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Review article

## Approaches to Assessing the Effectiveness of Healthcare in Kazakhstan and Abroad

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### Abstract

*World experience in the field of evaluating the effectiveness of public administration bodies shows that the key aspect of improving the efficiency of public servants in many countries is the creation of an objective and comprehensive system of indicators. For these purposes, all kinds of performance indicators are widely used. Improving efficiency is one of the important health issues, which is largely shaped by the effective work of government bodies. To date, a third of all money spent in the world on healthcare needs is used inefficiently, which is undoubtedly a consequence of the low efficiency of all health care participants, including labor resources with a constant shortage of personnel.*

**Keywords:** *Efficacy, Effectiveness, Efficiency, Strategy, Health care.*

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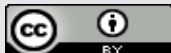
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## Introduction

According to statistics from the World Health Organization (WHO), every decade health spending increases by 1% of gross domestic product (GDP) [1,2].

In any case, no country is capable of indefinitely increasing spending on medical needs, for this reason it is important to maintain a balance between allocated resources and their maximum effective use. According to WHO recommendations, the efficiency of the system is achieved at a cost level of at least 6,5% of GDP.

An efficiency indicator in the broadest sense is understood as a descriptive or quantitative indicator that characterizes the result of an activity or the success of movement towards achieving a goal. The basic concept of the indicative planning system is an «indicator» – an integral indicator that quantifies the qualitative characteristics of the process. Indicators are defined as parameters of boundaries within which a system, including organizational mechanisms, technological connections, material and financial flows, can function and develop sustainably [3].

For decades, WHO has been actively trying to promote health in a holistic way. The most notable steps in this direction are the Alma-Ata Declaration and the subsequent development

## Approaches to assessing the effectiveness of healthcare abroad

World experience in the field of evaluating the effectiveness of public administration bodies shows that the key aspect of improving the efficiency of public servants in many countries is the creation of an objective and comprehensive system of indicators. For these purposes, all kinds of performance indicators are widely used.

Modern common methods of evaluating effectiveness applicable to the healthcare industry: DEA (Data Envelope Analysis) and SFA (Stochastic Frontier Analysis).

The method of analyzing the operating environment [5] – the DEA method belongs to the nonparametric class, which determines the efficiency boundary by optimizing the weighted ratio of Output (output factors – indicators of the industry) and Input (input factors) of each unit. For example, as Input, you can use a value equal to the product of GDP and health care costs. As an Output, you can use the number of days spent in the hospital, preventive treatment in the hospital, measured in days, characteristics of medical personnel, and the type of ownership of each hospital.

In order to increase efficiency, you should:

- 1) Increase Output weight;
- 2) Reduce the weight of the input;
- 3) If the Output and Input weights increase, the Output growth rate should be higher than the Input growth rate;
- 4) If the weights of Output and Input decrease, the rate of decrease for Output should be lower than the rate of decrease of Input.

The difference between DEA and other methods of evaluating efficiency is that this method describes optimal execution paths, not averaged ones. Currently, no organization can afford an average performance in an endlessly developing competitive healthcare market [6]. The DEA model makes it easier to identify not only effective organizations, but also offers ways to improve the performance of inefficient institutions to increase the overall effectiveness of all organizations.

The DEA method can be carried out not only at the institution level, but also in departments. At the same time, comparisons can be made to determine the results of strategic programs to improve the use of Input resources to maximize Output parameters. Consequently, this method is able to help healthcare managers [6]:

- 1) when analyzing the relative effectiveness of a management body, in addition, in determining its greatest productivity;
- 2) solutions for ways to improve the efficiency of the organization.

of the «Health for All» movement, as well as the Ottawa Charter on Health Promotion [4]. However, the predominant attention was still paid not to the comprehensive assessment of physical and mental well-being, but to the reduction of mortality, morbidity and disability.

We need new indicators on the way to eliminate this disbalance. Achieving the highest level of health at all stages of life is a fundamental right of everyone, not a privilege of the elect. Good health of people of all ages is a valuable resource and a source of economic and social stability, which is key to reducing poverty and ensuring sustainable development. It is extremely important that good health indicators cannot be considered as the result of the work of only one industry: sustainable improvement of health and well-being of people while respecting the principle of social justice is the result of the implementation of an effective policy covering all components of public administration, as well as the collective efforts of the whole society [4].

**Aim of the review:** To study current efficiency indicators and their evaluation methods in different countries.

The method of modeling the stochastic SFA boundary was proposed in the course of the theory of production efficiency and demonstrates the evaluation of efficiency based on the construction of econometric models. The method is based on the stochastic Cobb-Douglas production function, in which, after evaluation, a random error consists of two parts: a certain stochastic effect (actually an error) and the so-called technical inefficiency [7].

