

REVIEW ARTICLE

FINANCIAL AND ECONOMIC EFFECT FOR THE HEALTHCARE INSTITUTION FROM THE INTRODUCTION OF LOGISTICS MANAGEMENT METHODS

DOI: 10.36740/WLek202106139

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ABSTRACT

The aim: This study is to substantiate the theoretical approaches to determine the financial and economic effect for the Healthcare Institution from the introduction of logistics management methods.

Materials and methods: The work utilises a number of methods: Content Analysis, Bibliosemantic, Systematic approach and the analysis of products.

Conclusions: The use of logistics management methods is substantiated: synchronization of flow processes, interactive feedback and spatio-temporal timing, as well as the need to take into account in assessing the effectiveness of health facilities not only medical and demographic indicators, but also financial and economic effect.

Prospects for further research are related to the development of theoretical and methodological support for the transformation of health care management system, substantiation of methods for determining the relationship between the level of autonomy of institutions and quality of care, taking into account the risks of indirect impact due to reduced access to medical services in rural areas, reduction of the network of specialized institutions and the number of specialized specialists.

KEY WORDS: Management methods, Logistics approach in management, Healthcare facility, Financial and Economic effect, Medical and Demographic Indicators

Wiad Lek. 2021;74(6):1499-1504

INTRODUCTION

The spread of a customer-oriented approach to public administration processes in Ukraine highlights the need to improve the mechanisms, methods and tools traditionally used in the management of the healthcare system. Analyzing, systematizing and summarizing the scientific works of domestic and foreign scientists to establish the prospects for the introduction of Logistics Management Methods in Healthcare facilities in Ukraine with the appropriate adaptation. Autonomization of Healthcare Institutions, provided by the initiated reform of its organization and financing in accordance with the Concept of Healthcare financing reform, approved by the Order of the Cabinet of Ministers № 1013-r of 30.11.2016, requires the use of modern science-based logistics methods in the business environment. Appropriate adaptation of such methods to the needs of non-profit institutions, which include health care facilities, will create conditions for improving the financial and economic efficiency of their operation, improving the quality of medical services, providing promising opportunities for development.

The need and timeliness of the implementation of logistics management methods is due, in part, to the currently expected increased burden on Healthcare facilities due to the difficult epidemiological situation.

The rapid spread of COVID-19 coronavirus disease increases the risks of inefficient logistics in the health care system and threatens the functions assigned to it.

A scientific and methodological approach has been developed.

This is to determine the financial and economic effect on the Healthcare Institution from the introduction of logistics management methods. By taking into account the increase in the flow of patients due to improving the quality of medical services; reduction of hospital operating costs for the provision of medical services; elimination of the causes of irrational use of personnel and material and technical resources of autonomous Healthcare institutions.

THE AIM

The aim of the study is to substantiate the theoretical approaches to determine the financial and economic effect for the health care institution from the introduction of logistics management methods.

MATERIALS AND METHODS

The work uses a number of methods: Content analysis, Bibliosemantic, Systematic approach and an analysis of products.

REVIEW

The review of sources show that the theoretical and practical aspects of modernization of Management methods of

Healthcare facilities in Ukraine, ensuring the effectiveness of their activities are actively researched by scientists and discussed in scientific publications.

The attention of scientists and managers-practitioners focuses mainly on the problems of forming an effective system of Institution Management in the conditions of changing institutional conditions. Scientists are considering the possibility of modernizing methods [1], mechanisms [2] and management tools [3], as well as the factors that determine the choice of alternatives.

Many scientists are trying to assess and predict obstacles to modernization, for example, Danko V.V. [4], Skrip V.V. [5].

