

15.74% to 83.5 0/0000 for STT among the population in these areas.

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MORTALITY ANALYSIS OF THE WORKING-AGE POPULATION OF YAKUTIA

The article analyzes the government statistics data on mortality of able-bodied population in the Republic of Sakha (Yakutia) in the period from 1995 to 2020, together with the structure of the main causes of death in this category. The dynamics of changes in the mortality structure of urban and rural residents with gender division is studied, the impact of the new coronavirus infection on the work of the health care system in Yakutia is shown. Mortality rate of the population of the Republic of Sakha (Yakutia) of working age decreased significantly during the study period, but the proportion of deaths in this group to the total number of deaths is still higher than the all-Russian figures. It is also shown that the mortality rate of men is 3.6 times higher than that of women. Since 2011, the mortality rate in rural areas has become significantly higher than that in urban areas, especially among the female population, which is largely determined by the reduction of bed capacity. The trend towards reducing the number of inpatient beds is certainly typical not only for Russia, but also for most European countries, but the negative consequences of this are largely offset

by the opening of prevention and rehabilitation centers locally, where progressive treatment technologies are used. But this approach does not take into account the main regional peculiarities of Yakutia - its extensive territory and low population density. The problem is also exacerbated by environmental conditions, the negligent attitude of many citizens to their health and unfavorable socio-economic factors, especially pronounced in rural areas. But it must be recognized that in recent years the republic has carried out significant work to improve its healthcare system, including through the construction of new medical facilities, large-scale preventive work and the introduction of "Zemskiy Doctor" and "Zemskiy Feldsher" programs, thanks to which qualified personnel are sent to the remote corners of the republic to work. However, receiving quality and prompt medical care is still difficult for remote rural settlements.

Keywords: mortality; able-bodied population; main causes of death; coronavirus; Yakutia.

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Introduction. Increasing life expectancy is one of the national development goals of Russia until 2030. [1]. However, the achievement of this goal is still hindered by the high mortality rate of people of working age. According to even the average version of the UN forecast [6], calculated even before the COVID-19

pandemic, by 2050 the number of Russians aged 25-64 will decrease by 28% (from 82,808,000 to 59,623,000 people). This may cause a shortage of labor resources and lead to an increase in the demographic load factor.

Objective of the study. To conduct a comparative analysis of the mortality rate

Table 1

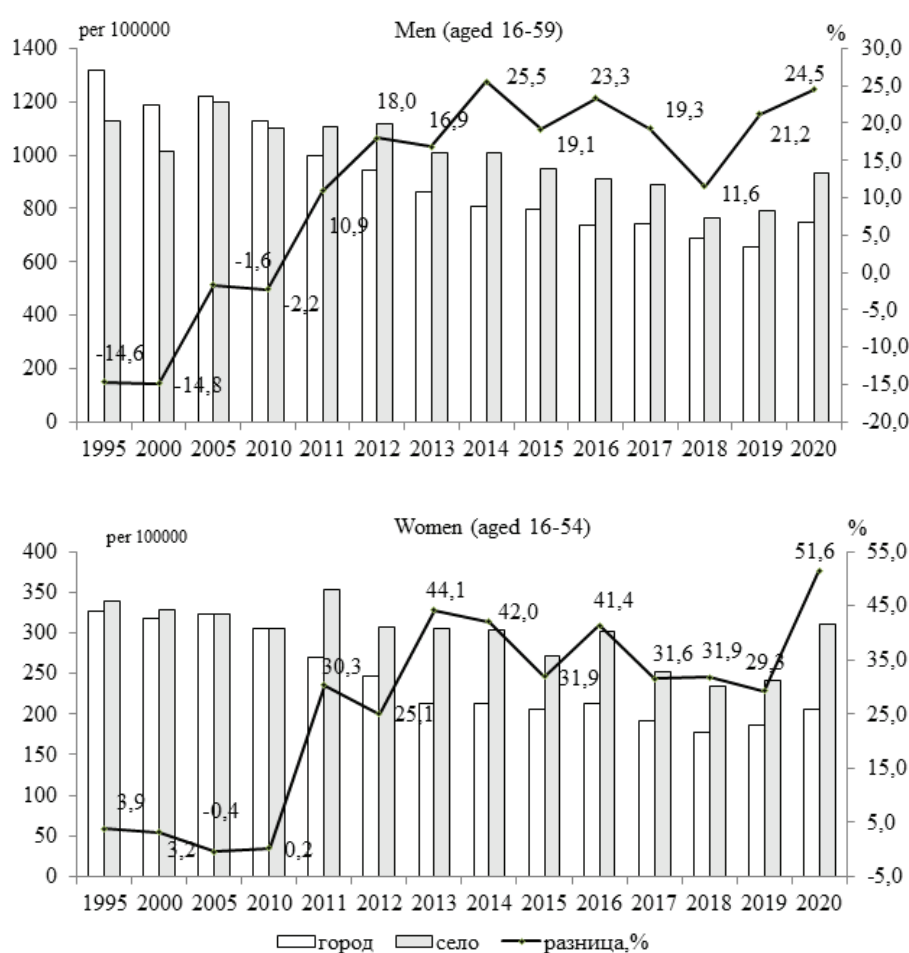
Dynamics of the number of deceased in the working age in the Republic of Sakha (Yakutia) from 1995 to 2020

