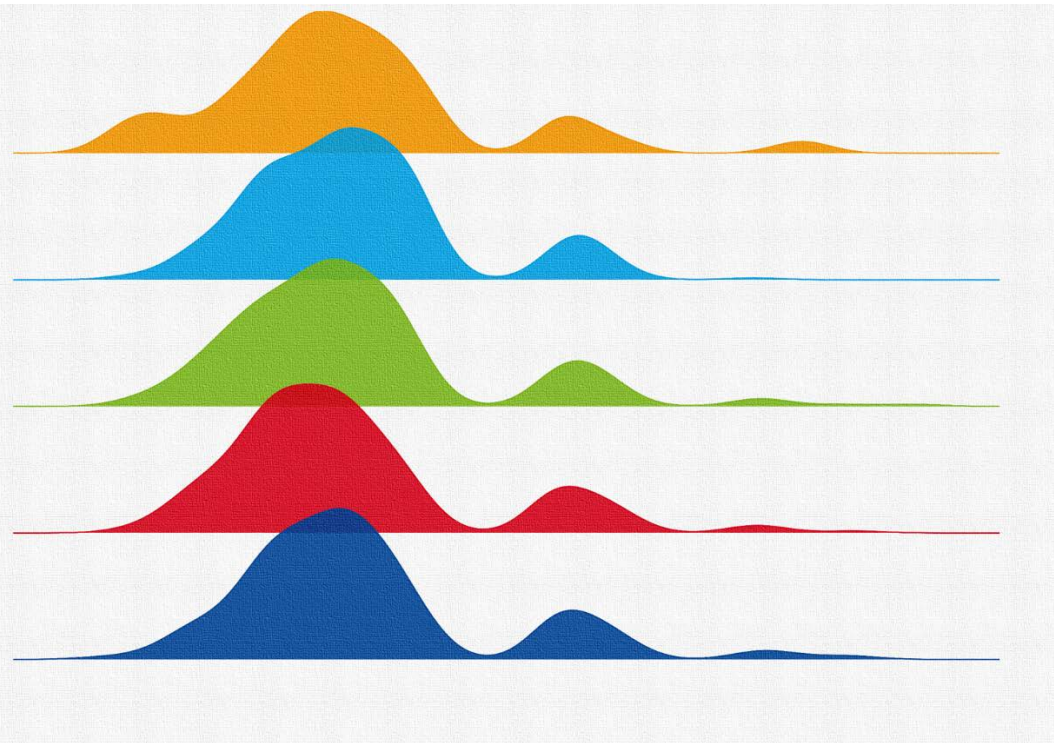


SHORT REPORT

PAYMENT METHODS FOR HOSPITAL STAYS WITH A LARGE VARIABILITY IN THE CARE PROCESS



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■ SHORT REPORT

TABLE OF CONTENTS

■	SHORT REPORT	1
1.	INTRODUCTION	3
1.1.	BACKGROUND	3
1.2.	RESEARCH QUESTIONS AND SCOPE OF THE STUDY	5
1.3.	METHODS.....	6
2.	INTERNATIONAL COMPARISON OF EXCLUSION MECHANISMS	7
2.1.	DENMARK.....	11
2.2.	ENGLAND	12
2.3.	ESTONIA	13
2.4.	FRANCE	14
2.5.	GERMANY.....	15
2.6.	USA – MEDICARE PART A	16
3.	HOSPITAL PAYMENT METHODS IN BELGIUM FOR COMPLEX OR DIFFICULT TO STANDARDISE CARE	17
3.1.	REDUCING VARIABILITY UNDER DRG-BASED HOSPITAL PAYMENT.....	17
3.2.	HOW ARE BELGIAN HOSPITALS PAID FOR STAYS WITH A LARGE VARIABILITY IN THE CARE PROCESS?	18
3.2.1.	Hospital revenue sources.....	18
3.2.2.	Adjustments to the DRG system: B2-points are weighted.....	19
3.2.3.	Adjustments at the margin of DRG-based hospital payment: outlier payments, supplementary points and payments for services relevant for several DRGs	20
3.2.4.	Payment methods outside of DRG-based hospital payment.....	23
4.	PAYMENT MECHANISMS FOR PARTICULAR AREAS OF CARE	25



4.1.	CANCER TREATMENT	27
4.2.	SPECIALISED PAEDIATRICS	27
4.3.	SEVERE BURNS	28
4.4.	NEUROLOGICAL DISEASES	28
4.5.	INTENSIVE CARE UNIT	29
4.6.	DIALYSIS	30
4.7.	ORGAN MANAGEMENT AND TRANSPLANTATIONS	30
4.8.	DIAGNOSTIC IMAGING SERVICES AND RADIOTHERAPY	31
5.	DISCUSSION	31
5.1.	IMPORTANCE OF PATH DEPENDENCY	31
5.2.	A CLOSE LINK WITH THE CORE PAYMENT METHOD	31
5.3.	STEERING CARE CAN LOWER HIGH VARIABILITY	32
5.4.	OUTLIER PAYMENTS	33
5.5.	A WIDE DIVERSITY OF PAYMENT METHODS FOR HIGHLY VARIABLE, COMPLEX OR RARE CARE	33
5.6.	NO CLEAR DEFINITION OF EXCLUSION CRITERIA	34
5.7.	BELGIUM: FRAGMENTED PAYMENT SYSTEM BUT COMPARABLE INSTRUMENTS AS ABROAD EXIST TO DEAL WITH VARIABILITY	34
5.8.	WHICH POLICY CONCLUSIONS CAN BE DRAWN FROM THIS STUDY?	35
■	RECOMMENDATIONS	37
■	REFERENCES	40



1. INTRODUCTION

1.1. Background

International hospital payment approaches at the margin and beyond DRG-based payment

Since the 1990s, diagnosis-related group (DRG)-based hospital payment systems have become the main mechanism internationally for reimbursement of acute inpatient care, and increasingly also for day care. DRG systems classify all hospital cases, most importantly on the basis of diagnoses and procedures, into a manageable number of clinically meaningful and economically homogeneous groups. This means that each DRG should ideally contain cases that have comparable costs in order to allow a reliable calculation of average costs per DRG. Under DRG-based payment, hospitals then either receive a fixed amount per case within a certain DRG, i.e. DRG-based case payment, or they receive a budget that is – at least partially – related to the number and type of DRGs (case-mix) provided in one of the previous years, i.e. DRG-based budget allocation.

However, all DRG systems struggle with the problem that some patients have costs that are difficult to predict on the basis of diagnosis and procedures because their costs are highly variable. There are three main reasons for this. First, some diseases are rare and because of a low number of patients treated, it is not possible to calculate valid average costs for this group of patients. Second, some patients are admitted to hospitals for multiple reasons and may require certain high-cost services (e.g. dialysis) on top of more standardised procedures (e.g. because of appendicitis). These comorbidities lead to variations in health expenses for patients within the same DRG. As DRG classifications are in general based on the primary diagnosis or procedure, they struggle to deal with multimorbidity.^{1, 2} Third, each individual patient is different – and statistical variation means that some patients will always have much higher costs than others.

Irrespective of the reason for the variability, it is clear that DRG-based payment systems have to take into account this variability. Otherwise payment would be unfair: it would be either too high or too low for a

considerable number of patients. Therefore, all countries have developed mechanisms that aim to assure fair reimbursement of hospitals by complementing DRG-based payments with other payment mechanisms. These mechanisms always involve the exclusion of certain parts from the calculation of DRG-based payment and the separate reimbursement of the related costs through other payment mechanisms. The four main mechanisms include the exclusion of:

1. Certain patient groups (e.g. patients with major burns, palliative patients)
2. Certain services and products (e.g. high-cost drugs, devices, intensive care)
3. Certain hospitals or hospital departments (e.g. highly specialised departments/hospitals, such as epilepsy departments, cancer hospitals)
4. Outliers with considerably higher/lower costs than other patients in the same DRG (cases with an extreme resource use are excluded from their DRG group).

Additionally, some countries use **other exclusion mechanisms** (e.g. mixture between the exclusion of patient groups and hospital departments).

Financial risk sharing between providers and payers determines provider incentives

All payment methods are likely to create incentives for providers to achieve health policy objectives: access to necessary care, high quality of care, promoting the effective and efficient use of resources and, where appropriate, cost containment. These incentives crucially depend on the degree of financial risk sharing between providers and payers. Hence, a primary difference among the reimbursement methods is the ability of the provider to influence the revenue/cost ratio. Under DRG-based payment, fixed payments are made to providers regardless of the volume of services provided per case. However, case-based hospital payment methods simultaneously create the incentives to increase the number of cases and to minimize the inputs used for each case.



If costs for the bundle of services needed to treat a particular diagnosis or the services provided for a particular procedure are larger than the payment, providers bear the financial risk for the difference between costs and revenues. Payers bear the financial risk for the volume of cases and for upcoding practices. With a DRG-based budget allocation system, and especially in case of a closed-ended budget, all financial risk for payers is eliminated.

Moreover, the more services that must be provided for a single payment, the more providers are at risk for intensity of services. Therefore, the financial risk sharing between provider and payer not only depends on the payment method, but also on the scope of services included.

Hospital payment methods and their potential incentives can be classified in different ways. We refer to other sources for a brief overview of incentives associated with different hospital payment methods.^{1, 3, 4} It should, however, be kept in mind that in reality there are many factors that influence provider behaviour in addition to the payment method.

Reform plans of the minister

In April 2015, the minister of Social Affairs and Public Health published a comprehensive plan to reform the Belgian hospital landscape.⁵ One of the central elements in this Action Plan is the idea to classify hospital stays in three clusters and to apply a different payment system to each of the clusters. The plan explicitly mentions that the payment system applied to each cluster should be determined in terms of the financial risk sharing between the payer and the hospital, with the delineation between the clusters to be based on the predictability of the care process.

The following clusters are defined in the Action Plan:

- The **first cluster** consists of hospital stays requiring a standard process of low-complexity care which varies little between patients and is called the 'low variability cluster'. For stays belonging to this first cluster, the Action Plan proposes to apply a prospectively determined amount per stay, irrespective of the care provided for each individual stay. The financial risk for care that is provided beyond the standard care process is borne by the hospital. The healthcare payer bears the financial risk for the number of cases.

- The **second cluster**, called the 'medium variability cluster', consists of hospital stays that are less predictable than stays in the first cluster. The proposed payment system is very similar to the current system, where a national closed-ended budget is divided among individual hospitals on the basis of the national average length of stay per diagnosis-related group. The predominant mode of payment for physicians remains fee for service. The financial risk is shared between the hospital (for the budget) and the payer (for the physician remuneration).
- The **third cluster** consists of hospital stays for which the provided care is highly complex, difficult to standardise and hence unpredictable. The financial risk in this 'high variability cluster' is mainly with the payer and hospitals are reimbursed for the care provided.

Despite the definition adopted by the Action Plan **not all complex care is difficult to standardise** and hence does not necessarily result in **unpredictable or highly variable resource use**. In KCE Report 270 a method was developed to partition hospital stays in three clusters with variability (within and between hospitals) measured in terms of reimbursements and length of stay.⁶ One of the results of this study was that it is difficult to empirically delineate clusters. In other words, in order to delineate them, the clusters need to be imposed on the data. In addition, it showed that the low variability cluster (when purely based on empirical analysis) also contains stays in which complex care is provided (e.g. liver transplant which is a complex but standardised procedure concentrated in a limited number of centres.)

A second central element in the reform plans concerns **capacity planning and programming** (see Box 1 in the [Short Report of KCE Report 289](#)).⁷ In addition to the creation of clinical hospital networks, a programme to manage the current and future supply of services ('aanbodbeheersing'/'*maîtrise de l'offre*') is considered as an important instrument to rationalise the care supply. This programme consists of the programming of care assignments using a new procedure which is evidence-based, transparent, evolving and proactive in case of new technologies. Task distribution between hospitals and concentration of specialised, complex services are key concepts in this part of the reform plans.



Warranted and unwarranted variation

When designing a payment system for hospitals that takes into account the variability in the care process, a distinction should be made between warranted and unwarranted variation. In case of warranted variation, it is important to pay this variation correctly to guarantee access to high-quality care. This requires a payment system in which the payment is closely connected to the care that is actually delivered. In case of unwarranted variation, on the other hand, a fixed payment per case can contribute to a decrease of the variation in care.

1.2. Research questions and scope of the study

KCE was asked by the minister of Social Affairs and Public Health to **review international payment mechanisms for hospital stays with a large variability in the care process** and to **assess the feasibility of using these mechanisms in the Belgian healthcare context**. The main research questions for the international comparison are:

- For which patient groups, hospital stays or services/products do hospitals outside Belgium receive other (additional) payments besides DRG-based payments?
- What are the criteria to determine which patient groups, hospital stays or services/products are outside the scope of DRG-based payments?
- How are hospitals reimbursed for these patient groups, hospital stays or services/products?
- Do specific mechanisms exist that support the centralisation of specific services at particular providers?
- How are outliers defined and what mechanisms for reimbursement exist?

In most countries outpatient care, mental healthcare, long-term care, rehabilitation and ambulatory emergencies are not financed through DRG-based hospital payments. Therefore they are outside the scope of this study. The same applies to payments for non-patient related hospital activities such as research or training.

Payment methods for medical specialists working in hospitals differ greatly across and even within countries.⁷ The most commonly used payment methods are salaries and fee-for-service payments, and combinations thereof. In case medical specialists are hospital employees, facility and professional services can be more easily bundled into a single payment for all services provided than when physicians are self-employed. Or separate payments can be made for both types of services. In [KCE Report 209](#) an extensive overview was given of the remuneration methods for hospital specialists in 10 high-income countries. The analysis revealed the complexity of most systems and the interdependence with country health system specific factors, such as hospital ownership, the number of private and public payers, hierarchies between specialists and the services provided within and outside hospitals. Also the process and the factors that determine fee or salary levels are very different between countries. Yet, recurrent factors taken into account in the determination of the fee/salary were the degree of risk, physical burden, duration of intervention, etc. An evaluation of whether differences in physician fees or salaries (sufficiently) take into account variability in the care process is outside the scope of the current study. The focus is on methods to pay hospitals, but it will be indicated whether specialist fees are included or not in the hospital payment.

The ultimate goal of the study is to identify lessons that can be learned from international experience and that may guide a possible reform of payment methods for Belgian hospitals. In the current reform plans, this concerns hospital stays in the third cluster and/or payments for care that is concentrated in a limited number of settings. It should, however, be kept in mind that a simulation of the financial impact at the national or hospital level of possible payment reforms is outside the scope of this study.

KCE has been commissioned several reports by the minister that fit in the reform plans for the hospital landscape and payment system. The results of the current study should be seen additional to the results and recommendations of these previous studies.⁶⁻¹⁰ For example, the current study has not the objective to evaluate the DRG-based case payment system itself. An extensive evaluation of the DRG-based case payment system of five countries is provided in [KCE Report 207](#).⁸



1.3. Methods

The study follows a mixed-methods approach. The main steps are summarized in. A detailed description of the international systems (country by country) and the consulted sources can be found in the [Scientific Report](#).

