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The ABC of DRGs

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Ever since the US Congress adopted the diagnosis related group (DRG) system for paying hospitals for Medicare patients in 1983, case payment mechanisms gradually have become the principal means of reimbursing hospitals in most industrialized countries. Nevertheless, the motives underlying the introduction and the development, as well the specific design features of DRG systems, vary greatly across countries.¹ This article provides a concise overview of the main issues that need to be considered when scrutinizing and comparing DRG systems. It focuses on (a) objectives and rationales underlying DRG systems, (b) main building blocks of DRG systems, and (c) crucial incentive considerations. It also summarizes briefly the limited empirical evidence on the effect of DRGs on hospital resource use and quality of care. The accompanying case studies in this Euro Observer issue provide more detailed snapshots of individual DRG systems (Austria, Spain and France) exemplifying the great variety of systems across Europe. More in depth analyses are conducted in the framework of the EuroDRG project (www.eurodrug.eu), which compares DRG systems, costs, efficiency and quality of care across European countries and scrutinizes the prospects for a coordinated or even single European DRG system.

Objectives and rationales behind the use of DRG systems

DRGs are often seen primarily as a way to pay hospitals for their services. However, they were originally designed for a different purpose – and they are used for a much wider range of objectives which can be grouped into three categories: increasing transparency, inducing efficiency and supporting the management of hospitals.

Increasing transparency – performance comparisons

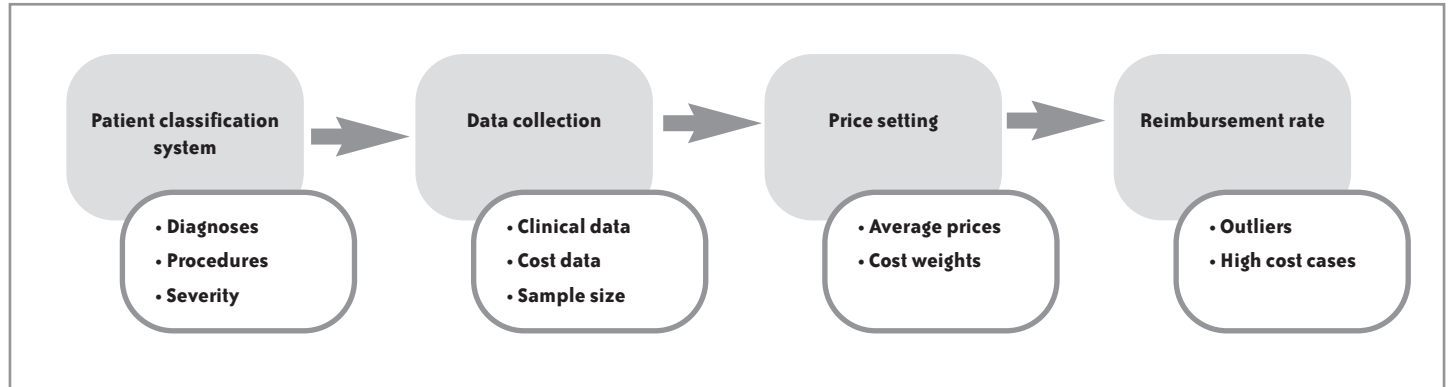
Central to the original scientific formulation of the DRG concept was the idea common to all classification systems: to condense an extremely large number of items all appearing to be unique (here: hospital cases) to a limited number of groups that have certain characteristics in common.² The main benefit of such an approach is that it enables certain analyses which otherwise would not be possible; e.g. the comparison of costs, efficiency and quality. Hence, it is thought to increase transparency about provider performance and resource consumption in an area of policy making that previously was characterized by extreme agency problems as regulators and payers knew very little about the internal processes of hospitals and had no means to conduct meaningful comparisons. Therefore, conceptually, one of the fundamental advantages is that DRGs offer a framework for an accurate assessment of the costs of treating a given patient, taking account of observable and measurable patient characteristics. Similarly, DRGs can be used to assess other dimensions of performance such as quality or efficiency. For all these purposes, the key technical challenge is to ensure that adequate adjustment for factors beyond the control of hospitals (regarding patient characteristics as well as certain environmental variables such as wages) takes place.

Inducing efficiency – pay and resource allocation

The second motivation behind the introduction of DRGs is more ambitious – they are used as a payment mechanism to allocate financial resources to hospitals. In this role the application and set-up of the DRG

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Figure 1: Essential building blocks of DRG-systems



system is much more complex as the aim is not only to reimburse providers fairly for the work they undertake, but also to discourage the provision of unnecessary care and to encourage the efficient delivery of appropriate care.

