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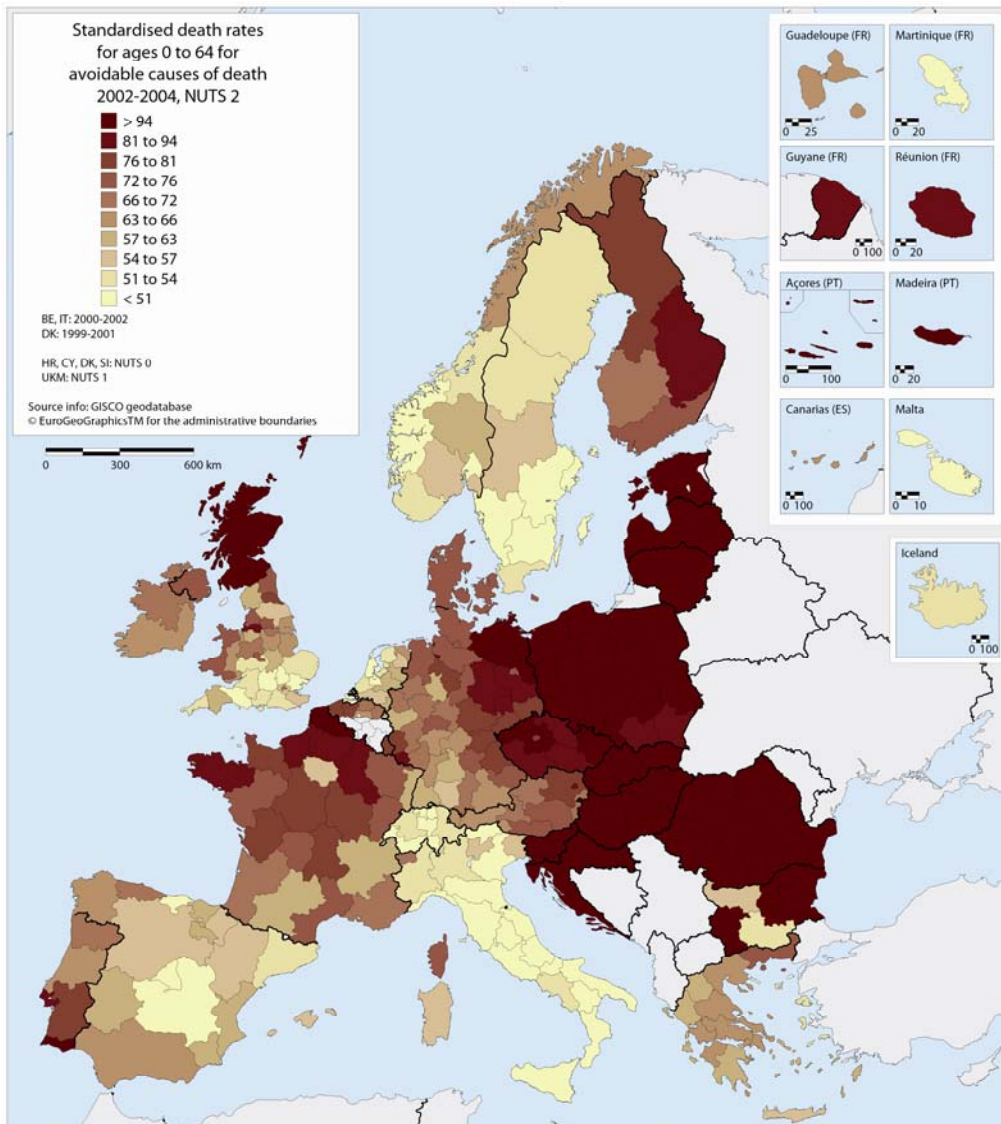
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Who dies of what in Europe before the age of 65

High life expectancy but large differences in mortality

An [atlas on mortality](#) in the European Union has just been published. This Statistics in Focus highlights important causes of avoidable mortality below age 65, namely ischaemic heart disease, lung cancer, alcohol-related mortality, suicide, transport accidents, cervical cancer and AIDS. These causes of death are described at

NUTS 2 level in 2002-2004. In the EU, men lost twice as many life years before age 65 as women. In the Baltic regions, men lost more than twice the number of years as compared to the EU-27 average. The lowest mortality in women before age 65 was found in the Mediterranean regions of Italy, Spain, Cyprus and Greece.



