Health expectancy in Russia in 1998-2019

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Health

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Introduction

Health expectancy (HE) indicators (Sanders, 1964; Sullivan, 1971) basing on the self-rated health indicator in particular are vital to assess the expenditures of social insurance and pension systems. There exist several scenarios of their comparative dynamics with time. According to one of them, the “pandemic morbidity” hypothesis (Gruenberg, 1977; Kramer, 1980), the life expectancy increase is due to the increase in the share of life lived with the diseases or health problems. According to the “compression of morbidity” hypothesis (Fries, 1980) it is due to its decrease.

Previously several studies examined Russia’s comparative position using the HE indicators where its demographic disadvantage was estimated (Andreev, McKee, Shkolnikov, 2003; Bobak, Kristensen, Marmot, 2004; Ramonov, 2013). The aim of this study is to estimate the extent to which one of those hypotheses was confirmed, or, rejected in Russia and to give more recent estimates of the structure of the demographic differences between the EU-15 and Russia by age.

Methodology

Self-rated health status measured by the question "How do you assess your own health in general?" that in previous studies has shown good predictive validity (Idler, Benyamini, 1997) was used. Prevalence of “bad” or “very bad” health was used calculated w/o the “Difficult to answer” and “Refused to answer” options in the denominator.

New Economic School (Russian Fertility and Mortality Database, 2019) database and RLMS-HSE (Russia Longitudinal Monitoring Survey, 2019) survey database (in 2005 the household response rate - 72,2%) are used for Russia. EurOhex database containing Eurostat and EU-SILC representative survey (in 2020 the response rate - 41,7%) databases (EuroHex, 2019) used for EU-15. Standardization for age-coefficients was not implemented. Disability weights were not used.

Survival probabilities were calculated on the basis of the following formula:

$$q(x,x+n) = \frac{nm(x,x+n)}{1+0,5nm(x,x+n)} \quad (1).$$

Table 1. Mortality-health life table, Poland, 1990

Poland, 1990, both sexes	m_x	π_x	l_x	e_x	h_x
20-24	0,0011	93%	100000	52,6	40,5
25-29	0,0012	92%	99476	47,9	36
30-34	0,0018	89%	98884	43,1	31,7
35-39	0,0026	87%	98023	38,5	27,4
40-44	0,004	84%	96761	34	23,4
45-49	0,0062	80%	94864	29,6	19,7
50-54	0,0093	76%	91971	25,4	16,2
55-59	0,0139	71%	87798	21,5	13,1
60-64	0,0204	65%	81885	17,9	10,4
65-69	0,0297	60%	73941	14,6	8,1
70-74	0,0444	54%	63729	11,5	6,2
75-79	0,0727	54%	50969	8,7	4,7
80-84	0,1157	54%	35297	6,5	3,5
85+	0,2086	53%	19456	4,8	2,5

Data sources: 1) Mortality: m_x functions by age (m_{85+} calculated as D_{85+}/P_{85+} (HMD, 2020)); 2) Health: $\pi(x)$ - Population health programme (Rostock January 2011) – excel file "Decomposition" (list – HE, table – Poland, 1990th, π_{85+} -1% to previous).

The smoothing of the prevalence ratios by age was not used.

The EU-15 model: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and the UK.

Time and age discount rates for the estimation of the demographic differences are not implemented.

The period from 1998 to 2019 divided into 2 sub-periods: 1) the 2nd wave of the Russian mortality crisis 2) the stage of positive life expectancy dynamics starting from 2004.

Decomposition ((Andreev, Shkolnikov, Begun, 2002; Andreev, McKee, Shkolnikov, 2003) was used to study the gap between neighboring time-points by age (20 is chosen as starting-age).

