

## Specifics of the Activity-Based Costing applications in Hospital Management

**Boris Popesko \***

*Tomas Bata University in Zlin, Czech Republic*

\* *Corresponding Author*; Email: popesko@fame.utb.cz

---

### Abstract

The current paper analyses the specifics of the application of Activity-Based Costing method in hospital management. Primary objective of the paper is to outline the methodology of the ABC application in hospitals. First part of the paper analyzes the ways of ABC implementation in published foreign studies. Second part describes the individual steps in ABC application and discusses the differences in the application procedures between the manufacturing and hospital organization.

---

**Key words:** Healthcare Management, Cost Management, Activity-based costing,

### Introduction

In the last decade, many non-profit and hospital organizations started to face difficulties and challenges in balancing limited resources and costs to provide their demand for services. Due to the introduction of modern medical techniques and medicines and consequent increase of consumed costs, many hospitals are under pressure to adopt more advanced cost management techniques usually utilized only in profit organization sector.

Hospital managers frequently seek the advanced techniques, for better understanding of relations between the cost and provided services.

One of the key factors of effective company management is ability of accurate estimation of the cost of products. Product costing is an essential economic tool used to quantify the cost of individual interventions carried out.

The need for an accurate method of costing in hospital organizations is frequently emphasized by many authors. Gujral et al.<sup>1</sup> comment, that healthcare organizations use cost accounting to estimate the unit cost of services they provide. Koyama<sup>2</sup> states, that the importance of obtaining accurate estimates of costs for medical services is increasingly recognized by hospital managers. Last but not least Ridderstolpe et al.<sup>3</sup> state, that a valid basis for calculation is increasingly important in the cost control of health care against a background of increasing demands and resource constraints.

---

Another important issue which is discussed is the used costing method. For instance Carvalho Jericó and Castilho<sup>4</sup> states, that most hospitals with costs management systems, use the absorption method. Traditional costing methods have caused distortions in indirect costs and accounting reports normally do not provide the managers' interpretations and actions for the control of deviations related to specific problems. The difficulty inherent in choosing a proper and accurate product costing method for manufacturing enterprises has been widely discussed by academics and practitioners.<sup>5,6</sup> The important limitation of traditional (absorption) costing methods had been also deeply discussed along with advantages of other costing method as Variable costing or Activity-based costing (ABC).<sup>7</sup>

Cardinaels et al.<sup>8</sup> states that systems such as ABC, may facilitate strive for cost efficiency. ABC provides more detailed cost information on the activities of the hospital, which could typically result into better cost reduction and cost management.

Carvalho Jericó and Castilho<sup>4</sup> supports the use of ABC in hospitals with statement, that information generated by ABC significantly contribute to hospital management in planning and managerial control.

Despite the fact that ABC methods had been originally developed for the use in the manufacturing organizations, use of the method in non-manufacturing sectors, such as services or healthcare is not unique, but relative frequent. According to important differences between manufacturing and hospital organization, the structure of the ABC systems implemented in those two organization types could show significant specifics.

## **Literature Review**

Utilization of costing methods in hospital organizations had not been as common as in traditional business organizations. Hospital economies are very often based on public funding and the primary objective of these organizations is much more to provide the acceptable level of care with predefined budget, than to generate the profit. In such environment the accurate cost estimation of provided services hadn't been the primary objective of hospital managers. Hospitals in different countries are often legally required for refunding purposes to have a predefined cost allocation scheme.<sup>9</sup> This makes them unique to other industries where such a legal obligation does not exist. Cardinaels et al.<sup>8</sup> state that the legal system mostly take the form of a step-down allocation of costs from service departments (e.g. laundry, administration, cafeteria, etc.) to revenue generating departments such as acute care, surgery, and laboratory. Sometimes costs are further allocated down to patient-level.

Despite the proved advantages of the ABC applications many authors<sup>10</sup> points at the number of disadvantages, such as high complexity of the system or large amount of non-financial data requirements.

