DOI: 10.15838/esc.2024.3.93.10
УДК 316.4, ББК 60.52

Public Health Potential: Current State and Relation to Russian Regions' Features

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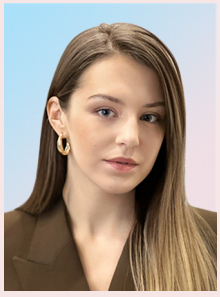

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For citation: Nazarova I.B., Karpova V.M., Lyalikova S.V. (2024). Public health potential: Current state and relation to Russian regions' features. *Economic and Social Changes: Facts, Trends, Forecast*, 17(3), 174–189. DOI: 10.15838/esc.2024.3.93.10

Abstract. The article investigates issues related to public health and its potential in the context of modern challenges. Understanding health potential as a complex concept is based on the interrelation of various aspects of health (physical, emotional, moral, social) and well-being of an individual in various spheres of life. The aim of the work is to analyze public health potential in various regions of the Russian Federation based on individuals' self-reported health data and the current socio-economic situation in the region. The study is based on the Selective Observation of the State of Public Health Survey conducted by Rosstat in 2019–2022, covering more than 100 thousand people. Additionally, statistical data on the socio-economic situation in the regions were taken into consideration. The analysis methods include hierarchical cluster analysis to classify regions according to the level of self-rated health using Ward's method to determine the proximity of clusters. The study revealed two main types of health potential preservation in Russian regions. The first type is associated with a good environmental situation in the regions alongside a wide spread of rural areas and the maintenance of a tradition of health care, the second type is due to the high level of socio-economic development in the region, an effective health care system and a high level of citizens' education. The age structure of the population turns out to be an important factor influencing self-reported health. The analysis of demographic indicators reveals that regions with high health potential have younger population. The metropolitan regions are distinguished by a high level of socio-economic development and education, which is reflected in the highest indicators of public health. The comparison of more attractive groups of regions in terms of health potential with regions characterized by low health potential shows that low living standards, poverty and high mortality of the working-age population have a negative impact on self-reported health and overall health potential. Health potential is an important indicator of the quality of life; and attention to the factors influencing its formation will allow identifying resources to improve public health and prevent negative trends in the socio-economic and demographic development of the region.

Key words: health, self-reported health, human potential, health potential, regional statistics, sampling observation, public health.

Introduction

An individual and their potential are at the forefront of the development of society, technology and major industries (for details, see: Lokosov, 2023). Health is one of the most important components of human potential (HP) along with education, economic, spiritual and other resources of an individual or population as a whole (Rimashevskaya, 2001; Rimashevskaya, 2009). This highlights the importance of determining human potential as a whole and its components, including health potential. In this regard, it is necessary to search for indicators that can characterize public health at the macro level, with the possibility of including these indicators in the analysis along with other macro indicators. It is also necessary to determine a methodology for analyzing and calculating health potential in relation to the country and regions, which can allow determining health policy at the regional level, taking into account regions' specifics. We assume that public health potential is related to the socio-economic characteristics of the region and may differ significantly across constituent entities of the Russian Federation.

The **aim of the research** is to determine public health potential in various regions of the Russian Federation by analyzing data on subjective indicators of individual health and the current

socio-economic situation in the region in which the individual lives. The article identifies main groups of RF regions formed on the basis of health potential determined through self-rated health data.

Materials and methods

In the framework of studies on human potential, which is understood as a set of available demographic, socio-economic and socio-cultural properties of the population that can be implemented if there is a motivational readiness and certain socio-historical and natural-geographical conditions (Lokosov, 2023), researchers focus on the population quality and, above all, on the internal characteristics of people or an individual (Fedotov, 2017), on a set of their essential features, properties, characteristics and estimates (Fedotov, 2021). In our opinion, self-rated health can be such a property, a feature of the population (individual).

Human potential also includes socio-physiological properties of the population, including health, which is empirically measured using objective statistical indicators (for example, morbidity), synthetic, i.e. calculated indicators formed on the basis of objective and subjective data (healthy life expectancy, commitment to a healthy life), as well as subjective-objective, an example of which is self-rated health.

Considering self-rated health as a property, a characteristic of an individual, as well as a component of human potential that determines one's life expectancy (including healthy life)[1], through subjective health assessments, health potential was determined, and it is expressed in the categorical differentiation of self-assessments of health. An empirical indicator of health potential indicates a good and very good level of health. Understanding and researching health potential as a complex potential (reflecting not only well-being, but also physical and psychological health, taking into account the relationship of self-assessments with objective assessments of specialists (Korkhova, 2001), is based on the WHO definition of health fixed in the preamble to the 1948 Charter of the World Health Organization in 1948, which emphasizes that health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. A healthy person is a prosperous person who has good health of any type: physical, mental, emotional[2]. Besides, the Organization for Economic Cooperation and Development (OECD) in its reports describes self-assessment of health as a unity of mental and physical health[3].

