

THE ROLE OF COST ACCOUNTING IN SETTING PRICES IN POLISH AND ENGLISH HOSPITALS

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Abstract

Many of European countries have implemented DRG- based payment systems to improve the financial resources allocation in their health care systems. In most cases they use cost information for pricing decisions and need appropriate cost accounting system implemented in hospitals which generates cost information on the patient level. The aim of the article is to present and compare cost accounting systems used in Polish and English hospitals and investigate the role of cost information in the pricing decisions. Differences between Polish and English hospitals concern the rules and stages of the procedure of cost accounting system, such as: classification, recording, cost allocation and cost calculation. The particular attention is paid on the problem of using cost information in the process of valuation of medical services in hospitals and in pricing decisions made at central level. The article presents the results of an empirical survey conducted in selected English and Polish hospitals in 2013. The respondents gave information regarding cost accounting used in their hospitals and evaluated the impact of cost accounting information on price determination and contract negotiation processes .

Key words: cost accounting, hospitals, pricing decisions, cost calculation, diagnosis related groups

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Introduction

The hospitals provide the full range of specialized medical services for their patients. The patient treatment process includes: diagnostic tests, surgeries consultations with the doctors, nursing care on the ward, etc. Such process, like any other product, is subject to economic valuation. Economic valuation can be defined as the measurement of the value of goods and services in monetary terms (Bateman et al., 2002).

It is estimated that the best basis for setting the prices are an accurate and reliable cost information of the whole treatment process of the patient. The value of the medical services depends therefore on the cost of treatment. The source of reliable and clear cost information for the valuation of medical services performed in the hospital, is cost accounting. Cost accounting is the branch of managerial accounting that deals with the costs analysis. It aims to compute the cost of a product or service (Gentili, 2014). In health care, cost accounting predominantly aims to support managerial decisions and to monitor and control the resource consumption with respect to hospital service delivery (Finkler, 1999).

In Poland, since 2008, the amount of reimbursement for hospitals, has been based on patient classification by Diagnostic Related Groups (DRG). The basic idea of this system is that patients are classified into a limited number of DRGs, which are supposed to be clinically meaningful and relatively homogenous in their resource consumption patterns (Fetter, 1991). Unfortunately, in reality it turned out that the National Health Fund, which is the institution responsible for reimbursement of Polish public health services, does not use cost information generated by hospitals, as the basis of price-setting. The base for determining prices are usually the prices from the previous years and an annual budget of this institution. In Poland, there is no uniform rules of cost accounting. Many hospitals are not interested in understanding the actual cost of medical services, and the payer does not collect cost information, even though they could be useful for setting or updating prices of public health services at the central level.

Quite the opposite situation is observed in England, where the cost information is taken into account in the price setting process. It should be distinguished, that cost data collected for the purpose of pricing is provided by all public hospitals, (Raulinajtys-Grzybek, 2014). All the hospitals also use the same Clinical Costing Standards.

The aim of the article was to present and compare cost accounting models which are used in Polish and English hospital and assess the role of cost information for pricing purposes. The article presents the results of an empirical survey conducted in 2013.

1. Methodology

The request for participation in the study was addressed to 100 Polish and 100 English hospitals. The questionnaire was sent by e-mail together with a cover letter. Most of the questions concerned the principles of cost accounting. Some of the questions were

formulated in order to assess the use of cost information in calculation of DRG prices. Replies were received from 30 Polish and 28 English hospitals.

In Poland, completed questionnaires were sent back mainly by financial directors or chief accountants. In England, most of the replies came from the managers or the officers representing Information Governance Department. It is worth noting that the access to public information has been defined in the Freedom of Information Act 2000 dated 17 December 2013 (Freedom of information, 2013). This Act provides public access to information held by public authorities, and the respondents referred to this act in the letters attached to the completed questionnaire.

