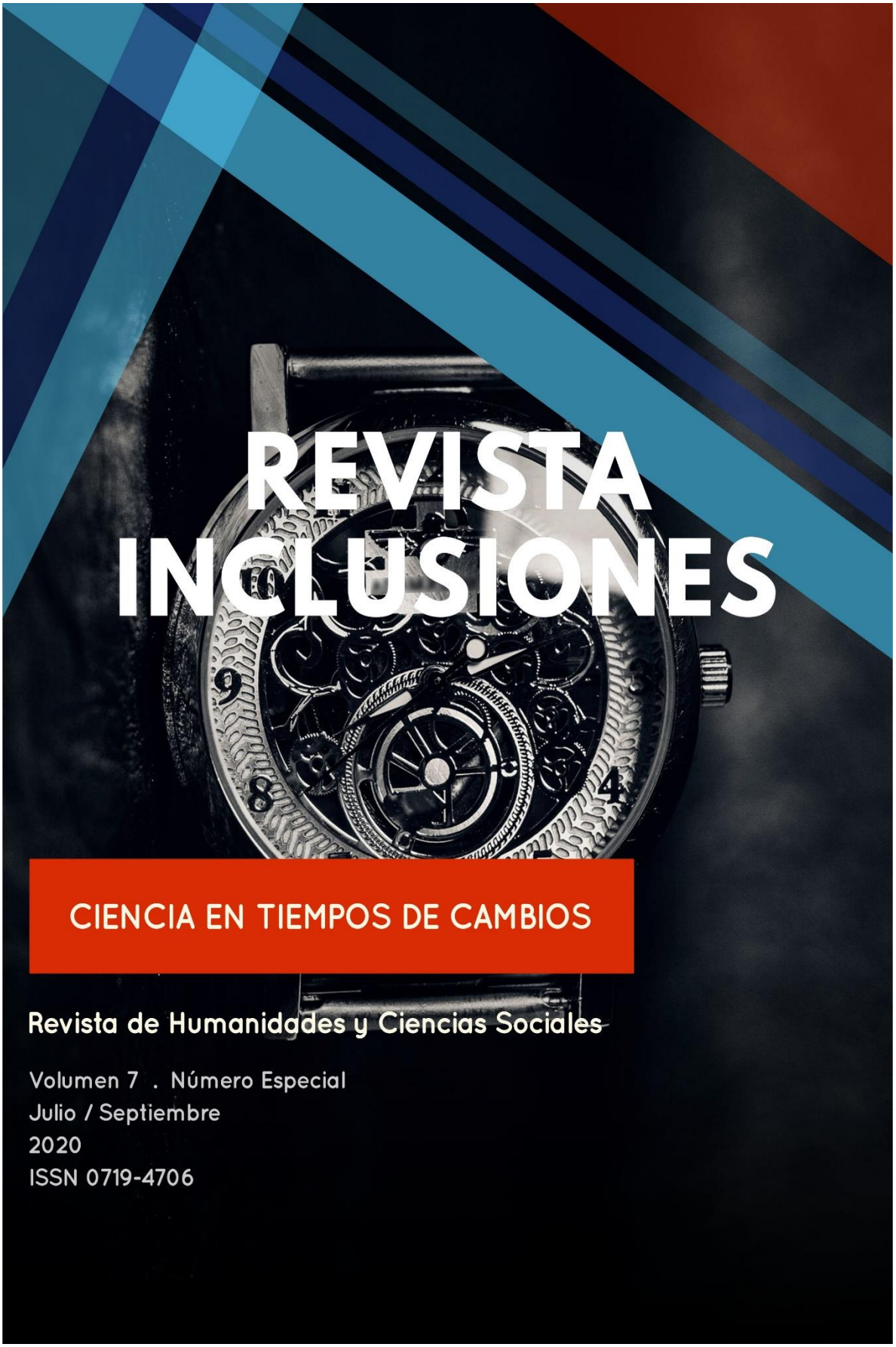

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TRANSFORMATION OF REGIONAL PRIORITIES OF REDUCTION OF PREMATURE MORTALITY AS A PREREQUISITE OF ECONOMIC DEVELOPMENT

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Abstract

The rationale of this study is the need for economic development of Russia's regions in the conditions of the current economic slowdown caused by external and internal factors. This paper explores changes in regional priorities of reduction of premature mortality in the economic conditions of a growing focus on public health and living standards. The transformation should entail better management decisions and more efficient use of resources, especially the financial resources. The purpose of the study was to determine the current priorities of reducing premature mortality given the economic situation in the region (through the example of the Perm region).

Keywords

Economic development – Mortality – Mortality reduction priorities – Economic losses

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Introduction

Along with the large-scale socio-economic, industrial and political transformations of the 20th century, a scientific breakthrough was observed in the demographic science and mortality research, which produced the theories of demographic transition and the theory of epidemiologic transition [1].

Mortality is a global concept made up of multiple individual deaths. And this phenomenon is subject to certain regularities, some of which have already been identified, and some are yet to be established in empirical research. The death of each person is a major life event for their family and friends. Death is usually a consequence of a complex of interrelated factors of different strength and direction, which makes it quite challenging to determine the contribution of each of them. However, scientific methods used on large samples of statistical data make it possible to identify correlations between specific mortality factors and the mortality rate, and therefore to determine methods of reducing their impact.

Science uses an unbiased and generalizing approach, i. e. it collects and studies aggregate mortality rate by different types of causes. Let us review the term “mortality”, its modern interpretation and the role in the socio-economic system. There is a variety of definitions for mortality, some of which are narrow, and some are broader. Sociologically, mortality is the frequency of deaths in the social environment. The demographic/economic definition of mortality is “a mass statistical process of extinction of a generation or population, consisting of a number of individual deaths occurring at different ages”[2]. Generally, mortality determines how the death of an actual or hypothetical generation occurs.

