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Research of Indicators of Sustainable Development in the Field of Healthcare Management (based on Materials from the Regions of the Republic of Kazakhstan)

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ABSTRACT: Achieving Sustainable Development Goal 3 is a complex and challenging task. The main obstacles to achieving the goal are: inadequate health financing, health inequalities, communicable diseases and pandemics, non-communicable diseases, complexity of health services. The importance of health as a systemically important factor in economic development, both nationally and globally, is undeniable. The long-term development of health care involves the creation of efficient, affordable and environmentally sound systems that provide good quality of life in health services and improve the quality of life. The aim of this study is to show that in order to achieve a sustainable transition to sustainable health care, a multidisciplinary approach involving partnerships between public entities, the private sector and civil society is necessary. The study is devoted to the substantiation of an integrated conceptual approach to the study of the health care system. The methodological basis of the study is represented by a set of provisions on sustainable socio-economic development, the theory of systems sustainability, as well as concepts of health care development. The article analyses the state of the health care system in the Republic of Kazakhstan. The current state of the health care system is assessed, the trends in the development of the health care system are identified and shown. By analyzing the state of the health care system in the Republic of Kazakhstan, the study identifies current trends, assesses sustainability indicators, and highlights strategies to enhance the sector's resilience. These findings underscore the significance of fostering sustainable, accessible, and efficient health care systems to address global challenges and support long-term socio-economic development.

Keywords: healthcare, sustainable development, indicators of sustainable development in healthcare, ecology, social aspect.

I. INTRODUCTION

Accessibility and quality of functioning of the healthcare sector are the most important components of the development of the country as a whole. Trends in this sphere are determinants of sustainable development of economic systems. The adoption of balanced and timely management decisions affects the challenges arising in the field of health care services, becomes the basis for the formation of human capital, respectively, and labour resources, which are an integral component of the functioning and development of the territorial system [1-4]. A significant number of economic losses caused by mortality of the working-age population is one of the obstacles to sustainable development. These benchmarks actualise the study of the scale and factors of accessibility of health care services and the development of directions for its improvement.

As important components of sustainable development, 'ensuring healthy lifestyles and promoting well-being for all at all ages' have been identified [5]. The '2030 Agenda for Sustainable Development', adopted by the UN in 2015, considers universal health coverage by 2030, including access to quality health services and medicines, as a health and well-being objective. To realise this goal, WHO experts estimate that a sustained increase in annual investment in health-related projects is needed, from $134 billion PPP to $371 billion PPP. This is an increase from US$134 billion PPP to US$371 billion, or US$58 per person by 2030 (WHO experts). This is expected to increase to US$ 58 per person by 2030 [6, 7].

Investment in fixed capital and investment in human capital, meaning investment in the knowledge economy, is the source of 60-70 per cent of economic growth.

The objectives of this study are refined to address the identified research gaps and are as follows:

1. Evaluate Accessibility and Quality of Healthcare Services: To analyze the current accessibility and quality of healthcare services in the Republic of Kazakhstan and identify the primary barriers limiting equitable access to health care.
2. Assess Socio-Economic Impacts: To quantify the economic losses associated with the mortality of the working-age population and highlight its implications for sustainable socio-economic development.
3. Identify Determinants of Sustainability in Health Care: To examine the key determinants of sustainable healthcare systems, emphasizing the role of balanced management decisions in strengthening human capital and labor resources.
4. Develop Policy Recommendations: To propose actionable strategies for improving healthcare accessibility and quality, aligning them with global objectives such as universal health coverage and the 2030 Agenda for Sustainable Development.
5. Analyze Investment Needs: To estimate the required levels of investment in healthcare infrastructure and human capital to achieve sustainable improvements in the healthcare sector by 2030, using WHO projections and benchmarks as a guideline.

By focusing on these objectives, the study aims to provide a comprehensive framework for enhancing healthcare systems' resilience and sustainability, contributing to broader national and global development goals.

The health care sector, which is in a deep crisis, requires urgent management measures aimed at reducing social risks and solving the priority social problems of society, which will contribute to achieving sustainable development of the health care sector and territorial systems as a whole.

The main objective of sustainable development is to fulfil the needs and aspirations of society. At the same time, economic growth alone is not enough; moreover, these concepts should not be identified. Sustainable development implies harmonious development of social, economic and ecological subsystems in order to meet the needs of mankind of the present and future generations [8]. The objectives of sustainable development include an extensive list of areas ranging from sustainable trends in economic growth and population growth to ensuring a high standard of living, accessibility and standards of health care, education, environmental safety, etc. [9]. Sustainable development cannot be achieved without a stable socio-economic and environmental policy in the region.

An alarming symptom for sustainable development is the low level of self-assessment by the population of their health status.

To date, ensuring accessibility and quality of health care services remains an acute social problem affecting the sustainable socio-economic development of territorial systems. On the one hand, in order to improve the health of the nation, individual responsibility of citizens for their health should be promoted, on the other hand, it is necessary to develop measures of both global and targeted nature to improve the effectiveness of socio-economic policies at the national level and locally. Of particular relevance in this direction is a set of actions in the field of primary, secondary and tertiary prevention, aimed at reducing the causes of major types of morbidity and mortality. In this regard, the need to monitor indicators for inter-country (regional) comparisons to determine the role and scale of the impact of health services on the sustainable development of systems as a whole is increasing.

It is impossible to overcome/neutralise negative trends in health care without activation of social responsibility of the population for their own health.

II. LITERATURE REVIEW

Effective health care management integrates human and material resources in a way that produces favourable, healthy outcomes consistent with the organisation's objectives. However, health care outcomes are very difficult to measure because they can manifest themselves long after the patient has been served. In addition, organisational goals and objectives often make it difficult to determine whether practical outcomes are consistent with them. For most health care organisations, objectives that relate to serving the population and the public good are much more difficult to measure than generating income in industrial enterprises [10].