Table 1 – Mixed-methods approach

What?	How?
Horizon scanning exercise	<ul style="list-style-type: none">• Review of the literature• Identification of a long list of countries (Denmark, England, Estonia, France, Germany, USA-Medicare Part A, Sweden, Switzerland, Austria, Finland, Israel, Italy, the Netherlands), where DRG-based payments are supplemented by other payment mechanisms• Collection of information on the structure of the DRG systems• Selection of six countries for full inclusion on the basis of the following criteria: use of complementary payment mechanisms, uniform DRG-based payment system across the country, availability of contacts/DRG-experts, and other aspects such as recent developments/reforms
Description and analysis of the current Belgian payment system	Review of existing literature: grey literature, legal documents, policy papers
International comparison of exclusion mechanisms applied in six countries (Denmark, England, Estonia, France, Germany, USA-Medicare Part A)	<ul style="list-style-type: none">• Development of a questionnaire asking about what is excluded from the DRG-based payment systems, why it is excluded and how it is reimbursed• Completion of the questionnaire by national experts and review of completed questionnaires by TU Berlin (<i>Technische Universität Berlin</i>) researchers; experts answered additional questions about points that had remained unclear in their original responses• Review of existing literature: technical reports and studies mentioned by national experts
Scientific validation	Review of the scientific report by independent scientific experts



2. INTERNATIONAL COMPARISON OF EXCLUSION MECHANISMS

This chapter provides an overview of the elements that are excluded from the generic DRG-based payment system in the six selected countries: Denmark, England, Estonia, France, Germany and the USA (Medicare Part A). The main mechanisms are presented in Figure 1 and include the exclusion of certain **patient groups** (based on a diagnosis), certain **services and products** (based on a procedure), entire **hospitals or hospital departments**, **outliers** or **other exclusion mechanisms**, often a mixture of the previous elements.

Figure 1 – Generic model of a DRG system with exclusion mechanisms for special patients, products/services and hospitals

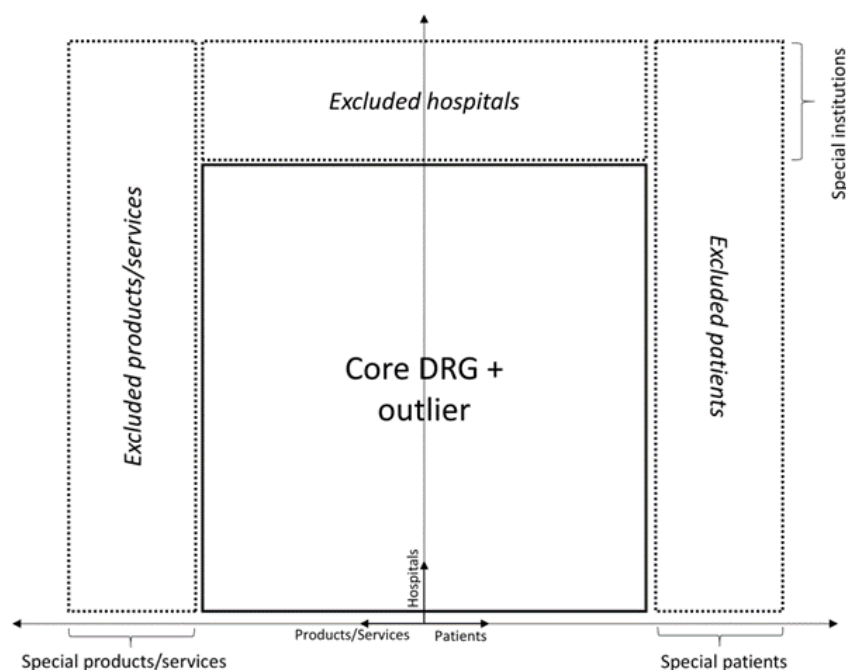


Table 2 shows the exclusion mechanisms that are used in the selected countries (a full list of exclusions for patient groups, services/products, hospitals/hospital departments and other can be found in the respective chapters of the [Scientific Report](#)). Some countries exclude many things while others have limited the use of exclusion mechanisms to only very particular elements of care. For a correct understanding of the scope of DRG-based payments (and the incentives they create), an important difference between countries is whether the **remuneration of medical specialists** is included in the DRG-based hospital payment or not. In England, Germany, Denmark and Estonia medical specialists are salaried and salaries are included in the DRG-based hospital payment. In France specialists working in public hospitals are salaried employees. Salaries are included in the DRG tariffs. Those working in for-profit hospitals are self-employed and paid fee for service. DRG tariffs do not include the costs of services provided by specialists. In the USA-Medicare Part A system, medical specialists are paid on a fee-for-service basis. These payments are not included in the hospital budget.

All countries have additional payment streams for a range of patients, product and services, and/or hospitals. In addition, all countries have a mechanism to pay for outliers, which can be defined either in terms of the length of stay (LOS) or costs of care (Table 3).

The number and type of exclusion mechanisms is closely related to the number of DRGs in the classification system and to whether or not the system is subdivided into **subgroups**, based on severity of illness levels, complications and comorbidities, to achieve more resource homogeneous DRGs. In most countries, the number of groupings has increased since the introduction of the DRG-based payment system. At this moment, the classification system in the six selected countries contains the following number of groupings: 742 in Denmark (with two levels for most DRGs); about 2 300 groupings in England (with up to six levels); about 800 groupings in Estonia (some DRGs have two levels); about 2 300 groupings in France (with four levels for most DRGs); 1 255 groupings in Germany (without a fixed maximum number of subgroups; in 2016: 590 base DRGs of which 310 were split resulting in 280 base DRGs and 940 non-base DRGs) and 756 DRGs in the USA-Medicare Part A system (with up to three levels).



Countries differ with regard to the use of specific mechanisms. In England and Germany, exclusions target a large number of patient groups, a long list of services and products, and a range of hospitals and departments. Also in Estonia, certain patients, services, and hospitals are excluded from DRG-based payments but the number of excluded patients, services and hospitals is much lower than in England and Germany.

By contrast, France does not exclude any patient groups, but excludes several services, high-cost drugs and certain (mostly small local) hospitals from DRG-based payment. The USA (Medicare Part A) has only very few exceptions from the DRG-based payment system. Most importantly, cancer hospitals and children's hospitals are excluded, although these constitute only a very small proportion of hospitals. Furthermore, local hospitals are excluded as part of the so called 'Critical Access Program'.

Interestingly, Denmark uses an approach that combines two criteria: highly complex patients are excluded from the general DRG-based payment system – but only if these patients are treated at specifically designated hospitals/departments. This approach contributes to a concentration of care as it provides incentives to hospitals to transfer these patients to hospitals that have the necessary resources (specialised technical equipment and staff) to provide high quality care. A somewhat similar approach exists also in England, where top-up payments are provided for specialised services if they are provided at designated children's, neuroscience, spinal surgery, or orthopaedics departments.

However, individual exclusion mechanisms should always be considered in the context of the mix of different payment mechanisms that constitute a national hospital payment system. For example, in the USA (Medicare Part A), where only few exceptions exist from DRG-based payment, outlier payments are based on costs – and not based on length of stay as is the case in most European countries (except for Estonia). This means that

hospitals receive additional payments if treatment costs of individual patients are much higher than average costs of care. Outlier payments based on costs can better reflect the true costs of care of an individual patient than outlier payments based on the length of stay. The degree of exclusion has an impact on the financial risk that is with either the payer or the provider. As described above, the financial risk of a case-based payment is (in terms of services provided) with the provider. But if many things are excluded from the DRG, this risk for the generic payment system is lowered and total financial risk depends on how exclusions are reimbursed.

The following subsections (2.1 to 2.6) provide overviews of national DRG-based hospital payment systems and exclusion mechanisms in order to enable a comprehensive understanding of national hospital payment systems. In addition, each subsection explains the reasons why certain elements are excluded from DRG-based payment in a specific country and the associated payment mechanisms. Furthermore, the exclusion mechanisms are summarized on the basis of the above mentioned framework (Figure 1). If numbers are available, total payments for each of the excluded elements are shown in the figure or rough estimates of the proportion of payments for included/excluded elements are provided.

For a full understanding of the DRG system (and exclusion mechanisms) in the six countries, we should go back to the hospital payment system that prevailed before the introduction of the DRG system. A historical overview of hospital payment systems was however out of scope of the current report. Such overview can be found in [KCE Report 207](#)⁸ for England, France, Germany, and the USA (Medicare) system and in the Euro-DRG report for Denmark and Estonia⁴.



Table 2 – Overview of exclusion mechanisms

Country	Exclusion of*			
	Patient groups	Products/services	Departments/hospitals	Other
Denmark	-	-	-	'Complex patients', i.e. those receiving specialised services (n=1 100) are treated at specialised institutions
England	130 out of 2 782 Healthcare Resource Groups (HRGs) do not have a national tariff, 33 HRGs have a non-mandatory tariff (2016)	High-cost drugs (n=359), devices (n=28), services (n=5), unbundled HRGs (n=214)	Decentralised system: the exclusion of hospitals depends on the local Clinical Commissioning Group	Specialised departments providing 'highly specialised services' to patients
Estonia	Chemotherapy patients	High-cost drugs, devices, services, organ transplantation	Departments for occupational disease / tuberculosis	-
France	-	Organ management, harvesting and transplantation, high-cost drugs (n=3 649)**, devices (n=68) and services (n=16)	Local hospitals / special institutions (n=166, 8.4% of all acute care hospitals)	-
Germany	45 out of 1 255 DRGs (in 13 major diagnostic categories) do not have a cost weight (2016)	Organ management, harvesting and transplantation, high-cost drugs, devices, services (total n=191)	Special institutions (n=153 in 2016)	-
USA (Medicare Part A)	-	Organ acquisition for transplant cases	Children's hospitals (n=11)/ cancer hospitals(n=60) / some hospitals in Maryland / Critical access hospitals (small, rural hospitals; n=1 300)	-

* A full list of exclusions can be found in the [Scientific Report](#). An exclusion triggered by a diagnosis is classified as a patient group, an exclusion triggered by a procedure is classified as a product/service. ** This number includes various dosages of the same substance.



Table 3 – Outlier cases: definition and payments

Country	Outliers based on	Outlier definition	Outlier payments
Denmark	LOS	No lower LOS threshold Upper LOS threshold: $Q3 + (Q3 - Q1) * 1.5$	Per diem (regardless of the DRG)
England	LOS	No lower LOS threshold Upper LOS threshold: $Q3 + (Q3 - Q1) * 1.5$	Per diem
Estonia	Costs	Lower cost threshold: average cost – $2 * STD$ Upper cost threshold: average cost + $2 * STD$	Fee for service Fee for service
France	LOS	Lower LOS threshold: $(ALOS / 2.5) + 1$ Upper LOS threshold: $ALOS * 2.5$	Per diem or fixed price Per diem
Germany	LOS	Lower LOS threshold: $\text{round}[\max(2, ALOS/3)]$ Upper LOS threshold: $\text{round}[\min(2, ALOS + 2 * STD, ALOS + 17)]$	Per diem Per diem
USA (Medicare Part A)	Costs	No lower cost threshold Upper cost threshold: DRG price + fixed loss deductible amount	80% of its costs above the cost threshold

LOS=length of stay; ALOS=average LOS; DRG=diagnosis-related group; Q1=first quartile; Q3=third quartile; STD=standard deviation



2.1. Denmark

Context: In Denmark, 60% of hospital budgets are determined on the basis of DRGs, while 40% depend on annually negotiated budgets. DRGs are applied to almost all inpatient cases and all costs except education, research and capital costs. Specialised care is concentrated at specific hospitals in order to generate synergies and to ensure quality of care.

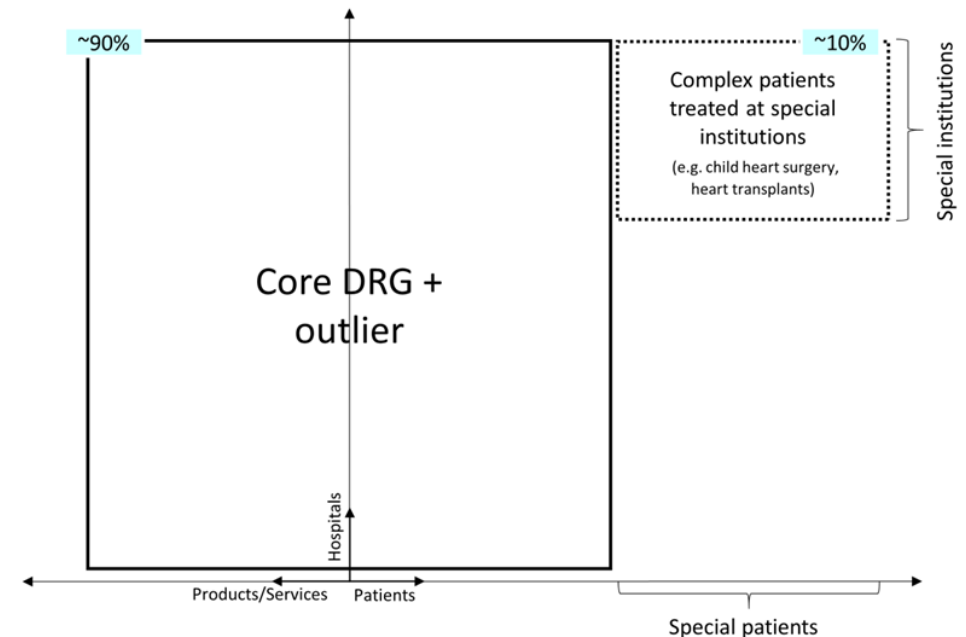
What is excluded? The only exclusion mechanism concerns 'complex patients' treated at special institutions (see Figure 2). Hospitals are reimbursed separately for these patients (see below), and the related payments account for approximately 10% of all acute hospital inpatient expenditures in Denmark.¹¹ Complex patients are defined for each medical specialty on the basis of a list of specialised or highly specialised hospital services, which includes about 1 100 services for the 36 medical specialties. Examples include transplantations or burn injuries.¹² Hospitals can apply for providing these services and the Danish Health Authority decides which institutions are eligible.¹³ Specialised services are usually provided by one to three hospitals per region, while highly specialised services are provided by only one to three hospitals in the country. In addition, some very complex, rare or resource intensive cases are referred for highly specialised hospital services abroad. Examples include fetal surgeries or particle radiotherapy. Outliers are defined based on the length of stay.

Why is it excluded? Highly-specialised hospital services are defined on the basis of three criteria: (1) *Complexity* (in terms of assessment, need for collaboration with other specialties/services, need for emergency preparedness); (2) *Rarity* (in terms of the incidence of disease, or the number of specific diagnostic or therapeutic modalities offered within the respective specialised service); (3) *Costliness* (in terms of their resource consumption, including socioeconomic and economic conditions, staff).¹¹ These criteria are not static. A specialised service may evolve to become more established, commonly known and uncomplicated.

How is it reimbursed? Each region has a pre-payment of 25% of last years' total payment for specific highly-specialised patients to the departments where the functions are undertaken. The total payment for each specific patient will be settled later – e.g. at the end of the year. The treating hospital calculates the costs per treatment/patient using its own local cost data.

Outliers are paid with an additional per diem for each day above the threshold, which is always € 270.5, irrespective of the DRG or the hospital, where the patient is treated.

Figure 2 – Exclusion mechanisms used in Denmark



Dotted lines represent payments outside the DRG-based payment; coloured boxes represent expenditures



2.2. England

Context: The English version of DRGs, HRGs (Healthcare Resource Groups) have been used for hospital payment since 2004. The HRGs cover all inpatient cases except psychiatric, community and ambulance services. Costs of education & research are excluded.

