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METHODOLOGICAL ASPECTS OF DIAGNOSING OF HEALTH CARE PUBLIC FINANCING IN VOLATILE CONDITIONS

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Abstract

The global financial crisis caused by the pandemic has reached a scale that has no parallel with previous extensive periods of economic instability. The countries with a poor healthcare system have turned out to be the most vulnerable to the crisis. In this regard, only comprehensive studies on the development of the healthcare concept and model to increase the efficiency of functioning of healthcare providers will allow to assess the impact the healthcare system has on the social, economic, cultural and moral state of society, which will identify further directions for stabilization and stable development of the country. The study aims to solve a scientific problem, which is the development of methodological approaches to and practical methods of diagnostics and efficiency of the healthcare system functioning to prevent risks during the pandemic. The object of this study are the healthcare systems and consolidated budgets of the constituent entities of the Russian Federation aimed at prevention of risks during the pandemic. The information base consists of the official data provided by the Federal State Statistic Service, Ministries of Finance, Healthcare of the Russian Federation before and during the period of the COVID-19 pandemic. The study is based on application of the risk assessment method, which is based on the probability distribution law. The proposed study is aimed at improvement of the diagnostics and increase in the efficiency of the healthcare system to prevent risks in the conditions of instable functioning of the economy and society during the pandemic.

Keywords: Aggregate standardized rate, budget stress, finance and resource provision, healthcare system, national projects, risk

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1. Introduction

The healthcare systems of both developed and developing countries have faced the problem of insufficiency of resources to meet the healthcare needs of population. The trend of population ageing, decrease in life expectancy, growing demand for healthcare services, growing needs for the use of new technologies and medicines observed in recent years have exacerbated the pressure on the healthcare system. Studies of the foreign and Russian healthcare system models have shown that the approaches of strategic management applied with regard to public healthcare providers are not efficient enough; the existing system of target indicators is very limited.

2. Problem Statement

The healthcare systems of both developed and developing countries have faced the problem of insufficiency of resources to meet the healthcare needs of population. The trend of population ageing, decrease in life expectancy, growing demand for healthcare services, growing needs for the use of new technologies and medicines observed in recent years have exacerbated the pressure on the healthcare system. Studies of the foreign and Russian healthcare system models have shown that the approaches of strategic management applied with regard to public healthcare providers are not efficient enough; the existing system of target indicators is very limited.

3. Purpose of the Study

The study aims to solve a scientific problem, which is the development of methodological approaches to and practical methods of diagnostics and efficiency of the healthcare system functioning to prevent risks during the pandemic. The object of this study is the healthcare systems and consolidated budgets of the constituent entities of the Russian Federation aimed at prevention of risks during the pandemic. The information base consists of the official data provided by the Federal State Statistic Service, Ministries of Finance, and Healthcare of the Russian Federation before and during the period of the COVID-19 pandemic. The study is based on application of the risk assessment method, which is based on the probability distribution law. The proposed study is aimed at improvement of the diagnostics and increase in the efficiency of the healthcare system to prevent risks in the conditions of instable functioning of the economy and society during the pandemic.

4. Research Questions

The healthcare systems of both developed and developing countries have faced the problem of insufficiency of resources to meet the healthcare needs of population. The trend of population ageing, decrease in life expectancy, growing demand for healthcare services, growing needs for the use of new technologies and medicines observed in recent years have exacerbated the pressure on the healthcare system. Studies of the foreign and Russian healthcare system models have shown that the approaches of strategic management applied with regard to public healthcare providers are not efficient enough; the existing system of target indicators is very limited.

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In the context of global crisis financial and epidemiological phenomena important social, economic, mental and moral changes are very rapid (Jakovljevic et al., 2020.) The analysis of the healthcare system functioning in regions allows to determine its impact on the social, economic, mental and moral state of the society, which is one of the aspects of this study. Such analysis represents a topical issue to evaluate the reasons that caused the reforming of the revenue and expenditure of the public budgets during the COVID-19 pandemic and will allow to determine the trends of development thereof. The healthcare problems and issues related to human capital development are key to the priority of public finance, since they determine the formation of various aspects of public health (Anderson et al., 2000).

