# MORTALITY DIFFERENCES BETWEEN THE SUBREGIONS OF HUNGARY *

ANDRÁS KLINGER

## INTRODUCTION

Regional differences in Hungary have long been the subject of research. Analyses have been so far either based on larger regional units (counties, or recently regions), or they have been done by settlements (for villages and towns/cities). The need arose to prepare a study for 'in-between', medium sized regional units in addition to larger and smaller ones. The statistical subregions seemed to be the most suitable ones for the purpose; research on them has been going on already for the last few years revealing a certain homogeneity – unlike the relatively heterogeneous larger regions. We also have data on subregions. Therefore we are preparing our survey on the mortality differences for these 150 subregions, and later on, in the second part of the survey, for the different districts of Budapest. We aim at comparing mortality data with the development indicators of the subregions, as well as to data with the demographic composition of the population.

## METHODOLOGY

Mortality data of the subregions comes from the Population Statistics Data Base of the Central Statistical Office of Hungary. Since data for a single year is difficult to analyse due to the small numbers, we took data for five years, 1996–2000, to serve as the basis for our calculations. Gender and age specific mortality rates (for 5 year age groups) were calculated for the average values of the investigated five years. Using these, *standardised mortality rates* were calculated for the two genders separately and for the population as a whole in order to exclude age structure differences, for all the subregions. We took WHO age structure in world population as the basis for standardisation, which defines the composition of the population as follows:

* Part of the National Research and Development Programme under the number of 1/002/2001 and United Nations Development Programme (UNDP) project HUN/00/002.

Table 1
*Age structure of world standard population, WHO*

| Age group | % of standard population |
|---|---|
| 0 | 1.8 |
| 1–4 | 7.0 |
| 5–9 | 8.7 |
| 10–14 | 8.6 |
| 15–19 | 8.5 |
| 20–24 | 8.2 |
| 25–29 | 7.9 |
| 30–34 | 7.6 |
| 35–39 | 7.2 |
| 40–44 | 6.6 |
| 45–49 | 6.0 |
| 50–54 | 5.4 |
| 55–59 | 4.6 |
| 60–64 | 3.7 |
| 65–69 | 3.0 |
| 70–74 | 2.2 |
| 75–79 | 1.5 |
| 80–84 | 0.9 |
| 85–x | 0.6 |
| Total | 100.0 |

Standardised mortality rates have been transformed into *standardised mortality indices* for the sake of easier comparison. This figure indicates the percentage of the standard mortality rate of a given subregion – for male, female or together – to the average standard mortality rate of the countryside. In the case of Budapest, the rates for districts were compared to the Budapest average. This division was necessary because the Budapest standard mortality rate (7.96‰) is only 86% of that of the countryside (9.28‰). Comparison to the national average (9.05‰) would cause distortions.

We can measure the degree of development of the subregions with a *complex development index*. This was defined based on the provisions of Act No. 24/2001 (IV. 30.) The value of the complex indicator showing the level of development of the subregion was determined with the use of 19 indicators for all the subregions. The scale of values set by the extreme values of the different indices was divided into five equal parts, and then going from the worst to the best values they were given a point between 1–5, corresponding to the indicators of the subregions. The average value of the different index groups gave us the figures for the economic, infrastructural, social and occupational situations in the given subregion, and then the average of the four groups of indices became the joint indicator for development (underdevelopment).

We used the following data to calculate the complex indicator:

Table 2
*Data used in calculating the complex development index (based on Act No. 24/2001 /IV. 20./ Parliament)*

I. Economic indices

1. Economic (business) organisations per 1,000 inhabitants
2. Changes in working economic organisations
3. Number of scientific researchers/developers per 1,000 inhabitants
4. Personal income tax base per permanent resident

II. Infrastructural indices

5. Rate of homes with public water work utilities
6. Length of the sewage pipelines per 1 km of water pipeline
7. Rate of homes with pipeline gas supply
8. Number of guest nights per 1,000 inhabitants
9. Number of retail shops per 1,000 inhabitants
10. Complex (calculated) index for quality of life
11. Number of telephone lines per 1,000 inhabitants

III. Social situation

12. Rate of homes built with 3+ rooms
13. Number of cars per 1,000 inhabitants
14. Net migration
15. Rate of people of 60 years of age and over
16. Average population size of settlements
17. Mortality rate

IV. Employment situation

18. Unemployment rate
19. Long term – over 180 days – unemployment rate

In addition to the 19 indices of the complex indicator, other quality indices were also be taken into account in connection with mortality. Data related to health care, educational institutions and public transport were especially significant.

The so-called *preferential regions* were defined on the basis of the above complex indices, and even EU funds were allocated accordingly. But these indices can be also used as quality indicators, thus they are suitable for the analysis of mortality. Out of the 150 subregions, 94 are considered to be preferential ones. Out of these, 90 are underdeveloped, 6 are regions of industrial restructuring, and 67 could be considered as regions of regional development. 36% of the population of the country live in preferential regions. 60% of all the settlements of the country belong to this category (some 1880 villages and towns).

## MORTALITY DIFFERENCES BETWEEN THE SUBREGIONS

Due to significant differences in the mortality rates of the two genders it is justified to separate them first, which we should also do when we study the mortality differences for the different subregions. Looking the 1996–2000 average the standard mortality rate of men was nearly double those of women nationwide.

Subregions were divided into two groups based on the magnitude of their standard mortality rate as compared to the countryside average. Thus the mortality distribution of subregions in the database of average standardised mortality rates for the period of 1996–2000 was as follows:

Table 3
*Number of subregions by mortality levels (1996–2000)*

| Mortality level | Standard mortality index | Number of subregions | | | As a % of subregions | | |
|---|---|---|---|---|---|---|---|
| | | Male | Female | Total | Male | Female | Total |
| | | Based on mortality index | | | | | |
| 1. Highest | 113–130 | 23 | 14 | 20 | 16 | 9 | 13 |
| 2. Very high | 108–112 | 29 | 23 | 25 | 19 | 16 | 17 |
| 3. High | 104–107 | 18 | 20 | 21 | 12 | 13 | 14 |
| 4. Medium | 101–103 | 12 | 20 | 20 | 8 | 13 | 13 |
| 5. Average | 97–100 | 22 | 26 | 20 | 15 | 18 | 13 |
| 6. Low | 93–96 | 25 | 25 | 22 | 17 | 17 | 16 |
| 7. Lowest | 77–92 | 20 | 21 | 21 | 13 | 14 | 14 |
| Total | | 149 | 149 | 149 | 100 | 100 | 100 |

If we study the distribution of subregions by mortality levels based on the total standard mortality index of the two genders, 13% of them would be in the highest category. This level is more typical of men: their index shows that 16% of subregions belong here (that is, their mortality index is 113% or higher);

women reach this category much less frequently: only 9% of subregions belong here.

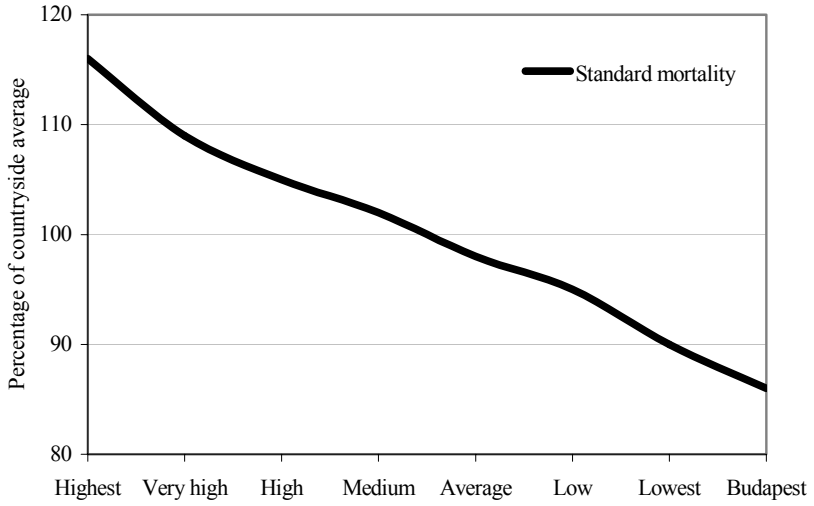


Figure 1
*Mortality indices of the subregions (1996–2000)*

This difference can be found even if we study larger groups. 47% of subregions can be put into the three high categories (1, 2 and3) based on the data on men. But if we take women's data, only 38% of them can be found there. The situation is the opposite in case of the middling groups (4th and 5th categories) for the two genders. As per the indices of men, 23% of subregions belong here, while based on women's data, 31% are present here. However, there is no difference in the lowest two categories (6th and 7th) According to the indices of men, 30% of subregions belong here, according to the women's indicators, the rate is 31%.