Using the indicator based on self-rated health: an overview and substantiation

Scientific research substantiates the choice of this indicator and confirms its relevance. Self-rated health is considered as a fairly stable indicator reflecting not only the subjective, but also the objective state of health. For example, during a Taganrog study, the results of self-assessment of health were found to correspond to the objective state of health of patients (Korkhova, 2001). Thus, self-rated health is a complex indicator that includes a set of health characteristics, rather than one of its parameters. There is also a proven link between self-assessment of health and mortality (Kaplan, Camacho, 1983), mortality and the need for medical care (Palladino et al., 2016). Self-assessment data are actively used as a criterion of health-related quality of life in the development and evaluation of the effectiveness of preventive

[1] Self-rated health is included in the calculation of the ROSSTAT index – healthy life expectancy. The methodology for calculating the indicator "Healthy life expectancy (years)" was approved by Rosstat Order 95, dated February 25, 2019. Health data are obtained based on the results of selective observation of the health status of the population in accordance with position 1.8.15 of the Federal Statistical Work Plan. The calculation of the indicator is carried out in accordance with position 2.9.1 of the Federal Statistical Work Plan.

[2] Comprehensive mental health action plan 2013–2030. Geneva: World Health Organization. 2022. The term "mental health" was introduced by WHO in 1979.

[3] Health at a Glance 2023: OECD Indicators. Paris: OECD Publishing. DOI: https://doi.org/10.1787/7a7afb35-en (accessed: May 8, 2024).

programs for the protection of motherhood and childhood (Surmach, Epifanov, 2019).

During periods of social stress, statistics do not always provide complete information about public health status, which would allow us to assess the situation at the level of behavior and well-being of individuals responsible for their own health and the health of others. In such situations, the results of sociological research can become an important source of information that allows us to understand the social reality in the health and healthcare system and supplement official statistics. In turn, mass phenomena of social life studied by statistical methods are the basis for sociological analysis, which helps to perceive reality more accurately (Maslov, 1967). Sociological research data complement the statistical material, providing additional illustrations to the understanding of objective processes. That is why self-rated health is used by international organizations such as the OECD[4], the World Health Organization (WHO)[5] and, starting in 2019, Rosstat[6]. It is recommended to monitor and use the self-assessment indicator to estimate public health status during epidemics, along with objective indicators (see for example: Nazarova, 2022). An important circumstance is that the indicator of self-rated health is backed by representativeness in Russia as a whole and in the context of regions. At the same time, regardless of the fact that self-rated health is used by international organizations on a par with statistical data characterizing the population, and is also used as a component in the calculation of the indicator of healthy life expectancy, the combination of self-assessments with macro indicators is practically not used. In this study, we propose to move from the perspective of a population survey within the framework of a survey to the perspective of assessments of macro regions.

An example of the prospect of such a study is the discovery of a connection between self-assessments of public health and macro indicators in the context of urban and rural settlements. This relationship has been verified taking into account differences in the provision of medical care: urban residents may have a higher level of self-rated health, including due to better access to health services (Dor lien, Xu, 2020), as well as the relationship of self-assessments with mortality (Kaplan, Camacho,1983).

The typology of regions, including on the basis of cluster analysis, was put forward in the context of the main macro indicators, which involved indicators indirectly characterizing health – life expectancy, number of patients with alcoholism and drug addiction along with the level of education; natural population growth (Lokosov et al., 2019).

The typology of Russian regions by health status based on a comprehensive indicator, including the level of morbidity for all reasons and average life expectancy, allowed us to identify the top regions: Ingushetia, Moscow, Chechen Republic, Karachay-Cherkess Republic, Republic of North Ossetia–Alania, Republic of Dagestan, and Kabardino-Balkar Republic. The bottom regions in terms of health are those most remote from the center of Russia, which are characterized by low life expectancy and high morbidity (possible causes: alcoholism, low level of health care, low level of social security) (Rybakova, Romanchenko, 2014).

Conditionally, the "top" and the "bottom" clusters are determined in accordance with indicators of sanitary and epidemiological well-being and lifestyle indicators as a result of ranking the average cluster values of indicators of RF constituent entities. The best in terms of sanitary and epidemiological well-being are the Leningrad, Tula, Belgorod regions, etc. (Klein et al., 2022).

[4] Health at a Glance 2023: OECD Indicators. Paris: OECD Publishing. DOI: https://doi.org/10.1787/7a7afb35-en (accessed: May 8, 2024).

[5] Self-rated health. WHO. 2020. Available at: https://gateway.euro.who.int/ru/indicators/hbsc_14-self-rated-health/#id=26248 (accessed: March 20, 2024).

[6] Selective observation of the state of public health. Rosstat. 2019–2024. Available at: https://03.rosstat.gov.ru/szn# (accessed: March 20, 2024).

Studies show the relationship of self-esteem with socio-demographic and economic indicators, but they do not confirm the relationship of self-esteem with macro indicators in the context of countries and regions. Most studies based on the analysis of self-rated health and the relationship with other indicators, for example, with the economic status of an individual (Kartseva, Kuznetsova, 2023; Kislitsyna, 2015) suggest that macroeconomic indicators characterizing the economic well-being of the region may also be related to the level of public health, expressed in self-assessments.

Empirical framework of the research

The analysis uses the results of the "Selective observation of the state of public health" (SPH) for the period from 2019 to 2022[7] in all regions of the Russian Federation; 60 thousand households, including more than 100 thousand people, were surveyed; surveys of all members of these households were conducted. In addition, statistical data reflecting the socio-economic situation in the regions[8] and socio-demographic characteristics of the population were used. These studies are representative of the entire Russian Federation. The analysis of Rosstat materials for Russia's regions made it possible to compare the results of self-assessments with objective data reflecting the level of morbidity and other aspects of public health. Data on respondents aged 15 years and older are taken into account.

