MORTALITY

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MAIN FINDINGS

» Between 1993 and 2013, life expectancy at birth for Hungarian men and women rose by 0.35 years per year. Since 2013, life expectancy has stagnated for both men and women, standing at approximately 72.3 years for the former and 79.2 years for the latter.

» Between 1990 and 2016, mortality among younger generations improved both in absolute and in international terms: the mortality rate dropped to a third (for boys) and a quarter (for girls) for those aged 0–14. By 2016, the mortality rates for the age groups 15–29 and 30–44 had dropped to between 30% and 40% of their 1990 values, to approach an internationally acceptable level. However, between 2014 and 2016 there was no improvement in the mortality of men aged 15–29, and the figure deteriorated slightly for women.

» By 2016, mortality among men aged 45–59 had dropped to 58% of its 1990 value, with this improvement continuing between 2014 and 2016; however, mortality among women decreased by only 35%. Mortality in this age group remains extremely high by international comparison.

» Mortality among the elderly showed a moderate improvement between 1990 and 2014, and basically did not change from 2014 to 2016.

» The majority of deaths are caused by cardiovascular disease. The increase in life expectancy after 1994 has primarily been a result of decreasing cardiovascular mortality.

» Cardiovascular mortality decreased most dynamically between 2005 and 2011 for men. By 2014, cardiovascular mortality was only 60% of the figure in the 1990s for men, and 48% for women. Compared to European Union averages, although absolute differences decreased, relative differences increased: in 1990 mortality among Hungarian men and women was 160% of the EU level; by 2014, it had risen to 204% among men and 196% among women.

» Cardiovascular mortality fell as a consequence of decreasing stroke mortality, while ischaemic heart disease – the other significant cause of cardiovascular death – began to decrease only in 2005.

Monostori, J. - Őri, P. - Spéder, Zs. (eds.)(2019): *Demographic Portrait of Hungary 2018.* HDRI, Budapest: 151–178.

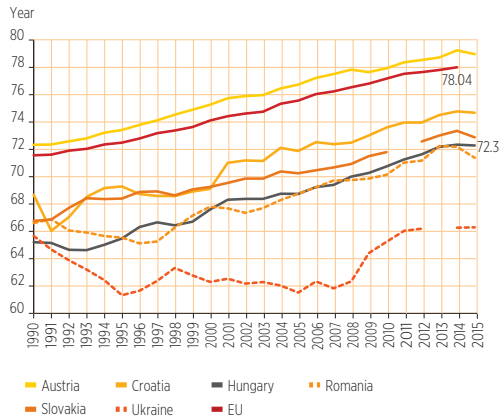
» Cancer mortality has declined only modestly over the past three decades, and many more individuals still die from such diseases than in other European countries. The slight drop is primarily a result of decreased mortality from cancers of infectious origin; cancers either related to lifestyle or that can be affected by screening or treatment have not decreased.

» Among other causes of death, only mortality from external causes shows a significant decrease. Among both sexes, the figures for deaths due to accidents, homicide and suicide have become quite similar to the European levels.

INTRODUCTION

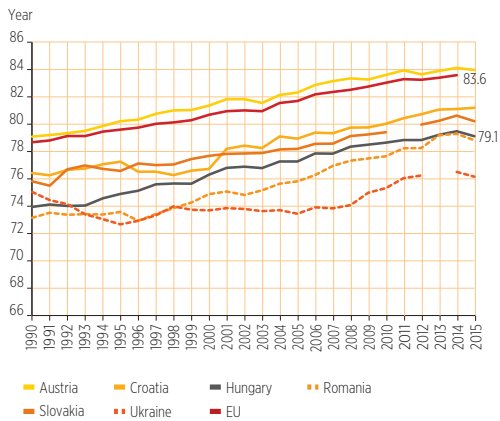
In the most developed countries of the world, *life expectancy at birth*[G] has increased (that is, mortality has decreased) over the past 50 years as never before. With treatments for most infectious diseases having spread in the 1950s and 1960s, by the 1970s cardiovascular disease had become the primary cause of death in these countries, and consequently affected mortality most significantly. From the 1980s, mortality due to cardiovascular disease fell dramatically, resulting in a significant decrease in overall mortality and an increase in life expectancy. Because of the dominant effect of cardiovascular disease, many scholars have referred to this process as the 'cardiovascular revolution' (Meslé and Vallin 2017), thanks to the combined effect of the spread of modern medical practices and a radical change in lifestyle, cardiovascular mortality dropped to a third of the initial levels within a matter of decades. During the next couple of decades, cardiovascular disease remained the primary cause of death, but at the same time cancer mortality increased. Simultaneously, in the case of both cardiovascular and tumorous mortality, the average age of death increased, so that the mortality of younger and middle-aged groups decreased significantly. These changes are most commonly referred to as the fourth stage of the epidemiological transition. In Hungary – as in other Central and Eastern European countries – the cardiovascular revolution began not in the 1970s, but in the 1990s. This chapter focuses on the corresponding changes in Hungary, and we also refer to some distinctly Hungarian features of mortality. Parallels will also be drawn with developments in neighbouring countries. A comparison of international mortality trends is possible for the period between 1990 and 2014 thanks to the European database of the World Health Organization (WHO). The mortality databases of the Hungarian Central Statistical Office (HCSO) and the WHO make it possible to calculate certain values for 2015 and 2016; consequently, some time series have a longer timeframe, especially in the case of Hungary.

Figure 1: Life expectancy at birth for men in Hungary, some neighbouring countries and the European Union, 1990–2015



Source: WHO Health for All Database; WHO World Health Statistics, 2017.

Figure 2: Life expectancy at birth for women in Hungary, some neighbouring countries and the European Union, 1990–2015



Source: WHO Health for All Database; WHO World Health Statistics, 2017.

LIFE EXPECTANCY AT BIRTH AND AGE-SPECIFIC MORTALITY

In 1990, life expectancy at birth was 65.2 years for men. This was lower than in the neighbouring countries: 7.1 years lower than in Austria and 0.5–1.5 years lower than in other neighbouring countries. Following a significant drop at the beginning of the 1990s, Hungarian male life expectancy began to rise – without any major fluctuation – to reach 72.3 years by 2014. Though a significant gain, this figure was not particularly high: it exceeded Romanian male life expectancy by only 0.1 year, and was 1.0 years lower than in Slovakia; 2.6 years lower than in Croatia; and – still – 7.0 years lower than in Austria. By 2014, Hungarian male life expectancy had only improved relative to Ukrainian male life expectancy (six years higher). Between 1993 and 2013, the average annual growth in male life expectancy was 0.35 years. From 2013, Hungarian male life expectancy did not rise any further, but hovered at around 72.3 years (72.2 in 2013, 72.4 in 2014, 72.3 in 2015 and 72.4 in 2016).

Between 1990 and 2014, Hungarian female life expectancy rose from 73.9 years to 79.5 years, altogether improving by 5.6 years. In 1990, female life expectancy was lower only in Romania (by 0.8 years); elsewhere it was 1–2.5 years higher – and in Austria it was 5.2 years higher. Between 1992 and 2013, average annual growth was 0.35 years in Hungary; but that was only enough to narrow the gap with Austria by 0.5 years. A relative improvement was only visible compared to Ukrainian female life expectancy. Hungarian female life expectancy was only 0.1 years higher than in Romania, and was 1.2 years lower than in Slovakia and 1.6 years lower than in Croatia. From 2013, the improvement in Hungarian female life expectancy also ceased and stagnated at around 79.2 years (79.2 in 2013, 79.5 in 2014, 79.0 in 2015 and 79.2 in 2016). An explanation for the interruption in the improvement in female and male life expectancy is provided after a review of age- and cause-specific mortality in Hungary.

CHANGES IN AGE-SPECIFIC MORTALITY

Between 1990 and 2014, mortality among young age groups dropped to approximately a third of the baseline (1990) level; mortality among middle-aged groups fell to 30–40% of the baseline; and among older middle-aged and elderly age groups it dropped to 60–70% of the initial level *(Table 1)*.

After 2014, only in the youngest age group did the dynamics of decrease remain as intensive. A significant decrease was apparent among individuals aged 15–29 between 1990 and 2000; the improvement moderated between 2000 and 2010, and did not continue from 2014 to 2016 – in fact, mortality among women of that age group increased slightly. For the 30–44 age group, the biggest drop occurred between 2000 and 2010, and this trend continued. However, the figures for this age group may not be accurate, as significant numbers were leaving the country.[1] This issue has also been raised in connection with other Central and Eastern European countries (Fihel and Pechholdová 2017). Mortality among those aged 45–59 has decreased moderately and steadily over time; the decrease speeded up between 2014 and 2016, but the data for this age group may also be slightly inaccurate due to migration. Mortality among individuals aged 60–74 showed a moderate decrease until 2014; thereafter it edged up slightly in the case of

[1] Including individuals with permanent residence but currently not residing in Hungary in the population presumably results in a lower mortality rate in comparison to the real situation.

*Table 1: Age-specific death ratio, 1990–2016**

	Age-specific mortality rates age group					
	0–14	15–29	30–44	45–59	60–74	75+
				Men		
1990	100	100	100	100	100	100
2000	63	59	84	90	91	84
2010	35	39	44	77	79	73
2014	33	36	33	62	72	72
2016	29	36	30	58	73	72
				Women		
1990	100	100	100	100	100	100
2000	66	57	80	90	84	85
2010	38	44	44	80	70	73
2014	31	38	40	70	66	70
2016	25	39	38	65	66	69

Source: WHO European Mortality Database; authors' calculations.
* Mortality rates for 2000, 2010 and 2014 as a percentage of mortality rates in 1990.

men and stagnated in the case of women. Mortality among the oldest age group (those over 75) decreased significantly between 1990 and 2010; thereafter it fell only slightly among women and stagnated among men.