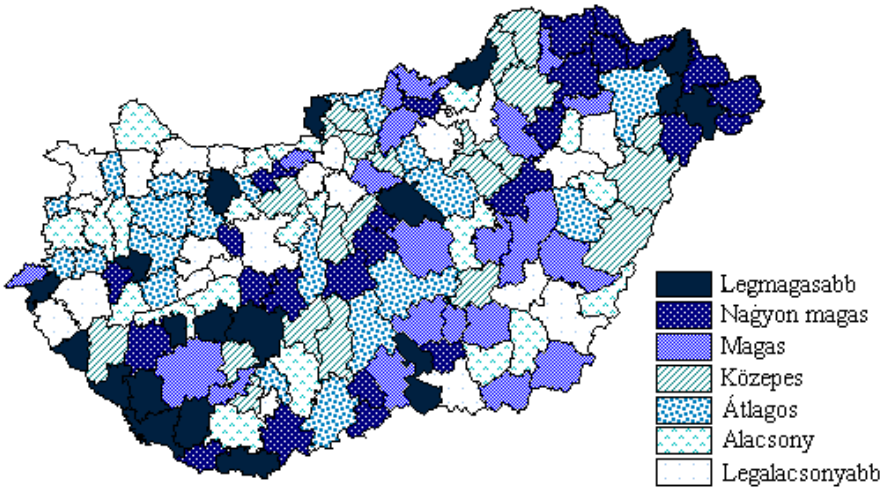


Figure 2
*Standard mortality indices (1996–2000)*

If we look at the data of the two genders separately we can see that *men's* standard mortality indices are the highest in the Szob region (130%), but the ones of the Kiskunmajsa, Kisbér and Őriszentpéter subregions follow closely (126–129%). There are three other subregions (Baktalórántháza, Nagykáta and Sümeg) where we find relatively high indices (122–123%). In 16 other subregions the standard mortality indices are between 113–119%.

The lowest mortality index for men can be found in the Csorna subregion (81%), followed by two North Lake Balaton subregions, the ones in Balatonalmádi and Balatonfüred (83–84%). The one in Sopron is just a little higher (85%), as are the ones in Szarvas, Szentendre and Győr (87%). 5 subregions have indices of 89–90%, and in 7 of them the index is 91–92%.

In the case of men, the subregion with the highest mortality (Szob) has a 60% higher mortality index than that of the subregion with the lower mortality rate (Csorna), which is quite a big difference among the subregions.

Taking women's data into consideration, the highest value can be found in the Barcs subregion (128%) though this index is quite high in the Lengyeltóti, Mátészalka and Kisbér subregions too (120–124%). 9 other subregions have a standard mortality index of 113–119% for women.

The lowest mortality rate among women can be found in the North Lake Balaton subregion (Balatonfüred: 77, Balatonalmádi: 80%), and this value is quite good (86%) for the Lenti, Gyöngyös and Pécsvárad subregions. It is only

a little higher for the Veszprém, Celldömölk and Eger subregions We find values of 89 and 90% in other cases.

The difference between the maximum and minimum values for women is even bigger than for men: in the Barcs subregion it is 66% higher than in Balatonfüred.

Strangely enough, the uppermost and lowermost values of the two genders do not really coincide. Perhaps the two North Lake Balaton subregions are the only ones where the standard mortality indices are among the lowest for both men and women. Only in the Kisbér subregion do we find correspondance between the indices for women and men (men: 127%, women: 120%). But in subregions where men have a value of over 120%, women reach only 102–108%. The best example of this is the Szob subregion where the maximum value is 130% for men, but here women reach a index of only 107%. In the four regions where women's values are above 120%, their indices are closer to those of men (110–119%). The highest degree of coincidence is in the Mátészalka subregion (women: 121, men: 119%). In Barcs, where women have the highest value of all (128%), the value of the index for men is slightly less (117%).

Due to the difference in the mortality rates of the two genders, the peak values of the *joint* (the total of the two genders) indices are different for the subregions. We can find the highest joint mortality index in the Kisbér subregion, where the value of 125% is 56% higher than the lowest value (80%) in the Balatonfüred one. This joint value is also high (120%) for the Mátészalka, Barcs and Őriszentpéter subregions The one in Balatonalmádi is one of the lowest (82%), closely followed by the Csorna, Sopron and Szentendre subregions (86–88%).

If we look at the map we can see that for both genders the highest standard mortality indices can be found in two areas of the country which are in some related: in north-eastern Hungary and in south-western Hungary. For men this is the case in the areas south-east and south-west of Budapest. The best off areas are the north-western parts of Hungary in case of both genders, but for men, subregions west to Budapest make up a continuous area with their low mortality indices.

In subregions where the mortality rate is 'very high' or 'high' (categories 1 and 2), there are relatively few towns/cities among the settlements (72 and 85% of the national average), however, in the 'low' category (number 6) there are many (126% of the average.) Strangely enough, this corresponds to the countryside average in the lowest category (number 7).

In subregions with larger towns/cities, the mortality level usually falls in the 'lowest' category, or it is in one of the low ones. The best mortality index can be found in the following subregions with larger towns/cities in them:

Table 4
*Standard mortality indices of larger towns/cities (1996–2000)*

| Subregion | Standard mortality index | | |
|---|---|---|---|
| | total | male | female |
| Sopron | 87 | 85 | 89 |
| Veszprém | 90 | 92 | 88 |
| Eger | 90 | 93 | 88 |
| Győr | 90 | 87 | 93 |
| Szeged | 91 | 93 | 90 |
| Zalaegerszeg | 92 | 95 | 89 |
| Székesfehérvár | 92 | 90 | 95 |
| Békéscsaba | 92 | 89 | 96 |
| Szombathely | 95 | 93 | 99 |
| Szolnok | 95 | 96 | 95 |
| Pécs | 95 | 93 | 99 |

The Nyíregyháza subregion lags behind in the list of low mortality indices of subregions with larger towns/cities (98%), so does Kecskemét (99%) but even more so the subregions of Debrecen (101%) and Miskolc.

In line with the above, a lot more people live in subregions with relatively low mortality rates than in those where the mortality rate is high. The distribution of the population by the magnitude of the mortality index in 2001 was as follows:

Table 5
*Distribution of the population by mortality levels (1996–2000)*

| Mortality level | Population (residents) 1 February, 2001 | |
|---|---|---|
| | Thousand persons | As % of population |
| 1. Highest | 640 | 6.3 |
| 2. Very high | 894 | 8.8 |
| 3. High | 1 092 | 10.7 |
| 4. Medium | 1 557 | 15.3 |
| 5. Average | 1 236 | 12.1 |
| 6. Low | 1 365 | 13.4 |
| 7. Lowest | 1 636 | 16.0 |
| Total countryside | 8 420 | 82.6 |
| Budapest | 1 776 | 17.4 |
| Total | 10 198 | 100.0 |

Due to the differences of population and urbanisation ratios in the subregion groups, the average population of settlements increases with the decrease in the mortality rates. In other words: the lower the average population size of a set-

tlement is, the higher the mortality level will be. In subregions with the highest mortality rates, the average population size hardly reaches half of the countryside average, and even in those with very high mortality rates it forms only two thirds. Yet in subregions with the lowest mortality rates, the average population size is 43% higher than the countryside average, and it nearly triples if compared to the subregions with the highest mortality rates.

One related factor is that as mortality increases, the total population density of the group with a given mortality rate increases. The population density index of subregions with the highest and very high mortality rates hardly reaches two thirds of the countryside average. Yet the level of population density in subregions with the lowest mortality rates is nearly one third above this, thus they are about double those in subregions with higher mortality rates.

## MORTALITY RATES BY AGE GROUPS

In addition to studying the general differences in mortality rates (which are presented through the standard mortality indices) it is also interesting to see whether the differences in age groups are the same or not. Therefore we calculated the specific indices for the following five typical age groups:

0–14 year olds
15–39 year olds,
40–59 year olds,
60–79 year olds,
80 year olds and older.

The age specific mortality rates in all cases are clearly the highest in the subregions with the highest mortality rates, and then they drop gradually in all age groups with the decrease of mortality levels. However, differences become smaller with age.

The mortality rates of the under 40's in subregions with the highest mortality levels is about one quarter above the countryside average, in the case of the 41–59 age group only by about one fifth, and in case of the older age groups, by one tenth. The mortality index of the highest mortality level, compared to the lowest level, is almost one and a half times as high in the age groups under 40; in the age group of 40–59 it is 40%; for the older ones it is one quarter and one sixth respectively. If we relate the differences in the mortality rates of the different age groups to the standard mortality indices – that is, to the average – we can see that the largest variation occurs in the age group under 40: in subregions with the highest mortality rates it is 8–9% higher, in subregions with the lowest mortality rates it is 7% lower. The situation is the opposite in case of the

older ones: in case of the highest ones mortality rate by age is 4–5% better, in case of the lowest ones it is 3% worse than average.

