

ARCTIC MEDICINE

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DYNAMICS OF DEMOGRAPHIC INDICATORS AND FEATURES OF MORTALITY IN THE ARCTIC ZONE OF THE REPUBLIC OF SAKHA (YAKUTIA) FOR THE PERIOD 2000-2019

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The article presents the dynamics of the main medical and demographic indicators and features of mortality in the Arctic zone of the Republic of Sakha (Yakutia). For the period 2000-2019 there is a tendency to reduce overall mortality, including from diseases of the circulatory system and external causes, against the background of continuing birth rates. The mortality rate from external causes was 1.9 times higher than the average for the Russian Federation, and 1.6 times higher than the average for the Republic of Sakha (Yakutia). The infant mortality rate in the Arctic zone was also higher than the average for the Russian Federation as a whole. High rates of infant mortality and mortality from external causes in the Arctic zone testify to the unfavorable socio-economic situation in the region.

Keywords: Arctic, Yakutia, demography, birth rate, mortality, external causes of death.

Introduction. In accordance with the Decree of the President of the Russian Federation dated 02.05.2014 N 296 "On the land territories of the Arctic zone of the Russian Federation" (as amended on 05.03.2020), the territories of 9 subjects of the Russian Federation, including the Republic of Sakha (Yakutia), are fully or partially assigned to the Arctic zone of the Russian Federation [11]. The features of this territory are extreme, uncomfortable natural and climatic conditions for human living and work, low population density, remoteness from industrial, administrative, business, educational and cultural centers, vulnerable life support of the population and ecosystems. The avail-

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ability of reserves of various minerals makes this region a strategic resource base of the country.

The population of the Arctic zone of the Russian Federation is about 2,5 million people. This territory is home to 82.5 thousand representatives of the minor indigenous peoples of the North [8]. Human health in the Arctic is dependent on a multitude of factors, including the adaptation of the body to extreme environmental conditions, social and living conditions, ecology, lifestyle and nutrition, availability of medical care and medication.

Medical and demographic processes reflect the level of socio-economic development of society and characterize the quality of life of the population. The novel coronavirus infection pandemic has changed the characteristics of the medical and demographic situation due to excessive mortality. Thus, only in the first year of the spread of infection, the total mortality in the Russian Federation increased from 12.3 to 14.6 per 100 thousand population [12]. In the current situation, it is necessary to distinguish between changes caused by the consequences of coronavirus infection and long-term trends in the medical and demographic situation that characterize general patterns. In this regard, the purpose of the study was to assess the dynamics of the main medical and demographic indicators and features of mortality in the Arctic zone of the Republic of Sakha (Yakutia) for the period 2000-2019, for characterize the general direction of the situation.

Materials and methods. For the analysis, information from the Federal State Statistics Service and the Territorial Department of the Federal State Statistics Service for the Republic of Sakha (Yakutia) for the period of 2000-2019 was used [4, 10, 12]. The 20-year period was divided into 10-year intervals and the average values of the indicators were calculated.

Spearman's rank correlation coefficient (IBM SPSS STATISTICS, version 22) was used to assess the strength of the relationship between the indicators.

The limitation of the study is the use of crude mortality rates due to the lack of available data on age-specific mortality rates in the territorial administrative units of the Republic of Sakha (Yakutia).

Results and discussion. The Republic of Sakha (Yakutia) is a subject of the Russian Federation with an area of 3.1 million square km, located in the northeast of the Asian continent. The population of the republic as of 01.01.2020 is 971 thousand people [10]. The population density is 0.32 people/sq. km. The territory of the Republic is divided into 36 administrative-territorial units (34 municipal districts/ ulus and 2 urban districts). According to the National Population Census (NPS) of 2010, the main ethnic groups are Yakuts (45.5%), Russians (41.2%), Ukrainians (3.6%), Evenks (1.9%), Evens (1.2%) [4].

In accordance with the Decree of the President of the Russian Federation "On the land Territories of the Arctic Zone of the Russian Federation" (as amended by Decrees of the President of the Russian Federation dated 27.06.2017 No. 287, dated 13.05.2019 No. 220, dated 05.03.2020 No. 164), the territories of the following 13 municipalities of the Republic of Sakha (Yakutia) are assigned to the Arctic zone of the Russian Federation [11]. These are territories with a very low population density. As of January 1, 2020, 67,652 people lived in these areas. During the period 2000-2019, the population density.

lation in this region decreased by 22%. The population of the Arctic territory of Yakutia is mainly represented by indigenous ethnic groups. The share of minor indigenous peoples of the North (MIPN) averages 32%, considering the share of the population of the Yakut nationality, it should be assumed that in this zone mainly lives the indigenous population of Yakutia. Only in the Verkhnekolymsky district the share of Yakuts and MIPN is less than 50%. The most significant population decline over a 20-year period occurred in areas with a smaller proportion of the indigenous population. The age structure of the population also had significant differences. In most districts, the average age of the population was higher than in the republic in whole.

The analysis of the gender and age structure of the population of the Arctic zone of the Republic as of 01.01.2020 showed that the ratio of men (33491) and women (34161) was comparable. The age structure had a disproportion, up to 45-49 years the number of men exceeded the number of women. Especially pronounced differences were observed at the ages of 25-29 years (the number of men is 1.5 times more than women) and 30-34 years (1.2 times, respectively). At the age of 70 and older, there were 2 times less men than women.

Numerous studies have shown that adaptation to the unfavorable factors of the North causes tension in the regulatory systems of the human body and can lead to early depletion of functional reserves [2, 5, 7, 13, 23]. Along with this, in a short period of time, the lifestyle and diet of the population of the North have changed, new stress factors have appeared [6, 17]. This changed the structure of morbidity and mortality, increasing the proportion of chronic non-communicable diseases, with a decrease in infectious morbidity [14, 20]. The combined influence of these factors is reflected in higher rates of morbidity and mortality of the population, low life expectancy of the population of the northern regions [15, 16, 18, 22]. In the Republic of Sakha (Yakutia) for the period of 1992-2019, the incidence of diseases of the circulatory system per 10,000 population increased from 90 to 328: diseases of the endocrine system, eating disorders and metabolic disorders, respectively, increased from 56 to 131 [3, 9].

