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Rural Mortality from External Causes in Russian Regions

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Rural Mortality from External Causes in Russian Regions

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Abstract. The paper addresses the factors that affect the reduction of rural mortality from external causes in the regions of RF of different types and contains an estimation of the degree of their impact. We made a quantitative analysis and built models of the factors and determinants of the existing interregional differences in the pattern of rural mortality from external causes of death (road traffic accidents of all kinds, accidental alcohol poisoning, murder and suicide). The paper presents the results of the study of the dynamics and pattern of external causes of rural mortality with the use of Rosstat's data for Russian regions (2000-2012), and describes the nosological, gender and regional profile of rural mortality from external causes. We also identified the social problem, which is a steadily high rate of mortality from external causes in a certain group of regions. We found that the impact of federal social policies on the reduction of rural mortality from external causes is asymmetric in the regions of different types. On the basis of our cluster analysis we developed taxonomy of Russian regions according to the pattern of external causes of rural mortality, formed seven groups of Russian regions and characterized them. The hypotheses were statistically tested by making a correlation, regression and factor analyses. We estimated the regression models that had been constructed for Russia in general and for two types of regions (with the highest and the lowest mortality from external causes) separately and included economic, social and behavioral explanatory variables, which made it possible to identify the determinants of rural mortality from external causes and describe their spatial combinations. The results of the analysis and modeling of spatial differences in the pattern of external causes of rural mortality can be used when developing regional programs for reducing mortality from external causes of death. This study is supported by the Russian Foundation for Basic Research (project # 12-06-00012).

JEL Classification: R1, J1, I1

Keywords: Russian regions, rural population, mortality, external causes, taxonomy, regression analysis, regional data, determinants, social policy

1. INTRODUCTION

1.1. Relevance of the study

In recent years certain positive results were achieved in the demographic development of the regions of Russia. Rural mortality decreased, which is largely due to active public social policy measures. At the same time, the contribution of external causes of death to rural mortality remains significant. External causes of death include road traffic accidents of all kinds, accidental alcohol poisoning, murder, suicide and etc. It should be emphasized that mortality from all these causes is premature and preventable, and a reduction in its rate could dramatically increase the life expectancy of the rural population. Monitoring of external causes of death of the rural population enables to measure the degree of safety of the environment and prevalence of antisocial forms of behavior among different population groups. Studying the role of external causes and their determinant factors is relevant because a better understanding of the causes of rural mortality and their patterns in the regions of different types is important for developing efficient social policies aimed at increasing life expectancy in Russia.

A significant factor in reducing rural mortality, including that from external causes, are active public social and demographic policy measures. For instance, 2005 saw the adoption of the National Project “Health” - a program to enhance the quality of medical aid, the main task of which was to improve the situation with health care and create conditions for its subsequent modernization (Priority National Project “Health”, 2005). This National Project included three main areas: increase in the priority of primary health care, strengthening of preventative health care and provision of better access to high-tech medical care. Special efforts in the National Project were aimed at reducing mortality from cardiovascular diseases, timely assistance at road accidents, development of blood services and prevention of cancer. In the long run the Priority National Project “Health” was expected to drive the domestic health care closer to the health-care standards of industrially developed countries (equipment, technology, the level of medical services, and training of health professionals) and thus reduce mortality from preventable causes.

The Concept of Development of Health Care of the Russian Federation until 2020 adopted in 2009 stresses that a priority of the public policy should be to strengthen and preserve the health of the population through encouraging a healthy lifestyle and improving

the availability and quality of medical care (The Concept of Development, 2009). As part of encouraging a healthy lifestyle the Concept declares creation of an efficient system of measures to combat pernicious habits, develop mass physical culture and sports, and prevent risk factors for non-communicable diseases. The Concept emphasizes that the problem of a healthy lifestyle in Russia is complex and manifests itself in: the loss of life prospects, lack of purpose and meaning in life in large parts of the population, widespread poverty and a significant population differentiation in terms of income, the mass nature of the devastating health addictions and dependencies, such as alcoholism, drug addiction, smoking, etc., as well as lack of motor activity and healthy eating.

Since 2011 the regions implement health-care modernization programs designed to help strengthen the material base of medical institutions and introduce medical care standards and information systems in health care. The main goal of the regional health-care modernization programs is to improve the performance of health care and, primarily, to reduce mortality from major groups of diseases. Special attention in these programs is paid to rural health care. These policy documents along with the Federal Law № 323-FZ "On the Bases of Health Protection in the Russian Federation" adopted in November 2011 are expected to contribute to reducing mortality, increasing life expectancy and health, and, consequently, improve the demographic situation in the country.

At the same time, the high rate of mortality of the rural population from external causes of death remains for many years, which causes concern of the society and the government. The more so that in economically developed countries not only the mortality rate, but also the fraction of external causes in the overall pattern of causes of death decreased.

