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## Measuring Main Public Health Indicators of the Republic of Kazakhstan

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### Abstract

The article analyzes the level of health indicators to predict the state of this social system and create a certain vision. The list includes coefficients reflecting the general socio-economic situation of the population: the total number of births, deaths, maternal mortality, and mortality of children under five years of age. For a more detailed study of the situation in the health sector, the amount of funds allocated for this direction was also determined. Such ratios reflect the social and economic well-being of the population. Another key indicator of health is the dynamics of mortality from diseases. According to this indicator, the highest mortality in Kazakhstan is observed from diseases of the circulatory system, but nevertheless, the incidence has decreased, reflecting the effectiveness of the health care system. One of the main goals of the article is a correlation analysis of factors influencing the life expectancy of the population of the Republic of Kazakhstan. Correlation analysis revealed positive and negative factors. While digital literacy and health spending are positively correlated with population life expectancy, the number of hospital organizations and the number of hospital beds showed a negative relationship. This study showed that the level of digital literacy of the population has a significant impact on life expectancy and lifestyle. This is evidenced by the fact that in the case of the COVID-19 pandemic, many countries have used digital tools to isolate people from each other for safety reasons, thus influencing the overall lifestyle. Today, developed countries are rapidly digitizing the healthcare sector.

*Keywords:* health care system, mortality dynamics, sustainable development, types of diseases, life expectancy, digital literacy.

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## Қазақстан Республикасының денсаулық сақтау саласының негізгі көрсеткіштерін өлшеу

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### Түйін

Мақалада осы әлеуметтік жүйенің жай-күйін болжауға және белгілі бір бейне құру мақсатында денсаулық сақтау саласының коэффициенттер тізімі құрылып олардың деңгейі зерттелді. Бұл тізімге халықтың жалпы әлеуметтік-экономикалық жағдайын көрсететін: жалпы туу, өлім-жітім, ана өлімі және бес жасқа дейінгі балалар өлімі сияқты коэффициенттер енгізілді. Денсаулық сақтау саласының жағдаятына толығырақ зерттеу үшін бұл салаға қатысты бөлінетін қаражат мөлшері де анықталды. Осындай коэффициенттер халықтың әлеуметтік-экономикалық әл-ауқатын баяндайды. Тағы да басты денсаулық саласының көрсеткіші- халықтың аурулар бойынша өлім динамикасы қарастырылды. Бұл көрсеткіш бойынша Қазақстанда өлім - жітімнің ең жоғарғы деңгейі қан айналым жүйесі ауруларынан байқалады, дегенмен денсаулық сақтау жүйесінің жұмысының тиімділігін көрсететін аурушандық тенденциясы төмендеді. Мақаланың негізгі мақсатының бірі Қазақстан Республикасының халқының өмір сүру ұзақтығына өзара әсер ететін факторлар арасында корреляциялық талдау болып табылады. Корреляциялық талдау барысында оң және теріс әсер ететін факторлар анықталды. Халықтың өмір сүру ұзақтығына оның цифрлік сауаттылық деңгейі мен денсаулық сақтауға бөлінетін шығындар көлемі оң және қатты байланыста болса, аурухана ұйымдар саны мен аурухана төсектер саны кері байланысты көрсетті. Бұл зерттеуде халықтың цифрлік сауаттылық деңгейі адамның өмір сүру ұзақтығына, өмір сүру салтына үлкен әсер ететіндігі айқындалды. Бұның бір дәлелі пандемиялық COVID-19 жағдайында көптеген елдер денсаулық сақтау жүйесінде адамдарды бір-бірінен оқшауландыру мақсатында цифрлік құралдарды қолданды. Қазіргі таңда дамыған елдер денсаулық саласын қарқынды түрде цифрландыруда.

*Түйін сөздер:* денсаулық сақтау жүйесі, өлім динамикасы, тұрақты дам, ауру түрлері, халықтың өмір сүру ұзақтығы, халықтың цифрлік сауаттылық деңгейі.