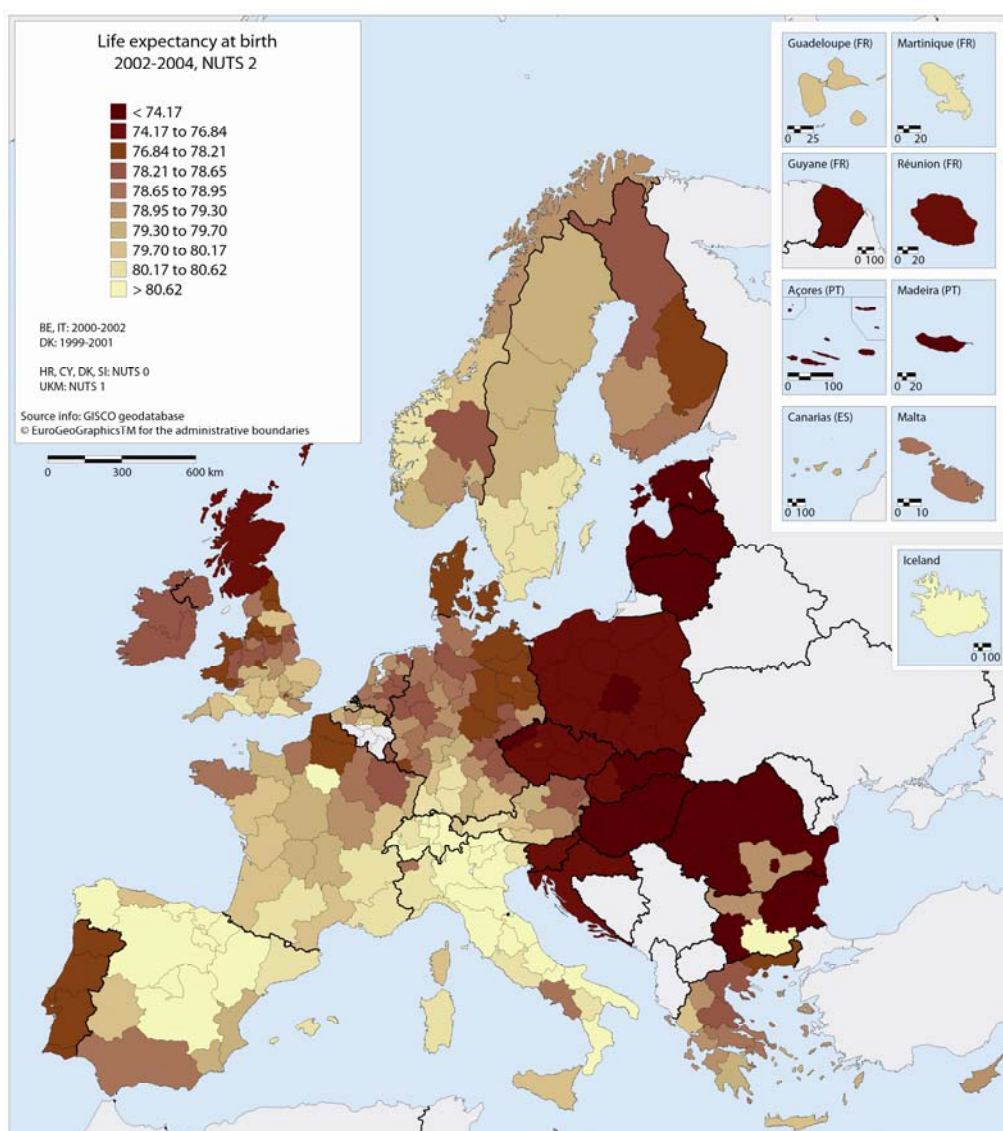
Standardised death rates

The map on the front page shows age standardised death rates for ages below 65 for avoidable causes of death. 'Avoidable' is loosely defined as important causes of death which could be avoided by changing lifestyles or health policies. This publication describes ischaemic heart disease, lung cancer, alcohol-related mortality, suicide, transport accidents, cervical cancer and AIDS. Age standardised rates correct for different age distributions of the population. Differences in classification and coding practices of selected diseases may explain a certain part of the differences. Each of the 10 ranges in the map holds approximately 10 % of all regions. The first range has a

mortality rate that is twice that of the last one. The Central and Eastern European new Member States have a high mortality, including parts of Germany that belonged to the former German Democratic Republic (GDR).

The countries with very low mortality below age 65 are Italy, Switzerland, Malta, Norway, Sweden, Iceland, the Netherlands and to a lesser extent Spain. Within the United Kingdom, there is a strikingly large north-south division that encompasses the whole range of EU mortality. A number of former industrial areas with high mortality are found in Northern England and the north-east of France.

Life expectancies



Low avoidable adult mortality corresponds to high life expectancy. The second map shows life expectancy, again divided in 10 ranges, each range holding 10 % of all regions. Life expectancy at birth includes mortality at all ages, but weighs the mortality at younger ages relatively more. The map is similar to the picture of avoidable

mortality at ages below 65. Some differences can be caused by very low mortality at old age. These for example boost the French and Spanish life expectancy. The relatively low ranking of the Netherlands and Portugal in EU total life expectancy is caused by both relatively high mortality at

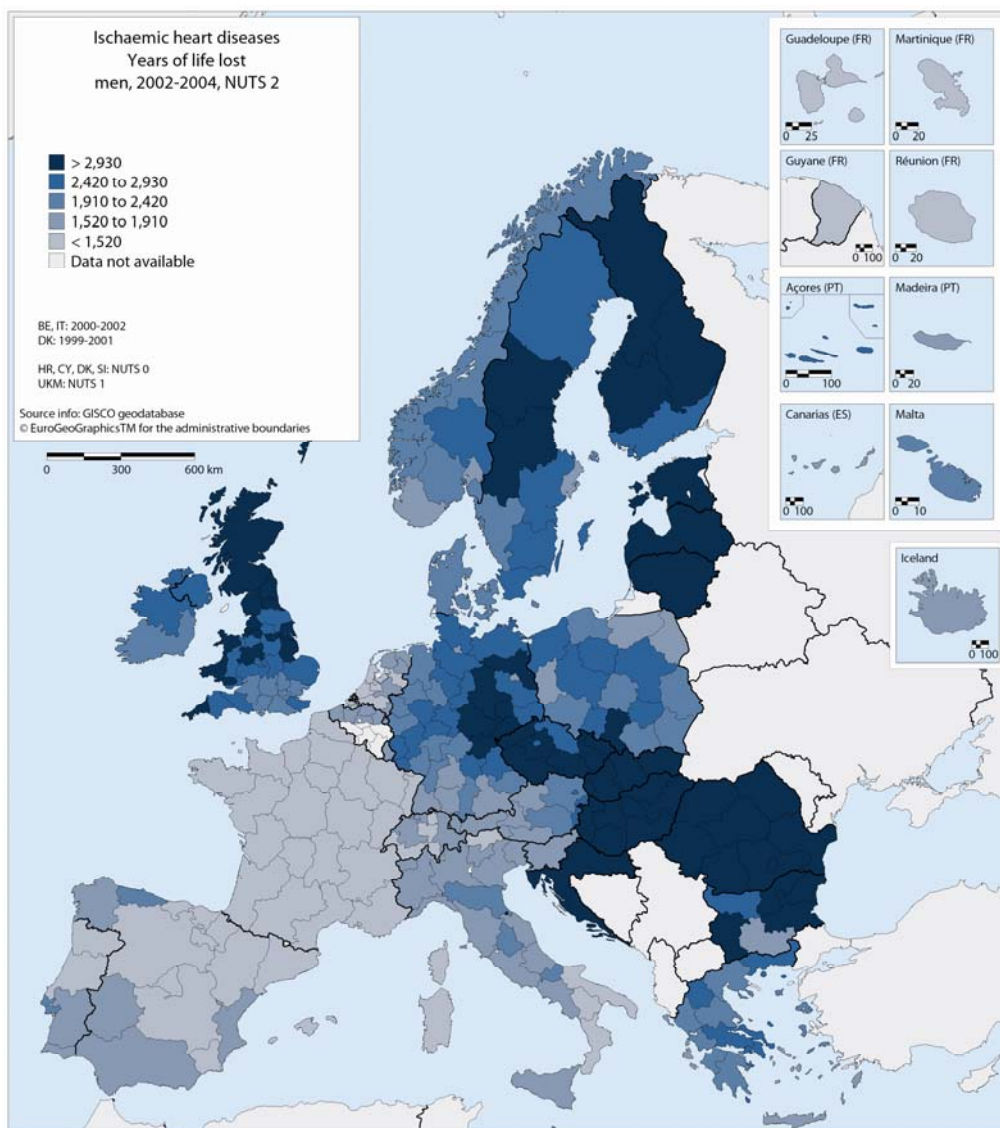
old ages (the Netherlands) and large fractions of ill-defined mortality.

