

chapter eleven

Austria: Inpatient care and the LKF framework

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11.1 Hospital services and the role of DRGs in Austria

11.1.1 The Austrian health system

In Austria responsibility for coordination and planning of health care provision and financing has been traditionally shared between the federal Government, the nine states, called *Länder* in German, and their municipalities. In addition, several self-governing bodies representing physicians and pharmacists play an important role. Although the Ministry of Health delegates many tasks to the states or to the self-governing bodies, it remains by far the most influential actor in health policy-making and nationwide planning. It is responsible for supervision of the health insurance funds, enforcement of bills, and regulation of the training of health care professionals (Hofmarcher & Rack, 2006).

In general the Ministry of Health is responsible for enacting legislation, while the implementation of health care-related legislation is the responsibility of the states. However, states can also pass legislation concerning the inpatient sector. In practice, the Federal Health Commission and the Health Platforms at state level – composed of the state governments, the social health insurance institutions and the federal Government – are the most influential actors in terms of the actual implementation. In addition, the physicians' chambers, municipalities, patients and hospital owners are represented in the Health Platforms (Hofmarcher & Rack, 2006).

An agreement according to the Federal Constitution (B-VG) Article 15a between the states and the federal Government is signed and adjusted every four years to establish and coordinate the constitutional duties. As part of this agreement the Austrian Structural Plan for Health is elaborated (ÖBIG, 2008), which guarantees nationwide standards in health care. Regarding inpatient care, the plan specifies standards for bed capacities and the availability of

infrastructure (such as major technological equipment) in hospitals. The states are obliged to ensure that these standards are met, which is achieved through regional health plans that specify regional standards for health care providers and their structural characteristics.

Since the early 1990s, expenditures on health have increased rapidly, both in absolute terms and as a share of gross domestic product (GDP). Total health expenditures (not including long-term care) grew from about €10 billion (7.4 per cent of GDP) in 1990 to almost €26 billion (9.2 per cent of GDP) in 2008 (Statistics Austria, 2010). In the same period, the share of public expenditure for health slightly increased from 73.4 per cent in 1990 to 76.9 per cent in 2008 (Statistics Austria, 2010).

In the statutory health insurance (SHI) system, membership is mandatory for almost 99 per cent of the population and depends either on profession or region of residence. SHI funds therefore do not compete. Income-related contributions to SHI are shared equally between employers and employees. Together this amounts to about 46 per cent of health care expenditure. Another 30 per cent of expenditure is paid from taxes. A total of 24 per cent is paid as co-payments either by additional private health insurance or out-of-pocket payments by patients (Thomson et al., 2009).

All SHI funds are organized in the Federation of Austrian Social Insurance Institutions, which administers delegated tasks from the federal Government and the states, such as contracting with the Austrian Physicians' Chamber or the Austrian Pharmacists' Association on prices for outpatient services and reimbursement of medications. Outpatient care is mainly provided by three types of providers: individual self-employed physicians, outpatient clinics and hospital outpatient departments.

Inpatient care is to a great extent provided by public or non-profit-making hospitals (see subsection 11.1.2) and is financed through State Health Funds (*Landesgesundheitsfonds* in German; SHF), which are supervised and managed by the respective State Health Platforms (BMGFJ, 2008e). Since 1997, resources from the SHFs have been allocated to hospitals on the basis of the Austrian performance-oriented hospital financing framework (*Leistungsorientierte Krankenhausfinanzierung* in German; LKF). The introduction of the LKF framework shifted hospital budget allocation for most inpatient services in most hospitals away from a per diem-based system to one that allocates a significant proportion of hospital budgets on the basis of a diagnosis-related group (DRG)-like patient classification system.

To distinguish between the general hospital financing framework, that is, the LKF framework and the patient classification system (PCS), we will refer to the latter as the LKF-PCS, although the term is not used in Austria. The LKF framework applies to all inpatient services covered by SHI, including rehabilitation and psychiatric care. The LKF-PCS applies only to (most) areas of acute inpatient hospital care. All public and non-profit-making hospitals are primarily financed through the LKF framework.

Private profit-making hospitals, on the other hand, obtain their funds primarily through out-of-pocket payments by patients and from private health insurance companies. In addition, the nationwide Private Hospitals Financing Fund (PRIKRAF), which is exclusively funded by SHIs, pays private profit-

making hospitals for health services covered by private health insurance. PRIKRAF allocates financial resources to hospitals exclusively on the basis of the same system of DRG-type hospital budget allocation that is used in public and private non-profit-making hospitals (Hofmarcher & Rack, 2006).

A more detailed description of the Austrian health care system can be found in Hofmarcher and Rack (2006).

11.1.2 Hospital services in Austria

Austrian hospitals provide a broad range of services. Amongst others, the Federal Hospitals Act (KAKuG) defines as hospitals (BMGFJ, 2008b) the following types of institutions:

- general hospitals for all patients without distinction according to gender, age or type of medical care provided;
- special hospitals for the examination and treatment of patients with particular illnesses or patients in particular age groups, or for other special purposes;
- convalescent homes for patients in need of medical care and special nursing care while they convalesce;
- homes for chronically ill patients in need of medical care and special nursing care;
- maternity clinics and maternity homes;
- sanatoria – hospitals specially equipped to provide higher standards of board and accommodation;
- independent outpatient health care centres (X-ray clinics, dental care centres and similar facilities) – organizationally independent facilities for the examination or treatment of patients who do not require inpatient care.

Table 11.1 provides an overview of the hospital infrastructure in Austria. In 2006 there were 264 registered hospitals equipped with 63 354 beds, which corresponds to 7.66 beds per 1000 residents and a utilization level of 32.5 admissions per 100 residents. All Austrian hospitals together provided more than 18 million bed days (BMGFJ, 2008b) in 2006.

