, it is too low for complex treatment cases.

The “One Hospital Model” includes only an overall – and therefore average – interpretation of the summarised data from all hospitals participating in DRG calculations, such that looking only at the cost homogeneity of a single DRG is not sufficient as a criterion for an accurate snapshot of services and costs. A mixed analysis of the case fees can adequately account for exceptions only if the cases occur in all hospitals in a similar way and with a similar allocation. If it is true that these cases are primarily treated in hospitals offering a higher level of care, it is to be assumed that the services are underfunded. The recognition of this fact has led other countries using the DRG system to analyse precisely the spectrum of performance within individual DRG case groups. Only by initially making inter-clinical comparisons will it be possible to represent and appropriately evaluate differences in the case spectrum and in treatment performance. Up to now, the German system has not undertaken to use the corresponding inter-clinical comparisons of case and cost data from institutions of various levels of care as a basis for recognising structural differences (Roeder N 2005: p. 83-84).

In this context, the random sample’s exact composition and its representativeness are of great importance. Comparisons among the participating hospitals indicate that medium-sized hospitals (with 301-600 beds) and, in particular, large hospitals (with over 600 beds) are overweighted. In proportion to their share of services rendered, the data collected in accordance with § 21 of the Hospital Remuneration Act indicates an over-proportional representation of these hospitals in random sample calculations. On the other hand, very few small hospitals with less than 300 beds participate in the data sharing programme. One possible cause for this result is that larger hospitals generally have access to the minimum personnel and technical resources required for conducting a calculation of costs per case, whereas smaller hospitals are less likely to have such resources (Methods Pretest project report 2001: pp. 40-41; Institute for Hospital Reimbursement Final Report 2003: p. 10). Furthermore, privately owned hospitals and university clinics show a relatively higher level of participation in the random sample calculations than other hospitals when comparing data collected in accordance with § 21 of the Hospital Remuneration Act. The opposite is true for community and public hospitals.

In summary, it can be seen that the composition of the random sample of German hospitals participating in the data sharing programme does not correspond to the reality of care provided in Germany. This means that, compared to the totality of services rendered in this country and recorded by means of the DRG data collected from all German hospitals pursuant to § 21 of the Hospital Remuneration Act, the per-case cost data from the data sharing programme is not representative.

HC.1.3 Outpatient care (EBM 2000plus)

With the introduction of the EBM 2000plus (*Einheitlichen Bewertungsmaßstab 2000plus*) on 1st April 2005 a new fee schedule for the practising physicians has been established. The EBM describes the various services provided in the individual specialities which can be charged by the SHI physicians. In addition, it also allocates a certain number of points for diagnostic and therapeutic measures (§ 87 Abs.2 Satz 1 SGB V). EBM 2000plus therefore has the function of a benefit catalogue and is binding for all practising physicians and for the outpatient care of all those insured through the statutory health insurance system (SHI). The EBM criteria and the calculations based on them therefore have considerable influence on outpatient medical care (Köhler A 2000: 3388).

The specification of benefits and the relevant valuations are made by the Valuation Committee. This is made up of seven representatives each from the federal associations of sickness funds and the Federal Association of Statutory Health Insurance Physicians (KBV). In accordance with the Social Code Book V (SGB V), the fee schedules should be reviewed regularly to establish that the description of benefits and that the valuations still correspond to the state-of-the-art and the economic efficiency (§ 87 Abs.2 Satz 2 SGB V). However, the law does not specify any maximum interval between reviews, so that in fact the fee schedule has only been revised irregularly.

Already in 1993 the representatives of the medical profession decided to develop a new fee schedule taking into account the economic requirements of the individual specialities. This was felt to be necessary in particular because the individual items of the EBM at that time had not been reviewed for some 10 to 15 years. However, considerable distortions arose within the framework of the last EBM reform in 1996. Since in particular prices for specialist and technical services were higher than average following the reform, services such as magnetic resonance imaging tended to be provided more frequently than was medically required (Parsch M, Held M 2004: 25). In order to eliminate such false incentives and to correct the

existing inadequacies in the health services, a thorough reform of the EBM was initiated with the Health Reform Act 2000. The EBM 2000plus was intended to improve the quality and the economic efficiency of the SHI health care by stimulating qualified, cost-effective care. In this context, the basis on which the number of points for the services and the point value are calculated is of particular importance, and also whether these represent a basis for negotiations or for the performance-oriented remuneration for outpatient health services.

The valuation system

One of the most important alterations for the EBM 2000plus is the use of cost accounting methods. The board of the Federal Association of SHI Physicians (KBV) was charged by the Valuation Committee to establish the economic requirements of the individual medical specialities, and for the complex process of valuation of outpatient services it makes use of the so-called standard valuation system (STABS).

STABS is a calculation program and a database used by the KBV to calculate the services specified in EBM 2000plus. This system represents a further development of the calculation models, the data storage system, and the formulas of the Swiss TarMed system. TarMed is the tariff system used in Switzerland for the reimbursement of outpatient services. STABS has been adapted to suit the EBM valuation system, so that it is able to take into account the specific structures of the SHI health care system in Germany for the valuation of medical services. Within the framework of the calculation every service in EBM is determined by the following parameters (Maus J 2005: 154-155):

- The time required for the provision of the service by the physician and the various cost centres (waiting room, treatment room etc.)
- The place where the service is provided (cost centre) and the local costs
- Necessary assistance for the provision of the service

Some 85 percent of the services in the EBM 2000plus were calculated with the standard valuation system. For these services, the physician's working time and the technical services components were calculated separately. This means that the service valuation in STABS is made up of two components, one relating to the medical care given by the physician (AL) and the other to the necessary technical inputs (TL). The sum of both parts gives the level of reimbursement or the number of points which is specified in the EBM (Schauenburg B 2004: 241):

$$\begin{array}{l} \text{Costs/price of a} \\ \text{Service} \\ (= \text{Cost object}) \end{array} = \mathbf{AL} \quad \begin{array}{l} \text{cost rate} \times \text{time} \\ \text{€min} \quad \times \quad \text{min} \end{array} + \mathbf{TL} \quad \begin{array}{l} \text{cost rate} \times \text{time} \\ \text{€min} \quad \times \quad \text{min} \end{array}$$

The importance of the time estimates

One of the most striking features of EBM 2000plus is the calculation of the service valuation on the basis of estimated times. The SHI Modernisation Act (GMG) required that as far as possible the EBM should include the times needed by the practising physician to provide a specific service (§ 87 Abs. 2 Satz 1 SGB V). The time-related valuation in EBM 2000plus is based on the assumption that the time the SHI physician spends with the patient, whether in discussion or within the framework of diagnostics and therapy, represents a core element of the service for the SHI-insured individual. Under these conditions it is important that accurate time estimates for every individual service are used in the cost accounting, both relating to the services provided by the physician and the technical services. The times used in the valuation are average times, but an individual physician may take longer or shorter, depending on the patient's problem and the possibilities for delegating parts of a service. The average times were determined by the Federal Association of SHI Physicians (KBV) on the basis of the Swiss TarMed system, also taking cost studies into account (Glöser R, Karbach U 2004: 18-19).

