A typology for provider payment systems in health care

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Received 23 April 2001; accepted 3 September 2001

Abstract

A typology to classify provider payment systems from an incentive point of view is developed. We analyse the way, how these systems can influence provider behaviour and, a fortiori, contribute to attain the general objectives of health care, i.e. quality of care, efficiency and accessibility. The first dimension of the typology indicates whether there is a link between the provider’s income and his activity. In variable systems, the provider has an ability to influence his earnings, contrary to fixed systems. The second dimension indicates whether the provider’s payments are related to his actual costs or not. In retrospective systems, the provider’s own costs are the basis for reimbursement ex post whereas in prospective systems payments are determined ex ante without any link to the real costs of the individual provider. These different characteristics are likely to influence provider behaviour in different ways. Furthermore the most frequently used criteria to determine the provider’s income are discussed: per service, per diem, per case, per patient and per period. Also a distinction is made between incentives at the level of the individual provider (micro-level) and the sponsor (macro-level). Finally, the potential interactions when several payment systems are used simultaneously are discussed. This typology is useful to classify and compare different types of payment systems as prevailing in different countries, and provides a useful

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1. Introduction

In order to attain the general objectives of health care—quality, efficiency and accessibility—different tools can be used: legislation, organisational models, financial incentives, etc. This article provides a framework to classify reimbursement systems according to the degree to which they might contribute to these objectives. The typology is illustrated with anecdotal examples from different countries’ payment systems. In order not to substantially increase the length of the paper, no systematic overview of different countries’ payment systems is attempted in this paper. Elsewhere [1] a systematic description of health care provider payment systems in six European countries (the Netherlands, Germany, the UK, Sweden, France and Switzerland) using the typology of the present paper, is given.

Analogously to Aas [2] ‘reimbursement systems’ for health care are defined as the way in which money is allocated to the provider of care 1 by health care payers (e.g. government, insurers, patients). Providers can be both individual caregivers (GPs, specialists, physical therapists, dentists, home nurses…) and institutional providers (hospitals, nursing homes, home health agencies…).

In the financial flows towards these providers, often a distinction is made between a funding for the operational costs of the practice or institution (nursing, other personnel, materials, drugs…) and the physician’s labour. Sometimes investments (space and equipment) are financed through different channels. In the group of the individual caregivers both flows are mostly integrated and hardly recognisable as such. For health care provided in hospitals, in a number of countries both flows are split, with potentially conflicting incentives for the professionals versus the hospital. This may even be contra-productive for the hospital system [3,4].

The typology proposed allows to easily describe the expected impact of reimbursement systems on the behaviour of providers. Providers can pursue different types of objectives [3,6,13], but to illustrate the typology, it is assumed that providers aim at maximising profits. Obviously, most providers not only pursue financial objectives: a number of non-price mechanisms, such as screening, socialisation, profiling, promotion, practice ownership, education, professional experience, contacts with colleagues, professional ethics… all affect their behaviour [5]. These factors can mitigate or even reverse purely financial incentive mechanisms. In case of dual public–private practices among physicians the relative weights of these factors in their decision making can differ between ‘public’ and ‘private’ patients or

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1 In order to avoid any misunderstanding, it should be emphasised that the scope of this definition is narrower than the concept of ‘financing systems’. Financing systems also involve issues of the debate of private versus public financing, aspects of health insurance and patients co-payments.
public and private health care systems. As only the purely financial incentives are the focus of the present paper (i.e. ceteris paribus analyses), we do not elaborate on this issue.

The next two paragraphs describe the basic dimensions of the typology, being (a) retro-versus prospective and (b) fixed versus variable systems. Subsequently variable systems are further detailed in terms of the most frequently used units of reimbursement. The last paragraph illustrates the usefulness of our typology by describing a number of hybrid systems.

2. Fixed and variable systems

2.1. Some concepts

The distinction between fixed and variable payment systems is made on the basis of the relationship between activities and payment (obviously from a given viewpoint e.g. provider, organisation or payer).

A payment system is considered as ‘fixed’ when the reimbursed amount does not change as activities increase or decrease. A payment system is considered as ‘variable’ when variation in activities induces changes in payment.

Fixed and variable systems can be distinguished on the micro-level as well as on the macro-level. The micro-level consists of the provider. At this level, the behaviour of providers in response to financial incentives is examined. The macro-level refers to (all or some) providers as a group. Consequently, the macro-level is the relevant level for the payer. Since the characteristics of a system on this level also influence the behaviour of caregivers, this dimension will be taken into consideration as well.

2.2. Micro-level

The distinction between fixed and variable systems on the micro-level mainly depends on the link between the provider’s earnings and his production. More precisely, the distinction is based on the provider’s extra revenue for the production of one extra unit, however defined (medical procedure, admission, patient day…).

