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## DYNAMICS AND STRATEGIC DIRECTIONS OF PUBLIC HEALTH PRESERVATION IN RUSSIAN FEDERATION\*

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**Abstract.** The article analyzes the dynamics of public health in Russia. It is noted that health preservation is not only a task for doctors, but also for other specialists. The authors believe that medical geographers can play a significant role in public health research. The study outlines major trends in the natural demographic movement of the population under the influence of socio-economic factors. The life expectancy of the population of Russia is characterized against the background of other countries. An increase in the number of registered patients and HIV is indicated. It is concluded that insufficient public expenditure on healthcare development in Russia causes negative trends in health protection. The article concludes with the main goals and corresponding objectives for improving public health and ensuring environmental sustainability.

**Keywords:** public health; habitat; demography; medical geography; depopulation; life expectancy; morbidity; health management

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**JEL Classifications:** I14, I15, I18

### 1. Introduction

Sustainable development of any country depends on quality and efficiency of resources used. Human resources play a crucial role in process of development. Life expectancy is one of indicators characterizing quality of human capital, therefore research of its tendencies and, especially, impacting factors and outcomes is widely discussed in

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the scientific literature (e.g. Panfiluk, , Szymańska, 2017; Rusoja et al., 2018, E.,Volchik et al., 2018; Pavlova, Šenfelde, 2017; Khan et al., 2018; Kalyugina, et al. 2018).

According to the World Health Organization (WHO, 2018), the lifestyle accounts for 50% of the overall health impact of the population, 20% falls on the conditions of habitat, another 20% is affected by heredity, and 10% by health care quality. The way of life, the entire social sphere of human activity has a determining effect on the health of the population, thus, public health research should fall beyond medical sciences on to social sciences (Chistobaev, Semenova, 2009). Only an interdisciplinary integrated research ensures the elaboration of accurate forecasts and adequate development programs of the healthcare sector. Such an integrated approach is present in medical geography discipline – the science dealing with the impact of natural and social conditions on the population health in its habitat (e.g. ecological state of the environment, employment and working conditions, living conditions, quality of life; medical geography studies often incorporate the economic aspects of health development; Semenova, 2010; Semenova, Chistobaev, 2015).

By the end of the last century there was an extremely unfavorable demographic situation in Russia. The death rate exceeded the birth rate in many regions of the country; mortality rates were much higher than in developed countries. These trends resulted in negative natural demographic movement – Russia lost some of its population. In 2015, the country was on the 127th place (from 210 countries) on the mortality rate of men and 89th place in terms of the death rate of women. Only in Russia in the early XX century men lived 11 to 12 years less than women and the mortality of the male population at working age was 4 times higher than that of women (Karaeva, 2014; Starodubov, 2006). Among the reasons for the occurrence of such phenomena are the fall in the standard of living of the population and the decline in the quality of medical services.

In the period between 1992 – 2008 Russia had experienced an annual loss of 700 – 800 thousand people, not only due to the excess of the number of deaths over the number of births, but also due to the migration of Russians abroad. The absolute decrease in the population for this period was 8 million people (including 4.8 million migrants), or about 470 thousand people on average per year. If this trend continued by 2050 the country would have been missing up to 30% of its population. The loss of gross domestic product (GDP) due to premature deaths, according to WHO (2018), would be 8.2 trillion rubles. Although after 2008 there have been positive changes in the demographic movement, it is not yet possible to suggest that the demographic problem has been solved.

This article considers the dynamics of public health preservation in Russia from the standpoint of an integrated approach of medical geography.

## **2. Methodology**

The study is based on open source statistical data of Federal State Statistics Service of the Russian Federation (Rosstat), annual reports of the World Health Organization (WHO), and the legal documents of the Russian Federation. Individual provisions are clarified using primary information of health care institutions, private clinics, state and municipal authorities. Previous authors' research is applied with regard to conceptual and methodological provision of medical geography and the territorial organization of public life, while the review on health care management studies are applied to structural assessment of the industry (Semenova, 2011).

There are several scientific approaches applied in the course of research: structural system, geosituational, spatio-temporal, problem-program. The basic methods are statistical, comparative-geographical, program-target. Visualization of figures is done using gapminder online software (Gapminder Tool, 2018). The totality of these approaches and methods allowed to conduct a comprehensive study of the dynamics of the state of public health

in the Russian Federation, to develop policy recommendations for managing public health, including the level of territorial health care.

