





01

Where we are:
health status
in Europe and
the case for
Health 2020

People in Europe are living longer than ever before; we in the WHO European Region are also living healthier lives. Nevertheless, as this chapter outlines, the benefits gained in recent decades are not equally distributed across the Region, or reaped by all parts of Europe or all population groups. In some countries, health and life expectancy have declined, widening the health gap across the Region. This is intolerable in a region of immense wealth and public health traditions, and calls for an urgent implementation of the new European health policy, *Health 2020* (1).

The European Region is undergoing important demographic and epidemiological changes that are shaping its future needs for health promotion, disease prevention and care. Nevertheless, such transitions are occurring at varying speed and intensity for different countries and populations, creating new challenges and a mosaic of health situations that requires specific approaches. This evolving context highlights some of the major challenges for health in Europe, which the *Health 2020* policy addresses (1). The information provided in this chapter mostly reflects data reported by countries to the WHO Regional Office for Europe (Box 1). It identifies key areas on which the *Health 2020* policy is based, highlights patterns that demand attention and provides a baseline for the monitoring of progress towards defined priorities and areas for policy action.

Demographic trends

Population growth and ageing

The population of the 53 countries in the European Region reached nearly 900 million in 2010, an increase of 5% since 1990 (6). Projections from 2010 onwards suggest that the population will not change significantly in the Region as a whole in the coming decades but that it will actually decrease in some countries (7). Several factors contribute to this trend, including lower crude birth rates (Fig. 1) along with fertility rates lower than 1.75 children per woman and relatively stable or slowly increasing crude death rates and migration inflows. A decrease, or negative annual population increase, has already been documented in central and eastern European countries from the early 1990s to the early 2000s.

Box 1.

Approach to preparing graphs and interpreting data

- Data presented in this report are mostly from the European Health for All database (6) as reported by countries or other international organizations to the WHO Regional Office for Europe.
- Although the WHO European Region includes 53 countries, the number of countries with data for any given year may vary between indicators, owing to differences in the reporting or availability of data.
- The average value for the European Region for any given indicator represents the population-weighted average of country data. Unlike previous reports, this edition of the European health report does not provide averages for different subregional groupings of countries. Developing a new, meaningful approach to present subregional data that accurately reflect the contemporary context and are useful for monitoring progress towards the Health 2020 policy is one of the measurement and analysis challenges noted in the last section of this report.
- The white areas in the graphs show trends, usually between 1980 and 2010, and represent the minimum and maximum country values for a particular indicator for a specific year (see Fig. 1). This means that different countries may represent the minimum or maximum value in different years. Countries in the Region vary in size and, for those with smaller populations, a few cases may determine whether a country has the minimum or maximum value.
- These points partly explain some of the extreme spikes observed in the white areas in different graphs. Nevertheless, these spikes may sometimes represent extreme situations: for example, increased mortality (or reduced life expectancy) following a significant natural disaster or man-made catastrophe.

Maximum country value

European Region average

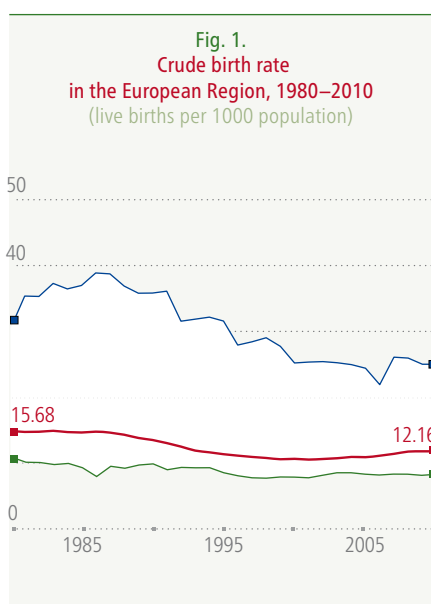
Minimum country value

The population in the European Region is ageing rapidly. By 2010, an estimated 15% of the overall population was aged 65 years and over (Fig. 2). This represents an increase of nearly 30% since 1980; this age group is the fastest growing segment of the population. Countries in the Region show important differences, however, in the proportion of people aged 65 years and over, ranging from more than 20% and increasing to 5% and potentially falling further. Nevertheless, this age group is projected to represent more than 25% of the total population of the European Region by 2050.

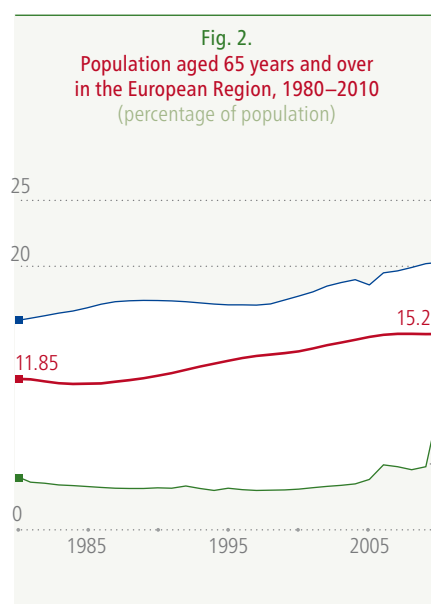
Overall, the ageing of the population is associated with the increased control of communicable diseases early in life, the delayed occurrence of chronic noncommunicable conditions and reduced premature mortality, reflecting improvements in living conditions and health services. Nevertheless, continuing to ensure and strengthen social inclusion, security and welfare – along with a range of health and social services in line with the needs of an ageing population, given this well-documented phenomenon and its expected effects – should be a high priority, requiring adequate resources adapted to the context of each country (8).

Population distribution

Migration is an additional factor influencing the demographic transitions observed in Europe. The main contributing causes are



Source: European Health for All database (6).



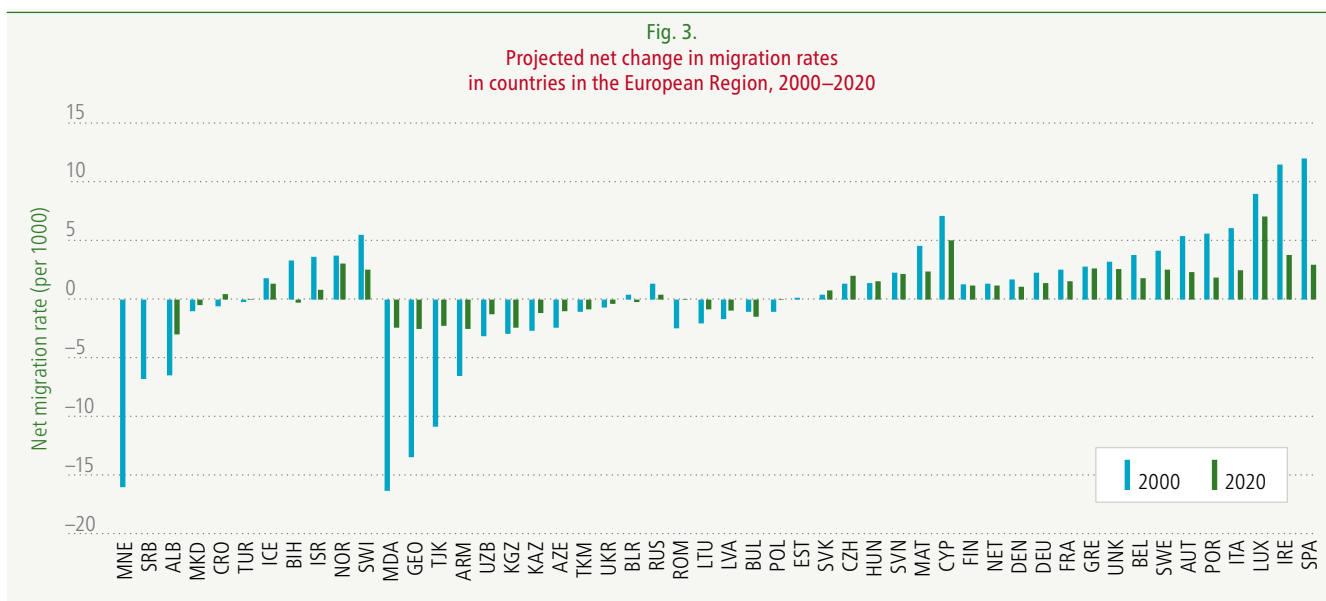
Source: European Health for All database (6).

natural and man-made disasters, as well as social, economic and political disruptions. Based on reported data, an estimated 73 million migrants live in the European Region, accounting for nearly 8% of the total population, with women representing 52% of all migrants. Overall, this population inflow reflects a 5 million increase to the Region's population since 2005 and accounts for nearly 70% of the population growth between 2005 and 2010.

Existing net migration estimates and projections to 2020 document and predict dramatic changes and differences across countries in the Region. With a baseline in 2000, Fig. 3 illustrates the projected net migration to 2020 across countries in the European Region.

The long-term effects of migration on sustained population growth and structure remain uncertain. Some facts are well documented: migrants are usually younger, less affluent and more likely to become ill from communicable diseases, and have less access to health services than the rest of the population. Taking this into account, government policies across different sectors will benefit from coordinated strategies that give special attention to the current and future needs of migrants. Across the European Region, sharing experiences and evidence gained through the implementation and evaluation of strategies in health systems and other social and economic systems should be further encouraged.

The geographical distribution of the population in the Region provides additional insights relevant to health policy. Nearly 70% of the overall



Box 2.**Demographic trends –
key messages**

- While the population of Europe has grown to nearly 900 million inhabitants, decreasing fertility rates across the Region mean that this trend will soon plateau.
- The population is ageing rapidly, with projections estimating that more than 25% of the total population of the European Region will be aged 65 and over by 2050.
- Migration is influencing the demographic transitions observed in Europe.
- The proportion of the population living in urban areas reached nearly 70% in 2010 and is expected to exceed 80% by 2045; as a consequence, people are exposed to different health risks and determinants.

population lived in urban settings in 2010; this proportion is expected to exceed 80% by 2045 (9). The proportion of the population in urban areas varies between countries, however, ranging from more than 85% in about 10 countries to less than 50% in 8 countries. Urban and rural populations may differ in their exposure to a wide range of social determinants of health, including access to health and other services (see the section on social determinants and health inequalities below). Similarly, urban centres have diverse social and economic conditions, and countries have different policies addressing, for example, social inclusion or the processes that render some people more vulnerable to illness.

Epidemiological situation and trends

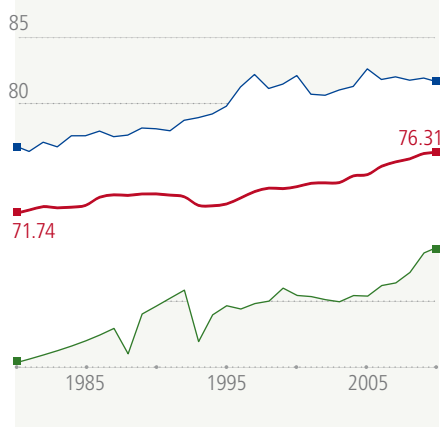
In addition to these demographic changes, the population of the European Region is experiencing important epidemiological changes in mortality, reflecting changing patterns across age and sex groups, and in the causes of disease and disability. The following sections illustrate trends, offer a baseline for Health 2020 and provide information that points to focus areas for promoting health, preventing disease and strengthening health systems across the Region.

Life expectancy

Life expectancy at birth

Although based on mortality rates, overall life expectancy is a widely used indicator of health. A major success for the European Region is that life expectancy at birth has increased by 5 years since 1980, reaching 76 years in 2010. This translates to an average annual gain of 0.17 years for the period and, except for two dips around 1984 and 1993, a steady upward increase.

Nevertheless, average life expectancy at birth differs across countries, ranging from 82.2 years to 68.7 years, giving a gap of 13.5 years for 2010 (Fig. 4). Over time, three distinct periods can be noted in terms of inequalities. During the 1980s the highest and lowest levels were converging, showing inequalities across countries narrowing. Following the mid-1990s, inequalities slowly widened, coinciding with significant social, political and economic change in the eastern part of the Region. Since 2006, the upper and lower extremes have slowly begun to converge again.

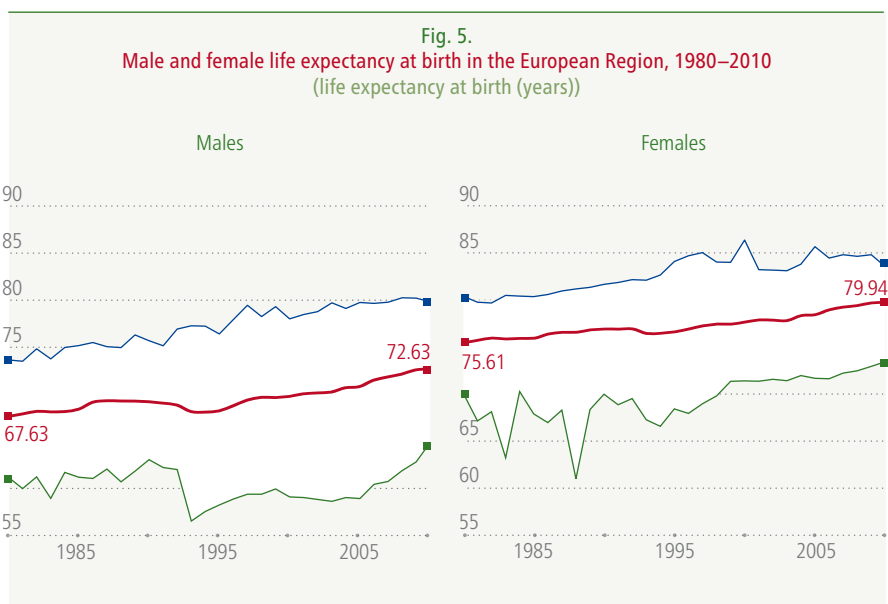
Fig. 4.
**Life expectancy at birth
in the European Region, 1980–2010**
(life expectancy at birth (years))


Source: European Health for All database (6).

