

**ABC METHOD – EQUILIBRIUM FACTOR OF THE
FINANCING-COST BINOMIAL IN THE ROMANIAN HOSPITALS**

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Abstract

During a time period dominated by resources constraint and an economic-social crisis, it has been noticed that the health system reforms have not been able to settle the shortcomings this system has confronted. In the present paper, we intend to show the way by which, by cost accounting, an equilibrium connection between the hospital financing by DRG (Diagnosis Related Groups) and cost per patient can be created. By using the ABC method (Activity-Based Costing) the material, financial and human resources consumption per disease can be calculated. Thus, the resource allocation would be in accordance with the activity amount.

Keywords: *activity-based costing, hospital, health care financing, resources, cost*

1. Introduction

The evolution of the social-economic environment, both internationally and nationally, determines increasingly more the officials in the public health system to develop new internal steer instruments inside organizations; so, knowing and controlling the costs is becoming a must for the resource management and for the management of the whole activity.

The operation constraints of the public hospital make it get closer and closer to what a traditional company represents, despite the specific concerns of the medical domain. The transition from the aggregate budget-based

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medicine, to the medicine being part of a complex process which has numberless actors of different specializations, calls for a minute analysis (fine activity evaluation, quality of coordination between interveners, rigour of planning different acts, manner of optimization of equipment and time use, interaction between administrative and medical departments).

Management accounting involves a great number of practices, by means of which managers reach their steer goals, for controlling an organization. The issue of management tools development must take into account the relevance of their use within the hospital context (i. e. the increasing request of health care and more and more limited, more and more restricted resources). The ABC method can support the monitoring of the resources allocated to a hospital, for them to be wisely used.

2. Literature Review

Costs analysis has become inherent, and they have tried to apply the methods employed by a company manufacturing machines in the health services system as well.

The literature offers a great number of scientific papers presenting the results of the health system studies concerning the advantages of introducing the cost accounting methods in the current activity. (Frank, 1976, Lapsley, 1994, Pettersen, 1999, Campos, 2004, 2008).

Since 1988, the popularity of the ABC method has been increasing and moving from being used in the academic environment and in the manufacturing system in services, surprisingly, to becoming useful in public systems. In the health care domain, the first paper was issued in 1994. (Ramsey, 1994, p. 385-396)

By studying the specialized literature, one can notice numberless studies on this method's applicability, carried out in different departments (laboratory, radiology, surgery rooms, hospital departments) of a health institution (Table 1.).

Table 1. Evolution of application of ABC method in health care system

Author	Year of Publication	Title
Ramsey H. R.	1994	<i>Activity-Based Costing for Hospitals</i>
Fabienne Alvarez	2000	<i>Le contrôle de gestion en milieu hospitalier: une réponse à l'émergence de risques organisationnels</i>
Rautio R, Keski -Nisula L., Paakkala T.	2002	<i>Activity-based cost analysis in catheter-based angiography and interventional radiology</i>
Ernest J Camponovo	2004	<i>The business of radiology: Cost accounting</i>
Arnaboldi M., Lapsley I.	2005	<i>Activity based costing in healthcare: a UK case study</i>
Thierry Nobre, Lionel Signolet	2006	<i>Evolution du système de pilotage de la performance et Système d'information : le cas d'introduction de l'ABC à l'hôpital</i>
Popesko Boris, Novak Petr	2011	<i>Application of ABC method in Hospital Management</i>
Hernando Ortiz, L.;Hinojosa Mena-Bernal,C; González Sarmiento,E.; González G., I.; Arana R., J.; Muñoz M.	2012	<i>Rentabilidad de un hospital de día: análisis de actividad, coste y eficacia</i>

Source: elaborated by the author

Popesko, B. și Novak, P. shows the advantages of the application of the ABC method in institutions providing health services, from the quantification of costs per activity and establishment of a relationship between costs and means of carrying out activities, up to the identification of the influence of the costs on the organization.(Popesko, Novak, 2011, p.73-78)

3. Premises of ABC method Application in Overnight Hospital stay

One of the critical problems concerning the hospital system has always been under-financing. There have always been attempts of improving the financing, so that equilibrium between the allocated funds (which constitute income for a hospital) and the expenses should be assured.

New responsibilities have been found for the DRG system, originally conceived out of the need to standardize the medical procedures. They switched from standardization of the medical procedures to cost standardization.

But, at present, the practice in hospitals highlights the fact that cost determination is still carried out using the traditional method, by which cost determination is made respectively per cost centres and per wards.

The indirect costs distribution per cost centres is made respectively according to a repartition key and according to the direct handwork expenses. This way of determining the cost raises a number of problems on the hospital level, where there is not output homogeneity, but a diversity of individual cases.