In variable systems, the incremental income is equal to the amount which the provider receives for the production of an extra unit. Because of this powerful link between the provider’s income and his activity, it is expected that caregivers have a strong incentive to increase production. Economic behaviour predicts that providers produce until marginal income equals marginal cost. Hence, the production is largely dependent on the marginal income or the fee, relative to the marginal cost of production. Therefore, variable systems with generous fees may cause overproduction. Although this may seem as a good outcome for the quality of care (because there is no under-utilisation), it should be acknowledged that providers might produce care which does not yield any health benefit or even does harm to the health of patients [6].
In fixed systems the provider is not remunerated for the production of extra units. He receives a ‘lump sum’, which is determined ex ante and is not related to his production. As a result, providers have strong incentives to reduce marginal costs, since marginal benefits are zero. This can be done in several ways, for instance by reducing the number and intensity of activities (e.g. less consultations, less days of care, less lab-tests…). However, if patients receive less care than appropriate, quality of care may be at stake. Moreover, fixed systems can endanger the access of care if these systems create incentives to exclude certain patient groups, especially the most ‘costly’ ones from the provider’s perspective.

However, the incentive effects of fixed versus variable payment systems are also partly determined by the type of ‘activity’ parameters used, e.g. item of service, diem, case, patient,… In general, a reimbursement system can even be considered as more fixed (or less variable) as the unit of reimbursement is on a more aggregate level on the following continuum: per item-of-service, diem, case, patient, period.

In fixed systems caregivers have less opportunities to influence their earnings. Evidently, it is less easy for a GP to increase his income by having more enrollees on his list than by performing more medical procedures. Likewise, a hospital can more easily increase the number of stay days, once patients are admitted, than increase the number of admissions. Nevertheless, each unit of reimbursement, always has a fixed and variable component, depending on the point of view. For instance, in a case-based system fees are invariable at the level of the individual case, as they are not dependent on the number of patient-days of care or medical activities; on the other hand hospitals have higher revenues by treating more cases. A similar way to characterise fixed and variable systems is to find out whether providers in a certain system are more inclined to minimise costs or to maximise earnings. A salaried GP or a hospital under a global budget, for instance, has no means to influence its income (zero marginal returns), but has more incentives to minimise costs. Consequently, such systems are considered fixed, rather than variable.

2.3. Macro-level

A financing system that is fixed at the macro-level, is called a closed-end system. Policy-makers (insurers, politicians) determine a ceiling of expenditures, which may not be exceeded during a certain period. This cap can be related to all types of health care expenditures whereby shifts among sectors are allowed (global budget ceiling) or split up over certain types of health care expenditures (partial budget ceilings). Closed-end systems can be a useful means to contain costs because the upper limit of health care expenses is—by definition—determined ex ante. However, merely determining a macro-budget ex ante does not guarantee that expenses will not go beyond the budget ex post [7,8]. Indeed, in many countries budgets are frequently exceeded [9]. In general, budgets become a more effective tool to control escalating health care costs as corrections are applied if the budget is overrun (or likely to be overrun). In this case, a ‘hard cap’ is applied; if not, a ‘soft cap’ is applied [10]. Corrections can be made during the budget-year or in the year(s) after. Obviously, in the first case the information requirements for the policy makers are
much larger since possible overruns have to be corrected immediately in order to stay within the budget limits. Beside the question *when* corrections should be applied, it must also be determined *who* should be penalised. Policy makers can choose to sanction only those providers who have largely contributed to the surplus of expenses, at least if this can be measured objectively. Another option is to penalise the whole group of providers. Frequently used measures are linear price reductions, whereby each provider, whatever his personal contribution to the budget overrun, is considered responsible for the overrun and consequently penalised to the same degree [11].

A financing system without any budget limits either on a global level or for certain health care expenses is called an open-end financing system. Obviously, such a system is not suited for cost containment.

### 2.4. Micro- versus macro-level

Financing systems whereby providers are remunerated according to their number and type of activities (i.e. variable systems at the micro-level) can encourage overproduction. Besides, if these systems are not capped at the macro-level (i.e. open-end systems), this effect is reinforced and can lead to spiralling health care expenses. Given the increasing scarcity of resources, there is nowadays a tendency towards making reimbursement systems more fixed. Consequently, there is a shift of financial risk away from the payers to the providers, though systems with a shared risk between both parties are also possible [12].

