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PROFITABILITY EVALUATION OF HOSPITAL DEPARTMENTS FORMING A HEALTH CARE ENTITY

Edyta Mioduchowska-Jaroszewicz,
University of Szczecin, Szczecin, Poland,
E-mail: emioduch@wneiz.pl

Mirela Romanowska,
University of Szczecin, Szczecin, Poland,
E-mail: mirelaj@wneiz.pl

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ABSTRACT. This aim of the article is to present the results of profitability evaluation of the departments forming the studied healthcare entity from Poland. In the analysis of profitability the authors applied simple tools of financial analysis, i.e. absolute deviation, indicators of growth rate and indicators of structure. Revenues were compared with costs in order to determine the profitability of each department of the studied healthcare entity. Despite the fact that not all the departments in this entity showed profitability, it should be emphasized that according to the EU Health for Growth Programme 2014-2020 health is a profitable investment in itself. Moreover, the studies so far carried out in 22 EU countries revealed that health is a good investment for the future.

JEL Classification: G30, H5 ***Keywords***: profitability, health care entity, cost, revenue.

Introduction

A healthcare entity is an enterprise with a complex structure, which at a time of system transformation as well as due to the accession of Poland to European Union, must be adapted to the needs of today's medicine. This process should take into account the principles of economic thinking in order to enhance the effectiveness of the use of resources of resource reduce operating costs of entities.

The current regulation of the Minister of Health of 02 February 2011 on requirements that should be fulfilled in technical and sanitary terms by premises and equipment of health care entities (Dz. U. Nr 31, poz. 158) enforces the need to implement adjustment programmes and aims at accelerating the desirable restructuring changes of particular health care entities.

As a result of hospital restructuring, the supply of short-term healthcare services continues to fall for the benefit of alternative forms. Many patients do not require hospitalization in short-term healthcare departments. Some forms of treatment can be provided in day-care centres or long-term care departments.

In most countries of the European Union the use of short-term care beds amounting to 85% is considered a minimum; it is justified on economic and organizational grounds. The aim of restructuring hospitals is to maintain an optimal number of hospitals and short-term care beds with an appropriate structure of services supply , making the optimum use of the existing resources.

This aim of the article is to present the results of profitability evaluation of the departments forming the studied healthcare entity from Poland. The primary aim of properly

operating healthcare entities is to strive to obtain more efficient and flexible structures of hospitals to provide comprehensive medical services, including diagnostics, treatment as well as early rehabilitation, as they allow to for a return quickly to work and regain a better quality of life.

1. Methodology of the Research

The analysis of profitability of the health care entity was carried out by applying comparative analysis and descriptive statistics, evaluating the sales, variable costs of treatment and the fixed costs (Dakin *et al.*, 2015).

The specificity of the services provided by the health care facility to evaluate the efficiency it is necessary to use the description of allowing for evaluation of the studied phenomenon (qualitative assessment). While quantitative measures do not take into account the diversity of the quality or effectiveness of medical services (Jacobs *et al.*, 2013).

The key contribution of productivity analysis models to measuring efficiency is: (a) to adjust for the external environmental influence on performance, and (b) to handle to problem of attaching relative valuations to diverse outputs. Two approaches have dominated the productivity literature: econometric methods, pre-eminently various forms of statistical methods such as stochastic frontier analysis (SFA); an descriptive methods, knowns as data envelopment analysis (DEA) (Jacobs *et al.*, 2006). Although these methods are approaching the task in very different fasions have a common intention to use obsereved behavior of all organizations to apply the maximum possible level of performance (production function) and providing estimates of the degree of risk the functioning of the audited entity (Papanicolas, Smith, 2013).