Life expectancy at birth across the European Region also differs between men and women, highlighting a fundamental and persistent inequality in the Region. In 2010, women's life expectancy has reached an average of 80 years, while men are living an average of 72.5 years, giving a gap of 7.5 years. Fig. 5 illustrates that, on average, men are lagging behind women in life expectancy by a generation, as in 2010 men had not yet reached the average level women enjoyed in 1980. There are also larger inequalities across countries for male life expectancy, in comparison to female life expectancy, particularly after 1993.

Large inequalities in average life expectancy at birth are also documented across 46 countries reporting data in 2006–2010 (Fig. 6), with 26 countries above and 20 below the average for the Region. Inequalities are especially prominent when life expectancy is analysed by sex (Fig. 7). On average, the gap between countries is wider for men (17 years) than women (12 years).

With a few exceptions, inequalities in life expectancy between men and women tend to be widest in countries with lower overall life expectancy levels (for example, below 80 years for women). The smallest within-country differences by sex (4 years or less) are seen in Iceland, Israel, the Netherlands, Sweden and the United Kingdom, while male–female gaps of 10 years or more occur in Belarus, Estonia, Kazakhstan, Lithuania, Montenegro, the Russian Federation and Ukraine. This suggests that, as countries increase



their overall life expectancy, they also become more equitable, as the disparities between males and females tend to narrow, potentially challenging the view that there is a static, biological explanation for females having higher life expectancy. Reducing inequalities in life expectancy between men and women requires action on the social determinants of health, including more balanced gender norms, roles and behaviour, which enable men and women equally to obtain the highest standard of health.

Fig. 6.

Life expectancy at birth in countries in the European Region, last reported data, 2006–2010



Source: European Health for All database (6).

Fig. 7.

Male and female life expectancy at birth in countries in the European Region, last reported data, 2006–2010



Source: European Health for All database (6).

Another dimension to compare across countries is the rate of improvement. Fig. 8 documents differences in improvement in life expectancy at birth between 1995 and 2009 in countries. Progress by country in terms of percentage gains during these 14 years varied from less than 1% to more than 10%. The rate of improvement was relatively faster in the eastern and central parts of the European Region than in other areas. Women in France, Italy and Spain gained over 3 years to reach a life expectancy at birth of nearly 85 years: the highest level in the European Region. On average, women in these countries also outlived their countrymen by 5–6 years. In the same period, some countries with lower life expectancy at birth – such as the Czech Republic, Estonia, Hungary, Ireland, Israel, Luxembourg, Poland, Romania, Turkey and the United Kingdom – gained more than 5 years among either men or women. Men in some countries, however, mainly in the eastern part of Europe, lost or had only marginal gains (up to 1.4 years). Nevertheless, even though men have lower absolute levels of life expectancy at birth, they generally had larger proportional gains in 1990–2010 than women.

Life expectancy of older people

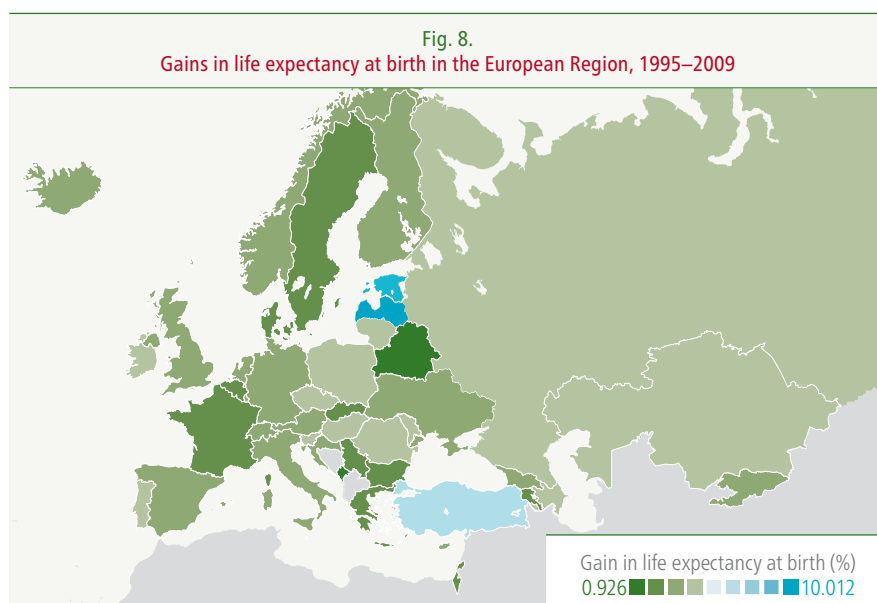
More people in the European Region are living past the age of 65. Life expectancy at 65 is 15.5 years on average in men (Fig. 9), with older women expected to outlive older men by nearly 4 years. As with life expectancy at birth, on average, men have not reached the life expectancy at 65 in 2010 that women reached in 1980. Large inequalities between men and women also exist within different countries.

Life expectancy may be further broken down to account for the length of life lived in less than full health due to disability and disease at different ages; this is a useful tool for health policy-makers. Although women in the European Region live on average 7.5 years longer than men, the average difference by sex in healthy life-years is estimated to be only 5 years, indicating that women live a smaller proportion of their lives in good health than men (10).

As a consequence of the ageing of a population, additional demands need to be met for necessary health care (particularly long-term care), which requires planning to ensure an adequately trained health workforce. At the same time, healthy older people are a repository of knowledge and a resource for their families and communities, and in

the formal or informal workforce. Monitoring the health and well-being of populations at all ages, including those over 65, and throughout life is the subject of Chapter 3.

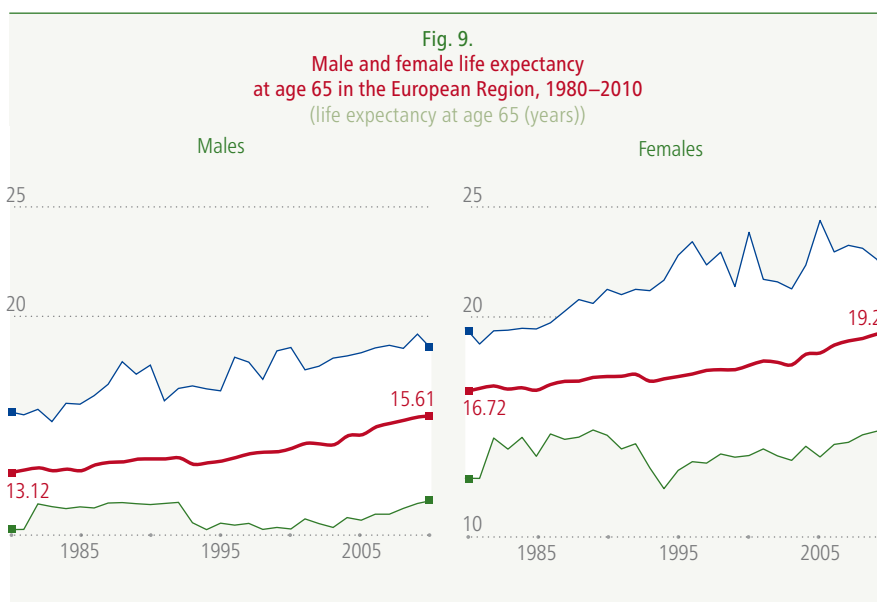
A scenario threatening the European Region's overall sustained gains in life expectancy may occur if economic or social crises are coupled with reductions in spending on health and other services and safety



Source: European Health for All database (6).

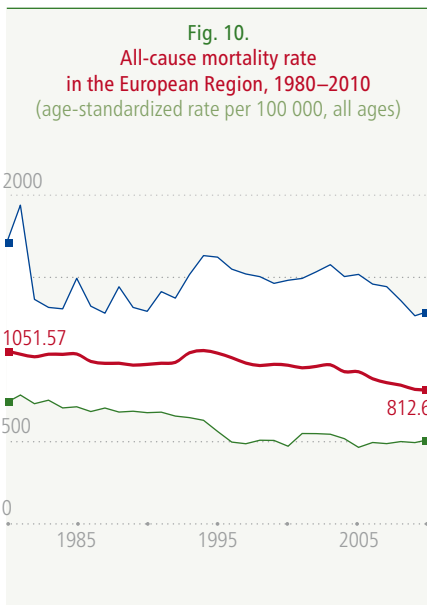
Box 3.
Life expectancy –
key messages

- A major success for the European Region is that life expectancy at birth has increased by 5 years since 1980, reaching 76 years in 2010.
- Average life expectancy at birth differs across countries, ranging from 82.2 years to 68.7 years, giving a gap of 13.5 years for 2010.
- Inequalities in life expectancy between men and women tend to be widest in countries with lower overall life expectancy levels: for example, below 80 years for women.
- In 2010, women reached an average life expectancy of 80 years while men lived an average of 72.5 years, giving a gap of 7.5 years. There are also larger inequalities across countries for male life expectancy in comparison to female life expectancy, particularly after 1993.
- More people in the European Region are living past the age of 65. Life expectancy at 65 is 15.5 years on average.



Source: European Health for All database (6).

nets, increases in environmental disasters, increasing rates of harmful behaviour or new and re-emerging infectious diseases with high pathogenic and pandemic potential. To sustain the average gains in life expectancy, continuous efforts are required to decrease mortality, particularly from diseases of the circulatory system, respiratory and infectious diseases, and external causes of injury and poisoning. The following sections describe trends in mortality across the European Region.



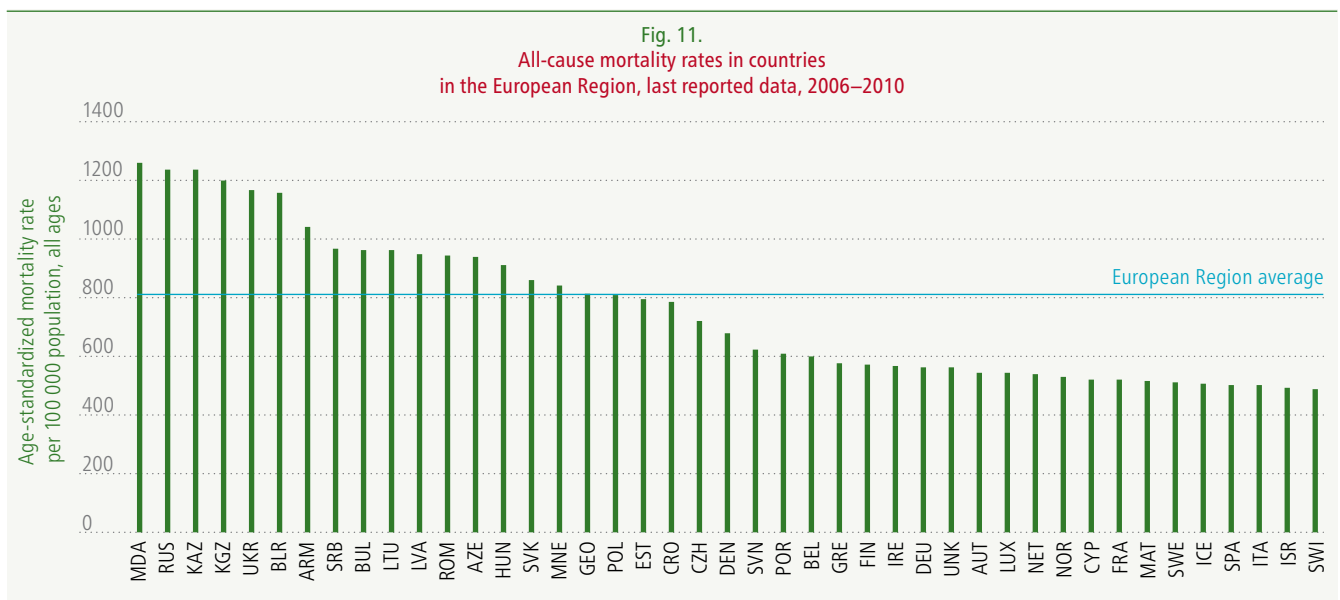
Source: European Health for All database (6).

Mortality

Mortality continues to be one of the most robust indicators for monitoring the situation and trends of disease impact in a population. With information on the magnitude, groups affected, and underlying causes and other contributing factors, more specific priorities and policies may be established to address the burden of disease and to identify cost-effective and equity-promoting strategies to decrease mortality and enhance well-being.

Overall mortality

Overall mortality from all causes of death continued to decline in the European Region, reaching an age-standardized rate of 813 deaths



Source: European Health for All database (6).

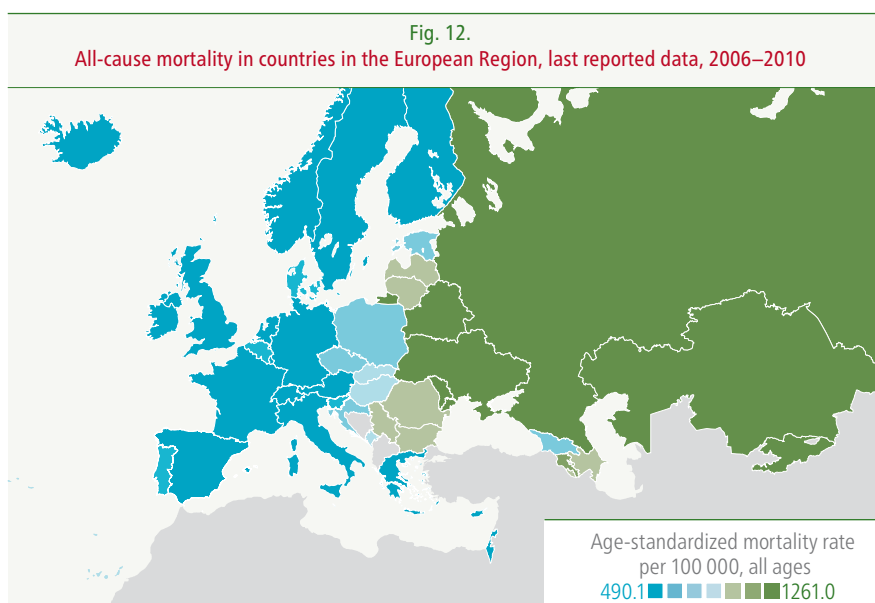
per 100 000 population in 2010 (Fig. 10). Nevertheless, variation in the Region has increased since 1993. Country-specific mortality rates range from a high of 1261 to a low of 497 per 100 000, giving a threefold inequality gap in the Region (Fig. 11).

