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## Health inequalities regarding territorial differences in Hungary by discussing life expectancy

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Since the middle of the 1990s, Hungary has seen substantial increases in life expectancy. Despite this improvement, many health outcomes remain poor, placing Hungary among the countries in the European Union with worse health status. Based on the general state of health of the population, Hungary belongs with the middle-ground countries of the world. Majority of the health indicators are worse than the average of OECD's values, and this is especially true regarding the mortality rate of the middle-aged male population.

The main objective of the study is to investigate health inequalities with regional differences in Hungary. It is still worth explaining how health inequalities and inequities have changed in terms of space and time after the Hungarian economic and political transition.

The territorial range of the study includes the national and regional levels (NUTS3) with the micro-regional level (LAU1). The statistical analysis is based on the use of life expectancy in addition to some mortality indicators. Data for 1990–2014 were examined to define health effects of the Hungarian transition as well as the consequences of the latest economic crisis.

Improvements in health along with growth of regional inequalities were found in Hungary since the second half of the 1990s. Larger relative inequalities were observed between Western and Eastern Hungary based on its higher and lower income. Gender differences are also significant in life expectancy. Poor health among the unemployed people was detected, which is a socio-economic effect of the latest economic crisis.

**Keywords:** health inequalities, health transition, regional differences, Hungary

In Hungary, income-related health inequalities persist; however, their degree has changed in space and time over the last 25 years. For a comprehensive description of health in Hungary, assessment of the poor health of lower income social groups and the regional level of health inequalities is needed.

## Introduction

Since the end of 1989, essential political, economic and social changes took place in Eastern–Central Europe. The transformation in these former socialist countries resulted in new initiatives, which were aimed at creating new political, economic and social links. The rapid social and cultural changes introduced by the collapse of the communist system have resulted in determinative, demographic and health challenges. Therefore, governments in post-socialist countries as well as in Hungary face many demographic, health and social challenges, which they have to overcome by reaching the level of welfare close to the average standards of the most developed European countries.

In the most developed Western European countries, the recent health-preserving and health-conscious life styles have become integrated in people's everyday values; however, in Central and Eastern European countries, the processes of post-socialist transformation have led to further deterioration of health. The bad morbidity and mortality situation in Hungary is almost unparalleled among the post-socialist countries; worse situations can only be found in the former states of the Soviet Union. The unfavourable Hungarian health condition is not unique, and health processes are very similar to European post-socialist countries.

The marked deterioration in the state of health of the Hungarian population has been going on since the middle of the 1960s. As a consequence of this process, Hungary is lagging behind countries with a more developed health culture. The general state of health of the Hungarian people is worse than justified by the level of economic development. The deterioration in the state of health, which has been going on since 1966, reached its bottom in 1985. This was not followed by a period of upswing due to the changes in the regime and the socio-economic transformation. Nevertheless, after 1989, the deterioration of the general state of health reached bottom again in 1993. *'The mortality situation in Hungary, which had been worsening for decades, developed into an epidemiological crisis by the early 1990s, and it presently hits the whole adult population'* (Józán 1994a, 1994b, 1996). The role of the transformation in the deterioration of health is easy to detect; however, differences can be experienced in its social and spatial dimensions. The social determination is essential in health inequalities.

The following important elements have to be considered into the Hungarian disadvantaged health situation (Uzzoli 2016):

- The Hungarian epidemiological crisis has long-term consequences on health inequalities. A new epidemiological stage has begun in Hungary from the middle of the 1990s with the decrease in chronic diseases of the circulatory system and increase in the average life expectancy at birth. That is a paradox situation, as although life expectancy has increased in the whole country, health inequalities have also increased territorially and socially.

- Unfavourable demographic processes, such as a natural decrease or gradual ageing, are contributing to the disadvantaged epidemiological situation.
- The most important challenge for the Hungarian health care system is that it is not functionally, structurally and financially able to reduce health inequalities that exist in the country. On one hand, the effective treatment and development of medical technology launched favourable processes in medication. On the other hand, the heritage of the state socialist system, the weak role of preventive approach in primary health care and financial conflicts of the health insurance system are the causes of serious dysfunctions in today's health care. The Hungarian health care system of the 21st century essentially combines the anomalies of the socialist system with the distortions of market mechanisms.

This review article will focus on the interpretation of the conditions of the Hungarian epidemiological crisis and the transition with its effects on health inequalities. Thus, there is no objective to present or define the determinants of the demographic crisis and anomalies of the health care system.

## Material and methods

The primary aim of the paper is to describe health conditions through health inequalities/inequities in Hungary by discussing how average life expectancy at birth and its spatial pattern has changed over the last 25 years.

The study is primarily based on statistical methods and with the demonstration of the most important experiences of Hungarian publications, it shows the territorial differences of mortality and life expectancy. The main objective is to present and explain the regional inequalities of health status within Hungary and interpret the changes in life expectancy and mortality over the past 25 years. The research has tried to answer to the following comprehensive questions:

- Do the spatial inequalities of life expectancy indicators establish 'Western-Eastern gradient' in Hungarian health inequalities?
- Can the advantageous socio-economic situation verify the better life expectancy, and can it also be true conversely?
- How could the epidemiological transition influence the spatial structure of health inequalities in Hungary?

The spatial unit of the research project examines the national (country) and county levels (NUTS3) as well as the micro-regional level (LAU1). The temporal scale embraces the period after 1989/1990. The data set was acquired from the publications of the Hungarian Central Statistical Office. In addition, the analysis also contains an international comparison to define the relative position of the Hungarian health indicators among developed countries (OECD statistics).

The applied methodological tools are matched with the character and topic of the chapters: the descriptive method is taken as tool of examination in the theoretical part and analytical tools are used in the chapters showing and explaining Hungarian health inequalities. Two aspects are considered in the theoretical part, which was prepared on the basis of the literature: first, the explanation of the health inequalities problem and, second, the interpretation of the scientific literature involving the presentation of Hungarian research approaches. The empirical part of the study is based on particular statistics of mortality, such as average life expectancy at birth by age and sex. Life expectancy refers to the average number of years to be lived, calculated from birth or from a particular age; thus, it refers to the average number of years a newborn is expected to live if the current mortality rates continue to apply (Johnston et al. 2000). The index reflects the overall mortality level of a population. It summarises the mortality pattern that prevails across all age groups – children and adolescents, adults and the elderly (Wilkinson 1996). It is still worth examining how mortality rate can reflect on life expectancy. That is the main reason to analyse the run of mortality rate, because the average life expectancy at birth and its changes continuously depend on the improvement or the worsening of the mortality situation in Hungary in the second half of the 20th century.

### **Explanation of health inequalities and health inequities**

On one hand, health is a multi-factorial phenomenon, and so it is a term that attracts various scientific approaches in its definition and interpretation (Last 2001). On the other hand, health inequalities can be defined as differences in health status or in the distribution of health determinants between different population groups and social classes. Moreover, health inequalities not only imply social or spatial inequalities but also socio-spatial inequalities as a whole (Jones–Moon 1987). It is also important to recognise that social inequalities have spatial aspects that reflect the social context of spatial inequalities.

