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Calculating reimbursement rates in Bulgaria – results of recent reforms

Abstract

The recent development of the healthcare system in Bulgaria has shown a clear need for a transparent and fair mechanism defining reimbursement prices in the sector. The rigidity of the healthcare system, as well as the lack of comprehensive data, has obstructed that process and posed the necessity of a substantive public discussion of the issues, arising from current payment mechanisms. This paper presents the via dolorosa from the data collection, the analytical methods and the sensitivity analysis to key results of an expert research study carried out by the Ministry of Finance on the basis of an initial empirical analysis of reimbursement policies for publicly-provided healthcare services in Bulgaria (conducted during autumn 2010). The revitalisation of the healthcare system that followed is underlined, as are the remarkable results with respect to the increase in equity under strict budgetary restrictions.

Keywords: *equity, reimbursement rates, clinical pathways, cost-reimbursement level gaps*

Introduction

During the late 1990s, Bulgaria was faced with the dilemma of settling on a radically new form of organisation and financing for its healthcare system. After a long period of economic downturn and crises, the endorsement of the new Health Insurance Act (HIA) in 1998 had seemed to be a breath of fresh air for all stakeholders involved in healthcare.

The HIA introduced a mandatory 6 % insurance premium on gross wages, under which self-insured people contributed 6 % of the minimum wage while the state insured all those under 18 as well as regular university students. In 2009, the insurance premium was raised to 8 % of the gross wage (and 8 % of the minimum wage for the self-insured) in the attempt to curb the problem of the constant re-evaluations that had plagued public health insurance.

The former Soviet-style healthcare system, the *semashko*, was replaced with an obligatory health insurance system which led to the establishment of the National Health Insurance Fund (NHIF). Soon after, in 1999, clinical pathways (CCPs) were accepted as an important financing tool in in-patient care. At the beginning, their number was forty, but that figure gradually increased to 298, suggesting a transition in the model of financing towards a fee-for-service, as opposed to per-case, form of reimbursement. In their essence, CCPs represent a reimbursement system based on main diagnoses, not taking in consideration such factors as age, sex, severity of disease, etc.

With the arrival of CCPs, reimbursement rates were defined as a symbiosis between administrative cost (through the expert opinion of national consultants by type of medical specialisation) and stakeholder negotiation (between the branch organisations of physicians and the NHIF).

Such an approach posed some serious open issues in relation to performance incentives in in-patient care (e.g. quality of care), cost control (over hospitalisations) and the referral system (over the utilisation of in-patient care), which had the potential to position the Bulgarian healthcare system between the *scylla* of equal access and the *charybdis* of cost sustainability. In that line of thought, a major reform was implemented in 2009 through the introduction of retrospective-based capped budgets which concentrated on the significance of cost-containment in in-patient care.

It should be noted that, during the 1998-2010 period, population health outcomes did not significantly improve; moreover, the reimbursement system created an explosion of private hospitals and an increase in the total supply of hospital beds. Furthermore, between 2003 and 2009, the total number of hospitalisations had risen by up to 60 % and re-hospitalisations saw an increase averaging around 30 %.

The valuation of clinical pathways (CCPs) and medical services, reimbursed by the system of statutory health insurance in Bulgaria in 2011, had started with the preparation of prognostic volumes, reimbursement rates and methodologies by the Bulgarian Ministry of Finance. The second stage included the co-ordination of the proposed results with national consultants in separate medical specialisations. In accordance with this procedure, an inter-institutional Committee was established, which included representative members of patient organisations, branch organisations of physicians in humanitarian and dental medicine, the Ministry of Finance, the Ministry of Health, the Ministry of Labour and Social Policies and the National Health Insurance Fund. The Committee then proposed a final variant of reimbursement rates and volumes to the medical services, which was discussed and endorsed by the Bulgarian Council of Ministers.

The following methodologies for valuation were then applied, taking into consideration the best European practices regarding the reimbursement of medical services.

Information for the purposes of the valuation was dealt with using up-to-date econometric models for analysing and valuing medical services. Reimbursement rates were defined by comparative methods, expert opinions, *ex post* and *ex ante* analysis, statistical models based on the normalisation of the relative disturbances to reimbursement rates in comparison with average cost and, finally, through the use of the cumulative function of a standard normal distribution.