There is variability from patient to patient; each patient has a diagnosis singularizing him/her, leading to handwork consumption, different from case to case. Under these circumstances, the efficiency of the use of the work of the medical staff (highly-educated staff and nurses) is difficult to assess. In addition, there might appear a tendency for the hospitals to discount more complicated diagnosis, which have a higher financing.

The average cost method does not provide the possibility of calculating the consumption per product, individually, per diagnosis or per patient. In case of the cost per length of hospital stay method, it would be hard to make the difference between the consumption pertaining to a patient or to another.

We consider that it is necessary to create compatibility between the way the cost is determined and the financing applied. Starting from this premise, the ABC method meets this request best.

4. An Applied Model of the ABC method in Hospitals

The purpose of the present paper is to compare the officially obtained cost by the application of the DRG National System, through which the financing of hospitals is assured, with the one resulted through the use of the ABC method.

For our evaluation, we consider as a final product, the case resolved. When a patient does not have collateral affections, the cost object is

constituted by the consumption of resources per patient, which corresponds to the consumption per diagnosis.

The ABC method (distribution of indirect costs, based on cost drivers) has been applied for the A diagnosis. The data were collected out in the field, by interviewing the medical staff of UPU - Emergency Department and X wards, the paramedical laboratory staff and non-medical staff of the auxiliary departments, by direct observation, but also from the financial-accounting documents. A part of the data has been calculated or estimated.

4.1. Determination of Activity Flow

During a first stage, the activity flow, the staff categories providing the hospital care, from the patient admission up to discharge, have been established. We observed the minimum duration allocated to each of the activities provided to the patient and, based on the accountancy data, the average salary expenses and the costs for each activity have been calculated. In the action of elaborating the procedure flow, we had in view the compulsory, repetitive or non-repetitive character of the primary and secondary activities carried out during the hospital stay of the patient having the A diagnosis.

4.2. Determination of Direct Costs

Drug costs have been determined according to the standard procedure for the A diagnosis, and the laboratory tests cost took into account the labour volume of the staff, and the reagent amount employed.

Direct costs on the selected diagnosis have been determined beginning from the handwork consumption, per staff categories and tariff per minute, drug consumption, and sanitary materials consumption per patient (Table 2). Taking into account that the daily paid amount for patients' meal is settled by law (RON/hospital stay), we may consider meal expenses as direct costs, being proportional with the number of hospital stay days; they can be identified per each patient.

Table 2. Hospital's direct costs

No.	Direct Costs	A Diagnosis	Other Interventions in X Ward	Other Interventions in Hospital	Total
1	Salary costs	273	218,043	118,205	336,521
2	Drugs	188	22,005	42,320	64,513
3	Sanitary materials	153	14,811	14,289	29,253
4	Laboratory tests	300	29,280	15,276	44,856
5	Meal costs	52	8,648	9,300	18,000
	Total Direct Cost	966	292,680	199,497	493,143

Source: elaborated by the author

Considering that we have taken into account only one diagnosis, the other costs relevant to staff, drugs, sanitary materials, meal have been considered as distributed on other interventions (Table 3).

Table 3. Direct costs on A Diagnosis

No.	Direct Costs	Cost per Case	Number of Cases	Total Costs
	Salary expenses			
1.	- highly-educated staff	35.85	5	179.25
2.	- nurses	13.04	5	65.20
3.	- health care persons	5.70	5	28.50
	Total Salary Expenses	54.59	5	272.95
	Drugs	37.60	5	188.00
1.	Sanitary materials	30.60	5	153.00
2.	Laboratory tests	60.00	5	300.00
3.	Meal costs	10.4	5	52.00
	Total Cost for A Diagnosis	139.19	5	965.95

Source: elaborated by the author

4.3. Determining Indirect Costs

For the same time period, indirect costs relevant to hospital are recouped, in order to further distribute them on final product, by using cost drivers (Table 4):

Table 4. Hospital's indirect costs

No.	Indirect Costs	Value	Cost Driver
1.	Costs relevant to salaries for the administrative, economic staff and other specialities	686,556	Number of employees
2.	Utilities expenses (energy, water, heating)	143,892	Surface
3.	Costs relevant to materials other than drugs and sanitary materials	308,201	Surface
5.	Maintenance and reparation	72,816	Number of labour hours
6.	Other indirect costs	21,269	Number of labour hours
Total Indirect Costs		1,232,734	

Source: elaborated by the author

4.4. Determining Cost Drivers and Regrouping Centres

The identification of activities must be accompanied by finding a cost driver for each activity. The higher the number of cost drivers, the higher the quality of the information and the cost accuracy obtained. The selection of activity-based cost drivers represents a key step for the success of the activity-based costing system (Table 5).