### 3. Research results

#### 3.1. Life expectancy dynamics of the Russian population against the background of other countries

One of the key indicators characterizing the health of the population is life expectancy at birth. Figures 1 and 2 show the relative position of individual countries in terms of two indicators: life expectancy at birth and GDP per capita. The sample includes some of the most and least developed countries, as well as countries that are at the stage of active development.

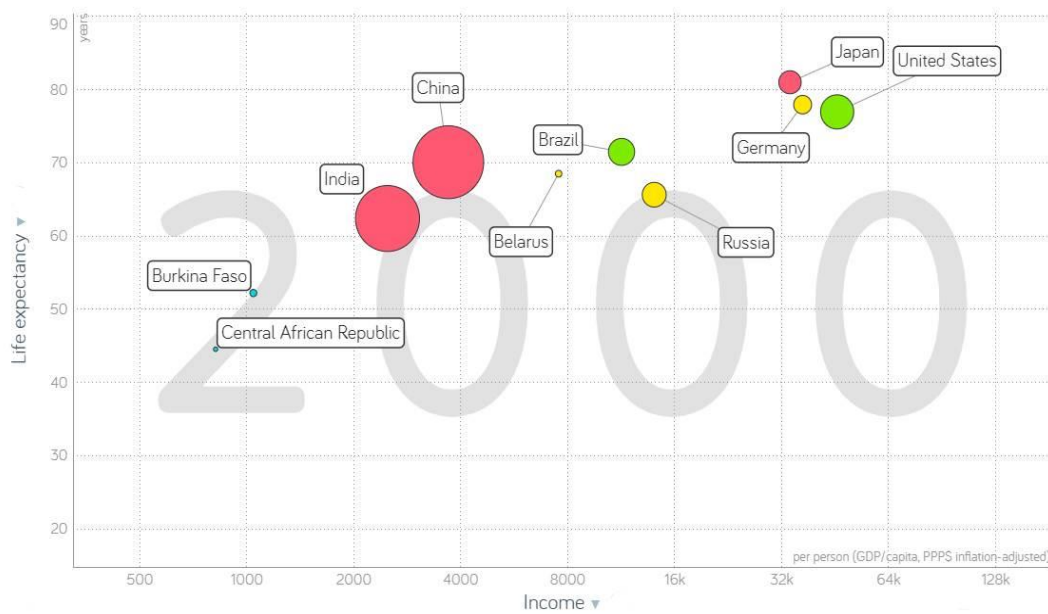


Fig. 1. Life expectancy and GDP per capita by country sample, 2000

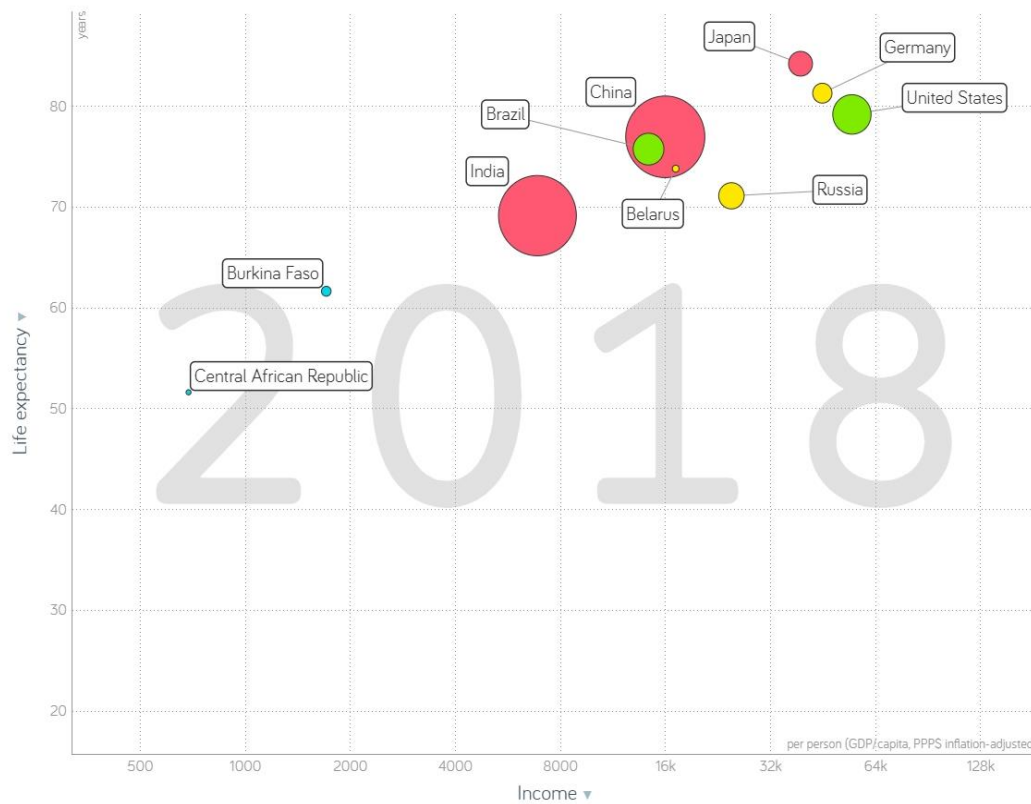


Fig. 2. Life expectancy and GDP per capita by country sample, 2018

Over the past 18 years, all of the countries in the sample have shown an increase in life expectancy, while GDP growth is observed in all countries except for Central African Republic. Particularly significant growth in human development is registered in China and India (Gapminder Tool, 2018). The clustering trend is clearly traced in terms of the indicators presented. There is a leveling of intercountry differences, which meets the challenges of ensuring the sustainable development of the planet.

### 3.1.1. An analysis of the implementation of public health preservation programs

Since 2005 the Government of the Russian Federation has initiated a number of integrated programs for the development of public health care: the program of additional drug provision for privileged categories of the population; the national priority project “Health”; regional health modernization programs (Takzdorovo, 2018). Thanks to these measures, trends in mortality and life expectancy at birth began to show a positive trend (Figure 3), and improved indicators for population habitat quality (Table 1).