The need to increase the efficiency of the existing Healthcare system in Ukraine necessitates a change in the model of its organization and financial support. When outlining the principles of operation, trans ag and the shortcomings of existing models, such as budget, mixed and private - in the work of Karpyshyn N.I. and Komunitskaya M.P. [5]; Bismarck, Beveridge, Douglas, Semashko - in Lisovska O.O. [6] and Voronina O.O. [7], Bogdan N.S. Panfilova G.L., Panfilova G.L. [8], points out the problems of defining and implementing in the practice of facility management new criteria for evaluating the effectiveness of health care facilities. The transition from the budget model, which still operated in Ukraine to the model of health insurance, similar in basic features to the British Beveridge model, encourages scientists to find ways to predict the future state of the health care system using scientifically sound indicators and indicators of social and financial and economic management efficiency.

Given the peculiarities of the functioning of health care facilities as objects of management, concentrating the directed flows of resources, customer requests (patient appeals), information, finance, published scientific and practical studies emphasize the prospects for use in the management of medical institutions logistics management methods. Yes, Shevchenko V.A. considers the possibility of using simulation methods in the management of health care facilities and as a criterion for assessing the effectiveness of the organizational structure of the institution proposes to use the results of comparing benefits and costs [9]. The application of this method allows you to compare the financial and economic effects (benefits and costs) of individual health care institutions from the exchange of information with other participants in the interaction. The question of quantifying the effects of the transformation of the organizational structure of the health care institution remains open. The paper attempts to make such an assessment. The authors point out gaps in the material and resource provision of non-profit health care facilities based on communal property and compare the processes of health care with business processes. This analogy leads to the idea that the introduction of logistics approaches in the non-profit sector will contribute to the organizational growth of medical institutions and help solve the problems of financial and logistical support "by establishing their cost-effective work" [10]. Given that the object of study in the above work are non-profit organizations - public

health facilities, probably, under the "profitability" the authors understand the increase in financial and economic effects of change.

In the context of determining the financial and economic effect, the introduction of logistics methods of Healthcare management researchers note,

A reduction in material costs,

A reduction in time to move the flow of patients, resources and information [11];

A reduction of total costs to meet the requirements of end users (patients) [12];

Optimization of flow process management in medical institutions based on the introduction of the latest information technologies [13];

A reduction of actual household spending on treatment due to reduced corruption [16], etc.

Given the specifics of the results of the management facility Healthcare Institution, in the evaluation of which the dominant role is played by the criteria for assessing the quality of care, its timeliness and effectiveness, safety and efficiency, accessibility, patient focus, the principles of organization and funding, the quality and quantity, of the provided medical services are set. The statement of a scientific and methodical problem of identification of financial and economic effects for Healthcare Institutions from change of principles of management is urgent. Modernization of health care management on the basis of the latest logistics methods, the need for which is now well-founded in theory and practice, requires the establishment of sources of financial and economic effect, principles and approaches to its evaluation. Elaboration of the questions will help to increase the validity of managerial influences during the introduction of logistics management methods in the activities of health care facilities.

Logistics is the science of organization and management of stocks and processes of movement in space of flows of goods, services, resources from suppliers to end users, as well as the formation of infrastructure to ensure the circulation of objects [16]. Managed objects in logistics are considered as logistics flows - material, information, financial and service. The main flow in the field of material production is a material flow - directed through the distribution channels from source to destination, a set of raw materials, materials and other material resources [17].

The evolutionary development of logistics and management has led to the separation of logistics methods in the classification of management methods. This is due to the specifics of the objects of managerial influence - the above logistics flows. In the management of business organizations and logistics as an integrated process that helps to optimize the processes of creating new value, solves the problem of providing a comprehensive financial and economic effect through the integration of internal and external logistics flows: resources, materials, services, customer requests and more.

The purpose of logistics management is to meet consumer demands in accordance with established criteria (product quality, service and service standards, etc.) while minimizing the company's costs for production and mar-

Table I. Some medical and demographic indicators characterizing the activity of the network of health care institutions in Ukraine and the European Union

Indicator	Ukraine	European Union (country - value of the indicator)	
		Highest level	Lowest level
Number of hospital beds (per 100 thousand population)	743	Germany – 611	Sweden – 226
Number of doctors of all specialties	440	Greece – 632	Poland – 233
The average length of stay of the patient in the hospital, days	11,2	Hungary – 9,5	Bulgaria -5,3
Total health expenditure,% of GDP	3,2	Belgium – 10,4	Romania – 5,1
Mortality rate, cases per 100 thousand population	1477	Lithuania - 1920	France - 738

