

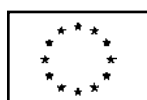


Health statistics

Atlas on mortality in the European Union

Chapter 2 Methodology

Data 1994–96



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sur les causes médicales de décès



UNIVERSITÉ PARIS X NANTERRE



THEME 3
Population and
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2. Methodology

Data

Data on mortality and population

Sources

Eurostat, the Statistical Office of the European Communities, supplied the data on population and the number of deaths. Eurostat centralises the data produced by the statistical institutes of the Member States and uses them to compile comparable indicators.

The data are taken from Eurostat's NewCronos database. The selection of the causes of death and the mortality indicators had been previously discussed at Eurostat's Task Force on Causes of Death Statistics. The NIDI (Netherlands Interdisciplinary Demographic Institute) age-standardised the mortality data.

Processing of the data

The data show, for each spatial unit, the population and number of deaths by sex and by five-year age group up to 85 and over.

The data were aggregated over a period of three years (1994, 1995 and 1996) in order to increase the number of deaths, thereby reducing a number of regions with numbers too small for statistical processing. Below about 20 individuals, the random fluctuations in sampling can be very considerable.

Missing data

Mortality data are currently unavailable for certain Belgian regions, so there are no maps for these regions and the figures for Belgium relate to the whole country. The French data apply only to Metropolitan France (i.e. overseas departments and territories are not included). Since mortality data were missing for the regions of Scotland and Wales, the figures were aggregated at the next highest geographical level. For certain regions of the United Kingdom, population numbers were estimated on the basis of Eurostat's projections of population growth.

General mortality

An initial set of maps on general mortality (all causes of death) gives crude mortality rates. These results largely reflect the effect of demographic structures on mortality. The maps showing

age-standardised mortality rates then give an initial regional comparison of general mortality rates after checking the age structures of the populations.

Causes of death

The Eurostat classification of mortality data breaks down causes of death into 65 groups based on the international classification of diseases (ICD). A list of the selected causes and their equivalent ICD codes are given in the annex. Causes of death were also grouped for a more specific approach corresponding to a particular aim (e.g. mortality associated with alcoholism).

Selected causes of death

The causes of death shown in the maps were selected according to various criteria: their relative share in general mortality, their importance in terms of public health, their potential role in prevention, etc.

Figure 1: Selected causes of death (in parentheses, the code(s) corresponding to the Eurostat list)

- **Infectious diseases**
HIV (4)
- **Diseases of the circulatory system**
Overall (33)
Ischaemic heart diseases (34)
Cerebrovascular diseases (36)
- **Diseases of the respiratory system**
Influenza and pneumonia (38, 39)
Chronic diseases (40)
- **Cancer**
Larynx and trachea/bronchus/lung (15)
Stomach (10)
Pancreas (14)
Colon, rectum and anus (11, 12)
Skin (16)
Bladder (23)
Prostate (21)
Breast (17)
Uterus (18, 19)
- **Violent causes of death**
Transport accidents (60)
Suicide (63)
Accidental falls (61)
- **Grouped causes of death**
Alcohol-related causes (8, 9, 29, 44)

Specific groupings of causes, 'premature' mortality and typologies by cause

Certain risk factors can be dealt with by grouping causes of death. In this way, grouping cancers of

2. Methodology

the upper respiratory and digestive tract and the oesophagus with alcoholic psychoses and chronic liver disease enables us to obtain an indicator of death associated with alcoholism.

'Premature' mortality (before 65 years) often involves causes of death whose frequency could be reduced by changing people's behaviour (alcoholism, smoking, violent deaths), which in turn are linked to social, economic and cultural risk factors.

The typologies by cause of death and by age define 'mortality profiles', which show, in relation to the European average, excess mortality or below-average mortality. They were compiled by methods of hierarchical ascending classification, the tree-structure of which is shown on each map concerned.

Mortality indicators used

Population sub-sets by sex and age

Male and female mortality were analysed separately. A preliminary analysis deals with general mortality (all causes of death) by major age groups (children, young people, adults and the elderly). Causes of death were then analysed for the total population and the population aged less than 65 years.

Statistical indicators

Conventional mortality indicators were used: crude death rates, age-standardised death rates and male/female ratios in the maps, proportional mortality and number of deaths in the tables and histograms.

Crude death rate

The crude death rate describes mortality in relation to the total population:

$$TBM = \frac{D}{E} \times 100\,000, \text{ where}$$

TBM = crude death rate per 100 000 inhabitants

D = number of deaths recorded in the population for a given period

E = population in the same period

This index is strongly influenced by the age structure of the population. It is useful for considering the ageing of the population, for comparing 'young' Europe with 'old' Europe, and for providing indications on the potential demand for care.

Age-standardised death rates (comparative rates)

In order to check the differences in age structure, comparative rates were used:

$$SDR = \sum_{i=1}^n P_i T_{ji}, \text{ where}$$

i = age group index

n = number of age groups

j = sub-population index

SDR = comparative death rates in sub-population j

P_i = percentage of age group i in the European standard population (1976)

T_{ji} = death rate observed in sub-population j for age group i

Mortality rates by age are thus weighted by the age structure of a standard population. The European population recommended by the UN was chosen as a reference (see Annex 1). This direct standardisation makes it possible to compare regions after checking the age structures.