The fee-for-service approach used to reimburse hospitals before the introduction of DRGs in the United States was considered inadequate and expensive since it allowed hospitals to use – and invoice – for unnecessary or inefficient services. DRGs became attractive for policy-makers to contain expenditure on hospitals, while avoiding the political controversies of global budgets. In this context, the term ‘prospective’ payment (vs. the ‘retrospective’ character of fee-for-service) was created. In Europe, however, global budgets and per-diem payments were the typical forms used to pay hospitals before the introduction of DRGs. That is, the starting point is completely different, both with regard to objectives (not cost-containment but fairness and efficiency) and ‘prospectiveness’ (as DRGs are less prospective than budgets which are not adjusted for patient volume).

First in the US, and later in many European countries, DRG-type systems fitted well with the paradigm of designing public policy according to general economic principles as they could be used to exert financial pressure to incentivize efficient resource use and thereby mimicked product markets that produce at marginal costs.³ However, this role of DRGs requires carefully balanced incentives, as well as a methodologically sound system.

Supporting the management of hospitals – clinicians’ accountability

Especially in countries with budgets or per-diems as the mode of paying hospitals, the management (if it existed) had very little information on what types of services and at what costs clinicians delivered them within their wards or departments. Desired or not, DRGs – together with their documentation needs – clearly serve to support the role of hospital managers by enabling them to monitor, or even control, the work of clinicians.

Essential buildings blocks of DRG systems

All DRG-type hospital payment systems principally build on two mechanisms: (1) assigning hospital services delivered to individual patients to comparable groups, i.e. defining the product categories of hospitals (the DRGs), and (2) determining the weight or price for each of these groups of products (Figure 1).

Defining hospital products

Product definition is operationalized in DRG-type systems via patient classification systems, which relate the types of cases a hospital treats to the resources used by the hospital. Hospital services were originally based on a limited set of clinical data (diagnoses and a few surgical procedures), demographic data (age, sex) and measures of resource consumption (costs, length of stay). Further DRG refinements, especially the system developed in Australia which was later exported to Germany, but also later

developments in Europe such as in France or the Netherlands, place more emphasis on (a) all types of procedures used during the hospital stay (groups in such systems are essentially no longer ‘Diagnosis-related’ but better categorized as diagnosis-treatment groups, as the Netherlands rightly name their system) and (b) the severity of the patient’s condition. While the US-derived systems only differentiate between ‘without’ and ‘with’ co-morbidities, the French system, for example, uses four levels of severity, and the German even uses nine for certain DRGs.

Technically, this process is challenging as grouping must be both clinically and economically meaningful. Clinically, cases allocated to one group should form a distinguishable entity based on diagnoses and medical procedures. The latter is important in order to measure and document clinical activity in a way that is meaningful to those working in the context, i.e. physicians and nurses, and to facilitate quality monitoring. From an economic perspective, treatments within one DRG should be characterized by homogenous costs, especially if the system is used for the allocation of resources.

The development of a patient classification system requires not only the existence of coding systems for diagnoses and procedures as well as a defined methodology for cost accounting, but also actual data from all or a sample of hospitals using the codes and methodologies. Countries which introduce DRG systems therefore often import the DRG system from another country – often the US,

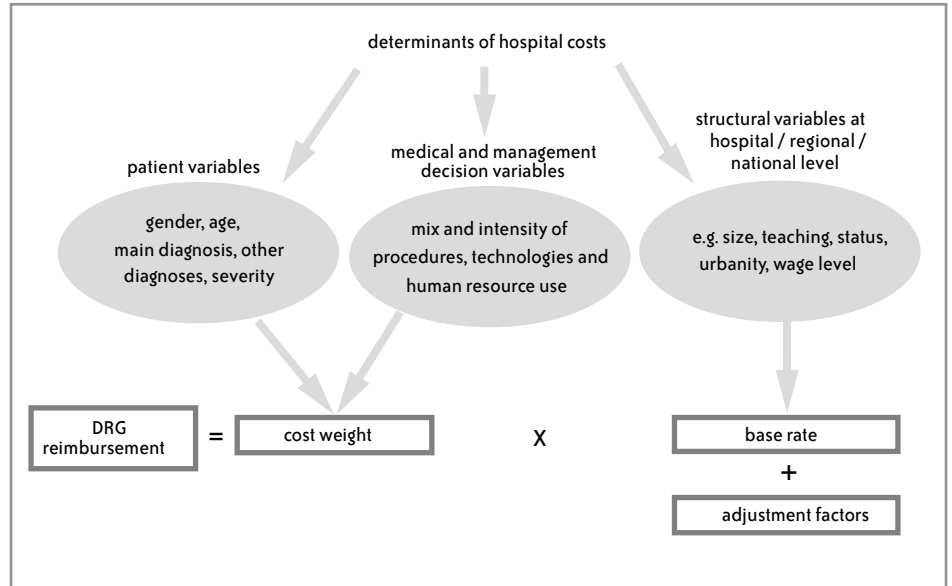
even though it may not reflect their own practice patterns. Only later do they refine it using their own data. However, cost data in particular are of rather low quality in many countries as hospital cost accounting systems are poorly developed. At least in less mature DRG systems, clinical data are therefore often used to approximate groups of services with assumed or estimated homogenous costs.