The corresponding calculation times were published by the Valuation Committee as Annex 3 of the EBM. The time estimates used for the service calculations and for the plausibility tests are presented there in tabular form. The calculation times differ from the plausibility times, and are usually longer. The plausibility times in the EBM 2000plus are crucial for the examining the acceptability of claims data. According to § 106a SGB V, the regional physicians' associations and the regional associations of sickness funds are obliged to scrutinise the legality and plausibility of the claims data submitted within the framework of SHI health care. In particular, the total amount of time is examined that is required by the physician for all the services provided on any given day. A distinction is made between the daily time profile and the time profile over a longer period, such as a calendar quarter (Kallenberg S 2005: 102).

The KBV and the Federal associations of sickness funds have agreed on examination criteria and procedures (§ 87 Abs. 6 Satz 1 SGB V). Their regulations, which are an integral part of the regional examination agreements, came into force together with the new EBM on 1st

April 2005. Both calculation times and checking times have been agreed with the sickness funds for all services provided by physicians. As part of the plausibility controls, daily time profile of the physician's activity is determined along with a quarterly working time profile. The plausibility checks are based on a quarterly profile of 48,555 minutes and a daily profile of 960 minutes. The examination procedure begins if the daily time profile for at least three days in the quarter exceeds 720 minutes or if the quarterly time profile exceeds 46,800 minutes (Maus J 2005: 154-155).

Database

The services calculations in the EBM 2000plus are based on business models. In all, the KBV has developed specific business models for 28 specialist groups which are broadly homogeneous in terms of costs and services provided. The costs used for the business models and thus also for the service calculations in the EBM 2000plus were generated from surveys. The valuations used were derived from four studies of costs for specialist groups carried out by the Central Institute for SHI-accredited Physicians' Services and from the data of the Federal Office of Statistics, converted to a standard base year. In addition, the validity of these studies was checked by comparisons with 15 further cost surveys carried out by professional associations and management consultancy firms.

The valuations of services in the business models are average calculations. However, in some cases a service can be provided by various specialist groups. In order to ensure economic efficiency, such a service is determined uniformly across all such specialist groups. The valuation is then based on the specialist group which focuses on providing the service, or which provides it most cost-effectively, or sets the standards for the quality assurance.

Valuation of a physician's services

The valuation of the services provided by the physician is oriented on the "imputed employer's salary". This is a widely-used concept when dealing with freelance occupations which by their nature do not allow the payment of a fixed income. The imputed employer's salary represents opportunity costs, because the entrepreneur could in principle offer his services to another enterprise. In order to calculate the income, empirical data is used together with average values for comparable managerial personnel (Partsch M, Held M 2004: 29).

When it comes to valuating the services provided by SHI physicians, comparisons are made with the earnings of a similarly qualified physician who is working for a hospital. An initial

comparison is based on the annual salary of a senior physician (BAT 1a on the German civil service pay scale) including additional costs such as the employer's contribution to social security, which in 2002 amounted to EUR 72,130. The Valuation Committee then took account of the difference in working hours between an SHI-accredited physician (which took 51 hours), and a hospital physician with a working week of 38.5 hours. This resulted in a calculated annual salary of EUR 95,553.

Productivity is also taken into account for the valuation of the physician's services. The gross working week is set at 51 hours, which corresponds to an overall annual working time of 140,148 minutes, which includes both time spent with patients and other activities. Within the framework of the EBM 2000plus, the physician's services are viewed as the sum of all directly patient-related activity. This does not take account of the time spent on so-called secondary activities, such as office management, the study of files, and other activities not directly related to a specific patient. With regard to the valuation of the physician's services, it is assumed that the net working time amounts to 45 hours per week. This is the product of the overall annual working time and the productivity or the efficiency. The productivity of an SHI-accredited physician is taken to be approximately 87.5 percent, which gives a net annual working time of 122,629 minutes. The Valuation Committee has established an average rate of 77.9 eurocent per minute for physicians. This so-called AL basic cost rate (EUR/min) is obtained by dividing the calculated annual salary of EUR 95,553 by the net annual working time of 122,629 minutes (Partsch M, Held M 2004: 29).

However, the sum of 77.9 eurocent is not the actual payment made to an SHI physician under EBM 2000plus for providing a service. The calculated physician's minute rate is only one element in the valuation. The full value of a given service provided by the physician is determined by the multiplication of the calculated physician's minute with the average time for the service in accordance with Annex 3 EBM 2000plus. In order to allow for the complex reality of medical practice, various modifiers are also included (A, S, and Q factors). The modifiers make it possible to take various factors into account and increase the AL-basic cost rate (Korzilius H, Rieser S, Maus J 2005: 13). In order to provide certain services, or to charge for these under EBM 2000plus it is necessary to have suitable qualifications. The Q-factor takes into account the opportunity costs to the physician of further training and / or annual continuous training courses. Five levels were determined in expert discussions with representatives of each speciality. The degree of difficulty of a specific service is represented

by the S-factor. This provides financial compensation for exceptional exertions and burdens, determined in accordance with the following criteria:

- Intellectual demands (high degree of complexity, low degree of routine)
- Psychic burden (high level of responsibility, high risk for the patients)
- Physical burden (physical exertion, activity without or with little support by personnel and / or apparatus)

There are two levels of the S-factor: the first level is significantly above the demands of average service, and the second level involves extreme demands clearly in excess of the first level, for example if the patient is in a life-threatening situation. Expert discussions were held with representatives of each speciality to establish the norms for the S-factor, and also for the A-factor. The A-factor takes into account in this context the physician's assistance in surgical and other invasive procedures. The payment of assistance services is not oriented on individual cases but on average values.

Valuation of the technical services

In the valuation of technical service components, costs are taken into account which arise in the course of running the physician's office. The pricing of these components is based on a full-cost calculation via the stages cost element, cost centre, and cost unit accounting. Within the framework of the EBM cost calculation system, eleven types of cost elements are registered:

- Material costs
- Personnel costs
- Rent for premises
- Leasing rate (hire costs) for equipment
- Energy costs
- Insurance premium
- Interest on loan capital
- Further training costs
- Costs for small investments
- Amortisation
- Other costs

In a second step, the cost elements are calculated for the various cost centres, such as the waiting room, the treatment room, and the x-ray area. In a third step, the length of annual use or the extent of services performed annually are determined for each cost centre, and then by division the cost rate of the technical service can be determined for each cost centre. For this the costs attributed to each cost centre are divided by the annual use in minutes. The result is the cost rate for technical services. The value or the price of a specific technical service is the result of multiplying the cost rate per minute by the average time needed for the service. The relevant times are also established within the framework of studies of the operational costs of physicians' offices.