Some particular results were achieved, as follows:

First of all, better balance and a redistribution were accomplished *vis-à-vis* individual specialisations in medical care. A superior pace of growth in the total resources made available to outpatient care was envisaged – this averaged 10 % in comparison to 2010 and was realised at the expense of in-patient care, in which expectations for 2011 are strongly connected to cost containment and a more fair internal redistribution.

Several financial stimuli were created, aiming at motivating providers in outpatient care, with the intention of promoting cost containment in in-patient care.

For the purposes of defining reimbursement rates, data was used regarding the reported costs of medical facilities to the NHIF over a three-year period. NHIF is the only financing body with respect to the obligatory health insurance pillar in Bulgaria. It should be mentioned that the main health indicators, as well as data on the demographic trends of the population, were also taken into consideration. These were provided by the National Statistical Institute (NSI) and the Ministry of Health (MH).

Literature review

With respect to the valuation of healthcare services, the academic literature is rich in approaches and methods, even though two streams of methods are most clearly defined – micro costing; and top-down costing.

With regards to micro costing, cost is derived for each element of an intervention: staff time; supplies and medication; out-of-pocket expenses; etc. Thus, the main source of information appears to be cost information, as gathered by questionnaires and accounting data. Consequently, emphasis is laid on the implementation of international comparisons using purchasing power parities (PPPs) and episode-specific PPPs, as well as constructing individual and group cost functions.

Top-down costing concentrates on aggregated data and is used as a main budgeting approach in the academic literature. It focuses on the establishment of homogenous cost categories and derives a level of use for each category. Accordingly, a cost-volume relationship is obtained and analysed, thus enhancing the allocation of common costs by the use of parametric models.

One of the micro-costing approaches in practice is the evaluation of health policies through micro-simulation methods (Zucchelli *et al*. 2010). These dynamic models (the Population Health Model 'POHEM' and the Future Elderly Model 'FEM') are used to simulate lifecycle health trajectories and associated healthcare costs under competing policy scenarios in order to illustrate the power of micro-simulation as a vivid and relevant tool for *ex ante* policy evaluation. This provides the opportunity to test the effectiveness of different policies, as well as to assess the efficacy of different versions of the same policy, for example a phased implementation. Dynamic micro-simulation offers a number of important advantages over more standard methods of *ex post* policy evaluation.

Regarding reimbursement rates and mechanisms, some studies exploit the phased shift from historical budgets to explore aggregate impacts on hospital output, national health spending and mortality from causes amenable to medical care. For example, Serra and Wagstaff (2009) use a regression version of difference-in-differences and two variants that relax the difference-in-differences parallel trends assumption. The results show that fee-for-service and patient-based payment methods both increase national health spending, including private (out-of-pocket) spending.

Serra and Wagstaff (2007) also discuss the implementation of social health insurance systems in post-communist countries during the transition period in the 1990s. The authors argue that most European and central Asian countries switched relatively quickly from a general tax-funded system to one based on social health insurance. Moreover, regression-based generalisations of the differences-in-differences approach are used for 28 European and central Asian countries, performed with panel data for

the 1990-2004 period. The main conclusions drawn include that implementation of social health insurance in Europe and central Asian countries increases government per capita health expenditure; that part of the additional spending on healthcare goes towards increased remuneration of medical staff; that medical personnel favour a transition to social health insurance systems due to the expected rise in their own compensation; and that the transition to social health insurance results in a decrease in average length of stay and in increase in hospitalisations and bed occupancy rates. The most important finding, according to authors, is that the transition to social health insurance systems did not lead to any serious improvements in the health status of the affected population.

Studies examining healthcare spending issues are a highly useful starting point for analysis and reform options. Jenkner and Leive (2010), for example, study how to modify provider payments to impose harder budget constraints. Analysing health spending can provide and identify outliers and potential areas for future reform. The challenge for many countries is to implement policies that allow them to realise the benefits of continued technological improvement without sacrificing fiscal sustainability.