Weighting output or defining prices

Weighting mechanisms and price setting for DRGs differ widely across countries, but share common properties. As DRGs are always meant to reflect empirically observed costs of treatment, a first step involves defining a data sample; i.e. selecting a number of hospitals from which (reliable) cost data are collected and pooled. Secondly, the institution responsible for data processing calculates DRG cost weights or DRG prices.⁴ Two different approaches can be distinguished to determine the reimbursement rate. The (less used) direct approach calculates average costs per defined DRG group to be used as reimbursement rates. The (more frequent) indirect approach calculates so-called cost weights, which define a relationship between the different DRG groups according to the intensity of resource used. Using this framework the price for the reference or average treatment group with a cost weight of 1.0 is negotiated or set and the prices for all of the other DRGs are calculated automatically by multiplying the DRG cost weight attached to each DRG with the price set for the reference DRG cost weight of 1.0. The cost-weight of each DRG group reflects the resource consumption relative to the reference DRG, which adjusts prices for resources.

All DRG systems are confronted with the problem that DRG groups also incorporate some treatments with resource consumption that is much higher (or lower) than the price or weight assigned to that group. Therefore, all systems developed so-called 'trimming methods' to account for cases with much higher or much lower resource consumption – so-called outliers. In general, these extreme cases tend to be singled out and receive extra payments in order to allow for

Figure 2: DRG adjustment and determinants of hospital cost



adequate reimbursement of the remaining cases within one DRG. However, it should be noted that outliers may also be the consequence of patient or treatment characteristics that were not adequately taken into account in the DRG's patient classification system.

Furthermore, recent research indicates that a second round of adjustment may be needed to reflect differences across hospitals with regard to organizational characteristics (teaching, size, specialization) and environmental conditions (differences in wages, capital and insurance costs)^{5,6} as these may generate unavoidable cost differences. Figure 2 visualizes the relationship between determinants of hospital costs and their ideal adjustment in a DRG system operating with cost weights. In practice most DRG systems account for some organizational differences and provide, for example, additional resources for teaching or certain specialties. In few systems, however, adjustment of reimbursement rates is applied for environmental factors beyond the control of hospitals such as differences in regional wage-levels or capital costs. Notable exceptions are the US Medicare wage index, which adjusts for differences in hospital wage levels by a factor reflecting the relative hospital wage level in the geographic area of the hospital compared to the US-wide average, and the Market Forces Factor (MFF) in

England, which adjusts for variations in input prices and considers price differences for land and buildings.

Incentives and DRGs

In most countries the inpatient sector is dominated by public or not-for-profit hospitals in which most health workers are reimbursed for the services they provide on a salary basis. As under these circumstances competition between providers is limited and administrative rules and regulations may also impede efficiency,⁷ DRGs are thought to increase incentives for effective and efficient service delivery. However, DRGs can also incentivize unintended behaviour, such as the rare but widely known examples of early hospital discharges of 'still bleeding patients' drastically illustrate. Therefore, the success of any DRG system ultimately depends on the extent to which it incentivizes provider behaviour in line with social objectives.

As outlined, the main desired objective of DRGs is that the case-based reimbursement provides incentives for hospitals to make efficient use of resources. The underlying logic is that as hospitals' reimbursement is tied to output, measured in terms of (mainly) diagnosis or procedure, they face an incentive to minimize the resources used per service (or DRG). However, DRG systems may also induce

Table 1: DRG incentives beyond efficiency

Quality of Care	Documentation of service delivery
<ul style="list-style-type: none"> • More treatment of patients whose expected costs are lower than the associated reimbursement. • Less treatment of patients whose expected costs are higher than the associated reimbursement (dumping of high-dependency patients) • More intensive treatment of patients ('gaming') if this leads to an increased reimbursement (only if the increased reimbursement exceeds costs) • Encouragement to minimize costs within the treatment group without consideration of quality (if pure case-payment) • Encouragement to shift costs to third parties 	<ul style="list-style-type: none"> • Encouragement of more coding of procedures or secondary diagnoses ('up-coding') if this leads to an increased reimbursement • Complexity of patient classification system may lead to wrong-coding • Bureaucratic efforts on documentation detract resources and attention away from main business, medical treatment

Source: Authors, based on Busse et al. 2006¹

more ambiguous behaviour by providers. Concerns regarding the unintended incentives of DRG systems refer to two main dimensions: (1) the quality of care provided and (2) documentation of service delivery. Table 1 provides an overview of these (unintended) incentives.

The extent to which DRGs incentivize intended or unintended behaviour and the overall net effect with regard to costs and quality cannot be determined conceptually as they are highly contingent upon context and practical implementation. Therefore they need to be scrutinized empirically.