In connection with the above, the following main features of health care organisation are highlighted, which require special approaches, knowledge and skills compared to other sectors of the national economy, complementing the fundamental and common for all sectors principles of management (Table 1):

Table 1. Types of management processes in health care.

No	Principle	Characterisation
1	Division and separation of managerial labour into an independent type of activity	The principle of division of labour should be used not only in satisfying the need to allocate managerial labour, but also in the division of general medical labour, including medical, paramedical, general technical (service), etc. The principle of division of labour should be used. This principle should be used, of course, and first of all in relation to medical science.
2	Programme control	In this case, the emphasis is not on the formation of objectives - there are few of them and they are clear - but on the careful development of specific tasks, the definition of the sequence of actions of units and the relationship of these actions among themselves. The totality of such tasks is the management programme. This type of management process is usually applicable when solving complex production tasks with many participants, when the main thing is to coordinate their actions in time
3	Situational management	It is characteristic of established, well-established production: large-scale, mass production. The goals here are clear and rarely change. The main thing is to be able to get the best out of unfavourable situations and failures of the production process. This is achieved by using ready-made standard solutions that allow to eliminate emerging deviations quickly and with the least losses (this type of management is sometimes called management by deviations)

It is important to note that in life, in practice, it is difficult to meet a situation for the application of one or another type of management in pure form. Usually, they are used in various combinations. An example of such a combination, which has become widespread in recent years, is programme-target management - the creation and implementation of targeted complex programmes, which absorbed elements of both target and programme management. The area of application of programme-target management is the solution of fundamental, fundamental tasks of the enterprise.

Objectives and strategies set the main directions for the search for market opportunities, keep costs within the planned limits, determine the number and qualification of personnel. The goals communicated to each employee, the strategies worked out and adopted in the enterprise make the personnel adapt their personal goals to the goals of the enterprise and their personal strategies to its strategies ('On the Health of the People and the Health Care System').

In accordance with Article 25, paragraph 5 of the Code of the Republic of Kazakhstan 'On the Health of the People and the Health Care System' ('On the Health of the People and the Health Care System'), the Ministry of Health of the Republic of Kazakhstan approved Order No. 25057 dated 5 November 2021 'On Approval of Standards for Accreditation of Medical Organisations', where in the measurable criteria '2.0-Management' of section 'A' the responsibilities of the management of the organisation include coordination and approval of the strategic and operational plans of the organisation, as well as the plan for quality assurance of medical services.

Under the influence of these trends and the recognition of the importance of finding systemic solutions to coordinate the activities of the entire diversity of actors in international relations regulating health protection issues, the concept of 'global health management' has gradually emerged in foreign scientific literature (Figure 1) [11].

The development of international legal regulation of health protection was influenced by the co-operation of states to develop effective approaches to counter the spread of infectious diseases. Population migration and the development of trade processes increased the rate of spread of infectious diseases in the European region. In particular, 6 major cholera outbreaks were registered in 1817-1923, which predetermined the main focus of international co-operation at this historical stage [12].

On the initiative of the French Government, the 1st International Sanitary Conference was organised in 1851 to develop measures to contain the spread of cholera worldwide from India. In total, 14 International Sanitation Conferences were held between 1851 and 1938, and some of them resulted in the adoption of International Sanitary Conventions, which became the first universal legal acts in the field of health protection [13].