Hierarchical cluster analysis using Euclidean distance and Ward's method for determining the proximity of clusters were used to classify regions according to the level of self-rated health. The analysis was carried out separately for each year, which made it possible not only to assess the stability of clustering, but also to study the dynamics of self-rated health in terms of the movement of regions between clusters to obtain a qualitative characteristic. This method was chosen because it was impossible to determine the number of clusters in advance, since significant outliers (more than three interquartile intervals) were observed in the distribution of self-assessments, grouped into one or two separate clusters. The use of hierarchical cluster analysis made it possible to identify the moments of formation of clusters with outliers and highlight them for further analysis. Other researchers also conducted clustering of regions, using socio-economic and demographic indicators characterizing the position of Russian regions in the overall structure in the analysis (details see in: Lokosov et al., 2019).

A comparative analysis of socio-demographic and economic characteristics of groups of regions was conducted using a single-factor analysis of variance, as well as a pairwise comparison of average values using a t-test with an appropriate Bonferroni correction for multiple comparisons. The threshold p-value for determining statistically significant differences is assumed to be 0.05. The key principles of forming groups of regions turned out to be as follows: belonging to a cluster, taking into account the health potential identified on the basis of self-assessments, and changing this affiliation during the analyzed period (from 2019 to 2022).

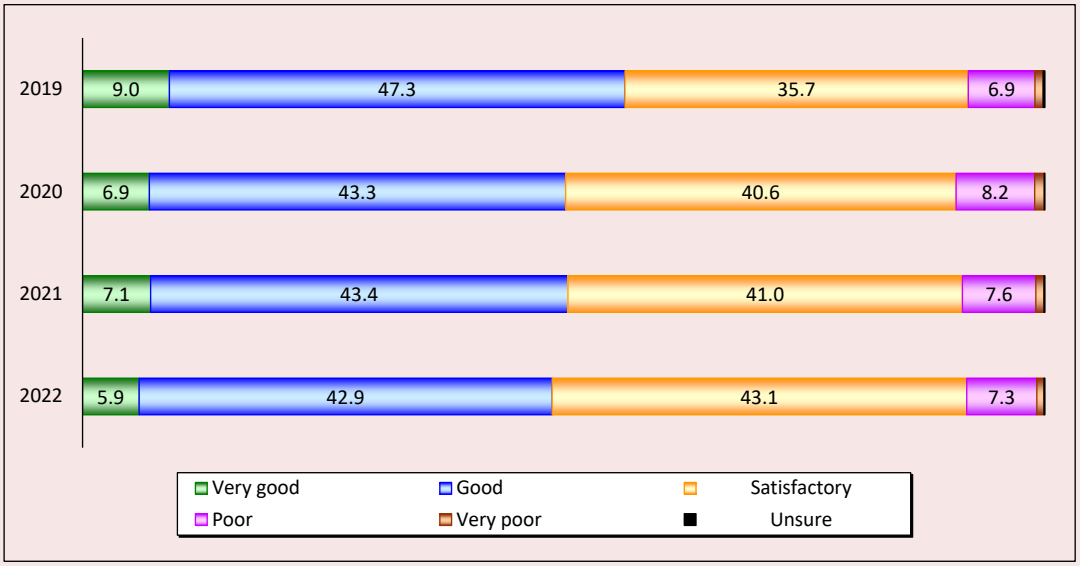
Results and discussion

The dynamics of self-rated health assessments in Russia in the period from 2019 to 2022 are mildly negative *(Fig. 1)*. This trend is manifested in a gradual decrease in the proportion of those who rate their health as being good (4–5 points out of 5) (from 56.4% in 2019 to 48.8% in 2022), against the background of an increase in the proportion of satisfactory ratings (from 35.7% to 43.1%) and

[7] Selective observation of the state of public health. Rosstat. 2019–2024. Available at: https://03.rosstat.gov.ru/szn# (accessed: March 20, 2024).

[8] The socio-economic situation of Russia. January 2022. Ministry of Economic Development of Russia. Rosstat. Moscow: Federal State Statistics Service. 2022. Available at: https://rosstat.gov.ru/storage/mediabank/osn-01-2022.pdf (accessed: January 20, 2024).

Figure 1. Dynamics of Russians' self-rated health assessments in 2019–2022, %*



* Values less than 1% are not indicated in captions.

Source: SPH, own calculation.

a fairly stable proportion of those who rate their health as being poor (1–2 points out of 5). This is typical for describing the dynamics of average assessments; for example, over four years there has been a uniform decrease in the values of the indicator from 3.57 points in 2019 to 3.46 points in 2022 (in 2020/21 – 3.47/3.48 points). It is noteworthy that the negative dynamics of self-rated health assessments go beyond 2020–2021, which could be explained by the impact of the COVID-19 pandemic; the dynamics are the same in 2022. This allows us to hypothesize that the pandemic had a negative impact not only on mortality during the peak of morbidity, but also retained a negative effect on the health of individuals in the long term (Amirov et al., 2021; Khasanova et al., 2021).