Numerous studies by foreign and Russian scientists and practitioners have highlighted the need to expand the public healthcare evaluation indicator system and to amplify the prospects of the population health promotion in future, which has been particularly exacerbated during the COVID-19 pandemic.

The need for urgent assessment of the impact COVID-19 has had on the society and global environment was emphasized by many researchers in their works (Chakraborty & Maity, 2020; Husain, 2020; Lucchese & Pianta, 2020.) Besides the importance of assessing the economic consequences of the pandemic, it is particularly relevant to develop possible actions that can lead the society to a more stable, healthy, equal and sustainable development trajectory (Lucchese & Pianta, 2020.) When developing such actions, the peculiarities of the healthcare system, social and economic level of development and mental and moral state of the society should be taken into account.

The COVID-19 pandemic has become an unprecedented challenge for healthcare systems in the whole world, while the healthcare system itself has become one of the most susceptible public systems in any country. In this regard, the scientific community emphasizes the need for profound changes in this field, which should lead to large investments in the disease prevention infrastructure and expedited digital transformation of healthcare delivery (Nicola et al., 2020; Sohrabi et al., 2020).

This interest is due to the fact that population health is one of the key parameters determining human capital. As noted by many authors (Anton & Onofrei, 2012; Bitran, 2012; Novignon et al., 2012), the lack of healthcare financing and low efficiency of public healthcare policy are particularly acute in developing countries.

Recurring crisis phenomena in the global economy further exacerbate the above mentioned problems (Anton & Onofrei, 2012) As a result, despite the increase in public expenditures on healthcare, their efficiency remains low (Anton & Onofrei, 2012).

The need to build a healthcare system development model based on the aggregate of indicators reflecting different aspects of public life was repeatedly stated by the scientific community (Bauer et al., 2006; Brady et al., 2020; Cacari-Stone et al., 2014; DiClemente et al., 2019; Kramers, 2003)

In the works by Yashina et al. (2017) and Yashin et al. (2018) the interrelationships were studied between the public healthcare financing policy and social and economic state of the country. Conclusions were made on the resource support, the level of development, availability and quality of the public healthcare in the Russian Federation, focusing on human capital in the context of the knowledge economy. A system was suggested for a comprehensive assessment of the healthcare system financing and management efficiency.

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This study aims at developing methodological approaches to and practical methods of diagnostics and efficiency of the healthcare system functioning to prevent risks during the pandemic.

5. Material and Methods

Introduction of new methods and techniques of diagnostics and improvement of the healthcare system by public bodies to prevent risks during the pandemic in the practices of the constituent entities of the Russian Federation will allow to properly analyse and evaluate the activities of public healthcare providers at a local level and to improve the strategic management.

A healthcare system means the aggregate of all organizations, institutions and resources, whose main objective is health promotion.

We offer to evaluate the efficiency of the healthcare system functioning taking into account the following:

i. diagnostics of the financial potential of public healthcare financing by determining budget stresses in the country as a whole and its regions;

ii. evaluation of the efficiency of the healthcare national projects implementation to improve the population healthcare in Russia;

iii. development of measures for improvement of the Russian healthcare related situation to diagnose and improve the healthcare system and to prevent risks during the pandemic.

Besides the financial support, it is important to analyze (based on the proposed tools) the functioning of public healthcare providers in the regions of the Russian Federation, and to compare the results of healthcare provision taking into account its quality and availability with the current activities of the public healthcare providers located in the territories under study.

Table 1 shows the methodological tools to assess the activities of public healthcare providers characterizing the state and functioning of the healthcare system in the regions of the Russian Federation.

Table 1. Methodological tools to assess the activities of public healthcare providers

Indicator	Calculation formula
First group: Indicators of the evaluation of public healthcare providers' staffing	
Provision of population with doctors	Number of doctors - natural persons / Average annual population*10,000
Provision of population with middle-level medical personnel	Number of middle-level medical personnel - natural persons/ Average annual population*10,000
Staffing level of doctoral positions (%)	Number of occupied doctoral positions / Number of full[-time doctoral positions*100%
Staffing level of middle-level medical personnel (%)	Number of occupied middle-level medical personnel positions / Number of full-time middle-level medical personnel positions*100%
Factor of medical personnel holding more than one job in health facilities	Number of occupied medical positions / Number of natural persons