In healthcare, the methods of DEA and SFA are applicable in many cases. In this regard, the question of the limitations of their use and the credibility of the results obtained is relevant, so quite a lot of work is devoted to this topic. One of such works, Giuffrida and Gravel authors who compared various modifications of the DEA and SFA models, where the object of the study were medical institutions engaged in providing primary care in England. The results they obtained showed that the SFA estimates were more stable and unbiased [8].

Worthington (2004) in his work made comparisons between different methods of measuring efficiency boundaries [9]. The author also found that the choice of the method of evaluating the effectiveness does not have a great impact on the results.

In his study, Joumard (2008) often uses the indicator of life expectancy when modeling the SFA method. The author considers this indicator to be a reference, than, for example, indicators of the morbidity/survival rate of patients to be used in the analysis, on the grounds that this indicator is more accurately assessable at the system level [10].

The Organization for Economic Cooperation and Development (OECD) uses a number of indicators to assess the effectiveness of the healthcare system: the level of quality, accessibility of medical services, and required financial resources. These indicators depend on the level of technology development, training and qualification of medical personnel of institutions. In the study of D. Vranik (2012) on the example of countries that are members of the OECD, approaches to assessing the effectiveness of health systems based on the definition of: health care costs (public, private), job security, income distribution, remuneration, etc. were analyzed. Using the SFA method described above, the author found that health care costs are most effectively used in the provision of medical services in systems that provide insurance to the largest part of their population and that the population bears part of the health care costs [11].

Sayyem Ahmed, in his work on assessing the effectiveness of health systems in Asia, used the above-described DEA method on the example of 46 countries, where our country was also [12]. As an input, the author took health

care expenditures per capita, as an output, indicators of public health such as: life expectancy at birth, infant mortality. The main conclusions of this article demonstrate that about 91,3% (42 out of 46 countries) of the Asian countries studied were ineffective in using the resources of health systems. Most of the effective countries belonged to the high-income group (Cyprus, Japan and Singapore) and only one country (Bangladesh) belonged to the lower-middle-income countries. Despite this, the inefficient countries identified through this study can improve health outcomes by using the current level of health spending per capita. When analyzing the situation, the authors calculated that through the improvement of the healthcare system, the effectiveness of the studied high-income, middle-income, low-income and lower- middle- income countries can improve the results of the healthcare system by 6,6%, 8,6% and 8,7%, respectively, at the existing level of resources [12].

Some foreign studies have compared the effectiveness of public and private hospitals. For example, in the Czech Republic, using open sources, hospital websites, the Institute of Health Information and Statistics for 2009 and 2012, P. Pirozhek et al. (2015) analyzed the data of about 200 hospitals, half of which were grouped by form of ownership. The authors of this article studied not only the annual reports of institutions, but also their staffing, staff qualifications, etc. During the analysis, it was revealed that public hospitals without subsidies suffered losses, while private hospitals had positive results regardless of the availability of subsidies. High estimates of the effectiveness of private hospitals were associated with their small size, on the contrary, state institutions are larger, therefore they are considered less flexible, thus, the legal form of the institution should not be associated with their economic indicators [13].

Ulumbekova U. (2021) in her work has developed a rating for evaluating the effectiveness of health systems in 85 regions of the Russian Federation. Four indicators were used in this rating, all of them have a certain weight for each indicator and are summed up when calculating points. The highest weight (50%) among the indicators used is the OPJ. The region with the highest level of OPJ at birth receives 50 points, and with the lowest – 0 points. The second indicator is per capita government spending on healthcare, which essentially determines the OBMP (30%). This indicator is calculated without taking into account the coefficient of differentiation (CD) to ensure comparability of data by region. The third indicator with a weight of 10% is the gross regional product (GRP) per capita, which in turn shows the level of economic development of the subjects of the Russian Federation. If this indicator has high values of GRP per capita, then, accordingly, there will be a high standard of living, the level of consumption of high-quality food, medicines, and paid medical services will also be higher, and together it will affect health. It follows from this that the subjects of the Russian Federation with the highest values of indicators of public spending on healthcare and GRP per capita receive the lowest score. Those regions that have a relatively low level of socio-economic development and less opportunities for medical care costs receive high scores on these indicators [14].

The effectiveness of medical care in assessing political decisions in the field of healthcare is considered by foreign researchers as an analysis of the constituent elements: structure, process, results, criteria (Figure 1).