Indicator	Year								
	1995	2005	2010	2015	2016	2017	2018	2019	2020
Mortality rate of working-age population, per 100000	829.2	773.6	725.5	552.8	532.2	516.7	468.8	465.2	538.4
including male mortality rate	1259.8	1209.9	1118.2	848.7	794.4	790.9	713.2	697.7	806.9
including female mortality rate	330.3	322.9	305.8	226.5	241.0	210.6	194.9	203.4	236.6
Proportion of deaths in working age in relation to the total number of deaths, %	50.6	48.2	46.9	38.8	37.5	36.9	34.5	33.7	33.9

of the working-age population of the Republic of Sakha (Yakutia) for the last 25 years (from 1995 to 2020). Data of the territorial body of the Federal State Statistics Service in the Republic of Sakha (Yakutia) on the death rate of the working-age population (men 16-59 years, women 16-54 years) by major causes of death were analyzed: certain infectious and parasitic diseases (A00-B99), neoplasms (C00-D48), cardiovascular diseases (I00-I99), respiratory diseases (J00-J99), digestive diseases (K00-K93) and external causes of death (V01-Y98) from 1995 to 2010 and from 2011 to 2020. The materials of the state report "On the state of population health and organization of health care in the Republic of Sakha (Yakutia) according to the results of activity for 2020" were also used. [3]. Statistical processing of the data was performed using Microsoft Office spreadsheets.

Results: According to official statistics, the mortality rate of Russians of working age is gradually decreasing. Not an exception is the Republic of Sakha (Yakutia). As Table 1 shows, while in 1995 this rate per 100,000 population was 829.2 people, by 2019 it has decreased by 43.9%, i.e. to 465.2 people. (Increase in mortality in 2020, due to the COVID-19 pandemic). For comparison, in 2019 the mortality rate for working-aged people was at 470 for the Russian Federation and 593 for the Far Eastern Federal District.

But it is worth noting that in Yakutia to this day the share of working-age deaths is still over 30% of the total number of deaths, while the average value for Russia in 2019 was at 21.1% (1,800,683 people died, including 379,883 working-aged. Second, even taking into account differences in the age range between the sexes, there is a significant gender difference - on average, the mortality rate of men is 3.6 times higher than that of women.



Mortality rates of the working-aged people of the Republic of Sakha (Yakutia) in rural and urban areas (1995-2020)

Thirdly, in recent years there has been a pronounced difference between mortality in rural and urban areas (Fig. 4). Thus, while before 2010 the mortality rate in rural areas was lower or was at the level of indicators in urban settlements, since 2011 it has been significantly higher than that in urban areas, especially for the female population. For example, in 2020 the difference was 51.6% (Fig. 1).

One of the reasons for the previously mentioned difference between the mortality rates of the rural and urban population is a significant reduction in the number of beds. So, from 1995 to 2020, this indicator for the Republic of Sakha (Yakutia) decreased from 155 to 96 beds/10 000 population, or, in absolute terms - from 16080 to 9305 units (-42.1%). When comparing the number of budget beds with the calculated difference in

Table 2

Distribution of causes of mortality of rural and urban residents of working-age residents in the Republic of Sakha (Yakutia) for 1995-2010 and 2011-2020

