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The Increase in the Number of Disabled Population in European Countries as an Indicator of the Effectiveness of Their Health Policies

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Abstract. The paper presents an analysis of disability indicators in European countries, where the increase in the number of persons with disabilities is largely determined by the high primary disability in the elderly. The goal of our research is to identify distinctive characteristics of disability in groups of European countries that have different levels of economic development and conduct different policies in the field of healthcare. To achieve this goal, we solve the following research tasks: we arrange European countries into groups; we make a comparative evaluation of disability rate in the population in selected groups; we analyze of the quality and accessibility of healthcare as a factor that influences disability indicators; we propose recommendations aimed to reduce the disability rate in Russia's population. We group European countries into six clusters according to disability indicators, the proportion of elderly persons in the population and healthy life expectancy at age 60. The greatest similarity of these parameters is observed in the countries that have similarities in geographical position and historical experience of participation in political associations. The Russian situation is characterized by worse values of healthy life expectancy and a relatively low proportion of elderly population in comparison with the situation in most other European countries. The discussion part of our paper considers the quality and availability of healthcare. In Russia, a significant part of older citizens who have the greatest risk of developing disabling pathologies cannot afford to receive treatment in private medical organizations. The effectiveness of rehabilitation measures for people with disabilities remains low. In conclusion, we summarize the arguments in favor of the use of disability indicators in assessing the effectiveness of countries' health policies. We propose directions of

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work to reduce disability in Russia. The results of the study can be useful for social management workers and for scientists whose research interests affect the problems associated with disability of the population.

Key words: disability, increase in the number of the disabled, quality and availability of medical care, demographic ageing.

Introduction

Population ageing largely determines the trends associated with people being registered as disabled. An increase in the proportion of older cohorts in the population tends to lead to an increase in primary disability. The World Health Organization (WHO) links the increase in disability to this very cause[1]. In addition to medical and biological factors, the negative socio-economic conditions contribute to the growth of disability. Disability is inextricably linked to poverty and social exclusion: according to the WHO, it mostly affects vulnerable groups (women, the elderly, the poor) and is more prevalent in low-income countries[2]. The correlation between the impact of demographic ageing and socio-economic conditions forms the characteristics of disability in different countries. In turn, an analysis of the extent and structure of disability provides insight into the quality of social policy.

Invalidization of the population is the process of increasing the proportion of people with disabilities in the population, due to the spread of disabling pathologies and external influences that lead to disability. The leading causes of disability vary from country to country depending on the stage of epidemiological and demographic transition experienced by the country and on the quality of their social and demographic policies. Disability, in turn, has a certain impact on the social and economic development of society. The increase in the number of the disabled is accompanied by a decrease in the health potential of the population. The increase in government spending on social services and healthcare, under-production of GDP by unemployed persons with disabilities – these are the manifestations of the impact of disability on the economy. Social implications of disability include the years of healthy life lost, and an increased risk of social exclusion.

There are several thematic areas in the disability studies. The first area covers the study of the dynamics of disability [1; 2] and the structure of disability [3], and forecasting [4] their indicators. The second area is closely related to the previous one and includes works on the causes and factors that determine the structure and dynamics of disability [5]. The third area aims to assess socio-economic consequences of disability [6]. A more specific area includes the works that study the socio-economic situation of people with disabilities [7]. It can include articles dealing with education, employment of disabled people [8], and creating an accessible environment [9].

These areas differ in their main subject. Demographic studies consider the parameters of the process of population invalidization and its consequences for society and economy. Among the sociological and economic studies, we can more often find works aimed at the study of disability as a phenomenon at the macro level (countries and their regions), meso level (on the example of local communities – in professional teams, enterprises) and individual level. At the same time, the grouping we have made is conditional, because there are works that consider the general problem of disability

[1] Disability and health. World Health Organization. Available at: http://www.who.int/mediacentre/factsheets/fs352/ru/ (accessed: 24 April 2019).

[2] 10 facts on disability. World Health Organization. Available at: http://www.who.int/features/factfiles/disability/facts/ru/index1.html (accessed: 24 April 2019).

together with the issues concerning the quality of life [10] or other complex problems, such as the effectiveness of public policy in the field of healthcare and social services [11; 12].

In some cases, the term "disability" may not be mentioned in the study, but its conclusions refer the reader to this problem. Thus, the article by V.M. Shkolnikov (et al.; 2019) examines the relationship between the quality of governmental social policy and the state of public health. The authors show that at the current level of GDP per capita, Russia could expect a higher level of life expectancy at birth (LEB) compared to what it is now. They came to this conclusion by comparing the indicators for Russia and a number of countries with a similar level of economic development. By plotting the Preston curve (the ratio of GDP per capita to life expectancy at birth in different countries at one time) for each year for the period 2005–2015, they found that there was no direct relationship between the growth rate of national income and life expectancy. However, the authors of the study say that life expectancy at birth in the developed countries of Europe is growing, although slowly and against the background of the economic crisis, due to investing in the development of new methods of treatment. For Russia, they see the need for more intensive investment of national income in improving public health [13]. And here the question arises that it is important not only to increase average life expectancy, but also to "stretch" its healthy period – without chronic diseases and disability.

Domestic works on demography consider disability indicators among other indicators of public health [14; 15]. Case studies of disability often discuss how to measure the number of persons with disabilities [16; 17], the causes of primary disability [18; 19; 20], quality of life of people with disabilities [21], conditions for equal participation of persons with disabilities in society [22; 23], and their employment [24; 25; 26; 27]. There are very few works aimed at identifying the features of the Russian process of disability against the background of global demographic trends [28].