Male/female mortality ratios

The purpose of this indicator is to compare the differences in mortality between men and women according to region.

$$RMF = \frac{SDR_M}{SDR_F}, \text{ where}$$

RMF = male/female mortality rate

SDR_M = male comparative rate

SDR_F = female comparative rate

A value higher than 1 corresponds to excess male mortality, while a value lower than 1 corresponds to excess female mortality. This indicator therefore serves to characterise the regions and causes of death according to the differences or similarities in terms of risk of death between the two sexes.

Number of deaths and proportional mortality

The histogram that accompanies each map is based on the number of deaths. With regard to mortality by causes, the table of national data that accompanies the regional maps shows the average, mini-

mum and maximum values of the percentage of total mortality accounted for by the cause of death concerned.

Cartographic analysis

Frontiers and levels of analysis

The map analysis uses the breakdown of the nomenclature of territorial units for statistics (NUTS) compiled by Eurostat. The data are aggregated at NUTS 2 level, except for some regions where, for reasons of availability of information, the higher level of NUTS 1 is used.

This territorial breakdown has the advantage of using the limits defined by each country, which thus correspond to their territorial makeup. On the other hand, it has the disadvantage of comparing regions that are very heterogeneous in terms of area and size.

One example of this is Germany, where NUTS 1 level is chosen by default, since NUTS 2 is not available, or Denmark and Luxembourg, which do not have any regional breakdown.

The commentaries on the maps set out to analyse initially the differences in mortality at regional level. The analysis at regional level comprises two phases, analysis of the regional differences within each country, then highlighting any instances of cross-border continuity, where the geographical proximity and the special regional features may be more important than the purely national aspects.

Basis of the maps

A number of countries have changed their breakdown of NUTS 2 regions since the mortality data were recorded. This is the case in Ireland, the United Kingdom, Sweden and Finland.

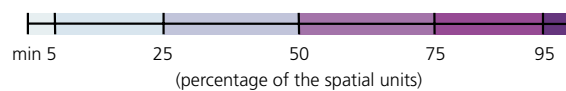
In the United Kingdom, Greater London was previously a single region, which has now been divided into two, Central London and Outer London. Similarly, Cornwall and Devon have been two separate regions since 1998, while previously they were only one. Ireland has been divided into two regions. The rates for the former region have been applied to the two new ones, and an average has been taken for calculating the number of deaths.

In the two Scandinavian countries, the border between two regions has been changed (Smaland med öarna and Västsverige in Sweden, and Uusimaa and Etelä-Suomi in Finland). Although only very slight border changes were involved, they affect densely populated areas, so that there were

significant changes in the mortality rates. For this reason, the rates have been recalculated for the two regions together and an average of the number of deaths has been calculated as for the regions of Ireland and the United Kingdom.

Cartographic processing and separation

Separation is the breakdown into classes of statistical series to be represented by different colours on the maps (choropleth maps). The method used is a separation by quartiles, which have the advantage of making the maps easily comparable. The breakdown is therefore a function of the number of spatial units and not of the distribution of values. These irregular quantiles in six classes (Q6) break down the statistical series as follows:



In all, 5 % of the spatial units are in the first class, 20 % are in the second, 25 % are in the third and fourth, and again 20 % and 5 % respectively in the fifth and sixth. This method is used irrespective of whether the distribution is normal, dissymmetrical or plurimodal.

For the spatial units that correspond to an insufficient number of deaths for meaningful interpretation (less than 20), a white line has been superimposed.

How to read the maps

The purpose of the maps is not so much to give the rates of a particular region as to portray the spatial structures of mortality in Europe. Care should therefore be taken to identify spatial continuities and discontinuities, particularly those of geographical areas covering a number of countries (the Mediterranean, the Alps, etc.), the homogeneity or heterogeneity of the countries, etc.

There are two types of maps: choropleth and typological.

Choropleth maps express rates or ratios. The brighter the colour, the higher the rates, thus highlighting the worst affected regions. The corresponding rate intervals are shown on the left and beside them the national data of the two countries with the lowest and highest rates and the European average. The histogram at the bottom left-hand side of the map gives the crude number of deaths recorded for each statistical class.

The typological maps portray standard mortality profiles, so the colour does not reflect the level of seriousness. The maps of typologies by age contain a number of graphs showing, on the vertical axis, mortality ratios in relation to the European average and, on the horizontal axis, the age classes. Thus, the age classes that appear below value 1 have a higher mortality rate than the European average, and vice-versa. On the top left-hand side, there is the tree diagram of the typology, emphasising the statistical proximity between identified types. The histogram gives the number of spatial units per standard profile. The typological maps by causes of death are constructed according to the same principle. The tables below the maps use a standard colour to show the differences from the European average for each cause of death.

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