All-cause mortality shows a geographical gradient, with the highest rates in the eastern part of the Region and the lowest towards the western part of the Region (Fig. 12).

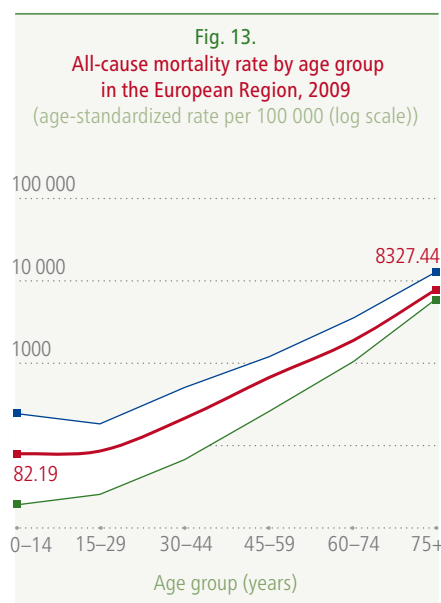
Effects by age

Mortality patterns by age in the European Region follow a J shape characteristically found in populations with more advanced demographic transitions, who benefit from higher socioeconomic development. Average all-cause mortality rates tend to be low or very low during early years of life up to young adulthood, and then rapidly increase two- to threefold across the Region, continuing to do so into older ages (Fig. 13).

A more detailed look at all-cause mortality by broad age groups between 1980 and 2010 shows that mortality rates decreased steadily, except for the well-documented increase in 1993–1995, most particularly for the group aged 30–59 years (Fig. 14). Variation in mortality rates increases for each broad age group. Country-specific differences range from less than 50% below to more than 70% above the regional average.



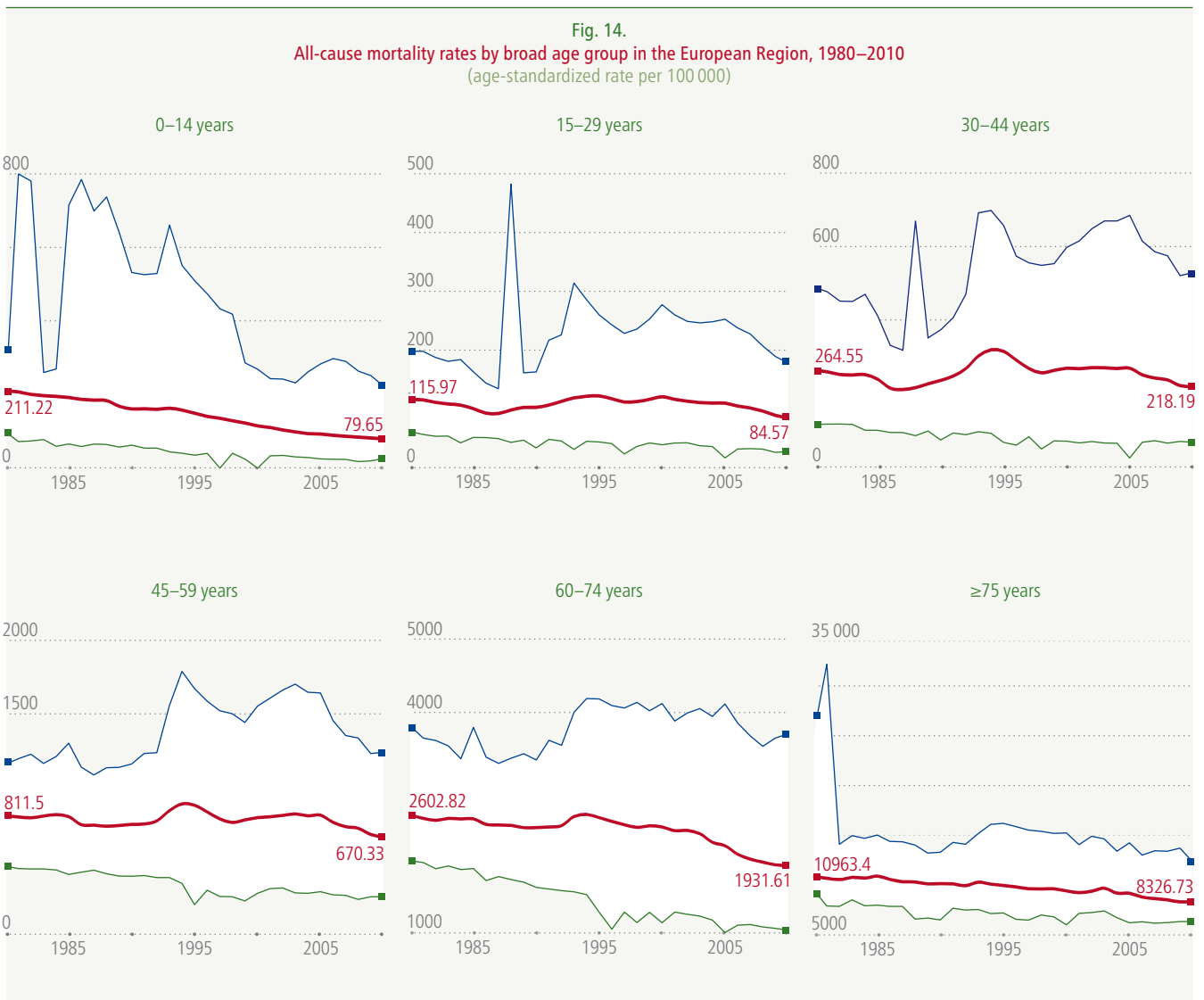
Source: European Health for All database (6).



Source: European mortality database (11).

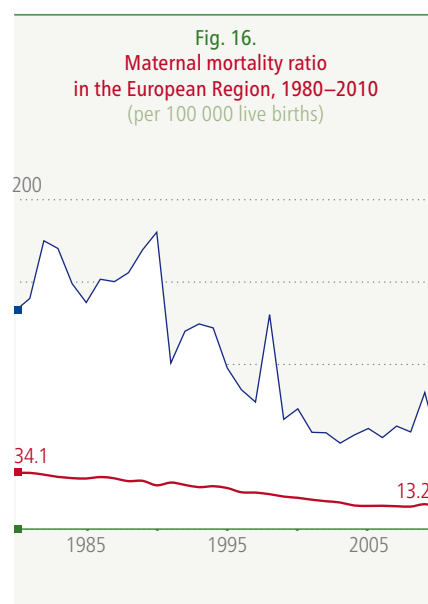
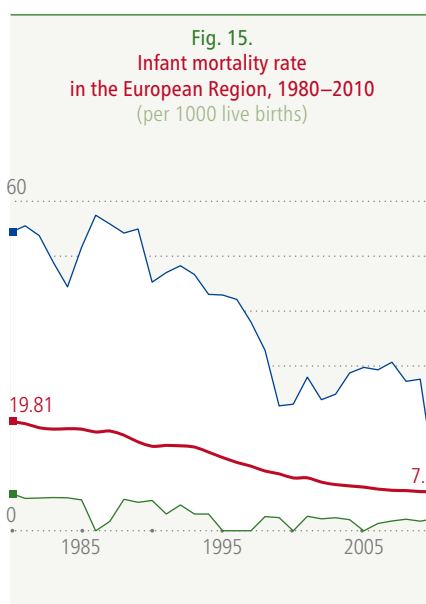
Child and maternal mortality

Indicators of child health, such as infant and child mortality, are often used to monitor health in a population. This is because of the special vulnerability of members of this age group: their sensitivity to overall living conditions and other social determinants of health, including access to health services. Infant and child mortality continues to influence life expectancy in several countries in the European Region. Child health indicators are frequently used to identify targets – such as Millennium Development Goal (MDG) 4 on reducing the mortality rate for children under 5 years by two thirds by 2015 (12) – and to measure countries' progress.



Infant mortality rates in the European Region have continued to decline since 1990 and are the lowest in the world (Fig. 15). The average reported infant mortality rate in 2010 (deaths before 1 year of age relative to live births) was 7.3 per 1000: a 53% reduction over three decades. Moreover, variations across countries have declined, particularly since 1997. Yet countries report strikingly different rates, ranging from more than 50% below to more than 60% above the regional average. Data on the probability of a child's dying before the age of 5 years (not shown) reveal a very similar pattern, with countries across the European Region reporting reductions. Most countries in the Region have made important progress towards MDG 4; only a few still have high child mortality levels. The target set seems to be within reach in most European countries.

Maternal mortality is another important indicator of population health, as well as gender equality. The maternal mortality ratio provides information on access to and the quality of health care, as it spans antenatal, delivery and post-natal care. It is also the core outcome indicator for MDG 5 (13), which aims for a three-quarters reduction in maternal mortality by 2015. The European Region's mortality ratio for 2010 was 13.3 maternal deaths per 100 000 live births. Variation is high, ranging from more than 75% above to more than 60% below the regional average (Fig. 16). Since 1990 the average maternal mortality ratio has fallen by 50%, and inequalities have narrowed. A small increase in the eastern part of the Region in 2009 could be attributed to increased vulnerability linked to pandemic



Box 4. Mortality – key messages

- While overall mortality from all causes of death in the European Region continues to decline, mortality trends show large gaps between country groups.
- Mortality by age in the Region follows a pattern in which rates tend to be low or very low during early years of life and young adulthood, after which they increase rapidly.
- Child mortality indicators in the European Region are the lowest in the world, with a rate of 7.9 per 1000 live births. Nevertheless, country rates show striking differences, ranging from 50% below to 60% above the regional average.
- The maternal mortality ratio for the Region was 13.3 deaths per 100 000 live births in 2010, a 50% reduction since 1990. Again, there is much variation across countries.
- All-cause mortality among people aged over 65 has decreased in the European Region, but countries show important differences in levels and patterns. These trends will help to anticipate some of the challenges facing health systems today and in the future.

influenza, which increased hospitalizations and severe respiratory diseases worldwide.

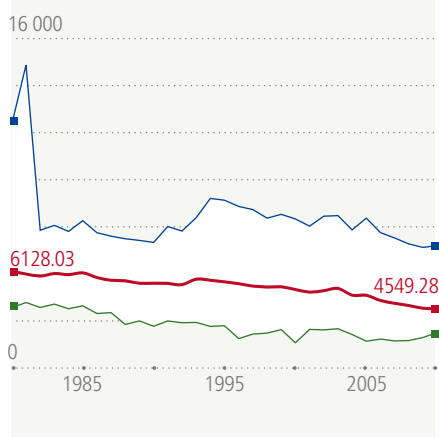
The main causes of maternal death are obstetric haemorrhage, hypertension and infection, much of which can be prevented by basic, evidence-based and cost-effective interventions (14). In addition, the socioeconomic status of women – including their level of education – clearly contributes directly to maternal mortality. This highlights the importance of addressing gender norms and other social determinants of health in policies and interventions, and of taking a human rights-based approach to providing the services needed, including emergency obstetric services without financial burden on households.

Older populations

As the European population ages, mortality trends help to anticipate some of the challenges that health and other social systems will face in the future. Trends by broad age groups, such as those aged over 65, provide greater insight into the approach that health systems will need to adjust and respond appropriately to the evolving needs. Moreover, consideration has to be given to the facts that women live longer than men yet also live a greater share of their lives in poorer health, with issues including a higher frequency of multiple diseases occurring simultaneously and higher disability rates (15). The all-cause mortality rate among people aged 65 years and over is decreasing in the European Region as a whole, reaching its lowest rate, 4549 per 100 000, in 2010: a 25% decrease since 1980 (Fig. 17). The minimum and maximum points indicate significant differences across countries, whose rates ranged from more than 20% below to more than 40% above the regional average. Close monitoring of these trends at the regional and country levels is warranted.

Fig. 17

All-cause mortality rate for people aged 65 years and over in the European Region, 1980–2010
(age-standardized rate per 100 000)



Source: European Health for All database (6).

Causes of death

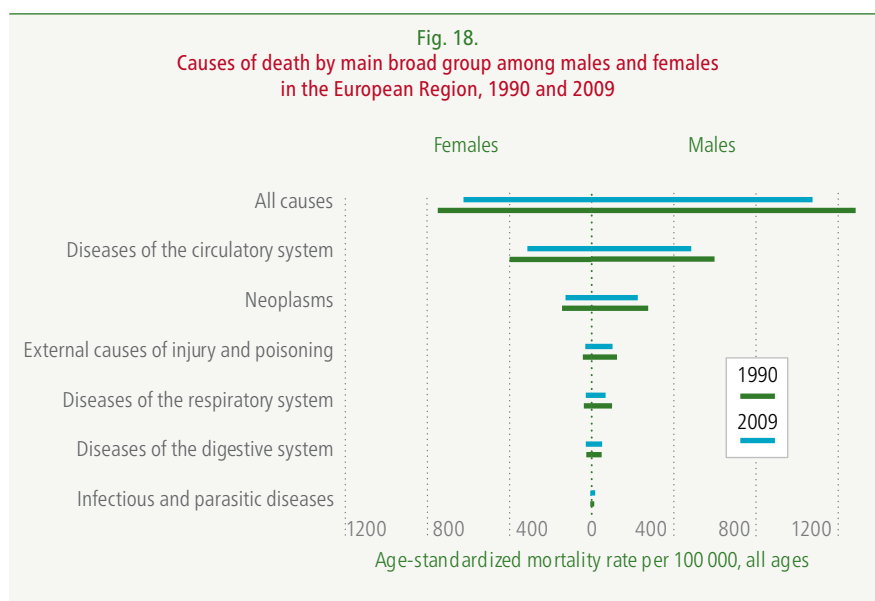
Using causes of death to disaggregate all-cause mortality data allows their distribution and magnitude in a population to be identified, providing information used for policy and programme formulation. In the European Region, disease patterns are changing and health problems emerging that are associated with its level of demographic and epidemiological change and social and economic circumstances.