What is excluded? In England multiple mechanisms exist to exclude elements from the DRG-based payment (see Figure 3). 163 HRGs do not have a national tariff (= excluded patient groups). In addition, there are 214 unbundled HRGs (separated high-cost elements, which become an HRG in its own right and can be added to a core HRG). Examples include haemodialysis or palliative care. Most unbundled HRGs have no national tariff (n=146), while the rest has a fixed tariff. In addition, several high-cost drugs, devices and procedures are excluded. Furthermore, the NHS makes top-up payments for specific patients defined based on more than 7 500 diagnosis and/or procedure codes, which are treated by specialized providers (e.g. children's, neuroscience, spinal surgery, orthopaedics departments). Finally, hospitals can be excluded if they have a special arrangement with their Clinical Commissioning Groups (CCG). These 'local variations' have significantly increased over the last years. Currently the NHS does not have information on the number of hospitals working under local contract agreements. Outliers are defined based on HRG specific LOS thresholds.

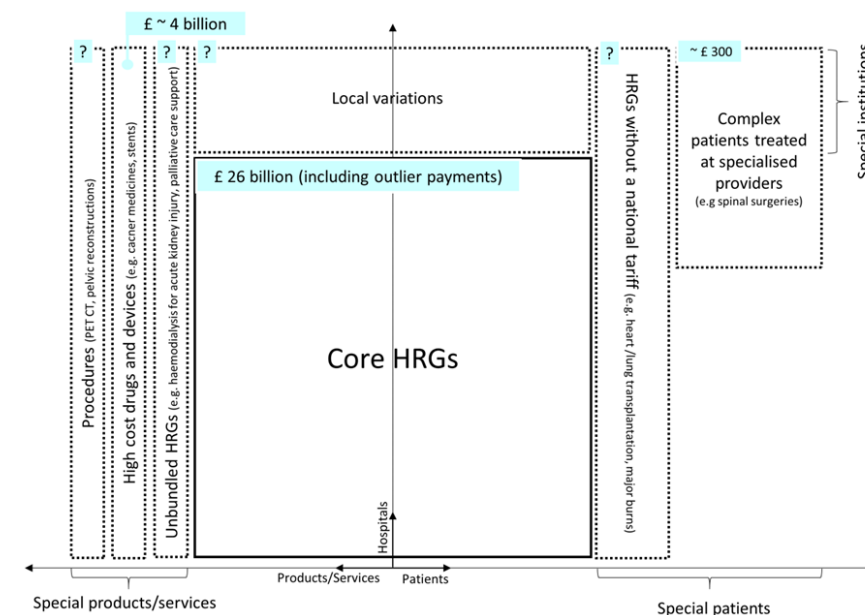
Why is it excluded? The exclusions are based on criteria such as their rarity or their proportion of costs in comparison to the relevant HRG (for excluded products/services). Lists of exclusions are regularly revised by steering groups of the NHS, advised by health providers.¹⁴ Also services eligible for top-up payments are determined by criteria such as number of occurrence, costs or number of providers able to provide the service.

How is it reimbursed? For all components without a national tariff, local tariffs are negotiated between commissioners and providers. The commissioners can define the way of reimbursement and can experiment with it. Therefore, there is a large variation in how local prices are set. In case a non-mandatory price exists (e.g. 33 HRGs have a non-mandatory nationwide tariff), they must be used as an orientation point for local negotiations. Furthermore, HRGs with national tariffs can sometimes be

adjusted to local variations, if they do not adequately compensate providers for their costs because of justified structural, or other local issues.¹⁴ Excluded hospitals are mostly paid on the basis of a global budget (block grant) – but there is no national rule. Top-up payments are awarded as a certain percentage increase of the normal HRG tariff, e.g. for complex paediatric patients treated by designated paediatric departments, the HRG tariff is increased by 64%.

Outlier payments are made in the form of HRG specific per diem payments for each day beyond the HRG specific threshold.

Figure 3 – Exclusion mechanisms used in England



Dotted lines represent payments outside the DRG-based payment; coloured boxes are payments in 2013

2.3. Estonia

Context: In Estonia, 70% of hospital budgets are determined on the basis of DRGs, while 30% are based on FFS payments. DRGs are applied to all inpatient care (except long-term term care like psychiatry) and outpatient-surgery cases. The payments cover all hospital costs except education & research.

What is excluded? In Estonia, relatively few patients, services and hospitals are excluded (see Figure 4), but these exclusions account for a relatively large share of hospital expenditures. Excluded patient groups include mainly patients with chemotherapy sessions. Beside of that, several high-cost drugs, devices and services are excluded. Examples are hearing implants, organ transplants or endovascular stents. Additionally, departments for occupational diseases and tuberculosis departments are excluded. Outliers are defined based on their incurred costs.

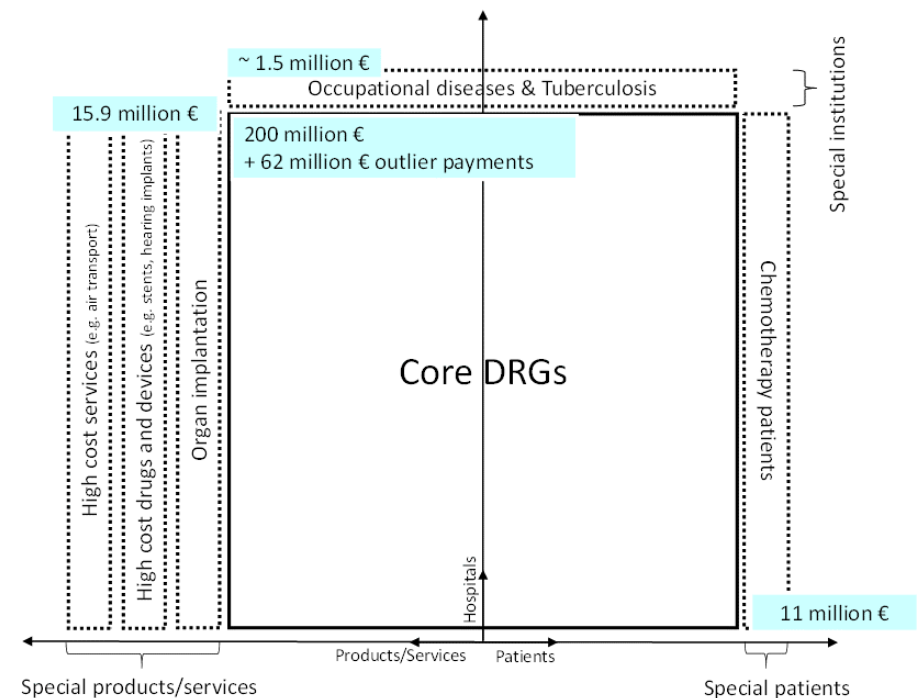
Why is it excluded? Chemotherapy patients were excluded in summer of 2007 because of the large differences in the prices of chemotherapy courses. The decision to exclude a service or product is based on the price, expected usage and the care setting (whether used mostly in ambulatory or in-patient setting). Exclusions are not regularly revised, but medical specialities can make suggestions, which are then analysed by the Estonian Health Insurance Fund (EHIF). The process is the same as for excluded patient groups.

The list of excluded departments was first defined in 2003. Tuberculosis departments were added in 2008, because the treatment requires often a long-lasting care, similar to rehabilitation or psychiatry. However, there are no specific rules set to exclude departments with high-cost variability and it is perceived that certain departments (e.g. tuberculosis) can be removed from the exclusion list.

How is it reimbursed? All excluded items are paid with a combination of per diems and FFS. Per diem payment covers accommodation, examination, consultation, basic drugs, bandages. The size of payment is dependent on the hospital department (but identical for a given department across the country). FFS covers the actual treatment with procedures etc., and is based on historical cost data received from hospitals.

Outliers are paid fee for service and account for approximately 19% of all acute inpatient expenditures.

Figure 4 – Exclusion mechanisms used in Estonia



Dotted lines represent payments outside the DRG-based payment; coloured boxes are payments in 2015



2.4. France

Context: The French DRG system is applied to all inpatient cases except psychiatric services and emergency care. Payments for public hospitals cover all costs linked to a stay including medical fees. Tariffs for private hospitals do not cover medical fees paid to doctors. Public hospitals get additional payments for education, research activities, activities of general public interest (*Missions d'intérêt général et d'aide à la contractualisation* (MIGAC)) and some investments contracted with the Regional Health Agencies. In 2010 56% of total hospital expenditures were covered by the DRG-based payment.⁸

What is excluded? In France, no patient groups are excluded from the DRG-based (called '*Groupes Homogènes de Malades*' or GHMs) payment system (see Figure 5). However, there is a relatively broad range of excluded services as hospitals receive additional payments for dialysis,¹⁵ and ten other services, such as intensive care or radiotherapy if certain patient-level conditions are met. In addition, a long list of high-cost drugs and devices are also excluded (n=3 649, including different doses). The acquisition and management of organs is also separately reimbursed. Furthermore, almost 10% of all acute care hospitals are excluded from the DRG-based payment system.¹⁶ Most of them are small 'local' hospitals, representing less than 1% of all patients treated.^{17, 18}

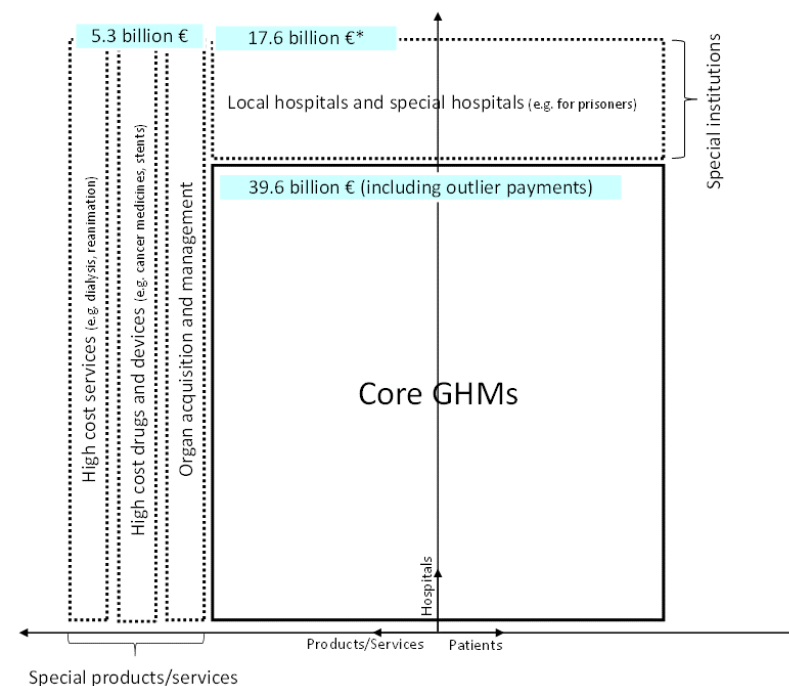
Outliers are defined based on their incurred LOS.

Why is it excluded? The list of excluded services/products is updated regularly by a decree of the Minister in charge of health and on recommendations of the Hospitalization Council. Expensive drugs and medical devices are identified from the medicalized information system programme and excluded based on criteria such as the frequency of prescription (for pharmaceuticals) or the costs of a device in relation to the DRG-tariff. The idea is to exclude expensive services that are not provided to all patients within a DRG. The list of excluded hospitals is updated – amongst others – based on the criteria of number of patients treated (<5 500) and rurality (population density <150/km²). The idea is to assure local access to basic hospital care (for medical and social reasons) in rural and deprived areas.

How is it reimbursed? The dialysis services are paid per session. Other excluded services are reimbursed with per diems (lower for private hospitals). Furthermore, block grants for the coordination and management of transplantations are provided. High-cost drugs and devices are paid separately with nation-wide prices on top of a DRG tariff. Excluded hospitals are paid by a mixture of block grants (based on historic costs), regional characteristics and activity produced.

For outliers, hospitals invoice the price of the DRG plus a per diem (which is equal to 75% of the average daily price of the concerned DRG).

Figure 5 – Exclusion mechanisms used in France



2.5. Germany

Context: Almost all acute inpatient cases are reimbursed with DRG-based payments. They cover all operating costs. Investing and maintaining infrastructure as well as research & education is financed separately.

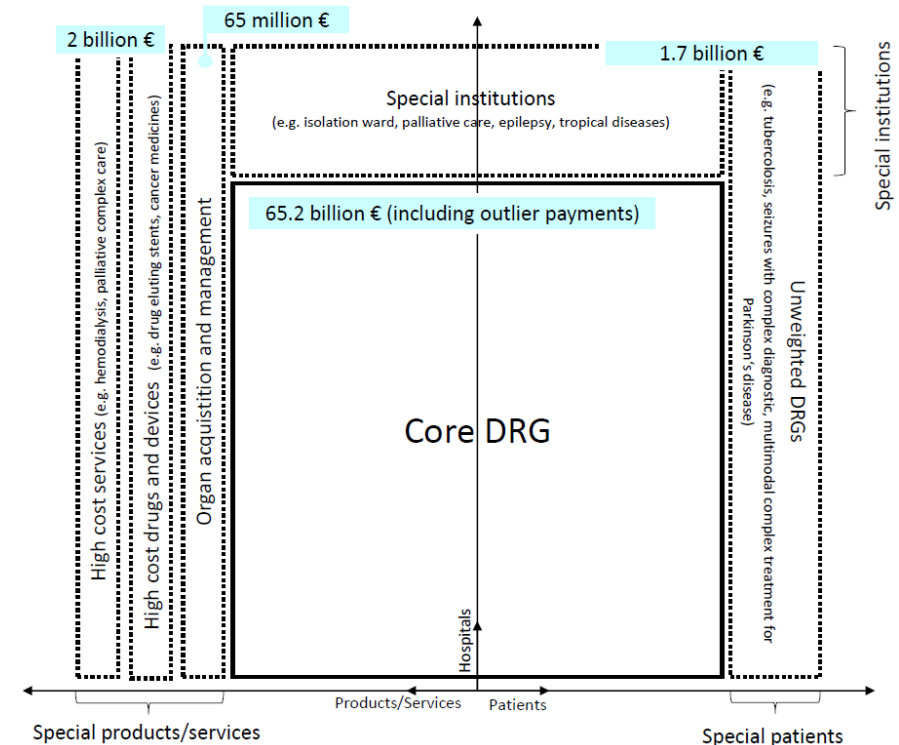
What is excluded? In Germany, all exclusion mechanisms are applied (see Figure 6). The German DRG system defines 45 DRGs (in 13 major diagnostic categories) without a national cost-weight, for example bone marrow transplant patients and tuberculosis patients. Furthermore 191 products/services, including 96 pharmaceuticals, are excluded, which accounted for 2.3 billion € in 2014. Examples are haemodialysis services or cancer drugs. It is also possible to exclude a broad scope of hospitals or hospital departments, which are classified as 'special institutions' (for example departments for epilepsy, tropical disease). Outliers are defined based on their incurred LOS.

Why is it excluded? The lists of excluded patient groups are regularly revised by the institution responsible for the DRG system (InEK) based on criteria such as the number of cases and/or the homogeneity of DRGs. No explicit thresholds for the exclusion of services/products is used (e.g. minimum number of cases needed to build a DRG or thresholds for variance of LOS).¹⁹ The term 'special institutions' is defined by an agreement between the public and private insurers and the German Hospital Federation (DKG).²⁰ This agreement is renewed every year.

How is it reimbursed? Excluded services/products are paid with a fee for service. For most services/products, there is a nation-wide price. However, for certain services, the InEK is unable to calculate a nationwide price (because of insufficient homogeneity of data) and prices are negotiated at the hospital level. The management (including transportation and removal) of organ-transplantations is paid by the institution responsible for organ transplantation (DSO). Each year, the DSO negotiates with providers and insurers fee for services for organ acquisitions and management.²¹ Prices for unweighted DRGs are negotiated at individual hospital-level. Excluded hospitals/departments are reimbursed either based on a negotiated payment per case or based on negotiated per diem payments.

