

OPTIMIZING EXPENSES IN HOSPITAL UNITS

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Abstract: Health systems are continuously subjected to challenges of different natures, from the ageing of the population, namely the increase in the number of associated diseases, high costs of financing new technologies to the emergence of pandemics, with a major impact on budgets allocated for health. In 2020, 48% of the funds allocated for health in Romania were spent in hospital units, 25% by retailers and other providers of medical goods, and 14% of the amounts were allocated to outpatient medical service providers. According to the OECD, up to 20% of health expenditure contributes little or no to improving the health status of patients, including unnecessary admissions or average outdated hospitalizations, sets of unnecessary or duplicated analyzes, overstated drug treatments to the detriment of generics, continuous hospitalizations for conditions that can be treated in outpatient settings, etc. Considering the fact that the budget allocated to health in Romania is among the smallest at the level of the Member States of the European Union, it is very important that the allocated amounts are spent as efficiently as possible. This paper carries out a qualitative and quantitative research on the use of funds allocated for health, for the period 2012 - 2022, in six hospital units in the west of the country, in order to verify the level of efficiency of the use of these funds. The results of the research show us the existence of avoidable expenses, which do not bring benefits regarding the health of the patients but put pressure on the budgets of the hospital units. By highlighting these expenses, there are the necessary premises for optimizing the expenses, the amounts thus saved can be used to increase the quality of the medical act and the development necessary to ensure the patients' treatments.

Keywords: Health expenditure, Financing of hospitals, Diagnostic related groups, Optimizing expenses in hospitals

JEL classification: A12, H51, I15, P43

1. Introduction

Although almost half of the budget allocated to health in Romania is spent in hospital units, given the low percentage allocated, relative to GDP, the financial needs of hospitals are often insufficient, so it is very important how these funds are obtained and spent.

The number of beds in hospital units in Romania is in the top at European Union level in 2020, being 7.1 beds per 1,000 inhabitants, with 2.1 beds above the EU average and 5 beds above Sweden, the country with the fewest beds existing in hospitals.

The existence of a high number of beds means, most of the times, higher costs for the hospital units, given the way of financing the medical services, depending on which the staffing norm for the hospital wards is established in conjunction with low bed usage rates and high costs from an administrative point of view.

The financing of hospitals in Romania is carried out on the basis of the contracts concluded with the County Health Insurance Houses, the legislation providing in the calculation formula a series of indicators that can be improved only by a rigorous management of the hospitalized cases, otherwise there is a risk of reducing efficiency, and the amounts collected do not cover the costs of treating patients.

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The share of personnel expenditures in total expenditures is high, with percentages between 61% and 71% for the analyzed hospitals, which leads to the decrease of the resources available for capital expenditures necessary for endowment and implicitly, the improvement of the quality of the medical act.

In general, hospitals have reduced levers regarding the increase of the amounts contracted with the health insurance houses, these being influenced by the number of beds established by the Ministry of Health, in conjunction with the legislation on personnel regulations for each ward, so it is important that they ensure an adequate management for the hospitalized cases.

The financing of hospitals in Romania is mainly based on the Diagnostic Related Groups (DRG) classification system, a system developed in the early 1970s by Robert Barclay Fetter and John D. Thompson of Yale University and implemented for the first time in New Jersey, since 1980, at the initiative of the NJ Commissioner for Health, Joanne Finley (Caryn Bredenkamp et al, 2020).

Romania implemented for the first time the DRG-based financing system in 2005, by concluding an agreement for the use of the classification system in Australia, which was a model for the development of the Romanian system of classification in diagnostic groups.

Hospitals can have a relatively small influence on the amounts received for the medical services provided, taking into account the number of patients discharged and their type, the main indicator being the case-mix index (ICM) which is closely correlated with the relative value (VR) and the tariffs related to each group of diagnoses.

2. Literature review

Universal health care services of the population were of importance more than 100 years ago, but the real reforms in the establishment of organized and coordinated health systems began with the implementation of the three basic models: Bismark, created by Otto von Bismarck in 1883 (Tulchinsky TH, 2018), Semashko, implemented by Nikolai Semashko in 1917 (Heinrich, A., 2022) and Beveridge, first established by William Beveridge in the United Kingdom in 1948 (Whiteside, N, 2014).

With the implementation of these health systems, as a natural evolution, it has become necessary to establish common criteria for the classification and financing of medical services within hospitals, based on the International Classification of Diseases (ICD), adopted as a global diagnostic system and which is regularly updated, at this time reaching the 11th edition.