The analysis of the dynamics of mortality indicators showed that for the period from 2000 to 2019, there was a decrease in mortality in the Russian Federation, these trends were also noted and the republic in whole and in the Arctic zone (Table 1). The average rate of decline in the Arctic zone was -0.7%. The indicators of total mortality in the Arctic zone in each 10-year period were higher than in the Republic of Sakha (Yakutia) as a whole, with comparable birth rates. Over the last 10-year period (2010-2019), the average mortality rates ranged from 8.6-13.2 per 1000 population. The highest mortality rates were observed in areas with a larger proportion of the elder population, the correlation coefficient between the average age of the population and mortality was 0.73 (p<0,001).

Birth rates in the Arctic zone were comparable to the average for the republic in whole. The average growth rate of the indicator in the Arctic zone over a 20-year period was 0.03%. The variability of indicators was noted, for example, in 2010-2019. in the Verkhnekolymsky district, the birth rate averaged 11.8 per 1000, while in the Oleneksky district the average was 23.3. Birth rate positively correlated with the proportion of the minor indigenous peoples in the districts (r=0,71, p<0,001).

The Republic of Sakha (Yakutia) is one of the subjects of the Russian Federation with a continuing natural increase in population. Over 20 years, there is an increase in the indicator of natural population growth. The period of 2011-2014 was the period of the highest rates of natural growth for both the Russian Federation as a whole and the Republic. In the Arctic zone, natural growth rates with similar trends were slightly lower than in the republic in whole.

The infant mortality rate is one of the indicators of socio-economic well-being of society. Over a 20-year period, the mortality rate of children under 1 years old has significantly decreased both in the Russian Federation as a whole and in the Republic of Sakha (Yakutia), in-

Table1

Demographic indicators of the Arctic zone of the Republic of Sakha (Yakutia) [4] [10]

| Territory | Total mortality per | 1000 population* | Birth rate per 1000 population* | | |
|---|---------------------|------------------|---------------------------------|--------------------|--|
| | 2000-2009 | 2010-2019 | 2000-2009 | 2010-2019 | |
| Abyysky district | 13.4 (12.1-14.8) | 14.4 (12.5-16.2) | 12.2 (11.2-13.2) | 11.3 (9.6-13.0) | |
| Allaikhovsky district | 14.4 (12.7-16.0) | 17.0 (14.7-19.3) | 13.0 (11.4-14.6) | 13.2 (11.1-15.4) | |
| Anabarsky district | 19.1 (17.4-20.8) | 20.0 (18.4-21.5) | 10.9 (9.6-12.2) | 8.6 (7.5-9.7) | |
| Bulunsky district | 13.8 (12.8-14.8) | 14.1 (12.5-15.7) | 10.6 (10.1-11.1) | 9.0 (7.6-10.3) | |
| Verkhnekolymsky district | 11.3 (9.9-12.6) | 11.8 (10.3-13.2) | 13.1 (11.7-14.4) | 13.1 (11.7-14.5) | |
| Verkhoyansky district | 15.5 (14.6-16.5) | 17.5 (15.6-19.4) | 12.7 (12.1-13.2) | 11.4 (10.5-12.3) | |
| Zhigansky Evenki National district | 16.8 (14.6-19.1) | 21.2 (19.1-23.3) | 11.9 (10.8-13.0) | 11.2 (10.1-12.4) | |
| Momsky district | 18.6 (17.3-19.9) | 19.9 (17.3-22.5) | 13.0 (11.2-14.8) | 9.7 (8.4-11.1) | |
| Nizhnekolymsky district | 14.1 (12.3-15.9) | 15.7 (13.9-17.4) | 12.6 (10.8-14.5) | 12.5 (10.9-14.0) | |
| Oleneksky Evenki National district | 17.5 (16.3-18.6) | 23.3 (22.3-24.3) | 11.9 (10.4-13.5) | 10.9 (9.1-12.7) | |
| Srednekolymsky district | 15.2 (13.6-16.7) | 17.8 (16.1-19.5) | 11.0 (10.2-11.9) | 12.0 (11.0-13.0) | |
| Ust-Yansky district | 10.9 (9.8-11.9) | 16.0 (13.9-18.2) | 11.1 (10.0-12.2) | 12.6 (11.2-13.9) | |
| Even-Bytantaysky National district | 18.4 (15.8-21.0) | 19.9 (17.7-22.1) | 12.8 (11.7-13.9) | 10.3 (8.5-12.2) | |
| The whole Arctic zone of the Republic Sakha (Yakutia) | 15.3 (14.8-15.8) | 17.6 (16.2-19.0) | 12.1 (11.5-12.6) | 11.2 (10.3-12.1) | |
| The whole Republic of Sakha (Yakutia) | 15.0 (14.3-15.7) | 16.2 (14.9-17.4) | 10.0 (9.8-10.2) | 8.6 (9.1-13.0) | |
| Russian Federation (whole) | 10.4 (9.6-11.2) | 12.4 (11.5-13.2) | 15.4 (14.8-15.9) | 13.0 (12.6 - 13.4) | |

Note: * - average values of indicators for 10-year periods are calculated (95%CI).