Payments for patients defined as outliers are added/deducted with per diems (defined in the DRG catalogue).

Figure 6 – Exclusion mechanisms used in Germany



Dotted lines represent payments outside the DRG-based payment; coloured boxes are payments in 2015



2.6. USA – Medicare Part A

Context: Health care in the USA is financed by a mixed system of private and public insurance. The Medicare program accounts for about 30 percent of payments to acute care hospitals for inpatient care. It reimburses almost all acute inpatient care and covers all costs, except physician fees and education & research payments.

What is excluded? In the USA, there are relatively few exceptions from DRG-based payments but this is somewhat compensated by FFS-based outlier payments and the separate reimbursement of physicians on the basis of FFS. The most important exception from DRG-based payment is the exclusion of local hospitals/departments and of cancer-hospitals/departments (n=11) (Figure 7). Children's hospitals are also reimbursed separately (n=60). In addition, 1 300 small, rural hospitals are exempt from the system. These hospitals are part of the Critical Access Hospital Program (CAH). The only excluded service is the 'organ acquisition of transplant cases'.²²

The Centers for Medicare and Medicaid Services (CMS), which administers the DRG system, has so far resisted to exclude services/products such as sole-source products under patent (e.g. pharmaceuticals). Furthermore, the USA defines their outliers based on the incurred costs.

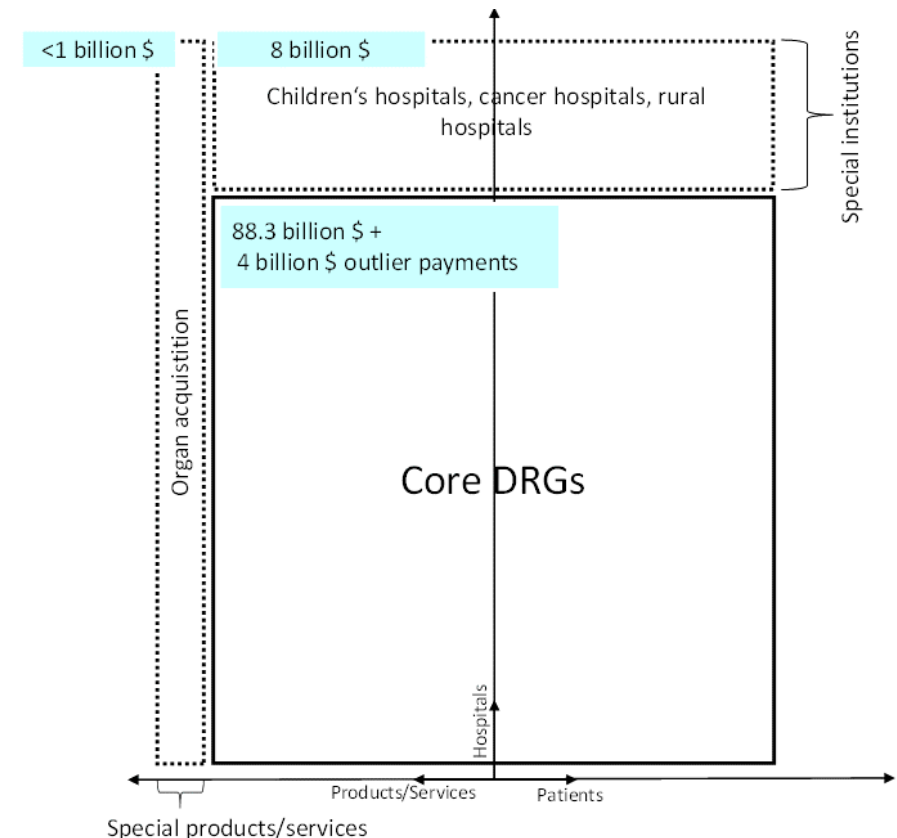
Why is it excluded? Children's hospitals are excluded because of the nature of the Medicare insurance scheme (insurance covers people who are age 65 or under 65 and disabled). Cancer hospitals are excluded because it is perceived that they have different patterns of care and higher costs than other acute care hospitals treating the same kinds of patients. Small, rural hospitals are excluded from the DRG-based payment system, because low-volume hospitals cannot bear the financial risk of cost variation within DRGs.

How is it reimbursed? Medicare pays excluded hospitals for inpatient care on the basis of their Medicare allowable incurred costs. 'Organ acquisition of transplant cases', is reimbursed based on each centre's incurred costs, only at certified, transplant centres.

For outliers, Medicare pays the hospital its full payment amount for the DRG plus 80 percent of its estimated costs above the cost threshold. A hospital's

outlier cost threshold for any DRG equals its full DRG payment plus the input price adjusted fixed-loss amount for its local market (set each year by CMS).

Figure 7 – Exclusion mechanisms used in the USA Medicare Part A



Dotted lines represent payments outside the DRG-based payment; coloured boxes are payments in 2015



3. HOSPITAL PAYMENT METHODS IN BELGIUM FOR COMPLEX OR DIFFICULT TO STANDARDISE CARE

3.1. Reducing variability under DRG-based hospital payment

Section 2 has shown that countries use different approaches that exclude certain elements from DRG-based hospital payment. These exclusion mechanisms contribute to assuring fair DRG-based hospital payment by reducing variability of costs of patients classified into DRGs. However, while these mechanisms are important, DRG-based hospital payment systems in all countries rely on a larger set of mechanisms that address the problem of variability of costs of care. These mechanisms can be clustered into three groups (see Table 4). In section 3.2 we discuss whether and how these mechanisms are applied in Belgium.

Changes to and regular updates of the DRG system

The first group of mechanisms concerns the backbone of all DRG-based hospital payment systems, i.e. the DRG system that classifies patients into groups. Almost all countries with DRG-based hospital payment systems have a process that regularly updates the DRG system. The aim of this process is to improve homogeneity (and reduce variability) of costs of care of patients within a DRG, which can be achieved by (1) splitting existing DRGs into several levels of severity, (2) reassigning patients with high/lower costs than average to other DRGs, or (3) creating new DRGs for patients with similar clinical characteristics and similar costs. In [KCE Report 207](#)⁸ a detailed description of system updates can be found for England, France, Germany and the USA (Medicare) and in the Euro-DRG report for Estonia and Denmark⁴.

Mechanisms at the margin of the DRG-based payment system

The second group of mechanisms operates at the margin of DRG-based hospital payment and includes three types of payments. The first group are the outlier payments, which retrospectively adjust hospital payments for the higher/lower costs of care of individual patients, i.e. patients whose costs could not be predicted based on their clinical characteristics (e.g. diagnoses and procedures). As shown in section 2, outlier payments are defined either based on individual patients' LOS or their costs, and they compensate hospitals for the higher costs/length of stay of individual patients. Secondly, England, Estonia, France, and Germany have additional FFS or per diem payments for certain services that are relevant for patients classified into many different DRGs but that are not needed by all patients within a DRG. Finally, for some patient groups it is difficult to reliably calculate average costs because of various reasons (low numbers, lack of standardised care pathways etc.). England and Germany define DRGs for these patient groups but they do not calculate cost weights, and allow local negotiations to enable fair reimbursement.

Mechanisms outside the DRG-based payment system

The third group of mechanisms operates outside of DRG-based hospital payment systems. This includes additional payments for specific services that are provided only by a few hospitals, making it difficult to calculate average costs of these services. Furthermore, provider level budgets exist in many countries for certain specified services, e.g. management of organ acquisition and distribution or major burns, which have high structural fixed costs that are independent from the number of services provided. Finally, Denmark has a system where provider costs are reimbursed for a limited set of conditions, and only if patients are treated by designated providers.



Table 4 – Mechanisms aiming to reduce variability under DRG-based hospital payment

Relationship to DRG-based payment system	Mechanisms
Within the DRG system	Split DRG
	Assign cases to other DRGs
	Create new DRGs
At the margin of DRG-based payment system	Outlier payments (FFS or per diems)
	Additional payments with fixed prices (FFS or per diems)
	DRGs with negotiated prices
Outside DRG-based payment system	Additional payments with negotiated prices
	Separate provider level budgets
	Reimbursement of provider costs

3.2. How are Belgian hospitals paid for stays with a large variability in the care process?

Also in the current Belgian hospital payment system hospitals receive extra payments for care that can be considered difficult to standardise, complex, high-cost or rare. However, it is difficult to find out the underlying criteria, such as complexity or variability in resource use, for (some of) these extra payments. The overview of exclusion mechanisms and corresponding payments in the six countries described in section 2 revealed that also abroad these extra payments are not always based on variability in the care process or on complexity.

We first give a brief overview of hospital revenue sources in the current payment system. In section 3.2 payment adjustments related to complexity, high-costs elements or specific services are described.

3.2.1. Hospital revenue sources

The main financing sources for Belgian hospital care are:²³

- A **hospital budget** (the Budget of Financial Means, BFM) covering costs partly linked to activity volume (nursing and care staff, administration, maintenance, laundry, legal obligations for quality and safety of care, operational cost of pharmacy, etc.). The distribution of the closed-ended national hospital budget to the individual hospitals is based on a multifaceted calculation with a specific calculation method and determining parameters for each budget component. The main mechanism to allocate the closed-ended macro budget to hospitals is DRG-based (see section 3.2.2).
- **Physician fees** are partially ceded to the hospital to pay for (part of) the costs directly or indirectly linked to the provision of medical activities. These include costs of nursing, paramedical, caring, technical, administrative, maintenance or other supportive staff but also the costs related to the use of rooms, costs of purchasing, renovation and maintenance of equipment and costs of materials not (sufficiently) included in the BFM.
- **Pharmaceutical products** are partly reimbursed on a product-by-product basis and partly by a pathology-related lump sum per stay.
- **Lump sum payments for conventions** are paid by the National Institute for Health and Disability Insurance (RIZIV – INAMI) for specific medical sectors.
- **Day-care activities** are financed through lump sums (both hospital-dependent and hospital-independent). Payments for day-care surgery are included in the BFM.

The hospital budget and the (ceded) physician fees are the largest revenue sources, representing 37.7% and 41.6% respectively of total hospital revenue.²⁴

The three groups of mechanisms mentioned in section 3.1 are to a certain extent present in the Belgian hospital payment system. However, although variation in the care process or in resource use caused by complexity, high-cost elements, etc. is (partly) captured by variation in payment sources and



payment rates in the current hospital payment system in Belgium, shortcomings will be illustrated by some examples. For ease of writing, we will use 'adjustments for complex care' to refer to adjustments for difficult to standardise, complex, high-cost or rare care, unless the context requires otherwise.

As mentioned above is the evaluation if and to what extent the physician fees take into account the variability in the care process out of scope of the current report. The results of the ULB-study (commissioned by the minister of Public Health), that aims to divide physician fees in a part that covers the costs for infrastructure, staff and equipment and a part that can be considered as the 'professional fee', can give important insights in this respect. Of course, since physician fees are paid on a fee-for-service basis, payments are in line with the variable nature of services rendered. Hence, since part of the fees are ceded to the hospital, variability in the care process (of complexity) is partly captured by the physician fees.

3.2.2. Adjustments to the DRG system: B2-points are weighted

Justified activities are the cornerstone of the Belgian DRG-based budget allocation system

In Belgium there is no DRG-based case payment as in the six selected countries, but a DRG-based budget allocation. The classification system is the All Patient Refined DRGs or APR-DRG system, which extends the basic DRG structure by adding subclasses to each base APR-DRG based on severity of illness (SOI). The APR-DRG and SOI categories are, in the Belgian payment system, further divided by age categories (i.e. <75 years; 75 years and above). The current system (2018) has 1 258 APR-DRGs: 314 APR-DRGs each with four SOI-levels and two APR-DRGs without SOI-levels.

A large part (part B2, representing about 40% of the total budget) of the national hospital budget is allocated to individual hospitals (mainly) on the basis of the national average length of stay per APR-DRG/SOI. B2 mainly covers clinical services of nursing staff and the most common medical products. The basic concept in this DRG-based budget allocation is called 'justified activities'. It should, however, not be confused with justified as reflecting evidence-based practice; it only reflects average activity. The

number of justified patient-days for a hospital is the result of multiplying the national average LOS per pathology group with the case-mix of the hospital (and adding justified days for outliers, see 3.2.3). Per department or group of departments, the number of justified patient-days is divided by the 'normative occupancy rate' of the service (in general 80%) to calculate the number of justified beds.

Adjustments to the basic DRG system by weighing the justified beds for department type

The national closed-end budget for B2 is allocated to individual hospitals by dividing the national hospital budget by the total number of B2-points 'earned' by all hospitals. This gives the monetary value of one B2-point. The **basic points** are granted to finance nurse staffing (see Figure 8), based on the number of justified beds, generally one point per justified bed but up to 3.75 points for maternal intensive care and up to 6.25 points for neonatal intensive care beds. The difference in the number of points per department type can be explained by different staffing norms in the respective departments.

This payment mechanism, with points weighted for department type, is similar to a DRG case-based system with DRG tariffs and cost weights. In the Belgian system, however, the weights in the budget allocation mainly depend on the average LOS per APR-DRG/SOI (and standard times per surgical intervention for the surgical APR-DRGs, see section 3.2.3: additional points for operating theatres). While systems abroad are set up to deal with variability in costs, this is, with the current payment system, not possible in Belgium. Therefore, other compensating mechanisms such as the system of supplementary points (see section 3.2.3) and separate payments for departments such as intensive care (see section 3.2.3) are set up. As a result, the Belgian system is much more complex, fragmented and less transparent than DRG-based payment systems abroad.⁷



3.2.3. *Adjustments at the margin of DRG-based hospital payment: outlier payments, supplementary points and payments for services relevant for several DRGs*

Although the basic points which are based on the LOS per APR-DRG/SOI are the main driver of the Belgian hospital payment system, several mechanisms at the margin of the DRG system exist.

Outlier payments and residual groups

The principle of the Belgian outlier system is that the DRG-weight of a specific hospital stay (when classified as outlier) is closer linked to the actual LOS than to the average LOS per APR-DRG. There are two types of outliers in the system of 'justified activities'. In case of **short-stay outliers** only the actual number of patient-days is counted. Short-stay outliers are defined as stays with a $LOS \leq EXP (lnQ1 - 2 \times (lnQ3 - lnQ1))$, Q1 and Q3 being percentiles 25 and 75 of the national LOS for the concerning pathology group. This lower bound should in any case be at least three days shorter than the average LOS for the pathology group.

In case of large outliers (largely exceeding national average lengths of stay) two types of outliers are defined:

- Large outlier type 1: $LOS > Q3 + 4 \times (Q3 - Q1)$
- Large outlier type 2: $Q3 + 2 \times (Q3 - Q1) < LOS < Q3 + 4 \times (Q3 - Q1)$

For large outliers type 1, all actual patient-days are considered 'justified'. For large outliers type 2, the number of justified patient-days equals the national average LOS plus actual patient days *beyond* $Q3 + 2 \times (Q3 - Q1)$. For these outliers there is thus a gap that is not taken into account for payment, i.e. the distance between national average LOS and $Q3 + 2 \times (Q3 - Q1)$.

In the 2014 registration of the Minimal Hospital Data ('*Minimale Ziekenhuis Gegevens*' (MZG) – '*Résumé Hospitalier Minimum*' (RHM)) outlier days represented 6.7% of the total number of justified days.