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## Измерение основных показателей здоровья населения Республики Казахстан

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### Аннотация

В статье анализируется уровень показателей здоровья с целью прогнозирования состояния данной социальной системы и создания определенного видения. В список включены коэффициенты, отражающие общее социально-экономическое положение населения: общее количество рождений, смертей, материнской смертности и смертности детей в возрасте до пяти лет. Для более детального изучения ситуации в сфере здравоохранения также был определен объем средств, выделяемых на это направление. Такие соотношения отражают социально-экономическое благополучие населения. Еще один ключевой показатель здоровья - динамика смертности от болезней. По данному показателю самая высокая смертность в Казахстане наблюдается от болезней системы кровообращения, но тем не менее снизилась заболеваемость, отражающая эффективность системы здравоохранения. Одна из основных целей статьи - корреляционный анализ факторов, влияющих на продолжительность жизни населения Республики Казахстан. Корреляционный анализ выявил положительные и отрицательные факторы. В то время как уровень цифровой грамотности и расходы на здравоохранение взаимосвязаны положительно с ожидаемой продолжительностью жизни населения, количество больничных организаций и количество больничных коек показали отрицательную взаимосвязь. Это исследование показало, что уровень цифровой грамотности населения оказывает значительное влияние на продолжительность и образ жизни. Об этом свидетельствует тот факт, что в случае пандемии COVID-19 многие страны использовали цифровые инструменты в изолировании людей друг от друга в целях безопасности, таким образом повлияли на образ жизни в целом. Сегодня развитые страны стремительно цифровизируют сектор здравоохранения.

*Ключевые слова:* система здравоохранения, динамика смертности, устойчивое развитие, виды заболеваний, продолжительность жизни, цифровая грамотность.

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### Introduction

The indicators are a measure used to consider the situation and behaviour of a part or a whole system. Indicators are used to perform management of public health [1].

The most essential indicator of the socio-economic well-being of a country is its health of population. Today, strengthening the health of the population is not only a medical task, but also a social task which requires the integration of fundamental knowledge and interdisciplinary research. Health of population is a multidimensional process (social, demographic, and medical) mirroring “the mental, physical and socio-economic well-being of people who implement their life in society.” Health is the most essential aspect of human being, labor potential and human capital.

Health as a socio - economic category manifests itself in the following aspects:

- Public health, like the health of every citizen, is a strategic goal of the state and people, a condition for the national security of the country.
- Health is an economic resource of society and the main condition for the reproduction of labor potential.
- Health by a significant use of economic resources and funds.
- Health is the most representative indicator of the level, way, quality of life of people [2].

A Joint Expert Meeting regarded indicators for health and well-being for Health 2020 was organized by WHO Regional Office for Europe to discuss and provide guidance on measuring indicators and indicators in the health system. Where participants looked at the definition of well-being and core health indicators [3]. For today, Covid - 19 revealed and discovered existed problems of health care system. Coronavirus infection (COVID-19) tested the strength of the NHS many countries, their resilience, the degree of preparedness to overcome and the speed of response to emergencies. The dynamic spread of COVID-19 underlines the need to strengthen the health workforce as an important part of any sustainable health system [4].

The aim of the finding is to identify the general state of the national healthcare system using indicators and consider the most influencing factors on the LE of the population of the Republic of Kazakhstan.

In the WHO health is defined as a statement of whole physical, mental and social well-being and also the non-existence of diseases and physical defects. Public health is a key indicator of the functioning and operating of the health system. The relationship between the economic growth of a country and the health of the population is complex because it is acted by the medical and

economic sciences. Today, public health plays a huge role in shaping the socio-economic potential of the country [5]. Improving the health of the population brings to the economic growth of the country by increasing their working capacity, raising the retirement age, thus requiring for the economic losses of the state. Improving it plays a huge role in increasing human capital by extending the workforce's working capacity. To improve the working capacity of the population, there are different models of health care organization, one of them is the basic state model of Beveridge, where the state decides on the management of the system, the Bismarck market model, which is based on health insurance. In any case, any model is targeting for improving the health and increasing LE (life expectancy). There is the Preston Curve examines the relationship between LE and gross domestic product. Preston of the 1900s, 1930s and 1960s studied the relationship between factors and found that they are the same every ten years [6]. The Preston Curve shows a clear but gradual trend towards an increase in life expectancy with increasing GDP. WHO experts have identified a trend where an increase in life expectancy and an improvement the quality of life of the community leading to the development of the economy and growing in the national product. Longevity and health play a huge role in human development, namely the increase in human capital, as well as a consequence of economic growth, the development of social and mental responsibility. Health is the main value of humanity [7].