Mortality is also part of a more generic concept of reproduction. Reproduction is “one of the major processes in the modern society, which is characterized by the continuous replacement of generations of people resulting from the combination of fertility and mortality that occurs in the historically defined social relations”[3]. The demographic/economic approach understands mortality as the statistically recorded number of deaths in a specific population over a certain period. In this paper, we will equate the terms “death” and “mortality” in relation to the population. Demographic processes and demographic development are affected by three groups of factors of different horizons. In the long term, they are affected by global modernization, in the medium term — attributes of the demographic transition model of a specific country and historical stage, and in the short term — state reforms and various crises[4].

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[1] Yu. V. Mikhailova and A. E. Ivanova (eds.), Preventable Mortality and Ways of Its Reduction (Moscow: TsNII OIZ Publ, 2006); A. E. Ivanova and E. V. Kondrakova, “Justification of the Projected of Life Expectancy in the Federal Regions of Russia through to 2025” Sotsial'nye aspekty zdorov'ya naseleniya, num 1 (2008); A. E. Ivanova and E. V. Kondrakova, “Justification of the Projected of Life Expectancy in the Federal Regions of Russia through to 2025” Sotsial'nye aspekty zdorov'ya naseleniya, num 1 (2008) y A. I. Tatarkin, “New industrialization of the Russian economy: the need for development and/or challenges of time”, Ekonomicheskoe vozrozhdenie Rossii, num 2 (2015): 65–88.

[2] Demography: the Dictionary of Demographic Terms. Retrieved from: http://voluntary.ru/slovari/demografija-slovar-demograficheskih-terminov.html

[3] D. I. Valentei (ed)., Demographic Encyclopedic Dictionary (Moscow: Sovetskaya Entsiklopediya Publ, 1985).

[4] B. A. Borisov, Demography (Moscow: NOTA BENE Publ, 2002); V.G. Glushkova (ed.), Demography (Moscow: KNORUS Publ., 2004); N.V. Zvereva; V.V. Elizarov and I.N. Veselkova, Demography Basics (Moscow: Vysshaya shkola Publ., 2004)

A distinction is also made between premature mortality and preventable mortality — basic medical and demographic concepts related to pre-retirement mortality[5]. This problem was studied in an array of publications[6]. Let us look into these concepts. Premature death is the death that occurred before reaching the age of average life expectancy, while the death could be avoided with timely delivery of healthcare services. Premature mortality is determined by the expert evaluation method used to determine what age most people should attain given the conditions and level of medicine. For instance, for Europe, life expectancy was set by the World Health Organization (WHO) as age of 70. Premature death is death before this reference age[7]. This approach to defining the reference age of premature death is used for calculating the years of potential life lost. The number of deaths before the age of 70 is multiplied by the number of years of life lost before this reference age. This gives more weight to infants, children, adolescents, and young people of working-age.

In addition, to monitor premature mortality, WHO calculates an age-standardized premature mortality rate (ages 30 to under 70) for four groups of leading non-infectious diseases: cardiovascular diseases, malignant neoplasms, diabetes mellitus and respiratory diseases[8].

But it is worth pointing out that the reference age of 70 is determined by experts and can be changed. When the economy grows and the healthcare system advances, it can be increased, and in the opposite situation, it can be decreased. It is reasonable to set reference age of premature mortality at age of 72 (the end of the period of economic activity) for Russian state statistical monitoring do not register people over this age as labor force involved in the production of products and services.

Preventable mortality is defined as “mortality where the cause of death in individual age and gender groups was identified by experts as medically preventable based on up-to-date knowledge and experience”[9].

In 2009, in Europe, a classification of preventable causes of death was created for solving tactical management problems. European studies currently use the preventability classification that involves three levels of prevention[10]. The list of preventable causes has been adapted to the conditions of the Russian Federation because the differences between the nations are too significant[11]. 38 causes of death, whose prevention was associated with high-tech methods, were excluded from the European list of preventable causes of death.

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[5] V. N. Rostovtsev, Premature Mortality and the Spectral and Dynamic Medical Comples. Retrieved July 31, 2017 from: http://www.kmsd.su/vracham/nauchnye-stati/prezhdevremennaya-smertnost-i-kmsd/#

[6] I. A. Gundarov, Resurgence: Ways to Pvercome the Demographic Disaster in Russia (Moscow, 2001) y I. I. Starodubov, (ed). “Premature and Preventable Mortality in Russia is a Measurement of Loss of Public Health”. Conference Papers of the All-Russian Scientific and Practical Conference on May 30–31, 2006. (Moscow: RIO TsNIIOIZ Publ., 2006).

[7] Newsletter for Healthcare Managers, num 18 (2006). Retrieved from: http://whodc.mednet.ru/en/component/attachments/download/22.html

[8] World Health Organisation (WHO). Retrieved from: https://gateway.euro.who.int/ru/indicators/h2020_1-premature-mortality/

[9] W. W. Holland, “European Community Atlas of Avoidable Death” Second edition. Volume one. Commission of the European Communities Health Services Research Series num 6 (1991).

[10] W.W. Holland, “European Community Atlas of Avoidable Death…

[11] T.P Sabgaida. et al. “Preventable Mortality. Demographic Prospects of Russia”. (Moscow: Ekon-Inform Publ., 2008): 373–394.

The Russian list, therefore, included 26 preventable causes of death divided into 3 groups by methods of management (political, socio-economic and industry-specific).

It suggests that much of premature mortality is associated with average life expectancy, while preventable mortality — with specific cause groups and the level of healthcare in the community and the country.

Mortality is one of the most complex demographic concepts as it deals with massive numbers of people and a substantial set of differentiating factors that affect it. Not only the correlation between mortality and age is interesting, but also causes of death, the dependence of the mortality risk on gender, location, income, spending, education, occupation, etc.[12].

Today, the most acute problem is mortality at working age, i. e., from age 15 to the retirement age (60 for women and 65 for men). For the healthcare system, this is associated with the need for prevention activities, and for the economy — with massive economic losses due to premature mortality[13].