Udpa<sup>11</sup> states, that the most of the early applications of the ABC method in healthcare organizations focus on a narrow application of the method to a department in the healthcare organization. For instance Chan<sup>12</sup> examines the application of the ABC to the costing of laboratory tests, Canby<sup>13</sup> publicized the application of ABC in X-Ray department of the hospital. Similar narrow applications of the Activity-based costing are frequent also recently. For instance, Gujral et al.<sup>1</sup> examines the use of the ABC in hematopathology laboratory,

Carvalho Jericó and Castilho<sup>4</sup> report about ABC application in central sterilizing services and Ridderstolpe et al.<sup>3</sup> examined the application of the method in heart centre.

Despite the relatively high number of existing applications, use of the ABC in hospital management still entails a number of issues related to the practical applicability of costing for the health organization environment, and its further practical usefulness for decision-making bodies and characteristics of specific information outputs of such methods especially for the specific conditions of national legislative environment.

Application of the ABC in healthcare service provider could bring a lot of benefits for an organization, but brings also large number of risks related to bad system construction and utilization.

Many authors such as Stouthuysen<sup>14</sup> state that while many studies advocated the use of ABC by service organizations in general and healthcare organizations in particular, there is, nevertheless, need for some degree of caution. Lievens et al<sup>15</sup>, for example, argue that a potential drawback of ABC systems lies in the time and resource consumption associated with the development and management of these systems. Kaplan and Eveart et al.<sup>7,16</sup> note that the high time and cost to estimate an ABC model and to maintain it through re-interviews and re-surveys – has been a major barrier to widespread ABC adoption. In a similar vein, Everaert et al.<sup>16</sup> claim that many managers dealing with ABC, have abandoned the attempt in the face of rising costs and employee irritation.

## **Methods**

Objective of this study is to analyze the specifics of the ABC application in hospitals and define the implementation procedure of ABC application. Objectives had been achieved based on the literature review and the application case studies performed by the author in previous research studies. Draft of the application procedure represents the initial result of the research project focused on research into costing techniques in hospital organizations.

## **Discussion and Conclusion**

Together with the emergence of ABC methodology in 1980's, issues relating to the practical application in different types of organizations have been presented by both academics and practitioners. Drury<sup>5</sup> defined the necessary steps to set up an ABC system as follows:

1. Identifying the major activities
2. Assigning costs to cost pools/cost centers for each activity
3. Determining the cost driver for every activity
4. Assigning the costs of activities to products

It is obvious that the application of the ABC in healthcare institution will have a lot of specifics especially in the first step of application, where the individual activities are defined. Despite the fact, that the healthcare institution provides the oppositely different activities and tasks, logically the system construction could be similar to the manufacturing organization.

Udpa<sup>11</sup> defines the seven steps in ABC application in hospital management, which focuses more on practical application procedure of the system than on the system structure:

1. Form a cross functional steering committee
2. Identify case types/DRGs for analysis
3. Profile the health care delivery system
4. Aggregate activities
5. Analyze cost flow using cost drivers
6. Educate hospital staff about ABC
7. Evaluate and analyze data and results

Interesting issue of this application is the fact that cost object definition is made before the activity analysis. Udpa's study results showed the several important characteristics of ABC application in healthcare institutions<sup>11</sup>:

- Key cost object, which is used for cost allocation are DRGs.
- Number of performed actions is too detailed for effective use in ABC system. Performed actions had to be aggregated.

Different approach to ABC application was published by Lin who used the following steps<sup>17</sup>:

1. Activity analysis
2. Cost structure analysis
3. Identification of cost object
4. Data collection for activity analysis
5. Data collection of cost assignment

Specific of the Lin's study<sup>17</sup> was use of the individual patient as the cost object. Study uses also strict separation of the defined activities into primary and secondary (support).