Table 6
*Mortality indices by age groups and by the mortality levels of subregions (1996–2000)*

| Mortality level | Death by hundred thousand inhabitants of the corresponding age group | | | | | |
|---|---|---|---|---|---|---|
| | 0–14 | 15–39 | 40–59 | 60–79 | 80–x | total[a)] |
| | As a % of the countryside average | | | | | |
| 1. Highest | 127 | 125 | 121 | 113 | 110 | 116 |
| 2. Very high | 119 | 120 | 112 | 106 | 106 | 109 |
| 3. High | 105 | 107 | 108 | 105 | 103 | 105 |
| 4. Medium | 105 | 104 | 104 | 101 | 99 | 102 |
| 5. Average | 91 | 100 | 97 | 97 | 100 | 98 |
| 6. Low | 89 | 87 | 91 | 97 | 97 | 95 |
| 7. Lowest | 85 | 83 | 86 | 92 | 86 | 86 |
| Total countryside | 100 | 100 | 100 | 100 | 100 | 100 |
| Budapest | 90 | 71 | 85 | 92 | 86 | 86 |
| Total | 100 | 98 | 98 | 99 | 97 | 98 |

[a)] Standard mortality index.

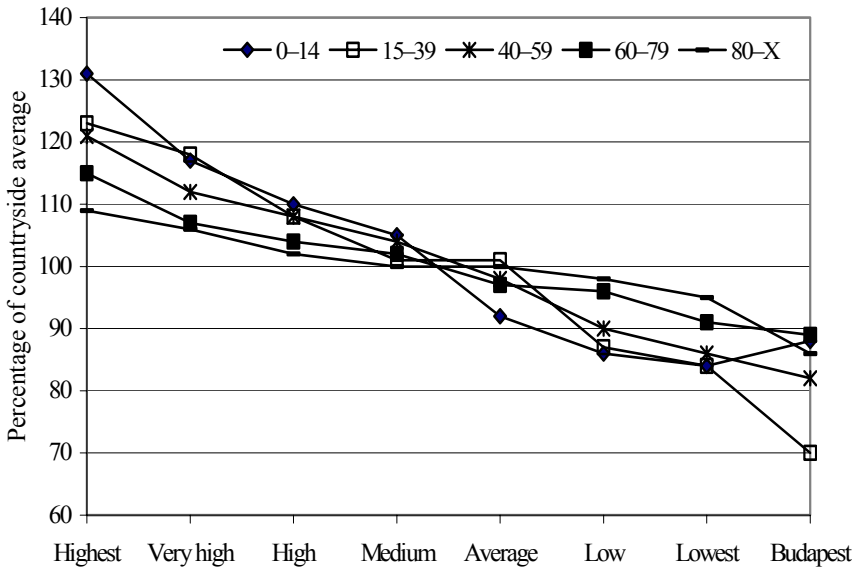


Figure 3
*Mortality indices by age-groups in subregions (1996–2000)*

The mortality index in Budapest almost always falls below the lowest levels of the countryside subregions. Perhaps the only exception is the age group of under 15, where the mortality index is 6% higher than in subregions with the lowest mortality rates. The two indices are the same in the age group of 60–79, and almost the same among the 40–59 year olds. Budapest has the greatest advantage among the 15–39 year olds (14% lower than in the subregions with the best mortality rate). Even in case of the oldest ones, there is an advantage in favour of Budapest (9%).

## MORTALITY RATES BY CAUSES OF DEATH

When we analyse mortality differences it is essential to study the differences in the major causes of death as well. Due to the small number of deaths, only the following nine categories of cause of death were studied in the subregions (indicating also the national rates for 1996–2000):

Table 7
*Main causes of death in Hungarian subregions (1996–2000)*

| Cause of death categories | % |
|---|---|
| Tumours | 24.1 |
| Ischemic heart diseases | 22.0 |
| Other heart diseases | 15.4 |
| Diseases of the cerebral blood vessels | 13.8 |
| Diseases of the respiratory system | 4.1 |
| Diseases of the digestive system | 7.2 |
| Other natural diseases | 6.0 |
| Accidents | 4.9 |
| Suicide | 2.4 |
| Total | 100.0 |

If the differences in the cause of death groups are studied on the basis of standard mortality indices for subregions in the countryside, we can say the following on their order of magnitude:

The largest difference in the standard mortality rates can be seen within the category of *diseases of cerebral blood vessels*, regarding the average mortality level. Their occurrence in subregions with the highest mortality rates is one third higher than the countryside average and it is nearly one and a half times as high as that of the subregions with the lowest mortality rates. Their frequency is 16% in the former ones and 14% in the latter ones. Also a huge difference can be found in the category of *diseases of the digestive system* (mostly due to liver

diseases caused by alcohol). This is 31% higher than average in the highest mortality categories and 62% more then in the lowest mortality categories. The frequency varies between 8.2 and 6.5%.

Differences are of medium level or are nearly the same in the two *heart disease* categories: in both cases mortality in subregions falling into the highest mortality category is 16% higher than average and one quarter higher than those in the categories with the lowest mortality. As for the category of *respiratory diseases*, mortality differences are similar: 14% compared to the average, but 52% compared to the lowest ones. Frequencies are almost identical in the two extreme groups. However, there is hardly any difference in the mortality level of the *tumour* category. In subregions with high mortality rates it is just above average, and we find an 8% drop compared to the average only in subregions with the lowest mortality rates. In subregions with the highest mortality rates tumours are identified as a cause of death in 21% of the total number of deaths; in subregions with the lowest mortality rates it is nearly 25%.

Among violent deaths, *accidents* show the greatest variation. Mortality due to accidents is one fifth higher than the countryside average in the highest mortality category, and one third more than in the lowest mortality category. There are 12% more deaths caused by suicide in the highest mortality category as related to the average, but compared to the figures of the category with the lowest mortality rates we can find one third more.

Table 8
*Mortality indices by causes of death and by the mortality levels of subregions (1996–2000)*

| Mortality level | Mortality per hundred thousand inhabitants (based on standard population) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | tumours | ischemic heart diseases | other | diseases of the cerebral blood vessels | diseases of the respiratory system | diseases of the digestive system | other natural deaths | accidents | suicide | total |
| | As % of the countryside average | | | | | | | | | |
| 1. Highest | 101 | 118 | 116 | 133 | 114 | 131 | 118 | 120 | 112 | 116 |
| 2. Very high | 103 | 109 | 103 | 113 | 118 | 114 | 118 | 107 | 108 | 109 |
| 3. High | 100 | 103 | 108 | 107 | 118 | 103 | 109 | 96 | 115 | 105 |
| 4. Medium | 104 | 100 | 102 | 93 | 94 | 106 | 104 | 103 | 109 | 102 |
| 5. Average | 96 | 102 | 94 | 98 | 111 | 98 | 89 | 106 | 95 | 98 |
| 6. Low | 100 | 95 | 94 | 93 | 95 | 93 | 94 | 94 | 91 | 95 |
| 7. Lowest | 92 | 92 | 94 | 90 | 77 | 91 | 87 | 90 | 83 | 90 |
| Countryside total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Budapest | 95 | 94 | 107 | 76 | 68 | 86 | 79 | 83 | 60 | 86 |
| Total | 98 | 99 | 96 | 95 | 94 | 97 | 96 | 97 | 98 | 98 |

There are quite a lot of differences between Budapest and the countryside subregions with the lowest mortality rates with regard to the cause of death. There are certain causes of death where Budapest is worse off: this is mostly due to the category of 'other heart diseases' (14% higher), but the mortality rate is 6% higher in Budapest due to diseases of the digestive system too, compared to the countryside subregions with the best mortality rates. Furthermore, there are 2–3% higher mortality indices in the categories of tumours and ischemic heart diseases, while there are 29% less suicides, 16% less deaths due to diseases of the cerebral blood vessels, and 8–12% less deaths due to accidents and diseases of the respiratory system per hundred thousand inhabitants in Budapest than in the countryside subregions with the best mortality rates.