Major causes

The mortality rate associated with all individual major causes – for both males and females, combining all age groups – decreased in the Region between 1990 and 2009 (Fig. 18). Noncommunicable diseases (NCDs) account for the largest share of mortality: about 80% of deaths in 2009. Among broad groups of causes, diseases of the circulatory system account for nearly 50% of all deaths, with higher rates among men than women. Proportions in countries range from less than 30% to more than 65% of all deaths. Cancer (neoplasm) mortality follows in frequency, accounting for 20% of deaths in the Region, ranging from around 5% to more than 30% in some countries. The third major cause of mortality is external causes of injury and poisoning, representing 8% of all deaths, again with variation across countries.

Age and sex profiles of causes

Mortality profiles by age and sex groups allow the relative importance of causes of death occurring at different stages across the life course to be visualized, and provide input in developing targeted strategies and interventions (Fig. 19). For example, respiratory diseases and external causes account for nearly 60% of all deaths among infants. These diseases subsequently predominate, along with neoplasms, up to just before the age of 15 years, accounting for nearly 75% of all deaths. For people aged 15–39 years, external causes are the main causes of death,



Source: European Health for All database (6).

particularly among men. Women in this same age group are more likely than men to die from neoplasms. Diseases of the circulatory system and neoplasms play an increasing role during adulthood until older ages, accounting for nearly 80% of deaths.

Table 1 illustrates the variation and pattern of mortality by the six broad causes of death for each country in the European Region reporting recent data. The next section examines a range of specific causes of mortality across the Region in greater detail.

Fig. 19.
Mortality profiles by cause of death, age and sex
in the European Region, last reported data, 2006–2010

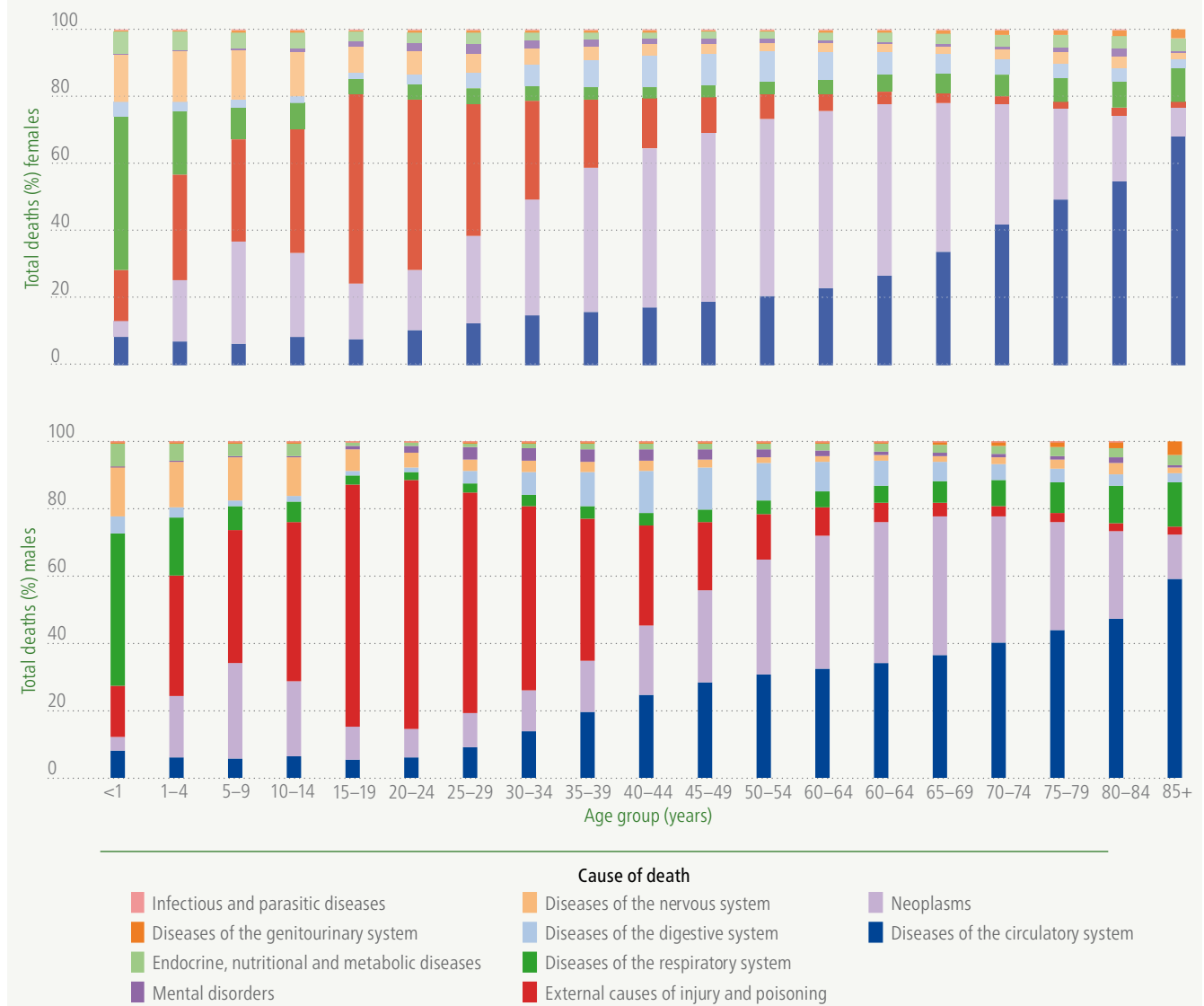


Table 1.
Mortality rates by main broad group of causes of death
in countries in the European Region, last reported data, 2006–2010

Country	Age-standardized mortality rate per 100 000 population, all ages					
	Diseases of the circulatory system	Neoplasms	Diseases of the digestive system	Diseases of the respiratory system	External causes	Infectious and parasitic diseases
Ukraine	732.7	158.2	51.4	33.5	88.4	30.4
Republic of Moldova	715.2	164.1	118.6	69.6	97.3	18.8
Kyrgyzstan	692.7	109.2	78.1	97.1	80.9	21.8
Russian Federation	683.0	180.4	56.6	49.7	147.2	22.5
Kazakhstan	626.4	156.6	58.0	64.6	114.6	19.4
Bulgaria	604.9	157.5	31.6	38.2	35.0	6.4
Belarus	587.2	162.9	43.1	34.8	133.6	11.2
Azerbaijan	551.6	87.6	60.4	55.9	28.6	5.6
Romania	539.8	179.8	58.0	49.0	53.3	10.1
Armenia	532.2	189.9	56.1	73.4	39.4	9.1
Serbia	506.6	205.9	32.4	35.3	42.8	4.0
Lithuania	496.8	193.0	56.3	35.6	115.8	11.9
Latvia	479.5	194.8	37.4	22.7	86.7	11.5
Georgia	476.0	92.2	21.8	14.8	27.3	5.3
Montenegro	460.8	128.7	20.0	35.5	35.2	0.9
Slovakia	446.6	198.9	49.8	49.4	51.0	4.9
Hungary	421.2	246.4	65.6	43.4	59.0	3.3
Estonia	408.3	187.9	35.6	21.8	76.3	7.6
Croatia	370.8	210.8	39.7	27.9	52.7	5.3
Poland	356.3	207.6	37.0	40.1	57.6	5.4
Czech Republic	344.1	198.2	34.2	40.2	48.1	3.4
Greece	244.6	153.6	14.5	49.5	29.6	4.6
Slovenia	231.8	199.8	40.7	35.4	59.9	3.0
Finland	213.6	138.2	32.6	21.3	60.5	4.2
Germany	208.7	162.5	30.3	37.0	27.9	9.1
Austria	206.6	159.5	25.3	27.7	37.3	4.7
Denmark	193.5	212.6	38.5	60.6	39.0	9.6
Cyprus	191.6	118.8	14.3	35.9	33.2	4.1
Ireland	191.6	181.8	22.5	65.2	29.4	3.5
Malta	189.3	153.9	16.0	47.1	24.8	0.9
Luxembourg	186.2	157.7	26.4	39.8	43.5	15.8
Belgium	182.7	175.0	27.6	60.2	49.0	13.4
Sweden	182.2	145.4	16.7	27.3	35.4	7.9
Portugal	177.6	158.3	29.3	60.5	33.0	17.1
Italy	173.8	168.0	21.4	28.6	27.4	7.7
Iceland	172.8	157.2	14.0	39.4	34.7	2.8
United Kingdom	169.2	175.9	31.7	69.6	27.5	7.0
Switzerland	161.4	149.1	20.5	27.3	37.7	5.5
Norway	151.8	159.8	16.1	45.3	39.1	9.2
Netherlands	146.7	186.7	20.6	48.1	25.4	7.9
Spain	143.1	157.7	26.6	50.2	24.4	9.8
France	126.1	174.5	24.7	27.6	44.4	9.9
Israel	121.3	143.9	16.9	36.1	26.0	18.3

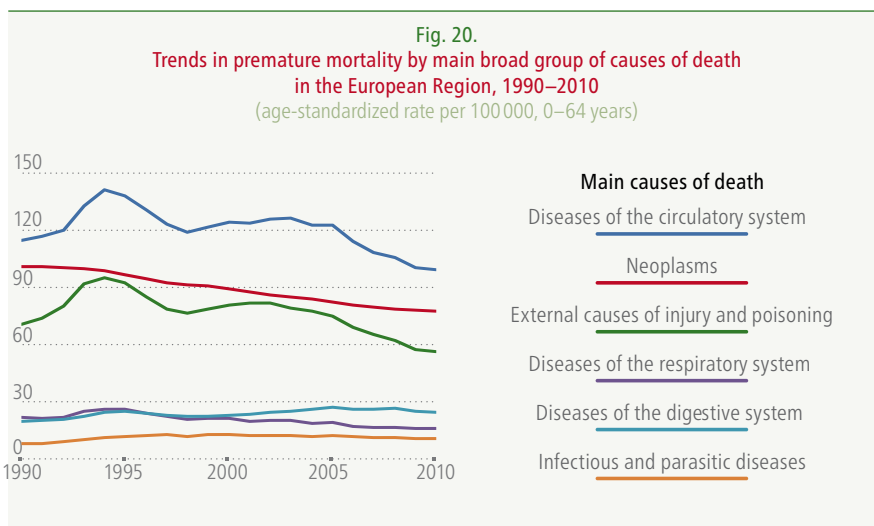
Source: European Health for All database (6).

Specific causes

More than 70% of mortality occurs at ages over 65 years, when people have been ill for several years. Assessment of premature mortality (deaths occurring before the age of 65 years) is informative for developing public health priorities, policies and programmes aiming to delay disease and the onset of disability.

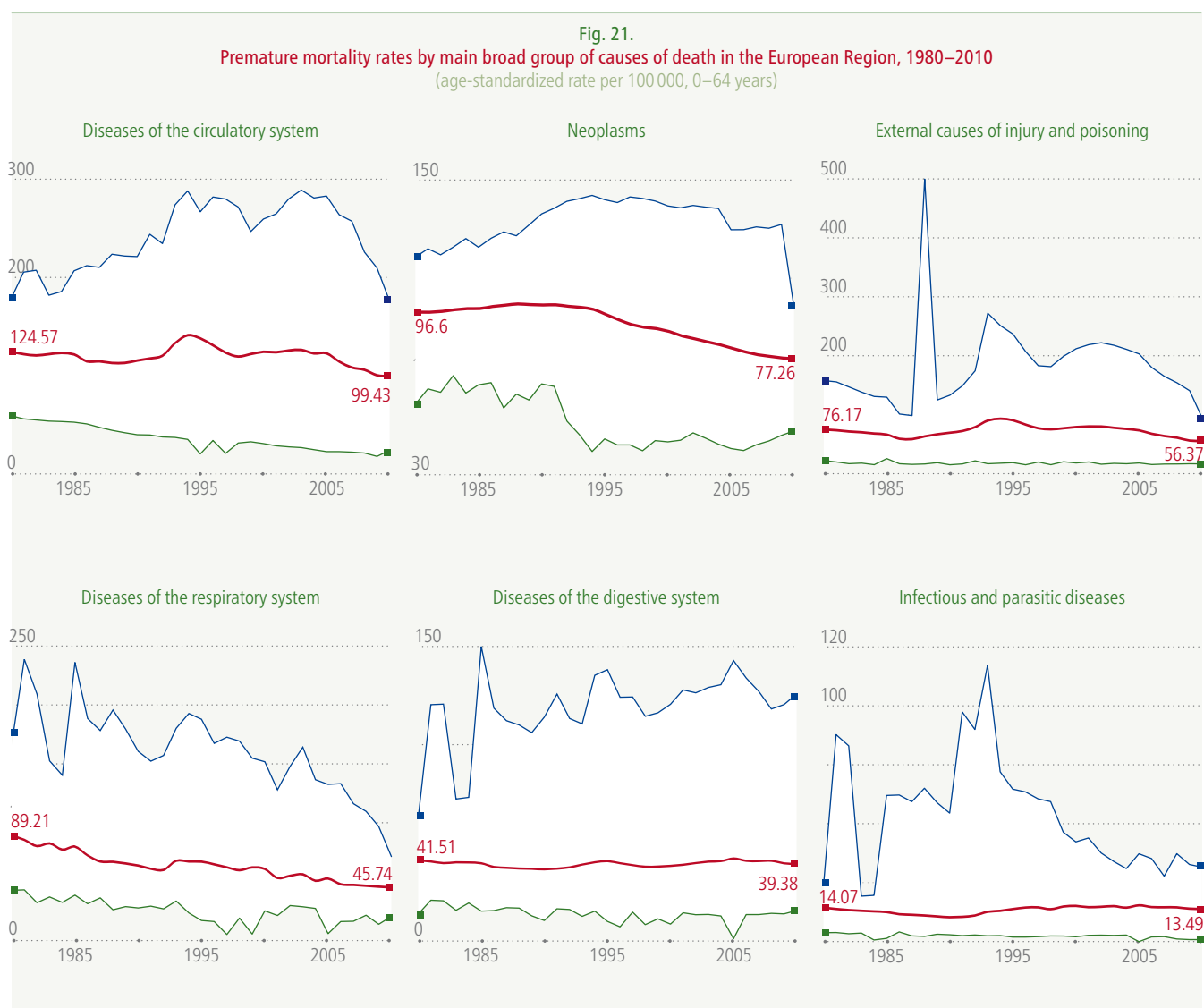
The trends show that diseases of the circulatory system have remained the most important cause of premature death in the European Region, with a rate approaching 100 per 100 000 population in 2010. The highest level in the past 20 years was recorded in 1995, after which there was a 30% decrease (Fig. 20). The cancer rate also decreased by 20% in this period. The largest health gains have been observed in external causes, the rate of which declined by 40% since 1990. In contrast, rates of infectious and parasitic diseases increased by nearly 30% since a 1990 low, while diseases of the digestive system showed almost no change, although they are less frequent than the others. The variations over time in both diseases of the circulatory system and external causes could well be related to increased stress and economic difficulties experienced in some countries in the Region (Fig. 21).