Remarkable economic progress in Western countries has been achieved through profound structural changes in the economy, society, individual human behavior and the government's attitude toward healthcare and human life. Economic development is inconceivable without effective and reasonable use of economic resources, not only in the industrial sector but also in the social sphere. This is inconceivable without setting modern priorities that allow for cost-effective management decisions. Therefore, rising health care costs can indicate profound changes in the values structure of the community and public authorities[14].

The economic losses from premature mortality can only be reduced if we have clear principles for making management decisions and a logical algorithm to implement those principles in a specific resolution.

Defining the principles is complicated as several important factors have to be taken into account: the current situation with premature mortality, the regulations in effect, financial capacity (budgetary constraints).

The reduction of economic losses is based on the reduction of premature mortality and improvement the return efficiency from the regional labor resources. The amount of economic losses indicates in which gender and age groups and from which cause groups, most resources (economic, financial, and other) are lost by the regional community and economy[15].

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[12] T.V. Mirolyubova and N.Yu. Zubarev, “Mortality as an Indicator of Regional socio-economic Slowdown”, ARS ADMINISTRANDI, Vol: 9 num 1 (2017): 16—31.

[13] V.N. Rostovtsev, Premature Mortality and the Spectral and Dynamic Medical Comples. Retrieved July 31, 2017 from: http://www.kmsd.su/vracham/nauchnye-stati/prezhdevremennaya-smertnost-i-kmsd/#

[14] R. J. Korda and J. R. Butler, “Effect of Healthcare on Mortality: Tendencies in Avoidable Mortality in Australia and Comparisons with Western Europe”, Public Health num 120 (2) (2006): 95–105.

[15] N. Yu. Zubarev, “Reduction of Final Consumption in the Economy due to Premature Mortality as a Threat to the Development of Regional Material Production (on the example of Perm Region)”. Proceedings of the IV Perm Economic Congress. Perm, Perm State University, February 8, 2018. Available at https://elis.psu.ru/ident/978-5-7944-3078-3: 117–122.

The influence of demographic processes on economic indicators was studied by Russian and foreign researches, such as E. Valkovich, B. D. Breev, A. Ya. Kvasha, M. A. Klupt, V. P. Kornev, A. S. Milovidov, N. V. Pankratyeva, A. S. Pervushin, S. I. Pirozhkov, R. Pressa, A. A. Sagradov, A. Sovi, S. G. Strumilin, A. A. Tkachenko, B. C. Urlanis, and others.

Scholars who adhere to the "integrated" approach, interpret the present-day economic development broadly, associating its progress not only with the integrated economic productivity, but also with the standards of living.

The foundation for improving the performance of the healthcare system is the efficiency of budgetary expenditures, the search for additional funding to improve quantitative and qualitative indicators of delivering healthcare services by virtue of new technologies[16]. V. I. Starodubov reports the need to use of available resources as rationally as possible at all levels of government (federal, regional and municipal) and improve the structural and functional effectiveness of the healthcare system[17]. As "...the stronger role of innovation as a factor of sustainability of the development of socio-economic systems, generates the growing demand for the business in educated, active, and creative individuals"[18].

Therefore, even in the conditions of transformation, "preservation of the health capital as a pillar of human capital" is the main goal of the healthcare system in the Russian Federation[19].

Substantial economic success is associated not only with modernization and improvement in the production field and new technologies but also to the reduction of premature death rates. Qualitative changes in preserving public health and their labor, creativity, and creative potential require the transformation of priorities in the reduction of premature mortality.

Materials and Methods

The study employs the theory of demographic transition, the theory of epidemiological transition, and the monetary component-wise approach in the assessment of integrated economic losses[20]. To ensure the economic development, the paper proposes using the integrated assessment of economic losses from premature mortality in determining priorities of reduction of premature mortality. It represents the total economic losses by a variety of differentiating factors (Figure 1) and is calculated for a period of 1 year by the following

[16] V. Yu. Semenov, Economics of Public Health (Moscow: MTsFER, 2004)

[17] V. I Starodubov; Yu.V. Mikhailova, and A. E. Ivanova, "Problems of Russian mortality, its consequences and priority directions of action". Proceedings of the All-Russian Scientific and Practical Conference May 30–31, 2006. Moscow: 30–31; Yu. V. Mikhailova and A.E. Ivanova, (ed). Preventable Mortality and Ways of Its Reduction (Moscow: TsNII OIZ Publ, 2006) y A. I. Tatarkin, "New industrialization of the Russian economy: the need for development and/or challenges of time". Ekonomicheskoe vozrozhdenie Rossii, num 2 (2015): 65–88.

[18] I. M. Golova and A.F. Sukhovei, "Challenges of Innovative Security of Regional Development in the Digital Society", Economika Regiona, num 3 (2018): 987–1002.

[19] N. V. Krivenko and A. I. Tsvetkov, "Efficiency of Funding Public Health Care to Ensure Regional Economic Security", Economika Regiona, num 3 (2018): 970–986.

[20] N.Yu. Zubarev, "Methodical Problems of Estimation of Economic Loss from Mortality of the Region", Ekonomika i upravlenie: problemy, resheniya, num 08–5' (2017): 84–88.

Formula 1:

$$EL_{x,s,d}=GRPL_{x,s,d}+TL_{x,s,d}+CL_{x,s,d}+EPYLL_{x,s,s}$$

where $EL_{x,s,d}$ — an integrated assessment of economic losses from premature death of people of (x) years of age, of (s) gender from the cause of (d) in the federal subject of Russia in the reporting year.

