WORLD HEALTH ORGANIZATION
EUROPE

Highlights on health in Luxembourg

2004

Highlights on health

Highlights on health give an overview of a country's health status, describing recent data on mortality, morbidity and exposure to key risk factors along with trends over time. The reports link country findings to public health policy considerations developed by the WHO Regional Office for Europe and by other relevant agencies. *Highlights on health* are developed in collaboration with Member States and do not constitute a formal statistical publication.

Each report also compares a country, when possible, to a reference group. This report uses the 27 countries with very low child mortality and very low adult mortality, designated Eur-A by WHO, as the reference group. Eur-A comprises Andorra, Austria, Belgium, Croatia, Cyprus, the Czech Republic, Denmark, Germany, Greece, Finland, France, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, the Netherlands, Norway, Portugal, San Marino, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

To make the comparisons as valid as possible, data, as a rule, are taken from one source to ensure that they have been harmonized in a reasonably consistent way. Unless otherwise noted, the source of data in the reports is the European health for all database of the WHO Regional Office for Europe. Other data and information are referenced accordingly.

Keywords

HEALTH STATUS
LIFESTYLE
DELIVERY OF HEALTH CARE
COMPARATIVE STUDY
LUXEMBOURG

EUR/05/5058526
http://www.euro.who.int/highlights

Address requests about publications of the WHO Regional Office for Europe to:
Publications
WHO Regional Office for Europe
Scherfigsvej 8
DK-2100 Copenhagen Ø, Denmark
Alternatively, complete an online request form for documentation, health information, or for permission to quote or translate, on the WHO/Europe web site at http://www.euro.who.int/pubrequest.

Contents

Summary: findings and policy options

Life expectancy

People in Luxembourg live as long as their Eur-A counterparts: girls born in 2002 can expect to live to the age of 82 and boys to the age of 76. More babies are born to people in Luxembourg than in Eur-A on average, and the ageing of the population is not as marked. The mortality in the first year of life remains among the lowest in Eur-A.

As the length of life increases, older people can respond with lifestyle changes that can increase healthy years of life. Correspondingly, health care systems need to shift towards more geriatric care, the prevention and management of chronic diseases and more formal long-term care. Since people are living longer, measures to improve health and prevent disease need to focus on people of working age.

Ageing and employment policies (OECD, 2004a)

What are the main risk factors for disability in old age and how can disability be prevented? (Health Evidence Network, 2003a)

Main causes of death

As in the other Eur-A countries, eight of ten people in Luxembourg die from noncommunicable diseases, mainly cardiovascular diseases (about one third of deaths). Mortality from this cause has decreased regularly and is now similar to the Eur-A average. Ischaemic heart disease, although still the single biggest killer, is lower than in Eur-A. Cerebrovascular disease is higher, especially among women aged 25–64 years.

Cancer mortality has declined substantially and is now below the Eur-A average. Lung cancer follows this trend for both genders. The incidence of cancer, however, has increased more rapidly than in Eur-A but is still 10% lower. Men in Luxembourg have one of the highest incidence rates of lung cancer.

Better eating habits can prevent premature death from CVD, but people's chances of a healthy diet depend on what food is available and whether it is affordable. Food and nutrition policies need to cross sectors and be coordinated, so that non-health sectors give priority to public health. This also applies to the promotion of physical activity: policies to encourage active living over the life course need to be integrated across health and non-health sectors.

Preventive care, delivered through a country's primary care system, can improve all-cause mortality and premature mortality, particularly from CVD.

A strategy to prevent chronic disease in Europe: a focus on public health action: the CINDI vision (WHO Regional Office for Europe, 2004d)

CINDI dietary guide (WHO Regional Office for Europe, 2000)

Diet, nutrition and the prevention of chronic diseases (WHO, 2003a)

Food and health in Europe: a new basis for action (Robertson et al., 2004)

The potential contribution of increased vegetable and fruit consumption to health gain in the European Union (Joffe & Robertson, 2001)

Towards a European strategy on noncommunicable diseases (WHO Regional Office for Europe, 2004g)

What are the advantages and disadvantages of restructuring a health care system to be more focused on primary health care services? (Health Evidence Network, 2004a)

Injuries and mental health

Injuries are a public health problem in Luxembourg, causing 9% of deaths. Mortality is 52% higher than in Eur-A, mainly due to suicide and motor vehicle traffic injuries. Both men and women have higher

suicide rates than their Eur-A counterparts, even after 65 years for men. The gender difference is more marked than in Eur-A. Of all diseases, neuropsychiatric conditions are the greatest burden on Luxembourg's population due to the associated disability in daily living, similar to the other Eur-A countries.

Better recognition and monitoring of depressive disorders can lead to positive effects, including reduced suicide rates. Comprehensive treatment programmes directed at the addictive and depressive features in alcohol abuse have been shown to be effective.

Mental health in Europe: country reports from the WHO European network on mental health (WHO Regional Office for Europe, 2001a)

Mental health policy and practice across Europe: the future direction of mental health care. Proposal for analytical study (Knapp et al., 2004)

Project Atlas: mapping mental health resources in the world (WHO, 2003b)

The world health report 2001: mental health: new understanding, new hope (WHO, 2001b)

Motor vehicle traffic injuries kill two to four times more men than women in Luxembourg, and overall one third more than in Eur-A.

Historically, injuries, and motor vehicle traffic injuries in particular, have been neglected because they were seen as random events. Injuries are now known to be preventable. Seat-belts, child car seats, motorcycle helmets, designated drivers (ensuring that the driver remains sober), traffic calming and other measures have proven to be effective. Greater political commitment to prevention is needed.

A 5-year WHO strategy for road traffic injury prevention (WHO, 2001a)

Preventing road traffic injury: a public health perspective for Europe (Racioppi et al., 2004)

World report on road traffic injury prevention (Peden et al., 2004)

Alcohol

People in Luxembourg have the highest alcohol consumption in Eur-A: 60% higher than the Eur-A average. They die more often from chronic liver disease and cirrhosis, especially men, as well as from alcohol-related causes for both genders.

Alcohol consumption varies among countries and between population groups within countries. The variation in drinking patterns affects the rates of alcohol-related problems and has implications for the choice of alcohol control policies. Measures that are generally effective in reducing alcohol consumption and the associated harm include pricing and taxation and restricting the availability of alcohol, opening hours for sales outlets and the legal drinking age. Most drink-driving countermeasures have been effective as well. International trade agreements and common markets have weakened the ability of national-level decision-makers to establish national alcohol policies. Most notable are the converging trends in alcohol taxation in several countries in the European Union.

Alcohol control database [online database] (WHO Regional Office for Europe, 2004a)

Alcohol: no ordinary commodity. Research and public policy (Babor et al., 2003)

What are the most effective and cost-effective interventions in alcohol control? (Health Evidence Network, 2004b)

Tobacco

More than a quarter of women and over a third of men in Luxembourg smoke, both in the highest range of Eur-A countries.

To reduce consumption across the whole population, policy-makers need permanently to raise prices for tobacco through taxes, and cessation policies need to target vulnerable groups. Increasing adults' cessation of tobacco use is cost-effective for public health in the short and medium terms.

European Strategy for Tobacco Control (WHO Regional Office for Europe, 2002b)

Tobacco control database [online database] (WHO Regional Office for Europe, 2004e)

Which are the most effective and cost-effective interventions for tobacco control? (Health Evidence Network, 2003b)

WHO European strategy for smoking cessation policy (WHO Regional Office for Europe, 2003)

WHO Framework Convention on Tobacco Control (WHO, 2003c)

HIV/AIDS, drug use and hepatitis C

New HIV infection rates in Luxembourg have consistently been 20–40% higher than in Eur-A in recent years, mainly through heterosexual contact. Hepatitis C is common among injecting drug users, and the incidence of hepatitis B is among the highest.

Prevention, treatment and care programmes need to reach all people affected by HIV/AIDS, particularly those whose language, culture or immigrant status might limit their access to health services.

Access to care: privilege or right? Migration and HIV vulnerability in Europe (Broring et al., 2003)

AIDS: epidemic update December 2003 (UNAIDS & WHO, 2003)

The HIV/AIDS epidemic in Europe and central Asia (WHO Regional Office for Europe, 2004c)

The key to effective prevention of hepatitis C is to reduce the number of people who start to inject drugs – a common vector for HIV – and to encourage harm reduction among young and new injectors. A high proportion of those with the most serious drug use and addiction problems are found in prisons. Coordination of efforts within and between countries is a vital component of effective drug policy in the WHO European Region.

Annual report 2003: the state of the drugs problem in the European Union and Norway (EMCDDA, 2003)

Declaration. Prison health as part of public health, Moscow, 24 October 2003 (HIPP, 2003)

In 2002, the majority of newly diagnosed HIV infections in Denmark were acquired through heterosexual contact. A third of the most recent new infections involved people who were or whose partners were from countries with generalized HIV epidemics.

Prevention, treatment and care programmes need to reach all people affected by HIV/AIDS, particularly those whose language, culture or immigrant status might limit their access to health services.

The HIV/AIDS epidemic in Europe and central Asia (WHO Regional Office for Europe, 2004e)

Access to care: privilege or right? Migration and HIV vulnerability in Europe (Broring et al., 2003)

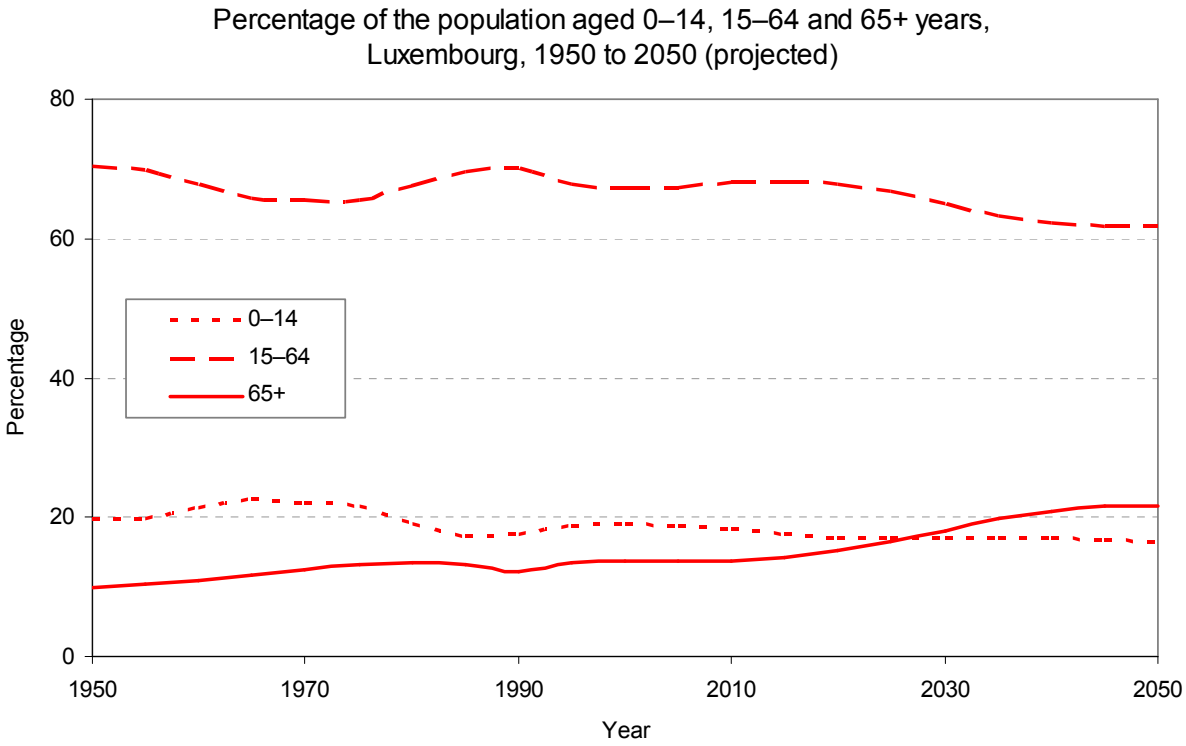
AIDS: epidemic update December 2003 (UNAIDS & WHO, 2003*)*

Selected demographic information

Population profile

Luxembourg had a population of less than half a million at the start of 2003, almost all of it urban. The most striking demographic feature in Luxembourg, also observed in the majority of Eur-A countries, is the increasing proportion of elderly people in the population. As the large birth cohorts of the late 1940s approach retirement age, the number of people aged 65 and over is expected to grow from 14% of the population in 2003 (Council of Europe, 2003) to an estimated 18% in 2030 (Annex. Age pyramid). This ageing trend is actually slower in Luxembourg than in many Eur-A countries, where, by 2030, one in every four people will be 65 or more.

Figure. Population trends



Source: United Nations (2002).

Luxembourg's birth rate is currently among the highest of the Eur-A countries. In contrast to the slow downward trend observed in Eur-A, it has increased by 18% between 1985 and 1995 and only started to diminish in 2000, resulting in a higher positive rate of natural increase than in Eur-A. Together with a positive, higher than average, net migration rate, Luxembourg's population has grown.

Table. Selected demographic indicators

Selected demographic indicators in Luxembourg and Eur-A, 2002 or latest available year

Indicators	Luxembourg	Eur-A		
	Value	Average	Minimum	Maximum
Population (in 1000s)[a]	448.3	–	–	–
0–14 years (%)	18.9	–	–	–
15–64 years (%)	67.1	–	–	–
65+ years (%)	14.0	–	–	–
Urban population (%)[b, c]	91.8	79.5	49.2	100.0
Live births (per 1000)[d, e]	12.0	11.3	8.7	21.2
Natural population growth (per 1000)	3.7	1.1	–2.4	15.5
Net migration (per 1000)[d,e]	5.9	3.5	–9.6	17.3

[a] As of 1 January 2003.
[b] 2001.
[c] Including Andorra and Monaco.
[d] Including Andorra.
Sources: Council of Europe (2003), WHO Regional Office for Europe (2004b); Central Bureau of Statistics of Israel (2003) for data on Israel.

Vulnerable populations

Income The evidence on determinants of health shows that people who are socioeconomically disadvantaged bear the greatest burden of disease. Among determinants, income is related to an accumulation of factors that affect mortality (Martikainen et al., 2001). For example, it influences and is influenced by education and employment.

Even in the richest Member States in the WHO European Region, wealth is not equitably distributed and pockets of relative poverty exist (WHO Regional Office for Europe, 2002a; WHO, 2002). The association between poverty and urban areas is especially important in Europe. As populations migrate and become more urban, there are increases in the number of urban poor whose housing, employment conditions and diet expose them to greater risk of illness and disease (WHO Regional Office for Europe, 2001b). The nature and impact of poverty can be unevenly distributed among poor people according to such factors as gender and age group (Ziglio et al., 2003).

According to the GINI index, Luxembourg (30.8) has the same income inequality overall as the Eur-A average of 30.8 (UNDP, 2004). However, the country traditionally has the highest income per capita in Eur-A, with both GNP and GDP above US$ 42 000, about twice the Eur-A average. In the period 1987 to 1997, 6% of Luxembourg's population lived below the 50% median income level versus almost 9% for the Eur-A group.

Overall unemployment in Luxembourg was 3.8% in 2003 (UNSD, 2004). For the last two decades, it has been one of the lowest in Eur-A (which had 6.5% in 2002). Unemployment among people aged 15–24 years was higher than the average, however: 5.7% among young men and 7.3% among young women in 2000. Of the unemployed people in Luxembourg, 90% had an educational attainment of secondary education or less. A quarter of those unemployed had been so for 12 months or more (UNECE, 2003).

Social exclusion (heading 3)

Social exclusion has a broad impact on health. It refers to the relative position of an individual or a group in society as a whole. The processes that accompany and result in social exclusion – such as discrimination, stigmatization and hostility – prevent people from getting education or training and from gaining access to services and citizenship activities, making them more vulnerable to health risks and disease.

Examples of people outside the mainstream include members of ethnic or religious minorities; people who live in geographically disadvantaged areas, are unemployed or are elderly; and in some

countries, indigenous peoples. People new to a country – such as refugees, immigrants or migrant workers – may also be socially excluded. The table gives the population figures for various vulnerable groups in Luxembourg. Immigrants include nationals and foreigners from within and outside the European Region. Countries have different data sources and administrative definitions of immigrant status.

Table. Vulnerable populations

Vulnerable populations in Luxembourg

Population	1992	1995	1998	2001	2003 (estimate)
Immigrants	10 696	10 325	11 630	12 135	
Refugees	–	–	–	1000	
Prison inmates (per 100 000 national population)	89	114	92	80	111

Sources: EUROSTAT (2004), UNDP (2003) and International Centre for Prison Studies (2004).

The table also includes data about prison inmates, a particularly vulnerable population in that they are typically from minority groups and have lower socioeconomic status and less education than the general population. Incarceration can expose them to direct health hazards, particularly if prison populations outpace capacity. The resulting overcrowding causes and contributes to many health problems, most notably mental health conditions and communicable diseases. In fact, drugs and drug-related infectious diseases in prisons are causing major problems in all countries in the European Region, with the risks of transmission affecting not only inmates but also prison employees and contacts outside the institutions (EMCDDA, 2002).