### Literature review

World Health Organization is a specialized agency that is responsible for international public health. In 1947 was developed a document, where health considers as a complex statement. The WHO concept considers the definition of healthcare indicators and their efficiency. So, the indicators are a measure used to consider the situation and behaviour of a part or a whole system. Indicators are used to perform management of public health. Also, we need to clarify the definition of word “measure”. It refers to discover ascertain amount, value, degree or size. Measuring health variables was regarded by Morgenstern and he generated in these ways: 10.

1. Through direct individual monitoring;
2. By monitoring of groups of population or local-based groups.

Health Indicators Conceptual and operational considerations. Collection and utilization of core health data. Washington, D.C.: PAHO [8]

Public health is extremely complex and multidimensional. The numerous signs and phenomena with which it is presented before

our eyes interfere with the perception of it as an independent concept. Also, it is necessary to systematically build a comprehensive picture of public health by overcoming fragmentation of ideas about it. Experts and statisticians have assessed that health status affects economic growth through health indicators like life expectancy. Bloom (2004) says that life expectancy has a positive effect on the economy and is statically important. Also other economists like Pascal (2005) report that this indicator is not a positive indicator in health care. Also, there are negative indicators such as mortality, maternal mortality. B.A. Raisberg considered mortality as the termination of individual lives, also a negative indicator of economic growth [9].

Also, there is scientists as Deshpande, Natasha Kumar, Anoosha Ramaswami and Rohini, who considered correlation between life expectancy and healthcare expenditure. They examined the relationship and demonstrated a strong dependance between those indicators. There is other kind of researchers, like Heijink, Koolman and Westert analyzed a negative relationship between avoidable mortality and healthcare spendings [10].

Regression analysis of Wim J.A. van den Heuvel and Marina Olaroiu MD showed that in states where spendings of GDP on social protection and have less number of beds and fewer infant mortality, also less drink alcohol they use to have longer life expectancy [11].

In some studies correlation was estimated between indicators as infant mortality rate and health assessments especially in underdeveloped countries and were performed by Anyanwu, Erhijakpor and in works of Gupta, Tiongson, Verhoeven comparing states with different levels of development. Also, M. Kolosnitsyna, T.Kossova and M.Sheluntsova analyzed health and growth factors that are influenced to the life expectancy. The findings show that life expectancy is influenced by various factors, as economic development, unhealthy lifestyle and it was considered that LE also depends from the the country's economic development and its cluster [12].

OECD also regarded relationship between income growth, income inequality changes and rising life expectancy and it said that for rising LE are influenced by factors as a quality of life, ecological situation, education and literacy [13].

The paper consisted of the reviews from electronic databases as a Medline, WHO PubMed and OECD statistics.

### Methodology

The article uses a system of technical and economic indicators. It applies various methods of economic efficiency of healthcare system

development of productive forces. Two types of economic-mathematical methods were most often used - structural and optimization. Also, statistical and comparative methods were used.

Healthcare sphere of social system is complex and sophisticated. In respect that, there is used comparative method to determine the level of healthcare indicators comparing with other healthcare systems. Comparative method is universal approach, which can adequately appreciate the situation. Nevertheless, comparing factors and elements brings to some suggestions that could improve the healthcare system. Many researchers used comparative method to describe healthcare system (J. Beckfield, S. Olafsdottir, and B. Sosnaud, 2018) and others compared national health systems using indicators related to economic growth, demography and epidemiology (D.Mechanic, D.Rochefort, 2013) and to visualize the situation after COVID-19 there were used comparative method (Lucie Lvque, M.Outas, Hantao Lui, Li Zhang, 2021).

As it was told before, life expectancy can reflect and assess the healthcare system. Thus, we used correlation method. Correlation economic-mathematical method to define the dependance between the factors. Many studies used this kind of method to know the efficiency of healthcare indicators (Sh. Srinivasan, F. Coffman, Kathkenn Kirk, 2016) and there are other findings that used correlation between healthcare availability, life expectancy, demographics and COVID-19 indicators (G.Wirawan and P.P.Januraga, 2021). So, we decided to practice correlation method to define the dependance between factors.

There were used statistical databases from the official websites of Ministry of National Economy of the Republic of Kazakhstan Statistics committee and Damu Entrepreneurship Development Fund JSC for 2018 year.

### Results and discussion

Public health, according to WHO, is “the science and art of disease prevention, life extension, mental and physical health promotion” [14].

The main, global indicator reflecting the success of actions in the framework of promoting and improving the health is traditionally considered to be the probable (expected) life expectancy from birth [15].