Table II. General characteristics of logistics methods of health care management

Name of the logistic method	Characteristics of use in the health care facility
Method of synchronization of flow processes	The target of synchronization of flow processes is mutual coordination of a stream of patients with a stream of medical services on resources, in time and space. It uses the tools of linear and dynamic economic and mathematical modeling, queuing theory, inventory theory and more.
Interactive feedback method	The implementation of the method involves the formation of a channel for the management system to «respond» from the object of management about its operational status: quantity and quality characteristics of patients' requests, volumes and quality of provided and provided medical services, medical equipment, medicines and drugs. This contributes to the improvement of operational management and provides an opportunity to predict future changes, more flexible adaptation of the system to the needs of patients.
Spatial-temporal timing method	This method provides for the operational monitoring of a set of logistics operations and functions through the use of modern information and communication technologies.

keting, adaptation of internal production, marketing and other processes to customer requirements.

Intensification of scientific and practical discussion on the prospects of using logistics methods in the management of health care facilities in Ukraine is associated with the ongoing reform of the funding model. According to the Concept of Health Care Financing Reform (2016), the transition to the model of state solidarity health insurance and the introduction of a new mechanism for strategic procurement of medical services are envisaged.

The distribution of funds between institutions is carried out in accordance with the principle of «money follows the patient». This is expected to contribute to the introduction of customer-oriented principles in the management of medical institutions, as the amount and level of customer satisfaction depends on the amount of funding that each autonomous hospital will receive.

To assess the effectiveness of the Healthcare system, medical and demographic indicators are used, some of which are comparable to similar indicators achieved in the European Union are given in table I.

The reason for the unsatisfactory performance of the Ukrainian Healthcare System in the accumulated fundamental shortcomings of management. Archaic approaches in the management of institutions, focused in the past on the fight against infectious diseases and injuries are not focused on the needs of patients. As a result, institutions are unable to provide efficient, quality services.

The object of Healthcare management has certain specific properties due to the special nature of medical services

Interaction with recipients of patient services:

Direct contact and direct involvement in the service delivery process.

The primary (if necessary, mutual coordination) logistics flows in the management system of the health care institution is the flow of patients and the flow of medical services (Figure 1), the existence of which generates a multi-component flow of personnel: personnel, material resources, information, etc.

A logistical approach to healthcare management is one of the tools for optimizing business processes. Prospects for improving the management of the institution are directly related to the ability to ensure the quality of medical services and care, which in turn depends on the consistency of logistics flows.

The flow of patients is dominant - its qualitative and quantitative characteristics determine other flows. The patient is not only the object of management (dispatching), but also, above all, the object of service. The provision of medical care involves the movement of both patients and medical staff in the hospital (and beyond). In addition, timeliness is important when providing medical care. That is, the flows of patients and medical services must be mutually consistent in time and space.

Patient flows are accompanied by staff flows, logistical, financial, information flows. Their formation is carried out in a planned manner (according to the forecasts of morbidity) and upon the provision of medical services.

To illustrate the dependence of the effectiveness of individual medical institutions and the entire public health system on the effectiveness of the coordination of logistics flows, the threat posed by the Covid-19 pandemic can be cited. At