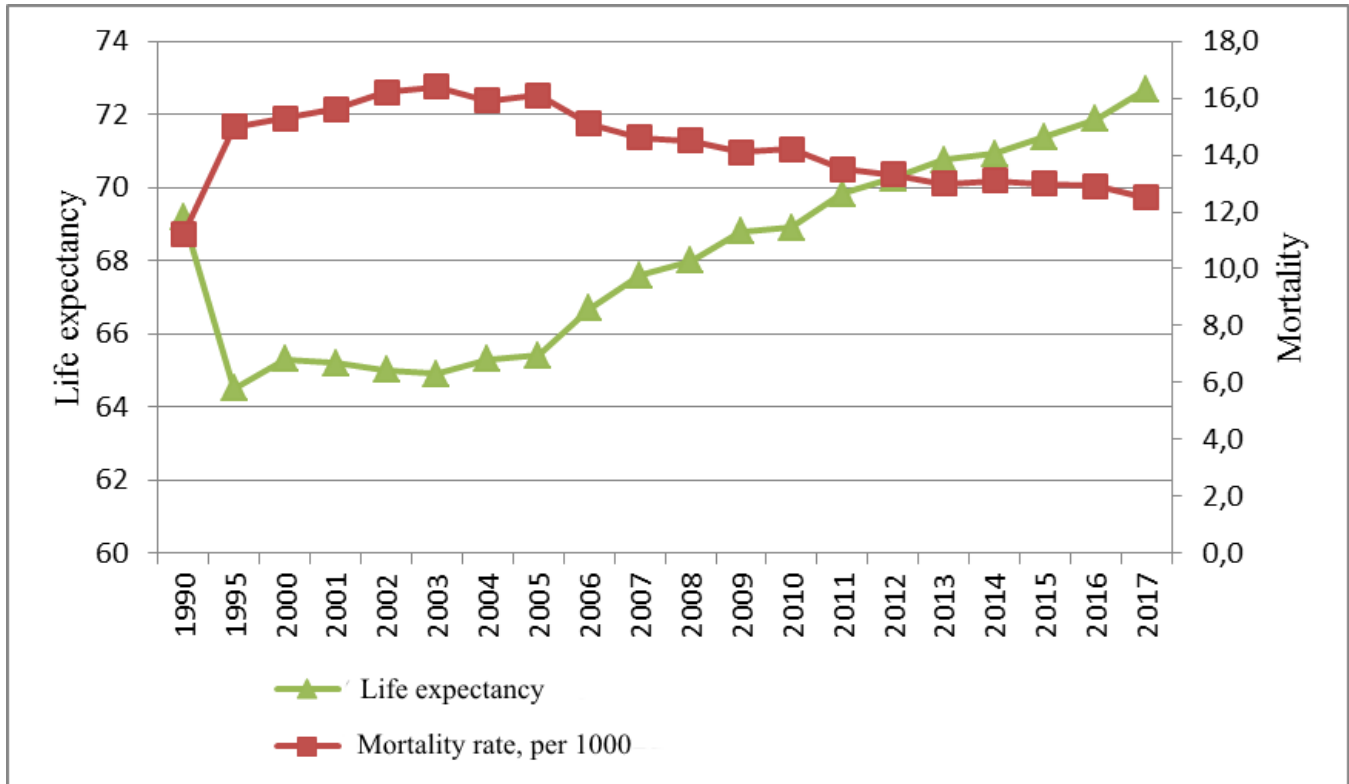


Fig. 3. Life expectancy at birth and death rate per 1000 population, 1990 – 2017

Source: based on (Federal State Statistics Service of the Russian Federation, 2018)

In recent years, public authorities have intensified various forms of support for health and well-being on the part of the population itself: attendance of gym and swimming pool, walking and jogging, skiing, various ways of tempering the body, taking vitamins and minerals, dieting, etc. In general, the dynamics of indicators reflecting the state of health and the habitat has become positive. So, in 2017 the life expectancy of women in comparison with 2000 increased by 5.34 years, for men – by 8.51 years; the mortality of the working-age population from all causes (the number of deaths per 100,000 people) decreased by 90,000 for women and 435,200 for men. But at the same time, the number of registered HIV patients increased more than 12-fold, due both to the spread of the disease itself and to more effective measures to identify, monitor and systematize data on such patients.

Table 1. Indicators of the health status and habitat of the population of Russia for 2000, 2014, 2016, and 2017

Indicators	2000	2014	2016	2017
Life expectancy, years				
women	72.3	75.9	77.06	77.64
men	59.0	64.6	66.5	67.51
Mortality of the working-age population from all causes (number of deaths per 100.000 people):				
women				
men	294.9	242.8	224.9	205
Children who died before the age of 1 year (per 1.000)	1154.2	887.4	800.5	719

live births)	15.3	8.2	6.0	5.5
Maternal mortality (per 100 thousand births)	37.7	11.3	10.0	7.3
Registered patients with HIV infection. persons	78571	463284	870952	943999