Reference to the topic of disability growth in foreign studies often serves as an illustration of more general problems: demographic aging, social inequality, loss of public health, improvement of social and health insurance systems. Disability growth in developed and developing countries is mainly due to the accumulation of diseases in older age groups. The speed and scale of this process depend on the quality of life, availability of advanced medical technologies, as well as on public health policy. Thus, in the work of A. Chang (et al.; 2019) it is shown that the population in different countries acquires a set of characteristic "senile" diseases at different ages. The list of such diseases, according to the authors includes cancer and cardiovascular diseases, diabetes mellitus, renal failure, chronic diseases of the respiratory system, psychological disorders, non-communicable diseases, diseases of the sensory organs, skin and subcutaneous diseases. The researchers for the first time managed to show the gap between the countries of the world in terms of indicators characterizing the burden of diseases of the population. They note that "the results of the equivalent age [old age] analysis show a staggering 30-year difference between the countries with the highest and lowest equivalent age compared to the world average age of 65" and that "even among countries with the same levels of the overall age-standardized burden of age-related mortality, the patterns of burden accumulation vary greatly from age to age, with some populations receiving the age burden of disease at an earlier age than others". At the same time, according to the calculations of researchers, the Russian equivalent indicator of old age was 60 years,

which is 5 years below the world average and 16 years below the Japanese indicator that is the best in the world. The authors concluded that their indicator of ageing, "which informs not only about life expectancy, but also about the health status and severity of diseases at the population level", helps identify countries that "have achieved relative success in delaying the accumulation of age-related burden of disease compared to their "peers" with similar levels of age-related burden of disease" [29].

The relationship between the quality of life and the state of public health is evidenced by the results obtained by researchers from England. They conducted a longitudinal observational demographic study of the health of a single cohort of people aged 50 years and older (2 measurements at intervals of 6 years: in July 2010–June 2011 and in May 2016–June 2017). Respondents' perceived age discrimination was found to be associated with an increased likelihood of poor self-esteem and a risk of serious illness over a six-year period. These findings, according to the authors, emphasize the need to take effective measures to combat stigma and discrimination based on age [30].

In the above-mentioned foreign works, the subjects of the study differ, but their conclusions agree that the state policy in the areas of health conservation and quality of life is the most important factor creating conditions for the preservation and strengthening of public health. Investment of developed countries in human potential is an investment in improving competitiveness at the global level. But the greater the per capita cost, the higher the marginal cost per case of disability or premature death. Therefore, the slowdown in the growth of LEB index in most EU countries after 2011 is seen as a threat to their sustainable development [31].

On the basis of our analysis of literary sources, we can distinguish two of the most common observations related to the problem of disability growth. First, demographic ageing is accompanied by an increase in the proportion of persons with disabilities in the population of countries. Second, residents of countries where there are problems in ensuring universal access to health services and systems for prevention and early diagnosis of these diseases are particularly vulnerable to disabling pathologies. In general, although the problem of disability is narrower than the problem of maintaining public health, its solution can have a "cascade" effect. Against this background, efforts to develop new, more effective and affordable methods of treatment and rehabilitation of patients suffering from disabling pathologies, to further improve preventive medicine, to eliminate any forms of discrimination in obtaining medical services, to prevent the spread of self-destructive practices among the population are of particular relevance. These circumstances necessitate a comprehensive consideration of disability in the context of demographic ageing in order to ensure the effectiveness of public health policies.

The goal of our work is to identify distinctive characteristics of disability growth in groups of European countries with different levels of *economic development and conducting different policies in the field of health*.

The chosen goal of the study determined the formulation of the following tasks:

1. To arrange European countries in groups according to their geographical location and participation in modern political associations in terms of LEB, disability and the proportion of older persons in the population.

2. To carry out comparative assessment of disability growth in the countries in the selected groups.

3. To consider the quality and availability of medical care as one of the factors affecting the indicators of disability growth.

4. Formulation of recommendations aimed at reducing disability growth in Russia.

Implementation of the tasks was provided by the use of representative data and the use of mathematical methods of analysis.

Research materials and methods

The information base of the study comprises the data of Russian and international official statistics. The object of the study is the growing disability of the population of Europe, including the Russian Federation. The subject of the study is the connection of disability growth with socio-economic development of countries.

These research tasks make it necessary to use open international statistical databases: Global Health Observatory (database of the World Health Organization), Eurostat (database of the European Commission), United Nations Disability Statistics Data Portal (portal of open statistical data on disability, created in the framework of the United Nations Disability Statistics Programme), Global Burden of Disease Study (the study on the assessment of the disease burden in different countries), World Population Prospects 2017 (UN). In addition, during the preparation of this article, we used the data on population health in different countries, published in the reports of international organizations: OECD Health Working Papers, United Nations Demographic Yearbook. Due to the fact that at the international level there is no practice to collect and systematize comparable data on disability, our work makes special mention of situations where data for different countries cannot be compared directly.

Europe as a geographical region of the world includes more than 40 independent countries. The UN identifies the regions of Northern, Eastern, Southern and Western Europe. In order to analyze the disability rates in these countries with reference to their level of economic development, they were grouped by income level, according to the World Bank classification[3]. At the same time, the quality of social policy is also a significant regulator of the level of disability. In this respect, the countries that make up the European Union are the most homogeneous group. Their social policy is built within the framework of common goals and objectives. The other group of countries in the region includes countries outside the EU. Taking into account these three criteria: geographical division, income level and membership in the EU, we have arranged the countries into 11 groups *(Tab. 1)*.

Most European countries are highly profitable, including all the countries of Northern and Western Europe (19 countries). The Eastern Europe region is more differentiated: there are 4 high-income countries, 9 upper-middle-income countries and 2 lower-middle-income countries. In Southern Europe, upper-middle-income countries include Albania, Bosnia and Herzegovina, Northern Macedonia, Serbia and Montenegro. Among the 27 European countries that make up the EU, the majority are high-income, only 2 countries – Bulgaria and Romania – have income at the level of "above average". It should be noted that the subsequent analysis will also provide data for Cyprus as one of the EU member states geographically belonging to Asia, according to the UN.

A significant limitation in the analysis of disability growth in Europe is the lack of statistical data on non-EU countries. For them, only the data on the proportion of older persons in the population and the value of the indicator of healthy life expectancy as of 2016 are available. The Eurostat website presents data on the number of persons with disabilities for EU member states, but the latest update was done

[3] World Bank Country and Lending Groups. URL: http://databank.worldbank.org/data/download/site-content/CLASS.xls (Accessed 24 April 2019).