The health status of the population living in different geographical regions, in various settlements as well as in different social groups, is determined by biological, individual, environmental, socio-economic, socio-cultural and lifestyle factors (e.g. Dahlgren–Whitehead 2006; Lalonde 1974; Marmot–Wilkinson 2006). Some of the health inequalities are independent of social and economic relations, but a larger number of them are dependent on socio-economic inequalities (e.g. Elstad 2005; Evans–Stoddart 1990). These latter factors are called health inequities in both the literature and the policy in this field. Thus, health inequities are part of health inequalities, and in order to improve the health of the population, these inequities should be decreased by means of effective policy and productive intervention.

Health determinants are factors that can directly or indirectly influence the health status, for example, lifestyle, environmental effects, genetic variations, etc.

(Mackenbach–Bakker 2002). Some health inequalities are attributable to biological variations: it may be impossible to change the health determinants, so these health inequalities are unavoidable. Other health inequalities are attributable to the external environment and socio-economic conditions mainly outside the control of the individuals concerned. The uneven distribution may be unnecessary and avoidable as well as unjust and unfair, so that the resulting health inequalities also lead to inequity in health (WHO Meeting Report 2011). Much more is now understood about the extent and socio-economic causes of health inequities; thus, action on the social determinants of health across the life-course and in wider social and economic spheres is required to achieve greater health equity and protect future generations. The social determinants of health are the circumstances of daily life – the conditions in which people are born, grow, live, work and age – and the structural drivers of these conditions (unfair distribution of power, money and resources; Marmot–Bell 2009). Inequality of life expectancy in connection to health presents in every country and mostly depends on macro-economic conditions. Behind these life expectancy inequalities related to health are economic inequalities, injustices of distribution, obstacles in the access to education and health supply, bad housing and life circumstances and a lack of opportunities for a healthy life (Benach et al. 2008).

According to a WHO definition and statement, there is ample evidence that social factors, including education, employment status, income level, gender and ethnicity, have a marked influence on how healthy a person is. In all countries – whether low-, middle- or high-income – there are wide disparities in the health status of different social groups. The lower an individual's socio-economic position, the higher their risk of poor health. Health inequities are systematic differences in the health status of different population groups. These inequities have significant social and economic costs, both to individuals and societies (<http://www.who.int>).

[Note: The term health inequality is used in this study as a general form to define inequities that are determined by socio-economic factors as well as biological variations.]

### **Interpretation of the factors of health inequalities in Hungary in light of the previously published scientific literature**

The research on health inequalities has a strong tradition and considerable history in Hungary, primarily through the interpretation of socio-regional disparities of health status. Owing to the interdisciplinary character of health research, different disciplines (e.g. Medicine, Public health, Sociology of Health, Geography of Health, Science of Behaviour, etc.) examine the causes and socio-economic consequences of health inequalities using different theoretical foci and methodological emphases. In our overview, the primary aspect is the presentation of previously published scientific literature that dealt with the tendencies of epidemiological development after the regime change and which, in connection with these, focused on the identification of

the characteristics of health inequalities in Hungary, particularly in view of the situation of territorial disparities.

Analyses concentrating on the quantitative approach and mortality indicators prevail in the Hungarian health inequality researches (e.g. Klinger 2003, 2006; Józán 1991, 1994, 1998). There are a lot of analyses that interpret the characteristics of health inequalities primarily through the gender and territorial disparities of life expectancy or mortality rate (e.g. Egri–Tánczos 2015; Kovács 2014). There is a separate group of statistical researches that apply different socio-economic indicators as explanatory factors in the case of age- and cause-specific mortality and changes in life expectancy indicators. Most of the authors apply the following inequality dimensions in the evaluation of factors determining and influencing health inequalities: highest completed education level, economic development, income, deprivation, poverty and labour market situation (e.g. Daróczy 2004; Hablicsek–Kovács 2007; Páldy–Bobvos 2009).

One of the most important research results is that regarding health inequalities and life expectancy, *'the different macro factors do not directly affect the mortality, but they have multiple indirect impacts on life expectancy'* (Daróczy 2004 p. 57.). Essential results have been obtained about the role of education level. Scientists agree that low education level has a negative impact on the labour market situation, living conditions and life expectancy: the mortality surplus is considerable among women with the highest and men with the lowest educational level (Hablicsek–Kovács 2007 p. 34; Kovács 2011 p. 48; Klinger 2003, 2007). Bálint and Kovács examined the determinative factors of the improvement of life expectancy; they found that the increase in life expectancy can be attributed to a significant improvement in cardiovascular mortality that increased the average life expectancy at birth by 2.8 years for males and 2.9 years for females (Bálint–Kovács 2015). They also identified large inequalities in life expectancy by educational level: the average life expectancy at birth for females (males) with higher education is 5.8 years (12.5 years) higher than that of women (men) with primary education (in 2012; Bálint–Kovács 2015).

Many authors have identified unemployment as the most important factor influencing health, mainly in the periods of crisis, as unemployment was a new phenomenon after the regime change (Lackó 2015). Most of the authors interpret it as a risk factor: experiencing joblessness increases the feeling of vulnerability; however, self-esteem disturbances depend on the level of education (Kopp–Kovács 2006), and even the householder's unemployment sets back the successors' labour market opportunities (e.g. Kollányi–Imecs 2007). The significant relationship between life expectancy and unemployment is accompanied by a characteristic territorial pattern (e.g. Szilágyi–Uzzoli 2013; Uzzoli–Szilágyi 2013).

Based on international and national studies, the association between health inequalities and socio-economic inequalities is well known. This identified association highlighted the fact that the spatial pattern of different diseases and death-causes may reflect the spatial distribution of health and socio-economic inequalities. Many authors have developed a multi-factorial model to measure this statistically significant

connection, and some have developed a definable approach that provides information about the spatial consequences or spatial relevances of this connection. In mid-1990s, the National Environmental Health Action Program of Hungary was one of the largest national programs that investigated different diseases, such as death causes according to the International Statistical Classification of Diseases 10th Revision (ICD-10) by their frequency and spatial distribution between 1986 and 1997 (Vincze et al. 2000). One of its most important results was to demonstrate spatial the typical death causes in Hungary along with its spatial distribution. These experiences can be used to inform national prevention strategies aimed at reducing health inequalities. Other authors developed a multi-dimensional index at the municipality level to provide information about socio-economic deprivation in Hungary and investigate the association between socio-economic status and spatial distribution of premature mortality due to different diseases (e.g. Juhász et al. 2010; Nagy et al. 2012). These risk analyses demonstrated that different population groups in different parts of the country can be identified with trends of increasing mortality caused by, for example, diseases of the circulatory system or alcoholic liver disease. For instance, areas with significantly high age-adjusted relative risks for males are found in the South Western part and at the eastern border of Hungary due to the mortality of alcoholic liver disease (Nagy et al. 2014). In addition, significantly high deprivation is identified in the North Eastern, Eastern and South Western parts of Hungary, where there is a significant association between premature cardiovascular mortality and deprivation status in both genders (Juhász et al. 2010).

At the same time, many European studies called attention to the huge differences between health indicators according to geographical areas (e.g. Dolk et al. 1995). It has become evident that mortality rates of different geographical places largely depend on the distance between urban and rural territories (e.g. Phillimore–Reading 1992). Connection between local socio-economic deprivation and health is the result of the nature of the rural area (Poortinga et al. 2008). Considering the extent of deprivation, it is possible that urban deprived areas have better illness indicator rates than deprived rural areas (Congdon 1995). In the past two decades, more and more research results have referred to the fact that differences between rural and urban health states are decreasing and that the previously evident health gap in rural areas is closing (e.g. Richardson et al. 2013).