In 2000, Luxembourg reported a 110% occupancy level for its two prisons, based on official capacity. A special characteristic of the incarcerated population in Luxembourg is its high rate of inmates who are not Luxembourg nationals: 64% (International Centre for Prison Studies, 2004).

Burden of disease

The burden of disease can be viewed as the gap between current health status and an ideal situation in which everyone lives into old age free of disease and disability. Causing the gap are premature mortality, disability and certain risk factors that contribute to illness. The analysis that follows elaborates on the burden of disease in the population.

Life expectancy and healthy life expectancy

A person born in Luxembourg in 2002 can expect to live 79 years on average: 81.8 years if female and 75.5 years if male, according to WHO (2003d) estimates.

Over the last 20 years, according to estimates reported by Luxembourg, the residents of Luxembourg gained about 6 years in life expectancy (LE), with women showing a greater gain than men: 6.5 years and 5.1 years, respectively. Both men and women die at about the same age as their Eur-A counterparts.

Figure. Life expectancy for males

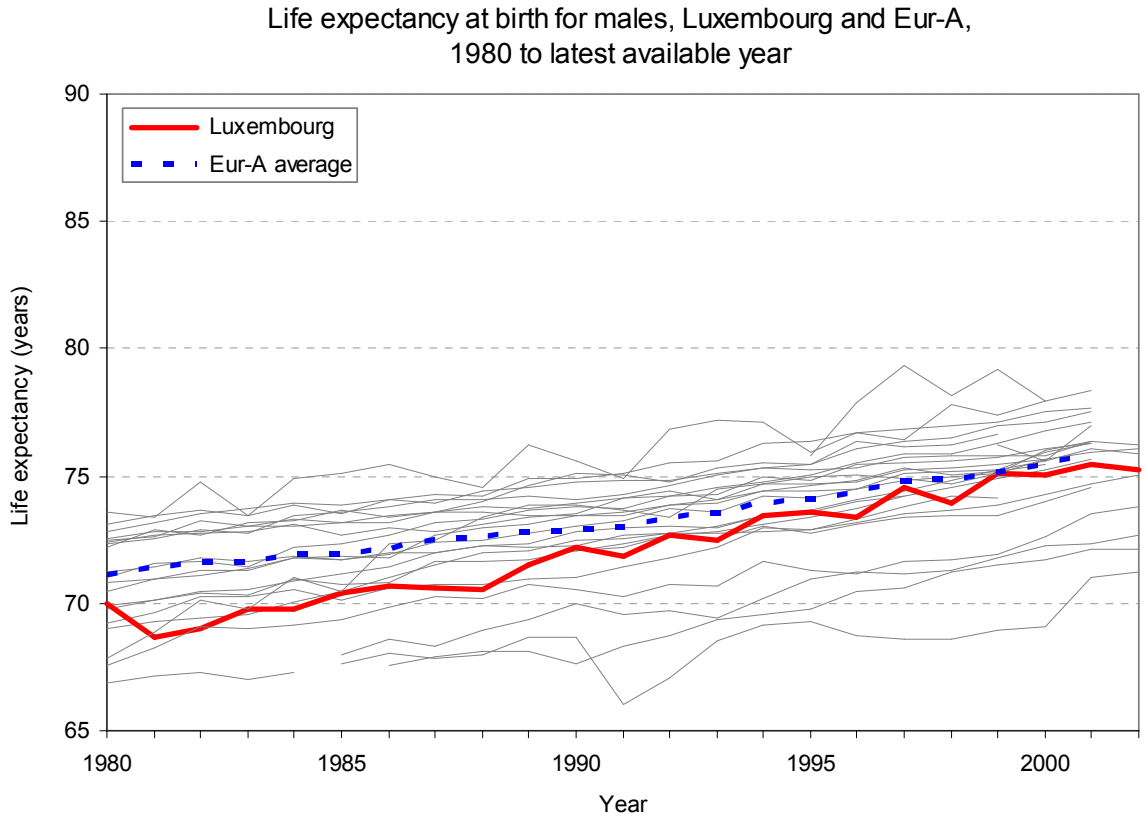
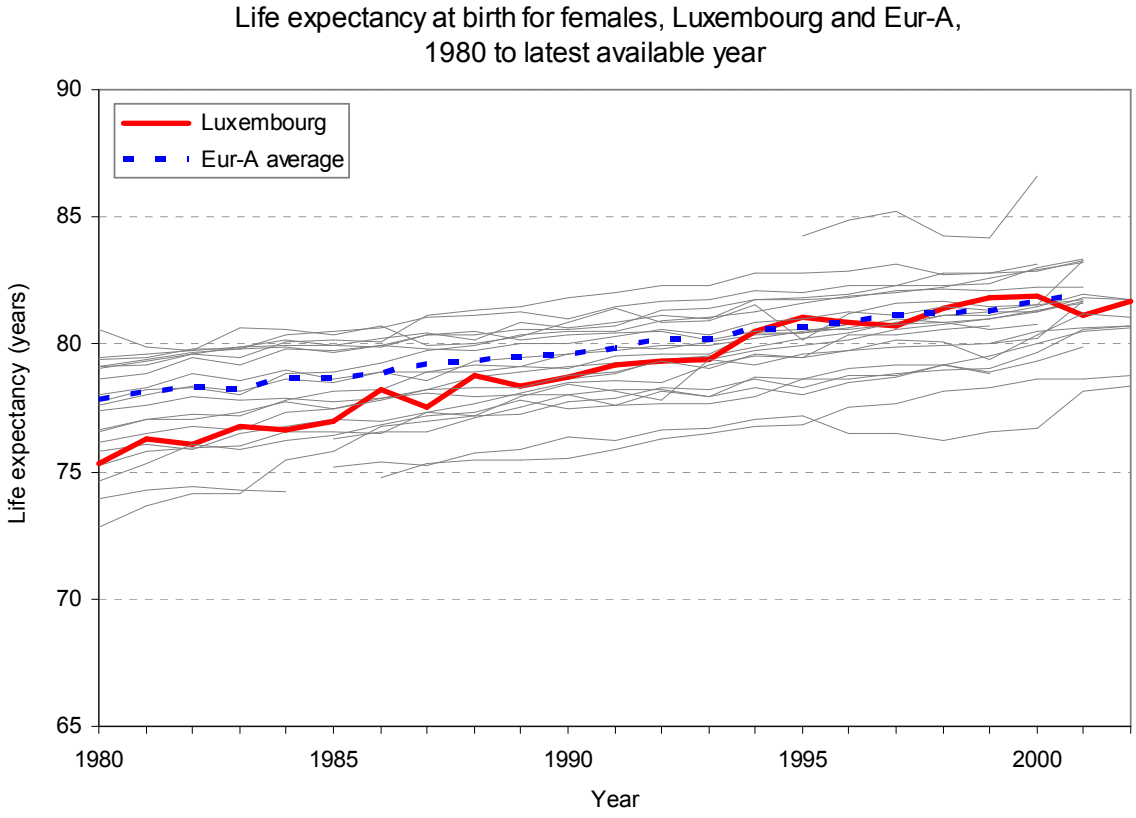
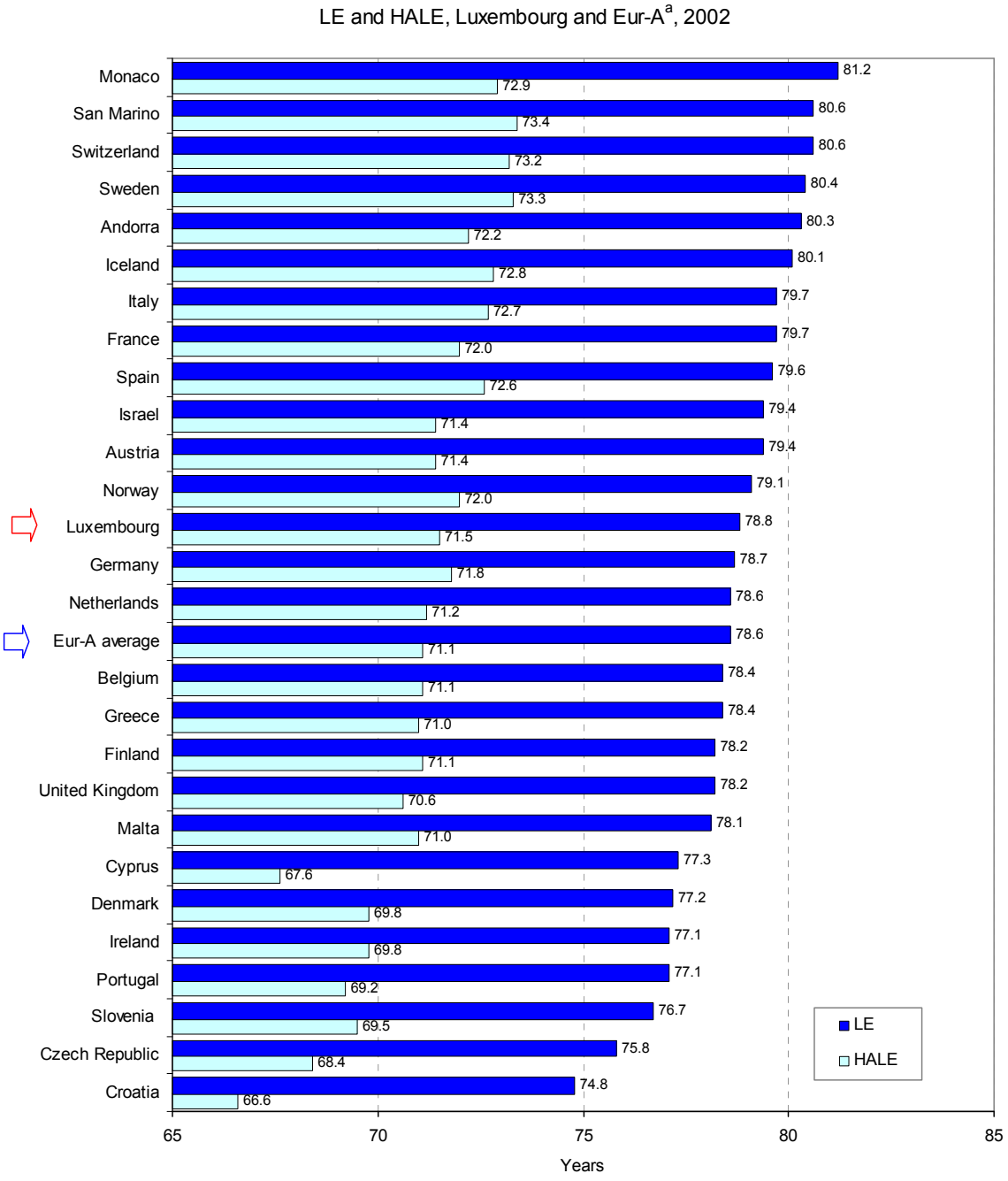


Figure. Life expectancy for females



In addition, WHO (2003d) estimates that, on average, people in Luxembourg can expect to be healthy for about 90% of their lives. They lose on average 7.3 years to illness – the difference between LE and healthy life expectancy (HALE). Since women live longer than men and since the possibility of deteriorating health increases with age, women lose more healthy years of life (8.0) than men (6.3). Nevertheless, the longer LE for women gives them four more years of healthy life than men in Luxembourg.

Figure. LE and HALE



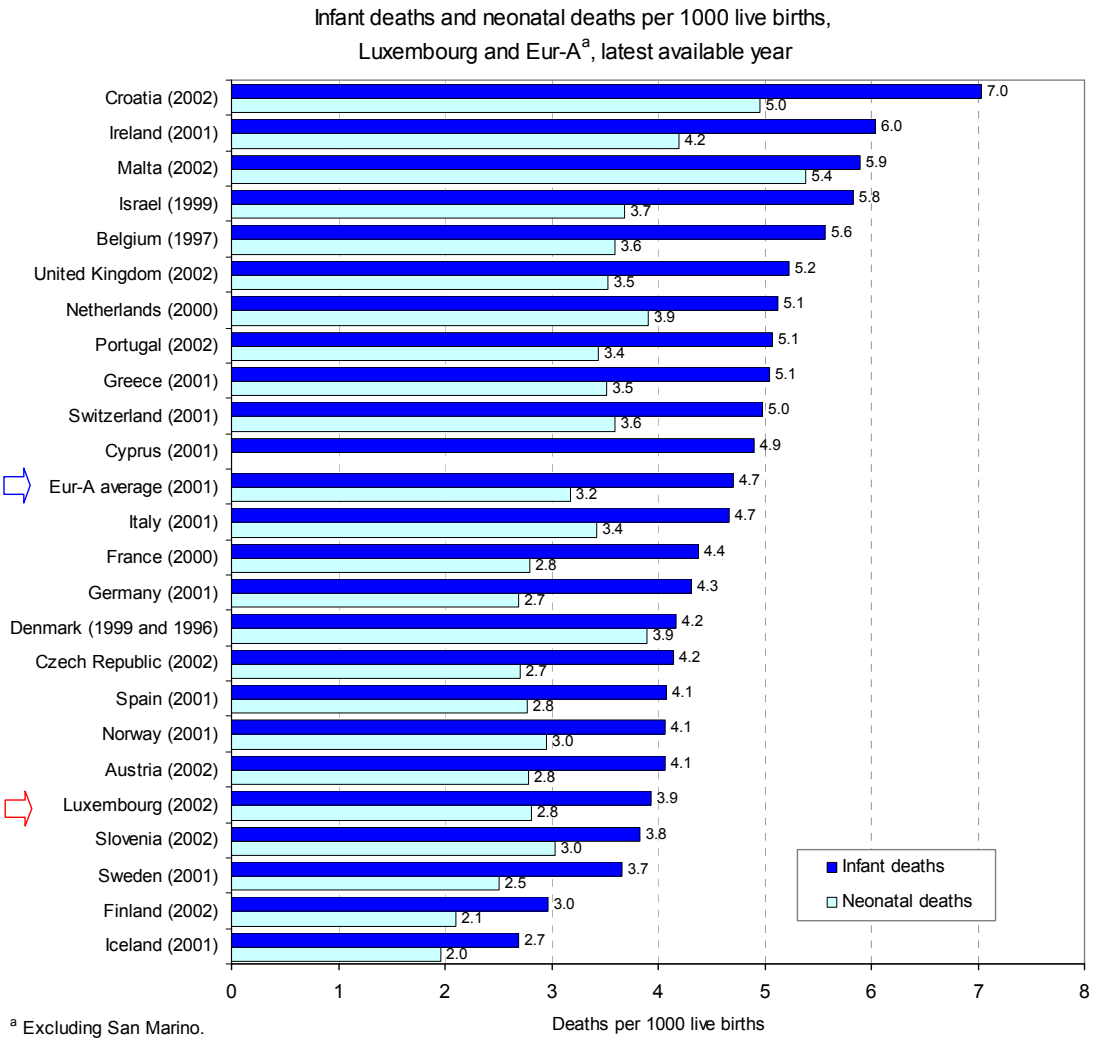
[a] Including Andorra and Monaco.
Source: WHO (2003e).

Mortality (heading 2)

Infant mortality and neonatal death

In 2002, Luxembourg's infant mortality rate was among the lowest in Eur-A, as was the neonatal mortality.