The value of the sales was compared with the variable costs and the fixed costs in order to evaluate profitability of the departments forming the health care entity. Positive surplus indicates a positive financial result, in economics defined as a profit, i.e. profitability of the studied health care entity. A negative difference between the sales, variable costs and the fixed costs indicates that the entity generates a negative financial result, defined as a loss, i.e. the lack of profitability (Hamrol, 2004). A financial result reflects a financial picture of the overall results obtained by a company in a particular period of time. It integrates all aspects of business activities with the market; therefore, it is the area of external factors. However, the financial result is influenced by the costs; the value of the costs depends on the internal conditions in a company (Labro, 2015; Gok, Altindag, 2015). Achieving a favourable financial result is a main purpose of all enterprises. Each entity tries to obtain the best possible outcome of their business activity. Striving to produce a favourable financial result has a strong motivational function. Without generating a positive financial result, it would be impossible to operate a business for a longer period of time (Gabrusewicz, 2014). The analysis of a financial result of a health care entity is difficult and ambiguous (Romanowska, 2015). Managers of these entities have to struggle with more complex problems than managers of typical businesses. Apart from providing medical services, they have to strive to achieve profitability, but on the other hand, they have to provide unlimited availability to their services (Mioduchowska-Jaroszewicz, 2010).

Another tool that was applied in the analysis were the indicators of growth rate (Wędzki, 2006) helping to analyse the changes that occur in certain financial values over time, and estimating how given values increase or decrease. The analysis of the growth rate is based on the research of selected values compared to the reference period, i.e. how much their level, expressed as a percentage, increases or decreases. On the basis of these changes, it can be evaluated which business activities gained in importance, and which were in the phase of balance or stagnation. It allows to evaluate the growth rate or the rate of decline. If we

compared the data for uneven periods of time, it would be impossible to interpret the results as the decline or the growth. In this case, it would only be possible to evaluate what share of the costs from the reference period was generated in a studied period of time (Wędzki, 2006).

The authors also used structure indicators (Wędzki, 2006; Gabrusewicz, 2014) allowing to identify financial values which have the greatest influence on the situation of the health care entity. The use of these indicators allows to estimate the share of the selected costs within the total costs. It indicates the costs that are of crucial importance as well as how they change in different periods of time. Moreover, the indicators allow to compare the structure of costs of the studied health care entity or its department with a different entity or a department. On this basis, it is possible to conclude how the entity operates, and if the deviations, if any, are the result of anomalies.

2. The Analysis of Revenues and Costs of the Departments of the Studied Hospital – Case Study

The authors evaluated the value of the sales of services, which are the funds received from the National Health Fund (Polish NFZ) as well as the variable costs of treatment, operating fixed costs of the departments, and the total costs for each department separately. The evaluation includes the analysis of the growth rate of these values and the structure of costs, along with the division into the fixed and variable costs in the period from January to June 2015.

The analysis of costs and revenues was carried out according to the places where they were generated, including the hospital departments forming the studied health care entity. There are eight departments in the studied hospital:

1) the department of surgery,
2) the department of internal medicine,
3) the department of obstetrics and gynaecology,
4) the department of pediatrics,
5) the department of neonatology,
6) the department of anaesthesiology and intensive care,
7) the admission room,
8) specialized medical clinics.

However, the article discusses only the selected departments, the choice of which resulted from the need to present representative departments, i.e. those that achieved diversified financial results caused by the changes in the costs and revenues.

2.1. The Department of Surgery

In the department of surgery, in the analysed period from January to June 2015, the sales of services was lower than total costs (see *Table 1*). Such a situation shows that the department achieved a negative financial result (loss), which was highest in March, amounting to -167 253. 64 PLN, and lowest in February, -81 011. 12 PLN.

Table 1. Monthly sales and costs of the department of surgery

Content	Data in Polish Zloty (PLN)					
	January	February	March	April	May	June
Sales of services	179709.40	197236.00	148645.24	219969.36	149719.44	204521.20
Variable costs of treatment	86447.26	103356.16	124130.26	115293.48	98223.67	117215.19
Operating fixed costs	176678.87	174890.96	191750.62	195710.43	196045.64	182897.24
Total costs	263126.13	278247.12	315880.88	311003.91	294269.31	300112.43
Financial result (revenues-costs)	- 83416.73	-81011.12	-167235.64	- 91034.55	-144549.87	-95591.23

Source: own elaboration.