The question is how these changes can be evaluated in relation to international trends. *Table 2* shows these same *age-specific mortality rates*[G] in an international comparison.

Generally speaking, between 1990 and 2014, the younger age groups showed a relative improvement in relation to countries included in the current analysis. In 1990, mortality among Hungarian boys aged 0–14 years was 35% higher than the EU mortality rate and 79% higher than the Austrian mortality rate (it also exceeded the Croatian level by 40% and the Slovakian level by 15%), although it was much better than the Ukrainian mortality rate. Twenty-five years later, the relative difference between the Hungarian level and the EU/Austrian levels had narrowed; and although the difference had increased compared to the Croatian level, the Hungarian figures were better than those of Slovakia.

In the case of Hungarian young men aged 15–29, the significant (approximately 30%) difference in comparison to the EU and Austria visible in 1990 had disappeared by 2014 and mortality in Hungary was more favourable in 2014 than in either Slovakia or Croatia.

Mortality among Hungarian men aged 30–44 also showed a positive change. Although mortality in this age group in 1990 was 135% higher than in Austria and 105% higher than the EU level, by 2014 the difference had narrowed to 67% and 28%, respectively, and the figure was already better in absolute terms than the corresponding Slovak figure.

The most critical point of Hungarian mortality is the remarkably high mortality rate among middle-aged men in international comparison. This has been a

Table 2: Age-specific mortality in Hungary, some neighbouring countries and the European Union, 1990, 2014

(1/100 000)

	Age-specific mortality rates													
	1990							2014						
	AU	HR	HU	RO	SK[a]	UA	EU	AU	HR	HU	RO	SK	UA	EU
Men														
0–14	88.8	123.8	158.9	291.4	137.8	172.3	117.6	34.3	54.0	55.2	96.5	63.2	93.8	42.5
15–29	115.6	133.2	153.1	140.7	119.9	201.9	118.8	50.4	56.2	54.6	70.5	67.6	176.7	55.0
30–44	215.0	292.8	507.3	385.8	360.1	492.2	246.4	100.4	127.5	168.0	194.2	181.9	593.7	131.1
45–59	769.4	1,228.4	1,723.9	1,266.1	1,414.7	1,524.9	857.0	431.9	715.7	1,072.4	985.9	844.8	1,511.1	536.2
60–74	2,908.9	3,768.7	4,542.4	3,609.7	4,199.6	4,250.1	3,040.5	1,690.0	2,547.0	3,254.0	3,107.8	2,848.9	4,326.9	1,845.4
75+	12,112.4	14,371.2	15,137.5	13,315.6	11,871.7	14,063.1	12,030.1	7,687.0	10,642.9	10,890.4	10,628.3	10,778.1	12,389.3	8,216.0
Women														
0–14	72.1	87.1	125.9	228.8	102.4	121.5	90.3	32.2	39.9	39.1	69.9	51.3	71.4	34.6
15–29	36.2	43.6	55.57	61.1	35.8	62.0	40.4	21.7	19.3	21.4	28.7	24.7	55.2	21.3
30–44	100.9	111.9	207.8	168.3	119.5	152.9	107.6	56.8	61.6	82.6	80.2	74.0	196.9	62.3
45–59	369.4	454.7	670.9	561.3	494.2	560.6	386.5	228.3	299.6	469.7	387.4	328.4	502.8	268.0
60–74	1,372.1	1,927.2	2,315.1	2,223.7	2,004.5	2,153.0	1,529.5	895.5	1,138.5	1,538.5	1,475.7	1,268.8	1,857.1	945.0
75+	8,995.5	11,207.7	11,486.7	12,411.1	9,339.0	10,913.5	8,714.4	5,831.0	8,179.0	8,056.0	8,482.4	7,872.8	9,782.2	5,831.0

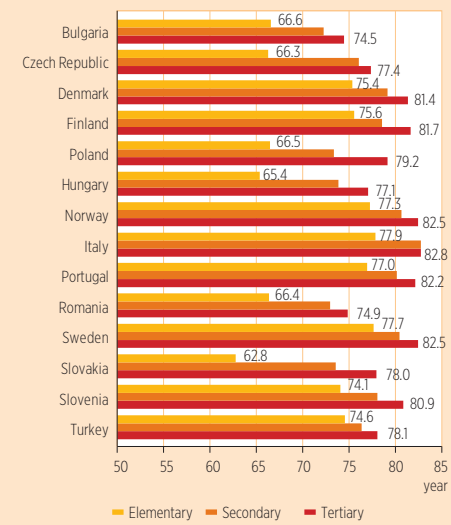
Source: WHO European Mortality Database.
[a] 1992.

MORTALITY OF VULNERABLE SOCIAL GROUPS

According to Eurostat calculations, life expectancy at birth among men with at most primary education in Hungary was only 65.4 years in 2015. Men with secondary education had a much more favourable value (73.9 years), while for men with tertiary education life expectancy was 77.1 years. Thus, the difference in life expectancy among men according to level of education is almost 12 years. As can be seen from *Figure B1*, these differences were just as large in countries of the Eastern bloc (ranging from 8 to 15 years), and are typically over 10 years. However, in Northern and Southern Europe, the differences are much smaller, approximately four years.

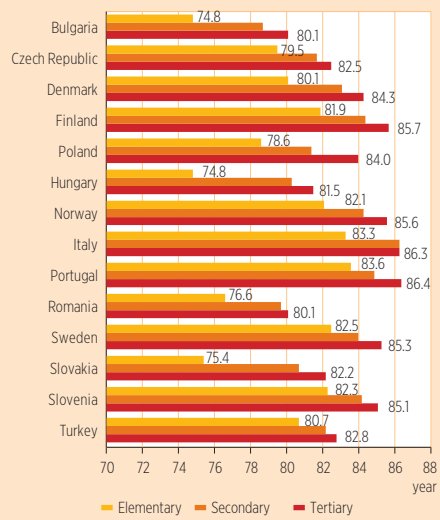
Differences in life expectancy among women *(Figure B2)* are smaller, although according to the data available (for a limited number of countries), the situation of Hungarian women is especially unfavourable. Life expectancy at birth for women with primary education was 74.8 years, placing Hungary and Bulgaria joint bottom of all the countries included in the graph. The figure for women with secondary education is 80.3 years; for those with tertiary education –81.5 years. Thus, the difference between the two extremes is 6.7 years. A similarly big difference among women is only typical of Slovakia. Life expectancy for women with tertiary education living in Northern and Southern Europe was only 2–4 years greater than among their counterparts with only primary education.

Figure B1: Life expectancy at birth for men, by educational level, in selected European countries, 2015



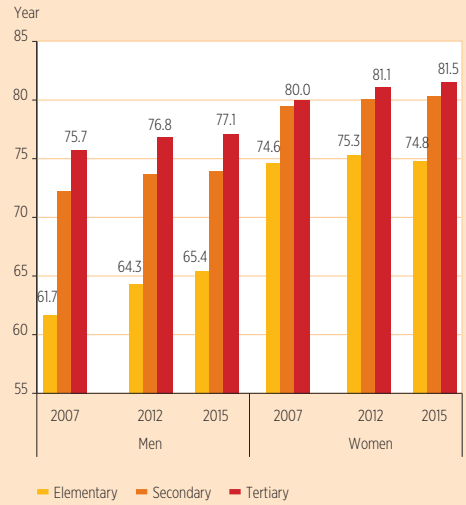
Source: HCSO Demographic Yearbook 2016; Eurostat.

Figure B2: Life expectancy at birth for women, by educational level, in selected European countries, 2015



Source: HCSO Demographic Yearbook 2014, 2016; Eurostat.

Figure B3: Life expectancy at birth, by educational level, in Hungary, 2007, 2012, 2015



Source: HCSO Demographic Yearbook 2014, 2016; Eurostat.

Differences in life expectancy according to level of education *(Figure B3)*, which are in fact differences in mortality, basically appeared in Hungary (and presumably in other former Soviet satellite states as well) during the 1980s; thereafter, they increased further before stabilizing. By 1990, Europe had become divided according to differences in mortality: Central and Eastern European countries had large mortality differences, while Northern, Western and Southern European countries had moderate mortality differences. Differences in mortality are smallest in the Southern countries (Mackenbach et al. 2008). Within our region, it is clear that life expectancy for both men and women with tertiary education is similar to that of Western Europeans with secondary education, and Hungarian graduates live for only 1–2 years less than graduates in Western Europe. However, life expectancy in Hungary for those with only primary education is 10–12 years shorter among men and 5–8 years shorter among women than is the case in Western Europe. Thus, the generally short life expectancy typical of the country as a whole is primarily related to the poor prospects of those with a low level of education.

A more detailed calculation conducted exclusively for Hungary by András Klinger revealed that in 1999, men who had not even completed primary education could expect to live for 56.3 years, while life expectancy for women with the same educational level was 74.2 years. Life expectancy for men with primary, secondary and tertiary education was 65.1, 71.6 and 76.9 years, respectively. The figures for the same groups of women were 73.2, 77.1 and 79.7 years (Klinger et al. 2001).

No comparison is possible between the above figures and the Eurostat calculations, which are based on fewer categories; consequently, in order to identify trends, we have relied on more recent figures – from 2007, 2012 and 2015. These show that the life expectancy of men with primary education improved between 2007 and 2012 by three years (compared to an improvement of only one year for those with higher education). Between 2012 and 2015, the trend moderated for those with a low level of education and stagnated further for those with higher education.

The prospects for women with a low level of education increased by 0.7 years between 2007 and 2012, but decreased by 0.5 years between 2013 and 2015.

persistent feature: taking all age groups, the biggest difference between the Hungarian figures and those of Austria, the EU as a whole and the other neighbouring countries appeared among those aged 45–59 even back in 1990, when mortality in this age group was 224% of the Austrian level and 201% of the EU level. By 2014, despite the otherwise decreasing Hungarian mortality, the difference for this particular age group, compared to other countries, had increased further: to 248% of the Austrian level and to 208% of the Croatian level (from 140% in 1990). That said, it remained the same against the EU level, and barely changed against the Slovak level.