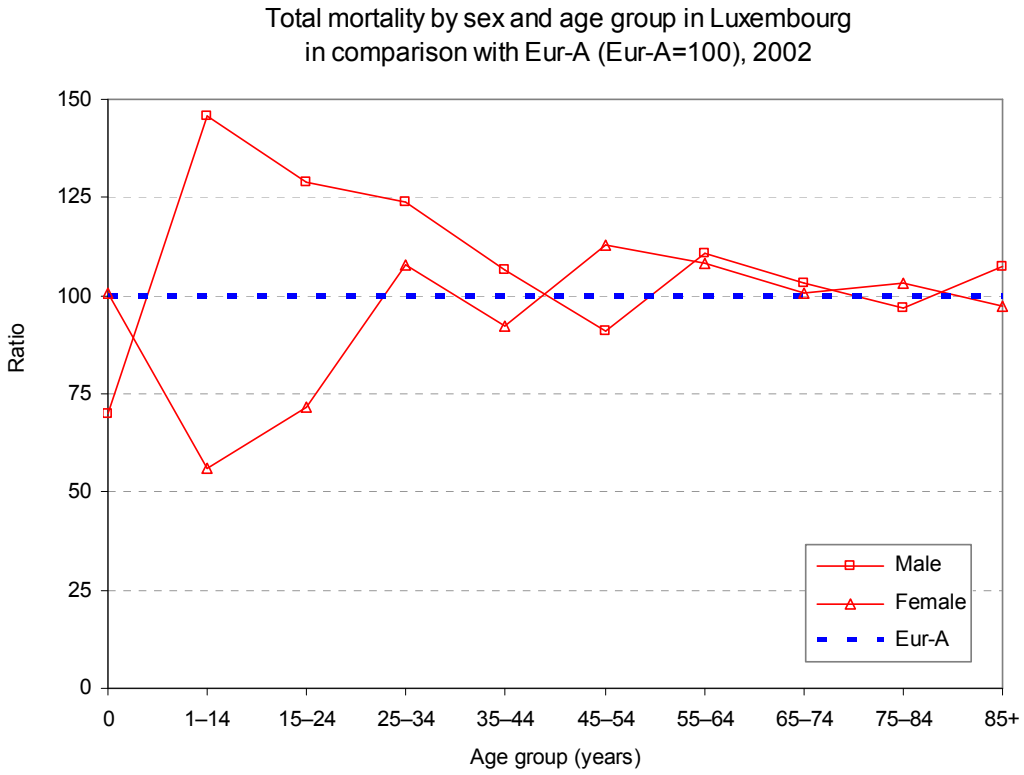
Figure. Infant and neonatal deaths



Excess mortality

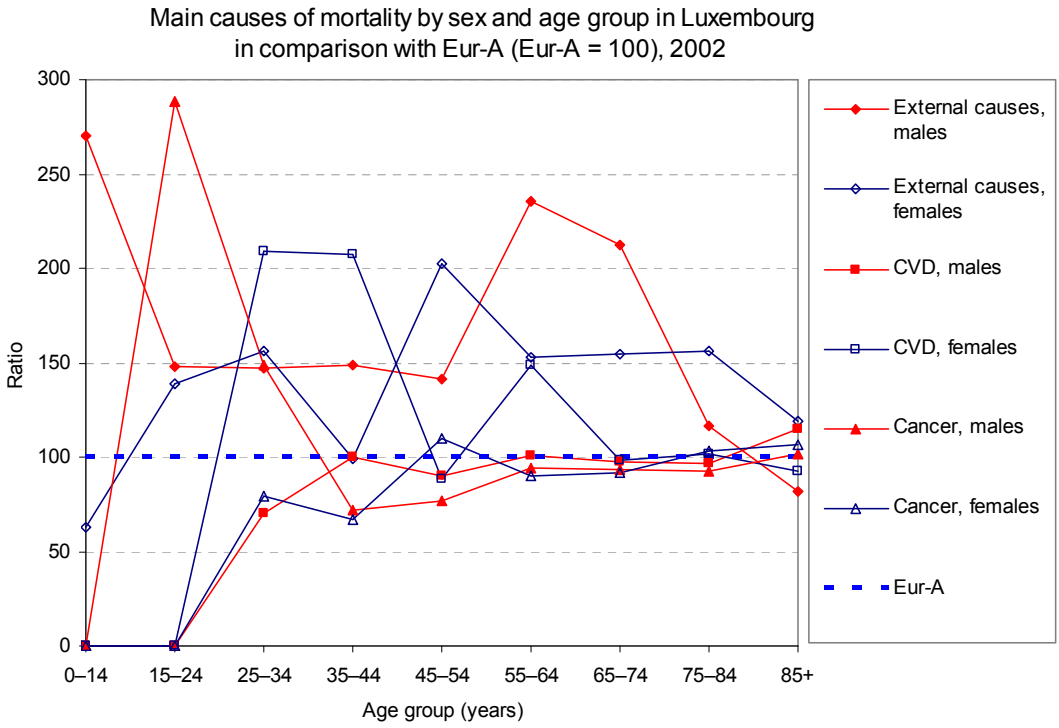
The striking feature of the excess mortality in Luxembourg is the higher risk of dying for boys 1–14 years old (almost 50% more) and men 15–34 years old (24–29% more) versus the Eur-A, whereas females have a lower risk of dying compared to Eur-A until age 24.

Figure. Total mortality by sex and age group



External causes and cancer are the main explanations at young ages, especially for boys, who die more than twice as frequently from external causes as in Eur-A. There is another peak excess for external causes among men 55–74 years old, which peaks at 45–54 years for women. CVD claims more lives of young women than in Eur-A.

Figure. Main causes of mortality by sex and age group

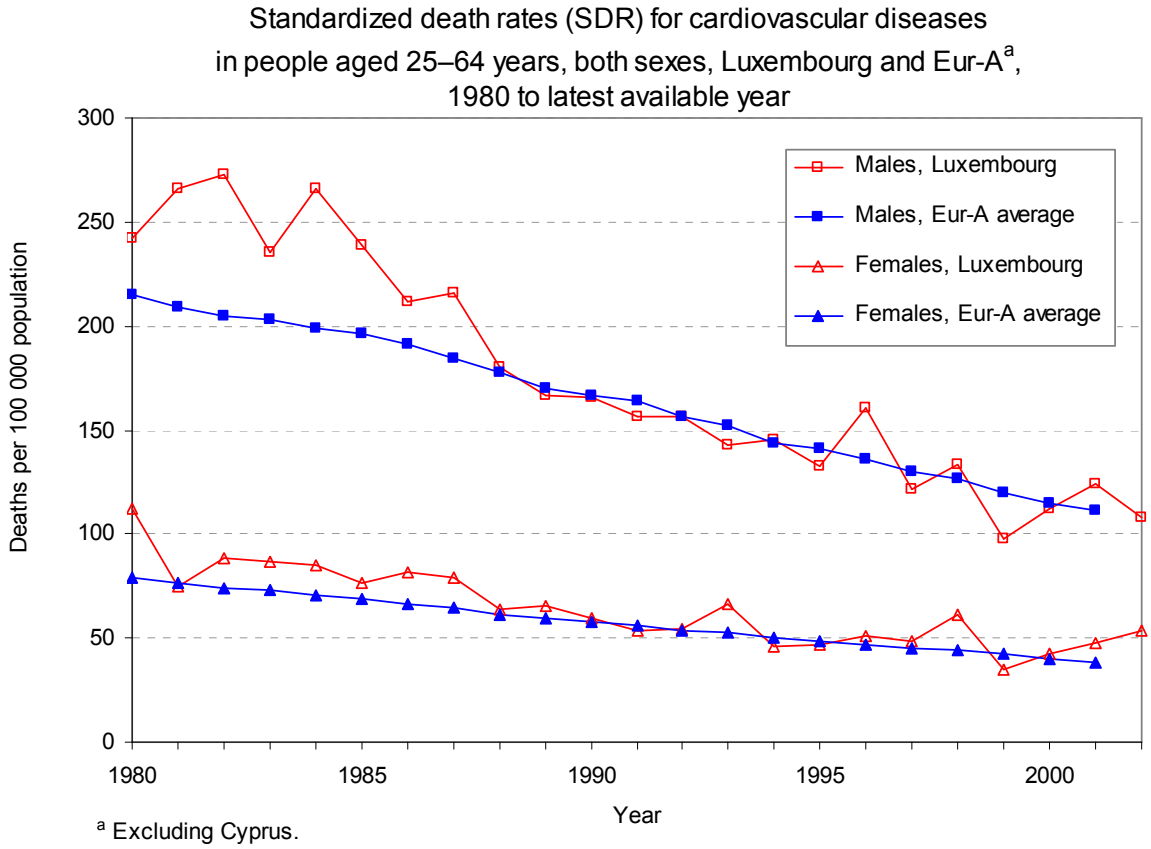


Main causes of death

In 2002, noncommunicable diseases accounted for 78% of all deaths in Luxembourg, external causes for about 9% and communicable diseases for 1.5% (Annex. Selected mortality).

Similar to the rest of the Eur-A, cardiovascular diseases are still the most common cause of death (37%). Once among the highest in Eur-A, cardiovascular mortality in Luxembourg has decreased regularly and has been around the Eur-A average since the end of the 1990s for both genders 25–64 years of age. However, most recently, the rate among women in the age group surpassed the Eur-A average for women by almost 40%. (Annex. Selected mortality; Annex. Mortality data).

Figure. Standardized death rates (SDR) for CVD in people aged 25–64 years



On the one hand, ischaemic heart disease, still the biggest single killer, has decreased and has been at or below the Eur-A average since the mid-1980s. On the other hand, cerebrovascular diseases have levelled off, especially among women, who die from this cause twice as often between 25 and 64 years as women in Eur-A (Annex. Mortality data). Although it is based on about 250 cases reported for all women annually, this trend has been consistent since the 1970s. This differential is not observed among older women and not in the same proportion among men.

Cancer causes a quarter of the deaths, and rates by specific types are overall comparable to Eur-A, except for prostate cancer, for which rates are 25% lower (Annex. Selected mortality). The overall rate, which was the highest in the Eur-A countries reporting in the 1980s, has decreased more rapidly in the 1990s and is now below the Eur-A average. (Note that fewer than 1000 people die from cancer in Luxembourg annually.)

The rate for lung cancer among men has decreased by 37% since 1995 among men aged 25–64 years and by 20–30% for both genders after that age. The regular upward trend observed for young women in Eur-A is not seen in Luxembourg.

External causes are a public health problem in Luxembourg among both men and women, with 52% more deaths than in Eur-A overall. There is excess mortality within each age group. Together, suicide and motor vehicle traffic injuries represent half of the mortality from external causes.

Suicide is consistently higher than the Eur-A average, including at young ages (15–24 years) and among older people, even after 75 years. Since the 1990s, the rate has tended to increase for people aged 65 years and older while remaining stable at younger ages. Twenty-three women and 63 men decided to take their own life in 2002, but the trends are consistent despite small absolute numbers. Mortality from neuropsychiatric disorders, which are sometimes associated with self-inflicting harm, is lower in Luxembourg than in Eur-A (Annex. Selected mortality).