Table2

Mortality rates by major classes of causes of death per 100,000 population [10]

Average 2015-2019 Territory 2015 2016 2017 2018 2019 Diseases of the circulatory system (ICD-10, I00-I99) 470.5 450.2 Abyysky district 389.3 662.3 429.0 480.3 Allaikhovsky district 553.9 296.3 662.5 590 444.0 509.3 317.5 339.6 279.2 220.7 290.1 Anabarsky district 293.3 Bulunsky district 465.1 500.9 430.1 335.7 344.1 415.2 Verkhnekolymsky district 422.3 641.8 699.8 705.2 623.2 758.7 395.5 413.4 315.4 395.7 Verkhoyansky district 471.6 382.5 705.6 329.6 Zhigansky Evenki National district 401.9 309.5 530.8 455.5 Momsky district 478.7 461.3 611.8 372.9 377.5 460.4 Nizhnekolymsky district 726.3 457.0 439.0 396.3 491.2 502.0 427.7 225.2 396.0 438.0 309.7 359.3 Oleneksky Evenki National district 531.6 474.4 417.3 Srednekolymsky district 345.8 373.0 361.8 579.9 Ust-Yansky district 553.9 518.3 397.1 456.0 501.0 Even-Bytantaysky National district 286.9 287.8 393.3 602.8 282.1 370.6 494.1 440.3 467.1 436.5 392.1 446.0 The whole Arctic zone of the RS (Ya) The whole Republic of Sakha (Yakutia) 386.7 368.7 364.2 354.0 357.1 366.1 Russian Federation (whole) 635.3 616.4 587.6 583.1 573.2 599.1 Neoplasms (ICD-10, C00-D48) 121.7 245.3 297.2 Abyysky district 25.0 126.2 163.1 Allaikhovsky district 184.6 37.0 147.2 184.4 111.0 132.8 Anabarsky district 88.0 86.6 113.2 195.4 137.9 124.2 Bulunsky district 102.7 83.5 59.6 131.4 155.9 83.1 Verkhnekolymsky district 116.6 164.6 119.8 220.3 248.4 173.9 Verkhoyansky district 104.8 140.6 149.5 177.9 180.2 150.6 Zhigansky Evenki National district 141.2 141.8 289.5 195.0 164.6 238.1 215.4 169.9 171.3 124.3 125.8 161.3 Momsky district Nizhnekolymsky district 158.9 228.5 254.2 209.8 140.4 198.4 Oleneksky Evenki National district 125.8 50.1 148.5 219.0 214.4 151.6 159.9 214.4 162.6 176.5 Srednekolymsky district 172.9 172.8 Ust-Yansky district 207.1 166.2 98.1 141.8 199.5 162.5 Even-Bytantaysky National district 107.6 107.9 107.3 177.3 176.3 135.3 The whole Arctic zone of the RS (Ya) 142.4 136.2 156.9 175.7 168.9 156.0 140.1 136.2 The whole Republic of Sakha (Yakutia) 130.1 134.6 136.5 139.8 Russian Federation (whole) 204.3 200.6 203.0 203.5 203.3 205.1 External causes (ICD-10, V01-Y98) Abyysky district 294.3 247.6 212.2 267.6 125.1 126.2 294.4 222.0 Allaikhovsky district 110.8 222.2 110.6 192.0 Anabarsky district 381.3 259.7 113.2 167.5 193.1 223.0 Bulunsky district 190.8 83.5 143.4 143.9 154.3 143.2 119.8 49.7 138.1 Verkhnekolymsky district 233.3 141.0 146.8 Verkhoyansky district 296.9 228.5 211.1 266.8 108.1 222.3 Zhigansky Evenki National district 376.3 141.2 236.4 142.9 265.4 232.4 Momsky district 71.8 242.8 195.8 149.1 75.5 147.0 Nizhnekolymsky district 181.6 228.5 231.1 186.5 117.0 188.9 Oleneksky Evenki National district 251.6 225.2 297 267.6 214.4 251.2 292.4 214.4 219.3 Srednekolymsky district 159.6 213.2 216.9 220.9 193.9 280.2 127.6 142.5 193.0 Ust-Yansky district Even-Bytantaysky National district 286.0 177.3 211.6 271.5 358.7 323.7 The whole Arctic zone of the RS (Ya) 238.6 221.3 220.7 171.2 161.3 202.6 145.3 135.4 122.6 122.6 109.4 127.1 The whole Republic of Sakha (Yakutia) 114.2 104.0 98.5 Russian Federation (whole) 121.3 95.3 106.7

cluding its Arctic zone [10, 12]. It should be noted that there are significant differences between the indicators of municipalities. In the last 10-year period, the average infant mortality rate ranged from 3.4 to 14.2 per 1,000 live births. In general, in all periods, the infant mortality rate in the Arctic zone was higher than in the whole RS (Ya) and the Russian Federation. Similar trends are observed among the population of the Arctic territories of other countries [16].

The analysis of mortality by the most common causes of death for 2015-2019 was carried out (Table 2). Over a 5-year period, a reduction in mortality rates from diseases of the circulatory system and external causes both in the Republic and in the Russian Federation were noted. Along with this, both in the Republic and in the Arctic zone there is an increase in mortality from neoplasms. Mortality rates from diseases of the circulatory system (DCS), neoplasms and external causes in the Arctic zone were slightly higher than in the Republic as a whole. At the same time, it is necessary to consider the differences in the age structures of the population. The most significant differences are noted in mortality rates from external causes. In the Arctic regions of the Republic, the average mortality rate for the analyzed period is 1.9 times higher than the average for the Russian Federation, and 1.6 times higher for the Republic of Sakha (Yakutia).

If we consider the structure of total mortality (2015-2019), then a significantly higher proportion of mortality from external causes in the Arctic zone is noteworthy than in the Russian Federation and the RS (Ya) as a whole. On average, in all Arctic regions, the share of external causes in the structure of mortality from all causes is 19.6%. There are significant fluctuations in the indicator ranging from 11.1 to 28.8%. In the Anabar and Even-Bytantay districts, mortality from external causes of death.

Analysis of the main causes of death from external causes showed that, on average, over the period 2015-2019, mortality from all types of transport injuries (V01-V99) in the Arctic zone of the RS (Ya) was lower than in the republic and the Russian Federation as a whole. Mortality from accidental alcohol poisoning (X45) increased from 0.9 to 12.1 per 100,000 population and was higher than in the RS (Ya) and the Russian Federation in whole in 2018-2019.