There are countless studies on DRG-based funding, starting with its origins (Rick Mayes, 2007), (Chilingirian, J., 2008), (Rodrigues, JM., 1993) or (Mayes R. 2007), its development and implementation in different states (Busato, A., von Below, G., 2010), (Zeynep Or. 2014), (Wilm Q. et al, 2022), (Busse, R., et al., 2002) until the impact on the financing of medical services is analyzed (Louis, D., et al., 1999), (Cots, F., et al., 2011), (Horn, et al., 1986), Louis DZ, et al. (1999), (Zou, K., et al., 2020), (Sergio I Prada, 2022).

The implementation of DRG-based funding may generate different results on the efficiency of hospitals depending on the type of hospital (Dismuke, C.E., Sena, V. 1999), (Louis, D. Z. et al 1999), mainly by reducing the hospitalization period (Shou-Hsia Cheng et al 2012), a high transparency of funding (Mihailovic, N. et al 2016), may involve risks in terms of the quality of the medical act, this system being focused on the financial side (Or, Z., & Häkkinen, U. 2011), but comparing it with financing based on costs or global budgets can provide incentives to hospitals to improve their efficiency (Street, A. et al 2011).

Some authors believe that DRG-based funding may lead to higher costs for healthcare services (Forgione, D.A. et al 1999), given the codification of treated cases, but this is most likely found in cases of "over-coding" (Carine Milcent, 2019), (Cremeans, K. et al 2019), (Coustasse A. et al 2021).

3. Research methodology

Within this study, we conducted a qualitative and quantitative research on the annual evolutions of the main indicators of clinical activity, for a period of 11 years (2012 – 2022), at six emergency

hospitals in the western counties of the country: Alba, Arad, Caraș-Severin, Hunedoara, Sibiu and Timiș, aiming at analyzing the evolution of the main hospital indicators that can contribute to optimizing expenses.

This research includes aggregated data from 792 monthly reports on the budget implementation of the six hospital units, 66 reports on the status of the number of beds for each hospital, 11 reports on the Case Complexity Index (ICM) and 97 reports on indicators of hospitalized morbidity, collected from official databases www.insse.ro, www.ms.ro, www.drg.ro, www.data.gov.ro, as well as those existing at European Union level (EUROSTAT).

Based on the analyzed aggregated data, we have made graphical representations that show the annual evolution for each hospital unit, especially on the indicators that are included in the calculation of the financing, namely the Relative Value (VR) and exceedances of the average hospitalization time (DMS). For the Relative Value indicator, we analyzed cases admitted to continuous hospitalization (acute) whose value was below 0.3 and which, in conjunction with the duration of hospitalization, may lead to higher costs for the hospital than the value settled for the resolved case.

The study of the literature was carried out by accessing the databases "Google Academic" and "Web of Science" (Clarivates) using the relevant search terms "financing of hospitals", "the impact of DRG in the financing of hospitals", "the efficiency of hospitals", individuals or combinations thereof. The results of the research show us that in the 11 years (2012 – 2022) analyzed the exceedances of the average duration of hospitalization has steadily decreased over the years, from 58% (maximum recorded in 2014 by a hospital) to less than 1% in 2022, and as a result of the SARS-CoV-2 pandemic, the percentage is insignificant, relative to the total cases.

Regarding the cases with a relative value below 0.3, the trend also remains decreasing, being also influenced by the pandemic situation.

4. Financing hospitals in Romania

The financing of hospital units in Romania is mainly carried out on the basis of the contracts concluded with the County Health Insurance Houses, according to Law no. 95/2006 on health reform, republished, with subsequent amendments, to Government Decision no. 696/2021 for the approval of the service packages and the Framework Contract which regulates the conditions for the provision of medical assistance, medicines and medical devices, within the social health insurance system for the years 2021-2022, respectively of the Methodological Norms of application, at the moment being supplemented by the Decision no. 248 of 22 March 2023.

The applicable legislation provides for the calculation formula that establishes the total value contracted by hospitals with the health insurance houses, namely: number of discharged cases contracted x case-mix index 2022 (ICM) x weighted case rate for 2022 (TCP).

For hospitals that provide continuous hospitalization services for acute conditions in the DRG system, the amount contracted with the health insurance funds is calculated according to the formula:

$$SC = P \times (Nr_pat \times IU_pat / DMS_spital) \times ICM \times TCP, \text{ where:}$$

P - The value of the reference percentage (P) established in relation to the classification of hospitals according to competences and is calculated as follows:

- for category I: $P = 85 \%$;
- for category IM: $P = (P - 4) \%$;
- for category II: $P = (P - 3) \%$;
- for category IIM: $P = (P - 5) \%$;
- for category III: $P = (P - 5) \%$;
- for category IV: $P = (P - 15) \%$;
- for category V: $P = (P - 23) \%$;
- for non-classifiable hospitals: $P = (P - 33) \%$.