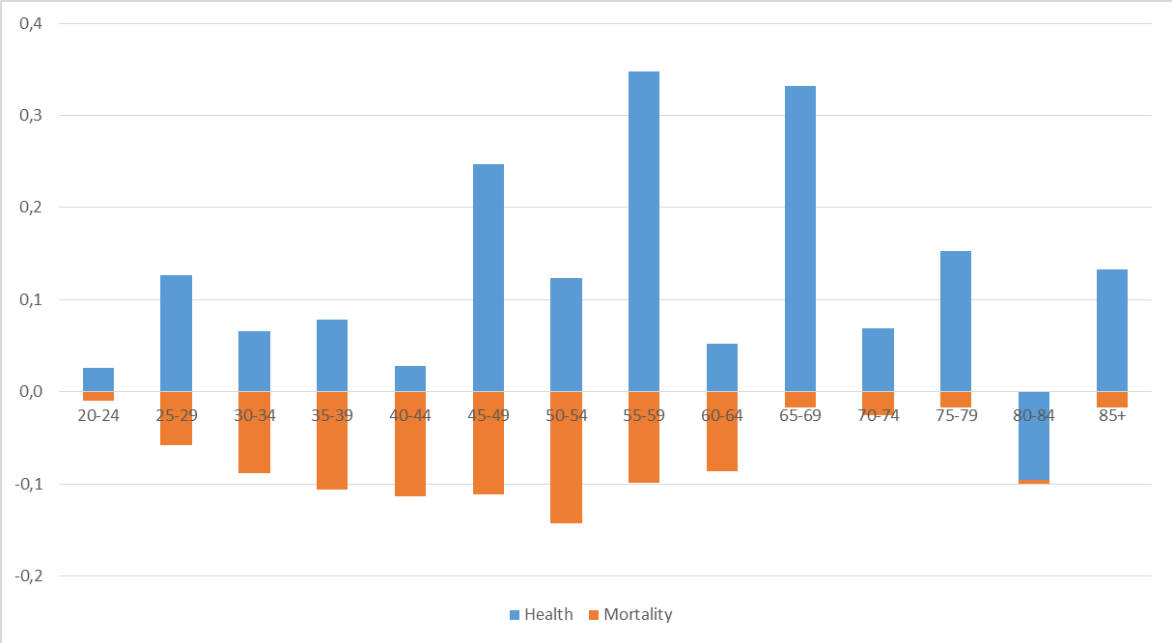
Results

The positive trends in self-rated health were more pronounced among females than among males. From 2006 to 2016 as an example of the positive trend in both (still the life expectancy recovered after the fall in 1999 only after 2006) the value of e_{20}-h_{20} increased from 4,7 years to 5,3 years among males (%e(20) remained constant on the level of 11%) telling the "pandemic morbidity" hypothesis was realized. Among females it decreased from 11 to 9,6 years (% «Bad» or «Very bad» decreased from 20% to 17%) speaking for the "compression of morbidity" scenario.

Table 2. Life expectancy and HE indicators among females in Russia in 1998, 2003, 2004 and 2019

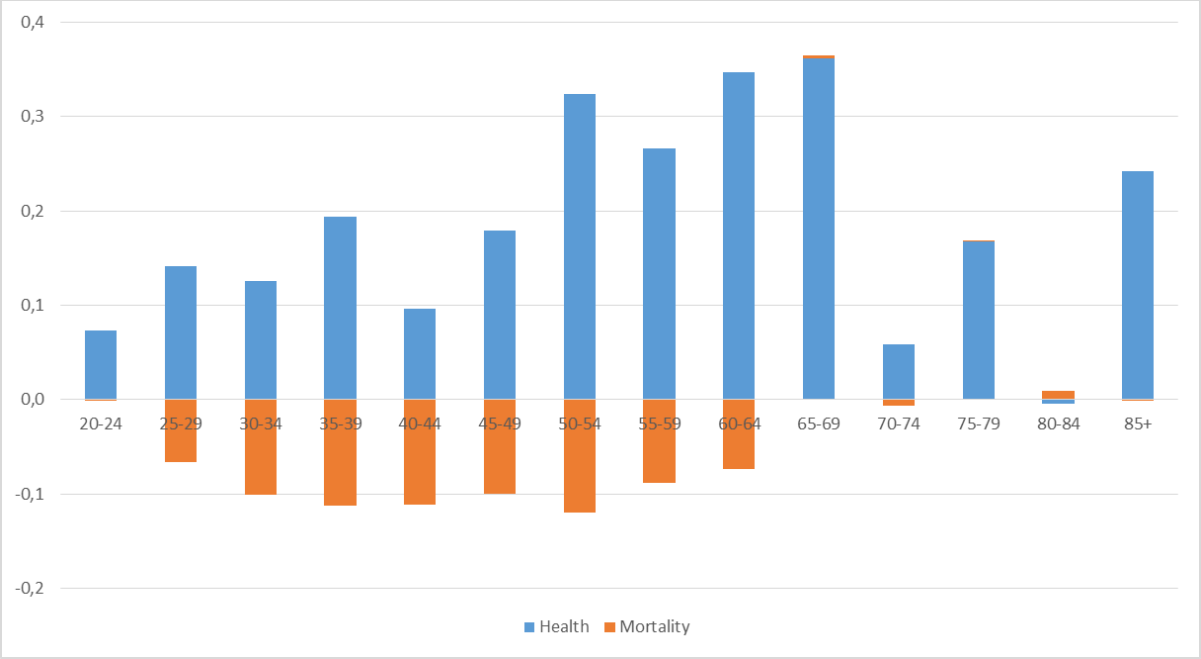
	e_{20}	h_{20}	e_{20}- h_{20}	% «Bad» or «Very bad»
1998	54,9	41,1	13,8	25%
2003	53,2	41,8	11,4	21%
2004	53,6	42,8	10,8	20%
2019	58,8	51,3	7,5	13%