Outliers are also defined for the calculation of the lump sum per stay for pharmaceutical specialties. They are calculated as stays with a $LOS > Q3 + 2 \times (Q3 - Q1)$ and paid on a product by product basis at public price level (list price).

In addition to outliers, some APR-DRGs are excluded from the calculation of justified activity. These residual groups are defined as APR-DRGs with less than 30 stays at the national level; stays without a valid principal diagnosis or with the procedure unrelated to the principal diagnosis; stays where the patient died within three days, etc. These residual groups represented 9.1% of the total number of justified days in 2014. These exclusions have a specific definition of justified length of stay and payment rule, which is often based on the actual length of stay.

Additional points for services besides the DRG-based calculation of 'justified activities'

Additional points are granted for **operating theatres** on the basis of a standardized operating time for a set of some 2 100 surgical interventions. The standardized operating time reflects the need for nursing resources and not the duration of the intervention itself. The standardized operating time determines the number of theatres and per operating theatre 7.5 points are allocated. Hospitals receive extra payments for a permanent operating theatre with a maximum of two permanent operating theatres per hospital.⁷

A closed-end budget (part of B2) is allocated to Belgian hospitals to pay for their nursing and caring staff in the **emergency department (ED)**.²⁵ Allocation rules changed in July 2013 and have been gradually implemented since then (40% new system/60% old system since July 2015). The basic part of the old payment system was based on the number of justified beds per hospital. As such, larger hospitals (with a correction for case-mix differences) received in general larger budgets for their ED. Supplementary points depended on the amount of supplementary fees for activities performed in the last two years during the night, weekend and bank holidays for hospitalised patients. Hospitals were classified in deciles based on the values of these supplementary fees per occupied bed and the basic points were multiplied by a decile-specific factor ranging from 1 for deciles 1 to 3 to a factor of 2 for hospitals in decile 10. In the new method, the share of B2-points for each hospital depends on the number of 'ED units' ('*Unit spoedgevallen*'/'*Unité d'urgence*') it 'collects'. Hospitals receive 1 ED unit for each patient admitted via the ED, irrespective of the disposition decision (admission or discharge), but for several patient groups (according to age, pathology, time of arrival or transfer to an intensive care unit) supplementary



ED units are awarded. A minimum of 15 points is guaranteed for all hospitals with an ED but there are exceptions related to the location of the ED.

Medical products are also financed through points, based on the number of justified beds and their weight (the number of points per bed depends on the department but can be up to 8.11 points for neonatal intensive care beds). Hence, the size of the hospital (corrected for case-mix) determines the budget available for medical products.

Supplementary points to compensate hospitals with a higher medical activity turnover or nursing profile

On top of the basic and additional points, supplementary points are distributed to adjust nurse staffing to the intensity of care (see Figure 8). About 10% of part B2 and hence 4% of the total hospital budget is dedicated to finance more severe pathology, and heavier nursing profiles, through the calculation of these supplementary points. The percentage of supplementary points is distributed as follows over the three systems: 11% for medical activity turnover; 35% for nursing profile; 54% for intensive care. While in most international payment systems these mechanisms are case-based, in Belgium they are largely hospital-based. In other words, in contrast with systems abroad, in Belgium hospitals do not always get compensation when they treat cases with a large variability in the care process. The compensation is only allocated to hospitals when their profile is more 'variable' compared to other hospitals.

These supplementary points are based on the medical activity volume and the nursing profile. For surgery, internal medicine and paediatrics units, hospitals get supplementary points according to their relative position among all hospitals in terms of **medical activity turnover**. Hospitals are ranked according to profile based on surgical and medical interventions in the respective units. Next, hospitals are divided in deciles (groups of 10% of hospitals) in accordance with their ranking and points are allocated. The number of supplementary points per justified bed that can be allocated varies from 0 points for deciles 1 to 3 up to 0.34 points for the highest decile for surgery and internal medicine or to 0.38 points for paediatrics. Hence, for hospitals in the highest decile the concerned subpart of this B2-budget is raised by an amount ranging from 34% to 38%.

Simultaneously, hospitals are ranked according to their **nursing profile** (nursing activity and nursing related groups, NRGs) and again either financed per decile, or financed for the share of patient days with an NRG-weight above national median NRG-weight per patient day. Hence, the correction for nursing care is performed independently from the DRG system.

In most international payment systems this additional payment is calculated per case: for each patient that corresponds with the criteria of 'high variability' an extra amount is paid. In Belgium, this extra amount, until recently, was only paid at the level of the hospital. As a consequence, Belgian hospitals did not always receive an additional payment even if they treated cases with high variability. The additional payment was only attributed to the hospitals when their 'general profile' was more variable compared to other hospitals. This is still largely the case with the exception of the 'nursing related groups' (NRGs) introduced in the hospital payment system since 2014. Under the NRG payment rules hospitals receive a budget for patient days for which the NRG-weight is higher than the national median NRG weight.

Nursing related groups (NRGs)

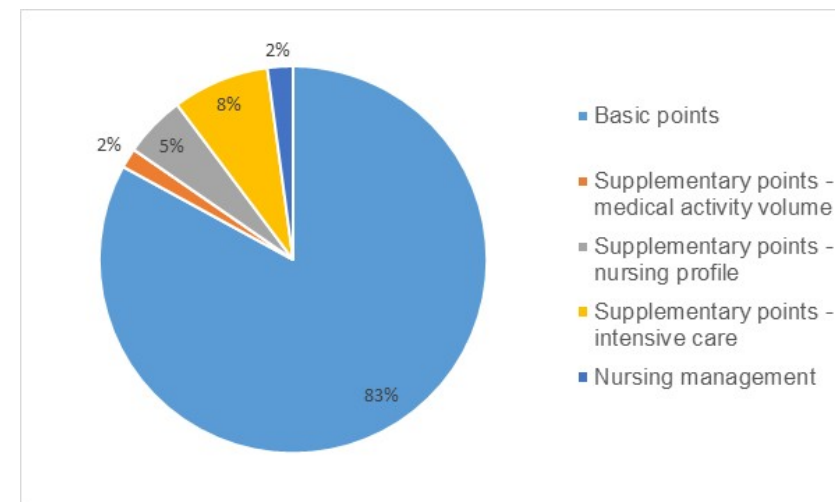
The NRGs are calculated based on items that measure the nursing activities, called the 'nursing data in the hospital discharge dataset' (VG-MZG). NRGs are a classification system used to assign the patient care delivered at a specific moment in time (nursing care episode) to a specific predefined nursing care profile (NRG). Each NRG has a weight, based on the required staffing levels. As such, NRG-categories classify a number of 'nursing care episodes' with a similar clinical profile into a same category, resulting in a weighting of nursing care episodes (NRG-points). The NRG points per patient day (can be a sum of different nursing care episodes) are used in the payment system to take into account differences in intensity of nursing care between hospitals. Supplementary B2-points are assigned based on the share of patient days with a higher NRG weight than the median national weight per patient day. This is done for three groups: surgery/internal medicine, paediatrics and intensive care.²⁶



In addition, supplementary points are attributed to pay for intensive care beds in surgery (C), internal medicine (D) and paediatrics (E) units, which require higher staffing levels. More specifically, the number of **intensive care** beds is calculated as a percentage of the number of C, D and E beds. Three criteria are taken into account: a selected list of resuscitation interventions, the percentage of inpatient days in an intensive care unit standardized per APR-DRG (Nperciz; national percentage of intensive care per APR-DRG) and intensive nursing profiles throughout the hospital whether patient care is taken up in intensive care units or not. The minimum share of intensive care beds in C, D and E units equals 2%, the maximum share is 10.5% of justified beds in these units.

Obviously, a relatively small part of the BFM at a national level, aimed at financing complex care, is based on a very elaborate set of calculations. Moreover, the resulting budgets, allocated to each hospital, depend on the activities of all other hospitals, which make them difficult to anticipate. Still, these mechanisms can induce important differences on the level of the budgets of individual hospitals depending on their degree of complexity of care. For example, for the supplementary points based on activity volume in surgery and internal medicine, 30% of hospitals (deciles 1 to 3) do not receive any supplementary funding from the closed-ended B2 budget, except when they end up in a higher decile for the supplementary points based on the nursing profile.

Figure 8 – Share of basic and supplementary points in total points for nursing units



Exclusion of high-cost/new/specific pharmaceutical products

Internationally pharmaceuticals are, in general, part of the case-based payment system but exceptions exist. High-cost drugs and/or chemotherapy drugs are unbundled elements of the **English** HRG system. They are locally priced. For high-cost devices in England, a national supply chain negotiates prices with suppliers and directly bills to NHS England. The care provider does not have to pay for the device. In **Germany**, some unbundled drugs and devices have a national price, some have not. For unbundled services with no national fee, prices are locally negotiated. In **France**, hospitals receive fixed prices for drugs and devices if they adhere to 'best practice' guidelines via 'good-use contracts'. In **Estonia** a series of specific products have a separate code with a price based on historical costs.

In Belgium pharmaceuticals are not included in the main DRG-based payment system of 'basic points'. Yet, a lump sum system exists which is DRG-based. As in the studied countries, not all pharmaceuticals are included in the lump sum. An elaborate list of more than 300 ATC-codes which are considered as 'special', 'new' or 'high-cost' exists. For these



products that are kept outside the lump sum hospitals can bill per used product.

The payment system for medical devices is very complicated. A distinction is made between invasive and non-invasive devices. We refer to Figure 5 in the synthesis of [KCE report 297](#) for a detailed overview of the different payment options.²⁷

Other mechanisms

While the above described mechanisms are the main ones, other mechanisms exist to compensate hospitals with a different patient profile.

B5-part of the BFM for operational costs of the hospital pharmacy

The major part of BFM part B5 (66%) is distributed on the basis of the volume of pharmacy activity (annual pharmaceutical products turnover and number and type of beds). The remaining part (34%) takes into account the number of burdensome interventions defined as major surgery, resuscitation and interventional radiology.

B8-part of the BFM for patients with a low socioeconomic status

Since 2002, Belgian hospitals receive extra payments (B8) for patients with a low socioeconomic status to compensate for the extra costs they generate. These extra costs result, among others things, from a more extensive use of the social services of the hospital and a longer LOS because of lack of support at home. These patients are so-called non-medical or social outliers.

Day-care activities

Day-care activities are financed through various lump sums per patient, which can be hospital-dependent (related to the B2 per diem price) or hospital-independent. This open-ended payment mechanism contrasts with the BFM which is a closed-ended budget.

- Group 1 to 7 lump sums: fixed (hence non-hospital specific) lump sums, which can be charged for 7 nominative lists of procedures (identified by nomenclature codes);

- Maxi lump sum: a hospital specific (hence variable) lump sum, with a minimum of €25, which can be charged for medical and nursing surveillance for any procedure needing a general anaesthesia supervised by an anaesthetist (or for the administration of specific chemotherapeutic agents);
- 3 lump sums for chronic pain;²⁸
- Hospital haemodialysis: a lump sum and a fee per session.²⁹

3.2.4. *Payment methods outside of DRG-based hospital payment*

The Belgian hospital payment system also has payment mechanisms outside the DRG-based payment mechanism that are reserved for specific departments, hospitals or services. These mechanisms include the system of conventions, specific items in the B4-part of the hospital budget, the B7-part for university hospitals and payments for major medical equipment. Other parts of the BFM are not described because they are not limited to specific departments, hospitals or services.

Conventions

Conventions are agreements between the National Institute for Health and Disability Insurance (RIZIV – INAMI) and (mostly) hospitals. These agreements define at least partly the activities of the centres and their payment, a lump sum amount per period (day, month, year) and/or per patient. In general, conventions are used to pay for multidisciplinary care activities for specific patient groups. The payment mainly covers nursing and paramedical care (e.g. nutritionists, social workers, physical therapists), otherwise not covered by the fee-for-service system.

For complex conditions, the number of centres is limited, e.g. 3 centres for haemophilia, 6 for paediatric nephrology, 7 for neuromuscular disorders, 7 for Cystic fibrosis. For certain other conditions there are many centres, e.g. 42 centres for cardiac rehabilitation and 102 for diabetes self-management. The conditions involved in conventions can be classified in the following groups:

- Respiratory diseases: respiratory rehabilitation, respiration support, oxygen therapy at home and cardiorespiratory monitoring of babies



- Conditions of the blood and immune system: haemophilia, AIDS
- Chronic fatigue syndrome
- Endocrine and metabolic conditions: diabetes, rare monogenetic metabolic diseases, cystic fibrosis
- Cardiac conditions
- Mental and neurological disorders: refractive epilepsy, mental disorders in adults (schizophrenia, anxiety disorder, autism,...), mental disorders in children, hearing-, voice-, and speech disorders, dementia-memory clinics.
- Musculoskeletal and neurological diseases and congenital disorders: neuro-musculoskeletal diseases, cerebral palsy, spina bifida
- Paediatric diseases: paediatric nephrology, morbid obesity, consequences of maltreatment of children and adolescents
- Sensory disorders: visual disorders, hearing disorders

Centres for severe burns

Centres for severe burns are paid with a fixed lump sum per bed within the B2-part of the BFM. In 2017 the lump sum was equal to €259 537 per bed per year. This is roughly about twice the average amount a general hospital is paid for a normally occupied bed, which can be explained by higher staffing levels.^a In Belgium six centres are eligible for this payment: three in Flanders, two in Wallonia and one in Brussels. Burn centres are not part of the basic B2-points calculation. Separate calculations also exist for chronic care (S-beds) and psychiatric beds.

^a In 2017 the median per diem amounted to about €400: 365 days x 80% (bed occupancy rate) x €400 = €116 800 per bed per year.

B4-part of the BFM for specific services

Part B4 of the hospital budget for acute hospitals represents 14% of total budget (2017). While originally the B4-part only contained one item to compensate hospitals for revenue losses as a result of bed closure, nowadays it contains more than 50 different items. Many of these items include budgets reserved for specific departments (e.g. coordinator of burn units, additional paramedical staff for hospitals with designated breast cancer clinics or paediatric oncology). Another example is the amount of €12 995 (value 2017) awarded per occupied bed per year to cover additional staffing needs for the care of comatose patients.

B7-part of the BFM for university hospitals

University hospitals receive separate payments for research, education and training but not for patient care. The rules to pay for patient care are the same for university and non-university hospitals. Hence, every hospital, whether university hospital or not, is entitled to the same B2-part of the per diem price^b for the same patient and service profile. The higher per diem B2-price for the university hospitals compared to (most of) the non-university hospitals is due to the type of patients they treat or services they offer. On average, university hospitals treat more patients with more severe pathology and have a more extensive and broader supply of often expensive services such as intensive care beds, neonatal intensive care services, maternal intensive care, haematology, a radiotherapy department, a Positron Emission Tomography (PET)-camera, national cancer plan projects, fertility clinics or expensive infrastructure.⁷

Part B7 is a closed budget for the seven university hospitals and for non-university hospitals that receive payments for the development, evaluation and implementation of new medical technologies and/or the training of residents (called non-university hospitals with university beds; five in 2017). The budget consists of several components of which mainly the first component is related to complex care: before 2002 (introduction of new hospital payment method) basic points as calculated in part B2 for several

^b Since 2002, the BFM has replaced the per diem price as the 'unit' of hospital payments. However, a per diem price or 100% price is still calculated.



departments were higher for university hospitals because of extra nurse staffing. Since 2002, no distinction in basic points is made between university and non-university hospitals but university hospitals receive an extra amount to compensate for the difference in calculation method. This amount is taken up by B7A for the university hospitals and by B7B for the five non-university hospitals with university beds. In addition, some other non-university hospitals with university beds receive additional budget for extra nurse staffing in the B4-part of the hospital budget.

