

REVIEW ARTICLE  
PRACA POGLĄDOWA

## ANALYSIS OF MEDICAL SERVICES FINANCIAL EFFICIENCY IN THE SECONDARY CARE INSTITUTIONS OF SUMY REGION

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### ABSTRACT

**The aim:** The aim of the study is to analyze financial indicators and assess the effectiveness of financing secondary medical care enterprises during the transition period in the context of remuneration to doctors.

**Materials and methods:** To perform the analysis, the financial characteristics of 26 medical facilities have been collected and processed by means of involving the bibliosemantic method, data extract and content analysis.

**Conclusions:** Presents a comparative analysis of labour payment expenses to doctors of cardiology, obstetric and gynecological and surgical departments of medical facilities. The predicted labour payment expenses for the number of services provided have been calculated. Besides, the article makes it clear that the allocation of funds according to bed-day loads and the number of medical services rendered is unsustainable and does not correspond to the real load on the actual position.

**KEY WORDS:** financing, costs, remuneration, medical institutions

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## INTRODUCTION

### PROBLEM FORMULATION

The key to the development and prosperity of each country is healthy citizens. Accordingly, healthcare is a priority for improvement and development. Today, the healthcare system is in the process of reforming. Tariff setting system for rendered services which had existed before the reform started and which to some extent retains its function in the transition period did not take into account many factors that eventually affect the quality level of medical services. The financial component of the health care system is divided into funding salaries, administrative expenses, procurement of pharmaceuticals, etc. The financing model proposed by power-makers aims at introducing a state guaranteed package of medical care. It is based on the main principle of changes which consists in the shift from funding cost estimates of medical institutions to payment for the result [1]. Although the implementation of new legislative norms and work systems has been under way not long so far, and it mainly refers to primary health care, currently, we can observe both positive changes and problematic issues that require elaboration and identification of the ways to solve them. Currently, the issue that needs to be thoroughly studied is secondary healthcare financing, that will enable efficient distribution and employment of the funds rendered. At the same time, secondary medical institutions are supported by medical subvention funds from the state and local budgets. There are a lot of health care facilities where funds are spent only on their passive

maintenance, or use of funds does not meet improving the quality of medical care and the real workload. Therefore, in order to determine the effectiveness of funding, it is necessary to undertake a thorough cost analysis using the example of remuneration for health professionals.

### PUBLICATIONS ANALYSIS

The issue of medical system and health care reform in Ukraine is being explored by scientists from various fields of science, since these areas have multiple components that are worth analyzing, studying and processing. Publications of various scholars both cover new approaches to work in the face of changes and actively analyze the still operating system. Thus, S.O. Kushnir is considering financial security issues with the problems of financial support in the process of reform, focusing on the level of wages and staffing of medical institutions [2].

I.S. Muzyka when considering the implementation of medical reform on the example of the Carpathian region, Ukraine, concludes that the existing financing mechanism does not fully allow for the specifics and features of a particular region. [3].

I.V. Yaremchuk pays attention to the public internal control over financial flows in the context of healthcare reform. Having conducted the cost analysis for several years, he concluded that, despite increased costs, the overall situation in medicine has not improved significantly [4].

L.V. Hryniv and T.V. Pushik dedicate their research to the issues of medical facility management in the context of medical reform, and conclude that quality services are guaranteed by the availability of skilled and motivated staff,