Premature mortality for the main causes of death has shown decreasing trends over the past 30 years, with the exception of diseases of the digestive system and infectious and parasitic diseases. Premature mortality from cardiovascular disease varies widely across the Region; that from cancer varies less, and the following sections further discuss these trends.

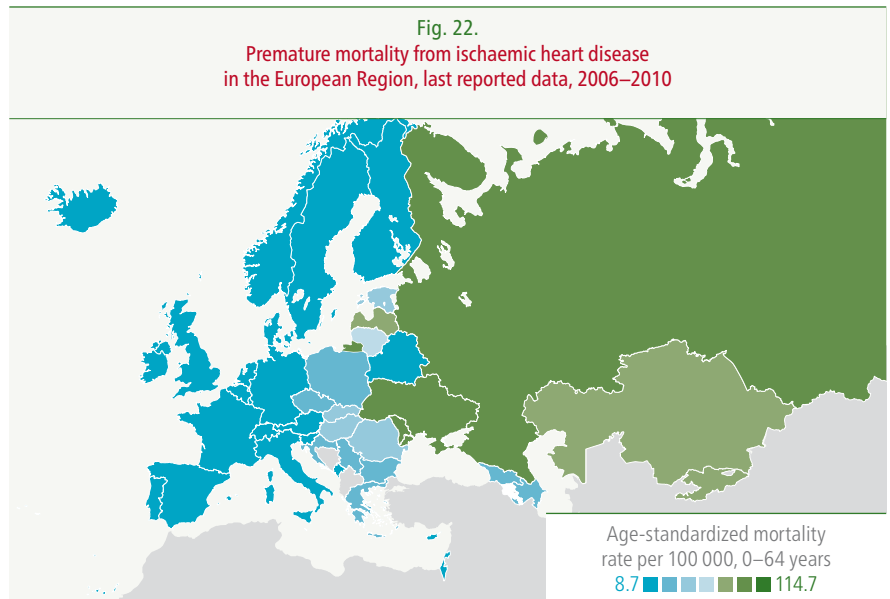


Diseases of the circulatory system

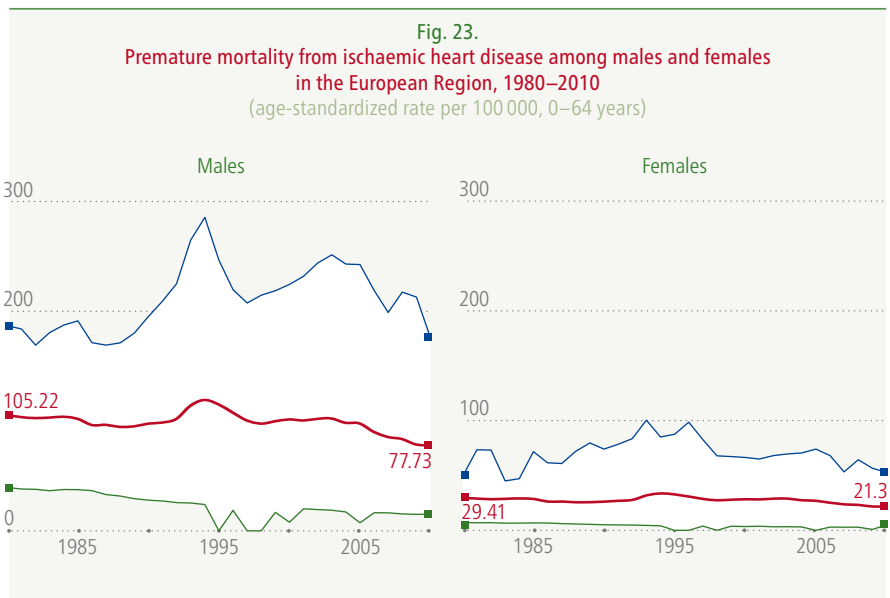
The main diseases of the circulatory system are ischaemic heart and cerebrovascular diseases, which together account for 35% of all deaths in Europe. The most recent data indicate that the mortality rate for diseases of the circulatory system varies widely between countries in the Region (Fig. 22), and by age, sex and the distribution of important determinants. For example, the European regional average rate of premature mortality from ischaemic heart disease is 47.5 per 100 000, but within individual countries the rate can be about five times higher for men than women (Fig. 23). For men, the maximum rates are nearly 13 times the minimum country values.



Although premature mortality from ischaemic heart disease is generally decreasing, in some eastern countries in the Region the rate is decreasing more slowly, stagnating or – worryingly – slightly increasing. Premature mortality from cerebrovascular diseases shows similar patterns and trends in the Region. Evidence indicates that this challenge can be improved by countries' addressing a combination of preventable factors, including high alcohol intake and binge drinking, increasing stress levels and reduced social support.



Source: European Health for All database (6).



Source: European Health for All database (6).

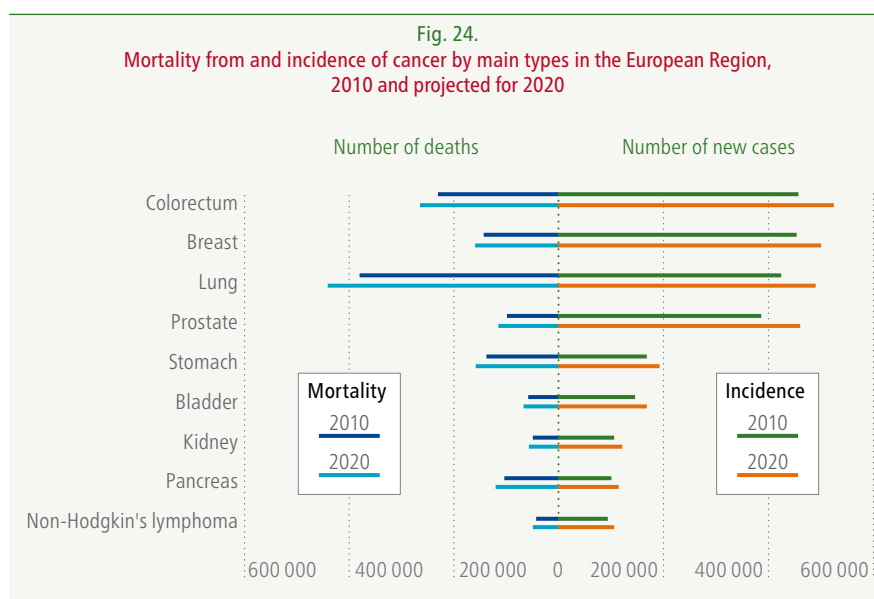
Moreover, a global assessment has documented that almost 50% of the burden of these diseases may be attributed to high blood pressure (≥ 115 mm Hg systolic) (17). Broad social and economic determinants of health, such as economic downturns, exacerbate these risk factors. Coordinated policies and interventions need to consider these factors and address a combination of determinants (such as obesity, high salt intake and physical inactivity) as priorities for improving overall health and well-being and reducing premature mortality from diseases of the circulatory system.

Cancer

General situation

Cancer is the second leading cause of mortality in countries in the European Region. According to the latest available data, neoplasms account for nearly 20% of all deaths in the Region. The mortality and incidence patterns vary according to the type of cancer, with lung and colon neoplasms having the highest overall mortality (Fig. 24).

Specifically, lung, colon, stomach and prostate neoplasms account for nearly 50% of cancer deaths among men, while breast, lung, stomach, colon, cervical and ovarian neoplasms account for 60% of deaths among women. Reported cancer incidence data are sparser than mortality data, but are needed to calculate case fatality (see below). In



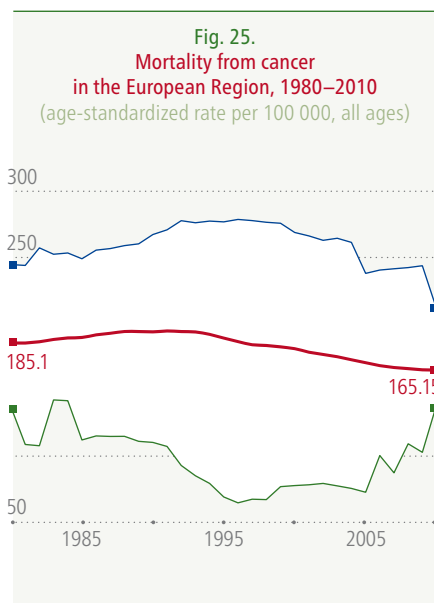
Source: European Health for All database and GLOBOCAN (6, 18).

2008, GLOBOCAN (18) indicated that around 2.5 million new cancer cases occur every year in Member States of the European Union (EU) – countries representing about 55% of the European Region's total population.

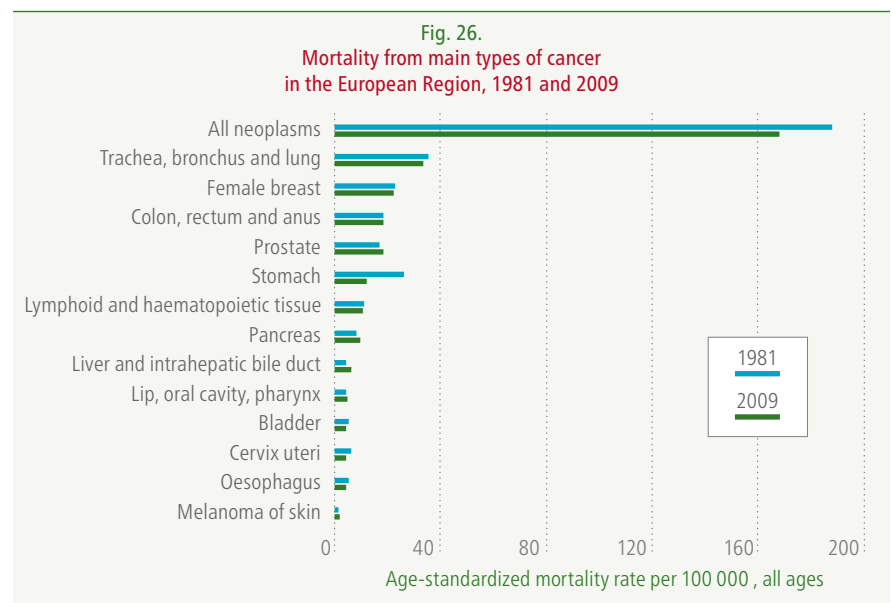
Across the Region, neoplasms with the highest incidence include those of the lung, female breast, colon and prostate, and their rates are expected to increase further by 2020. According to the Health for All database (6), overall cancer incidence in the European Region is 379 cases per 100 000, translating into a 32% increase since the mid-1980s. Incidence has almost doubled in some parts of the Region.

The overall increase in cancer incidence reflects the changing profile of causes of death resulting from the sustained reduction in mortality from diseases of the circulatory system, as well as the gain in life expectancy (see above). People are living longer, and most neoplasms develop over an extended time with a long latency period; this context has contributed to the increasing incidence. Moreover, neoplasms have replaced diseases of the circulatory system as the leading cause of premature death in 28 European countries, primarily in the western part of the Region.

In general, overall cancer mortality in the Region has shown a decreasing trend since the mid-1990s, with a 15% reduction to 2009 (Fig. 25). The regional average is 168 per 100 000, with a continued



Source: European Health for All database (6).



Source: European mortality database (11).

narrowing of differences since 2005. In terms of age and sex patterns, cancer mortality rates increase almost exponentially from 30 years of age onwards, and men experience higher rates than women at all ages. The risk for men is 50% greater by the age of 60 years and 100% greater (twice as high) by 65.

Case fatality

Combining mortality and incidence rates provides a crude estimate of case fatality, which is an indicator of survival from cancer after being diagnosed and provides insights into the effectiveness of disease screening, diagnosis and care. For lung cancer, the case fatality rate (mortality rates over incidence) for selected European countries was collectively 86% in 2008. Countries showed fairly consistent high case fatality rates, suggesting that there is no effective treatment or means to delay death after diagnosis with lung cancer. Five-year survival estimates from a recent EUROCARE-4 report (19) showed no major changes in low survival rates (below 10%) over a ten-year period, supporting this hypothesis.

There is a contrasting picture for female breast cancer, which shows an average case fatality rate of 30%. The EUROCARE-4 study (19) indicates that five-year survival is relatively high and increased from 74% to 83% over a ten-year period. In spite of different incidence levels in countries, mortality tends to be similarly low, suggesting the effectiveness of schemes for early diagnosis and treatment of breast cancer.

Main types of cancer

Mortality rates by main types of cancer among women and men indicate that lung cancer (which is highly preventable, as the main cause is tobacco smoking) is responsible for the greatest number of deaths in the European Region, followed by colon and stomach cancers (Fig. 26). The overall mortality rate for lung cancer was 17 per 100 000 in 2009, with variation across the Region. Proportionally, lung cancer is 2–3 times more frequent than colon cancer. Among females, breast cancer is responsible for the greatest number of deaths, with average mortality rates of 14 per 100 000, followed by cervical and ovarian cancers. Breast cancer rates appear relatively uniform across the Region.