Although complex patient care in university hospitals can receive cross-subsidization from other components of B7 that are meant to pay for research and training, research and training can also be a cause of variability in patient care. In theory, it would be possible to specifically identify those costs of university hospitals that are related to research, teaching and education, as well as to the capital costs and other structural requirements of ensuring availability of highly specialised services. However, in practice, this is much more difficult, as teaching and research activities are often closely related to patient care, and structural costs can be difficult to disentangle from service provision costs.⁷

Major medical equipment

Immovable assets for magnetic resonance imaging (MRI), radiotherapy and positron emission tomography (PET)-scan are paid for by the subpart A3 through fixed yearly lump sums.³⁰ The number of licensed radiotherapy devices depends on the number and type of acts conducted two years before. In 2016, this A3 budget has been transferred from the federal state to the federated authorities, which have the authority to determine other amounts or payments methods.

Operational costs of this heavy equipment (maintenance, consumables, nursing, technical and administrative staff) are covered by subpart B3. Whereas MRI has become a mainstream medical tool for diagnosis and (surgical) treatment, PET scanners and radiotherapy are most often used in diagnosis and treatment of complex pathologies. Equipment for radiotherapy is only present in a selected number of hospitals: 24 licensed centres and 13 additional satellite sites (belonging to 9 of the 24 licensed centres).

4. PAYMENT MECHANISMS FOR PARTICULAR AREAS OF CARE

When considering the implications of international payment approaches for the Belgian context, it is useful to look at specific areas of care, and at the elements that are excluded from DRG-based payment within these areas. Table 5 gives an (non-exhaustive) overview of how the analysed countries deal with highly variable, complex and rare care. In some care areas, e.g. organ transplantations, at least organ acquisition and management are excluded from *all* DRG systems. However, countries differ in the way they exclude and pay for these elements. Many other elements are excluded from *most* of the DRG systems, e.g. cancer treatments, specialised paediatric services, dialysis services or diagnostic imaging services/radiotherapy. And yet other elements are only excluded from *few* DRG systems, e.g. intensive care or severe burns.

As was mentioned in Table 2 the exclusion of a patient group is triggered by a diagnosis whereas the exclusion of a service/product is triggered by a procedure. Given the different and complex hospital payment system in Belgium, no examples for Belgium were added in Table 5 but in sections 4.1 to 4.8 the main exclusion mechanisms and corresponding payment methods for the respective care areas are described.



Table 5 – International comparison of exclusion mechanisms used for certain types of care

Care area	What is excluded?*			
	Patient groups	Services/Products	Hospitals/Departments	Other
Cancer treatment	England (bone marrow transplantation) Estonia (chemotherapy) Germany (bone marrow transplantation)	England, France, Germany (cancer drugs)	USA (certain cancer hospitals)	Denmark (e.g. kidney cancer treatment)
Specialised paediatrics	Germany (neuro-paediatrics)	France (e.g. paediatric intensive care) Germany (neuro-paediatric diagnostics)	Germany (e.g. child-rheumatology) USA (60 children hospitals)	Denmark (e.g. paediatric intensive care) England (top up payments for several specialized services)
Severe burns	England, Germany (major burns)		Germany (major burns)	Denmark (major burns)
Neurological diseases (e.g. multiple sclerosis, epilepsy)	Germany (e.g. multimodal, complex treatment against Parkinson)	Estonia (biologic therapy for multiple sclerosis)	Germany (e.g. multiple sclerosis)	Denmark England (top-up payments for neuroscientific services)
Intensive care		England (e.g. neonatal intensive care) France (e.g. intensive care)		Denmark (e.g. intensive care for children)
Dialysis	England (e.g. hospital haemodialysis or filtration)	France, Germany (dialysis)		Denmark (e.g. peritoneal dialysis) England (top-up payment for insertion and the removal of peritoneal dialysis catheter for children)
Transplantation	England (transplantations)	Estonia (transplantations) Germany, France (only organ acquisition and management)	USA (transplantation centres for organ acquisition and management)	Denmark (transplantations)
Radiotherapy		England (e.g. radiotherapy) Estonia (brachytherapy) France (radiotherapy)		Denmark (e.g. particle radiotherapy)

* An exclusion triggered by a diagnosis is classified as a patient group, an exclusion triggered by a procedure is classified as a product/service. USA=USA-Medicare Part A



4.1. Cancer treatment

In **Denmark**, 31 highly specialised cancer treatment services are reimbursed on the basis of the specialised hospital's own cost calculation. Examples are the treatment of thyroid, oesophagus, pancreas or kidney cancer, stereotactic radiation treatment of extracranial tumours, total body irradiation and experimental treatments. In **Estonia**, chemotherapy patients are reimbursed with a fee for service and per diem combination based on historical cost data from hospitals. They are excluded from the core DRG-based payment system because of large differences in the prices of chemotherapy courses. A few DRGs related to bone marrow transplantation are 'unweighted' in **Germany** and their prices have to be negotiated locally between individual hospitals and their associations and individual sickness funds and/or their associations or (private) insurance associations. HRGs with no national tariff for bone marrow transplantation are also used in **England**. Furthermore, several cancer drugs in England, France and Germany are additionally reimbursed. In the **USA-Medicare Part A**, 11 selected cancer treatment hospitals are excluded since the late 80ies from the USA Medicare DRG-payment as 'test-hospitals'. They are reimbursed based on allowable incurred costs. However, since then most cancer therapies are provided in outpatient settings and inpatient cancer treatment is widely provided in acute care hospitals.

Cancer treatment in Belgium

- Most cancers are treated in the majority of hospitals and payment rules as described in section 3.2.2 apply. Currently there are no designated hospitals or reference centres for the treatment of rare or complex cancers.
- Some items of the B4 part are related to cancer treatment. For paediatric oncology and for hospitals with a licensed oncologic breast cancer care programme, financing is provided for extra care and paramedical staff. Additionally, since 2008 part of a national 'cancer-plan' budget is designated to finance hospital specific actions: psychological, social and nutritional support for patients (especially in paediatric hemato-oncology), data registration, biobanks (cell, blood and tumour) and clinical research.

- High-cost cancer drugs are excluded from the lump sum per stay and are paid on a product by product basis at public price level.

4.2. Specialised paediatrics

A long list of highly specialised child care domains can only be offered in 10 specialised hospitals in **Denmark**. These hospitals are reimbursed on the basis of their own cost calculation. Examples are: paediatric intensive care, neonatal ventilation > 24h or cystic fibrosis. Top-up payments for complex patients in certified (highly) specialised services are granted for children in **England**. These services get 44% extra for cases of low complexity and 64% for cases of high complexity, commissioned directly by NHS. Several DRGs are 'unweighted' and have negotiated prices in **Germany**, e.g. 'Social and neuro-paediatric and paediatric-psychosomatic therapy for mental illnesses and diseases and disorders of the nervous system'. Similarly in England several HRGs are 'unbundled' and have negotiated prices e.g. 'Paediatric critical care and intensive care without external carer'. Certain DRGs are also split up by age to differentiate tariffs between children and adults in Germany. Furthermore, children-hospitals can be excluded from DRG payment in Germany, if at least 40% of their cases belong to a list of DRGs. Special institutions for child- and youth-rheumatology and neonatal satellite stations in remote areas are also excluded in Germany. In the **USA**, 60 children's hospitals are reimbursed on the basis of allowable incurred costs under the Medicare-program, but only disabled children qualify for benefits. **France** provides supplementary codes for paediatric resuscitation or intensive care and neonatal care with or without resuscitation (paid per diem) and paediatric radiotherapy (paid per session).



Specialised paediatrics in Belgium

- In March 2017 new lump sums were introduced for chemotherapy and tariffs were differentiated between children and adults. For intravenous or percutaneous monotherapy (with a single medicine), the oncology day centre receives € 120 per treatment day, topped up with € 35.09 per day when the patient is under 16. For a combined therapy (more than one medicine), the hospital lump sum equals € 161 per treatment day and € 262.90 for patients aged under 16.
- Other measures include the additional staff for paediatric oncology and hematology/oncology units (via B4 and B9 of the BFM) and specific conventions for children (e.g. child nephrology, morbid obesity, sequels of maltreatment of children and adolescents).

4.3. Severe burns

Hospitals or departments for major burns can get excluded from the **German** DRG system if they prove to fulfil a societal need. They then negotiate case-based or per diem payments. The German system also provides two 'unweighted DRGs' for 'Heavy burns' and 'Heavy burns with surgical procedure, artificial respiration >95 hours or intensive complex care'. The tariffs for these DRGs are negotiated. In **Denmark** only two hospitals have the authorisation to treat major burns. They are paid on the basis of their own local cost data in accordance to an agreed procedure. Care for patients having major burns is paid for with locally negotiated tariffs in **England**. The commissioners define the way of reimbursement and can experiment with it, e.g. incorporating integrated care tariff or paying fee for services. Therefore, there is a large variation and it is not transparent how the local prices are determined.

Severe burns in Belgium

- Six hospitals are licensed centres for severe burns: three in Flanders, two in Wallonia and one in Brussels. They benefit from a lump sum payment per bed within the B2-part of the hospital budget (€ 259 537 per bed in 2017). Medical acts are reimbursed on a fee for service basis.
- Additional financing is provided to coordinate care paths for patients with major burns and to offer them psychological support (B4-part of the BFM).

4.4. Neurological diseases

Top-up payments for complex patients in certified (highly) specialised services are granted for interventions in the field of neuroscience in **England**. These services get 28% extra payment, commissioned directly by NHS. In **Germany** hospitals for the treatment of neurological disorders like multiple sclerosis, Parkinson, epilepsy and neuro-paediatric and psychosomatic disorders are excluded from DRG payment and the negotiation partners agree on either case-based or per diem payments. In **Estonia**, the biologic therapy for multiple sclerosis is reimbursed by a combination of per diems and fee for service.



Neurological diseases in Belgium

- So-called '**Sp-services**' were created in 1993, either in specialised hospitals, either in units inside acute hospitals, sometimes linked to an elderly care home. These 'specialised' services have the objective to treat and rehabilitate patients suffering from cardiopulmonary, neurological, chronic locomotor or psycho-geriatric health problems. The services are often used to treat patients after an acute care episode and aim at active and multidisciplinary rehabilitation, or else offer services for specific neurological conditions such as multiple sclerosis or Huntington's disease. There are also Sp-services for patients who need palliative care.
- There are 6 759 licensed Sp-beds (of which 1 466 within the domain of neurological rehabilitation called S3-beds); 5 802 Sp-beds are licensed in acute hospitals, 957 in specialised hospitals.⁹
- Sp-services are financed via a combination of a lump sum per day and fee-for-service payments for medical acts or lump sums for medical acts in case of conventions with RIZIV – INAMI.

4.5. Intensive care unit

Internationally, there is not one approach to pay for intensive care (ICU). A RAND report showed that there are three main mechanisms in DRG-based payment systems to pay for intensive care: 1) as part of the case-based payment; 2) surcharges to the case-based payment; 3) a separate budget outside the DRG-based payment. Although all three systems include the risk of underpayment for ICU, this risk is the highest when ICU is part of the case-based payment. This is especially so for the more specialised forms of intensive care such as intensive care for children and specific adult patient groups.³¹

Also in the countries evaluated in the current study, different approaches to deal with intensive care are identified. **France** provides supplementary codes for resuscitation or intensive care. Intensive care for children can also only be offered at specialised hospitals in **Denmark**. Neonatal intensive care and paediatric intensive care in **England** are unbundled and reimbursement

rates are locally negotiated. In addition, top-up payments are provided when specific patient groups are cared for in designated centres (e.g. major trauma patients in major trauma centres which is a patient group with an important ICU use).

Intensive care in Belgium

- Since 2012, nursing and clinical operational cost for neonatal intensive care (NIC) is reimbursed like any other acute hospital care, based on a national average length of stay per APR-DRG combined with fee-for-service payments for medical acts. In this way, the system takes into account the case-mix of each NIC service.
- However, no specific payment exists to finance **paediatric intensive care** units. According to stakeholders, the lack of specific payments turns this highly specialised care into a loss-making activity. The bigger needs in case of child care result from the fact that:
 - The price of paediatric devices is higher due to their smaller size (more fragile) and smaller production quantities
 - Paediatric devices have to be replaced more often (e.g. risk of obstruction by blood clots in thinner tubes)
 - With the age of the patients, their size and weight varies widely, entailing a wide range of medical devices needed
 - Evolution of vital functions is much more variable in children than in adults, so monitoring needs to be more intensive
 - Procedures are often more delicate and complicated than with adult patients
 - More nursing staff is required for invasive and non-invasive procedures in order to obtain the child's collaboration
 - More nursing staff is needed to support the children's parents and to support young patients during night times in absence of their parents.



4.6. Dialysis

In **Denmark**, dialysis treatments are reimbursed on the basis of the specialised hospital's own cost calculation. For dialysis services in **France**, hospitals receive a budget per session, called 'dialysis package' as a supplement to a standard DRG tariff. Additionally, several regions are experimenting with care pathways for the treatment of chronic renal failure to obtain a more fluent care pathway. In **England**, HRGs for 'hospital haemodialysis or filtration', 'home haemodialysis' and 'ambulatory peritoneal dialysis' have no national price. Haemodialysis and peritoneal dialysis for acute kidney injury are unbundled. Reimbursement rates are locally negotiated. Furthermore, certified hospitals receive a top-up payment of 44% for the insertion and the removal of peritoneal dialysis catheter for children.

Dialysis in Belgium

- The Belgian system for reimbursement of dialysis resembles the French one with hospital tariffs and physician fees for different types of dialysis sessions. The physician fee for chronic haemodialysis in hospital is €139.19 per session during the day and €107.46 during the night. In both cases, the hospital receives a lump sum of €238.37. In a 'collective centre for self-dialysis', the fee is €107.46 per session and the lump sum payment equals €176.96. At home two types of dialysis exist: haemodialysis (fee: €107.46 and lump sum: €176.96) and peritoneal dialysis (fee: €46.05 and lump sum: €98.86).
- In anticipation of a full review of reimbursement of haemodialysis in hospital, the amounts of the lump sums and the fees are reduced if the hospital does not reach the threshold of treating at least 40% of patients in a collective centre for self-dialysis or with home dialysis.

- Patients can also subscribe to a care pathway which allows them to be reimbursed for medical equipment (blood pressure monitor), dietary counselling and drugs. An acute dialysis, though, needed throughout an acute hospital admission (e.g. after heart surgery) is not reimbursed to the hospital other than with physician fees. For patients with a chronic renal failure, admitted for an acute condition (e.g. heart surgery) physician fees for dialysis are still fully reimbursed but per diems for nursing and clinical operational costs are reduced to 50%.

4.7. Organ management and transplantations

Organ transplantations in **Denmark** are only offered at specialised hospitals, which are reimbursed on the basis of their own cost calculation. In **Estonia**, a combination of per diem and fee for service pays for all organ transplantations (except cornea transplants). Heart transplants are performed in Finland. In **England**, reimbursement rates for HRGs for kidney, heart, lung and multiple organs transplantations are negotiated locally. Transplantations of children-organs are additionally paid with a top-up of 64%. In **France**, the coordination of organ transplants (management of living donors, removal and transportation) is reimbursed by block grants. The transplantation itself is covered by the DRG system. A similar approach is used in **Germany**: a prospective block grant is negotiated between the DSO (the German centre for organ transplantation), payer and provider. The DSO takes care of (and pays for) the management and the transport of the organs. 'Harvesting hospitals' receive a fee per organ from DSO. Transplantations are reimbursed by incurred costs under the **USA** Medicare program, and conducted only in specific hospitals.