One should also check whether there is a direct relation between the change of volume of the activity-based cost driver and the production factors of the respective activity.

After determining the values of the cost drivers for the activities in the flow, the distribution of the expenses per cost centre (wards) is made, on the activities that generated them. The operation consists in assigning direct and indirect costs on activities in each of the departments constituted.

To simplify the complex activity set in a hospital, the activities need to be grouped together according to the same cost driver, in regrouping centres. The next step is the determination of the indirect expenses per each regrouping centre.

The share of indirect expenses, distributed to each centre is determined according to the identified repartition keys.

Thus:

- Salary expenses for administrative, economic and other types of staff, as in Equation (1).

$$\frac{\text{Salary costs to distribute}}{\text{number of employees}} \cdot \text{No of employees of the regrouping centre} \quad (1)$$

- Utilities expenses (energy, water, heating), as in Equation (2).

$$\frac{\text{Utilities expenses}}{\text{Total surface}} \cdot \text{Surface of regrouping centre} \quad (2)$$

- Costs relevant to materials, other than drugs and sanitary materials, as in Equation (3).

$$\frac{\text{Others cost materials}}{\text{Totalsurface}} \cdot \text{Surface of regrouping centre} \quad (3)$$

- Maintenance and repairs expenses, as in Equation (4).

$$\frac{\text{Mainenance repaires}}{\text{Total labour hours}} \cdot \text{Number labour hours of regrouping centre} \quad (4)$$

- Other indirect expenses, as in Equation (5).

$$\frac{\text{Other indirect expenses}}{\text{Total labour hours}} \cdot \text{Number labour hours of regrouping centre} \quad (5)$$

Table 5. Cost Drivers

Re-grouping Centre	Cost Drivers	Activitie s	Total Labour Hours	Number of Employees	Surface (sqm)
C1	Cost driver 1	Activity 1			
		Total C1	6,000	30	380
C2	Cost driver 2	Activity 2			
		Activity 3			
		Total C2	780	35	200
...	...				
Cn	Cost driver n	Activity n-1			
		Activity n			
		Total Cn	17,520	152	500
TOTAL			32,750	458	3,770

Source: elaborated by the author

4.5. Determination of cost per unit per Cost Driver and per Product

Determining the cost per unit per cost driver is very similar to calculating the cost per unit per unit of product by the aggregate method, by establishing the relation between the expenses of each regrouping centre and the number of cost drivers pertaining to the respective centre.

After having classified the activities having the same cost driver in regrouping centres, the expenses pertaining to these centres are determined, and the cost per unit for each ward is calculated (Table 6).

Table 6. Cost per Unit per Cost Driver

Regrou- ping Centre	Total Indirect Costs (RON)	Total Value of Cost Drivers	Cost per Unit per Cost Driver (RON)
C1	105,420	1160	90.88
C2	78,384	761	103
.....			
Cn	344,129	17,520	19.64
Total	1,232,734		

Source: elaborated by the author

Having calculated the cost per unit per cost driver within each regrouping centre, one can go on to the determination of the cost per unit per diagnosis.

Compared to the cost calculation method based on analysis centres, whose hypothesis is that products consume resources, the ABC method starts from the hypothesis that *activity consumes resources, and resources consume activities*.

For each diagnosis, the activities used to solve the medical problem are determined, along with the cost drivers of those activities. In case activities are specific to a certain diagnosis, the relevant costs can be allocated only to the respective diagnosis. If the activities correspond to several diagnoses, the costs need to be distributed based on cost drivers.

The obtained cost is made up of the total direct costs, adding the costs for the activities consumed to give a solution to the respective diagnoses (obtained on the basis of the cost per unit per cost driver for each activity, and of the volume of cost drivers associated to the respective diagnosis).

The more systematic distribution of the indirect costs by the ABC method, not just on the basis of a single repartition key, respects the causality connections between products and resource consumptions.

The cost per unit of the A diagnosis is to be compared to the cost determined on a national level by the DRG system.

4.6. Elaborating the Post-calculation Sheets

After the distribution of the indirect costs and the determination of their cost per unit, the post-calculation sheet for the A diagnosis can be elaborated.

Table 7. Cost per unit for A Diagnosis

Indicators	A Diagnosis	Other Interventions in X Ward	Other Interventions in Hospital	Total
Direct costs	966	292,680	199,391	493,037
Indirect costs	5,682	671,988	555,073	1,232,743
Total costs	6,648	964,668	754,464	1,725,780
Number of control units	5	488	268	
Cost per unit	1,330	1,977	4,326	

Source: elaborated by the author

CNAS (The National Health Insurance House) discounts the cases solved depending on the relative value of the diagnosis and on the case-mix (complexity) index recorded by the hospital. Each case is given an average length of hospital stay and a different time of hospital stay.