Types of cancer affecting men and women

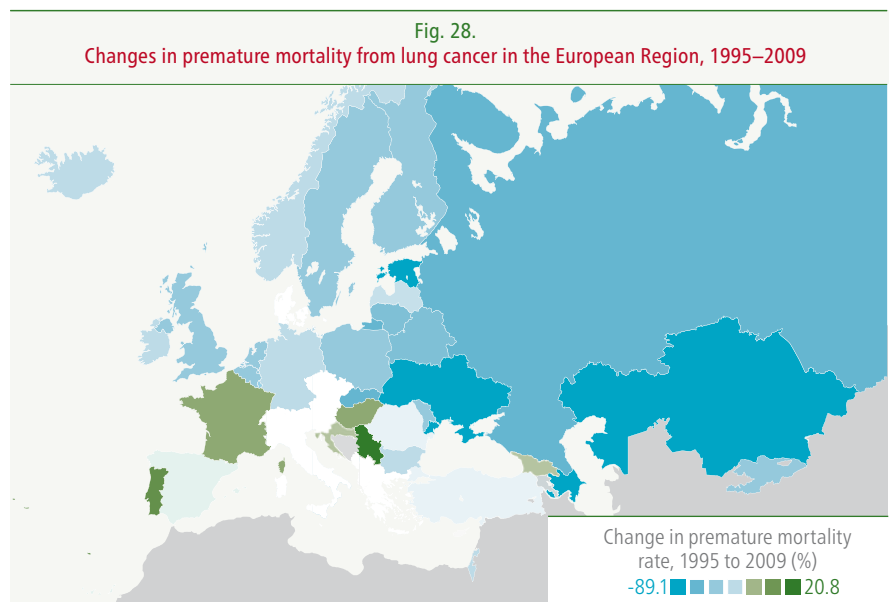
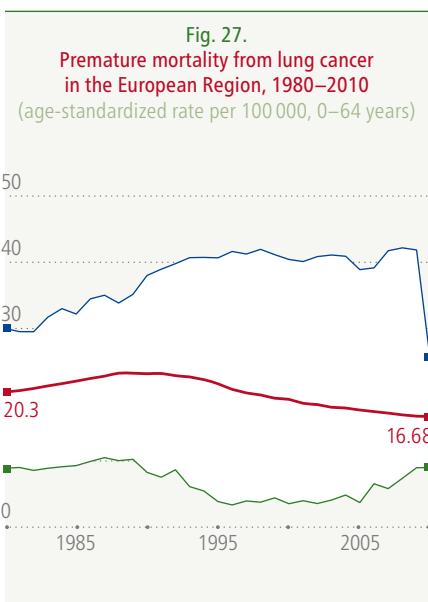
The trend for average premature mortality (deaths occurring before the age of 65 years) from lung cancer in the Region has two distinct

periods: an increase in 1980–1990 and subsequently a gradual decrease. Nevertheless, variation is substantial, as some countries experienced rates twice the regional average until recently (Fig. 27).

Moreover, countries reported substantial decreases between 1995 and 2009, particularly in the eastern part of the Region (Fig. 28), although rates continue to increase in some. On average, rates are decreasing for men but stagnating or increasing for women. Nevertheless, overall premature deaths from lung cancer remain more than twice as high for men in the Region (Fig. 29).

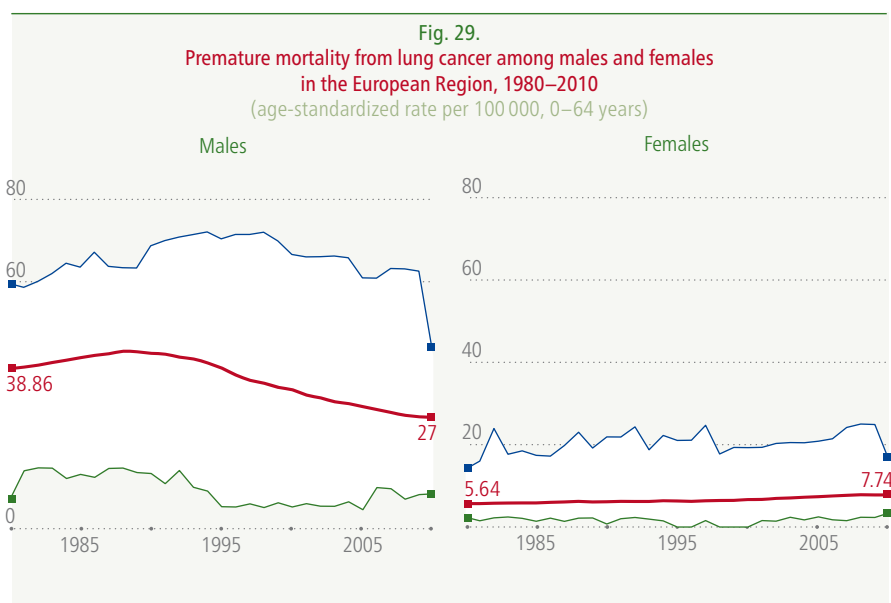
At the country level, mapping premature mortality from lung cancer across the Region shows that the highest rates are found in central Europe (Fig. 30), where rates are over 25 per 100 000. Higher rates are also associated with higher prevalence of tobacco smoking, which in turn is determined and shaped by the affordability of tobacco products, limited restrictions on advertising (among other marketing strategies) and other national policies that do not consider public health priorities.

Other, less prevalent but important forms of cancer include those of the stomach, colon and liver. In comparison to lung cancer levels and trends, these types of cancer present more diverse patterns and greater inequality across the Region (Fig. 31). Second to lung cancer, premature mortality from colon cancer declined marginally from its highest levels in the early 1990s to 7 per 100 000 in 2010; the decrease is an example of the reversal of an increasing trend during the 1980s with measurable

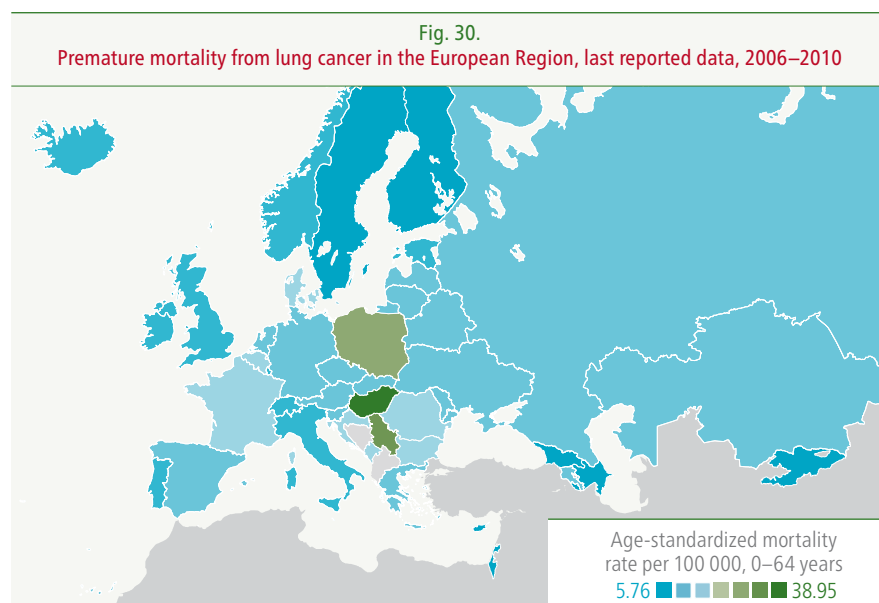


improvements. The contributory factors include the effects of screening, earlier diagnosis and more effective treatment schemes. Ensuring that the benefits of these practices are available across the European Region is one priority in the fight against premature mortality.

Turning to the overall pattern of stomach cancer, since 1980 the Region has had steady and sustained reductions of nearly 60%, resulting in a premature mortality rate of 5 per 100 000 in 2009. Progress may be



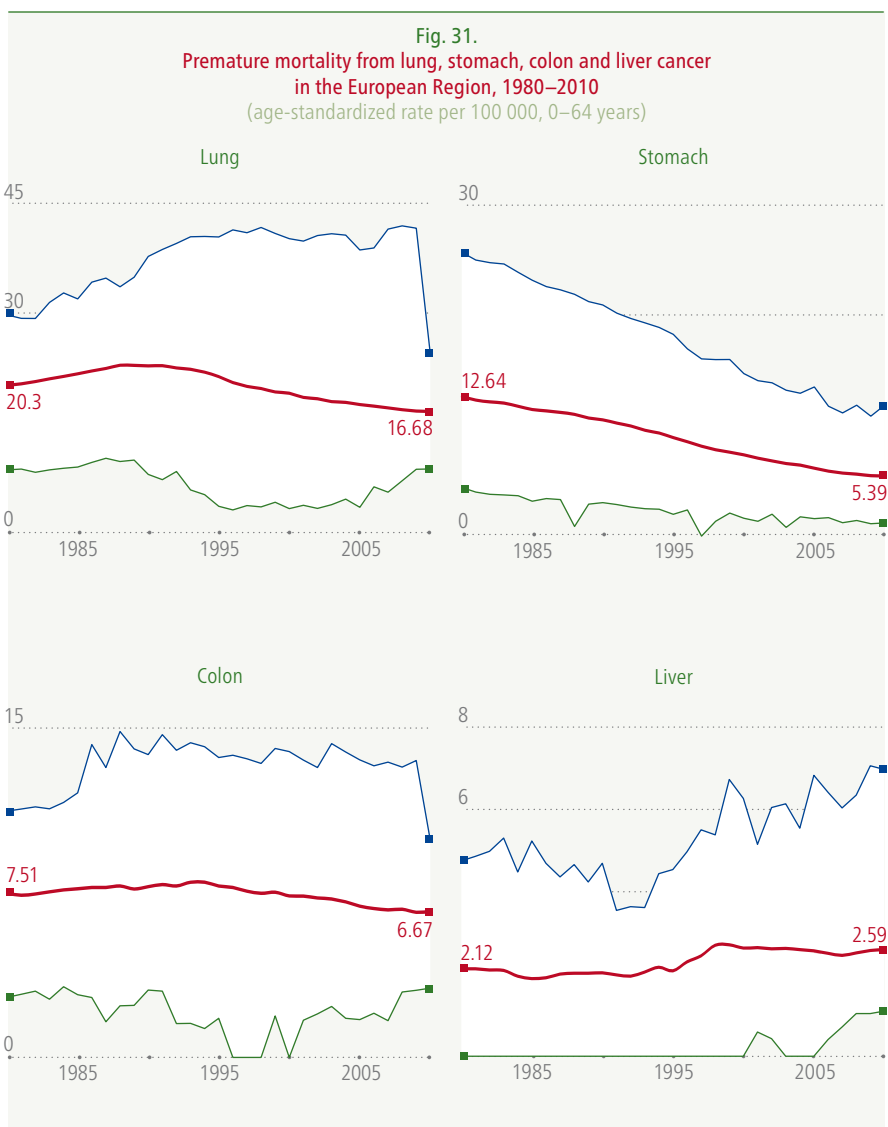
Source: European Health for All database (6).



Source: European Health for All database (6).

attributed to the reduced consumption of some carcinogenic products (such as nitrates) and the discovery and treatment of *Helicobacter pylori*, a pathogen that facilitates carcinogenesis. Despite variation, countries in the eastern part of the Region have made significant progress and are converging towards rates found in the central and western parts.

Liver cancer, however, shows a different pattern. Although the absolute level is lower, premature mortality is increasing – particularly since 1995 – reaching an overall rate of 3 per 100 000 for the European Region, with country-level trends beginning to move towards convergence. Verifying



Source: European mortality database (11).

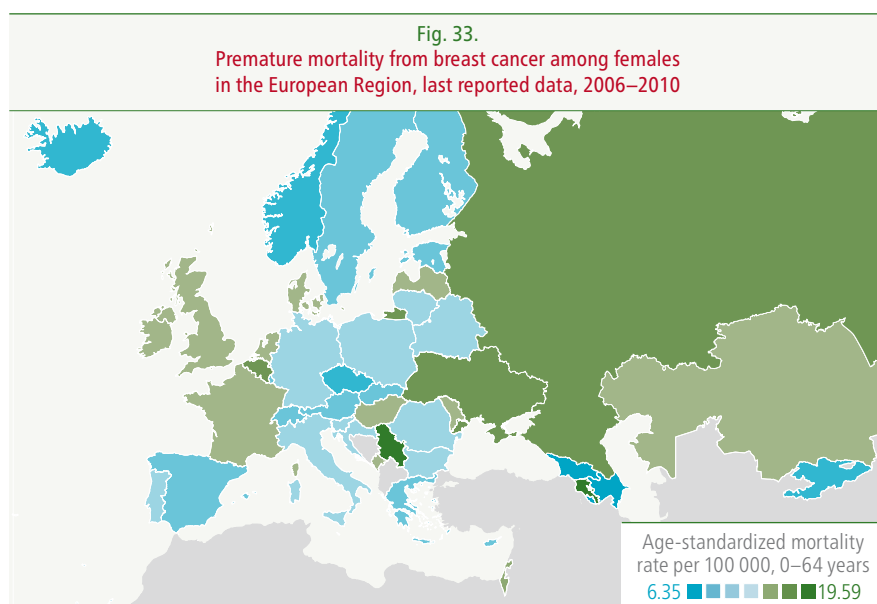
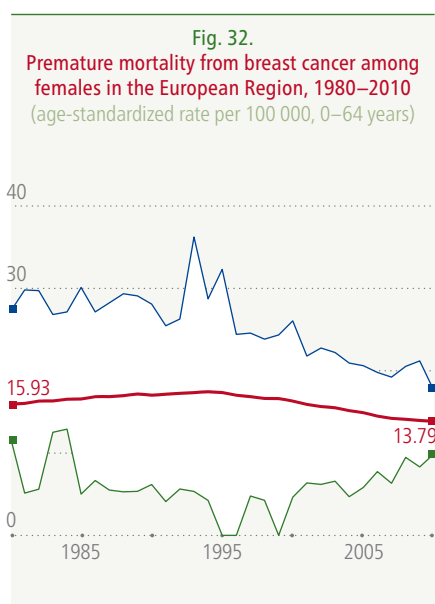
whether this is an effect change due to diagnosis or classification codes will require additional assessments of associated conditions and risk factors, such as the patterns of chronic liver disease and alcohol consumption.

Types of cancer affecting women

Breast cancer is responsible for the highest cancer mortality rate among women, with relatively uniform rates across the Region. This remains the case, although overall premature mortality rates in the Region have decreased to a level of 14 per 100 000, an important reduction of 21% since the peak in around 1995 (Fig. 32).