In the past one and a half decade, the Hungarian health inequality researches have published results while taking the supply and consumption statistics into account. It is interesting that the importance of place appears in the latter statistics: they interpret the role of place of residence separately in the research on factors determining both the supply need and access to supply (e.g. Ember et al. 2013; Vitrai et al. 2008, 2010). Morbidity researches related to mental health from the 1990s (e.g. Kopp–Skrabski 1995) and public health surveys from the 2000s (e.g. OLEF 2002; ELEF 2009) have also contributed to the comprehensive understanding of domestic health inequalities.



## Hungarian health indicators and life expectancy in an international comparison

This international comparison is especially based on OECD Health Statistics rather than EU or WHO statistics. On the one hand, the OECD Health Database offers a comprehensive source of comparable statistics on health and health systems across OECD countries. It is an essential tool to carry out comparative analyses and draw lessons from international comparisons of diverse health systems all over the world. On the other hand, OECD statistics can provide the opportunity to analyse the relative position of Hungary in an international context larger than EU28 but less than WHO members.

In 2013, average life expectancy at birth in Hungary was 75.7 years, 4.7 years below the OECD average of 80.2 years and the second lowest among all OECD countries (Table 1). Despite significant increases in males' life expectancy at birth, it is trailing the OECD average by 5.6 years. Overall, average life expectancy at birth is relatively low and avoidable mortality rates are high. The relatively low life expectancy is mainly because Hungary has the highest mortality rate from cancer and the second highest mortality rate from cardiovascular diseases among OECD countries. Lifestyle factors – especially the traditionally unhealthy Hungarian diet, alcohol consumption and smoking – play a very important role in shaping the overall health of the population.

Table 1

### Hungary's most important health indicators from OECD Health Statistics 2015

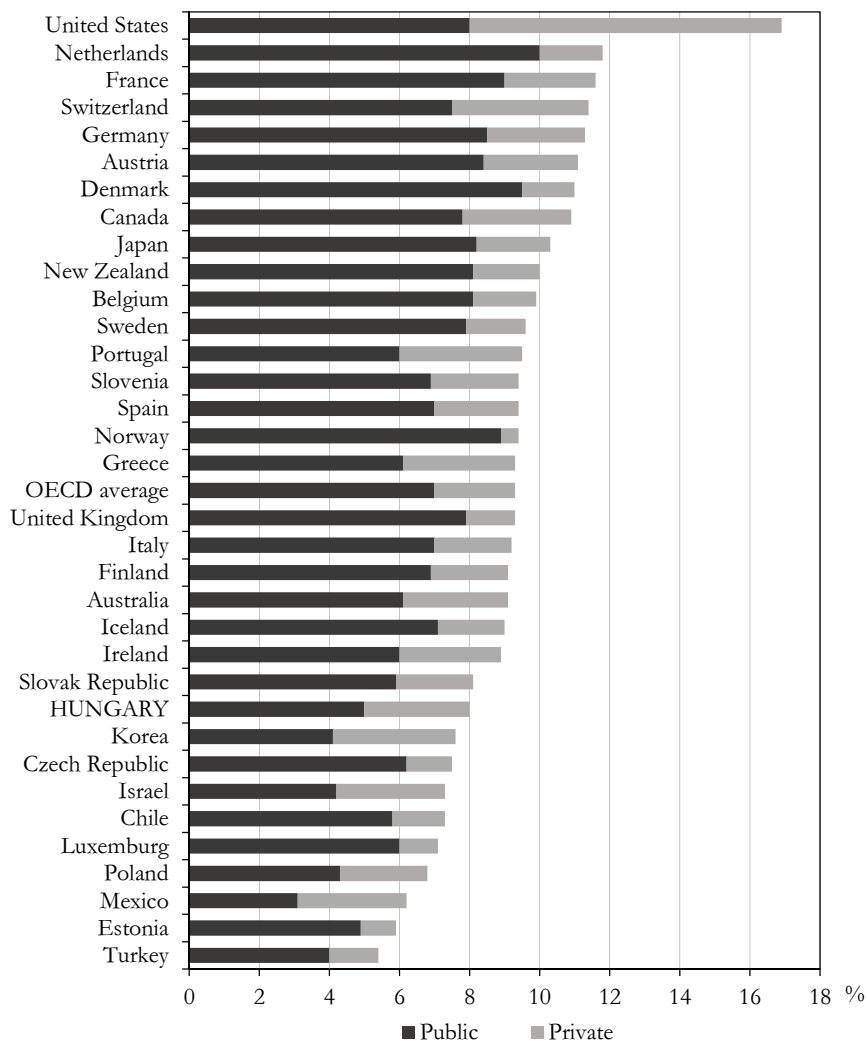
Health indicators	Hungary		OECD average		Rank among OECD countries <sup>a)</sup> , 2013
	2000	2013	2000	2013	
Average life expectancy at birth, total (years)	71.9	75.7	77.1	80.4	33 out of 34
Average life expectancy at birth, male (years)	67.5	72.2	74.0	77.8	33 out of 34
Average life expectancy at birth, female (years)	76.2	79.1	80.2	83.0	33 out of 34
Difference between male and female life expectancy (years)	8.7	6.9	6.2	5.2	32 out of 34
Mortality from cardiovascular diseases (age-standardised rates per 100,000 people)	803.5	602.1	428.5	295.2	32 out of 34
Mortality from cancer (age-standardised rates per 100,000 people)	349.8	297.8	242.5	212.3	34 out of 34

Data source: <http://www.oecd.org/els/health-systems/health-data.htm>

a) Countries are ranked in descending order of values.

Figure 1

**Health expenditure, public and private, as a share of GDP  
in OECD countries, 2012**



Data source: OECD Health Statistics 2015.

The total health spending accounted for 8.0% of the gross domestic product (GDP) in Hungary in 2012, less than the average of 9.3% for OECD countries (Figure 1). In Hungary, 63% of the health spending was provided by public sources in 2012, below the average of 72% for OECD countries. Health spending growth in Hungary has been very volatile over the past decade. Years of strong spending increases were followed by periods of negative growth in the 2000s, due to either organisational reforms of the health sector or cost-containment measures introduced following the economic crisis.

After a return to growth in 2011, health spending in Hungary fell again in 2012, mainly triggered by a sharply reduction in pharmaceutical spending. This is partly due to the impact of new mandatory tendering processes for publicly financed medications, which have resulted in price reductions. The distribution of some costly pharmaceuticals has also been shifted away from pharmacies to the hospital sector, which is now included under hospital expenditure, thus over-estimating the real reduction in pharmaceutical spending (OECD Health Review 2014).