Figure 1. Contribution of improved health and increased deaths to the gap in HE among females between 2003 and 1998



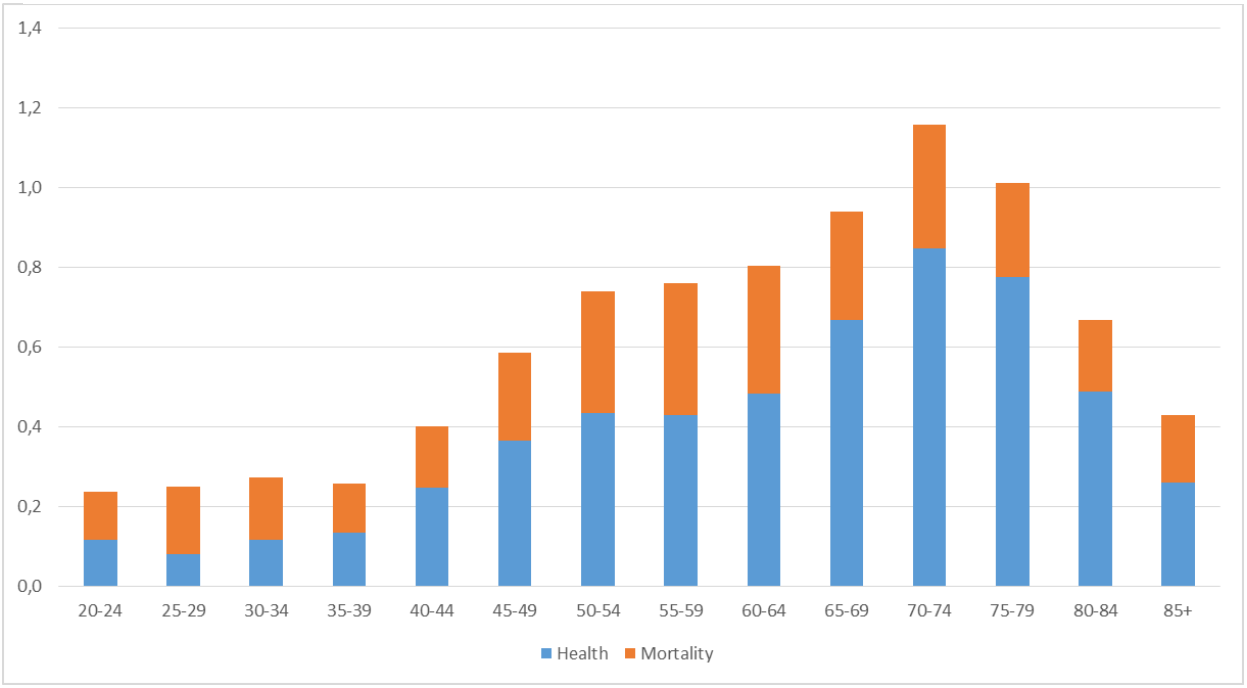
Data sources: NES Database (date: 07.04.2019). RLMS-HSE survey database, representative sample, r12, r7.

