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PATHWAYS TO ENHANCING THE EFFICIENCY OF BUSINESS MANAGEMENT MECHANISMS IN HEALTHCARE

ABSTRACT

The article presents an assessment of the operational efficiency of the Sumy Regional Blood Service Center and the Kharkiv Regional Blood Service Center. The analysis was carried out considering key performance indicators of the institutions, encompassing economic, managerial, informational, technological, and social aspects. Based on the results of the efficiency evaluation of these blood service enterprises, a system of measures was developed and proposed to enhance the performance of the analyzed centres. These measures were structured according to the main determinants of functioning: managerial, informational, security-related, and economic, and aligned with modern requirements for business processes in the blood service sector, particularly at the stages of collection, processing, storage, quarantine, and distribution of blood components. The selection and prioritization of the recommended measures were based on consultations with key target audiences, including new and regular donors, healthcare institutions, and blood centre staff, as well as taking into account the components of the marketing mix (product, price, promotion, place, people, processes, physical environment). The development of proposals also incorporated comparative analysis data and the experience of leading countries in the field of blood donation, which made it possible to integrate best international practices into the national context. Special attention was given to identifying stakeholders, including the Ministry of Health of Ukraine, the Ministry of Energy, the Ministry of Digital Transformation, the Ministry of Education and Science, other government bodies, healthcare institutions, regional enterprises, associations and NGOs, media outlets, advertising and marketing agencies. The proposed measures aim to address current challenges in the blood supply sector, improve population access to safe, high-quality blood components, and enhance overall satisfaction with blood services. Implementation of these initiatives will significantly increase the competitiveness of blood service enterprises in the national healthcare market.

Keywords: efficiency of blood service enterprises, blood donation, healthcare management, health system, medical sector resources

JEL Classification: I10, O17

INTRODUCTION

The healthcare sector in Ukraine faces significant challenges, particularly in the efficient functioning of its enterprises. The ongoing economic and social pressures exacerbate these challenges, including the consequences of military conflict and the need for systemic healthcare reforms. SMEs play a critical role in ensuring accessibility and innovation in healthcare services. Yet, financial constraints, outdated management practices, and limited integration into broader healthcare strategies hinder their sustainability and effectiveness. Recent initiatives, such as Ukraine's National Health Strategy (2024–2030), emphasize optimizing healthcare networks and enhancing resource allocation to improve service delivery (Transforming Healthcare, 2024). The urgency of addressing these issues is underscored by alarming statistics, such as the high rate of catastrophic health spending among Ukrainian households, nearly 20%, which highlights the inefficiency of current systems (New WHO, 2023). By focusing on healthcare sector enterprises, Ukraine can leverage its potential to drive innovation, reduce inequities, and enhance overall efficiency in the public health domain. A pivotal component in ensuring

the resilience of Ukraine's healthcare system is the national blood service, which plays a critically important role during wartime by supporting the continuous functioning of the medical sector, a cornerstone of disaster medicine. Effective management in this area is essential for strengthening the resilience and adaptability of the public health system in response to crises, aiming to preserve and enhance human capital as a foundation for economic development.

LITERATURE REVIEW

The issues of strategic management in the health sector were considered from different angles in the works of Ukrainian and foreign scientists, who considered them from the standpoint of an interdisciplinary approach with an emphasis on the socio-economic consequences of management decisions in this field of activity. In (Safonov et al., 2019), it is theoretically substantiated that the need for the implementation of strategic management in the health sector is quite high. It is noted that it is necessary to create conditions for the implementation of strategic management functions through the formation and development of the management capital of healthcare institutions. In (Hurzhyi, 2022), the author describes the conceptual principles of the organization of management in healthcare institutions, in particular, the types of management decisions that are made in medical institutions for their effective activity are characterized.

In (Kalinichenko et al., 2024) the authors analyze the main challenges in the field of management of modern medical institutions and justify the need to develop fundamentally new approaches to planning, organizing and managing the activities of healthcare institutions, which should be formed on the basis of the optimal ratio of available resources and potential opportunities.

In (Letunovska et al., 2023), the authors determine the prerequisites for the formation of patients' requirements for the quality of medical care, which determines the necessary measures for introducing changes in the management of healthcare institutions. The issue of small and medium-sized enterprises and their development is investigated in the works (Rosokhata et al., 2021; Letunovska, 2017), where these areas are analyzed from the standpoint of their development as part of marketing territories and supporting regional competitiveness.

Another relevant contribution to the field of healthcare performance assessment is the study by Gomes et al. (2010), which proposes a systematic approach for measuring, monitoring, and continuously improving operational effectiveness in healthcare settings. The article introduces the healthcare operational effectiveness framework, which integrates three core indicators (availability, quality, and efficiency) to provide a comprehensive evaluation of healthcare service delivery. A relevant empirical contribution to the evaluation of healthcare sector efficiency is presented in the study by Alqasimi et al. (2025), which explores the impact of formal institutional factors on performance outcomes in the environmental and healthcare sectors – two key domains frequently addressed in public administration research.

A significant contribution to the discussion on healthcare system modernization and efficiency is provided by Kwilinski et al. (2024), who investigate the role of digital transformation in enhancing healthcare across European Union countries. This study demonstrates that the development of e-government initiatives significantly contributes to transformative improvements in healthcare. The findings highlight how digital public services can facilitate integrated policies and improve the efficiency, effectiveness, and accessibility of healthcare delivery.