Foreign and Russian scholars still argue about the causes of the high mortality from external causes in Russia and its regions. Some believe that the cause is alcohol abuse among the population, while others see the main rationale in the stratification of the population, sharp income differentiation, low quality of life and rural poverty. In the context of social stratification of the society the sense of injustice exerts additional psychological pressure on the people. Still others think that in the period of market reforms the system of values was destroyed, not everyone managed to find their place in the new social structure, and the criminalization of Russian regions increased. Researchers are trying to find out what factors in different Russian regions to the largest extent affect the high rate of mortality from external causes of death.

1.2. Theoretical approaches presented in the literature

The influence of different factors and determinants on mortality from external causes of death (road traffic accidents of all kinds, accidental alcohol poisoning, murder and suicide) is studied by both Russian and foreign researchers. Recognizing the high overall rate of mortality of the Russian population from all causes, they put forth a number of explanations. Some authors point at the incompleteness of the second phase of the epidemiological transition (Vishnevski and Shkolnikov, 1997). Others point out the need to eliminate bad habits and promote healthy lifestyles (Andreyev, Kvasha, Kharkova, 2004). Still others believe that the factors of poverty, low living standards, dissatisfaction and social stress are important (Rimashevskaya, 1999, Gundarov, 2004). Others emphasize the alcohol abuse of the population (Treisman, 2008, Razodovski, 2002, European Status Report on Alcohol and Health 2010). The impact of the factors of alcohol abuse on mortality in Russia is the most deeply studied by such authors as D.A. Khalturina and A.V. Korotayev (Khalturina, Korotayev, 2006). Mortality associated with alcohol is also estimated by other authors. According to Y.V. Andrienko and A.V. Nemtsov, one of the ways to reduce supermortality (especially among men of the working age) is to substitute strong alcoholic drinks for beer in the structure of alcohol consumption (Andrienko, Nemtsov, 2005).

In the scientific literature the group of risk factors includes lifestyle characteristics – smoking and consumption of alcohol and illicit drugs. According to studies conducted in the United States, alcohol abuse is a serious problem among rural youth. The results show that premature mortality is considerably higher among rural residents than urban ones (Ricketts, 2001, Eberhardt, Ingram, Makuc, et al., 2001), Mansfield, Wilson, Kobrinski, Mitchell, 1999). Many authors note that rural and urban residents have unequal access to medical services. There are fewer physicians in the countryside than in the city. Furthermore, the factor of rural poverty plays an important role as it limits the economic availability of hi-tech health-care services.

In a number of studies the authors quantified the relationship between mortality and social-economic characteristics of social groups and found, in particular, the importance of education and employment status. Many foreign and domestic authors present the results of mortality dependence on the level of education of the population (Kunst, Mackenbach, 1994, Hurt, 2004, Valkonen, 1989, Shkolnikov, 1998). The impact of medical system effectiveness and economic situation in the country on mortality was studied by Davis and many others

authors (Davis, 1997). Of scientific interest and practical value are the studies carried out at the Moscow State University after Lomonosov, Institute for Economic Forecasting of the Russian Academy of Sciences, Center for Social Demography and Economic Sociology of the Institute of Social and Political Studies of the Russian Academy of Sciences, Institute of Demography at the National Research University - Higher School of Economics and by other authors. The factors of public health are deeply studied by such Russian authors as B.B. Prokhorov, Y.I. Ivanova, D.I. Shmakov, Y.M. Scherbakova (Prokhorov, 2011). Inequality and mortality are studied by Foreign and Russian scholars.

Basing ourselves on the results of foreign and domestic studies of the factors and causes of mortality, we included in the model economic, demographic, ecological, social and behavioral variables. It is important to take into account the approach of the French demographer J. Bourgeois-Pichat, who distinguished between exogenous (external, associated with living conditions) and endogenous (internal, associated with natural ageing changes of the body) causes of mortality in his models. J. Bourgeois-Pichat studied the life expectancy of Norwegian men and women by using six extended groups of mortality causes.

Important social determinants of health and rural mortality reduction are the level of income, education and the employment status. The factors of lifestyle of the population, the situation with health care and characteristics of the regional labor market should also be taken into account. Expertise shows that an increase in unemployment by more than 3% in the short term can lead to an approximate 5% increase in suicide and self-harm among the people younger than 65 years. In view of this, those countries where the rate of unemployment is expected to rise by more than 3% are considered to be at a high risk of increased mortality from external causes (The European Health Report, 2012). Thus, mortality rates, including mortality from external causes, mirror the entirety of the social-economic conditions, the cultural environment in which the people live, and also the features of their behavior, lifestyle and values systems.

1.3. Objectives and tasks of the study

The objective of this study was to make an empirical analysis of the factors that determine the pattern of external causes of rural mortality in the regions of different types and to assess the degree of their influence. In order to attain this objective we had to fulfill the following tasks:

- Make an interregional comparative analysis of the rate and pattern of external causes of rural mortality in Russia;
- Develop a multidimensional typology of Russian regions according to their patterns of external causes of mortality;
- Make correlation and regression analyses, determine the basic variables that explain the pattern of external causes of rural mortality in the regions of different types;
- Analyze the impact of the factors of the regional environment, social policy measures, characteristics and behavior of the population of the region on mortality from external causes of death;
- Identify the interregional differences in the rate and pattern of rural mortality from external causes and their determinant factors;
- Assess the contribution of different factors to reducing rural mortality in Russian regions.