DRGs and outcomes – empirical evidence

There is broad agreement in academic and policy circles that the introduction of DRGs affects provider behaviour. Nevertheless, the empirical literature on the impacts of provider payment reform in the inpatient sector across the industrialized world is surprisingly limited.⁸ Existing studies tend to focus solely on the US context and tend to narrowly consider the effects on hospital costs. The impact of the introduction of DRGs in other countries and on their effect on health outcomes is much less frequently evaluated.

Cost and efficiency

With regard to cost and efficiency most

studies during the 1990s, mainly from the US, found that the introduction of DRGs caused a reduction in average length of hospital stay and a decline in total input used per case. However, there was an increase in the input used per hospital day and the overall number of cases performed.⁷ Overall, the rate of growth in hospital expenditure became smaller – and hospital profit margins decreased. More recent international evidence scrutinizing the impact of DRG introduction in Central and Eastern Europe and Central Asia indicates that DRG systems and fee-for-service reimbursement regimes similarly affected overall health spending between 1990 and 2004.⁸

Health outcomes and quality of care

Systematic evidence on the effects of DRGs on health outcomes and quality of care is extremely limited. Early studies from the US found that DRGs did not increase mortality rates and re-admission rates.⁹ Similarly, more recent empirical investigations found modest or no effects on medical outcomes.^{8,10,11} Clearly, however, health outcomes are hard to measure via routine data, especially if meaningful comparisons are to be made across payment, and therefore documentation, regimes. This is one of the reasons for the absence of well-grounded empirical evidence across countries. As a consequence, results have to be interpreted with great caution.

Conclusion: challenges and constraints

Conceptually, DRGs are clearly attractive for policy makers as they introduce the means to compare hospital performance and resource use. Additionally, in their more ambitious role as resource-allocation instruments, they can induce market-like financial pressure in a sector of health care that was previously sheltered from competitive pressure. As outlined, great care needs to be paid to technical details and operationalization to (a) allow for meaningful performance comparisons and (b) incentivize providers in line with social objectives. For most countries the empirical evidence on the effects of DRGs remains very limited. In the absence of such clear cut evidence, policy design must mainly rely on conceptual considerations. These suggest that policy makers need to pay special attention to the adjustment factors for setting DRG rates as few systems so far consider organizational and environmental factors. Moreover, policy-makers need to consider how to account for differences in quality, which is a neglected area of DRG system development. In addition, the administrative burden, especially for health professionals, needs to be kept manageable to allow hospitals to concentrate on their main business as transaction costs related to DRGs are high.¹²

Lastly, policy makers need to reflect on how to deal with increasing demands for high-end new technologies, which often apply only to very narrow groups of patients and can be expensive. Currently, after a new technology is launched, it is often first covered by additional reimbursement components and then, if sufficient evidence for effectiveness is provided, is incorporated into the DRG system.¹³ This approach facilitates, but does not force, the adoption of innovative medical devices. Moreover, it may lead to an ever increasing complexity of DGR systems, which may not be suitable and sustainable in the long term.

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Activity based payment in France

Zeynep Or

The French hospital system is characterized by a wide choice of public and private providers. More than one third of all inpatient care and 56% of all surgery are provided by private for-profit hospitals. Patients can choose freely between public and private hospitals. Activity based payment (ABP) was first introduced in 2004/ 2005 to pay for acute care services (including home hospitalization) with the objectives of improving efficiency; creating a 'level playing field' for payments to public and private hospitals; improving the transparency of hospital activity and management; and improving quality of care.

Before the ABP, two different funding arrangements were used to pay public and private hospitals. Public and most private not-for-profit hospitals had global budgets, mainly based on historical costs, while private for-profit hospitals had an itemized billing system with different components: daily tariffs covering the cost of accommodation, nursing and routine care; and separate payments for each diagnostic and therapeutic procedure carried out, with separate bills for costly drugs and physicians' fees.

The implementation of ABP has been progressive. In public hospitals, the share of all activities paid by the ABP has increased gradually each year: from 10%

in 2004 to 25% in 2005 and reaching 100% in 2008. Private for-profit hospitals have been paid entirely by the ABP since February 2005. A transition period is in place until 2012, where 'national prices' are adjusted for each provider, taking into account its own historical costs/prices.

Patient classification

Under the ABP system, the income of each hospital is linked directly to the number and case-mix of patients treated as defined in terms of homogeneous patient groups (GHM, *Groupe Homogène des Malades*). The classification system used in France was inspired by the US Health Care Financing Group classification (HCFA-DRG) but adapted to the French system. Assignment of patients to GHM is based on the primary diagnosis as well as on any surgical interventions provided. Data on age, length of stay and mode of discharge (death, transfer) are used to define case severity. The current version (v11) of the GHM classification, which was introduced in January 2009, accounts for 2291 groups compared with 784 in the previous version.

