FIRST DEMOGRAPHIC READINGS IN MEMORY OF ANATOLY VISHNEVSKY

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Epidemiological transition: causes of death and ages of death

based on the paper A.G.Vishnevsky. The epidemiological transition and its interpretations. *Demographic Review*, 2020

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Background

In order to better understand the interrelated dynamics of mortality from different causes of death during the epidemiological transition, it is necessary to consider the associated changes in the prevalence of certain causes, on the one hand, and the age of death from each of them, on the other, and not individual causes, but all of them together **(Vishnevsky, 2020)**









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Danilova, Shkolnikov. Epidemiological transition: causes of death and ages of death. Vishnevski's Readings. HSE 9 Nov 2021. Vishnevsky, 2020

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Background

Omran (1971) "During the transition, a long-term shift occurs in mortality and disease patterns whereby pandemics of infection are gradually displaced by degenerative and man-made diseases as the chief form of morbidity and primary cause of death"

Andreev, Vishnevsky, Shaburov (1986) radical restructuring of the structure of causes of death is basically now behind us and, in contrast to the previous period, there is no longer a clear connection between the average life expectancy and the probability of dying from various causes

Meslé, Vallin (2002) The term epidemiologic transition is used to designate the shift from one dominant pathologic structure to another and a radical transformation process in ages at death

Vishnevsky (2020) By 1960, causes with a pronounced low age of death had largely lost their importance. The main reserve for growth in life expectancy now became an increase in the average age of death from the remaining causes.



Data and Methods

Data

Death counts by causes of death:

up to ICD7: Preston, Keyfitz, Schoen (1972) ICD7 – ICD10: WHO Mortality Database for Russia: the Rosstat data

Methods

Multiple-decrement life tables to calculate average age at death from specific causes and lifetime odds of death from these causes

Kitagawa decomposition to estimate the contribution of changes in the structure of causes of death and changes in the average age at death by causes to the changes in life expectancy



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Kitagawa Decomposition



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Plots from Vishnevsky (2020)

England and Wales





Tuberculosis

Influenza, pneumonia, bronchitis

Other external causes

Degenerative diseases (nephritis, liver cirrhosis, stomach ulcer, diabetes)

Neoplasms

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The dynamics of changes in the shares of causes of death and causespecific ages at death (from life tables), 1960-2015, males



The dynamics of changes in the shares of causes of death and cause-specific ages at death (from life tables), 1960-2015, males



+ Finland

↔ Norway ↔ Spain

ain ••• Switzerland

England and Wales

Russia. LE gains between 2005 and 2019



Kitagawa decomposition of LE difference between Russia and selected countries Males, 1956 Males, 2005 Males, 2019







Females, 1956



20.0





20.0

Females, 2019



Cause-specific shares and ages at death from major causes in Russia, Poland, England and Wales











Limitations

The data on causes of death coded in different classifications (ICD-Revisions) are not fully comparable

The analysis was performed by large classes/groups of causes of death. The average age at death can be different for smaller causes

The same age at death by causes at the last open-ended age interval (Mostly, 85+ as the last age interval was available. The data on causes of death up to the age 95+ are available in the WHOMDB from the mid-90s-00s)

The changes in certification and coding practices can affect the changes in mortality structure by causes of death

Conclusion

Beginning from the middle of the XXth century the changes in the structure of causes of death do not contribute any substantially to the growth of life expectancy at birth

The growth of life expectancy is rather caused by the increases in average age at death from different causes

At the same time, the structure of causes of death is not static and continues to change. However, since the indicators of average age at death from major causes are very close to each other, the changes in the cause-of-death structure appear to be of minor importance for life expectancy

"...the disappearance of fundamental differences in the age of death from various causes. As soon as this happens, the change in the epidemiological picture, while continuing to be very important from the point of view of an epidemiologist, doctor or healthcare organizer, ceases to interest the demographer, because it ceases to be part of the demographic transition" (Vishnevsky, 2020).