ICD	Population							
	Urban				Rural			
	1995-2010		2011-2020		1995-2010		2011-2020	
	M	F	M	F	M	F	M	F
	чел./100 тыс. населения							
V01-Y98	472.2	90.5	259.2	50.3	564.6	103.6	416.2	88.1
I00-I99	388.1	97.2	291.7	65.3	293.9	98.2	291.8	86.6
C00-D48	115.9	52.1	80.9	38.6	78.5	43.0	91.3	46.7
A00-B99	29.0	7.6	24.5	8.0	20.4	9.3	17.0	6.6
J00-J99	49.2	12.9	28.4	7.7	26.3	11.1	20.2	6.3
K00-K93	81.8	28.8	56.8	24.2	48.8	20.5	40.6	19.9
Прочие	78.0	29.6	55.8	18.3	77.6	38.4	70.9	34.1
	%							
V01-Y98	38.9	28.4	32.5	23.7	50.9	32.0	43.9	30.6
I00-I99	32.0	30.5	36.6	30.7	26.5	30.3	30.8	30.0
C00-D48	9.5	16.3	10.1	18.2	7.1	13.3	9.6	16.2
A00-B99	2.4	2.4	3.1	3.8	1.8	2.9	1.8	2.3
J00-J99	4.1	4.0	3.6	3.6	2.4	3.4	2.1	2.2
K00-K93	6.7	9.0	7.1	11.4	4.4	6.3	4.3	6.9
Others	6.4	9.3	7.0	8.6	7.0	11.8	7.5	11.8

urban and rural population mortality, we found a pronounced inverse correlation ($r = -0.8...-0.9$). It should be taken into account that the dynamics of the reduction of beds in Yakut villages is much higher than in the city. For example, if from 2008 to 2020 the last indicator has decreased by 12.4%, the reduction of beds in rural areas has been registered by 40.2%, or from 3134 to 1873 units. In other words, in 2020 there were on average 3.2 beds per one rural settlement of the republic, whereas in 2010. (i.e. before the difference in mortality between the rural and male populations), the figure was 4.7 beds.

The new coronavirus infection COVID-19, which emerged in 2020, has made a significant change in public health. According to the State Report "On the state of public health and organization of health care in the Republic of Sakha (Yakutia) according to the results of 2020" in 2020 the hospitalization rate decreased by 23.7% compared to 2019, the volume of inpatient care - by 24%, the intensity of use of beds in hospitals - by 14.8%. There was also a significant reorganization of 24-hour beds. Primarily by increasing the number of infectious disease beds for adults (from 264 to 1691) the number of therapeutic (by 40.9% or from 1377 to 814), tuberculosis

(by 29.1% or from 731 to 518), neurology (by 35.8% or from 386 to 248), gynecology (by 35.6% or from 388 to 250), pediatric somatic (by 34.9% or from 708 to 461) and other beds were reduced. This aggravated the deplorable situation in healthcare, especially in distant from the center, where transport infrastructure is extremely difficult, lack of qualified personnel, necessary medicines, equipment, etc.

The problem is exacerbated by Yakutia's severe environmental conditions, the careless attitude of many citizens toward their health, unfavorable socio-economic factors, such as low income or unemployment, deteriorating nutrition, etc. According to a medical and social survey we conducted in 2020 among the residents of rural areas of Namsky District diagnosed with chronic viral hepatitis, we found that only 20.8% considered their income high enough, 54.5% of respondents were burdened with consumer loans, 50.6% lived in poorly equipped houses, 46.8% considered the consumed food intake to be insufficient. Only 15.5% of men and 40.9% of women fully followed their physician's prescriptions [4].

In 1995-2000, a significant proportion of the working-aged male population died of external causes (V01-Y98). But over the past decade, positive changes have

been observed, especially in the urban population, where the mortality rate has decreased by 44.4-45.1%. This reduction is caused mainly by the decrease in the number of murders (from 241 to 116 cases/year) and suicides (from 340 to 168 cases/year), the total share of which in the structure of external causes varied from 28.1% to 39.8% depending on the year. The number of deaths caused by transport injuries also decreased significantly (from 160 to 76 cases/year). But the mortality rate due to alcohol poisoning is still high - a total of 601 people died in the country between 2011 and 2020, including 468 men and 133 women. In general, the mortality rate of rural residents from external causes is always significantly higher than that of urban residents - 39.5% for men and 47.3% for women.