One option is to replace variable systems at the micro-level by systems with a more fixed character. The expected effects of such a fixed system were already discussed in the previous paragraph. Another option is to combine a variable micro-system with a closed-end macro-system. Providers are still rewarded for each unit of production (e.g. a price for each item, for each patient-day…), but the value of one unit and hence their total earnings cannot be forecast perfectly ex ante by the providers because these also depend on the production level of the other providers. In contrast to open-end systems, a provider cannot systematically increase his earnings by increasing his production. This relation holds only if his volume has risen faster than other providers’ volume.\(^2\) Hence there is a great deal of uncertainty regarding the actual marginal returns of extra-activities [7].

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\(^2\) Consider the following example in a virtual system with two providers and a macro-budget of 100 Euro. If in period \(t\), each provider produces 50 units of care, their income is 50 Euro each since the value of one point equals 1 Euro. If in period \(t + 1\) with an equal macro-budget each provider doubles his production to 100 units, their income is not doubled since the value of one point decreased to 0.5 \((= 100/200)\). Only if one provider increases his production more than the other does, his income will rise, to the disadvantage of the other provider.
3. Retrospective and prospective systems

A second dimension to classify reimbursement systems for health care is the distinction between retrospective and prospective systems. This characteristic of a system concerns the relation between the provider’s income and his costs for providing the service [13]. This characteristic, providing information about the generosity of the system for providers, adds information to the dimension variable fixed in understanding providers’ behaviour.

3.1. Retrospective systems

In a retrospective payment system the provider’s own costs are fully (or partially in certain systems) reimbursed ex post. Since the reimbursement is based on the real costs, even profit maximising providers are barely motivated to decrease these costs. Moreover, they may have an incentive to increase costs (without producing a significant health benefit) and hence their income. Eastaugh [14, p. 29] describes this behaviour as follows: “...if the department-level decision was either to improve the productivity of 22 employees or hire four more, the response was typically to hire...”. As this behaviour is not penalised, these systems do not stimulate technical efficiency.

In a number of countries hospitals used to be financed by a retrospective per diem price. As a mechanism to refund the hospital’s costs, a price for year \( t \) was calculated by dividing the hospital’s total costs in year \((t - 1)\) by the number of patient-days in year \((t - 1)\). In year \( t \), the income for the hospital was equal to this per diem price (mostly adjusted for inflation) times the number of patient-days in year \( t \). If the total costs in year \( t \) had risen, these were reimbursed in year \((t + 1)\) by an increased per diem price. Another mechanism to pay back the hospital’s real costs was the use of historical budgets whereby the budget equalled the expenditures in a former year (adjusted for inflation). Although the exact pricing mechanisms may differ between countries, all these systems have in common that all costs are reimbursed ex post one way or another.

3.2. Prospective systems

In a prospective payment system (PPS) the provider’s payment rates or budgets are determined ex ante. Contrary to retrospective systems, there is no link with the individual costs of the provider.

Since the provider’s costs have to be financed with a given amount of money, these systems have more incentives to stimulate efficiency than retrospective systems. In most prospective systems providers are allowed to keep financial surpluses (or at least a certain percentage of them). In case of a deficit, the caregivers are financially accountable either fully or partially. These systems can be attractive to policy makers because of the high potential for cost containment. There is a risk that providers—in the pursuit of efficiency—economise on the volume and type of appropriate services and consequently, by providing too little care, do harm to the
health of some of their patients. For instance, in hospitals, the ‘quicker but sicker’ phenomenon occurs when patients are discharged sooner than appropriate and consequently have an increased risk to be readmitted. Especially, prospective systems are vulnerable to this behaviour since providers have an incentive to reduce marginal costs per unit of reimbursement (i.e. without lowering marginal returns). Prospective systems can also generate opportunities to shift costs, by referring patients to other, less appropriate, providers. In the end, costs at more aggregate levels even may rise. In systems, where different insurers finance a provider with different payment mechanisms, providers may shift costs from the more restrictive insurers to the insurers who pay on the basis of real costs. Finally, prospective systems may also jeopardise access if providers can predict costs at admission better than the payment mechanism predicts them. In this case, providers might not admit patients with an unfavourable relation between predicted costs and income [15]. However, financing agencies can use this same information, to avoid this negative side effect. Hence, policy makers willing to implement such systems should monitor quality of care.