Primary activities might relate to actions which the organization performs to satisfy external demands, while secondary refers to those performed to serve the needs of internal “customers”. This classification is essential for cost allocation procedures. In healthcare organizations, we can identify the higher importance of support activities, which could consume also the higher volumes of costs

Carvalho Jericó and Castilho<sup>4</sup> use the application procedure, which is very similar to traditional procedure presented by Drury<sup>5</sup>. The study defined the following steps:

1. Institutional and analysis unit diagnosis
2. Processes mapping and activities identification
3. Activities and resource drivers cost
4. The cost of cost objects and activity drivers

Costs objects or costs objectives in their study are costing sterilization and disinfection by cycle/load and by the groups of products performed in this CSS. Based on the other published studies, it is possible to define the general specifics of the ABC application in healthcare organizations:

#### ***Identifying the major activities***

Most of the studies define the activity definition as the default step of application. Activities form the basis of measurement of all relevant information in an ABC system. Several procedures defining activities may be used<sup>6</sup>: analysis of the organizational structure of an enterprise, analysis of the workplace of analysis of personnel costs. Applying all three ensures that no activity is overlooked.

Generally the principles of activity definition in healthcare organizations are similar to the manufacturing organizations. Number of activities or level of detail of the system is the optional issue. In case of organization wide application, there is important to keep the limited number of activities in order to avoid the data overload. Partial applications could work with more detailed structure of activities.

#### ***Assigning costs to cost pools/cost centers for each activity***

Second step in ABC application is the assigning costs to cost pools/cost centres for each activity. Cost allocation to defined activities might prove very complicated in practice and eventually take up an important amount of the implementation process time. The reason is that the structure of activities and structure of a company’s department usually clash somehow. The activity cost matrix could be invaluable for assigning company costs classified in company cost centres to activities. Very often it is necessary to define a resource cost driver in order to effectively allocate such costs. Resource cost drivers help to assign costs to a

specific activity, when the cost in evidence is aggregated in general book entries. The following resource cost drivers were used in the case studies: personnel workload, square meters, the quantity of machines, tools, etc. or estimation

Accurate allocation of the costs to defined activities is the one of the crucial points of ABC application.

### ***Definition of activity cost drivers***

Third step of the ABC application is the determining the cost driver for every activity.<sup>5</sup> Within this step of the application it is necessary to calculate the primary rates of individual activities. Calculating the primary rates of individual activities can be conducted in four steps<sup>17</sup>:

1. Setting appropriate activity cost drivers for individual activities
2. Determining the output measures of individual activities
3. Calculating the primary rates of individual activities
4. Assigning the costs of support activities to primary activities

Performing of this step of ABC application in healthcare institutions could have a lot of specifics. The setting the appropriate cost drivers may be questionable and the measuring the output rates could also be complicated.

Many studies of ABC application in hospitals deal with the problem of selecting the appropriate cost drivers, and collection of data about volumes of each activity output which is defined as output measures. Cao et al.<sup>19</sup> states, that the workload for collecting data of cost drivers is not easy, even if integrated hospital information systems are introduced; labour hours for which hospital staffs are engaged in some medical services are generally difficult to collect.

Cao et al.<sup>19</sup> further states that the resolution for simple and accurate cost accounting is to reduce the number of cost drivers based on logical procedure. Some cost drivers have very high correlation with each other, and therefore one cost driver among them may be used for these activities. Cao's study is then focused on cost drivers reducing.

Stouthuysen<sup>14</sup> describes in detail obstacles existing in procedures of accurate cost driver selection and the data collection. The possible way of the simplification of the system is the application of time-driven activity-based costing system (TDABC).

### ***Assigning the costs of activities to products***

Final step in ABC application is the assigning the cost of activities to products. In case of ABC implementation in hospital this step could be crucial, because the management have to decide, what the final product or cost object of the healthcare institution is. Is it the patient as the customer or the type of diagnosis?

Different published studies on ABC application uses various types of cost objects. It starts with types of diagnosis or individual patients and finishes with the specific cost objects in the narrow applications of ABC, in specific healthcare areas. Cost object definition is based on managerial requirements of the system. Another important issue is to collect the accurate information about the volume of activities consumed by the cost objects.