Incidence of active tuberculosis. number of patients registered in healthcare institutions:				
total, thousand people	379.9	211.9	178.1	
per 100 thousand people	261.5	147.5	121.3	n.a.
Death rate from tuberculosis. number of deaths per 100 thousand people	20.5	11.3	7.9	6.2
Emissions of pollutants into the atmosphere. million tons	32.3	31.2	31.6	32
Share of housing stock equipped plumbing:				
city	86	90	91	n.a.
village	39	52	58	

*Source:* based on (Environmental protection in Russia, 2014; Healthcare in Russia, 2013, 2017; Housing in Russia, 2016; Russia in figures, 2015–2017)

In 2008, Russia has joined the WHO framework conference on tobacco control (HIV in Russia, 2017), which intensified the policy of combating tobacco smoking. After the adoption in 2013 of a law banning smoking in public places, selling tobacco products to minors, advertising tobacco, etc. (Federal Law No. 15-FZ of February 23, 2013), the number of smokers began to decline. As a result of the increase in the excise rate, there has been a decrease in the average per capita consumption of alcoholic products (Grigorieva, Bobileva, 2015).

In 2011, the modernization of the Compulsory Medical Insurance (CMI) system began. The management of CMI funds was centralized in the Federal Compulsory Medical Insurance Fund, while the financial independence of regional CMI funds was significantly limited. Starting from 2015, funding for all types of medical care included in the program of state guarantees for the provision of medical care, excluding high-tech medical care and socially significant diseases (HIV / AIDS, tuberculosis, mental illnesses) is made only through the CMI system.