The highest 10 % of the EU regions have an average life expectancy of 80.6 years, the lowest 10 % of 74.2 years. This is a difference of 6.4 years. The regional maps by cause show that causes of death related to unhealthy and risky lifestyles (ischaemic heart disease, lung cancer,

cervical cancer mortality, alcohol-related mortality, suicide and transport accidents) are an important explanation of this difference.

However, a large fraction of avoidable (premature) mortality could be amenable to effective evidence-based public health measures.

Ischaemic heart disease



Ischaemic heart disease is responsible for 14 % of all years of lost life (YLL) in Europe and of 7 % of all potential years of life lost below age 65 (PYLL). It is still the most important specific cause of lost life years, although ischaemic heart disease mortality has halved in less than three decades in most of the old Member States of the European Union. This came as a consequence of multiple changes: increases in wealth, better levels of education and security, decreased levels of smoking and blood pressure, improved cardiovascular risk management, particularly in those patients with a history of heart disease and improvements in emergency treatment of an acute myocardial infarction.

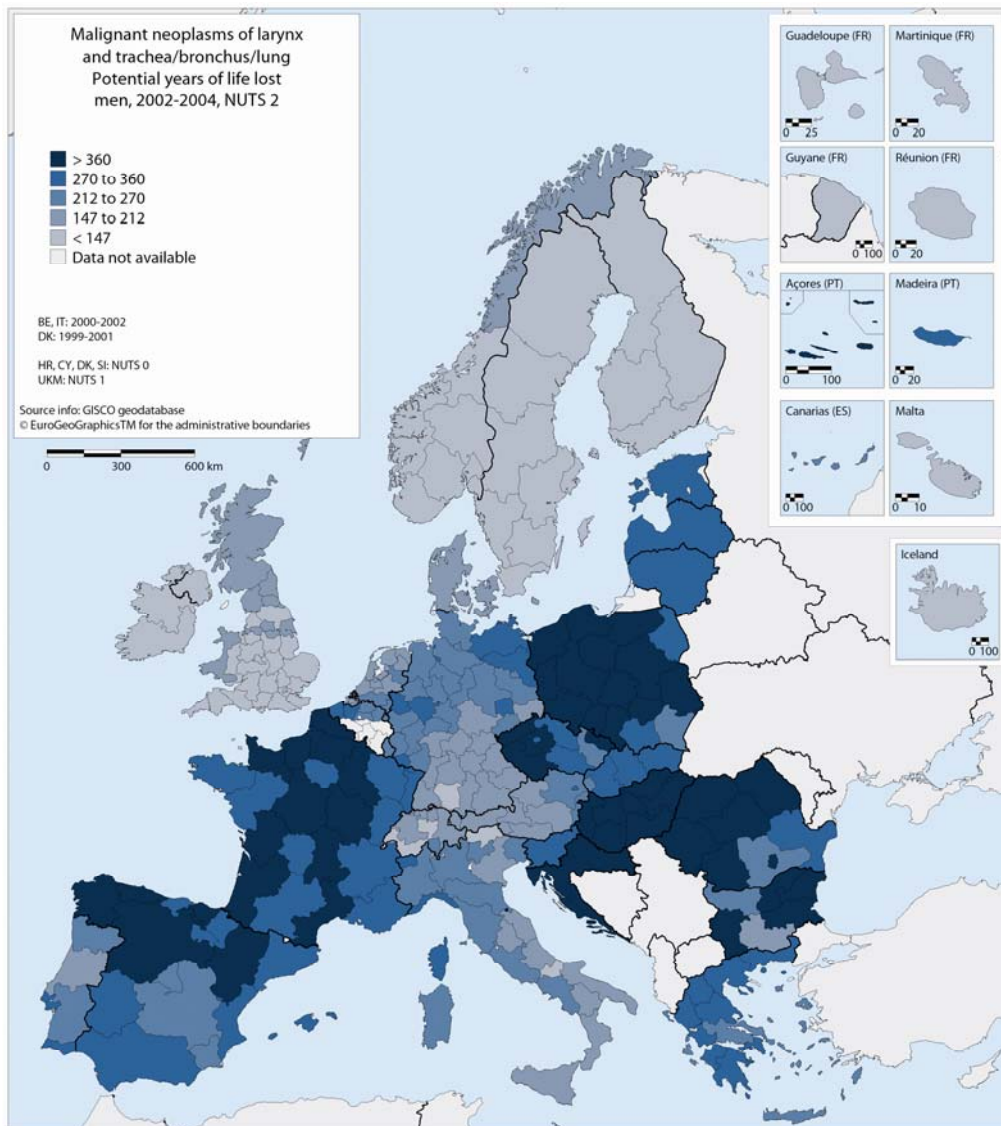
Due to its acute natural and long term consequences, the classification of deaths by ischaemic heart disease is less reliable in international comparisons. Acute lethal events can be classified as acute myocardial infarction, sudden heart death, cardiovascular death of unknown origin and ill-defined causes of death. Death by chronic heart disease can be classified as ischaemic of origin, heart failure or dysrhythmias. This opens up many possibilities for different registering and coding practices in different cultures, countries and care systems. Different coding practices show up in relatively low ischaemic heart disease mortality (compared to all cause mortality) and relatively high mortality of ill-defined causes. For example, the ratio of ill-defined

causes of death to ischaemic heart disease as cause of death is ten times higher in the Netherlands than in Flanders, two neighbouring countries with the same language and similar culture.

Even if we take these caveats into account, the patterns from west to east and from south to north are striking. The low ischaemic heart disease in the Mediterranean regions has been called “the Mediterranean paradox”. The paradox is low heart diseases in regions where there

is a high intake of animal fats. The ischaemic heart disease mortality patterns in the United Kingdom have been explained in part by relative differences in social deprivation between the wealthy south and the old industrial north. There are also high levels of ischaemic heart disease in the new Member States of Eastern and Central Europe. However, these maps do not show (yet) that most new Member States nowadays experience decreasing ischaemic heart disease rates.

Lung cancer



Lung cancer is rare in non-smokers. In 100,000 non-smokers, the average number of potential years of life lost would be around 30¹. Compared to non-smokers active smoking increases the risk of lung cancer thirty fold. Environmental tobacco smoke is thought to increase lung cancer risk by 15 to 30 % from passive smoking². Other environmental air pollution increases

lung cancer risks with comparable levels at comparable doses³. In Europe, more than 90 % of all lung cancer mortality is caused by tobacco smoke and an estimated 1 % by air pollution^{1,3}.