Figure. SDR for suicide and self-inflicted injury, 15–24 years

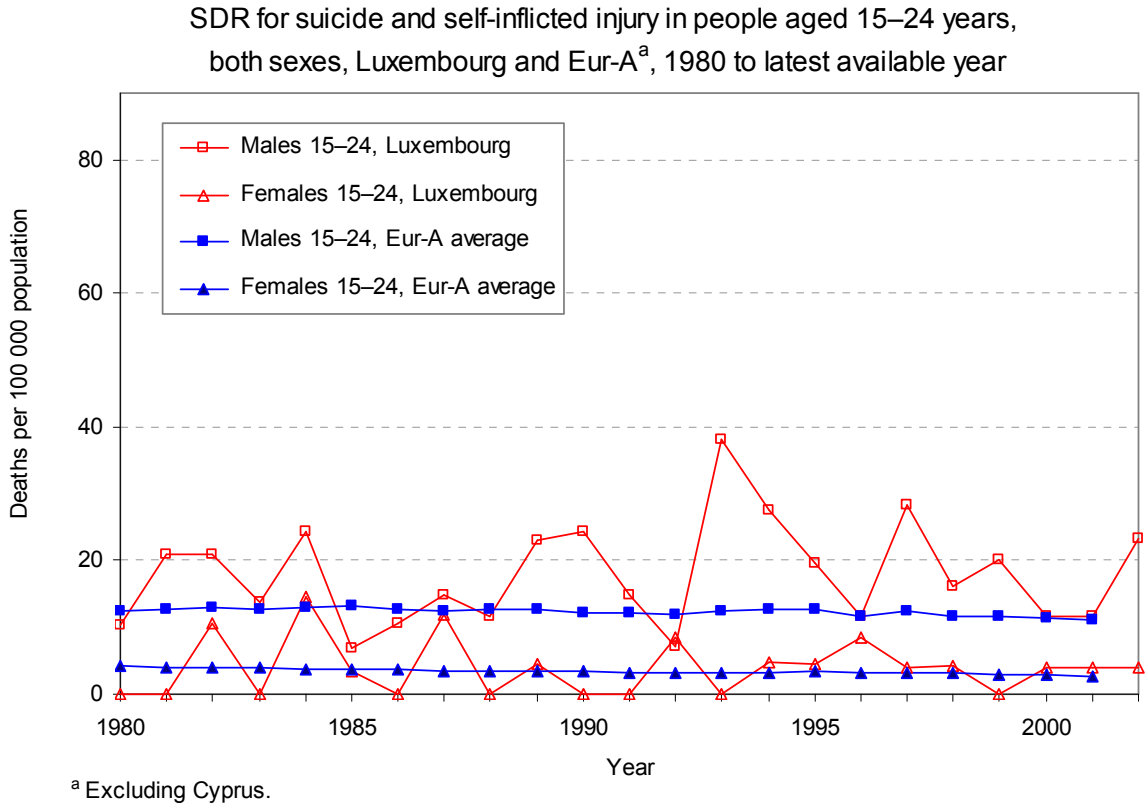


Figure. SDR for suicide and self-inflicted injury, 25–64 years

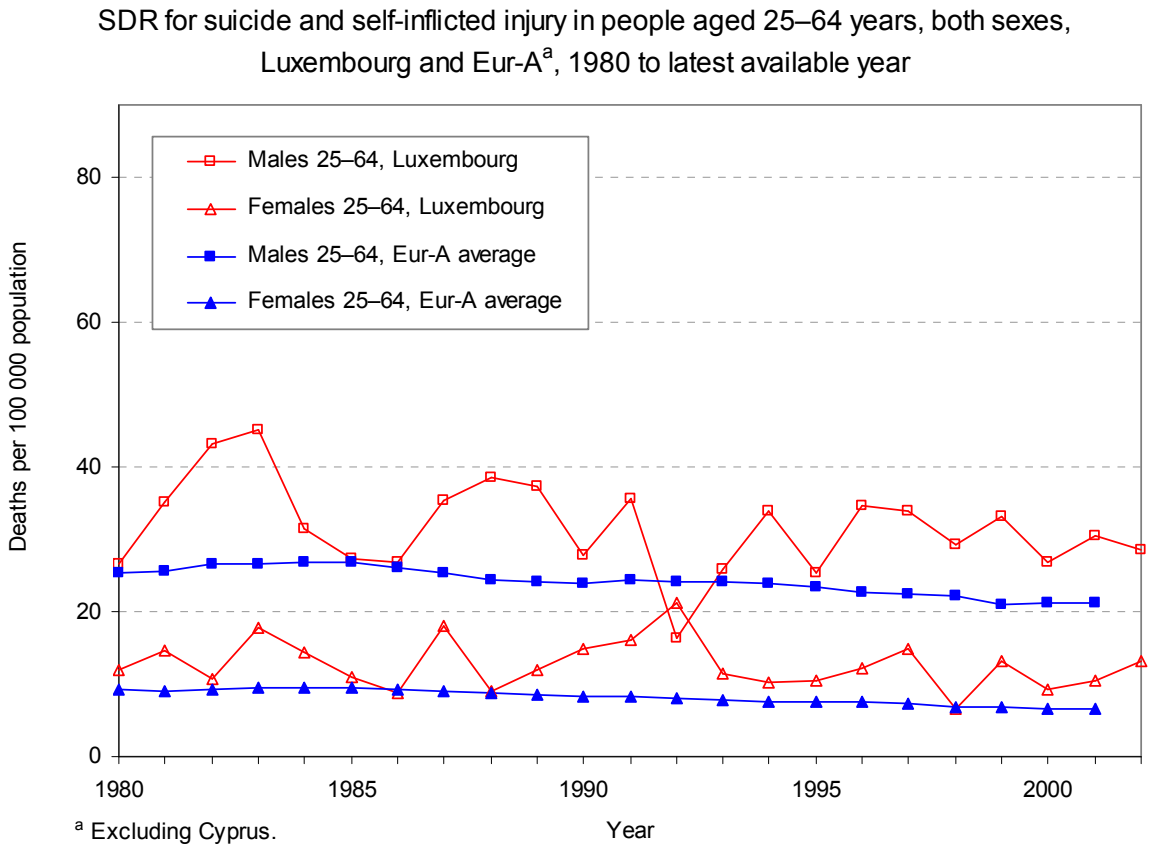
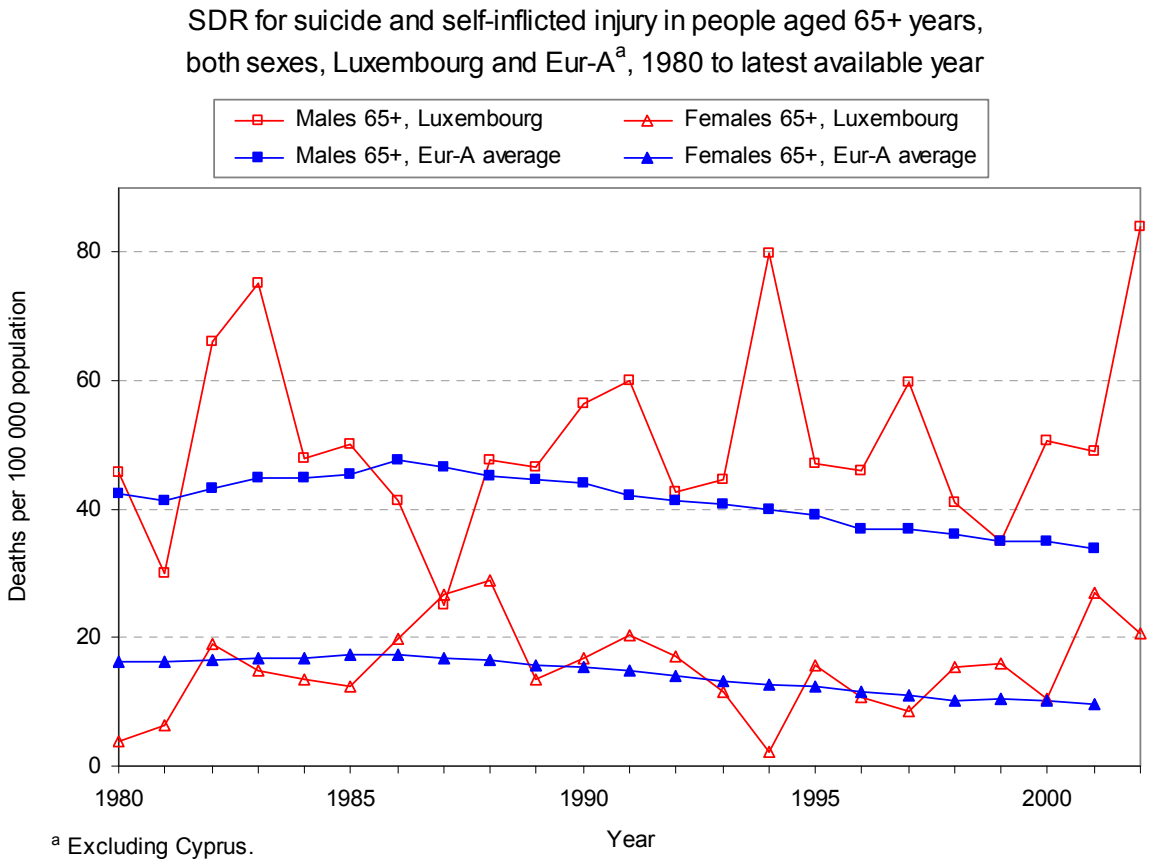
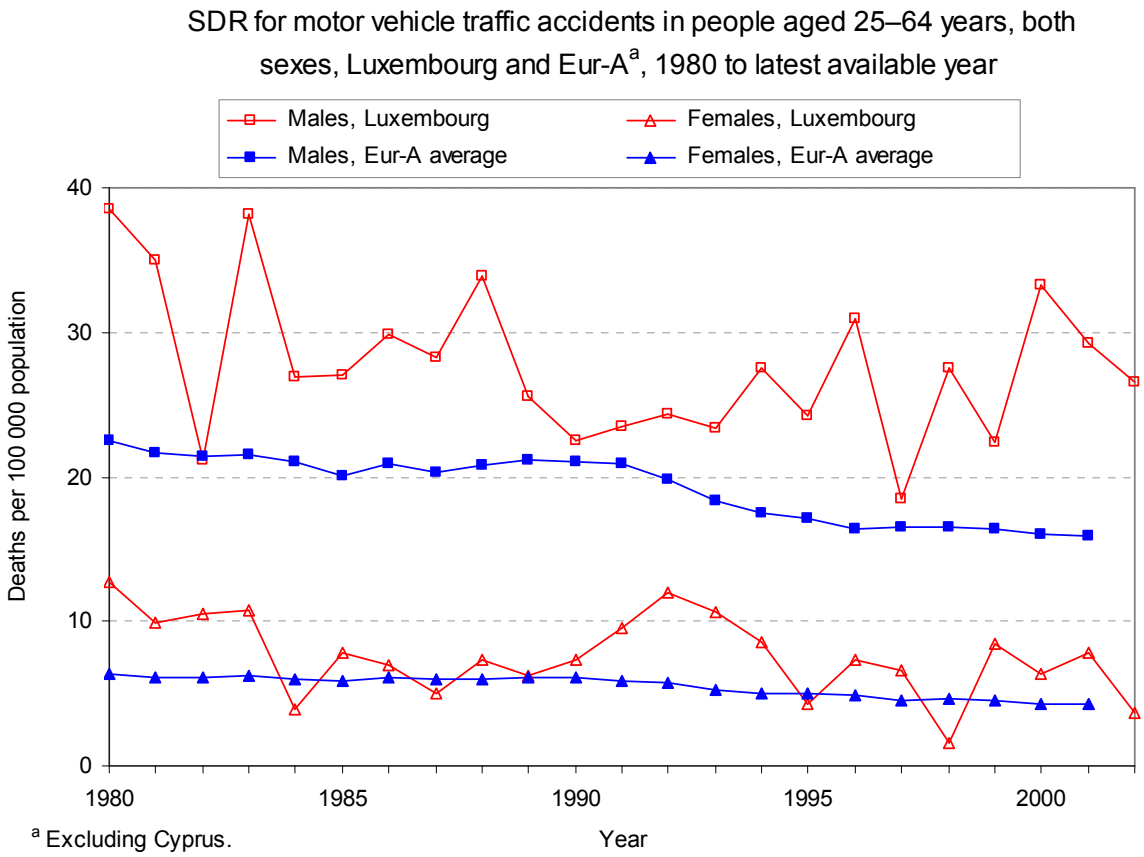


Figure. SDR for suicide and self-inflicted injury, 65+ years



Traffic fatalities are more frequent among people in Luxembourg than in the rest of Eur-A for both genders and at all ages. Overall, males still have two to four times the female rate of dying from injuries sustained in a traffic incident.

Figure. SDR for motor vehicle traffic accidents, 25–64 years



Mortality from digestive diseases, which was about 25% higher than the Eur-A average, decreased in 2002 (n = 200); more than half of it is attributable to chronic liver disease and cirrhosis (Annex. Selected mortality; see also the section on alcohol).

Given the small absolute numbers, mortality from infectious and parasitic diseases in Luxembourg can be considered as comparable to the Eur-A average (Annex. Selected mortality).

Disability-adjusted life-years The disability-adjusted life-year (DALY) is a summary measure that combines the impact of illness, disability and mortality on population health. The table lists the top 10 conditions affecting males and females in Luxembourg in terms of DALYs.

Table. Ten leading disability groups

Ten leading disability groups as percentages of total DALYs for both sexes in Luxembourg

Rank	Males		Females	
	Disability groups	**Total DALYs (%)**	**Disability groups**	**Total DALYs (%)**
1	Neuropsychiatric conditions	26.8	Neuropsychiatric conditions	31.6
2	Cardiovascular diseases	15.8	Cardiovascular diseases	15.1
3	Malignant neoplasms	14.2	Malignant neoplasms	14.5
4	Unintentional injuries	12.5	Respiratory diseases	6.1
5	Respiratory diseases	6.8	Unintentional injuries	5.4
6	Digestive diseases	4.9	Musculoskeletal diseases	5.1
7	Sense organ diseases	4.1	Sense organ diseases	5.1
8	Intentional injuries	3.8	Digestive diseases	4.8
9	Musculoskeletal diseases	3.1	Endocrine disorders	1.8
10	Infectious and parasitic diseases	1.4	Intentional injuries	1.8

Source: Background data from WHO (2003e).

For both men and women, neuropsychiatric disorders account for the greatest burden of disease in Luxembourg, and they represent as much as one third of the total disease burden for women. Since mortality for these disorders is relatively low (Annex. Selected mortality), most of the burden arises from their impact on daily living. Cardiovascular diseases account for the second greatest burden for both genders, followed by cancer. Unintentional injuries rank fourth among men, but they impose a burden of similar magnitude to those of cardiovascular diseases or cancer.

Main risk factors (heading 2)

The table presents the top 10 risks to health in developed countries in terms of DALYs. As with the conditions in the previous table, risk factors are estimated to contribute differently to the burden of illness and death in a population. The degree to which the Luxembourg population is exposed to three of these risks is described below.

Table. Ten leading risk factors

Ten leading selected risk factors as causes of disease burden measured in DALYs in developed countries

Risk factors	Total DALYs (%)
Tobacco	12.2
Blood pressure	10.9
Alcohol	9.2
Cholesterol	7.6
Overweight	7.4
Low fruit and vegetable intake	3.9
Physical inactivity	3.3
Illicit drugs	1.8
Unsafe sex	0.8
Iron deficiency	0.7

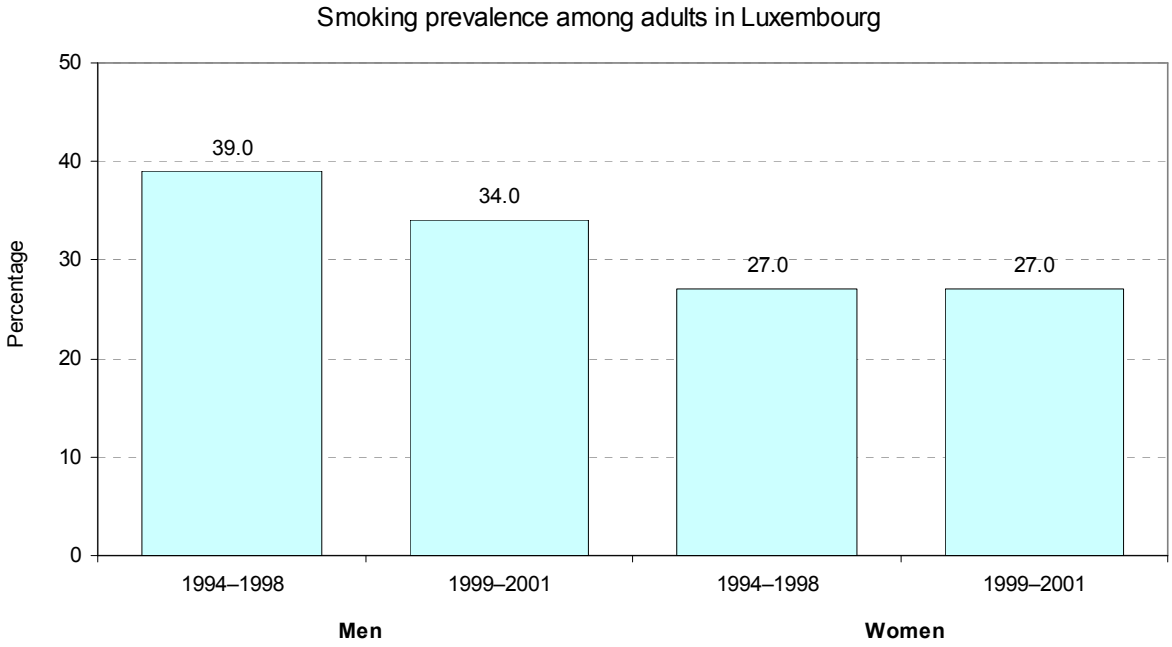
Source: WHO (2002).

TobaccoThe European Region has only 15% of the world's population but nearly 33% of the worldwide burden of tobacco-related diseases (WHO Regional Office for Europe, 2004f). The annual number of deaths in the Region attributable to the consumption of tobacco products was recently estimated to be 1.2 million, and about 40% occur in Eur-A countries (WHO Regional Office for Europe, 2002a). About half the deaths affect people in middle age. Typically, the more affluent are the first both to begin smoking

and to stop. As they quit, smokers increasingly comprise people with less education and lower income (Bostock, 2003).

About a third of the population smokes in Luxembourg. The prevalence among adult women has remained stable, while that of men has decreased slightly, although it remains in the highest range in Eur-A for both genders. Luxembourg signed the WHO Framework Convention on Tobacco Control in 2003. The country only has partial bans on advertising and incomplete restrictions on smoking in public facilities and transport (WHO, 2003a; WHO Regional Office for Europe, 2004e).

Figure. Smoking prevalence among adults



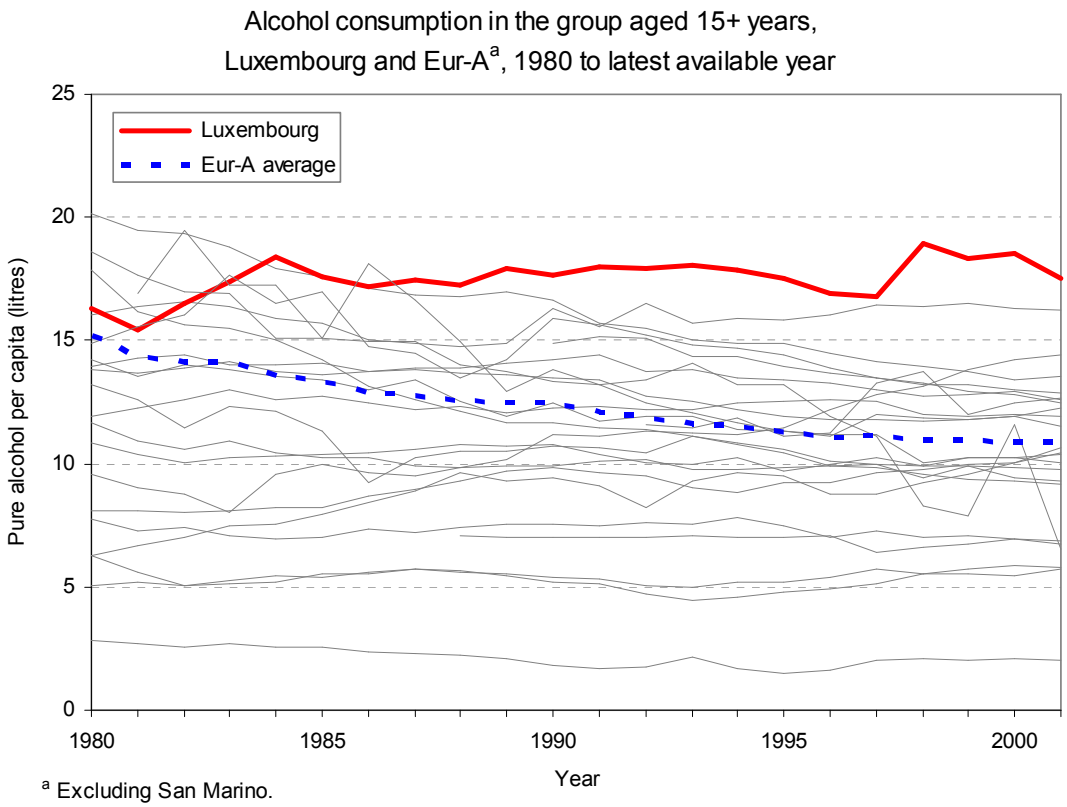
Source: WHO Regional Office for Europe (2004d).

Alcohol

Two major public health issues are related to alcohol consumption: regular drinking of more than small amounts and harmful patterns such as binge drinking (when a person consumes a bottle of wine or equivalent on one occasion; or having five or more "standard" drinks in a row). Both practices cause or aggravate health problems and increase the risks of injury to the drinker and others (European Commission, 2003).

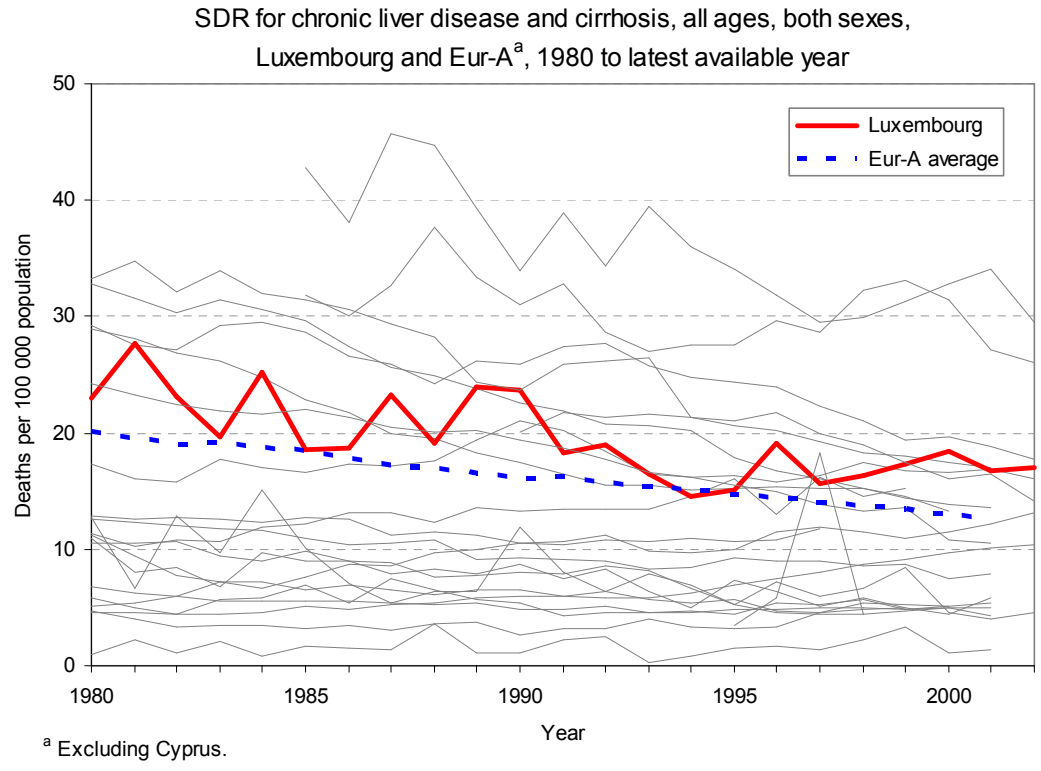
Alcohol abuse is an important public health problem in Luxembourg. Although pure alcohol consumption has steadily decreased in Eur-A over the last 20 years, according to official statistics on local production, sales, imports and exports, it has remained stable in Luxembourg, and at the highest level (60% higher than the Eur-A average in 2001). Wine consumption has especially increased.