In dynamics over a 5-year period, there has been a decrease in the suicide rate both in the country as a whole and

Table3

Mortality rates for the main external causes of death per 100.000 population [10]

| 1 2 3 4 5 6 7 Transport accidents (V01-V99) Allaikhovsky district 24.3 0 18.9 18.8 9 21/13/13/13/13/13/13/13/13/13/13/13/13/13 | Territory | 2015 | 2016 | 2017 | 2018 | 2019 | Average 2015-2019 | | |
|--|---------------------------------------|----------|---------|---------|----------|-------|-------------------|--|--|
| Transport accidents (V01-V99) Abyysky district 24.3 0 0 0 0 0 0 0 Allaikhovsky district 0 0 0 0 0 0 0 0 Anabarsky district 0 11.9 0 12 0 4.8 Verkhnekolymsky district 0 23.5 0 24.5 0 9.6 Zhigansky Evenki National district 8.7 8.8 0 8.9 18 8.9 Mornsky district 0 24.3 0 0 0 4.9 Nizhnekolymsky district 0 21.3 0 0 0 0 0 Oleneksky Evenki National district 35.9 0 0 0 0 0 2.7 Ust-Yansky district 13.8 13.8 13.8 2.8 2.7 1.4 7.5 The whole Arctic zone of the RS (Ya) 11.9 9.8 8.7 5.7 1.4 1.5 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| Abyysky district 24.3 0 0 0 0 4.9 Allaikhovsky district 0 0 0 0 0 0 0 Anabarsky district 0 11.9 0 12 0 4.8 Verkhnekolymsky district 0 23.5 0 24.5 0 9.6 Verkhnyansky district 0 24.3 0 0 4.8 N Momsky district 0 24.3 0 0 0 4.9 Nizhnekolymsky district 0 44.3 0 0 0 4.9 Nizhnekolymsky district 0 45.7 0 0 0 2.7 Ust-Yansky district 13.8 13.8 28 28.4 0 16.8 Even-Bytantaysky National district 35.9 0 0 0 0 7.2 The whole Arctic zone of the RS (Ya) 11.9 9.8 8.7 5.7 1.4 7.5 Russian Federation (who | Transport accidents (V01-V99) | | | | | | | | |
| Allaikhovsky district 0 0 0 0 0 0 Anabarsky district 0 11.9 0 12 0 4.8 Verkhnekolymsky district 0 23.5 0 24.5 0 9.6 Verkhnekolymsky district 0 23.5 0 24.5 0 9.6 Verkhnekolymsky district 0 24.3 0 0 18.9 Momsky district 0 24.3 0 0 9.1 Oleneksky Evenki National district 25.2 0 24.8 0 10 Srednekolymsky district 0 0 13.3 0 0 7.7 Ust-Yansky district 13.8 13.8 28 28.4 0 16.8 Even-Bytantaysky National district 35.9 0 0 0 7.2 The whole Republic of Sakha (Yakutia) 13 11.1 12.4 12.1 8.7 Anabarsky district 0 0 0 0 < | Abyysky district | 24.3 | 0 | 0 | 0 | 0 | 4.9 | | |
| Anabarsky district 0 0 0 0 0 0 Bulunsky district 0 11.9 0 12 0 4.8 Verkhnekolymsky district 0 23.5 0 24.5 0 9.6 Verkhoyansky district 0 24.3 0 0 18.9 Momsky district 0 24.3 0 0 4.9 Nizhnekolymsky district 0 45.7 0 0 0 9.1 Olenecksky Evenki National district 25.2 0 24.8 0 10 Srednekolymsky district 13.8 13.8 28 28.4 0 16.8 Even-Bytantaysky National district 35.9 0 0 0 7.2 The whole Arctic zone of the RS (Ya) 11.9 9.8 8.7 5.7 1.4 7.5 Russian Federation (whole) 17 15 14 13 12 14.2 Accidental poisoning by and exposure to alcohol (X45) X4.143.3 Y4.2 A.11.3 </td <td>Allaikhovsky district</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> | Allaikhovsky district | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Bulunsky district 0 11.9 0 12 0 4.8 Verkhnekolymsky district 0 23.5 0 24.5 0 9.6 Verkhoyansky district 0 47.7 0 47.3 0 0 18.9 Momsky district 0 24.3 0 0 0 4.9 Nizhnekolymsky district 0 45.7 0 0 0 9.1 Oleneksky Evenki National district 25.2 0 24.8 0 0 10 Srednekolymsky district 0 0 13.3 0 0 2.7 Ust-Yansky district 13.8 13.8 28 28.4 0 0 7.2 The whole Arctic zone of the RS (Ya) 11.9 9.8 8.7 5.7 1.4 7.5 Russian Federation (whole) 17 15 14 13 12 14.2 Anabarsky district 0 0 0 0 0 0 0 | Anabarsky district | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Verkhnekolymsky district 0 23.5 0 24.5 0 9.6 Verkhoyansky district 8.7 8.8 0 8.9 118 8.9 Zhigansky Evenki National district 47 0 47.3 0 0 148.9 Momsky district 0 24.3 0 0 0 4.9 Nizhnekolymsky district 0 45.7 0 0 0 9.1 Olencksky Evenki National district 25.2 0 24.8 0 0 0 2.7 Ust-Yansky district 13.8 13.8 13.8 28 28.4 0 16.8 Even-Bytantaysky National district 35.9 0 0 0 0 0 7.7 The whole Republic of Sakha (Yakutia) 13 11.1 12.4 12.1 8.7 7.1 Accidental poisoning by and exposure to alcohol (X45) 44.94 44.0 23.7 7.4 Anabarsky district 0 0 0 0 < | Bulunsky district | 0 | 11.9 | 0 | 12 | 0 | 4.8 | | |
| Verkhoyansky district 8.7 8.8 0 8.9 18 8.9 Zhigansky Evenki National district 47 0 47.3 0 0 18.9 Momsky district 0 24.3 0 0 0 4.9 Nizhnekolymsky district 0 45.7 0 0 0 1.1 Olencksky Evenki National district 25.2 0 24.8 0 0 2.7 Ust-Yansky district 13.8 13.8 28 28.4 0 16.8 Even-Bytantaysky National district 35.9 0 0 0 7.7 The whole Republic of Sakha (Yakutia) 13 11.1 12.4 12.1 18.7 11.5 Russian Federation (whole) 17 15 14 13 12 14.2 Abaysky district 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | Verkhnekolymsky district | 0 | 23.5 | 0 | 24.5 | 0 | 9.6 | | |