There are two distinct smoking epidemics. In men, smoking reached very high levels in adult cohorts early

¹ Peto et al. (1992) *The Lancet* 339, 1268-1278

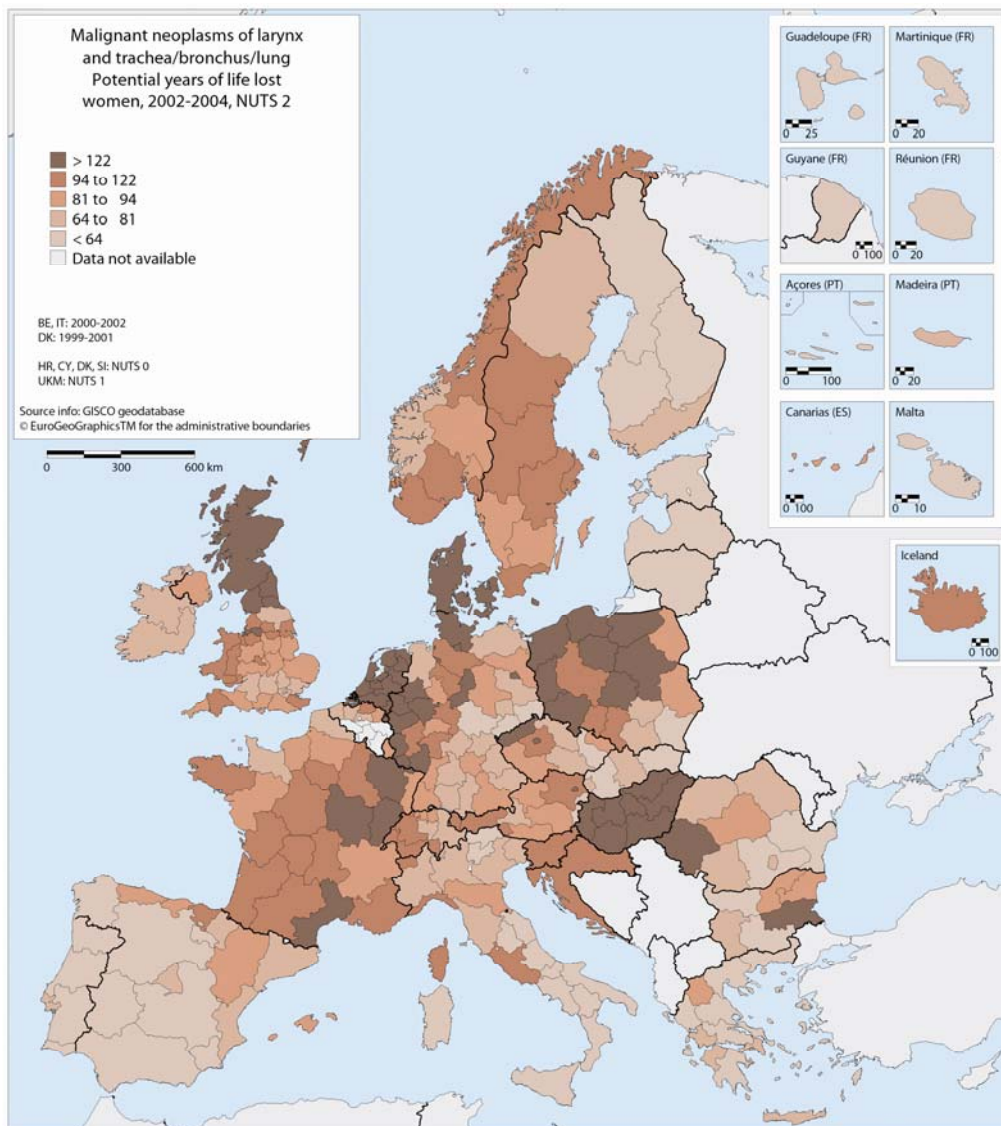
² Hackshaw et al. (1997) *BMJ* 315, 980-988

³ Peto (2001) *Nature* 411:390

after World War II. Then, increasing knowledge and increasingly effective health promotion started to curb the epidemic, followed 20 years later by decreasing lung cancer rates. Women took up smoking later, in the 1960s. Smoking behaviour is now converging to similar levels between both genders; with equal exposure, women may be more at risk of lung disease.

The maps show remarkably distinct effects of country borders and regions. As lung cancer is quite consistently coded, this illustrates the importance of tobacco policy and smoking culture. The potential years of life lost show lung cancer mortality as a consequence of smoking behaviour in younger cohorts. More traditional patterns of very high male to female ratios of lung cancer mortality are found in the Iberian Peninsula, Italy