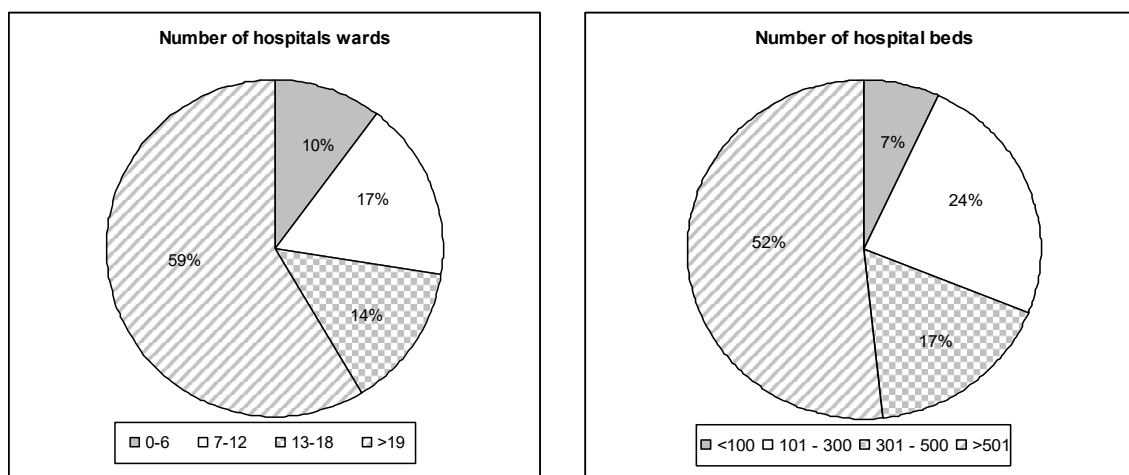
The hospitals that participated in this study were mainly public hospitals, however, two questionnaires were sent back by two non-public Polish hospitals. In Poland, most of respondents represented provincial hospitals (about 53%), whose founding body is the marshal office or the provincial government. On the other hand, most English hospitals were managed by NHS Trusts (over 70%).

The largest share of surveyed hospitals (28%) is located in medium-sized towns with a population between 51,000 - 150,000. Other hospitals are located in the towns with a population:

- under 50,000 - 20%,
- between 151,000 -300, 0000 - 24%,
- above 301,000 - 28%.

All hospitals differ from each other mainly in terms of size. Information on the number of wards and hospital beds is presented on the figure 1.

Fig 1. Number of wards and hospital beds in surveyed hospitals



The largest group of surveyed hospitals were large units, with more than 19 wards (59%) and more than 501 beds (52%). Small units represented the lowest share in the group - 7% of the units had less than 100 beds, and 10% had less than 6 wards. It can be concluded that the majority of the hospitals included in the survey are represented by large public hospital, which has over 500 beds, and over 19 wards, and is located in medium-sized town.

2. Principles of cost accounting used by the surveyed hospitals

Based on the obtained results it can be stated that all hospitals collect their costs by cost centres and by cost categories. The cost category structure provides the opportunity to compare the costs by resources, such as personnel, drugs, materials and equipment. The cost centres structure provides the opportunity to compare the costs by units where costs are incurred (e.g. wards, operation theatres or laboratory) (Raulinajtys-Grzybek, 2014). Table 1 shows that almost all respondents rated, that their hospitals collect costs by cost centres and categories at good or very good level. Much less hospitals collect their costs on the level of medical procedures, diagnostic related groups (DRG) and patients.

Tab. 1: Levels of cost accounts recorded in hospitals

Levels of cost accounts	The scale of assessment									
	Hospitals – in %									
	1		2		3		4		5	
	PL	EN	PL	EN	PL	EN	PL	EN	PL	EN
Cost categories – used resources						7	13	29	87	64
Cost centres						14	13	22	87	64
Medical procedures	30	30	20	18	20	30	13	-	7	22
DRG	60	30	13	15	7	18	13	7	7	30
Patients	53	30	7	7	20	26	7	15	13	22

* the scale of assessment: 1 (definitely not applicable) – 5 (definitely applicable)

There is a big difference between Polish and English hospitals regarding the cost collection on the level of DRG - much more English hospitals collect costs on this level. Such situation is because English mandatory costing model leads to the calculation of the average cost of each Healthcare Resource Group (English equivalent of DRG) for the purpose of price setting (Monitor, 2016).

In all hospitals, cost accounting measures, therefore the cost of used resources, which in most cases are allocated to cost centers using specific cost drivers. An example of the cost

driver for personnel costs is time devoted to work on different wards, and for materials – their actual or standard usage by various cost centres.

The analysis of next stages of cost accounting showed that all Polish hospitals allocate the costs of support cost centres to the final cost centres on the basis of cost drivers that should best describe the cause of cost occurrence. Most of them uses the simplest direct method that ignores services provided mutually by support cost centres. On the other hand, 21% of English hospitals didn't implement any method of allocation of support cost centres. Anyway, according to some author the method of support cost centre allocation has only little impact on the cost level of final products (Zuurbier, Krabbe-Alkemade, 2007).