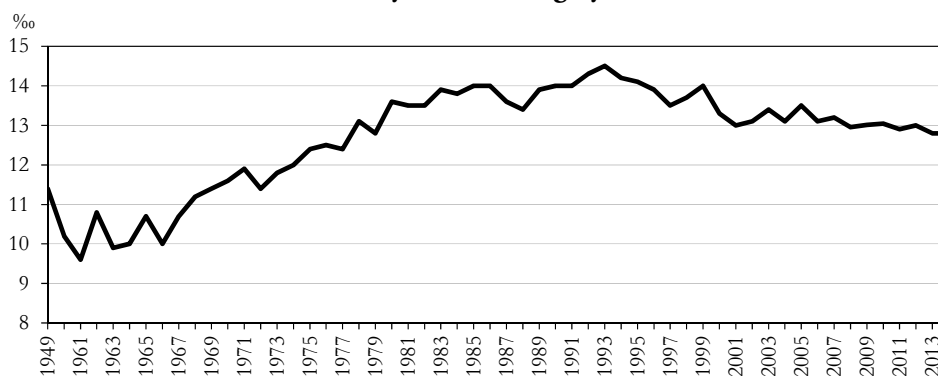
Average life expectancy at birth in Hungary is among the lowest in the OECD; however, life expectancy increased by 1.3 years between 2009 and 2013, more than in most other OECD countries during the same period. Health spending in Hungary (excluding investment expenditure in the health sector) is below the OECD average, and this has decreased by almost one percentage point since 2003 as a result of relative low health spending growth over the 10-year period (<http://www.oecd.org>).

### Changes of the Hungarian life expectancy in time

The average life expectancy at birth and its changes in time have continuously depended on the improvement or worsening tendencies of mortality rate in Hungary in the second half of the 20th century (Figure 2). The slow, moderate improvement of mortality rate started after 1995, but the indicator reached 14% again in 1999, although since then it seems to have stagnated around 12.8–13.0%. The trend in the mortality rate in Hungary shows a similar pattern as most other Central and Eastern European countries along with some characteristic features. As in all of the European states after the Second World War, a downtown trend in mortality rate was seen, which led to an improvement period in health status through the increase in life expectancy (Michalski 2005). This favourable tendency was caused by the decrease in the number of maternal, neonatal and infant mortality rates and development of implements for infectious diseases in Europe at the beginning of the 20th century.

Figure 2

#### Crude mortality rate in Hungary, 1949–2014

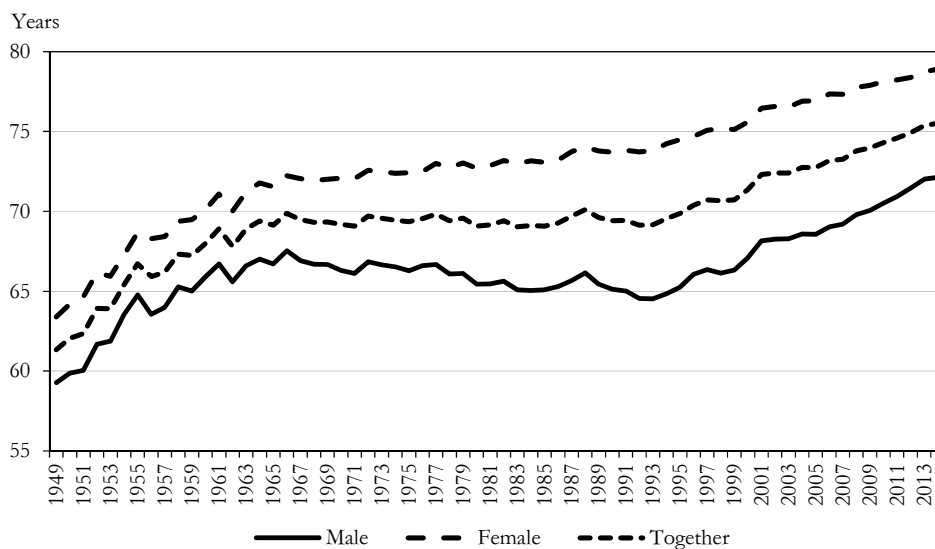


Data source: <http://www.ksh.hu>

The remarkable improvement in the Hungarian average life expectancy at birth with an increase of 5.4 years was mainly experienced between 1949 and 1955, and it could also increase during the 1950s and 1960s (Figure 3). However, the substantial improvement was followed by a marked deterioration of life expectancy after the end of the 1970s, because from 1966, the main health indicators changed for the worse. The deterioration of the Hungarian life expectancy reached its bottom in 1985, but this could not be followed by a period of upswing due to the change of regime and socio-economic transformation. Nevertheless, the role of the transition caused another substantial decrease in 1993. In this year, the average life expectancy at birth fell to unprecedented levels: 64.5 years for men, 73.8 years for women and 69.2 years for both sexes. The fall of life expectancy between 1989 and 1993 was caused by the sharp rise in premature mortality of the middle-aged male population. The moderation of the mortality rate after 1993 allowed life chances to increase again to over 70 years after the second half of the 1990s. The average life expectancy at birth stagnated generally for many years before rising in the late 1990s.

Figure 3

#### Average life expectancy at birth in Hungary, 1949–2014



Data source: <http://www.ksh.hu>

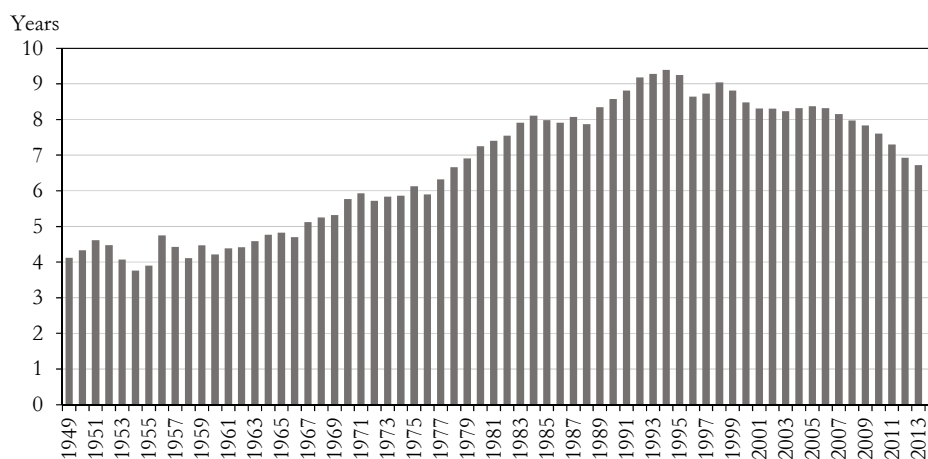
The deep social and economic crisis around the regime change had a strong impact on the health processes within a short period of time; in this way, the morbidity and mortality statistics of the whole population seriously worsened again after 1989. This was a dramatic consequence despite knowing that although our health indicators worsened from the middle of the 1960s, their stagnation already occurred in the middle of the 1980s. By comparison, in the next few years, the social and economic transition was accompanied by new, unprecedented worsening of life expectancies.

After the Hungarian transition, the slow and gradual life expectancy increase started in 1996, and it is still a growing trend. From 1996, it increased to above 70 years and from 2009, to above 74 years, which means that between 1993 and 2010, life expectancy grew 5.3 years. It must be emphasised that the average life expectancy at birth for men reached 70 years only in 2009, while women's life expectancy was already above 76 years in 2001. The difference between the life expectancy of the two sexes was the highest between 1993 and 1995 (9.3–9.4 years) after the Second World War in Hungary (Figure 4). The difference has decreased gradually from the middle of the 1990s, and in 2014, it was 6.8 years. The biomedical relation explains the disparity of life expectancy by sex, but the gap between Hungarian men and women is one of the widest in OECD. Life expectancy is influenced by the death rate (especially age-specific death rate), so it is an even compound index for life chances. According to the very disadvantageous mortality rate of the middle-aged Hungarian male population (Józán 1996), their health is mainly poor compared with the males of OECD countries. Therefore, besides the biomedical relation, the social and cultural factors can also affect the difference in life expectancy by sex (Józán 1999).