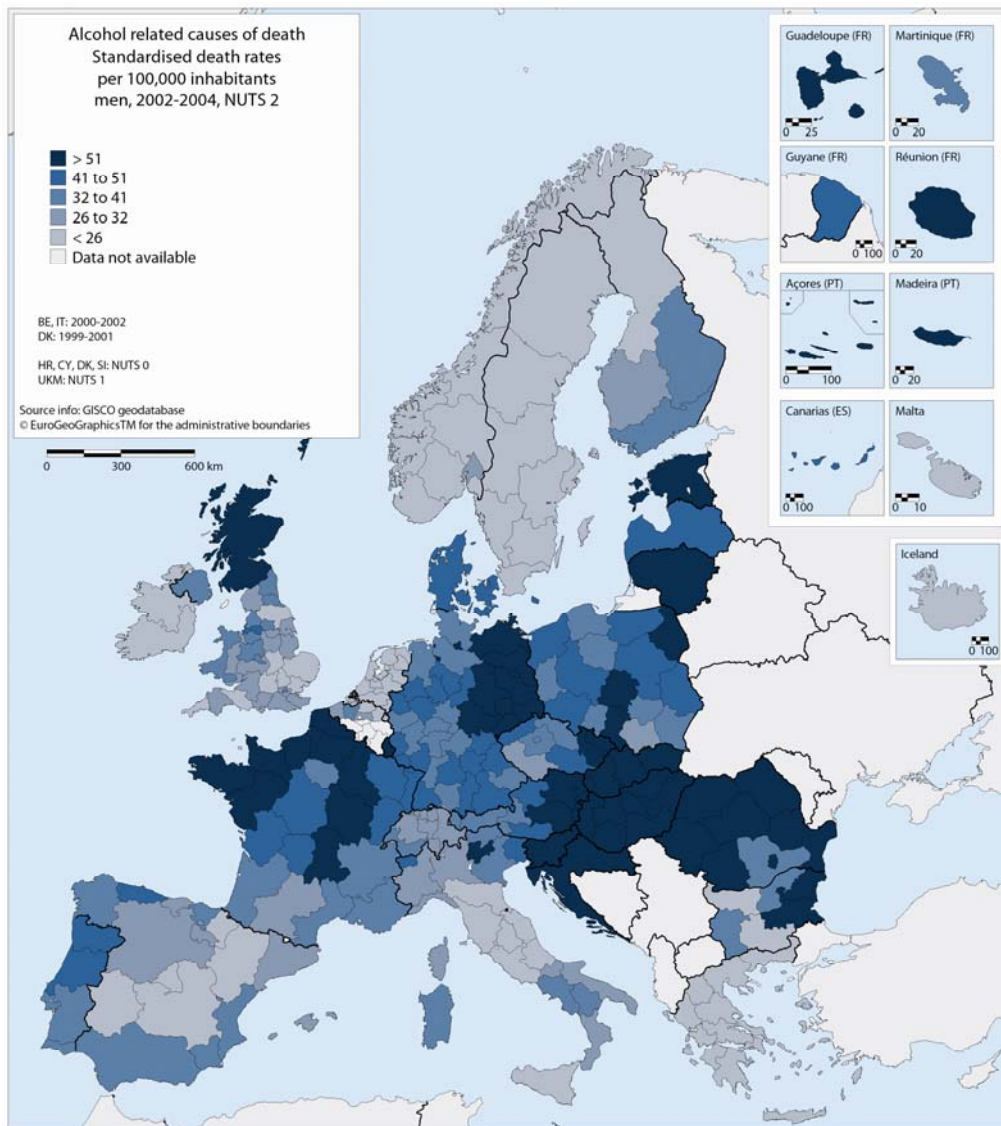
and Greece. The Baltic states also have large gender differences. In the Nordic regions (Sweden, Norway and Iceland) male and female lung cancer rates are equal and low, in the United Kingdom and the Netherlands male and female lung cancer rates are equal and high, showing distinct severe epidemics in women. Among men, the Scandinavia peninsula, the southern part of Germany, Switzerland and Austria show low rates. England and Wales, with very high lung cancer rates in the past, document the successes of tobacco research and policy. Maps of mortality at all ages (in the [Atlas on Mortality](#) in the European Union, 2002-2004) document the high mortality in old industrial regions in the United Kingdom, France, Germany, and Spain, where smoking prevalences had been very high.



Loss of productive life years among men is now highest in the many regions of the new Member States that have yet to benefit from strong anti-tobacco policies. The risk of dying of lung cancer in Hungary among men below age 65 is 131% higher than in the EU 27. In the Member States of the old EU-15, France and Spain have the highest lung cancer mortality among men, 14% and 12% higher than the EU-27.

Hungary has the highest lung cancer mortality in women also. The risk of dying of lung cancer below age 65 was 144% higher than the EU 27 average. Other regions with high rates were to be found in Denmark (99% higher), Iceland (93%), the Netherlands (75%) and Poland (36% higher).

Alcohol-related mortality

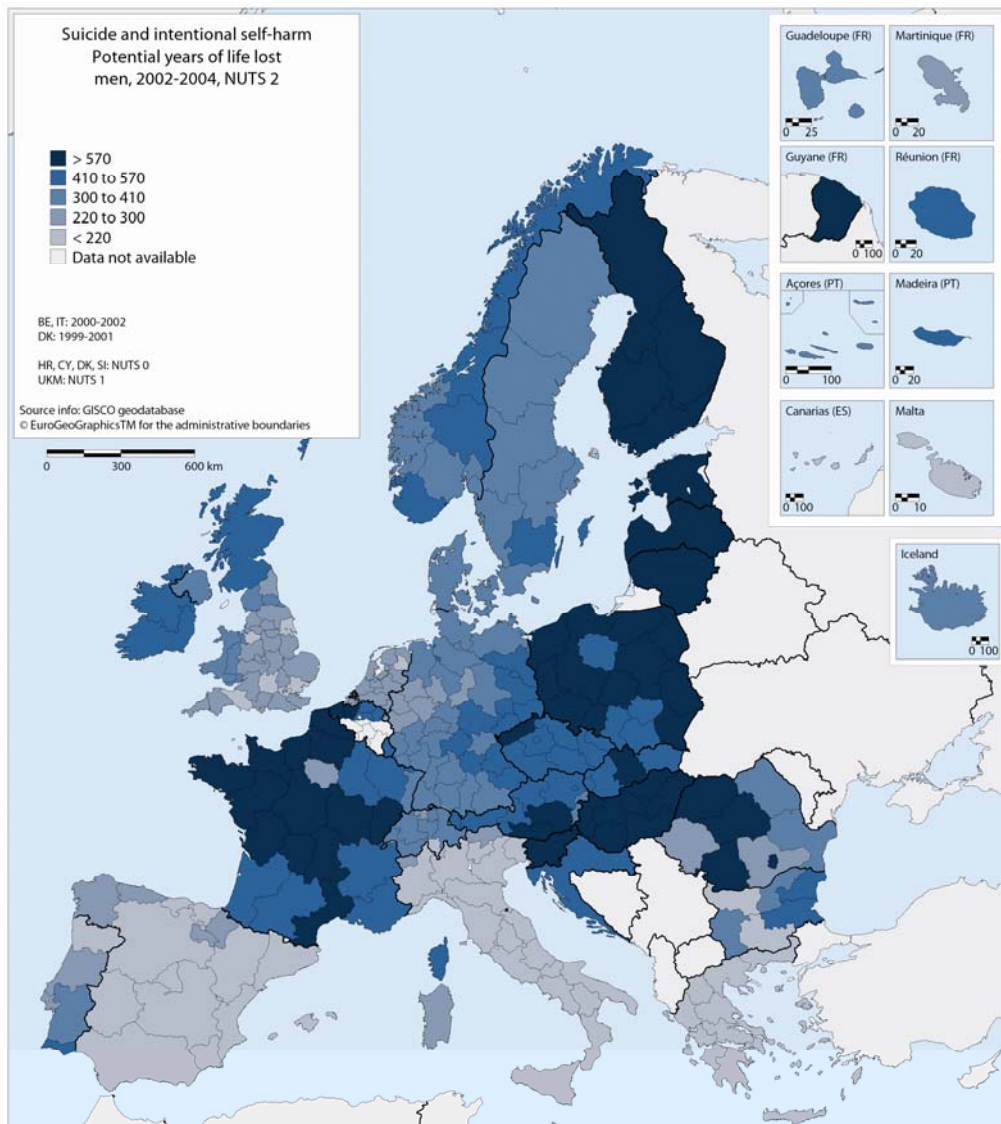


Alcohol-related mortality refers to the aggregated mortality of cancers of the mouth, throat and oesophagus (gullet), chronic liver disease and alcohol abuse. Alcohol-related mortality is only loosely related to alcohol use. While only a fraction of chronic liver disease is caused by alcohol, alcohol is also an important risk factor for road traffic injuries, suicide, falls,

homicide and circulatory disease mortality. The map coincides with country reports about alcohol use⁴. Differences are six-fold between the high mortality regions in Hungary and Romania and the low mortality regions in Greece and the Nordic countries Norway, Iceland and Sweden with very restrictive alcohol policies.