The models of cost accounting used in Polish and English hospitals provide different levels of accuracy. Most of Polish hospitals use bottom-up methodology that involves the identification of all relevant cost components and values each cost component for all individual patients resulting in the most accurate cost estimates. Direct costs like drugs, medical materials are traced to the cost objects (e.g. medical procedures, DRG, patients), and indirect cost pools (nurses, equipment) can be allocated with a different cost driver. This provides substantially greater accuracy than in the top-down costing approach, used by around 20% English surveyed hospitals. They fail to trace costs directly to the specific patient that incur that costs and value each cost component for average cost object.

The last stage of cost accounting is calculation of unit costs. The study has revealed that all hospitals can perform calculation of both final and intermediate products. Intermediate products are various healthcare services, like inpatient days, outpatient visits, medical procedures. The surveyed hospitals calculate the costs of medical procedures (e.g. surgical interventions, diagnostic tests) on the level of:

- full costs – 73 percent of Polish and 65 percent of English hospitals;
- direct costs + indirect costs of the final costs centres (without administrative costs) – 33 percent of Polish and 29 percent of English hospitals;
- average costs – 20 percent of Polish and 38 percent of English hospitals;
- direct costs – 13 percent of Polish and English hospitals.

All the hospitals also calculate the costs of final products, that involves the calculation of the cost of individual patient episodes. These costs are calculated on the level of:

- full costs – 80 percent of Polish and 52 percent of English hospitals;
- direct costs + indirect costs of the final costs centres (without administrative costs) – 33 percent of Polish and 22 percent of English hospitals;
- average costs – 60 percent of Polish and 22 percent of English hospitals;

- direct costs – 13 percent of Polish and 4 percent of English hospitals.

Most of the Polish hospitals uses microcosting approach in the valuation process of patient treatment. It involves the identification of all relevant cost components as detailed as possible and combine them in order to arrive at the healthcare service costs (Shuman, Wolfe 1992). A detailed list of each component of a patient's care is created and costed separately for each facet of a patient's hospitalisation (Clement Nee Shrive et al. 2009). The hospitals take into account not only the direct costs traced to the patient treatment process (eg. materials, labor), but also the costs of medical procedures and the costs of inpatient days. On the other hand more than 20 percent of English hospitals don't calculate the costs of patient treatment process at all. The current English costing model leads to the calculation of the average cost of each Healthcare Resource Group (HRG, English equivalent of DRG). Since 2009 there is also a patient-level costing system (PLICS), which allows to determine the cost of patient treatment process, but it is still voluntary. The assessment of stages of the valuation process of patient treatment, done by the hospitals, is presented in Table 2.

Tab 2. Stages of the valuation process of patient treatment in the hospitals

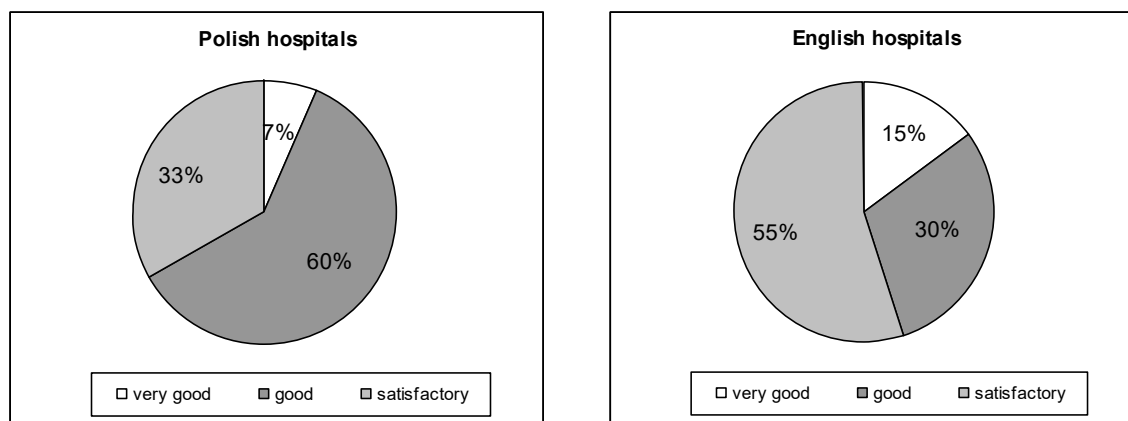
Stages of the valuation process	The scale of assessment Hospitals – in %									
	1		2		3		4		5	
	PL	EN	PL	EN	PL	EN	PL	EN	PL	EN
Measurement of direct materials used by the patient	-	22	20	-	-	41	20	22	60	15
Measuring the direct costs of labor performed for the patient	-	30	20	15	-	10	27	30	53	15
Allocation of costs of medical procedures to patient treatment	-	23	20	8	-	12	27	15	53	42
Allocation of costs of inpatient days to patient treatment	7	23	13	7	13	7	20	7	47	56
Allocation of other indirect costs to patient treatment	13	30	13	7	13	7	13	7	47	48

* the scale of assessment: 1 (definitely not applicable) – 5 (definitely applicable)

3. Assessment of cost accounting and its usability in the process of setting prices of hospital services

The last part of the survey was devoted to the assessment of cost accounting used in hospitals. An important task was also to obtain information regarding the usability of cost accounting in the valuation of medical services. The assessment of cost accounting, made by the respondents, is shown in Figure 2.