AIMS AND OBJECTIVES

The aim of this research is to evaluate the efficiency of blood service institutions by analyzing key performance indicators across managerial, economic, informational, technological, and social dimensions, and to develop evidence-based recommendations for improving their operational effectiveness in accordance with modern standards of healthcare service provision. The tasks of the study include identifying systemic strengths and weaknesses in the functioning of blood service institutions and formulating a set of strategic measures for their improvement, based on stakeholder analysis, international best practices, and the integration of marketing and management tools relevant to the blood donation sector.

METHODS

This study applied a multi-criteria analytical approach to evaluate the performance efficiency of two regional blood service centres in Ukraine: the Sumy Regional Blood Service Center and the Kharkiv Regional Blood Service Center. The evaluation was based on a set of key performance indicators encompassing five major domains: economic, managerial, informational, technological, and social aspects. Data were collected from publicly available reports, internal documentation of the centres

(subject to access and permissions), expert consultations, and stakeholder interviews. Quantitative indicators were supplemented with qualitative insights gathered through structured interviews with blood centre personnel, healthcare professionals, and donor representatives.

RESULTS

It is important to use quantitative indicators of the effectiveness of the functioning of blood service enterprises according to determinants for blood service enterprises (Sumy Regional Blood Service Center and Kharkiv Regional Blood Service Center (Tables 1-8).

In the Sumy Regional Blood Service Center, the share of donations in 2013–2015 decreased to 4%, and in 2016–2017 it was higher – 7–10%, which is a negative trend, and since 2018 it has stabilized again at 3%. At the same time, in 2012–2015 and 2018–2020, it was lower than the average for Ukraine (7–9%). The share of apheresis platelets in 2017–2023 was almost 100%, which is a positive trend (on average for Ukraine 61–88%). The share of shortages of canned donor blood from that procured by 2015 decreased to 0.02%, and in 2016–2023 was higher, at 0.13–0.47%, which is a negative trend. However, this indicator is lower than the average for Ukraine (0.9–1.9%). The share of safety-related red blood cell defects ranged from 2–6.5%, which is mostly lower than the average for Ukraine (5.3–6.3%). The share of regular donors increased from 24% to 78% and is the highest in Ukraine (on average for Ukraine, 8–15%). The number of reactions per 1000 orders is decreasing every year, which is a positive trend. That is, until 2014, safety indicators were improving, in 2015–2019 they were worse, in 2020 they returned to the 2014 level or became better.

Table 1. Indicators of safety determinants of the Sumy Regional Blood Service Center. Note: *data was not collected; **data calculated by extrapolation method. (Source: calculated by the authors based on data Moroz et al., 2013; Perekhrestenko et al., 2014–2022)

Year	Rate of donor deferrals	Proportion of apheresis platelets in the total number of harvested platelets	The proportion of shortages of preserved donor blood from the procured	Proportion of safety-related red blood cell defects	Share of regular donors	Number of reactions per 1000 orders
2012	0.03	*	0.0005	0.026	0.27	2.925
2013	0.08	*	0.0005	0.035	0.24	2.89
2014	0.07	*	0.0002	0.029	0.3	2.855
2015	0.04	*	0.0002	0.05	0.51	2.82
2016	0.07	*	0.0035	0.058	0.58	2.785
2017	0.1	1	0.0035	0.058	0.64	2.75
2018	0.03	0.997	0.0047	0.02	0.65	2.715
2019	0.03	1	0.003	0.058	0.7	2.68
2020	0.03	0.997	0.0013	0.022	0.74	2.645
2021	0.04	1.000	0.0028	0.063	0.7	2.61
2022**	0.03	0.999	0.0039	0.059	0.76	2.575
2023**	0.03	0.999	0.0042	0.065	0.78	2.54

Table 2. Indicators of safety determinants of the Kharkiv Regional Blood Service Center. Note: *data was not collected; **data calculated by extrapolation method. (Source: calculated by the authors based on data Moroz et al., 2013; Perekhrestenko et al., 2014–2022)

Year	Rate of donor deferrals	Proportion of apheresis platelets in the total number of harvested platelets	The proportion of shortages of preserved donor blood from the procured	Proportion of safety-related red blood cell defects	Share of regular donors	Number of reactions per 1000 orders
2012	0.1	*	0.007	0.042	0.2	2.925
2013	0.06	*	0.0028	0.079	0.24	2.89
2014	0.06	*	0.0018	0.064	0.22	2.855
2015	0.04	*	0.0017	0.042	0.25	2.82
2016	0.04	*	0.0016	0.056	0.27	2.785
2017	0.04	0.33	0.0016	0.056	0.28	2.75
2018	0.03	0.96	0.0018	0.051	0.29	2.715
2019	0.08	0.97	0.0106	0.066	0.3	2.68
2020	0.06	0.98	0.0025	0.044	0.33	2.645
2021	0.06	0.94	0.0021	0.042	0.3	2.61
2022**	0.04	1	0.0036	0.047	0.34	2.575
2023**	0.04	1	0.0036	0.046	0.36	2.54