Strengthening the resource provision of healthcare is aimed at improving the skills of medical personnel. It is associated with higher wages, motivation for professional growth, better working conditions. However, until recently all these components of physicians' professionalism were inferior to foreign countries (Kochkina et al., 2015). More than half of the Russian citizens were confident that the professional level of the majority of doctors in Russia is lower than required, and the share of those who perceive doctors to be more concerned about their incomes than patients is 60% (Karaeva, 2014). This mistrust of the population to the medical profession was a serious challenge to the Russian healthcare system, prompting government bodies to take measures for eliminating this negative trend.

In the Decree of the President of the Russian Federation “On the Improvement of Public Health Policy” as of 2012 and the Decree of the President of the Russian Federation “On Measures for the Implementation of the Demographic Policy of the Russian Federation” as of 2018 a set of target indicators for the health status of the population is defined: reduction of mortality from diseases of the blood circulatory system, neoplasms (including malignant), tuberculosis, traffic accidents, infant mortality. To achieve these goals, it was necessary to solve the problem of increasing the average wage, the quality of the services provided. The level of wages in the healthcare system began to correlate with the specific conditions of regional labor markets as well as to take into account the professional achievements of doctors.

Public expenditure on healthcare in real terms has begun to decline after a successful 2012 when it reached its maximum values. In 2013 the decrease amounted to 19%, in 2014 there was a slight increase of 6%, and in 2015 and 2016 there was a decline of 4% and 2%, respectively (Table 2).

**Table 2.** Indicators of public expenditure on healthcare by sources of financing, bln. rubles

Funding source	Year				
	2012	2013	2014	2015	2016
Federal budget	613.9	502.0	535.6	516.0	506.3
Budgets of constituent entities of the Russian Federation including:	1068.5	1250.9	1316.2	1355.8	1281.2
Contributions to CMI from non-working citizens	298.9	385.7	478.3	640.7	640.7
Contributions to CMI from working citizens	615.1	687.4	733.2	774.9	845.4
Public expenditure on healthcare	2297.5	2440.3	2585.0	2646.7	2632.5
Increase in public expenditure on healthcare in real terms, %	-	6.21	5.92	2.38	-0.5

Source: based on: (Federal State Statistics Service of the Russian Federation, 2018; Russia in figures, 2017; Grigorieva, Bobyleva, 2015)

In the conditions of economic recession (after 2013) in the Russian Federation the budget policy for the healthcare system has become the main political and economic challenge and a source of serious risks. The Government of the Russian Federation has set the task for the sectoral ministries of the social bloc and the authorities of the constituent entities of the Russian Federation to ensure at least 30% increase in wages by optimizing the use of resources and increasing revenues from paid services. However, as practice shows, such “optimization” was accompanied by a reduction in the number of medical workers and medical institutions. In a number of regions there has been a tendency to reduce the level of provision of the population with hospital beds in hospitals, close medical facilities in villages and small towns, reduce the number of doctors, middle and junior medical personnel per capita.

The average salary of doctors in 2015 reached 140% of the average wage in the respective region and since then has remained at about the same level. The salary of the average medical personnel is 4/5, and the salary of the junior medical personnel is 1/2 of the average salary in the corresponding region. However, in a number of regions, reaching these proportions has proved problematic. Therefore, if the national targets set remain unchanged the risk of accelerated reduction in the number of beds and medical personnel, the deterioration in the quality and accessibility of free inpatient medical care to the population will continue.

Managerial decisions on the development of the healthcare sector should take into account the specificity of the morbidity, and, consequently, the corresponding structure of medical services and the availability of medical specialists. In general, the main causes of death (50% of cases) are diseases of the blood circulatory system, in second place – diseases associated with neoplasms. Data in table 3 suggests a reduction in mortality for all groups of causes.

**Table 3.** Data on the death rate of the population for the main causes of death in the Russian Federation for 2016 – 2017

Causes of death	Number of deaths					
	people			per 100,000 people		
	2016	2017	2017 to 2016, %	2016	2017	2017 to 2016, %
<i>1. Main types of diseases</i>						
infectious and parasitic	32631	32123	98.4	22.3	21.9	98.2
neoplasms	295372	288951	97.8	201.6	196.9	97.7



circulatory system	899953	857980	95.3	614.1	584.7	95.2
respiratory system	68954	60549	87.8	47.1	41.3	87.7
organs of digestion	97157	91571	94.3	66.3	62.4	94.1
<i>2. External factors</i>						
traffic accidents	21570	19885	92.2	14.7	13.6	92.5
accidental alcohol poisoning	8283	6789	82	5.7	4.6	80.7
other poisoning	8818	8116	92	6	5.5	91.7
random drowning	6368	4877	76.6	4.3	3.3	76.7
suicide	22839	20055	87.8	15.6	13.7	87.8
murders	10331	8844	85.6	7	6	85.7
poisoning and exposure to alcohol with uncertain intentions	1709	1650	96.5	1.2	1.1	91.7
other external causes	73599	68568	93.2	50.2	46.7	93