There were 183 acute care hospitals in 2006, providing 52 894 beds. Of those, 133 were public or private non-profit-making hospitals funded by the SHFs. They provided 92 per cent of beds in acute care hospitals. A total of 43 hospitals were private profit-making hospitals. The remaining 7 were prison or military hospitals. Hospitals funded by the SHF had an average length of stay (ALOS) of 5.71 days (without day cases and long-term care) (BMGFJ, 2008b). For the remainder of this chapter we focus on acute care hospitals.

The sources of financing for inpatient care in Austria are regulated nationwide by the Article 15a B-VG treaties. The federal Government, states, local authorities and health insurance funds contribute to a global national budget, which is then allocated to the SHFs based on state quotas. While health insurance funds pay a flat fee, the federal Government, the states and local authorities pay based on fixed percentages of value-added taxes. In addition, in most states, payments to balance structural deficits by local authorities and the state are also included

Table 11.1 Hospital infrastructure in Austria

	<i>Hospitals</i>		<i>Beds</i>	
	<i>Absolute no.</i>		<i>% of total</i>	
Non-acute care hospitals	81	10 460	30.7	16.5
Acute care hospitals	183	52 894	69.3	83.5
hospitals funded by SHF	133	48 870	50.4	77.1
hospitals funded by PRIKRAF ^a	43	4031	16.3	6.4
Total	264	63 354	100.0	100.0

Source: BMGFJ, 2008b.

^a Applies to certain cases/services.

in the budgets (Hofmarcher & Rack, 2006). The sum of all financial contributions to SHFs determines the global budget of resources available for the financing of hospital services provided in that state for a given year (Table 11.2).

Financing of acute care hospitals is regulated by the national LKF framework, which provides the basis for resource allocation from SHFs to hospitals. The LKF framework consists of two areas: (1) the core area (*Kernbereich* in German) that is made up of the nationwide DRG-like patient classification system (the LKF-PCS); and (2) a state-specific steering area (*Steuerungsbereich* in German). When the LKF framework was introduced, the idea of the steering area was to enable quality-related payments and to allow for a transitional period before hospital resource allocation would be exclusively based on the LKF-PCS. Yet, states continue to use the steering area for different purposes, such as assuring higher payments to university hospitals, providing additional resources to hospitals in alpine areas or compensating for deficits of hospitals (see subsection 11.5.3).

Table 11.2 Payments to the SHFs in 2005

	<i>%</i>			
	<i>Federal Government^a</i>	<i>States</i>	<i>Local authorities</i>	<i>Health insurance institutions</i>
Burgenland	11.3	45.3	3.6	39.8
Carinthia	11.7	33.2	8.0	47.2
Lower Austria	10.7	31.0	20.9	37.5
Salzburg	12.4	32.1	10.7	44.8
Styria	18.7	34.6	1.3	45.4
Tyrol	22.8	17.9	15.5	43.8
Upper Austria	13.0	22.5	16.8	47.7
Vienna	15.6	39.1	1.7	43.5
Vorarlberg	12.5	25.6	14.3	47.6
Austria	14.7	31.6	9.9	43.8

Source: Based on Grossmann & Hauth, 2007.

^a Including payments for university teaching hospitals.

11.1.3 Purpose of the Austrian LKF-PCS

During the 1980s and 1990s, cost inflation in the Austrian health care system and in particular in the inpatient sector exceeded annual growth of GDP. Austria was spending more on inpatient care than the average of the EU15 countries (belonging to the European Union before May 2004) and had one of the longest ALOS (OECD, 2010). The old per diem-based hospital financing system did not provide incentives for cost-effectiveness or for a reduction in lengths of stay. In addition, transparency in terms of hospital activity was poor, as no detailed structured data relating to diagnoses or procedures were available.

Inspired by DRG-based hospital payment systems in other countries, it was decided to introduce a new hospital payment system to overcome these problems. Using a DRG-like patient classification system was expected to increase cost-effectiveness, limit cost inflation and contribute to a reduction of the ALOS – all while guaranteeing high-quality health care. In particular, using DRGs for hospital payment was intended to reduce multiple diagnostic procedures and to promote a shift from inpatient care to ambulatory care, thus contributing to a reduction in hospital beds (BMGFJ, 2008e). Furthermore, it was hoped that the introduction of a DRG-like system would increase transparency and improve documentation quality (BMGFJ, 2008f).

Today, the primary purpose of the LKF-PCS as part of the LKF framework is to enable activity-based budget allocations to Austrian acute care hospitals. Beyond that, the LKF framework provides a catalogue of diagnoses, an Austrian modification of the World Health Organization's International Classification of Diseases (ICD-10-WHO), and a catalogue of selected procedures; 'selected' to the effect that only expensive and highly frequent procedures are listed. Together with the Austrian Structural Plan for Health, the LKF framework is also used as a planning and steering instrument by stipulating minimum department sizes, staffing standards or volume thresholds as prerequisites for the financing of certain services.

11.2 Development of and updates relating to the LKF-PCS

11.2.1 The LKF-PCS at a glance

The Ministry of Health is the owner of the LKF-PCS and as such responsible for the content, structure, development and maintenance of the system. As already mentioned, the Austrian LKF-PCS is the backbone of the core area (*Kernbereich*) of the LKF framework. The LKF-PCS defines procedure- and diagnosis-oriented case groups (*Leistungsorientierte Diagnosefallgruppen* in German; LDF).