Figure. Alcohol consumption in the group aged 15+ years



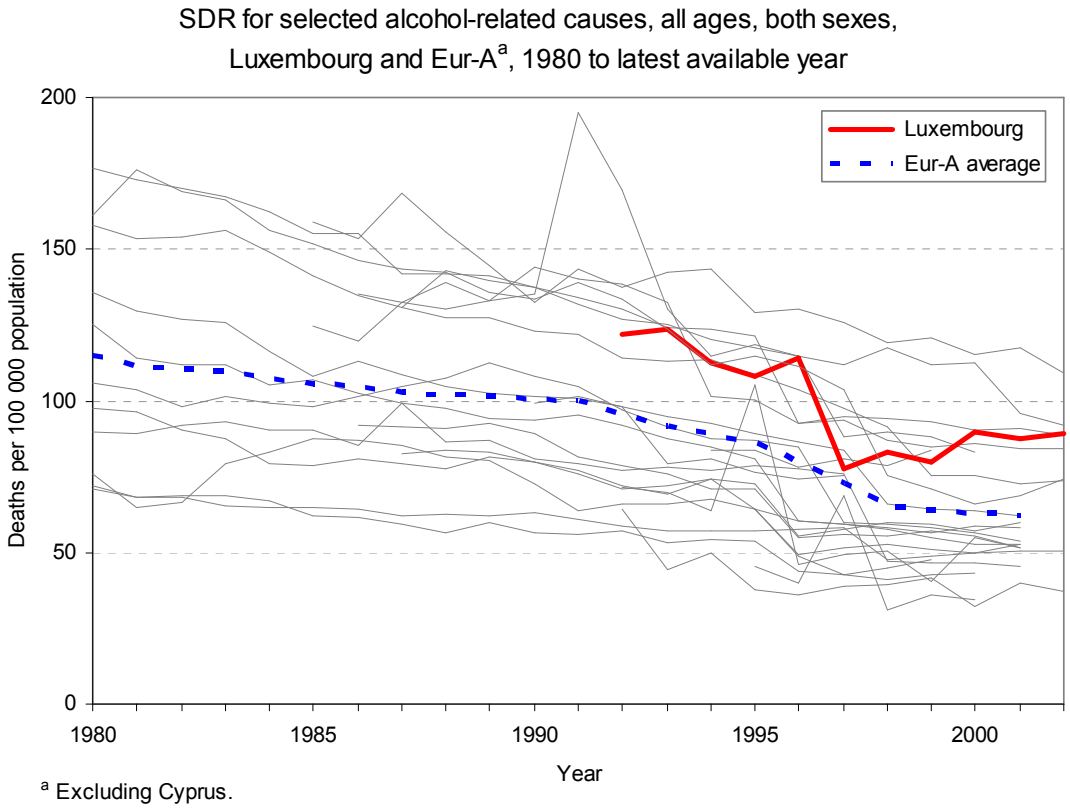
Mortality from liver cirrhosis is a classic and reliable indicator of harmful effects from chronic excessive drinking (Hemström et al., 2002). It has tended to stabilize while decreasing in the other Eur-A countries, resulting in Luxembourg being 30% higher than the Eur-A average in 2001.

Figure. SDR for chronic liver disease and cirrhosis



Luxembourg's mortality rate from alcohol-related causes is also among the highest after Slovenia, Croatia and Finland, both among men and women, suggesting harmful drinking patterns in Luxembourg.

Figure. SDR for alcohol-related causes



[a] Excluding Cyprus.

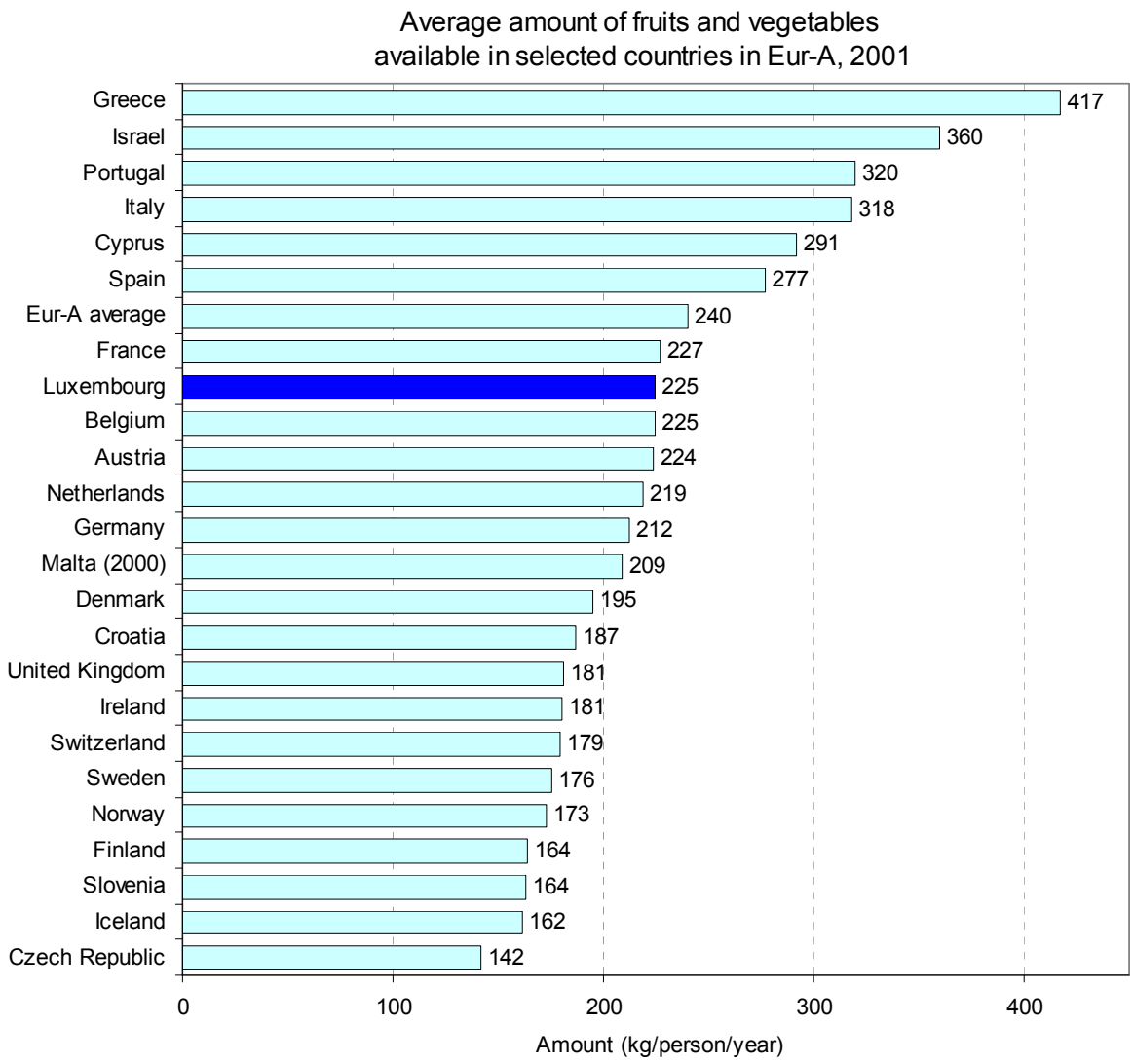
Intake of fruits and vegetables

Both CVD and cancer have substantial dietary bases. Conservative estimates suggest that better eating habits could prevent about a third of CVD cases and a third of all cancer deaths worldwide (Robertson et al., 2004). Contributing risk factors are high blood pressure and serum cholesterol, overweight and obesity, and low intake of fruits and vegetables. For the large proportion of the population that does not smoke, diet is one of the most important modifiable determinants of cancer risk.

Low fruit and vegetable intake is estimated to cause around 18% of gastrointestinal cancer, about 28% of ischaemic heart disease and 18% of stroke in the European Region. WHO recommends an intake of more than 400 g fruits and vegetables per person per day (equivalent to 146 kg per year). Based on availability data, used as a proxy for intake, the average consumption in Luxembourg was 225 kg for 2001, slightly less than the Eur-A average.

Mean consumption, however, is a poor measure of the intake distribution within a population. Data for the countries comprising the European Union before May 2004 show that people with higher incomes typically eat more fruits and vegetables than those with lower incomes (Joffe & Robertson, 2001).

Figure. Vegetable and fruit intake



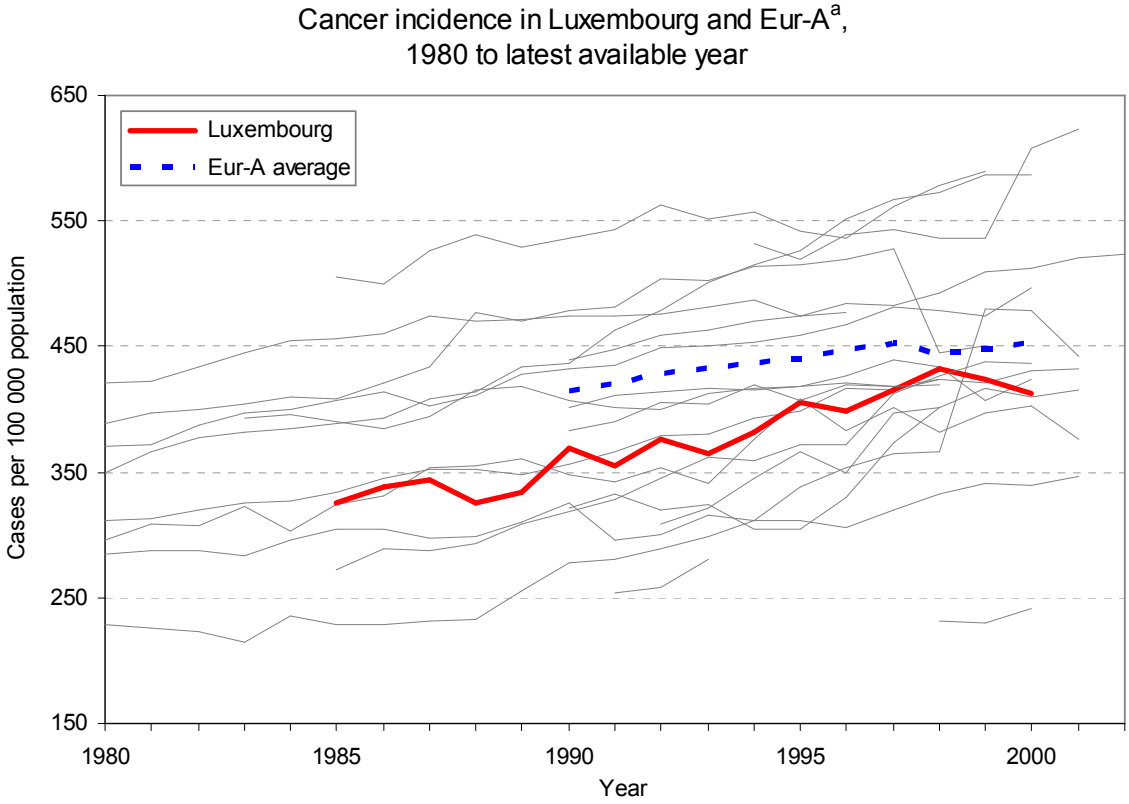
Source: WHO Regional Office for Europe (2004b).

Selected causes of illness

Cancer Cancer accounts for almost 26% of deaths in Luxembourg, whereas the combination of death and illness due to cancer, represented as DALYs, accounts for 14% of disease burden among men and women equally. Together the indicators show that the burden of cancer on the population is mainly attributable to death as opposed to long-term illness.

The incidence rate of cancer is rising more rapidly in Luxembourg than in Eur-A but was still lower than the Eur-A average by 10% in 2000.

Figure. Cancer incidence

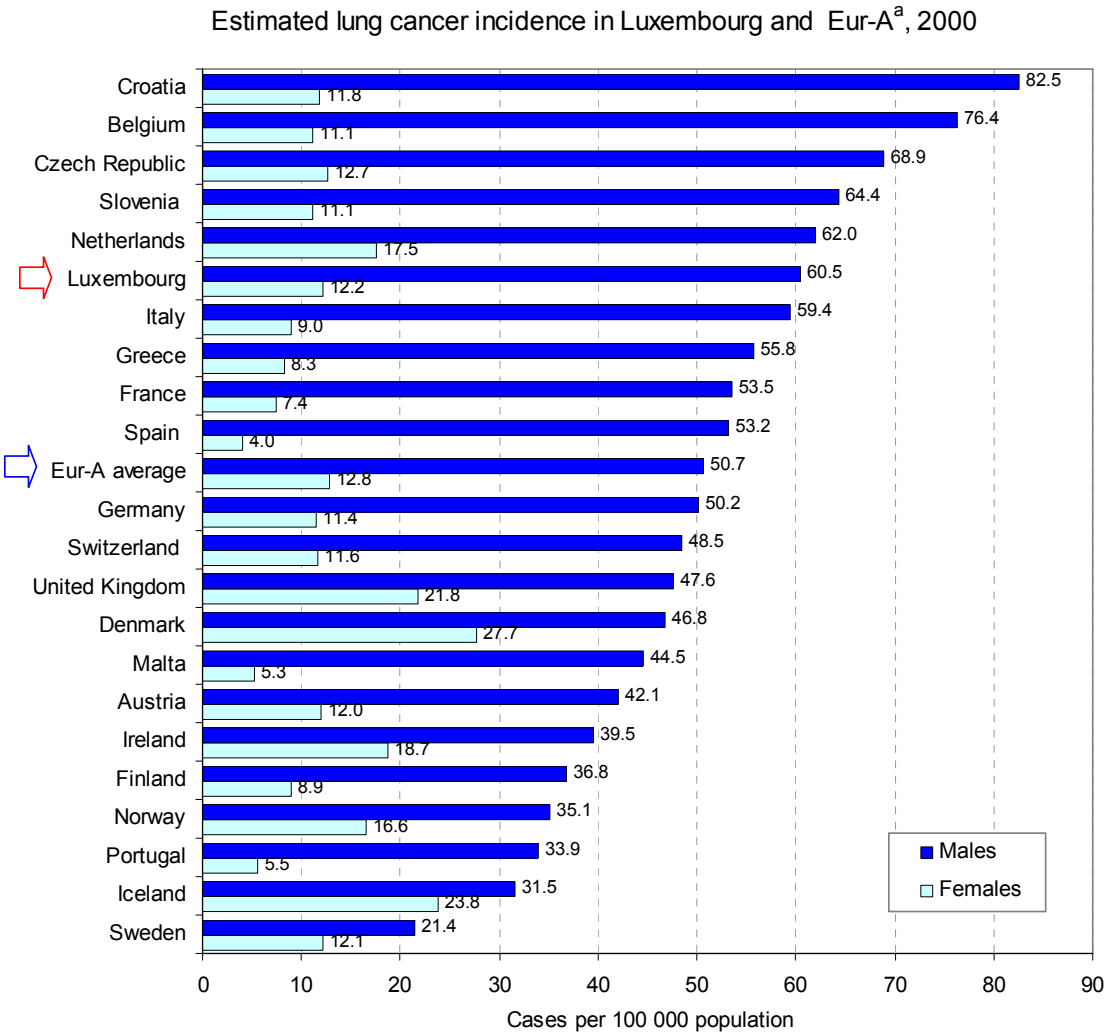


[a] Excluding Greece, San Marino, Spain and Switzerland.

Lung cancer is the most common cancer in the Region and the world. The most important risk factor is tobacco (Tyczynski et al., 2002).

In 2000, the estimated lung cancer incidence among men in Luxembourg was among the highest (about 20% higher than the Eur-A estimate), whereas it was about average for women.