In the Kharkiv Regional Blood Service Center, the proportion of withdrawals from donations decreased from 10% to 3–4% by 2023, which indicates an increase in safety. Since 2020, the proportion of withdrawals has been lower than the average for Ukraine (7% in 2019). The proportion of apheresis platelets in 2018–2023 increased to 100%, which is a positive trend (on average for Ukraine 61–88%). The proportion of shortages of preserved donor blood in 2019 was above 1%, which indicates a deterioration in safety, in other years it was less than 1% and is lower than the average for Ukraine (0.9–1.9%). The proportion of shortages of red blood cells related to safety in 2013–2014 was higher than the average for Ukraine (5.3–6.3%), in other years at the level of the average for Ukraine or lower. The share of regular donors has increased from 20% to 36% and is significantly higher than the average for Ukraine (8–15%), which is a positive trend. The number of reactions per 1000 orders is decreasing every year, which is a positive trend. That is, in general, there is a trend towards improving safety indicators.

In the Sumy Regional Blood Service Center, there was a decrease in regular donors only in 2017, 2020 and 2021, and an increase in other years. The largest increase was in 2015 – 216%. The decrease in new donors was in 2016, 2018–2019, and an increase in other years. With a general trend in Ukraine towards a decrease in new donors, the Sumy Regional Blood Service Center saw an increase in both new and regular donors, which is a positive trend. The percentage of donors from the total population increased from 0.49% to 1.74% in 2012–2023, which is a positive trend. The share of component write-offs in the Sumy Regional Blood Service Center is the lowest in Ukraine - almost 0%. Staffing decreased to 94%, which is a negative trend. In general, most indicators show improvement. In the Kharkiv Regional Blood Service Center in 2014, 2020, and 2021, there was a decrease in regular donors; in other years, there was an increase. The largest increase was in 2016 - 113%. The decrease in new donors was in 2015–2017, 2020, and 2022–2023, in other years there was an increase. The percentage of donors from the total population fell from 0.88% to 0.7% by 2015, then remained at a level close to 0.8%, which indicates a slight improvement. The share of component write-offs decreased from 10.7% to almost 0 in 2023, which is a positive trend. Staffing decreased from 87.2% in 2012 to 70.9% in 2023, which is a negative trend.

Table 3. Indicators of managerial determinants of the Sumy Regional Blood Service Center. Note: data was not collected; **data calculated by extrapolation method. (Source: calculated by the authors based on data Moroz et al., 2013; Perekhrestenko et al., 2014–2022)

Year	Increase in regular donors	Increase in new donors	Percentage of donors from the total population, %	Rate of discarded blood components	Staffing level, %
2012	*	*	0.49	0.1	100
2013	0.99	1.1	0.54	0.1	99.1
2014	1.85	2.11	0.83	0.1	96.7
2015	2.16	1.58	1.05	0.1	87.2
2016	1.04	0.73	0.97	0.001	100
2017	0.82	1.43	0.73	0.001	86
2018	1.88	0.87	1.38	0.001	97.3
2019	1.14	0.73	1.47	0.001	95.8
2020	0.97	1.18	1.37	0.001	94.6
2021	0.96	1.34	1.42	0.001	98
2022**	1.26	1.04	1.63	0.001	94.2
2023**	1.09	1.06	1.74	0.001	94

The number of donations per 1,000 population in the Sumy Regional Blood Service Center increased from 9.3 in 2012 to 102.6 in 2021, which is higher than recommended by the WHO (33 per 1,000 population) and is the largest in Ukraine and the world, which was included in the Guinness Book of Records. The number of blood components collected per inhabitant decreased from 66.6 in 2015 to 2.8 in 2023, which is lower than recommended by the WHO (12–15 ml per inhabitant). The average number of blood donations increased by 2021 and is the highest in Ukraine (an average of 1.5). The donor base increased more than threefold during 2012–2023, but in 2020 it decreased by a thousand people. This may be due to quarantine restrictions in 2020–2021. According to the data in Table 6, the number of donations per 1,000 in the Kharkiv Regional Blood Service Center in 2012–2023 has not changed (10.9–12.7) and is lower than recommended by WHO (33 per 1,000 population).

The number of blood components procured per inhabitant was within 5.0–7.6, which is less than the WHO recommended values (12–15 ml per inhabitant). The average number of blood donations remains unchanged, at 1.5 times, and is generally quite low. The number of regular donors in 2012–2023 decreased from almost 24 thousand to 19.9 thousand in 2023, which is a negative trend. In 2020, the donor base decreased by 1.5 thousand, which may be due to the onset of the COVID-19 pandemic. In 2021, it increased again by 1,000 people, which indicates the stabilization of the blood centre's work.