As a result, we identified the most significant factors that help reduce rural mortality that cannot be ignored when developing regional rural social development strategies and regional health-care modernization plans.

2. RURAL MORTALITY IN RUSSIAN REGIONS: THE ROLE OF EXTERNAL CAUSES

2.1. Analysis of the status and trends of external causes of mortality

External causes of death respectively rank second and third in the pattern of causes of mortality of rural men and women. According to the data for 2012, the cause of death of 54.9% of the deceased rural residents was cardiovascular diseases, 12.3% - neoplasm and 11.4% - external causes. Rural mortality from external causes in Russia peaked in 2003 to make 264.4 per 100.000 people [Rosstat]. Between 2003 and 2012 mortality from external causes dropped by more than a third, amounting to 276.9 (men) and 70.9 (women) per 100.000 people.

In European countries cardiovascular diseases accounted for 50% of deaths (2009), cancer – 20% and external causes – 8% (The European Health Report, 2012). Russia, compared to developed European countries, experiences a high mortality rate among men of the working age, primarily from external causes. For every 100 thousand deaths of men under

the age of 50 years Russia accounts for by 18 thousand more than France and by 19 thousand more than Germany, for every 100 thousand deaths of women the figures are respectively 5.6 and 5.8 thousand, and the excess is due to external causes of death (Prokhorov, Shmakov, 2013). Thus, the reserves of increasing life expectancy through reducing mortality from external causes are sufficiently large.

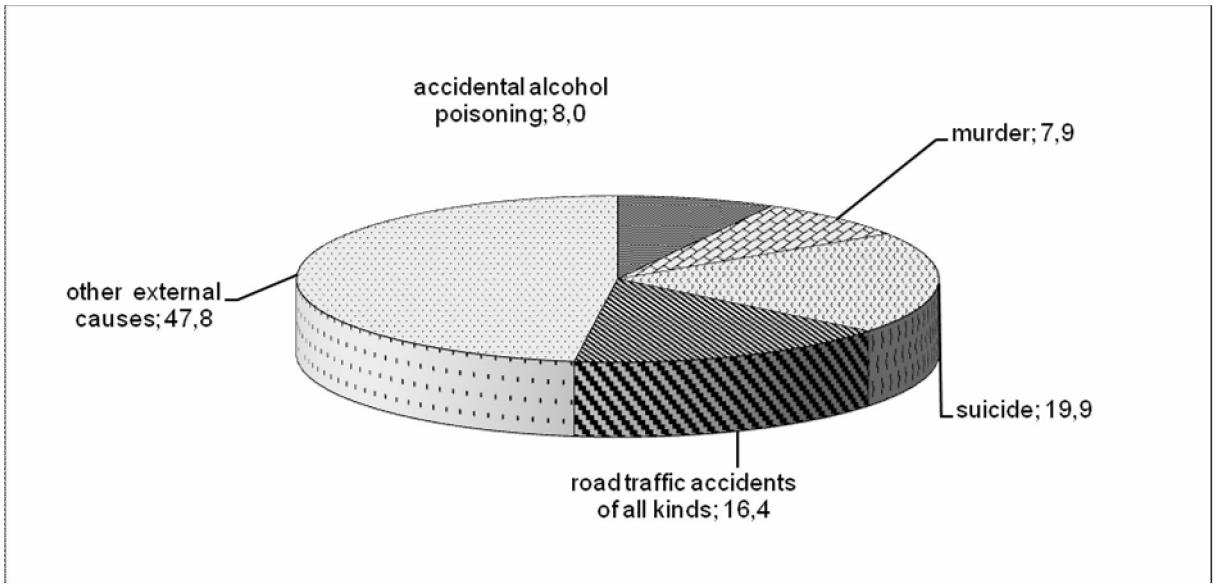

Fig. 1. Pattern of rural mortality from external causes, 2012, %

Among the external causes of death of the rural population RF, suicide ranks first followed by road traffic accidents of all kinds, murder and accidental alcohol poisoning (Fig. 1). Other external causes include deaths from drowning, poisoning not associated with alcohol consumption, accidental falls, accidents with fire, firearms, electric shocks and etc.

According to the state statistics [Rosstat], rural mortality from external causes is reducing in recent years (Fig. 2). Since 2005, mortality from suicide, which is the leading external cause of death, reduced by 29.4%. Rural mortality from road traffic accidents is traced since 2008. Between 2008 and 2012 rural mortality from this cause of death dropped by 36.7%. Before 2010 rural mortality from accidental alcohol poisoning would exceed mortality from murder. However, in 2012 the situation changed, and mortality from accidental alcohol poisoning and murder constituted 8.0% and 7.9% of deaths from external causes, respectively. The reduction of rural mortality from accidental alcohol poisoning between 2005 and 2012 reached 62.6%, which is the maximum rate of reduction for this cause of death in the overall pattern of external causes of mortality. Rural mortality from murder in the same period decreased by 50.2%.