Mortality among younger elderly men in Hungary (those aged 60–74) deteriorated slightly compared to other countries included in the analysis (with the exception of Ukraine). For this age group, in 1990 the range of excess mortality among Hungarian men was between 8% and 56% (depending on the country of comparison). In 2014, the figure ranged from 14% to 92%. The difference between the mortality rate of the oldest age group (individuals aged 75 years and over) in Hungary and the corresponding Austrian, Croatian and EU rates widened further, while the difference compared to the Slovak mortality rate narrowed. Thus, mortality in the older age group improved less than in most of the neighbouring countries.

Mortality among Hungarian girls aged 0–14 years has improved in international comparison. In 1990, only in Romania was mortality higher in this age group. Whereas Hungarian mortality in that year was almost 40% higher than the EU average and 75% higher than in Austria, by 2014 the difference had narrowed considerably (only 13% higher than the EU level and 21% higher than the Austrian level). Mortality among women aged 15–29 also improved: whereas in 1990 it was 37% higher than the EU rate and 53% higher than in Austria, by 2014 the difference had basically disappeared. The mortality rate in this age group is much lower than in Slovakia or Romania; is only slightly higher than in Croatia; and is approximately a third of the Ukrainian level.

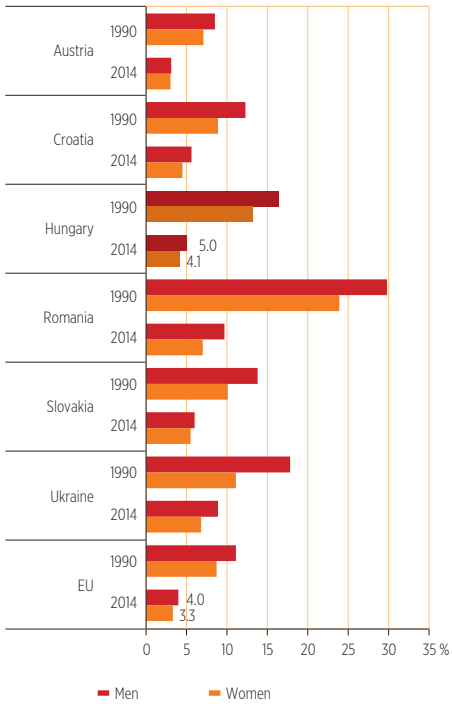
However, among young middle-aged Hungarian women (30–44), despite a downward trend, there was no significant relative improvement in mortality: in this age group the female mortality rate was twice as high as the Austrian and EU levels in 1990, and was still 46% and 32% higher, respectively, in 2014. With the exception of Ukraine, all the other neighbouring countries have a better mortality rate in this age group; and although the Romanian rate is similar to the Hungarian, the Croatian and the Slovak levels are lower.

As with men, mortality among Hungarian women aged 45–59 also gives cause for concern. In this age group, the situation in Hungary deteriorated compared to all the countries included in this analysis, except Ukraine. Whereas in 1990, the Hungarian rate was 82% higher than that of Austria, by 2014 that figure had increased to 105%. Compared to the EU level, the gap widened from 73% to 75%. The 1990 difference of 36% between Hungary and Slovakia increased to 43%, and against Romania the gap opened up from 19% to 21%.

In the case of Hungarian women aged 60–74, there was little change from the original (unfavourable) situation: mortality in this age group – which is similar to that of Romania – is 70% higher than in Austria, 62% above the overall EU level (up from 51% in 1990), 20% higher than in Slovakia and 35% higher than in Croatia – although matters improved compared to Ukraine. Mortality among women aged 75 and over was similar to that in Croatia, Slovakia and Romania, and was only 32% higher than the EU level and 38% higher than in Austria.

The mortality rates for two age groups – the best-performing and the worst-performing internationally – are shown in *Figures 3* and *4*.

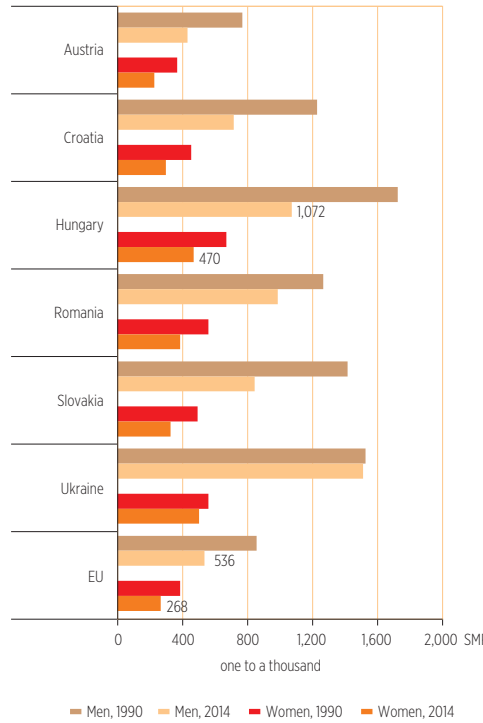
Figure 3: Infant mortality (deaths per 1,000 live births) in Hungary, some neighbouring countries and the European Union, 1990, 2014



Source: WHO Health for All Database.

International comparison supports the observations made in relation to the Hungarian trends: beside the remarkable decrease in mortality in the younger age groups (0–24 years), a decreasing (but relatively high) mortality among middle-aged groups and a slightly decreasing (but also relatively high) mortality among older age groups are characteristic of the age-specific mortality in Hungary.

Figure 4: Mortality of men and women aged 45–59 in Hungary, some neighbouring countries and the European Union, 1990, 2014

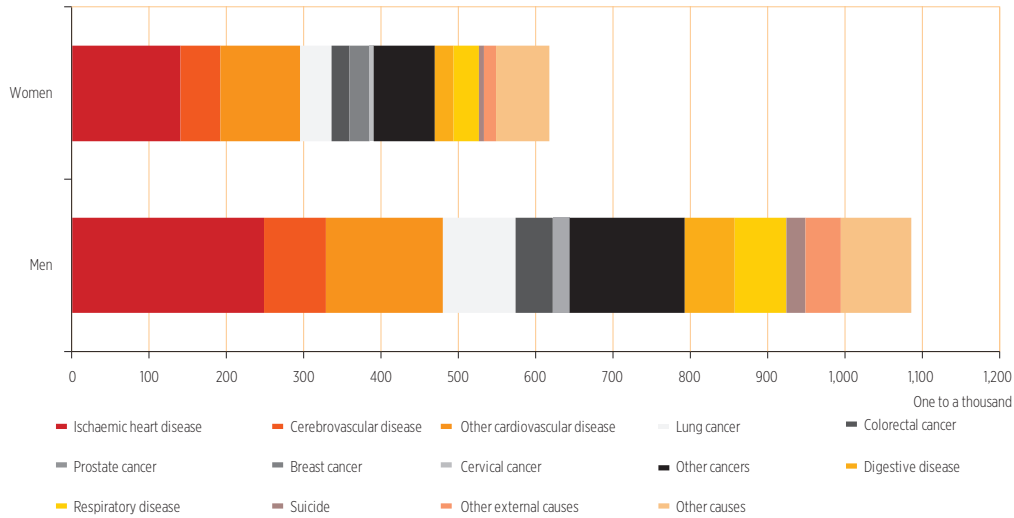


Source: WHO European Mortality Database.

CHANGES IN CAUSE-SPECIFIC MORTALITY

As in most European countries, the majority of individuals die from cardiovascular disease. However, in countries with higher life expectancy, the share of cancer (the second most significant cause of death in Hungary) is close to – or sometimes even exceeds – that of cardiovascular disease. Cardiovascular mortality in Hungary today shows a pattern seen earlier in some other countries: it is responsible for 44% of male and 48% of female mortality. Approximately

Figure 5: Composition of male and female mortality in Hungary, by main causes of death, 2016



Source: HCSO, demographic data; authors' calculations.

half of all cardiovascular causes of death involve ischaemic heart disease (the most common form of which is infarction), which accounts for 22% of total mortality. The other significant element of cardiovascular mortality is stroke mortality, which adds up to 7% (among men) and 8% (among women) of total mortality.

Some 29% (men) and 28% (women) of total mortality is due to cancer. Of the various cancers, lung cancer is the most common, being responsible for 9% of male and 7% of female deaths. Among the more common cancers, colorectal cancer should also be mentioned (4% among both sexes); 2% of male mortality is due to prostate cancer; 4% of female mortality is due to breast cancer and 1% to cervical cancer.

Digestive disease (including liver cirrhosis) is more common among men, causing 6% of deaths, as opposed to 4% among women. The proportion of mortality due to respiratory disease is 6% (men) and 5% (women).

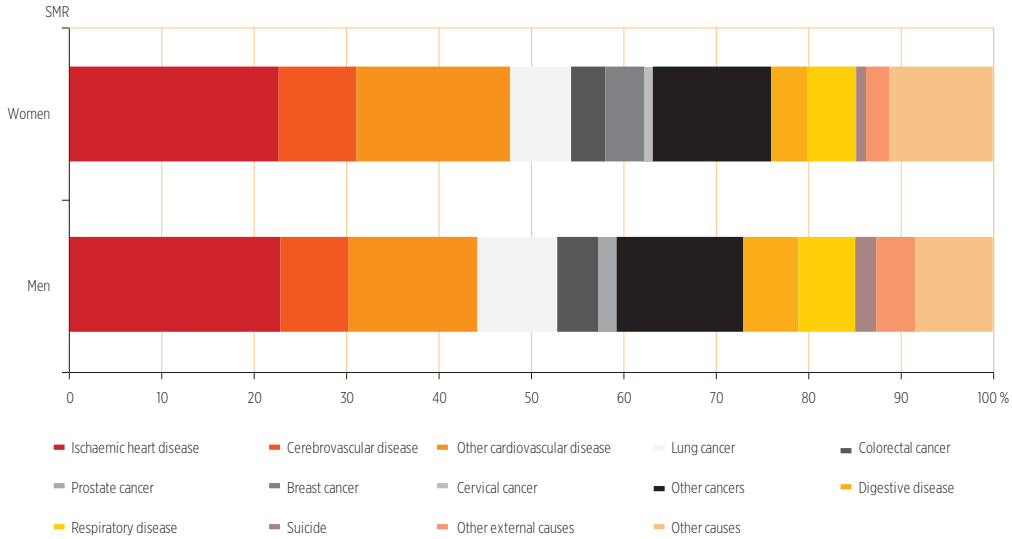
The proportion of deaths due to metabolic disease increased to 2.5% by 2016, largely as a result of diabetes (this cause of death does not feature in *Figure 6*).