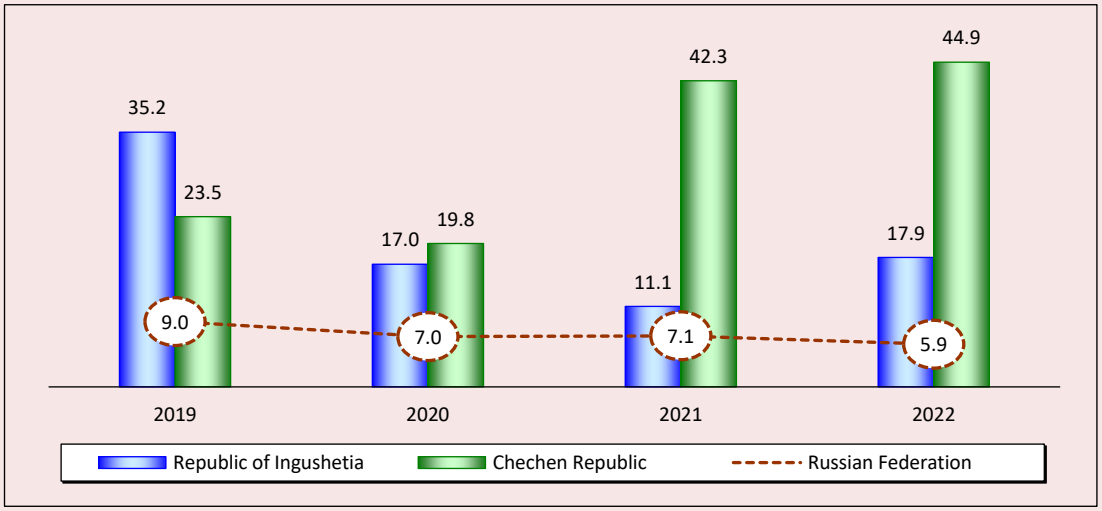
The RLMS-HSE monitoring shows slightly different data than Rosstat: 2019 – 3.27 points; 2020 – 3.30; 2021 – 3.31, 2022 – 3.29 (i.e., there is no trend). Perhaps this is due to the formulation of the question regarding self-rated health. At Rosstat, the central category of gradation in assessing self-rated health is referred to as "satisfactory", while in the RLMS – as "average, not good, but not bad", which is closer in meaning to the "I am unsure" option, and it turns out that respondents tend to choose this response more often.

General overview of public health in the regions

The grouping of regions with different health potential, calculated by analyzing self-rated health assessments, was carried out in two stages:

Stage 1 – clustering of regions in each year of the study, depending on the level of self-rated health of residents. At this stage, hierarchical cluster analysis was used to determine regional features of self-rated health assessments in Russia's regions. For each year under consideration (2019, 2020, 2021 and 2022), there were three significant clusters, and sometimes an additional cluster was formed, which included regions with major deviations (an outlier cluster). Significant deviations toward overestimated self-assessments of health were observed in the

Figure 2. Dynamics of the share of respondents who rated their health as "very good" in the Russian Federation and in some regions in 2019–2022, %



Source: SPH, own calculation.

Chechen Republic (in 2019, 2021 and 2022) and the Republic of Ingushetia (in 2019 and 2022). If these regions were not included in the outliers cluster, they confidently occupied leading positions in the cluster with the highest health scores. However, for some regions, especially for the Chechen Republic, self-rated health assessments were so high that they raised doubts about their reliability (which gave grounds to exclude them from further analysis; *Fig. 2*). Throughout the entire survey period (2019–2022), regions were grouped annually into three clusters (with the exception of the Republic of Ingushetia and the Chechen Republic), which differed statistically significantly in terms of self-rated health assessments (all p-values of the single-factor analysis of variance were less than 0.01).

The first cluster is represented by regions with high health scores (the proportion of respondents who described their health as "very good" and "good" is higher than the share of those who said it was "poor" and "very poor"), the second cluster was formed by regions with average scores, and the third – with the lowest scores.

Stage 2 – determining the dynamics of health potential in the regions. As part of this stage, an analysis of the dynamics of regions belonging to certain clusters was carried out. This allowed us to identify upward dynamics when the region moved into a cluster with higher health scores (for example, from "average" to "best") and downward dynamics. In general, negative dynamics of self-rated health assessments was observed throughout Russia, which was aggravated by the transition of some regions to a cluster with lower self-assessments.

Based on the generalized analysis of regions belonging to clusters in terms of self-rated health assessments and their dynamics, seven groups of regions were identified *(Table)*. The first set consists of three stable clusters in which self-rated health assessments remained unchanged throughout the study period. The second set includes four variable clusters, which included regions that moved from one cluster to another during the monitoring period (i.e., residents of these regions changed their health assessments with each subsequent survey).

Structure of regions according to self-rated health assessments in 2019–2022

<table>
<tr><th colspan="5">Types of clusters – groups of regions</th></tr>
<tr><th colspan="5">Stable clusters – unchanging assessments</th></tr>
<tr><td colspan="2">Group 1
“above-average self-rated health assessments”</td><td>Group 2
“average self-rated health assessments”</td><td colspan="2">Group 3
“self-rated health assessments below average”</td></tr>
<tr><td colspan="2">Subgroup 1.1:
1. Astrakhan Region
2. Kabardino-Balkar Republic
3. Republic of Dagestan
4. Republic of Tyva

