Mortality in the EU

1997 - 1999

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Eurostat began collecting and disseminating mortality data for the Member States of the European Union, broken down by a "shortlist" of causes of death, in 1994. A preliminary regional analysis (NUTS-2 regions) of the 1994-1996 data has just been published in the form of an atlas. The present publication summarises the main European, national and regional results of that analysis and brings them into starker relief using more recent data for the period 1997-1999 (The characteristics of causes of death remain fairly stable over the medium term.)

Some of the main results ...

Broadly speaking, the EU has witnessed a very significant reduction in mortality during the last century or so. There were four main developments: a decline in infectious diseases (in the second half of the 19th century); an increase in degenerative diseases (at the end of the 19th century); a slowdown in the increase in life expectancy (the 1960s); and a narrowing of differences between the sexes (current period; see figure 1).

Cardiovascular diseases are currently the biggest single cause of death in the EU. They account for about 40% of deaths in both sexes. Nearly nine out of every 10 deaths of this type occur in persons aged 65 or over. Cancers of the respiratory tract (lungs, bronchi, trachea, larynx) are responsible for one death in 20 in the EU. These cancers are mainly due to smoking, although other factors such as industrial pollution are also at work. Moreover, cancers of the intestine are responsible for 3% of deaths in the EU. They affect mainly elderly people: seven deaths out of 10 occur in persons aged 65 and over. Lastly, breast cancer is the most common form of cancer in women. It is responsible for more than 4% of deaths among European women and frequently affects women between the ages of 45 and 64 (more than 12% of deaths in this age bracket).

... mask major regional disparities which vary as a function of cause of death, sex and age

During the period 1997-1999, and taking all causes of death together, the age-standardised mortality rate varied between 328 deaths per 100 000 women in Västsverige (Sweden) and 1 770 per 100 000 men in Madeira (Portugal).

Figure 1: Mortality rate, by age group
Despite the pronounced decline in mortality throughout the EU since the 19th century, major inequalities persist. Indeed, mortality rates within the EU and in each Member State are seldom uniform: different regions in one country can have values at opposite ends of the spectrum (in France, for example, the standardised male mortality rate in 1997-1999 was 773 deaths per 100 000 males in Île-de-France, while in Nord-Pas-de-Calais it was 1 115), and regions of different countries can have very similar mortality rates (for example, 941 per 100 000 in North Rhine-Westphalia (Germany) and 949 per 100 000 in Overijssel (the Netherlands)). The geographical breakdown of Europe into NUTS 2 regional units was therefore retained.

Moreover, although differences in mortality between the sexes tend to be small in some Member States, they are very marked in Europe as a whole (the death rate among men is 1.7 times higher than among women, taking all ages and causes of death together). This is why separate analyses were performed for men and women. Lastly, under age 65, mortality in the EU is fairly low, but this is related to health and prevention practices, which can vary significantly from one Member State to another. A typology of the regions according to age-specific mortality was therefore established. "Premature" mortality (mortality in the population aged from 0 to 64 years) was also analysed.


Differences in mortality between the regions of the EU, and trends in those differences, can vary, depending on the age groups under consideration. For example, the situation in a given country may compare unfavourably with the European average where mortality among young people is concerned, yet favourably for mortality among the elderly. In order to analyse these mortality profiles by age group, a typology of mortality rates in the European regions was established, broken down into five-year age brackets. The analysis covers the period from 1994 to 1996. It was done separately for men and women.

Map 1 shows the typology of male mortality. Five types of region emerge. Types 3 and 4 comprise countries or regions with excess mortality, irrespective of the age group studied: Portugal, Denmark, southern Finland and eastern Germany. Type 5 includes countries or regions where there is excess premature mortality (i.e. among persons under the age of 65) but where the mortality among the elderly is low: France, the Spanish coastal provinces, the Danube region of Austria, and Luxembourg. By contrast, the situation in most regions of the United Kingdom, Sweden, Italy and Greece is the opposite, with generally below-average mortality, irrespective of the age group under consideration (Type 1). In the case of female mortality, a number of specific characteristics are observable (the United Kingdom and Ireland, in particular, appear to have excess female mortality).
The typology of age-specific mortality made it possible to identify countries or regions which have a high mortality profile for young people. In the EU, deaths before the age of 65 account for one-third of overall mortality, with death rates twice as high among males. Violent deaths and deaths related to alcohol consumption and smoking (bronchopulmonary cancers, diseases of the respiratory tract, alcohol-induced cirrhoses etc.) dominate premature mortality, especially among men. This type of causes of death accounts for more than 30% of premature deaths among men. A spatial analysis of premature mortality reveals major disparities between European regions (Map 2).