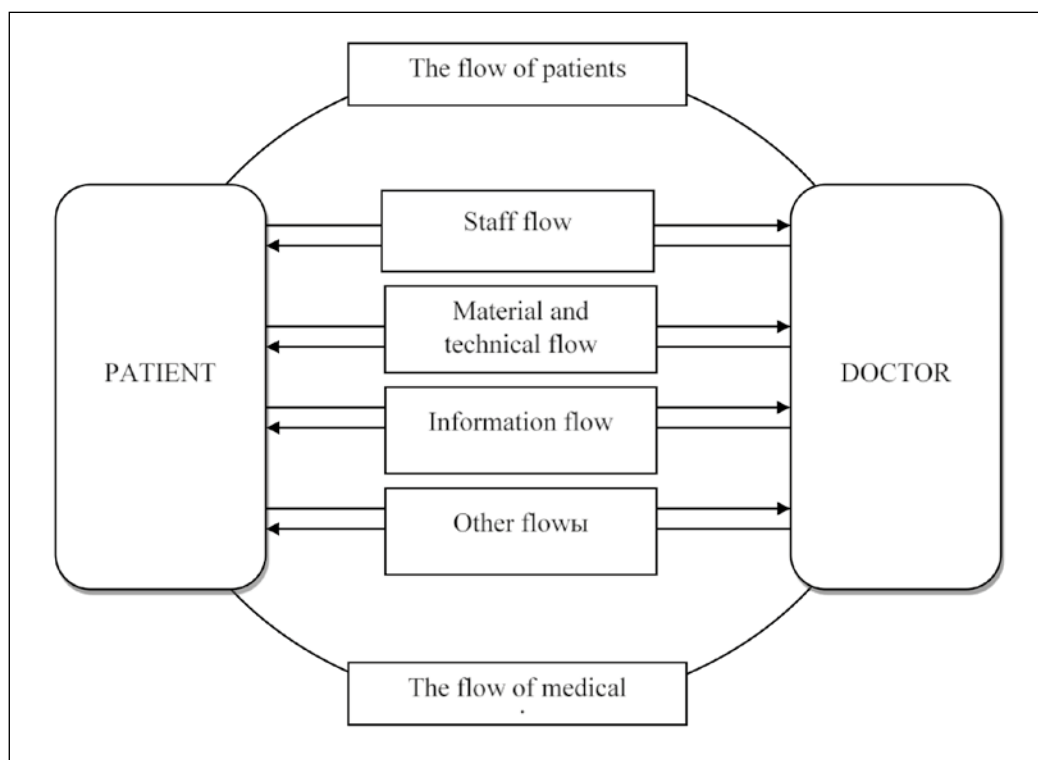


Fig. 1. Logistics flows of the health care institution
Source: compiled by the author based on [12, 13]

the same time as a threat to human health, the coronavirus can cause the health system to collapse if doctors become patients, that is, if an increase in the flow of patients leads to a mass infection of health workers and a critical reduction in the flow of health care. According to the estimates of the Chief Sanitary Doctor of Ukraine V. Lyashko in Ukraine on July 1, 2020 there were 25 thousand hospital patients x beds ready to receive patients with Covid-19 [19, p. 1]. Exceeding the number of patients with indications for hospitalization due to Covid-19 beyond this limit poses a threat to its systemic crisis in the health care system.

The program of reforms of the medical system in Ukraine (2015–2020) provided for its focus not only on people (patients and employees), but also on the focus on results - taking into account when financing medical institutions the effectiveness of their work. Development of transparent indicators for monitoring the condition of an individual institution and the effectiveness of its work will increase the level of controllability of the system. Introduction of logistics methods, the general characteristics of which are given in table II, provides for the transformation of the management system in autonomous healthcare facilities in the following areas.

Directions of transformation of the management system in autonomous health care institutions on the basis of logistic methods:

Determining the quality of medical services as the dominant target of the institution. In Ukraine, the main issues concerning the assessment of the quality of medical care and services are currently regulated - such work is currently underway. Among the criteria for assessing the

quality of medical services, experts and patients call time - waiting time, ease of appointment, duration of contact with a doctor / other medical staff, as well as financial and economic - availability of treatment, nominal and actual cost of medical services for patients and customers.

DISCUSSION

Monitoring of logistics flows in order to regulate them promptly to ensure the highest possible level of patient satisfaction;

Optimization of material, financial, labor and other costs for the purchase of material resources, marketing and promotion of medical services, provided that the target criterion of meeting the needs of patients. For the first time, hospitals are forced to compete in the process of providing medical services - the patient independently chooses a doctor and an institution, which promotes the development of horizontal relations between institutions with different levels of specialization; simplification of multilevel hierarchical management structures[5];

Scheduling of flow processes with the introduction of the principles of «just-in-time» («just in time») based on the use of modern information and communication technologies;

Monitoring the implementation of logistics management methods in health care facilities using indicators for assessing the social, socio-economic and financial-economic effect.