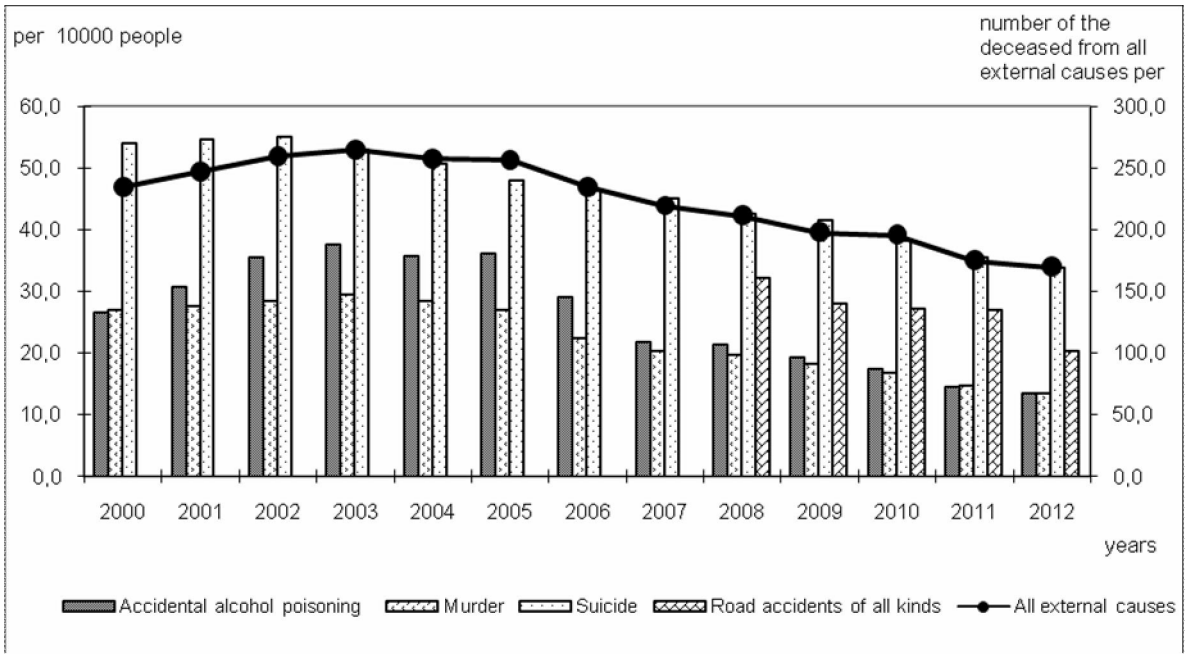

Fig. 2. Dynamics of rural mortality from external causes of death

Gender and interregional differences should be taken into account when developing measures for reducing mortality from external causes of death. It should be mentioned that the rate of rural men's mortality from external causes today is almost 4 times higher than rural women's. In the 2000-2012 period, women's mortality from external causes of death decreased by 25.9%, and men's – 31.3% (Fig. 3).