Rates vary in a ratio of 1:2.5 between men in Sweden, the least severely affected country (the rate was 220 per 100 000 in 1997-1999; see Map 2), and Portugal, which is worst affected (384 per 100 000; Map 2). France and Germany also have excess mortality. Some countries display very marked regional structures. There are also similarities between neighbouring border regions. For example, the northern regions of Finland, which are much less severely affected than the south of the country, have rates close to those of Sweden. In Germany, the risk of an early death is generally high (308 per 100 000), with the eastern Länder, but also Bremen (356) and Hamburg (322), showing clear excess mortality. In France, the map reveals a northern "T" of excess mortality located inside a "U" of below-average mortality. In Austria, there is something of an east/west divide, with the Bundesländer in the Danube region in an unfavourable position. The lower mortality rates of the alpine Bundesländer are close to those of the neighbouring alpine regions of Italy. In Spain, the coastal provinces have rates similar to those of the southern regions of France. By the same token, the rates for Galicia (317) and Principado de Asturias (331) are close to those of the neighbouring Portuguese provinces.
Some of the worst-affected European regions have common socio-economic characteristics. They tend to be large, urban regions, old industrial regions (Nord-Pas-de-Calais (441), Lorraine (440), Saarland (334), Greater Manchester (328)), or economically disadvantaged regions such as the Länder of eastern Germany, Anatoliki Makedonia-Thraki (404) and the Portuguese regions.

Patterns of premature mortality among women are different to those among men (Map 3). Denmark is the most severely affected country, with a rate almost twice that of Spain (200 for Denmark, compared with 120 for Spain; see Map 3). Denmark is part of an almost unbroken swathe of countries and regions where there is excess mortality, encompassing the British Isles, the Benelux countries, north-eastern France, Germany and northern Austria. Portugal, southern Finland, Anatoliki Makedonia-Thraki, Attiki and Campania in Italy also have high rates of premature mortality among women.

The specific geographical breakdown of premature mortality is particularly interesting in that there is a preponderance of causes of death associated with lifestyle choices. Premature mortality, whether in terms of absolute level or regional disparities, is therefore an important indicator for assessing the preventive practices in different European countries.

### Ischaemic heart diseases

Ischaemic heart diseases mainly affect older people (65 years +) and are not a significant factor in premature mortality. This cause of death was therefore studied for the population as a whole.

There is a considerable disparity between the north and south of the EU in terms of mortality connected with the various diseases of the circulatory system, particularly ischaemic heart diseases. This phenomenon, which is observable in both sexes, is highly specific (see Map 4, Female mortality).

Two groups of countries are situated at opposite ends of the spectrum. One group (comprising the British Isles, the Scandinavian countries, the Netherlands, Germany and Austria) displays a high degree of excess mortality, while the other (Luxembourg, Belgium and the Mediterranean countries, including France) displays below-average mortality. There are some very pronounced contrasts between these two groups of countries, with the rates varying in a ratio of 1:9 for men and 1:11 for women. In the south, France, northern Spain and Portugal have the lowest rates in Europe. In the north, the most northerly regions and the Länder of eastern Germany, the Saarland (122) and Vienna (122) are particularly badly affected.

Before interpreting these disparities as functions of risk factors or the features of health care systems, consideration should be given to the comparability of death certification practices. For example, some sudden deaths of cardiac origin may be recorded, depending on certification practices, under "cause of death unknown" or "infarction". A recent comparative study of France and the United Kingdom, however, has shown that, if the data are adjusted on the basis of robust hypotheses, death rates are much lower in France.

In addition to these methodological biases, disparities between Member States in mortality due to ischaemic heart diseases can be explained by dietary habits, for example, an unbalanced diet or one which is rich in fatty substances (more common in the northern Member States).

The favourable position of France in terms of death due to ischaemic heart diseases (32 per 100 000) is in stark contrast with its unfavourable position in terms of premature mortality (139). There may be some "competition" between causes of death: by comparing
the level of premature mortality in France and the United Kingdom, one can demonstrate a substitution effect between causes directly related to alcohol (very common in France), and deaths by infarction (very common in the United Kingdom). An explanation may be that persons most liable to make dangerous life-style choices (such as alcohol consumption in France) die prematurely, while the population which survives and is in “good” health, tends to escape ischaemic heart disease. However, this hypothesis does not hold true for Germany or Austria, countries which have excess premature mortality due to pathologies related to both alcohol consumption and ischaemic heart diseases.