It is worth looking at the causes of death causing surplus mortality in the subregions with the highest mortality rates. If we compare the mortality rates by cause of death in the countryside subregions with the highest mortality rates and those in the Budapest districts to those in the areas with the best rates we can identify the categories which cause the surplus mortality in the given category. There is a 29% difference between the two extreme values in the standard mortality index in the countryside. If we break down these extra deaths by causes of death, we find the following:

Table 9

*Mortality surplus of the subregions with the highest mortality rates by causes of death groups (1996–2000)*

| Cause of death groups | Mortality surplus of subregions with the highest mortality rates compared to those with the lowest ones | |
|---|---|---|
| | Per hundred thousand inhabitants | percentage |
| Tumours | 30 | 8.4 |
| Ischemic heart diseases | 70 | 19.7 |
| Other heart diseases | 48 | 13.1 |
| Diseases of the cerebral blood vessels | 81 | 22.9 |
| Diseases of the respiratory system | 21 | 6.0 |
| Diseases of the digestive system | 50 | 14.0 |
| Other natural diseases | 26 | 7.3 |
| Accidents | 20 | 5.6 |
| Suicide | 9 | 2.7 |
| Total | 364 | 100.0 |

Only around 8.4% of the surplus mortality in the countryside can be related to tumours. However, 22.9% surplus mortality is caused by diseases of the cerebral vessels. Ischemic heart diseases also play an important role in the surplus mortality (19.7%), but the role played by other cardiac diseases is less

significant (13.1%). The effect of the diseases of the digestive system is also significant regarding the mortality surplus (14%).

## MORTALITY RATES AND MENTAL HEALTH

The question arises: to what extent does mental health influence health in general, and thus what impact does it have on mortality differences? The Institute of Behaviour of the Semmelweis Medical University prepared a study with the title 'Hungarostudy/2002' which covered some 12.600 people in its representative investigation of the entire country and the subregions, and thus it became possible to answer this question too. Using the questions of the study, the Beck depression index was established in a 4 scale grouping for the subregions, and thus for the subregion groups. Thus we can compare distributions and depression averages in the subregions and in Budapest.

Based on the data of the representative study, 51% of the adult population nationwide can be considered as mentally healthy, 27% are slightly depressed, 13% are depressed and 9% are severely depressed. The average depression index is 7.9. If we look at the distribution by depression, study of the differential ratios for the healthy and the severely depressed seems to be the most fruitful approach regarding the levels of mortality. No linear increase or decrease can be found in either one according to individual mortality levels, since the depression indices vary a great deal between the highest ($1^{st}$) and the lowest ($4^{th}$) categories and here a clear trend can be seen: the ratio of the psychologically healthy increases while that of the depressed decreases as the mortality rates improve.

But on average we can say that depression is higher in areas with worse mortality rates than in those where relatively less people die. In subregions with the lowest mortality rates, the ratio of the mentally healthy is 16% higher than the countryside average, and some 30–50% higher than in subregions with high mortality rates. Or to put it the other way around: the ratio of the severely depressed in subregions with better mortality rates is one fifth lower than the countryside average, and it is only two thirds to three fifths of those living in areas with high mortality rates.

As a result, the average depression rate in areas with the best mortality rates remains 8% below the countryside average and about one fifth below that of subregions with very high and high mortality rates. The linear relationship with regard to depression is clearly indicated by the fact that the highest depression average occurs in subregions with very high and high mortality rates (where this is 17% above the countryside average), while in subregions with the highest mortality rates depression 'surplus' is a lot less than this (only 8% more

than the countryside average, and thus it remains 8% below the two categories with higher depression values.

Table 10

*Occurrence of depression by the mortality levels of subregions (based on the representative data of Hungarostudy-2002)*

| Mortality level | Standard mortality index | Healthy | Slightly depressed | De-pressed | Severely depressed | Depres-sion average |
|---|---|---|---|---|---|---|
| | As a % of the countryside average | | | | | |
| 1. Highest | 116 | 90 | 109 | 108 | 119 | 108 |
| 2. Very high | 109 | 77 | 120 | 117 | 131 | 117 |
| 3. High | 105 | 83 | 113 | 122 | 121 | 117 |
| 4. Medium | 102 | 93 | 106 | 108 | 108 | 106 |
| 5. Average | 98 | 108 | 95 | 90 | 88 | 93 |
| 6. Low | 95 | 113 | 88 | 86 | 85 | 95 |
| 7. Lowest | 90 | 116 | 86 | 82 | 78 | 92 |
| Countryside total | 100 | 100 | 100 | 100 | 100 | 100 |
| Budapest | 86 | 113 | 91 | 82 | 80 | 83 |

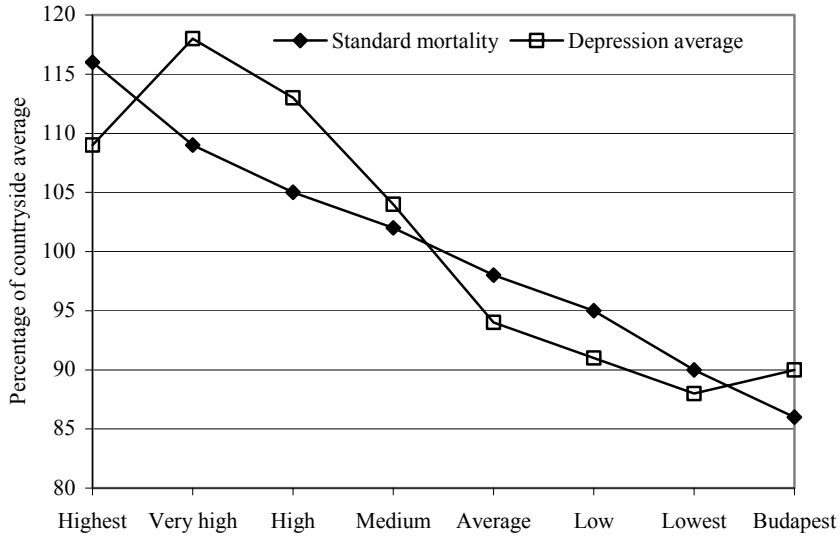


Figure 4

*Mortality indices and average depression indices in subregions*

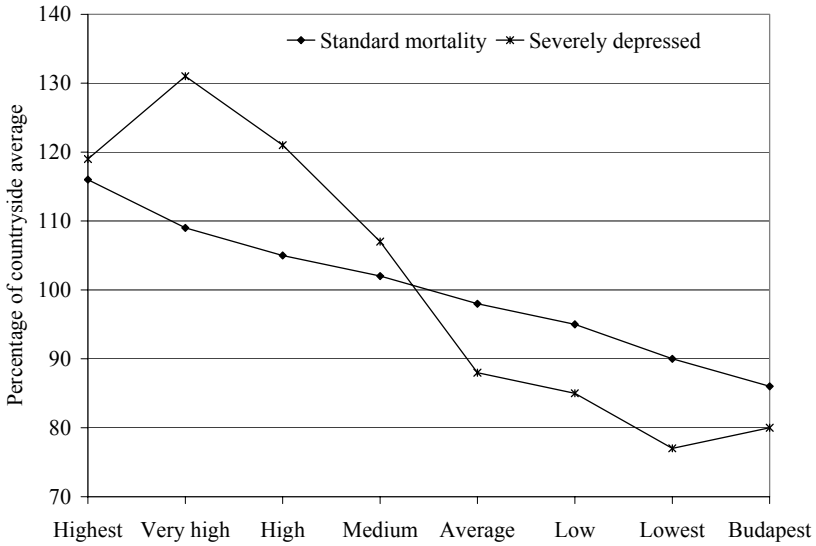


Figure 5
*Mortality indices and depression levels in subregions*

The average depression index in Budapest is somewhat lower than the countryside average (by 17%). The reason for this is that the ratio of healthy people is much higher (by 13%) and that of the depressed and severely depressed is much lower (by one fifth).

## MORTALITY RATES AND THE LEVELS OF DEVELOPMENT

There is a strong correlation between the mortality rates of the subregions and the general level of development. The *complex development index* is the lowest in subregions with high mortality rates, while it is the highest in subregions with low mortality rates. This relationship means that the less developed a region is, the higher its mortality rate will be.