To determine and clarify the level of health of the population, a table was built with the main indicators such as the crude birth rate, the crude death rate, the infant mortality rate, the maternal mortality rate and the under-five mortality rate. It should be said that the crude death rate in 2020 increased by 19% differing to the previous year.

The total fertility rate is an indicator that

determines the intensity of childbearing in relation to the entire population. It is the ratio of summary number of live births during the year to the average annual population. Usually expressed as the number of births per 1000 population.

The crude birth rate is increasing while the crude death rate has declined until 2018, with an increase of 0.7% in 2019 and 3% in 2020. The infant mortality rate fell by 31% from 2013 to 2020, while the under-five mortality rate increased by 45%.

**Table 1** - General health care ratios

	2013	2014	2015	2016	2017	2018	2019	2020
Total birth rate (per 1000 people)	22,75	23,15	22,73	22,54	21,65	21,76	21,75	22,4
Fatality rate (per 1000 people)	8,01	7,64	7,43	7,38	7,16	7,15	7,2	8,6
Maternal mortality rate (per 100,000 births)	13,2	15,71	15,81	15,72	14,81	13,92	13,43	-
Infant mortality rate (per 1000 births)	11,4	9,83	9,42	8,61	7,99	8,03	8,4	7,8
Under-5 mortality rate per 1000 births	14,19	12,35	12,04	10,79	10,24	10,11	20,69	-
Developed by the author by source of Bureau of national statistics of the ASPR RK [16]								

Developed by the author by source of Bureau of national statistics of the ASPR RK [16].

End preventable infant and under-five mortality by 2030, with many republics achieving to reduce the amount of neonatal mortality to no more than 12,16 per 1000 live births and under-five mortality to no more than 26 per 1000 live births.

On 26 September 2018, the United Nations (UN) hosted the first-ever high-level meeting on tuberculosis, during which leaders of state and government discussed the status of the tuberculosis epidemic and how to end it. This meeting followed the first world ministerial conference on tuberculosis control organized by WHO. In order to end tuberculosis, the SDGs and the WHO Strategy adopted new measures that were agreed in a declaration by all UN Member States.

According to the existing target 3.3, the SDG is to end the tuberculosis epidemic by 2030. The goal of eradicating tuberculosis is set by 2020-2025, and the incidence will decrease by 2030-2035. According to the strategy, it is planned to reduce the death rate for tuberculosis by 90% by 2030, and the morbidity by 80% by that year. Tuberculosis by 35% and a decrease in the incidence of tuberculosis by 20%. The strategy also includes a 2020 benchmark to ensure that TB patients and their families do not incur catastrophic costs as a result of TB [17].

Comparatively all ratios such as incidence of tuberculosis, hepatitis B, mortality from cancer, diabetes cardiovascular disease, chronic respiratory diseases, mortality from suicide, morbidity of mental and behavioral disorders, morbidity of

mental and behavioral disorders and mortality from road traffic accidents have decreased in 2019 compared to 2013. Nevertheless, the rate of new HIV infections increased by 42%.

In order to reduce infant and maternal mortality, these indicators were regarded in the Republic Program for the Development of Healthcare of the Kazakhstan named “Salamatty Kazakhstan” during 2011 – 2015 years and when the program was completed, indicators demonstrated of reducing infant and maternal mortality by 2015 were achieved. Therefore, in order to reduce these indicators, within the framework of the approach Development of Healthcare “Densaulyk” for 2016-2019, a Roadmap was approved to improve work efficiency and introduce an integrated model of obstetrics and childhood services. In each region, together with regional akimats, similar road maps have been developed and approved. According to this state program, the priority of PHC work will remain the strengthening of the health of mothers and their children [18].

One of the most essential indicator of evaluating public health is mortality rate. The mortality rate’s structure and level could be influenced by various changes of the socio-economic development of a state, as the development of education and medical science, treatment and rehabilitation. The mortality rate is largely determined by the style of life, and way of life of people of various age groups, the attitude of individuals to their own health and the health of other members of society [19].