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Second group: Indicators of the evaluation of public healthcare providers' performance

Indicators of round-the-clock inpatient clinics at hospitals

Provision of population with hospital beds per 1,000 or 10,000	Average annual number of hospital beds (per ward and hospital as a whole) × 1,000 (10,000) / Average annual population served
Provision of population with inpatient care	Hospital beds, total*10,000/ Population served
Population hospital admission frequency (per 1,000 or 100)	Patients admitted to inpatient clinic per year × 1,000 (100) / Average annual population served
Hospital beds as of the end of the year	Number of actually occupied hospital beds in the inpatient clinic per each month of the year /12 months
Average annual number of hospital beds	Number of actually occupied hospital beds in the inpatient clinic per each month of the year /12 months
Average annual number of days of hospital bed use (hospital bed functioning)	Number of bed-days spent by the patients in the inpatient clinic per year / Average annual number of hospital beds
Patients treated	Number of bed-days / Average duration of patients' staying in hospital bed
Average treatment period (days)	Number of bed-days spent by patients in the inpatient clinic per year / Number of patients that left the inpatient clinic (were discharged or died)
Hospital bed turnover rate	Number of patients that left the inpatient clinic / Average annual number of hospital beds
Average hospital bed downtime	Average annual hospital bed occupation rate, number of days per year / Hospital bed turnover rate
Mortality (%)	Number of patients that died in the inpatient clinic × 100 / Number of patients that left the inpatient clinic

Indicators of day inpatient clinics at hospitals

Number of beds	Number of beds in the day patient clinic at hospital
Average number of days of hospital bed use	Number of bed-days spent by the patients in the inpatient clinic per year / Average annual number of hospital beds
Average treatment period	Number of bed-days spent by the patients in the clinic per year / Number of patients that left the clinic (were discharged)
Provisions with beds (per 10,000 population)	Number of deployed hospital beds in the day patient clinic / Average annual population*10,000
Number of patient-days spent by patients (per 1,000 population)	Number of bed-days actually spent by patients in the day patient clinic / Average annual number of hospital beds in the day patient clinic
Hospitalization rate (per 1,000 population)	Patients treated in the day patient clinic / Average annual population* 1,000

Indicators of outpatient polyclinic facilities

Average number of visits per 1 inhabitant per year	Number of doctor's appointments / Average annual population
Dentist's appointments per 1,000 population	Number of dentist's appointments / Average annual population*1,000
Number of visits per 1 inhabitant	Number of doctor's visits in a polyclinic facility / Average annual population
Capacity	Number of doctor's offices *Functioning of doctor's office per shift (number of visits)

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Third group: indicators of public healthcare providers' performance efficiency

Indicators of frequency of all diseases in population	Frequency of all diseases in population / Average annual *1,000
Incidence per 100,000 population	Number of diseases / Average annual *1,000
Mortality rate per 100,000 population	Total number of deaths per year / Average annual population*100
Birth rate per 100,000 population	Total number of births / Average annual population*100
Natural increase	Birth rate — mortality rate

Source: Developed and compiled by the authors

The presented tools can be used to compare evaluations of healthcare providers' performance over different time periods. The said indicators can be used as standards to evaluate healthcare providers' activities or can be equated to reference values of the most successfully functioning healthcare providers. The presented tools allow to evaluate the healthcare system efficiency in regions in order to collect and analyze data related to public healthcare providers.

The suggested indicators provide the possibility for comparison of certain characteristics of public healthcare providers in a corresponding constituent entity of the Russian Federation. However, the analysis using solely selected indicators cannot provide an overall picture of healthcare in the region as a whole. To evaluate the activities of healthcare providers in a specific district as compared to another one, standardized indicators should be used.