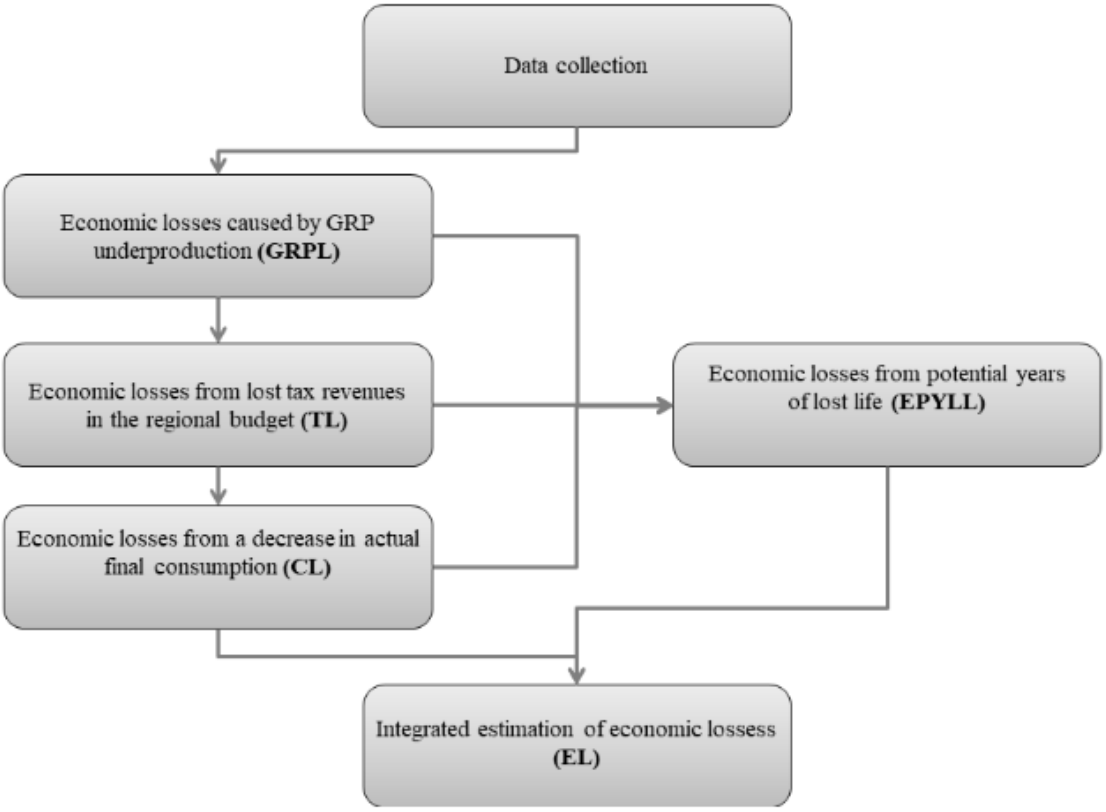

Figure 1
The algorithm of integrated assessment of economic losses from premature mortality in the region

Transformation of the principles is complicated as several important factors have to be taken into account: the current situation with premature mortality, the regulations in effect, financial capacity (budgetary constraints).

Results

The long-term population policies aimed at reducing mortality and increasing life expectancy includes two interrelated fundamental components. The first component is reliable data on the history and the current tendencies in public health and mortality by age groups and cause groups (including by various attributes, such as territorial, economic, social, etc.). The level of understanding and granularity of this picture determines the adequacy of the choice of long-term and short-term priorities, and so tools.

The second component is a vision, a concept that sets the line of managerial impact and joins principles, priority directions, and key tools together around the goal.

One such concept is WHO's Health for All strategy. This document summarizes the experience of economically advanced nations that show substantial progress in reducing mortality. WHO's experience shows that a strategy can only be effective if the authorities begin to see people as something more than merely a means for attaining economic progress. As a suggested alternative, the purpose of development (economic, social, etc.) is seen to be the greater public good, not the other way around[21]. This is a philosophy that has enabled developed countries to achieve remarkable progress in reducing mortality through large-scale investments in human capital. In relation to human health, this philosophy is implemented through the following basic principles:

- Right to health. The principle means, on the one hand, the value of each life to the nation, and on the other hand — equal rights, duties, and responsibilities of each person with regard to health.
- "Health equity. The principle includes two aspects: (a) socio-economic policies aimed at reducing poverty and health risks; (b) protecting individual groups of people with special health needs (due to economic or social circumstances) from isolation, and to give them equal access to necessary health care"22.
- "Participation in healthcare and responsibility of individuals, groups, organizations, and the public sector. This principle is based on understanding the multi-factor nature of health and includes two main elements: (a) all sectors recognize their responsibility for health and development of effective mechanisms of their involvement in healthcare; (b) people are engaged in the development and implementation of health-related policies"[23.]

The consideration of the history of epidemiological transition and the current state of epidemiological processes in the formulation of policies to reduce mortality and promote health suggests that along with the long-term goals of maximizing longevity, increasing the period of active and healthy life, the mortality and public health policies can and should set goals and targets relevant to the actual situation. There is a need to overcome negative tendencies for individual causes and age groups, especially among the working-age population. Such implemented programs can, in many ways, be opportunistic or urgent, but never contradictory to the general strategy of protecting human life and health. Moreover, most negative changes in mortality and public health result from conceptual and tactical missteps, therefore special anti-crisis programs can be used as an instrument for adjusting the overall strategy.

Given the current situation of premature mortality in the working-age population in federal regions of the Russian Federation, which is, overcoming the long-term mortality tendencies that started back in the early 1990s, we can determine the priorities for the state policy in this area.

[21] V. A. Sukhikh and N. Zubarev, "Health risk assessment as an indicator of long-term planning of regional socio-economic development (on the example of Perm Region)". Ars Administrandi, num 3 (2012).
[22] A. E. Ivanova and E. V. Kondrakova, "Justification of the Projected of Life Expectancy in the Federal Regions of Russia through to 2025", Sotsial'nye aspekty zdorov'ya naseleniya, num 1 (2008).
[23] A. E. Ivanova and E. V. Kondrakova, "Justification of the Projected of Life…

The long-term effect from promoting health and reducing mortality on the scale of that of developed nations requires both substantial resources and adjustment of priorities of social and economic development. Despite the current global political and economic processes, Russia has ratified international treaties and assumed responsibility to promote health and reduce mortality.