According to the latest reported data, mortality trends are converging, though some additional effort must be made in the eastern part of the Region to align with the others. Innovations in medical technology (including diagnosis, treatment and surgical procedures), combined with greater access to these innovations, have led to reduced mortality in spite of high incidence: that is, lower case fatality rates. As with colon and stomach cancers, this represents an important success for the health sector and for wider public health actions, including those of many nongovernmental organizations.

The distribution of premature breast cancer mortality rates at the country level shows a different pattern from other diseases (Fig. 33), with lower rates in the southern and northern parts of Europe, possibly



associated with some cultural and genetic factors. The gap between the highest (20 per 100 000) and lowest (6 per 100 000) country mortality rates represents a threefold difference in the risk of women dying from breast cancer.

Tackling cervical cancer – an important component of women's health programmes in the Region – is an unfinished item on the health agenda. Knowledge and health technology to screen for, diagnose and treat this form of cancer are affordable and potentially available today, yet cervical cancer continues to occur and kill. This context is associated with a range of social determinants of health, including inequalities in access to health services, that lead to inequities in health outcomes. Nevertheless, universal policies addressing cervical cancer have shown an impact in countries: premature mortality trends at the regional level indicate that some level of control has been achieved. The most recent data show an average age-standardized mortality rate of 4 per 100 000 (Fig. 34). Nevertheless, wide variation exists, indicating that continual sharing of best practices across the Region, as well as adaptation for implementation to different contexts, is warranted.

External causes of injury and poisoning

Overall situation

External causes of injury and poisoning are also important causes of mortality in the European Region, responsible for 9% of all deaths. They comprise a constellation of causes, including transport and motor vehicle accidents, falls, suicides and homicides. By definition, deaths from these causes are all premature and avoidable. Some argue against the use of the word “accidents”; for example, most transport crashes reflect a lack of policies or their implementation. In contrast to other causes of premature mortality previously described, examining the specific causes by all ages (across the life course) is vital. Moreover, mortality-related indicators are useful in providing information on environmental safety and security conditions, as well as the levels and trends of some harmful behaviour in the population. As indicated above (see Fig. 19), mortality rates for external causes are higher among men than women, and disproportionately concentrated during the most economically productive stage of life.

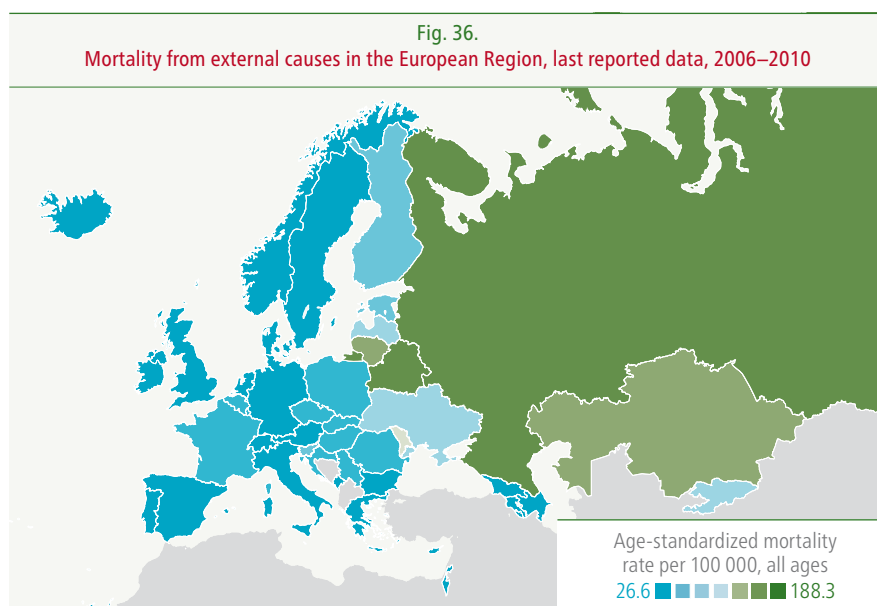
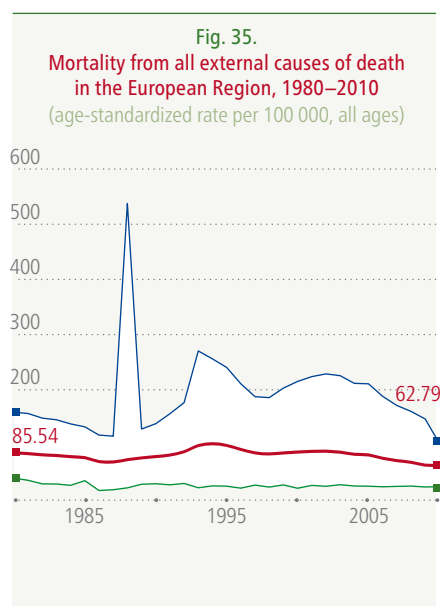
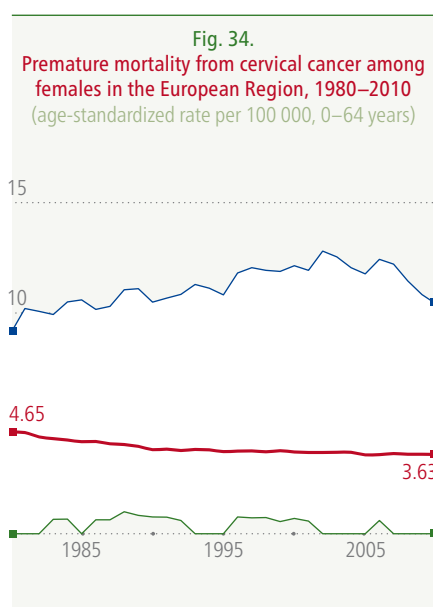
Mortality from all external causes in the European Region reached 63 per 100 000 in 2010, having decreased by 20% since 1990 (Fig. 35).

As noted in Box 1, spikes reflect natural disasters or man-made catastrophes. Nevertheless, the most recent data show that significant variation remains at the country level, from less than 27 per 100 000 to more than 180 per 100 000, a sevenfold disparity (Fig. 36). Socioeconomic downturns are important social determinants of the mortality from external causes.

Main types

In order of frequency, accidents (transport and motor vehicle, poisoning, falls, drowning, and exposure to smoke and fires), suicide and self-harm, and homicide and assault dominate mortality from external causes in the European Region. Reductions were documented between 1980 and 2009 (Fig. 37), but there are significant differences across countries. For example, mortality rates from suicide, drowning, transport accidents and homicide are significantly higher (up to 1.5 times greater) in the eastern part of the Region, whereas falls are on the rise in the western part.

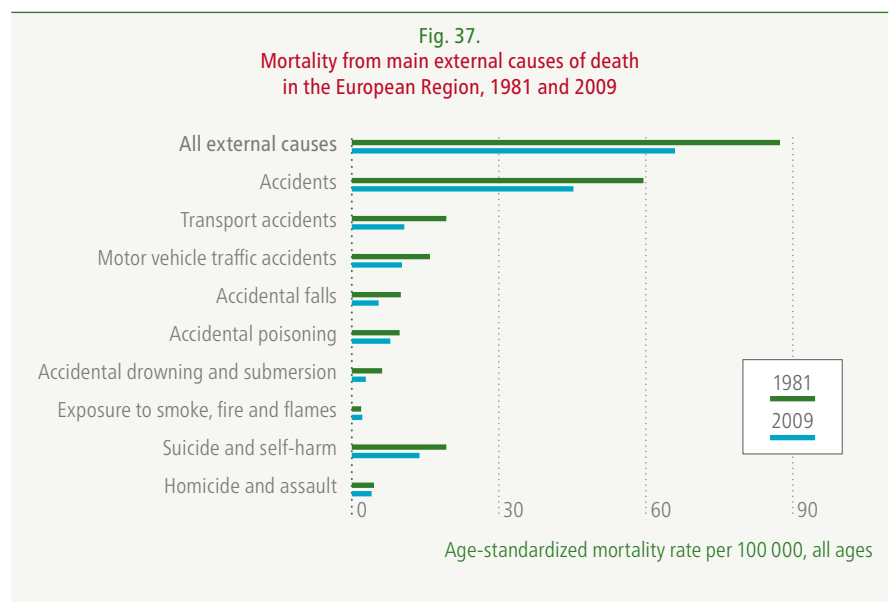
Monitoring mortality trends for the main external causes provides additional useful information on the impact of social determinants of health. For example, suicide rates – one of the only indicators of mental health in the Health for All database – have decreased by 25–40% across Europe. Nevertheless, the rate of reduction has slowed since 2008, with some countries experiencing a reversal.



Increasing suicide rates are often the tip of the iceberg, and do not necessarily represent a much broader range of psychological and neuropsychiatric conditions and their overall burden of disease. Moreover, other severe consequences for health are usually associated with economic downturns. This situation merits close monitoring and timely interventions to mitigate the potential psychosocial effects of lower income and unemployment, and processes that exclude different groups or individuals. Chapter 3 discusses approaches to monitoring broader components of health and well-being more fully.

Another important contributor to deaths from external causes is mortality from transport and motor vehicle accidents. Rates from these causes provide information on road safety (including infrastructure conditions), the effectiveness of protective measures and the enforcement of regulations in each country. At the European level, the rates of road traffic accidents with injuries have marginally decreased over the past three decades, and the rates of accidents involving alcohol are decreasing across the entire Region (Fig. 38), despite fluctuations at the country level.

Overall, the trends in external causes of death call out for specific strategies and more targeted health interventions, including intersectoral or joined-up policies and implementation strategies (for example, from the transport, justice, labour and financial sectors). Best practices can be scaled up within countries and shared between them to tackle deaths from external causes from a European perspective.



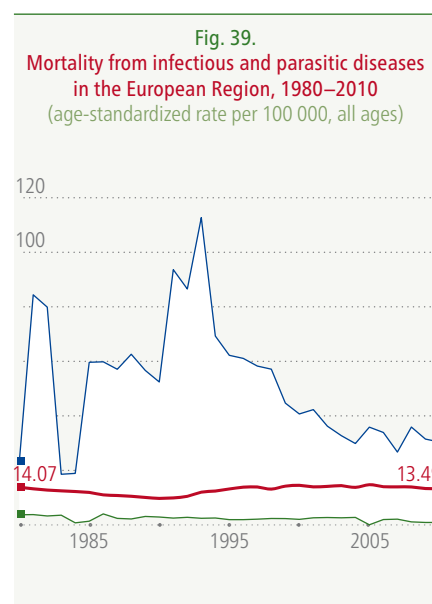
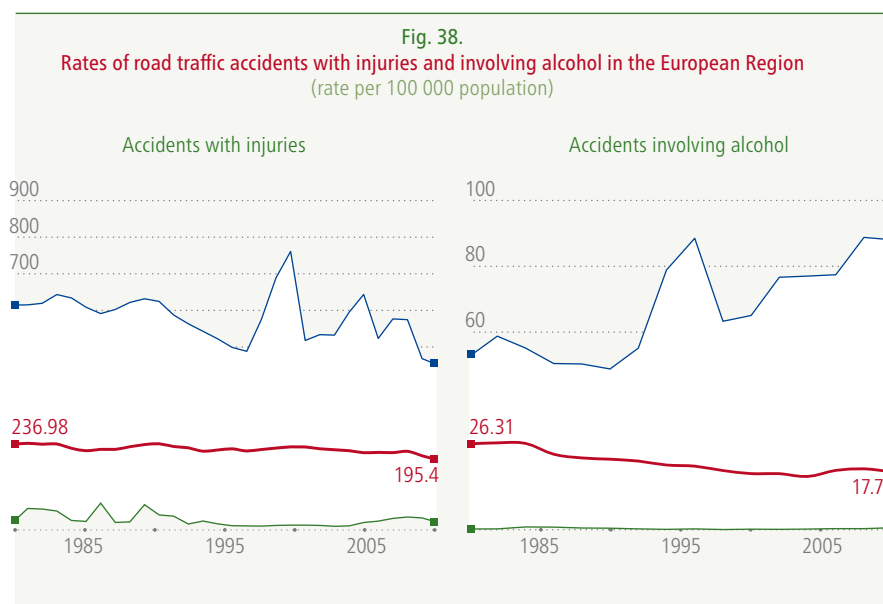
Communicable diseases

Major aspects

Communicable diseases occur less frequently in the European Region than in other parts of the world. Nevertheless, their unexpected emergence or re-emergence – combined with the fast propagation and epidemic potential of some – contributes to avoidable illness, premature mortality and their potential threat to health. Preparedness for communicable diseases therefore remains high on the health agenda. Additional factors, such as increased population mobility and trade, concomitant infections and increased antimicrobial resistance, further compound their occurrence, spread and threat.

In the European Region, concern currently focuses on tuberculosis, HIV/AIDS, other sexually transmitted diseases and viral hepatitis. Recent outbreaks of poliomyelitis, rubella and measles in different parts of Europe, however, have also re-emphasized the need to sustain or improve public health activities, such as surveillance and prevention of communicable diseases, involving health promotion and immunization.

According to reported data from across the European Region, mortality from all infectious and parasitic diseases slowly increased in the last two decades, from 10 per 100 000 in 1990 to 14 per 100 000 in 2010 (Fig. 39),



with significant variation: from less than 50% below to more than 50% above the regional average. Further assessment, using information from the European detailed mortality database (16), suggests that in some countries this may be attributed to increased mortality from septicaemia, particularly among older people. In addition, methicillin-resistant *Staphylococcus aureus* may play a role in this situation, although confirmatory studies are needed. Nevertheless, this highlights the increasing importance of antimicrobial resistance as very relevant to the European Region.

Tuberculosis

Tuberculosis (TB) is among the most significant infectious and parasitic diseases, representing over 40% of mortality within this group of causes in the European Region. Following increases in the 1990s, mortality rates for TB decreased by 30%, reaching a rate of 6 per 100 000 in 2010. Nevertheless, there is significant variation across the Region (Fig. 40). In the eastern part of the Region, after 10 years without change, an encouraging decreasing trend has recently been documented. TB incidence rates indicate that the risk of transmission has also decreased since 2000, to 35 new cases per 100 000 (Fig. 41).