The complex development level is worse than the countryside average in subregions with the highest and high mortality rates (categories 1 and 2), but it is nearly one third higher in subregions with the lowest mortality rates (category 7), and it is better by more than a quarter in the subregions with low mortality rates (category 6). The relationships among the indices can be seen below:

Table 11
*Complex development indices and the preferential subregions by mortality levels*

| Mortality level | Standard mortality index | Complex development index | Number of subregions | | |
|---|---|---|---|---|---|
| | | | total | preferential | |
| | | | | number | % |
| | As a % of the countryside average | | | | |
| 1. Highest | 116 | 96 | 20 | 20 | 100 |
| 2. Very high | 109 | 93 | 25 | 21 | 84 |
| 3. High | 105 | 103 | 21 | 17 | 81 |
| 4. Medium | 102 | 103 | 20 | 12 | 60 |
| 5. Average | 98 | 114 | 20 | 14 | 70 |
| 6. Low | 95 | 127 | 22 | 7 | 32 |
| 7. Lowest | 90 | 131 | 21 | 3 | 14 |
| Total countryside | 100 | 100 | 149 | 94 | 63 |
| Budapest | 86 | 160 | 1 | 0 | 0 |
| Total | 98 | 110 | 50 | 94 | 63 |

Naturally there are certain exceptions in the general relationship between a high level of mortality and a low level of development, and between low mortality rates and a high level of development, which could perhaps be explained by some further analyses (especially by the study of the composition of the population):

The Nagykáta and Siklós areas belong to the highest mortality categories (category 1, with mortality indices of 115 and 113%, respectively), yet their complex development indices are 111–113% of the countryside average. Similarly, with relatively high mortality indices (116 and 113%) the development indices are also high (106–107%) in the Szob, Kisvárda and Letenye subregions. The contradictions are even greater in the following category (number 2, high mortality rate): in the Tatabánya subregion the complex index is 135%, but the mortality index is 110%. In the Monor, Dabas and Várpalota subregions the development levels are more than 20% higher than the countryside average, yet the mortality levels are some 8–11% higher than the countryside average.

The opposite tendency can be found in areas with the lowest mortality rates. Thus the development level of the Balmazújváros subregion is only 89% of the average, while its mortality index is 91%. Levels of development are even lower in the Pétervásár, Sarkad and Polgári subregions (83–87%) but their mortality indices are relatively good (93–96%).

The subregions below show general trends (with the strange phenomenon that in the category with ‘high’ mortality rates (no. 2) we find lower development levels than in the category with the ‘highest’ mortality rates (no. 1).

Table 12
*Mortality and development indices in certain subregions*

| Subregion | Complex development index 2001 | Mortality index (1996–2000) |
|---|---|---|
| | As a % of the countryside average | |
| *1. Subregions with the highest mortality rates* | | |
| Ózd | 78 | 113 |
| Baktalórántháza | 82 | 117 |
| Szigetvár | 85 | 114 |
| Tamási | 87 | 113 |
| Mátészalka | 88 | 120 |
| Tab | 88 | 113 |
| *2. Subregions with high mortality rates* | | |
| Encs | 58 | 109 |
| Sellye | 63 | 111 |
| Vásárosnamény | 70 | 109 |
| Szerencs | 70 | 108 |
| Tiszafüred | 74 | 108 |
| Sátoraljaújhely | 75 | 112 |
| *7. Subregions with the lowest mortality rates* | | |
| Szentendre | 152 | 88 |
| Győr | 151 | 90 |
| Pilisvörösvár | 150 | 92 |
| Balatonfüred | 149 | 80 |
| Balatonalmádi | 149 | 82 |
| Szeged | 149 | 91 |
| Veszprém | 146 | 90 |

Budapest fits well into this last category because the development index of 160% for Budapest is in harmony with a mortality index of 86%.

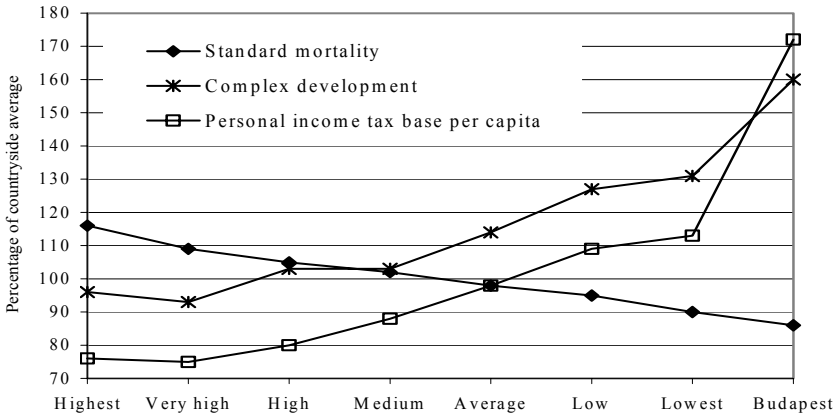


Figure 6
*Mortality indices , levels of development and income in subregions*

Correlations similar to the development index can be found if we compare the criteria for *preference (underdevelopment)* with the mortality level. This too, shows total correlations. All the subregions with the highest mortality rates are considered to be 'preferential', that is, underdeveloped. More than four fifths of subregions in the following two categories (2: very high and 3: high) belong among the underdeveloped ones. Yet only 3 are preferential from among the 21 areas with the lowest mortality rates (equal to 14%). The Monor, Tatabánya, Dabas and Várpalota subregions are not within this general coincidence, where mortality rates are very high (108–111%), but these are not preferential. A counter tendency prevails in the Szarvas, Balmazújváros and Hajdúböszörmény subregions: these are preferential ones but their mortality rates are among the lowest ones (91%-os).

## MORTALITY RATES AND INCOME LEVELS

It is important to analyse the different elements of the complex development index separately. From among them, the first one we analysed was the impact of i*ncome*. We took the amount of the personal income tax base per one permanent resident based on the 2000 tax returns as the basis for our calculations. We then compared this to the countryside average. The income differences which emerge from this are strongly correlated – negatively – with the standard mortality indices. The lower the per capita residents' income in the given subregion, the higher the mortality rate. In subregions with the highest and very high mortality rates (categories 1 and 2) the level of personal income tax is only

three quarters of the countryside average. Yet this level is 13% higher than average in subregions with the lowest mortality rates. The difference between the maximum and the minimum values is 51% (which is over the 41% difference found with regard to the complex development index). This also means that the difference in the income levels might have a greater impact on the mortality level than the level complex development. This is also true for the Budapest-countryside relation. The per capita income in Budapest is 72% over the countryside average, while for the complex development index there is only a 60% surplus in Budapest.

Table 12
*Levels of income and development in subregions by mortality levels*

| Mortality level | Mortality index | Per capita income | Complex development |
|---|---|---|---|
| | As a % of the countryside average | | |
| 1. Highest | 116 | 76 | 96 |
| 2. Very high | 109 | 75 | 93 |
| 3. High | 105 | 80 | 103 |
| 4. Medium | 102 | 88 | 103 |
| 5. Average | 98 | 98 | 114 |
| 6. Low | 95 | 109 | 127 |
| 7. Lowest | 90 | 113 | 131 |
| Total countryside | 100 | 100 | 100 |
| Budapest | 86 | 172 | 160 |
| Total | 98 | 113 | 110 |

Naturally, certain subregions do not fit into this general trend. Thus for instance in the subregion with the highest mortality rate – Kisbér (125%) – the per capita income is also high: 110% of the countryside average. The same is true for the Tatabánya and Tiszaújváros subregions of the category ‘very high’, where there is a 116% income index next to the 108–100% mortality index. This is countered in the Balmazújváros subregion, listed among the lowest mortality rates, where the mortality level is 91% yet the average income stands only at 64%. The Szarvas and Hajdúböszörmény subregions show a similar situation, where the per capita income is only 75–77% of the countryside average, but the level of mortality remains well below it (with a mortality index of 91%).

The indices indirectly defining the *poverty* level of the subregions show that the impact of income on mortality is negative. We can show two of them here:

- The proportion of the unemployed receiving social benefits but due to the length of the unemployment no unemployment benefit;
- The proportion of those receiving free medication from public funds.

In both cases it is absolutely evident that high mortality goes with poverty; in areas of lower mortality poverty is much less frequent. Thus in the case of countryside subregions, in areas with the highest mortality rates the proportion of those receiving social benefits is about one and a half times higher than the countryside average; in those where mortality is high, it is double. In the same places about one fifth to one quarter more people receive free medication from public funds. In subregions with the lowest mortality rates the former index is only about half of the countryside average, while the latter one is about four fifths of it. Thus there is a nearly fourfold and a one and a half time difference between the extreme values respectively.

In addition to income indicating the standards of living for the moment indices describing *wealth* are also very typical of the standards of living in the given area. It is difficult to give a complete picture of the situation but the ownership of certain durable consumer goods may indicate the level of wealth. We can show three such indices for the subregions and for the subregion groups:

– Number of passenger cars per 1,000 inhabitants;
– Number of fixed telephone lines per 1,000 inhabitants;
– Number of those having cable television per 1,000 inhabitants;

We can add some other indices to these which characterise housing and also suggest wealth:

– Number of homes built per 1,000 inhabitants;
– Proportion of flats built with 4 or more rooms;
– Proportion of flats with pipeline sewage system;
– All-comfort flats as a % of all the inhabited flats;
– Flats without comfort as a % of all the inhabited flats;

All eight indices clearly highlight the fact that low income and high level of poverty increase the probability of death, just as much as it decreases with wealth and affluence. All of these indices are lower because they increase in subregions with high mortality rates as mortality decreases.