To standardize the indicators shown in Table 1, linear transformation was used according to formulae (1, 2): upon minimization of indicators formula (1) is applied, upon maximization of indicators – formula (2) is applied. Such method of standardization results in a change in the indicator values within the range from 0 to 1:

$$K_{ij}^{*} = \frac{K_{ij} - K_{i\,min}}{K_{i\,max} - K_{i\,min}}, \quad (1)$$

$$K_{ij}^{*} = \frac{K_{i\,max} - K_{ij}}{K_{i\,max} - K_{i\,min}}, \quad (2)$$

where K_{ij}^{*} – is the calibrated indicator of the ith suggested indicator assessing a public healthcare provider in the jth territory, K_{ij} – is the estimated value of the ith suggested indicator assessing the functioning of a public healthcare provider in the jth territory, $K_{i\,max}$ – is the highest estimated value of the ith indicator among the analyzed territories of a specific constituent entity of the Russian Federation, $K_{i\,min}$ – is the lowest estimated value of the ith indicator among the analyzed territories of a specific constituent entity of the Russian Federation.

To assess the functioning of a public healthcare provider in the context of volatility, the variability of the values of public healthcare providers' functioning characteristics in the corresponding constituent entity of the Russian Federation should be taken into account. In this regard, the (3) calibrated indicator is determined taking into account the volatility ($Kvol_{ij}^{*}$):

$$Kvol_{ij}^{*} = \frac{K_{ij}^{*}}{\sigma_i}, \quad (3)$$

Where $Kvol_{ij}^{*}$ – is the ith standardized indicator of the jth territory taking into account the volatility K_{ij}^{*}, σ_i is the standard deviation of the ith calibrated indicator among the analyzed public healthcare providers.

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Further, the rating evaluation value for each analyzed public healthcare provider is determined according to formula (4):

$$P_z = \sqrt{(1 - Kvol^*_{ij_1})^2 + \cdots + (1 - Kvol^*_{ij_n})^2} \quad (4)$$

Where Pz is the rating evaluation of the zth public healthcare provider, $Kvol^*_{ijz\ (z=1,\ldots n)}$ are the standardized indicators of the zth public healthcare provider.

The final step is to prepare an aggregate rating of public healthcare providers, which is determined by summing up the rating evaluations. Based on the aggregate rating evaluation obtained, a public healthcare provider is assigned a rank.

The rank allows to analyze the efficiency of public healthcare providers' performance. The higher the rank is, the higher the quality of the corresponding public healthcare provider' performance is.

The presented methodology is aimed at the development of a clear plan of actions to be used by the public bodies regulating the healthcare system based on the above presented tools. The distinctive feature of this methodology in comparison with other existing methods and techniques is the application of a classification of indicators included in the set of tools depending on the direction of their impact on the comprehensive social and economic part of the life of society, as well as the simplicity of calculation of an aggregate rating and rank. It allows to study in detail the functioning of public healthcare providers in order to carry out consolidated comparative assessment, to analyze and collect data on the current situation in a specific territory, where the said providers operate, to improve the strategic management of the said providers. Improvement of the strategic management will consist in assessment of the current state of the public healthcare providers' functioning in order to develop the directions of development in future.

The proposed methodology has been approved based on the official data of the Ministry of Healthcare of the Russian Federation, Ministry of Finance of the Nizhny Novgorod region, Federal State Statistic Service, Ministry of Healthcare of the Nizhny Novgorod region, Territorial Fund of Compulsory Medical Insurance for the Nizhny Novgorod region, as well as statistical information reflecting the state and trends of public healthcare providers management.

6. Calculation

This study has allowed to reveal the main problems of the Russian healthcare system functioning that have become evident during the pandemic, which creates a need to improve the approaches to diagnostics of the healthcare system functioning in order to prevent risks in non-standard conditions of functioning thereof. The most pressing issues of the healthcare system functioning are the following: public healthcare underfunding per capita; low wages, high factor of medical personnel holding more than one job, constant overwork, excessive requirements, needless checks, staff shortage, low and constantly decreasing provision of population with doctors in the Russian Federation, which has exacerbated during the COVID-19 pandemic with an increase in the number of sick people; decentralization of healthcare as a result of inefficient government administration; breakdown of the patient routing system and continuity of care as a result of application of market-based approaches to compensation of healthcare providers' costs.

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Critical problems have been accumulated in the Russian healthcare system caused by market-based approaches that substitute the notions of a "medical service" and "healthcare", and the "patient oriented" approach is oriented at maximization of healthcare providers' revenues, which results in decrease in the availability of free healthcare.

The COVID-19 coronavirus infection pandemic has shown that well-thought-out reforms of the healthcare system are key to the population health and constitute the basis of Russia's security.