There are significant differences between the death rates of males and females, and the deterioration of age-specific mortality rate from 1966 had a significant effect on Hungarian men's life chances, especially middle-aged men. The increasing tendency in men's mortality rate in all age groups was higher than that of females (Figure 5, Figure 6); the worst deterioration could be observed among males aged 40–49 years: their mortality rate doubled between middle of the 1960s and the beginning of the 1990s (Józán 1994a, 1994b). From the middle of the 1990s, the improving tendency of the mortality rate was more remarkable among Hungarian women (Statisztikai Tükör 2008).

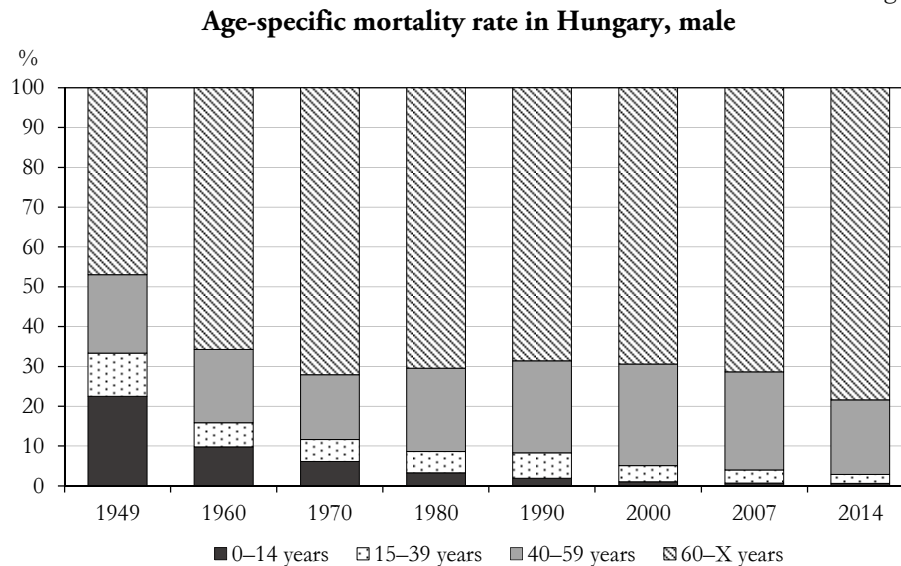
Figure 4

#### Differences between the life expectancy of males and females in Hungary, 1949–2014



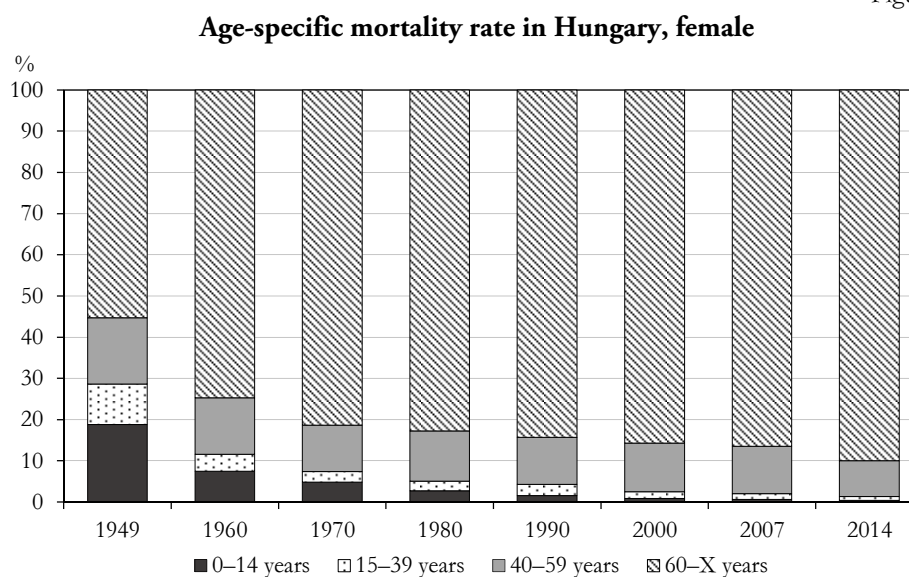
Data source: <http://www.ksh.hu>

Figure 5



*Data source:* KSH Tájékoztatósi Adatbázis, Statisztikai Tükör 2008. 2 (176) p. 2.

Figure 6



*Data source:* KSH Tájékoztatósi Adatbázis, Statisztikai Tükör 2008. 2 (176) p. 2.

The epidemiological changes supervened in the mortality situations in mid-1990s. Its background was the deepening of the epidemiological crisis in early-1990s, which was the result of the decades-long worsening of health indicators. Life expectancy declined in each age group, especially for middle-aged males. From mid-1990s, the

epidemiological transition resulted in the slow increase of life expectancy as well as the emergence of chronic diseases at later ages and the significant decrease of early death. At the same time, the sustained but moderate improvement in health status caused the increase in health inequalities, which was determined socially and regionally as well.

### Characteristics of the spatial pattern of life expectancy

Among the life chance indicators, the average life expectancy at birth draws attention to the significant territorial inequalities at both county (NUTS3) and district (LAU1) levels. At the same time, its development over time and space after the regime change also refers to the pronounced spatial patterns of life expectancies.

According to the latest data of 2014, the life expectancy of Hungarian males is 72.1 years and that of females is 78.9 years; however, considerable divergences are shown between the different parts of the country. There is a ten-year difference between the life expectancy of women living in the capital (80.0 years) and men living in the Borsod-Abaúj-Zemplén county (69.2 years); thus, where someone is born in the country and whether one is born as a boy or a girl is not without relevance (Figure 7). Males in the capital have the highest life expectancy in Hungary nowadays. The lowest life expectancies of Hungary are found in the Borsod-Abaúj-Zemplén county: the male life expectancy is 2.9 years lower than the national level, while female life expectancy is 1.3 years lower.