Nr_pat - the number of beds approved and contracted with the health insurance houses

IU_pat - the index of use of beds

DMS – the average duration of hospitalization at the hospital level

TCP - weighted case rate

ICM - case -mix index.

$$\text{Utilization index of beds (Iu)} = \frac{\text{Man-day hospitalization (of patients in and out of date)}}{\text{Average number of beds}}$$

One of the important indicators in determining the settlement value of cases is the case-mix index (ICM) which shows how complex hospital cases are and the costs required to treat them.

The value of the case-mix index is obtained by considering the relative value (VR) and the solved cases (CR), as follows:

$$\text{ICM} = \Sigma (\text{VRDRGi} \times \text{CRDRGi}) / \text{Total cases}$$

Relative value (VR) expresses the ratio between the tariff of a DRG and the average tariff of all DRGs being assigned according to the relative amount of work, consumables and capital resources necessary for the complete treatment of the patient with the respective condition(s).

The financing through the Diagnostic Related Groups (DRG) system was initially developed as a statistical tool, later being implemented as a stimulus method of hospitals with the aim of keeping the costs of treating patients at a level below the settlement tariffs, hospitals that have higher costs will register losses, respectively a gain if they are below the tariff the settled rate.

5. Optimization of expenses in hospital units

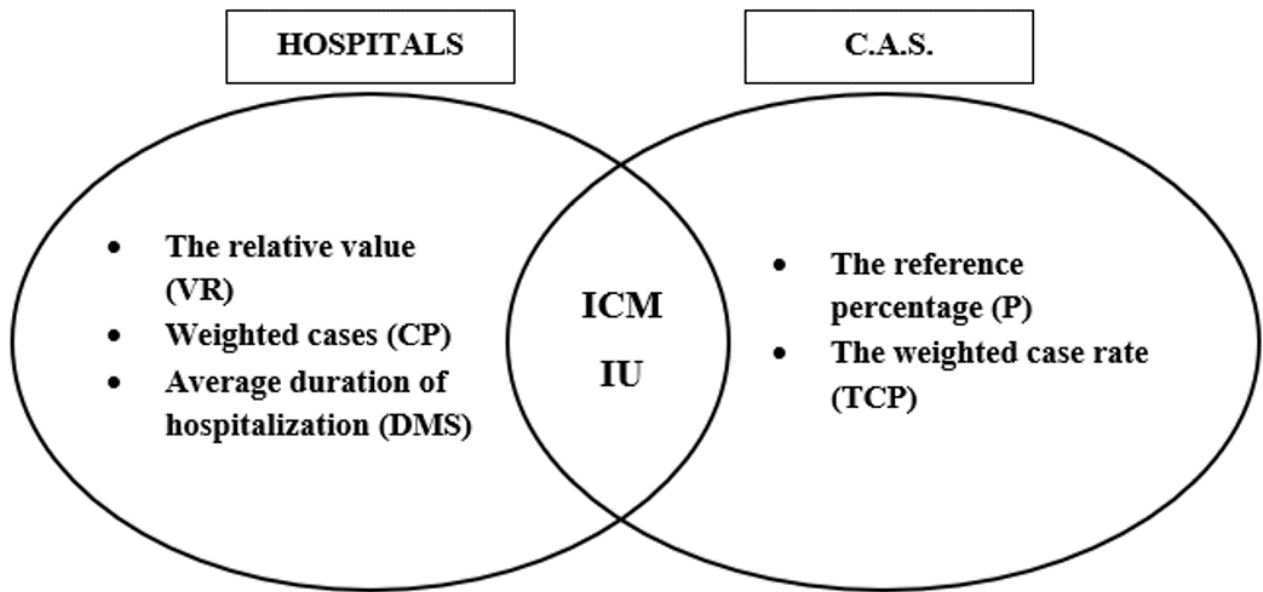
In order for a hospital to be as financially efficient as possible and at the same time to provide the necessary medical services to the population, their management has relatively limited possibilities for action, mainly through rigorous management of expenses and increase revenues by managing cases treated in the hospital. The measures, although sometimes difficult to implement, can bring the necessary surplus to the development and increase of the quality of the medical act, respectively of the complexity of the cases treated, which lead to a better financing.