Table 4. Indicators of managerial determinants of the Kharkiv Regional Blood Service Center. Note: *data was not collected; **data calculated by extrapolation method. (Source: calculated by the authors based on data Moroz et al., 2013; Perekhrestenko et al., 2014-2022)

Year	Increase in regular donors	Increase in new donors	Percentage of donors from the total population, %	Rate of discarded blood components	Staffing level, %
2012	*	*	0.88	10.7	87.2
2013	1	1.12	0.72	10.7	91.2
2014	0.95	1.02	0.73	0.001	87.6
2015	1.05	0.97	0.7	6.4	88.7
2016	1.13	0.94	0.72	0.001	90.1
2017	1.05	0.98	0.73	4.2	83.3
2018	1.1	1	0.8	1.5	83
2019	1.07	1.11	0.82	4.4	82.9
2020	0.99	0.78	0.75	1.5	65.3
2021	0.93	1.21	0.8	1.2	76.8
2022**	1.12	0.94	0.77	0.001	72.9
2023**	1.04	0.99	0.77	0.001	70.9

Table 5. Indicators of information determinants of the Sumy Regional Blood Service Center. Note: *data calculated by extrapolation method. (Source: calculated by the authors based on data Moroz et al., 2013; Perekhrestenko et al., 2014-2022)

Year	Number of donations per 1000 population	Number of blood components procured per inhabitant, ml	Average number of blood donations per person per year	Donor base in the current year, people
2012	9.3	5.5	1.9	5619
2013	17	16.7	3.1	6155
2014	23.8	28.2	2.9	9328
2015	40.5	66.6	3.8	11738
2016	38.9	4	4	10736
2017	49.3	3.7	6.8	7946
2018	60.7	3.1	4.4	14870
2019	59.6	3	4.1	15657
2020	61.7	3.5	4.5	14404
2021	102.6	3.2	7.2	14665
2022*	93.1	2.9	5.7	17025
2023*	101.6	2.8	5.9	18101

The average price of marketing costs in the Sumy Regional Blood Service Center in 2012–2023 decreased threefold, and the efficiency ratio increased more than 2.5 times. At the same time, the number of donations per thousand population and the base of regular donors increased, which indicates the economic efficiency of marketing costs. The purchase price of plasma and erythrocytes for the blood bank increased fourfold during the analyzed period. The share of sales to external customers in the sales structure increased to 97%, which indicates the economic efficiency of the blood centre. However, the number of components procured per inhabitant decreased threefold and is less than the average for Ukraine, which

indicates a change in the company's priorities in favour of economic benefit over the social component in providing regional healthcare institutions with blood and its components.

Table 6. Indicators of information determinants of the Kharkiv Regional Blood Service Center. Note: *data calculated by extrapolation method. (Source: calculated by the authors based on data Moroz et al., 2013; Perekhrestenko et al., 2014-2022)

Year	Number of donations per 1000 population	Number of blood components procured per inhabitant, ml	Average number of blood donations per person per year	Donor base in the current year, people
2012	11.9	5.2	1.4	23931
2013	10.9	7.2	1.5	19609
2014	10.9	7.6	1.5	19955
2015	10.6	7.3	1.5	19084
2016	11.3	4.5	1.6	19443
2017	10.9	5.2	1.5	19580
2018	12.2	5.6	1.5	21172
2019	12.7	6	1.5	21752
2020	11.2	5.1	1.5	19613
2021	11.8	5.7	1.5	20615
2022*	11.9	5.2	1.5	19994
2023*	12	5	1.5	19907

Table 7. Indicators of economic determinants of the Sumy Regional Blood Service Center. Note: *data calculated by extrapolation method. (Source: calculated by the authors based on data Moroz et al., 2013; Perekhrestenko et al., 2014-2022)

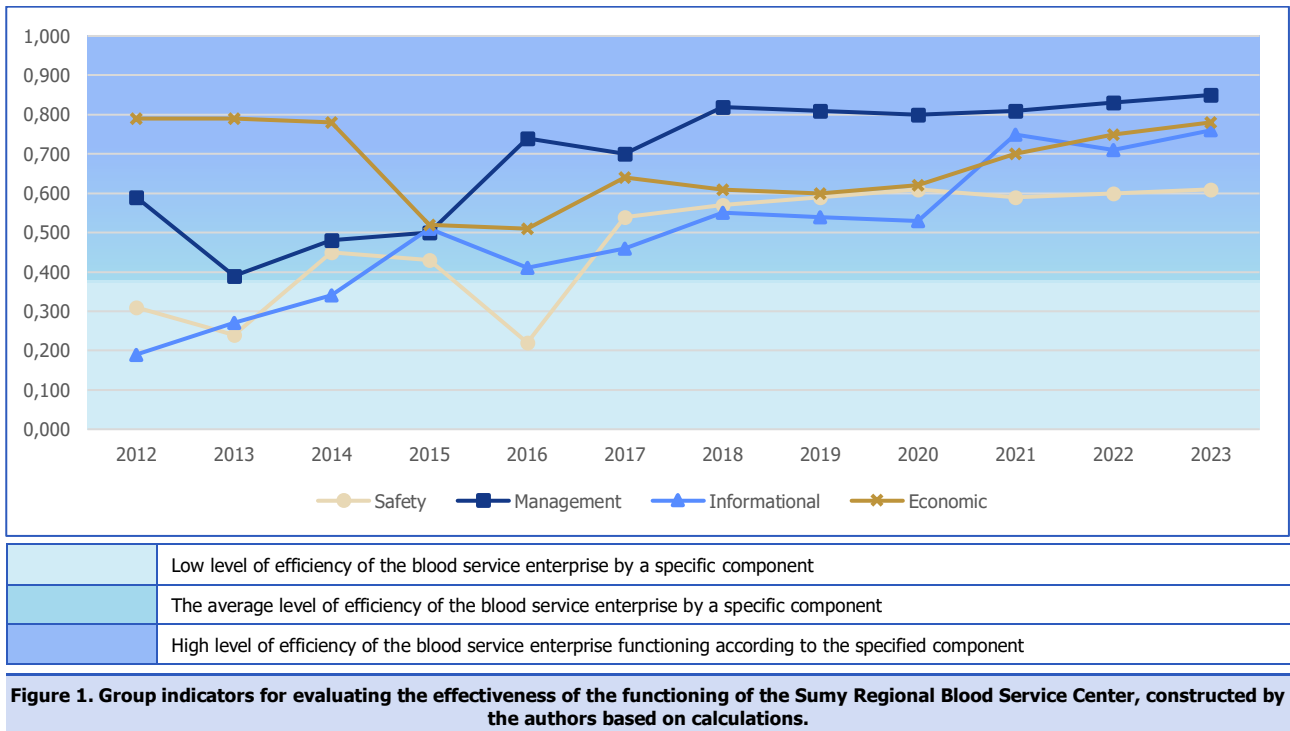
Year	The average price of marketing costs per 1 donation, UAH	Advertising efficiency ratio	Purchase price of plasma for a blood bank, UAH	Purchase price of erythrocytes for a blood bank, UAH	Share of sales to external customers in the sales structure
2012	7.1	0.282	975	960	0
2013	4.2	0.273	1025	1010	0
2014	3.4	0.394	1100	1110	0
2015	2.2	0.583	1250	1240	0.1
2016	2.6	0.56	1500	1450	0.2
2017	2.2	0.813	2400	2370	0.39
2018	2	0.563	3000	2975	0.52
2019	2.2	0.515	3600	3550	0.61
2020	2.3	0.552	4250	4220	0.7
2021	2.5	0.702	4270	4225	0.78
2022*	2.7	0.741	4700	4650	0.88
2023*	2.8	0.781	5129	5076	0.97