Decree of the President of the Russian Federation of July 21, 2020 No. 474 sets out the "preservation of population, health and welfare of people" as a national objective. This objective can be achieved only by increasing the number of highly qualified doctors, nurses, teachers of medical universities, colleges and schools, whose work is highly appreciated and esteemed in the society.

The main budget parameters and evaluation of budget stresses indicate the sufficiency of public financial resources in Russia and stability of supply thereof. The GDP in 2020 amounted to RUB 106.974 trillion, the consolidated budget revenue in 2020 amounted to RUB 37 trillion 856.7 billion, while the consolidated budget expenditure was RUB 42 trillion 150.9 billion, the tax burden of 34.5% was not high, amounting to 46.7 % taking into account the funds.

According to the report published on the web-site of the Federal Treasury, the consolidated budget of the Russian Federation for 2020 was implemented with a deficit of RUB 4 trillion 294.2 billion. The federal budget with the revenue of RUB 18 trillion 722.2 billion and expenditure of RUB 22 trillion 821.1 billion was implemented with a deficit of RUB 4 trillion 99.4 billion. The budgets of the constituent entities of the Russian Federation with the revenue of RUB 14 trillion 901.2 billion and expenditure of RUB 15 trillion 577.7 billion had a deficit at the level of RUB 676.6 billion. The budgets of state extra-budgetary funds were implemented with a surplus of RUB 472.5 billion (revenue amounted to RUB 13 trillion 247.4 billion, expenditure amounted to RUB 12 trillion 774.9 billion). The budgets of territorial state extra-budgetary funds were implemented with a surplus of RUB 9.2 billion, with the revenue of RUB 2 trillion 506.8 billion and expenditure of RUB 2 trillion 497.6 billion.

The main parameters of the federal budget for 2021 are projected GDP amounts to RUB 115.53 trillion, revenue amounts to RUB 18.8 trillion, expenditure amounts to RUB 21.52 trillion, deficit amounts to RUB 2.75 trillion. (2.4 % of GDP). Spendings on housing and public utilities — RUB 322.5 billion, education — RUB 1.08 trillion, healthcare — RUB 1.12 trillion, social policy — RUB 5.6 trillion.

Information showing the main trends of public finance development, including on the country's state budget condition, indicates its financial stability. Despite the impact the COVID-19 pandemic has had, the following positive economic factors of the year 2021 are worth mentioning: growth of the National Welfare Fund; growth of oil-and-gas revenues: corporate profit tax, tax imposed on additional revenues from hydrocarbon production, personal income tax (NDFL) (related to the tax imposed on income from deposits and additional receipt of tax payments as a result of increasing the tax rate from 13% to 15% imposed on the revenues exceeding RUB 5 million); low level of public debt — 19% of the GDP.

The efficiency of the healthcare system depends on how stably, rhythmically and with what risk budgets are implemented in the territories that constitute the basis for financial and resource support of

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the healthcare system. We suggest determining as budget stress a tight budget implementation that affects its ability to maintain stability determined by the indicators that were provided for by the initially approved budget for the ensuing financial year. Budget stresses can lower the efficiency of the healthcare system functioning, which will provide negative impact on the availability to the country's population and quality of healthcare, which, in turn, will jeopardize the preservation of health and welfare of citizens.

Evaluation of the budget stresses and financial mechanisms of response to threats to the social and economic stability in the regions of Russia allows to assess the risk of financing the obligations to implement national projects and state programs in the regions both in the short and long term.

One of the most important indicators of budget stresses is own revenue mobilization. Budget stresses are determined based on the amount of receipt of budget own revenues during the analyzed period; provision with the own funds of financing of the branches of productive and non-productive sectors, aggregate debt burden, tax debt, etc. during the analyzed period.

The budget stress level in the Nizhny Novgorod region for 2019-2020 was calculated using the values of an aggregate standardized rate that included the indicators of the budget implementation, risk of implementation of the budget or a revised plan, growth rates in comparison with the similar period of the previous year. The set of indicators can be expanded or changed, which is determined by the quality and availability of the initial data, as well as by the objectives of the analysis. The current values of the assessment indicators are determined based on the data on the implementation of budgets.