These risks are more likely to occur in case of a weak relation between prospective payment and the resources required for the production of this care, i.e. the actual costs, or put differently: if prospective reimbursement is not cost-neutral. Cost-neutrality means that for each additional unit of care the relationship between (expected) marginal costs and marginal returns is identical. This makes the physician more likely to offer the medically optimal units of care (since all extra units would have a similar impact on expected profits). Ideally, to avoid the side effects of non-cost-neutrality, the prospective marginal reimbursement should be set in line with the expected marginal costs of the intervention/episode-of-care. In order to determine the expected costs, costs for the production of a certain type of care (e.g. GP consultation, hip replacement) can be averaged among different groups of providers with similar characteristics (e.g. all acute, rural, non-teaching hospitals with acute care facilities), or the median costs or standard costs can be used. In other words, patient categories in a classification scheme should be as homogeneous as possible in terms of resources used. Frequently used variables to compose homogeneous patient groups are gender, age, demographic characteristics, diagnostic group, severity of illness and (expected) length of stay. Even after including these variables, a great deal of cost variation persists. Sometimes this variation is due to factors which cannot be influenced by a provider, for instance a hospital attracting systematically the more costly patients within an alleged homogeneous payment category, location in a rural/urban area, teaching character of a hospital, regional wage differences… Ellis and McGuire [12] have identified this as the systematic risk for a hospital. As a solution to this problem, they suggest the use of peer groups. These are groups of caregivers with similar characteristics (e.g. number of beds, in the same region…) and therefore similar expected costs for the production of the same care. Prospective prices can be set at the level of the group average. In determining the size of the peer groups policy makers should balance cost containment and fairness to providers [16]. Indeed, as the number of providers in a peer group decreases, the system becomes fairer because payment rates are brought more
in line with the real costs of the providers, but on the other hand this might lower incentives for providers to reduce costs. Ultimately, if each peer groups consists of one provider, the system becomes retrospective [12].

The most well known and documented example of a PPS is Medicare’s PPS for the reimbursement of hospitals. This system was introduced in the US in October 1983. Besides hospitals, GP’s can also be financed by prospective mechanisms, for instance capitation or fee-for-service (FFS) (cf. infra).

### 3.3. The relation between retrospective/prospective and fixed/variable

The concepts ‘retrospective’ and ‘variable’ are often mistaken for synonyms as well as ‘prospective’ and ‘fixed’. Although they are related, there are essential differences as they can affect provider conduct in different ways. These differences may however be subtle and sometimes hardly recognisable in practice. Fig. 1 demonstrates the essential differences.

The dimension retrospective/prospective refers to the presence/absence of a link between reimbursement for the provider and his costs. The dimension variable/fixed describes the presence/absence of a link between reimbursement for the provider and his activities. Although ‘activities’ are related to costs (hence the amount and type of activities determines the providers’ cost), they are not identical.

In retrospective systems, providers typically are reimbursed for extra production and real costs are fully (or partially) covered. The sponsors bear the financial risk since expenditures cannot be predicted ex ante. A fully retrospective system is therefore always variable. However, the reverse is not always true i.e. not each variable system is retrospective. In variable systems, providers earn revenues for extra production, but there is no guarantee that these financial flows cover the providers’ real costs. A variable system can be prospective as well (e.g. Medicare DRG payments). Fully fixed systems on the other hand are always prospective, but prospective systems can both be variable and fixed.

Moreover, systems that appear to be fixed from a technical point of view, may be variable from an incentive point of view. Consider a system whereby the hospital budget for year \( t \) is determined on the basis of the expenditures in year \((t-1)\). On the one side, the income in year \( t \) is independent from the number of activities in \( t \). Consequently, it is expected that providers have strong incentives to minimise hospital costs. However, things become complicated since increasing production in year \( t \) allows to increase income in year \( (t+1) \). Hence, the retrospective character

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**Fig. 1. Retrospective/prospective dimension versus fixed/variable dimension.**
of the system will dominate the fixed character. In fact, the budget is only a mechanism to refund the hospital’s costs of the previous year. The incentives of fixed systems do not apply to this case. Since, the aim of this article is to classify systems according to their incentives, these systems are considered as variable in spite of the apparent fixed character.

This way of classifying reimbursement systems has two important implications. First, according to these criteria, a system that is simultaneously fixed and fully retrospective cannot exist because retrospective systems are—by definition—variable. Second, if a budget is merely based on historical activity measures (e.g. budget = historical activity × prospective prices), the system is classified as fixed and prospective.

These examples illustrate that the dimension retrospective/prospective adds information to the dimension variable/fixed and vice versa in understanding the incentives of a payment mechanism for the behaviour of caregivers. Fig. 2 summarises the features of each dimension as well as the expected effects.

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3 Consider the analogy with historic per diem prices. If hospitals are reimbursed for each patient-day by a per diem price which is equal to previous year’s costs divided by the number of patient days, the resulting amount may appear as prospective in the current year. However, this payment is only a mechanism to refund the historical costs of the hospital. Although the reimbursement of the real costs lags behind, these systems are considered retrospective.