The LKF-PCS classifies each hospital case into exactly one of 979 LDFs. There are two main steps (for details see section 11.3). First, in the event that a patient has undergone at least one grouping relevant procedure listed in the Austrian catalogue of procedures, (s)he is grouped into one of the 209 single medical procedure-based groups (*medizinische Einzelleistungen* in German; MEL). Otherwise, the patient is grouped into one of 219 main diagnosis groups (*Hauptdiagnose-Gruppen* in German; HDG). These groups are similar to

base-DRGs, adjacent DRGs, or classes used in other DRG-like patient classification systems (see Chapter 4 of this volume). Second, depending on the patient's characteristics (that is, age, diagnoses or treatments), MEL groups may be split into one of 427 procedure-oriented MEL-LDFs; and HDGs may be split into one of 552 diagnosis-oriented HDG-LDFs.¹

Each LDF has a specific score that is determined based on information about average costs of treating patients within that LDF (see section 11.4). These LDF scores, together with add-on scores for additional expensive procedures or for stays in specialist departments serve as the basis for hospital budget allocation from SHFs and the PRIKRAF (see subsection 11.5.3).

The steering area (*Steuerungsbereich*) of the LKF framework allows each state to determine hospital budget allocations from its SHF according to state-specific priorities. As each state uses different criteria to adjust hospital budgets, there are 10 different ways of paying hospitals based on the LKF-PCS of the core area: one for each of the nine SHFs, plus one in the nationwide PRIKRAF (Hofmarcher & Riedel, 2001).

11.2.2 Development of the LKF-PCS

In the 1980s, different performance-oriented hospital payment systems were tested with the conclusion that none of them fitted exactly the special needs of the Austrian health care system and that an appropriate legislative framework for documentation standards was still lacking (BMGFJ, 2008f). It was therefore decided to introduce documentation standards for hospitals and to develop an Austrian patient classification system from scratch.

Working in close collaboration with medical experts from various fields, an interdisciplinary team of economists and statisticians developed a system that would be tailored to the specific needs of the Austrian inpatient sector. The result was a precursor version of today's LKF-PCS. Between 1988 and 1990 the system was tested by a sample of 20 hospitals across the country. The outcome was that further development was needed.

Meanwhile, an obligation to document diagnoses was introduced in all Austrian hospitals. Between 1991 and 1996 an Austrian catalogue of procedures was developed by the Ministry of Health, which was the prerequisite for defining procedure-oriented LDFs. Around that time, the potential effects of using the LKF-PCS for hospital financing were calculated for testing purposes. A pilot project in Vorarlberg in 1995 and in Lower Austria in 1996 tested the potential of using the LKF-PCS for hospital budget allocation. The pilot project showed good results as the LKF-PCS seemed to fulfil the aims connected with its introduction (see section 11.3). After final evaluation and further adjustments, the LKF-PCS was introduced within the LKF framework for all acute care hospitals in 1997.

Table 11.3 summarizes some main features of the Austrian LKF-PCS. Since its introduction, the LKF-PCS has undergone annual revisions. However, the Ministry of Health distinguishes years during which revisions are related to 'maintenance' (meaning that only absolutely essential corrections are implemented) from those during which 'amendments' are implemented that imply

far-reaching further developments of the system (BMG, 2010). Therefore, the table shows only the three LDF versions resulting from major amendments.

One of the main aspects of annual maintenance work is the introduction of new procedures to keep the system up to date (see section 11.6). In addition, in 2001 the minimum basic data set (MBDS) was extended and the coding of diagnoses was changed to ICD-10-BMSG-2001 (see Table 11.4 in subsection 11.3.1), an Austrian modification of the ICD 10th revision (ICD-10) that was developed together with the German Institute of Medical Documentation and Information (*Deutsches Institut für medizinische Dokumentation und Information* in German; DIMDI).

In 2002, the first major amendment took place. Based on data from 15 reference hospitals, LDF scores, ALOS and trim-points were recalculated for every LDF. LDFs were rearranged or new ones created and new procedures were introduced. Since then, the LDF scores for each LDF consist of a day component and a performance component. The performance component includes costs directly connected to procedures (for example, personnel costs during surgery and medical products) calculated by the reference hospitals' data. The day component includes costs that accrue during the whole hospital stay, such as nursing and hotel costs.

Again, years of minor maintenance revisions followed and in 2006/2007 the LDF scores for day patients were recalculated to discourage unnecessary longer hospital stays. Extra scores for necessary stays in specialist departments and intensive care unit (ICU) were introduced on a per diem basis.

The next major amendment was performed in 2009. As in 2002, all LDF scores, the ALOS and trim-points were recalculated for each LDF, and LDFs were rearranged if necessary. For the calculation of LDF scores, cost data from 20 reference hospitals from 2005 were used. In addition, new procedures were added to the catalogue of procedures, and its structure was revised.

A detailed description of the development has been given by the BMGFJ (2008f).

Table 11.3 LKF-PCS versions

<i>Year</i>	<i>1997</i>	<i>2002</i>	<i>2009</i>
Purpose	DRG-based budget allocation, planning, performance measurement		
DRG system	LKF-PCS Version 1997	LKF-PCS Version 2002	LKF-PCS Version 2009
Data used for development	Cost data from 20 reference hospitals, activity data from all hospitals	Cost data from 15 reference hospitals, activity data from all hospitals	Cost data from 20 reference hospitals, activity data from all hospitals
Number of LDFs	916	842	979
Applied to	Public and non-profit-making acute care hospitals	All acute care hospitals (including those paid through PRIKRAF)	
Included services	All acute inpatient care (including day cases), excluding psychiatric, rehabilitation and long-term care		

Source: Authors' own compilation based on BMGFJ 2008f.

11.2.3 Data used for development and updates of the LKF-PCS

Two main databases are used for updates of the LKF-PCS. First, a hospital activity database is maintained at the Ministry of Health, containing the aggregated information of all MBDS from all hospitals (see Table 11.4). For each admission, hospitals complete the MBDS, which is then sent to the SHFs or the PRIKRAF. There, the data are integrated into a state discharge database, plausibility checks are performed and the data are searched for errors. If necessary, hospitals are asked to correct the data. After approval by the SHF, the data are forwarded to the Ministry of Health.