Table 1. Grouping of European countries by geographic region, EU membership and income level

Groups of European countries by income	Northern Europe		Western Europe		Southern Europe		Eastern Europe	
	EU member (year of accession)	EU non-member	EU member (year of accession)	EU non-member	EU member (year of accession)	EU non-member	EU member (year of accession)	EU non-member
High-income countries	Denmark (1992) Ireland (1992) Latvia (2004) Lithuania (2004) United Kingdom (1992 to 2016) Finland (1995) Sweden (1995) Estonia (2004)	Iceland Norway	Austria (1995) Belgium (1992) Germany (1992) Luxemburg (1992) The Netherlands (1992) France (1992)	Liechtenstein Monaco Switzerland	Greece (1992) Spain (1992) Italy (1992) Malta (2004) Portugal (1992) Slovenia (2004) Croatia (2013)	Andorra San Marino	Hungary (2004) Poland (2004) Slovakia (2004) Czech Republic (2004)	
Upper-middle-income countries						Albania Bosnia and Herzegovina Macedonia Serbia Montenegro	Bulgaria (2007) Romania (2007)	Belarus Russian Federation
Lower-middle-income countries								Moldavia Ukraine

Sources: Standard country or area codes for statistical use. United Nations Secretariat. Available at: https://unstats.un.org/unsd/publication/SeriesM/SeriesM_49rev4corr4R .pdf; What is the euro area? European Commission. Available at: https://ec.europa.eu/info/business-economy-euro/euro-area/what-euro-area_en#whos-already-in; World Bank Country and Lending Groups. Available at: http://databank.worldbank.org/data/download/site-content/CLASS.xls (accessed: 12 April 2019).

in 2012. We took these limitations into account when formulating the conclusions of the study.

Results

According to the World Population Ageing report, the population aged 60 and over doubled between 1980 and 2017, reaching 962 million people, and experts expect another doubling by 2050. The process is going on faster in developing countries, and according to the forecast, by 2050, eight out of ten older persons will come from a developing country. In developed countries, the process of demographic ageing has slowed down because the main factors that led to premature mortality are largely under control and further reduction of mortality in older ages is difficult. Opportunities in this direction are mainly associated with the development of the focus on gerontology in medicine. The highest proportion of the population aged 60 and over in 2017 was recorded in Europe – 35%. In other regions of the world, the values are lower: in North America – 28%, Latin America – 25%, Asia – 24%, Oceania – 23%. The "youngest" population was observed in Africa, where the proportion of people 60 years of age and older was only 9%[4].

[4] World Population Ageing 2017: Highlights. Department of Economic and Social Affairs. United Nations. New York, 2017. 40 p.

Table 2. Proportion of persons aged 60 and over in the European population, 2016

Country	Geographical region	EU membership	Proportion of persons aged 60 and over in the population, %
Finland	Northern Europe	Yes	27.8
Latvia		Yes	26.2
Estonia		Yes	25.9
Sweden		Yes	25.5
Denmark		Yes	25.3
Lithuania		Yes	25.3
United Kingdom		Yes	23.9
Norway		No	22.3
Iceland		No	20.1
Ireland		Yes	19.1
Germany	Western Europe	Yes	28
France		Yes	25.7
Austria		Yes	25.1
Netherlands		Yes	25
Belgium		Yes	24.6
Switzerland		No	24.1
Luxembourg		Yes	19.6
Italy	Southern Europe	Yes	29.4
Portugal		Yes	27.9
Croatia		Yes	26.8
Greece		Yes	26.5
Slovenia		Yes	26.3
Malta		Yes	26.1
Spain		Yes	25.3
Serbia		No	24.5
Bosnia and Herzegovina		No	23.4
Montenegro		No	21.3
Republic Of Northern Macedonia		No	19.5
Albania		No	19
Bulgaria	Eastern Europe	No	27.7
Hungary		Yes	26
Czech Republic		Yes	25.6
Romania		Yes	24.9
Poland		Yes	24
Ukraine		No	23.2
Slovakia		Yes	21.8
Belarus		No	21.3
Russian Federation		No	21.1
Republic of Moldova		No	17.6
Cyprus	Asia	Yes	18.5
Total average value			24.03
Variation coefficient			12%

Notes: in column 1: high-income countries are highlighted in green, upper-middle-income countries – in purple, lower-middle-income countries – in pink; in column 4: countries where the proportion of elderly in the population is over 25.5% are highlighted in bright orange, countries with the proportion of elderly from 22.3 to 25.5% – in light orange, countries with the proportion of elderly less than of 22.3% – in light blue. Ranked in descending order of values of the indicator of the share of the elderly in the population within each of the geographical regions.

Source: World Population Ageing Report, 2017. Available at: https://www.un.org/en/development/desa/population/publications/pdf/ageing/WPA2017_Report.pdf (accessed: 15 April 2019).

In Europe, the proportion of persons over 60 in the population varies from 17.6% in the Republic of Moldova to 29.4% in Italy. The average value of this indicator is 24.03%. The group of countries where the share of older persons is higher than this level is made up of 14 EU member states, among which there are 6 countries from Southern Europe, 3 countries from Eastern and Northern Europe, and 2 countries from Western Europe. The second group of states, where the proportion of older persons in the population varies from 22.3 to 25.5%, includes 10 EU countries and 5 other countries. Countries of Northern Europe dominate geographically (5). Also, the group includes 4 countries from Western and Southern Europe and 3 countries from Eastern Europe. Another 3 EU member states and 7 non-EU countries form a group where the share of older people in the population is not more than 22.3%. Thus, most of the countries in Southern Europe were in group 1, most of the countries of Western and Northern Europe were in group 2. Eastern Europe has the greatest variation in the values of the analyzed indicator *(Tab. 2)*.

Taking into account the fact that population ageing leads to an increase in primary access to disability in older cohorts, we shall analyze the distribution of European countries in terms of the proportion of persons with disabilities in the 60–74 age group. Below are the data of the European statistics service for EU member states, as well as for Norway and Iceland *(Tab. 3)*. The highest values in 2012 were recorded for Latvia (42%), Hungary (40%), Bulgaria (38%), Lithuania (38%), and Romania (37%). The lowest values were observed in France (16%), Belgium (18%), The Netherlands (19%), and Sweden (19%). It should be noted that Sweden and France, as shown above, have a high proportion of persons aged 60 and over, which, combined with a low level of disability in persons aged 60–74, indicates a high quality of life in these countries. It can be assumed that in them the increase in life expectancy is due to the increase in the period of active longevity of citizens.