Before defining the principles, let us review Russian laws and regulations that determine and regulate healthcare policy and, in particular, the national priorities in the reduction of mortality (Table 1).

Laws and regulations	Goals and targets in mortality reduction
The Strategy of Socio-Economic Development of the Russian Federation through to 2020	According to the Strategy, one of the priorities of the State population policy is to "reduce the mortality rate, in particular, the high mortality among men in working age from external causes, including: 1. Reduction of road traffic death and injuries (by improving the quality of road infrastructure, traffic discipline, traffic management, the quality and performance of medical service to those injured) and deaths for other external causes; 2. Reduction of mortality and injuries from occupational accidents and diseases, prevention activities and timely detection of occupational diseases, formulating and implementing measures to improve working conditions and health & safety measures in collaboration with employers and trade unions" (the Strategy of Socio-Economic Development of the Russian Federation through to 2020).
Decree of the President of the Russian Federation No. 1551, On Approval of the Concept of Demographic Policy of the Russian Federation through to 2025.	"The purpose of the national population policy is to reduce the natural population decline, stabilize the population, create conditions for an increase, improve living standards, and increase life expectancy. The goal is to stabilize the population at a level of at least 142–143 million people by 2015, to create the conditions for increasing the population to 145 million people by 2025, and increase life expectancy to 75 years" (Decree of the President of the Russian Federation No. 1551, On Approval of the Concept of Demographic Policy of the Russian Federation through to 2025). The Concept includes a number of direct objectives to reduce mortality, in particular, for specific groups of age and causes. The objectives include: 1. "Reduction of mortality by at least 37%, in particular, for people of working age from external causes" (Decree of the President of the Russian Federation No. 1551, On Approval of the Concept of Demographic Policy of the Russian Federation through to 2025); At the same time, the Concept specifies the objectives related to the reduction of mortality: 1. "Reduction of deaths from cardiovascular diseases by comprehensive risk factors prevention activities, early detection through advanced technologies, the introduction of education programs on prevention of the diseases; 2. Reduction of road traffic deaths and injuries by improving the quality of road infrastructure, traffic discipline, traffic management, and by improving quality and performance of medical care to those injured in road traffic accidents at all stages; 3. Reduction of deaths and injuries from occupational accidents and diseases by the transition of the occupational health and safety to occupational risk management (including communicating the relevant risks to employees, creating a system for identifying, assessing

	and controlling such risks), and by economic incentives for employers to improve the working conditions; 4. Reduction of suicide deaths by improving the performance of preventive work with people at risk aimed at the prevention of suicide; 5. Reduction of deaths from cancer by prevention programs and screening programs for early detection of cancer; 6. Reduction of deaths from HIV/AIDS and tuberculosis by improving prevention and treatment programs and introducing innovative treatment technologies" (Decree of the President of the Russian Federation No. 1551, On Approval of the Concept of Demographic Policy of the Russian Federation through to 2025).
The National Program of the Russian Federation "Healthcare Development"	"The purpose of the program is to ensure the availability of health care services improve their performance, while the volume, types, and quality of these services should correspond to the incidence rates, public demand, and medical advances. The program's targets and indicators related to mortality reduction: 1. Mortality for neoplasms (including malignant) (per 100 thousand population), people; 2. Mortality for all causes (per 1,000 population), people; 3. Infant mortality (per 1,000 live births), people; 4. Mortality for tuberculosis (per 100 thousand population), people; 5. Mortality for circulatory disease group (per 100 thousand population), people; 6. Mortality for road traffic accidents (per 100 thousand population), people" (National Program of the Russian Federation "Healthcare Development").

Table 1
National priorities in mortality reduction at the federal level
Source: the authors

The basic strategic document that establishes the principles of mortality reduction is the Concept of the Long-Term Socio-Economic Development of the Russian Federation through to 2020 (see References). It is worth mentioning that the Russian Ministry of Economic Development has begun to formulate the draft Strategy for Socio-Economic Development of the Russian Federation through to 2035, however, this document is still under development, so we will be using the 2020 version.

Decree of the President of the Russian Federation No. 1551, On Approval of the Concept of Demographic Policy of the Russian Federation through to 2025 is a more specific document of equal importance that enshrines the lines of demographic policy in the Russian Federation (Decree of the President of the Russian Federation No. 1551, On Approval of the Concept of Demographic Policy of the Russian Federation through to 2025).

At the federal level, we also have the National Program of the Russian Federation "Healthcare Development" for 2018–2025, which defines the top priorities within the strategic lines of development of the Russian Federation "Healthcare" for the period through to 2025[24] The National Program includes 13 subprograms. In the above documents, we will only concentrate on the goals and objectives related to mortality reduction (the overall mortality rate and, in particular, among the working-age people) to determine a possible correlation between priorities both in the different documents and at the different levels of authorities that implement these documents into life.

[24] The National Program of the Russian Federation "Healthcare Development", approved by the Resolution of the Government of the Russian Federation No. 1640 dated December 26, 2017, On Approval of the National Program of the Russian Federation "Healthcare Development".

A summary of the objectives of laws and regulations and state programs at different levels can provide a more holistic view of the priorities in the reduction of mortality in the short-term horizon (Table 1 and Table 2).

Apart from the Healthcare Development national program addressing issues of reducing mortality, Russian federal subjects have their regional strategies that enshrine similar priorities at the regional level given its specific attributes (Table 2). For example, the Perm region adopted and operates the Strategy of Socio-Economic Development of the Perm region through to 2026[25] and the state program of the Perm region "Healthcare Development" (Resolution of the Government of the Perm Region No. 1319-p dated October 3, 2013 (updated August 14, 2015), On Approval of the State Program of the Perm Region "Healthcare Development"), which has been implemented since 2014.