Analysis of receipt of the tax revenues to the budget system shows that in 2020 the amount of revenues, was far from decreasing: it grew. Based on the analysis made, it follows that the Russian tax system operates quite efficiently in the period of crisis phenomena and the tax potential of the regions is sufficiently stable.

Then, we will consider the implementation of the proposed methodology and the impact of the pandemic on budgetary stress on the example of one of the Russian regions.

Table 2 shows the comparative analysis of monthly implementation, risk of implementation and growth rates of own revenues of the consolidated budget in 2019-2020. Assessment of the budget stress level can be carried out according to the said indicators, which will allow to determine the response of public finance to stress and to find the methods of eliminating it in the early stages.

Table 2. Comparative analysis of monthly implementation, risk of implementation and growth rates of tax and non-tax revenues (own revenues) of the consolidated budget in 2019 and 2020

Name of the month, indicators	**Tax and non-tax revenues, 2019**		**Tax and non-tax revenues, 2020**			
	Execution rate (%)	**Variation coefficient (%)**	**Execution rate (%)**	**Variation coefficient (%)**	**Execution rate (%)**	**Variation coefficient (%)**
January	5.8	22	119.2	5.6	19	107.3
February	11.7	12	116.2	12.8	11	109.0
March	23.2	12	112.3	22.7	9	109.1
April	35.6	9	120.1	31	9	97.1
May	43.9	10	113.3	37.3	7	94.6
June	49.1	10	109.7	44.8	13	97.5
July	60.1	10	111.7	56	20	97.4
August	67.8	9	111.1	63.3	14	97.8

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September	72.7	8	111.6	69.5	11	98.7
October	84.1	7	107.9	79.3	8	97.4
November	91.8	6	107.1	88.2	7	98.5
December	101.6	12	107.7	102.3	5	100.3
Standard	54.0	10.6	112.3	51.1	11.0	100.4
Max. value	101.6	22.0	120.1	102.3	20.0	109.1
Min. value	5.8	6.1	107.1	5.6	4.7	94.6
The scale of variation	95.8	15.9	12.9	96.7	15.3	14.5

Source: Developed and compiled by the authors based on data of Ministry of Finance of Nizhny Novgorod region (2019, 2020)

The presented analysis provides a fair view of the functional disorders of the region's budget system as a response to stress caused by the novel coronavirus infection. The results of a comprehensive assessment of the budget stress using an aggregate standardized rate in 2019-2020 are shown in Table 3.

Table 3. Standardized indicators of the budget stress assessment based on monthly implementation of own revenues, risk of implementation and growth rates of tax and non-tax revenues (own revenues) of the consolidated budget in 2019-2020

Month	**Standardized income indicators, 2019-2020**	
	Standardized Execution Ratio, 2019	**Standardized Execution Ratio, 2020**
January	2.068	2.059
February	1.606	1.349
March	1.791	1.105
April	0.871	1.845
May	1.372	1.823
June	1.598	1.934
July	1.330	2.287
August	1.232	1.790
September	1.079	1.468
October	1.167	1.252
November	1.102	1.010
December	1.314	0.610
Standard	1.378	1.544

Source: Developed and compiled by the authors based on data of Ministry of Finance of Nizhny Novgorod region (2019, 2020)

The analysis of indicators in Table 3 gives the opportunity to understand that based on the results of the budget stress assessment the least tight budget implementation characterized in the end by a relative stability (in particular, by a low risk level) of the budget indicators, was recorded in April, September, October and November.

The novel coronavirus infection has had a slight impact on the budget stress standard level, which became higher in 2020; however, taking into account the operative budget adjustment the Nizhny Novgorod region fulfilled its obligations with respect to its population in full and in a timely manner and mobilized its own budget revenues to finance high-priority and socially important budget expenditure.

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7. Results and Discussion

Recently, the program-based principle of expenditure financing has become widespread in the budget planning practice. Let's consider national projects in the field of medicine and demographics as an example.