In the theoretical part of the article we mentioned that the growth in healthy life expectancy (HLE) in the population aged 60 is one of the most urgent tasks for Europe. In addition, bridging the gender gap in the indicator remains on the agenda for many countries. According to the World Population Ageing report, in most European countries, the increase in HLE in women was lower than in men. The continuation of this trend in the future is likely to bridge the gender gap. The increase in HLE at the age of 60 was more intense in countries that have recently joined the European Union, and in some non-member states. Ireland, which ranked first in terms of the increase in HLE in older men and women, was an exception to this observation. The second place in terms of growth rate for men was occupied by Russia, the third – by Slovenia, the fourth – by Estonia, the fifth – by Slovakia. In the growth of HLE in older women, Estonia ranked second, Belarus – third, Russia – fourth, Serbia – fifth *(Tab. 4)*.

The question arises: what are the differences in the levels of disability growth in the older population in European countries? It can be assumed that they are formed under the influence of living conditions, which, in turn, depend on social policy (including health policy), depending on the participation of countries in political associations. To test this assumption, we carried out a cluster analysis of European countries according to five indicators: healthy life expectancy for men and women aged 60 (according to 2016 data), the proportion of the elderly in the population, the proportion of persons with disabilities in the population aged 15 and older and in the elderly aged 60–74.

Table 3. Percentage of persons with disabilities in the population 15 years of age and older and 60–74 years of age in Europe*, 2012

Country	Geographical region	EU membership	Percentage of persons with disabilities in the population 15 years of age and older, %	Percentage of persons with disabilities in the population 60–74 years of age, %
Latvia	Northern Europe	Yes	**24**	**42**
Lithuania			**23**	**38**
Estonia			20	33
United Kingdom			20	25
Norway		No	20	23
Iceland		No	16	22
Denmark		Yes	20	21
Finland			17	20
Sweden			15	19
Ireland			no data	no data
Austria	Western Europe	Yes	16	28
Portugal			15	28
Germany			21	27
Luxembourg			16	21
Netherlands			17	19
Belgium			17	18
France			14	16
Greece	Southern Europe	Yes	18	31
Slovenia			18	27
Spain			17	25
Italy			14	21
Malta			12	20
Croatia			no data	no data
Hungary	Eastern Europe	Yes	**25**	**40**
Bulgaria			21	38
Romania			18	37
Poland			18	32
Slovakia			18	31
Czech Republic			14	31
Cyprus	Asia	Yes	15	24
Average for the countries listed above, %			18	27
Variation coefficient			17%	27%

Source: Population by sex, age and disability status. Database. Eurostat. Available at: https://ec.europa.eu/eurostat/data/database# (accessed: 16 April 2019).

To divide the countries into groups, we conducted a cluster analysis using SPSS Statistics. We used hierarchical cluster analysis. The clustering of countries was carried out by the method of intergroup connection, the calculation of the Euclidean squared distance was used as a method of determining the distance; z-transformation of the initial data was performed. The analysis involved 28 countries for which the full set of data was available (indicators listed above). The optimal number of clusters for the analyzed data set was six. The results of the distribution of countries by cluster and the average values of the analyzed indicators for each of them are presented in *Table 5*.

Table 4. Healthy life expectancy at the age of 60, broken down by groups of countries of Europe, 2016

European country	European region	EU membership	Year of accession to the EU	HLE_{60}		Rank by HLE_{60}		Growth of HLE_{60}		Rank by the growth of HLE_{60}	
				m	w	m	w	m	w	m	w
France	WE	Yes	1992	19.1	21.9	1	1	16%	9%	15	29
Switzerland	WE	No		19	21.2	2.5	3	16%	9%	14	27
Iceland	NE	No		19	20.3	2.5	10	11%	7%	29	39
Spain	SE	Yes	1992	18.7	21.8	4	2	14%	11%	22	21
Italy	SE	Yes	1992	18.6	21	5	4	14%	8%	21	32
Norway	NE	No		18.4	20.7	6	5.5	16%	10%	17	25
United Kingdom of Great Britain and Northern Ireland	NE	Yes	1992 (until 2016)	18.3	20.1	7	14	17%	11%	6	19
Sweden	NE	Yes	1995	18.2	20.1	8.5	14	11%	6%	30	40
Ireland	NE	Yes	1992	18.2	20.1	8.5	14	26%	18%	1	1
Portugal	SE	Yes	1992	17.9	20.7	11.5	5.5	17%	14%	9,5	10
Malta	SE	Yes	2004	17.9	19.9	11.5	18	13%	12%	26	15
Austria	WE	Yes	1995	17.9	20.6	11.5	7	15%	10%	19	24
Luxembourg	WE	Yes	1992	17.9	20.5	11.5	8	17%	8%	9,5	31
Denmark	NE	Yes	1992	17.8	19.9	14.5	18	17%	13%	7,5	13
Netherlands	WE	Yes	1992	17.8	19.9	14.5	18	17%	9%	7,5	30
Greece	SE	Yes	1992	17.5	20.1	16	14	10%	10%	34	23
Finland	NE	Yes	1995	17.4	20.4	18	9	15%	10%	18	22
Belgium	WE	Yes	1992	17.4	20.1	18	14	13%	8%	27	34
Cyprus	A	Yes	2004	17.4	20.2	18	11	10%	12%	33	17
Germany	WE	Yes	1992	17.3	19.8	20	20	12%	7%	28	37
Slovenia	SE	Yes	2004	16	19	21	21	22%	14%	3	8
Albania	SE	No		15.3	17.4	22	29	13%	8%	24,5	33
Czech Republic	EE	Yes	2004	14.9	18.2	23	24	16%	14%	11	9
Poland	EE	Yes	2004	14.5	18.4	24	23	16%	13%	13	14
Croatia	SE	Yes	2013	14.4	18	25	25.5	13%	13%	23	11
Estonia	NE	Yes	2004	14.3	18.9	26.5	22	21%	17%	4	2
Montenegro	SE	No		14.3	17	26.5	32	11%	12%	31	16
Slovakia	EE	Yes	2004	14.2	18	28	25.5	18%	14%	5	6
Republic of Northern Macedonia	SE	No		14	16	29	39	9%	7%	37	36
Bosnia and Herzegovina	SE	No		13.8	16.8	30	33.5	9%	7%	36	38
Serbia	SE	No		13.6	16.3	31	38	13%	14%	24,5	5
Romania	EE	Yes	2007	13.5	17.2	32	30.5	10%	14%	35	7
Latvia	NE	Yes	2004	13.3	17.6	33	28	15%	9%	20	26
Bulgaria	EE	Yes	2007	13.2	16.8	34	33.5	7%	11%	38	18
Hungary	EE	Yes	2004	13	16.7	35.5	35.5	10%	9%	32	28
Lithuania	NE	Yes	2004	13	17.9	35.5	27	4%	8%	40	35
Ukraine	EE	No		12.5	16.4	37	37	16%	13%	16	12
Russian Federation	EE	No		12.4	16.7	38	35.5	23%	16%	2	4
Belarus	EE	No		12.3	17.2	39	30.5	16%	17%	12	3
Republic of Moldova	EE	No		12	15.1	40	40	7%	11%	39	20