4 Remark that the reverse does not hold necessarily (as discussed above).
4. Provider payment systems according to the unit of reimbursement

Reimbursement systems for health care providers can also be classified according to the unit of financing. The unit of reimbursement applied affects financial incentives. The unit used, e.g. item-of-service, diem, case, patient, period, indicates the intensity of the link between the provider’s production costs and his return (dimension variable/fixed). For prospective systems, it allows to pinpoint the incentive effects in a more precise way. Prospective systems are likely to encourage providers to reduce the costs of their health care practice, in general. In which way costs are reduced will depend on the unit of reimbursement used. For instance, with prospective case payment providers can be expected to reduce the number/type of services provided (since each service yields extra costs). With prospective FFS payments not the number of services but e.g. the material used or labour time per service might be reduced to augment profits. Hospitals on a prospective budget may reduce costs by lowering the number of admissions (cases). In retrospective systems, the unit of financing does yield additional insights into the incentives. This paragraph describes and illustrates the different units. For the reimbursement of physician care, the most frequently used units are the item-of-service (FFS system), patient (capitation system) and period (salary system). In hospitals the dominant units are the patient-day (per diem systems), the case and the period (budget systems). Also, combinations of these basic units prevail.

4.1. Payment per item-of-service

In FFS systems, medical (diagnostic and therapeutic) activities and contacts are separately identified. The price of each item is known ex ante. Activities that are not on the list, are not remunerated. FFS is a largely variable system as providers increase their returns by producing more services. Only if the system is capped at the macro-level, this conduct will not always lead to higher earnings (cf. supra). FFS has two principal benefits: access of care is guaranteed as well as provision of the best care available, at least if marginal payments compensate for the marginal cost of care. However, adverse effects are possible. Providers may be inclined to produce too much care, i.e. care which does not deliver any significant marginal health benefits or even damages health, a phenomenon known as ‘supplier induced demand’ (SID). This is ‘the amount of demand, induced by doctors, which exists beyond what would have occurred in a market in which consumers are fully informed’ [17, p. 103].

Composing the list of reimbursable medical activities and in particular determining the relative value of each item involves a complex and delicate process. In many countries, where FFS-systems are in use, technical procedures are frequently

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5 Remember that the unit of reimbursement in retrospective systems is only a mechanism to refund historical costs, for instance via a historical budget or per diem price.
overvalued vis-à-vis intellectual acts [18]. Moreover, the relative value of many items remains unchanged for long periods and hence does not follow the evolution in the actual costs and benefits of technological developments. This may lead to a misallocation of resources. Ideally, to achieve maximal social welfare, relative prices should reflect the relative cost-effectiveness of the various procedures in a way that appropriate provider behaviour is stimulated. To avoid misallocation by individual profit-maximising providers, marginal fees should moreover be in line with marginal costs.

There exist a lot of FFS-systems in different varieties. The Belgian ‘nomenclature-system’ regulates fees for an extensive list of medical, diagnostic and therapeutic interventions. This system is also in use for the financing of physiotherapists, speech-trainers, dentists and nursing home care. In fact, drugs are also financed per item. The German system for the reimbursement of physicians is also a FFS-system. Until 1997, fees were modified during the year in order not to exceed the macro-budget for this year. The payment rates were a function of the expenditures in the past quarters. If the expenditures were above (below) the target, fees were reduced (increased) to the same degree in the next quarters [19,20]. This is a system that is variable at the micro-level, but close-end at the macro-level. From this, it may be clear that the incentives are different than in an open-end system.

4.2. Payment per patient-day

The ‘per diem system’ to finance the operational costs of hospitals, is a reimbursement system which was frequently used in the past. In these systems, specialists play a decisive role in hospital reimbursement because they determine the length of stay of patients (and hence the income for the hospitals) by their admission and discharge policy. The per diem system is largely variable and can have a retrospective or a prospective basis. In the latter case, whereby a price, independent of the real costs, is determined ex ante by the regulatory authorities, incentives for profit-maximising providers are to reduce costs per patient-day. In the former case, the real costs of the hospital determine the reimbursement. The per diem price is hence not a real ‘unit of reimbursement’ but rather a payment modality, to cover the historical costs of the hospital.

In New Jersey, the SHARE-program introduced a prospective per diem fee for the financing of hospital care. Between 1974 and 1978, this resulted in lower costs per diem as well as per case, whereas the average length of stay per patient increased [21].

4.3. Payment per case

In this system, hospitals are paid according to the type of case treated. Most often, it is used in a prospective way, whereby the payment per case is determined irrespective of the real costs (e.g. the length of stay) of the patient. The best known scheme to classify cases is the Diagnostic Related Groups System (or DRG-system). This classification groups diagnoses according to the homogeneity of the resource
use and clinical characteristics (e.g. principal diagnosis, secondary diagnosis, principal procedure, age...). The different groups build up the different DRGs. Initially, the DRG-system was developed for hospital managers as a tool for quality improvement and product management [22]. In 1983, Medicare used it as a basis for the reimbursement of hospital care. Since, the classification scheme has been updated continuously and many other countries started to implement local variants [23], for instance the case-mix groups in Canada [24] or the ‘Fallpauschalen’ in Germany [20,25].