The growth rate of sales of services was highest in April compared to March. In this period, the sales rose by 47.98%. (see *Table 2*) It was lowest in May compared to April 68.06%, which represents a decrease of sales by 31.94%. The decline also occurred in March compared to February. The growth rate amounting to 75.36% actually stands for a decline by 24.64%. In the remaining months, i.e. in February and June, compared to the preceding month, there was an increase by 9.75% and 36.6% respectively.

The variable costs of treatment rose in the three out of five months, i.e. in February, March and June. The fastest growth rate occurred in March compared to February and it amounted to 120.1% (an increase by 20.1%). As part of these costs, a substantial increase by 228.36% occurred in the position of out-of-hospital diagnostics. The variable costs decreased by 14.81% (growth rate 85.19%) in May compared to April. A slight decrease of these costs by 7.22% was recorded in April (growth rate 92.88%) compared to March.

The costs of transport in June amounted to 1734.23%. They were characterised by the fastest growth rate within the variable costs of treatment in the studied period between January and June 2015. A slightly different situation was observed in operating fixed costs of the department. These costs rose in March by 9.64%, in April by 2.07% and in May by 0.17% compared to the preceding month. These costs decreased in February by 1.01% and in June by 6.71%.

The fastest growth rate of fixed costs of the department of surgery occurred in February in the position of other fixed costs, 557.77%. The fastest rate of decline occurred in May in the position of medical equipment and depreciation. The decrease amounted to 79.07% (growth rate 20.93%). Such a situation led to the increase of total costs: in February by 5.75%, in March by 13.53%, and in June by 1.99%. These costs decreased in April by 1.54% and in May by 5.38%.

Table 2. Growth rate of revenues and costs of the department of surgery (%)

Content	Data (%)				
	February	March	April	May	June
1	*2*	*3*	*4*	*5*	*6*
Sales of services	109.75	75.36	147.98	68.06	136.6
Variable costs of treatment, including:	119.56	120.1	92.88	85.19	119.33
Pharmaceuticals and blood	139.16	128.36	76.82	69.55	127.47
Disposable equipment and medical supplies	49.33	307.1	70.44	51.09	189.21

1	*2*	*3*	*4*	*5*	*6*
Out-of-hospital diagnostics and examinations	56.64	328.89	103.42	49.36	148.44
Hospital diagnostics	157.82	82.17	103.64	80.62	134.79
Operating room and anaesthesiology	129.71	98.3	113.37	95.84	92.65
Costs for hospital stays of patients	95.17	135.43	81.02	97.23	151.61
Costs of transport	132.27	218.43	15.35	45.46	1734.23
Operating fixed costs of department	98.99	109.64	102.07	100.17	93.29
Medical equipment and depreciation	114.02	186.32	261.55	20.93	88.98
Remunaration, labour costs	93.14	107.27	98.29	104.16	96.75
Share in maintaining medical infrastructure	124.56	120.22	102.29	120.5	81.77
Costs of occupied premises	146.5	97.22	74.92	102.95	70.62
Other fixed costs	557.77	143.58	92.98	-	
Total costs	105.75	113.53	98.46	94.62	101.99

Source: own elaboration.

The analysis of the structure of costs of the department of surgery leads to a conclusion that throughout the studied period, i.e. from January to June 2015, the fixed costs exceeded 60% of all the costs of the department. Their share was highest in January as they amounted to 67.15% (see *Table 3*). A large share of the fixed costs translated into high operational risk expressed by a heightened sensitivity of a financial result to even a small change of sales (e.g. the number of patients).

Table 3. The structure of costs of the department of surgery (%)

Content	Data (%)					
	January	February	March	April	May	June
Variable costs of treatment	32.85	37.15	39.3	37.07	33.38	39.06
Operating fixed costs of department	67.15	62.85	60.7	62.93	66.62	60.94
Total costs	100	100	100	100	100	100

Source: own elaboration.

2.2. The Department of Pediatrics

The department of pediatrics was the only department achieving a positive financial result throughout the analyzed period from January to June 2015. (see *Table 4*) This was due to the higher sales of services than the total costs. The largest profit was generated in February. The 18 069.05 PLN means that the sales of services was higher by this amount than the total costs. The lowest financial result was recorded in May when the profit amounted to 16.34 PLN.