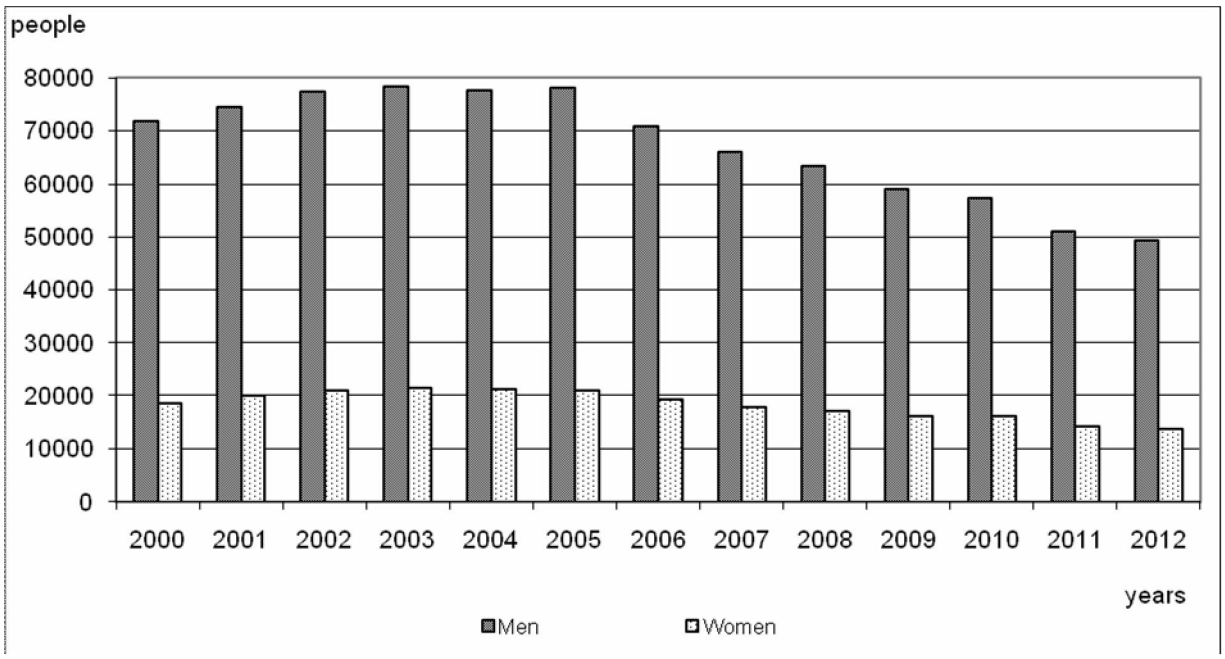

Fig. 3. Dynamics of rural mortality from external causes of death

2.2. Regional features of the pattern of external causes of rural mortality

Despite the fact that rural mortality from external causes is generally on the decline in Russia, the situation in its regions differs considerably (Fig. 4). For instance, the number of rural residents killed in road accidents in 2011 was the greatest in the Republic of Tyva (70.1 per 100000 people) and Nenetsk Autonomous Okrug (52.6) with a high overall rate of mortality from external causes. The minimum mortality from road accidents of all kinds was observed in the Republic of Chechnya (7.4 per 100000 people) with a low overall rate of mortality from external causes.

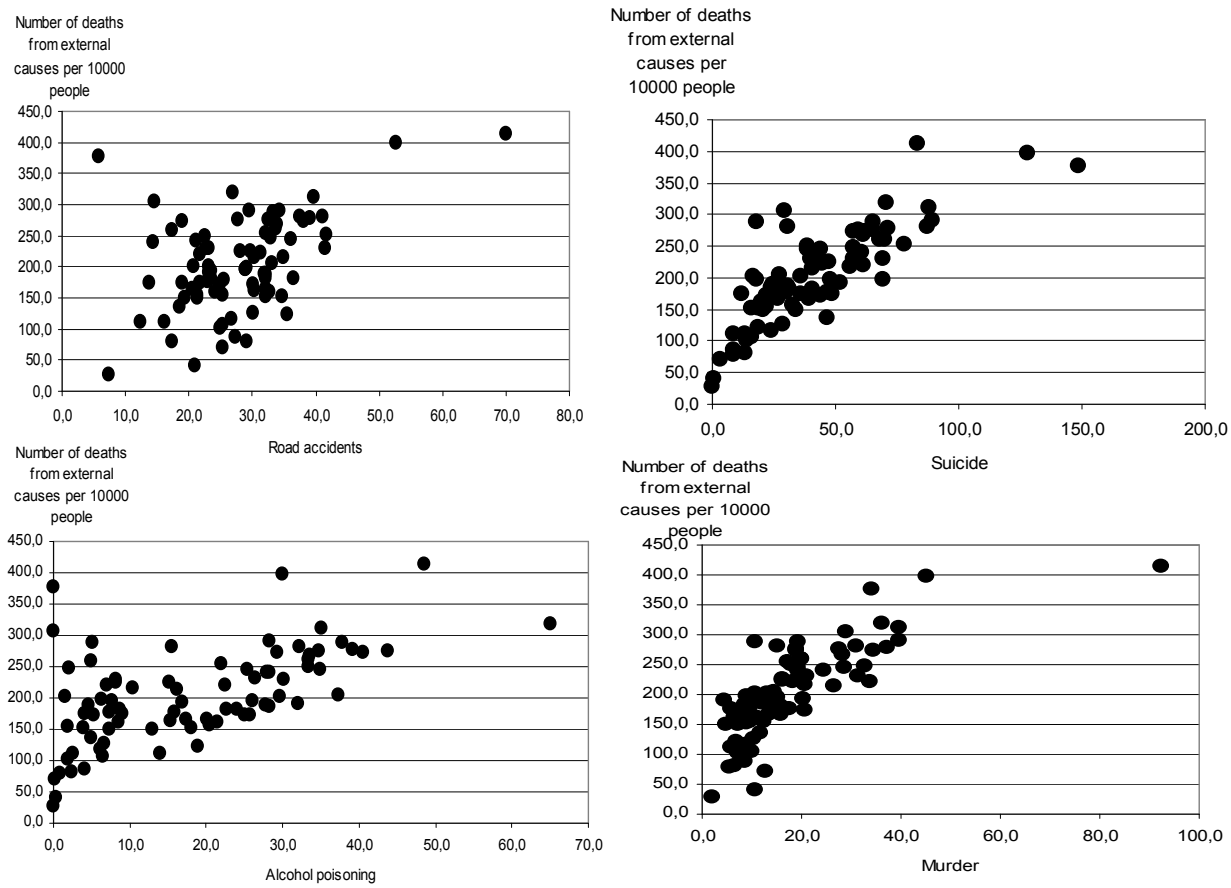

Fig. 4. Relationship between the rate of rural mortality from external causes and its structural elements by Russian regions in 2011

The number of those who committed suicide was the highest in Chukotka (148.6 per 100000 people) and Nenetsk (127.7) Autonomous Okrugs and the Republic of Buryatia (87.7)

with a high overall rate of mortality from external causes. The lowest numbers were in the Republics of Chechnya (0.2 people) and Ingushetia (0.4). According to the number of deaths from alcohol poisoning the leading position was occupied by the Republics of Komi (65.0 per 100000 people) and Tyva (48.6 people) with a high rate of mortality from external causes. The lowest mortality from alcohol consumption was observed in the North Caucasus: Chechnya (0.0 per 100000 people), Dagestan (0.1) and Ingushetia (0.4 per 100000 people), where the overall rate of mortality from external causes was also low.