In general, a distinction is made between systems that classify patients according to diagnoses on the one hand and treatments and procedures on the other hand. In practice, both systems are in use simultaneously [26]. Case-based financing can be considered as an intermediate form on the continuum of variable and fixed systems. Sometimes the term ‘itemised budget’ is used to refer to this characteristic [27]. Evidently, the system is prospective, as fees are determined ex ante.

The best known prospective system probably is the Medicare’s PPS. It was expected that the introduction of this system would decrease the costs per case, e.g. by reducing the length of stay, substituting towards cheaper inputs or reducing the quality of care [17]. However, there is a risk that profit maximising hospitals specialise in treatments for the more healthy, low-cost patients. Moreover, care (e.g. pre-operative diagnostic procedures and surgery) can be spread over several admissions per patient in order to gain more income. To prevent this adverse effect, regulators can stipulate that hospitals are not reimbursed if patients are readmitted within a given number of days after discharge [27]. Another risk is upcoding or DRG-creep, i.e. to classify admissions in a way to maximise reimbursement [14]. In Sweden, some county councils introduced local variants of the American DRG-system, especially for the financing of some elective operations. On the one hand, this system has raised productivity and reduced the waiting lists, but on the other hand the expenditures of the county councils have risen. Therefore, the system was combined with ceilings per DRG in course of time [29]. In Germany, prospective case fees (Fallpauschalen) cover all diagnostic and therapeutic activities, as well clinical as nursing activities. This type of reimbursement applies only for types of diagnoses and treatments that are on the list, mainly elective operations. This list is extended gradually [20,26].

4.4. Payment per patient

In a system of list patient capitation, providers receive a periodical (mostly annual) lump sum per patient under their supervision during a certain period (mostly a year). The total income for a provider is a function of the number of patients enrolled on the list, irrespective of the number of performed activities and contacts. Reimbursement per capita is used in particular for the reimbursement of GPs if patients are to be enrolled on a list. Capitation involves incentives to reduce costs for profit maximising physicians in a different way than e.g. FFS or case payments. If a patient seeks care several times during a period, the provider is not additionally rewarded, whereas providers in a case-based system are remunerated
each time a patient is admitted, unless limits are specified. Compared to a FFS-system, providers are more inclined to decrease the costs for the treatment of a patient, for instance by eliminating inappropriate care. Also, health prevention and promotion might be stimulated more if these are more cost-effective than treatment ex post. These activities will be performed more frequently to the extent that the period for which a provider is financially accountable for treating his patients is longer. However, if patients frequently change providers, such as in the US, with their high mobility of the US working population and the frequent changes of health plans by employers, there may be an incentive not to invest in prevention, to undertreat patients or even defer treatment as long-term cost savings are expected to accrue to the ‘next’ health plan.6

Capitation offers additional benefits to payers because expenditures are approximately7 known ex ante. Moreover, there are few administrative needs because no invoices have to be made ex post as opposed to FFS-systems. Quality of care may be encouraged as well, to the extent that providers can earn additional income by having more patients enrolled on the list [2]. However, capitation-based systems may endanger access of care for vulnerable patient groups as financing per capita may provide opportunities for risk selection by providers i.e. selection in favour of expected low cost patients, to the detriment of expected high cost patients [30]. As a (partial) solution, capitation payments can be differentiated, according to age, gender, chronic illnesses (e.g. diabetes, asthma…) and other socio-economic features of the patients. Also, a prohibition to refuse enrolment to patients could act as a solution, though it still leaves opportunities for subtle forms of risk selection e.g. by referring patients to other providers or treatment settings. Incorporating a compensation for treatment in other settings could be a solution, as it was done by both HMOs and GP Fundholders.

In the Dutch capitation-based system, sickness fund patients should enrol on the list of a GP of their choice. This GP receives a capitation payment for each patient on his list. Also the GP fundholding system in the UK was a capitation-based system.

4.5. Payment per period

In systems where care is reimbursed per period, caregivers receive a lump sum for the treatment of patients in a given period. In contrast to the previous systems, the sum is independent of the number of patients, or services provided. These systems are—by definition—fixed, both on the micro-level and the macro-level. On the micro-level, providers cannot increase their income in a certain period by increasing production. On the macro-level, expenditures are known ex ante.

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6 This is pointed out by one of the referees.