The proportion of deaths due to mental disorders and diseases of the nervous system is increasing, being responsible for 4% of deaths in 2016 (this cause of death also does not feature in *Figure 6*).

Relatively few individuals die in Hungary from infectious disease, although certain infectious diseases can be temporarily significant. Such problems are discussed in the boxes below on 'Influenza' and 'A hospital outbreak of *Clostridium difficile*'.

Some 6.5% of men and 3.5% of women do not die as a consequence of any disease, but because of so-called external causes – mainly accidents (2% of total mortality), but also suicide (1%).

Figure 6: Composition of male and female mortality in Hungary, by main causes of death, %, 2016



Source: HCSO, demographic data; authors' calculations.

INFLUENZA

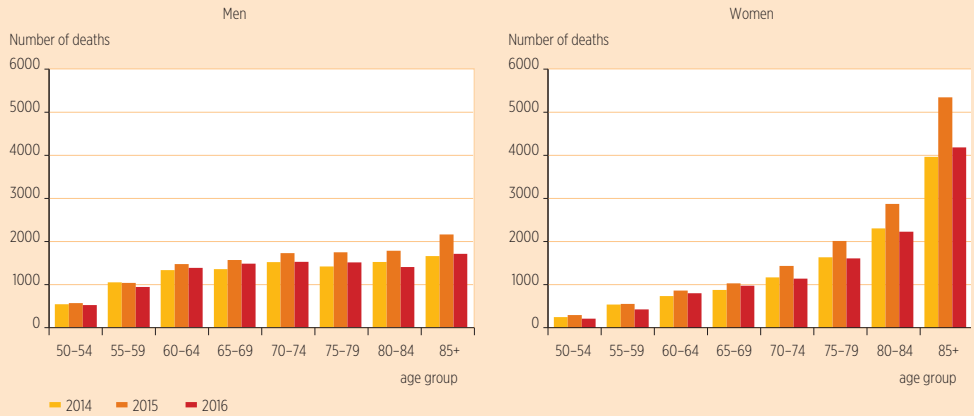
In 2015, almost 5,400 more individuals died in Hungary than in the previous year. Life expectancy at birth for women dropped from 78.91 to 78.61 years (HCSO 2016). There had not been such a decrease since the change of regime. This unexpected drop did not affect men: their life expectancy at birth remained basically the same between 2014 and 2015 (72.13 and 72.09 years, respectively). The mortality surplus can be attributed to mortality due to influenza and its complications. The 2015 epidemic affected almost every European country, and resulted in unusually high mortality among individuals aged 65 and over; typically, those with some kind of chronic (circulatory or respiratory) disease fell victim.

The influenza epidemic lasted from the third to the fourteenth week of 2015, peaking in the seventh week. In what follows, we compare the number of deaths in this period with the number in the corresponding period of 2014 and 2016. In 2015, most (85.6%, 4,662 cases) of the mortality surplus over 2014 (5,389 cases) occurred during the epidemic. Analysis of the age distribution of deaths clearly reveals that the 2015 figures for individuals aged 60 and over were higher for both sexes than in either the preceding or the following year.

The effect of the influenza epidemic can be better expressed numerically by determining the differences in the age-specific mortality rates or life expectancy changes by age group. In order to achieve this, we *decomposed*[6] the single-year life tables for 2014 and 2015 published by the HCSO, and then aggregated the results according to age group. The 0.1 yearly loss in life expectancy for men aged 65–84 was compensated for by a gain at a younger age, which explains the afore-mentioned zero growth. In the case of women, loss

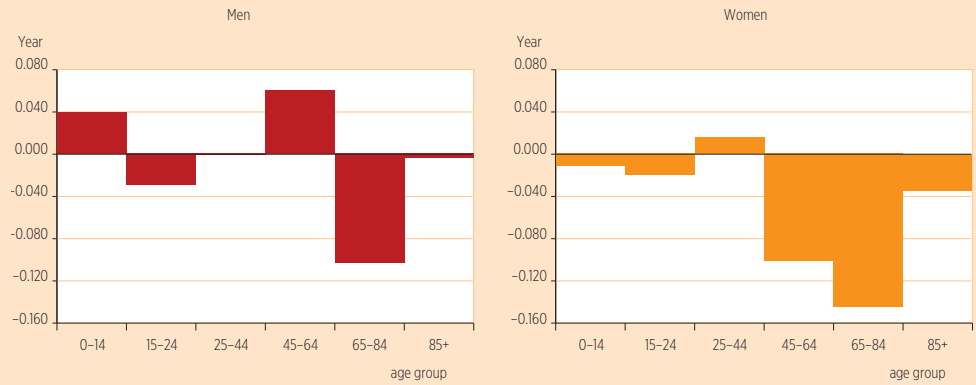
appeared only in age groups over 45, and was most significant among those aged 65–84. Surprisingly, the life expectancy loss was more moderate for women aged over 85.

Figure B4: Number of deaths between 12 January and 15 March 2014, 2015 and 2016



Source: HCSO, Vital Statistics.

Figure B5: Difference in life expectancy between 2014 and 2015, by age group



Source: HCSO, life tables for Hungarian male and female population, 2014, 2015; authors' calculations.

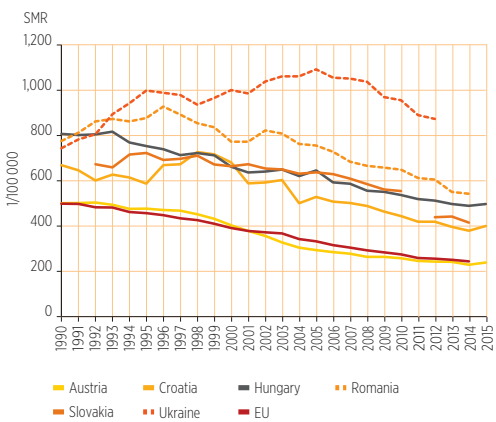
CARDIOVASCULAR MORTALITY

At the beginning of the 1990s, male mortality due to cardiovascular disease across Western Europe (and to an almost identical degree in Austria) was approximately 500 per 100,000 men, which was the result of a declining trend that began in the 1970s. This trend continued after 1990, and as a consequence, by 2014 the rate had dropped to half (224 per 100,000) of the 1990 level. This steadily declining trend continued until the middle of the 2000s, when it became more dynamic. In Hungary and

the neighbouring countries included in this analysis, mortality due to such causes was significantly higher in 1990 than elsewhere in Europe (ranging from 658 per 100,000 to 812 per 100,000, with 782 per 100,000 in Hungary), and was even increasing in the majority of those countries. The decreasing tendency only began during the 1990s, and specifically – in the case of Hungary – from 1993 *(Figure 7)*.

Since then, cardiovascular mortality has shown an almost uninterrupted decrease among Hungarian men, with the most dynamic period between 2005 and 2011. By 2014, male cardiovascular mortality had dropped to 60% of the initial (1990) level. The difference compared to the EU mortality rate (310 per 100,000 in 1990) did not change for a long time, but began to narrow during the 2000s, and by 2014 it had fallen to approximately 240 per 100,000. The male cardiovascular mortality rate of 540 per 100,000 in 2014 was somewhat higher than the 1990 EU level, and much higher than the 2014 Slovak and Croatian levels, but lower than the Romanian and Ukrainian levels *(Figure 7)*.

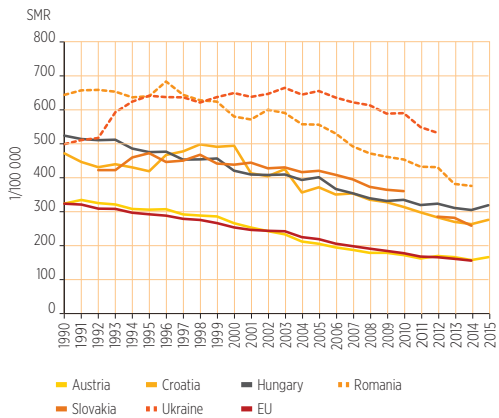
Figure 7: Mortality caused by cardiovascular disease in Hungary, some neighbouring countries and the European Union, men, 1990–2015



Source: WHO European Mortality Database; WHO Detailed Mortality Database.

Cardiovascular mortality among Western European women also decreased significantly – from 320 per 100,000 in 1990 to 155 per 100,000 in 2014 (a decrease of 52%). The tendency was basically steady during the two and half decades under consideration. In 1990, female cardiovascular mortality was in the range 400–650 per 100,000 in the neighbouring countries: the Hungarian level of 524 per 100,000 was higher than among Ukrainian, Slovak and Croatian women, but lower than among Romanian females. During the Yugoslav Wars, Croatian mortality increased. In other countries, however, with the exception of Ukraine, cardiovascular mortality began to decrease among women during the 1990s. The current cardiovascular mortality of Hungarian women is higher than the level in Slovakia and Croatia, but lower than in Ukraine and Romania *(Figure 8)*.