Lastly, with regard to ischaemic heart diseases, particularly infarctions, death often occurs quickly, before the patient can be hospitalised. The density of medical services and the quality and speed of the care provided, both at the time of the attack (emergency services) and upstream (hospital cardiology departments) should also be taken into account as explanatory factors, but would require specific studies.

Cancers of the respiratory tract

Deaths caused by cancers of the respiratory tract are common among the under-65s and are therefore a major factor in premature mortality.

Cancers of the respiratory tract (lungs, bronchi, trachea, larynx) are primarily due to smoking, although other factors, such as industrial pollution, play an important part (e.g. exposure to asbestos). The duration of survival of this type of cancer is short.

There is a clear distinction between rates of premature male mortality due to cancer of the respiratory tract in the most northerly Member States and the rest of the EU (Map 5). Despite marked disparities in most countries, there are some national tendencies. For example, most regions in France (rate of 39) and Spain (38) are severely affected. There also some geographical continuities across national borders. All Mediterranean coastal regions and islands display excess mortality, from Andalusia (24) to Campania (24): the picture is similar in the Atlantic regions of Galicia (18) and Brittany (17). Overall, with the exception of Austria and Portugal, the countries of the south-east are most affected. At the opposite end, the northern EU Member States constitute a below-average mortality area. Sweden and Finland are very homogeneous, and the mortality level is low throughout the British Isles.

The geographical distribution of female mortality rates is different from that of men (Map 6). A broad area of excess mortality stretches from the British Isles, via the southern regions of Sweden and Finland, through to Germany. Denmark is the worst-affected country (20 deaths per 100 000 women). With the exception of northern Italy (where the rate is closer to that in neighbouring Austria), women in Mediterranean countries have relatively low mortality. The Iberian Peninsula has generally very low rates.

The relationship between smoking and death due to cancer of the respiratory tract has been clearly established. The regions with excess mortality are geographical areas where tobacco consumption is or was higher than elsewhere. In industrial regions, high death rates among men caused by cancers of the respiratory tract are an indicator of mortality in a population which consumes large quantities of tobacco and which is also more frequently exposed to a high-risk working environment. In the northern countries, smoking among women has a long tradition, but there is currently a major increase in the countries of the south. Despite increasingly widespread smoking among women in the EU, however, men are still much more likely to be
affected by cancers of the respiratory tract than women (the male/female ratio is 4:1). Nevertheless, ratios of male excess mortality in persons under the age of 65 vary greatly between regions.

The geography of excess male mortality reveals a clear distinction between northern and southern Member States. In the northern countries, where female mortality is high, the ratio of male/female mortality is relatively low (1.7 on average). In Sweden and Denmark, cancers of the respiratory tract affect men and women almost equally. In the Mediterranean countries, on the other hand, and especially Spain (12.2), excess male mortality is very pronounced.

The disparities in the geographical breakdown of cancers of the respiratory tract need to be interpreted with caution, since they reflect patterns of nicotine consumption in the past, patterns which vary as a function of sex, age and socio-economic group. Moreover, in addition to smoking, which is widely recognised as a risk factor, there are others, particularly occupational ones, whose effects have yet to be satisfactorily measured. Given current trends in nicotine consumption in the various countries, the differences between countries and between the sexes at European level are likely to change considerably in the future.

### Other major causes of death

#### Other cancers

<table>
<thead>
<tr>
<th>Type of tumour</th>
<th>Total All tumours</th>
<th>larynx, trachea, bronchi and lungs</th>
<th>breast</th>
<th>prostate</th>
<th>colon</th>
<th>stomach</th>
<th>pancreas</th>
<th>lymphatic and haemopoietic tissues</th>
<th>ovaries</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Women</strong></td>
<td>144,2</td>
<td>15,6</td>
<td>28,3</td>
<td>-</td>
<td>12,8</td>
<td>7,2</td>
<td>7,4</td>
<td>11,7</td>
<td>8,5</td>
</tr>
<tr>
<td><strong>Mens</strong></td>
<td>257,7</td>
<td>72,5</td>
<td>-</td>
<td>26,1</td>
<td>18,7</td>
<td>15,2</td>
<td>10,9</td>
<td>18,3</td>
<td>-</td>
</tr>
</tbody>
</table>

As can be seen from Table 1, the types of malignant tumour which cause most deaths in the EU (all age groups combined) are mainly tumours of the larynx, trachea, bronchi and lungs, the breasts in the case of women, and the prostate in men. Next come tumours of the colon, the stomach, the pancreas, the lymphatic and haemopoietic tissues and, among women, the ovaries.