Source: based on (Russia in figures, 2016–2017)

3.1.2. Regional specifics of population health

Causes and correlation of mortality rates in the context of subjects of the Russian Federation correspond to all-Russian trends. Table 4 shows the regions that are defined as the most unfavorable (left part of the table) and the most favorable (right part of the table) from the environmental point of view according to the monitoring results of the NGO “Green Patrol” (Environmental rating of the subjects of the Russian Federation, 2018). In addition, the two largest cities of Russia are additionally represented – Moscow and St. Petersburg.

Table 4. Information on population mortality by reasons of death, per 100 thousand people, 2016 – 2017

Causes of mortality	Subjects of the Russian Federation											
	Sverdlovsk region	Bryansk region	Chelyabinsk region	Moscow region	Irkutsk region	Moscow	St. Petersburg	Tambov Region	Belgorod region	Altai Republic	Altai region	Kursk region
Total deaths 2017	1332.8	1528.1	1301.2	1235.8	1285.7	<b>960.3</b>	<b>1146.6</b>	1515.2	1345.9	964.3	1395.6	1551.1
% to 2016	95.2	98.1	95.6	94.6	96.4	<b>95.9</b>	<b>97.6</b>	95.8	96.8	96.9	99.5	96.2
including												
Infectious and parasitic diseases 2017	47.1	10.5	39.2	12.4	64	<b>11.1</b>	<b>22.6</b>	6.8	4.5	14.7	54.1	9.2
% to 2016	97.7	87.5	98	100.8	92.4	<b>105.7</b>	<b>100.4</b>	75.6	115.4	88	105.9	88.5
Neoplasms 2017	226.1	240.8	239	174.7	219.3	<b>208.4</b>	<b>256.6</b>	180.1	194.7	146.5	218.9	244.3
% to 2016	101.9	99.7	100.1	84.5	103.5	<b>98.1</b>	<b>100</b>	96.1	97.8	101.1	98.7	100.6
Diseases of the blood circulatory system	654.6	752.4	573.2	545.5	613.6	<b>529.4</b>	<b>655.1</b>	607.7	722.6	399.7	563.7	699.7
	<b>0.491</b>	<b>0.492</b>	<b>0.441</b>	<b>0.441</b>	<b>0.477</b>	<b>0.551</b>	<b>0.571</b>	<b>0.401</b>	<b>0.537</b>	<b>0.414</b>	<b>0.404</b>	<b>0.451</b>



2017 % of total % to 2016	96.8	100.3	92.1	85	94.1	<b>100.1</b>	<b>94.9</b>	92.7	94.2	95.1	94.9	91.8
Respiratory diseases 2017 % to 2016	43.5	65.2	43.5	42.7	46.6	<b>26.1</b>	<b>35</b>	57.1	41.8	47.3	56.9	73.3
	92.4	93.4	92.6	86.3	81.3	<b>97</b>	<b>77.3</b>	91.1	79.9	90.4	90.5	99.7
Diseases of the digestive system 2017 % to 2016	76.8	84.7	60.5	74.8	57	<b>38.2</b>	<b>47.5</b>	67.3	46	44.6	55.6	69.7
	91.3	97.5	91.1	100.5	89.5	<b>96</b>	<b>96</b>	96	92.2	86.1	90.7	83.6
External causes 2017 % to 2016	128.7	124.7	111.6	96.1	136.9	<b>46.9</b>	<b>54.4</b>	97	65.3	129. 5	106.4	84.6
	85	95.3	85.8	92.9	93.8	<b>96.3</b>	<b>92.2</b>	84.2	87.2	93.2	93.8	83.4

Source: based on (Environmental rating of the subjects of the Russian Federation, 2018; The natural movement of the population in the context of the subjects of the Russian Federation, 2017)