The efficiency of implementation of the said national projects was assessed using the following indicators: life expectancy of people aged 55+, years; healthy life expectancy, years; mortality of population older than working age per 100,000 population of the corresponding age; total fertility rate, children per 1 woman; share of persons engaged in healthy lifestyles, percent; mortality of working age population per 100,000 population of the corresponding age; mortality caused by cardiovascular diseases, per 100,000 population; mortality caused by tumors, including malignant tumors, per 100,000 population; infant mortality rate, children who died before the age of 1 per 1,000 live births.

The results of the assessment of the national projects implementation efficiency in the regions based on the aggregate standardized indicator have been ranged, divided into three levels of efficiency according to the expert evaluation and shown in Table 4.

Table 4. Rating of the regions according to the assessment of the national projects implementation efficiency based on the aggregate standardized indicator of implementation of national projects, 2019 (fragment)

Russian Regions	Aggregate standardized indicator	Rank
First level		
Respublika Ingushetiya	1.327	1
Chechenskaya Respublika	2.471	2
Respublika Dagestan	2.990	3
Yamalo-Nenetskiy avtonomnyy okrug	3.591	4
Khanty-Mansiyskiy avtonomnyy okrug – Yugra	3.610	5
…	…	…
Second level		
Respublika Tatarstan	4.276	11
Moscow	4.311	12
Respublika Severnaya Osetiya – Alaniya	4.320	13
Respublika Sakha (Yakutiya)	4.381	14
Karachayevo-Cherkesskaya Respublika	4.422	15
…	…	…
Third level		
Udmurtskaya Respublika	5.343	32
Belgorodskaya oblast	5.364	33
Volgogradskaya oblast	5.366	34
Respublika Bashkortostan	5.409	35
Respublika Buryatiya	5.411	36
…	…	…

Source: Developed and compiled by the authors based on data of Ministry of Finance of the Russian Federation (2019, 2020)

Based on the analysis carried out, it can be concluded that in the Russian Federation there is both sufficient financial and resource support and high efficiency of implementation of national projects aimed at solving important strategic tasks in the field of healthcare and demographics.

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The final part of the study aimed at improvement of the diagnostics and increase in the efficiency of the healthcare system to prevent risks in the context of social and economic instability during the pandemic, consists in assessment of public healthcare providers' activities using the example of the municipal units of the Nizhny Novgorod region. The results of the assessment of public healthcare providers' activities characterizing the state and functioning of the healthcare system based on the proposed methodological tools (Table 1), are shown in Table 5.

Table 5. Rating of the Nizhny Novgorod region districts by the aggregate indicator and rank of the efficiency of the functioning of medical organizations (fragment)

Territories	Rating					Total rating	Rank
	The first group is "indicators for assessing the staffing of public medical organizations"	The second group is "indicators for assessing the work of public medical organizations in the context of types of medical care"			The third group is "indicators of the performance of public medical organizations"		
		Indicators of 24-hour departments at hospitals	Indicators of day departments of hospitals	Outpatient and polyclinic service indicators			
Nizhegorodskij	7.84	9.77	6.06	7.56	6.61	37.84	1
Arzamas	5.98	8.63	5.14	4.57	7.23	31.54	2
Sharangskij	7.04	8.81	5.75	2.36	7.48	31.44	3
Priokskij	4.99	8.67	5.69	3.74	6.99	30.07	4
Pavlovskij	6.57	7.40	5.96	4.24	5.10	29.27	5
Leninskij	5.30	7.85	6.44	3.58	6.01	29.17	6
Moskovskij	4.99	7.31	6.41	2.22	7.66	28.59	7
Sechenovskij	7.04	6.56	5.50	2.47	6.80	28.38	8
Tonkinskij	7.44	6.85	5.30	2.56	6.18	28.33	9
Vetluzhskij	7.68	6.61	6.67	2.58	4.74	28.27	10
B. Boldinskij	7.95	6.59	5.01	2.03	6.55	28.13	11
Sepgachskij	5.98	5.77	6.30	1.97	7.75	27.78	12
Pochinkovskij	7.99	6.77	5.35	2.34	5.10	27.54	13
Tonshaevskij	6.25	7.17	4.76	2.02	7.25	27.45	14
D.Konstantinovskij	5.66	6.16	5.76	2.07	7.73	27.37	15
Sosnovskij	7.72	5.53	5.45	3.28	5.32	27.29	16
…	...	…	…	…	…	…	…
B. Mupashkinskij	4.31	7.38	5.85	1.82	3.96	23.32	56
Knyagininskij	5.03	5.68	5.11	2.64	4.72	23.18	57
Butuplinskij	5.62	5.49	4.14	2.00	5.80	23.06	58
Vachskij	6.73	4.42	4.14	1.91	4.75	21.94	59
Apzamasskij	6.65	5.12	0.00	1.53	6.74	20.04	60