Notes: WE – Western Europe, EE – Eastern Europe, NE – Northern Europe, SE – Southern Europe high-income countries are highlighted in yellow, upper-middle-income countries – in lilac, lower-middle-income countries – in light blue; (according to the World Bank grouping of countries).

Source: World Population Ageing Report, 2017. Available at: https://www.un.org/en/development/desa/population/publications/pdf/ageing/WPA2017_Report.pdf (accessed: 15 April 2019).

Table 5. Composition and profiles of clusters of European countries

Indicators (average values)	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
HLE in men aged 60	18.9	18.1	17.9	15.9	14.3	13.1
HLE in women aged 60	21.5	20.3	20.4	19.2	18.0	17.3
Proportion of the elderly (60 years of age and older) in the population	27.6	19.4	25.4	26.7	24.1	26.3
Percentage of persons with disabilities in the population aged 15 and older	14.0	15.7	17.0	19.7	17.0	23.3
Percentage of disabled persons in the 60-74 age group	18.5	22.3	23.1	29.0	32.8	39.5
Countries included in the cluster	France Italy	Iceland Luxembourg Cyprus	Spain Norway United Kingdom of Great Britain and Northern Ireland Sweden Portugal Malta Austria Denmark Netherlands Greece Finland Belgium	Germany Slovenia Estonia	Czech Republic Poland Slovakia Romania	Latvia Bulgaria Hungary Lithuania
Total number of countries	2	3	12	3	4	4

Note. Verification of the obtained solution was carried out according to the Kruskal–Wallis test, total error was 0.019 at a significance level of p=0.05.
Source: own compilation.

The resulting distribution indicates that the best health indicators, including those in old age, are observed in the countries of the first cluster: in Italy and France. In comparison with the countries included in the third cluster, the level of disability growth in the population aged 15 and older and the population of 60–74 years of age is significantly lower. Cluster 2 is distinguished from clusters 1 and 3 by the lower proportion of older persons in the population; and according to the rest indicators it is intermediate between these neighboring groups. Clusters 5 and 6 were formed by Eastern Europe and former Soviet republics. These clusters are characterized by low healthy life expectancy and high levels of disability. The difference between them relates to age-related disability rates: in the fifth cluster, the proportion of persons with disabilities is high only among the population aged 60–74, while the sixth cluster is also characterized by a high rate of disability among the population aged 15 and over. The fourth cluster occupies a transitional position between the third and fifth clusters according to all the indicators.

The results indicate that the state of public health is affected by the difference in the "initial conditions" of socio-economic development of European countries, including those that are caused by the characteristics of participation in political associations (in the past or at present).

The content and effectiveness of public health policies have a direct impact on the prevalence of non-communicable diseases that can lead to disability. The largest scale of disability losses in Europe is due to such groups of diseases as disorders of the musculoskeletal system, mental disorders, and neurological diseases. These are followed by chronic respiratory, cardiovascular diseases, and neoplasms. There are differences between the averages for Western, Central and Eastern

Table 6. Years Lived with Disability (YLDs), broken down by individual groups of disorders, in some countries of Europe, per 100,000 population, 2017

Region	Group of disorders					
	N (neoplasms)	CVD (cardiovascular diseases)	CRD (chronic respiratory diseases)	MSD (musculoskeletal disorders)	MD (mental disorders)	ND (neurological disorders)
European region (WHO classification)	216.6	756.6	613.0	2576.0	1773.4	1280.8
Western Europe	299.9	713.8	646.5	3089.4	2018.2	1383.2
Central Europe	192.1	1085.9	722.2	2511.4	1471.4	1191.2
Eastern Europe	176.9	904.1	536.9	2146.2	1634.5	1311.9
UK	340.8	626.2	868.2	3138.9	1954.4	1266.6
Germany	332.4	838.8	756.2	3475.4	2021.6	1339.6
France	263.7	752.8	460.9	2739.5	2756.9	1730.2
Hungary	210.8	1148.4	815.0	2767.4	1577.7	1215.8
Czech Republic	245.6	1213.1	704.8	2498.9	1521.6	1184.5
Belarus	166.6	921.3	562.1	2309.2	1703.7	1276.7
Russia	176.4	879.9	525.1	1985.8	1600.6	1314.4

* Abbreviations: N – neoplasms, CVD – cardiovascular diseases, CRD – chronic respiratory diseases, MSD – musculoskeletal disorders, MD – mental disorders, ND – neurological disorders.
Source: Global Health Data Exchange. GBD Results Tool. Available at: http://ghdx.healthdata. org/gbd-results-tool (accessed: April 16, 2019).