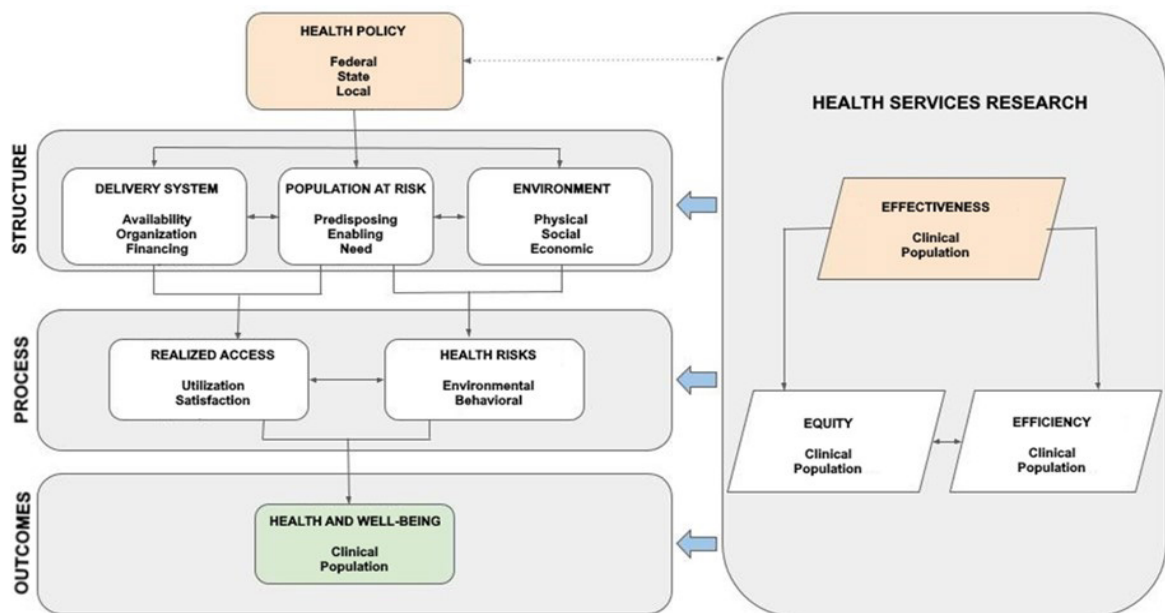


Figure 1 - Structure of the study of the effectiveness of medical care and evaluation of health policy [21]

## The history of efficiency evaluation in Kazakhstan

Since 2012, the Ministry of Health of the Republic of Kazakhstan has applied the ranking methodology, where the algorithm of the final assessment was based on the expert-point method with the summation of points according to the actual performance of the indicator. After that, a rating was displayed, where the highest value was awarded rank 1. According to its results, a continuous ranking of the activities of bodies (health departments of regions and cities of republican subordination) and more than 600 medical organizations of the country was carried out [15].

In 2018, the methodology for evaluating activities was revised. The point system was replaced by the assignment of

stars from 5 to 1, and a division was proposed into two categories: according to clinical indicators and management indicators, and an indicator of scientific activity is also applied to national centers.

In this assessment methodology, 75 indicators are used depending on the profile [16]. Processing of this information for all MO (medical organizations) is carried out once a year and the results obtained can be used to some extent for strategic planning, but monthly and quarterly data are needed for operational management of the industry.

In order to objectively assess the effectiveness of health authorities in the republic, S.E. Ibraev proposed the following indicators: 1) Accessibility to medical care; 2) life expectancy at birth; 3) maternal mortality rate; 4) number of people per doctor;

### Kazakhstan in the world rankings

The Bloomberg rating included 55 countries that meet the following criteria: a population of more than 5 million people, a GDP per capita of \$5,000 and an average life expectancy above 70 years.

Hong Kong took the first place in the ranking: the SPH here is more than 84 years old, the cost of medical services per capita is \$2,222. It is followed by Singapore and Spain: the SPJ is more than 82 years old, the cost of medical care is \$2,280 and \$2,354. The top ten also included Italy, South Korea, Israel, Japan, Australia, Taiwan and the UAE.

5) infant mortality rate; 6) number of people per average medical worker; 7) share of public health spending [17].

Kazakhstan was placed on the 44th line of the rating in 2018, having risen by one position. The level of health care efficiency is 39,2 points. The average life expectancy is 72 years. The cost of medical services per capita is \$379, the share of health care costs is 3,9% of GDP.

\*To calculate the index of the level of development and effectiveness of medicine, three indicators are used: average life expectancy, government spending on medicine from GDP per capita, the cost of health services per capita.

