Arctic and North. 2026. No. 62. Pp. 170–192.
Original article
UDC 314.18(571.52)(045)
DOI: https://doi.org/10.37482/issn2221-2698.2026.62.212

Demographic Challenges and Prospects of the Tyva Republic

Tatyana S. Lytkina [1], Cand. Sci. (Sociol.)
Andrey V. Smirnov [2]✉, Cand. Sci. (Econ.)

[1, 2] Institute for Socio-Economic and Energy Problems of the North, Federal Research Centre "Komi Science Centre of the Ural Branch of the RAS", ul. Kommunisticheskaya, 26, Syktyvkar, Russia
[1] tlytkina@yandex.ru, ORCID: https://orcid.org/0000-0003-1972-9080
[2] av.smirnov.ru@gmail.com ✉, ORCID: https://orcid.org/0000-0001-6952-6834

Abstract. The article examines contemporary demographic processes in the Tyva Republic based on an analysis of official statistics. Highly detailed demographic analysis methods are applied: migration trajectories are analyzed by individual municipalities, birth rates — by area in conditional and real generations, mortality — by leading causes of death. The purposes of the study are to assess the prospects for the demographic development of the Tyva Republic and to identify limitations and reserves for improving the situation. It is shown that due to the special position of the family institution in the hierarchy of values, ethnic identity, and state and regional family support programs, high birth rates are maintained in the republic. Signs of the second demographic transition, such as an increase in the number of delayed births and refusal to have children, as well as a decrease in the proportion of large families indicate a value gap between social groups and emerging social inequality. The implementation of agricultural economic policy in the region does not solve the problems of poverty, but contributes to the preservation of the traditional way of life of the Tyvan people and influences the migration behavior of the population. It has been revealed that external causes and infectious diseases remain among the leading causes of death: tuberculosis, homicides and suicides, poisoning, exposure to low temperatures, pneumonia and traffic accidents. Despite the fact that rural residents bear the main burden in solving demographic problems, they often die at the working age. The practical significance of the study is to identify reserves for improving the demographic situation in the republic. Since the difficulties are primarily related to economic factors, the authors propose to focus efforts on expanding social infrastructure and developing the economy through diversification of economic practices, which will also create favorable conditions for return migration of young people and a comfortable life for older age groups. Further research should be aimed at studying the effectiveness of demographic policy measures in the republic, as well as assessing the impact of compression and digitalization of social infrastructure on demographic processes.
Keywords: *demography, population structures, migration, fertility, mortality, life expectancy, territorial differences, Tyva Republic*

Acknowledgments and funding

This research was supported by grant No. 24-78-10061 of the Russian Science Foundation, https://rscf.ru/project/24-78-10061/.

Introduction

The Republic of Tyva (Tuva) is the most atypical of the regions included in the list of territories of the Far North. This is explained by its unique spatial location far from the other

For citation: Lytkina T.S., Smirnov A.V. Demographic Challenges and Prospects of the Tyva Republic. *Arktika i Sever* [Arctic and North], 2026; 62: 212–239. https://doi.org/10.37482/issn2221-2698.2026.62.212

northern regions, its national composition with a predominance of the titular ethnic group, and its socio-economic situation. Tyva is a border zone between two civilizations with its own distinctive nomadic, Turkic-speaking and Buddhist culture. It is an "unknown part" of Russia in the center of Asia [1, Lamazhaa Ch., p. 296], which attracts the interest of scholars from various fields. By most socio-economic indicators, Tyva remains one of the least prosperous regions of Russia. As of 2022, the republic ranks second to last in terms of median population income (18,691 rubles) and poverty level (27.2%), ahead of Ingushetia, as well as last in terms of life expectancy (67.1 years), ahead of the Chukotka Autonomous Okrug. At the same time, the region ranks second in terms of total fertility rate (2.51), behind the Chechen Republic [1]. These extreme values make Tyva an interesting and important target for demographic research.

This article aims to study the demographic prospects of the region and to identify internal reserves for stabilizing the situation in the Republic of Tyva. It has been fully included in the list of regions of the Far North and equivalent areas since 1994 due to its natural and climatic conditions and is the southernmost region of the list. The republic does not have the large-scale extractive industry typical of most northern regions of the country, and in many respects is similar to the agrarian southern regions. Therefore, in order to assess demographic processes, a comparative analysis with both the 13 regions of the Far North and Russia as a whole will be carried out. A distinctive feature of this work is the detailed analysis of official statistics. While migration has previously been considered primarily within the context of general regional or district-specific processes, this paper examines it in terms of individual settlements and age groups. Fertility is analyzed by district in both conventional and actual generations. A detailed classifier containing 307 causes of death was used to study mortality.

The first section of the article is devoted to an overview of modern studies of the population of the Republic of Tyva. This is followed by a presentation of the research methodology and data sources used. The results are divided into four subsections: migration, birth rates, mortality and demographic prospects. The concluding section summarizes the main results of the study.

Between indigenous culture and the market: in search of demographic equilibrium

Most authors agree that the complex demographic situation in the region is primarily linked to economic factors. Poverty has a negative impact on mortality rates due to the population's lifestyle and affects the republic's attractiveness for migration. T.Yu. Gusakov notes that "the reason for economic stagnation is the "agrarian path" chosen by the regional elite of Tyva" [2, p. 76]. However, natural and climatic conditions do not allow for full-scale agricultural production throughout the republic, exacerbating the region's poverty problems. The most agrarian areas are the western and south-eastern regions (kozhuuns), as well as the Piy-Khemskiy

[1] Supplement to the collection "Regions of Russia. Socio-economic Indicators — 2023". Rosstat. URL: https://rosstat.gov.ru/folder/210/document/47652 (accessed 10 December 2024).

district, located north of the capital in the central part of the republic. The diversity of ethno-cultural landscapes testifies to the mosaic structure and natural isolation of the territories [3, Dirin D.A., Fryer P, p. 32], which complicates the region's economic development and the solution of poverty problems [4, Soyan Sh.Ch., pp. 48–50], and contributes to population outflow.

The mass outflow of the Russian population in the early 1990s had a negative impact on the economic situation in the region. The population decline accelerated sharply with the onset of capitalism in Russia, but the migration balance had already become negative in the late Soviet period, after 1970. At the same time, natural growth in Tyva was positive, with the exception of 1989–2002 [5, Abylkaliikov S.I., p. 135]. The decline in the population of various ethnic groups deprives the region of cultural diversity and skilled personnel. In the current situation, this limits the opportunities for enriching the Tyvan economy with modern skills and technologies [6, Tarbastaeva I.S.], and reduces the quality of services in the fields of education and medicine. Taking into account the level of poverty in the region, Tyva is becoming unattractive for specialists from other regions of Russia, despite the region's need for highly qualified personnel due to the contraction of social infrastructure in the periphery.

Intra-regional migration draws the most active population to the capital, leaving virtually no prospects for the development of remote areas of the republic and maintaining high levels of poverty there [7, Balakina G.F., Anayban Z.V., p. 92]. Overall, the migration mobility of the republic's residents is low. According to the 2021 census, more than half of the inhabitants of Tyva who indicated their length of residence had no experience of long-term migration [8, Abylkalikov S.I., Baimurzina G.R., Batalov R.O., p. 6], i.e., they did not leave their municipalities for more than nine months. Recent migration studies have shown that the observed movements are mainly associated with the education of young people. An analysis of digital traces from the social network VKontakte revealed that 39.5% of school graduates in Tyva continue their education in the region, in the city of Kyzyl. In addition to the regional capital, residents of the republic enter universities in Krasnoyarsk, Novosibirsk, Moscow, Tomsk, Abakan, Barnaul, Kemerovo, Blagoveshchensk, Irkutsk and Ulan-Ude [9, Chernyshev K.A., Mityagina E.V., Chernysheva N.V. et al., pp. 75, 77, 79]. In other words, there is interest among school graduates in studying outside their home region.

In Tyva, with its predominantly agrarian economy, the birth rate remains favorable. The preservation of cultural identity, ethnic self-awareness, and the integration of cultural symbols and images into the formation of the region's image [1, Lamazhaa Ch.], as well as expanded regional support for the reproduction of agricultural enterprises and the traditional rural way of life [2, Gusakov T. Yu.] contribute to the reproduction of family values. Sociological studies confirm the focus of Tyvans on their family, children, and health [10, Natsak O.D., p. 64]. Every third family in the republic has many children [11, Natsak O.D., p. 128]. Nevertheless, existing individual values of social development contradict the lifestyle of the Tyvans supported by regional authorities, which, with a lack of social support measures, increases the risk of large families falling into the

low-income category. The contradictions are most clearly evident in discursive practices about modern Tyvan women [12, Borgoyakova T.G., Lopsan A.P.]. On the one hand, these are financially successful women, running their own businesses and careers; on the other hand, there are women who are subjected to domestic violence and have low status at work [13, Anaiban Z.V., p. 37]. At the same time, the traditional image of men as breadwinners and protectors is shifting towards "parasitical" interests [12, Borgoyakova T.G., Lopsan A.P.]. In our opinion, this leads to the formation of "modern" strategies of family relations and, as a result, to an increase in the proportion of nuclear single-parent families and unregistered partnerships [14, Rostovskaya T.K., Natsak O.D., Elamanova A.S., p. 243]. In this context, not only the value gap between social groups and emerging social inequality are evident, but also the contradictions between the ongoing agricultural policy in the regional economy and social policy, which contributes not only to the breakdown of social ties, but also to the growth of social problems.