Figure. Estimated lung cancer incidence

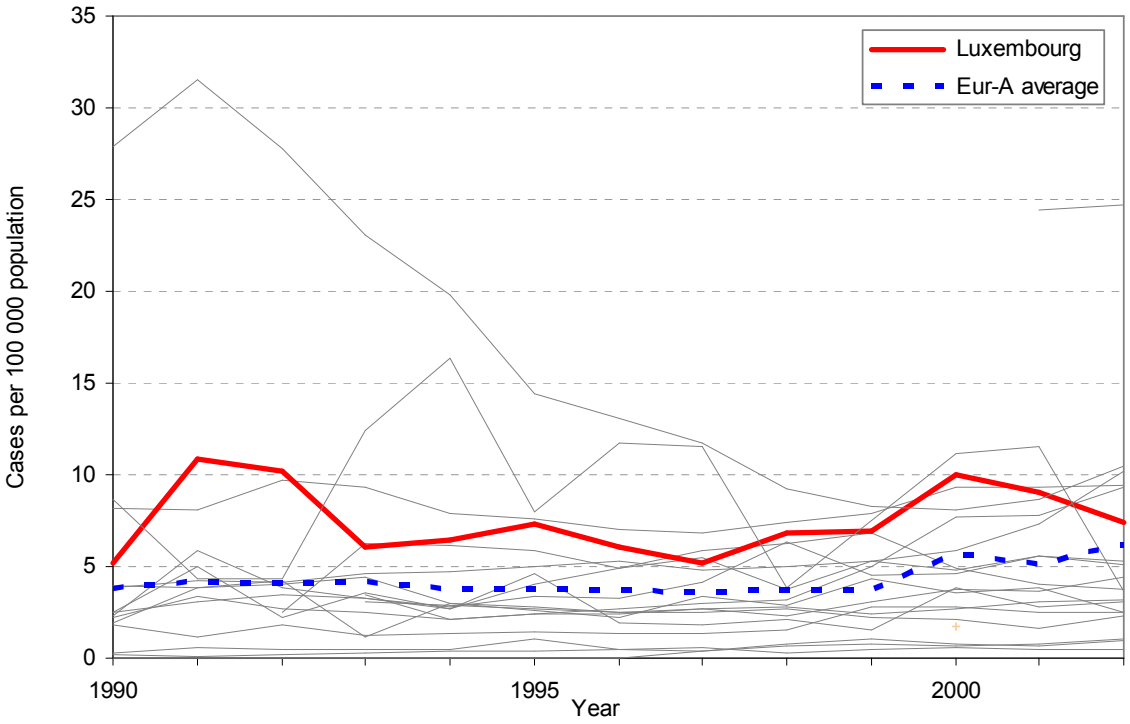


[a] Excluding Cyprus, Israel and San Marino.
Source: Tyczynski et al. (2002).

HIV Increased trade and population movement within the European Region have facilitated the spread of infectious diseases. Surveillance of communicable diseases in western Europe remains incomplete, particularly testing for and reporting HIV. Data on newly diagnosed HIV infections and especially comparisons of rates in countries should be interpreted with caution (EuroHIV, 2003a, b).

Figure. New cases of HIV

New registered cases of HIV, Luxembourg and Eur-A[a], 1990 to latest available year



[a] Excluding Austria, Cyprus, France, Italy, the Netherlands and Spain.

Rates of new HIV infection in Luxembourg have been about 40% higher than the Eur-A average in recent years (20% higher in 2002 at 7.4 per 100 000 population), so this finding is not likely to be attributable to the small absolute number of cases involved (EuroHIV, 2003b). By the end of 2003, a cumulative total of 592 HIV cases had been reported, of which 47 were new HIV infections registered in 2003.

The main vector for transmission in Luxembourg is heterosexual contact, with about half of the cases in 2001–2002, of which about one third are cases originating from a country with a generalized HIV epidemic. Second is transmission among homosexual and bisexual men, about one third of the cases (UNAIDS & WHO, 2004).

The number of deaths from AIDS is too small for comparisons.

Hepatitis C Since the introduction of screening of blood and blood products for hepatitis C in the countries of the European Union before May 2004, transmission of the virus has fallen dramatically. Injecting drug users are now the group at greatest risk, accounting for up to 60–90% of new infections. Young and new injectors are at high risk of contracting the virus shortly after they begin injecting.

Wherever injecting drug use is taking place, new epidemics of hepatitis C are likely to emerge. Social exclusion is a factor in and a characteristic of the spread of infection (EMCDDA, 2004). Hepatitis C is predicted to have considerable long-term effects in terms of both health care spending and personal suffering.

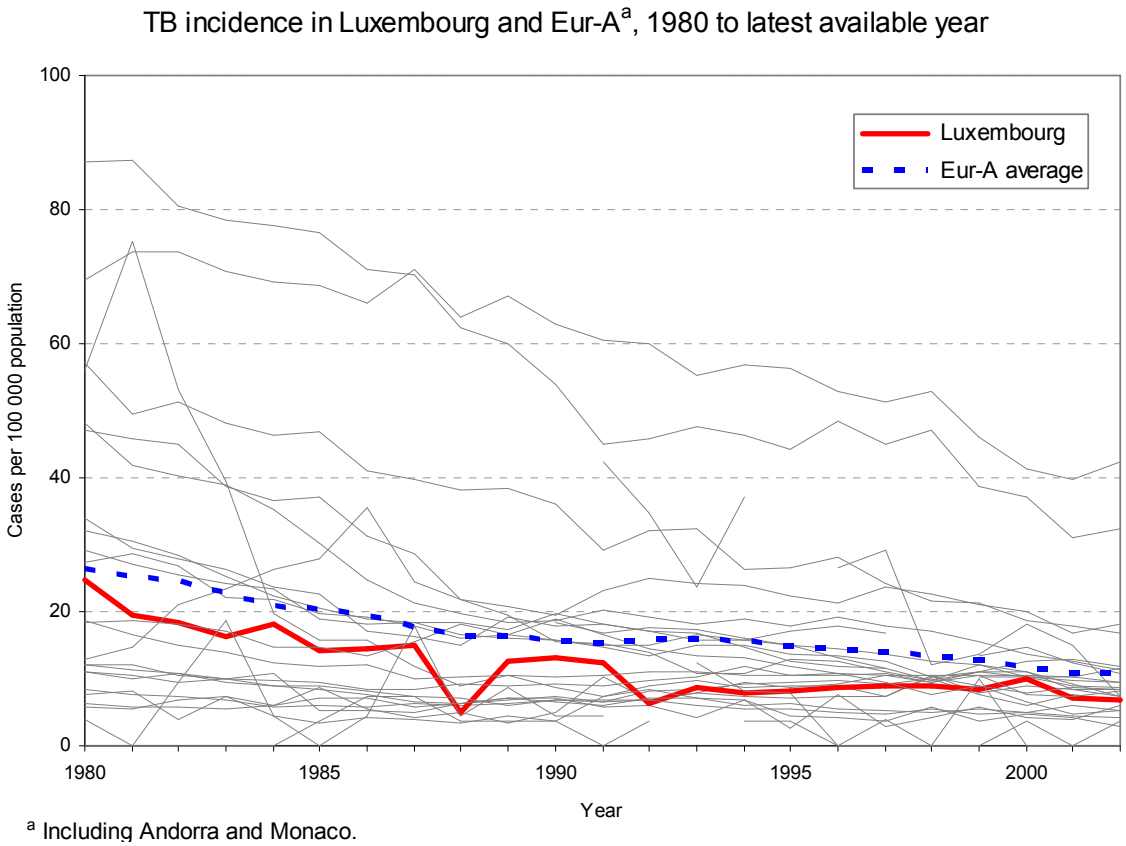
In 1998, limited local testing in prisons in Luxembourg found that 37% of 116 injecting drug users were infected (EMCDDA, 2003). Mortality from all types of viral hepatitis is lower than the – rising – Eur-A average. However, the incidence rate of hepatitis B – transmitted through the same vectors as hepatitis C – has consistently been the first or second highest among the countries reporting since the 1990s (based on about 50 cases per year).

TB Between 1995 and 2001, TB notification rates decreased overall in western Europe. Drug resistance remains relatively low in reporting countries, indicating that TB control is in general effective (EuroTB,

2003). Higher rates are typically found in pockets of risk populations (such as immigrants and refugees from areas with high TB incidence) and among the indigenous poor, homeless people and prison inmates. Higher rates are also associated with HIV.

The incidence of TB in Luxembourg has consistently been lower than in Eur-A. It has dropped by 12% since 1995 versus a 26% drop in Eur-A, and is now a third lower than Eur-A (7 versus 11 per 100 000 population in 2002).

Figure. TB incidence



[a] Including Andorra and Monaco.

Health systems[1]

Organizational structure of the health system

Luxembourg's health care system is based on three fundamental principles: compulsory health insurance, free choice of provider for patients and compulsory provider compliance with the fixed set of fees for services.

The standard contribution level is set by the Union of Sickness Funds which, along with nine profession-based funds, manages and provides statutory health insurance for 99% of the population. Civil servants and employees of European and international institutions have their own health insurance funds; further, any unemployed person who is neither receiving unemployment benefit nor a public pension is excluded.

Voluntary health insurance has always played a limited role in Luxembourg as a share of reimbursement. Nevertheless, about 75% of the population purchases complementary health insurance coverage, which is mostly used to pay for services categorized as nonessential under the compulsory schemes.

Health care financing and expenditure

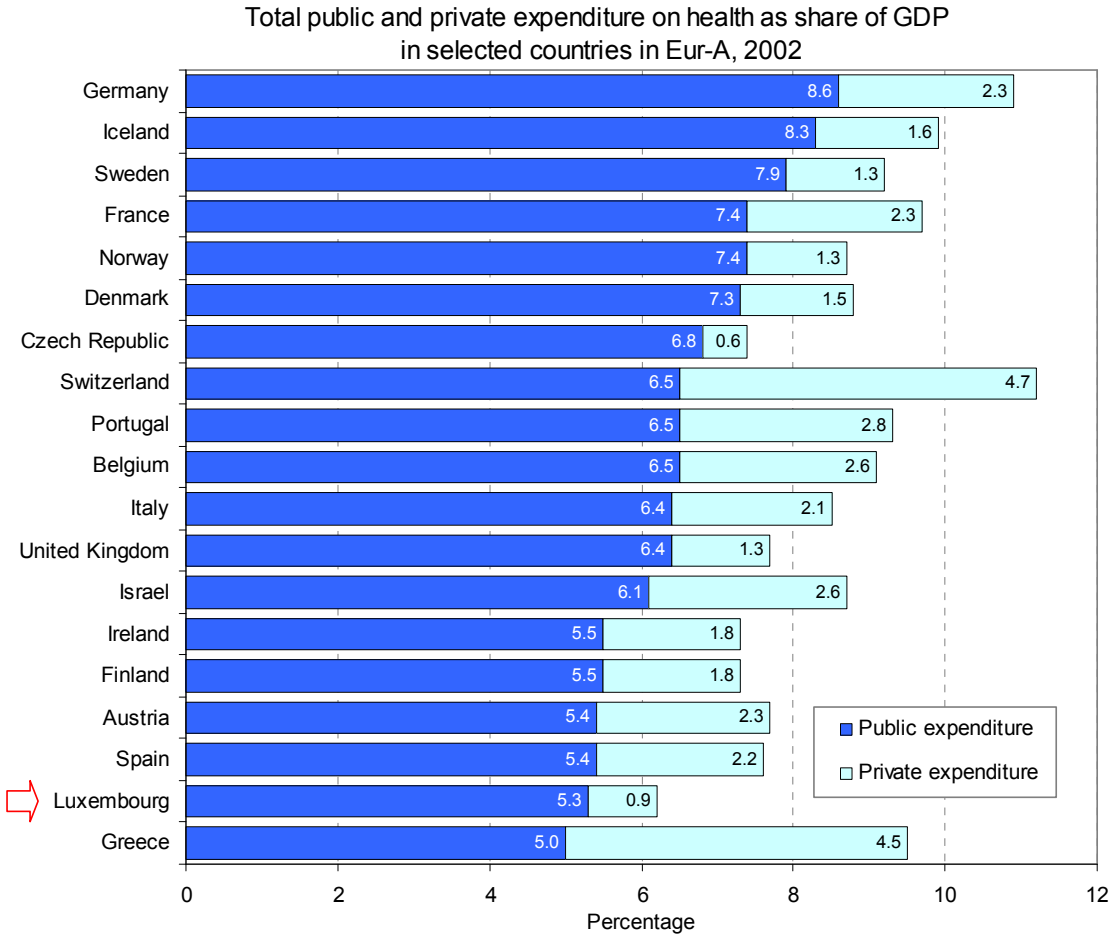
Similarly to its neighbouring countries Belgium, France and Germany, Luxembourg's health care system is mainly publicly financed through social health insurance.

In 2000, statutory insurance comprised 72.7% of total health expenditure, taxes 15.1%, out-of-pocket payments 7.7%, voluntary health insurance 1.6% and miscellaneous expenditure 2.9%.

Total health care expenditure was estimated to amount to 6.2% of GDP in 2002, representing the lowest share among the Eur-A countries; 86% of the total health expenditure was estimated to come from public sources. In the same year, health care expenditure per capita calculated in purchasing power parity was US$ 3065, the third highest among the Eur-A countries (Annex. Total per capita expenditure on health). This apparent contradiction can be explained by two factors: (1) per capita expenditure calculations are based on the resident population, which can be misleading, since 25% of Luxembourg's insured workers are commuters from neighbouring countries; and (2) Luxembourg's per capita GDP is the highest in Eur-A.

Figure. Total expenditure on health

[1] This section is based on publications of the European Observatory on Health Care Systems and Policies (1999, 2002a–c).



Sources: OECD (2004); data for Israel are 2001 estimates from WHO (2004c).

Because Luxembourg is small, few resource allocation decisions are delegated to local authorities except for hospital budgets, which are negotiated between individual hospital administrative boards and the Union of Sickness Funds.

Health professionals' payments are based on a fixed statutory fee level. Individual hospitals negotiate global prospective budgets with the Union of Sickness Funds. A comprehensive list of pharmaceuticals is approved for use as a national formulary and guide for reimbursement. It is maintained by the Division of Pharmacy of the Directorate of Health**.**

Health care provision

Providers are usually contracted out. Insured people can choose their providers freely, and any level of care provision chosen (hospital, clinic, etc.) is eligible for reimbursement.

As of 1 January 2004, Luxembourg had 14 acute-care hospitals. One of these, specializing in maternity services, is run for profit. Of the remaining 13, half are run by local authorities and the other half by not-for-profit and mainly religious organizations. The number of acute-care beds per 1000 population decreased from 7.4 per 1000 in 1980 to 5.6 in 2003.

The Ministry of Health is responsible for preventive services. Interventions are provided by public services, private practitioners and not-for-profit associations paid from the Ministry's budget.

The number of physicians, specialists and dentists per 1000 population increased during the 1980s and 1990s but remains below the figures of other Eur-A countries. In 2002, Luxembourg had 2.6 physicians and 7.8 nurses per 1000 population (Annex. Selected health care resources). The number of pharmacists was relatively constant over this period as they are controlled by the Division of Pharmacy of

the Directorate of Health. Luxembourg imports all pharmaceutical products. Retail prices are usually based on prices determined in the country of origin.

Developments and issues

Luxembourg provides compulsory social health insurance, with insured people enjoying access to a comprehensive benefit package and a free choice of providers. Compared with other Eur-A countries, health care expenditure as a percentage of GDP has remained low over the past decades.

The reforms of the 1980s and 1990s in Luxembourg mostly focused on attaining financial stability for the sickness funds. The main measures introduced during this period were increasing co-payments, the establishment of a reserve by the Union of Sickness Funds to deal with any budget imbalance and the transfer of responsibilities from individual sickness funds to the Union of Sickness Funds.

In 1995, in response to spiralling hospital costs, a change in the payment system was introduced, substituting a tariff scheme with annually negotiated global prospective budgets between the individual hospitals and the Union of Sickness Funds.

Luxembourg is small in area and population with a very high GDP. Therefore, although cost containment has been a priority area on the political agenda, it has not been pursued as urgently as in other European countries.

References

Babor T et al. (2003). Alcohol: no ordinary commodity. Research and public policy. Oxford, Oxford University Press.

Bostock Y (2003). Searching for the solution: women, smoking and inequalities in Europe. London, Health Development Agency, National Health Service.

Broring G et al., eds. (2003). Access to care: privilege or right? Migration and HIV vulnerability in Europe. Woerden, NIGZ European Project AIDS & Mobility (http://212.206.44.60/systeem3/pdf/Country_report_oct031.pdf, accessed 8 June 2004).

Central Bureau of Statistics of Israel (2003). Statistical abstract of Israel 2003, No. 54. Jerusalem, Central Bureau of Statistics of Israel (http://www1.cbs.gov.il/reader, accessed 1 September 2004).

Council of Europe (2003). Recent demographic developments in Europe 2003. Strasbourg, Council of Europe.

EMCDDA (2002). 2002. Annual report on the state of the drugs problem in the European Union and Norway: drug use in prisons. Luxembourg, Office of Official Publications of the European Communities (http://ar2002.emcdda.eu.int/en/home-en.html, accessed 8 June 2004).

EMCDDA (2003). Annual report 2003: the state of the drugs problem in the European Union and Norway. Luxembourg, Office of Official Publications of the European Communities (http://ar2003.emcdda.eu.int/en/home-en.html, accessed 25 June 2004).

EMCDDA (2004). Hepatitis C: the "hidden epidemic". Lisbon, European Monitoring Centre for Drugs and Drug Addiction (News Release, No. 1; http://www.emcdda.eu.int/index.cfm?fuseaction=public.Content&nNodeID=6771&sLanguageISO=EN, accessed 25 May 2004).

EuroHIV (2003a). HIV/AIDS surveillance in Europe. Saint-Maurice, Institut de Veille Sanitaire (End-year Report 2002, No. 68; http://www.eurohiv.org/, accessed 28 May 2004).

EuroHIV (2003b). HIV/AIDS surveillance in Europe. Saint-Maurice, Institut de Veille Sanitaire (Mid-year Report 2003, No. 69; http://www.eurohiv.org/, accessed 28 May 2004).