Figure 8: Mortality caused by cardiovascular disease in Hungary, some neighbouring countries and the European Union, women, 1990–2015



Source: WHO European Mortality Database; WHO Detailed Mortality Database.

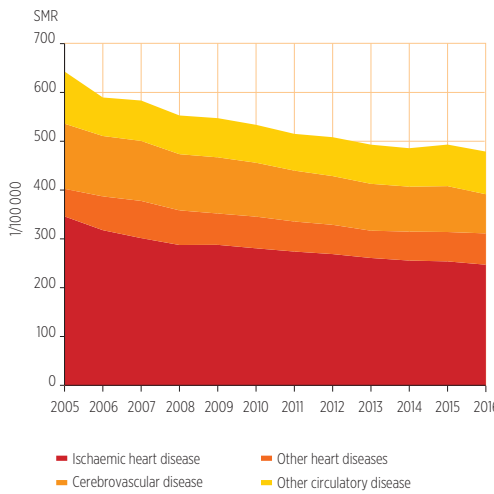
Cardiovascular mortality (which has the biggest effect on general mortality) has improved considerably among women in absolute (if not in relative) terms. By 2014,

there had been an absolute reduction in the difference between Hungary and the EU: male mortality in Hungary was 242 per 100,000 higher than the EU average (compared to 310 per 100,000 higher in 1990) and female mortality was 150 per 100,000 higher (compared to the initial 201 per 100,000 higher). However, the relative differences have increased: both male and female mortality in Hungary was 160% of the EU level in 1990; by 2014 this had increased to 204% in the case of men and to 196% in the case of women.

While international comparison reveals barely any change in Hungarian cardiovascular mortality relative to the EU, in absolute terms it decreased sharply in the two and a half decades from 1990 to 2016: the 2016 level was 59% of the 1990 level in the case of men and 56% in the case of women. The main reason for this decrease has been the dramatic fall in cerebrovascular mortality (i.e. stroke). A more detailed description can only be made regarding the period between 2005 and 2016: any further back it becomes difficult to determine the exact proportions, due to changes introduced in the coding of cause of death. Nonetheless, despite the inaccurate data, trends can be discerned with regard to the most important groups of diseases.

The most significant group within cardiovascular diseases (*Figures 9* and *10*) – ischaemic heart disease (analysis of which is often used to determine how advanced the epidemiological transition is) – generally stagnated during the period before 2005. However, subsequently a new, declining trend appeared: among men, the 2016 level was only 71% of the 2005 level; and the same was true for women, with the 2016 mortality rate only 69% of the 2005 level. The decrease among men was more dynamic between 2005 and 2009, moderating thereafter. The initially dynamic decrease among women also decelerated after 2010, but overall continued – with just a blip (a temporary increase) in 2015. Mortality due to 'other heart diseases' did not show a definite trend among either men or women, and fluctuated at between 55 per 100,000 and 76 per 100,000 among men and 28 per 100,000 and 40 per 100,000 among women. The most obvious and dynamic decrease among both men and women was that of cerebrovascular mortality. Mortality rates as a consequence of diseases commonly referred to as stroke dropped to 60% and 57% of the 2005 levels. Additionally, this steady decrease continued a previous trend. Mortality due to other cardiovascular diseases (aortic stenosis and other vascular diseases) also decreased, although by only 16–18% over the decade and a half under consideration.

Figure 9: Composition of cardiovascular mortality in Hungary, men, 1990–2016



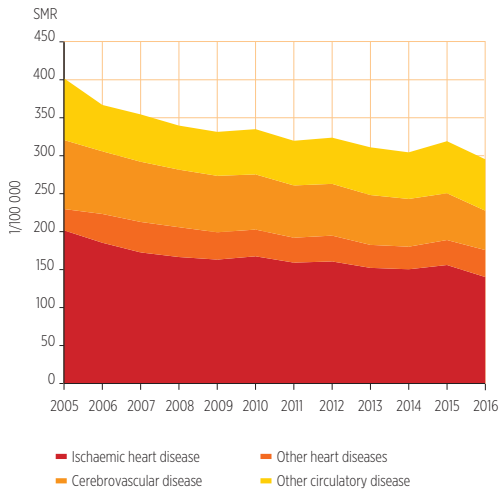
Source: WHO European Mortality Database.

Therefore, the improvement with regard to cerebrovascular mortality is significant; and this is also apparent (albeit to a lesser extent) in the case of ischaemic heart disease. While the former can be viewed as a continuation of a previous trend, the

latter is a more recent phenomenon dating from the mid-2000s. Since the primary risk factor for cerebrovascular disease is high blood pressure, mortality trends are probably a result of more successful hypertension control. The slowly decreasing trends in ischaemic heart disease might also indicate improvement in cardiac treatment and a shift towards a healthier lifestyle. However, the decreasing tendency has been less dynamic in recent years, with either no or minimal positive change in so-called risk factors (see the chapter on 'Health status'). A direct parallel can be drawn between the less dynamic decrease and the gradually deteriorating indicators with regard to the quality of health care. The most commonly used such indicator is mortality within 30 (or 365) days after a heart attack. In what follows, only the information available on 30-day survival will be discussed. In 2008, of the 23 OECD countries included in the analysis, mortality within 30 days was highest in Hungary (OECD Health at a Glance 2016). According to an overview of the Hungarian healthcare system (Gyenes 2016), the 30-day survival indicator improved slightly between 2011 and 2014, but stagnated at around 85% between 2014 and 2015. However, according to the OECD findings, this survival indicator was already at around 90–95% in 2013 in the countries that provide data. There are no more recent figures available for Hungary, although the 30-day survival indicators do indicate a serious problem with regard to the quality of treatment – even if there are comparability issues.

In 2016, 62,846 individuals died in Hungary as a consequence of cardiovascular disease. If cardiovascular mortality had been at the Austrian level, there would have been 31,677 such deaths – i.e. over 30,000 fewer people would have died (the exact estimate is 31,169).

Figure 10: Composition of cardiovascular mortality in Hungary, women, 1990–2016



Source: WHO European Mortality Database.

Cancer mortality

Among those countries included in the present study, cancer mortality is highest in Hungary among both men and women. Between 1990 and 2014, male cancer mortality decreased by only 15%, while in the EU it fell by almost a quarter. Consequently, in comparison to the EU, cancer mortality among Hungarian men was 29% higher in 1990 and 45% higher in 2014. Cancer mortality is also high among women: in 1990 it was 14% higher than the EU level, and 37% higher in 2014; and although it shows a moderately decreasing tendency, as in other countries, it was still higher throughout the period considered.

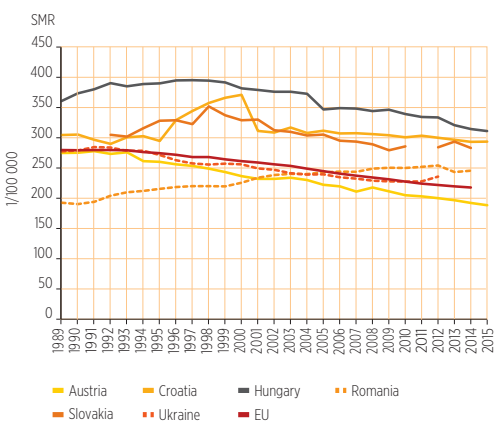
Cancer mortality was steady across the EU during the given time frame. However, a decrease in mortality due to tumours among Hungarian men and women only began in the late 1990s (*Figures 11* and *12*).

WOMEN AND CARDIOVASCULAR DISEASE

International academic literature lays great emphasis on the situation of women in relation to cardiovascular disease. It was in the 1980s that some voiced their concerns about the problems caused by the overrepresentation of men in cardiovascular drug research in the United States. In 1991, the director of the National Institutes of Health published her famous study about the so-called 'Yentl' syndrome, which – claimed the author – reflects the nineteenth-century medical attitude, according to which the female body is the equivalent of the male body, but with female genitalia (Healy, 1991). Since 1991, the healthcare authorities in the US have examined whether determining the efficiency of treatment takes into account the differences between men and women.

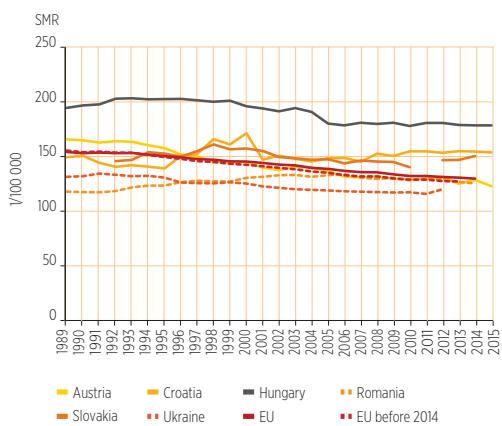
As was revealed by the MONICA project – which aimed at evaluating the results of the first decade of the new treatment regime for heart disease in Europe – there was a smaller mortality gain among women (Tungstall-Pedoe et al. 2000). Later several interesting studies on other issues were also written, highlighting the disadvantages of women; according to these, it would seem that the perception and presentation of symptoms, diagnosis, treatment received and the whole process of illness management differ for men and women. Generally, it can be said that cardiovascular problems in women are more difficult to identify (Galick et al. 2015), are more often diagnosed as psychosomatic, and display more uncertainty during treatment. A recent Swedish study reported that mortality among hospital patients with acute infarction was higher among women than among men; however, controlling mortality by the number of procedures undergone shows that mortality becomes more even: thus, the higher mortality is a result of less-intensive treatment (Alabas et al. 2017). No relevant study has been carried out in Hungary regarding this matter.

Figure 11: Cancer mortality in Hungary and some neighbouring countries, men, 1989–2015



Source: WHO European Mortality Database; WHO Detailed Mortality Database.