The number of deaths from violence was the greatest in the Republic of Tyva (92.4 per 100000 people), by far exceeding that in other Russian regions. The overall rate of mortality from external causes in this republic was also high. As the Concept of Development of Health Care of the Russian Federation until 2020 puts it, there exists a direct relationship between the level of social-economic development and the efficiency of the health-care system.

We can therefore suppose that a similar relationship exists between the parameters of the social and economic development of a region, the degree of safety of its social environment, a number of other factors and the rates of rural mortality from external causes. In order to identify this relationship, at the initial stage of our study we made a typology of Russian regions according to dominating "external causes" of rural mortality.

3. EMPIRICAL METHODOLOGY AND RESULTS

3.1. Cluster analysis and distinguishing typological groups

The typology was constructed by using the procedure of hierarchical cluster analysis by Webb with the Euclidian metric in statistical data processing package SPSS 13.0. The initial data were the regional rates of rural mortality from external causes: all kinds of road traffic accidents, alcohol poisoning, suicide and murder for 2011 obtained from the Central statistical databases of Rosstat. As a result of classification we derived seven typological groups, the main distinctions of which are presented in Table 1. The composition of the groups is shown in Figure 5.

The first group includes regions with the lowest rates of rural mortality from major external causes of death. In all the 16 regions that make up the first group rural mortality from the external causes considered here is below the Russian average mortality rates. The situation is the best in the North Caucasus – Chechnya, Ingushetia, Dagestan, North Osetia, Kabardino-

Balkaria, and also in Murmansk and Rostov Oblasts. Therefore, the regions of the first group in this classification are considered as “relatively favorable”.

Table 1- Typology of Russian regions according to rural mortality from external causes, 2011

Group	Number of regions in the group	Average mortality rates for the group			
		All kinds of road traffic accidents	Accidental alcohol poisoning	Murder	Suicide
RF	**82**	**26,9**	**14,4**	**14,6**	**35,4**
1	16	20,7	5,2	7,9	15,6
2	12	26,6	9,5	12,3	26
3	3	21,8	25	11,7	37,2
4	11	22,3	6,1	23,2	64,8
5	12	33,2	22,7	10,8	24,2
6	7	22	28,2	18,7	54,1
7	20	37,3	32,4	30,8	65,2

The second group includes 12 Russian regions, each of which has the rates of mortality from one of the external causes of death that exceed the Russian average. In the Republic of Tatarstan and Sakhalin Oblast, alongside high rural mortality from road traffic accidents, mortality from suicide (the Republic of Tatarstan) and murder (Sakhalin Oblast) is higher than the Russian average rates. In general the rates of mortality from external causes in the group are lower than the Russian average, but in 7 of the 12 regions mortality from all kinds of road traffic accidents surpasses the Russian average.

The third group is comprised of just three regions: Kostroma, Saratov and Omsk Oblasts. In these regions the rates of rural mortality from suicide and alcohol poisoning go beyond the Russian average rates. In the fourth group the dominating external causes of rural mortality are murder and suicide. In all the regions belonging to this group mortality from these causes exceeds the Russian averages. Mortality from alcohol poisoning in the regions of the fourth group is lower than the Russian average. At the same time, in 4 of the 11 regions – the Republic of Bashkortostan, Tyumen, Chelyabinsk and Tomsk Oblasts – mortality from road accidents surpasses the Russian average.

The fifth classification group of regions is notable for high mortality from alcohol poisoning and road traffic accidents. The rates of rural mortality from the other external causes of death in all the regions of this group are lower than the Russian averages, with the exception of Vladimir and Pskov Oblasts, where rural mortality from murder is high. In the

regions comprising the sixth classification group rural mortality from alcohol poisoning, murder and suicide is higher than the Russian averages. The exception is the Republic of Chuvash, where mortality from road traffic accidents is high, but mortality from murder is, on the contrary, lower than the Russian average.

The regions of the seventh group have the highest rates of mortality from all the causes of death referred to as "external". It is this very group of regions that is considered the least favorable because of its high mortality from external causes, including all kinds of road traffic accidents, accidental alcohol poisoning, murder and suicide. It should be stressed that in the regions of the third, fifth and sixth classification groups the major external cause of rural mortality is excessive alcohol consumption, which leads to suicidal (the third group) and criminal (the sixth group) behavior.