Table 1 - Examples of rating the effectiveness of healthcare systems in some countries of the world

Country	Year			
	2013	2014	2016	2018
Hong Kong	1	2 ↓ (-1)	1 ↑ (+1)	1
Singapore	2	1 ↑ (+1)	2 ↓ (-1)	2
Israel	4	7 ↓ (-3)	7	6 ↑ (+1)
Switzerland	9	15 ↓ (-6)	14 ↑ (+1)	12 ↑ (+2)
Great Britain	14	10 ↑ (+4)	21 ↓ (-11)	35 ↓ (-14)
France	19	8 ↑ (+11)	15 ↓ (-7)	16 ↓ (-1)
Germany	30	23 ↑ (+7)	39 ↓ (-16)	45 ↓ (-6)
China	37	26 ↑ (+11)	19 ↓ (-7)	20 ↑ (+1)
Turkey	44	31 ↑ (+13)	25 ↑ (+6)	26 ↓ (-1)
Kazakhstan	-	-	45	44 ↑ (+1)

In the world ranking on the level of healthcare published in 2021 by the world's largest database Numbeo, Kazakhstan ranked 58th among 95 countries. At the same time, our country has the highest quality index of the healthcare system among the CIS countries. Kazakhstan's indicators are noticeably inferior to Russia (62nd place), Ukraine (79th place), Belarus (91st place) and Azerbaijan (92nd place).

The rating evaluates the quality of the health care system, equipment, the level of professionalism of medical workers and health professionals, the cost of service in clinics and other indicators. The TOP 5 best countries in the world included Taiwan, South Korea, France, Japan and Denmark [18].

The above-mentioned ratings generally show how effective Kazakhstan's healthcare system is. However, I would like to mention the national project «Healthy Nation», for which a program for 2021-2025 has been formed, aimed at improving the lifestyle of the population, which involves creating favorable conditions and mass propaganda of this direction. The project also assumes an increase in the level of financing of the

### Conclusions

The existing rating assessment of the activities of medical organizations is very passive, inert and represents a large list of indicators, using them there is no possibility of determining causal relationships when evaluating effectiveness. World

healthcare system, which is always welcomed by the medical community. A few of the points: to increase the availability and quality of medical care, to increase life expectancy to 75 years, to promote the development of the domestic pharmaceutical industry, to form a modern system of epidemiological forecasting and response, it is planned to increase the share of total healthcare expenditures from GDP to 5% by 2025 [19]. Each of the points is, of course, important. In order to achieve this goal within the framework of this project, it is necessary to have a balance focused on the balanced development of healthcare, which is possible only with a stable balance of individual elements of regional systems, adequate influence of external and internal factors on which the well-being of the population depends. Political decisions in the field of healthcare and legal aspects of its activities should positively influence social factors of health [20]. We also need to keep in mind the main problem is the long-term underfunding of the healthcare system, and it ends with an inefficient management model.

experience shows the importance of evaluating effectiveness, where no more than 10 indicators are used. While more than 70 indicators are used in Kazakhstan.

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## Қазақстанда және шетелдерде денсаулық сақтау жүйесінің тиімділігін бағалау тәсілдері

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### Түйіндеме

Мемлекеттік басқару органдарының тиімділігін бағалау саласындағы әлемдік тәжірибе көптеген елдерде мемлекеттік қызметшілер жұмысының тиімділігін арттырудың негізгі аспектісі көрсеткіштердің объективті және бәрін қамтитын жүйесін құру болып табылатынын көрсетеді. Осы мақсаттар үшін тиімділіктің барлық түрлері кеңінен қолданылады. Тиімділікті арттыру денсаулық сақтаудың маңызды проблемаларының бірі болып табылады, ол көбінесе мемлекеттік органдардың тиімді жұмысымен анықталады. Бүгінгі күні әлемде денсаулық сақтау қажеттіліктеріне жұмсалатын барлық ақшаның үштен бірі тиімсіз пайдаланылады, бұл, сөзсіз, денсаулық сақтаудың барлық қатысушыларының тиімділігінің, оның ішінде персоналдың тұрақты жетіспеушілігі кезіндегі еңбек ресурстарының төмен болуының салдары болып табылады.

**Түйін сөздер:** Тиімділік, Пәрменділік, Медициналық көмектің сапасы, Стратегия, Денсаулық сақтау

## Подходы к оценке эффективности здравоохранения в Казахстане и зарубежом

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### Резюме

Мировой опыт в области оценки эффективности органов государственного управления показывает, что ключевым аспектом повышения эффективности работы государственных служащих во многих странах является создание объективной и всеобъемлющей системы показателей. Для этих целей широко используются всевозможные показатели эффективности. Повышение эффективности является одной из важных проблем здравоохранения, которая во многом определяется эффективной работой государственных органов. На сегодняшний день треть всех денег, расходуемых в мире на нужды здравоохранения, используется неэффективно, что, несомненно, является следствием низкой эффективности всех участников здравоохранения, в том числе трудовых ресурсов при постоянной нехватке персонала.

**Ключевые слова:** Эффективность, Действенность, Качество медицинской помощи, Стратегия, Здравоохранение.