#### Violent death

The term "violent death" encompasses a very wide range of events. Traffic accidents are the main cause of violent death in the population, with a standardised European rate of 17.5 per 100 000 men, followed by suicides, at 14.6 per 100 000 men. These two causes of death mainly affect people under the age of 65. Accidental falls account for one-third of violent deaths, but these mainly affect the older population. This is the most common type of violent death among women (6.0 per 100 000), followed by traffic accidents (5.4) and suicide (5.3).
AIDS

AIDS mainly affects young men, and is the third-biggest cause of death among men aged between 25 and 44 (the rate is 6.7 deaths per 100,000). The female population is less severely affected: the standardised rate for all ages is 0.7.

The worst-affected regions are Lisboa e Vale do Tejo (Portugal), with a standardised rate of 31, and Ceuta y Melilla (Spain), with a standardised rate of 21.

**Essential information – methodological notes**

The analysis for each country was performed at the highest available regional level: the NUTS-2 level of Eurostat's Nomenclature of Territorial Units for Statistical Purposes. The data were aggregated over the period 1997-1999, except in the case of Belgium, for which only the 1994-1996 data were available. The medical causes of death were selected from a "shortlist" of 65 such causes compiled by Eurostat. For mapping purposes, the data were grouped into six classes, depending on the number of spatial units concerned, for each statistical series: classes 1 (5% of the spatial units), two (20%), three (25%), four (25%), five (20%) and six (5%).

The mortality indicator analysed in this edition of "Statistics in Focus" is the age-standardised rate. Depending on the type of breakdown used (sex, age or cause of death), the indicator provides insights into:

- differences in mortality between men and women, either by region or cause of death,
- the level of premature mortality (occurring before the age of 65), which is explained mainly by causes of death whose frequency could be decreased by eliminating dangerous lifestyle choices (alcohol consumption, smoking, violence, etc.),
- the mortality profiles of each region, by cause of death and by age.

In this publication, the results for 1997-1999 are set out by typology, using hierarchical classification methods of age-specific mortality (for the period 1994-1996) and a regional analysis of premature mortality for all causes of death combined and mortality due to lung cancer, and ischaemic heart diseases for mortality in all age groups combined.

**Mortality rates, standardised by age**

In order to compensate for differences in the age structure, standardised rates were used.

\[
SDR_j = \sum_{i=1}^{n} P_i T_{ji}
\]

where

- \(i\) = index of the age group
- \(n\) = number of age groups
- \(j\) = index of the sub-population
- \(SDR_j\) = standardised mortality rate (standardised death rate) in sub-population \(j\)
- \(P_i\) = share of the standard European population accounted for by age group \(i\) (1976)
- \(T_{ji}\) = mortality rate observed in sub-population \(j\) for class \(i\)

Mortality rates by age are thus weighted by the standard population age structure. The measure of the European population chosen as a reference was the one recommended by the UN. This direct standardisation facilitates comparisons between regions, after adjustments for age structures.

**Premature mortality**

Premature mortality is defined as all deaths which occur before the age of 65. This age limit is used in many international studies. In the EU as a whole, early deaths represent a third of overall mortality, with death rates twice as high among the male population. The spatial analysis of premature mortality reveals major disparities in the EU, distinct from those in general mortality, and different configurations for each of the sexes.
Further information:

- **Reference publications**
  - Title: Atlas on mortality in the European Union
  - Catalogue No: KS-08-02-001-EN-C
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This study was performed by a French team coordinated by the CépiDc (Centre for the Epidemiology of Medical Causes of Death) of Inserm (the French Institute of Health and Medical Research), led by Éric Jougla, in collaboration with a team of geographers at the Université de Paris X, led by Gérard Salem. Sophie Gancel, Vincent Michel, Marie-Laure Kürzinger, Gérard Pavillon, Stéphane Rican and Nassima Hamzaoui also took part in the study.

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