The growth rate of the sales of services of the department of pediatrics showed the highest increase by 31.65% in February compared to January (see *Table 5*) Another increase in sales was recorded only in June when the sales went up by 11.12% compared to May. In March, April and May the sales of services compared to the preceding month went down. The most significant decrease occurred in the month of May compared to April when the sales of services decreased by 12.5%.

Table 4. Monthly sales and costs of the department of pediatrics

Content	Data in Polish Zloty (PLN)					
	January	February	March	April	May	June
Sales of services	75084.88	98852.00	94786.17	92348.29	80809.32	89797.63
Variable costs of treatment	11537.23	17080.06	21596.76	18248.16	16259.66	18982.19
Operating fixed costs of department	60487.70	63702.89	60970.57	65077.48	64533.32	64890.98
Total costs	72024.93	80782.95	82567.33	83325.64	80792.98	83873.17
Financial result (revenues-costs)	3059.95	18069.05	12218.84	9022.65	16.34	5924.46

Source: own elaboration

The variable costs of treatment increased considerably in February by 48.04% compared to January. They rose further in March by 26.44%, in June by 16.74%. They decreased compared to April by 15.5% (growth rate 84.5%), and in May by 10.9% (growth rate 89.1%). Within the variable costs of treatment, the costs of transport showed a slight increase in absolute values (PLN), whilst a significant one in relative values (%). The cost of transport amounted to 7 821.25%. A considerable growth in June compared to May was recorded in the position of disposable equipment and medical supplies. It amounted to 307.33% (growth rate 407.33%). In May compared to April, it decreased most significantly, because by 77.14% (growth rate 22.86%), of all the variable costs of treatment.

Table 5. Growth rate of revenues and costs of the department of pediatrics (%)

Content	Data (%)				
	February	March	April	May	June
Sales of services	131.65	95.89	97.43	87.5	111.12
Variable costs of treatment, including:	148.04	126.44	84.5	89.1	116.74
Pharmaceuticals and blood	145.08	89.79	97.62	170.99	53.25
Disposable equipment and medical supplies	84.9	255.11	84.22	22.86	407.33
Out-of-hospital diagnostics and examinations	-	293.48	103.7	-	-
Hospital diagnostics	129.81	106	110.09	101.6	82.44
Operating room and anaesthesiology	-	-	-	-	-
Costs for hospital stays of patients	159.05	95.42	89.32	89.38	126.69
Costs of transport	-	78281.25	36.49	96.6	201.99
Other variable costs	-	139	65.4	785.43	32.57
Operating fixed costs of department	105.32	95.71	106.74	99.16	100.55
Medical equipment and depreciation	108.17	98.99	128.07	122.66	87.97
Remunaration, labour costs	95.4	96.36	114.35	91.17	110.64
Share in maintaining medical infrastructure	112.49	109.7	87.58	102.92	107.82
Costs of occupied premises	146.5	97.22	74.92	102.95	70.62
Other fixed costs	21370.5	25.64	43.04	1290.05	12.49
Total costs	112.16	102.21	91.84	96.97	103.81

Source: own elaboration.

The fixed costs, due to their nature, did not undergo significant changes over time. Their largest increase occurred in April compared to March, amounting to 6.74% (growth rate 106.74%). In March and May these costs were slightly reduced compared to the preceding

month, i.e. 4,29% and 0.84% respectively. Within the fixed costs of the department of pediatrics, other fixed costs changed most considerably (a significant increase).

The total costs did not show significant changes. Following the decrease in April and May compared to the preceding month, the costs went up by 3.81% (growth rate 103.82%) compared to May.

The overall structure of the costs of the department indicated that the variable costs of treatment were relatively low because they accounted for about 20% of all costs (see *Table 6*). Thus, the fixed costs had a share of about 80%. The highest share of the variable costs of treatment was recorded in March and it amounted to 26.16%, whilst the lowest occurred in January when it totalled 16.02%.

Table 6. The structure of costs of the department of pediatrics

Content	Data (%)					
	January	February	March	April	May	June
Variable costs of treatment	16.02	21.14	26.16	21.90	20.13	22.63
Operating fixed costs of department	83.98	78.86	73.84	78.10	79.87	77.37
Total costs	100	100	100	100	100	100

Source: own elaboration.