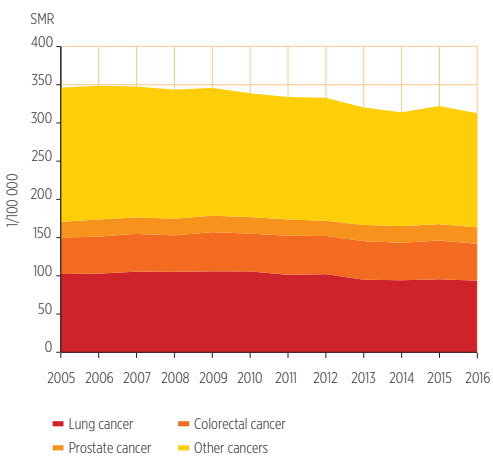
Figure 12: Cancer mortality in Hungary and some neighbouring countries, women, 1989–2015



Source: WHO European Mortality Database; WHO Detailed Mortality Database.

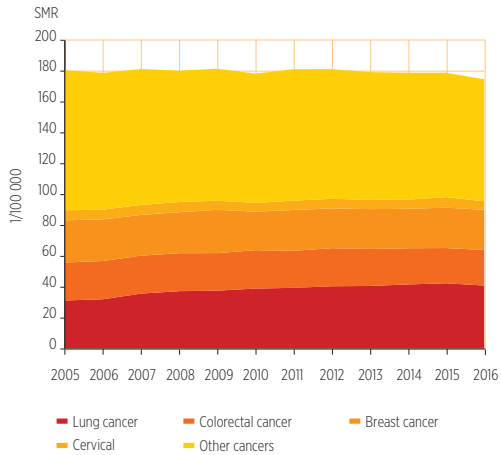
A reliable analysis of cancer mortality is possible for the period following 2005 (*Figures 13* and *14*). During the decade and a bit under consideration, almost a third of cancer mortality among men was a result of lung cancer. Lung cancer mortality was high during the first half of this period (fluctuating at between 102 per 100,000 and 106 per 100,000); then in 2013, it dropped by 7–8% and has since remained at the same level (94–95 per 100,000). Mortality due to colorectal cancer also does not reveal a clear tendency, fluctuating at between 47 per 100,000 and 50 per 100,000. The mortality rate due to prostate cancer, the third most significant cause of death considered here, did not change significantly, fluctuating at 20–22 per 100,000. However, mortality due to other cancers decreased by 15%, which is a result of a favourable tendency regarding other, less-common cancers. It is important to note that an improvement in treatment methods is crucial in the case of such tumours, while in relation to the three aforementioned forms of cancer, it is primarily prevention and screening that could help reduce mortality.

Figure 13: Structure of cancer mortality in Hungary, men, 2005–2016



Source: WHO European Mortality Database.

Figure 14: Structure of cancer mortality in Hungary, women, 2005–2016



Source: WHO European Mortality Database

Female cancer mortality decreased by only a few percentage points during the period under consideration. This decrease can also be attributed to favourable changes with regard to less-common cancers. Regarding the more-common cancers, a very uncertain and slight improvement can be detected for colorectal and breast cancer. However, there is a significant increase (of 30% from 2005 to 2016) in mortality due to lung cancer. This increase occurred in the period up to 2012; since then, female mortality from lung cancer has stagnated. Therefore, we cannot detect an obvious decreasing tendency regarding cancers that can be linked to prevention or screening.

Nonetheless, it is possible to analyse broader tendencies and long-term changes between 1990 and 2014 in terms of the importance of specific cancers.

The positive trends visible among men are mainly the result of a decrease in mortality from stomach cancer. Most stomach cancer is of infectious origin; consequently, this phenomenon indicates a drop in infections. A similar change

Table 3: Changes in the structure of cancer mortality in Hungary and the European Union, 1990–2014

	Types of cancer with increasing dynamics between 1990 and 2014	Types of cancer with decreasing dynamics between 1990 and 2014
Hungarian men		Stomach cancer ↓↓↓ Lung cancer ↓↓
EU men	Liver cancer ↑	Lung cancer ↓↓↓ Stomach cancer ↓ Colorectal cancer ↓
Hungarian women	Lung cancer ↑↑↑	Stomach cancer ↓↓ Breast cancer ↓↓ Colorectal cancer ↓↓
EU women	Lung cancer ↑↑	Stomach cancer ↓↓ Breast cancer ↓↓ Colorectal cancer ↓

Source: WHO European Mortality Database; authors' calculations .
Megjegyzés: the number of arrows indicates the intensity of the decreasing or increasing dynamics
↓↓↓: at least 20/100,000 (men) and 10/100,000 (women) estimated decrease in the given period
↓↓: at least 10/100,000 (men) and 5/100,000 (women) estimated decrease in the given period
↓: other decrease
↑↑↑: at least 20/100,000 (men) and 10/100,000 (women) increase in the given period
↑↑: at least 10/100,000 (men) and 5/100,000 (women) increase in the given period
↑: other increase

has occurred within the EU, although the intensity of the decrease has been smaller, due to the lower initial stomach cancer mortality rate. The decrease in cancers that are preventable with screening and a health-conscious lifestyle has been significant within the EU, whereas the change in Hungary has been only slight *(Table 3)*.

With regard to female cancer mortality, the majority of changes have been positive across the EU: the decline in mortality due to stomach, breast and colorectal cancer has been more intensive than the slight increase in mortality due to lung cancer. Similar changes occurred with regard to Hungarian women, although the intensity of the increase in lung cancer mortality was approximately the same as the intensity of the decrease in mortality due to all other cancers; therefore, female cancer mortality stagnated.

The indicators of successful treatment currently available are from 2012. The rate of survival for five years among those diagnosed with cancer was 42%, which is similar to the figures (ranging from 32% to 46%) for other Balkan and Eastern European countries. However, the survival rate in Slovakia, Austria and the Czech Republic is over 50%, and in eight Western European countries it exceeds 60% (Euro Health Consumer Index 2016). The different structure of cancer mortality might partially explain the low survival rate, since the proportion of lung cancer (which is more difficult to treat) is higher in Hungary. However, more recent data from the OECD for 2013 reveal a significant deficit with regard to the equipment of the healthcare system. For example, whereas in European countries there are 20–40 CT scanners per million inhabitants, in Hungary the figure is 7.9.

Some 32,987 individuals in Hungary died as a consequence of cancer in 2016. If cancer mortality had been at the Austrian level, there would have been only 22,181 such deaths; that is, there would have been 10,806 fewer deaths.

Mortality due to diseases of the digestive system

A significant proportion of mortality from diseases of the digestive system is due to cirrhosis of the liver. The occurrence and severity of this is related to viral hepatitis, but the coding of hepatitis was significantly modified in 2012. Consequently, it is not possible to draw up long-term tendencies here. Therefore, an international comparison of the Hungarian situation will only be made with regard to 2014. Nonetheless, an analysis of previous trends clearly reveals that mortality due to digestive diseases, and more specifically alcoholic cirrhosis, is on the decline in Hungary among both men and women.

In light of the 2014 data, this cause of death is responsible for proportionally more cases in Hungary than across the EU. Among men, the Hungarian mortality rate is twice as high as the EU level, and 240% of the Austrian level. It exceeds the Croatian level by 40% and the Slovakian level by 11%, although it is slightly lower than the Romanian and Ukrainian levels.

Among women, mortality exceeds the EU and Croatian level by 48% and the Austrian level by 109%; however, it is lower than the Ukrainian and Romanian levels, and is almost identical to the Slovakian level. In 2016, mortality due to this cause of death (i.e. diseases of the digestive system) was 64.64 per 100,000 among men and 24.16 per 100,000 among women in Hungary.

Table 4: Mortality due to digestive disease in Hungary, some neighbouring countries and the European Union, 2014–2015

(standardized mortality rate[6], per 100,000)

	Men 2014	Women 2014	Men 2015	Women 2015
Austria	28.9	13.7	28.7	14.2
Croatia	49.9	19.2	47.9	19.9
Hungary	69.6	28.6	60.1	25.3
Romania	72.2	35.7	77.0	36.1
Slovakia	62.3	28.3	n. a.	n. a.
Ukraine	74.8	30.9	n. a.	n. a.
EU	34.9	19.3	n. a.	n. a.

Source: WHO European Mortality Database; WHO Detailed Mortality Database.
n. a.: no data.

In 2016, 6,202 individuals died across the country as a consequence of digestive disease. If mortality had been at the Austrian level, only 2,993 such deaths would have occurred; that is, there would have been 3,209 fewer deaths.

Mortality due to diseases of the respiratory system

Of the respiratory diseases, pneumonia is the best known; but they also include asthma, chronic bronchitis and other chronic respiratory diseases. The trends are more or less obvious; however, it should be noted that the methodological changes made in 2005 with regard to determining the cause of death and the disease that directly resulted in death may slightly alter the results, and therefore trends can only be plotted for the past decade.

Regarding mortality related to diseases of the respiratory system, Hungary showed a favourable picture in 1990. The relevant mortality rate was approximately that of

Table 5: Mortality caused by respiratory diseases in Hungary, some neighbouring countries and the European Union, 2014–2015

(standardized mortality rate, per 100,000*)*

	Mortality caused by respiratory diseases 1/100 000									
	Men					Women				
	1990	2000	2010	2014	2015	1990	2000	2010	2014	2015
Austria	61.4	49.3	39.7	33.2	38.0	26.9	24.2	20.1	16.6	20.1
Croatia	46.9	69.1	47.0	48.0	53.3	17.2	28.1	17.1	17.3	22.7
Hungary	91.3	62.5	65.0	66.4	67.1	35.8	26.3	28.7	31.6	38.5
Romania	140.6	92.1	72.8	68.2	77.4	78.3	47.9	31.0	29.1	33.7
Slovakia	109.6[a]	80.3	77.9	61.6	n. a.	56.5[a]	37.5	36.1	26.0	n. a.
Ukraine	121.1	128.1	64.1	50.7	n. a.	38.8	31.6	15.3	11.8	n. a.
EU	90.1	77.4	57.8	55.1	n. a.	39.7	38.4	30.1	29.5	n. a.