The complexity index for the X Hospital has been established at the value of 1.1567.(G.D. 1389/2011)

Table 8. Comparison cost DRG/ our study

Diagnosis	Relative Value	Average Length of Stay ALOS	Low Limit of Length Hospital Stay	Upper Limit of Length Hospital Stay	Cost per Unit by DRG (RON)	Cost per Unit by ABC Method (RON)
A Diagnosis	0.4347	4.08	2	10	0,4347*1,1567*1444=726	1,331

Source: elaborated by the author

Differences between the costs determined by the ABC method and the financial resource allocated by the CNAS (The National Health Insurance House) for each case can be noticed. Under these circumstances, we may conclude that there is disproportion in financing different specializations.

5. Conclusions

The hospital is an organization whose products are not to be traded on a free market. In addition, the products (treatment regime, DRG, hospital stay bed) are negotiated between the medical services' suppliers and buyers on the atypical market.

For promoting high standard services at a low price, the hospital is forced to adopt a severe conduct regarding the costs' control, especially when budget resources are scarce, and the hospital's own resources almost do not exist. A good costing system must meet several requirements: it needs to lead to efficient costs, to a better allocation of resources, in order to provide high standard services to patients, and allow for a continuous improvement.

Given the diversity and complexity of the activity in a hospital, the adaptation of a management accounting method is needed to render the activity cost analytically.

We have pondered on the ABC method, considering that its application can simplify our study due to the repetitive character of some procedures used to make the product (in our case, the diagnosis).

After interviewing the medical staff about the stages the patient goes through, from admission up to discharge, and also the time allocated to a stage, we used the financial-accounting documents and statistics necessary to the present study.

A first observation is the discontinuity, the gap between the medical staff's interest and managers. On the one hand, doctors are concerned about the quality of the medical act and solving the case, often fighting against the clock; on the other hand, managers have to supervise the way resources are consumed. Often, the medical staff has to make a compromise between medical ethics and financial constraints.

In our study, we have supposed an imaginary hospital, having a low number of wards, i. e. only the ones having a direct connection with the initially established diagnosis, the traditional diagnosis, with no complications: the X ward, UPU Emergency Department, ATI - Surgery Block and Laboratory. The remaining medical staff, with its pertaining costs, which we have established by weighed average, has been decreased out of the total costs per unit. We then proceeded to the steps specific to the ABC method.

We must mention that the time pertaining to each stage of the care process is specified by the staff providing care services and corresponds to

experienced skilled people, not to beginners in their carrier. There are not protocols either, to stipulate the steps to be followed, from the moment a patient is taken over from the Emergency Department or in wards, or for collateral activities (or the time that should be allocated to them).

The study has highlighted that most of the indirect costs go to the Regrouping Centre of Administrative and Service Staff and to the Treatment Centre, to which most of the indirect costs related to materials are allocated.

Utilities (water, energy, heating) pertain to larger areas, for which we have established the cost driver (square meters) (ATI and surgery block).

The study allowed us to find a difference between the cost per diagnosis, established through the application of the ABC method and the resources established by CNAS (the National Health Insurance House) for those diagnoses, taking into account the case-mix index established for the X Hospital, the relative value for each diagnosis and the TCP tariff of the case under analysis.

That difference may come from a disproportional funding of the different specializations.

The system required by CNAS (the National Health Insurance House) influences the professional ethics and also the quality of the medical act, leading to a tendency of keeping the cases in stable condition in hospital for a minimum standardized period, in order to be able to compensate – by means of the resources left unused – for the cases in which, the seriousness and complexity degree exceed the maxim hospital stay time allowed.

Another inconvenience owing to the DRG System is its tendency of classifying a case in a higher complexity group, with the intention of increasing the case-mix index for an increased financing in the following year, which would lead to an allocation of a higher amount per case. The patient is hospitalized for a minimum amount of time, which creates the possibility to save money to meet other necessities.

As a conclusion, it is necessary to have protocols where the stages the staff should go through during their activity, the allocated time, the minimal paraclinical tests, and the standard treatment for each disease should be specified.

The ABC method will be able to reflect the image of the costs, after the careful selection of the cost drivers; their number must be sufficiently large to provide useful details on the sub-activities and the resources needed for them to take place.

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7. Acknowledgement

This work was co-financed from the European Social Fund through Sectoral Operational Programme Human Resources Development 2007-2013, project number: POSDRU/CPP107/DMI1.5/S/77497.