Source: Developed and compiled by the authors

Taking into account the calculations made, it can be concluded that despite the high financial resources of the Nizhny Novgorod region, such districts as Buturlinsky, Vachsky, Arzamassky, B. Murashkinsky, Knyagininsky have an unsatisfactory system of healthcare functioning.

The calculations have shown that there are also leading territories: Nizhegorodsky, urban district city Arzamas, Sharangsky, Prioksky, Pavlovsky, Leninsky, Moskovsky, Sechenovsky, Tonkinsky and

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Vetluzhsky districts, which as of today are sufficiently staffed with medical personnel, show high rates of medical activities split by healthcare types, which lead to productive results of healthcare provision to population taking into account its quality and availability.

In the context of the pandemic, it is important to take prompt decisions based on the analysis of healthcare providers at a local level. The analysis of public healthcare providers' activities is considered as an analysis of the immediate surrounding for each healthcare provider and for the region as a whole. The results of the assessment allow to develop the directions and strategies of the healthcare system development.

The practical relevance of the study is that the developed methods and techniques of diagnostics and improvement of the healthcare system to prevent risks in the period of the pandemic have significant value for development of the healthcare sector. The scientific results obtained can be used by the Ministry of Healthcare, Federal and Territorial Funds of Compulsory Medical Insurance, public healthcare providers to improve strategic management.

8. Calculation

The implementation of national projects and state programs is aimed at the population growth, increase in the life expectancy of population up to 80+, decrease in the mortality rate, preservation of citizens' reproductive health, increase in the availability of medical and preventive care for children and adolescents, decrease in the infant mortality, increase of the share of persons who regularly go in for physical training and sports.

Achievement of the said indicators depends on the healthcare system functioning. The methodological approaches to diagnostics of the financial potential of public healthcare financing by determining budget stresses in the country and its regions have shown that the country has a good budget potential. On this basis, it is important to implement the following mechanisms of reforming the country's healthcare system to increase: the level of public financing of expenditure on healthcare using the existing public financial resources and increasing the tax revenue rates up to 5.5% of the Gross Domestic Product (GDP) by 2024; the remuneration of work of medical personnel and teaching staff of medical universities and colleges, expenditure on their further training; expenditure on the compensation of healthcare providers' costs for additional infection protective measures in the context of possible epidemic outbreaks, such as the COVID-19 coronavirus infection; to implement the system of nationwide provision of medicines.

The evaluation of the efficiency of the healthcare national projects implementation in order to improve the population healthcare in Russia has also shown good results of the implementation of the May Presidential Decrees.

The assessment of the efficiency of healthcare providers' activities has shown the inefficient nature of the market and insurance model of the Russian medicine, which has been emphasized by the COVID-19 pandemic, and has shown that only centralized government management of the healthcare system has enough resources to overcome it. Based on the foregoing, we suggest implementing the budget model of financing and budgeted method of public financing of healthcare providers (Arrow, 1963).

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To abolish the model of financing free healthcare delivery guaranteed by the state via insurance healthcare providers as an excessive component, to use the system of financing and control via the Federal Service for Surveillance in Healthcare (Roszdravnadzor) again. The Fund of Compulsory Medical Insurance can be involved as a structural subdivision of the Ministry of Finance. It is important to analyze the Union of Soviet Socialist Republics (USSR)'s experience and to consider the budgeted method of financing healthcare providers based on an estimate that guarantees the coverage of their current expenses, which include the standard volume of the healthcare services and prime cost of provision thereof according to current prices and tariffs, which will lead to the possibility of functioning of healthcare providers in rural areas, towns, to restore the infection service and emergency medical care in accordance with the revised standards based on the analysis of the COVID-19 coronavirus infection. It is possible to keep the provision of paid medical services by public healthcare providers only upon clear regulation of such services.

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