Source: WHO European Mortality Database; WHO Detailed Mortality Database.
[a] 1992; n. a.: no data.

the EU for both men and women. However, it was higher than the figures for Austria and Croatia. Between 1990 and 2000, mortality rates fell significantly in each country considered (with the exception of men in Ukraine), and this tendency continued during the 2000s – apart from in Hungary. Between 2010 and 2014, the mortality rate from respiratory disease continued to stagnate in Hungary, unlike in neighbouring countries, where levels decreased further.

Following the remarkably high rates of 2015, the 37.06 per 100,000 mortality for men and 32.80 per 100,000 mortality for women indicated a return to normal levels. Most probably, the remarkable figures of 2015 were due to the flu epidemic (see the box on 'Influenza'). Apart from smoking, respiratory mortality is affected by environmental factors, primarily air pollution. Inadequate air quality affects cardiovascular mortality, but primarily increases the risk of death due to respiratory disease.

According to OECD calculations,[2] in 2014 for every 100,000 individuals aged 0–69 years, 5,056.4 years were potentially lost in Hungary (known as premature death). According to the findings of the European Environment Agency, for every 100,000 individuals the number of years lost due to premature death in Hungary is 1,128 for particulate matter; 133 for nitrogen dioxide; and 38 for ozone level compared to the most favourable European levels. According to these moderate estimates, the number of years lost due to inadequate air quality is at least 1,300 for every 100,000 individuals, which constitutes 25.7% of premature deaths (European Environment Agency 2017).

In all, there were 7,205 deaths due to respiratory diseases in 2016. If the Austrian mortality rate were applied to Hungary, only 4,323 deaths would have occurred – 2,882 fewer than the actual figure.

[2] See https://data.oecd.org/healthstat/potential-years-of-life-lost.htm

Mortality due to external causes

Death due to not illness, but to some other ('external') cause – usually some form of accident – is decreasing considerably across Europe. Among accidents, we differentiate between road accidents and other accidents: the majority of the latter are so-called accidental falls, which lead to the death of many elderly individuals. Non-accidental external mortality includes deaths caused by homicide and suicide. The number of individuals dying because of suicide is considerably higher than the number of individuals falling victim to homicide. With regard to Hungary, especially in recent history, the proportion of suicides has been remarkably high in international terms. Therefore, only all deaths due to external causes and suicide will be considered in our analysis.

In case of mortality due to external causes – deviating slightly from the previous practice – we chose 1991 as the starting point, in order to illustrate – if not entirely present – the effects of war through Croatia's example. The high Croatian mortality of 1991 eventually dropped to almost the level of Slovakia. Mortality due to external causes halved in almost every European country among both men and women. The relative decrease in Hungary was even more significant: mortality due to external causes in 2014 was 42% of the 1991 level among men and 32% among women.

In 2016, mortality due to external causes in Hungary was 70.4 per 100,000 among men and 22.3 per 100,000 among women,[3] which means that there has been no let-up in the slowly decreasing trend of recent years.

Comparison of the data in *Tables 6* and *7* clearly shows that in 1991 approximately a third of mortality due to external causes in Hungary involved suicide. By 2014 mortality due to suicide had fallen to 45% of its 1991 level among men – the most significant relative decrease of all the countries considered. The decrease was also significant among women: the 2014 level was 38% of the 1991 level.

Comparison of mortality due to suicide and external causes reveals that favourable tendencies apparent in the latter category

Table 6: Mortality due to external causes in Hungary, some neighbouring countries and the European Union, 1991–2015

(standardized mortality rate, per 100,000*)*

	Men					Women				
	1991	2000	2010	2014	2015	1991	2000	2010	2014	2015
Austria	94.3	73.8	57.1	51.3	53.0	32.6	25.7	20.2	19.7	20.8
Croatia	244.7	104.5	77.6	66.9	69.3	59.6	32.8	30.0	27.2	28.8
Hungary	170.8	124.3	90.4	73.9	73.3	68.9	45.6	29.2	23.2	23.9
Romania	115.3	101.3	87.1	67.1	71.6	37.7	29.3	22.2	15.9	17.6
Slovakia	122.46[a]	97.2	84.3	80.6	n. a.	38.1[a]	22.3	19.5	24.0	n. a.
Ukraine	205.2	258.5	154.4	149.4	n. a.	46.7	54.4	33.2	30.7	n. a.
EU	87.6	69.3	54.4	49.8	n. a.	32.2	24.7	19.0	17.6	n. a.

Source: WHO European Mortality Database; WHO Detailed Mortality Database.
[a] 1992; n. a.: no data.

[3] Authors' calculations.

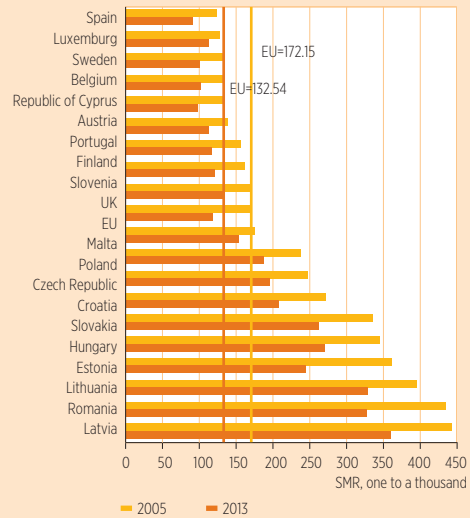
AVOIDABLE MORTALITY

So-called avoidable mortality is a composite indicator of complex, age- and *cause-specific rates*[G], which is most often used to measure the efficiency of a given healthcare system. This indicator expresses the mortality from illnesses that are curable with already available (and not too expensive) methods – at least up to a certain age. This definition takes into account the fact that the list of causes of death might have to be extended from time to time. The original list (compiled in 1976 in the United States) has already been revised on numerous occasions. Today two subcategories of avoidable mortality are used: indicators of treatable and preventable causes. The list of preventable causes contains diseases that primarily relate to certain aspects of lifestyle (death due to lung cancer, for example). Treatable causes generally include medically treatable causes less directly influenced by lifestyle (appendicitis being a common example). In 2015, the European Union introduced treatable mortality among the indicators used to evaluate European healthcare systems.

The list of treatable causes of death accepted by Eurostat currently includes 29 diseases, the impact of one of which, however – namely ischemic heart disease – is debated. Due to the fact that it is affected by lifestyle-related factors, only a certain percentage (usually 50%) of deaths caused by this disease are taken into account in calculations of avoidable mortality.

According to a recently published study by Weber and Clerc (2017), only Latvia, Romania, Lithuania and Bulgaria have higher mortality rates due to treatable causes than does Hungary. The level is similar in Slovakia and Estonia, but much lower in Poland, the Czech Republic and Croatia. Comparison of the 2005 and 2013 figures clearly reveals that this indicator is much lower (approximately 100 per 100,000) in Western countries. By 2013, Poland, the Czech Republic and Croatia had levels of approximately 200 per 100,000; Slovakia, Hungary and Estonia had approximately 250 per 100,000; and Lithuania, Latvia and Romania approximately 300–350 per 100,000. Although the figure below clearly shows that there is a distinct line between Eastern and Western countries regarding treatable causes of death, it is possible to significantly reduce the level of treatable causes in the 'Eastern' countries. This is exemplified by the case of Estonia. From a longer perspective, the Czech Republic has also been successful in reducing treatable mortality.

Figure B6: Mortality due to treatable causes in some European countries, 2005, 2013



Source: Weber and Clerc (2017).

Table 7: Suicide mortality in Hungary, some neighbouring countries and the European Union, 1991–2015

(standardized mortality rate, per 100,000*)*

	Men					Women				
	1991	2000	2010	2014	2015	1991	2000	2010	2014	2015
Austria	33.9	28.4	20.8	20.1	18.8	10.2	8.9	5.6	5.8	5.1
Croatia	34.5	35.2	24.3	22.5	22.7	11.8	9.2	6.5	6.7	6.7
Hungary	58.7	49.1	37.5	27.9	26.5	18.0	12.2	8.5	6.9	7.0
Romania	15.4	21.4	20.8	15.9	17.7	4.5	4.2	3.7	2.3	2.8
Slovakia	27.6[a]	23.3	19.4	16.6	n. a.	5.3[a]	4.7	3.0	2.6	n. a.
Ukraine	37.0	52.3	33.1	30.0	n. a.	7.5	8.7	5.3	5.6	n. a.
EU	21.2	19.3	16.7	16.0	n. a.	6.6	5.4	4.4	4.3	n. a.

Source: WHO European Mortality Database; WHO Detailed Mortality Database.
[a] 1992; n. a.: no data.

can be attributed to the decrease in the suicide rate, although positive changes regarding other components (primarily accidents and other deaths) also contributed to the favourable trend. Hungarian trends fit well with the otherwise divergent European tendencies. The once remarkable suicide rate is still high in European terms, but is no longer outstanding.

In *Tables 6* and *7*, Ukraine exemplifies those unfavourable tendencies – typical primarily of Eastern European countries – which reveal a high suicide rate and a slowly decreasing mortality due to external causes. The suicide rate of Hungarian men was twice as high as the EU average in 1991, but in 2014 only exceeded it by 48%. Mortality due to external causes shows a similar pattern, which indicates that improving work and (primarily) road safety contributes significantly to the favourable tendencies.

In 2016, the suicide mortality rate was 24.5 per 100,000 among Hungarian men and 6.6 per 100,000 among Hungarian women. These numbers indicate that the relevant trends are continuing to decline.