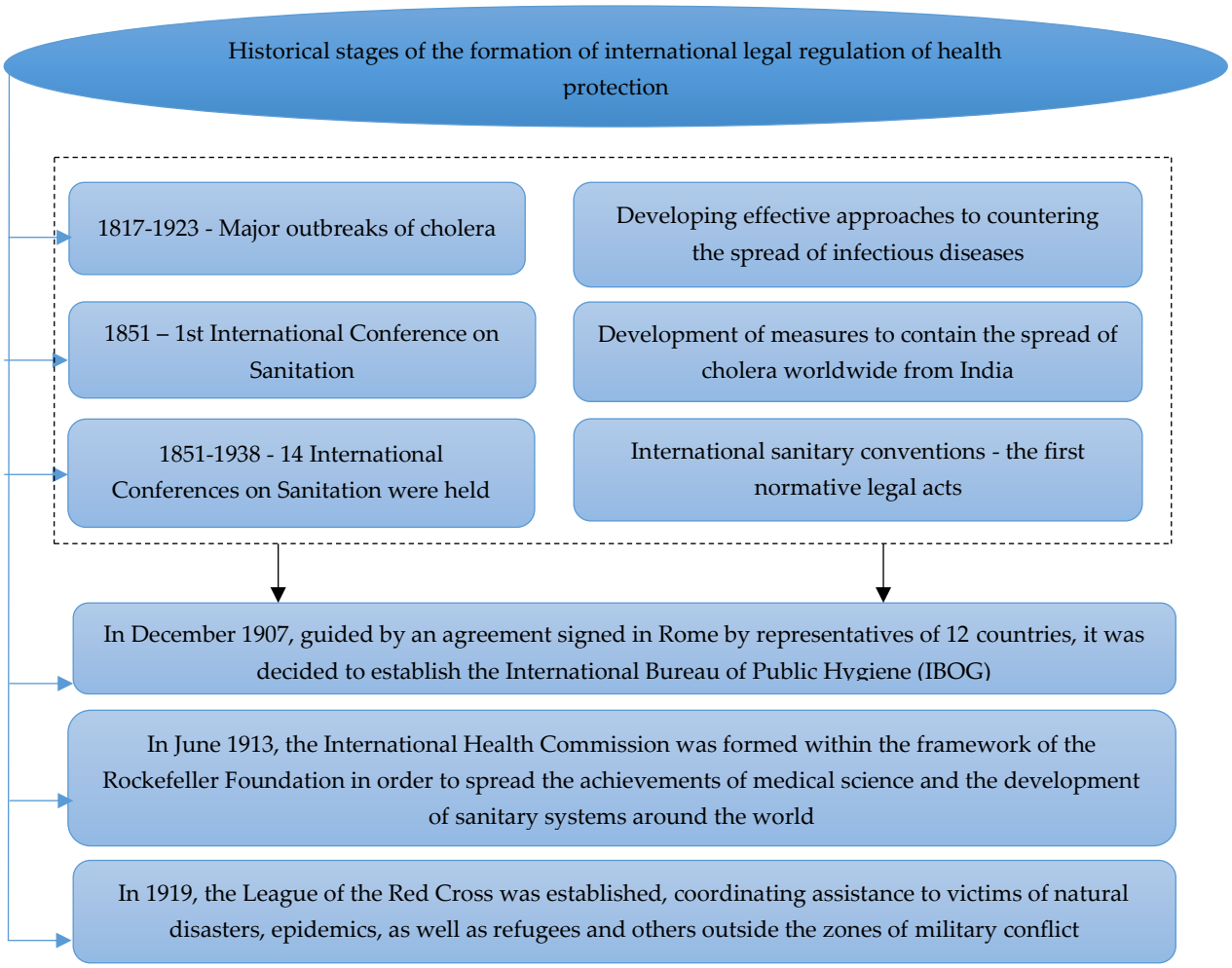


FIGURE 1. Development of international legal regulation of the health protection sphere.

It should be noted that the peculiarities of drafting international sanitary conventions demonstrated two important trends in the development of international legal regulation of health protection that have persisted to the present day. Firstly, the reliance on strong scientific evidence in developing normative responses to certain diseases. Second, the need to assess the extent of the regulatory impact on trade, as the imposition of quarantine measures or other restrictions may have adversely affected trade activities.

The need to ensure sustained dialogue on the development of international sanitary conventions, as well as the subsequent sustainable exchange of information on measures to counter the spread of diseases, has determined the expediency of forming a permanent international organization.

Paradoxically, increased access to health care and the benefits of scientific progress, which have made it possible to achieve a significant increase in life expectancy, have created a new challenge to the global health

system, manifested in a change in the demographic structure of the population. Population ageing is accompanied by an increase in the prevalence of chronic non-communicable diseases (oncology, diabetes mellitus, cardiovascular diseases), leading to disability of the population and an increase in the need for long-term use of various health care technologies (drugs, medical devices, etc.).

III.METHODS

The article uses the system of technical and economic indicators. Various methods of assessing the economic efficiency of the health care system development of productive forces are applied. Most often two types of economic and mathematical methods were used structural and optimisation methods. Statistical and comparative methods have also been used. The sphere of health care in the social system is complex and sophisticated. Therefore, comparative method is used to determine the level of health indicators in comparison with other health systems. The comparative method is a universal approach that allows adequate assessment of the situation. Nevertheless, the comparison of factors and elements makes it possible to make some suggestions that could improve the health care system. Many researchers have used the comparative method to describe the health system [14], others have compared national health systems using indicators related to economic growth, demography and epidemiology [15], and comparative methods have been used to visualise the situation after COVID-19. method. As already known, life expectancy can reflect and evaluate the health care system. Thus, we used the correlation method. Correlation economic and mathematical method of determining the dependence between factors [16]. Many studies have used a similar method to determine the effectiveness of health indicators [17]. Thus, we decided to practice the correlation method to determine the relationship between the factors. We used statistical databases from the official websites of the Ministry of National Economy of the Republic of Kazakhstan, the Committee on Statistics and JSC 'Entrepreneurship Development Fund "Damu" for 2023. This study employs a quantitative research design, utilizing a combination of statistical, comparative, and economic-mathematical methods to analyze the development and efficiency of the healthcare system. This choice is grounded in the nature of the research objectives, which require systematic measurement and evaluation of healthcare indicators, economic efficiency, and interrelationships between factors influencing the healthcare system.

The comparative method is applied to benchmark health indicators against other systems, offering a universal approach to assess the level and quality of healthcare services. This method is particularly effective in identifying areas for improvement and drawing actionable insights based on comparisons with other national and international health systems.

The correlation method is used to analyze the relationships between key factors affecting healthcare outcomes, such as economic investments, demographic variables, and life expectancy. This method provides a robust framework for identifying dependencies and evaluating the effectiveness of health indicators in reflecting the overall system performance.

Data for the analysis is drawn from reliable statistical databases, including official sources from the Ministry of National Economy of the Republic of Kazakhstan, the Committee on Statistics, and the Entrepreneurship Development Fund "Damu," ensuring the validity and relevance of the findings. The quantitative design is justified by its ability to provide precise, data-driven insights into the healthcare system, enabling evidence-based recommendations for enhancing accessibility, quality, and sustainability.

IV.FINDINGS

The representativeness of the sample is ensured by selecting regions based on their demographic and health-related characteristics, providing a comprehensive and unbiased view of Kazakhstan's healthcare system. The regions were chosen to reflect significant variations in birth rates, mortality rates, and the causes of death, allowing for an inclusive analysis of health disparities and challenges across the country.

1. High-Birth-Rate Regions: Mangistau, Turkestan oblasts, and Shymkent city were selected due to their high birth rates, which are indicative of regions with potential resource demands in maternal and child healthcare. These areas provide insights into the effectiveness of perinatal and maternal care services.
2. High-Mortality-Rate Regions: North Kazakhstan, East Kazakhstan, and Kostanay regions were included because of their high mortality rates, largely influenced by the age structure of the population. These regions help identify age-related healthcare needs and assess the burden of chronic diseases.