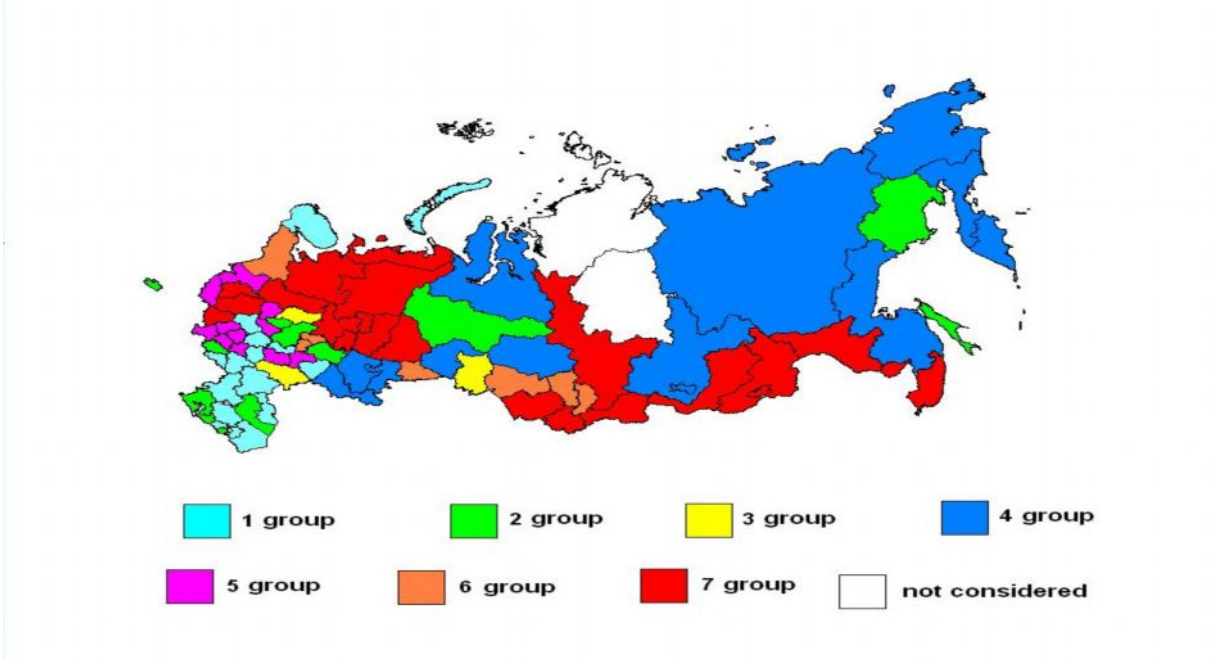

Fig. 5. Russian regions classified according to the rates of rural mortality from external causes of death, 2011

This cause is also indirectly associated with mortality from road traffic accidents (the fifth group). Having made our typological analysis, we drew a social card of rural mortality rates in the regions of RF (Fig. 5). The typology we made was used to determine the factors that affect the rates of rural mortality from external causes of death. In order to construct the regression equations we used the two polar opposite typological groups of regions, that is the first one (relatively favorable) and the seventh group (the least favorable).

3.2. Evaluation of regression equations

We built regression dependencies of the rates of rural mortality from external causes of death from the factors of economic, social, cultural and demographic development of the regions. The following indicators were selected as predictors: the amount of gross regional product (GRP) per capita; gross value added of agriculture, forestry, hunting and fishing; the number of enterprises and organizations in the region; capital investments in health care and social services; the number of physicians per 100000 of population); the fraction of population with incomes below the subsistence minimum; average monthly cash incomes per capita; the rate of unemployment calculated by using the International Labor Organization's (ILO) methodology, per cent; the number of alcoholics registered with health-care settings per 100000 people; the number of registered crimes per 100000 people); the number of population older than 15 years with higher, postgraduate and incomplete higher education; with complete secondary, primary and secondary vocational education; with basic and primary education (Regions of Russia,2012, Russian Statistical Yearbook, 2012).

Table 2 - Parameters of the regression dependency of the rates of rural mortality from external causes on the factors of social-economic development in Russian regions

Variables	Unstandardized rates	Std. error	t-statistics
Constant	0,02	0,0065	2,52
Gross value added of agriculture, forestry, hunting and fishing	-0,335	0,0842	-3,98
Capital investments in health care and social services	-0,146	0,0676	-2,17
Fraction of population with incomes below the subsistence minimum	0,504	0,0710	7,10
Average monthly cash incomes per capita	-0,494	0,0887	-5,57
Unemployment rate, %.	0,231	0,0690	3,35
Number of population older than 15 years with higher, postgraduate and incomplete higher education	-0,447	0,0707	-6,32

R Square	Adjusted R Square	Std. error of the estimate	F Change	Sig. F Change
0,825	0,680	0,577	21,96	0,033

The dependencies were built for RF in general, and for the first, the most favorable, and the seventh, the least favorable, groups of regions. All variables were normalized in the standard way. Among the resulting regression dependencies we selected models with the regression coefficients significant at the 5% level, and the Durbin-Watson coefficient close to 1.5. The resulting models have a sufficiently high quality of approximation determined by the coefficient of determination: they describe from 82.5% to 94.5% of the variance of the independent variables. The value of Fisher *F*-change characterizes the required reliability of the regression equation, and the probability of deriving this value by chance does not exceed the acceptable level of significance of 5%. The values of t-statistics for the variables point to the importance of these parameters in the models. The results are presented in Tables 2-4.