The ownership model of modern healthcare service delivery shows a mix of public and private institutions which maximises the benefits and efficiency of healthcare services. Countries can move towards their balance by reducing waste and producing cost-effective interventions. They try to expand their evidence base and identify and quantify inefficiencies in order to improve performance (Hsu, 2010).

Cost variations in the healthcare systems of European countries seem to diverge regardless of the use of Diagnosis-Related Groups (DRGs) as a main method of payment throughout Europe. Differences in costs are due to the following variations in explanatory variables (Street *et al*. 2010): patient mix; diagnostics and treatment; unit cost; and the observable characteristics of cost calculations. The main target of economic research in healthcare is to establish a fair payment method which takes cost variations into account due to factors beyond the control of hospital managers.

Scheller-Kreinsen *et al*. (2009) present and analyse the main strengths of DRGs – increased transparency regarding hospital costs; enhanced economic efficiency; and improved management support. It is concluded that proper implementation of DRGs develops meaningful performance comparisons and incentivises the providers of healthcare services in line with social objectives.

Balabanova and McKee (2002) stress the lack of political consensus in the course of economic reforms made in the Bulgarian health sector during the last decade. It is found that the social security system that has been implemented in Bulgaria encounters greater public support than the tax-based alternative which it has replaced.

Joumard *et al*. (2010) analyse the efficiency of healthcare systems in OECD countries. In their study, data on life expectancy, the efficiency of healthcare spending, length of hospital stays and the occupancy rate for acute care hospital beds are used in order to assess the efficiency of the care systems and to group countries based on the results. Moreover, it is assumed that there is no health system that performs systematically better than the others with respect to cost-efficiency, and that the employment of

good practices among the systems has the potential to achieve better results than large-scale reforms.

Kutzin *et al*. (2010) design a conceptual framework in order to analyse health financing systems and the effects of reforms based on 'three pillars': fiscal content; policy objectives; and descriptive framework. Subsequently, healthcare systems and the reforms implemented in central European and eastern Europe, Caucasus and central Asian countries are reviewed, indicating important 'pitfalls' in the realisation, such as the legalisation of informal payments as co-payments; the incomplete undertaking of reforms; the realisation of contradictory policies; and ignoring the policy analysis of public health services and programmes. The need to align public expenditure and financial management with health financing reforms is supported, as quintessential in the policy analysis, with strong emphasis on transparency-oriented reforms.

Fattore and Torbica (2008); Schreyögg *et al*. (2005); Swan Tan *et al*. (2008); Schreyögg *et al*. (2008); Bellanger *et al*. (2005); Tiemann (2008); Schreyögg (2008); Stargardt (2008); and Epstein *et al*. (2008) all concentrate on European cross-country comparisons regarding the costs of similar medical procedures performed in hospital conditions. At first, they underline the difference between benefit baskets (the entirety of services granted in a given country by the public health system) and benefit catalogues (the normative framework that describes the benefits in detail). Then a set of DRGs is selected which represents the 'backbone' of the international comparisons which are made. Finally, information about cost is gathered on the basis of standardised questionnaires and thoroughly analysed using multiple regression models and ANOVA. Moreover, the relationship between PPP-adjusted prices and constructed episode-specific PPPs is emphasised in the breakdown of cost variations.

Kifmann and Lorenz (2011) demonstrate that cost reimbursement, in addition to risk adjustment, helps to reduce selection incentives. They construct a model on the basis of a perfectly competitive health insurance market, aiming at promoting the prices of medical services independent of the patient's risk profile. Thus, they support the optimal cost reimbursement of health insurers in order to minimise risk selection. For that reason, the risk types and associated health costs are meticulously studied, constructing a marginal rate of reimbursement for each risk type. Finally, it is concluded that the costs should be reimbursed up to a certain threshold, enhancing cost efficiency.