The traditional culture of peoples, including the Tyvans, is oriented toward strengthening social ties, even in communities where individualization plays a significant role in maintaining a household. The density of social networks and ethnic self-awareness allow for the effective use of social resources (networks) and positive results from cooperation between people in the realization of private and public interests [15, p. 266]. This is well understood by communities that have lost this "social strength" and are unable to participate in the formation of territorial development strategies at the regional level [16, Lytkina T.S., Yaroshenko S.S.]. At the same time, preserving and using indigenous culture solely as a means of earning a living does not contribute to the resolution of social problems. Poverty, infrastructure crisis, unemployment, and marginalization of remote rural populations lead to morbidity, alcoholism, and high mortality rates. Currently, there is an extremely high proportion of preventable causes in the mortality structure [17, Sabgaida T.P. et al., p. 62], and the highest tuberculosis mortality rate in the country [18, Revyakina O.V. et al., p. 167]. The risk group for behavioral mortality factors includes rural men over the age of 35 and rural women between the ages of 20 and 34 [17, p. 57]. From the age of 15–19, male mortality begins to exceed female mortality twofold [11, Natsak O.D.]

Thus, a number of serious socio-economic problems persist in Tyva. The traditional way of life maintained by the Tyvans, on the one hand, has a beneficial effect on the birth rate of the population; on the other hand, it does not allow solving the problems of poverty in the region, determining high mortality rates and the tendency of young people to migrate. When analyzing statistical data, we will take a closer look at the migration attitudes of residents, the future prospects for population growth in the region, and the leading causes of death.

Data and methods

The source of data for studying migration was the Rosstat Database of Municipality Indicators (DBMI). The data on the number of arrivals and departures by urban districts, settlements, and age groups were compiled from it. Migration intensity indicators were obtained

by dividing these indicator values by the population size of the corresponding groups. The sum of arrivals and departures per 1,000 inhabitants shows the migration turnover rate, and the difference — the migration gain (loss) rate. The former reflects the population's propensity for migration, while the latter records its results.

Fertility is analyzed in both hypothetical and actual generations. The main data source for analyzing fertility in actual generations, i.e., over a woman's lifetime, is the results of the 2010 and 2021 All-Russian Population Censuses. The quality of the results of the last census has been criticized due to the significant number of "non-responders", the use of administrative sources, and omissions in online questionnaires [19, Andreev E.M., Churilova E.V.; 20, Chudinovskikh O.S.], but the census remains one of the few publicly available sources for analyzing the birth rate. The census results contain information on the average number of children born per 1,000 women by urban districts, municipal areas, and age groups of women. For women aged 50 and older, this indicator reflects the total fertility rate of the generation; data on younger women allows identifying changes in the territorial and age patterns of fertility in real generations. The fertility rate in conditional generations (by calendar year of birth) at the municipal level was calculated using the method of indirect standardization by 5-year groups based on data from the DBMI. The methodology is similar to that used in the work of A.N. Petrosyan [21, Petrosyan A.N.]. The population of the republic in the corresponding years was taken as the standard.

Data on age and causes of death from the Russian Database on Fertility and Mortality [2] (RosBRiS) were used to study mortality. It was decided to use averaged data for 2015–2021, as external causes of death are not detailed since 2022. The impact of each of the 307 causes of death (including COVID-19) on life expectancy was calculated. For this purpose, standard life tables [22, Preston S., Heuveline P., Guillot M.] were constructed, as well as life tables in which individual causes of death were excluded by reducing the age-specific mortality rates by the age-specific mortality rates from the cause under study. Comparing the final values of the life tables allows answering the question: to what extent will the life expectancy of men and women change if they stop dying from a certain cause? It should be noted that, in reality, mortality from most causes cannot be completely eliminated, and reducing mortality from one cause may lead to an increase in mortality from others. Furthermore, cause-of-death coding practices may vary by region, so cross-regional comparisons of indicators are limited. Differences in mortality rates between regions were analyzed using a standardized overall mortality rate by gender and age.

The calculation algorithms were implemented in the Julia programming language, and the maps were constructed using the VegaLite.jl software.

[2] Russian Fertility and Mortality Database. *Center for Demographic Research, New Economic School, Moscow (Russia)*. URL: https://www.nes.ru/demogr-fermort-data (accessed 10 December 2024).

Research results: demographic processes in the Republic of Tyva

According to the census results, the total population of the republic in 2021 was 336,651 people, of whom 47.2% were men. The urban population accounted for slightly more than half (54.6%). In the post-Soviet period, the population of the Republic of Tyva increased by 27,500 people, or 8.9%. Currently, the republic includes two urban okrugs: the capital, Kyzyl, and Ak-Dovurak, as well as 17 municipal districts, which include 4 urban and 120 rural settlements. In total, the republic has six urban settlements (five towns and one urban-type settlement) and 144 rural settlements. It is noteworthy that the population of the capital's urban okrug, Kyzyl, grew more slowly than in the nearby urban-type settlement of Kaa-Khem [3]. While the population of the capital increased by 13.9% over the last decade, the population of the aforementioned urban-type settlement increased by 30.9%. This growth is due to its proximity to the center, the availability of developed infrastructure and the possibility of building housing on one's own. Despite the higher population growth rate in Kaa-Khem, Kyzyl's share of the region's population increased from 27.4% to 37.2% between the 1989 and 2021 censuses. The concentration of the population in two neighboring urban settlements, which practically form a single territory with developed infrastructure and opportunities for solving everyday problems, demonstrates the interest of inhabitants in this place of residence (Table 1).

Table 1

Population dynamics of the Republic of Tyva by urban okrugs and municipal districts, 1989–2021, people [4]

Area	1989	2002	2010	2021	Increase (decrease) for 2010–2021		
					total	natural	migration *
Tyva Republic	***309 129***	***305 510***	***307 930***	***336 651***	***28 721***	***45 999***	***-17 278***
urban okrugs:							
Kyzyl	84 641	104 105	109 918	125 241	15 323	15 809	-486
Ak-Dovurak	est. in 1994	12 965	13 468	12 456	-1 012	1 905	-2 917
municipal districts:							
Bay-Tayginskiy	13 401	12 321	10 803	10 807	4	1 643	-1 639
Barun-Khemchikskiy	31 421	12 683	12 847	12 178	-669	1 732	-2 401
Dzun-Khemchikskiy	22 748	21 361	19 918	19 645	-273	3 743	-4 016
Kaa-Khemskiy	14 982	13 071	12 279	12 337	58	1 386	-1 328
Kyzylskiy	22 205	22 678	27 659	35 868	8 209	4 559	3 650
Mongun-Tayginskiy	5 576	5 938	5 661	6 101	440	1 250	-810
Ovyurskiy	8 868	7 930	7 022	7 380	358	1 226	-868
Piy-Khemskiy	14 236	11 431	10 092	10 621	529	602	-73
Sut-Kholskiy	12 038	8 430	8 029	8 310	281	1 349	-1 068
Tandinskiy	23 653	13 827	12 891	15 284	2 393	1 762	631
Tere-Kholskiy	est. in 2002	1 835	1 882	1 944	62	333	-271
Tes-Khemskiy	10 413	8 908	8 174	8 966	792	1 552	-760
Todzhinskiy	6 448	5 931	6 020	6 667	647	1 073	-426

[3] Although the Kaa-Khemskiy district itself is one of the worst in the Republic in terms of migration attractiveness.

[4] Source: 1989–2021 censuses results. URL: https://24.rosstat.gov.ru/folder/66693; https://demoscope.ru/weekly/ssp/census.php?cy=6 (accessed 10 December 2024).

Ulug-Khemskiy	29 866	19 461	19 266	20 309	1 043	2 861	-1 818
Chaa-Kholskiy	est. in 1992	6 532	6 036	6 173	137	917	-780
Chedi-Kholskiy	est. in 1993	8 081	7 685	7 788	103	1 180	-1 077
Erzinskiy	8 633	8 022	8 280	8 576	296	1 117	-821

** mechanical growth — authors' calculations.*

A decline in population over the last inter-censal period has been observed in only two towns: Turan (1.0%) and Ak-Dovurak (7.5%). The former was founded by Russian settlers in the late 19th century, while the latter is known for its industrial specialization, following the establishment of a plant for the production of asbestos, slate and other products in 1964. The plant ceased operations in the 1990s, and local authorities are currently attempting to resume its work [2, Gusakov T.Yu.]. The population of 70 out of 120 rural settlements has grown, with 15 of them growing by more than a quarter. Only five of the 50 settlements with declining populations lost more than a quarter of their residents (Fig. 1).

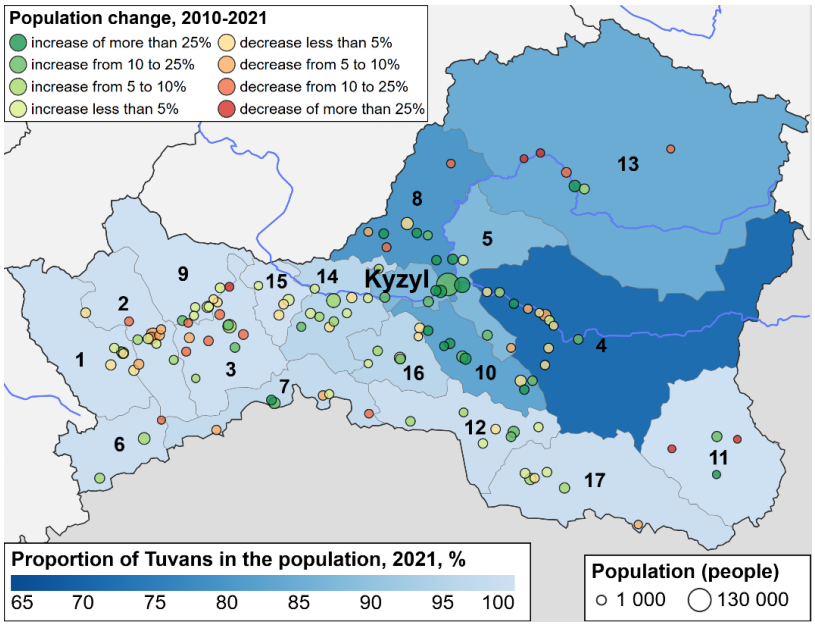

Fig. 1. Population change in settlements in the Republic of Tyva, 2010–2021 [5].