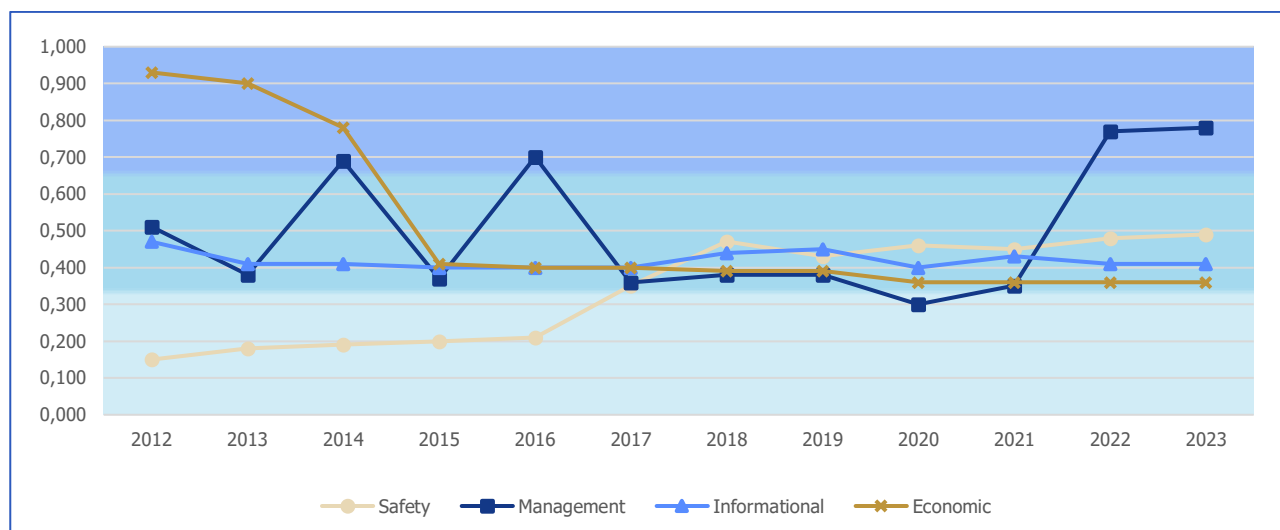
In the Kharkiv Regional Blood Service Center, the average price of marketing costs also doubled, and the efficiency ratio increased by 35%. The purchase price of plasma and erythrocytes for the blood bank increased by 3.2–3.6 times. The share of sales to external customers in the sales structure increased to 34%, which indicates an increase in the economic efficiency of the blood centre. Thus, the analysis of statistical data for the Sumy Regional Blood Service Center for the period from 2012 to 2023 shows that the Sumy Regional Blood Service Center successfully carries out information activities, thanks to which it became the leader in Ukraine in terms of the number of donations per thousand population, the share of regular donors, sales to external customers, but needs improvement in terms of safety determinants and pricing policy (purchase prices for blood banks are relatively high).