| Zhigansky Evenki National district 47 0 47.3 0 0 18.9 Momsky district 0 24.3 0 0 0 4.9 Nizhnekolymsky district 0 45.7 0 0 0 9.1 Oleneksky Evenki National district 25.2 0 24.8 0 100 Srednekolymsky district 13.8 13.8 28 28.4 0 16.8 Even-Bytantaysky National district 35.9 0 0 0 7.2 The whole Arctic zone of the RS (Ya) 11.9 9.8 8.7 5.7 1.4 7.5 The whole Republic of Sakha (Yakutia) 13 11.1 12.4 12.1 14.2 Accidental poisoning by and exposure to alcohol (X45) Ahabarsky district 0 23.7 | Verkhoyansky district | 8.7 | 8.8 | 0 | 8.9 | 18 | 8.9 | | |
| Momsky district 0 24.3 0 0 0 4.9 Nizhnekolymsky district 0 45.7 0 0 0 9.1 Oleneksky Evenki National district 25.2 0 24.8 0 0 10 Srednekolymsky district 13.8 13.8 28 28.4 0 16.8 Ust-Yansky district 13.5 9 0 0 0 7.2 The whole Arctic zone of the RS (Ya) 11.9 9.8 8.7 5.7 1.4 7.5 Russian Federation (whole) 17 15 14 13 12 14.2 Accidental poisoning by and exposure to alcohol (X45) Abyysky district 0 0 0 25.2 5 Allaikhovsky district 0 0 0 0 0 0 0 0 Bullansky district 0 17.6 0 9 5.3 Zhigansky Evenki National district 0 0 0 0 0 0 <td< td=""><td>Zhigansky Evenki National district</td><td>47</td><td>0</td><td>47.3</td><td>0</td><td>0</td><td>18.9</td></td<> | Zhigansky Evenki National district | 47 | 0 | 47.3 | 0 | 0 | 18.9 | | |
| Nizhnekolymsky district 0 45.7 0 0 9.1 Oleneksky Evenki National district 25.2 0 24.8 0 0 10 Srednekolymsky district 13.8 13.8 28 28.4 0 16.8 Even-Bytantaysky National district 35.9 0 0 0 0.7.2 The whole Arctic zone of the RS (Ya) 11.9 9.8 8.7 5.7 1.4 7.5 The whole Republic of Sakha (Yakutia) 13 11.1 12.4 12.1 8.7 11.5 Russian Federation (whole) 17 15 14 13 12 14.2 Accidental poisoning by and exposure to alcohol (X45) A Anabarsky district 0 0 0 0 0 Anabarsky district 0 | Momsky district | 0 | 24.3 | 0 | 0 | 0 | 4.9 | | |
| Oleneksky Evenki National district 25.2 0 24.8 0 0 Srednekolymsky district 0 0 13.3 0 0 2.7 Ust-Yansky district 13.8 13.8 28.2 28.4 0 16.8 Even-Bytantaysky National district 35.9 0 0 0 7.2 The whole Arctic zone of the RS (Ya) 11.9 9.8 8.7 5.7 1.4 7.5 Russian Federation (whole) 17 15 14 13 12 14.2 Accidental poisoning by and exposure to alcohol (X45) Abyysky district 0 | Nizhnekolymsky district | 0 | 45.7 | 0 | 0 | 0 | 9.1 | | |
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| The whole Arctic zone of the RS (Ya) 11.9 9.8 8.7 5.7 1.4 7.5 The whole Republic of Sakha (Yakutia) 13 11.1 12.4 12.1 8.7 11.5 Russian Federation (whole) 17 15 14 13 12 14.2 Accidental poisoning by and exposure to alcohol (X45) Accidental poisoning by and exposure to alcohol (X45) Alakikhovsky district 0 <td< td=""><td>Even-Bytantaysky National district</td><td>35.9</td><td>0</td><td>0</td><td>0</td><td>0</td><td>7.2</td></td<> | Even-Bytantaysky National district | 35.9 | 0 | 0 | 0 | 0 | 7.2 | | |
| The whole Republic of Sakha (Yakutia)1311.112.412.18.711.5Russian Federation (whole)171514131214.2Accidental poisoning by and exposure to alcohol (X45)Abyysky district000025.25Allaikhovsky district0000000Anabarsky district0000000Bulunsky district011.924.023.714.3Verkhnekolymsky district017.60000Verkhnekolymsky district017.60000Momsky district000000Nizhnekolymsky district000000Oleneksky Evenki National district00000Oleneksky Evenki National district00000Ust-Yansky district027.7028.414.2The whole Arctic zone of the RS (Ya)0.93.54.715.112.17.3The whole Republic of Sakha (Yakutia)4.89.311.110.110.39.1Russian Federation (whole)10.010.08.04.07.214.3Abysky district26.4115.4055.855.298.1Bulunsky district36.93773.603736.9 <td< td=""><td>The whole Arctic zone of the RS (Ya)</td><td>11.9</td><td>9.8</td><td>8.7</td><td>5.7</td><td>1.4</td><td>7.5</td></td<> | The whole Arctic zone of the RS (Ya) | 11.9 | 9.8 | 8.7 | 5.7 | 1.4 | 7.5 | | |
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| Accidental poisoning by and exposure to alcohol (X45)Abyysky district00025.25Allaikhovsky district0000377.4Anabarsky district000000Bulunsky district11.9011.924.023.714.3Verkhnekolymsky district000000Verkhoyansky district017.60095.3Zhigansky Evenki National district000000Nizhnekolymsky district000000Oleneksky Evenki National district000000Oleneksky Evenki National district000000Ust-Yansky district027.7028.414.214.1Even-Bytantaysky National district00070.9014.2The whole Arctic zone of the RS (Ya)0.93.54.715.112.17.3The whole Republic of Sakha (Yakutia)4.89.311.110.110.39.1Russian Federation (whole)10.010.08.04.04.07.2Intentional self-harm (X60-X84)34.334.334.334.334.3Allaikhovsky district26.4115.4055.855.298.1Bulunsky district23.523.547.323.8 <t< td=""><td>Russian Federation (whole)</td><td>17</td><td>15</td><td>14</td><td>13</td><td>12</td><td>14.2</td></t<> | Russian Federation (whole) | 17 | 15 | 14 | 13 | 12 | 14.2 | | |