The quantity control approach

Although the new EBM contains elements of quantity control (such as service complexes and time factors), in view of the probable financial consequences it was not possible to introduce a new fee schedule without an effective quantity control strategy. The Statutory Health Insurance Modernisation Act (GMG) requires that the medical profession work together with the sickness funds to develop rules to prevent an excessive expansion of the activities of SHI-accredited physicians (§ 85 Abs. 4 SGB V). Therefore a limited number of points were determined, up to which services provided by a physician's office would be paid at the regular point value. The limits are group specific, i.e. different groups of specialists have different total numbers of points. The limits are agreed in term of a regular service volume on the basis of the EBM 2000plus. If services are provided above the limit, then the excess is paid at a much lower floating point value. As more services are provided above the limit, the point value sinks even lower, and the lower the payment will be. The aim here, on the one hand, is to provide the physicians with a stable price for a specific quantity of services, and on the other hand to effectively reduce incentives to expand the quantity (Partsch M, Held M 2004: 27-28).

The regular service volume is agreed on *Länder* level between regional physicians' associations and the regional associations of sickness funds. However, the Valuation Committee is responsible for providing key regulations at the federal level. The division of the overall budget that is yearly negotiated between the regional physicians' associations and the regional associations of sickness funds, among the specialist groups and the allocation of the budgets within each specialist group has to take place in accordance with transparent and comparable criteria. The following two points are of particular importance (Köhler A 2000: 3393):

- Formation of specialist group budgets to determine the funds available to the specialist group
- Distribution of the funds on the basis of case-number dependent regular service volumes

In order to divide the overall budget, specialist group budgets were formed. A specialist group budget shows the pre-determined proportion of the overall budget at the regional level which goes to the specialist group. This proportion of fees is exclusively reserved for the specialist group in question. These specialist group budgets form the basis for determining the regular service volume of a physician. The regular service volumes, or the appropriate number of points, are derived from the individual number of cases treated by a physician and the average number of points per case of his specialist group.

Regular service volume = No. of points per case x No. of cases treated

The number of cases is the sum of all cases invoiced by a physician's office over the relevant period, as determined by the regional physicians' association (KV). Physician's offices with a higher number of cases therefore have a larger regular service volume than those with fewer cases. However there are limits, because not all cases are treated equally for the regular service volume. For case numbers which are more than 50 percent higher than the average for the specialist group, the number of points per case is reduced by 25 percent. The 200 percent level of average number of cases for the specialist group represents the absolute upper limit for a physician's office. Cases above this level are no longer added to the regular service volume, and are only paid with the floating point value (Schauenburg B 2004: 242).

The number of points per case is derived from the relevant specialist group budget and the overall number of cases. The number of points per case is therefore the same for every SHI-accredited physician within a specialist group, and expresses a value for the service provided in points. It is calculated by the regional physicians' association (KV) on the basis of the key regulations made at federal level. The specialist group budgets are the central instrument for financial redistribution, because they determine the calculation of the regular service volume of a physician office. The allocation of funds to budgets is intended to ensure funding distribution in accordance with the accounting principles for services specified in EBM 2000plus. This means that the size of budget is determined on the basis of the same data used for the calculation of services under the uniform value scale EBM. Not all services are

covered by the concept of the regular service volumes. Such other services are included in a list of exceptions issued by the Valuation Committee. Furthermore, the quantity control by means of the regular service volume in connection with the introduction of the EBM 2000plus is subject to a time limit. The law says that on 1st January 2007, risk-adjusted regular service volumes (Morbi-RLV) will be introduced (§ 85 SGB V). From 2007, the medical care services would then be funded by a regulated service volume related to the insured person. An amount of funding will be allocated for every insured individual on the basis of their state of health for the payment of physician's services. Extensive preparations are already underway for this at the federal level. A key point is to develop criteria for the measurement of morbidity and methods to predict the expected morbidity of an insured individual (Gass S, Gibis B, Hess R et. al. 2003: 27-29).

Conclusions

For its calculations concerning the individual services, the Valuation Committee has used a calculated point value of 5.11 eurocent. However, the actual point value is the subject of negotiations between the individual regional physicians' association (KV) and the regional associations of sickness funds. The point value of 5.11 eurocent is appreciably higher than the previously valid point values. Calculations have shown that such a value would not be compatible with stability of health insurance contribution rates.

The consequence of the above is that in some cases the regulated service volumes do not appropriately cover the extent of the services provided. To the extent that medically-unnecessary services are to be cut back this is indeed intentional. However, a more critical view is appropriate for regular service volumes which do not provide (in full or in part) for the provision of medically-necessary services. The Valuation Committee has reacted to this problem by deciding that the regular services volumes must take due account of the extent of services previously provided. According to the new specification, it must be possible to cover at least 80 percent of the previously available services with the regular service volumes. The fixed point value to be determined at the regional level should apply for this volume. It then follows that only 20 percent of the previously provided services will be outside the regular service volumes and will be paid for on the basis of floating point values. This arrangement represents firstly an acceptable compromise between a necessary quantity control and the need to secure the provision of medical care. Secondly it makes clear that only the price structure or the allocation of funds is based on management principles. In this context, all services have been calculated for the first time on the basis of the same principles, so that the

weighting of the services with respect to one another is closer to the reality of medical care in Germany than it was in the past. The price level, and thus the prices in individual cases are the result of negotiations and thus orient themselves only to a limited extent to the actual consumption of resources.

In this context, it should be noted that in many cases the calculations could not be based on up-to-date figures. Many details were thus determined through negotiations. For example, the annual physician's working time, the productivity of the physician's work and the resultant valuation of the physician's services were in the end determined by the Valuation Committee. Furthermore, it is not clear how reliable the results of the calculations are regarding the valuated times for the average length of treatment. The Federal Association of SHI Physicians (KBV), representing the interests of its members, has been arguing for an appropriate valuation of services in terms of a realistic practical determination of the times taken. However, various experts claim that the assumed times could not be determined exactly, and that they also represent estimates or the results of the negotiations of the Valuation Committee.

HC.1.3.2 Outpatient dental care (BEMA)

With the introduction of the Reform Act of SHI 2000, a reorganisation and revaluation of the uniform value scale for dental services (BEMA) was required by law (§ 87 Abs. 2d SGB V). A revised version of the SHI benefit catalogue started on January the 1st 2004. The BEMA defines the content of services that are reimbursed by the sickness funds. It is a fee schedule for dental treatments, but it also contains detailed instructions for each service. Additionally, each service is assigned a certain number of points for reimbursement reasons. The actual compensation of a dental service is the result of the multiplication of the number of points defined by the BEMA and the agreed point value in Euro. The BEMA serves as a reference for the billing of the dental services within the statutory health insurance (SHI). The so called valuation committee decides on the value and the definite content of the reimbursable services. The committee consists of seven representatives of the Federal Association of SHI Physicians and sickness funds and is required by law to revise the status of the dental science and technique regularly even if there is no prescribed time interval (Maibach-Nagel E, Prchala G 2005: p. 30).