Districts (kozhuuns): 1 — Bay-Tayginskiy, 2 — Barun-Khemchikskiy, 3 — Dzun-Khemchikskiy, 4 — Kaa-Khemskiy, 5 — Kyzylskiy, 6 — Mongun-Tayginskiy, 7 — Ovyurskiy, 8 — Piy-Khemskiy, 9 — Sut-Kholskiy, 10 — Tandinskiy, 11 — Tere-Kholskiy, 12 — Tes-Khemskiy, 13 — Todzhinskiy, 14 — Ulug-Khemskiy, 15 — Chaa-Kholskiy, 16 — Chedi-Kholskiy, 17 — Erzinskiy.

The presented demographic dynamics of rural settlements in Tyva are significantly better than in most regions of Russia, especially in the Far North. In 2010–2021, as a result of migration, the Republic of Tyva lost only 5.6% of its population, which is a small outflow compared to other northern regions and is fully offset by natural growth. Furthermore, while there was a decline in the rural population in the vast majority of rural settlements across the Russian North, this trend was observed in less than half of them in Tyva due to the high birth rate. Over the past decade, the median growth rate for urban okrugs and settlements was 7.0%, for rural settlements — 1.8%. This tendency does not suggest a positive demographic outlook for rural areas. Let us take a closer

[5] Source: 2010 and 2021 census results. URL: https://24.rosstat.gov.ru/folder/66693 (accessed 10 December 2024).

look at how migration processes, birth rates and life expectancy affect the population of Tyva in different settlements.

Migration

An analysis of migration statistics at the settlement level and by directions of movement from 2014 to 2023 showed that internal migration is a characteristic feature of the republic. The vast majority of settlements (109) did not participate in international exchange, as a result of which 2,500 people left Tyva and 2,800 people arrived. Migration growth amounted to 312 people, of which 286 were in Kyzyl. The largest international migration was recorded with Kyrgyzstan, Belarus, Uzbekistan, and Mongolia. The influx of international migrants does not compensate for the outflow to other regions of Russia and has virtually no impact on the ethnic composition of the region's population. The proportion of Tyvans in 13 of the republic's 17 districts and okrugs exceeds 95%, except for the Kaa-Khemskiy district, where their share is below 80% (Fig. 1).

The migration outflow recorded by statistics is the result of interregional exchanges involving all settlements. A total of 57,400 people left Tyva for other regions over the past decade, while 42,100 people arrived. The negative balance amounted to 15,300 people [6]. The highest declines were in Kyzyl (9,174 people), Kyzylskiy (1,907 people), Kaa-Khemskiy (755), and Piy-Khemskiy (675) districts in the center of the republic, the lowest — in Mongun-Tayginskiy, Erzinskiy, and Ovyurskiy districts, located along the southern border of Russia.

At the intraregional level, all settlements participate in migration exchanges. Growth is observed in 20 of them. The largest intraregional growth was demonstrated by the capital Kyzyl (7,611 people) and the districts located nearby: Kyzylskiy (3,887 people), Tandinskiy (1,374 people), and Piy-Khemskiy (288 people). The highest migration loss was recorded in the western peripheral districts: Dzun-Khemchikskiy (2,462 people), Barun-Khemchikskiy (1,542 people), and Bay-Tayginskiy (1,249 people), as well as in Ak-Dovurak (1,261 people). In relative terms, these districts are leading in outflow. The map shows that the settlements with declining populations as a result of intraregional exchange are located in remote areas in the east (Tere-Kholskiy, Todzhinskiy) and west (Barun-Khemchikskiy, Dzun-Khemchikskiy, Sut-Kholskiy). At the same time, settlements close to the administrative center are losing population through interregional exchange (Fig. 2).

[6] A slight population increase was observed in 24 settlements, while the remaining 102 experienced a decline. The largest interregional increase, only 26 people over the decade, was in the settlement of Khayyrakan.

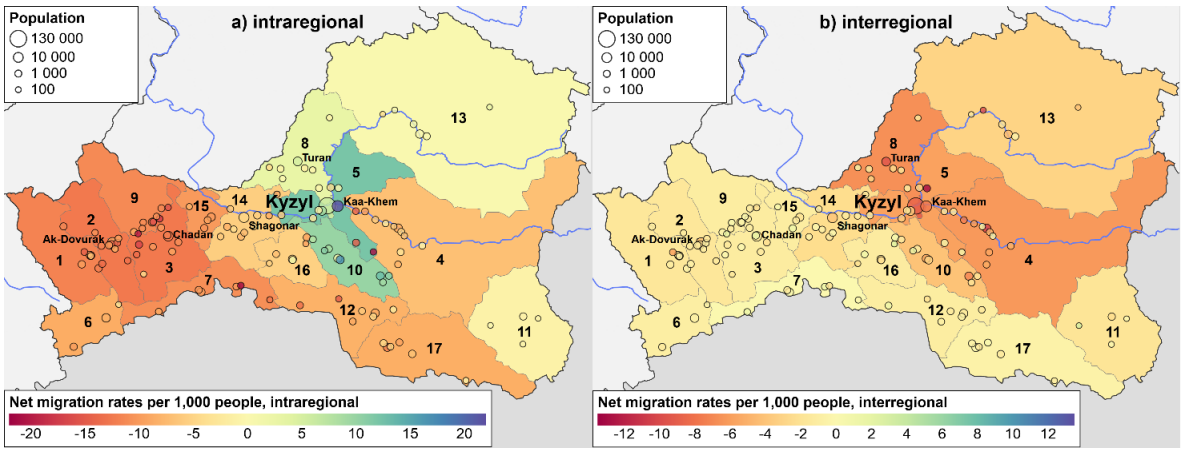

Fig. 2. Migration growth rates in the Republic of Tyva by type of movement, average annual value for 2014–2023 [7].

Low migration mobility rates are observed in Old Believer settlements in the upper reaches of the Yenisei, especially in the Sizimskiy district, despite the fact that since the early 2000s, they have been unable to support their households through crafts and other traditional types of employment and have been forced to resort to seasonal migration more often [2, Gusakov T.Yu., p. 91]. The reason for low mobility may be the chosen lifestyle or social exclusion of this group. Moreover, a secluded lifestyle often manifests itself as an optimized survival strategy. Solving poverty problems simultaneously provokes the migration of residents from remote areas with weak economies to more prosperous areas of the republic. The lack of funds for relocation and adaptation to new places of residence leads to sedentism — an extreme form of social exclusion. Neither of these contributes to the development of these territories.

Thus, in Tyva, despite a predominantly agricultural economy, the administrative center and urban settlements with developed infrastructure attract the rural population. Kyzyl is becoming a center of attraction for international migrants and residents of the republic's peripheral territories, who, lacking sufficient resources to move to other regions of Russia, choose the regional capital as their migration destination. Meanwhile, urban residents, having accumulated the necessary resources for departure, are leaving the region. In the republic's capital, Kyzyl, there is an overall decline due to interregional outflow exceeding intraregional and international growth. However, overall migration growth has been recorded in ten settlements located mainly near the capital: Kaa-Khem, Durgen, Uspenka, Aryg-Bazhy, Mezhegey, Kyzyl-Aryg, Kochetovo, Balgazyn, Sukpak, Sumon Kargy. With the exception of the last one, the listed settlements are located no more than 120 km from Kyzyl.

The age profile of migration shows differences between Kyzyl and other municipalities. Within the region, the most mobile population is aged 15 to 39. In other words, migration is widespread not only among students, but also among older cohorts, with all age groups showing a negative migration balance in relation to the regional capital. In the interregional level, the peak of outmigration is much more pronounced and occurs among those entering universities (ages 15–19). A positive balance is observed among those aged 20 to 24, but this is partly determined by the

[7] Source: Rosstat DBMI. URL: https://rosstat.gov.ru/dbscripts/munst/ (accessed 10 December 2024).

removal of students from the registration records after completing their studies — automatic returns. People of retirement age also tend to migrate, although to a lesser extent, which rather indicates the existence of a family strategy: children studying and working outside the region and their parents subsequently moving to be with them after retirement (Fig. 3).