With regard to almost all of these indices, the level of wealth in the subregions with the highest mortality rates is about three quarters of those in the

lowest ones. The difference is outstanding as regards the sewage system, which has a direct impact on the public health situation: this is only four fifths of the countryside average in the areas with the highest mortality rates, and one quarter of the subregions with the best mortality levels. The proportion of all-comfort flats in subregions with good mortality indices is two thirds higher than in those with the worst rates. In the subregions with the highest mortality rates, on the other hand, the relative frequency of flats without any comfort is nearly three times as much as in regions with the best mortality situations. The difference in the availability of cable television is also more than double between the two extreme values.

Table 13
*Levels of wealth by mortality levels in subregions*

| Mortality level | Standard mortality index | Passenger cars | telephones | Cable TV | No. of flats built | As a % of sewage pipeline | All-comfort flats | Flats with no comfort |
|---|---|---|---|---|---|---|---|---|
| | | Per thousand inhabitants | | | | | As a % of inhabited flats | |
| | As a % of the countryside average | | | | | | | |
| 1. Highest | 116 | 86 | 85 | 57 | 86 | 42 | 74 | 145 |
| 2. Very high | 109 | 83 | 86 | 69 | 86 | 65 | 84 | 138 |
| 3. High | 105 | 84 | 89 | 53 | 95 | 60 | 80 | 130 |
| 4. Medium | 102 | 90 | 92 | 76 | 100 | 77 | 104 | 102 |
| 5. Average | 98 | 98 | 98 | 86 | 95 | 91 | 102 | 94 |
| 6. Low | 95 | 129 | 109 | 100 | 114 | 107 | 112 | 74 |
| 7. Lowest | 90 | 110 | 111 | 118 | 114 | 119 | 122 | 49 |
| Total countryside | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Budapest | 86 | 139 | 152 | 121 | 90 | 212 | 126 | 36 |

## MORTALITY RATES AND UNEMPLOYMENT

Even if we cannot find a direct correlation between unemployment and mortality rates, unemployment rates can be used indirectly as an index for the average level of economic development in a region, thus the level of unemployment could be a determining factor regarding the mortality rate. Therefore it is worth comparing the unemployment rates in the last few years (2000–2001) to the mortality indices and drawing certain conclusions.

As a general statement we can say that with regard to larger groups it is clear that if there are more unemployed, the mortality rate is higher. On average we can find the highest number of unemployed in the subregions belonging to the three high categories (1st 2nd and 3rd). This is especially true for the subregions in the 'very high' (2nd) category, where the unemployment rate is more

than one and a half times of the countryside average, but even in the 'highest' and 'high' categories (1st and 3rd) the surplus is one third. This index reaches only three quarters of the average in the lowest (7th) category. The difference is double between the highest and the lowest levels. The Budapest index in this regard is even better: unemployment rate in Budapest is just one third of that in the countryside.

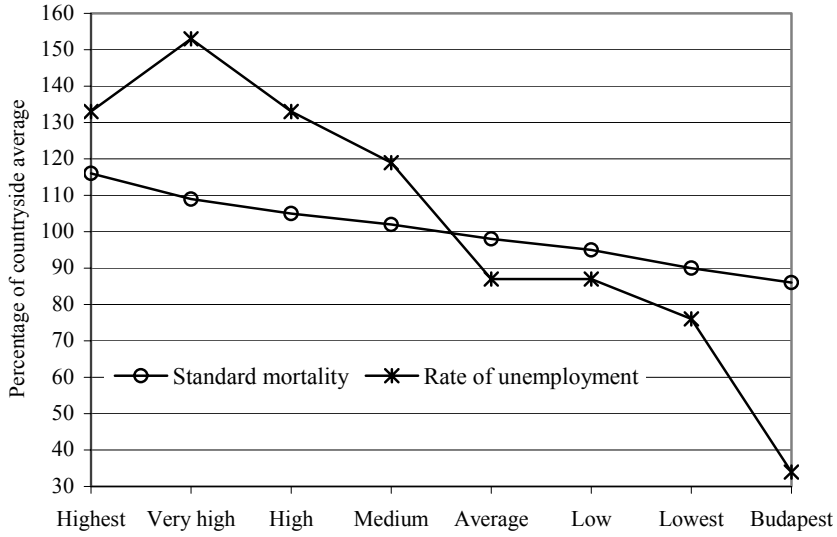


Figure 7
*Mortality indices and unemployment in the subregions*

The relationship between levels of mortality, complex development and unemployment in the subregions were as follows:

Table 14
*Unemployment rate and level of development by mortality levels in the subregions*

| Mortality level | Mortality index | Unemployment rate | Complex development |
|---|---|---|---|
| | As a % of the countryside average | | |
| 1. Highest | 116 | 133 | 96 |
| 2. Very high | 109 | 153 | 93 |
| 3. High | 105 | 133 | 103 |
| 4. Medium | 102 | 119 | 103 |
| 5. Average | 98 | 87 | 114 |
| 6. Low | 95 | 87 | 127 |
| 7. Lowest | 90 | 76 | 131 |
| Total countryside | 100 | 100 | 100 |
| Budapest | 86 | 34 | 160 |
| Total | 98 | 89 | 110 |

There are certain contradictions in some subregions regarding unemployment and mortality, but this is less surprising because job opportunities in certain areas differ from what might otherwise we ecpected considering the level of social development. Thus there are certain subregions with the highest (1st category) mortality rates where unemployment rate reaches only two thirds of the countryside average (Szob, Nagykáta), even though the mortality index is very high (116–115%). But also we can find high unemployment rates among subregions with the best mortality situations. In the Balmazújváros subregion unemployment is higher than average by three quarters, in Hajdúböszörmény it is some 40% higher than the countryside average, yet their mortality index is only 91%.

## MORTALITY RATES AND THE COMPOSITION OF EMPLOYMENT

Mortality differences related to social differences can be seen in the composition of employment by the different sectors of the economy. We can divide subregions into three groups according to the sectoral composition of employment:

– those in the agricultural sector;
– those in industry and construction;
– those in the service sector (trade and commerce, catering, transportation, telecommunication, finances, public administration, education, health care, personal services).

If we look at the proportions of the above three branches of economy a major finding is that in countryside subregions where the ratio of those in agricul-

ture is high, levels of mortality are also usually high or medium. However, in areas with good mortality rates, there are relatively fewer people working in agriculture. This correlation is especially true for the two highest mortality categories, where the ratio of those working in agriculture is 40–35% higher than the countryside average. On the other hand, in subregions where mortality rates are low, this is less then a quarter but in the lowest mortality category it is the same as the average.

The ratio of those in industry hardly shows any clear correlation with mortality rates. Yet the ratios in services indicate a strong correlation. In subregions with high and average mortality rates, the proportion of those in the 'third sector' is relatively low. In the low mortality subregions, however, this index is very high; the difference between the two extreme values is 30%.

Relationships are even clearer between the mortality level and the type of job. In subregions with high mortality rates the proportion of blue collar workers is higher, but in the low mortality areas white collar workers are in the majority. The ratio of white collar workers in the subregions with the highest mortality rates is one fifth less than the countryside average, and that of blue collar workers is 12% more. In subregions with the lowest mortality rates the situation is the converse: the proportion of white collar workers is 37% over the countryside average, while that of the blue collar ones remains 22% less/below. Clearly, there is an enormous difference between the two extreme values: in the case of white collar workers it is more than 70% in favour of the subregions with the best mortality rates, in the case of blue collar workers, the surplus is 44% in subregions with the highest mortality rates.