**Table 1.** Labour costs for one treated patient per year, UAN

The name of a Medical Facility	Cash labor costs (KEKV 2110) for 2018, thousand UAH	Bed capacity as of 01.01.2019	Number of patients treated for 2018	Labour costs per 1 patient, thousand UAH	Labour costs outlook per 1 patient, UAH, in terms of the reform	Percentage of patients treated of the total number by districts
Bilopillia Central District Hospital (Bilopillia CDH)	10567	200	6 962	52,84	4859,80	4,02
Buryn CDH	6910	105	3 764	65,81	11196,19	2,17
Velyka Pysarivka CDH	5252	100	2992	52,52	11240,72	1,73
Krasnopillia CDH	6284	125	2978	50,27	10810,17	1,72
Krolevets CDH	10892,9	160	5013	68,08	8696,75	2,90
Lebedyn CDH	11277	162	6264	69,61	7116,36	3,62
Lypova Dolyna CDH	4503	94	2592	47,90	11835,05	1,50
Nedryhailiv CDH	6975	100	3713	69,75	12029,58	2,15
Putyvl CDH	9194	135	3893	68,10	11202,56	2,25
Seredyno-Buda CDH	4957	94	2528	52,73	13358,11	1,46
MNO "Sumy CDCH" of SDC, SR (Municipal Non-Commercial Organization "Sumy Central District Clinical Hospital" of Sumy District Council, Sumy Region	11062	215	7291	51,45	4518,97	4,21
Yampil CDH	4737	91	3050	52,05	10929,32	1,76
MF (Municipal Facility) "Sumy City Clinical Hospital № 1"	25485	360	12315	70,79	3681,11	7,12
MNO "Clinical Hospital № 4" of SCC (Sumy City Council)	8745	130	6040	67,27	7131,99	3,49
MF (Municipal Facility) "Sumy City Clinical Hospital № 5"	22557	330	10928	68,35	4005,51	6,31
MNO "The St Zinaida Children's Hospital" of SCC	20331	295	10729	68,92	4113,47	6,20
MNO "The Blessed Virgin Mary Clinical Maternity Hospital" of SCC	11552	165	4566	70,01	9819,03	2,64
Konotop CDH	33392	521	19718	64,09	2081,48	11,39
MNO of KCC "Konotop City Hospital"	6132	110	4308	55,75	8286,38	2,49
Romny CDH	23892	350	12837	68,26	3405,27	7,42
Shostka CDH	22860	340	11418	67,24	3770,84	6,60
MNO "Shostka Children's Hospital" of Shostka City Council	4496	65	2090	69,17	21193,26	1,21
Okhtyrka CDH	17642	326	12462	54,12	2780,82	7,20
Hlukhiv CDH	19529,75	265	8477	73,70	5567,24	4,90
Trostianets City Hospital	11660	170	6145	68,59	7147,58	3,55

Note: Compiled by the authors according to the data from [14].

and applying a value-based healthcare system at the micro level allows to achieve cost savings, to improve the quality of medical services, and at the state level – to increase health care efficiency [5].

V.A. Smiiianov developed and implemented a model of internal audit at the institution of health care. This mechanism

helps to optimize financial, organizational and treatment processes in hospitals, leading to improved quality of care. [6].

T. Zhelyuk talks about the scientific and applied aspects of work, which should be aimed at effectiveness capable of contributing to the development of competitiveness at medical institutions. For this purpose, it is required to have a resource

**Table 2.** Activity analysis of inpatient obstetric and gynecological departments per one actual permanent positions, UAN

The name of a Medical Facility	Actually held positions	Number of patients treated for 2018	Average monthly labour costs in terms of actually held position, UAH	Average annual labour costs in terms of actually held position, UAH	Cash labor costs (KEKV 2110) for 2018, thousand UAH	Number of patients treated per 1 actually held position	Labour costs per 1 patient treated, UAH, for actually held position	Bed capacity	Labor costs outlook per 1 bed, UAH	Projected labor costs for actually treated patients, UAH, per one established position
Bilopillia CRH	3,75	672	10 602	127 224	477090	179,20	709,96	20	11,01	66304,00
Burn CDH	1,5	561	7161	85 932	128898	374,00	229,76	15	9,89	138380,00
Velyka Pysarivka CDH	1,25	674	27878	334 536	418170	539,20	620,43	18	9,88	199504,00
Krasnopillia CDH	1	261	9850	118 200	118200	261,00	452,87	15	21,26	96570,00
Krolevets CDH	5,5	630	6609	79 308	436194	114,55	692,37	18	10,57	42381,82
Lebedyn CDH	5	683	9288	111 456	557280	136,60	815,93	14	7,58	50542,00
Lypova Dolyna CDH	1	247	16175	194 100	194100	247,00	785,83	15	22,47	91390,00
Putyvl CDH	3,25	642	24079	288 948	939081	197,54	1462,74	25	14,41	73089,23
Sumy CDCH	1,5	773	8817	105 804	158706	515,33	205,31	20	9,57	190673,33
Yampil CDH	2	683	7017	84 204	168408	341,50	246,57	16	8,67	126355,00
MF "Sumy City Clinical Hospital № 1"	6,5	1632	6560	78 720	511680	251,08	313,53	40	9,07	92898,46
MF "Sumy City Clinical Hospital № 5"	9	1474	5404	64 848	583632	163,78	395,95	30	7,53	60597,78
MNO "The Blessed Virgin Mary Clinical Maternity Hospital" of SCC	208,5	4566	4598	55 176	11504196	21,90	2519,53	165	13,37	8102,73
Konotop CDH	14	2188	16995	203 940	2855160	156,29	1304,92	65	10,99	57825,71
Romny CDH	11,5	2034	14912	178 944	2057856	176,87	1011,73	50	9,10	65441,74
Shostka CDH	20,25	1756	11826	141 912	2873718	86,72	1636,51	60	12,64	32084,94
Okhtyrka CDH	10,75	1118	5881	70 572	758649	104,00	678,58	33	10,92	38480,00
Hlukhiv CDH	7,5	1687	12738,6	152 863	1146474	224,93	679,59	38	8,33	83225,33
Trostianets City Hospital	6	861	10003	120 036	720216	143,50	836,49	25	10,74	53095,00