⁴ http://www.who.int/substance_abuse/publications/en/1_all_country_profiles_euro.pdf

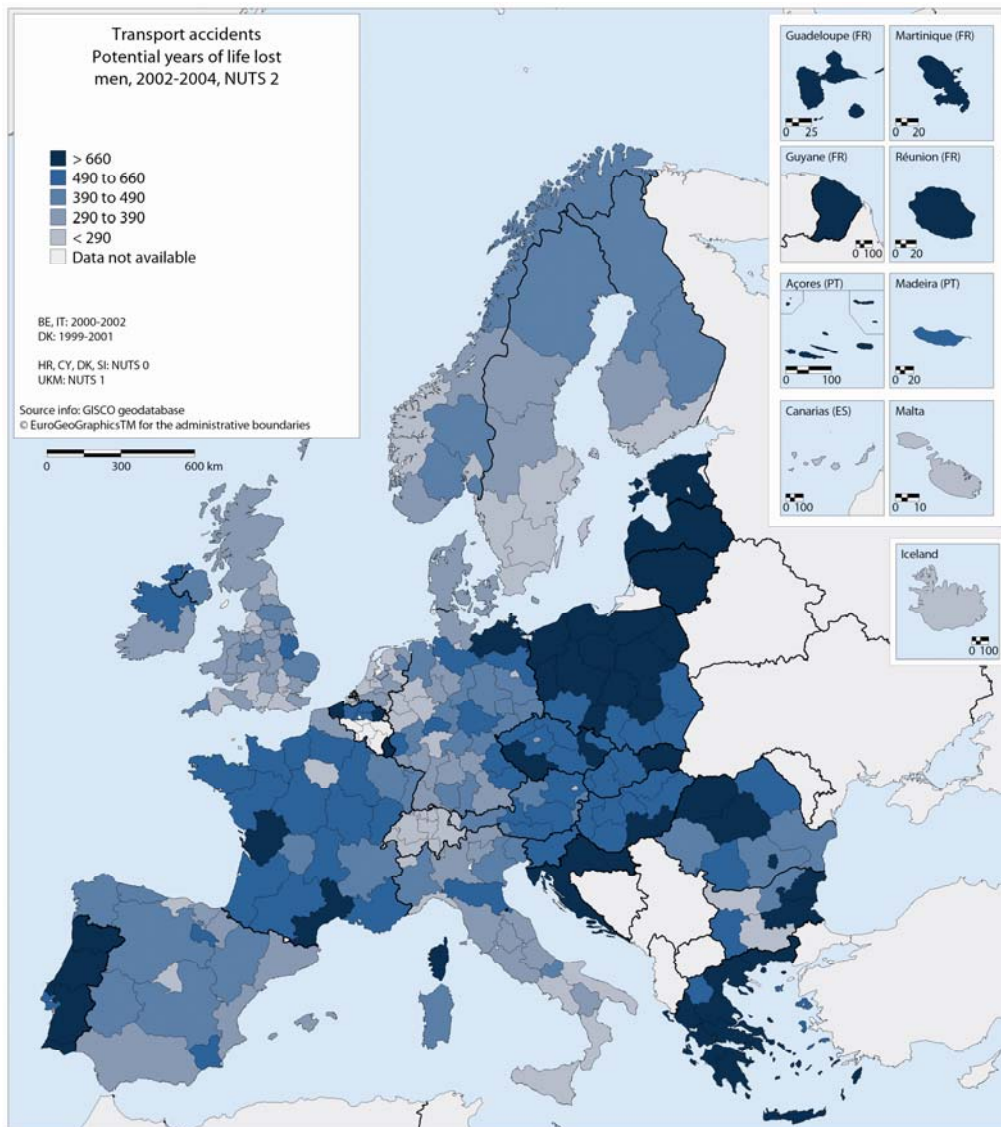
Suicide



Diagnostic and certification practices will vary from country to country. Suicide may carry a cultural or religious stigma or may cause financial consequences, as insurances may not be paid after a suicide. However, country rankings are consistent and validated. Men are much more likely to take their own lives than women. In high-mortality countries, adult men lose five times more life years than in low-mortality countries. In high-mortality regions, 100,000 men lose an average of 720 years below age 65; in low-mortality countries, 100,000 men lose 170 years, or a difference of 550 years. The highest suicide figures are found in the

three Baltic states, Hungary, Slovenia and many regions in Poland. Comparable high suicide figures are to be found in Finland, Belgium (East and West Flanders) and some French regions (Normandy, Brittany, Loire, the North East). Country borders show sharp boundaries, witnessing the influence of social and cultural factors (the stigmas mentioned earlier) and differences in coding practices. Of the 20 % (54 regions) with the lowest suicide rates, all but two are in Greece, Spain, Italy and Malta (South Europe) and the United Kingdom and the Netherlands in the West.