The selection of these regions ensures a balanced representation of urban and rural areas, diverse demographic structures, and varying socio-economic conditions. This approach allows for an in-depth analysis of regional disparities and facilitates the development of targeted policy recommendations to address healthcare inequities and improve overall system performance.

Who defines public health as 'the science and art of preventing disease, prolonging life and promoting both physical and mental health' (Health Systems: Health, wealth and societal well-being [18]. One of the key global indicators reflecting progress in improving population health is life expectancy at birth [19]. In order to analyse and assess the health level of the population, a chart has been developed with key indicators which include total fertility rate, total mortality rate, infant mortality rate, maternal mortality rate and under-five mortality rate. It is important to note that the number of births was 403.9 thousand people; the number of deaths was 133.5 thousand people; the natural population growth was 270.4 thousand people (Developed by the author from sources of Bureau of national statistics of the ASPR RK).

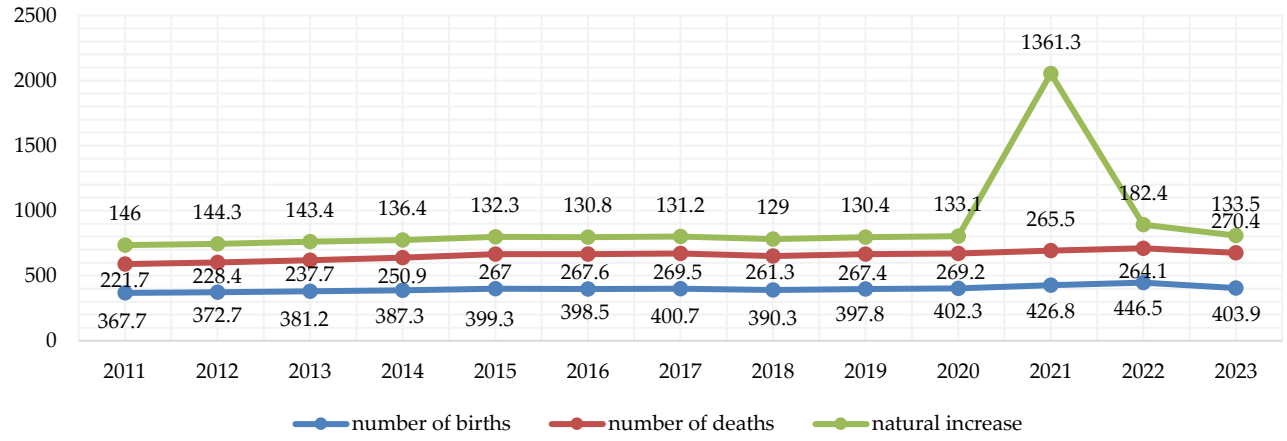


FIGURE 2. Demographic coefficients of natural population movement, per 1000 people.

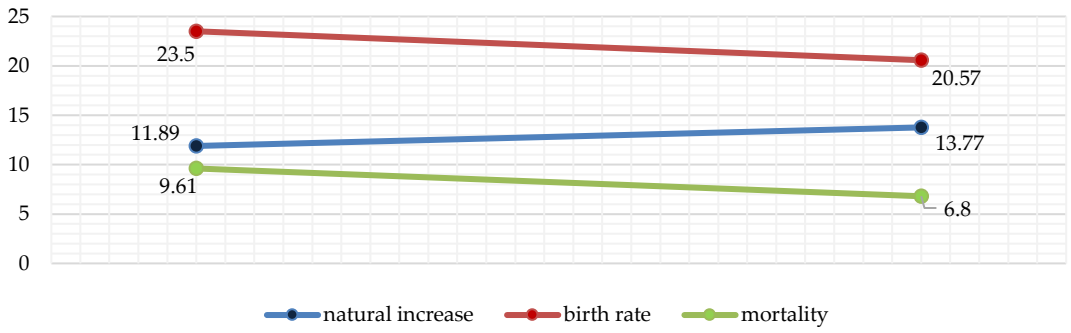


FIGURE 3. General coefficients of natural population movement, per 1000 people.

The highest birth rates are observed in Mangistau (28.53 per 1,000 population), Turkestan (27.67) oblasts and Shymkent city (27.13). The main share of births is accounted for by women aged 30-34 years and accounts for 28, 6 per cent, and 28, 1 per cent for women aged 25-29 years.

The highest mortality rates were observed in North Kazakhstan (11.63 per 1,000 population), East Kazakhstan (11.58) and Kostanay regions (10.65), which is associated with the age structure of the population of these regions.

The main causes of death are diseases of the circulatory system - 22.7 per cent, neoplasms - 10.4 per cent, respiratory diseases - 9.8 per cent, accidents, poisoning and injuries - 8.4 per cent and diseases of the digestive organs - 8.0 per cent. The number of children under 5 years of age who died in 2022 was 3,989, with a child mortality rate of 9.88 per 1,000 births. The number of deaths under 1 year of age was 3,154 infants, the infant mortality rate was 7.68 per 1,000 live births.

By 2030, the goal is to end preventable infant and under-five mortality by ensuring that neonatal mortality does not exceed 12.16 deaths per 1,000 live births and under-five mortality does not exceed 26 deaths per 1,000.