Note: Compiled by the authors according to the data from [14].

base for functional activity, to strengthen the internal factors of competitiveness, such as medical efficiency, that is, the ability to meet the needs of patients by providing a full range of high-quality medical services and administrative effectiveness, including the effectiveness of administrative, financial, personnel, information and communication management [7].

S. Knysh considers the problems of medical reform from the point of view of legal regulation and speaks about the prevention of corruption in the management process. In his work, he says that corruption largely depends on the level of material security of medical professionals themselves. Adequate cash security together with the increased legal liability significantly facilitate the prevention of corruption offenses.

The scientist emphasizes the main problem consisting in the fact that it is incorrect to require transparency and honesty in work whereas financing does not correspond to the complexity of the acquired profession. Medical reform is aimed at taking measures to remedy this situation, in particular, by improving the working conditions of health workers [8].

## THE AIM

The aim of the study is to analyze financial indicators and assess the effectiveness of financing secondary medical care enterprises during the transition period in the context of remuneration to doctors.

Table 3. Labour costs for childbirth in a maternity ward per one actual established (permanent) positions, UAN

The name of a Medical Facility	Actually held positions	Cash labor costs (KEKV 2110) for 2018, thousand UAH	Number of births (deliveries) for 2018	Number of patients treated for 2018	Bed capacity	Labour costs per 1 patient, thousand UAH	Number of births per 1 actually held post	Labour costs outlook per 1 patient, UAH, in terms of the reform	Projected labor costs for actually treated patients, UAH, per one established position
Velyka Pysarivka CDH	0,75	750	33	37	8	20,27	44,00	80,00	16280,00
Putyvl CDH	1,5	1144	85	205	10	5,58	56,67	18,05	20966,67
Yampil CDH	1	561	73	285	6	1,97	73,00	7,79	27010,00
MNO "The Blessed Virgin Mary Clinical Maternity Hospital" of SCC	61	3366	1854	1860	75	1,81	30,39	14,92	11245,57
Konotop CDH	12	3484	695	1062	35	3,28	57,92	12,19	21429,17
Romny CDH	9,75	3086	404	1130	30	2,73	41,44	9,82	15331,28
Shostka CDH	16,25	4373	459	617	30	7,09	28,25	17,99	10451,08
Hlukhiv CDH	3,25	2022,8	362	952	19	2,12	111,38	7,38	41212,31

Note: Compiled by the authors according to the data from [14]

## MATERIALS AND METHODS

In order to assess cost-effectiveness of medical services, we have analyzed the financial performance of inpatient departments of Sumy region's medical clinics rendering secondary medical care. These figures concern payroll costs to physicians. In total, 26 institutions are subordinated to the healthcare department of Sumy Regional State Administration.

Our computations are based on the following criteria: cash labour costs, average monthly labour costs per an actually held position, the number of patients treated, as well as bed capacity. The study was conducted with involving the bibliosemantic method, content analysis and data extract.

## REVIEW AND DISCUSSION

In Ukraine, medical reform started with the adoption of the Laws "On State Financial Guarantees of Medical Services for the Population" of October 19, 2017, which entered into force on January 30, 2018, and "On Amendments to Some Legislative Acts of Ukraine on Improving Legislation on the Activities of Health Care Institutions" dated 06.04.2017, which came into force on 06.11.2017 [9]. This law provides for a change in the legal status of healthcare institutions to municipal non-commercial organizations (non-profit utility companies) that will enable to independently manage administrative, financial and business activities. The cardinal change in the reform is the transition from the completely state-subsidized medical institutions to public funding of particular health care services. Accordingly, the National Health Service of Ukraine has been established. It is a governing body that pays money to medical facilities for their services provided. Under the Medical Guarantee Program, citizens are ensured to have full payment at the expense of the state budget [10]. According to this law, a uniform tariff for medical service payment has

been set. It may sustain modifications in compliance with coefficients. Change in funding system began with primary health care. An important component of the reform is the remuneration to health workers. However, in the transition period, secondary healthcare funding is still being carried out by the current system (at the expense of local budgets) [11].