Price setting

The GHM prices (tariffs) for each service are set annually at the national level based on average costs. Nevertheless, there are

two different sets of tariffs: one for public (including private-non-profit) hospitals and one for private for-profit hospitals. The initial objective of achieving price convergence between the two sectors in 2012 was recently pushed back to 2018. Cost calculation methods underlying the prices and what is included in the price differ between the public and private sectors. The tariffs for public hospitals cover all of the costs linked to a stay (including medical personnel, all the tests and procedures provided, etc.), while those for the private sector do not cover medical fees paid to doctors (which are paid on a fee-for-service basis) and the cost of biological and imaging tests (eg. scanners,) which are billed separately.

All funding is not linked to ABP

Public hospitals (and private hospitals participating in so called ‘missions’) receive additional payments to compensate for specific ‘public missions’, including: education, research and innovation-related activities; activities of general public interest such as meeting national or regional priorities (e.g. developing preventive care); and the financing of investments in infrastructure contracted with the Regional Hospital Agencies. The costs of maintaining emergency care and related activities are paid by fixed yearly grants, plus a fee-for-service element taking into account the yearly activity of providers. Finally, a restricted list of expensive drugs and medical devices is paid retrospectively, according to the actual level of prescriptions made. The expenditure on these drugs and devices increased by 37% between 2005 and 2007.

Efficiency in question

Between 2004 and 2007, the financial situation of public hospitals deteriorated generally, while that of private hospitals improved.¹ In 2007, one out of every three public hospitals was in deficit, with a total budget deficit of about €500 million. Public hospitals seem to have difficulty in reducing their costs despite an increase in their activity.

In terms of productivity improvements, the situation is unclear. Overall, both public and private hospitals appear to

have reacted to ABP by increasing their activity in 2005, the year of its introduction. In public hospitals, both inpatient and day cases have increased by 1.5% and 5% respectively, while in the private sector there seems to be a shift from inpatient to ambulatory surgery with a 3% reduction in inpatient care and a 9.5% increase in day cases.

However, it is not clear how much of this rise in ambulatory activity represents an increase in efficiency, and how much is due to miscoding or over-supply of services. The external audits by the Health Insurance Funds revealed that some of this increase was due to ‘up-coding’ of ambulatory consultations. In 2006, the Ministry of Health issued a decree providing a more strict definition of ‘ambulatory stays’. Subsequently, the overall number of day cases fell by 8% in 2007 (4% and 10% in the public and private sectors, respectively).

Macro-level control of volume and price

In order to contain the level of hospital expenditure, national level expenditure targets for acute care (with separate targets for the public and private sector) are set by Parliament. If the actual growth in volume exceeds the target, prices subsequently go down. Because the increase in activity in 2005 was higher than the targets set, the government reduced GHM prices by 1% in 2006. Subsequently, overall activity went down about 3.5% in 2007, but it is difficult to say how much of this was in reaction to the decline in GHM prices.

Nevertheless, this macro-level regulatory mechanism creates confusion and an extremely opaque environment for hospitals where it is not possible to predict market trends and prices. GHM prices are set as a function of global changes in hospital activity, independent of costs and their evolution at the individual hospital level. Thus, some hospitals may experience a reduction in their revenues even if their own level and range of activities have remained unchanged but there has been a global rise in activity which has led to a fall in GHM prices.

Lack of information on impact

No national evaluation is yet available on the effects of ABP on measurable outcomes such as activity rates, readmissions and throughput (length of stay, etc.). But a recent report by the Auditor’s Office (*Cour de comptes*) concludes that ABP has become a very opaque mechanism of control for hospital managers and the follow up of hospital resources (revenues) is not adequate. The report also criticizes the ambiguous process of fixing GHM prices because it is not always clear what is included in the price and what is not.

Overall, expenditure on hospital activity which is not linked to the GHM escalated between 2005 and 2007: expenditure for expensive drugs and medical devices increased by 37% and other daily supplementary payments by 21%, against a 4% increase in GHM related expenditure.

Conclusion

So far, activity based payment in France does not appear to have achieved any of its stated objectives in terms of improving efficiency, transparency and fairness of funding and quality. Cost data is missing to identify efficient providers, to understand the differences in medical practices and to monitor any changes in behaviour of the various actors. Quality indicators such as readmission and mortality rates are not available either. The playing field is not much fairer since the GHM prices do not cover the same cost items in public and private hospitals and extra-GHM payments are still opaque. Better monitoring is required on hospital expenditure that falls outside of the GHM system.

Moreover, the macro-level volume-price control mechanism appears to be counter-productive or ineffective. A contractual approach giving individual providers clear volume and quality signals could improve efficiency.

