

## DEATH RATE AS A DEMO-ECONOMIC FACTOR OF THE COUNTRY'S LABOUR POTENTIAL REDUCTION

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### Abstract

The article deals with the impact of mortality rate on the reduction of labour potential. The authors determine the index of years of potential life lost, analyze the primary causes of deaths as well as provide some prognostic estimates concerning the population size in Ukraine. A number of domestic and international institutions, including The State Research Institute of Information and Economic Modeling (SRIIEM), The National Institute for Strategic Studies (NISS), the United Nations Organization (UNO), the International Statistical Committee of the Commonwealth of Independent States (ISC CIS), Council of Productive Forces of Ukraine (CPFU) and the Bureau of Census US developed three possible scenarios of projected mortality in Ukraine for 2025. It were conventionally called pessimistic, intermediate and optimistic.

**Keywords:** Mortality, premature mortality, years of potential life lost.

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### 1. Introduction

Extremely high mortality rate, especially premature deaths, is the main negative factor that deepens the demographic crisis and is the urgent social problem in modern Ukraine. To create conditions for strengthening the nation's health and reduce mortality are the Ukraine's major priorities of the national security policy in the National Security Strategy. The loss of human capital due to premature mortality (premature mortality is seen as death that occurs before the age of 65 by WHO criteria) and caused by this quantitative and qualitative population changes affect significantly the economic, military and intellectual potential of the country, and represent threat to the progressive social development and to the process of human reproduction.

The current socio-economic crisis, however, complicated demographic processes led to mistakes and problems that painfully affect the main subject of the current transformations – population.

### 2. Analysis of published data and problem statement

Demo-reproductive processes in Ukraine have been the subject of research conducted by many scientists in the years when it was the part of the Soviet Union. But the then scientific studies require considerable reinterpretation now in the context of modern transformational processes. Today special attention should be paid to works written by scientists, which made a significant contribution to the theories of demo-development and labour potential. Scientists proposed comprehensive model of demographic forecasts of the population of Ukraine for 2050 [1]. In particular [2] there is examined

mortality as an important part of the political, economic, social, environmental, technological, military and information security. Experts believe that the demographic crisis is the real threat of deep irreversible consequences in social and economic development of the Ukrainian nation, predicting its danger to the national interests of Ukraine [3]. One feature of the current demographic situation in Ukraine that is much higher compared to developed countries is the levels of premature mortality, what was in recent years emphasized by both domestic and foreign researchers [4].

It should be mentioned, however, that impact of demographic factors such as mortality on the formation of labour potential remains still insufficiently investigated.

### 3. Topicality of the research

The demographic situation in Ukraine and its changes entail the impact of a wide range of social, economic, socio-political, and environmental factors-transient and long term ones, that are related to the specificity of socio-historical development of the country, and those that are caused by social changes it has experienced and is still experiencing.

The socio-demographic dynamics throughout the whole period of independence was shaped against a background of a protracted transformational crisis, the world financial crisis and the armed conflict in the east of Ukraine.

The characteristic features of the demographic situation in Ukraine in the context of the current demo-economic situation are:

- low birth rate;
- unfavorable trends in people's state of health and life expectancy (including the rapid spread of HIV/AIDS, sexually transmitted diseases, difficult epidemiological situation with tuberculosis, high mortality in the active working age, and reproductive health problems, etc.);
- continuous aging of the population;
- some destructive phenomena occurring in the spheres of family and marriage;
- extension of *social abandonment*, *children's dereliction* and homelessness;
- perpetuation of gender inequality manifestations in social, labour, political and family life areas;
- large scale of labour migration, first of all illegal [5–7].

But in general, massive depopulation of Ukraine and worsening of qualitative characteristics of its population (mainly its health) gave grounds to classify the situation as an acute demographic crisis. Amid the other European states Ukraine is distinguished by very unfavorable levels of basic demographic indices: one of the lowest birth rate and high (typical for much less developed countries) mortality rate that determined the large scale and steadiness of depopulation and the rapid pace of population decline.

### 4. Evaluation of potential life years lost and projections of the population of Ukraine

Studies show that today Ukraine faces a real danger, with catastrophic and irreparable consequences, that is called a demographic crisis.

Casualties have been the most important material damage to any country in the world in all times. The reduction in life expectancy, birthrate, the nation's health reduction, growing migration, increase in mortality, aging, etc. all of these directly affect the quantity and quality, qualification and educational levels of workforce, which ultimately ensures the state and personality well-being.

Thus, the average life expectancy (ALE) is generally recognized as an index of public health quality. Life expectancy at birth, or the number of years that a person from the generation born this year must live on average, in condition of maintaining during the life of this generation death rate level existing in a given year in all age groups, characterizes the system of mortality, which was formed in a set year for the population of a certain territory. Ukraine was ranked 25-th in 2014 according to this indicator among 27 EU countries represented in the HFA database (HFA – DB) of the WHO European Regional Office (index value was lower only in Kazakhstan and the Russian Federation). The discrepancy between the average European ALE indices for both sexes reached 11.1 years [8].