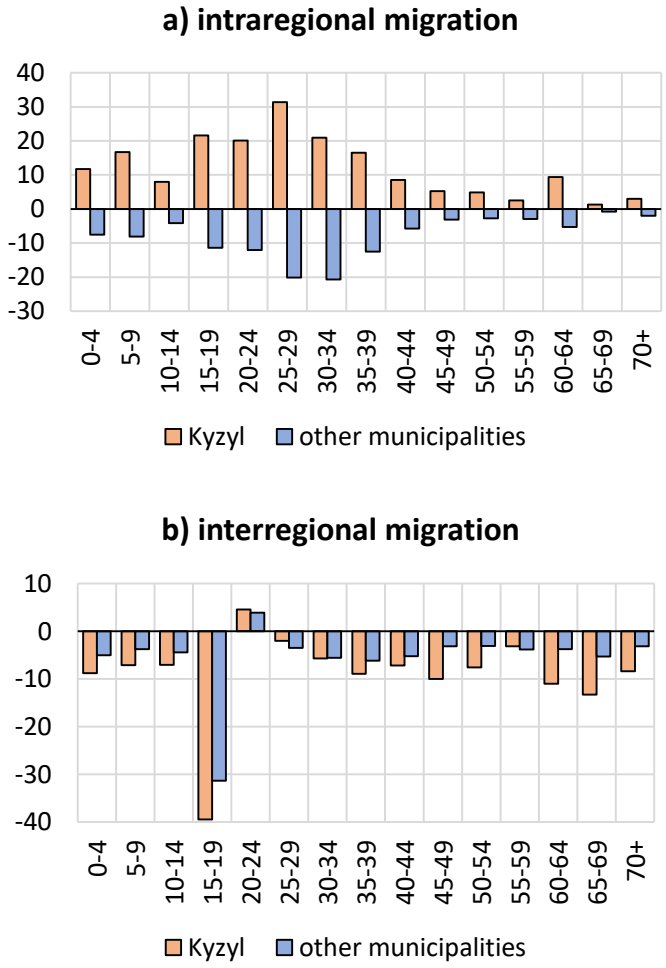

Fig. 3. Migration growth rates in the Republic of Tyva by type of migration and age group, 2023 [8].

An analysis of migration processes in the region revealed a high proportion of interregional educational migration. The results of previous studies prove that preserving and developing the educational infrastructure within the region is crucial to reducing the outflow of young people from the republic; educational centers require a rural population in the surrounding areas to compensate for the interregional outflow [23, Lytkina T.S., Smirnov A.V.]. In 2022, the Republic of Tyva had only one university (Tyva State University), with a total of 3,316 students. There are 8,667 students enrolled in 16 secondary vocational education institutions, half of which are located in Kyzyl. As demand for educational services increases, the shortage of state-funded places may lead to higher interregional migration outflows [24, Rostovskaya T.K., Vasilyeva E.N., p. 207].

Data on the digital footprints of the population from profiles on the social network VKontakte allow identifying population migration trajectories. A chord diagram constructed using G. Abel's algorithm [25] demonstrates that more than half of those leaving Tyva's districts move to

[8] Source: Rosstat DBMI. URL: https://rosstat.gov.ru/dbscripts/munst/ (accessed 10 December 2024).

Kyzyl, while residents of the capital most often move to Krasnoyarsk, Moscow, Novosibirsk, and Abakan. Reverse flows are several times smaller. Movements between rural areas are insignificant (Fig. 4).

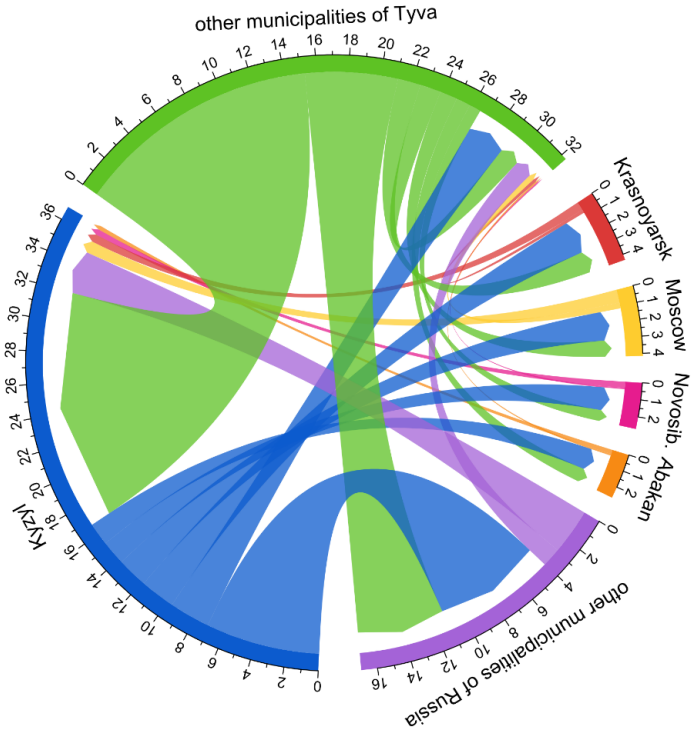

Fig. 4. Distribution of population migration in the Republic of Tyva by municipalities, % [9].

The absence of centers comparable to Kyzyl means that the migration patterns of the region's residents are rather uniform: rural areas provide an influx of population to cities. At the same time, the social potential of the most remote and isolated settlements, which are in a state of social exclusion [26, Lytkina T.S.], remains untapped. If social support measures are not implemented in a timely manner, the processes of aging and poverty reproduction will accelerate here.

Birth rate

The preservation of the traditional economy and material incentives contribute to the relatively high birth rate in the region. Comparing different historical periods, it is noteworthy that the total fertility rate began to decline during the Soviet era, and the number of children per family gradually decreased. In 1989, it was 3.31. Expanded reproduction in the region was maintained until 1996, but since 1993, this was exclusively due to rural women. The total fertility rate for urban women reached its minimum (1.52) in 2000, and for rural women — a year later (2.15). With the improvement of the economic situation in the country, by 2002 the total fertility rate for rural women had risen to 2.46, and for urban women — to 1.77. We assume that the level of ethnic self-awareness may also have influenced the growth in fertility during this period. The introduction of programs to stimulate the birth rate in the country in 2007 led to a significant

[9] Source: Virtual Population of Russia. URL: https://webcensus.ru/ (accessed 10 December 2024).

increase among both urban and rural women (2.34 and 3.11, respectively). Overall, rural women were more responsive to social support measures. The indicator reached its maximum values in 2020 in towns (2.88) and in 2014 in rural areas (6.41), after which it began to decline. Nevertheless, the region still appears to be prosperous in terms of birth rates. The share of children in the population has remained virtually unchanged since the early 2000s, remaining just above 30% (in 2021, it was 32.7%). It is worth noting that in terms of birth rates in Russia, Tyva is second only to Chechnya, where ethnic identity is also strong and the quality of life is significantly higher.

Kyzyl, a city that attracts the population of rural settlements, is less capable of reproducing its population, which indicates an accelerating demographic transition. Relatively low birth rates are also recorded in the neighboring Piy-Khemskiy, Chedi-Kholskiy, Kyzylskiy, and Tandinskiy districts. The first two districts experience a slight migration outflow, while the latter show an increase. Remote areas (Bay-Tayginskiy, Barun-Khemchikskiy, Dzun-Khemchikskiy, Sut-Kholskiy kozhuuns, etc.), on the contrary, have the highest birth rates, but also the highest migration outflow (Fig. 5).

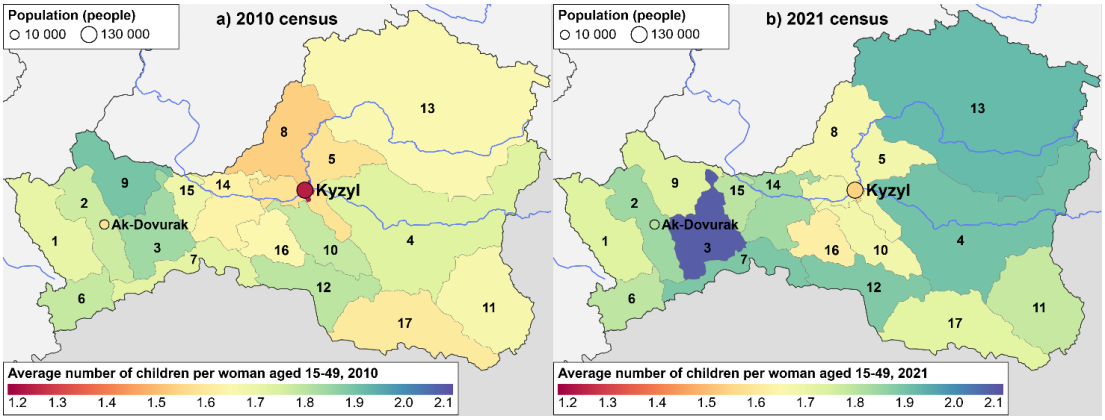

Fig. 5. Average number of children per woman of reproductive age in the Republic of Tyva by urban okrugs and municipal districts, 2010 and 2021 [10].

Conditional generation indicators better demonstrate short-term changes in fertility. In a nationwide study covering 2011–2019, all territories of Tyva, along with some republics of the North Caucasus, were among the regions with the highest birth rates [21, Petrosyan A.N.]. In 2014–2023, the total fertility rate, calculated using the indirect standardization method, decreased in all municipalities of the republic by an average of 1.65. Although the birth rate was higher than the reproduction level everywhere except the Erzinskiy and Kyzylskiy districts, measures to stimulate fertility are no longer as effective as they were previously (Fig. 6). It can be assumed that cohorts of women born in the 21st century will no longer reach the replacement level. Data from the 2021 census make it possible to track the dependence of the fertility rate on ethnicity and region of residence. Thus, the birth rate among Tyvan women living in Tyva is significantly higher than among Tyvan women in other regions of Russia (2,094 and 1,783 children per 1,000 women aged 30 to 34, respectively). The birth rate among Russian women is also higher

[10] Source: 2010 and 2021 census results. URL: https://24.rosstat.gov.ru/folder/66693 (accessed 10 December 2024).

in the republic (1,625 versus 1,296 in the rest of Russia). The Tyvan-Tojin sub-ethnic group leads the region in terms of the average number of children per woman (2,502).