Organ management and transplantations in Belgium

- Specific financing is provided (in total € 1.4 million in 2017) for 'small medical equipment' used for organ transplantations. Another budget was released in 2014 to finance the 'local coordination of donors' (between €30 000 and €130 000 in 2017). Both budgets are part of B4.
- Physician fees are determined in article 14m of the nomenclature.



4.8. Diagnostic imaging services and radiotherapy

Particle radiotherapy (e.g. hadron therapy) is reimbursed for **Danish** people in hospitals abroad. In **England**, unbundled diagnostic imaging services (MRI, CT, DEXA Scan, Contrast Procedures, Ultrasound, Nuclear Medicine, Echocardiogram) from DRGs and prices for these services are locally negotiated. In **France** an additional payment (supplement) is granted for radiotherapy. In **Germany**, prices for complex neuro-paediatric diagnostic services are locally negotiated.

Diagnostic imaging services and radiotherapy

- Hadron therapy is reimbursed by RIZIV – INAMI for patients who meet certain conditions. Currently, patients have to be sent to a specialised centre abroad for treatment. RIZIV – INAMI has concluded an agreement with four centres (1 in France, 2 in Germany and 1 in Switzerland).
- MRI, PET-scanners and radiotherapy are paid through yearly lump sums. After the 6th State Reform the federated entities have the authority to change the amount of these lump sums or the payment method.

5. DISCUSSION

The aim of this study was to assess the feasibility of implementing international payment methods for hospital stays with a large variability in the care process in Belgium. To that end, we described international hospital payment approaches at the margin and beyond DRG-based payment and compared these payment methods with current Belgian payments for particular areas of care.

5.1. Importance of path dependency

As mentioned in the introduction, knowledge of the hospital payment system in place before the introduction of the DRG-based system helps to understand specific choices that were made concerning exclusions and corresponding payment methods. This path dependency also had an impact on the main objectives of the introduction of the DRG-based payment system. In [KCE Report 207](#) (see Table 2 in the Short Report)⁸ a long list of objectives of DRG-based payments was found in official documents of the five reviewed countries: increase of efficiency, increase of productivity, increase of volume, fair treatment of hospitals, transparency in payments, reduction of overcapacity, increase of competition between hospitals, cost control, etc. Therefore, in the same report it was concluded that the objectives of a payment reform should be clearly stated and specified: “Concepts such as ‘efficiency’ and ‘quality’ are too broad to give shape to a payment system or to evaluate its impact.”

5.2. A close link with the core payment method

Notwithstanding the importance of previous hospital payment systems, the international comparison also shows that mechanisms that aim to account for variability of care in international DRG-based payment systems are essential parts or closely linked to these systems (see Table 4). In fact, the main aim of DRG-based payments is to account for the variability of care between different groups of patients (DRGs). This is reflected in the number of DRGs (from less than 800 to about 2 300) and subgroups defined in terms of severity of illness, complications, comorbidities, etc. Furthermore, outlier payments and additional payments reduce variability within DRGs. This



means that it is difficult to discuss payment mechanisms for highly variable care independently from the payment method for other care.

The DRG-based budget allocation in part B2 of the hospital budget in Belgium is largely based on the APR-DRG/SOI classification. The classification system has been criticized as insufficiently reflecting clinical and cost differences in the Belgian hospital activity context (see [KCE Report 121](#) for some analyses³²). A same level of severity of illness for a particular APR-DRG can reflect very different nursing and medical needs. Stakeholders complain that the 3M-grouper (3M is the owner of the grouper) is very unclear about the allocation of patients to SOI subclasses and that there is insufficient flexibility to adapt the APR-DRG system to the Belgian context.⁷

Currently, no compulsory nationwide registration of patient-level cost data is available in Belgium. However, two alternative approaches can be considered. First, for many years a number of hospitals have collected cost data on a voluntary basis (for example, hospitals participating in the PACHA project³³). Second, the results of the ongoing UZ Leuven study (commissioned by the minister), in which care-related parts of the hospital budget and costs are allocated to individual stays on the basis of data of a sample of hospitals give a proxy for the costs per case. In a later phase, the data collection can be expanded.

Some examples of the lack of differentiation in the APR-DRG classification system and SOI-levels resulting in large differences in the LOS were provided by stakeholders:

- Replacement of a hip prosthesis with a new implant is in the same APR-DRG as a primary hip replacement, yet the medical act is much more complex and the patient will stay longer in hospital. Infection or loss of bone tissue will amplify complexity even more;
- There is only one APR-DRG for surgery of one or two-sided cleft-lip or cleft-lip and palate;
- Lengths of stay for decompensated cirrhosis are much longer than the normative length of stay for the cirrhosis APR-DRG.

Already in [KCE Report 121](#) (2010)³² it was recommended that the grouping rules used in the originally developed APR-DRG system needs thorough modification in order to accurately reflect the practice patterns and cost structures of Belgian hospitals. The above examples illustrate the importance of the DRG-granularity (broad or narrow definition of DRGs). Broadly defined DRGs have the advantage that they create incentives for efficiency and reduce incentives for data manipulation. However, they also give incentives for cream skimming lower cost patients. In case of narrowly defined categories this effect is less pronounced. Hence, the choice of granularity of the DRG-classification and the need for exclusion mechanisms are complementary issues.

5.3. Steering care can lower high variability

Some payment mechanisms may have an effect on the organization (e.g. centralisation) of care, which means that their applicability to Belgium depends on the aims and the direction of future reforms of the hospital landscape in Belgium. Rare, complex care can be highly variable because of unwanted high variability in clinical practise. The variability of rare, complex care can be reduced if it is standardized and concentrated (e.g. at treatment centres). This approach of reducing high variability by steering care is used in for example Denmark, where specialised care (or 'complex patients') are only treated at a few, designated treatment centres. This could be adopted by imposing volume criteria (minimal number of patients) and quality criteria (norms for available technical and human resources) for certain types of care. Therefore, a reform of the hospital payment system for complex, high-cost or difficult to standardise care should be carefully tuned to the programme that aims to manage the current and future supply of services ('*aanbodbeheersing*'/'*maîtrise de l'offre*') in the reform plans of the minister (June 2017).⁹



5.4. Outlier payments

The DRG-based payment system in the six countries includes outlier payments as insurance against incentives to avoid or prematurely discharge costly patients. These outlier cases are based on the length of stay or on actual costs. Outlier payments protect hospitals from losses related to exceptionally costly patients relative to their DRG payment rates. Therefore, outlier cases are excluded from the determination of average costs and separate outlier payments are provided. Outlier payment reflects to a certain extent the actual cost incurred by the hospital for extreme cases, rather than the cost of an average case, in order to reduce the financial risk and enhance payment fairness for the hospital.

Outlier payments based on fee for service can better reflect the true costs of care of an individual patient than outlier payments based on per diems, which are always based on average per diem costs. The USA-Medicare Part A uses such an outlier system and has - compared to other countries - only few elements which are excluded from their DRG system (e.g. no excluded high-cost drugs). In case a patient exceeds a certain predefined cost-threshold, the outlier payments cover a share of the additionally incurred costs.

The strength of DRG adverse incentives (for example, to select low-risk patients) can be reduced with outlier payments. However, there may be incentives to increase the length of stay in order to qualify a patient as an outlier. The strength of the incentives depends on the location of the threshold and the specific payment method. Given the substantial variation across countries in the way outlier thresholds are defined, also the share of outlier payments in total hospital payments differs greatly. Moreover, there is a trade-off between the outlier cases and other exclusion mechanisms.³⁴

There is, however, no gold standard to determine and pay for outlier cases. Instead, "the choice of method must be made based on the characteristics of the data sample at hand, as well as on the goals that health-policy makers intend to reach by using the DRG system".³⁵

5.5. A wide diversity of payment methods for highly variable, complex or rare care

Not only for outlier cases, but for all exclusion mechanisms a wide diversity of payment methods is applied in the six countries: FFS payments, global or pathology-specific per diems, block grants (and combinations thereof), etc. However, very limited information has been found on the rationale for the choice of payment method. In general, the specific payment method is to a large extent embedded in the overall healthcare system. For example, DRGs or additional payments with locally negotiated prices between providers and commissioners are very common in the NHS-system in England, which has a long tradition of contract negotiation. The Belgian healthcare sector has, however, no tradition of negotiations between individual hospitals and payers.

Ideally, the payment method is aligned to the type of patient, service, department, etc. that is excluded and to the reason for exclusion. Some types of care have a high share of fixed (personnel) costs because they fulfil an availability function, which makes a guaranteed budget (global payments) more appropriate than volume-based payments. Examples include organ management, medical surveillance in centres for severe burns, stroke units or permanently equipped operating theatres. Volume-based payments, which depend on the number and type of patients, are more appropriate for types of care where a close link between activity and payments is being pursued. The more variable the payment system, the larger the share of financial risk that is conferred to the payer. Hence, the choice between for example a FFS system and per diem payments essentially depends on who (provider versus payer) bears the risk. With service-specific per diems (for example, different per diems for medical-surgical services, obstetrics, intensive care, etc.) the financial risk for the provider can be reduced and they also reduce the need for outlier payments for unusually costly patients.



5.6. No clear definition of exclusion criteria

Although the DRG-based payment in the six countries is very comprehensive including most types of pathologies, at least some part of hospital care, which is highly variable, highly complex and/or rare is excluded from DRG-based payment in all countries. However, it is not straightforward to draw lessons for Belgium on the basis of these findings and to answer the question of whether these payment models are feasible or desirable in Belgium. As was mentioned in the background section (section 1.1), the desirability of a provider payment method and associated incentives crucially depends on the degree of financial risk sharing between providers and payers that one aims at.

Moreover, a factor which makes it difficult to draw lessons for Belgium is that in most countries the exclusion of certain care elements from DRG-based payments is not based on hard pre-determined statistical criteria. This problem was also illustrated for Belgium in [KCE Report 270](#). Most countries have various reasons for the exclusion of certain elements from DRG-based payment systems and these are not always due to high variability or complexity. Reasons for exclusion are e.g. low volume of care, sporadic occurrence or high level of costs. Furthermore, the USA-Medicare Part A and France exclude small and rural hospitals, since it is perceived that these hospitals are necessary from a societal perspective and cannot bear the financial risk of cost variation within DRGs.

Some types of care are always excluded, for example specialised paediatrics, certain cancer treatments or organ transplantations (see Table 2). For most types of care, countries differ in the way how they exclude and how they reimburse these elements.

Instead of being based on clearly defined criteria, the choice of exception mechanisms is the result of multiple iterative analyses and a comprehensive assessment of the potential effects on the entire system of excluding certain elements of care from DRG-based payment. However, simulations of the impact of new payment methods for selected patient groups, services, etc. was beyond the scope of this study.

5.7. Belgium: fragmented payment system but comparable instruments as abroad exist to deal with variability

The international and Belgian payment mechanisms for hospital stays with a large variability in the care process, operationalised as cases with difficult to standardise, complex, high-cost or rare care, are to a certain extent comparable. The instruments or payment methods that are applied abroad are also used in Belgium: outlier payments, annual budgets (global or per bed), payment per product for high-cost drugs, per diem payments, fee-for-service payments etc. However, more than in the six studied countries, the Belgian hospital payment system has many *layers* making it less transparent and more fragmented than abroad. The core payment system consists of the basic points weighted for department type, which is similar to the DRG tariffs and weights in a DRG case-based system. On top of the basic points, hospitals can be entitled to supplementary points, B4, B5, B7, B8, lump sum payments (convention and other) and payments per product for pharmaceutical specialties, etc. which all contain elements to compensate hospitals for the difficult to standardise, complex, high-cost or rare care they provide, often within a closed-ended budget. Moreover, also the organisation of hospital services has been characterised as fragmented and highly dispersed in previous evaluations.^{7, 9} A clear need to concentrate services with a volume-outcome relationship and/or high-cost services in a more limited number of centres has been demonstrated. As such, once a decision about concentration of services is taken, the most suitable payment methods to support these organisational reforms have to be chosen.



5.8. Which policy conclusions can be drawn from this study?

The fact that comparable instruments as abroad are available facilitates the application of exclusion mechanisms in the Belgian context. However, given the large choice in potential exclusions and payment methods it is impossible to give concrete advice to Belgian policymakers based on the current overview. It is clear that, in first instance, policy decisions about potential candidates (selection of patient groups, services, products, care areas, etc.) to exclude from the core payment system are required. In fact, these decisions should be in line with the larger objective policymakers are aiming for (e.g. increasing transparency of the payment system, concentrating complex and high-cost care, reducing the problem of underpayment of staffing norms; etc.). Once these decisions are made specific analyses and simulations (e.g. how to identify the excluded elements, budget impact for hospitals and the payer, etc.) should precede implementation.

More specifically, given the policy lines developed in the Action Plan of the minister and given the limitations of the current system (including data availability), policy decisions should be taken and directions established concerning the organisational model of specific patient groups, services, etc. and concerning the APR-DRG classification system.

This can be illustrated by three examples. A first example concerns intensive care for which policymakers should decide on the organisational model, for example whether or not to implement a model with different levels (e.g. general intensive care, intensive care for children, tertiary intensive care). This decision in itself is preferably evidence-informed: scientific literature about for example effectiveness, evaluation of international implemented models, thorough analysis to gain insight into current practice (type of services, length of stay, use of resources, etc., including variability between hospitals) and the implications of the proposed change. This will have to be followed by a choice of appropriate payment method, which mainly depends on the specific characteristics of providing intensive care, such as the share of fixed and variable costs or the (legitimate) variability in resource use between patients.

Another example are the centres for complex cancer surgery. If it is decided to concentrate these activities in a limited number of centres conventions are the most obvious payment mechanism that currently exists in Belgium to support such a reform. Other instruments to pay for designated services/departments are less suitable. A lump sum payment per bed (cf. major burn units) is less suitable as the '24/7 availability function' of complex cancer surgery centres is less important than it is the case for burn units. The B4-additions are another option (cf. additional paramedic staff for breast cancer clinics) but will only add another layer of fragmentation to the already very fragmented BFM.

A third example concerns stroke, for which the implementation of an organisational model is currently being prepared.³⁶ A distinction is made between the organisation for 'acute stroke care' and a specialised programme 'acute stroke care with invasive procedures'. It will be important to adapt the payment system to this organisational model. This can be inspired on experiences abroad. In the Euro-DRG project, for instance, an evaluation was done for the DRGs for stroke in 11 countries. It was shown that the number of DRGs for stroke ranged from 1 to 7 with large variability in cost weights. In countries where the DRG system provides a separate category for 'stroke units' the cost weights appear to be better tailored to the actual costs for this patient group. This is desirable since treatment on stroke units is more expensive than standard care. Other variables with an important impact on costs are systemic thrombolysis and the severity of the stroke (measured via ICD-codes corresponding with the 'National Institute of Health Stroke Scale' rather than based on a severity of illness index based on co-morbidities). The variability in DRG systems is linked with the degree of involvement of clinicians. In countries where neurologists were involved and had an impact on the DRG system, these variables (e.g. 'stroke unit', systemic thrombolysis) were better taken into account compared to countries that did not involve clinicians to the same extent.³⁷

It should, however, be kept in mind that a case-by case approach should not lose sight of the fact that in the current system cross-subsidization between patient groups, services, etc. makes hospitals as a whole financially viable. As such, carefully simulating the impact of individual measures on the total hospital budget is needed.