The point of origin for introducing the basic reform were imbalances of valuation between and within the different service types of the BEMA like teeth preserving services, prevention, prosthetic services and orthodontics. Corresponding economic mal-functions and wrong incentives for the dental service provision had to be changed by the revaluation of the BEMA. After revising the whole system there should be no incentives for a dentist to favour one procedure over another. The reform act of SHI 2000 also requires the valuation committee to create financial incentives especially for dentists regarding preventative care and teeth preserving services (§ 87 Abs. 2 d SGB V). The intention of the legislation is shared by the Federal associations of sickness funds. But the revaluation of the dental services should be realised by regrouping the funds and without adding expenses by the sickness funds.

Working time as an indicator for dental use of resources

The idea of the legislation is to offer a valuation that remunerates the dental services equally no matter which section of dental services is affected. The main criterion for the revaluation of the dental services is the working time. This criteria serves as an orientation for the value based rate of services. As a result of the criteria, the valuation committee carried out an investigation for counting the working time of the dentists. The goal of this research was to expose the time variances for dental services to have a basis for the revaluation. The services described in the BEMA were checked with regard to their over- and underestimation of working time. It was essential for this reason to compare the different numbers of points and the necessary working times which are defined within the BEMA. Another aim of the research was to collect on the one hand the established dental services and on the other hand the services that have not been gathered in the BEMA but are already provided as a routine. The research presumed that the rate of the actual needed input of resources for certain services can be approximately assigned by the working time ratio. As for other qualitative factors like physical and mental burden, quality and qualification requirements are supposed to be equal in all sections of the dental services, and thus do not change the rate of valuation. Concerning the remaining input factors for valuation, dental services like material cost as well as the maintenance costs are not taken into account as it is assumed that every service can be calculated by the working time ratio and a proportional indirect cost surcharge. Those factors are not used to revise the ratio of valuation because they are only affecting the level of valuation and not the cost relation (Marbé W, Muschter W 2002: pp. 5-6).

Data collection

Data was collected from several dental offices in 2001. The KZBV and the federal associations of sickness funds were not able to agree on the fundamentals of design data collection for joint research. The research of the federal associations of sickness funds contained data of the working time in minutes for 40 dental offices, 6 orthodontic offices and 5 offices of oral surgery in 11 different states of Germany. 81 dentists participated in this research and their working time in minutes was measured for 254 days (Stackelberg HM, Wienefoet A 2003: p 9). The KZBV and the orthodontists carried out two different investigations and the results were put together in one survey. Within those investigations 56 dentists in four regions of Germany (Hamburg, Stuttgart, Dresden, Munich) were observed and 2738 patient treatments were analysed. Every minute of the dental working horizon has been valued on 267 treatment days (Müller BH, Häcker H 2002: p. 38).

Results of the revaluation

Both investigations were taken into account for revaluating the dental services and this data collection supported the decision making process. Despite the fact that the design of the investigations was different, the results of both surveys are comparable. The results from the survey of sickness funds underlined the assumption of the legislation that several parts of the dental treatments were not reimbursed as the actual resource consumption of dental services (Prchala G 2002: p. 34).

The remuneration of the teeth preserving and preventative services were found to be too low while the remuneration of prosthetic services was too high. The survey clarified that dentists earn on average 135Euro per working hour as measured by all services. Teeth preserving services, which includes individual prevention services, is disbursed on average with 109Euro per working hour. In contrast, 206Euros per working hour were earned by dentists for orthodontic services. The results of both surveys have been combined through negotiations. They serve as a foundation for the revaluation of the services in the revised BEMA that have been accomplished by the valuation committee. The number of points of teeth preventing services has been increased on an average by 11.2 percent in the sense of an equivalent remuneration of dental treatment. On the contrary the section prosthetic services number of points per procedure has been decreased by 8.3 per cent and especially the section orthodontic services, which have been decreased by 19.8 percent on average. The section of services for treating periodontosis and periodontitis experienced a decrease of 32.2 percent on average. Furthermore, there were also some new services that were remunerated even though they did not belong to the BEMA catalogue (Maibach-Nagel E, Prchala G 2005: S. 30).

Conclusion

The revaluation of BEMA is characterized by the fact that during the survey of the separate sections were no data of costs collected. The legislation supports this procedure with the Reform Act of SHI 2000. The regrouping of funds and with this the revaluation of the several services is geared to the dental working time. Therefore the price structure within the BEMA is based on an approximation where the dental working time is a foundation. The actual treatment costs are not considered. The regional dentists association and the association of the sickness funds will decide together on the level of prices which means that they are free to negotiate the point value at the beginning of each year. The economical calculated point value assessed by the regional dentists association is simply an orientation as a start for the negotiations.

Uniform Value Scale for Dental Technicians (BEL-II)

The services of a dental technician are listed in a similar framework to the Uniform Value Scale for Dental Technicians (BEL-II). The content of the BEL-II is negotiated in the Dental Valuation Committee between the Federal Association of Sickness Funds and the Federal Association of SHI Dentists. The Federal Guild of Dental Technicians is allowed to express their concerns at hearings, but is not further involved in the decision making process.

While the BEMA assign a number of points to each service, the BEL-II includes maximum prices for its services. Maximum prices are negotiated at the *Länder* level between the regional associations of sickness funds and the regional guild of dental technicians. For taxation reasons, maximum prices differ by 5 percent depending on whether the laboratory is a commercial dental laboratory, or whether the laboratory is a dental laboratory belonging to dentists. The reason for this distinction is because commercial laboratories pay excise taxes, while dentists do not (§ 88 SGB V).

HC.1.3.9 All other outpatient curative care

The term “Cures” subsumes health care services that are provided by non-medical practitioners in Germany. Non-medical practitioners include professional and recognized therapists (e.g. psychotherapists, occupational therapists etc.). The entitlement to cures of insured persons can be found in the fifth section of the “Benefits in Case of Disease“ under Chapter III of the SGB V (§ 32 SGB V).

The scope of services covered by the Statutory Health Insurance is explicitly described and regulated by the Directive on Care by Non-physicians issued by the Federal Joint Committee under § 92 SGB V. The Directive on Care by Non-physicians was amended and came into force on July 1, 2004. This Directive regulates the prescription of cures under the SHI. The cures listed in the directive in connection with the stipulated indications are services and benefits of the SHI. The federal associations of sickness funds and federal representatives of the interests of the cure providers included a Catalogue of Care by Non-physicians for the implementation of the directive, issued by the Federal Joint Committee, in accordance with § 125 SGB V. This catalogue regulates:

- the content, scope and frequency of cures,
- further training measures and quality assurance,
- the content and scope of collaboration between cure providers and the prescribing SHI physician,
- measures to meet the precept of cost-effectiveness and,
- specifications for remuneration structures.