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Financing inpatient health care in Austria

Conrad Kobel and Karl-Peter Pfeiffer

Health care in Austria is organized via statutory health insurance that covers almost 99% of inhabitants. The revenue sources for the health care budget are complex. They consist of the combined payments of employers and employees to the social health insurance funds, which amount to 46% of total expenditure on health. A further 30% is provided by taxes and the remaining 24% consist of co-payments paid out-of-pocket by patients themselves or covered by additional private health insurance.¹ While the federal government is responsible for enacting basic laws in health care, implementation falls under the remit of the country's nine provinces. However, actual implementation is carried out by the so-called 'health platforms'* at the federal and province level. As part of health care reforms in 2005, State Health Funds were set up in each province to finance inpatient care and to implement regulations concerning health care in general.²

There are 183 acute care hospitals in Austria (2006) providing 52,894 beds.³ Of these hospitals, 140 (92% of beds in acute care hospitals) are public or private not-for-profit hospitals financed mainly by the State Health Funds. The budgets of the State Health Funds consist of resources from the federal government, the provinces and the municipalities based on fixed percentages of value-added taxes. Furthermore, social insurance funds pay a flat fee. In most provinces, contributions by municipalities and provinces covering hospitals' operational deficits are also added to the State Health Funds. The private for-profit hospitals are mainly financed by direct patient contributions or private health insurance. Additionally, for health services covered by the social insurance funds, these private hospitals are reimbursed by the Private

Hospitals Financing Fund (PRIKRAF).

While the average length of stay has been decreasing constantly, admission rates remain at a high level. However, comparisons with other countries are problematic because outpatient health services performed in hospitals (ie. 0-day stays), which is very common among Austrian hospitals, require a formal hospital admission for reimbursement purposes.

The Austrian DRG system

Until 1996 hospital financing was implemented on a per diem basis and there were no incentives for cost efficiency or transparency. Therefore, after years of development and reforms of the legal framework, a performance-orientated hospital financing system, called *Leistungsorientierte Krankenanstaltenfinanzierung* (LKF), was introduced and made compulsory in 1997 for all hospitals financed by today's State Health Funds. Moreover, LKF became compulsory even for private for-profit hospitals that provide services covered by the social health insurance scheme. LKF is neither an adoption nor a further development of existing DRG systems. It was developed and still is administered by a group of experts at the Ministry of Health. Detailed information and grouping software is freely available at www.bmg.gv.at.

Goals

The main goals connected to the introduction of a case-based financing system were⁴:

- higher transparency of costs and activities;
- reduction of the frequency of hospitalization;

- reduction of annual cost increases and the average length of stay;
- to shift from inpatient care to ambulatory care;
- reduction of hospital beds; and
- implementation of an easy-to-use steering and planning instrument.

System characteristics

Today, LKF primarily serves as a reimbursement framework. Together with the Austrian Structural Plan for Health it is also used for steering and planning purposes by defining minimum requirements for certain health services to be reimbursed.

LKF is a two-part system, with a core area and a 'steering' area. Patient classification and the allocation of corresponding scores are performed in the core area, and are administered by the Ministry of Health at the federal level uniformly for all provinces and hospitals. The steering area, located at the province level, regulates how hospitals are reimbursed within the LKF scheme.

Patient classification is based on whether or not patients have received one of the expensive or very frequently used services in the Austrian catalogue of procedures (list of all inpatient services covered by the social health insurance system). They are classified either into one of the 204 single medical procedure groups (MEL groups) or into one of the 219 main diagnosis groups (HDG groups). These groups have been defined to pool medically similar hospital cases into economically homogeneous groups. In each of these groups a decision tree classifies patients into one of the 979 performance-orientated (procedure or diagnosis orientated) case groups, called LDF groups. The information used in determining a LDF group is related to hospital stay (e.g. diagnoses according to ICD-10 BMSG 2001 or medical services) or patient characteristics (e.g. age classes).

* Health Platforms are executive bodies, with wide stakeholder representation, of the respective State Health Funds, whose main task is to take part in implementation and monitor adherence to planning and quality measures in health care provision. For more detailed information see Hofmarcher MM, Rack H-M, 2006.²

Each LDF group has a certain score that consists of a performance component (e.g. treatments, diagnostic procedures) and a day component (e.g. nursing, hotel costs). Outlier reductions or surcharges are applied to the day component. For stays in intensive care units or special departments (e.g. psychiatric or acute geriatric/remobilization departments) extra scores are allocated on a per diem basis.⁵

Originally, the steering area was introduced to ensure a smooth transition to the new case-based financing system and to create incentives to achieve high quality health care. However, the provinces, which are relatively free to implement the steering area according to their needs, use it to distribute their resources according to certain criteria. Two provinces (Lower and Upper Austria) do not, or just marginally, use the area for resource allocation. However, most provinces use it to allocate either a fixed percentage of the budget according to hospital or personnel factors (Vorarlberg, Tyrol, Burgenland) or by weighting the LKF scores directly by hospital or personnel factors (Carinthia, Styria, Vienna). In Salzburg a mixture of both is used.⁶

Concluding remarks

After the introduction of LKF a shift from outpatient to inpatient care was observed although the contrary was desired. This is partly due to the lack of interfaces between these two sectors. Currently, there are efforts towards achieving integrated health care and the development of a joint catalogue of procedures for inpatient and outpatient care is ongoing. With better integration of care, the necessity of hospital admissions, especially 0-day stays, decreases and the implementation of episodes of care, including inpatient and outpatient care, is possible. However, the current outpatient financing system differs enormously from the one used for inpatient services delivered in hospitals. It is therefore also necessary to discuss how integrated care should be reimbursed.