Subgroup 1.2:
5. Moscow
6. Saint Petersburg</td><td>1. Arkhangelsk Region
2. Kostroma Region
3. Krasnodar Territory
4. Moscow Region
5. Perm Territory
6. Tambov Region
7. Yaroslavl Region</td><td colspan="2">1. Altai Territory
2. Kirov Region
3. Kurgan Region
4. Orel Region
5. Pskov Region
6. Republic of Komi
7. Republic of Mari El</td></tr>
<tr><th colspan="5">Variable clusters – variable self-assessments</th></tr>
<tr><th colspan="2">Negative dynamics</th><th>Positive dynamics</th><th colspan="2">Unstable</th></tr>
<tr><td>Group 4 “from high to average”</td><td>Group 5 “from average to low”</td><td>Group 6 “from low to average”</td><td colspan="2">Group 7 “improvement and decline”</td></tr>
<tr><td rowspan="4">1. Sevastopol
2. Irkutsk Region
3. Karachay-Cherkess Republic
4. Kemerovo Region
5. Krasnoyarsk Territory
6. Leningrad Region
7. Orenburg Region
8. Primorye Territory
9. Republic of Adygea
10. Republic of Buryatia
11. Republic of Crimea
12. Republic of North Ossetia – Alania
13. Republic of Tatarstan
14. Republic of Khakassia
15. Rostov Region
16. Sakhalin Region
17. Stavropol Territory
18. Tomsk Region
19. Tyumen Region
20. Chukotka Autonomous Area</td><td rowspan="4">Subgroup 5.1 – consistently negative dynamics:
1. Voronezh Region
2. Trans-Baikal Territory
3. Kaliningrad Region
4. Kaluga Region
5. Tver Region
6. Republic of Udmurtia

Subgroup 5.2 – fluctuations followed by a fall
7. Vologda Region
8. Jewish Autonomous Region
9. Ivanovo Region
10. Novosibirsk Region
11. Omsk Region
12. Penza Region
13. Republic of Kalmykia
14. Ryazan Region
15. Ulyanovsk Region
16. Chuvash Republic</td><td>Subgroup 6.1 – stable improvement:
1. Bryansk Region
2. Novgorod Region
3. Smolensk Region
4. Kamchatka Territory
5. Republic of Bashkortostan
6. Chelyabinsk Region</td><td colspan="2" rowspan="4">1. Belgorod Region
2. Vladimir Region
3. Murmansk Region
4. Nizhny Novgorod Region
5. Republic of Altai
6. Republic of Sakha (Yakutia)
7. Sverdlovsk Region</td></tr>
<tr><td>Subgroup 6.2 – overcoming the pit: from the average to the low cluster with a subsequent return to the average cluster:
7. Amur Region
8. Lipetsk Region
9. Magadan Region
10. Republic of Karelia
11. Republic of Mordovia
12. Saratov Region
13. Tula Region
14. Khabarovsk Territory</td></tr>
<tr><td>Subgroup 6.3 – fluctuations between the average and the low cluster:
15. Volgograd Region
16. Kursk Region
17. Samara Region</td></tr>
</table>

Group 1 is the first sustainable cluster with above-average self-rated health assessments (health potential), uniting six regions with the highest health scores. The average self-rated health score is 3.7 points. In these regions, the proportion of residents who rate their health as "very good" or "good" exceeds the proportion of those who rate it as "poor" or "very poor". These regions remained in the cluster with high scores throughout the survey period, demonstrating higher rates compared to other regions. Two subgroups have been formed within this cluster:

– *subgroup 1.1* – average self-rated health score was 3.7 points, in particular, 62.0% of respondents rated their health as very good or good, 5.2% – as poor or very poor: Astrakhan Region, Kabardino-Balkar Republic, Republic of Dagestan, Republic of Tyva;

– *subgroup 1.2* – average self-rated health score was 3.7 points, 64.8% of respondents rated their health status positively to varying degrees, 5.8% held a sharply opposite opinion: two federal cities – Moscow and Saint Petersburg.

The regions in the subgroups differ significantly in their demographic characteristics, which is why two subgroups were identified: on the one hand, these are the two largest cities in Russia, on the other, the constituent entities whose combined number turns out to be less than each of the abovementioned cities. Such an approach will further allow for a more differentiated analysis of the main socio-demographic and economic characteristics of the regions. (In addition, we should note that the group includes regions in which indicators characterizing health are inconsistent, for example, the Republic of Tyva, despite high self-rated health assessments, is characterized by a relatively low level of life expectancy, which requires a separate analysis).

Metropolitan regions have previously stood out from other regions of Russia, for example, the value of health is higher in the regions, but the real concern for their health due to various factors is shown by metropolitan residents[9] and, in general, residents of the regions have a low valeological culture (Novoselova, 2020).

Group 2 is the second stable cluster with an average health potential. The average self-rated health score is 3.4 points. Less than 50% of citizens rated their health as very good or good (46.7%), while the number of those who gave it negative ratings was 8.1%. The cluster includes seven regions with average health scores: Arkhangelsk Region, Kostroma Region, Krasnodar Territory, Moscow Region, Perm Territory, Tambov Region, Yaroslavl Region.

Group 3 is the third stable cluster with below-average health potential: self-rated health score is 3.3 points. In this group, the maximum number of those who assessed their health status as poor or very poor turned out to be 11.7%, while 37.5% of the survey participants held the opposite opinion (similarly, the lowest value for all groups). Regions characterized by "low self-rated health assessments" include Altai Territory, Kirov Region, Kurgan Region, Orel Region, Pskov Region, Republic Komi, Republic of Mari El.

Group 4 is a cluster with values varying "from best to average", in which health potential deteriorated during the years of the survey. The average self-rated health score is 3.5 points. Every second citizen living in these regions had a positive assessment of their state of health to varying degrees (53.5%), representatives of the opposite side made up 7.8%. This group includes 20 regions that fell into the "top" group once during the survey period, but in 2022 moved to the average cluster. Figure 3 shows that most regions repeat the trends typical for Russia as a whole, when the average level of self-rated health falls in 2020, then rises slightly in 2021 and decreases again in 2022.