The data in Table 2 show that of the diseases influencing high mortality in working-aged people, the leading place is occupied by diseases of the circulatory system (I00-I99). At the same time, in recent years, urban residents have seen an obvious decrease in mortality from this cause (by 24.8-32.8%). Rural residents have not seen such pronounced positive changes. According to calculations for 2011-2020, the most frequent causes of death were coronary heart disease (27.8%), cerebrovascular disease (17.6%) and acute myocardial infarction (10.3%). Today in the Sakha Republic there is Regional Vascular Center No. 2 on the basis of the State Institution of the Republic of Sakha (Yakutia) Republican Hospital No. 1-National Medical Center, which provides care for cerebrovascular disease, Regional Vascular Center No. 1 on the basis of the State Institution of the Sakha Republic (Yakutia) Republican Hospital No. 2-Emergency Medical Care Center, and 4 primary vascular departments in Mirny, Neryungri, Nyurba and the village of Maya of the Megino-Kangalassky District. Pre-hospital thrombolysis by ambulance services is carried out to reduce mortality from acute coronary syndrome, work on early detection of patients with high and very high cardiovascular risk is carried out, etc. [3]. In April 2022 it is planned to put into operation the republican cardiovascular center for 150 places, equipped with the most up-to-date equipment.

The mortality rate from neoplasms (C00-D48) among the urban population also decreased significantly (by 25.9-30.2%), and, on the contrary, among men in rural areas increased by 16.3%. From 2011 to 2020 the absolute number of those who died of neoplasms in the work-

ing-aged people in the Republic of Sakha (Yakutia) amounted to 3663 people, including 2538 men and 1125 women. Proceeding from the urgency of the problem, Yakutia is working to create a network of outpatient cancer care centers. At present, such centers have been opened in Aldan, Vilyui, Mirny, Megino-Kangalassy, Neryungri, Nyurba, Lensk, Olekminsky, Khantalassy uluses and in Yakutsk. It is also planned to open 2 centers in Amga and Verkhnevilyuyusky uluses on the basis of the Central Regional Hospital. Besides, in the regional capital, under the regional program "Fighting cancer in the Republic of Sakha (Yakutia)", the construction of a new Oncoclinic center is being completed, the Internet project initiated in 2020, operates for early cancer diagnostics. Yakutsk Republican Oncological Dispensary. Since its launch, about ten thousand people have been surveyed on the platform, and about seven thousand of them have been examined.

The share of infectious and parasitic diseases (A00-B99) in the total structure has ranged from 1.8 to 3.8% for all years. But it should be borne in mind that only some intestinal infections and tuberculosis are included in this category. And those who died of complications of viral hepatitis depending on the diagnosis are classified as those who died of diseases of the digestive organs or neoplasms. Coronavirus infection is also included in a separate group, from which 1784 people died from the beginning of the pandemic till December 31, 2021, including 1073 in 2021.

The mortality rate from respiratory diseases (J00-J99) became much lower - for urban dwellers by 40,3-42,4%, for rural women by 43,2%, for men by 23,2%.

Conclusion: in recent years Yakutia has made significant efforts to improve the health care system, including the construction of new health care facilities, large-scale preventive work, as well as

the implementation of the "Zemskiy Doctor" and "Zemskiy Paramedic" programs, thanks to which qualified personnel are sent to remote parts of the republic to work. Nevertheless, for a significant part of the population, especially in rural areas, it is still difficult to obtain high-quality and prompt medical care.

Despite a steady decline in the mortality rate of the working-age population in Yakutia over the past 25 years, including from external causes, the share of deaths in the working-aged people to the total number of deaths is still high, even compared to the national data. In Yakutia, 2,500-3,000 people of working age die annually for various reasons. Moreover, the male mortality rate is 3.6 times higher than the female mortality rate. In addition, since 2011 a significant difference in mortality between rural and urban populations began to emerge. The calculations showed that one of the main reasons for this was the reduction in the number of beds, especially after the emergence of a new coronavirus infection. However, in the target indicators of the state program of the Republic of Sakha (Yakutia) "Development of healthcare of the Republic of Sakha (Yakutia) for 2020 - 2024 years", approved on December 12, 2019 (N 887), this most important indicator was not included, which we consider a great omission [2]. Undoubtedly, the downward trend in the number of inpatient beds in general hospitals is typical not only for Russia, but also for most European countries, and its negative consequences are largely compensated by the opening of prevention and rehabilitation centers in the field, where advanced treatment technologies are used [5]. But in the Far East, particularly in Yakutia, which is characterized by its unique natural and territorial conditions and low population density, this approach is ineffective, and this is confirmed by state statistics.

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