Table 15

*Ratio of the employed by sectors of the economy, by quality of job and by mortality levels in subregions*

| Mortality level | Standard mortality index | Agricultural | Industry and construction | Services | White collar | Blue collar |
|---|---|---|---|---|---|---|
| | | sector | | | job | |
| | Ratio of employed as % of the countryside average | | | | | |
| 1. Highest | 116 | 140 | 99 | 98 | 80 | 112 |
| 2. Very high | 109 | 135 | 104 | 98 | 86 | 109 |
| 3. High | 105 | 128 | 97 | 88 | 94 | 104 |
| 4. Medium | 102 | 76 | 94 | 107 | 104 | 97 |
| 5. Average | 98 | 125 | 110 | 91 | 90 | 106 |
| 6. Low | 95 | 76 | 99 | 108 | 107 | 95 |
| 7. Lowest | 40 | 101 | 78 | 121 | 137 | 78 |
| Total countryside | 100 | 100 | 100 | 100 | 100 | 100 |
| Budapest | 86 | 7 | 65 | 136 | 159 | 64 |
| Total | 98 | 81 | 92 | 107 | 112 | 93 |

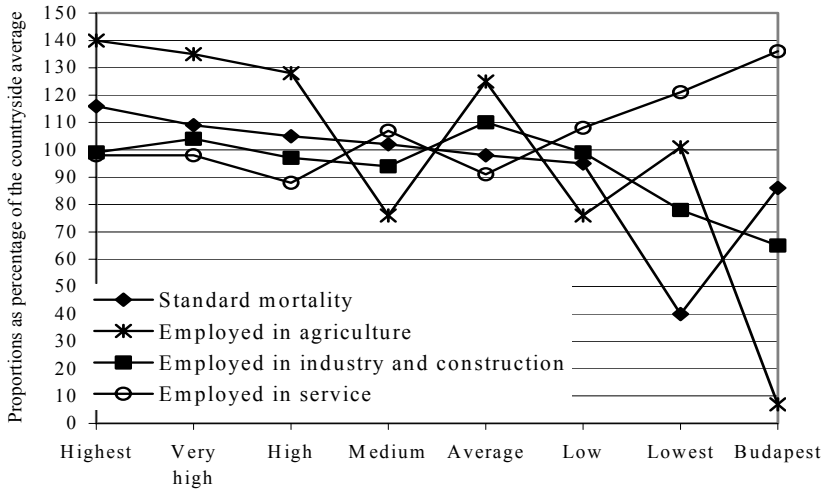


Figure 8
*Mortality indices and the sectors of economy of the employed population in the subregions*

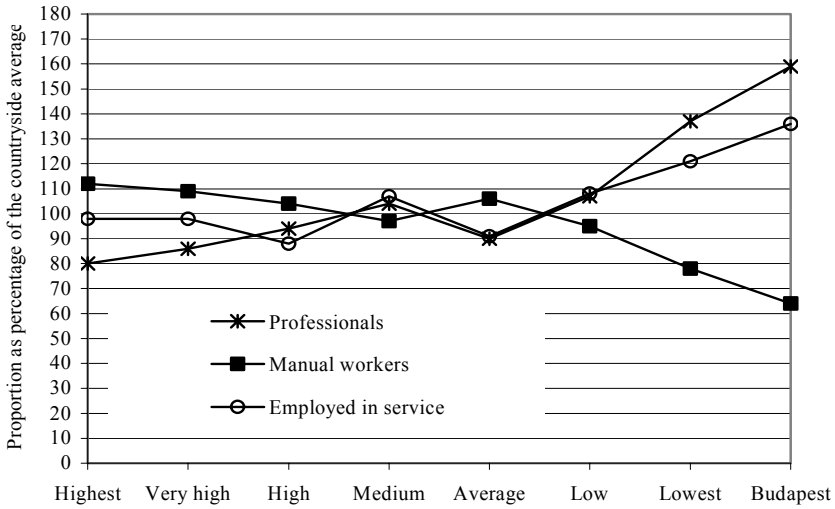


Figure 9
*Mortality indices and the quality of jobs of the employed population in the subregions*

## MORTALITY RATES AND LEVELS OF EDUCATION

A strong relationship can be found between levels of education in a given regional unit and rates of mortality. The following four indicators of schooling were used for comparison:

- Completion of at least 8 grades of elementary school, as a proportion of the population of 15 years of age and over;
- Completion of secondary school as a proportion of the population of 18 and over;
- Completion of higher education as a proportion of the population of 25 and over;
- Average number of classes finished.

In the case of countryside subregions we can still find certain differences in the levels of mortality for those who finished 8 grades of elementary school. But this difference is very small: in subregions with higher mortality rates 4% less people finished 8 grades of elementary school than the countryside average; among those with the lowest mortality levels, 8% more than average did the same. The difference between the two extremes is one eighth. However, there is a significant difference in the case of those with secondary and higher education. The ratio of those with at least secondary education in subregions with the highest mortality rates is only 71% of the average; in areas with the best mortality situations this is more than double (where this is 150% of the average). The relationship is even stronger in the case of those with higher education. This is only 57% of the average in areas with the highest mortality rates, and in areas with the lowest mortality levels it is almost double the countryside average (190%). The difference between the two extreme values is 3.3 fold.

Table 16
*Highest educational levels by the mortality levels of subregions*

| Mortality level | Standard mortality index | At least 8 grades 15–x | At least secondary 18–x | Higher education 25–x |
|---|---|---|---|---|
| | as % of population | | | |
| 1. Highest | 116 | 96 | 71 | 57 |
| 2. Very high | 109 | 96 | 76 | 66 |
| 3. High | 105 | 98 | 89 | 82 |
| 4. Medium | 102 | 100 | 104 | 100 |
| 5. Average | 98 | 99 | 91 | 90 |
| 6. Low | 95 | 103 | 114 | 122 |
| 7. Lowest | 90 | 105 | 150 | 190 |
| Total countryside | 100 | 100 | 100 | 100 |
| Budapest | 86 | 108 | 175 | 285 |
| Total | 98 | 101 | 114 | 125 |

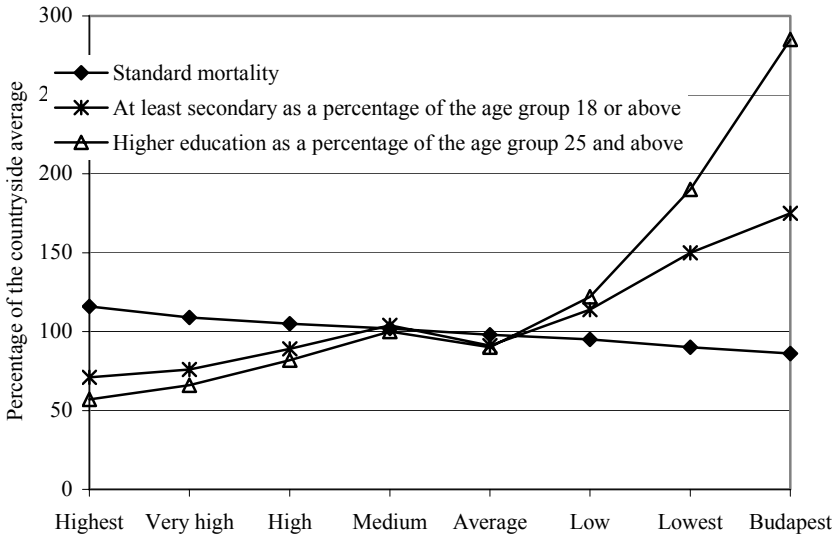


Figure 10
*Mortality rates and the level of education in subregions*

## MORTALITY RATES AND ETHNICITY

The relationship between mortality rates and ethnicity also hides some social differences. In Hungary, the regional proportion of the Roma (Gypsy) minority can contribute to an explanation of the difference in mortality rates. Though in the latest census (2001) the number of those who declared themselves to be Roma remained under the probable figure of the number of Roma, there are still significant regional differences and the large scale correlation to the mortality rate makes the study worth doing.

In the countryside subregions where the mortality rate is the highest or very high (categories 1 and 2), the ratio of Roma is double the countryside average. In the high and middle categories (3rd and 4th category) the occurrence of Roma is slightly higher than average.

From the average level on, the proportion of the Roma minority gradually drops, and in subregions with the best mortality levels their ratio is only two fifth of the countryside average. Thus in areas with the highest mortality rates, there are nearly five times as many Roma as in areas with better mortality. The (declared) ratio of Roma in Budapest is only one third of the countryside average.

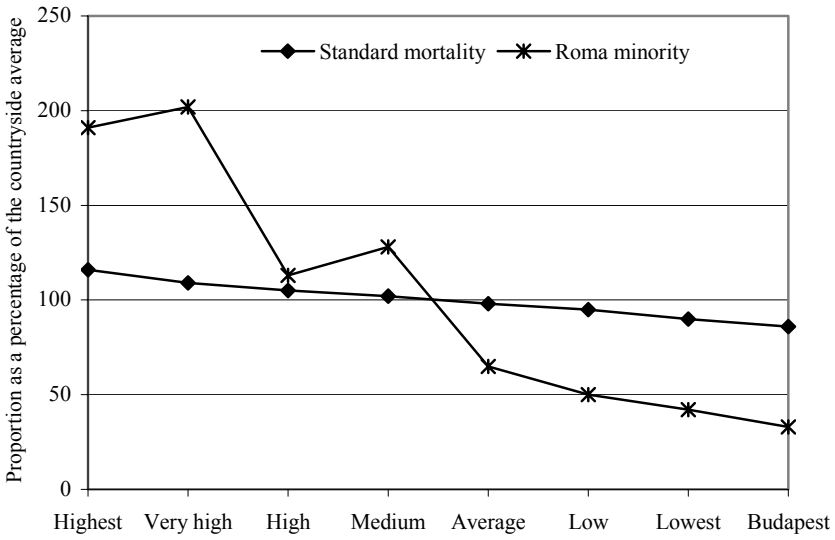


Figure 11
*Mortality indices and the Roma minority in subregions*

Relationships are similar if we look at those Roma who do not declare their ethnic identity, but claim to speak Roma and follow Roma traditions (even if they claim to be of Hungarian nationality). Thus if we take 'those belonging to the Roma' as a basis, their presence in subregions with the highest mortality rates is 225% of the countryside average, while in subregions with the lowest mortality levels they carry only a 50% weight. The difference between these two mortality levels is 4.5 fold.