Second, for the two revisions in 2002 and 2009, detailed resource-consumption data were provided by 20 reference hospitals. The data from these hospitals were merged into a resource-consumption database maintained at the Ministry of Health that contains detailed information for the procedures listed in the catalogue of procedures, including personnel hours spent (by type of personnel and type of treatment), costs for medical consumables and investment costs for large-scale medical equipment. In addition, department-level cost information is available for the calculation of the day component of LDF scores. (For further details, see section 11.4 and subsection 11.5.2.)

Updates of the system rely on information relating to changes in the Austrian catalogue of procedures, which is updated annually. As part of the yearly revisions of the LKF-PCS, the Austrian catalogue of procedures is reviewed for procedures that are used only rarely or no longer fulfil the criteria of the Ministry of Health. After consultation with the SHFs, those procedures are deleted (BMGFJ, 2008c).

11.2.4 Regularity and method of system updates

Revisions of the LKF-PCS are carried out by the LKF team within the Ministry of Health and are divided into two major areas: (1) recalculation of scores for each LDF; and (2) revisions of the LKF-PCS.

LDF scores have been recalculated only twice since the introduction of the LKF-PCS. Recalculations in 2002 relied on data from the year 1999. Recalculations in 2009 were based on data from 2005. As already described, the scores for each LDF comprise two components, which are calculated separately: a performance component related to the direct resource consumption of procedures, and a day component related to hotel costs of keeping a patient in hospital.

Revisions of the LKF-PCS rely on all the types of information described. On a yearly basis, updates (which are almost always related to the inclusion of new procedures) concern only a small number of LDFs, for which the ALOS, thresholds and (if necessary) LDF scores are recalculated (see section 11.6). This is carried out for all LDFs in years of systematic revision. ALOS and thresholds are calculated on the basis of the hospital activity database (BMGFJ, 2008a).

Before a new version of the system comes into effect, simulation calculations are performed to estimate the financial impact for hospitals. No major system amendments are planned before 2013.

11.3 The current patient classification system

11.3.1 Information used to classify patients

The LKF-PCS classifies patients on the basis of information provided in the MBDS that hospitals are required to prepare for every admission. Table 11.4 shows the kind of data that are included in the MBDS.

For the grouping process, only the following data are used as classification variables: (1) procedures, (2) main diagnosis, (3) age classes, (4) secondary diagnoses, and (5) treatment at specialist departments (that is, acute geriatric care, remobilization, palliative departments or neuropsychiatric departments for children and youths).

The procedure catalogue is particularly important for the LKF-PCS and was specifically developed for the purpose of supporting the system. As already mentioned, procedures in the catalogue are called single medical procedures (MELs). Consequently, MEL groups in the LKF-PCS simply summarize the procedure-based groups, similar to base-DRGs in an operation-room partition of a DRG system (see Chapter 4). In contrast to the extensive procedure catalogues used in other countries, the Austrian catalogue of procedures contains only 1500 selected procedures that range from surgical, through cancer treatment, to diagnostic procedures using large-scale equipment. In addition, possible plausibility information is provided for each procedure, such as age, gender, and day-case flag.

The close relationship between the procedure catalogue and the LKF-PCS is also illustrated by the fact that the catalogue indicates a group of expensive and highly frequent procedures that qualify individual cases to be grouped into procedure-oriented LDFs. By contrast, secondary diagnoses and treatment at specialist departments are very rarely used for the classification of patients.

Table 11.4 Content of the MBDS

Administrative data	Admission data <ul style="list-style-type: none"> • hospital code • admission code and date • type of admission • departments and transfers • discharge date and type 	Patient data <ul style="list-style-type: none"> • date of birth • gender • citizenship • principal residence • insurance or funding body
Medical data	<ul style="list-style-type: none"> • main diagnosis (ICD-10 BMSG 2001) • any additional diagnoses (ICD-10 BMSG 2001) • any medical services from the catalogue of procedures 	
LKF data ^a	<ul style="list-style-type: none"> • LDF • LDF score • score for outliers • extra scores for ICU stays • extra scores for multiple treatments • scores for specialist departments • total scores 	

Source: BMGEJ, 2008f.

^a Only if required by the respective SHE.

11.3.2 Grouping algorithm

On the basis of information contained in the MBDS (see subsection 11.3.1), every hospital admission is grouped into exactly one LDF. The classification process follows a series of iterative steps that are illustrated in Figure 11.1. Coding and grouping is carried out by medical doctors within hospitals using special software provided by the Ministry of Health.

The objective of the LKF-PCS (as with any other DRG-like patient classification system) is to assign cases into medically meaningful and economically homogeneous groups. In order to do so, the grouping algorithm checks first whether patients were treated in specialist departments (for example, acute geriatric care