Fuchs (2010) emphasises the role of reimbursement schemes regarding healthcare services and underlines the impact of the three major reforms in the US health system (the development of private insurance; the creation of Medicare and Medicaid; and the introduction of DRGs). The author argues that these re-organisations improved some aspects of equitable access, and the quality and timeliness of healthcare services, as well as the health status of the population. Nevertheless, such results were achieved at the expense of an imbalance in the growth of healthcare expenditure in which the percentage increase in health costs outweighs the growth in GNP. It is supposed that the introduction of third-party payments in health care and of co-insurance schemes have the potential to alleviate the problem of increasing health expenditure, but they do not represent a solution. A better one is to reduce the health costs of certain groups of the population, to design methods for global reimbursement schemes (taking into consideration the under-utilisation that might occur) and to encourage competition between

health insurance companies. Finally, it is concluded that prospective reimbursement payment schemes may possibly have a positive impact on research and innovation activities at hospitals and lead to a super-concentration of specialists in certain regions.

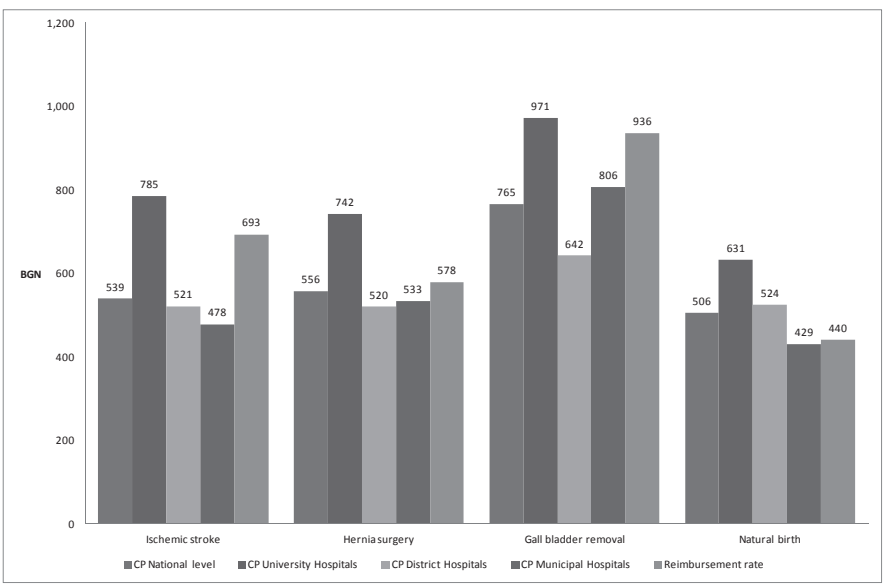
Data and methodology

Up to 2010, the reimbursement rates for CCPs were negotiated between the branch organisations of physicians and the NHIF. This practice was instituted following the establishment of the NHIF in 1999; however, this led to the emergence of several disproportions in the rates of medical services from one medical specialisation to another. Moreover, hospitals received the full amount of the reimbursement rates of those CCPs reported to NHIF, without having to report the structure of costs incurred for individual patients.

The lack of a lucid consistency in reimbursement rate policies, in addition to the deficiencies in connection with actual hospital expenditure, was caused mainly by an original shortage of reliable data, certain lobbies among the separate medical specialisations and a lack of implicit cost adjustment mechanisms in respect to certain CCP changes. Such incongruities had led to a breach in the negotiation process which resulted in rising hospital deficits, as well as deficits for NHIF concerning in-patient care.

The substantial variations in actual costs are shown in Figure 1, using data from 2009.