Figure 7

#### Average life expectancy at birth in the counties of Hungary, 2014

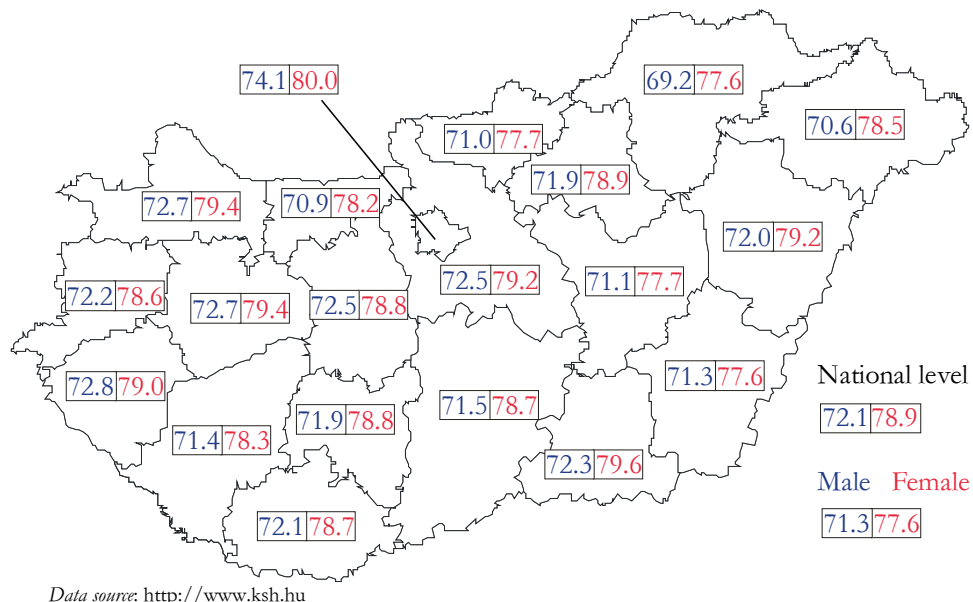
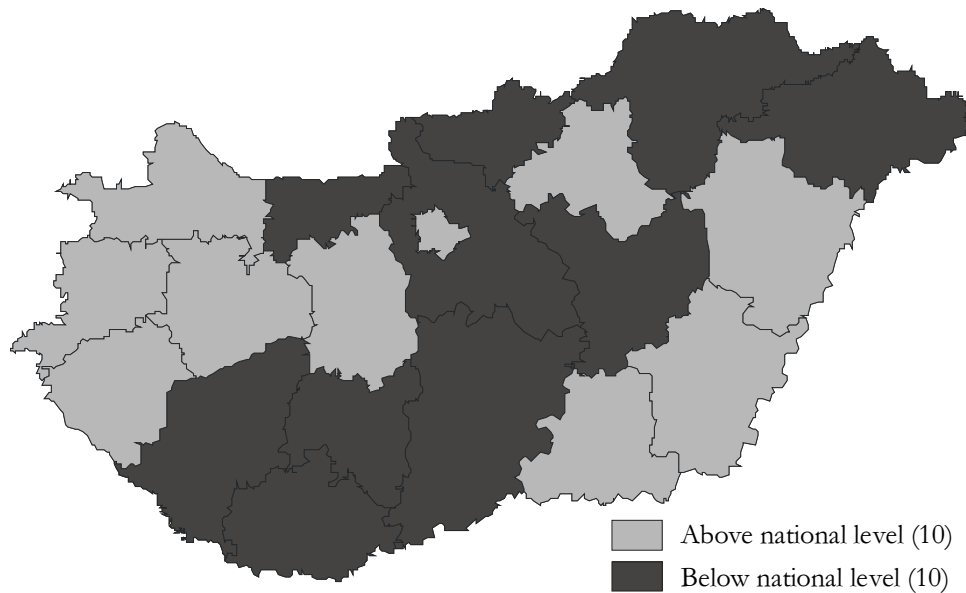


Figure 8

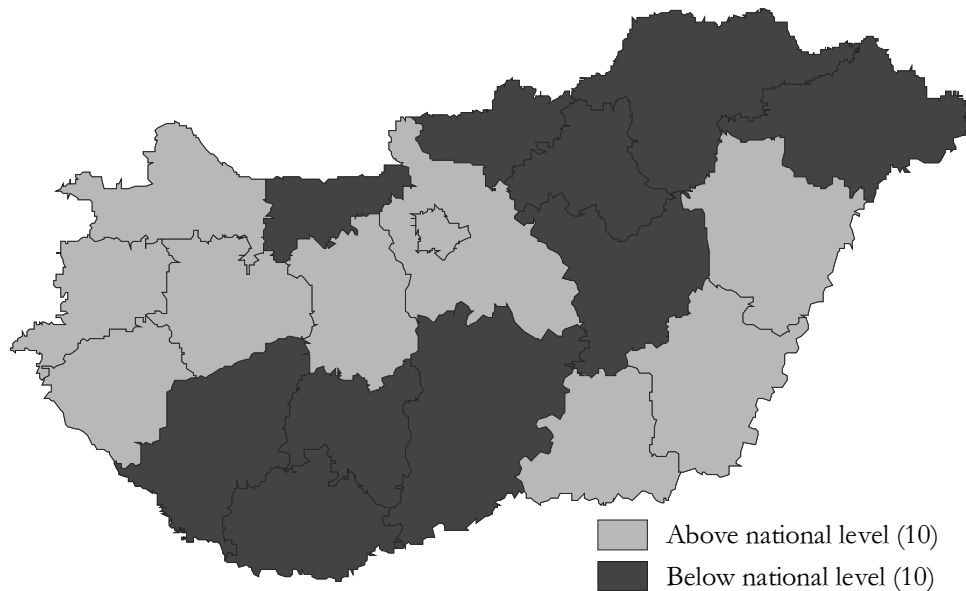
**Average life expectancy at birth in the Hungarian counties and its divergence from the national average, 1990–1990**



Data source: KSH Tájékoztatósi Adatbázis.

Figure 9

**Average life expectancy at birth in the Hungarian counties and its divergence from the national average, 2001–2014**



Data source: KSH Tájékoztatósi Adatbázis.



The life expectancies and its regional differences within Hungary are influenced by the socio-economic situation of the counties as well as the districts. The relative position of the counties to each other has not changed or has hardly changed in the past 25 years. The most advantaged and worst disadvantaged counties were the same at the beginning of the 1990s as today. The average level of life expectancy in the counties and its divergence from the national level shows a very typical spatial structure (Figure 8, Figure 9). The most favourable counties are in the North Western part of Hungary including the capital, while the most unfavourable areas can be found in the South Western and North Eastern parts of the country. In this latter case, the average life expectancy at birth in the Borsod-Abaúj-Zemplén and Szabolcs-Szatmár-Bereg counties always occurred at the national level over the last 25 years. The relative positions of the counties did not change between the two examined periods; only the Pest county showed an improvement, while Heves county showed deterioration according to the divergence from the national averages in life expectancy.

To determine the extent of territorial inequalities, a positional indicator has been used for providing the extent of variance. The development of extreme values can be interpreted through the difference between and the proportion of the maximum and minimum values in the data series. The differences of variance and rate of variance were summarised in a table (Table 2), based on which the most favourable and most unfavourable micro-regions/districts (LAU1) can be identified. Based on the results, we can say that the best values of statistical indicators – almost in each case – can be linked to districts situated in the Western part of the country, while the worst values are linked to districts in the Eastern part of the country.