Changes to the secondary health facilities are gradually entering into force. The key point of this reform is the modification of healthcare financing system, which consists in channeling funds for the services rendered by a healthcare facility to a particular patient. To calculate the cost of a service, the following indicators must be taken into account: the total budget allotment for the healthcare system, the cost of a particular service, and the need for a given service [12]. As of today, hospital financing is calculated on the basis of the number of people living on the territory accountable to a particular healthcare facility per inhabitant. The amount of financing for hospital maintenance on the state and local budgets is determined by the established economic norms and standards, based on bed capacity by a specific disease profile. It is according to those standards that the required number of doctors, mid-level and junior medical personnel, salary funds, costs on medications, nutrition, etc. are identified [13]. The amount of payment is formed on the basis of official salaries, which are approved by the Cabinet of Ministers of Ukraine. That is, healthcare workers are paid for the hours worked, but not for the volume of services rendered. This approach results in the lack of motivation in for healthcare employees to improve the quality of care and care. The existing load on hospital beds does not take into account the practical need for their number and duration of inpatient treatment without regard to the profile of hospital department, where in order to maintain the funding level, the unreasonable bed capacity is available.

Table 4. Activity analysis of inpatient surgical departments per one actually held established positions, UAN

The name of a medical facility	Actually held positions	Number of surgeries for 2018 without regard to skin and subcutaneous layer intervention	Average monthly labour costs in terms of actually held position, UAH	Average annual labour costs in terms of actually held position, UAH	Number of surgeries per 1 actually held post	Labour costs for 1 surgery, UAH, per actually held post	Bed capacity	Labour costs outlook per 1 bed, UAH	Projected labor costs for actually treated patients, UAH, per one established position
Bilopillia CDH	5,5	135	6 829	81 948	24,55	3338,62	25	68,52	9081,82
Buryin CDH	2	205	9129	109 548	102,50	1068,76	25	45,12	37925,00
Velyka Pysarivka CDH	1	150	16933	203 196	150,00	1354,64	22	54,27	55500,00
Krasnopillia CDH	1,5	73	13928	167 136	48,67	3434,30	15	76,03	18006,67
Krolevets CDH	6,5	188	8559	102 708	28,92	3551,07	45	88,56	10701,54
Lebedyn CDH	6,5	196	8149	97 788	30,15	3242,97	26	49,08	11156,92
Lypova Dolyna CDH	2,5	77	13331	159 972	30,80	5193,90	19	91,30	11396,00
Nedryhailiv CDH	4	178	12675	152 100	44,50	3417,98	31	64,44	16465,00
Putyvl CDH	4,75	290	12079	144 948	61,05	2374,15	30	38,28	22589,47
Seredyno-Buda CDH	4,25	142	9673	116 076	33,41	3474,11	30	78,17	12362,35
MNO "Sumy CDCH" of SDC, SR	3,5	589	6943	83 316	168,29	495,09	35	21,99	62265,71
Yampil CDH	2,5	116	9870	118 440	46,40	2552,59	25	79,74	17168,00
MF "Sumy City Clinical Hospital № 1"	9,75	640	8179	98 148	65,64	1495,22	40	23,13	24287,18
MF "Sumy City Clinical Hospital № 5"	18,25	937	18482	221 784	51,34	4319,70	110	43,44	18996,71
Konotop CDH	13	738	7372	88 464	56,77	1558,31	70	35,09	21004,62
MNO of KCC "Konotop City Hospital"	4	97	10373	124 476	24,25	5133,03	45	171,65	8972,50
Romny CDH	14	761	8524	102 288	54,36	1881,78	47	22,85	20112,14
Shostka CDH	12	664	7074	84 888	55,33	1534,12	50	27,86	20473,33
Okhtryka CDH	9,5	456	8680	104 160	48,00	2170,00	55	44,63	17760,00
Hlukhiv CDH	6,75	298	8244,4	98 933	44,15	2240,93	48	59,60	16334,81
Trostianets City Hospital	5,5	202	12289	147 468	36,73	4015,22	30	54,95	13589,09

Note: Compiled by the authors according to the data from [14].

Labor costs per one person treated at secondary health-care hospitals for 2018 presented in Table 1 on average have the following characteristics:

Table 1 clearly shows that bed capacity in hospitals has significant differences, as this figure is mainly calculated in accordance with the average annual population in regions. However, labour costs per patient are different. For example, comparing two medical establishments – Bilopillia Central District Hospital, which has 200 beds, and the

number of treated is 6962 people, and Nedryhailiv Central District Hospital, where 100 beds and 3713 treated, the salary costs are 52,84 thousand UAN per year and 69.75 thousand UAN per year respectively. We can see that, compared to the Nedryhailiv CDH, the Bilopillia CDH has twice the load, but receives 24.24% less labour costs. This discrepancy exists in other institutions.