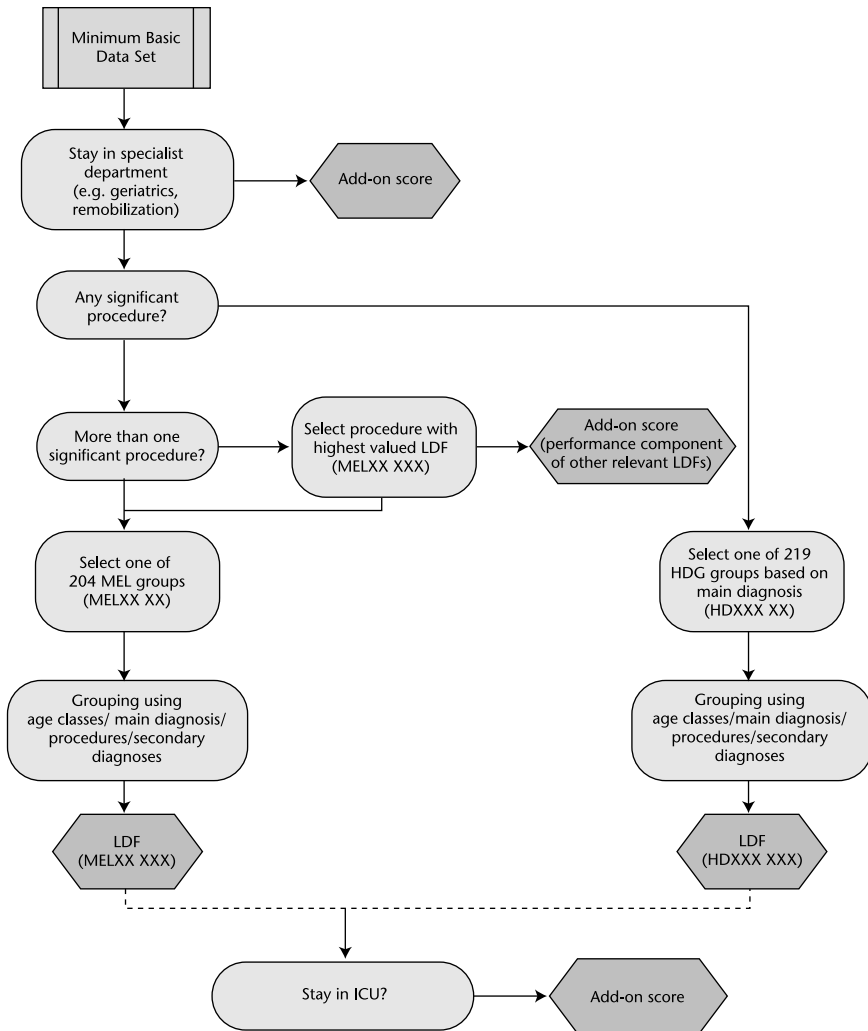


Figure 11.1 LKF grouping process

Source: Based on BMGFJ, 2008e; Grubinger et al., 2010.

or remobilization). If this was the case, the system assigns extra scores based on the number of days spent in these departments. As a second step, the grouping process also checks whether patients have received significant procedures. These are procedures that significantly influence the total costs of the hospital stay. If no such procedures have been carried out, the case is assigned into one of the 219 HDGs on the basis of the main diagnosis. If patients received any significant procedures during the hospital stay, the algorithm checks whether more than one such procedure was performed. If this is the case the procedure and LDF that returns the highest LDF score is selected and add-on scores for all other significant procedures are added, based on the performance component of their LDF. If only one procedure was performed, the case is directly assigned into one of the 204 MEL groups.

Each of the 219 HDG groups and of the 204 MEL groups is characterized by a four-digit number code, which follows a prefix (either 'HDG' or 'MEL'). As a result of the grouping process, HDG groups comprise cases with similar diagnoses, and MEL groups pool procedures that are medically similar and have similar resource-consumption levels. MEL and HDG groups are similar to base-DRGs or classes in other DRG systems. In order to increase economical homogeneity of the final LDFs, MEL and HDG groups are either split into several severity levels according to age classes, principal diagnoses, procedures and secondary diagnoses, or they remain as one group (unsplit). If groups remain unsplit, the letter A is added to the four-digit MEL or HDG code and defines the final LDF. If MEL or HDG groups are split, additional letter codes are assigned (B, C, D). However, the LDF codes are not ordered by resource consumption. The system does not limit the number of splits per MEL or HDG group but subdivides them into as many LDFs as necessary in order to achieve relative homogeneity of resource consumption within each group. In total, there are 979 LDFs in the 2009 LKF-PCS: 427 MEL-LDFs and 552 HDG-LDFs.

After assignment of the final LDF, the system checks whether patients were treated in an ICU and assigns additional per diem points per day of ICU treatment. Four types of ICU exist, with differing per diem scores: intensive monitoring units, and three stages of ICU. Hospitals need approval by the SHF or the PRIKRAF in order to be able to provide ICU treatment. If a patient stays in an ICU, the patient's status has to be documented every 24 hours according to standardized reporting schemes, for example TISS-28, SAPS and TRISS (BMGFJ, 2008a; BMGFJ, 2008d). A minimum score is required to justify ICU stays.

Although the assignment of per diem-based add-on scores is not – strictly speaking – the result of the grouping process, these scores are determined during the grouping process and are an integral part of the Austrian LKF-PCS (BMGFJ, 2008e). Since the LKF-PCS does not use the concept of major diagnostic categories (MDCs) used in other DRG systems, the main diagnosis of procedure-oriented groups is often not checked during the grouping process.

11.3.3 Data quality and plausibility checks

The grouping software, which is available free of charge from the Ministry of Health includes a set of data quality and plausibility checks. The most important plausibility and data quality rules are:

- plausibility of diagnoses and age and gender
- plausibility of procedure and age and gender
- for each procedure, there must be at least one diagnosis
- whether a certain procedure is allowed/possible in a certain hospital.

In each SHF and in the PRIKRAF a data quality group is responsible for carrying out data quality controls at hospitals. Usually, random samples from the hospital activity database are taken and the structured documentation is compared with the patient history documented at the hospital. Questionnaires are used to identify the main problems, such as incorrect main diagnosis, wrong fourth digit of the ICD-10 codes assigned, missing or too many procedures or secondary diagnoses, and so on. Some states apply special algorithms to identify suspicious datasets (Pfeiffer, 2002a). This also allows a data quality profiling of hospitals.

11.3.4 Incentives for up- or wrong-coding

Up-coding is not an issue in Austria, probably because severity levels are rarely based on secondary diagnoses. They are most frequently defined on the basis of relatively objective criteria, such as age, or specific procedures. Since the introduction of the LKF framework, some companies have offered so-called 'optimization' software. However, software has also been developed by the Ministry of Health that allows a certain level of control, if systematic optimization has been used.