European countries[5]. The highest losses due to these causes are observed in Western Europe, with the exception of cardiovascular and chronic respiratory diseases, the losses from which are higher in Central Europe. Russian indicators are most similar to the average in Eastern Europe, and the greatest losses, as well as throughout the European region as a whole, are associated with diseases of the musculoskeletal system, mental disorders, and neurological diseases *(Tab. 6)*.

According to our analysis of disability data and healthy life expectancy in European countries, the most similar pattern is observed in high-income countries in Western and Northern Europe that have formed the core of the European Union in 1992–1995. They formed clusters 1, 2 and 3. In these countries, the proportion of persons with disabilities is lower and HLE rates are higher. Norway, never a member of the European Union, and Malta and Cyprus, which joined the Union later (in 2004) stand apart in this regard. Germany, which along with Estonia and Slovenia was included in cluster 3 that occupies an intermediate position, probably continues to experience the negative consequences of adverse historical events of the 20th century (participation in wars and the division of the country). Estonia and Slovenia, by contrast, were able to get the most out of joining the European Union. Indirect evidence of this is the marked growth of HLE in men and women in these countries (see Tab. 4). In other countries that joined the European Union during the "second wave" (in 2004 and later), the situation is different for the worse. They have a higher proportion of people with disabilities in the population, and the values of HLE in men and women are lower. A feature of these countries that formed clusters 5 and 6 is a more significant difference between the proportion of disabled persons in the population 15 years of age and older and the share of disabled persons among the population 60–74 years of age, which suggests greater vulnerability of the elderly population facing the threat of disability.

[5] Here the division of Europe into regions is given according to the research methodology "Global Burden of Disease Study 2017". Available at: http://ghdx.healthdata.org/gbd-results-tool

The values of life expectancy in men and women in Russia (12.4 and 16.7 years) are the closest to the values typical for the countries included in cluster 6. The share of the elderly in the Russian population is one of the lowest among European countries (21.1%). These facts show that the situation in Russia is characterized by the worst state of health of the population, especially among the elderly.

In the light of these problems, it becomes especially relevant to develop a system for medical prevention of disabling diseases. To maintain the health of the population of older ages, it is necessary to implement targeted measures to create comfortable conditions in health care institutions, to introduce special diagnostic programs for the timely detection of signs of the development of disabling pathologies. But the key factor is to ensure the maximum availability of quality medical care for the population at the place of residence.

The quality and availability of medical care – a prerequisite for increasing healthy life expectancy of Russians

The possibility of obtaining effective medical care is an indispensable condition for achieving the high quality of life, which, in turn, contributes to the growth of life expectancy and helps reduce losses associated with disability.

In the European Union there is a very low proportion of the population with unmet needs for health care (according to self-assessments) – 3.1% for 2017. At the same time, the main reasons why people do not receive medical care include the high cost of these services (1% of respondents), unwillingness to make an appointment with the doctor in the hope that the problem "will be solved on its own" (0.6%), and queues in medical institutions (0.6%)[6]. In our country, the Federal State Statistics Service also conducted a sample survey of the quality and availability of health services provided to the population in 2017[7]. Its results give an idea of the proportion of citizens whose need for healthcare was not satisfied. Among the respondents, 15.8% found themselves in situations where they could not get a consultation (medical examination) with medical specialists or postponed it indefinitely. Another 7.4% of the respondents "failed to undergo the required health checkup or postponed it indefinitely". These data indicate that among Russians, the proportion of those whose needs for medical care were not satisfied is higher than among EU residents. At the same time, major reasons for not receiving the necessary medical care in Russia are different and have territorial specifics.

The main obstacles to receiving a timely medical consultation and medical examinations in the cities were "long waiting in line and the inconvenient working schedule of medical specialists" (29%), in rural areas – "remoteness of medical organizations where you can get a consultation (undergo medical examination; 27%)". At the same time, in the million-plus cities of millions, the main reason for such difficulties lies in the lack of time for people to undergo a medical examination (37% of respondents noted that they had to postpone the necessary medical examinations or abandon

[6] Self-reported unmet needs for medical examination by sex, age, main reason declared and educational attainment level. Eurostat. Database. Cross cutting topics. Quality of life. Health. Access to healthcare. Available at: https://ec.europa.eu/eurostat/data/database?p_p_id=NavTreeportletprod_WAR_NavTreeportletprod_INSTANCE_nPqeVbPXRmWQ&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&p_p_col_id=column-2&p_p_col_pos=1&p_p_col_count=2# (accessed: 18 April 2019).

[7] Selective monitoring of the quality and availability of services in the fields of education, healthcare and social services, employment promotion. Federal State Statistics Service. Available at: http://www.gks.ru/free_doc/new_site/quality17/index.html (accessed: 18 April 2019).