In the analysis carried out in this research, we have followed the indicators relevant in the financing of hospitals and which, through optimization, can lead to a better financing of the treated cases, namely: the relative value (VR) of the solved case and the average duration of hospitalization (DMS), which can lead to an increase or decrease in the complexity index of cases (case-mix - ICM), a basic component in funding (Figure 1).

On the other hand, health insurance funds use, in the formula for determining the amount contracted with hospitals, the reference percentage (P), which is a 'penalty' in funding determined according to the classification of hospitals by competence, which leads to different settlements for the same pathology, even if the consumption of resources is similar, only considering that a hospital is classified in a higher category.

Also, the weighted case rate (TCP), set in the financing of cases, is not based on the actual costs of hospitals for treating each DRG code, at this time it is not updated depending on the level of expenses incurred to solve a case in the hospital.

Figure 1. Indicators that can influence hospital funding, depending on the entity

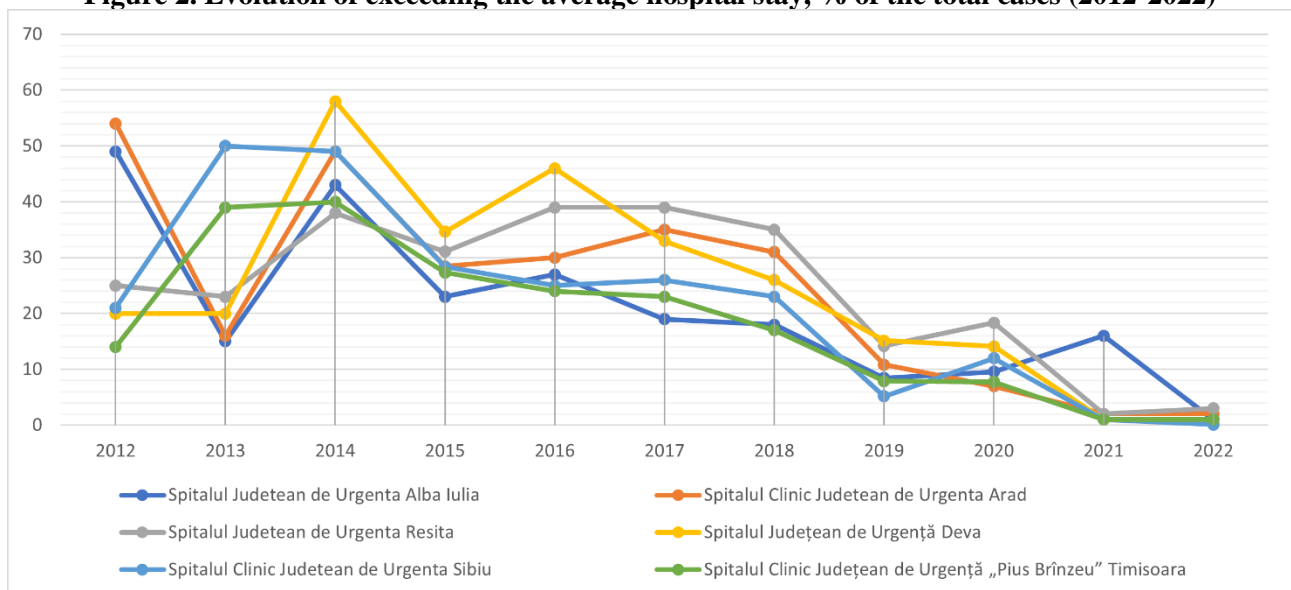


Source: Author processing according to legislative provisions

The analysis of the reports on the exceedances of the average hospitalization duration, based on their indicators of hospitalized morbidity, at the six emergency hospitals in the west of the country, for the period 2012 – 2022, shows us the existence of an uneven trend until 2017, and starting with 2018 it is decreasing, being accentuated during the SARS-CoV-2 pandemic, when significant percentage decreases are observed (Figure 2).

The average duration of hospitalization is part of the hospital's performance indicators, being set at national level for each diagnostic group, and the exceedances are generating costs for the hospital unit (hotel services, food, etc.), without generating additional revenue for the hospital. The "artificial" increase in the average duration of hospitalization with the aim of improving the rate of use of beds, applied in some situations, does not improve the efficiency of the hospital, having a negative impact on funding and is, most of the time, without benefits for patients.