Table 8. Indicators of economic determinants of the Kharkiv Regional Blood Service Center. Note: **data calculated by the extrapolation method. (Source: calculated by the authors based on data Moroz et al., 2013; Perekhrestenko et al., 2014-2022)

Year	The average price of marketing costs per 1 donation, UAH	Advertising efficiency ratio	Purchase price of plasma for a blood bank, UAH	Purchase price of erythrocytes for a blood bank, UAH	Share of sales to external customers in the sales structure
2012	1.8	0.268	985	965	0
2013	2.2	0.661	1055	1015	0
2014	2.4	0.329	1160	1120	0
2015	2.6	0.335	1300	1260	0.1
2016	2.8	0.329	1520	1434	0.13
2017	2.7	0.341	1765	1650	0.15
2018	2.8	0.329	2030	1895	0.17
2019	2.8	0.352	2375	2182	0.2
2020	3.4	0.337	2800	3450	0.25
2021	3.4	0.311	2784	2945	0.28
2022**	3.6	0.3	3008	3202	0.31
2023**	3.7	0.289	3232	3458	0.34

Analysis of statistical data for the Kharkiv Regional Blood Service Center for the period from 2012 to 2023 demonstrates that the enterprise is gradually improving safety, management and economic determinants. There has been almost no progress in the information determinant. At the same time, the enterprise has problems with staffing, which may affect further performance results. Normalization of performance indicators using the min-max method was carried out. All indicators were assigned values ranging from 0 (worst value) to 1 (best value). Principal components and factor averages were calculated. Taking into account the weight of indicators and normalized values, group indicators for assessing the state of the Sumy Regional Blood Service Center and the Kharkiv Regional Blood Service Center are presented in Figures 1 and 2, respectively.





	Low level of efficiency of the blood service enterprise by a specific component
	The average level of efficiency of the blood service enterprise by a specific component
	High level of efficiency of the blood service enterprise functioning according to the specified component

Figure 2. Group indicators for evaluating the effectiveness of the Kharkiv Regional Blood Service Center, constructed by the authors based on calculations.

The calculation of group indicators demonstrates that in the Sumy Regional Blood Service Center, the managerial, informational and economic components in 2020–2023 were at a high level, and the level of safety components manufactured by the blood centre is at an average level. This indicates that in the Sumy Regional Blood Service Center there is a need to develop and implement measures to increase the level of safety determinants. For other determinants, it is sufficient to apply supporting measures. In the Kharkiv Regional Blood Service Center, all components in 2021–2023 were at an average level. This indicates that the Kharkiv Regional Blood Service Center needs to improve all determinants, primarily economic, informational and safety since the value of group indicators is the lowest for these determinants.

DISCUSSION

Based on the results of assessing the effectiveness of blood service enterprises, it is advisable to form a system of measures to improve the management of the activities of small and medium-sized blood service enterprises. One of the problems of the healthcare system that society faces is the constant need for blood components and preparations. In recent years, there has been a need to improve safety determinants. It is advisable to popularize a healthy lifestyle among the population (potential donors). This will allow in the future to increase the number of healthy people who can be donors throughout their lives (today, the older a person is, the more chronic and other diseases, and with age, the opportunity to be a donor decreases).

It is also necessary to promote the primary prevention of infectious diseases at the state level through the popularization of vaccination among the population. This will help reduce the number of people who are annually excluded from donation due to infectious diseases. Enhanced control of storage conditions during blood delivery and temporary storage will minimize the deterioration of the quality of blood components due to improper storage conditions.

The use of apheresis machines for the procurement of components will contribute to increasing the safety of blood components. When obtaining platelets, this will allow each dose to be obtained from only one donor, instead of three (as with the separation of whole blood). Also, when collecting plasma, thanks to the apheresis method, a single dose can be up to 800 ml instead of 200 ml (as with the separation of whole blood).

Blood procurement from regular donors, conducting educational work among them about their responsibility, the need to lead a healthy lifestyle, and increasing the number of regular donors is a guarantee of safety, because regular donors regularly undergo medical examinations for infectious diseases, over time begin to lead a healthy lifestyle and promote the idea of donation among their acquaintances by their example. It is also important that these donors are unpaid, aware of their responsibility for the quality of their blood that will be transfused to another person, and do not hide information that may affect the quality of the donated blood (taking antibiotics, other medications, eating fatty, sweet foods, etc.),

and this is possible when establishing friendly long-term relationships with the donor, which is impossible with a single contact with situational donors. To increase the level of economic determinants, it is advisable to calculate the optimal number of donors for the region and the volumes necessary for blood procurement based on WHO requirements and collect the required number of components. This will avoid periods of component shortages and surpluses for disposal in the region. Since the promotion of blood donation in the country is insufficient, there is a need to increase the marketing budget to attract new and retain existing blood donors. Some messages posted online and offline do not reach potential donors, so there is a need to involve professionals in creating advertising and organizing effective marketing campaigns instead of developing advertising messages on your own.

To allocate funds for promotion, it is necessary to look for ways to reduce the cost of the procurement of blood components. One such way may be the introduction of energy-saving technologies and the use of renewable energy sources, the transition from energy-consuming equipment to more energy-saving ones, etc.

It is also advisable to develop a network of external clients (healthcare institutions in other regions, and other blood centres). This will increase the company's income, reduce the write-off of excess components and stimulate the implementation of effective solutions for competition in the market.

Proper organization of logistics chains, which involves the use of loggers (a device that constantly monitors the temperature regime and records on a flash drive in case of a decrease or increase above the permissible value) and refrigeration equipment at all stages to maintain the temperature. This will help maintain the high quality of blood components all the way from the blood service enterprise to the patient. This will also increase the competitiveness of the blood service enterprise in the market.