Table 2

**Extent of territorial inequalities according to  
the average life expectancy at birth (years), 1991, 2011**

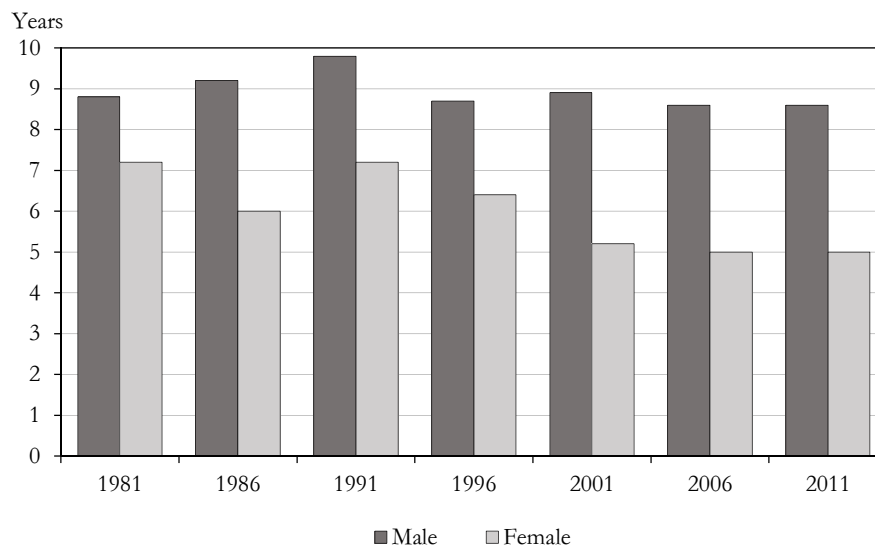
	Minimum value	District of minimum value	Maximum value	District of maximum value	Difference of variance	Rate of variance
Average life expectancy at birth, 1991						
Together	63.5	Tokaji	71.9	Csornai	8.4	1.1
Male	57.6	Tokaji	67.4	Siófoki	9.8	1.2
Female	69.8	Tokaji	77.0	Balaton-almádi	7.2	1.1
Average life expectancy at birth, 2011						
Together	71.3	Bodrogközi	77.9	Balatonfüredi	6.7	1.1
Male	65.9	Bodrogközi	74.5	Balatonfüredi	8.6	1.1
Female	76.6	Kadarkúti	81.6	Körmendi	5.0	1.1

*Data source:* <http://www.ksh.hu>

The volume index shows what difference can be experienced between the lowest and the highest values of the districts in life expectancy. If we examine the regional inequalities at the LAU1 level using this index, we can also see the differentiation and equalization in life expectancy (Figure 10). The difference in male life expectancy increased during the 1980s, and the health effects of the transition could strengthen this difference at the beginning of the 1990s. In the second half of the 1990s, the regional differences became moderated, but from 2001, these differences are becoming sharper (8.6 years in 2011). On the other hand, the changes in female life expectancy were not parallel with the differences in male life expectancy. The differentiation period was the result of the transformation and was followed by an equalisation period from 1996. By comparing male and female life expectancy using the volume index, we can observe a more changing position of females' index than the males'.

Figure 10

#### Average life expectancy at birth by sex and by volume index



Data source: <http://www.ksh.hu>

Based on the average life expectancy at birth, the degree of territorial inequalities decreased between 1991 and 2011. This appeared principally in the life expectancy of women: on the one hand, their life changes improved by 4.4 years between 1991 and 2011 and, on the other hand, the territorial disparities in their life expectancy were also much smaller compared to that of males in the early 1990s. At the same time, the life expectancy of males improved by 5.9 years between 1991 and 2011, but by comparison, a smaller equalisation of the territorial differences took place. Overall, in

Hungary, the increase in life expectancy during the last 20 years can be explained mainly by the improving life expectancy of males, which, however, was not accompanied by the considerable decrease of territorial disparities.

The decile ratio applied based on the cumulative per cent frequency answers the following question: according to district-level distribution of life expectancy, how many times is the average life expectancy of districts belonging to the upper 10% larger than that of the lower 10%?

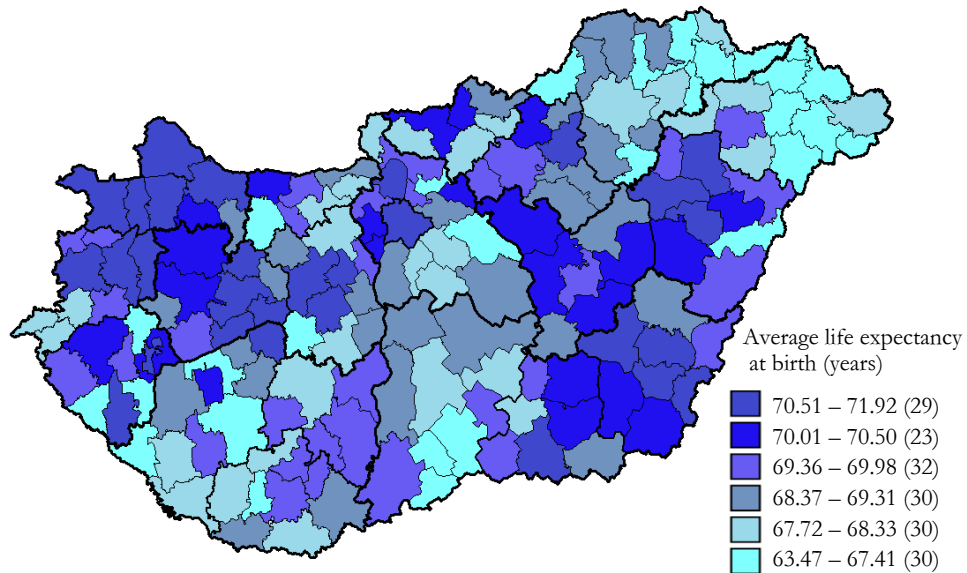
In 1991, the average life expectancy at birth was 71.6 years in 10 Hungarian districts (LAU1) with the highest life expectancy and 65.9 years in 10 Hungarian districts with the lowest life expectancy. There was only one Western Hungarian district among those belonging to the lower-tenth part, and the others were situated in the Eastern part of the country; none of the Eastern Hungarian districts belonged to those in the upper-tenth part, only the districts situated in the Western and middle parts of the country. The difference of average life expectancy between the lower- and upper-tenth part districts was 5.7 years. This difference decreased to 4.9 years until 2011; meanwhile, the average life expectancy increased to 72.1 years in the lower-tenth part and to 77.0 years in the upper-tenth part. Two districts from the Southern Transdanubia Region belonged to the former 'Eastern' districts, while there was only one district among the latter 'Western' ones that was situated in the Southern Great Plain Region.

According to the average life expectancy at birth, the territorial pattern of the country was quite mosaic in 1991 (Figure 11). Territorially coherent districts in a better or worse situation were located in the North Western, South Eastern and North Eastern parts of Hungary. The highest life expectancy could be observed in the capital, in some districts in its agglomeration and partially in North Western Hungary. The North Western–South Eastern division of the Central Hungary Region emerged even at the beginning of the 1990s: the situation of the Western and Northern sectors was favourable and that of the Eastern and South Eastern sectors of the Budapest agglomeration was unfavourable.

The Borsod-Abaúj-Zemplén, Szabolcs-Szatmár-Bereg and Bács-Kiskun counties were territorially coherent areas in bad situations that affected each or almost each district (LAU1). However, the situation of the Central and Western parts of the country improved spectacularly until 2010. For example, the number of districts with the highest values increased to the largest extent in the Western and Northern sectors of Central Hungary; in the Bács-Kiskun county, the proportion of districts with better and worse indicators was 50:50; the situation of Central Transdanubia Region turned positive regarding life expectancies; and in the Eastern part of Hungary, the chief towns of the counties and their surrounding districts appeared as territorial units offering better life chances.