Transport accidents



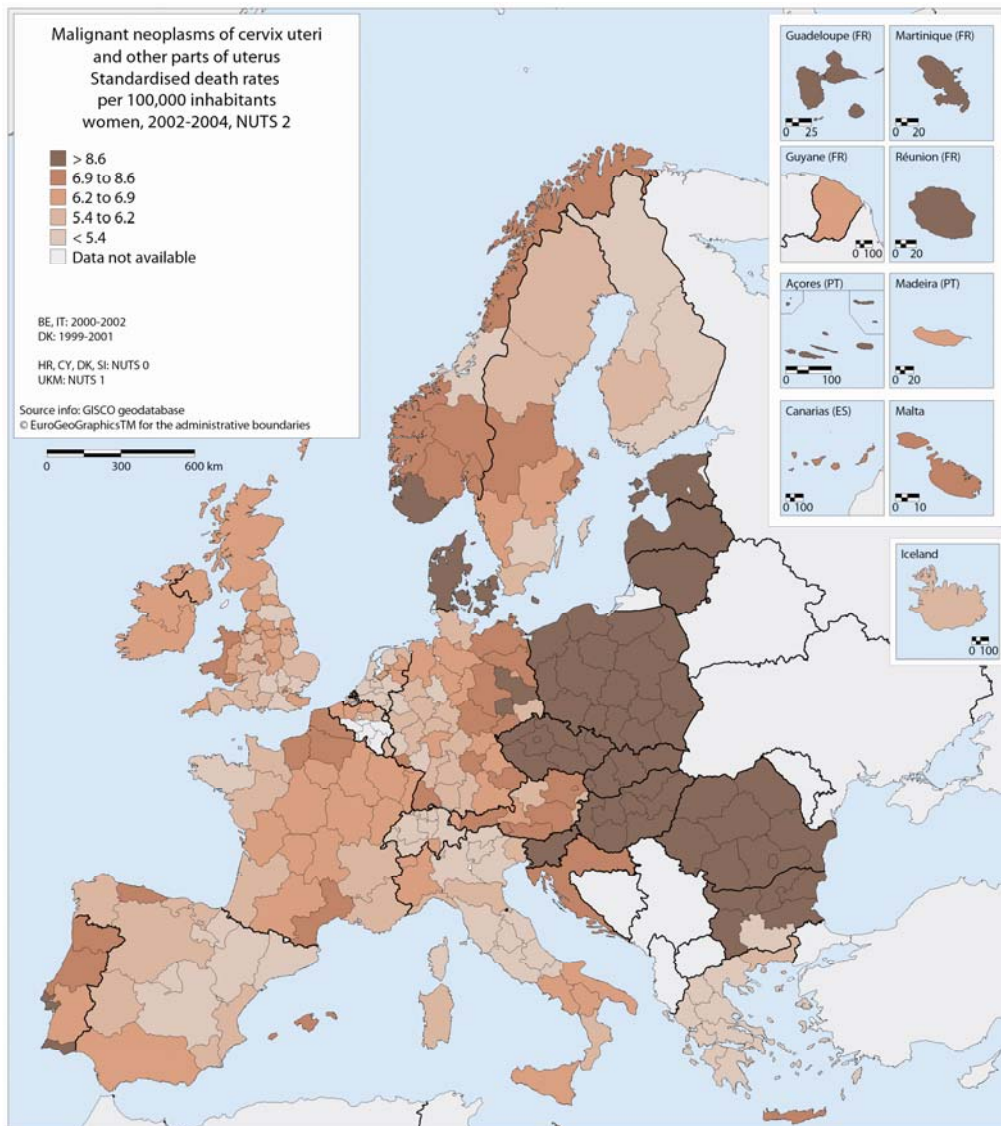
Road traffic accident mortality is high among young people. Transport accidents cause 8 % of all loss below 65 years in the EU-27, more than any disease. Sound traffic policy, based on engineering, education and enforcement, can prevent many deaths. Safer roads, more walkways and bicycle lanes and sustainable transport policies with less reliance on cars are among the first priorities of Public Health. Enforcement of speed limits and high-visibility random breath testing for control of drinking and driving have been shown to be effective⁵.

Men run higher risks than women, a well known gender characteristic. In the EU-27, the male to female mortality ratio is 3.9. This ratio is higher in high mortality areas and lower in low mortality areas.

The boundaries between most countries indicate the effects, or lack of effects, of national road safety policies. Transport is most dangerous in regions in Portugal, Lithuania, Latvia, Corsica, Greece and Poland. In the 10 % most dangerous regions we also find Mecklenburg-Vorpommern (north eastern Germany), Limburg (East Belgium) and Yugoiztochen (the richer Bulgarian province touching the Black Sea). The safest areas are often regions where speed is limited, such as the large German cities, or isolated regions. Switzerland has remarkably low transport mortality, together with the west of Germany, the Netherlands, and the south of England, Italy, Norway and Sweden.