**Table 2** - Monitoring indicators of the Sustainable Development Goals until 2030 to ensure a healthy lifestyle

	2013	2014	2015	2016	2017	2018	2019
Tuberculosis incidence per 100,000 population	73,4	66,4	58,5	57,7	52,2	48,2	45,6
Incidence of hepatitis B per 100,000 population	1.01	0.77	0.95	0.54	0.54	0.58	0.60
Mortality from cancer, cardiovascular diseases, and diabetes, chronic respiratory diseases, percent	23,70	20,53	21,12	20,84	19,73	19,28	17,41
Suicide mortality rate per 100,000	20,67	18,10	16,52	14,47	14,77	13,65	12,82
Morbidity of behavioral disorders and mental due to the use of psychoactive substances per 100,000 population	278,2	241,5	216,4	156,6	109,2	99,8	85,6
Incidence of mental and behavioral disorders as a result per 100,000 population	241,1	210,0	184,8	130,6	86,6	79,4	69,0
Incidence behavioral disorders due to drug and mental use per 100,000 population	33,0	29,7	90,7	25,1	21,8	20,1	16,2
Mortality due to road traffic accidents per 100,000 population	19,08	16,28	15,16	15,27	13,04	13,20	14,56
Number of new HIV infections per 1000 uninfected people, by sex, age and membership of key populations	0,12	0,13	0,14	0,16	0,16	0,17	0,19

Developed by the author by source of Bureau of national statistics of the ASPR RK [16].

For a deeper analysis of mortality a diagram of diseases was built.

Monitoring of health indicators allows to create an information that could be used in improving health care system or to optimize its activities, also to identify the ineffective areas and some lacks of international healthcare system.

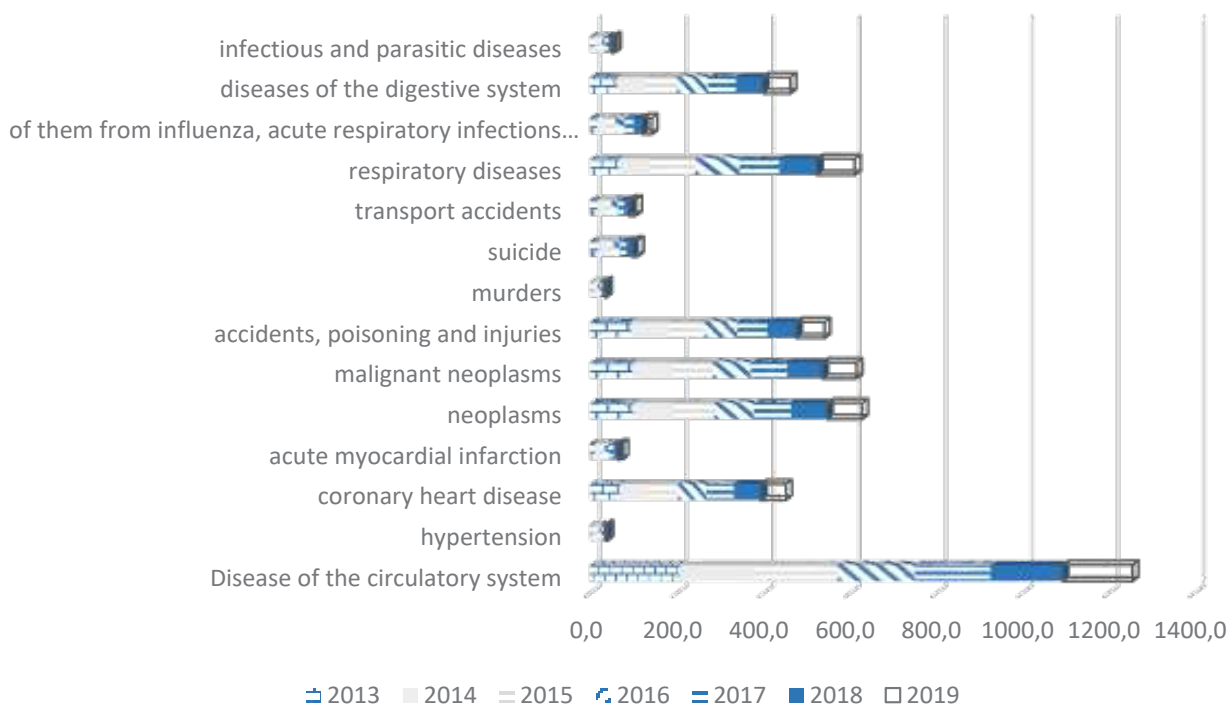
The logical question is what economic effect could be expected if it were possible to achieve a decrease in the incidence and premature mortality from injuries among adults.