Laws and regulations	Goals and targets in mortality reduction
The Strategy of Socio-Economic Development of the Perm Region through to 2020	"In relation to reducing mortality, the Strategy includes the following key objectives: 1. Reduction of mortality in the working age" (Resolution of the Legislative Assembly of the Perm Region No. 3046, dated December 01, 2011, On Strategy of Socio-Economic Development of the Perm Region through to 2026).
State Program of the Perm Region "Healthcare Development"	"The expected program outcomes include: 1. Reduction of mortality for all causes; 2. Reduction of mortality for circulatory diseases; 3. Reduction of mortality for road traffic accidents; 4. Reduction of mortality for neoplasms (including malignant); 5. Reduction of mortality for tuberculosis" (Resolution of the Government of the Perm Region No. 1319-p dated October 3, 2013 (updated August 14, 2015), On Approval of the State Program of the Perm Region "Healthcare Development").

Table 2
National priorities in mortality reduction in the Perm region (regional level)
Source: the authors

It should be pointed out that the Strategy of Socio-Economic Development of Perm Region qualifies the "relatively high mortality, including in the working age" as a shortcoming and a threat of the region (Resolution of the Legislative Assembly of the Perm Region No. 3046, dated December 01, 2011, On Strategy of Socio-Economic Development of the Perm Region through to 2026). This study confirmed that point, and the mortality problem is worsening every year.

The analysis of the priorities of the federal and regional documents suggests that priorities are definitely closely related. In general, the authorities are focused on premature mortality among the working-age population. The public health institutions' traditional practices suggest that a high number of deaths for a given cause makes it a priority for reducing premature mortality. In other words, the more common the cause of death is, the higher priority it is assigned to.

[25] Resolution of the Government of the Perm Region No. 1319-p dated October 3, 2013 (updated August 14, 2015), On Approval of the State Program of the Perm Region "Healthcare Development" y Resolution of the Legislative Assembly of the Perm Region No. 3046, dated December 01, 2011, On Strategy of socio-economic Development of the Perm Region through to 2026.

At the same time, the authors believe it reasonable to use the estimated economic losses in assigning priorities in mortality reduction, namely to find the largest source of losses and the age and gender groups to which efforts should be directed to reduce those losses. Therefore, we can speak of the prevailing role of the economic expediency principle. This principle can be used for making managerial decisions when selecting options for reducing the quantitative indicators of mortality because it introduces another plane into decision-making: the economic plane.

Another aspect of setting priorities is the impact focus on preventable mortality. For the Russian Federation, the study of preventable mortality and methods of minimizing it are very valuable due to extremely limited economic and financial resources directed to the healthcare sector.

At this point, two leading complementary approaches are used to assess and analyze preventable mortality[26]:

1. Reviewing indicators of preventable regional mortality against that of other territories, regions, nations;
2. Analyzing and identifying causes of death that result from a poorly performing healthcare system.

Above all, the reduction of preventable mortality is an opportunity to reduce the number of premature deaths from causes amenable to intervention by public authorities and the healthcare services. The currently prevailing scientific belief is that there is a number of causes of death for which people should not die given the current advances of health care[27]. The mortality for preventable causes directly depends on the healthcare system and its institutions, and the efficiency of reducing mortality depends on their performance[28].

A notable study carried out in 2008 on preventable mortality in the Russian Federation found that in 2005, two-thirds of preventable deaths were for causes that could be reduced by adjusting regulatory and financial resources of the national healthcare[29]. Without fulfillment of these conditions, healthcare institutions would have been able to prevent only about 5 percent of the total amount of preventable deaths.

Primary prevention offers the most potential for reducing preventable mortality. It is statistically certain ($p < 0.05$) that one in four male deaths is preventable, and among women, it is much lower, about 6–8% of deaths[30].

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[26] V. I Starodubov; Yu. V. Mikhailova and A. E. Ivanova, ”Problems of Russian mortality, its consequences and priority directions of action”. Proceedings of the All-Russian Scientific and Practical Conference May 30–31, 2006. Moscow: 30–31 y A. I. Tatarkin, “New industrialization of the Russian economy: the need for development and/or challenges of time”. Ekonomicheskoe vozrozhdenie Rossii, num 2 (2015): 65–88.

[27] T. P Sabgaida, et al. “Preventable Mortality. Demographic Prospects of Russia” (Moscow: Ekon-Inform Publ., 2008): 373–394.

[28] I. I. Starodubov, (ed). “Premature and Preventable Mortality in Russia is a Measurement of Loss of Public Health”. Conference Papers of the All-Russian Scientific and Practical Conference on May 30–31, 2006 (Moscow: RIO TsNIIOIZ Publ., 2006).

[29] T. P Sabgaida, et al. “Preventable Mortality. Demographic Prospects of Russia” (Moscow: Ekon-Inform Publ., 2008).

[30] I. I. Starodubov, (ed). “Premature and Preventable Mortality in Russia is a Measurement of Loss of Public Health”. Conference Papers of the All-Russian Scientific and Practical Conference on May

Therefore, the focus of managerial impact in reducing premature mortality and economic losses should be on the principle of priority of preventable causes over the rest of them.

Having conducted the study, the author formulated the following priorities of reduction of the region's premature mortality, given the focus of the regions on economic development that places higher requirements on the effectiveness of management decisions, digitalization of technologies (including in the field of healthcare), and standards of living:

- The principle of economic expediency. Reviewing the economic effect of the prevention of premature deaths against its costs;

- The principle of priority of preventable causes of death. Influence what is amenable;

- The scaling down principle. First of all, economic losses should be reduced resulting from the most problematic groups of causes, genders, and ages, and only then the rest of them should be handled;

- The principle of priority of younger age groups. The younger population have a longer post-retirement survival period.