In principle, sanctions are possible, if up-coding is found to be an issue. However, thus far hospitals have never been sanctioned, even where misuse has been detected.

11.4 Cost accounting within hospitals

In general, cost accounting within hospitals is not part of the LKF framework and it is not even regulated. Hospitals can therefore implement cost-accounting systems suited to their own needs. However, hospitals financed by SHFs report highly aggregated and standardized data to the SHF. These data include, for example, total costs for consumables (medical and non-medical), energy, fees and administration; the number of full-time equivalents by type of personnel and the respective total costs (reported at department level).

Hospitals that act as reference hospitals for the recalculation of the LDF scores provide data on average resource consumption for procedures. For each procedure, average working time by type of personnel is reported. A distinction is drawn between times for preparation, anaesthesia and actual treatment or surgery. Average costs are reported for 'expensive' medical consumables, such as blood products, implants, prostheses and operation linen. For non-surgical procedures, usage times for large-scale equipment and its costs are reported. These costs include acquisition, depreciation, interest and maintenance (BMGFJ, 2008a). In addition, total costs at the departmental level are reported

(including the allocated share of overheads), which are used for calculation of the day component.

11.5 Hospital financing on the basis of the LKF-PCS

11.5.1 Range of services and costs paid through the LKF framework

The LKF framework serves as the reimbursement framework for all hospital stays covered by the SHI in all acute care hospitals (public, private non-profit-making and private profit-making hospitals), including day care and stays in specialist departments, such as acute geriatric care, rehabilitation, palliative departments or neuropsychiatric departments for children and youths. However, payment based on the LKF-PCS does not apply to stays in specialist departments which are financed on a per diem basis. In addition, the SHFs can finance investments as part of their steering activity from within their own budgets. Private profit-making hospitals are financed partly by the LKF-PCS. The PRIKRAF pays directly for those treatments that are listed in the catalogue of procedures covered by the SHI.

Besides financing by the SHFs or PRIKRAF, hospitals also receive payments from various other sources. Treatment of private patients is paid for by private health insurance or out-of-pocket payments by the patients themselves. The federal Government pays a lump sum to university hospitals to cover additional expenses for teaching and research.

11.5.2 Calculation of the LDF scores

The LDF scores are calculated based on the hospital activity data from all hospitals and the resource-consumption data for procedures from the reference hospitals (see subsections 11.2.3 and 11.2.4). As already described, the score of each LDF contains two components: (1) a performance component that includes all resource consumption directly connected to procedures; and (2) a day component which comprises the sum of all remaining costs accruing during the hospital stay.

Performance component

Based on the data for procedures provided by the reference hospitals, the average procedure-related costs for each LDF are determined.

For each procedure the reference hospitals provide the average cost, which is the sum of four categories: (1) personnel costs, which are calculated as working time multiplied by average salary according to type of personnel; (2) costs of expensive consumables, established by multiplying the quantity by the price; (3) large-scale equipment costs; and (4) procedure-related overheads.

Day component

At department level all costs that cannot be allocated to one of the procedures are divided by the total number of bed days, which provides the adjusted costs of a bed day. The day component of an LDF score is then calculated as the average sum of the adjusted costs for each bed day, assuming the ALOS of this LDF.

The ALOS in MEL-LDFs is calculated as a 10 per cent trimmed mean, and as a 20 per cent trimmed mean in HDG-LDFs. In MEL-LDFs, 'outliers' are defined as patients staying longer than the minimum of 1.5*ALOS and the 90th percentile of the length of stay or staying less time than the maximum of 0.3*ALOS and the 10th percentile of the length of stay. In HDG-LDFs, outliers are defined by a slightly different method. Long stays are those longer than the minimum of 1.5*ALOS and the 80th percentile, while short stays are those shorter than the maximum of 0.5*ALOS and the 20th percentile (BMGFJ, 2008e).

Adjustments for outliers

The additional daily score for long-stay outliers is reduced for each following outlier day, but remains stable at the minimum of half of the daily day component. The calculation is carried out as follows (BMGFJ, 2008e):

$$Score(x) = \max \left\{ DC \times \frac{t}{x}, \frac{DC}{2} \right\}$$

x = number of hospital days (and has to be above the trim-point)

Score(x) = extra points for day x

DC = day component per day

t = trim-point = bound for long-stay outliers

The LDF score of short-term outliers contains the full performance component, whereas the day component is reduced (BMGFJ, 2008e).

$$Score = PC + \frac{(LDF\ score - PC) * (x + 1)}{t + 1}$$

x = number of hospital days (and has to be below the trim-point)

Score = reduced LDF score

LDF score = score of the LDF-group

PC = performance component

t = trim-point = bound for short-stay outliers

For 0-day stays, approved treatments in day hospitals are reimbursed in the same way as 1-day stays. 0-day stays with non-approved treatments receive the full performance component but only 10 per cent of the reduced day component calculated for short-stay outliers.

11.5.3 LDFs in actual hospital payment

SHFs allocate the majority of hospital budgets on the basis of LDF scores. As the general rules that apply for determining the LDF score are the same nationwide, these are part of the LKF core area. However, how SHFs make use of this information in order to determine hospital budgets depends on state-specific priorities and is defined in the LKF steering area, which is specific to each state.