7 Small variations may result from changes in the composition of the population, for instance due to births, decreases, migration, etc., but they cannot be influenced by the provider.
Reimbursement per period can be applied as well for the reimbursement of hospitals as physicians (GPs or specialists).

When applied to physicians, a salary is allocated to cover practice costs and an income for the provider. This salary is not linked to the costs and quantity of the performed activities i.e. prospective and fixed. Like in capitation-systems there are fewer administrative requirements compared to FFS-systems. Salaries have also in common with capitation-based systems their risk for under-utilisation and patient shifting. Another potential disadvantage is the smaller incentives for appropriate and continuous patient follow-up.

Another variety of ‘fixed periodical payments’ for physicians is ‘geographic capitation’. In this system, the physician’s income is dependent on the number of patients in his catchment area. This can be used in systems where patients have no choice of provider and are assigned to a provider in their region. Although there are similarities with ‘list patient capitation’, this system is classified in the category of reimbursement per period. First, geographic capitation can be considered as more fixed since providers have no tools to increase their income as opposed to ‘list patient capitation’. In the latter system physicians can increase their income by having more patients enrolled on their list; in the former system physicians cannot influence the size of this list. Second, the incentives for physicians in geographic capitation systems are comparable to these in salary-systems. From the provider’s point of view, an income is received which cannot be actively influenced, neither in the short nor in the long term.

Hospitals also can be reimbursed per period. In this case, they receive a fixed income or budget for providing care in a specified period, mostly a year. Different criteria are used to determine the size of the budget. In general, two main types of criteria can be distinguished: input-related measures and volume-related measures. The capacity of a hospital, e.g. measured by the number of types of beds and/or specialists, is a typical input-measure. The budget is determined by multiplying the quantity of input measures by the corresponding fees. In these systems, the authorities in charge of regulating hospital capacity play a decisive role in determining the size of the hospital budget. Volume of activities can be measured by e.g. patient-days, admissions, outpatient visits, cases (e.g. DRGs), etc. Notice that the system is considered prospective only if fees are determined ex ante and if these are unrelated to the individual provider’s real costs in the current or previous year. Otherwise, the budget is merely a mechanism to refund the hospital’s costs of the previous year.

From an incentive point of view, periodical payments differ in the degree to which providers can influence future income. Systems in which production increases do not result systematically in larger budgets are more fixed than systems in which the hospital budget is equal to the production in the previous year times the prospective prices (cf. supra). In the latter case, providers have incentives to increase production, to augment future income. The only difference with a FFS-system in terms of incentives, is the timing: in a FFS-system, providers receive their income immediately, whereas in the other system, earnings are lagging behind by a longer period, mostly a year.
Budget systems can use a combination of different budget parameters. In the Netherlands, for instance, the budget is based on the number of treated patients in the catchment area of the hospital, the hospital capacity (as measured by the number of beds and specialists) and the negotiated hospital production [10,28].

4.6. Typology scheme

The described dimensions (fixed/variable, retrospective/prospective) and units are summarised in a schematic way (Fig. 3). A distinction is made between the micro- and the macro-level.

Closed-end systems can be fixed or variable on the micro-level, whereas open-end systems must—by definition—be variable at the micro-level. Further, retrospective systems are always variable, as well on the micro-level as on the macro-level. Indeed, retrospective systems are incompatible with closed-end systems since expenditures cannot be forecast ex ante. Prospective systems can be applied in open-end systems as well as in closed-end systems. In the former system, the monetary value of one unit is known ex ante; in the latter system, this value depends on the total production of all providers. Finally, the unit of reimbursement is irrelevant in retrospective systems.

5. Hybrid systems

In practice, a variety of units and systems is used simultaneously for financing care in a certain treatment setting. These are called hybrid systems. Different types of hybrid systems can be distinguished, depending on whether the mix of systems applies to the type of payers (i.e. different payers use different payment systems), of providers, of resources used or whether payers simply use more than one type of financing system to finance providers.

A first type arises if different payers apply different types of financing systems, as e.g. in the USA. In the Netherlands, the type of reimbursement of GP care differs

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<td>input</td>
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<td>RETROSPECTIVE</td>
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Fig. 3. Summary.
among insurers (sickness funds vs. private insurers) and this distinction is also related to type of patients (low-income patients are compulsory insured with sickness funds; higher income patients are voluntary insured with private insurers). For sickness fund patients, GPs are reimbursed on a capitation basis, whereas private insurers use a FFS-system. Such a variety of systems may offer opportunities for providers to shift costs from the more to the less restrictive payers, possibly impairing cost-containment objectives. In order to prevent such adverse effects, some American states introduced all-payer systems whereby differences in prices between payers are minimised [30].