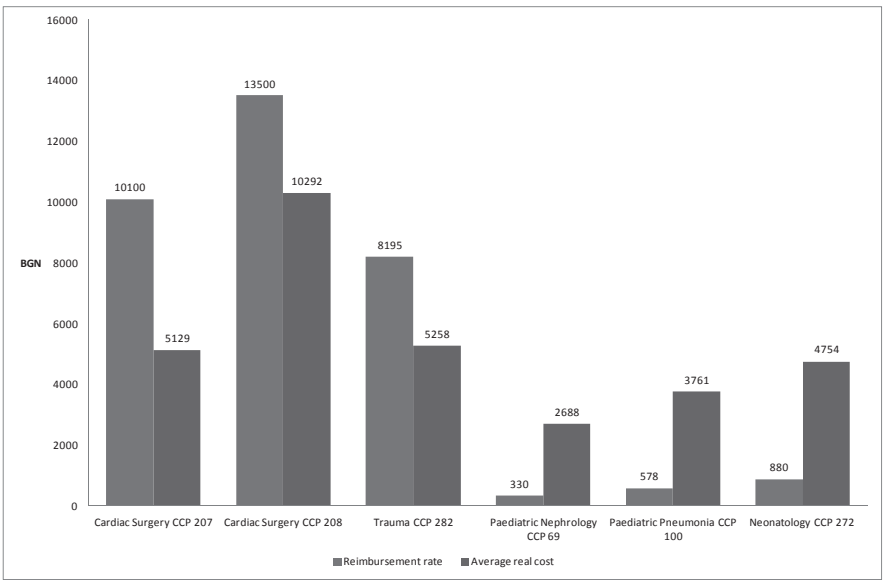
Figure 1 – In-patient care episodes variation of actual costs in BGN (2009 data)



Source: NHIF, Ministry of Finance

When the actual costs were considered as a benchmark for setting a reimbursement rate, it was found that there were immense differences between average actual costs and reimbursement rates. This had caused severe over- or under-reimbursement in numerous cases, as is shown in Figure 2.

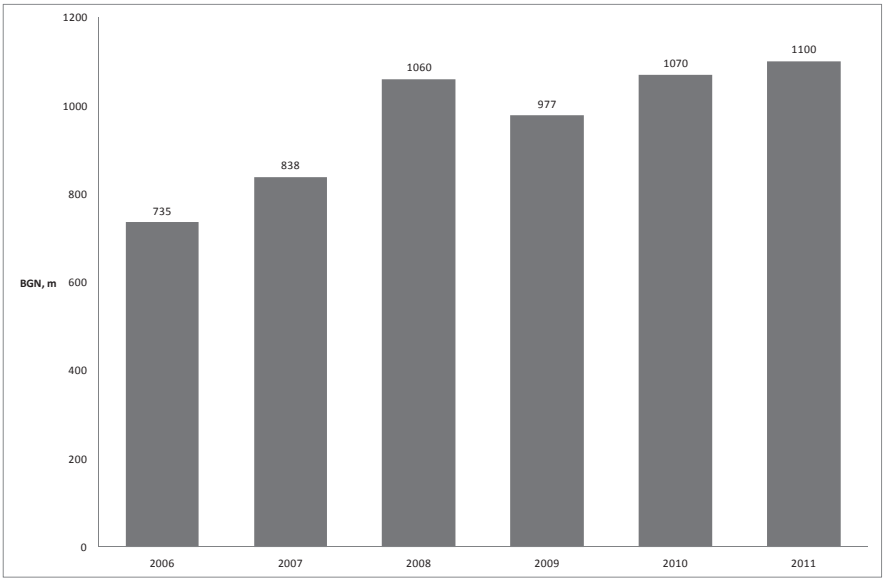
Figure 2 – Over- or under-reimbursed CCPs in comparison to average costs in BGN (2009 data)



Source: NHIF, Ministry of Finance

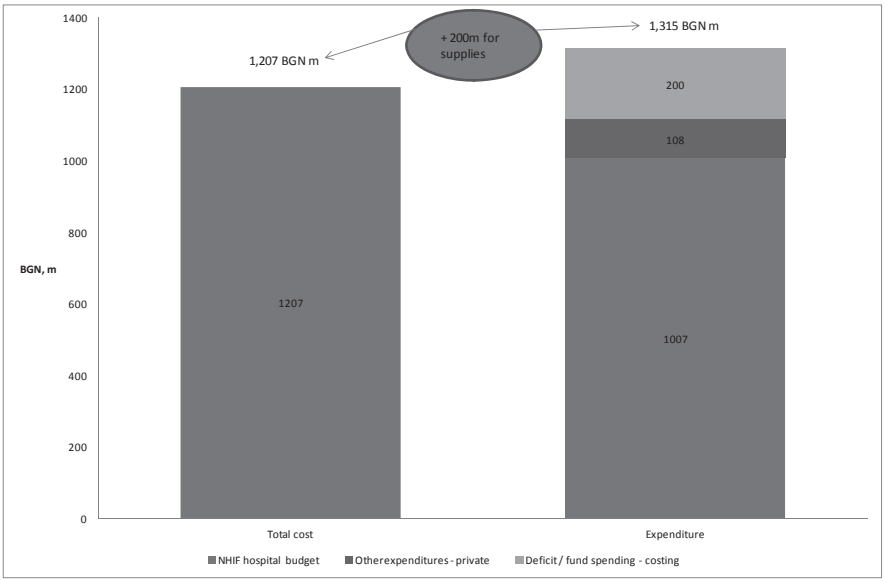
The processes outlined led to a vicious cycle of ever-increasing public expenditures on in-patient care and constant deficits in the NHIF (see Figure 3). The combined total expenditure by NHIF, out-of-pocket spending and registered debt proved to exceed the total real cost of the services provided, as is illustrated in Figure 4.