Fig 2: The assessment of cost accounting used in hospitals



According to opinion of Polish respondents, 7% of them have very good opinion about cost accounting in their hospitals, 60% good and only 33% satisfactory. This is due to the fact that cost information generated by the cost accounting is sufficient to satisfy the information needs of hospital management. English respondents have slightly worse opinion of their costing system. Nobody rated it as poor and unsatisfactory.

Polish hospitals find cost information useful mainly for internal purposes. The managers use it not only for the pricing of medical services, but also to analyze profitability, cost control, and in the process of planning and budgeting. In addition, they use this information to assess the effectiveness of resources use, and to assess hospital performance.

Cost information are much less useful for external purposes. For instance they are not used in the benchmarking process. The Polish hospitals practically do not make any comparisons using cost information. Most of them don't use cost information to negotiate prices with the payer. According to opinion of managers, 40 percent of them don't use cost information to negotiate prices with NHF. Twenty percent of them have very poor opinion of usability of cost information for negotiation process. This is due to the fact that the Polish National Health Fund don't collect and process cost information, and the main issue affecting the value of DRG prices are financial resources of the payer and the prices from previous years.

Polish DRG system is currently not directly related to the costs of hospital services. The only available cost information in Polish health care system is selective. Some hospitals collect cost information on particular medical care episodes and voluntarily submit to the NHF, but the payer don't use this information in the process of setting prices in a systematic way (Czach, et al. 2011).

English hospitals find cost information useful for internal as well as for external purposes. Costs are used as a basis for prices and as a check on profitability. According to opinion of respondents, almost 50 percent of them have at least good opinion about the usability of cost information for the valuation of medical services. Only 15 percent of them assess this usability as insufficient.

All English hospitals operating within the public health system are involved in the cost data provision for the purpose of pricing. It is obligatory for them. Prices are determined based on cost information 2 years in advance, because this time is needed for processing cost information (Epstein, 2006).

Anyway, the respondents didn't assess well the effects of pricing of medical services at the central level. The majority of them (64 percent) assessed these effects as sufficient, and only 8 percent as good. Nobody gave a very good assessment. This may result from the methodology of pricing. The tariffs are based on average hospital costs of each Healthcare Resource Group. Such reference costs have many disadvantages and they are not the best quality. They generate many problems with: data quality and credibility, clinical validity, granularity, activity data. For instance reference costs produce cost relativities (ratios between the costs of different HRGs) that are inconsistent from a clinical perspective. They are dependent on the data quality of the underlying inputs, especially activity data and there are concerns that the quality of clinical coding is still poor at some providers. Because they are average costs, they do not give any information on the variation of patient costs within a provider for the same HRG, or other relevant information (Costing Patient Care, 2012).

Conclusion

Cost information should play an important role in calculating DRG weights or tariffs at central level (Nathanson, 1984). If the data from cost-accounting systems are imprecise or bad quality, hospitals are likely to be over- or underpaid for specific DRGs.

Polish hospitals are not obliged like English ones to use uniform cost accounting standards. No document specifies in details, how health care providers should carry out their cost accounting. Consequently, significant discrepancies exist in the methods of calculating costs between particular service providers.

The study showed that cost accounting used in most of Polish hospitals, has many advantages, but also some disadvantages. Cost data obtained from cost accounting, undoubtedly provide knowledge about the profitability of the hospital and its various

organizational units. The solutions used in hospitals allow for valuation of selected health services. This valuation in most of hospitals is carried out, however, to a limited extent.

The problem is that NHF doesn't collect and use nationally cost-accounting data from hospitals to calculate DRG prices, like it is in other countries. Poland is only country in Europe that express DRG prices not on the base of relative weights or raw tariffs but on the base of scores. Such scores are not expressed in monetary terms but as a number of points, that are next multiplied by a point value that is the same for the entire country (Cots et al. 2001). The value of one point should be determined through negotiations between the National Health Fund and providers, but in fact it depends on national hospital budget. Because of this situation, the prices of various health services are too low or too high comparing to their costs and it causes discontent among hospital managers.