The determinant feature for ALE reduction in Ukraine is high population mortality in the active working age, especially among men. Children's mortality is also referred to as premature

death, but ALE reduction caused by it is rather insignificant. Dynamics of levels of premature mortality in Ukraine cannot be called otherwise than dangerous – since the premature mortality in Ukraine today is twice as high as in the EU, bigger than in 1990, i. e. before the socio-economic transformations in the post-Soviet countries, and reached the ratio of 2.9 times in 2005 (670 versus 230 per 100 thousand people in the EU) (Fig. 1).

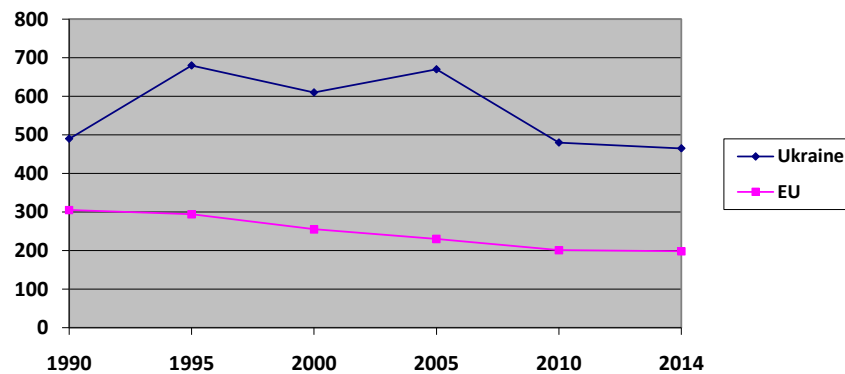


Fig. 1. Premature mortality, Ukraine, the EU standard rate of 100 thousand population

In recent decades, the level of premature mortality in Ukraine has been constantly growing, apart from the brief period of Gorbachev's anti-alcohol campaign in the second half of the 80's, when a decrease in mortality, mainly among men, was observed but, unfortunately, it was unstable.

Adverse trend in Ukraine today is mortality from external causes that ranks third among the major causes of death and the first in the mortality among men of working age [2]. According to WHO, Ukraine ranked sixth among the 46 EU countries in terms of mortality from external causes, and the mortality of men in comparison with women is 4,3 times higher [5]. The most critical dynamics of mortality from external causes in Ukraine was observed from 1990 to 2002. And the most difficult situation was in 1995 (82,7 thousand people died), when the death rate among men was 4 times and among women 2,8 times higher than the corresponding figures in the developed countries. During the last four years, Ukraine has seen positive dynamics in mortality rate from external causes of death. However, mortality in Ukraine from injuries, poisoning and as the result of some external factors plays a significant role in the population decrease, because 70 thousand annually die from them [3, 9–11].

To establish harm to society it is necessary to determine the index of Potential Years of Life Lost – PYLL.

$$\frac{\sum (65 - \text{age of death}) \times \text{number of death at each age}}{\text{Number of people ages 65 and younger}} \times 100,000. \quad (1)$$

In this case 65 years – this is the upper limit of working age in Ukraine, and the rate of lost potential years of life determines the amount not live person-years through premature mortality.

According to researchers in Ukraine this index is analyzed in relation to different causes of death and its dynamics is examined over the period of 8 years (Table 1).

Table 1

PYLL index in relation to the causes of death in Ukraine, both sexes, per 100 thousand people

Causes of death	2006	2014	Decrease, %
I. Infectious and parasitic diseases	931,6	718,5	22,9
II. Neoplasms	1252,6	1158,3	7,5
IX. Diseases of the circulatory system	2399,3	1890,1	21,2
XI. Digestive diseases	924,8	752,4	18,6
XX. External causes	3110,8	1929,9	38,0
All reasons	10526,3	7895,3	25,0

Comparing the level of premature mortality in the period of labour activity of separate age groups it appears that the greatest excess was in the middle age group of 30–44 years old, which was almost 5 times higher (4,9) for men and more than 3 times (3,2) for women (Fig. 4). This age is the midpoint of life, when a relatively greater vulnerability of the child and disposition to risk and hazardous experiments typical of adolescents and youth are over, and the problems that are connected with the difficulty of aging and pathology accumulated over the years, is still far ahead. Death of a man at this age, at the height of physical and social development, causes major losses to society. Citizens at this age do not have to die in peacetime in a civilized country under the usual circumstances. External causes constitute the largest part of deaths of the Ukrainians at the age of 30–44, the second in importance are cardiovascular diseases (Table 2). Most of these lethal cases could have been prevented; therefore it is important to direct measures to stop premature death in the younger age groups.