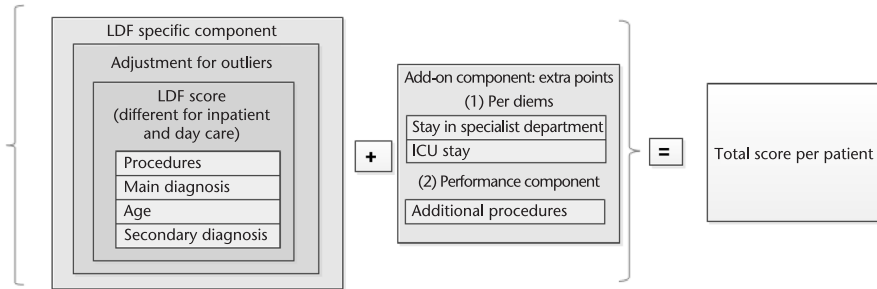


Figure 11.2 Calculation of total LDF score per patient

Source: Based on BMGFJ, 2008e.

LKF core area (Kernbereich)

The LKF core area defines how the LDF score per patient is determined on the basis of the LKF-PCS. Figure 11.2 shows that the total score consists of two main components: (1) the LDF-specific part; and (2) add-on scores for certain services.

Every hospital discharge is assigned to an LDF on the basis of its diagnoses, procedures, and so on (see section 11.3). Each LDF has a specific score which is calculated based on average costs of treatment of patients within that LDF (see subsection 11.5.2). In addition, the LDF score is adjusted for outlier patients, that is, patients with exceptionally long or short lengths of stay. For long-stay outliers, the day component is increased for every day that patients stayed beyond the upper length-of-stay threshold. For short-stay outliers, the day component of the LDF score is reduced for every day that patients were discharged below the lower length-of-stay threshold. For day cases (for which length of stay is 0), the reduction depends on whether day-care treatment is explicitly allowed or not.

Add-on scores are assigned in two ways. Per diem-based add-on scores are given for every day a patient spent in specialist departments (such as acute geriatric care, remobilization, palliative departments or neuropsychiatric departments for children and youths) or in an ICU. Additional procedure scores are added if patients received more than one significant procedure during a hospital stay, as the performance component of an LDF for patients with multiple procedures reflects only the resource consumption of the most complex procedure. Possible reductions apply for multiple treatments on the same day.

As the basis for hospital payment, the sum of all LDF scores of each hospital in a given state is calculated. In addition, the total sum of all LDF scores in a state is calculated and serves as a reference point from which to determine the share of total score provided by a specific hospital. A comparable procedure is used to determine hospital budget allocations to private profit-making hospitals from the PRIKRAF. The main difference is that only one nationwide global budget exists (financed by SHIs) that is distributed to all private profit-making hospitals.

LKF steering area (Steuerungsbereich)

In the steering area of the LKF framework, states have the possibility to determine hospital budgets for public and private non-profit-making hospitals funded by the SHF according to provincial criteria. Four main approaches can be identified.²

1. Upper Austria allocates the entire hospital budget on the basis of LDF scores; that is, the SHF budget is distributed to the hospitals according to their share of LDF scores. This is also the case for 98 per cent of the budget in Lower Austria. Only 2 per cent of the SHF budget is allocated according to the hospital type – that is, block grants are made to hospitals depending on structural characteristics of those hospitals, for example according to teaching status or size.
2. In three states, fixed rates are used between the core area and the steering area. Tyrol and Burgenland allocate 70 per cent according to LDF scores. The remaining 30 per cent of the budget is allocated after weighting the LDF scores, depending on the hospital type (for example, LDF scores produced by university hospitals are inflated) or depending on the specific hospital. In Vorarlberg, 15 per cent of the budget is allocated by adjusting LDF scores for higher personnel costs in certain regional areas.
3. Carinthia, Styria and Vienna do not use fixed rates between the core area and the steering area, but weight LDF scores by certain criteria. While Vienna combines personnel costs and additional costs as a factor, Carinthia and Styria weight hospital types by different factors. This means that the LDF scores of each hospital are weighted by a factor and the budget is allocated based on the weighted shares.
4. In Salzburg, financing is divided into two tiers. In the first, 75 per cent of the budget is allocated without weighting and 25 per cent is weighted by a hospital-related factor. A total of 40 per cent of the second tier is based on past deficits and 60 per cent on weighted LDF scores.

11.5.4 Quality-related adjustments

Hospital budget allocations under the LKF framework are not adjusted for quality. However, the Austrian Structural Plan for Health (ÖBIG, 2008) requires minimum standards for certain treatments financed through the LKF framework. For example, there are specifications relating to hospital size, availability of infrastructure and personnel, and minimum volume thresholds.

11.5.5 Main incentives for hospitals

The budgets of the SHFs are distributed mainly according to the amount of LDF scores that hospitals produce in a given year. Therefore, hospitals may try to increase their share of the budget by producing more LDF scores, for example by treating more patients, especially day cases. However, as the LKF hospital budget allocation system operates within a fixed global budget, increased

production of LDF scores by one hospital reduces the value of LDF scores and thus the budget available for other hospitals.

Several states were forced to take up counter-measures in order to avoid an uncontrolled growth of hospital activity by defining score budgets for each hospital. If a hospital produces more than the permitted amount of LDF scores, the value of these LDF scores is reduced.

11.6 New/innovative technologies

The inclusion of new technologies into the Austrian catalogue of procedures and the LKF framework follows several predefined steps.

Hospital departments that want to use a specific technology must prepare a request containing a detailed description of the technology and a calculation of costs. Subsequently, the request is submitted by the hospitals and their owners to the respective SHF using a standardized form, which is now based on an Internet platform maintained by the Ministry of Health.³

SHFs evaluate the requests and forward them to the LKF team at the Ministry of Health, where medical and economic aspects are assessed. In the event of a positive evaluation, new technologies are preliminarily included in the catalogue of procedures, nationwide, for two years. However, utilization is often restricted to a limited number of hospitals based on certain structural criteria, such as number of beds or hospital types.