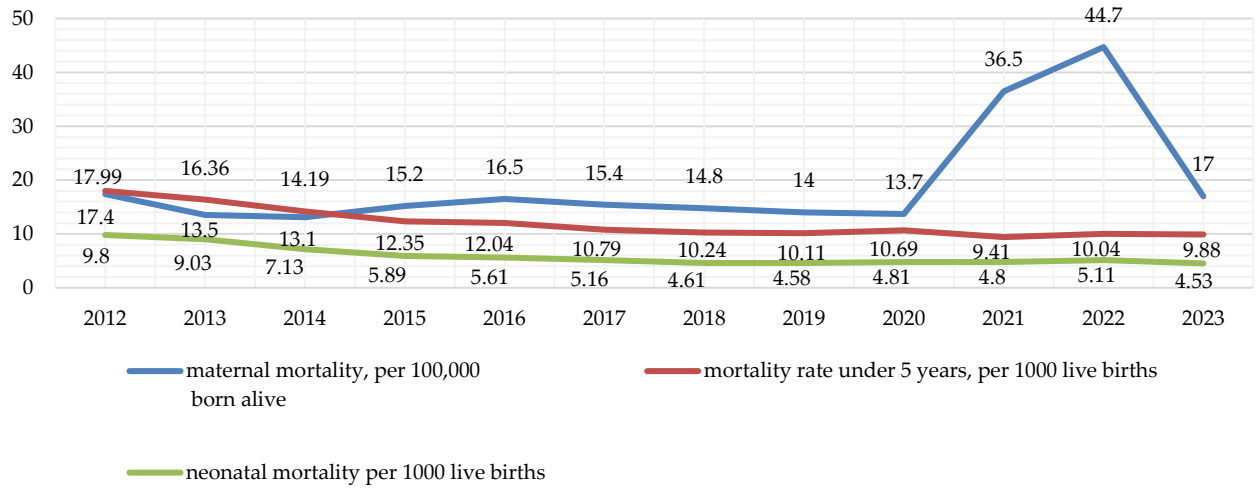


FIGURE 4. Maternal and child mortality in Kazakhstan.

On 26 September 2018, the UN held the first historic high-level meeting on tuberculosis, where world leaders discussed the tuberculosis epidemic and possible ways to end it. The meeting followed WHO's first global ministerial conference on tuberculosis, leading to new actions agreed under the Sustainable Development Goals (SDGs) and the WHO strategy, and commitments from all UN members. Target 3 of the SDGs aims to end the tuberculosis epidemic completely by 2030.

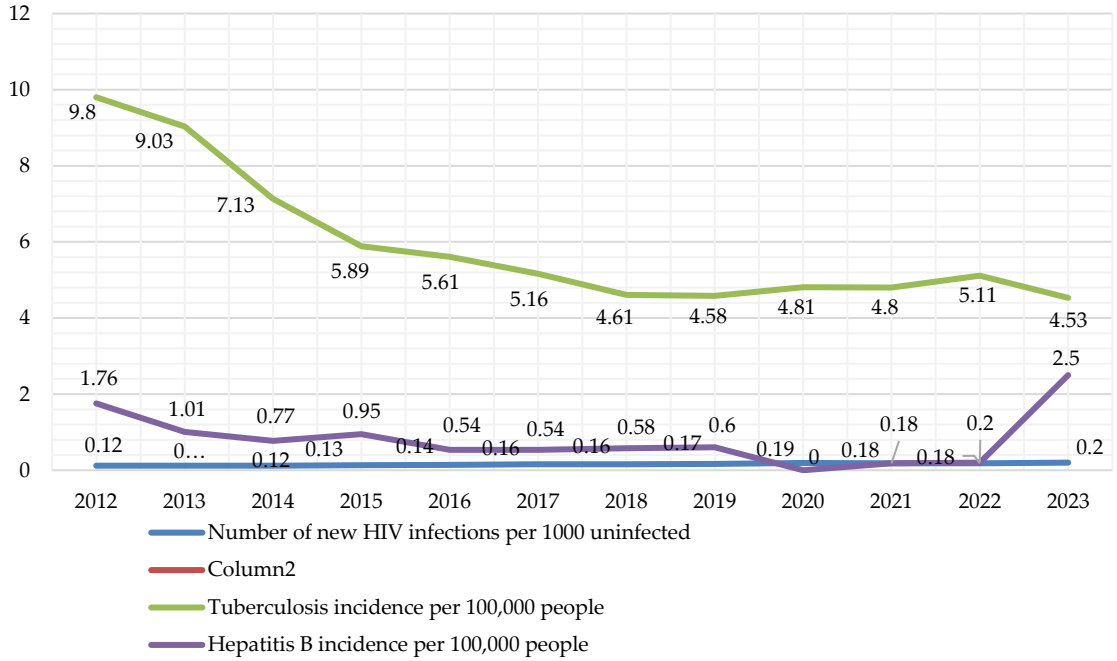


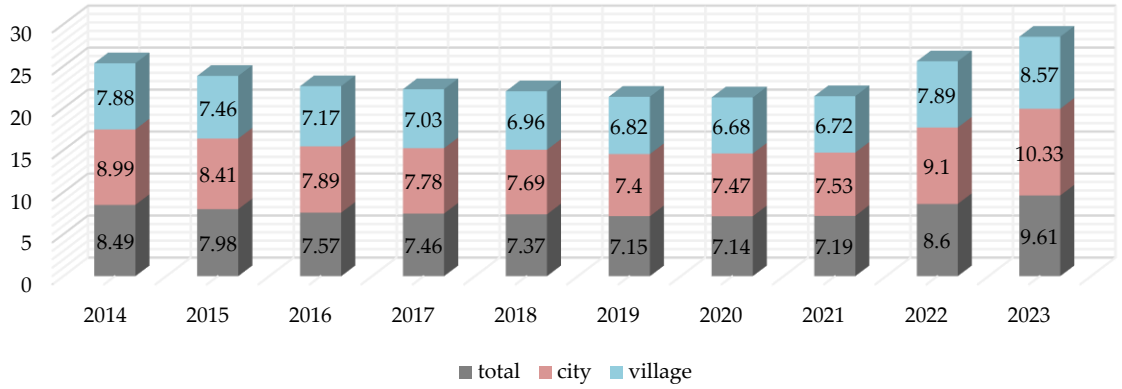
FIGURE 5. Data on AIDS, tuberculosis, hepatitis cases in Kazakhstan.