| Abyysky district00025.25Allaikhovsky district0000377.4Anabarsky district000000Bulunsky district11.9011.924.023.714.3Verkhnekolymsky district000000Verkhoyansky district017.60095.3Zhigansky Evenki National district000000Nizhnekolymsky district000000Oleneksky Evenki National district000000Oleneksky Evenki National district000000Oleneksky Evenki National district000000Ust-Yansky district027.7028.414.214.1Even-Bytantaysky National district0007.9014.2The whole Arctic zone of the RS (Ya)0.93.54.715.112.17.3The whole Republic of Sakha (Yakutia)4.89.311.110.110.39.1Russian Federation (whole)10.010.08.04.04.07.2Intentional self-harm (X60-X84)35.855.298.139.1Bulunsky district23.5024.5018.9Verkhnekolymsky district35.835.823.924 <td< td=""><td>Accidental poisoning</td><td>by and e</td><td>xposure</td><td>to alco</td><td>hol (X4:</td><td>5)</td><td>1</td></td<> | Accidental poisoning | by and e | xposure | to alco | hol (X4: | 5) | 1 | | |
| Allaikhovsky district0000377.4Anabarsky district0000000Bulunsky district11.9011.924.023.714.3Verkhnekolymsky district0000000Verkhoyansky district017.60095.3Zhigansky Evenki National district000000Nizhnekolymsky district000000Oleneksky Evenki National district000000Oleneksky Evenki National district000000Oleneksky Evenki National district000000Ust-Yansky district027.7028.414.214.1Even-Bytantaysky National district0007.9014.2The whole Arctic zone of the RS (Ya)0.93.54.715.112.17.3The whole Republic of Sakha (Yakutia)4.89.311.110.110.39.1Russian Federation (whole)10.010.08.04.04.07.2Intentional self-harm (X60-X84)03736.93736.9Anabarsky district26.4115.4055.855.298.1Bulunsky district35.835.823.924023.9Verkhnekolymsky d | Abyysky district | 0 | 0 | 0 | 0 | 25.2 | 5 | | |
| Anabarsky district00000Bulunsky district11.9011.924.023.714.3Verkhnekolymsky district000000Verkhoyansky district017.60095.3Zhigansky Evenki National district000000Momsky district000000Nizhnekolymsky district000000Oleneksky Evenki National district000000Ust-Yansky district027.7028.414.214.1Even-Bytantaysky National district000000Ust-Yansky district0.93.54.715.112.17.3The whole Arctic zone of the RS (Ya)0.93.54.715.112.17.3Russian Federation (whole)10.010.08.04.04.07.2Intentional self-harm (X60-X84)Abyysky district264115.4055.855.298.1Bulunsky district35.835.823.924023.9Verkhnekolymsky district52.443.952.880.145.154.9Zhigansky Evenki National district23.523.547.323.872.438.1Momsky district52.443.952.880.145.154.9 | Allaikhovsky district | 0 | 0 | 0 | 0 | 37 | 7.4 | | |
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| Ust-Yansky district027.7028.414.214.1Even-Bytantaysky National district00070.9014.2The whole Arctic zone of the RS (Ya)0.93.54.715.112.17.3The whole Republic of Sakha (Yakutia)4.89.311.110.110.39.1Russian Federation (whole)10.010.08.04.04.07.2Intentional self-harm (X60-X84)Abyysky district24.3147.224.825044.3Allaikhovsky district264115.4055.855.298.1Bulunsky district35.835.823.924023.9Verkhnekolymsky district52.443.952.880.145.154.9Zhigansky Evenki National district23.523.547.323.872.438.1Momsky district22.722.923.10013.7Oleneksky Evenki National district099.048.7029.5Srednekolymsky district79.893106.693.8108.496.3Ust-Yansky district55.241.52814.242.736.3 | Srednekolymsky district | 0 | 0 | 0 | 0 | 0 | 0 | | |
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| The whole Republic of Sakha (Yakutia) 4.8 9.3 11.1 10.1 10.3 9.1 Russian Federation (whole) 10.0 10.0 8.0 4.0 4.0 7.2 Intentional self-harm (X60-X84) Abyysky district 24.3 147.2 24.8 25 0 44.3 Allaikhovsky district 36.9 37 73.6 0 37 36.9 Anabarsky district 264 115.4 0 55.8 55.2 98.1 Bulunsky district 35.8 35.8 23.9 24 0 23.9 Verkhnekolymsky district 46.7 23.5 0 24.5 0 18.9 Verkhoyansky district 52.4 43.9 52.8 80.1 45.1 54.9 Zhigansky Evenki National district 23.5 23.5 47.3 23.8 72.4 38.1 Momsky district 22.7 22.9 23.1 0 0 13.7 Oleneksky Evenki National district 0 | The whole Arctic zone of the RS (Ya) | 0.9 | 3.5 | 4.7 | 15.1 | 12.1 | 7.3 | | |
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| Intentional version (version) Intentional self-harm (X60-X84) Abyysky district 24.3 147.2 24.8 25 0 44.3 Allaikhovsky district 36.9 37 73.6 0 37 36.9 Anabarsky district 264 115.4 0 55.8 55.2 98.1 Bulunsky district 35.8 35.8 23.9 24 0 23.9 Verkhnekolymsky district 46.7 23.5 0 24.5 0 18.9 Verkhoyansky district 52.4 43.9 52.8 80.1 45.1 54.9 Zhigansky Evenki National district 23.5 23.5 47.3 23.8 72.4 38.1 Momsky district 22.7 22.9 23.1 0 0 13.7 Oleneksky Evenki National district 0 99.0 48.7 0 29.5 Srednekolymsky district 79.8 93 106.6 93.8 108.4 96.3 Ust-Yansky district 55.2 | Russian Federation (whole) | 10.0 | 10.0 | 8.0 | 4.0 | 4.0 | 7.2 | | |