The general conclusion that can be drawn based on the analysis of the material presented in this chapter is unambiguous: if an effective action program were implemented in Kazakhstan, improving the health of the population would be crucial for ensuring high rates of economic growth at the macroeconomic level. This is in spite of the economic assessment procedure mainly takes into account only the effect of a decrease in the mortality rate and does not get into account the consequences of a likely decrease in the incidence rate.

The highest mortality rate in Kazakhstan is noted from diseases of the circulatory institution. In the end of 2019 years 30,360 people died from myocardial infarction and stroke.

Respiratory diseases were next in the mortality ranking, from which 16,306 people died. This includes dozens of different diseases besides pneumonia and tuberculosis. Cancer ranks third. A terrible disease claimed the lives of 14 696 Kazakhstanis in 2019. Many deaths also occur due to accidents: injury or poisoning. 12,081 people died for this reason. The five dangerous diseases include common flu, SARS and pneumonia. Only 4164 people could not withstand the infection attack in 2019 in Kazakhstan. But in general, from 2013 to 2019, the indicators decreased, which speaks of an effective health care system.

For sustainable economic and social development, as well as human well-being, better health is principal prerequisites. To achieve these goals, many countries are taking action and continuing to universal health coverage.



Picture 1 - Morbidity by diseases

Developed by the author by source of Bureau of national statistics of the ASPR RK [12]

To achieve the goals and also universal health coverage, countries need financial resources to enable people to benefit from all types of services for health promotion, prevention and treatment.

Many people are unable to access health services being to financial difficulties. Thus, financing has a huge role to play in improving the health sector. For some idea of health financing, expenditures were considered from 2010-2019, and a comparative chart of expenditures with other countries was also built [20].

Diagram 2 shows the relationship between total health spending and GDP.

The development of health care, as an economic system, takes place in a natural accordance with economic and social processes, reflecting the general trends in the forming of market relations in the Republic of Kazakhstan. However, the arisen discrepancy between the real needs of the health care system and the level of its financing with an objective necessity requires finding ways to overcome this discrepancy in order to ensure a balance between the medical and economic components.

To compare the current expenditures on health care in Kazakhstan with other countries, Chart 5 was built, which shows the expenditures of the the United States, UK, Germany, and Russia from 2013 to 2019. In terms of current expenditures, the United States is in the lead, where financing from private sources goes, then Germany, where

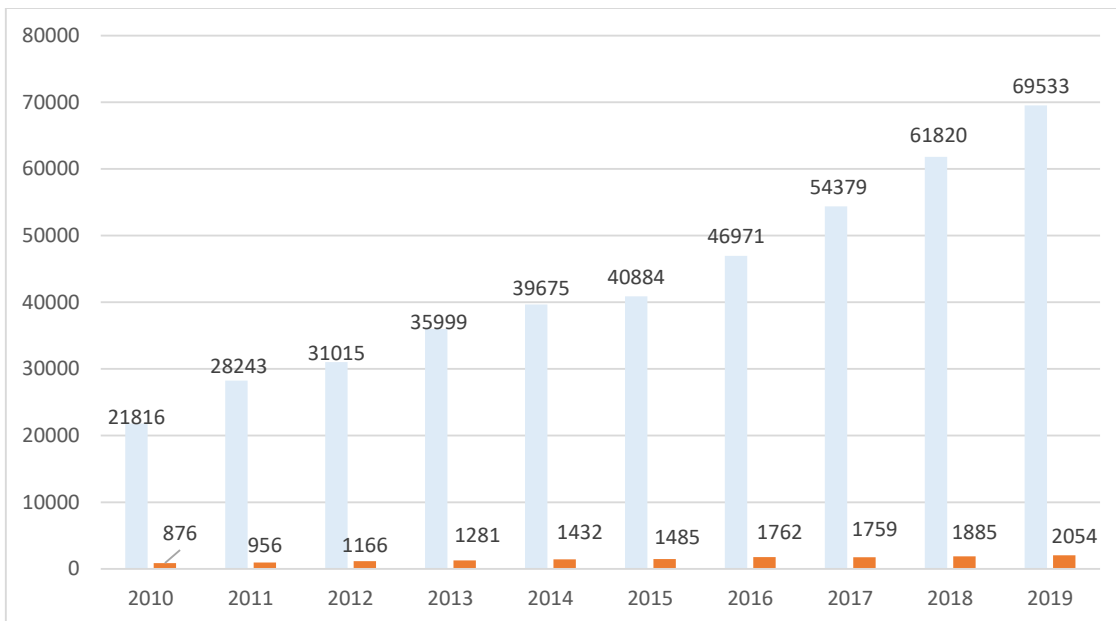
budget financing is provided. Since 2013 the current expenditure on health care from GDP has decreased by 16,5% comparing to 2019.