In 2016, 5,699 individuals died in Hungary as a consequence of external causes. If mortality had been at the Austrian level, this figure would have been only 4,329: that is, 1,370 fewer. The number of suicides in 2016 was 1,762. If the Austrian suicide rate applied to Hungary, there would have been only 1,273; that is, 489 fewer such deaths.

A HOSPITAL OUTBREAK OF *CLOSTRIDIUM DIFFICILE*

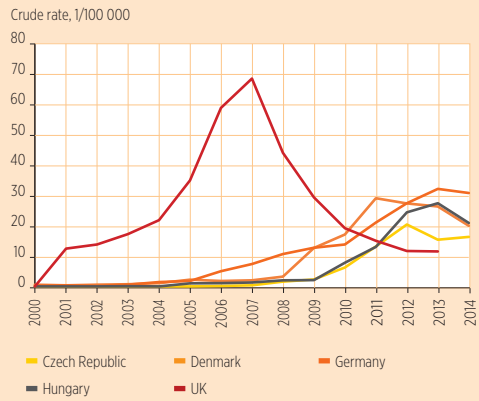
There has been significant public interest in hospital infections in recent years. These can include a wide range of diseases; but in this case, we focus on only one of the most lethal forms of intestinal infection – that caused by the so-called *Clostridium difficile* bacterium. The infection causes constant diarrhoea, nausea and high temperature. Certain forms are resistant to antibiotics. Although the bacterium has long been known, and its disease-inducing nature was recognized in 1976, the number of outbreaks has only risen since 2001.

With regard to Hungary, it is uncertain how precisely hospital outbreaks of the disease are recorded. *Table B1* shows the frequency of the disease as the main underlying cause of death, according to mortality statistics, although the infection itself is probably responsible for a higher number of deaths.

According to relevant literature, death and illness caused by *Clostridium difficile* is more frequent in women, and according to *Table B1*, this is also true in the case of Hungary.

International comparison shows that before 2000 there were only sporadic deaths in European countries that were attributed to the disease. The disease remained sporadic in many countries; however, in certain areas it caused the death of hundreds, or even thousands, of individuals. *Table B2* show the countries where the *crude mortality rate*[G] exceeded 1 per 100,000 in any year between 2000 and 2015.

Figure B7: Features of deaths caused by Clostridium difficile in the five worst-affected European countries, 2000–2015



Source: WHO Detailed Mortality Database.

Table B1: Number of deaths in Hungary directly or indirectly caused by Clostridium difficile bacterium (cause of death code A04.7), 2003–2016

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Men	0	0	5	4	3	11	3	34	55	95	92	78	92	53
Women	1	0	5	7	10	9	18	44	75	148	180	129	159	126
Total	*1*	*0*	*10*	*11*	*13*	*20*	*21*	*78*	*130*	*243*	*272*	*207*	*251*	*179*

Source: WHO Detailed Mortality Database.

Table B2: Mortality rates caused by Clostridium difficile bacterium in the five worst-affected European countries, 2000–2015

	Calendar year with the highest number of cases	Cause-specific crude mortality rate (per 100,000) in the year with the highest number of cases	Proportion of women among deceased between 2000 and 2015
Czech Republic	2012	2.046	60
Denmark	2011	2.908	61
Germany	2015	3.244	60
Hungary	2015	2.763	63
UK	2007	6.823	65

Source: WHO Detailed Mortality Database.

Many scientists attribute the increase in the frequency of *Clostridium difficile* infections to increased use of antibiotics; the frequency is then kept at a high level due to inappropriate hospital hygiene. The data and *Figure B7* suggest that the frequency of this disease might be much higher than has yet been experienced in Hungary, although the United Kingdom (which was affected by the disease much more seriously than Hungary in 2007) was able to reduce the number of cases within a couple of years.

SUMMARY

The most significant feature of the years following 2013 is the break in the declining trend of cardiovascular mortality. Apart from 2015, a year with an exceptionally high number of deaths (65,493), figures from 2013 (62,979), 2014 (62,786) and 2016 (62,846) are almost identical, while previously the number of such deaths was decreasing by approximately 1,500 cases annually. The moderate fluctuation in life expectancy was only affected by changes in infectious and respiratory mortality, which involved a fluctuation of 100–200 cases annually. Cancer mortality also stagnated at approximately 32,750 victims annually between 2013 and 2016, although in 2016 the figure rose to 32,987 (primarily as a consequence of an increasing number of prostate and breast cancer cases). Small-scale positive changes (primarily a decline in mortality from external causes) were negated by small-scale increases as part of long-term trends (an increase in deaths caused by diabetes, dementia and Alzheimer's disease). Consequently, mortality figures, with the exception of a peak in 2015 (131,697), barely changed for the period after 2013 (2013: 126,778; 2014: 126,308; 2016: 127,053).

Long-term mortality trends in Hungary are ambiguous. Although mortality from cardiovascular causes began to decrease, that has not continued in recent years. From a long-term perspective, the decrease is slow and not dynamic enough to compensate for the increase in mortality due to certain selected causes of death. A common feature of long-term trends and

the current situation is that the number of deaths caused by cancer is not decreasing. The level of lung and colorectal cancer is stable, which indicates both little shift towards a healthier lifestyle and deficiencies in health care.

A long-term trend also typical of other countries is an increase in the number of deaths due to mental behaviour problems and diseases of the nervous system (most importantly Alzheimer's and Parkinson's diseases); the number is still low, but it began to increase in 2015. Screening and prevention seem to be losing their significance, as is indicated by the moderate increase in prostate and breast cancer mortality in recent years and the exceptionally high mortality of 2015 due to influenza. In order to guarantee constantly increasing life expectancy, not only is a shift towards a healthier lifestyle and significantly better access to (and quality of) cardiological and oncological screening necessary, but so also is a different attitude towards public health care and the re-evaluation of the role of prevention.

GLOSSARY

Crude mortality rate: The ratio of the number of deaths and the size of the given population.

Age-specific mortality rate: The ratio of the number of deaths within a given age group and the number of individuals belonging to that age group.

Standardized mortality rate (SMR): Composite indicator that expresses the difference between age-specific mortality rate sequences from two different populations. It indicates the degree of mortality if the two populations had the same age structure.

Cause-specific mortality rate: The ratio of the number of deaths from a given cause in relation to the total population. Usually used age specifically.

Life expectancy at birth: A composite indicator of different age-specific mortality rates, usually calculated for a given year. It shows how long individuals born in a given year can expect to live if the mortality rate for the given year applied to their entire life.

Decomposition: Demographic tool that illustrates how mortality differences by various age bands contribute to the life expectancy differences among groups compared. The life expectancy differences can be decomposed not only by age, but also by cause of death.

REFERENCES

Alabas, O. A. – Gale, C. P. – Hal, M. et al. (2017): Sex differences in treatments, relative survival, and excess mortality following acute myocardial infarction: National cohort study using the SWEDEHEART registry. *Journal of the American Heart Association*, 6(12).

European Environment Agency (2017): *Air quality in Europe — 2017 report*. EEA Report, No 13/2017. Publications Office of the European Union, Luxembourg.

Euro Health Consumer Index (2016): *Euro Health Consumer Index 2016. Report*. Health Consumer Powerhouse.

Fihel, A. – Pechholdová, M. (2017): Between 'Pioneers' of the Cardiovascular Revolution and Its 'Late Followers': Mortality Changes in the Czech Republic and Poland Since 1968. *European Journal of Population*, 33(5): 651–678.

Galick, A. – D'Arrigo-Patrick, E. – Knudson-Martin, C. (2015): Can Anyone Hear Me? Does Anyone See Me? A Qualitative Meta-Analysis of Women's Experiences of Heart Disease. *Qualitative Health Research*, 25(8), 1123–1138.

Gyenes, P. (ed.) (2016): *A magyar egészségügyi rendszer teljesítményértékelési jelentése 2013–15. [Performance Evaluation of the Hungarian Healthcare System 2013–15].* National Healthcare Services Centre, Budapest.

Healy, B. (1991): The Jentl syndrome. *The New England Journal of Medicine*, 325: 274–246.

Hungarian Central Statistical Office (HCSO): *Demográfiai Évkönyv, 2016 [Demographic Yearbook, 2016]*, HCSO, Budapest.

Józan, P. (2012): Changes in the socio-economic system and political regime and the fourth stage of the epidemiological transition. *Orvosi Hetilap,* 153(17): 662–677.

Klinger, A. (2001): Halandósági különbségek Magyarországon iskolai végzettség szerint [Mortality differences in Hungary according to educational level]. *Demográfia*, 44(3–4): 227–258.

Mackenbach, J. P. – Stirbu, I. – Roskam, A. J. et al. (2008): Socioeconomic Inequalities in Health in 22 European Countries. *The New England Journal of Medicine*, 358(23): 2468–2481.

Meslé, F. – Vallin, J. (2017): The End of East–West Divergence in European Life Expectancies? An Introduction to the Special Issue. *European Journal of Population*, 33(5): 615–627.

OECD Health at a Glance (2016): *Health at a Glance: Europe 2016. State of Health in the EU Cycle.* http://www.oecd.org/health/health-at-a-glance-europe-23056088.htm

OECD Health Statistics (2017): *OECD Health Statistics 2017.* http://www.oecd.org/els/health-systems/health-data.htm

Tungstall-Pedoe, H. – Vanuzzo, D. – Hobbs, M. et al. (2000): Estimation of contribution of changes in coronary care to improving survival, event rates, and coronary heart disease mortality across the WHO MONICA Project populations. *The Lancet,* 555(9205): 688–700.

Weber, A. – Clerc, M. (2017*):* Deaths amenable to health care: Converging trends in the EU? *Health Policy*, 121(6): 644–652.

WHO Detailed Mortality Database: http://www.who.int/healthinfo/mortality_data/en/

WHO European Mortality Database: http://data.euro.who.int/hfamdb/

WHO Health for All Database: http://data.euro.who.int/hfadb/