To strengthen the information determinant (lack of a sufficient base of regular donors, insufficient popularization of blood donation at the state level), it is advisable to work with primary and repeat donors to transfer them to the category of regular and loyal to the blood centre. This will increase the safety of blood and components, and reduce promotion costs. It is also worth using the opportunities of free social advertising (free boards, free publications in the media, advertising at enterprises), placing paid advertising and improving the quality of advertising appeals.

To ensure repeated donations and reduce the time blood centre employees on phone calls to donors, it is advisable to introduce an automatic reminder about blood donation (sms, messages in messengers, etc.) before the next blood donation.

To stimulate donors to return to donate blood, loyalty programs should be created. This will increase the frequency of donations from one donor and reduce marketing costs for finding new donors. One of the ways to work with regional enterprises and donor groups is to organize donor days at the enterprise, when on a certain day known in advance, a visiting team of the blood service enterprise comes to the enterprise, and all interested employees of the organization can donate blood at the workplace. The work of visiting teams of the blood service enterprise on the periphery with the support of local authorities contributes to an increase in the territorial coverage of donors. Thus, people living in other cities that do not have their own blood centres will be able to join the donor movement and donate blood.

Educational activities in schools and other educational institutions can help form the right positive attitude towards donation as a component of social life and lay the foundation for these children to become blood donors in adulthood.

The implementation of a blood donation registration system in any region using software, and mobile applications, such as "Diya", will allow the donor to maintain the habit of donating blood regardless of their location within the country (during business trips, vacations, etc.).

To increase the level of managerial determinants (lack of a sufficient base of regular donors, insufficient popularization of voluntary donation at the state level, insufficient number of personnel in the industry, a significant percentage of write-offs of blood components, in particular erythrocyte mass, due to the expiration of the storage period), marketing departments should be created at the blood centre level or a marketer should be hired who will be responsible for organizing and conducting marketing activities at the blood service enterprise, cooperating with the media on the placement of advertising materials, advertising agencies on the development of layouts and the manufacture of branded products, presenting the blood service enterprise in the online environment and participating in or organizing events, etc. This will contribute to increasing the base of primary and regular donors, optimizing the volumes of procured blood components and popularizing donation in general.

The introduction of component procurement at the blood service enterprise will not only increase safety, and reduce the risks of complications, but also optimize the number of blood components obtained depending on the needs of healthcare

institutions. Cooperation with higher education institutions and postgraduate education institutions in the training of specialists in industrial transfusion will simplify the search and training of personnel who will be prepared to work in the field of industrial transfusion. This will allow the blood service enterprise to fully staff its staff. The introduction of automation of cold chain control and logistics will improve the quality of blood components that the patient receives during transfusion, and eliminate the possibility of quality degradation on the way from the blood center to the patient. This will contribute to reducing the number of reactions during blood transfusion. To implement the proposed areas, in addition to the SME SC, other market participants should be involved: the Ministry of Health, the Ministry of Energy of Ukraine, the Ministry of Digital Transformation of Ukraine, the Ministry of Education and Science of Ukraine, other state authorities, healthcare institutions, regional enterprises, associations and public organizations, the media, advertising and marketing agencies.

Blood service enterprises can promote blood donation, regularly hold conversations and other events among the donor base regarding a healthy lifestyle, select blood according to a larger number of blood group systems (except AB0, Rhesus, Kell), strengthen control over storage conditions during delivery and temporary storage of blood and its components, increase the number of regular donors, conduct explanatory work among them about their responsibility, the need to lead a healthy lifestyle; procure blood and recruit donors based on calculating the number of donors and the volume of blood procurement in the region; increase the budget for promotion and improve the quality of advertising messages and the effectiveness of advertising; look for ways to reduce costs, introduce energy-saving technologies, use energy from renewable energy sources; develop a network of external clients; properly organize logistics chains; work with primary and repeat donors to transfer them to the category of regular donors; place free advertising about donation as social advertising; analyze previous marketing campaigns and improve the quality of advertising; implement loyalty programs for donors and an automatic reminder system for blood donation; organize donor days at enterprises in the region and the work of field teams in the periphery; promote donation in educational institutions in the region; initiate the implementation of a blood donation registration system in any region; hire a marketer or create a marketing department and conduct marketing activities, implement component procurement, implement automation of cold chain control and logistics; implement a system for providing benefits for paying for utility services to "Honorary Donors", "Distinguished Donors" and persons who have other state awards in the field of blood service.

State authorities can promote a healthy lifestyle at the state and regional levels, primary prevention of infectious diseases through regional health care institutions, strengthening control over storage conditions during delivery and temporary storage of blood and its components, introducing component procurement and purchasing apheresis machines for blood service enterprises, introducing a methodology for calculating the number of donors and volumes of blood procurement in the region; increasing the budget for promotion; helping to find ways to reduce costs (for example, through subsidies for the purchase of equipment for blood centres); introducing energy-saving technologies and the use of renewable energy sources; introducing automation of cold chain control and logistics.