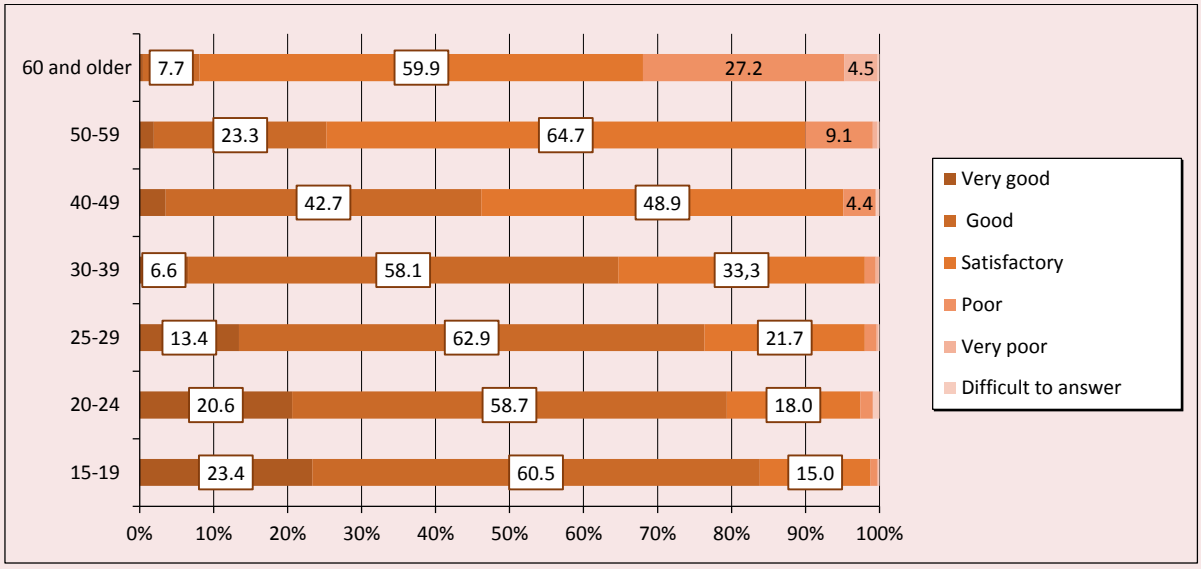
the idea completely). The main barriers to a timely medical examination in 2017 in the cities included the respondents' lack of time to do this (25.9%), the length of waiting in line, inconvenient working schedule of medical specialists (25.8%). Residents of million-plus cities cannot undergo a timely medical examination due to some unclassified causes ("other circumstances" – 35.1%) and due to a lack of time (32.5%). The main problems for residents of rural settlements are as follows: "remoteness of medical institutions where it is possible to undergo medical examination" (27.8%), lack of time (24.7%), long queues and inconvenient working schedule of the doctors (18.8%). On average, 19.9% of respondents indicated that they could not undergo a medical examination due to the fact that they were offered only a paid option for which they had no money. Most often, respondents indicated that they were unable to undergo ultrasound examination (the largest proportion is in cities – 34.4%), MRI (36% in villages) and laboratory tests (33.5% of cases in million-plus cities). Respondents who were unable to get a consultation or examination of a specialist doctor most often pointed to the same range of reasons: queues and inconvenient working hours of doctors (26.1%), lack of time (24.1) and remoteness of medical organizations (11.6%). In general, judging by respondents' answers, the least accessible consultations are such specialists as neurologist, endocrinologist, cardiologist, dentist, gynecologist and ophthalmologist (oculist).

Private organizations are an alternative for providing medical services to the population. Russian free medical care lags behind paid medical care due to the fact that the latter has better laboratory and diagnostic equipment, flexibility of schedules of specialists, and employs physicians of in-demand specializations. In 2017, 25.1% of respondents paid for medical research, 32.4% paid for appointments with medical specialists. Citizens use paid medical services in order to overcome such problems as the inconvenience of the doctors' schedule or the lack of necessary specialists in public health organizations, and the lack of quality of free medical services. At the same time, the coverage of the population by paid medical organizations remains lower compared to their coverage by public health services. Obviously, low income reduces people's opportunities to use paid medical services. According to this criterion, unemployed persons older than the able-bodied age are in a less advantageous position. According to Rosstat, in 2016, they accounted for 11.2% of the needy population[8]. At the same time, according to a sample survey conducted by Rosstat, 13% of people 60 years of age and older noted that they did not have enough money to buy food, medicines and clothing. Among people aged 30–39, the proportion of those who can afford everything they want was 9%, the share of those who do not experience "considerable financial difficulties" was 55%. Among those aged 60 and over, this proportion was 35 and 7%, respectively[9]. The share of those who received paid medical services was the highest in the age group of 30–39 (26%), while among the respondents 60 years of age and older this share did not exceed 17% (the indicator is lower only in young people aged 15–19 – 15%). Due to the deterioration of health, the need for specialized medical care among older citizens is higher than among the

[8] Distribution of the total poor population by major groups. Social status and standard of living of the population of Russia, 2017. Federal State Statistics Service. Available at: http://www.gks.ru/bgd/regl/b17_44/IssWWW.exe/Stg/d01/06-18.doc (accessed 18 April 2019).

[9] Distribution of respondents by self-assessment of their financial situation (in %). Selective observation of behavioral factors affecting people's health. Federal State Statistics Service, 2018. Available at: http://www.gks.ru/free_doc/new_site/ZDOR/Factors2018_2812/index.html (accessed 18 April 2019).

Distribution of health self-assessments in different age groups in Russia, 2018



Source: Selective observation of behavioral factors affecting public health. Federal State Statistics Service. Available at: http://www.gks.ru/free_doc/new_site/ZDOR/Factors2018_2812/index.html (accessed: April 18, 2019).

younger population. Moreover, the fact that people cannot receive these services is most often due to a lack of money to pay for them or the need to wait in line in public health organizations[10]. In general, given the fact that the paying capacity of elderly citizens is low, the development of private medicine cannot have a positive impact on their health. To a certain extent, an alternative to paid services for the population, especially during the crisis period, was an appeal to state medical organizations using personal connections – through the doctors who are one's acquaintances [38].

According to Rosstat's sample survey of behavioral factors that affect health, self-assessment of health status in the population 60 years of age and older are shifted toward unfavorable. The majority (60%) of the older generation call their health satisfactory, and another 27% – bad. It should be noted that the majority of population under the age of 40 assess their health positively. Further, the situation is changing. At the age of 40–49, the answers "good" and "satisfactory" are almost equally represented, but in the group of those 50–59 years of age, the proportion of people who assess their health as "good" sharply decreases and the prevailing assessment is "satisfactory" (65%; *Figure*).

One of the leading causes of disability among adults is cardiovascular diseases, there are no favorable conditions for their detection and prevention: consultations of cardiologists in public health organizations, as noted above, are included in the list of the least accessible services. Another leading cause of primary disability is malignant neoplasms. Consultations of oncologists were not among the least available. However, this fact can also indicate that people are less likely to turn to such specialists on their own, without the recommendations of a therapist. The diagnosis "diabetes mellitus" implies constant

[10] Needs for specialized medical care by age groups of respondents in 2016. Social status and standard of living of the population of Russia – 2017. Federal State Statistics Service. Available at: http://www.gks.ru/bgd/regl/b17_44/IssWWW.exe/Stg/d02/10-18.doc (accessed 18 April 2019).

supervision of the doctor, cardinally changes a way of life of the person in terms of food habits, physical activity, need of careful self-control of the state of health. The high prevalence of this disabling disease among people aged 60 and older requires increased availability of specialist endocrinologists, which, according to the above data, is now insufficient.