The development of health care systems around the world is always an urgent task, which is targeting for getting better the health. However, any improvement is always associated with high costs. This is why monitoring health spending indicators is an essential element in decision-making. An important indicator point for assessing the health financing system is the analysis of health system expenditures. It provides an initial indication of how the country is moving towards universal health coverage.

Current expenditure on healthcare in 2019 consisted 4% of GDP. This indicator in OECD countries demonstrates 9% of GDP. As for developing government spendings on health care in 2017 illustrates 2% , in OECD countries it is at the level of 6.5% of GDP. This suggests that developed countries prioritize the health care system.

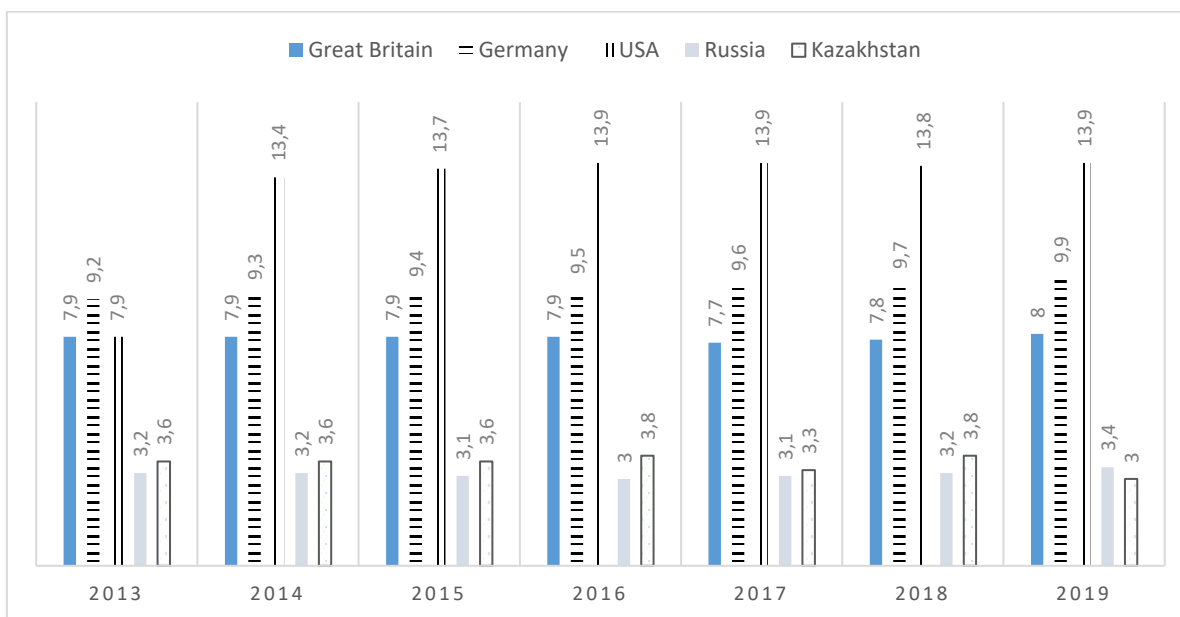
Lack of funding leads to a shortage of personnel, an increased workload on doctors and, most importantly, in equality in affordable to quality health care in different regions. The poorer the region, the most problematic is to get free medical care and the fewer opportunities to solve the problem by contacting private clinics. Together, these factors contribute to the increased mortality of citizens of working age, the study showed.





Picture 2 - Total expenditures on health care, billion tenge

Developed by the author by source of Bureau of national statistics of the ASPR RK [16]



Picture 3 - Current expenditure on health, % of GDP

Developed by the author by source OECD statistics [16]

Also, one of the main indicators of health care is life expectancy.

One of key metrics of population health is life expectancy. Life expectancy is much more wider metric than child mortality or mortality, it captures mortality along the entire whole life. It demonstrates us the average age of death of population. By statistics, in 15<sup>th</sup> and 16<sup>th</sup> centuries in poor world LE was around 30-31 years old.

Since the Age of Enlightenment LE has started to increase. In 19th century LE began to increase in the early industrialized developing countries while others stuck. This situation led to a very high inequality in distribution of health. In globalization this situation with inequality was decreasing.