The Ministry of Health of Ukraine, through the approval of policies and regulatory documents, can promote the promotion of a healthy lifestyle, primary prevention of infectious diseases, introducing a methodology for calculating the number of donors and volumes of blood procurement in the region, and increasing the budget for promotion.

The Ministry of Energy of Ukraine, through the approval of policies and regulatory documents, can promote the introduction of energy-saving technologies and the use of renewable energy sources.

The Ministry of Digital Transformation, together with blood centres and associations, can create, implement and promote a blood donation registration system in any region, for example, in "Diia". The Ministry of Education and Science of Ukraine can promote the promotion of blood donation in educational institutions through educational seminars, adding individual materials to curricula, etc., as well as cooperate with higher and postgraduate education institutions to train specialists in industrial transfusion medicine. Healthcare institutions can also contribute to strengthening control over storage conditions during delivery and temporary storage of blood and its components, proper organization of logistics chains and introduction of automation of cold chain control and logistics. Enterprises in the region can contribute to holding donor days at their facilities and blood donations to employees during working hours.

Associations can also conduct campaigns to promote a healthy lifestyle, improve the quality of advertising messages by cooperating with all Ukrainian advertising agencies, promote the implementation of loyalty programs in several or all regions of Ukraine, and conduct educational activities in educational institutions on the benefits and necessity of donation. The mass media can promote the placement of free advertising messages about donations within the framework of free social advertising.

Advertising and marketing agencies, and printing houses can help in developing layouts and producing high-quality advertising appeals for market needs, taking into account the experience of other industries.

Taking into account world experience and existing prerequisites, it was possible to identify the most significant areas of activity that require timely and coordinated cooperation of key stakeholders, which will contribute to increasing the efficiency of blood service enterprises and the implementation of European legislation. For each of the three business processes provided for by the roadmap (procurement (donation), processing, storage and quarantine, distribution), a list of measures to increase the efficiency of functioning has been identified in terms of determinants of functioning (security, information, economic, management), which will allow representatives of state authorities, the population and enterprises to coordinate the use of appropriate tools, involve the necessary stakeholders in decision-making and establish relations in the field of providing the population with donor blood and its components.

CONCLUSIONS

To implement measures to improve the functioning of blood service enterprises, a scientific basis for the formation of these measures has been proposed. It takes into account data from comparative analysis, the experience of leading countries and allows you to form a list of specific measures to ensure security, information, management and economic determinants, business processes of blood service enterprises (stages of procurement, processing, storage, quarantine and distribution), stakeholders and directions for solving the identified problems. Taking into account the proposals will allow achieving results for increasing the level of provision of blood components to the population. Future research should focus on validating the proposed measures through empirical studies at different levels of the national blood service system. In particular, it is necessary to assess the effectiveness of the recommended measures in real-world conditions and across various regions, considering their socioeconomic and infrastructural specificities. Further studies may also explore the behavioural and motivational factors influencing donor retention and recruitment, as well as the role of digital tools and communication strategies in enhancing stakeholder engagement. Additionally, comparative longitudinal research involving international benchmarking could provide deeper insights into best practices and innovative models of blood service organizations. Special attention in future research should be given to the development of adaptive management strategies under crisis conditions (e.g., pandemics, armed conflict), ensuring resilience and continuity in blood supply services.

ADDITIONAL INFORMATION

AUTHOR CONTRIBUTIONS

All Authors have contributed equally.

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CONFLICT OF INTEREST

The Authors declare that there is no conflict of interest.

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ШЛЯХИ ПІДВИЩЕННЯ ЕФЕКТИВНОСТІ МЕХАНІЗМІВ УПРАВЛІННЯ В ГАЛУЗІ ОХОРОНИ ЗДОРОВ'Я

У роботі здійснено оцінювання ефективності функціонування обласних центрів служби крові на основі аналізу ключових показників діяльності, що охоплюють економічні, управлінські, інформаційні, технологічні та соціальні аспекти. Метою дослідження є виявлення основних проблем у роботі установ служби крові та розроблення системи заходів для підвищення їхньої ефективності відповідно до сучасних вимог медичної галузі. Розроблені рекомендації сформовано за основними детермінантами ефективного функціонування: управлінською, інформаційною, безпековою та економічною. Окрема увага приділена вдосконаленню бізнес-процесів на всіх етапах роботи центрів служби крові — від заготівлі та обробки до зберігання, карантинізації та розподілу компонентів крові. Вибір і пріоритезація заходів здійснені на основі погодження з основними цільовими аудиторіями, серед яких — нові та постійні донори, медичні установи, а також персонал центрів крові. До процесу розроблення пропозицій було залучено результати компаративного аналізу та досвід країн-лідерів у царині донорства крові. Це дозволило інтегрувати найкращі міжнародні практики в український контекст з урахуванням національних реалій і потреб. Запропоновані заходи спрямовані на розв'язання актуальних проблем у царині кровозабезпечення, підвищення рівня задоволеності потреб населення в компонентах крові, забезпечення їхньої безпеки, доступності та якості. Реалізація зазначених ініціатив сприятиме підвищенню конкурентоспроможності установ служби крові на національно-му ринку медичних послуг і зміцненню довіри з боку стейкхолдерів.

Ключові слова: ефективність діяльності підприємств служби крові, донорство крові, управління медичними закладами, система охорони здоров'я, ресурси медичної сфери

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