The interim targets for 2025-2030 include targets to reduce TB mortality by 90% and incidence by 80%. The strategy also takes into account the guarantee that by 2027, TB patients and their families will not suffer catastrophic financial losses due to the disease [20]. In parallel, actions are being taken to reduce morbidity and

mortality from tuberculosis, hepatitis B, cancer, diabetes, cardiovascular disease, chronic respiratory disease, mental disorders and suicide.

To analyse mortality rates in detail, a chart showing data on various diseases was constructed. Monitoring the health status of the population provides valuable information for improving the health care system and optimising its processes, as well as helping to identify inefficiencies and weaknesses in the international health care system. The question logically arises about the possible economic effect if it were possible to significantly reduce morbidity and premature mortality, especially from injuries among the adult population. Based on the analysis of the data, we can draw a clear conclusion: the introduction of an effective programme to improve the health of the population in Kazakhstan would contribute to accelerated economic growth at the macroeconomic level. This remains relevant despite the fact that existing methods of economic evaluation mainly take into account only the effect of reducing mortality rates, leaving aside the potential for possible reductions in morbidity.

FIGURE 6. Standardised mortality rates from 2014 to 2023 for Kazakhstan, per 1,000 people.



The highest mortality rate in Kazakhstan is from circulatory diseases: according to the Ministry of Health of the RK, the highest mortality rates from circulatory diseases are observed in Karaganda region (314.27 deaths per 100 thousand population), Akmola region (259.14), Pavlodar region (221.58), West-Kazakhstan region (220.27), North-Kazakhstan region (217.49). In our country, the mortality rate from diseases of the circulatory system per 100 thousand people has decreased by 20.3% over the past three years. There is a stable decrease in the mortality rate from respiratory diseases, which at the end of 2023 compared to 2021 decreased by 45.6% to 66.8% per 100 thousand people (2021 - 122.9). In 2020, the growth of mortality from respiratory diseases was high due to the increase in morbidity and mortality of the population from coronavirus infection.

In Kazakhstan since the beginning of the year mortality from coronary heart disease decreased by 12%, acute myocardial infarction - by 5%, angina - by 10%, strokes - by 13.5%, while in comparison with the same period last year the number of open-heart surgeries increased by 7.1% in the country. Next in the ranking of mortality were respiratory diseases, which decreased in 2023 by 1.7 times, which amounted to 13,249 Kazakhstanis compared to 2022. This includes dozens of different diseases, in addition to pneumonia and tuberculosis. In third place is cancer. In 2023, this terrible disease claimed the lives of 12,920 people. As of the end of 2023, a total of 218,213 cancer patients (2022 - 205,822 patients) are under dynamic follow-up, an increase of 5.7%. Women (56.9 %, 23,613 cases) fell ill more often than men (43.1 %, 17,902 cases), which is explained by the morbidity structure of malignant neoplasms (MN). Among those who fell ill, 55.6 per cent were persons of working age between 18 and 64 years of age. In terms of morbidity: Breast cancer ranked first (13.3 per cent, 5,507 cases), colorectal cancer second (9.5 per cent, 3,939 cases), lung cancer third (9.3 per cent, 3,872 cases), stomach cancer fourth (6.9 per cent, 2,874 cases) and cervical cancer fifth (4.9 per cent, 2,035 cases). Note that in 2023, lung cancer swapped places with colorectal cancer in terms of incidence and dropped to 3rd place. In 2023, 41,515 new cases were detected. In terms of mortality: lung cancer ranks first (15.7%, 2,034 cases), stomach cancer ranks second (11.9%, 1,536 cases), colorectal cancer ranks third (10.8%, 1,389 cases), breast cancer ranks fourth (8.2%, 1,054 cases), and pancreatic cancer ranks fifth (6.2%, 805 cases).

Many deaths are also due to accidents: injuries or poisoning. In 2003, 2,670 accidents were registered. The main types of injuries in accidents were closed fractures (611 persons), superficial injuries (507 persons), injuries from concussion and injuries to internal organs (276 persons), open fractures (138 persons), and thermal burns (102 persons). Of the total number of injured persons, women accounted for 18.2 per cent (Table 2).

Table 2. Number of victims of labour-related accidents, including fatalities.

	Number of casualties with loss of working capacity for 1 working day or more, including fatalities		
	2021	2022	2023
Total	2 133	2 446	2 670
Large and medium-sized enterprises	1 726	2 084	2 244
Small enterprises	407	365	426

The highest rate of traumatism remains in Karaganda region. In 2023, 496 cases were recorded in the above region, which is 18.6% of the total number of cases. The second place is occupied by Ұlytau region, where 408 people were injured at work (15.3% of the total number of cases).

The top five dangerous diseases are common flu, acute respiratory viral infections and pneumonia: 3-4 million cases of acute respiratory viral infections and up to 2,000 cases of influenza are registered in the country every year. Influenza viruses of type A/ H1N1pdm09, H3N2 and influenza virus B are expected to circulate, which are included in the strain composition of influenza vaccines. In September this year, 544,368 cases of acute respiratory viral infections were registered, there is a 27% decrease compared to the same period last year (September 2023 746,598 cases). But overall, from 2017 to 2023, the rates have decreased, indicating an effective health care system. For sustainable economic and social development as well as human well-being, improving health is essential. To achieve these goals, many countries have taken action and continue to provide universal health coverage. The study primarily relies on *archival data* from official statistical databases and employs quantitative forecasting techniques to analyze trends in healthcare expenditures. The following tools and instruments were utilized for data collection and analysis: *Archival Data:* Data on healthcare expenditures, including per capita expenditures, current healthcare spending, and government investments, were sourced from official records such as the Ministry of National Economy of the Republic of Kazakhstan and the Committee on Statistics. These datasets are considered reliable and authoritative, providing a robust foundation for analysis. *Excel Statistical Functions:* The *'LINEST' function* in Microsoft Excel was employed to perform regression analysis using time series data from 2014 to 2023. The coefficients a0a_0a0 (intercept) and a1a_1a1 (slope) were calculated to model and forecast trends in current healthcare expenditures. *Time Series Forecasting:* Using linear regression models, the study projected future healthcare expenditures for 2025, 2026, and 2027. This method allows for the estimation of trends based on historical data, ensuring a data-driven approach to forecasting. *Table and Chart Analysis:* Data were organized into tables (e.g., Table 3 and Table 4) and visualized using graphs (e.g., Figure 6) to illustrate expenditure trends and support analytical insights. The validity of the analysis stems from the accuracy and comprehensiveness of the archival data and the use of well-established statistical methods. The reliance on official datasets minimizes bias, while the application of quantitative tools ensures objective and reproducible results. This approach enables the study to provide credible projections and actionable insights into healthcare expenditure trends.