In order to assure adequate reimbursement of hospitals, the LKF-PCS is modified by the LKF team. In most cases, new procedures can be assigned to existing MEL groups comprising similar procedures, and the cost of a new procedure is assumed to be similar to the existing ones. If no similar procedures exist, a new LDF can be created and the performance component of the LDF score is estimated based on the cost calculation included in the request for inclusion in the catalogue. Consequently, new technologies are financed through the LKF framework in the same way as any existing procedure, and there are no separate or supplementary payments for new technologies.

After the first and the second years the new technology is evaluated based on medical evidence. For the ultimate inclusion in the catalogue, the respective LDF scores are calculated based on the collected data. If necessary, a new LDF is created (BMGFJ, 2008c).

11.7 Evaluation of the LKF framework in Austria

Ten years after the introduction of the LKF-PCS as the basis for the hospital budget allocation system, an evaluation process was initiated by the Ministry of Health. As part of this evaluation, a group of international experts was contracted to assess the status quo and to propose future developments. Their findings are programmed to have a great impact on the next Article 15a treaties between the states and the federal Government. However, unfortunately, the results have not yet been made public.

11.7.1 Official evaluations

Some research has assessed whether the switch from per diem-based financing to hospital budget allocation on the basis of the LKF-PCS has had an effect on ALOS and hospitalization rates or not (Frick et al., 2001). Other research has focused on the impact that the introduction of the LKF framework has had on health care as a whole (Theurl & Winner, 2007). All authors found that the introduction of the LKF framework had a decreasing effect on the overall ALOS, on top of the long-term trend of declining lengths of stay (Frick et al., 2001, Theurl & Winner, 2007). However, when looking at separate medical disciplines, Frick and colleagues (Frick et al., 2001) showed that only 3 out of 21 disciplines had displayed significant reductions in lengths of stay. Furthermore, they found that in 8 disciplines, hospitalization rates had increased significantly.

Theurl & Winner (2007) came to similar conclusions and showed that 8 out of 20 diagnostic groups (according to ICD-10) had significant declines in ALOS. The authors concluded, 'Our evidence suggests that the Austrian hospital sector has gained a substantial increase in efficiency through the reform of the financing system. This conclusion is also confirmed by the fact that the annual increase of hospital costs declined after the implementation of the LKF1997' (Theurl & Winner, 2007).

In addition, the authors highlight that the introduction of the LKF-PCS could only have a limited influence on shifting inpatient care to ambulatory care, because organizational structures and financing of different health care sectors are highly segmented in Austria. SHI funds do not pay the full costs of inpatient care, contributing only flat fees per member to the SHFs. Consequently, they are not particularly interested in shifts towards outpatient care for which they would be required to cover a higher percentage of the total costs.

Pfeiffer (2002b) has observed that the amount of day-care treatment in hospitals is increasing every year. However, the majority of these cases do not replace inpatient admissions. Instead, they represent a shift from the outpatient to the inpatient sector (Pfeiffer, 2002b) – the opposite of what was intended when the LKF framework was introduced (see subsection 11.1.3). Pfeiffer (2002b) explains this trend with reference to the strict separation of health care in Austria. Beyond that, he finds that there is a missing link in health care provision, highlighted by the example of clinics located between inpatient care and care provided by private physicians.

11.7.2 Authors' assessment

The introduction of the LKF framework was an important improvement in hospital financing in Austria, as hospital budget allocations under the LKF framework are more closely related to hospital activity than under the old per diem system. In addition, hospitals now report detailed activity data, contributing to increased transparency in the hospital sector and improving documentation quality.

Now, 13 years after the introduction of the LKF framework, it still serves its purpose(s). However, reforms are needed that require a consensus by all relevant

stakeholders, including the federal Government and all nine states, which is almost impossible to reach. Financial issues are particularly difficult to solve. For example, it remains unclear how SHFs are to be compensated for financing the treatment of patients from other states, or how 'fairness' of budget allocations from the federal Government to the SHFs can be improved.

Other countries, such as France or England have recently updated their patient classification systems, especially in terms of their systematic assessment of secondary diagnoses for the definition of severity levels. In Austria, secondary diagnoses play a very minor role in defining severity levels. Aside from changes in the catalogue of procedures, the classification process as such has not changed.

Although transparency and activity documentation have been improved, research into the hospital sector is rarely carried out. Unfortunately, detailed information – such as hospital activity data or resource-consumption data – is only available to a limited number of people at the federal Government, the states and a group of contracted experts at the Ministry of Health (the LKF team). For researchers outside this circle of people it is very difficult, if not impossible, to obtain hospital activity data. Yet, such research could help to improve health care in Austria.

11.8 Outlook: Future developments and reform

In Austria there is a clear separation between inpatient and outpatient care. In order to improve the continuity of care and to avoid unnecessary hospital admissions, it is necessary to build interfaces. However, there are many obstacles to this, such as the different financing systems for inpatient and outpatient care and varying interests on the part of stakeholders.

Concerning technical issues of the LKF framework and the LKF-PCS grouping algorithm, further extensions and specifications of the catalogue of procedures are necessary, along with updates to diagnosis coding. However, after the major maintenance of the LKF framework in 2009, the system should remain relatively unchanged for the next few years. Future development will include the implementation of plausibility checks in the provided grouping software and specific access criteria for ICUs. Furthermore, how to improve the severity classification will be discussed, along with how to define LDFs that extend beyond individual hospital admissions and include transfers or readmissions of patients.

Currently, the development of a procedure classification system for the outpatient sector is coming to an end, and pilot tests have been initiated (BMG, 2009). This is important, as an outpatient procedure classification is a prerequisite for any attempts to extend the LKF framework to the outpatient sector.

11.9 Notes

- 1 Figures correct for the 2009 LKF-PCS.
- 2 Further details can be found in Hofmarcher and Riedel (2001) or in Hofmarcher and Rack (2006).

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- 3 More information can be obtained at the Ministry of Health web site (<http://mel.lkf.bmgf.gv.at>, accessed 26 June 2011).

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