A significant element of the Medical Guarantee Program will be medical services related to childbirth, treatment

**Table 5.** Activity analysis of inpatient cardiac departments per one actually held established position, UAN

The name of a medical facility	Actually held positions	Number of patients treated for 2018	Average monthly labour costs in terms of actually held position, UAH	Average annual labour costs in terms of actually held position, UAH	Cash labor costs (KEKV 2110) for 2018, thousand UAH	Number of patients treated per 1 actually held position	Labour costs per 1 patient treated, UAH, for actually held position	Bed capacity	Forecast	Projected labor costs for actually treated patients, UAH, per one established position
Lebedyn CDH	2,25	1294	6596	79152	178	575,11	137,63	33	9,44	212791,11
MNO "Sumy CDCH" of SDC, SR	3	929	4811	57732	173	309,67	186,43	30	11,95	114576,67
MF "Sumy City Clinical Hospital № 1"	5	847	5143	61716	309	169,40	364,32	30	13,11	62678,00
MF "Sumy City Clinical Hospital № 5"	2,25	166	4044	48528	109	73,78	657,76		0,00	27297,78
Konotop CDH	3	1592	6250	75000	225	530,67	141,33	45	10,46	196346,67
Romny CDH	2	975	6496	77952	156	487,50	159,90	30	11,38	180375,00
Shostka CDH	2	795	6368	76416	153	397,50	192,24	25	11,64	147075,00

Note: Compiled by the authors according to the data from [14].

of cardiovascular diseases, screening for early detection of cancer, etc. Taking the example of obstetric and gynecological, cardiac, and surgical wards we can analyze the pre-reform payments and predict the total costs that healthcare establishments will be able to receive after reforming the financial relationships. The data are presented in Table 2 and Table 3.

Table 2 says that the number of patients per 1 actually held position makes a big difference, and labour costs do not match the actual workload. For example, the cost of remuneration per 1 patient treated in Bilopillia CDH is UAH 709.96, and the number of patients treated per 1 actually held position is 179.2 people. At that time, in Buryn CDH labor costs per 1 patient treated is UAH 229.76, and the number of patients treated per 1 actually held position is 374 people. The Shostka CDH has completely inappropriate figures – the cost of remuneration per 1 patient treated is 1636.51 UAH, while the number of patients treated per 1 actually held position is only 86.72 people.

We also analyzed those facilities that provide only obstetric services with regard to delivery costs. There are only 8 of them in Sumy region. Table 3 covers the available and projected indicators.

As we can see, there exists inconsistency and imbalance as to the load on maternity wards within district hospitals of the region. In order to optimize hospital departments and the rate of expenditure, as well as to increase the level of qualified assistance for childbirth, the minimum safe load will be determined. It is considered that 200 childbirths per year for one ward is insufficient for physicians to maintain the required level of qualification, and as the WHO has estimated, the minimum required number of childbirths should be 500 in order to be safe [15]. Table 3 shows that two of eight medical facilities departments have

got more than 500 childbirths. But three of them do not exceed even 100 childbirths but labor costs are higher than in those departments which have got more than 500 cases.

A similar discrepancy situation is observed in surgery and cardiology departments, which is presented in Table 4 and Table 5.

Also remarkable is the situation with bed capacity. Having an equal load on the bed fund (Bilopillia, Buryn and Yampil CDHs), there is a big difference between the actually held positions and the number of surgeries fulfilled, and again we can see the fact that the workload does not match the labour costs.

We can conclude that the load on one permanent post at remuneration of labor in different hospitals within the same type of medical care does not correspond to the number and quality of services provided. It is obvious that labour costs are insufficient. It means if there are more patients treated then there is less expenditure on wages. It causes the absence of motivation that results in quality of health services.

## CONCLUSIONS

Analyzing projected labor costs for actually treated patients per one established position it is necessary to mention that they can become quite sufficient and would create competitive atmosphere in healthcare industry.

The reform of the health care system is primarily aimed at improving the quality of healthcare support. The introduction of secondary healthcare reform, which is gradually extending, will contribute to a significant redistribution of financial flows, which will significantly improve the quality and accessibility of health care. However, because of the ongoing transition process, financial activity in health

care facilities remains the same, that causes inappropriate and irrational resource utilization and is subject to careful analysis and further advanced academic research.

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*The Authors declare no conflict of interest*

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