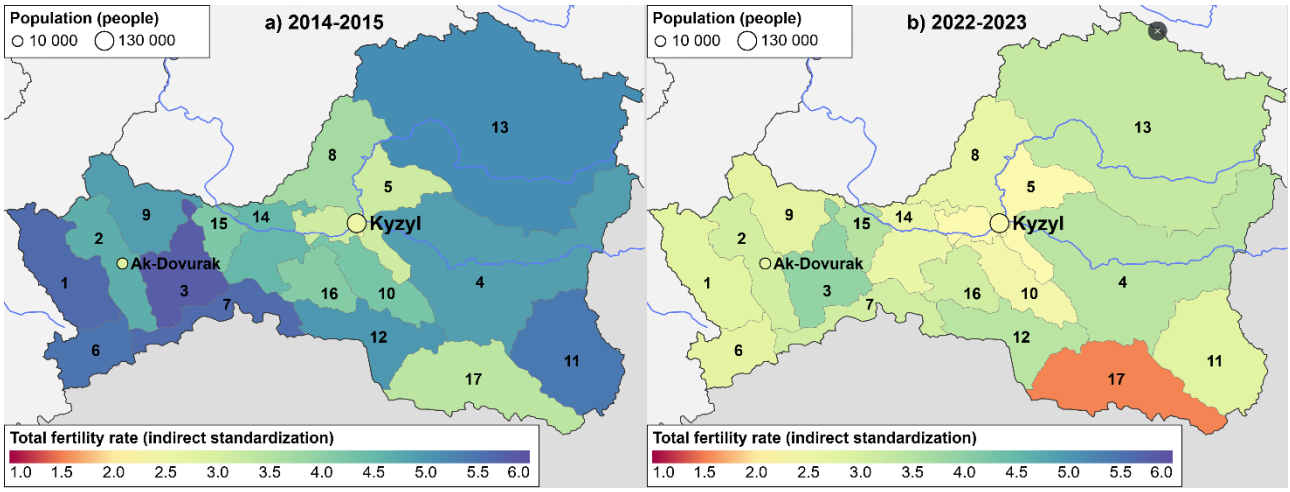

Fig. 6. Standardized total birth rate in the Republic of Tyva by urban okrugs and municipal districts, 2014–2015 and 2022–2023 [11].

Analysis by age group and settlement type showed that, despite the increase in the overall birth rate, a decline in rates is observed in both the youngest cohorts (18–24 years) and older cohorts (45 years and older). The decline in the number of births and the postponement of childbirth by young women indicates the westernization and globalization of culture and the focus of young people on their careers [1, Lamazhaa Ch., p. 305]. The increase in the number of children among older urban women is more likely to reflect the impact of financial incentives and the availability of social services during pregnancy and childbirth for urban women who have decided to have a child closer to the age of 40 or even later.

As in most regions of the world, women in Tyva are differentiated into two groups: those who consciously refuse to have children and those who are focused on family and children. The distribution of women by number of children born indicates a decline in the proportion of large families. For women aged 60 and over in 2010–2021, whose fertility period was in the 1960s–1980s, having many children was the norm. Almost one in three women gave birth to five or more children (Fig. 7).

[11] Source: Rosstat DBMI. URL: https://rosstat.gov.ru/dbscripts/munst/ (accessed 10 December 2024).

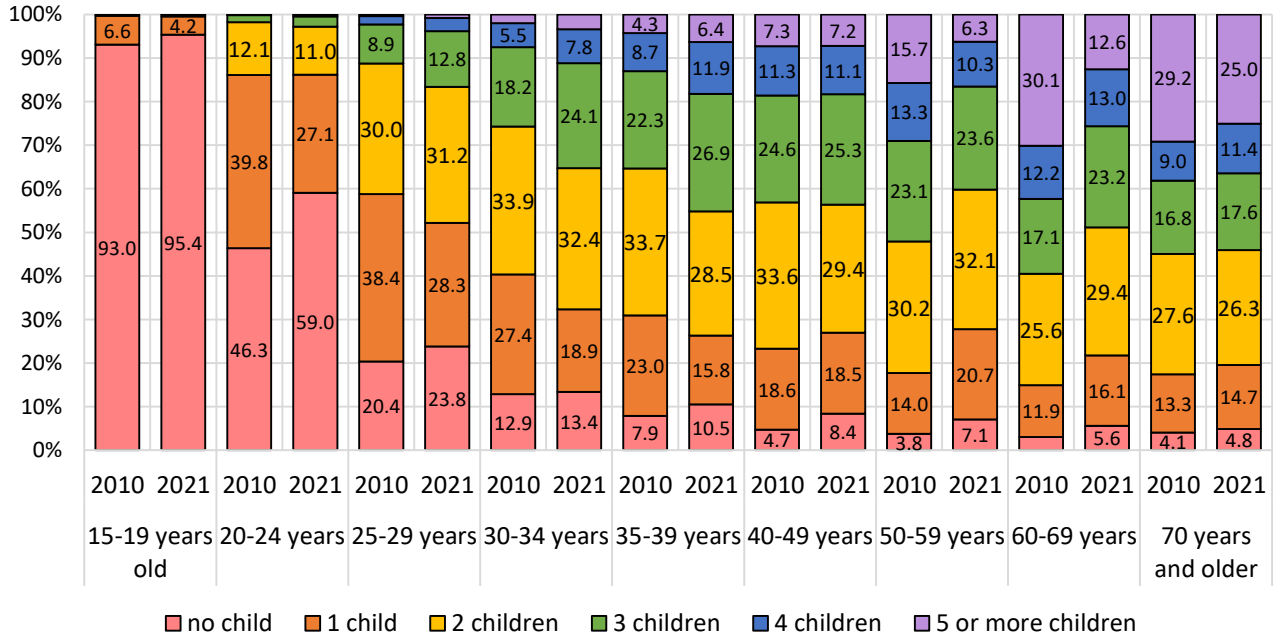

Fig. 7. Distribution of women in the Republic of Tyva by age group and number of children born, 2010 and 2021, % [12].

For the next generation of women, the desire to have a large number of children in the family is declining sharply. Among women over 50, whose active reproductive years coincided with the economic reforms of the 1990s, the proportion of those who have decided not to have children is increasing significantly. Having two or three children in the family is becoming the norm. Looking at younger cohorts (especially those aged 20 to 24), whose reproductive plans may still be realized in the future, we can observe an increase in the number of childless or delayed births, which demonstrates signs of a second demographic transition — a re-evaluation of individual views on marriage and family [27, Kalabikhina I.E., Kuznetsova P.O., p. 25]. Although the demographic transition in Tyva is usually characterized as incomplete, the combination of signs of the first and second transitions may have theoretical explanations. It is well known that the later the demographic transition begins, the faster it occurs. What took some Western countries several centuries to achieve, some developing countries can complete in just one or two generations. In Tyva, where the transition is particularly late, this may be even more pronounced — signs of both transitions are observed simultaneously in different age cohorts. It should also be noted that the westernization of traditional societies through the internet and television may lead to the spread of new family and fertility patterns even before the economic foundations for the transition are established [28, Frantsuz Yu.A.]. The increase in the proportion of women aged 25–34 with two and three children gives cause for optimism, on condition that the proportion of childless women does not grow rapidly.

The region maintains a high birth rate. During the most difficult economic times, Tyva owes its population reproduction to rural women living in remote peripheral areas. The capital city has a lesser population reproduction rate. However, it should be noted that improvements in social

[12] Source: 2010 and 2021 census results. URL: https://24.rosstat.gov.ru/folder/66693 (accessed 10 December 2024).

infrastructure and financial incentives have contributed to an increase in the number of births among urban women in older age groups, including a shift away from childlessness — a reproductive behavior more typical for this social group.

Mortality and life expectancy

In 2023, life expectancy for women in Russia was 78.7 years, compared to 73.3 years in Tyva. Life expectancy for men was 68.0 years in Russia and 59.9 years in Tyva. The difference in life expectancy between Tyvan women and men is 13.4 years, a quarter higher than the Russian average. It should be noted that in 2023, life expectancy for rural men was only 56.7 years. This is one of the lowest rates in the country. Only Chukotka Autonomous Okrug and Magadan Oblast have lower rates. Age-specific mortality rates in Tyva are significantly higher than the Russian average in all age groups over 15.

Let us consider the leading causes of death in the region; their impact on life expectancy (at birth) exceeds a quarter of a year. The data show how much the life expectancy of the population would change if mortality from a single cause was eliminated and mortality from other causes remained unchanged. Let us focus on those causes for which mortality in Tyva exceeds the average for the country and the northern regions. First, there is a group of seven external causes of death (Table 2).