Meeting the needs of patients with appropriate compliance with the quality standards of medical services at the level of individual hospitals should lead to an increase in the level of funding by increasing the state order of medical services in this institution.

The introduction of logistics management methods in autonomous health care facilities helps to increase the efficiency of their activities by generating additional revenues and reducing the cost of logistics of service delivery processes[4].

The sources of financial and economic effect are:

Increasing the flow of patients due to improving the quality of medical services;

Reduction of operating costs in the logistics flow of medical services by optimizing the workload of general practitioners and specialists;

Reduction of costs for the formation and maintenance of surplus stocks (medicines and drugs), excessive use of funds due to inefficient use of equipment and premises.

In the process of developing indicators for assessing the financial and economic effect of the implementation of logistics methods of managing the activities of health care facilities should take into account the ratio of direct and indirect financial and economic effects. In this area, the indirect economic effect in almost all cases exceeds the direct increase in cash inflows or an absolute reduction in losses. The activities of hospitals are primarily aimed at combating diseases, their treatment and prevention, which improves the quality of life and reduces mortality.

CONCLUSIONS

As a result of the study, the following conclusions can be drawn:

- 1) Reforming the system of organization and financing of health care institutions in Ukraine, giving them the status of autonomous economic entities necessitates scientific and practical justification for the introduction of modern management methods. Promising management methods are logistics methods that allow to implement a customer-oriented approach in the management of institutions through the adaptation of internal production, sales and other processes of the enterprise to the requirements of patients;
- 2) To ensure the unity of the management cycle in the hospital it is necessary to transform it as an object of management into a single logistics system based on the coordination of all flows - patients, information, materials, fixed assets, staff, time and space. The introduction of logistics methods involves the formation of an appropriate network information environment, development and adaptation of digital logistics tools to the specifics of health care facilities, as well as standards for data exchange interfaces with the minimum available resources.
- 3) It is established that the hospital can be considered as a set of logistics flows: patients, medical services, staff flow, material flow, information, finance and others. The flow of patients is dominant in relation to others. Achieving mutual coherence of the hospital's logistics flows contributes to meeting the requirements of patients and improving the quality of medical services;
- 4) It is determined that the introduction of logistics methods of health care management, namely: synchronization of flow processes, interactive feedback and

spatio-temporal timing involves the transformation of the management system in the areas of: determining the quality of medical services as a dominant target.; monitoring of logistics flows for the purpose of their operative regulation; optimization of material, financial, labor and other costs for the purchase of material resources, marketing and promotion of medical services, provided that the target criterion of meeting the needs of patients; scheduling of flow processes with the introduction of the principles of «just-in-time» using modern information and communication technologies; monitoring the implementation of logistics management methods in health care facilities using indicators for assessing the social, socio-economic and financial-economic effect; Substantiated scientific and methodological approaches, to determine the financial and economic effect for the Healthcare Institution. With the introduction of logistics management methods, taking into account the increase in the flow of patients in connection with improving the quality of medical services, reduction of hospital operating costs for the provision of medical services, elimination of the causes of irrational use of personnel and material and technical resources of autonomous health care institutions.

Prospects for further research are related to the development of theoretical and methodological support for the transformation of health care management system, establishing the relationship between the level of autonomy of institutions and indicators of quality of care, taking into account the risks of possible reduction of medical facilities in rural areas, reducing the number of specialized specialists.