Actual prices for the remuneration of cures are determined on the *Länder* level between the regional associations of sickness funds and the regional representatives of the interests of cure providers. The actual price for the remuneration of cures comes as a result of negotiations, leading to variations in the price structure within the *Länder*. The Catalogue of Care by Non-physicians solely predetermined the contents of the different services on a federal level.

HC.2 Services of rehabilitative care

The system of rehabilitative care in Germany is highly fragmented. There is no single payer in charge of rehabilitative care benefits or individual benefit categories. Rehabilitative care services thus, comprises one of the many miscellaneous tasks that the various payers of social insurance are responsible for (§ 6 SGB IX). Medical rehabilitation benefits are provided by the SHI, the Statutory Retirement Insurance (SRI), and the Statutory Accident Insurance (SAI). In addition, the SHI only provides subsidiary rehabilitation services, if no other social insurance is responsible (§ 40 Abs. 4 SGB V).

The decentralized placement of medical rehabilitative services within the social insurance system is followed by different requirements which vary significantly depending on the type and complexity of rehabilitative services. This variety originated from the somewhat different

aims of third party payers within the social insurance system. It was required that the framework had to be combined to a clear design and had to be integrated in the Social Code Book as the new Book IX (SGB IX). In addition to the fifth book of the SGB, the ninth book of the SGB is applicable as well. The ninth book of the SGB regulates rehabilitation and the participation of disabled persons, and came into force on January 1, 2001. The introduction of SGB IX created a uniform foundation for the provisioning of rehabilitative care services. However, concrete cognizance's and service requirements results from the certain laws of the different books in the SGB, like for example the SGB V for the statutory health insurance (§ 7 SGB IX).

Medical rehabilitation consists of in- and outpatient rehabilitative care. More than 90 per cent of rehabilitative services are provided for in inpatient facilities. However, there is no list of individual services, like a benefit catalogue in either the inpatient or the outpatient centres. Explicit regulations governing the exclusion or inclusion of services are therefore not stipulated for the field of rehabilitation. In addition, explicit regulations governing the exclusion or inclusion of services are not documented as well. Since no benefit catalogue is available on a federal level; there is no corresponding reimbursement catalogue. 95 percent of the majority of medical rehabilitative services in Germany are financed by the social insurance carriers. In particular, 65 percent of medical rehabilitative services are generated by the SRI. This can be compared to 25 percent by the SHI and 5 percent by the SAI (Burger S 1996: S. 22).

HC.2.1 Inpatient rehabilitative care

The SRI conducts 95 inpatient rehabilitative care facilities containing 17.000 beds. For this reason, it covers over one third of the inpatient rehabilitative services per year with its own rehabilitative care facilities (VDR 2003: S. 17-22). The SRI, like all other social insurance carriers, is a public corporation (§ 29 Abs. 1 SGB IV). Financial management is based on the SRI planned budget. Every rehabilitative care facility of the SRI has its own planned budget where all the receipts and expenditures are taken into account. These budget plans are an attachment of the planned budget of the SRI. By valuating the budgets, which are necessary for the completion of the tasks of the rehabilitative care facilities, financial resources are prospectively determined for the year. The systematic calculation of the actual costs are realized by the use of cost element and cost centre accounting. The identification of annual profit or loss is the most important aspect, but at the same time a very detailed overview of the expenditures and receipts are given. In the detailed income statement, the principles of

cost effectiveness, thriftiness, and completeness have to be borne in mind (§ 69 Abs. 2 SGB IV und § 13 Abs. 1 SGB VI). This kind of a reimbursement system is very close to the principle of cost coverage.

The remuneration of rehabilitative services of other providers occurs via daily reimbursement rates. Those rates are equivalent to a per diem remuneration during the length of stay in an inpatient rehabilitative care facility. The day oriented lump sums will be assigned in the yearly proceedings together with the several rehabilitative care facilities. In consideration of the development of costs and services, the reimbursement rates will be assigned mostly on basis of the historical costs. Historical costs are taken into account for future cost plans. It is important for rehabilitative care facilities to give plausible reasons for their personnel costs and other costs during the negotiations of remunerations with the SRI. Therefore, historical costs are used as an orientation for the process of negotiation. It is because of this reason that rehabilitative care facilities are able to generate profits and losses. The SRI demands the disposition of every diagnosed and therapeutic service. The SRI also demands a profit and loss statement, which serves as a foundation for reimbursement rate negotiations. A special listing for the level of the actual service performance is not available and therefore cannot be used for the negotiations. The gathering and reimbursement of single services is seen as too complex from the administrative point of view (VDR 1991: S. 197-209). The regional associations of sickness funds also include service agreements with several inpatient rehabilitative care facilities. The remuneration on the *Länder* level is made by reimbursement rates. Therefore, reimbursement rates are determined separately for each rehabilitative care facilities or negotiated with regional representatives including the interests of the rehabilitative care providers.

Conclusion

There exists no list of certain individual services like a benefit catalogue in either the inpatient or the outpatient section of rehabilitative care in Germany. As a result, cost valuation of the reimbursement rates is undifferentiated and actual costs are not taken into account. Furthermore, there are no federal standards. This means that prices of the different *Länder* vary extremely. Also by using nursing rates, no explicit incentives for economic and high qualitative service provisions are given.

HC.3 Services of long-term nursing care

Statutory Long-Term Care insurance (LTC) was introduced in 1994 – as Book XI of the Social Code Book (SGB XI). The regulations of the remuneration of inpatient, (§§ 84 - 88 SGB XI) outpatient, (§§ 89f SGB XI) and long-term nursing care are determined in chapter 8 of the SGB XI. Applicants for the LTC are examined and grouped into one of three categories by the regional medical review boards, which are jointly run by the all sickness funds. Inpatient as well as outpatient remuneration is differentiated according to these three groups (nursing grade I – III) (§ 15 SGB XI).