Figure 3 – Public spending on in-patient care, 2006-11 (BGN, m)



Source: NHIF, Ministry of Finance

Figure 4 – 2010 total cost versus total reimbursement of basic package (BGN)



Source: NHIF, Ministry of Finance

Regarding the sources of information, NHIF is confirmed as the main source of data, alongside NSI. The data gathered from NHIF encompassed information on the activities of medical facilities, performed CCPs and, in part, information about actual costs per CCP. The data retrieved from NSI and MH concerned demographic trends on the population and the main health indicators.

Information about the total number of hospitalisations was assembled for 2007, 2008 and 2009, with 2009 being the starting point for the data analysis. The scope of cases reported to NHIF improved during the years, covering in 2009 more than 80 % of cases (CCPs and actual costs), which makes the information statistically significant.

It was assumed that forecast hospitalisations for 2011 would equal the number of hospitalisations in 2009, as well as that the reimbursement rates should be defined based on actual costs as reported to the NHIF.

For the process of the valuation of the CCPs, five critical steps were performed, as follows:

Step 1

- determination of the cost of each CCP: as a multiple of the base rate for all cases and the weight allocated to each specific CCP
- determination of the base rate for all cases: the total expense for all hospitals divided by the total number of equivalent cases

- determination of the weight per case: disaggregation of the direct and indirect costs and the identification of the average cost per CCP, divided by the average cost of all CCPs

Step 2

- determination of the volume of each CCP: calculation of the so-called 'equivalent case', which is the average length of stay per CCP

Step 3

- definition of new reimbursement rates, based on an analysis of the ratios between valid reimbursement rates and the actual cost as reported to NHIF

Step 4

- defining the coefficients of relative under- and over-reimbursement for each and every CCP. This is calculated as the relationship between the difference between average cost and the reimbursement level, and average cost

Step 5

Defining new reimbursement rates:

- the coefficients of relative over- and under-reimbursement are standardised through Z-transformation
- the new reimbursement level is positioned in the interval between the old reimbursement level (valid for 2009 and 2010) and the average cost of a hospitalisation episode in 2009
- positioning is performed with the help of the cumulative function of the standard normal distribution.

The new reimbursement level is positioned in the interval between the old one (valid for 2009 and 2010) and the average costs per hospitalised episode for 2009. Thus, a balance was sought between the opinion of experts, which had defined reimbursement rates, and actual cost. The idea of such an algorithm is to capture the amount to which a certain clinical pathway is under- or over-reimbursed and to approximate this by the same relationship to actual cost. For this reason, the coefficients of relative over- and under-reimbursement were standardised using the Z transformation:

(1)

$$Z_i = \frac{\Delta R_i - \mu}{\sigma}$$

where μ and σ are the average value and the standard deviation of the population of the 298 coefficients of relative under- and over-reimbursement. After that, with the help of the cumulative function of the distribution N (0,1) (standard normal), values for P(Zi) were calculated, positioned in the interval [Ci, RCi] in the case of over-reimbursement and in the interval [RCi, Ci] in the case of under-reimbursement. The formula used is:

(2)

$$P(Z_i) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{Z_i} \exp\left(-\frac{u^2}{2}\right) du$$

The new reimbursement level is calculated as follows:

(3)

$$New\_RC_i = C_i - 2 \cdot P(Z_i) \cdot (C_i - RC_i)$$

in the case of over-reimbursement, and:

(4)

$$New\_RC_i = C_i - 2 \cdot (1 - P(Z_i)) \cdot (C_i - RC_i)$$

in the case of under-reimbursement.