Figure 2. Evolution of exceeding the average hospital stay, % of the total cases (2012-2022)



Source: Author processing based on their reports on hospitalized morbidity indicators

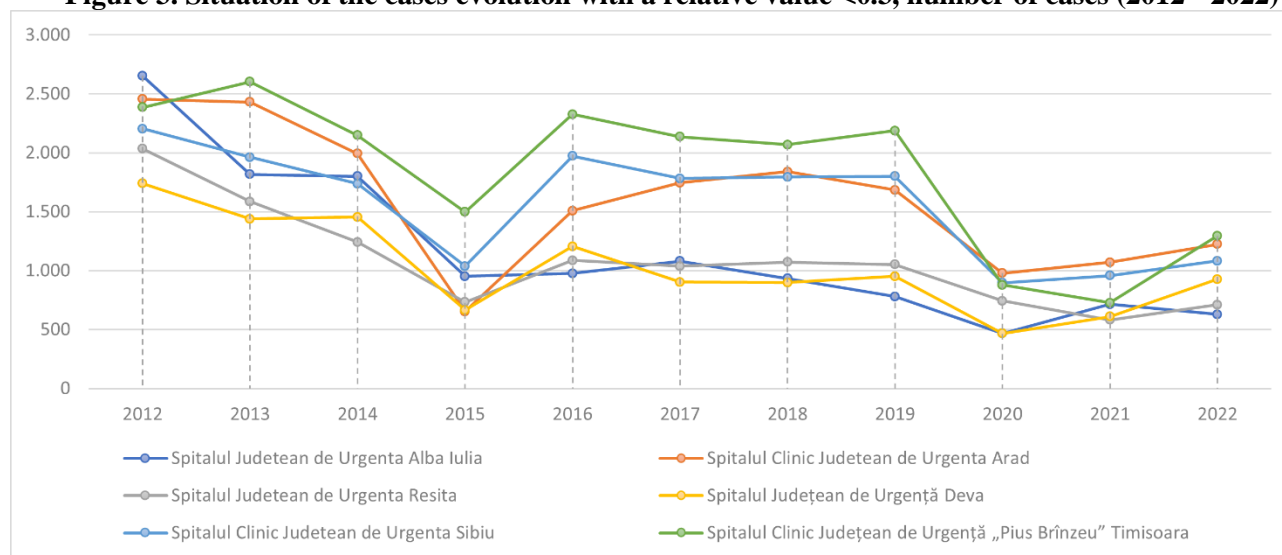
The relative value (VR) is the main component coefficient of the case-mix index (ICM) which shows us how complex a particular disease, as well as the costs necessary to treat it. In order for a hospital to receive better funding, it is necessary to indicate the complexity of cases to be as high as possible, this means that the value of DRG diagnoses is as high as possible.

From the aggregated data contained in the reports on the indicators of hospitalized morbidity, for the period 2012 -2022, for the six emergency hospitals analyzed, we have extracted for each hospital unit the cases with relatively low values (below 0.3), these being considered cases of low complexity and which could be treated in day or outpatient hospitalization regime (Figure 3).

For the period under review, hospitals recorded 91,034 cases, or an annual average of 1,379 cases with a relative value below 0.3, meaning that hospitals spent substantial amounts each year on the treatment of cases of low complexity without the amounts settled for those cases covering the costs.

The graphical representation of the evolution of cases with low relative value shows us a decreasing trend, especially during the pandemic, but in 2022 it returns to growth.

Figure 3. Situation of the cases evolution with a relative value <0.3, number of cases (2012 - 2022)



Source: Author processing based on their reports on hospitalized morbidity indicators

Analyzing the volume of the case-mix index for each hospital, in the period 2012 – 2022, there is a continuous decrease of it, except for a hospital unit (Alba Iulia) where there is an insignificant increase (0.0033), this trend having a negative impact on the amounts financed for the treatment of hospitalized cases (Table 1).