Limitations of the study

This study focused on the payment methods for difficult to standardise, complex, high-cost or rare care in an acute inpatient setting. Payment methods for outpatient care, mental healthcare, long-term care, rehabilitation and ambulatory emergencies were not discussed. No data analysis or simulation exercise was conducted to assess the financial impact at the national or hospital level of possible payment reforms in the Belgian context.

In addition to the limitations inherent to the scope of the study, some other limitations reduce the applicability of the payment methods for excluded patient groups, products, services, etc. applied in other countries and make it difficult to draw firm conclusions:

- No official evaluation studies have been published on the impact of the various exclusion mechanisms and payment methods and the section on “Current developments, debates and reforms” (see [Scientific Report](#)) is mainly based on expert input.
- Data on the percentage of hospital revenue coming from DRG-based payments was lacking in most countries. This information is, however, important in understanding the financial risk sharing between provider and payer.
- The cross-section analysis applied in this report largely neglects the importance of path dependency in changes and reforms. A longitudinal study is better designed to capture the impact of cultural differences and contextual factors and to assess the transferability of results to the Belgian context.



■ RECOMMENDATIONS^c

In the context of the plan to reform the Belgian hospital landscape and hospital payment system, KCE was asked by the minister of Social Affairs and Public Health to study which criteria other countries use to define difficult to standardise, complex, high-cost or rare care and what payment methods they apply for this type of care. These choices are embedded in the overall healthcare system and reflect societal priorities, including the relative importance of efficiency, quality and health outcomes. Moreover, the selection of excluded patient groups, services, products, departments, hospitals and the definition of outliers are closely linked to the mechanics of the core DRG-based payment system.

The Belgian hospital payment system differs from payment systems in most other countries in two ways: 1) hospitals receive a DRG-based budget allocation (mainly B2) instead of a DRG-based case payment and 2) there is no nationwide system for patient-level cost data available.

In other countries, decisions to identify cases (or elements) that fulfil the criteria of appropriate highly-variable care and to reimburse them differently are based on cost data which is not the case in Belgium. There are two alternative approaches for a nationwide patient-level cost data system that can be used to start with: 1) the cost data collected on a voluntary basis by a selection of hospitals; 2) the results of a recent study, commissioned by the minister, in which care-related parts of the hospital budget and costs are allocated to individual stays on the basis of data of a sample of hospitals (this gives a proxy for the costs per case). Later on, the data collection can be expanded.

In general, the selection of difficult to standardise, complex, high-cost or rare care and associated payment methods is the result of an interactive process of evidence-informed decision making. The number of patient groups in the DRG-classification and the remuneration system of physicians (fee for service or part of the DRG-tariff) on the one hand and the need for exclusion mechanisms on the other hand are complementary issues. The financial risk for the provider is to a large extent limited when physicians are paid by means of fee for service. In addition, the better the APR-DRG classification performs on Belgian data in terms of homogeneity of resource use within DRGs, the less need there is for exclusions.

When designing a system for highly-variable care, at least the following steps should be taken.

^c The KCE has sole responsibility for the recommendations.

***To the minister of Social Affairs and Public Health***

- A roadmap should be developed for the organisational model of selected patient groups, services or products. Decisions should be substantiated by scientific literature about for example effectiveness, an evaluation of international implemented models and thorough analysis of Belgian data to gain insight into current practice and variability between hospitals (type of services, length of stay, use of resources). As some of the selected patient groups, services or products can be categorized as supraregional care assignments, the organisation of these care assignments should be addressed in the same way. The possible impact on quality and patient costs should be evaluated.
- The APR-DRG/SOI classification system should be assessed in terms of homogeneity of resource use (including a clinical and statistical analysis): splitting of APR-DRGs, separation of price distorting components (for example high-cost drugs, medical devices or other services), outlier analysis, analysis of fixed and variable costs, etc.
- Potential candidates to exclude from the core payment system to hospitals (Budget of Financial Means) should be selected on the basis of a combination of variability in resource use and other criteria such as quality (e.g. volume-outcome), economies of scale, etc.
- The impact of different payment methods on individual hospital budgets and on the macro-budget should be analysed. This analysis requires to:
 - Determine in the data which elements or stays will be excluded from the core payment
 - Determine the payment mechanism, such as
 - Convention
 - Top-up payments
 - Payment in line with share of fixed and variable costs (for example 24/7 availability in emergency department)
 - Etc.
 - Simulate the budget impact (shift between hospitals and at macro-level)
 - Consult stakeholders including stakeholders with a clinical, managerial and policy background

Propose a model to implement (gradually or not) the new payment system.



- It is recommended to start with a 'proof of concept' of payment system that takes into account the 'appropriate variation' in the care process in a domain where the general outline of the organisational reform is decided upon (e.g. stroke). Other domains can be developed step-by-step but the impact of each step on the overall hospital budgets (i.e. cross-subsidization between patient groups, services, etc.) should be carefully analysed.
- To manage and monitor the DRG system, a team with adequate staffing and resources, preferably within existing structures, should be set up. A close and permanent collaboration between RIZIV – INAMI and FOD – SPF Public Health within the framework of the planned redesign is required.



■ REFERENCES

1. Struckmann V, Quentin W, Busse R, van Ginneken E. How to strengthen financing mechanisms to promote care for people with multimorbidity in Europe? 2017. European Observatory on Health Systems and Policies. Health systems and policy analysis. Policy Brief 24 Available from: http://www.icare4eu.org/pdf/PB_24.pdf
2. Wammes JJG, Tanke M, Jonkers W, Westert G, Van der Wees P, Jeurissen P. Characteristics and healthcare utilisation patterns of high-cost beneficiaries in the Netherlands: a cross-sectional claims database study. *BMJ Open*. 2017;7:e017775.
3. McKee M, Healy J. Hospitals in a changing Europe. World Health Organisation on behalf of the European Observatory on Health Systems and Policies, editor. Copenhagen, Denmark: World Health Organisation; 2002.
4. Busse R, Geissler A, Quentin W, Wiley M. Diagnosis-Related Groups in Europe: Moving towards transparency, efficiency and quality in hospitals. Copenhagen: 2011. European Observatory on Health Systems and Policies Series Available from: http://www.euro.who.int/_data/assets/pdf_file/0004/162265/e96538.pdf
5. Beleidscel van de minister van Sociale Zaken en Volksgezondheid. Plan van aanpak - Hervorming Ziekenhuisfinanciering. Brussels: 2015.
6. Devriese S, Van de Voorde C. Clustering pathology groups on hospital stay similarity. Health Services Research (HSR). Brussel: Belgian Health Care Knowledge Centre (KCE); 2016 06/2016. KCE Reports 270 (D/2016/10.273/62) Available from: http://kce.fgov.be/sites/default/files/page_documents/KCE_270C_Clustering_pathology_groups_Report.pdf
7. Van de Voorde C, Van den Heede K, Mertens R, Annemans L, Busse R, Callens S, et al. Conceptual framework for the reform of the Belgian hospital payment system. Health Services Research (HSR). Brussels: Belgian Health Care Knowledge Centre (KCE); 2014 26/09/2014. KCE Reports 229 Available from:



- https://kce.fgov.be/sites/default/files/page_documents/KCE_229_Hospital%20Financing_Report.pdf
8. Van de Voorde C, Gerkens S, Van den Heede K, Swartenbroekx N. A comparative analysis of hospital care payments in five countries. Health Services Research (HSR). Brussels: Belgian Health Care Knowledge Centre (KCE); 2013 11/10/2013. KCE Reports 207 (D/2013/10.273/61) Available from: http://kce.fgov.be/sites/default/files/page_documents/KCE_207_hospital_financing.pdf
 9. Van de Voorde C, Van den Heede K, Beguin C, Bouckaert N, Camberlin C, de Bekker P, et al. Required hospital capacity in 2025 and criteria for rationalisation of complex cancer surgery, radiotherapy and maternity services. Health Services Research (HSR). Brussel: Belgian Health Care Knowledge Centre (KCE); 2017 06/2017. KCE Reports 289 (D/2017/10.273/45) Available from: <https://kce.fgov.be/sites/default/files/atoms/files/Download%20the%20report%20in%20English%20%28550%20p.%29.pdf>
 10. De Pourcq K, De Regge M, Callens S, Coëffé M, Gemmel P, Van den Heede K, et al. Governance models for hospital collaborations. Health Services Research (HSR). Brussel: Belgian Health Care Knowledge Centre (KCE); 2016 12/2016. KCE Reports 277 (D/2016/10.273/92) Available from: http://kce.fgov.be/sites/default/files/page_documents/KCE_277_Governance_models_hospital_collaborations_Report.pdf
 11. Sundhedsstyrelsen. Specialised Hospital Services: Principles of national planning in Denmark. Copenhagen, Denmark: Danish Health and Medicines Authority; September 2015. Available from: <https://www.sst.dk/da/planlaegning/specialeplanlaegning/~media/3499BD6FE4894BF1B75A27CAD2A3AB29.ashx>
 12. Sundhedsstyrelsen. Specialeplan [Web page]. Copenhagen: Sundhedsstyrelsen; 2017 [cited 23/02/2017]. Available from: <https://www.sst.dk/da/planlaegning/specialeplanlaegning/gaeldende-specialeplan/anaesthesiologi>
 13. Ministry of Health. Healthcare in Denmark: An Overview. 2016. Available from: http://www.sum.dk/~media/Filer%20-%20Publikationer_i_pdf/2016/Healthcare-in-dk-16-dec/Healthcare-english-V16-dec.ashx
 14. NHS England and Monitor. 2014/15 National Tariff Payment System. NHS England. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/300547/2014-15_National_Tariff_Payment_System_-_Revised_26_Feb_14.pdf
 15. Reimbursement of acute renal dialysis [Web page]. 2017 [cited 03/10/2017]. Available from: <http://translucency.co.uk/easy-reimbursement/reimbursement-of-acute-renal-dialysis/>
 16. Agence technique de l'information sur l'hospitalisation (ATIH). Médecine, chirurgie, obstétrique: chiffres clés. 2015. Available from: http://www.atih.sante.fr/sites/default/files/public/content/2554/atih_chiffres_cles_mco_2015_1.pdf
 17. Arrêté du 23 juin 2016 fixant la liste des hôpitaux de proximité mentionnée à l'article R. 6111-25 du code de la santé publique, JORF 7 juillet 2016. Available from: <https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT00032851526>
 18. Médecine, chirurgie, obstétrique. Chiffres clés [Web page]. 2015. Available from: https://www.atih.sante.fr/sites/default/files/public/content/2554/atih_chiffres_cles_mco_2015_1.pdf
 19. Heimig F. Abschlussbericht, Weiterentwicklung des G-DRG-Systems für das Jahr 2006. 2006.
 20. GKV-Spitzenverband, Verband der Privaten Krankenversicherung, Deutsche Krankenhausgesellschaft. Vereinbarung zur Bestimmung von Besonderen Einrichtungen für das Jahr 2017. VBE; 2016.
 21. Deutsche Stiftung Organtransplantation. Finanzierung des DSO [Web page]. 2017 [cited 25/4/2017]. Available from:



- <https://www.dso.de/dso/aufgaben-und-ziele/finanzierung-der-dso.html>
22. Centers for Medicare & Medicaid Services (CMS). Transmittal 471: Provider Reimbursement Manual - Part 1, Chapter 31, Organ Acquisition. Department of Health & Human Services (DHHS), CMS; 2016.
 23. Durant G. Le financement des hôpitaux en Belgique. Situation au 1er septembre 2015. Wolters Kluwer Belgium; 2015.
 24. Belfius. Sectoranalyse algemene ziekenhuizen op basis van het MAHA-analysemodel. 2017. Available from: https://www.belfius.be/common/NL/multimedia/MMDownloadableFile/PublicSocial/Expertise/Social_Profit/MAHA%202016%20versie%20voor%20de%20pers.pdf
 25. Van den Heede K, Dubois C, Devriese S, Baier N, Camaly O, Depuijdt E, et al. Organisation and payment of emergency care services in Belgium: current situation and options for reform. Health Services Research (HSR). Brussels: Belgian Health Care Knowledge Centre (KCE); 2016 29/03/2016. KCE Reports 263 Available from: http://kce.fgov.be/sites/default/files/page_documents/KCE_263_Organisation_and_payment_of_emergency_care_services.pdf
 26. van Sloten F, van den Oever R. De metamorfose van de ziekenhuissector. September 2016. CM-Informatie 265 Available from: https://www.cm.be/media/CM-Info-gezondheidsbeleid_tcm47-29114.pdf
 27. Vinck I, Vijverman A, Vollebregt E, Broeckx N, Wouters K, Piët M, et al. Verantwoord gebruik van hoog-risico medische hulpmiddelen: het voorbeeld van 3D geprinte medische hulpmiddelen. Health Technology Assessment (HTA). Brussel: Belgian Health Care Knowledge Centre (KCE); 2018. KCE Reports 297As (D/2018/10.273/01) Available from: https://kce.fgov.be/sites/default/files/atoms/files/KCE_297As_3D_printing_Synthese.pdf
 28. Leroy R, Camberlin C, Lefèvre M, Mistiaen P, Van den Heede K, Van De Sande S, et al. Proposals for a further expansion of day surgery in Belgium. Health Services Research (HSR). Brussel: Belgian Health Care Knowledge Centre (KCE); 2017 03/2017. KCE Reports 282 (D/2017/10.273/09) Available from: https://kce.fgov.be/sites/default/files/page_documents/KCE_282_Day_surgery_Report_0.pdf
 29. RIZIV-INAMI. Overeenkomst betreffende de financiering van dialyse (inwerkingtreding vanaf 1 januari 2018).
 30. Koninklijk besluit van 25 april 2002 betreffende de vaststelling en de vereffening van het budget van financiële middelen van de ziekenhuizen, B.S. 30 mei 2002.
 31. Ettelt S, Nolte E. Funding intensive care - approaches in systems using diagnosis-related groups. RAND Europe; 2010. Technical Report
 32. Van de Sande S, De Ryck D, De Gauquier K, Hilderson R, Neyt M, Peeters G, et al. Feasibility study of the introduction of an all-inclusive case-based hospital financing system in Belgium. Health Services Research (HSR). Brussels: Belgian Health Care Knowledge Centre (KCE); 2010 25/01/2010. KCE Reports 121 (D/2010/10.273/03) Available from: <https://kce.fgov.be/publication/report/feasibility-study-of-the-introduction-of-an-all-inclusive-case-based-hospital-fin>
 33. Pirson M, Leclercq P. PACHA: proefproject voor kostenanalyse per pathologie. Healthcare Executive. 2014;78.
 34. Schreyögg J, Stargardt T, Tiemann O, Busse R. Methods to determine reimbursement rates for diagnosis related groups (DRG): a comparison of nine European countries. Health care management science. 2006;9(3):215-23.
 35. Cots F, Elvira D, Castells X, Sáez M. Relevance of outlier cases in case mix systems and evaluation of trimming methods. Health Care Management Science. 2003;6(1):27-35.



36. Koninklijk besluit van 19 april 2014 houdende vaststelling van de normen waaraan de zorgprogramma's "beroertezorg" moeten voldoen om erkend te worden, B.S. 8 augustus 2014.
37. Peltola M, Quentin W. Diagnosis-related groups for stroke in Europe: patient classification and hospital reimbursement in 11 countries. *Cerebrovasc Dis.* 2013;35(2):113-23.



COLOPHON

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