2.3. The Department of Anaesthesiology and Intensive Care

When analyzing the sales of services of the department of anaesthesiology and intensive care, it can be noted that in the month of January it was very low compared to the other months; due to high fixed costs it resulted in incurring a high loss, i.e. -139752.94 PLN. (see *Table 7*). The department also recorded a loss in the month of April (-65699.02 PLN) and May (-2067.62 PLN) when the total costs were the highest.

Table 7. Monthly sales and costs of the department of anaesthesiology and intensive care

Content	Data in Polish Zloty (PLN)					
	January	February	March	April	May	June
Sales of services	94252.96	323916.08	256273.03	200443.15	283021.65	247132.03
Variable costs of treatment	74278.71	43403.67	87546.14	81703.21	106243.14	69555.73
Operating fixed costs of department	159727.19	150689.79	156550.37	184438.96	178846.13	166614.15
Total costs	234005.90	194093.46	244096.51	266142.17	285089.27	236169.88
Financial result (revenues-costs)	-139752.94	129822.62	12176.52	-65699.02	-2067.62	10962.15

Source: own elaboration.

The analysis of the values making up the financial result of the department of anaesthesiology and intensive care showed a considerable change of the sales of services, which in February compared to January rose by 243.67% (growth rate 343.67%), whilst in the following month it decreased compared to the preceding month by 20.88% (growth rate 79.12%) (see *Table 8*). In April the sales of services also decreased (growth rate 78.12%),

similarly in June (growth rate 87.32%) when a decrease by 12.68% was recorded compared to the previous month.

The variable costs of treatment similarly to the sales of services showed a considerable change. Their highest increase occurred in March compared to February, i.e. by 101.7% (growth rate 201.7%). The highest decrease by 41.57% was recorded in February compared to January. Within the variable costs of treatment, the value of the out-of-hospital diagnostics varied significantly over the months. The highest growth rate of this value was recorded in April compared to March (265.06%), whilst the lowest (39.04%) in February compared to January.

The fixed costs of the department of anaesthesiology and intensive care, similarly to the other departments, were not subject to significant changes. In April compared to March, they increased by 15.9% (growth rate 115.9%), and in June – when the lowest growth rate was recorded – the fixed costs went down by 6.84% compared to May (growth rate 93.16%). The position of medical equipment and depreciation showed the greatest changeability within the fixed costs. In May compared to April, this value rose by 83.46%, whilst in June compared to May it decreased by 68.63% (growth rate 31.37%). The result was that the growth rate of total costs – following the increase by 42.82% in March compared to February – showed a constant downward trend.

Table 8. Growth rate of revenues and costs of the department of anaesthesiology and intensive care (%)

Content	Data (%)				
	February	March	April	May	June
Sales of services	343.67	79.12	78.21	141.2	87.32
Variable costs of treatment, including:	58.43	201.7	93.33	130.04	65.47
Pharmaceuticals and blood	48.01	241.74	91.07	142.71	62.19
Disposable equipment and medical supplies	80.44	201.5	88.76	68.98	93.64
Out-of-hospital diagnostics and examinations	39.05	145.61	265.06	105.45	139.23
Hospital diagnostics	85.53	96.4	116.9	129.92	56.21
Operating room and anaesthesiology	-	-	-	-	-
Costs for hospital stays of patients	76.32	138.13	128.87	116.99	71.24
Costs of transport	-	-	63.97	149.81	33.38
Other variable costs	-	-	-	-	-
Operating fixed costs of department	94.34	103.89	115.9	96.97	93.16
Medical equipment and depreciation	73.52	166.88	86.16	183.46	31.37
Remunaration, labour costs	92.78	99.85	126.68	91.14	100.13
Share in maintaining medical infrastructure	112.49	109.7	87.58	102.92	107.96
Costs of occupied premises	146.5	97.22	74.92	102.95	70.62
Other fixed costs	129.36	111.09	48.63	-	-
Total costs	82.94	125.76	109.03	107.12	82.84

Source: own elaboration.