The authors suggest reviewing the algorithm of setting priorities by public authorities in the reduction of premature mortality based on the analysis of the statistics on premature mortality (Fig. 2). In fact, this is an outdated approach which, sadly, is still used by public authorities.

The central problem of this algorithm is that the priority of a given cause of death is set based on its prevalence. However, the resulting economic losses might be much lower than for other seemingly less significant causes of death. In other words, the high number of deaths for a certain reason does not indicate that it must be a priority for the impact because this logic lacks consideration of the integrated losses.

Apart from that, the algorithm does not take into account the different value of premature deaths in different age groups in terms of post-retirement survival period and the amount of human capital.

30–31, 2006 (Moscow: RIO TsNIIOIZ Publ., 2006) y A. I. Tatarkin, “New industrialization of the Russian economy: the need for development and/or challenges of time”, Ekonomicheskoe vozrozhdenie Rossii, num 2 (2015): 65–88.

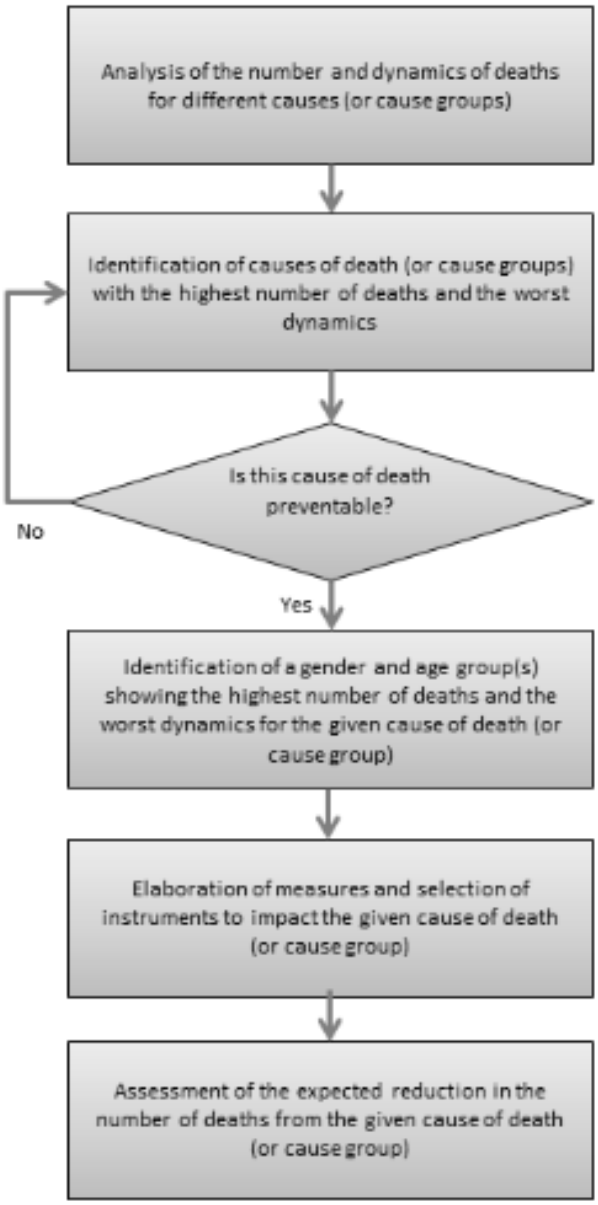

Figure 2
The algorithm for setting priorities in the reduction of premature mortality
net of the integrated assessment of regional economic losses (current state).

If the estimated projected reduction of mortality is the same for two groups, that makes it difficult to make management decision using this algorithm.

Finally, the algorithm lacks consideration of the integrated economic losses. Therefore, the algorithm limits management decisions. You never know how effective such a decision would be.

The author proposes a new algorithm the eliminates the limitations of the current one and transforms the priorities in accordance with regional and national challenges of economic development.

The proposed algorithm is based on a comprehensive assessment that includes the losses in production and consumption, and the present-day and future losses depending on the differentiating factors (cause group, gender, age) (Fig. 3). It is for this reason that the algorithm begins with the analysis of the economic losses and finding the causes of death for which the greatest losses and the worst dynamics are observed. Then it is determined whether the cause is preventable, the gender and age group associated with the greatest losses. As a result, the algorithm can be used to determine a specific cause of death and the gender and age group to elaborate activities with appropriate tools to minimize economic losses, and to evaluate the expected reduction of premature mortality and the prevented losses. Thus, the algorithm can be used as a decision-making instrument for preventing regional premature deaths and economic losses.