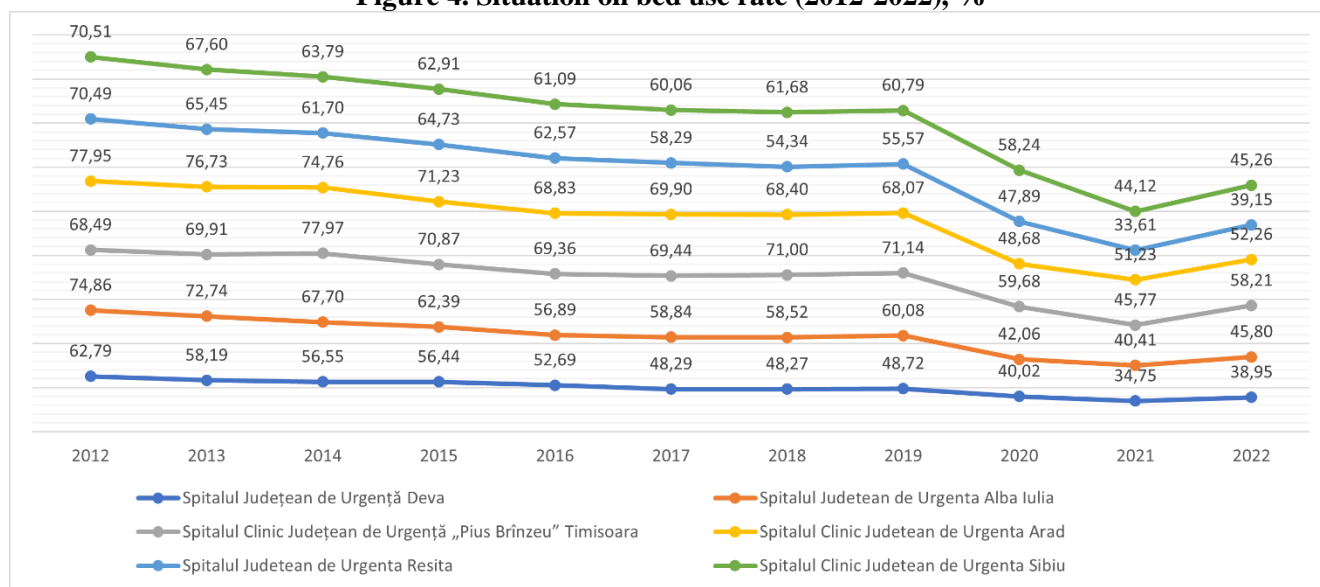
Table 1. The evolution of the case-mix index for each hospital, in the period 2012 – 2022

	ICM Hospital vs ICM Medium Type Hospital											Difference 2022 - 2012
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
SJU Alba Iulia	1,1083	1,0801	1,0500	1,0677	1,0613	1,0509	1,0551	1,0635	1,1181	1,1312	1,1116	0,0033
SCJU Arad	1,2395	0,9214	0,9752	0,9827	0,9635	0,9431	0,9235	0,9523	0,9293	0,8576	0,9268	-0,3127
SJU Reșița	1,1324	0,9994	0,9928	0,9674	0,9656	0,9590	0,9322	0,9147	0,8887	0,9925	1,0224	-0,1100
SJU Deva	1,2490	0,9499	0,9269	0,9154	0,9127	0,9884	0,9641	0,9070	0,8660	0,9190	0,8655	-0,3835
SCJU Sibiu	1,2511	1,0035	1,0027	0,9930	1,0201	0,9954	1,0304	1,0249	0,9830	1,0460	1,0752	-0,1759
SCJU "Pius Brnzeu" Timișoara	1,4868	1,0511	1,0347	0,9920	1,0553	1,0729	1,0957	1,0873	1,1460	1,1246	1,0800	-0,4068

Source: Author processing based on their nationally determined case-mix index reports

Among the causes of this development can be highlighted the high number of hospitalized cases in which the relative value is low, overruns of the average hospital life, or the deficient coding of cases, respectively only the introduction of the main diagnosis, without being recorded in the observation sheets the secondary diagnoses that have generated costs and which have increased the complexity of the cases treated.

Figure 4. Situation on bed use rate (2012-2022), %



Source: Author processing based on their reports on hospitalized morbidity indicators

The rate of bed use in the six hospitals analyzed has a decreasing evolution, mainly during the SARS-CoV-2 pandemic, when the lowest percentages of use were recorded. Even in the rest of the years, the situation is not a positive one, except for 2012 where the use rate is close to the ideal values (80%), given that the average index of use of beds, established according to legal regulations, is 290 days for the sections, respectively the acute compartments.

In these conditions, hospital units have limited chances that the financial efficiency will be a positive one, given other factors that have led to an increase in expenses, namely administration expenses, hotels, meals, etc.

6. Conclusions

Health systems and especially sanitary units with beds operate in an extremely complex environment, with many challenges of a financial, human or regulatory nature, where the possibility of optimizing expenditure is often difficult to meet.

In Romania, the health system is chronically underfunded, implicitly also the hospital units, even if the percentage allocated to them represents almost half of the total budget. For the analyzed hospitals, the personnel costs amount, on average, to 65%, those of administration, treatment, etc. is around 30%, and the difference of 3-5% is represented by capital expenditures, which means that hospital units cannot develop or manage properly.