[9] The Family-Child Lifestyle Values (SeDOJ–2019): An analytical report on the results of an interregional socio-demographic survey (2020). Moscow: MAKS Press. DOI: 10.29003/m857.SeDOJ-2019

Group 5 is a cluster with values varying "from average to worst". The average self-rated health score is 3.4 points. The group is represented by 16 regions, in which 44.8% of respondents rated their health as good or very good, and one in ten as poor or very poor (9.5%). Regions from this group in 2022 fell into the cluster with the lowest estimates of health potential, although in the past they occupied a place in higher categories; but in recent years they have consistently lost their position. Among these regions, one can distinguish the following subgroups:

– subgroup 5.1 – regions with consistently negative dynamics (each year regions moved to a cluster with lower health scores): Voronezh Region, Trans-Baikal Territory, Kaliningrad Region, Kaluga Region, Tver Region, Republic of Udmurtia;

– subgroup 5.2 – regions characterized by positive dynamics at first, followed by a fall in 2022: Vologda Region, Jewish Autonomous Region, Ivanovo Region, Novosibirsk Region, Omsk Region, Penza Region, Republic of Kalmykia, Ryazan Region, Ulyanovsk Region, Chuvash Republic.

Group 6 is a cluster with values varying "from worst to average". The average self-rated health score is 3.4 points; 42.6% of respondents from this group of regions rated their health condition to varying degrees, while one in ten held the opposite opinion (10.2%). The group includes 17 regions that were included in the middle cluster in 2022, but had previously occupied lower positions in terms of health potential. There are also several subgroups among these regions:

– subgroup 6.1 – regions demonstrate stable improvement (Bryansk Region, Novgorod Region, Smolensk Region, Kamchatka Territory, Republic of Bashkortostan, Chelyabinsk Region);

– subgroup 6.2 – regions are overcoming the decline; from the cluster with average self-rated health assessments there is a drop into the category with the lowest ratings, followed by a return to the cluster an order of magnitude higher (Amur Region, Lipetsk Region, Magadan Region, Republic of Karelia, Republic of Mordovia, Saratov Region, Tula Region, Khabarovsk Territory);

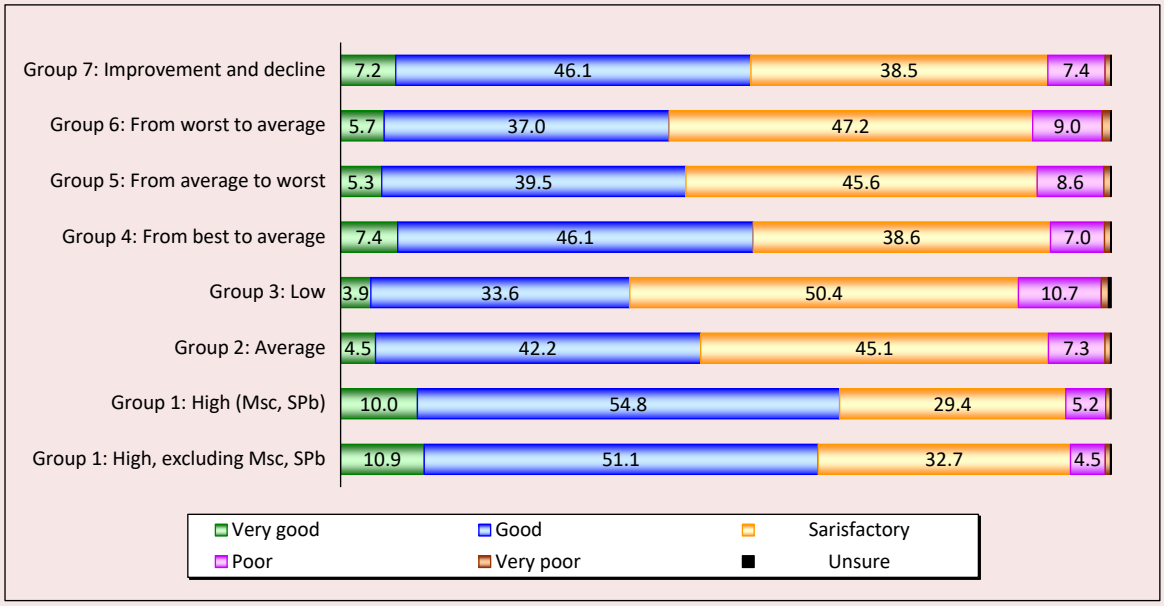
– subgroup 6.3 – shows fluctuations between the group with average and low self-rated health assessments (Volgograd Region, Kursk Region, Samara Region).

Group 7 is a cluster with varying values of "improvement and decline". The average self-rated health score is 3.5 points. Approximately one in two residents of this group of regions assessed their health status positively (53.2%), while 8.2% of respondents held negative views. The group consisting of 7 regions is characterized by stable positive dynamics of transition to clusters with higher ratings until 2021 and return to the middle cluster in 2022.Constituent entities included in this category are as follows: Belgorod Region, Vladimir Region, Murmansk Region, Nizhny Novgorod Region, Republic of Altai, Republic of Sakha (Yakutia), Sverdlovsk Region.

Analyzing the trends in the physical public health in the regions, expressed in self-rated heath assessments, we can say that a positive condition (in regions with consistently high scores) and positive dynamics (in regions that showed a transition from low to high self-assessments during the years of the survey) is typical only for 22 regions (group 1 and group 6); 23 regions (group 3 and group 5) demonstrated a negative condition (most residents assessed their health as poor) or negative dynamics (most representatives of the regions lowered their self-rated health assessments). The rest showed implicit dynamics (7 regions – group 7) and mainly middle indicators (26 regions – groups 2 and 4).