European Commission (2003). Health in Europe: results from 1997–2000 surveys. Luxembourg, European Commission (http://epp.eurostat.cec.eu.int/portal/page?_pageid=1073,1135281,1073_1135295&_dad=portal&_schema=PORTAL&p_product_code=KS-57-03-184, accessed 7 June 2004).

European Observatory on Health Care Systems (1999). Health care systems in transition – Luxembourg 1999. Brussels, European Observatory on Health Care Systems (HiT country profiles; http://www.euro.who.int/document/e67498.pdf, accessed 25 June 2004).

European Observatory on Health Care Systems (2002a). Funding health care: options for Europe. Copenhagen, WHO Regional Office for Europe (Policy Briefs, No. 4; http://www.euro.who.int/document/obs/Fhcpolbrief4.pdf, accessed 25 June 2004).

European Observatory on Health Care Systems (2002b). Hospitals in a changing Europe. Copenhagen, WHO Regional Office for Europe (Policy Briefs, No. 1; http://www.euro.who.int/document/obs/hosbrief170202.pdf, accessed 25 June 2004).

European Observatory on Health Care Systems (2002c). Regulating entrepreneurial behaviour in Europe. Copenhagen, WHO Regional Office for Europe (Policy Briefs, No. 2; http://www.euro.who.int/document/obs/regbrief170202.pdf, accessed 25 June 2004).

EUROSTAT (2004). NewCronos: EUROSTAT's reference database [online database]. Luxembourg, Statistical Office of the European Communities (http://europa.eu.int/newcronos/, accessed 8 June 2004).

EuroTB (2003). Surveillance of tuberculosis in Europe. Report on tuberculosis cases notified in 2001. Saint-Maurice, Institut de Veille Sanitaire (http://www.eurotb.org/rapports/2001/etb_2001_full_report.pdf, accessed 7 June 2004).

Health Evidence Network (2003a). What are the main risk factors for disability in old age and how can disability be prevented? Copenhagen, WHO Regional Office for Europe (http://www.euro.who.int/HEN/Syntheses/20030820_1, accessed 28 May 2004).

Health Evidence Network (2003b). Which are the most effective and cost-effective interventions for tobacco control? Copenhagen, WHO Regional Office for Europe (http://www.euro.who.int/HEN/Syntheses/20030820_1, accessed 28 May 2004).

Health Evidence Network (2004a). What are the advantages and disadvantages of restructuring a health care system to be more focused on primary health care services? Copenhagen, WHO Regional Office for Europe (http://www.euro.who.int/HEN/Syntheses/20030820_1, accessed 28 May 2004).

Health Evidence Network (2004b). What are the most effective and cost-effective interventions in alcohol control? Copenhagen, WHO Regional Office for Europe (http://www.euro.who.int/HEN/Syntheses/20030820_1, accessed 28 May 2004).

Hemström O, Leifman H, Ramstedt M (2002). The ECAS survey on drinking patterns and alcohol-related problems. In: Norström T, ed. Alcohol in postwar Europe: consumption, drinking patterns, consequences and policy responses in 15 European countries. Stockholm, Almqvist and Wiksell International.

HIPP (2003). Declaration. Prison health as part of public health, Moscow, 24 October 2003. London, Health in Prisons Project (http://www.hipp-europe.org/news/moscow_declaration_eng04.pdf, accessed 25 June 2004).

International Centre for Prison Studies (2004). World prison brief. London, International Centre for Prison Studies (http://www.prisonstudies.org, accessed 24 November 2004).

Joffe M, Robertson A (2001). The potential contribution of increased vegetable and fruit consumption to health gain in the European Union. Public Health Nutrition, 4(4):893–901.

Knapp M et al. (2004). Mental health policy and practice across Europe: the future direction of mental health care: proposal for analytical study. Copenhagen, WHO Regional Office for Europe (http://www.euro.who.int/observatory/Studies/20021104_4, accessed 8 June 2004).

Martikainen P et al. (2001). Income differences in mortality: a register-based follow-up study of three million men and women. International Journal of Epidemiology, 2001, 30(6):1397–1405.

OECD (2004a). Ageing and employment policies. Paris, Organisation for Economic Co-operation and Development (http://www.oecd.org/document/37/0,2340,en_2649_201185_32019685_1_1_1_1,00.html, accessed 19 August 2004).

OECD (2004b). OECD Health Data 2004 [online database]. Paris, Organisation for Economic Co-operation and Development (http://www.oecd.org/statisticsdata/0,2643,en_2649_34631_1_119656_1_1_1,00.html, accessed 25 June 2004).

Peden M et al., eds. (2004). World report on traffic injury prevention. Geneva, World Health Organization (http://whqlibdoc.who.int/publications/2004/9241562609.pdf, accessed 15 July 2004).

Racioppi F et al. (2004). Preventing road traffic injury: a public health perspective for Europe. Copenhagen, WHO Regional Office for Europe (http://www.euro.who.int/document/E82659.pdf, accessed 7 July 2004).

Robertson A et al., eds. (2004). Food and health in Europe: a new basis for action. Copenhagen, WHO Regional Office for Europe (WHO Regional Publications, European Series, No. 96; http://www.euro.who.int/InformationSources/Publications/Catalogue/20040130_8, accessed 28 May 2004).

Tyczynski JE et al. (2002). Lung cancer in Europe. ENCR Cancer Fact Sheets, 1.

UNAIDS, WHO (2003). *AIDS: epidemic update December 2003*. Geneva, Joint United Nations

Programme on HIV/AIDS and World Health Organization (http://www.who.int/hiv/pub/epidemiology/epi2003/en/index.html, accessed 8 June 2004).

UNAIDS, WHO (2004). Epidemiological fact sheets on HIV/AIDS and sexually transmitted infections, 2004 update [online database]. Geneva, Joint United Nations Programme on HIV/AIDS and World Health Organization (http://www.who.int/hiv/pub/epidemiology/pubfacts/en, accessed 28 June 2004)

UNDP (2003). Human development report 2003. Millennium Development Goals: a compact among nations to end human poverty. New York, United Nations Development Programme.

UNDP (2004). Human development report 2004. Cultural Liberty in Today's Diverse World. New York, United Nations Development Programme.

UNECE (2003). Trends in Europe and North America. The statistical yearbook of the United Nations Economic Commission for Europe 2003. Geneva, United Nations Economic Commission for Europe: Chapter 4 (http://www.unece.org/stats/trend/trend_h.htm; accessed 25 May 2004).

UNSD (2004). United Nations Statistics Division [online database]. New York, United Nations (http://unstats.un.org/unsd/demographic/default.htm, accessed 19 August 2004).

United Nations (2002). World population prospects: the 2002 revision population database [online database]. New York, United Nations (http://esa.un.org/unpp/index.asp?panel=1, accessed 8 June 2004).

WHO (2001a). A 5-year WHO strategy for road traffic injury prevention. Geneva, World Health Organization (http://whqlibdoc.who.int/hq/2001/WHO_NMH_VIP_01.03.pdf, accessed 15 July 2004).

WHO (2001b). The world health report 2001: mental health: new understanding, new hope. Geneva, World Health Organization (http://www.who.int/whr/2001/en/, accessed 8 June 2004).

WHO (2002). The world health report 2002 – Reducing risks, promoting healthy life. Geneva, World Health Organization:248 (http://www.who.int/whr/2002/en/, accessed 25 May 2004).

WHO (2003a). Diet, nutrition and the prevention of chronic diseases. Report of a joint WHO/FAO expert consultation. Geneva, World Health Organization (WHO Technical Series, No. 916; http://whqlibdoc.who.int/trs/WHO_TRS_916.pdf, accessed 28 May 2004).

WHO (2003b). Project Atlas: mapping mental health resources in the world. Geneva, World Health Organization (http://www.who.int/mental_health/evidence/atlas/, accessed 24 November 2004).

WHO (2003c). WHO Framework Convention on Tobacco Control. Geneva, World Health Organization (http://www.who.int/tobacco/areas/framework/en/, accessed 28 May 2004).

WHO (2003d). The world health report 2003 – Shaping the future. Geneva, World Health Organization (http://www.who.int/whr/2003/en/, accessed 25 May 2004).

WHO (2004). The world health report 2004 – Changing history. Geneva, World Health Organization (http://www.who.int/whr/2004/en, accessed 6 September 2004).

WHO Regional Office for Europe (2000). CINDI dietary guide. Copenhagen, WHO Regional Office for Europe (http://www.euro.who.int/document/e70041.pdf, accessed 28 May 2004).

WHO Regional Office for Europe (2001a). Mental health in Europe: country reports from the WHO European network on mental health. Copenhagen, WHO Regional Office for Europe (http://www.euro.who.int/document/E76230.pdf, accessed 8 June 2004).

WHO Regional Office for Europe (2001b). Poverty and health - evidence and action by WHO's European Region. Copenhagen, WHO Regional Office for Europe (http://www.euro.who.int/SocioEconomicDeterminants/poverty/20030530_5, accessed 25 August 2004).

WHO Regional Office for Europe (2002a). The European health report 2002. Copenhagen, WHO Regional Office for Europe:156 (http://www.euro.who.int/europeanhealthreport, accessed 28 May 2004).

WHO Regional Office for Europe (2002b). European Strategy for Tobacco Control. Copenhagen, WHO Regional Office for Europe (http://www.euro.who.int/tobaccofree/Policy/20030826_3, accessed 28 May 2004).

WHO Regional Office for Europe (2003). WHO European strategy for smoking cessation policy. Copenhagen, WHO Regional Office for Europe (http://www.euro.who.int/tobaccofree/Policy/20030826_5, accessed 28 May 2004).

WHO Regional Office for Europe (2004a). Alcohol control database [online database]. Copenhagen, WHO Regional Office for Europe (http://data.euro.who.int/alcohol/, accessed 15 November 2004).

WHO Regional Office for Europe (2004b). European health for all database (HFA-DB) [online database]. Copenhagen, WHO Regional Office for Europe (http://www.euro.who.int/hfadb, accessed 20 July 2004).

WHO Regional Office for Europe (2004c). The HIV/AIDS epidemic in Europe and central Asia. Copenhagen, WHO Regional Office for Europe (http://www.euro.who.int/aids/20040326_1, accessed 25 June 2004).

WHO Regional Office for Europe (2004d). A strategy to prevent chronic disease in Europe: a focus on public health action: the CINDI vision. Copenhagen, WHO Regional Office for Europe (http://www.euro.who.int/document/e83057.pdf, accessed 20 July 2004).

WHO Regional Office for Europe (2004e). Tobacco control database [online database]. Copenhagen, WHO Regional Office for Europe (http://data.euro.who.int/tobacco/, accessed 8 June 2004).

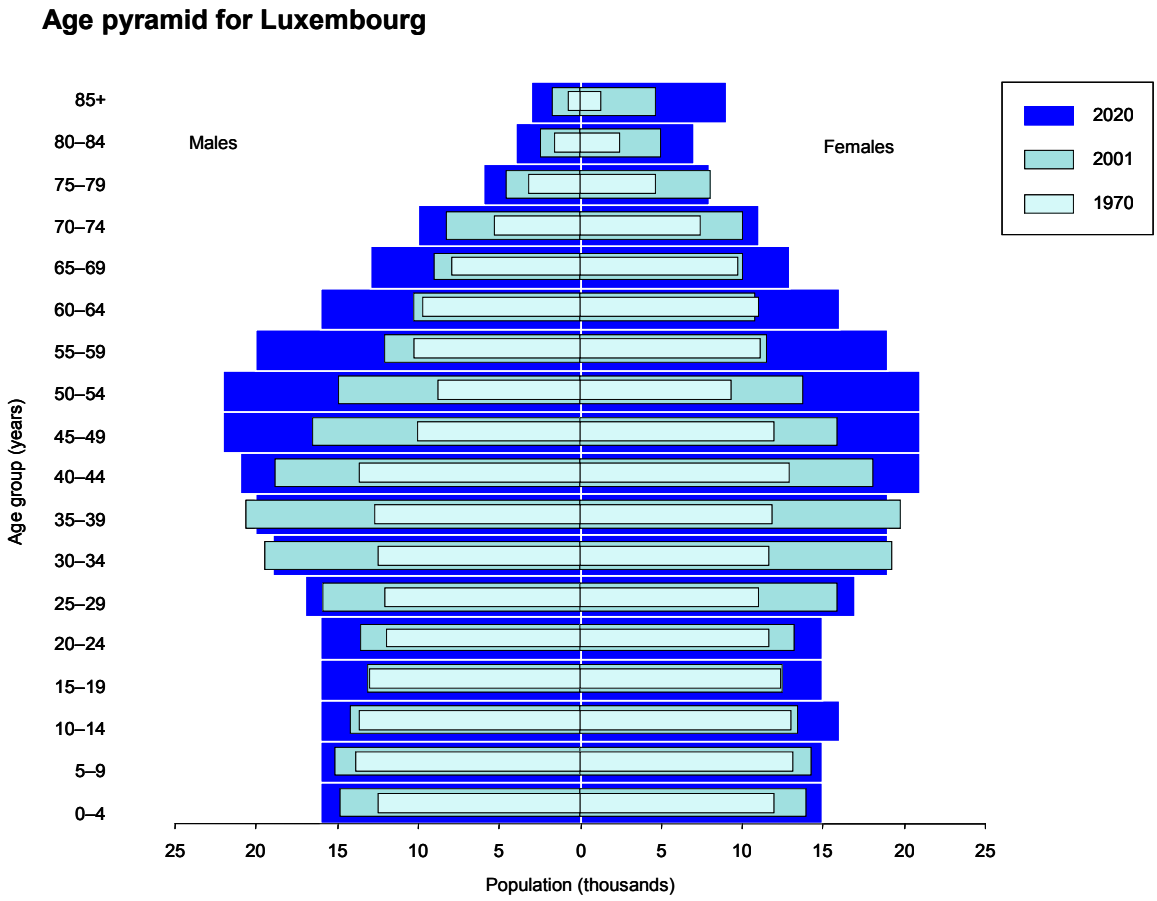
WHO Regional Office for Europe (2004f). Tobacco-free Europe. Policy. Copenhagen, WHO Regional Office for Europe (http://www.euro.who.int/tobaccofree/Policy/20040614_1, accessed 19 August 2004).

WHO Regional Office for Europe (2004g). Towards a European strategy on noncommunicable diseases. Copenhagen, WHO Regional Office for Europe (http://www.euro.who.int/document/rc54/edoc08.pdf, accessed 26 October 2004).

Ziglio E et al., eds. (2003). Health systems confront poverty. Copenhagen, WHO Regional Office for Europe (Public Health Case Studies, No. 1; http://www.euro.who.int/document/e80225.pdf, accessed 25 August 2004).

Annexes

Annex. Age pyramid



Sources: WHO Regional Office for Europe (2004b) and United Nations (2002).

Annex. Selected mortality

Selected mortality in Luxembourg compared with Eur-A averages

Condition	SDR per 100 000		Excess mortality in Luxembourg (%)	Total deaths in Luxembourg (%)	Total deaths in Eur-A (%)
	Luxembourg (2002)	Eur-A average (2001)			
Selected noncommunicable conditions	518.4	519.5	– 0.2	78.0	79.9
Cardiovascular diseases	245.7	246.3	– 0.2	36.9	37.9
Ischaemic heart disease	77.2	97.3	– 20.6	11.6	15.0
Cerebrovascular disease	69.6	62.0	12.2	10.5	9.5
Diseases of pulmonary circulation and other heart disease	78.0	57.0	37.0	11.7	8.8
Malignant neoplasms	171.2	181.8	– 5.9	25.7	28.0
Trachea/bronchus/lung	35.3	37.0	– 4.6	5.3	5.7
Female breast	26.5	27.1	– 2.4	4.0	4.2
Colon/rectal/anal	20.5	20.7	– 0.9	3.1	3.2
Prostate	18.9	25.0	– 24.6	2.8	3.8
Respiratory diseases	61.8	47.7	29.4	9.3	7.3
Chronic lower respiratory diseases	25.8	20.0	29.0	3.9	3.1
Pneumonia	22.4	16.5	36.3	3.4	2.5
Digestive diseases	31.7	30.7	3.2	4.8	4.7
Chronic liver disease and cirrhosis	16.5	12.8	28.8	2.5	2.0
Neuropsychiatric disorders	8.1	13.0	– 37.6	1.2	2.0
					0.0
Selected communicable conditions	10.1	8.1	25.5	1.5	1.2
HIV/AIDS	0.9	0.9	3.4	0.1	0.1
External causes	61.7	39.5	56.2	9.3	6.1
Selected unintentional causes	21.8	16.1	36.0	3.3	2.5
Motor vehicle traffic injuries	13.4	10.0	33.7	2.0	1.5
Falls	8.5	6.1	39.7	1.3	0.9
Selected intentional causes	20.1	11.4	76.1	3.0	1.8
Self-inflicted (suicide)	18.2	10.5	74.4	2.7	1.6
Violence (homicide)	1.9	1.0	94.8	0.3	0.1
Ill-defined conditions	24.4	21.3	14.6	3.7	3.3
All causes	664.9	650.1	2.3	100.0	100.0

Annex. Mortality data

Table 1. Selected mortality data for the group aged 1–14 years by sex in Luxembourg and Eur-A: SDR per 100 000 population and percentage changes from 1995 to latest available year

Causes of death	Sex	Luxembourg (2002)		Eur-A (2001)			
		Rate	Change (%)	Average	Change (%)	Minimum	Maximum
All causes	Both	18.4	214.2	17.0	– 20.4	12.9	28.2
	M	28.0	146.9	19.2	– 20.3	12.6	32.2
	F	8.3		14.8	– 20.4	4.9	24.1
Cardiovascular diseases	M			0.9	– 26.0		1.8
	F			1.0	– 21.8		1.6
Ischaemic heart disease	M				– 75.0		0.6
	F				– 66.7		0.2
Cerebrovascular disease	M			0.2	– 44.4		0.4
	F			0.2	– 39.4		0.7
Malignant neoplasms	M			3.3	– 15.4		5.1
	F			2.7	– 10.4		4.9
Lung cancer	M				– 80.0		0.2
	F						0.3
Breast cancer	F				– 100.0		0.1
Respiratory diseases	M			0.8	– 13.7		3.0
	F			0.7	– 11.9		2.4
Digestive diseases	M			0.3	– 21.6		0.7
	F	2.6		0.2	– 25.0		2.6
External causes	M	20.3	636.4	6.4	– 30.7	3.5	20.3
	F			4.0	– 24.3		7.0
Motor vehicle traffic injuries	M	5.2	87.6	2.7	– 30.3		8.0
	F			1.8	– 29.3		4.1
Suicide	M			0.4	– 11.9		0.7
	F			0.1	0.0		0.6

Blank = rate < 0.1.