Even if the number of beds in relation to the population is among the highest in the European Union, Romania continues to maintain the same number of beds, given that they are cost-generating, without the existence of benefits for the health system.

The occupancy rate of the beds is at a low level, and the norming of the medical staff is carried out by reference to the number of beds, without considering the addressability of a particular pathology and without there being a flexible possibility for the hospital units to adapt their activity dynamically.

The current DRG-based funding is outdated, the settlement tariffs are not based on the actual costs of the hospitals for solving the cases, and by applying the reference percentage (set according to

the hospital category) discrepancies are created in the settlement, on each DRG code there can be up to six different levels of funding, although the consumption of resources is the same.

Hospitals generally have limited leverage in terms of increasing revenues from contracting services with health insurance funds, mainly by increasing the case complexity index (ICM)," but this is not an easy task to perform and the results are visible

In order to optimize the expenses in the hospital units, it is important to monitor the hospitalized cases, depending on the complexity of the cases, so as to eliminate those cases with a relatively low value and which can be treated in day hospitalization or outpatient regime.

Another important indicator in optimizing expenses is the average duration of hospitalization (DMS), which is regulated at national level, as well as at the level of hospital or diagnostic group, and exceeding it generates additional costs for the hospital that may not be covered by the amount settled for the treatment of that case, respectively the recording of losses for the hospital.

The unjustified extension of the duration of admission, in order to artificially increase the rate of use of beds or by discharge at the beginning of the week, generates costs for the hospital and does not bring real benefits to patients.

It is also very important to train the staff in order to correctly encode the cases in the medical documents, so that the inclusion in the DRG diagnostic groups, respectively their financing, is as close as possible to the costs made by the hospital for treatment.

The results of this research, respectively the way of optimizing the expenses in hospitals, can be influenced by the modification of the regulations on the financing of hospitalized cases, at this moment being underway a pilot project involving 50 to 60 hospitals, in order to establish the real costs for the main types of patients discharged so that the settled tariffs reflect the reality.

References

- Bentes, M. (1990). Implementing DRGs in Portugal: a summary of the first real European experience. In Proceedings of the 6th international working conference. PCSE, St Etienne, [online], Accesat 23.04.2023
- Busato, A., von Below, G. (2010). The implementation of DRG-based hospital reimbursement in Switzerland: A population-based perspective. *Health Res Policy Sys* 8, 31 <https://doi.org/10.1186/1478-4505-8-31>, [online], Accesat 23.04.2023
- Busse, R., et al. (2002) *Health Care Systems in Eight Countries: Trends and Challenges*. European Observatory on Health Care Systems, London School of Economics & Political Science Hub, London.
- Carine Milcent (2019). From downcoding to upcoding: DRG based payment in hospitals. 2019. {halshs-03966671}
- Caryn Bredenkamp et al, (2020). *Transition to Diagnosis-Related Group (DRG) Payments for Health*, International Bank for Reconstruction and Development / The World Bank
- Chilingirian, J. (2008). Origins of DRGs in the United States: A technical, political and cultural story. In J. Kimberly, G. De Pourville, & T. D'Aunno (Eds.), *The Globalization of Managerial Innovation in Health Care* (pp. 4-33). Cambridge: Cambridge University Press. doi:10.1017/CBO9780511620003.002, [online], Accesat 22.04.2023
- Cots, F., et al. (2011). *DRG-based Hospital Payment: Intended and Unintended Consequences*, Open University Press McGraw-Hill Education, Maidenhead.
- Coustasse A. et al (2021) Upcoding medicare: is healthcare fraud and abuse increasing? *Perspect Health Inf Manag.* 18(4):1f. PMID: 34975355; PMCID: PMC8649706.
- Cremeans, K. et al (2019). Implications of upcoding on Medicare. Paper presented at BHAA Annual Conference, Chicago, IL.
- Dismuke, C.E., Sena, V. (1999). Has DRG payment influenced the technical efficiency and productivity of diagnostic technologies in Portuguese public hospitals? An empirical analysis using parametric and non-parametric methods. *Health Care Management Science* 2, 107–116.