HC.3.1 Inpatient long-term nursing care / HC.3.2 Day cases of long-term nursing care

The remuneration of inpatient nursing services occurs via daily nursing rates. These rates are equivalent to a per diem remuneration during the length of stay in an inpatient nursing facility. The nursing rate of a nursing home equals the cost that emerges due to board and lodging of occupants in the nursing homes. The nursing rates are remunerations which are paid by the occupants of nursing homes for the day and inpatient cases of nursing services (§§ 41-43 SGB XI). The nursing rates are determined on the *Länder* level and can be divided into three cost components:

- Investment costs (IK)
- Board and lodging costs (so called hotel costs) (HK)
- Nursing costs (PK)

The investment cost share of the nursing rate consists of the cost per building and those costs are geared to the private expenditure for the apartment rent. The board and lodging costs cover food and cleaning costs. The nursing costs include material and personnel costs for nursing services. The IK and HK are on the one hand completely financed by the insured. The PK on the other hand, is financed by the LTC with a lump sum payment. The inpatient and outpatient long-term care benefits are legally limited according to the three categories (§§ 36, 37 SGB IX). The level of the lump sum payments depends on the category the insured has been grouped into. The nominal level of these amounts has not been changed since the introduction of the LTC, which in real terms means a decrease in cash-benefits and the amounts of provided benefits-in-kind. Monthly benefits are limited to 1023 Euros (Grade I), 1279 Euros (Grade II) and 1432 Euros (Grade III). These payments are the same for day and inpatient cases of institutionalized long-term nursing care. Higher benefits may be provided in exceptional cases. If the income of the insured is not sufficient to pay the remaining share of

the nursing rate, it is borne by the public assistance schemes of each local community (BMGS 2004: 64-66).

During 2001, the HK was 19Euros on average per occupant per day; the PK was, depending on the nursing grade, between 41 and 69 Euros per occupant per day. The IK is dependent on the age and condition of the building and is therefore very different. It is between 10 and 20 Euros per occupant per day (Statistisches Bundesamt 2003: S. 14). Since January 1, 1998, prices are negotiated between regional associations of long-term care funds, providers delivering nursing care, and the local communities (§ 85 SGB XI). Provided that the nursing home can prove efficient management, they have a legally fixed right to receive performance-oriented remunerations (§ 84 SGB XI). Therefore, nursing rates are determined separately for each nursing home (§ 85 Abs. 2 S. 2). Because of this, the law takes into account individual and regional variations. However, providers of nursing homes are also allowed to negotiate collectively for uniform nursing rates on a local level (§ 86 Abs. 2 S. 2 SGB XI). Furthermore, nursing rates are determined prospectively, which means that there is no reimbursement of actual costs and historical costs are only taken into account for future cost plans. However, it is important for nursing homes to give plausible reasons for their personnel costs and miscellaneous expenditures during the negotiations of remunerations with the LTC and local communities. Therefore historical costs are used as an orientation for the process of negotiation. For this reason, nursing care facilities are in fact able to generate profits and losses (Rothgang H 1997: S. 49-54).

Nursing rates are based on an agreement between the provider of nursing care facilities and the majority of third party payers (§ 85 Abs. 4 S. 1 i. V. m. § 89, Abs. 3, S. 2 SGB XI). If both parties are not able to agree, they can both call the arbitration board (§ 85 Abs. 5 SGB XI). Periods of the agreements can differ between nursing homes. The legislation did not determine a period of time, which means that agreements can be reached independent of the calendar year. However, the agreements are obligatory for a fixed period of time. Split remunerations for different third party payers are not allowed, and larger payers should not have any advantages compared to others.

HC.3.3 Long-term nursing care: home care

Remuneration of outpatient nursing care services follows the same structure (§ 89f SGB XI). The remuneration agreements of the contractual partners of the outpatient provision have to be performance-oriented, and the remuneration has to be sufficient for fulfilling the service

agreement. Efficient management is a prerequisite for that. Contractual partners of the remuneration agreement are the providers of the nursing services and

- the regional associations of long-term care funds and
- the local communities.

These actors participate in the negotiations if they financed more than 5 percent of the costs for nursing services of the respective nursing home in the previous year. Remunerations are negotiated separately for each outpatient nursing service provider (§ 89 Abs. 2 SGB XI). All third party payers are obliged to pay the same remuneration to outpatient nursing services. The remuneration is determined prospectively. Remuneration schemes exhibit large variation within the outpatient sector. According to § 89 Abs. 3 SGB XI the following reimbursement schemes are allowed:

- payment according to working time
- different payment rates according the content of services
- payment according to service packages
- in exceptional cases: fee-for-service payment

Around 80 per cent of the facilities are reimbursed on the basis of service packages; remuneration according to fee for service (11%) and payment according to working time (7%) are rarely used. However, outpatient nursing services in Bavaria are only reimbursed by fee-for-service. If service packages used similar services, they are grouped to one service package. The content of the service packages and their remuneration vary between the different *Länder* of Germany (BMGS 2001: S. 59-61).

Conclusion

Reimbursement rates for nursing care services are always a result of negotiations between the local providers and the third-party-payers. The results are supposed to consider particularities of each region and each nursing care facility. In this context the cost structure of every facility is taken into account. However, there is no regulation on a federal level for performance-oriented remuneration of nursing care services, and retrospective remuneration of services is not allowed.

The implementation of a federal standardized nursing rate for inpatient provision failed so far. For the outpatient provision it is however intended to have tariffs on a federal level (§ 90 SGB XI). The federal government is authorised to define the services included into the benefits covered by LTC and their reimbursement (§ 90 SGB XI), but, so far this possibility has not

been used. What has been developed however, is a national uniform reimbursement scheme. Recently, the option of personal budgets for recipients of professional outpatient nursing care services has been introduced. These personal budgets are paid as cash benefits as opposed to the traditional benefit-in-kind remuneration of the past. Since July 2004, professional the recipients of outpatient nursing care services may apply for a personal budget, which is lower than the normal nursing care budget, and they are entitled to spend it on the providers and services of their choosing.

HC.4 Ancillary services to health care

HC.4.1 Clinical laboratory / HC.4.2 Diagnostic imaging

Benefits belonging to clinical laboratory or diagnostic imaging are included in the benefit catalogues of the affected sector. Laboratory tests and diagnostic imaging tests are often provided by laboratories and imaging departments within hospitals and by outpatient specialists. Laboratory and imaging services provided as part of the inpatient and outpatient care are covered by the DRG case fees catalogue and the EBM 2000plus. The only exception exists in the inpatient sector. If a hospital buys the accordant services externally, the remuneration has to be done according to the DKG-NT. 20 Years ago the reimbursement scheme was introduced in line with the negotiations and from that time on it will be adjusted every year.

HC.4.3 Patient transport and emergency rescue

There are substantial regional variations among the 16 *Länder* with respect to legislation, regulation, organization, purchasing, financing, and delivery of rescue care and emergency care. Emergency rescue and non-emergency rescue are integrated with other types of rescue services. Often non-rescue patient transport is also part of the rescue package.

Since the second SHI Restructuring Act (1997), planning for emergency physician service capacities has been allocated to the *Länder*, unless state legislation explicitly delegates the duty to regional physicians' associations (as in Bavaria). Most *Länder* (except for Berlin, for example) delegate the organization and delivery of rescue care to the municipalities. Within the framework of the state rescue law, local communities may accredit, regulate, and plan for capacities of integrated public providers as well as contracted private rescue providers.