| Abyysky district 24.3 147.2 24.8 25 0 44.3 Allaikhovsky district 36.9 37 73.6 0 37 36.9 Anabarsky district 264 115.4 0 55.8 55.2 98.1 Bulunsky district 35.8 35.8 23.9 24 0 23.9 Verkhnekolymsky district 46.7 23.5 0 24.5 0 18.9 Verkhoyansky district 52.4 43.9 52.8 80.1 45.1 54.9 Zhigansky Evenki National district 23.5 23.5 47.3 23.8 72.4 38.1 Momsky district 22.7 22.9 23.1 0 0 13.7 Oleneksky Evenki National district 0 99.0 48.7 0 29.5 Srednekolymsky district 79.8 93 106.6 93.8 108.4 96.3 Ust-Yansky district 55.2 41.5 28 14.2 42.7 36.3 | Intentional self-harm (X60-X84) | | | | | | | | |
| Allaikhovsky district 36.9 37 73.6 0 37 36.9 Anabarsky district 264 115.4 0 55.8 55.2 98.1 Bulunsky district 35.8 35.8 23.9 24 0 23.9 Verkhnekolymsky district 46.7 23.5 0 24.5 0 18.9 Verkhoyansky district 52.4 43.9 52.8 80.1 45.1 54.9 Zhigansky Evenki National district 23.5 23.5 47.3 23.8 72.4 38.1 Momsky district 22.7 22.9 23.1 0 0 13.7 Oleneksky Evenki National district 0 99.0 48.7 0 29.5 Srednekolymsky district 79.8 93 106.6 93.8 108.4 96.3 Ust-Yansky district 55.2 41.5 28 14.2 42.7 36.3 | Abyysky district | 24.3 | 147.2 | 24.8 | 25 | 0 | 44.3 | | |
| Anabarsky district264115.4055.855.298.1Bulunsky district35.835.823.924023.9Verkhnekolymsky district46.723.5024.5018.9Verkhoyansky district52.443.952.880.145.154.9Zhigansky Evenki National district23.523.547.323.872.438.1Momsky district22.722.923.10013.7Oleneksky Evenki National district099.048.7029.5Srednekolymsky district79.893106.693.8108.496.3Ust-Yansky district55.241.52814.242.736.3 | Allaikhovsky district | 36.9 | 37 | 73.6 | 0 | 37 | 36.9 | | |
| Bulunsky district 35.8 35.8 23.9 24 0 23.9 Verkhnekolymsky district 46.7 23.5 0 24.5 0 18.9 Verkhoyansky district 52.4 43.9 52.8 80.1 45.1 54.9 Zhigansky Evenki National district 23.5 23.5 47.3 23.8 72.4 38.1 Momsky district 22.7 22.9 23.1 0 0 13.7 Oleneksky Evenki National district 0 99.0 48.7 0 29.5 Srednekolymsky district 79.8 93 106.6 93.8 108.4 96.3 Ust-Yansky district 55.2 41.5 28 14.2 42.7 36.3 | Anabarsky district | 264 | 115.4 | 0 | 55.8 | 55.2 | 98.1 | | |
| Verkhnekolymsky district 46.7 23.5 0 24.5 0 18.9 Verkhoyansky district 52.4 43.9 52.8 80.1 45.1 54.9 Zhigansky Evenki National district 23.5 23.5 47.3 23.8 72.4 38.1 Momsky district 22.7 22.9 23.1 0 0 13.7 Oleneksky Evenki National district 0 99.0 48.7 0 29.5 Srednekolymsky district 79.8 93 106.6 93.8 108.4 96.3 Ust-Yansky district 55.2 41.5 28 14.2 42.7 36.3 | Bulunsky district | 35.8 | 35.8 | 23.9 | 24 | 0 | 23.9 | | |
| Verkhoyansky district 52.4 43.9 52.8 80.1 45.1 54.9 Zhigansky Evenki National district 23.5 23.5 47.3 23.8 72.4 38.1 Momsky district 23.9 97.1 48.9 24.9 0 39 Nizhnekolymsky district 22.7 22.9 23.1 0 0 13.7 Oleneksky Evenki National district 0 0 99.0 48.7 0 29.5 Srednekolymsky district 79.8 93 106.6 93.8 108.4 96.3 Ust-Yansky district 55.2 41.5 28 14.2 42.7 36.3 | Verkhnekolymsky district | 46.7 | 23.5 | 0 | 24.5 | 0 | 18.9 | | |
| Zhigansky Evenki National district 23.5 23.5 47.3 23.8 72.4 38.1 Momsky district 23.9 97.1 48.9 24.9 0 39 Nizhnekolymsky district 22.7 22.9 23.1 0 0 13.7 Oleneksky Evenki National district 0 0 99.0 48.7 0 29.5 Srednekolymsky district 79.8 93 106.6 93.8 108.4 96.3 Ust-Yansky district 55.2 41.5 28 14.2 42.7 36.3 | Verkhovansky district | 52.4 | 43.9 | 52.8 | 80.1 | 45.1 | 54.9 | | |
| Momsky district 23.9 97.1 48.9 24.9 0 39 Nizhnekolymsky district 22.7 22.9 23.1 0 0 13.7 Oleneksky Evenki National district 0 0 99.0 48.7 0 29.5 Srednekolymsky district 79.8 93 106.6 93.8 108.4 96.3 Ust-Yansky district 55.2 41.5 28 14.2 42.7 36.3 | Zhigansky Evenki National district | 23.5 | 23.5 | 47.3 | 23.8 | 72.4 | 38.1 | | |
| Nizhnekolymsky district 22.7 22.9 23.1 0 0 13.7 Oleneksky Evenki National district 0 0 99.0 48.7 0 29.5 Srednekolymsky district 79.8 93 106.6 93.8 108.4 96.3 Ust-Yansky district 55.2 41.5 28 14.2 42.7 36.3 | Momsky district | 23.9 | 97.1 | 48.9 | 24.9 | 0 | 39 | | |
| Oleneksky Evenki National district 0 0 99.0 48.7 0 29.5 Srednekolymsky district 79.8 93 106.6 93.8 108.4 96.3 Ust-Yansky district 55.2 41.5 28 14.2 42.7 36.3 | Nizhnekolymsky district | 22.7 | 22.9 | 23.1 | 0 | 0 | 13.7 | | |
| Srednekolymsky district 79.8 93 106.6 93.8 108.4 96.3 Ust-Yansky district 55.2 41.5 28 14.2 42.7 36.3 | Oleneksky Evenki National district | 0 | 0 | 99.0 | 48 7 | 0 | 29.5 | | |
| Ust-Yansky district 55.2 41.5 28 14.2 42.7 36.3 | Srednekolymsky district | 79.8 | 93 | 106.6 | 93.8 | 108.4 | 963 | | |
| | Ust-Yansky district | 55.2 | 41.5 | 28 | 14.2 | 42.7 | 36.3 | | |