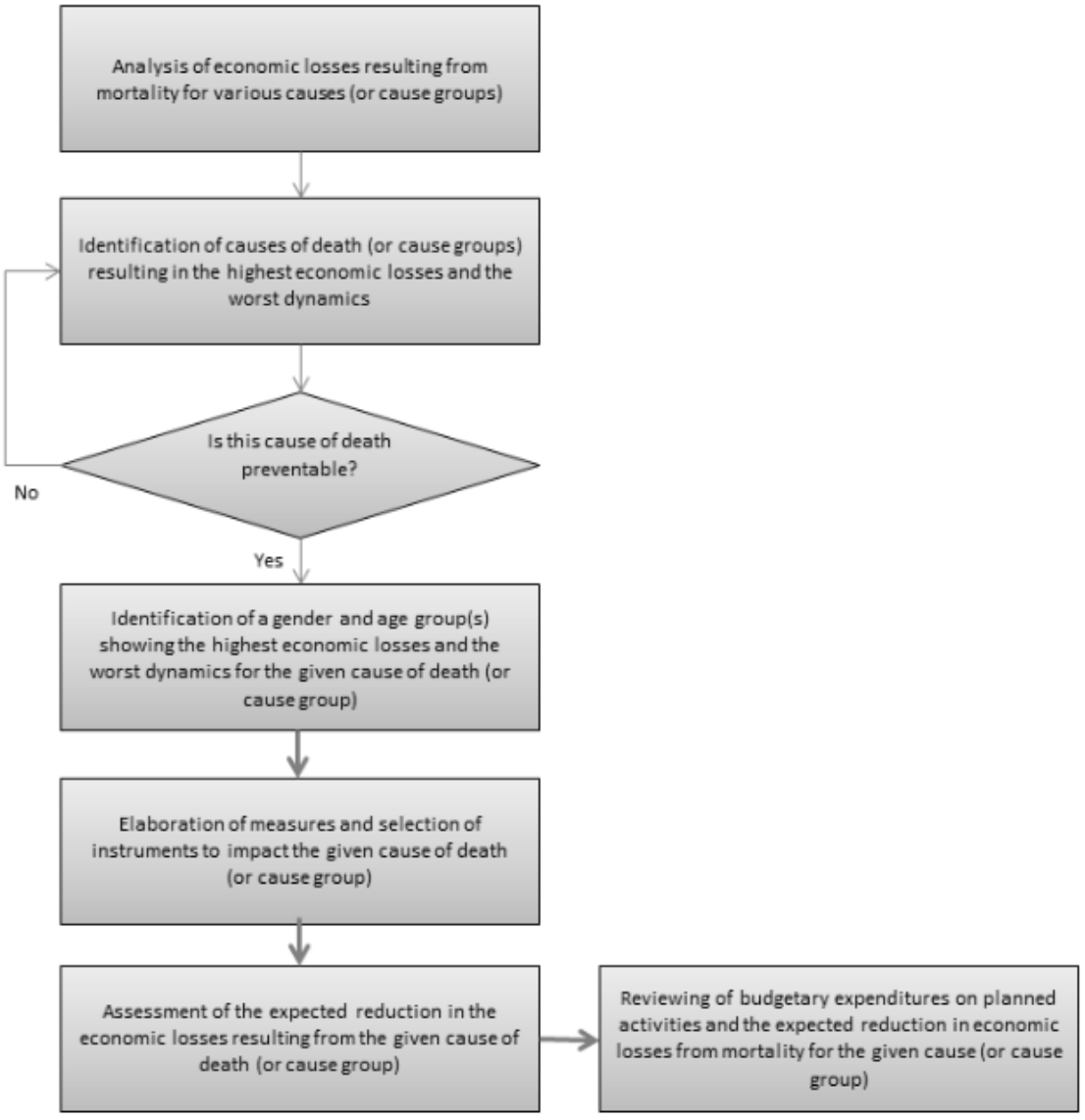

Figure 3
The algorithm for setting priorities in the reduction of premature mortality inclusive of the integrated assessment of regional economic losses (desired state).

The transformation of regional priorities for reduction of premature mortality is part of the overall process of economic development.

Conclusion

The authors believe that setting priorities in mortality reduction should be associated with estimations of economic losses, i. e. finding the largest source of losses and the age and gender groups, to which efforts should be directed to in order to reduce those losses. Therefore, we can speak of the prevailing role of the economic expediency principle. This principle can be used for making managerial decisions when selecting options for reducing the quantitative indicators of mortality because it introduces another plane into decision-making: the economic plane.

If it is not possible to review the budget expenditures on reducing premature mortality in a given gender and age group or for a particular cause (group of causes), the average value of economic losses can be used for this group.

The principles of reduction of economic losses from premature mortality proposed in the article can be implemented in practical activities of public authorities only in combination with the principle of systematic integrated assessment of economic losses.

The principles and algorithm proposed in this paper is an instrument to reduce economic losses from premature mortality and accelerate economic development while preserving the population and resources. However, these principles can be implemented and the algorithm can be used only on the condition of systematic assessment of economic losses and proper budgetary spending on the health sector.

So regional sustainable economic development implies the use of all the growth drivers: both internal and external. A decrease in mortality is a latent internal driver capable of ensuring constant, systematic growth of the regional economy for years ahead. We should not concentrate only on increasing the industrial output without considering the environment. Such growth entails the risk of increasing morbidity and, therefore, mortality.

For now, under the circumstances of limited financial resources and a decline in investment in production industries, management efforts should be directed to and budget effectively allocated, above all, for reducing mortality for the leading causes.

The assessment of losses from mortality is becoming increasingly important in relation to the "socialization" of the economy and putting people (the primary unit of production and creativity) to the foreground. In addition, high mortality and its negative dynamics can entail major economic losses in the future, which may slow down regional economic development.

The objectives of the public authorities include improving the living standards. This requires new methods, new indicators and measurements to take into account the multicomponent impact of economic losses on the socio-economic system, to plan, execute, and control the uniform policy of regional strategic development.

Estimation of complex economic losses from premature mortality can be viewed as a component of managing the standard of living. The following provisions are most important for the strategic regional development:

1. Assessment of economic losses is necessary as a measurement of managerial decision-making in the socio-economic system that solves the problem of information asymmetry. The consideration of two-way connections in the system will allow to harmonize the interests of different interest groups.
2. Death means a full loss of health resulting from the realization of risks that are inherently multidimensional, this is why the economic assessment should be expressed in the monetary form. In this case, the monetary value can be compared, analyzed, and used by a variety of institutions.
3. Economic losses resulting from mortality will occur in the present and in the future. Normally, the losses of the future periods have the most impact on the socio-economic system. The planning and administration system is focused on the short- or medium term horizons (usually, up to 5 years) and does not properly estimate the losses. This problem can be solved by strategic planning with a time-frame of 10–15 years.

If the government rejects the long-term planning of socio-economic development and its management methods and tools, this will entail enormous economic losses for the system in 10–20 years. These losses will be leveled up in the beginning, but at some point, they will surface and amplify the problems. Such behavior, instead of solving the current problems, sets them aside for an indefinite period.

To summarize the above, we emphasize the urgent need for strategic management tools for the regional economic development associated with setting priorities in the reduction of mortality based on an integrated assessment of economic losses.

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