Figure 2. Contribution of improved health and increased deaths to the gap in HE among females between 2004 and 2003



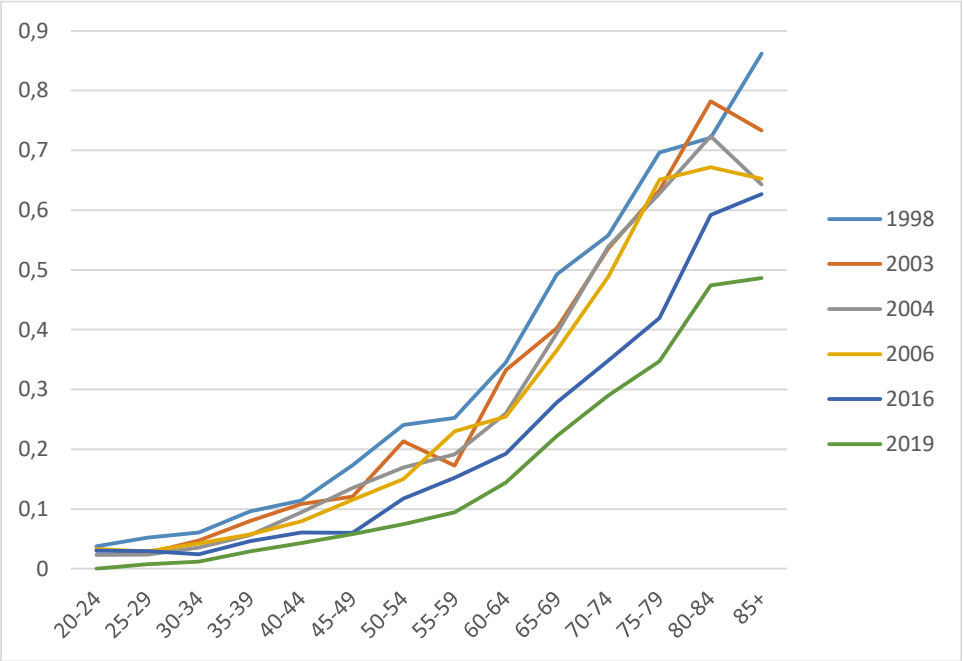
Data sources: NES Database (date: 07.04.2019). RLMS-HSE survey database, representative sample, r13, r12.

Figure 3. Contribution of improved health and lower deaths to the gap in HE among females between 2019 and 2004



Data sources: NES Database (date: 07.04.2019). RLMS-HSE survey database, representative sample, r28, r13.

Figure 4. The prevalence of "Bad" or "Very bad" self-rated health among females in Russia in 1998, 2003, 2004, 2006, 2016 and 2019, % of sample by age-group



Data sources: RLMS-HSE, representative sample, r7, r12, r13, r15, r25, r28.

Speaking of the dempgraphic differences or the losses of the Russian population, in 2016 among males 60% of total difference in h_{20} between EU-15 and Russia was by the increased deaths from 40 to 84 years (total difference - 13,7 years). Among females both the ill-health and the increased deaths contributed from the age of 60 (74%), total difference - 10,2 years.

Discussion

The prevalence of serious activity limitations data among the elderly that is required for the testing of the “dynamic equilibrium” hypothesis (Manton, 1982, 1988) could provide additional ground to the results obtained in this research.

The positive dynamics of the health among females in Russia may be associated with the decrease in the mortality from the cardiovascular diseases speaking for the “cardiovascular revolution” (Meslé, Vallin, 2006; Grigoriev et al., 2014).

One of the issues, that could possibly influence the results presented, is the specifics of the RLMS-HSE survey. Its sample does not include extreme population groups (for example, in terms of income, these would be the most and the least deprived groups) (Shkolnikov, 2021).

Despite the mortality increase, that occurred between 1997 and 2004 (also known as “second wave” of Russian mortality crisis (Shkolnikov et al., 2004)), self-rated health prevalence indicators’ values remained stable for males, and even improved slightly among females. One of

the possible explanations for this fact is in different susceptibility of mortality, and, prevalence indicators to various risk factors, such as tobacco and alcohol (Perlman, Bobak, 2008).

After 2005 the changes in consumers' behavior could also be the case, such as the possible decrease in the consumption of hard spirits combined with the new styles in the consumption of cigarettes (e-cigarettes), could also be a factor. Another component was the growth of the public healthcare expenditures, the pace of which has accelerated starting from the end of the 2019 with the beginning of the new COVID-19 pandemic. Accommodation effects occurred connected with the new epidemiological situation. The so-called "safety seat-belt" effect arose, but lagged due to the rapid spread of the virus within the population).

Stability across time does not necessarily imply cross-population comparability of HE based on these indicators. Calculating joint estimates for the countries with similar mortality levels (Ramonov, 2013) could be a promising method to solve this problem.

The dynamics of the self-rated health demonstrated above could be subject to response rate decrease. Among males the positive dynamics was not so pronounced, probably, due to relatively small samples among the population representatives 60+.

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