Relationships between mortality rates and the ratio of Roma in the subregions are as follows:

Table 17
*Ratio of Roma by mortality levels in subregions*

| Mortality level | Mortality index | Roma minority | In the Roma group |
|---|---|---|---|
| | As a % of the countryside average | | |
| 1. Highest | 116 | 191 | 225 |
| 2. Very high | 109 | 202 | 125 |
| 3. High | 105 | 113 | 150 |
| 4. Medium | 102 | 128 | 100 |
| 5. Average | 98 | 65 | 75 |
| 6. Low | 95 | 53 | 75 |
| 7. Lowest | 90 | 42 | 50 |
| Total countryside | 100 | 100 | 100 |
| Budapest | 86 | 33 | 25 |
| Total | 98 | 90 | 100 |

## MORTALITY RATES AND AGE STRUCTURE

The regional age structure differences were eliminated at the start when we adopted the standard mortality index. Yet the differences in the regional age structure can also be used as an independent variable when determining the levels of mortality.

The age composition of the different subregions was studied for three large age groups:

– *Children:* 0–14 years of age;
– *People of working age:* 15–59 year olds;
– *Old people:* 60 year olds and older.

Having studied the differences in the proportions of these three age groups by mortality levels in the countryside subregions, we found no significant differences. We could say in general that in subregions with higher mortality rates children and people of working age represent a higher proportion of the population; in areas with lower mortality levels these people are less frequent. Differences are significant only in the case of children: the maximum value for the proportion of the 0–14 year old age group in the two categories with the highest mortality (1st and 2nd) is 109, while the minimum in the two categories with the lowest levels of mortality (6 and 7) is 95–93%. Thus the difference between the two extreme values is only 17%. The ratio of those of working age in all categories is about average. And there are practically no differences in the categories with regard to old people. The distribution can be found in the 7th category between 96 and 104:

The correlations between mortality rates and the age structure are as follows:

Table 18
*Age structure of the population by the mortality levels in subregions*

| Mortality level | Mortality index | 0–14 | 15–59 | 60–x | 0–14 | 15–59 | 60–x |
|---|---|---|---|---|---|---|---|
| | | Year olds as a % of the countryside average | | | Year olds as a % of the total population | | |
| 1. Highest | 116 | 109 | 99 | 99 | 18 | 62 | 20 |
| 2. Very high | 109 | 109 | 97 | 100 | 19 | 61 | 20 |
| 3. High | 105 | 101 | 97 | 104 | 17 | 62 | 21 |
| 4. Medium | 102 | 102 | 100 | 98 | 17 | 63 | 20 |
| 5. Average | 98 | 100 | 100 | 100 | 17 | 63 | 20 |
| 6. Low | 95 | 95 | 102 | 101 | 16 | 64 | 20 |
| 7. Lowest | 90 | 93 | 102 | 98 | 16 | 64 | 20 |
| Total countryside | 100 | 100 | 100 | 100 | 17 | 63 | 20 |
| Budapest | 86 | 75 | 101 | 117 | 13 | 64 | 23 |
| Total | 98 | 95 | 100 | 103 | 16 | 63 | 21 |

The ratio of children in Budapest is much lower (by one quarter) than in the countryside, while that of the older people is higher (by 7%).

The differences in age structure – besides differences in mortality levels – are strongly influenced by differences in birth rates as well. However, these differences in the fertility rates can be used as independent variables. There is a strong relationship between the birth rate and the standard mortality level. In general, a bad mortality level goes with a slightly higher number of live births than average. In subregions with the highest and high mortality levels the proportion of live births measured in the last few years was 10% over the countryside average, yet at the same time in the categories with average, low and lowest mortality levels it was 10% lower. This led to a difference of nearly 25% between the two extreme values.

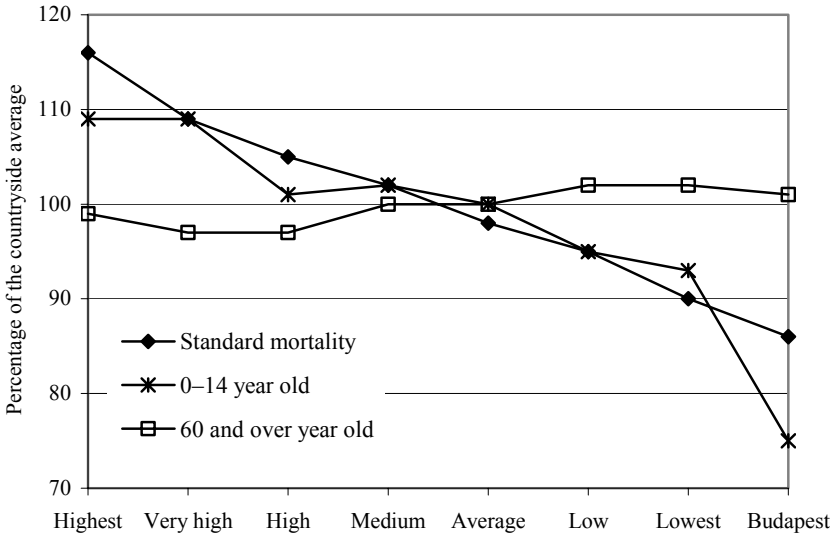


Figure 12
*Mortality indices and age structure in subregions*

The 'younger' age structure of areas with higher mortality rates is influenced by different fertility rates as well. The completed fertility rate measured in the last census in 2001 (the number of children born for every 100 women of the age of 45–49) is higher in subregions with worse mortality levels than in those with better ones. This indicator was 5–6% over the countryside average in subregions with the highest and high mortality rates, while in subregions with the lowest mortality levels it is 11% less.

The difference between the maximum and minimum values is 19%. The case is similar in the Budapest districts. Here, the fertility level in the districts with high mortality rates is 7% higher than the Budapest average (but in those ones with the highest rates this is only 1%). Women living in districts with the best mortality rates have 6% fewer children than the Budapest average, and this is 12% under the maximum level.

## CONCLUSION

If we wish to characterise the individual impacts of certain social and economic phenomena on the mortality rates of subregions, the best is to calculate the correlation coefficient between the standard mortality index and the subregional variable which is typical of the given phenomenon (using the *Pearson*

method). Thus mortality indices of subregions are determined by the following variable (in decreasing order). The negative correlation coefficient indicates that the low value of the given variable results in a higher mortality index, the positive value means that the high value of the variable would result in a high standard mortality rate). The list includes only those correlations which have a 95% significance.

Table 19
*Correlation coefficients by mortality indices and other social and economic indices*

| Index | Pearson correlation coefficient with the standard mortality index | |
|---|---|---|
| | + | – |
| 1. Complex development | | –0.610 |
| 2. Number of grades finished in the elementary school | | –0.575 |
| 3. Per capita income | | –0.566 |
| 4. Number of taxpayers in the entire population | | –0.564 |
| 5. Fixed telephone lines per thousand inhabitants | | –0.560 |
| 6. Flats covered by the sewage system | | –0.521 |
| 7. Passenger cars per thousand inhabitants | | –0.482 |
| 8. Unemployment rate | 0.469 | |
| 9. Live birth rate | 0.437 | |
| 10. Ratio of people receiving free medication from public funds | 0.433 | |
| 11. Long term unemployment rate | 0.420 | |
| 12. Ratio of Romas | 0.377 | |
| 13. Secondary school students per thousand inhabitants | | –0.376 |
| 14. Ratio of those working in agriculture | 0.347 | |
| 15. Ratio of those working in services | 0.303 | |
| 16. Rate of depression | | –0.328 |
| 17. Average population size of settlements | | –0.312 |
| 18. Number of flats built per thousand inhabitants | | –0.298 |
| 19. Cable TV subscribers per thousand inhabitants | | –0.284 |

We can say that of the 19 significant indicators showing social and economic relations we can find 12 where the correlation is negative, that is, their magnitudes are in reverse relationship to the standard mortality index. The 7 highest values can be found among these negative correlations. It is no coincidence that from among them the highest one is the complex development index (which is –0.610) because this includes all the other significant indices showing the level of development. From among them, the level of schooling/education and the per capita income show highly significant negative values.

*Translated by Ildikó Várhegyi*