The remuneration of rescue care services follows a dual principle: while recurrent expenditures are reimbursed by SHI or private health insurance or out-of pocket, the financing

of the investment costs is mainly a task of the *Länder*. With respect to the different kinds of investment financing, there are great variations in service prices among the *Länder*: Baden-Württemberg covers investments in buildings, and technical, and organizational development if these are part of the rescue plan. Bavaria pays for transport vehicles and major technical equipment. In Brandenburg, depreciation of investment costs is explicitly enacted as part of the negotiated service prices. Recurrent expenditures are reimbursed by SHI or – to a lesser extent – by private health insurance. Only if there are no arrangements for remunerations of rescue services on a *Länder* level or a municipal level, is the SHI authorised to conclude prices with the several providers of rescue services (§ 133 SGB V). But contracting between SHI and providers outside the hospital is still rare. Instead a pure reimbursement system based on a fee-for service is in place.

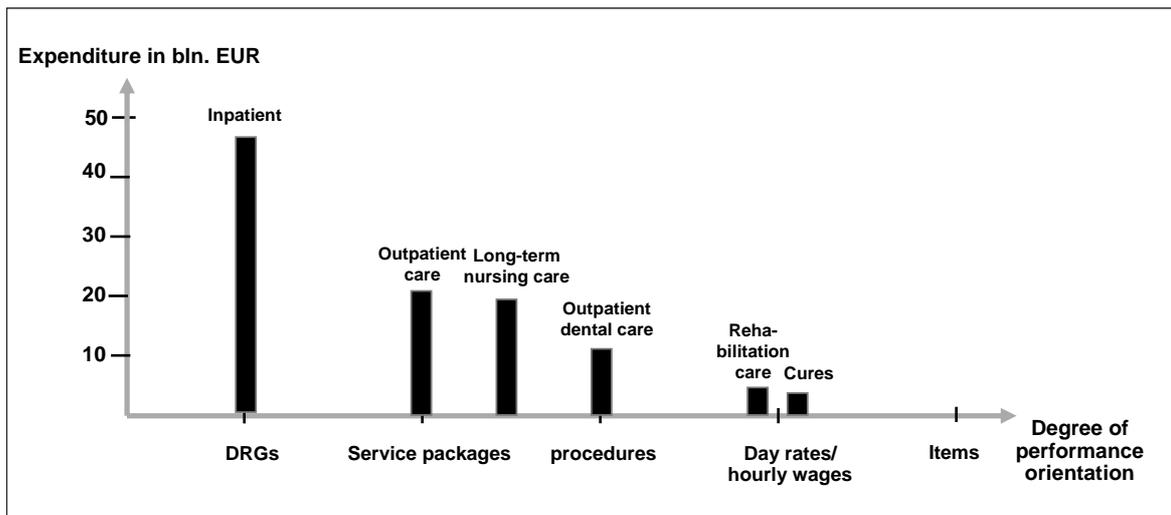
III) Discussion

Generally, there are large differences between health care sectors in Germany concerning remuneration schemes and the extent actual costs are taken into account for determining prices of health services. Remuneration schemes can be more or less performance-oriented while costing schemes vary according to the detail of planned and especially implemented cost accounting methodologies. Table 2 summarizes the cost accounting and pricing practices in Germany according to different health care categories which have been described in greater in part II of the report.

All sectors are characterized by a clear conceptual separation between costs and prices. Prices are prospectively determined for all health services and post-hoc adjustments or local negotiations are rarely permitted. Unlike a few years ago most providers are fully accountable for their activity and not able to pass on additional costs incurred to any payers.

In general there is a clear trend towards more performance-oriented remuneration schemes in all sectors of the health care system. If looking at the different remuneration schemes, the degree of performance-orientation largely depends on the financial or economic impact of each health sector, at least for those services that are mainly financed by the SHI. While the DRG-system in the inpatient sector, as the largest sector in terms of health expenditure, reimburses hospitals on the basis of their performed cases, differentiated according to main diagnosis, procedures, age, co-morbidity, cause of discharge, the remuneration scheme for outpatient services is already less performance-oriented reimbursing on the basis of service packages. However, dental care is reimbursed on the basis of procedures, although it is the fourth largest sector (including drugs as third largest) in the SHI. Inpatient long-term care, mental care and inpatient rehabilitative care are mainly reimbursed on the basis of day rates. Outpatient long-term care does also not fit into the picture that larger sectors are reimbursed more performance-oriented as services are mainly (80% of all services) reimbursed on the basis of service packages. Figure 2 displays the degree of performance-orientation of each reimbursement scheme and the size of each sector in bln. EUR.

Figure 2: Degree of performance-orientation of remuneration according to health sector



Source: Federal Ministry Health and social security 2005, Federal Association of Retirement Funds 2004.

The extent to which costs actually are reflected by prices varies largely between different sectors. In some sectors there is also a gap between the planned and the realized reflection of costs by price setting. The inpatient sector gives a good example for this. Those hospitals designated for cost data delivery are supposed to deliver micro-costing data derived by step-down accounting. However, the majority of the selected hospitals is not able to perform step-down accounting and delivers cost data which only allocates costs to different cost centres. Therefore the institute for the reimbursement of hospital services (InEK) is not sufficiently able to differentiate between the resource intensity of different services. Subsequently prices (DRGs) do mainly reflect the resource use of departments, but not of single services, although they are actually supposed to. This systematic problem leads to the fact that prices for one service are too high given its resource consumption while those for others are too low. Surgical DRGs are an exception from this as it is easier to allocate resource usage in OP-theatres to single operations.

Prices for outpatient medical and diagnostic services are also claimed to be based on micro-cost data derived from step-down accounting in samples. However information on cost data is not publicly available and it is unclear to which extent prices in reality reflect the actual costs incurred. Price setting for outpatient dental care services is based on gross-costing, but

information on the actual cost accounting methodology is even less transparent than for outpatient medical and diagnostic services. Prices for rehabilitative care services, long-term care services and ancillary services are not based on micro- or gross-costing data and are mainly negotiated on a regular basis between providers and payers in the case of emergency rescue the *Länder* or the local communities do the price setting.

A lack of reflection of costs by prices can also have implications on the access or on the delivery of appropriate health care. Such phenomenon can be observed in the inpatient care sector, where the care of certain diseases requiring large amounts of resources, e.g. drugs, is not sufficiently covered by prices. Therefore, the care of diseases, such as haemophilia or cystic fibrosis, is often subsidized by other services which sometimes receive higher prices than costs are incurred. This discrepancy between prices and incurred costs is even more evident in the outpatient sector, where the care of certain diseases such as cystic fibrosis is completely underfinanced and thus financed instead by large private foundations. However, there are only case reports on this issue and no systematic studies on the access of care due to inappropriate prices for certain services.