Table 2. Selected mortality data for the group aged 15–24 years by sex in Luxembourg and Eur-A: SDR per 100 000 population and percentage changes from 1995 to latest available year

Causes of death	Sex	Luxembourg (2002)		Eur-A (2001)			
		Rate	Change (%)	Average	Change (%)	Minimum	Maximum
All causes	All	60.7	– 32.3	53.1	– 13.2	37.4	69.7
	M	100.3	– 3.3	77.8	– 13.0	59.4	110.2
	F	19.8	– 73.6	27.7	– 13.2	13.9	34.8
Cardiovascular diseases	M		– 100.0	3.3	– 12.1		5.7
	F			1.8	– 13.1		2.9
Ischaemic heart disease	M			0.3	– 15.0		1.6
	F			0.1	– 7.7		0.7
Cerebrovascular disease	M			0.7	– 13.6		1.4
	F			0.4	– 24.1		1.4
Malignant neoplasms	M	15.5		5.4	– 7.9		15.5
	F			3.7	– 7.9		7.0
Lung cancer	M			0.1	– 50.0		0.3
	F			0.0	– 33.3		0.3
Breast cancer	F			0.1	– 16.7		0.3
Respiratory diseases	M			1.1	– 25.7		4.5
	F			0.8	– 18.8		2.0
Digestive diseases	M			0.5	– 28.8		1.2
	F			0.3	– 30.4		1.1
External causes	M	81.1	– 18.9	54.9	– 12.0	33.0	96.5
	F	19.8	– 62.9	14.3	– 14.8	6.9	23.5
Motor vehicle traffic injuries	M	34.9	– 22.2	30.2	– 9.3	14.9	71.1
	F	11.9	– 68.1	8.1	– 10.7	2.6	14.3
Suicide	M	23.2	17.9	11.2	– 11.5		36.7
	F	4.1	– 10.9	2.5	– 24.3		7.5

Blank = rate < 0.1.

Table 3. Selected mortality data for the group aged 25–64 years by sex in Luxembourg and Eur-A: SDR per 100 000 population and percentage changes from 1995 to latest available year

Causes of death	Sex	Luxembourg (2002)		Eur-A (2001)			
		Rate	Change (%)	Average	Change (%)	Minimum	Maximum
All causes	All	337.2	– 10.3	315.4	– 13.1	218.8	449.7
	M	448.8	– 14.4	425.4	– 14.3	276.0	661.7
	F	224.7	– 1.2	208.4	– 11.0	128.0	322.5
Cardiovascular diseases	M	107.6	– 18.6	110.6	– 20.8	72.2	225.0
	F	53.3	13.8	38.2	– 21.3	23.4	74.7
Ischaemic heart disease	M	58.2	– 25.6	59.8	– 24.6	35.2	108.6
	F	16.9	29.2	13.6	– 28.0	5.4	28.6
Cerebrovascular disease	M	21.4	4.8	17.4	– 22.0	7.5	56.6
	F	19.8	– 1.6	10.5	– 20.2	5.2	27.0
Malignant neoplasms	M	132.0	– 30.2	148.8	– 9.8	91.0	217.2
	F	96.0	– 4.5	102.4	– 7.7	76.1	155.2
Lung cancer	M	37.0	– 36.8	43.9	– 12.8	18.5	71.0
	F	11.0	1.7	13.3	11.7	6.9	32.8
Breast cancer	F	27.1	– 21.9	27.5	– 14.3	14.7	37.2
Respiratory diseases	M	22.2	5.7	15.8	– 19.2	8.5	29.7
	F	11.4	– 16.1	7.9	– 12.3	3.7	22.6
Digestive diseases	M	38.5	– 26.5	31.8	– 9.6	3.1	67.0
	F	13.6	12.8	13.4	– 7.5	4.2	26.2
External causes	M	99.0	15.0	59.9	– 10.5	28.2	120.7
	F	27.6	11.8	17.8	– 10.6		33.1
Motor vehicle traffic injuries	M	26.6	10.0	15.8	– 7.8	6.5	34.0
	F	3.7	– 13.2	4.3	– 14.4		7.4
Suicide	M	28.5	12.2	21.2	– 9.0	6.6	56.4
	F	13.1	24.2	6.8	– 11.1		15.8

Blank = rate < 0.1.

Table 4. Selected mortality data for the group aged 65+ years by sex in Luxembourg and Eur-A: SDR per 100 000 population and percentage changes from 1995 to latest available year

Causes of death	Sex	Luxembourg (2002)		Eur-A (2001)			
		Rate	Change (%)	Average	Change (%)	Minimum	Maximum
All causes	All	4251.9	– 7.4	4199.5	– 11.5	3714.4	6010.0
	M	5490.6	– 13.2	5328.5	– 13.2	4658.1	7580.8
	F	3489.3	– 4.3	3460.2	– 11.5	2937.7	5088.6
Cardiovascular diseases	M	2332.0	– 15.5	2232.9	– 23.4	1614.4	4272.2
	F	1558.9	– 13.7	1613.4	– 21.7	1027.5	3314.3
Ischaemic heart disease	M	738.4	– 19.6	948.2	– 20.3	517.5	1702.7
	F	381.2	– 12.3	539.5	– 17.4	244.7	1084.7
Cerebrovascular disease	M	613.4	– 25.1	536.2	– 35.9	324.8	1302.3
	F	503.2	– 18.4	457.0	– 32.6	170.4	1018.5
Malignant neoplasms	M	1404.3	– 23.4	1482.9	– 12.1	1175.1	1900.6
	F	744.5	– 12.5	749.8	– 9.4	589.1	1088.5
Lung cancer	M	431.2	– 18.6	371.8	– 22.0	196.0	615.4
	F	52.9	– 27.8	81.7	15.6	13.8	213.2
Breast cancer	F	109.7	– 32.1	113.9	– 10.1	83.3	164.1
Respiratory diseases	M	675.3	5.8	545.9	– 13.6	371.8	1115.6
	F	370.2	67.8	266.5	– 13.9	157.9	716.3
Digestive diseases	M	171.8	– 25.1	205.0	– 10.5	117.8	342.9
	F	145.3	12.3	143.3	– 20.3	77.8	196.0
External causes	M	214.3	19.8	152.6	2.0	80.6	282.8
	F	127.8	38.1	91.0	0.7	41.3	157.3
Motor vehicle traffic injuries	M	19.1	– 16.3	20.4	– 15.3	8.7	46.0
	F	9.1	– 31.8	7.9	5.4	0.0	15.5
Suicide	M	83.9	78.0	34.3	– 13.5	8.8	86.1
	F	20.6	31.5	9.9	– 17.6	1.1	23.6

Blank = rate < 0.1.

Annex. Total expenditure on health per capita

Total public and private expenditure on health per capita, in selected countries in Eur-A, 2002

Country	Expenditure (US$ purchasing power parity)
Austria	2220
Belgium	2515
Czech Republic	1118
Denmark	2580
Finland	1943
France	2736
Germany	2817
Greece	1814
Iceland	2807
Ireland	2367
Israel	1622
Italy	2166
Luxembourg	3065
Netherlands	2643
Norway	3083
Portugal	1702
Spain	1646
Sweden	2517
Switzerland	3445
United Kingdom	2160
Eur-A average	2348

Sources: OECD (2004) and WHO Regional Office for Europe (2004b) for 2001 data on Israel.

Annex. Selected health care resources

Selected health care resources per 100 000 population in Eur-A, latest available year

Eur-A	Nurses		Physicians		Acute hospital beds	
	Number	Year	Number	Year	Number	Year
Andorra	316.1	2002	304.2	2002	283.2	2002
Austria	587.4	2001	332.8	2002	609.5	2002
Belgium	1075.1	1996	447.8	2002	582.9	2001
Croatia	501.6	2002	238.3	2002	367.3	2002
Cyprus	422.5	2001	262.3	2001	406.6	2001
Czech Republic	971.1	2002	350.5	2002	631.3	2002
Denmark	967.1	2002	364.6	2002	340.2	2001
Finland	2166.3	2002	316.2	2002	229.9	2002
France	688.6	2002	333.0	2002	396.7	2001
Germany	973.1	2001	335.6	2002	627.0	2001
Greece	256.5	1992	453.3	2001	397.1	2000
Iceland	898.2	2002	363.6	2002	368.2	1996
Ireland	1676.2	2000	238.3	2001	299.5	2002
Israel	598.4	2002	371.3	2002	218.0	2002
Italy	296.2	1989	612.1	2001	397.9	2001
Luxembourg	779.3	2002	259.3	2002	558.7	2002
Malta	551.1	2002	267.2	2002	348.8	2002
Monaco	1621.4	1995	664.3	1995	1553.6	1995
Netherlands	1328.2	2001	314.9	2002	307.4	2001
Norway	2055.7	2001	364.5	2002	308.9	2001
Portugal	384.0	2001	322.9	2001	330.8	1998
San Marino	507.7	1990	251.7	1990	–	–
Slovenia	717.9	2002	224.2	2002	414.3	2002
Spain	367.2	2000	324.3	2000	296.4	1997
Sweden	975.1	2000	304.1	2000	228.3	2002
Switzerland	830.0	2000	361.6	2002	398.3	2002
United Kingdom	497.2	1989	210.0	2002	390.0	2002
Eur-A average	819.8	2001	354.1	2002	409.6	2001

Sources: WHO Regional Office for Europe (2004b) and OECD (2004) for data on physicians and acute hospital beds for the United Kingdom.

Technical notes

Calculation of averages

In general, the average annual or ten-year percentage changes have been estimated using linear regression. This gives a clearer indication of the underlying changes than estimates based on the more straightforward percentage change between two fixed points over a period.

To smooth out fluctuations in annual rates caused by small numbers, three-year averages have been used, as appropriate. For example, maternal mortality, usually a small number, has three-year moving averages calculated for all countries.

Data sources

To make the comparisons as valid as possible, data for each indicator have, as a rule, been taken from one common international source or from the Statistical Office of the European Communities (EUROSTAT) to ensure that they have been harmonized in a reasonably consistent way. Unless otherwise noted, the source of data for figures and tables is the January 2004 version of the WHO Regional Office for Europe's European health for all database.

Disease coding

Case ascertainment, recording and classification practices (using the ninth and tenth revisions of the International Statistical Classification of Diseases and Related Health Problems: ICD9 and ICD10, respectively), along with culture and language, can influence data and therefore comparability across countries.

Healthy life expectancy (HALE) and disability-adjusted-life-years (DALYs)

HALE and DALYs are summary measures of population health that combine information on mortality and non-fatal health outcomes to represent population health in a single number. They complement mortality indicators by estimating the relative contributions of different causes to overall loss of health in populations.

DALYs are based on cause-of-death information for each WHO region and on regional assessments of the epidemiology of major disabling conditions. The regional estimates were disaggregated to Member State level for the highlights reports.

National estimates of HALE are based on the life tables for each member state, population representative sample surveys assessing physical and cognitive disability and general health status, and on detailed information on the epidemiology of major disabling conditions in each country.

More explanation is provided in the statistical annex and explanatory notes of *The world health report 2003*.[1]

Household surveys

Household surveys are currently the only source of evidence of health status at the individual level. The information generated is subjective and self reported. It complements the official aggregated statistics on death rates, life expectancy and morbidity. Tools are available for both designing the surveys and analytically estimating health, adjusted for differences in cultural norms and expectations of health, so that survey results become comparable across populations and groups.

Limitations of national-level data

National-level averages, particularly when they indicate relatively good positions or trends in health status, as is the case in most developed countries, hide pockets of problems. Unless the health status of a small population is so dramatically different from the norm that it influences a national indicator, health risks and poorer health outcomes for small groups will only become evident through subnational data.

[1] *The world health report 2003 – Shaping the future.* Geneva, World Health Organization, 2003 (http://www.who.int/whr/2003/en/, accessed 25 May 2004).

Ranking

A special case of comparison gives each country a rank order. Although useful as a summary measure, ranking can be misleading and should be interpreted with caution, especially if used alone, as the rank is sensitive to small differences in the value of an indicator. Also, when used to assess trends (as in the table at the start of the section on health status), ranking can hide important absolute changes in the level of an individual country. Graphs have usually been used to show time trends from 1970 onwards. These graphs present the trends for all the reference countries and for the EU-15, as appropriate. Only the country in focus and the appropriate group average are highlighted, and identified in the legend. This enables the country's trends to be followed in relation to those of all the reference countries, and performance in relation to observable clusters and/or the main trend or average to be recognized more easily.

Reference groups for comparison

When possible, international comparisons are used as one means of assessing a country's comparative strengths and weaknesses and to provide a summary assessment of what has been achieved so far and what could be improved in the future. Differences between countries and average values allow the formulation of hypotheses of causation or imply links or remedies that encourage further investigation.

The country groups used for comparison are called reference groups and comprise:

- countries with similar health and socioeconomic trends or development; and/or
- geopolitical groups such as the European Union (EU), the newly independent states or the central Asian republics.

The fifteen-member EU (EU-15) is the reference group comprising Austria, Belgium, Denmark, Germany, Greece, Finland, France, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom.

Comparisons should preferably refer to the same point in time, but the countries' latest available data are not all for the same year. This should be kept in mind, as a country's position may change when more up-to-date data become available.

Glossary

Causes of death	*ICD-10 code*
Cerebrovascular diseases	I60–I69
Chronic liver disease and cirrhosis	K70, K73, K74, K76
Chronic obstructive pulmonary disease	J40–J47
Colon/rectal/anal cancer	C18–C21
Diseases of pulmonary circulation and other heart disease	I26–I51
Falls	W00–W19
Female breast cancer	C50
Ischaemic heart disease	I20–I25
Pneumonia	J12–J18
Prostate cancer	C61
Neuropsychiatric disorders	F00–99, G00–99, H00–95
Road traffic injuries	V02–V04, V09, V12–V14, V19–V79, V82–V87, V89
Self-inflicted (suicide)	X60–X84
Trachea/bronchus/lung cancer	C33–C34
Violence	X85–Y09

Technical terminology

Disability-adjusted life-year (DALY)	The DALY combines in one measure the time lived with disability and the time lost owing to premature mortality. One DALY can be thought of as one lost year of healthy life.
GINI index	The GINI index measures inequality over the entire distribution of income or consumption. A value of 0 represents perfect equality; a value of 100, perfect inequality. Low levels in the WHO European Region range from 23 to 25; high levels range from 35 to 36[1].
Healthy life expectancy (HALE)	HALE summarizes total life expectancy into equivalent years of full health by taking account of years lived in less than full health due to diseases and injuries.
Income poverty line (50% of median income)	The percentage of the population living below a specified poverty line: in this case, with less than 50% of median income.
Life expectancy at birth	The average number of years a newborn infant would live if prevailing patterns of mortality at the time of birth were to continue throughout the child's life.
Natural population growth	The birth rate less the death rate.
Neuropsychiatric conditions	Mental, neurological and substance-use disorders.
Population growth	(The birth rate less the death rate) + (immigration less emigration).
Standardized death rate (SDR)	The age-standardized death rate calculated using the direct method: that is, it represents what the crude rate would have been if the population had the same age distribution as the standard European population.

[1] WHO Regional Office for Europe (2002). *The European health report 2002*. Copenhagen, WHO Regional Office for Europe:156 (http://www.euro.who.int/europeanhealthreport, accessed 28 May 2004).