Figure 11

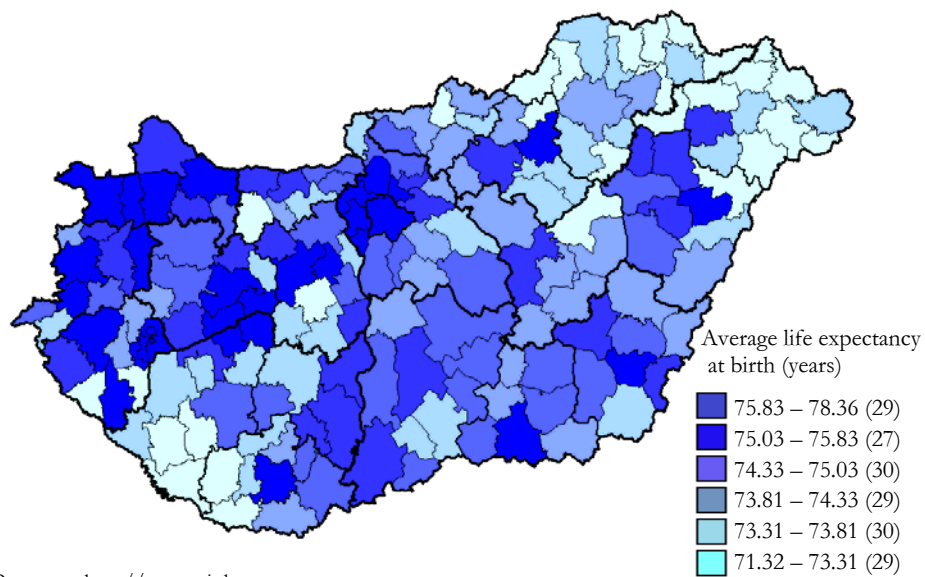
**Average life expectancy at birth in the districts of Hungary at the LAU1 level (years), 1991**



Data source: <http://www.teir.hu>

Figure 12

**Average life expectancy at birth in the districts of Hungary at the LAU1 level (years), 2011**



Data source: <http://www.teir.hu>

According to average life expectancy at birth at the LAU1 level, the spatial pattern became more mosaic after the Hungarian economic and political transformation. On the one hand, life expectancy was increasing continuously in all districts after 1996. Despite this, there is a marked differentiation between Eastern and Western Hungary. There are more districts with better values of life expectancy in the Western part of the country. The most advantageous spatial units are located around Budapest and in the North Western half of the country (Figure 12). The entire Eastern part of Hungary is in a very disadvantageous position due to its life expectancy. Therefore, a marked differentiation between the most favourable and unfavourable areas can be experienced. There are some districts in the Eastern part with better values, especially in county headquarters: we can define them as islands or hills in the Hungarian Great Plain.

## Conclusions

According to statistical data, the mortality and life expectancy indicators have improved slowly and moderately, but continuously, from the middle of the 1990s in Hungary, which has led to the epidemiological change. Despite this, the health status of the Hungarian population is in some respects one of the worst in the developed countries. The unfavourable life expectancies refer in a complex way to the disadvantageous situation of health-related quality of life and its influencing factors: labour market situation, income level, living conditions, health behaviour and access to health care supplies.

The most important conclusions of the quantitative research conducted in this study are as follow:

- The improvement of average life expectancy at birth is less spectacular and large than what would result from the economic performance.
- The improvement of life expectancy draws attention to considerable gender inequalities, primarily based on the premature mortality of males and mortality surplus among middle-aged men.
- The low life expectancy is combined with significant regional disparities in the country.
- The socio-economic division of Hungary can also be demonstrated in health inequalities.
- Regarding life expectancy, the most disadvantaged areas in the country have largely lagged behind the national average, and this lagging is also a significant restrictive factor to economic development.
- The mortality trends have remained disadvantageous for North Eastern Hungary (Borsod-Abaúj-Zemplén and Szabolcs-Szatmár-Bereg counties) and South Western Hungary (Somogy and Baranya counties).

- The widening health gap between the Eastern and Western halves of Hungary had already begun to evolve during the 1970s and 1980s, but also has suggested the common origins of the health trends and the uprisings of 1989.
- Considering the significant life expectancy data, it is impossible to disregard that in the Eastern part of the country, the number of people in multiple disadvantaged positions is very high, and thus they struggle with many economic and social problems.
- The disadvantaged life expectancy in Hungary currently hits the entire adult population, but its spatial inequalities are influenced by the connection between life expectancy and economic development.

In light of results and experiences, it is clear that the decade-long worsening of mortality indicators stopped in the middle of the 1990s; subsequently, the mortality rate remained stable at a high level, while the life expectancy has increased slowly. This process has lasted for almost 20 years, but the health status of the Hungarian population has not improved spectacularly during this period. Obviously, positive changes have occurred, but the predominance of their long-term effects is impeded by the dysfunction of the health care system and the phenomena of demographic crisis (demographic decline, low fertility rates and ageing).

## Summary

Health inequalities are always linked to economic and social inequalities because of the unfairness of the distribution system, bad labour market positions, difficulties in the availability of health care and education, disadvantaged living and life conditions and no chance of a healthy life. Social inequalities related to health are present in every district in Hungary and mostly depend on macroeconomic conditions. The interpretation of the social factors defining health inequalities presumes that not only do the life expectancy and health status count from a health point of view but also the level and growth of already existing health inequalities with their spatial pattern.

The health status of the Hungarian population has passed through four main phases in the second half of the 20th century according to the theory of epidemiological transition (Gaál et al. 2011). The first phase lasted until the middle of the 1960s with an improving tendency of life expectancy reaching levels comparable to those seen in the most developed Western European countries for both men and women. The second phase lasted from 1966 until the end of the 1980s in which there was marked deterioration in mortality from non-communicable diseases and life expectancy led to an increasing health gap between Hungary and Western Europe. The third phase began after 1989 and lasted until the middle of the 1990s: in this period, there was a sharp decline in life expectancy caused by the deepest point of the Hungarian epidemiological crisis, which was a unique situation in Central Europe

(Ádány 2008). The fourth phase started after 1996 and has lasted until the present day. During this time, Hungary has seen a strong and steady increase in life expectancy at birth among both men and women (Gaál et al. 2011).

Life expectancy in Hungary has been increasing recently but with a geographically uneven distribution. The scale of the health inequalities through spatial differences within the country is surprising. Life expectancy varies among different areas: there are clear determining inequalities in life chances mainly between the Western and the Eastern halves of the country, and the patterns of these differentials vary considerably among micro-regional territorial units. The structure of health inequalities is not confined to differences between the poor and the rest of society; instead, it runs right across the society with every level in the social hierarchy having worse health than the one above it. The main point is that health inequalities have typical spatial pattern due to the socio-economic inequalities.

The Eastern–Western and the Centre–Periphery relations have an influential role in both socio-economic development and the spatial pattern of life expectancy. It should be emphasised that some settlements have been slowly declining since 1990 even in Western Hungary, which is otherwise positioned favourably. Alternatively, in Eastern Hungary, the situation is not wholly unfavourable according to health indicators. As far as the latter region is concerned, some areas – such as larger cities or county headquarters – have improved significantly since the 1990s, and now there are better than average indicators.

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