V. DISCUSSION

The most important area of any programme to reform the health care system is to address the issue of financing. In order to improve the provision of medical care services in the Republic of Kazakhstan, a budget-insurance model of health care has been introduced. The budget-insurance model is most common in such countries as Germany, the Netherlands, Poland, France, Russia and others. According to some experts, the new model of health care financing will influence the quality and accessibility of medical care, reduce morbidity and mortality, and increase life expectancy of the population [20]. Other experts question the effectiveness of the OSMS, as at present the OSMS is often subjected to justified criticism from the population, experts and other stakeholders. As it is given at the dynamics of health expenditure in 2018-2023 (Table 3).

Table 3. Structure of health expenditure from 2018 – 2023.

Indicators	2018	2019	2020	2021	2022	2023
GDP	54 379	61 820	69 533	70 714	81 269	103 766
ARI per capita in tenge	97 366	102 592	110 372	149 840	170 962	204 789
ODS per capita in USD	299	298	288	356	401	444,73
TRZ per capita in tenge	91 696	96 088	104 134	141 786	162 838	196,128
TRZ per capita in USD	281	279	272	337	382	425,92

An analysis of the structure of health expenditure by funding schemes shows that in 2022, the public sector has the highest share of expenditure at 62 per cent. As shown in Table 3 there is a high share of private expenditure in the current expenditure structure in 2018 - 37.7 per cent, 2019 - 38.4 per cent, 2020 - 40 per cent, 2021 - 33.8 per cent, 2022 - 35.4 per cent,2023-38 per cent.

Table 4. Structure of health expenditures from 2017-2022 (billion tenge).

Indicators	2018	2019	2020	2021	2022	2023	Changes, %
GDP	54 379	61 820	69 533	70 714	81 269	103 766	90,8
Total health care expenditure	1 768	1 887	2 056	2 830	3 269	4 042,8	128,6
Current expenditure on health care	1 665	1 768	1 940	2 678	3 114	3 871,8	132,5
Capital expenditure on health care	103	120	116	152	155	170,9	65,9
Public expenditure	1 033	1 087	1 163	1 771	2 012	2 389,0	131,3
including SGBMP				1 127	1 212	1553	-
including OSMS				424	539	836	-
Private expenditure	627	680	776	906	1 102	1466	133,8
VHI + enterprises	77	96	120	170	277	268	248,1
Direct payments	550	583	656	736	825	1198	117,8
Donor expenditure	5,3	1,0	0,5	0,9	3,0	16,8	217

Based on the data in Table 4, we see that there is an increase in per capita expenditure on health care. In 2023, total per capita expenditures amounted to 204.8 thousand tenge, which is 107 thousand tenge more than in 2018. Per capita current expenditures on health care in 2023 amounted to 196 thousand tenge [21].

Using the statistical function 'linear' in Excel and time series data based on the first five points, we estimated the coefficients a0=1212.388 and a1=93.176 corresponding to time t=0. These coefficients allow us to predict the values of current health expenditure.

According to Table 3, in 2023, the volume of total health care expenditure totalled 4,042.8 billion tenge, an increase of 128.6 % compared to 2018. Current healthcare expenditure in Kazakhstan totalled 3,871.8 billion tenge, an increase of 132.5 % compared to 2018. Government spending on healthcare in 2023 totalled 2,389.0 billion tenge, an increase of 131.3 % compared to 2017 [22].

To project the trend in current health care spending through the end of 2027, we built a model using data from 2014 to 2023 (Figure 6). The forecast values of health care expenditures were 3355.70 in 2025, 3557.09 in 2026 and 3758.48 billion tenge in 2027. The results of the forecast show that in the medium term the current expenditures on health care will have a slight upward trend.

VI. CONCLUSIONS AND RECOMMENDATIONS

The results of the study reveal the country's health indicators. According to the statistics, the health care system as a whole is improving at a slow pace from 2017 to 2023. Healthcare funding is stable, but 3-4 times less than in developed countries. Therefore, a correlation analysis was done. Thus, while digital literacy is increasing, life expectancy is also increasing. This suggests the need to use digital tools in the healthcare system. In addition, we noticed a negative relationship between variables such as life expectancy, number of hospital beds and organisation, this suggests that our health system needs prevention. Health promotion and disease prevention

play an important role in improving the standard of living. Thus, our system must prevent illness and injury by implementing digital tools and utilising the digital literacy of the population.

Financial provision of health care is characterised by a variety of sources of financing: budgetary funds, contributions from the compulsory social health insurance fund, private expenditures and other sources of financing. Among the sources of financing, the largest share - 64.7 per cent - is accounted for by public expenditures. However, despite the annual growth of public expenditures on health care, the share of current expenditures on health care in 2023 was only 3.8% of GDP, the same indicator in OECD countries was 9.3%. Limited budgetary allocations for health care can pose challenges in ensuring sufficient resources for the effective functioning of the system.