Table 2

*Life expectancy losses from external causes of death in the Republic of Tyva, northern regions *, and Russia, 2015–2021* [13]

Code	Cause of death	Men			Women		
		Russia	North	Tyva	Russia	North	Tyva
285	Homicide (assault, violence) committed by another person	0.16	0.26	0.94	0.06	0.09	0.24
294	Contact with a sharp or blunt object with uncertain intentions	0.21	0.26	0.69	0.06	0.08	0.25
290	Hanging, strangulation, and suffocation with uncertain intentions	0.16	0.23	0.68	0.04	0.05	0.20
258	Injuries in traffic accidents	0.21	0.23	0.47	0.09	0.11	0.33
284	Other intentional self-harm (incl. suicide)	0.39	0.50	0.51	0.09	0.13	0.23
302	Exposure to extreme cold	0.11	0.15	0.35	0.04	0.07	0.35
279	Accidental alcohol poisoning	0.19	0.18	0.27	0.06	0.08	0.28

** North is a weighted average for 13 regions that are fully included in the List of Far North regions and equivalent areas: the Republics of Karelia, Komi, Sakha (Yakutia), and Tyva; Kamchatka Krai; Arkhangelsk, Magadan, Murmansk, and Sakhalin Oblasts; Chukotka, Nenets, Khanty-Mansi–Yugra (KhMAO), and Yamalo-Nenets (YNAO) Autonomous Okrugs.*

The impact of homicides is 5.9 times higher than the national average for men and 4.0 times higher for women. Overall, homicides reduce the life expectancy of the population by 0.6 years. The impact of a number of other external causes of death is many times higher in Tyva: contact with sharp and blunt objects (impact — 0.47 years), strangulation with uncertain intentions (0.44), and road traffic accidents (0.40). It is interesting to note that the impact of low temperatures is significantly higher than not only the national average, but also the average for regions in the Far North. Exposure to extremely low natural temperatures reduces life expectancy

[13] Source: compiled by the authors based on data from RosBRiS.

by 0.35 years. Accidental alcohol poisoning, which often leads to other external causes of death, reduces life expectancy by 0.28 years. Tyva shares a high male mortality rate from suicide with other northern regions. All of these causes of death are the result of poverty and the socio-psychological state of the population, as a reaction to difficulties in solving everyday problems, the awareness of a low quality of life and social inequality, leading to the marginalization of the individual and the manifestation of destructive forms of behavior. In addition to the seven external causes, 13 other leading causes of death in Tyva were identified (Table 3).

Table 3

Life expectancy losses due to other (excluding external) causes of death in the Republic of Tyva, northern regions, and Russia, 2015–2021 [14]

Code	Cause of death	Men			Women		
		Russia	North	Tyva	Russia	North	Tyva
129	Atherosclerotic heart disease	1.04	1.12	0.59	0.95	0.97	0.90
133	Other forms of acute ischemic heart disease	0.36	0.38	0.80	0.16	0.18	0.63
9	Respiratory tuberculosis, confirmed bacteriologically and histologically	0.10	0.10	0.90	0.03	0.04	0.42
142	Intracerebral and other non-traumatic intracranial hemorrhages	0.29	0.28	0.42	0.23	0.23	0.70
149	Consequences of cerebrovascular diseases	0.14	0.19	0.33	0.13	0.18	0.47
183	Liver fibrosis and cirrhosis (except alcoholic)	0.34	0.25	0.33	0.28	0.27	0.46
162	Pneumonia without specified pathogen	0.26	0.26	0.41	0.15	0.18	0.32
320	Coronavirus infection caused by COVID-19	0.41	0.38	0.24	0.52	0.49	0.38
244	Other types of sudden death of unknown cause, death without witnesses	0.46	0.53	0.41	0.18	0.20	0.20
143	Cerebral infarction	0.41	0.31	0.23	0.41	0.33	0.37
64	Malignant neoplasm of the trachea, bronchi, or lungs	0.50	0.51	0.37	0.13	0.15	0.16
127	Acute myocardial infarction, including complications after acute myocardial infarction	0.29	0.30	0.30	0.19	0.20	0.23
56	Malignant neoplasms of the stomach	0.20	0.20	0.30	0.14	0.16	0.21

The Republic of Tyva has the highest mortality rate from respiratory tuberculosis, confirmed bacteriologically and histologically. Although this cause of death is not considered an external one, it also reflects the region's depressed state. Tuberculosis is largely determined by social factors such as inequality, urbanization, food security and malnutrition, housing conditions, the environment, and barriers to accessing healthcare [29, Hargreaves J.R. et al.]. Life expectancy losses from this cause are 9.0 times higher than the national average for men and 14.0 times higher for women. This cause reduces the life expectancy of the entire population by 0.66 years. Tyva has a lower mortality rate from cardiovascular diseases such as atherosclerotic heart disease and cerebral infarction. This is probably due to higher mortality from external causes at an early age. In other words, the region's population does not live long enough to develop diseases of old age. At the same time, the cause "other forms of acute ischemic heart disease" accounts for several times more deaths than the Russian average. The impact of pneumonia in the republic is approximately twice as high as the average, but mortality from coronavirus infection caused by COVID-19 has taken fewer years of life than in Russia and the Far North. This is due to the smaller

[14] Source: compiled by the authors based on data from RosBRiS.

proportion of elderly people in the population. The low excess mortality in Tyva is confirmed by other studies [30, Nikitin B., Zakharova M., Pilyasov A. et al.].

Despite some increase in life expectancy in the republic since 2003, mortality from preventable causes remains extremely high. While one part of the population has begun to live significantly longer, another (primarily men in rural areas) dies from causes related to alcohol, poverty, and deprivation. Urban women have a 20-year longer life expectancy (76.0 years) compared to rural men (56.7 years). Low life expectancy rates are also observed among rural women (70.0 years) and urban men (62.3 years) [15]. The potential for increasing the life expectancy of the population is primarily linked to systematic efforts to reduce mortality from specific causes that are preventable, i.e. those that can be influenced by the healthcare system through prevention, detection and timely treatment of diseases in their early stages. It is important to note that Tyva, like many other peripheral regions, is facing a shrinking social infrastructure. For example, the number of hospital beds decreased from 5,000 to 3,700 between 2000 and 2022. The population per bed increased from 60.9 to 91.5 people. The dynamics of organizations outside the regional capital, in rural areas, is a cause for concern. Thus, the number of ambulatory and polyclinic organizations decreased from 75 in 2003 to 40 in 2022, and the number of hospitals decreased from 50 to 29 during the same period [16].

Nevertheless, the overall capacity of outpatient and polyclinic organizations, as well as the number of doctors and nursing staff, increased. We assume that this contributed to the success in reducing infant mortality (Fig. 8). While in 2000, infant mortality in the republic was twice as high as the Russian average (30.0 and 15.3‰), in 2020–2022, the figures were almost equal (5.1 and 4.5‰ on average over the three years, respectively). In terms of early neonatal mortality (within the first 7 days of life), Tyva is also close to the Russian average.

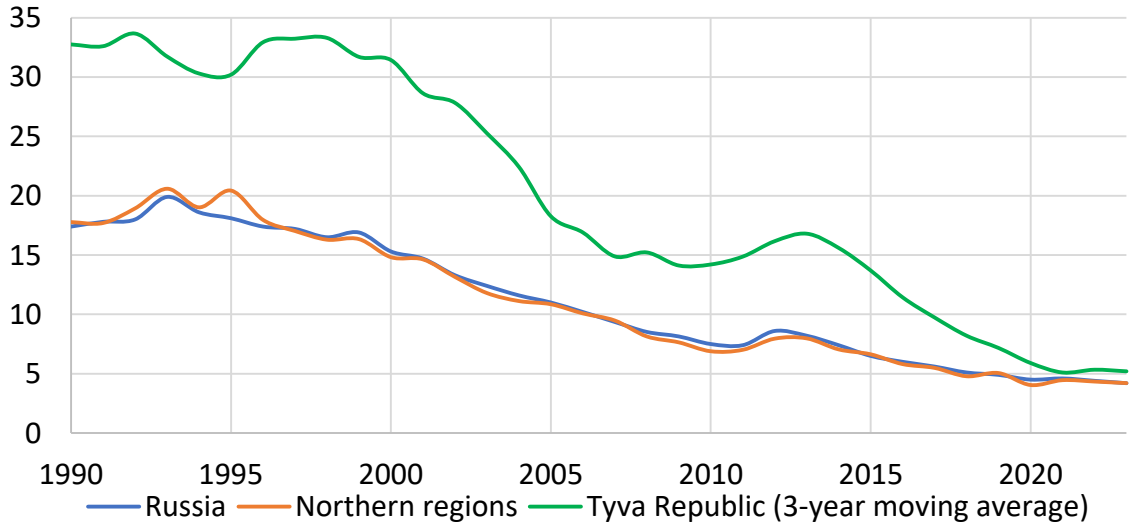

Fig. 8. Infant mortality rate per 1,000 live births in the Republic of Tyva, northern regions, and Russia, 1990–2023 [17].

[15] Life expectancy at birth. EMISS. URL: https://www.fedstat.ru/indicator/31293 (accessed 10 December 2024).
[16] Statistical Yearbook of the Republic of Tyva 2023. URL: https://24.rosstat.gov.ru/folder/45814 (accessed 10 December 2024).
[17] Source: EMISS. URL: https://fedstat.ru/indicator/31166 (accessed 10 December 2024).

A research of standardized mortality rates in all regions of Russia for 2008–2012 showed that all municipalities in the Republic of Tyva are among the most disadvantaged in terms of both male and female mortality [31, Timonin S., Jasilionis D., Shkolnikov V.M. et al.]. Data for 2014–2023 demonstrate that life expectancy indicators have improved across almost the entire republic. Kyzyl and the Kyzylskiy district are in the lead, while the worst indicators are in the peripheral territories in both the western and eastern parts of the region. On average, the standardized mortality rate across all territories decreased by 2.2‰ (Fig. 9).