REFERENCES

1. Shevchenko V.A. Formuvannya sistemi upravlinnya zakladami okhoroni zdorovya. [Formation of the management system of health care facilities]. International Scientific Conference Innovative Economy: Processes, Strategies, Technologies: Conference Proceedings, Part II, January 27, 2017. Kielce, Poland: Baltija Publishing. 28-31. (in Ukrainian).
2. Borshh V. I. Upravlinskij kapital v sistemi okhoroni zdorovya: teoriya i metodologiya: avtoref. dis. [Management capital in the health care system: theory and methodology: author. dis.] ... Dr. Econ. Science: 08.00.03 - Chernihiv, 2020, 40 p. (in Ukrainian).
3. Safonov Yu.M., Borshh V.I. Strategichnij menedzhment zakladiv okhoroni zdorovya: zagalni principy ta osoblivosti zastosuvannya v galuzi okhoroni zdorovya Ukrayini. [Strategic management of health care institutions: general principles and features of application in the field of health care of Ukraine]. Current economic problems. 2019; 8 (218): 62-69. (in Ukrainian).
4. Danko V.V. Udoskonalennya sistemi upravlinnya zakladami okhoroni zdorovya na innovacijnikh zasadakh. [Improving the management system of health care facilities on an innovative basis]. Scientific notes of Tavriya National University named after V.I. Vernadsky. Series: Economics and Management 2019; 30 (69): 102-110. (in Ukrainian).
5. Skrip V.V. Operativni politiki yak pereshkodi na shlyakhu avtonomizaciyi zakladiv okhoroni zdorovya ta mozhlivi shlyakhi usunennya takikh politik. [Operational policies as obstacles to the autonomy of health care facilities and possible ways to eliminate such policies]. Ukraine. Health of the nation. 2016; 4 (1): 189-195. (in Ukrainian).