It should be noted that the system of compulsory social health insurance has not been properly developed in Kazakhstan, as it only performs the functions of redistribution of contributions collected by the compulsory social health insurance fund, and does not contain actuarial calculations typical for health insurance.

There are problems with the efficient use of financial resources in health care. Lack of coordination, excessive bureaucracy and sub-optimal management can lead to inappropriate use of funds. Inefficient planning of public funds is a consequence of poor health management at all levels, which leads to related problems in health care, such as staffing, material support, etc.

All of the above points to the need to improve the health care financing system: firstly, it is necessary to introduce effective mechanisms to manage health expenditures and ensure transparency in the distribution of these funds among all stakeholders; secondly, it is necessary to develop and implement an effective system of healthcare resource management, including more accurate planning of equipment and drug procurement, payment and tariff setting within a unified information platform; thirdly, there is a need to strengthen monitoring and control of health expenditures to identify and eliminate inefficiencies; fourth, a mechanism should be developed to modernise the compulsory social health insurance system, aimed at improving the quality and accessibility of medical care for the population; fifth, mechanisms should be strengthened to ensure accountability of state bodies for the results of the health care system.

It should be noted that these measures require concerted action by all stakeholders, including the state, medical institutions, public organisations and citizens. A combined approach focused on improving the efficiency and accessibility of health services can lead to a more sustainable health financing system.

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Author contribution

All authors made an equal contribution to the development and planning of the study.

Conflict of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Data are available from the authors upon request.

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REFERENCES

1. Mikhalkina, E. V. (**2014**). *Human resource management: Research methods*. Rostov-on-Don: Southern Federal University Publ.
2. Faoil, A. (**1923**). *General industrial administration* (B. V. Babin-Korn, Trans.).
3. Voronkov, A. N., & Kolosova, T. V. (**2013**). *Dictionary of management* (125 p.). Nizhny Novgorod State Architectural Construction University. ISBN 978-58794178.
4. Rumyantseva, Z. P., Salomatin, N. A., Akberdin, R. Z., et al. (**1995**). *Organisation management* (432 p.). INFRA-M. ISBN 5-86225-136-7 V5.
5. Luchkevich, V. S. (**1997**). *Fundamentals of social medicine and health care management: Textbook*.
6. Bakhtina, I. S., Boyko, A. T., Ovsyanikov, E. M., & Sarkisova, V. A. (**2002**). *Nursing: Management and leadership*. SPb.
7. Alekseeva, V. M. (**2002**). *Fundamentals of medical management*. Chief nurse, 4-5-6.

8. Panchenko, D. V., Turgambayeva, A. K., & Khismetova, Z. A. (**2022**). Kazakhstan model of healthcare financing through public health principle: Experience and prospects. *Наука и здравоохранение, 24*(1), 79-89.
9. Minister of Health of the Republic of Kazakhstan. (**2021**). On approval of standards for accreditation of medical organisations (Order No. KR DSM - 111). Registered with the Ministry of Justice of the Republic of Kazakhstan on November 9, 2021, No. 25057.
10. Fidler, D. (**2007**). *Architecture amidst anarchy: Global health's quest for governance*. *Global Health Governance, 1* (2007).
11. Bloom, D. E., Cafiero, E., Jané-Llopis, E., Abrahams-Gessel, S., Bloom, L. R., Fathima, S., ... & Weiss, J. (**2012**). *The global economic burden of noncommunicable diseases* (No. 8712). Program on the Global Demography of Aging.
12. Mukhamedkhanova, A., Seidakhmetov, M., Tulemetova, A., & Nursoy, M. (**2024**). Innovation enterprise development strategy in animal husbandry.
13. Mamrayeva, D. G., Toxambayeva, A. B., Mamrayeva, G. B., & Rodina, L. A. (**2020**). Theoretical aspects of studying the innovations commercialization process. *Bulletin of the Karaganda University Economy series, 100*(4), 79-92.
14. Akhmetova, G. T., Dzhumabekova, A. T., & Zhambylova, G. Z. H. (**2019**). Features of innovations in agriculture of RK. *Series of Social and Human Sciences, 2*(324).
15. Sayakbayeva, A. A., & Ashimbayev, T. A. (**2019**). The experience of introducing innovations in the financial market of Russia and Kazakhstan. *Proceedings of the Issyk-Kul Forum of Accountants and Auditors of Central Asian Countries, 1*(24), 171–180.
16. Maksat, Y., & Ainur, M. (**2023**). The role of innovation in sustainable development and improving the competitiveness of business structures in Kazakhstan. *Rivista di studi sulla sostenibilità, XIII*(1), 139-151.
17. Glukhov, V., Schepinin, V., Luebeck, Y., Babkin, I., & Karimov, D. (**2023**). Assessment of the impact of services and digitalization level on the infrastructure development in oil and gas regions. *International Journal of Technology, 14*(8).
18. Farley, J. (**2004**). *To cast out disease: A history of the International Health Division of Rockefeller Foundation (1913-1951)*. Oxford University Press.
19. Bakhtiari, E., Olafsdottir, S., & Beckfield, J. (**2018**). Institutions, incorporation, and inequality: The case of minority health inequalities in Europe. *Journal of Health and Social Behavior, 59*(2), 248-267.
20. Mechanic, D., & Rochefort, D. A. (**1992**). A policy of inclusion for the mentally ill. *Health Affairs, 11*(1), 128-150.
21. McDaid, D. (**2012**). *Health systems, health, wealth and societal well-being: Assessing the case for investing in health systems*.
22. International Consortium for Health Outcomes Measurement (ICHOM). (**2019**). Standard sets. Retrieved June 14, 2021, from https://www.ichom.org/standard-sets/