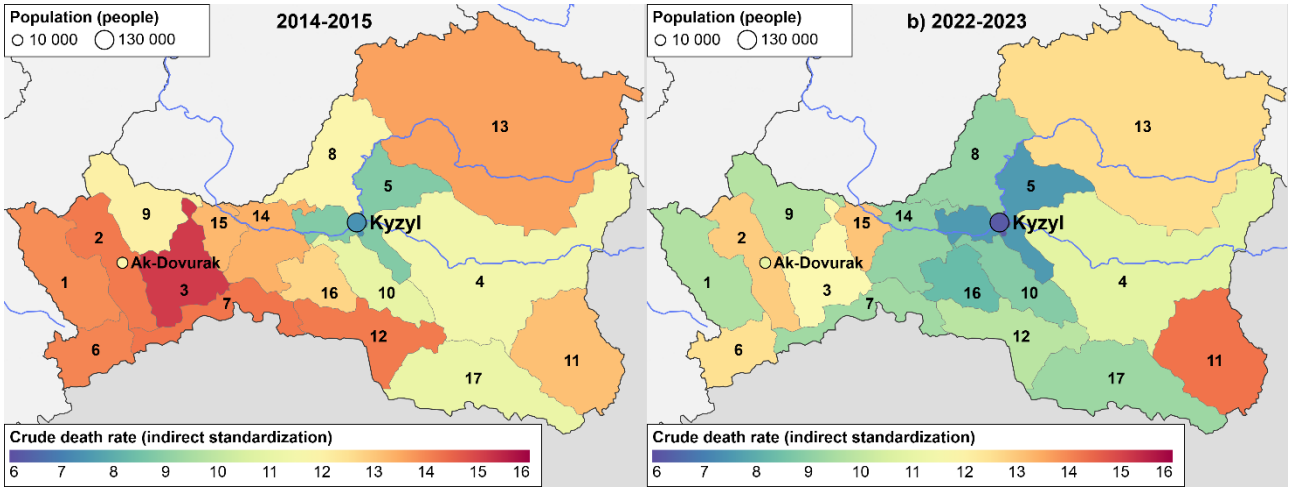

Fig. 9. Standardized mortality rate in the Republic of Tyva by urban okrugs and municipal districts, 2014–2015 and 2022–2023 [18].

As a result of high male mortality, the proportion of men has decreased by 2 percentage points since the last Soviet census and stabilized at approximately 47.2%. With a high proportion of the population under working age (over 30%), the proportion of elderly people aged 60 and over has increased more than 1.5 times, while the average and median ages of the population are steadily increasing. Losses in the working-age population due to mortality in the republic are close to those due to migration. The conducted analysis of the causes of death demonstrates the need to improve the material standard of living, the quality of life, and the level of education of the population. The Republic of Tyva has demonstrated significant success in reducing infant mortality, but there are still numerous causes of death among working-age people due to alcoholism and high levels of poverty. These include tuberculosis, homicide, suicide, poisoning, exposure to low temperatures, traffic accidents, and pneumonia.

Demographic trends and prospects for Tyva

In order to make assumptions about the demographic future of the republic, let us consider the dynamics of the main indicators of population reproduction in comparison with the northern regions and Russia as a whole. The total birth rate for the last three decades shows that, despite considerable variability, Tyva consistently exceeds the average birth rate for northern Russia. Only for a few years at the turn of the millennium the region failed to reach the replacement rate. Since 2015, this rate has been declining, but remains the highest in northern

[18] Source: Rosstat DBMI. URL: https://rosstat.gov.ru/dbscripts/munst/ (accessed 10 December 2024).

Russia. The difference between Tyva and northern regions in modern Russia has always been at least 0.5 (Fig. 10a).

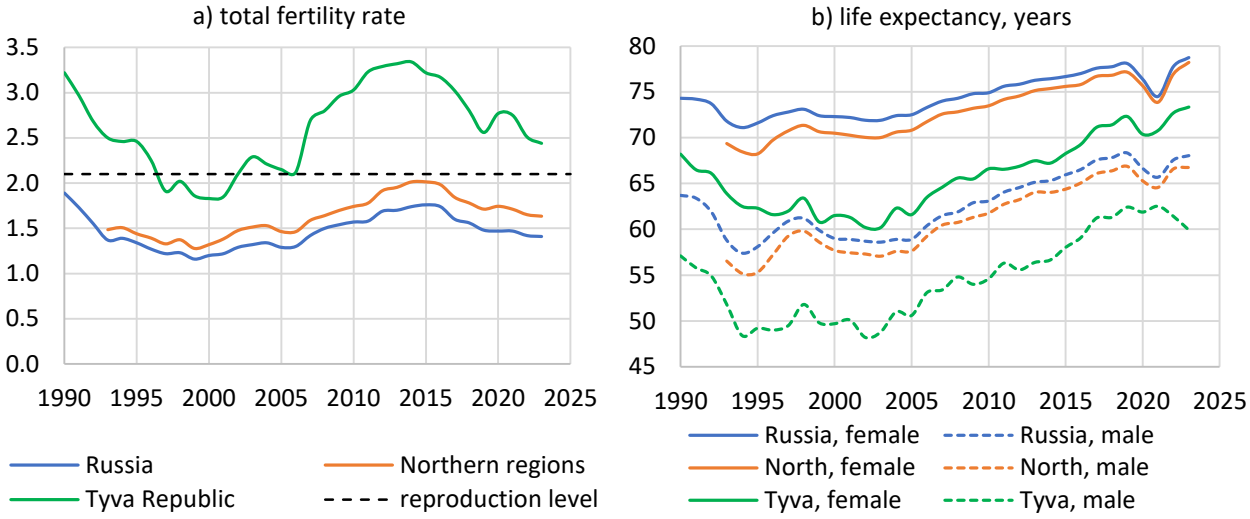

Fig. 10. Dynamics of population reproduction indicators in Russia, northern regions and Tyva, 1990–2023 [19].

Life expectancy in the republic grew from the mid-2000s until the pandemic period (Fig. 10b). The study showed that there is still significant potential for further mortality reduction. Over the past three decades, men in Tyva have lived on average 6.6 years less than in the Russian North, while women have lived 7.2 years less. This gap is gradually narrowing for women, but remains high for men.

What are the demographic prospects for Tyva? The population forecast by Rosstat shows that while the population of the North will continue to decline (by 1.6% by 2045), the number of residents in Tyva will grow (by 21.5% or 72,500 people). This is the best forecast among all northern regions. Yakutia and the Yamalo-Nenets Autonomous Okrug are in second and third place, with population growth forecast at 12.7%. By comparison, according to the same forecast, the Komi Republic will lose 26.3% of its population, the Arkhangelsk Oblast — 20.3%. While Tyva accounted for 4.5% of the population of the northern regions at the beginning of 2024, this figure is projected to increase to 5.6% by 2045 (Table 4).

Table 4

Forecast of the population of the northern regions of Russia and the Republic of Tyva [20]

Indicator	2024 (actual)	2025	2030	2035	2040	2045	Growth, 2024–2045, %
Total number, thousands of people							
Northern regions	7 441.5	7 395.4	7 298.6	7 250.7	7 265.0	7 324.7	-1.6
Republic of Tyva	337.5	341.7	353.4	369.8	389.8	410.0	21.5
Tyva's share among northern regions, %	4.5	4.6	4.8	5.1	5.4	5.6	
including those of working age							

[19] Source: EMISS. URL: https://fedstat.ru/indicator/31517; https://fedstat.ru/indicator/31293 (accessed 10 December 2024).

[20] Source: Estimated population of the Russian Federation until 2045. Rosstat. URL: https://gks.ru/compendium/document/13285 (accessed 10 December 2024).

Northern regions	4456.1	4424.3	4590.7	4628.3	4564.8	4445.9	-0.2
Republic of Tyva	192.2	196.5	218.6	232.2	241.2	246.9	28.5
Tyva's share among northern regions, %	4.3	4.4	4.8	5.0	5.3	5.6	

The working-age population in Tyva will grow even more significantly over the same period — by 28.5% (or 54,700 people), while in the north, according to the forecast, it will remain almost unchanged. This is particularly important given that, according to the Spatial Development Strategy, Russia's border regions, along with the Arctic and the Far East, are considered geostrategic territories crucial for ensuring the country's connectivity and national security.

Conclusion

Existing state and regional programs promoting the preservation of the traditional way of life of the Tyvans, aimed at stimulating the birth rate and supporting large families, do not address the problem of poverty. The prolonged financial deprivation of Tyvan families and the population's dependence on social benefits are a cause for concern, as they lead to the formation of a culture of dependency and poverty. For the region, this means dependence on the central government's loyalty and a reduction in the territory's potential for socio-economic development. Therefore, the republic's authorities should focus their efforts on stimulating the economy through the diversification of economic practices and the strengthening of horizontal ties in local communities, where various social groups participate in the formation of regional development strategies.

Currently, the population outflow is not as massive as in some other regions of the Russian North. Educational migration cannot be considered a negative factor, as it contributes to the improvement of the workforce's skills and the population's standard of living. The main way to improve the situation here is to encourage people to return after completing their education. A familiar linguistic and cultural environment may be a significant attraction for Tyvans, but without the creation of highly skilled jobs and the development of the cultural and entertainment industries, it will be impossible to significantly reduce the outflow of educated youth. In order to encourage young professionals to return, it is necessary to provide information about employment opportunities in the region at the end of their studies, so that they can realize their professional ambitions [21]. Meanwhile, for older age groups, it is necessary to improve the conditions for entrepreneurship and the accessibility and quality of social services. The tendency of the older population to leave may send a negative signal to young people, encouraging them to migrate. The difficult economic situation in the region leads to the formation of family strategies in which parents are interested in their children leaving the region. From the perspective of their life experience, the older generation determines and finances the migration needs of young people through education outside the region. The choices made by young people, in turn, are primarily determined by their environment and the people close to them.

[21] Similar practices are widely used in the European North [32, Kull M. et al., p. 142].