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DRGs in Spain – the Catalan experience

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During the 1980s there were many changes in the Spanish health care sector. The starting point was a fragmented system: a social security system which assured health care coverage only for working and retired people and a combination of mutual and private organizations which also ensured basic care for the rest of the population. The democratic change during the late 1970s led to a health care system with universal coverage based on equity of access (Health Care General Act of 1986).

In Catalonia, after the 1981 devolution of health care responsibilities to this Autonomous Community, in 1986 most hospitals were brought together to form a public hospital utilization network (*Xarxa Hospitalària d'Utilització Pública*, XHUP) to enable a single public purchaser to contract health activities for the whole population. Currently, there are two networks, a public one, XHUP representing 73% of total acute care

centres and 84% of total beds, and a private one for the remaining 27% of centres and 17% of beds.¹

In Catalonia 24.1% of the population has coverage from both the public and private networks of acute care and health choices are differentiated according to the type of care needed.² Private care tends to be primarily used for obstetric services, as many people choose private centres because of the higher comfort and room quality, for elective surgery, to avoid long waiting lists, and for other specialties with no public coverage, like cosmetic surgery and dental care.

Public health network activities

In the mid 1980s the public health sector in Catalonia was merely the sum of heterogeneous types of organizations owned by different institutions – government, municipalities, sickness benefit funds, religious organizations and mutual

insurance companies. The Catalan health authority (which later became the Catalan Health Service, *CatSalut*) was not able to know the types and number of activities bought nor the effect of their reimbursement on the health care system's sustainability. This led to the implementation of tools that were able to define activities and consumption.

An information system was created for XHUP hospitals – 60 acute care hospitals with an average of 220 beds – in order to verify that health activities were provided according to adequacy and equity principles.³ In 1990 it was made compulsory for all public and private hospitals in Catalonia to draw up a Minimum Basic Data Set (*Conjunt Mínim Bàsic de Dades, CMBD*) on hospital discharges with information on acute-care hospitalization activity. In 1995, the Minimum Basic Data Set allowed CatSalut to have enough information about all XHUP hospitals to group discharges with DRG coding systems. The CMBD uses diagnosis and procedure codes, including the ICD-9 CM, the same version that is used for all Spanish hospitals.

The CMS-DRG System

Until 1997, DRG coding did not play any role in hospital reimbursement. Previously, health care activities were reimbursed according to a 'per contact' system based on Basic Assistance Units (*Unitat Bàsica d'Assistència, UBA*).⁴ Each activity was valued as a proportion of the inpatient stay which had a value of 1. Each outpatient surgery and day hospital utilization had a value of 0.75, each emergency contact was valued at 0.50, a first ambulatory visit 0.4 and a follow-up visit 0.2. All other Spanish autonomous communities used a similar reimbursement system.⁵

DRG payment systems were first used in Catalonia in 1997. The system introduced for grouping discharges was defined using the CMS-DRG* coding version.⁶

* The CMS-DRG system is the original DRG classification designed to group hospital activities provided to the Medicare population in the US.

Hospitals receive an amount per case that depends upon the relative mean DRG weight of all hospital discharges, compared to the mean weight of the public network. This hospital-relative ratio is multiplied by a fixed amount which is published annually.⁷

Discharge tariffs depend on two specific indicators, the IRR (relative resources intensity) and the IRE (structure relative index). Catsalut sets the discharge prices for each IRR and IRE (IRR and IRE prices) as well as two weighting percentages (See Box 1)

Box 1 Discharge price calculation

$$\text{DISCHARGE PRICE} = (\text{IRE} * P_{\text{ire}} * 65\%) + (\text{IRR} * P_{\text{irr}} * 35\%)$$

IRE and IRR are the main components of each hospital's reimbursement. The value of both prices (P_{irr} and P_{ire}) has remained almost the same since their introduction. IRE reflects a hospital's structure level, while the level of a hospital's consumption of resources (IRR) is defined by DRG discharge weights coded with CMS-DRG.

Unfulfilled goals

When it was first introduced, the reimbursement setting structure aimed to gradually reduce the weight of the structure index (IRE) and to increase the resource consumption index (IRR), an indicator of the level of complexity, which should be the main reimbursement driver for Catalan hospitals. However, IRR and IRE weights also have not changed since 20008 (Table 1). Thus, the goal of attributing even more weight to discharge complexity in the reimbursement formula has not been reached as it is evident that the current weighting (65%

for IRE and 35% for IRR) does not provide an incentive for hospitals to seek the best complexity performance. Regardless of the difference in the discharges' DRG weight, the end result is almost the same in terms of reimbursement.