The method described was adopted to calculate new reimbursement rates only for those clinical pathways in which the total number of hospitalisations in 2009 is larger than 0.001 % of the total number of all hospitalisations. For other clinical pathways, due to the lack of information and data, the old reimbursement rates from 2009 and 2010 were preserved.

Thus, the definition of the final new reimbursement rates RP_i could be performed. They are calculated as follows:

(5)

$$PRC_i = K \cdot New\_RC_i$$

The coefficient of proportionality is dependent on the total budget and has the numerical illustration:

(6)

$$K = \frac{Budget}{\sum (FQ_i \; New\_RC_i)}$$

where:

Budget is the sum that is forecast for the reimbursement of all CCPs; and FQ_i is the forecast number of hospitalisations of the ***i***-th CCP during 2011.

Results and sensitivity analysis

The volumes and rules of the reimbursement rates agreed in this way reflect the healthcare policies of the government and its commitment to reforming the healthcare sector. For 2011, the revaluation of the reimbursement rate led to an increase of more

than BGN 1.3m being earmarked for preventive care, and BGN 4.9m for the treatment and monitoring of chronic illness, compared to 2010 reimbursement rates and volumes. This amounts to a total increase of BGN 6.2m for primary health care services in 2011 on the 2010 level. In practice, this means that there will be an average monthly increase of BGN 114 per general practitioner, not taking into account an additional BGN 9m destined to ensure 24-hour access to primary healthcare for every insured person.

Within specialist care services, a BGN 6.8m increase in the funds designated for the reimbursement of primary and secondary visits was achieved, under which resources for preventive care and the treatment of chronic illness were increased by more than BGN 1m (equivalent to a monthly increase of around BGN 70 per specialist).

In in-patient care, a 6 % decrease in the number of hospitalisations is foreseen compared to the level of 2009. This assumption is based on the obligation of the National Health Insurance Fund to contract only with providers that comply with adopted medical standards.

The new provider payment fees described above, as well as the anticipated volumes and methodologies for the costing and reimbursement of healthcare services contracted under the NHIF for 2011, were officially adopted through a Decree of the Council of Ministers (No. 304, dated 17 December 2010).

The analysis reduced the gap between actual costs and reimbursement levels from 22 % (2010) to 17 % (2011), which was one of the most clear-cut results. On the other hand, the average CCP reimbursement level (volume-weighted) increased from BGN 618 in 2009/10 to BGN 652 in 2011 (simultaneously increasing primary care funds by BGN 6.2m and BGN 6.8m for specialist care).

The assumption of a 6 % decrease in the total number of hospitalisations was, at November 2011, achieved precisely on a year-on-year basis. The better reimbursement level balances are expected to enhance both efficiency and access. In that line of thought, the preliminary data on designated hospital budgets and specialist care access issues is strongly encouraging.

Finally, the resulting changes should be underlined (See Table 1).

Table 1 – Resulting changes in reimbursement levels

Changes in reimbursement levels, 2009/10 – 2011	No.	% of total
All CCPs	298	100 %
CCPs with increased reimbursement levels	189	63 %
CCPs with an unchanged reimbursement level	65	22 %
CCPs with decreased reimbursement levels	44	15 %

Re-balancing reimbursement rates through a reduction in just 15 % of CCPs has facilitated an increase in the reimbursement rates of 63 % of CCPs.

In conclusion, several more measures need to be taken. Between them, of great significance is the study of how medical practice behaviour changes in response to

financial incentives. On the other hand, a quantification of the quality of clinical care is needed, as well as better use of information technology in the process of valuation. Alternatively, it is extremely important that patient satisfaction should be incorporated in future analyses. Last, but not least, some measures for medical specialists should be designed so as to measure their performance and efficiency.

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