Stage 3 – characteristics of self-rated health assessments in 2021 in the context of the groups of regions. The analysis of indicators of self-rated health assessments by groups of regions allows

Figure 3. Self-rated health assessments in 2021 by groups of regions, %*



Source: SPH, own calculation.

* Values less than 3% are not indicated in figure captions

us to form an idea of the actual perception of an individual's state of health, taking into account their place of residence. The regions belonging to group 1, characterized by *"above-average self-rated health assessments"* (subgroups 1.1 and 1.2), have a high proportion of positive health assessments (more than 60%), as well as average self-assessment values (3.7 points). The mentioned subgroups are similar in terms of the values of the indicators, which proves the correctness of the cluster analysis. However, this group is heterogeneous in other socio-demographic and economic indicators, which will be discussed in more detail below. Groups 4 and 7 occupy the third place in terms of average self-rated health score of 3.5 points; among representatives of these groups about half of the respondents rated their health positively. This is followed by groups 2, 5 and 6 ("average", "from average to low" and "from low to average"), which are slightly worse than the previous ones: the average score is 3.4 points, but at the same time they retain the proportion of respondents who, to varying degrees, assessed their health as good – over 40%. The worst situation in terms of self-rated health assessments is observed in the regions of group 3 ("consistently below average") – here only 37.5% of respondents gave assessed their health as good, and 11.7% said it was bad *(Fig. 3)*.

Stage 4 – analyzing the indicators of regions' socio-demographic and economic development. The comparison of the average values of socio-economic development indicators in the groups of regions was carried out on the basis of an analysis of key indicators for 2021, which was due to the availability of sufficient statistical data. Further, the analysis was carried out by comparing individual thematic groups of indicators, including demographic development, medical care, education, economic development at the macro level, as well as the development of science, culture, sports, leisure, etc.

The analysis of a number of indicators characterizing the quality of human potential (Rimashevskaya et al., 2014) reveals the nature of the influence of various factors on public health potential. The results show that population age structure is of particular importance in this issue. The regions of group 1, with the exception of the metropolitan subgroup, are characterized by a high proportion of the population younger than working age and a low proportion of pensioners; this, in general, given the trend of higher health ratings characteristic of the young population, leads to high indicators of health potential in the region as a whole.

In the metropolitan regions (subgroup 1.2), the average number of pensioners is 260.3 per 1,000 people; in subgroup 1.1 – 239.4 per 1,000 people; and in group 3 with the lowest self-rated health assessments, the number of pensioners reaches 339.8 per 1,000 people. The average number of employees per pensioner for 2021 in group 3 is 1.3 people (in group 1 the situation is slightly better: in subgroup 1.1 – 1.6 people and in subgroup 1.2 – 2.5 people). In group 1, other demographic indicators that characterize the social health of the regions are better; for instance, they show the most favorable situation in the marriage and divorce sphere: in subgroup 1.1, there are 766.6 divorces per 1,000 marriages; in subgroup 1.2 the indicator is lower – 717.5; and in group 3, the value reaches 819.4. Total divorce rate per 1,000 people in subgroup 1.1 is 3.6; in subgroup 1.2 – 4.3; in group 3 – 4.5; total marriage rate per 1,000 people in subgroup 1.1 is 4.7; in subgroup 1.2 – 8.2; in group 3 – 5.5.

Group 3, which has the lowest health potential, shows the most negative average assessment characterizing population growth, a higher mortality rate – 19.2 (in group 1 – 10.6), including a high mortality rate of the working-age population – 658.4 (in group 1 – 427.5). The average value of the indicator "termination of pregnancy" (abortions) per 16000 women aged 15 to 49 years in subgroup 1.1 was 14.8, in subgroup 1.2 – 10.5, in group 3 – 20.1 and per 100 births – 23.8, 26.0 and 51.9, respectively.

The regions in group 1 show the lowest rates of infant mortality, mortality of working-age people, as well as mortality from road accidents, which may indirectly indicate good medical care, its high availability and a greater prevalence of self-preservation practices. The statistics of deaths from road accidents indicate that less risky behavior on the roads may be detected in the regions; in subgroup 1.2, the death rate from road accidents per 100,000 people is 4.2, while in other groups the average value of the indicator is more than twice as high.

Subgroup 1.2, which includes Moscow and Saint Petersburg, consists almost entirely of urban population. By the end of 2021, the share of urban residents in this subgroup was 99.2%, while in subgroup 1.1 this figure was the lowest among all groups of regions – 54.6%. This may serve as confirmation of the hypothesis that urban areas are characterized by a more developed health care system, while in the regions of subgroup 1.1, a healthier lifestyle and better ecology are maintained, as well as, possibly, the quality of food due to the high proportion of rural residents who are most likely to have a subsidiary farm.

Partially, the higher health scores in subgroup 1.2 can also be explained by the higher level of education of metropolitan regions' residents, since education is one of the most important factors affecting human health (Nazarova, 2007; Nazarova, 2014). More than a third of the respondents from subgroup 1.1 have higher education (34.8%); in subgroup 1.2 their number reaches 47.8%; for comparison, in group 3 there are only 28.7% of persons with higher education, and the proportion of people with secondary vocational education, on the contrary, is higher – 48.3% (in subgroup 1.1. – 36.2%, in subgroup 1.2 – 41.9%).