- Forgiione, D.A., D'Annunzio, C.M. (1999). The use of DRGs in health care payment systems around the world. *Journal of Health Care Finance*, 26:66–78.
- Framework contract of 26 June 2021 regulating the conditions of providing medical assistance, medicines and medical devices within the social health insurance system for the years 2021-2022
- Government Decision nr. ANRE President's Order no. 696/2021 for the approval of the service packages and the Framework Contract regulating the conditions of providing medical assistance, medicines and medical devices, within the social health insurance system for the years 2021-2022.
- Heinrich, A. (2022). The Emergence of the Socialist Healthcare Model After the First World War. In: Nullmeier, F., González de Reufels, D., Obinger, H. (eds) *International Impacts on Social Policy. Global Dynamics of Social Policy*. Palgrave Macmillan, Cham. https://doi-org.am.e-nformation.ro/10.1007/978-3-030-86645-7_4, [online], Accesat 21.04.2023
- Horn, et al. (1986). Severity of Illness within DRGs: Impact on Prospective Payment. *American Journal of Public Health*, 75, 1195-1199.
- Implementing rules of the framework contract act of 26 June 2021 regulating the conditions of providing medical assistance, medicines and medical devices within the social health insurance system for the years 2021-2022.
- Law nr. 95/2006 on health reform, republished, with subsequent amendments.
- Louis DZ, et al. (1999). Impact of a DRG-based hospital financing system on quality and outcomes of care in Italy. *Health Serv Res*. 1999 Apr; 34(1 Pt 2):405-15.
- Louis, D. Z. et al (1999). Impact of a DRG-based hospital financing system on quality and outcomes of care in Italy. *Health services research*, 34(1 Pt 2), 405.
- Louis, D., et al. (1999). Impact of a DRG-based hospital financing system on quality and outcomes of care in Italy, *Health Services Research*, Vol. 34, pp. 405-415.
- Mayes R. (2007). The origins, development, and passage of Medicare's revolutionary prospective payment system. *Journal of the history of medicine and allied sciences*, 62(1), 21–55. <https://doi.org/10.1093/jhmas/jrj038>
- Mihailovic, N. et al (2016). Review of diagnosis-related group-based financing of hospital care. *Health services research and managerial epidemiology*, Volume 3: 1-8.
- Or, Z., & Häkkinen, U. (2011). DRGs and quality: For better or worse. *Diagnosis-Related Groups in Europe: Moving towards transparency, efficiency and quality in hospitals*, 115-129.
- Rick Mayes (2007), The Origins, Development, and Passage of Medicare's Revolutionary Prospective Payment System, *Journal of the History of Medicine and Allied Sciences*, Volume 62, Issue 1, January 2007, Pages 21–55, <https://doi.org/10.1093/jhmas/jrj038>, [online], Accesat 22.04.2023
- Rodrigues, JM. (1993). DRGs: Origin and Dissemination Throughout Europe. In: Casas, M., Wiley, M.M. (eds) *Diagnosis Related Groups in Europe*. Springer, Berlin, Heidelberg. https://doi-org.am.e-nformation.ro/10.1007/978-3-642-78472-9_2, [online], Accesat 22.04.2023
- Sergio I Prada. (2022). Efficiency in organizations providing health services: illustration of cases in the Colombian context. *Journal of Public Health* 24:1, pages 1-7.
- Shou-Hsia Cheng et al (2012). The impacts of DRG-based payments on health care provider behaviors under a universal coverage system: A population-based study, *Health Policy*, Volume 107, Issues 2–3, Pages 202-208.
- Street, A. et al (2011). DRG-based hospital payment and efficiency: Theory, evidence and challenges. In R. Busse, A. Geissler, W. Quentin, & M. Wiley (Eds.), *Diagnosis-related groups in Europe: Moving towards transparency, efficiency and quality in hospitals* (pp. 93–114). Maidenhead, UK: Open University Press.

- Tulchinsky TH. (2018) . Bismarck and the Long Road to Universal Health Coverage. Case Studies in Public Health. 2018:131–79. doi: 10.1016/B978-0-12-804571-8.00031-7. Epub 2018 Mar 30. PMID: PMC7149836, [online], Accesat 21.04.2023
- Whiteside, N. (2014). The Beveridge Report and Its Implementation: a Revolutionary Project. *Histoire@Politique*, 24, 24-37. <https://doi.org/10.3917/hp.024.0024>, [online], Accesat 21.04.2023
- Wilm Quentin et al, (2022). How Denmark, England, Estonia, France, Germany, and the USA Pay for Variable, Specialized and Low Volume Care: A Cross-country Comparison of In-patient Payment Systems, *Int J Health Policy Manag*, 11(12), 2940–2950
- Zeynep Or. (2014). Implementation of DRG Payment in France: Issues and recent developments, *Health Policy*, Volume 117, Issue 2, Pages 146-150
- Zou, K., et al. (2020). The effects of diagnosis-related groups payment on hospital healthcare in China: a systematic review. *BMC Health Serv Res* 20, 112