A second type of hybrid system applies when different types of financing systems are used for different types of providers. In France, public and private hospitals are reimbursed both by public means, but the latter receive a per diem price, whereas the former is under a global budget. These differences have contributed to a shift of activity away from the public sector towards the private sector [31]. Such a system may entail even more confusing incentives, when the different types of providers work in close collaboration, or are integrated in one setting. In hospitals, for instance, medical specialists are often reimbursed through other mechanisms the hospital itself. This may result in conflicting incentives for clinicians and the hospital. For instance, specialists who are reimbursed on a FFS-basis in a hospital in which operational costs are financed by a global budget, have an incentive to increase production, whereas management is inclined to minimise costs. Especially in systems where clinicians are paid by more variable mechanisms and hospital costs are reimbursed by more closed-end systems, the need for integration between both parties becomes more stringent [33]. This can be achieved among other things by giving specialists a more fixed payment. In the Netherlands, experiments to promote integration between the hospital and the clinicians were started up. Although, the approach could differ substantially between institutions, most experiments had in common that the direct link between the clinicians’ level of activities and their income was made less intense. Also, specialists were encouraged to make decisions that enhanced both their interests and those of the hospital [34].

Policy makers have become aware of the potential negative impact on quality and efficiency of ‘fragmented’ health care financing systems, especially within one episode of care [4,5]. Consequently, efforts have been undertaken to facilitate integration of the different treatment settings via financial incentives. Most solutions tend to centralise financial accountability. Instead of making the different providers (e.g. GP, specialist, hospital, post-acute care…) each financially accountable for their part of the health chain, financial risk for a broader spectrum of treatments is now centralised with one agent. It is expected that this agent is encouraged to select these treatments which are most cost-effective i.e. deliver the best benefits at the lowest costs. In selecting the agent, different options exist.

One option is to give the GP a gatekeeping role, with financial accountability, as e.g. in the British GP fundholder system. On top of their income for primary care, GPs were allocated a (virtual) budget for the purchase of drugs and certain forms of hospital care. As surpluses could be retained in the practice, there was a clear incentive for GPs to seek out these treatments which were most cost-effective [32].
For particular conditions, patients (or their family members) can even be held accountable via a system of vouchers which can be used to select care in these treatments settings which best corresponds with their needs. Obviously, this system can not apply to all treatments since medical judgement is necessary for many conditions.

Another approach to reducing the lack of integration between care providers can be identified as ‘disease management’, which is ‘...a co-ordinated, proactive, disease-specific approach to patient care that seeks to produce the best clinical outcome in the most cost-effective manner across the entire health care delivery system’ [36]. Recent applications of disease management can be found in several chronic diseases, such as diabetes, asthma and cardiovascular illnesses. The total amount of money reimbursed for curing the patient is allocated to one disease co-ordinator or co-ordinating group of health care providers.

A third type of mixed systems arises if payers use different payment systems for different types of resources used in care. For instance, investments in space and equipment in new Belgian hospitals are subsidised (i.e. retrospectively, up to a ceiling) while the hospital receives an annual budget to cover its annual operating costs (e.g. nurses, materials, replacement of equipment).

A fourth type arises if a payer reimburses providers by a combination of different generic systems (as advocated in Ref. [5]), with the aim of combining the favourable elements of the different systems. Finnish and Norwegian GPs, for instance, are reimbursed by a mix of three systems: partly salaries, partly list patient capitation and partly FFS. It may be expected that such a system contains incentives for cost-effectiveness (because of the more fixed and prospective characteristics of the salary- and capitation-system) without jeopardising the access of care (because of the FFS-component). In the UK, a list-capitation system mainly finances GPs. This fee is supplemented with specific fees for additional medical activities (e.g. vaccinations, consultations at night, etc.) i.e. a FFS-system. Moreover, British GPs acquire bonuses if specific targets (e.g. screening) are achieved [35].

6. Conclusions

In this article, a typology was developed to classify reimbursement systems for care providers. Several classifications are feasible, which indicates the complex nature of these matters, and underlines the need for a workable typology. The selected criteria to classify payment systems largely depend on the intended use of the typology. Our objective was to classify systems according to their incentive effects i.e. their capability to attain the general objectives of health care: to produce an acceptable level of quality in an efficient way without jeopardising access for patients, assuring that providers aim at maximal profits. This resulted in a typology with two dimensions (variable/fixed and retrospective/prospective) and five units (item-of-service, patient-day, case, enrolled patient, period). Besides, incentives on the micro- and macro-level were distinguished because these can guide provider conduct in different ways.
Acknowledgements

This study was partly financed by the Government of the Flemish Community (Belgium). The contribution of Geert Lombaert at the beginning of the study and constructive comments of two anonymous referees are gratefully acknowledged.

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