**Table 2**

Potential Years of Life Lost due to deaths from cardiovascular diseases, 2014

Causes of death	Age groups, years									Total PYLL	
	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	0–64 e.	15–59 e.
Died before 65	47,5	42,5	37,5	32,5	27,5	22,5	17,5	12,5	7,5	0–64 e.	15–59 e.
Due to circulatory system diseases, Including:	91	239	672	1374	2324	3807	6344	12941	18681	725647,5	718292,5
Coronary heart disease	22	99	273	523	908	1628	3053	6758	11636	373837,5	319260
Strokes	21	36	81	181	386	726	1304	2754	4123	146060	126565

Decline in the natural population growth causes deformation of its age structure, decrease of the natural growth of human resources. “Aging” of population leads to the increased demographic load on the able-bodied population, and to certain difficulties in the formation of human resources and providing economy with manpower. It is one of the most alarming symptoms of deterioration of demographic conditions of population’s reproduction. The high proportion of the aged, older than working-age population, reduces the amount of labour potential. If the proportion of pensioners among the population increases, the younger generation reduces. According to specialists’ forecasts, the number of people of working age in 2019 will amount to 53.3 %; in 2024 – 52.9 %; and in 2029 – 53 %.

Thus, narrowing of demographic base of reproduction of labour potential takes place in Ukraine. The main reasons for this situation are the following: the low birth rate, high mortality rate, labour emigration, deterioration of the age structure. Therefore, the state demographic policy must ensure the optimal allocation and efficient use of the available employment potential.

A number of domestic and international institutions, including The State Research Institute of Information and Economic Modeling (SRIEM), The National Institute for Strategic Studies (NISS), the United Nations Organization (UNO), the International Statistical Committee of the Commonwealth of Independent States (ISC CIS), Council of Productive Forces of Ukraine (CPFU) and the Bureau of Census US developed three possible scenarios of projected mortality of Ukraine for 2025. That were conventionally called pessimistic, intermediate and optimistic [11].

In the development of the optimistic variant type it was presupposed that during the suggested period certain conditions would be created to prevent further worsening of the state of health. Some prerequisites to reduce morbidity, disability and to increase longevity will appear; however, this will not lead to transition from a backward toward a contemporary model of health care. This

option is possible in case of significant improvement in living standards in Ukraine, environmental situation, and revision of the principles of the Ukrainian's health care system.

Data in **Table 3** show that the country's population in 2025 in accordance with the intermediate, the most discreet variant, might fluctuate in the range of 46.7 to 48.7 million people. However, the closest to reality was the pessimistic forecast. As leading national experts in the theory of population rightly claim, decline in the number of people in the country, that is largely caused by social and economic crisis will continue throughout the forecast period.

**Table 3**

Estimations of population size in Ukraine in 2025, thousand people [3, 9, 11]

Company	2000	2005	2010	2015	2020	2025
<b>Intermediate variant</b>						
SRIEM	49627	48068	48000	47360	46674	46706
NISS	52108	51724	50935	–	–	–
UNO	50974	50526	50085	49680	49125	48715
ISC CIS	51611	52516	–	–	–	–
Census Bureau, US	50380	50117	49834	49491	49058	48679
<b>Optimistic variant</b>						
NISS	52297	52200	51965	–	–	–
UNO	51359	51370	51445	51612	51734	52172
CPFU	–	–	47600	–	–	–
<b>Pessimistic variant</b>						
NISS	52001	51382	50241	–	–	–
UNO	50659	49963	49151	48261	47107	45953
CPFU	–	–	46100	–	–	–

Even implausible considerable improvement in the process of human reproduction obviously will not be able to compensate for the negative impact on the demo-development process of the inauspicious age structure.

## 5. Conclusions

The results of the analysis of the demographic situation attest the need to design the state program for the development and management of human reproduction and active population policy must be the state's important task. To do this it is important:

- to stimulate the birth increase;
- to develop a family policy aimed at increasing the number of children in families by expansion of financial support for pregnant women and families having many children;
- to target the state demographic policy at the health care;
- to reduce the employment rate for women in order to reorient some of them towards the family maintenance (through the government social policy);
- to conduct demographic examinations of current economic transformations and to impose measures to stop premature mortality.

The most promising ways to reduce premature deaths are, in the first place, the recognition of public health as a strategic potential, the factor in national security, stability and prosperity, the shared responsibility for the standard of health (both present and future generations) of society and the state by means of complex inter-branch actions, that secure healthy and safe living conditions and real, not just declared transition to the preventative type of medicine in Ukraine.

Without ensuring the three components it is impossible to oppose effectively one of the most urgent internal threats – the problem of high levels of premature mortality.

The first one in order of importance must be formation of citizens' conscious position towards the responsible attitude to their health and personal safety.

The second component – execution by the government constitutionally defined obligations to provide safe living conditions, protect the environment and create socio-economic conditions for strengthening the nation's health.

The third one – the implementation of the reform of public health with the priority of preventative medicine. It should be emphasized that the optimization of medical care service is necessary but is not the only (and therefore not sufficient) component of such activities.

There is an urgent need to transform the problem of securing a healthy lifestyle into an aspect of political worldview and to form public's attitude towards health as a source of socio-economic prosperity in a competitive environment.

To implement the policy aimed at reduction of premature mortality is possible only in condition of coordinated intersectorial collaboration with obligatory public awareness and active participation in the ongoing events.

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