6. Karpyshyn N.I., Komunitskaya M. P. Klasichni modeli finansovogo zabezpechennya okhoroni zdorovya. [Classic models of financial security]. *World of Finance* 2017;1 (14): 110-117. (in Ukrainian).
7. Lisovska O. Teoretichni zasadi funkcionuvannya modelej finansuvannya sistemi okhoroni zdorovya. [Theoretical principles of function financing models for the health care system]. *Economic Bulletin. Series: finance, accounting, taxation*, 2020; 4: 96-103. <https://doi.org/10.33244/2617-5932.4.2020.96-103>. (in Ukrainian).
8. Voronina O.O. Vprovadzhennya Beveridzhskoyi modeli finansuvannya okhoroni zdorovya: perspektivi ta zagrozi dlya Ukraini. [Implementation of the Beveridge model of health care financing: prospects and threats for Ukraine]. *Collection of scientific works of the Cherkasy State Technological University. Series: Economic Sciences*. 2019; 52: 80–86. (Ua)
9. Bogdan N.S., Panfilova G.L. Kharakteristika modelej funkcionuvannya sistem okhoroni zdorovya ta farmaceutichnogo zabezpechennya naselennya u svitovij prakticzii. [Characteristics of models of functioning of health care systems and pharmaceutical provision of the population in world practice]. 2019. <http://91.234.42.22/bitstream/123456789/18657/1/211-213.pdf> (in Ukrainian).
10. Shevchenko V.A. Imitacijne modelyuvannya organizacijnoyi strukturi upravlinnya zakladom okhoroni zdorovya v ramkakh spriyannya open innovation na vezi metodichnogo pidkhdou vitrati / vigoda. [Simulation modeling of the organizational structure of health care management in the framework of promoting open innovation on the basis of a methodical cost / benefit approach]. *Economic space*. 2016; 116: 243-254. (in Ukrainian).
11. Mykhalchuk V.M., Kolomojets A.V., Hbur Z.V. Mediko-socjalne obruntuvannya logistiki v upravlinni komunalnim neizbutkovim pidpriemstvom zakladu okhoroni zdorov'ya. [Medical and social substantiation of logistics in the management of a municipal non-profit enterprise of a health care institution]. *Bulletin of Social Hygiene and Health Care Organization of Ukraine*, 2020; (1): 67-74. <https://doi.org/10.11603/1681-2786.2020.1.11210>. (in Ukrainian).
12. Posylkina O.V., Lisna A.G. Aktualnist vprovadzhennya logistichnogo pidkhdou u di`yalnist zakladiv okhoroni zdorovya. [The urgency of implementing a logistical approach in the activities of health care institutions. *Social pharmacy: status, problems and prospects: materials VI International. scientific-practical Internet conference, Kharkiv, April 23-24. 2020. Kharkiv: NFAU. 2020: 244-247.* (in Ukrainian).
13. Kotys N.V., Tsishchuk R.V. Anali`z doczilnosti zavvadhennya logistichnogo menedzhmentu v diyalnist zakladiv okhoroni zdorovya. [Analysis of the feasibility of introducing logistics management in the activities of health care institutions]. *Market infrastructure*. 2019; 33: 178-183. (in Ukrainian).
14. Belous M.V. Perspektivi vprovadzhennya czifrovikh logistichnikh innovacij dlya realizacziyi efektyvnogo logistichnogo upravlinnya potokovimi procesami u vijs`kovo-medichnij sluzhbi Zbrojnikh Sil Ukraini. [Prospects for the introduction of digital logistics innovations for the implementation of effective logistics management of flow processes in the military medical service of the Armed Forces of Ukraine]. *Modern pharmacy: history, realities and prospects of development: materials of scientific practice. conf., Kharkiv, September 19-20, 2019.: in 2.* Kharkiv: NFAU. 2019; 2: 72-73. (in Ukrainian).
15. Birkovich T.I. Korupczia yak pereshkoda na shlyakhu efektyvnogo regulyuvannya sistemi okhoroni zdorovya. [Corruption as an obstacle to effective regulation of the health care system]. *Investments: practice and experience*. 2018; 10: 79-82. (in Ukrainian).
16. Nerush Yu. M., Nerush A. Yu. Logistics. Moscow: «URAIT Publishing House», 2016: 559. (in Russian).
17. Shtal T., Uvarova A. Sutnisni kharakteristiki logistichnoyi diyalnosti` torgovelnogo pidpriemstva. [Essential characteristics of the logistics activities of a commercial enterprise]. *Bulletin of Taras Shevchenko National University of Kyiv. Economy*. 2019; 3 (204): 64-71. (in Ukrainian).
18. Drogomyretska M.I., Zorya A.V. Integrovana logistichna sistema yak osnova pidvishhennya competitivospromozhnosti pidpriemstva. [Integrated logistics system as a basis for increasing the competitiveness of the enterprise]. *Economy and society*. 2016; 6: 134-139. (in Ukrainian).
19. Lyashko V. Khotel by ya stat merom Kieva? [Would I like to become the mayor of Kyiv?]. *GordonUA.com*. 8.07.2020 <https://gordonua.com/publications/viktor-lyashko-hotel-by-ya-stat-merom-kieva-dumayu-malo-kto-otvetil-by-net-na-takoe-predlozhenie-1507031.html> (in Russian).
20. Burakov V.I. Principipy i metody logisticheskogo upravleniya predpriyatiami v promyshlennosti. [Principles and methods of logistics management of enterprises in industry]. *Baikal Research Journal*. 2013. 2. <https://cyberleninka.ru/article/n/printsiy-i-metody-logisticheskogo-upravleniya-predpriyatiami-v-promyshlennosti/viewer>. (in Russian).
21. Aktualni idikatoru stanu sistemi okhoroni zdorov'ya v krayinah Yevrosoyuzu ta Ukraini. [Current indicators of the state of the health care system in the European Union and Ukraine]. *Economic discussion club*. <http://edclub.com.ua/analitika/aktualni-indykatory-stanu-systemy-ohorony-zdorovya-v-krayinah-yevrosoyuzu-ta-ukrayini>. (in Ukrainian).

This study was conducted within scientific and research (initiative-search) work of Shupyk National Medical Academy of Postgraduate Education entitled.

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Conflict of interest:

The Authors declare no conflict of interest.

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Received: 10.11.2020

Accepted: 08.04.2021

A – Work concept and design, **B** – Data collection and analysis, **C** – Responsibility for statistical analysis, **D** – Writing the article, **E** – Critical review, **F** – Final approval of the article