⁵ D. Sethi et al. (2006) <http://www.euro.who.int/document/e87321.pdf>

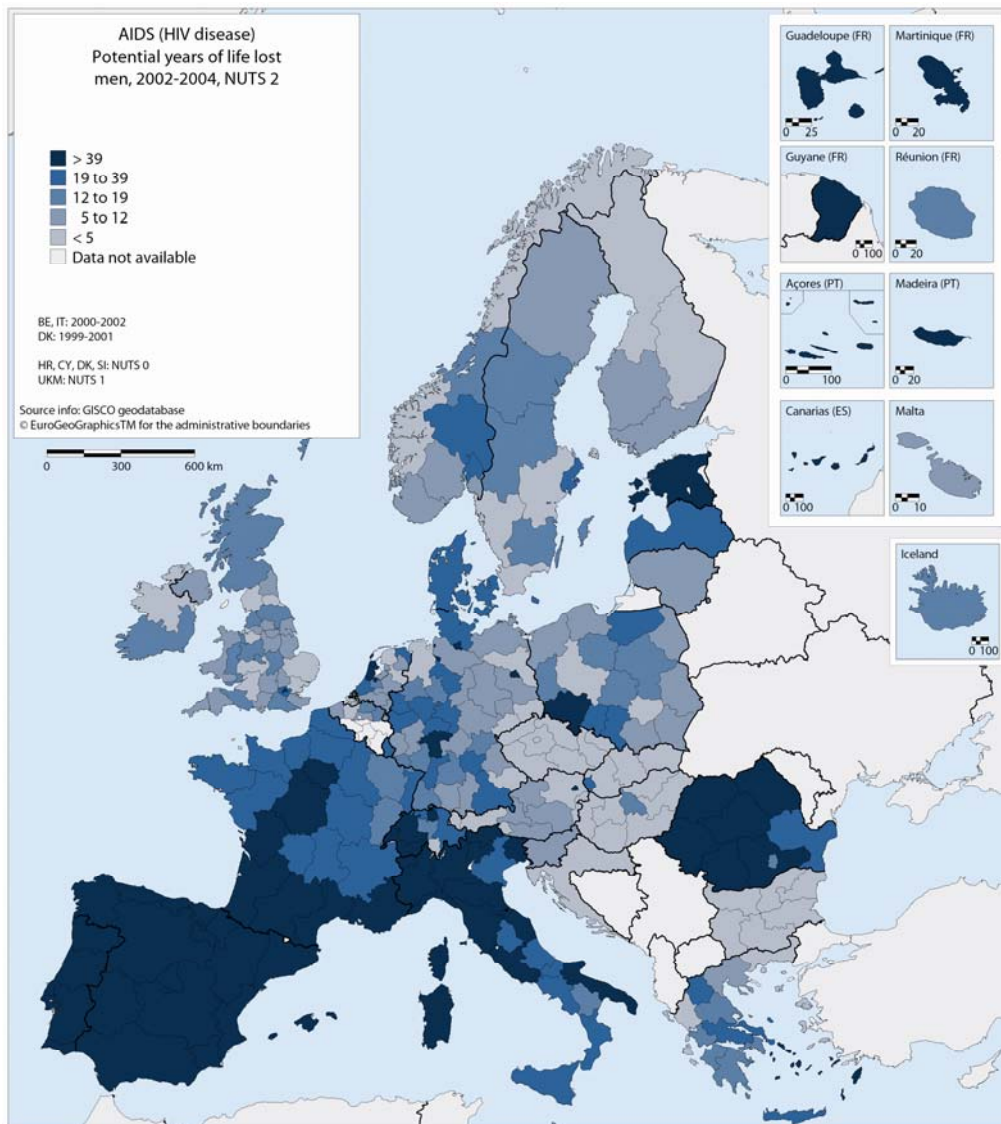
Cervical cancer



Cervical cancer is associated with infection with high-risk strains of the human papillomavirus (HPV). Cervical cancer screening with PAP smears (a screening test) is effective in reducing incidence and mortality of invasive cervical cancer. However, to be effective, well-organised cancer screening programmes have to actively target women with a high risk of cervical cancer, while limiting the adverse effects of overscreening and overtreatment in women at low risk.

Romanian regions have the highest cervical cancer mortality, 20 times higher than in Italy or Greece, which have the lowest mortality. The highest rates are nearly all to be found in the new Member States. The rates of cervical cancer are very low in Switzerland, Spain, Greece and Italy. In the Nordic countries, the Netherlands and the United Kingdom, the lowering of cervical cancer incidence and mortality after adequate organization of PAP screening has been well documented.

AIDS (HIV disease)



The maps of HIV-AIDS partly overlap with the Tuberculosis maps (not shown). Bulgaria and the Czech Republic did not notify AIDS deaths. HIV mortality is shifting away from men having sex with men to intravenous drug users and migrants from countries with a high prevalence of HIV/AIDS. These groups are less likely to receive and benefit from antiretroviral

treatment, showing the need for specific public health programmes. Spain, Portugal, France, Switzerland, Italy and Estonia have high rates of AIDS deaths. Romania was a special case in the global AIDS crisis, with widespread iatrogenic transmission of blood-borne HIV in children⁶.

⁶ F.F. Hamers (2003) *The Lancet* 361, 1035- 1044

METHODOLOGICAL NOTES

Mortality indicators used

In this Statistics in Focus two conventional mortality indicators are used: Age Standardised Death Rates and Life expectancies. In addition, two less conventional indicators are used, namely the Potential Years of Life Lost (PYLL) and Years of Life Lost (YLL).

Standardised Death Rates

The age-specific death rate describes mortality in relation to the size of an age category of the population. Expressed per 100,000 inhabitants, it is calculated as the number of deaths of a given age recorded in the population for a given period divided by the population of that age in the same period and then multiplied by 100,000. The (Age-) Standardised Death Rate is a weighted average of age-specific death rates. The weighting factor is the age distribution of a standard reference population. The standard reference population used is the 'European standard population' as defined by the World Health Organisation (WHO).

Life expectancies

Life expectancies can be calculated for any age. They refer to the mean number of years still to be lived by a person who has reached a certain exact age, if subjected throughout the rest of his or her life to the current mortality conditions (age-specific probabilities of dying). Life expectancies are calculated using the concept of a life table.

Potential Years of Life Lost

Potential Years of Life Lost (PYLL) is a public health measure showing the importance of loss of life at young, adult and middle ages. PYLL weigh mortality, age at death and the population structure. It is based on the 'fair innings' principle, which states that people dying at younger ages lose more life, and reflects the health problem of the true population, explicitly taking into account the age distribution.

The PYLL represents the total number of years not lived until the age of 65 by an individual who died before the age of 65. This indicator gives more importance to the causes of death that occurred at younger ages than to those that occurred at older ages. Deaths occurring to individuals aged 65 or older are not included in the calculation. The PYLL is expressed as a rate per 100,000 inhabitants.

Years of Life Lost

Years of Life Lost (YLL) is the mortality component of the DALY (disability adjusted life years), introduced by the World Bank and the WHO as a description of the 'burden of disease'. YLL ignores morbidity, and therefore only describes 'the burden of mortality'. As in PYLL, YLL weighs mortality, age at death and the population structure, but YLL counts all life years lost. PYLL counts loss of life at ages below 65 years. YLL counts mortality at all ages, and weighs deaths by the residual life expectancy in a standard life table. As a standard life table, we use the common life table for the EU-15, separately for men and women. The YLL, like the PYLL, is expressed as a rate per 100,000 inhabitants.

Standard Life Table

The use of an appropriate standard is always a difficult choice. Standards cover different purposes, descriptive and proscriptive. As a descriptive standard, the common life table of the EU-27 is an average of the very different mortality patterns of the EU-15 and the new Member States. As a proscriptive, normative standard, the common life table of the EU-27 includes higher mortality countries. This Statistics in Focus therefore uses the common life table of the EU-15 as the standard. For the EU-15 countries, it reflects deviances from a comparable standard, which serves as the best description. For the other countries, the comparisons with the common EU-15 life table show where the most important gains can be made. As the mortality profiles of men and women are very different, and at least some of these differences are biological, the common life table of the EU-15 countries for men and women separately is used as the standard.

EU-15: European Union of 15 Member States from 1 January 1995 to 30 April 2004 (BE, DK, DE, IE, EL, ES, FR, IT, LU, NL, AT, PT, FI, SE, UK)

EU-27: European Union of 27 Member States from 1 January 2007: Belgium (BE), Bulgaria (BG), the Czech Republic (CZ), Denmark (DK), Germany (DE), Estonia (EE), Ireland (IE), Greece (EL), Spain (ES), France (FR), Italy (IT), Cyprus (CY), Latvia (LV), Lithuania (LT), Luxembourg (LU), Hungary (HU), Malta (MT), the Netherlands (NL), Austria (AT), Poland (PL), Portugal (PT), Romania (RO), Slovenia (SI), Slovakia (SK), Finland (FI), Sweden (SE) and the United Kingdom (UK)

Acknowledgments

This publication was prepared for Eurostat by Luc Bonneux and Corina Huisman (NIDI, the Netherlands).

Further information

Data: [Eurostat Website: http://ec.europa.eu/eurostat](http://ec.europa.eu/eurostat)

Data on "Health statistics":

http://epp.eurostat.ec.europa.eu/portal/page/portal/health/public_health/database

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