When calculating hospital reimbursement, along within inpatient care, major ambulatory surgery (MAS) is included and accounts for some 40% of total surgical activity (37% by 2006).⁸ In the Catalan health care system MAS was introduced in 1990, with the objective of optimizing the use of resources and reducing waiting lists. Its use has increased steadily, reaching today's significant levels. The most frequent procedures in ambulatory surgery are cataract surgery, release of carpal tunnel, circumcision, inguinal hernia repair, uterine dilatation and curettage, and arthroscopy.

Grouping MAS and inpatient care in the reimbursement system was a political decision taken to give a powerful incentive to set surgery in an outpatient setting as one of the measures to reduce waiting lists, as well as to reduce costs. This has been a great incentive to substitute inpatient surgery with MAS, but this incentive has tended to be over intensive. Thus, the main trend has been an increase in the importance of outpatient settings (Table 2).³

Unintended Outcomes

In the first years of its introduction, this system did not work as expected. The first sub optimal result was that the CMS-DRG American weights used to determine hospital reimbursement were not able to explain cost variability in Catalonia,⁹ highlighting the need to define system-specific weight adjustments, and also to promote the development of cost accounting systems to evaluate the per patient cost.

Table 1 IRE and IRR weighting percentages

Weights	IRE	IRR
1998–1999	70%	30%
2000–2009	65%	35%

Table 2 XHUP Hospital contacts

XHUP	Number of contacts							Variation 01/07
	2001	2002	2003	2004	2005	2006	2007	
Inpatient	734,662	730,060	732,164	733,020	736,493	737,338	764,536	4.1%
Major Ambulatory surgery	104,887	117,115	128,400	144,854	159,434	173,060	183,608	75.1%
Other types of assistance (including day hospital)*	152,604	171,367	184,495	189,549	217,788	234,599	262,623	72.1%
Total	992,153	1,018,542	1,045,059	1,067,423	1,113,715	1,144,997	1,210,767	22.0%

Source: Data elaborated from the Catalan CMBD 2001–2008.³

*Data not exhaustive as part of the variation could depend on changes or improvements in the quality of hospital information provided to the XHUP.

Table 3 Introduction of DRG systems in Catalonia

CATALONIA	1st DRG version	2nd DRG version
Date of introduction	1997	2006
(Main) Purpose	Hospital reimbursement	Hospital benchmarking
DRG system	CMS-DRG	AP-DRG modified*
Data used for development	None (i.e. completely imported)	None (i.e. completely imported)
Number of DRGs	520	670
Applied to	Public hospitals, both inpatients and some outpatients (major surgery and high-profile emergencies)	Public and private hospitals

* The AP-DRG system is a modification of CMS-DRGs. It covers a wider range of procedures and supports other population groups in addition to Medicare beneficiaries.

The reimbursement system caused strong incentives to modify clinical strategies within Catalan hospitals. As MAS prices are defined with the same method as inpatient discharges, hospital activities have been oriented to increase the use of MAS. The increase (Table 2) of activity and costs (significantly in outpatient activities) has caused distortions in the financial balance of the health care system due to the lack of information on hospital activities and costs that the DRGs have not been able to capture.¹⁰

Future challenges

There are two main areas to focus on: firstly, the definition of a new weights structure that reflects the costs of hospital activity more efficiently than American DRG weights; and secondly, the development and homogenization of

cost accounting systems in order to make hospital information comparable, at least at regional level.

Spain chose to adopt the DRG system without any adjustment or modification (Table 3). Therefore, changing to another DRG system or adjusting existing algorithms would be easier than for most European countries and could be done at relatively low cost. In the European environment, only Portugal has maintained the American standard in its DRG system while all other countries have developed their own modified systems. The custom-made DRG weight adjustments that have been deployed in several European countries implies that there is a high degree of non comparability between case mix indicators, thereby reducing the power and usefulness of this tool as a standard for European health care measurements.

The Spanish situation shows that current versions of DRGs cannot capture the increasing importance of MAS and other outpatient activities. Therefore, the Spanish Ministry of Health has developed projects aimed at verifying the usefulness of the IR-DRG system,¹¹ collecting data from participant hospitals that could provide costs at patient level and grouping their CMBDs with the IR-DRG grouper. The objective of this project was to launch a pilot trial to define the cost structures of inpatient and outpatient activities.

In the Catalan health care context quality improvement is also a current strategic aspect related to DRG systems. The Alliance for Patient Safety program (Aliança per la Seguretat), a project promoted by the Catalan Department of Health, involving XHUP hospitals, and based on the WHO World Alliance for

Patient Safety guidelines, motivated significant changes in quality and safety strategies, moving from a focus on efficiency to improvements in patient safety. This change increased the relevance of DRG systems in quality indicators based on DRG capacity, yielding clinical and management information. Moreover, the EuroDRG project (www.eurodrgeu), which involves some Catalan hospitals, will enable a comparison between European case mix systems and will demonstrate if DRG systems could achieve a European common standard that includes inpatient activity, MAS and other outpatient activity.

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