It is typical of Russians to consult a doctor when the symptoms of their disease interfere with performing their job. At the same time, their attitude toward medical examination is skeptical. This measure of preventive medical care is considered by the population as a formal procedure that does not contribute to improving health [39]. In combination with the indicated negative phenomena, these behavioral features may prevent the timely detection of the risk of chronic disabling pathologies.

In the study by S.E. Pokrovskaya it is shown that the medical activity of the population has age-related specifics. Persons of pre-retirement and retirement age tend to apply for medical care to public health organizations in case of illness to a greater extent than younger groups of the population. They are less likely to hope for spontaneous recovery, as many young people do. At the same time, in older ages, the proportion of people who believe that a person's own efforts can largely determine his or her state of health is significantly lower. The author also points to the fundamental difference between elderly citizens and people with disabilities. Among the latter, they failed to identify anyone who would consider personal efforts to maintain health completely insignificant [40].

The recognition of a person as disabled and defining his/her disability group actually impose additional responsibilities for maintaining their health on the person and on the healthcare system. In the context of demographic ageing, prevention of disabling pathologies and improving the effectiveness of rehabilitation of disabled people are one of the most important areas in health development. According to the already mentioned sample observation of Rosstat, in 2017, among people with disabilities, 45% indicated that an individual rehabilitation program (IRP) had not been developed for them. Among those who had IRP, 39% said that it did not fully meet their needs. In addition, 7% of respondents indicated that the activities prescribed in the program were not being implemented. The provision of rehabilitation facilities and medical supplies to the disabled remains a separate problem. In cities, 38% of disabled people reported that they were not provided with technical means of rehabilitation, 73% said that they were not provided with means of care. In rural areas, the proportions of such answers were 41 and 67%, respectively.

Conclusion

In terms of healthy life expectancy, disability, as well as the proportion of older people in the population, European countries can be grouped into six clusters. The similarity of these criteria is related to the geographical position of countries and their participation in political associations (now or in the recent historical past). Thus, disability rates in Russia are the closest to those observed in Eastern Europe, especially in the former Soviet republics. In Russia, the main factors contributing to the growth of disability of the population are, on the one hand, demographic ageing, and on the other – unfavorable living conditions of a significant part of citizens. Moreover, low income can be an independent motive for obtaining a disability group or it can lead to this event indirectly – through poor nutrition, reduced availability of quality medicines and paid medical care. It is particularly alarming that the Russian healthcare system is not yet ready for a significant increase in people's need for medical services. This is evidenced by the above results

of Rosstat surveys and by the data from regional sociological studies [41]. It will not be possible to decrease the burden on public institutions through the development of paid medicine as long as the income of older citizens, who make up the bulk of patients of public health institutions, remains low. Moreover, experts expect an increase in the number of disabled people in older age groups due to the recent increase in the retirement age [42].

In the world practice there is an experience of negative consequences of reforms in the field of healthcare. Optimization of the network of medical institutions in many countries has led to a decrease in the availability of medical care [43]. D. Sakellariou & E.S. Rotarou (2019) analyze the impact of neoliberal reforms on the access to health services for people with disabilities on the example of Chile (the country is a pioneer on the path of neoliberal reforms in healthcare) and Greece (it actively implements these reforms in recent years). According to the results of their analysis, the authors of the study call neoliberal reforms in healthcare a form of "structural violence", which disproportionately affects the most vulnerable categories of the population, including people with disabilities [44].

Bearing in mind that in any society there are vulnerable groups that have the least opportunities to receive paid medical services, it is necessary to develop medical services of public health institutions and make them more accessible. However, for the most successful identification of disability risks, preventive work should be carried out, taking into account the gender and age specifics of the risks of developing disabling diseases.

In the context of demographic ageing and the growing demand of the older generation for free medical services, the most comprehensive outcome in terms of disability prevention can be expected from the measures aimed at improving the health of this category of population. These measures are as follows: developing and improving gerontological medical care; supplementing the program of medical checkups for older generations with the surveys that help timely identify the signs of brain and cardiovascular diseases; explanatory and educational work with the population aimed at increasing the trust in doctors, adherence to the prescribed course of treatment, medical literacy and promoting health-saving behavior skills.

The most important way to reduce disability among older people is to provide them with a decent standard of living. In addition to the fulfillment of existing obligations (provision of benefits and guarantees in the field of pensions and employment), it is necessary to promote financial literacy of the older generation, i.e. to inform them about the ways to protect themselves against fraudsters and involvement in risky financial schemes, since the inability to dispose of one's income is one of the reasons why people cannot get out of poverty [45].

Among the population of working age, the reduction of disability rates can also be achieved by improving the availability of consultations of medical specialists for the employed population, encouraging employers to take care of their workers' health, improving methods of diagnosis of disabling diseases and their use during regular medical examinations.

Preventing the years of healthy life lost due to disability is possible only after solving the problem of poor quality of life of Russians, which requires the use of a range of management tools. At the same time, the consequences of disability also require regulation. Three areas of work can be proposed to reduce the level of disability and to reduce the social and economic damage caused by this phenomenon:

1) prevention of disability: includes measures to predict, identify and prevent threats to public health;

2) compensation of the current economic cost of disability growth by creating an equal

opportunities society, designing an accessible environment, development and use of the ethics of communication with disabled persons, development and implementation of programs and projects to promote employment for persons with disabilities;

3) secondary prevention necessary to prevent losses associated with further health deterioration in persons with disabilities, which involves the improvement of the rehabilitation system and includes measures aimed at maintaining the high quality of life for persons with disabilities.

These areas, of course, do not cover the full range of problems associated with disability, but help streamline the activities aimed at minimizing the economic and socio-demographic losses of society due to disability.

Our study suggests that disability is associated with a poor quality of life of the population or its individual categories. Demographic ageing in itself does not lead to the growth of disability, but only overlaps with existing socio-economic conditions. Depending on these conditions and the quality of social management, disability acquires observable dimensions and structural characteristics. This determines the possibility of using the characteristics of this process as indicators of the effectiveness of health policy.

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