We should also mention the level of morbidity and the specifics of the health care system. For example, in subgroup 1.1, 646.8 cases of diseases were registered in patients diagnosed for the first time in their lives, per 1,000 people (in subgroup 1.2 – 958.2, which may be explained by the high level of detectability of morbidity); and in group 3, the indicator value is 1.5-fold higher (996.0). In group 3, the situation is also unfavorable regarding certain types of diseases: diseases of the circulatory system (diseases were registered in patients with a diagnosis established for the first time in their lives), subgroup 1.1 – 21.0, subgroup 1.2 – 22.6, group 3 – 31.1; respiratory diseases – 283.1; 433.1; 490.2 and some others.

In group 3, a small proportion of citizens were found who annually undergo medical check-ups. The proportion of citizens leading a healthy lifestyle is also small: in subgroup 1.1 it is 7.8%, in subgroup 1.2 – 6.8%, and slightly more in group 3 – 8.5%. However, in Russia as a whole, the proportion of people leading a healthy lifestyle is extremely small (one tenth of the population), which at this level means a negligible contribution to public health potential in the context of different regions. Capacity of outpatient clinics at the end of 2021 per 10,000 people in group 3 was 321.7 thousand visits per shift, and in subgroup 1.2 – 364.4. The number of doctors of all specialties per 10,000 people in group 3 was 41.0 people, in subgroup 1.2 – twice as high – 82.3, and the average number of hospital beds per 10,000 people, on the contrary, was higher in group 3 (88.4), in subgroup 1.1 – 83.1, in metropolitan cities – 74.1. The situation with the provision of hospital beds is as follows: the number of people per hospital bed in group 3 was 113.6, which is slightly lower than in group 1 (subgroup 1.1 – 125.4, subgroup 1.2 – 124.3).

The economic well-being of citizens plays an important role in their health. The average wage in subgroup 1.2 is 65.9% of total money income, in subgroup 1.1 – 38.0%, in group 3 – 55.1%. Other incomes (including "hidden" ones) in subgroup 1.1 account for 25.5% of total money income, in subgroup 1.2 – 3.7%, in group 3 – 5.2%. Income from entrepreneurial activity is as follows: in subgroup 1.1 – 9.3% of total money income, in subgroup 1.2 – 4.8%; in group 3 – 5.9%. Monthly consumer spending on average per capita is the largest in metropolitan cities – 54,250 rubles, in group 3 it amounts to 22,378 rubles, in subgroup 1.1 – 20,947 rubles. Food purchases based on the results of a sample survey of household budgets in subgroup 1.1 are higher than in other regions and amount to 42.1%, in subgroup 1.2 – 32.3%, in group 3 – 35.3%.

The other groups of regions do not differ so significantly from each other, with the exception of group 4 – "from high to average", which is distinguished by a younger population structure (but not young enough to compete with group 1). The regions of group 4 have a reserve for improving their health potential. Group 2 (with average estimates of health potential) tends to group 3 (with low estimates of health potential) according to the general characteristics of the region. The remaining groups represent regions in which residents assess their health status differently, but do not have significant differences; nevertheless, they have a certain resource that allows them to maintain their position without reducing their health potential. In all groups, compared with group 1, the overall mortality rates and mortality rates in working age are higher, which is a negative factor related to the level of health in these regions.

Conclusions

A number of Russia's regions with consistently high self-rated health assessments demonstrate two types of preservation of public health potential: the first type – taking into account good ecology in the regions for residents mainly living outside urban agglomerations, maintaining a tradition

of caring for their health, healthy nutrition for a significant part of rural residents; the second type – by maintaining a high standard of living, a high level of education and income and development of the healthcare infrastructure. In the first type of regions, there is a high proportion of the population younger than the working age, and a low proportion of pensioners. The younger population evaluates their health mainly positively, while the assessments of own health potential by representatives of the older generation are lower.

An analysis of the demographic development indicators of the regions shows that, first of all, self-rated health assessment is related to the age structure of the population. The regions of the subgroup with consistently high indicators of self-rated health (subgroup 1.1) are characterized by the highest proportion of the population younger than working age; the lowest proportion of pensioners, which in general, given the trend of higher health ratings at a young age, leads to higher indicators of health potential in the whole region. However, even in these regions, high health ratings would be impossible in the case of a low level of socio-economic development and well-being of citizens. The metropolitan cities are characterized by a high level of socio-economic development, have a higher level of education, there is a lower level of infant mortality, as well as mortality of working-age people. The abovementioned group of regions is most vividly opposed by the group with the lowest health potential, expressed in residents' self-assessments, over several years of the survey. Low health potential in these regions is associated with a high mortality rate of the working-age population, a high level of poverty, as well as a significant level of alcoholism and drug addiction.

Health potential is an important indicator of the quality of life and the general well-being of society. For Moscow and Saint Petersburg, the key factor determining their belonging to a cluster with high health potential is the socio-economic development and well-being of residents, reflected, among other things, in high life expectancy. In a number of regions where there are changes in self-assessment of health potential, the short-term appearance of low scores is considered favorable, which can be adjusted for the better due to the availability and activation of certain resources. However, the constant decline in health potential and persistently low self-rated health assessment are alarming signs. Negative factors such as low living standards, poverty and high mortality rates represent serious obstacles to achieving a good level of public health and realizing its potential.

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Received April 15, 2024.