### **Conclusion**

Hospital managers, who consider the ABC utilization, have to face a number of obstacles. Hospital has usually very complex structure of outputs (products), customers, performed activities and financial flows, than an ordinary manufacturing enterprise. The setting the appropriate cost objects, suitable structure of activities and relevant and simple cost drivers requires the detailed future studies. Ultimate objective of the research in this area should be defining the general methodology for the ABC application on the organization wide level. Deeper level of knowledge in the area could facilitate the hospital managers to use the limited resources more effectively and save the increasing costs of healthcare services.

### **Acknowledgment**

This paper is the output of the project NT 12235-3/2011 “Application of modern calculation methods for optimization of costs in health care” registered at Internal grant agency of Ministry of Health Czech Republic.

**Conflict of Interest:** None declared.

---

### **References**

1. Gujral S, Dongre K, Bhindare S. Activity-based costing methodology as tool for costing in hematopathology laboratory, Indian Journal of Pathology and Microbiology. 2010; 53(1): 68-74.
  2. Koyama W. Lifestyle change improves individual health and lowers healthcare costs. *Methods Inf Med.* 2000; 39: 229-32.
  3. Ridderstolpe L, Johansson A, Skau T, Rutberg H, Ahlfeldt H. Clinical process analysis and activity-based costing at a heart center. *Journal of Medical Systems.* 2002; 26(4): 309-322.
-

4. Carvalho Jericó M, Castilho V. Cost management: the implementation of the ABC method in central sterilizing services, *Revista da Escola de Enfermagem da USP*. 2010; 44(3): 734-741.
5. Drury C. *Management and Cost Accounting*. 5<sup>th</sup> Edition, Thomson Learning, 2001.
6. Lucas M. Absorption costing for decision making. *Management Accounting: Magazine for Chartered Management Accountants*. 1997; 75(9): 42-45.
7. Kaplan R, Johnson H. *Relevance lost: Rise and fall of management accounting*. Boston: Harvard. 1987.
8. Cardinaels E, Roodhooft F, van Herck G. Drivers of cost system development in hospitals: results of a survey. *Health Policy*. 2004; 69(2): 239-252.
9. Eldenburg L, Kallapur S. Changes in hospital service mix and cost allocations in response to changes in Medicare reimbursement schemes. *Journal of Accounting and Economics*. 1997; 23: 31-51.
10. Cokins G. *Activity-Based Cost Management: An Executive's Guide*. John Wiley and Sons, 2005.
11. Udpa S. Activity-based costing form hospitals. *Health Care Management Review*. 1996; 21(3): 83-96.
12. Chan YC. Improving Hospital Cost Accounting with Activity-Based Costing. *Health Care Management Review*. 1993; 18(1): 71-77.
13. Canby J. Applying Activity-Based Costing to Healthcare Settings. *Healthcare Financial Management*. 1995; 49(2): 50-56.
14. Stouthuysen K, Demeere N, Roodhooft F. Time-driven activity-based costing in an outpatient clinic environment. *Health Policy*. 2009; 92(2-3): 296-304.
15. Lievens Y, van den Bogaert W, Kesteloot K. Activity-based costing: a practical model for cost calculation in radiotherapy. *International Journal of Radiation Oncology Biology Physics*. 2003; 57(2): 522-35.
16. Everaert P, Bruggeman W, Sanac De Creus G. From ABC to time-driven ABC (TDABC)-an instructional case. *Journal of Accounting Education*. 2008; 26(3): 118-54.
17. Lin BY, Chao TH, Yao Y, Tu SM, Wu CC, Chern JY, Chao SH, Shaw KY. How can activity-based costing methodology be performed as a powerful tool to calculate costs and secure appropriate patient care? *Journal of Medical Systems*. 2007; 31(2): 85-90.
18. Popesko B. Activity-Based Costing application methodology for manufacturing industries. *E+M Ekonomie a management*. 2010; 13(1): 103-113.
19. Cao P, Toyabe S, Akazawa K. Development of a practical costing method for hospitals. *Tohoku Journal of Experimental Medicine*. 2006; 208(3): 213-224.