The structure of costs of the department of anaesthesiology and intensive care indicated that the operating fixed costs were well over 60% (see *Table 9*). In February their share in the total costs amounted to 77.64% and was the highest throughout the analyzed period. The lowest share of 62.73% occurred in May.

Table 9. The structure of costs of the department of neonatology (%)

Content	Data (%)					
	January	February	March	April	May	June
Variable costs of treatment	31.74	22.36	35.87	30.7	37.27	29.45
Operating fixed costs of department	68.26	77.64	64.13	69.3	62.73	70.55
Total costs	100	100	100	100	100	100

Source: own elaboration.

A visible further relative or absolute reduction of costs is limited due to the previously made reductions. The improvement of the financial result of the departments can be sought in the increase of the sales of services, i.e. mainly the value of contracts with the National Health Fund (however, there still remains the issue of executing these contracts), as well as in the increase in the number of patients admitted, including those from outside the province.

In all the analyzed hospital departments the sales decreased compared to the previous month. In five of them, such a situation occurred in three periods, i.e. mostly in April and May. In the other three departments the sales decreased in the two months compared to the previous period.

The value of variable costs of treatment also showed changes in all the departments. In the two of them, the sales decreased in the three studied periods compared to the previous month. Common are the months of February and April. In four departments, these costs decreased in February, April, May compared to the previous period.

A simultaneous growth of revenues and costs in the same months was recorded in the department of obstetrics and gynaecology and pediatrics (in February) as well as in the department of neonatology (in March). This resulted in the positive financial result generated in March in the two out of the three departments, i.e. in the pediatrics and neonatology.

A multidirectional analysis of the revenues and costs shows that in the studied hospital only two out of the eight departments, i.e. the department of pediatrics and specialized medical clinics achieved a positive financial result in the period under consideration. In addition, the department of anaesthesiology and intensive care made a profit in the three out of the six analysed months.

This situation may be due to the relatively low share of variable costs of treatment, which in the case of pediatrics and specialized medical clinics account for about 20-30%, whilst in the department of anesthesiology and intensive care amount to 22-27% of total costs. Another reason may be the result of a favorable valuation of medical procedures performed by these departments.

To conclude, if the hospital was to be evaluated only from the perspective of its financial results, it can be said that it should limit its activities exclusively to specialized medical clinics and the department of pediatrics.

Conclusions

Financial standing of a health care entity is influenced by the results achieved by its departments. The results of the analysis confirm the steady growth of costs in all the departments of the hospital. The situation was brought about by the need to carry out adjustment programmes, including restructuring programmes for particular departments, aiming to improve the quality of medical services and to increase patients' safety. This was confirmed in the steady increase in the fixed costs (depreciation) associated with the increasing value of assets, which resulted from investments in infrastructure and medical

equipment. However, in order to meet the expectations of potential patients, it will be necessary to make further investments, which may lead to gradual deterioration of financial condition of health care entities.

In Poland very often patients requiring intensive care or long-term palliative care, as well as those requiring nursing care, are treated in the same hospital departments. It is a result of the lack of long-term health care facilities (such as nursing homes) and hospice services. Hospitals are still suffering from too few hospital bed days. Hospital financing system existing since 1999 has not encouraged to use alternative and cheaper but equally efficient forms of care. Under the present system, there is a need for such alternative forms; however, it also entails changes in the structure of health care entities. There also appear new needs stemming from social expectations and concerning the forms of elderly care, which result from demographic changes in Poland.

In the EU Health for Growth Programme 2014-2020[1] it is emphasized that health is a profitable investment in itself (Rudawska *et al*., 2012). Moreover, the studies so far carried out in 22 EU countries revealed that losses attributed to health as an investment good are estimated at approx. 1.4% GDP, which in absolute values makes up 141 bln Euros annually (Mackenbach *et al.*, 2007). These arguments support the calls for investing in health and health care entities. However, there are important questions of where these health care entities should be situated, what infrastructure they should be based on, and most importantly, from what sources they will be financed (Watson, 2009).

Further study aiming to find factors and ways to improve financial performance of the studied departments with the use of Panel Data Modeling and methods of linear regression will be a complement of the research presented in the article.

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