In the regions under review, as in Russia as a whole, in 2017 there was a decrease in mortality in comparison with the previous year; the main cause are diseases of the blood circulatory system. The share of deaths associated with them ranges from 40% in the Tambov region and the Altai Krai to 55% and 57% in Moscow and St. Petersburg, respectively. Neoplasms are on the second place among the mortality causes. The most difficult situation is in the largest cities of the country – Moscow and St. Petersburg (21% and 22%, respectively). The smallest number of deaths from neoplasms is observed in the Tambov region, where this indicator is at the level of 11%. According to the received data, almost all neoplasms are malignant. The third most important indicator is the external causes of death, which include alcohol poisoning, murders, traffic accidents, etc. These are among the highest share in all the regions represented.

On some indicators, there are significant differences between the regions. For example, 64 people per 100 thousand of the Irkutsk region population die from infectious and parasitic diseases, which is more than 14 times greater than the favorable Belgorod region. The first two aforementioned causes of mortality constitute the main challenge for preserving the human potential of the country. In Moscow and St. Petersburg they account for almost 80% of deaths. Reduction of mortality in these categories should become one of the strategic directions of preserving population health. At the level of some municipalities, other ratios of mortality causes may appear, for example, diseases of the respiratory system (Safiullin, 2011). Obviously, this of morbidity causes ratio was affected by the state of the environment, not only outside, but also within industrial enterprises, that is, affected by both living conditions and working environment. Consequently, the objectives of improving the places of residence and work do not lose its relevance. Based on the data presented in the table 4 it follows that the environmental rating of the regions compiled by the NGO “Green Patrol” is not indicative from the point of view of the main causes of mortality in the subjects of the Russian Federation.

## Conclusions

Prior to the second millennium the sustainable development was understood as ensuring the environmental security of the population (Glazovsky, 2006). At the same time, the solution of environmental problems was linked with the development of the material and technical base (Chistobayev et al., 2003). At present, sustainable development means the development of a society in which human living conditions are improved, and the environmental impact remains within the economic capacity of the biosphere, so that the natural basis of the functioning of mankind is not destroyed. The level of the state of public health depends on the productivity of

labor, the timing and quality of the production processes performed, and, consequently, the growth rates of the economy, the level and quality of life.

In the modern world the material security of the population is differentiated not only by country, but also within them. The Russian Federation is no exception: poverty reduction is an urgent problem and the main goal of national and regional policy. Achievement of this goal set the following objectives in the public healthcare domain: poverty elimination among non-marginalized groups of population, provision of marginalized people with access to food and housing.

One of the main goals of preserving public health in Russia is to increase life expectancy of the population, to bring the level relevant indicators to those of developed countries of the world. This necessitates to: a) reduce the level of mortality from the main causes; b) orient society towards a healthy lifestyle; c) prevent the death of mothers and children at birth; d) provide the necessary conditions for the social activity of elderly groups of the population.

Reducing the level of socially conditioned infectious diseases remains the responsibility and the target setting of public authorities. Taking into account the trends in population health and the state of environment shown in table 1 the following objectives are outlined: a) stop the spread of HIV / AIDS; b) prevent the expansion of tuberculosis and other socially determined infectious diseases.

The integral goal of improving public health is ensuring environmental sustainability. Among the numerous tasks for its achievement we will single out three main ones: a) incorporate the principles of sustainable development in the program documents on the prevention of losses in the sphere of nature management; b) provide the population with clean water and ecologically clean food; c) improve the quality of living conditions.

The outlined goal and objectives are the essence of strategic directions in the field of preserving public health at the level of the country and its regions.

Population health preservation is a task not only for medical workers or physicians, but also for other specialists, including medical geographers, who use an integrated approach to the study of natural and social systems.

By the end of the last century the life expectancy of the population in Russia was significantly lower than in developed countries. Since 2005, the growth of this indicator has begun – the death rate per 1000 people began to decline. Most of the indicators reflecting the state of public health and its habitat markedly improved. The only exception was the number of registered patients with HIV: their number increased 12 times. Indicators of public expenditure from the federal budget of the constituent entities of the Russian Federation remained approximately at the same level. The increase in state expenditures on health in real terms was insignificant, and in 2016 – negative. The main goals and related tasks in the area of improving public health are to reduce poverty, increase life expectancy, combat HIV / AIDS, tuberculosis and other socially determined infectious diseases, and ensure environmental sustainability.

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