Since 1900 the global average life expectancy has doubled and now it is above 70 years. The inequality of life expectancy indicator is still

increasing within countries. By the statistics of 2019 the lowest life expectancy was the Central African Republic 53 years and the longest belonged to Japan 30 years longer than in developed countries [21].

LE at birth in Republic of Kazakhstan increased by 0.3 years in 2019 to 73.2 years, which is 7 years less than the OECD average of 80.2 years. In Kazakhstan, the share of people who were are satisfied with their health is 95%, while this indicator shows an OECD average of 69% [22].

The main and main indicator of health care is life expectancy. Correlation analysis was built to identify influencing elements on LE. In short, a strong relationship was found between LE and the cost of health care and social services of the population (0.94). The greatest correlation was found between the values of the level of digital

literacy of the population aged 6-74 and life expectancy

Digitalization is changing the way we think about how and where health services can be delivered, and is driving the shift towards predictive and preventive health care delivery models.

The main and main indicator of health care is life expectancy. Correlation analysis was built (Table 3) to identify affecting aspects on LE. So, a clear relationship was found between LE and the cost of health care and social services of the population (0.94). The greatest correlation was found between the values of the level of digital literacy of the population aged 6-74 and life expectancy [23].

Digitalization is changing the way we think about how and where health services can be delivered, and is driving the shift towards predictive and preventive health care delivery models.

**Table 3** - Correlation between health care factors

	y	x1	x2	x3	x4	x5	x6
y	1						
x1	0,89	1					
x2	0,71	0,61	1				
x3	-0,94	-0,83	-0,70	1			
x4	-0,98	-0,92	-0,76	0,95	1		
x5	0,94	0,81	0,86	-0,97	-0,95	1	
x6	0,95	0,90	0,78	-0,90	-0,98	0,92	1

Developed by the author by source of Bureau of national statistics of the ASPR RK [19].

- In correlation analysis, the variable y is life expectancy;
- X1 - Number of doctors of all specialties, thousand people (r = 0.89);
- x2 - Number of nursing staff, thousand people (r = 0.71);
- x3 - Number of hospital organizations (r = - 0.93);
- x4 - Number of hospital beds, thousand (r = - 0.98);
- x5 - Expenditures on health care and social services of the population (r = 0.94);
- x6 - Digital literacy rate of the population aged 6-74 years (r = 0.95).

The analysis reveals a strong relationship between variables such as life expectancy and the number of workers of all specialties, health care costs and social services of the population, and the strongest with the level of digital literacy of the population. Thus, such a hypothesis appears, the larger the number of doctors and health care costs, the longer life expectancy. Also, the top of digital literacy of the population, the longer life expectancy. As well as digital literacy is increasing LE growing. Reason is many states are moving to digital health. Because digital health plays a

key role in achieving universal health coverage, it provides rational and effective models for delivering quality care that is equally accessible to everyone. At the same time, for the implementation of digital health, it is necessary to provide a direct link between investments in its development and the solution of tasks for protecting public health.

Interpreting the data obtained, it have to be regarded that negative correlations show between factors such as life expectancy and the number of hospital organizations, the number of hospital beds.

According to existed and got calculations, a contradictory relationship is developing and considering: the higher the amount of hospital beds per 10,000 people (or the lower the value of the population size per one hospital bed), the lower the LE.

### Conclusion

The results of the study uncover health indicators of the country. According to statistics, the health care system as a whole has been improving since 2013-2019 in a slow rate. Health care financing is stable, but 3-4 times less than in developed countries. Therefore, correlation analysis was estimated, where the main variable was the life expectancy of the population and other influencing factors. Correlation analysis demonstrated a strong dependence between the factors of life expectancy and the level of digital literacy of the population aged 6-74, health care costs and social services. So, while digital literacy is rising life expectancy is improving. It says about necessity of using digital tools in healthcare system. Also, we noticed a negative dependence between variables as life expectancy and number of hospital beds and organization, it assumes that our healthcare system needs preventions. Health promotion and disease prevention plays an important role of increasing LE. So, our system needs to prevent diseases and injuries by implementing digital tools and using digital literacy of the community. Likewise, we noticed a strong dependance between LE and healthcare expenditure, but this dependence is a little bit less than the relation between LE and digital literacy. Nevertheless, it refers that increasing healthcare expenditures we refine health and well-being of population of Kazakhstan Republic.

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