In England, mandatory cost accounting systems operate, which apply to all public providers. The national guidances explain the principles of cost accounting and also how cost should be calculated for pricing purposes.

This mandatory model of cost accounting applies top-down microcosting approach to cost calculation. English hospitals calculate only the average costs of DRGs. The costs of various medical procedures are calculated separately and they depend on resource consumption for the average procedure. The costs of individual patient episodes are calculated only by hospitals that use a voluntary patient-level costing system (PLICS). The hospitals that use only mandatory costing model are not able to observe the connection between costs and treatment for specific patients or take into consideration some special patient characteristics (Raulinajtys-Grzybek, 2014).

England belongs to countries that use nationally collected cost-accounting data to calculate DRG prices. The study showed that pricing process is not well evaluated by the respondents. The reference costs as the base of prices lead to underfunding of many complex health services. The mandatory costing principles result in excessive level of costs aggregation.

The use of DRGs as a payment mechanism increased the awareness of the importance of accurate cost accounting in hospitals of many European countries. Therefore, Poland should start to routinely collect cost-accounting data from a representative sample of hospitals in order to calculate and continuously update national DRG prices. Cost accounting should also support other purposes, such as systematic benchmarking. On the other hand, England, should continue the implementation of Patient-Level Information and Costing Systems (PLICS) within the National Health Service (NHS). The PLICS cost data could facilitate the

introduction of more accurate bottom-up costing methodologies. It would be the better base for the setting of prices. PLICS data could have also many additional uses for benchmarking, validation and currency design.

References

1. Czach, K., Klonowska, K., Swiderek, M., Wiktorza, K. (2011). Poland: the Jednorodne Grupy Pacjentów–Polish experiences with DRGs. In: Busse, R., Geissler, A., Quentin, W., Wiley, M. (editors), *Diagnosis-Related Groups in Europe: Moving towards transparency, efficiency and quality in hospitals*, McGraw-Hill/OpenUniversity Press; p. 359-380.
2. Costing Patient Care, (2012) *Monitor's approach to costing and cost collection for price setting*, Monitor, November, 2012;
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/303161/Costing_Patient_Care_201112_FINAL_0.pdf (access: 28. 03. 2016)
3. Bateman, I.J., Carson, R.T., Day, B., Hanemann, M., Hanley, N., Hett, T., Jones-Lee, M., Loomes, G., Mourato, S., Özdemiroglu, E., Pearce, D.W., Sugden, R., Swanson, J. 2002. *Economic Valuation with Stated Preference Techniques: A Manual*. Edward Elgar, Cheltenham.
4. Clement Nee Shrive FM, Ghali WA, Donaldson C, Manns BJ. The impact of using different costing methods on the results of an economic evaluation of cardiac care: microcosting vs gross-costing approaches. *Health Economics* 2009; 18, p. 377-388.
5. Cots, F., Chiarello, P., Salvador, X., & Quentin, W. (2011). DRG-based hospital payment: Intended and unintended consequences. In: Busse, R., Geissler, A., Quentin, W., Wiley, M. (editors), *Diagnosis-Related Groups in Europe: Moving towards transparency, efficiency and quality in hospitals*, McGraw-Hill/OpenUniversity Press; p. 75-92
6. Epstein D, Mason A. Costs and prices for inpatient care in England: mirror twins or distant cousins? *Health Care Management Science*, 2006; 9(3) p.233–42
7. Fetter, R. B. (1991). Diagnosis related groups: understanding hospital performance. *Interfaces*, 21(1), 6-26
8. Finkler, S. A., & Ward, D. M. (1999). *Essentials of cost accounting for health care organizations*. Jones & Bartlett Learning.

9. Freedom of Information Act 2000 (the Act) dated 17 December (2013)
<http://www.legislation.gov.uk/ukpga/2000/36/contents> (access: 20. 02. 2016r.)
10. Gentili, A. (2014). Cost accounting for the radiologist. *American Journal of Roentgenology*, 202(5), 1058-1061.
11. Monitor (2016), Approved Costing Guidance, February 2016;
12. Nathanson, M. (1984). DRG cost-per-case management. Comprehensive cost accounting systems give chains an edge. *Modern Healthcare*, 14(3):122, p. 124, 128.
13. Raulinajtys-Grzybek, M. (2014). Cost accounting models used for price-setting of health services: An international review. *Health Policy*, 118(3), p. 341-353.
14. Shuman LJ, Wolfe H. (1991) The origins of hospital microcosting. *Journal of the Society for Health Systems* 3(4), 61-74.

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