High birth rates are maintained in Tyva as a result of the high status of the family in the hierarchy of values, ethnic identity, and financial incentives. The main burden falls on rural women, who are "pulling" the demographic situation towards positive indicators, despite low life expectancy and migration losses. Currently, there is a view that measures to stimulate the birth rate should be targeted specifically at women who are interested in having families with many children. However, in our opinion, such measures may have a positive but limited effect, especially in families where domestic violence is common and there are signs of deviant behavior on the part of one of the spouses. It is important to maintain and develop social infrastructure (kindergartens, schools, medical facilities) in remote areas where the birth rate remains high. It is feasible to consolidate nearby settlements in order to optimize social services for the population, but this should only be done with consideration for the needs and lifestyles of residents in these remote areas. The region has undoubtedly achieved success in reducing infant and child mortality. The development of medical services and improving their quality require qualified specialists and investment in social infrastructure. Creating a comfortable environment is an important factor not only for local residents, but also for attracting tourists from other regions of Russia. The expansion of tourism, in turn, can stimulate the development of a whole range of other activities, such as the creation of souvenir products, food and light industry. Currently, employment in these sectors remains low, and poverty continues to drain the region's economic resources without solving strategic problems.

References

1. Lamazhaa Ch. Unknown Asian Russia: Nomadic, Turkic-Speaking, Buddhist Tuva Facing Modern Challenges. *Asian Studies, the Twelfth International Convention of Asia Scholars (ICAS 12)*. 2022; 1: 296–308. https://doi.org/10.5117/9789048557820/ICAS.2022.037
2. Gusakov T.Yu. The Multistructure of the Contemporary Ethnic Region in Russia: Archaization, Agrarianization and Migration (On the Example of the Republic of Tyva). *Russian Peasant Studies*. 2019; 4 (4): 76–95. https://doi.org/10.22394/2500-1809-2019-4-4-76-95
3. Dirin D.A., Fryer P. The Sayan Borderlands: Tuva's Ethnocultural Landscapes in Changing Natural and Sociocultural Environments. *Geography, Environment, Sustainability*. 2020; 13 (1): 29–36. https://doi.org/10.24057/2071-9388-2019-76
4. Soyan Sh.Ch. Modern Demographic Problems of the Republic of Tuva. *Population*. 2023; 26 (3): 43–54. https://doi.org/10.19181/population.2023.26.3.4
5. Abylkalikov S.I. Features of the Demographic Development of Tuva: Contribution of Migration to the Demographic Balance. *The New Research of Tuva*. 2021; 4: 131–142. https://doi.org/10.25178/nit.2021.4.10
6. Tarbastaeva I.S. Tuva's Transformation into a Monoethnic Region: Risks and Possibilities. *Problems of Economic Transition*. 2019; 61 (1–3): 54–68. https://doi.org/10.1080/10611991.2019.1691879
7. Balakina G.F., Anayban Z.V. Features of Ethno-Regional Migration in Tuva. *Sociological Studies*. 2016; 10: 85–92.
8. Abylkalikov S.I., Baimurzina G.R., Batalov R.O. Migration of the Population in Tuva According to the All-Russian Census of 2020. *The New Research of Tuva*. 2023; 2: 6–16. https://doi.org/10.25178/nit.2023.2.1
9. Chernyshev K.A., Mityagina E.V., Chernysheva N.V., Petrov E.Yu. Incidence and Directions of Educational Migration of Tuvan Youth. *The New Research of Tuva*. 2023; 2: 70–83. https://doi.org/10.25178/nit.2023.2.5

10. Natsak O.D. Transformation of the Reproductive Model of the Tuvan Family: Historical Retrospective and Current Trends. *Sociological Science and Social Practice*. 2022; 10 (2): 52–71. https://doi.org/10.19181/snsp.2022.10.2.9028
11. Natsak O.D. Gender and Demographic Features of the Labor Market of the Republic of Tuva: Trends and Prospects. *Population*. 2021; 24 (2): 120–130. https://doi.org/10.19181/population.2021.24.2.11
12. Borgoiakova T.G., Lopsan A.P. Gender Issues in the Tuvan Internet Discourse. *The New Research of Tuva*. 2024; 4: 46–60. https://doi.org/10.25178/nit.2024.4.4
13. Anayban Z.V. Women's History in the Works of Russian Tuvan Researchers. In: *Women's History Today: Source Studies, Historiography, New Methodological Approaches*. Moscow, IEA RAS Publ.; 2021. 268 p.
14. Rostovskaya T.K., Natsak O.D., Elamanova A.S. Single-Parent Families in Tuva and Kazakhstan: A Statistical and Demographic View of the Problem. *The New Research of Tuva*. 2024; 2: 243–262. https://doi.org/10.25178/nit.2024.2.15
15. Lazhentsev V.N., ed. *Spatial and Temporal Trends of Socio-Economic Processes in the Russian North*. Moscow, Syktyvkar, KSC UB RAS Publ.; 2012. 346 p. (In Russ.)
16. Lytkina T.S., Yaroshenko S.S. Expulsions of the Russian North: Exclusion without Rights to Resources. *Economic Sociology*. 2023; 24 (5): 93–127. https://doi.org/10.17323/1726-3247-2023-5-93-127
17. Sabgaida T.P., Rudnev S.G., Zubko A.V., Evdokushina G.N. Preventable Mortality in the Republic of Tuva and the Impact of the Covid-19 Pandemic on It. *The New Research of Tuva*. 2023; 2: 50–69. https://doi.org/10.25178/nit.2023.2.4
18. Revyakina O.V., Filimonov P.N., Murashkina G.S., Alekseyeva T.V., Novikova N.M. Prognosis of Epidemiologic Situation with tB in the Republic of Tuva. *Bulletin of the East Siberian Scientific Center SB RAMS*. 2011; 2 (78): 167–171.
19. Andreev E.M., Churilova E.V. The Results of the 2021 All-Russian Population Census in the Light of Civil Registration Statistics and Censuses of Previous Years. *Demographic Review*. 2023; 10 (3): 4–20. https://doi.org/10.17323/demreview.v10i3.17967
20. Chudinovskikh O.S. On the Issue of the Possibility of Studying Migration Based on the Materials of the 2020 All-Russia Population Census. *Demographic Review*. 2025; 12 (2): 4–34. https://doi.org/10.17323/demreview.v12i2.27489
21. Petrosian A.N. Fertility at the Municipal Level in Russia, 2011–2019. *Demographic Review*. 2021; 8 (3): 42–73. https://doi.org/10.17323/demreview.v8i3.13266
22. Preston S., Heuveline P., Guillot M. *Demography: Measuring and Modeling Population Processes*. Oxford, Blackwell Publishers Ltd; 2001. 291 p.
23. Lytkina T.S., Smirnov A.V. Expulsions in the Russian North: Migration Processes and Neoliberal Policy. *Arktika i Sever* [Arctic and North]. 2019; 37: 94–117. https://doi.org/10.17238/issn2221-2698.2019.37.94
24. Rostovskaya T.K., Vasilieva E.N. Challenges of Educational Migration of Tuvan Youth: Demographic Aspect. *The New Research of Tuva*. 2023; 3: 207–219. https://doi.org/10.25178/nit.2023.3.13
25. Abel G.J., Cohen J.E. Bilateral International Migration Flow Estimates for 200 Countries. *Scientific Data*. 2019; 6: 82. https://doi.org/10.1038/s41597-019-0089-3
26. Lytkina T.S. The Social Potential of the Northern City: From Ignorance to Recognition. *The Journal of Sociology and Social Anthropology*. 2014; 3: 33–47.
27. Kalabikhina I.E., Kuznetsova P.O. Parity Transition in Fertility in a Long Historical Perspective. *Demographic Review*. 2024; 11 (3): 25–48. https://doi.org/10.17323/demreview.v11i3.22713
28. Frantsuz Yu.A. In Search for the Best-Fitting Theoretical Model for Explaining Demographic Dynamics. *Population and Economics*. 2025; 9 (1): 108–128. https://doi.org/10.3897/popecon.9.e128817
29. Hargreaves J.R., Boccia D., Evans C.A., Adato M., Petticrew M., Porter J.D. The Social Determinants of Tuberculosis: From Evidence to Action. *American Journal of Public Health*. 2011; 101 (4): 654–662. https://doi.org/10.2105/AJPH.2010.199505
30. Nikitin B., Zakharova M., Pilyasov A., Zamyatina N. The Burden of Big Spaces: Russian Regions and Cities in the COVID-19 Pandemic. *Letters in Spatial and Resource Sciences*. 2023; 16: 16. https://doi.org/10.1007/s12076-023-00341-z

31. Timonin S., Jasilionis D., Shkolnikov V.M., Andreev E. New Perspective on Geographical Mortality Divide in Russia: A District-Level Cross-Sectional Analysis, 2008–2012. *Journal of Epidemiology & Community Health*. 2020; 74: 144–150. https://doi.org/10.1136/jech-2019-213239
32. Kull M., Refsgaard K., Sigurjónsdóttir H.R., Bogason Á., Wøien Meijer M., Sánchez Gassen N., Turunen E. *Attractive Rural Municipalities in the Nordic Countries: Jobs, People and Reasons for Success from 14 Case Studies*. Stockholm, Nordregio; 2020. 237 p. https://doi.org/10.6027/R2020:1.1403-2503

The article was submitted 07.02.2025; approved after reviewing 04.09.2025; accepted for publication 13.10.2025

Contributions from the authors: T.S. Lytkina — development of the theoretical framework for the study, preparation of the social science section of the manuscript and conclusions. A.V. Smirnov — development of the research methodology, data collection and analysis, visualization, preparation of the demographic section of the manuscript

The authors declare no conflicts of interests