Regarding long-term care two problems occur due to the insufficient reflection of costs by prices. First of all, the lump-sum payment, which patients receive from the long-term care insurance and the nominal amount has not been amended since the introduction of the long-term-care insurance in the middle of the nineties which means a decrease in real terms as the bed-day rates for inpatient long-term nursing care are regularly amended in negotiations. Therefore access to long-term care is increasingly limited, although the public assistance schemes do provide financial means for persons with very low income. Secondly many experts claim that the available resource of the long-term care insurance is not allocated according to the costs incurred. They claim that prices of inpatient long-term nursing care is rather too high while prices for nursing home care are too low. This often led to a substitution of nursing home care by inpatient long-term nursing care, although nursing home care would be the cheaper alternative. In this sense, it is demanded that prices of inpatient long-term nursing care and nursing home care should be amended accordingly.

The future development of cost accounting practices and the reflection of costs in prices are not easy to predict. In face of limited resources and raising health expenditure due to medical progress and to a lesser extent also demographic development, an efficient allocation of resources according to need is gaining more and more importance. Efficient allocation of resources, however, requires information on the exact costs incurred by the delivery of health care services. If costs are not sufficiently reflected by prices certain health care services will always be overpaid while other will be underpaid creating unintended inequities of access to care. Furthermore, performance-oriented remuneration schemes can only work if providers are in fact rewarded for their performance i.e. so that providers have the chance to cover the incurred costs by prices. This does not imply that prices should always cover exactly the costs incurred. Prices could also be set incentive-based e.g. below the incurred costs, as otherwise providers would have no incentive to cut down on costs for certain services.

The German DRG-system will surely not remain like it is. Certain measures will have to be taken to improve the insufficient reflection of costs by prices. Three different scenarios could be realistic:

1. Hospitals designated for data delivery improve their accounting systems and are able to deliver data derived from step-down accounting
2. The methodology of the DRG-systems is amended in a way that only a few representative hospitals are selected to provide data in great detail (which is practiced in Australia); data would be more accurate, but less representative
3. The DRG-system is abolished and remuneration based on beddays is reintroduced while numerous possibilities (more than currently) for additional payments, e.g. for expensive drugs or medical devices, are created

The DRG-system serves to certain extent as a model for other areas of health care. Thus, the success of this system is of vital importance for the whole health care system in Germany. Price setting processes in other sectors are likely to follow. The new EBM2000plus for outpatient diagnostic and medical is already a first step towards a more “evidence-based” price setting for outpatient services. Other sectors are likely to follow for the above states reasons.

Table 2: Cost accounting and price setting according to health care category

| Sector (Functional Categories) | | Cost accounting | | | | Price Setting | | | | | |
|--------------------------------|---------------------------|----------------------------|---------------------------------------|---|-----------------------------------|--|--|---|--|---|---|
| | | Used? | Units of resource usage | Source of resource usage | Source of monetary value | Unit of price/ payment | Level of price setting/negotiation | Variability of prices depending on... | Updating | | |
| HC 1 | Services of curative care | | | | | | | | | | |
| | HC 1.1 | Inpatient care | Yes, Step-down accounting | Resource usage of each DRG and beddays for mental health care | All hospitals | Hospital designated for cost data delivery | DRG, beddays for mental health care | Cost weights (national)/ base rates (regional) | Volume, to a much lesser extent: quality, number of trainees, service guarantee etc. | Annually, cost weights (real data)/ base rates (negotiated) | |
| | HC 1.2 | Day cases of curative care | Yes, Step-down accounting | Resource usage of each DRG and beddays for mental health care | All hospitals | Hospital designated for cost data delivery | DRG, beddays for mental health care | Cost weights (national with negotiated deductions)/ base rates (regional) | Volume, to a much lesser extent: quality, number of trainees, service guarantee etc. | Annually, cost weights (real data)/ base rates (negotiated) | |
| | HC 1.3 | Outpatient care | | | | | | | | | |
| | | HC 1.3.1 | Basic medical and diagnostic services | Yes, gross-costing | Working time and technical inputs | Selected physicians offices/TarMed (Swiss outpatient remuneration system), but information on cost data not publicly available | Selected physicians offices/TarMed (Swiss outpatient remuneration system), but information on cost data not publicly available | Procedures/service packages | Number of points per procedure (national)/point value (regional) | Volume, deductions if training cannot be proved | Number of points per procedure (not regularly based on real data)/ point value (annually based on resource usage) |
| | | HC 1.3.2 | Outpatient dental care | (Yes, gross-costing) | Working time and technical inputs | Selected physician offices | Selected physician offices | Procedures/Items | Number of points per procedure (national)/point value (regional) | Volume, deductions if training cannot be proved | Number of points per procedure (not regularly based on real data)/ point value (annually based |

| | | | | | | | | | | | |
|------|------------------------------------|--|-----------------------------------|---------------------------------|-----------------------------------|--|--|--|--|---|---|
| | | | | | | | | | | | on resource usage) |
| | | HC 1.3.3. | All other specialised health care | Yes, micro-costing | Working time and technical inputs | Selected physicians offices/TarMed (Swiss outpatient remuneration system), but information on cost data not publicly available | Selected physicians offices/TarMed (Swiss outpatient remuneration system), but information on cost data not publicly available | Procedures/service packages | Number of points per procedure (national)/point value (regional) | Volume, deductions if training cannot be proved | Number of points per procedure (not regularly based on real data)/ point value (annually based on resource usage) |
| | | HC 1.3.9 | All other curative care | No | | | | Varying from region to region | Regional | Varying from region to region | Annually negotiated |
| | HC 1.4 | ... | | | | | | | | | |
| HC 2 | Services of rehabilitative care | | | | | | | | | | |
| | HC 2.1 | Inpatient rehabilitative care | | No | | | | Beddays | On provider level | Deductions if training cannot be proved | Annually negotiated |
| HC 3 | Services of long-term nursing care | | | | | | | | | | |
| | HC 3.1 | Inpatient long-term nursing care | | No | | | | Beddays | On provider level | | Regularly negotiated |
| | HC 3.2 | Day cases of long-term nursing care | | No | | | | Beddays | On provider level | | Regularly negotiated |
| | HC 3.3 | Long-term nursing care: home care | | No | | | | service packages (80%)/some-times procedures | On provider level | | Regularly negotiated |
| HC 4 | Ancillary services to health care | | | | | | | | | | |
| | HC 4.1 | Clinical laboratory | | Yes (if part of DRG or EBM)/ No | | | | Procedures | German Hospital Federation | | No regular update |
| | HC 4.2 | Diagnostic imaging | | Yes (if part of DRG or EBM)/No | | | | Procedures | German Hospital Federation | | No regular update |
| | HC 4.3 | Patient transport and emergency rescue | | No | | | | Cases/ Procedures (large variation) | local | Volume | Regularly negotiated |

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