in the republic. At the same time, suicide mortality in the Arctic zone is significantly higher than in the Republic of Sakha (Yakutia) and the Russian Federation as a whole. On average, over a 5-year period, suicide mortality was 3.3 times higher than in the Russian Federation and 1.7 times higher than in the republic in whole. The main causes of death in this class are suicide and homicide. According to the sources, the suicide rate in the Arctic communities of other countries is also high [19, 21]. High death rates from homicides are associated with alcohol consumption. According to the Analytical reviews of the NSC of Narcology of the Ministry of Health of the Russian Federation, the number of patients with alcohol dependence syndrome (alcoholism), including alcoholic psychoses, registered by narcological institutions in the period 2015-2019 was 1,631 per 100,000 population in the Republic of Sakha (Yakutia) (RF-990 per 100,000 population) [1]. During the same time, the Arctic zone of the Republic experienced similar indicators - 2,237 per 100,000 population.

In the Arctic zone of the RS (Ya), high rates of homicide deaths persist. The differences in indicators reach 5.5 times with the Russian Federation and 2 times with the RS (I) as a whole.

Conclusion. High rates of mortality from external causes and infant mortality in the Arctic zone indicate an unfavorable socio-economic situation in the region. A significant increase in mortality rates from accidental alcohol poisoning in the Arctic zone of the Republic requires stricter control over the quality of alcoholic beverages sold.

Only the close attention of the state can affect the development of the Arctic as a whole, including the development of the healthcare system, education, agriculture, culture and transport infrastructure. The development and implementation of regional research programs in the field of public health, ensuring the availability and quality of medical services, the construction of cultural and wellness centers, the promotion of a healthy lifestyle, increasing the employment of the local population at the objects of industrial development of the Arctic, the preservation of traditional crafts through the development of reindeer husbandry, fish farming, etc. can improve the demographic situation and the quality of life in the Arctic.

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Окончание табл. 3

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---------------------------------------|-------|------|-------|------|-------|------|
| Even-Bytantaysky National district | 107.6 | 0 | 143.0 | 35.5 | 105.8 | 78.4 |
| The whole Arctic zone of the RS (Ya) | 59.4 | 52.4 | 51.6 | 34.6 | 35.9 | 46.8 |
| The whole Republic of Sakha (Yakutia) | 34.7 | 30.2 | 27.7 | 23.9 | 22.9 | 27.9 |
| Russian Federation (whole) | 17.0 | 16.0 | 14.0 | 12.0 | 12.0 | 14.2 |
| Assault (X85-Y09) | | | | | | |
| Abyysky district | 48.7 | 73.6 | 49.5 | 25.0 | 50.5 | 49.5 |
| Allaikhovsky district | 0 | 37.0 | 36.8 | 73.7 | 37.0 | 36.9 |
| Anabarsky district | 29.3 | 0 | 28.3 | 0 | 27.6 | 17 |
| Bulunsky district | 23.9 | 0 | 23.9 | 24 | 47.5 | 23.9 |
| Verkhnekolymsky district | 46.7 | 47 | 47.9 | 0 | 24.8 | 33.3 |
| Verkhoyansky district | 52.4 | 52.7 | 17.6 | 17.8 | 18.0 | 31.7 |
| Zhigansky Evenki National district | 47.0 | 47.1 | 47.3 | 23.8 | 48.3 | 42.7 |
| Momsky district | 0 | 72.8 | 48.9 | 0 | 0 | 24.3 |
| Nizhnekolymsky district | 45.4 | 0 | 46.2 | 0 | 23.4 | 23 |
| Oleneksky Evenki National district | 75.5 | 50.1 | 74.3 | 97.3 | 71.5 | 73.7 |
| Srednekolymsky district | 0 | 39.9 | 13.3 | 0 | 27.1 | 16.1 |
| Ust-Yansky district | 13.8 | 55.4 | 56 | 28.4 | 28.5 | 36.4 |
| Even-Bytantaysky National district | 0 | 71.9 | 71.5 | 35.5 | 0 | 35.8 |
| The whole Arctic zone of the RS (Ya) | 29.4 | 42.1 | 43.2 | 25.0 | 31.1 | 34.2 |
| The whole Republic of Sakha (Yakutia) | 20.7 | 20.1 | 18.2 | 14.3 | 13.4 | 17.3 |
| Russian Federation (whole) | 8.0 | 7.0 | 6.0 | 5.0 | 5.0 | 6.2 |

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