Table 3- Parameters of the regression dependency of the rates of rural mortality from external causes on the factors of social-economic development in the regions of the first group

Variables	Unstandardized rates	Std. error	t-statistics
Constant	-0,548	0,113	-4,842
Number of alcoholics registered with health-care settings	0,829	0,120	6,932

R Square	Adjusted R Square	Std. error of the estimate	F Change	Sig. F Change
0,880	0,774	0,328	48,049	6,32E-07

The results show that in general mortality from external causes positively correlates with the degree of social stratification of the population and negatively with the level of incomes as evidenced by high regression coefficients in terms of the fraction of population with incomes below the subsistence minimum and the amount of the average incomes per capita.

The contribution of the number of population with higher education in reducing mortality from external causes turned out sufficiently high. Regional mortality from external causes also depends on the situation on the regional labor market and on the rate of unemployment in the region. A positive impact on reducing mortality from external causes, but to a lesser extent, is produced by capital investments in health care and social services and development of industries with high added value in rural areas.

For the first group of regions with low rural mortality from all kinds of external causes, the regression equation estimating the impact of such a factor as the number of alcoholics registered with health-care settings has the best statistical parameters. Alcoholism is one of the most significant causes of rural mortality even in the regions with a higher life expectancy and low numbers of patients with alcoholism. This is emphasized by the majority of Russian and foreign researchers. Male supermortality is primarily associated with high alcohol consumption. Estimating the rate of mortality from alcohol consumption, many authors include not only mortality from alcohol poisoning, but also deaths from cirrhosis and alcohol-related cancers and cardiovascular diseases. Alcohol-related losses from external causes of death are substantial too (Nemtsov, 2001).

In the regions of the seventh group mortality from accidental alcohol poisoning is higher than the Russian average and that in other groups. However, henceforth the number of alcoholics registered with health-care settings was not included in the equation, since its high significance has been determined already, and the task was to identify the impact of other factors.

Table 4 - Parameters of the regression dependency of the rates of rural mortality from external causes on the factors of social-economic development in the regions of the seventh group

Variables	Unstandardized rates	Std. error	t-statistics
Constant	0,871	0,071	12,203
Rate of unemployment calculated by using the International Labor Organization's (ILO), % methodology	0,951	0,143	6,645
Average monthly cash incomes per capita, RUR	-0,320	0,059	-5,385
Number of enterprises and organizations in the region	-0,245	0,069	-3,557
Number of population older than 15 years with complete secondary, primary and secondary vocational education	0,186	0,085	2,191

R Square	Adjusted R Square	Std. error of the estimate	F Change	Sig. F Change
0,926	0,858	0,297	24,130	6,34E-06

For the regions of the seventh group with the highest rural mortality from external causes we derived a multiple regression equation with four variables, including: the rate of

unemployment calculated by using the International Labor Organization's (ILO) methodology, average monthly cash incomes per capita, the number of enterprises and organizations in the region, and the number of population older than 15 years with complete secondary, primary and secondary vocational education.

Mortality from external causes positively correlates with the rate of unemployment and low level of education, and negatively – with the average per capita incomes of the population and availability of jobs in the region. These results are consistent with those of other authors. Multiple studies show that people with higher education consume much less strong alcohol beverages than those who are less educated (Khalturina, Korotayev, 2006).

Therefore, rural mortality from external causes depends on the entire complex of social-economic conditions of life and cannot be reduced just through the development of health care and social protection.

Analysis of the explanatory factors contributes to the development of targeted measures aimed at reducing the risks of rural mortality from external causes in Russian regions.

4. CONCLUSIONS

Russian regions are considerably different in terms of rural mortality from external causes. Our regression analysis shows that rural mortality from external causes positively correlates with such parameters as the number of alcoholics registered with health-care settings, the rate of unemployment in the region, the fraction of population with incomes below the subsistence minimum, the degree of criminalization of the region, and the low level of education in the region.

At the same time, the significant correlation is negative for such factors as the average monthly incomes per capita, capital investments in health care and social services, gross value added of agriculture, forestry, hunting and fishing, and the number of population older than 15 years with higher, postgraduate and incomplete higher vocational education. People with higher education more often prefer a healthy lifestyle, spending more money on sports, leisure and hi-tech medical services, while those with low level of education or low incomes are more likely to get along with low-cost kinds or leisure and medical treatment, which is not always consistent with the principles of a healthy lifestyle. The territorial features of external

causes of death identified in the course of the study can be taken into account when developing regional programs for reducing rural mortality.

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