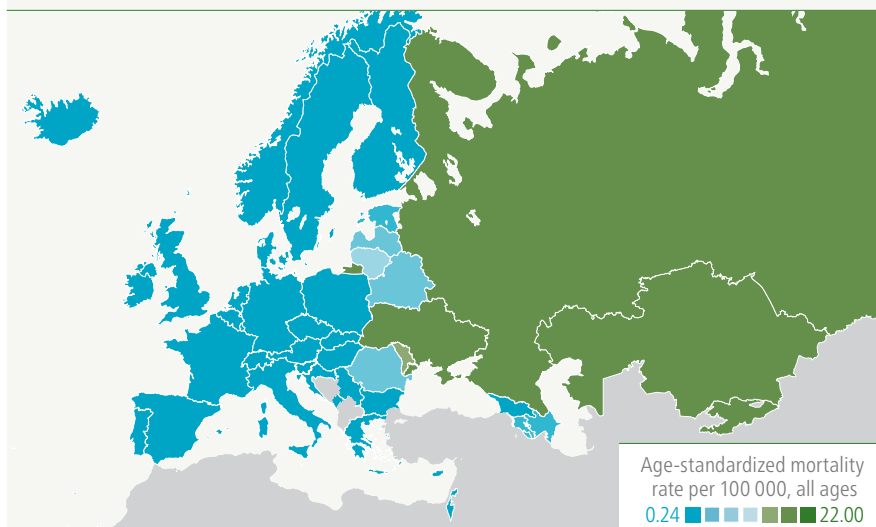
Although treatment success rates are not entirely satisfactory (only around 70%), earlier and accessible diagnosis, along with availability and adherence to short-course treatment, explains decreasing TB mortality and incidence trends. Nevertheless, some countries still face challenging situations and have pockets of populations at higher risk. For example, the WHO Regional Office for Europe's interactive atlases (20) show that TB is highly concentrated in a few small deprived areas with a risk of mortality 14 times that in more affluent areas, suggesting the importance of social determinants of health for this cause of death. In parallel, co-infection with HIV offers a further challenge to reducing mortality from TB, particularly in areas where both infections coexist and where multidrug resistance is present.

HIV/AIDS

HIV incidence, rather than mortality, is the preferred measurement of the frequency and impact of HIV/AIDS. Annual HIV incidence has marginally increased and is potentially reaching a plateau at the regional level, according to the most recent data (Fig. 42). Yet HIV incidence varies widely across countries, as mapped by the latest reported data between 2006 and 2010 (Fig. 43).

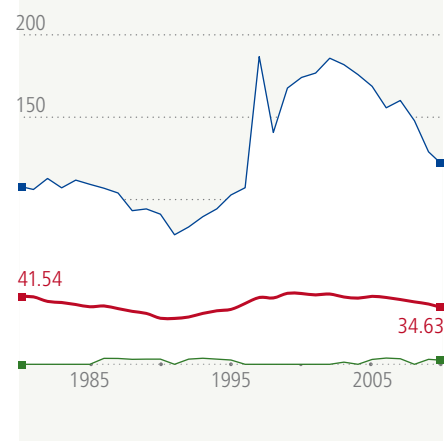
Importantly, with the wide availability of antiretroviral therapy in the European Region, progression from seroconversion to clinical disease is decreasing in most countries (data not shown). Lower reported rates can indicate that effective treatment of HIV-positive people plays an important role in reducing overt disease risk. Appropriate delivery mechanisms need to be in place in the diverse health systems across the Region, however, to reach all people without discrimination, and to provide the conditions to make this effort sustainable.

Fig. 40.
Mortality from TB in the European Region, last reported data, 2006–2010



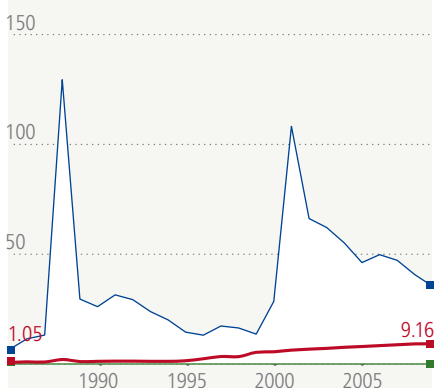
Source: European Health for All database (6).

Fig. 41.
Incidence of TB in the European Region, 1980–2010
(rate per 100 000 population, all ages)



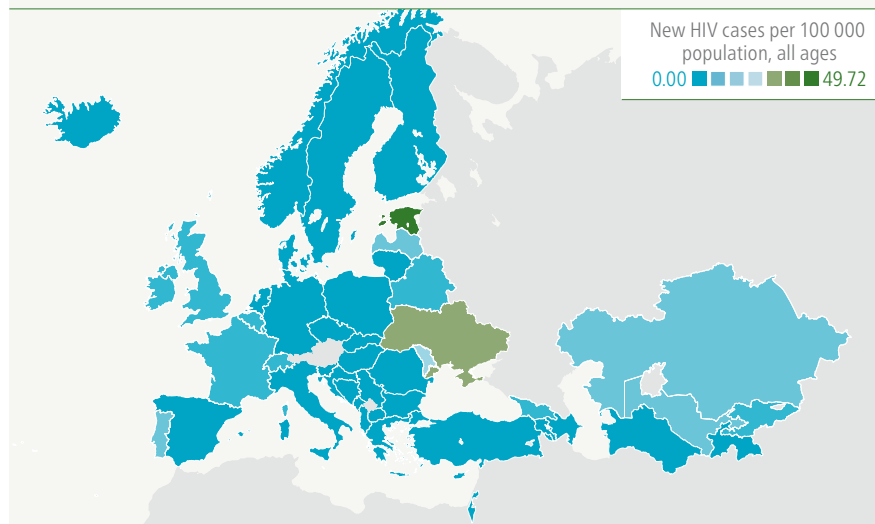
Source: European Health for All database (6).

Fig. 42.
Incidence of HIV in the European Region, 1985–2009
(rate per 100 000 population, all ages)



Source: European Health for All database (6).

Fig. 43.
Incidence of HIV in the European Region, last reported data, 2006–2010



Source: European Health for All database (6).

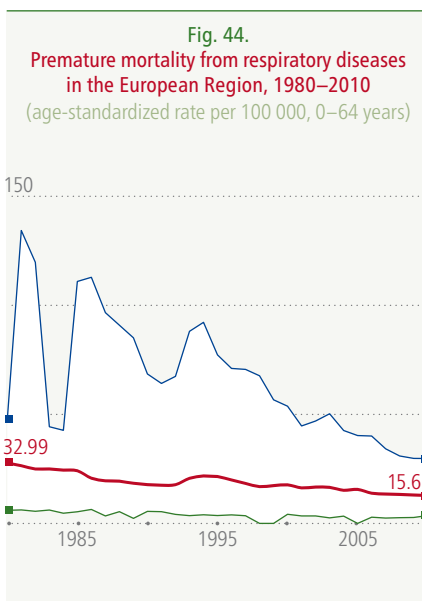
Diseases of the respiratory system

Mortality from respiratory diseases takes its toll on two distinct populations: children and older people. The main specific causes of death are chronic obstructive pulmonary disease (COPD), pneumonia, influenza and asthma; each is closely associated with outdoor and indoor environmental conditions and exposures. The interventions to prevent respiratory diseases often reflect wider social determinants of health that require some intersectoral action to ensure an impact that lowers disease incidence and severity.

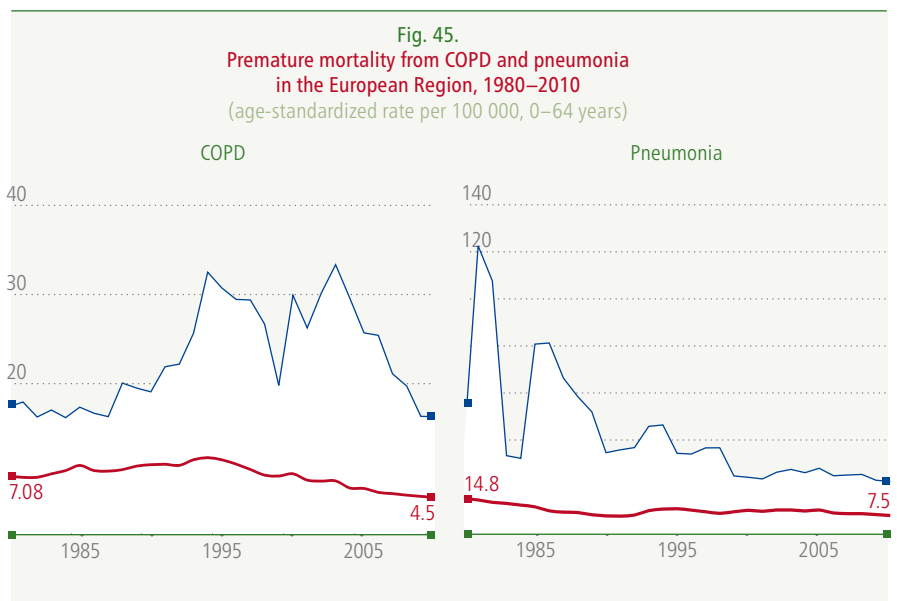
Rates of premature mortality from respiratory diseases have steadily decreased in the European Region, falling by 40% since the mid-1990s to a rate of 16 per 100 000 in 2010 (Fig. 44).

COPD and pneumonia account for the greatest number of premature deaths from respiratory diseases and their mortality trend patterns offer two distinct scenarios: one with decreasing rates and another with relatively stable ones (Fig. 45). Mortality rates from COPD (with men more affected than women) have decreased across the Region, while pneumonia rates remained mostly unchanged for the past decade.

This context suggests that some exposures have increased in parts of the Region, perhaps as a result of pollution and poorer air quality from industrialization and increased transportation, damp housing



Source: European Health for All database (6).



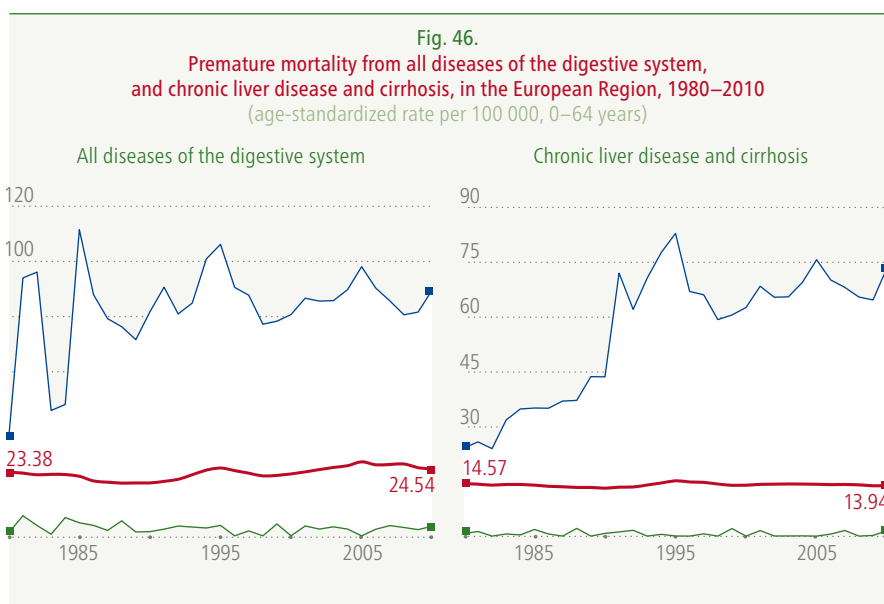
Source: European mortality database (11).

and poor indoor air quality. At the same time, increased access to treatment and vaccination, improved housing conditions and enhanced environmental protection and regulations may have a positive impact across the entire Region.

Diseases of the digestive system

Another important group of causes of death in the European Region, diseases of the digestive system include chronic liver disease and cirrhosis, as well as ulcers of the stomach and duodenum. At the regional level, premature mortality from all digestive-system diseases showed an increasing trend from the late 1990s to 2005, with a subsequent slight reduction. The overall rate reached 25 per 100 000 in 2010: a 30% net increase in the last two decades (Fig. 46). The harmful intake of some products, such as alcohol and some processed foods, contributes to these diseases.

Over the past decade, mortality from chronic liver disease and cirrhosis has stagnated (Fig. 46). Chronic liver disease has been associated with a range of viral causes (such as hepatitis B and C infections), toxins and drug misuse. Nevertheless, alcohol abuse, particularly at a heavy and sustained level, probably makes the largest contribution. Mortality from chronic liver disease and cirrhosis is therefore often used as a proxy measure of a wide range of health problems related to excessive alcohol consumption. According to



Source: European Health for All database (6).

Box 5.
Causes of death –
key messages

- NCDs account for the largest proportion of mortality in the European Region: 80% of deaths in 2009.
- Diseases of the circulatory system are the most important cause of premature mortality in the Region, accounting for nearly 50% of all deaths. Neoplasms are the second leading cause, accounting for nearly 20%, while external causes of injury and poisoning are responsible for 9%.
- Disease mortality shows changing patterns in various parts of the European Region; it also varies greatly both between countries and by age and sex.
- Since there has been a sustained decrease of mortality from diseases of the circulatory system and an associated increase in life expectancy, the risk of developing cancer – linked to long latency periods – is increasing. Neoplasms have replaced diseases of the circulatory system as the foremost cause of premature death in 28 countries in the Region.
- Primary and secondary prevention, rather than treatment only, are effective measures to reduce premature mortality from diseases of the circulatory system and neoplasms. For those with no effective treatment, prevention is the only way to reduce impact until innovations in medical technology become available.
- Communicable diseases, although occurring less frequently in Europe than the rest of the world, remain high on the health agenda. The main concerns are TB, HIV/AIDS and other sexually transmitted diseases, and viral hepatitis.
- Mortality from infectious and parasitic diseases in the Region has slowly increased since 1990.
- Trend patterns for HIV incidence differ across the Region, with higher rates in some central and eastern countries in the Region. AIDS incidence is decreasing, indicating the importance of effective treatment of people living with HIV.

recently reported data (2006–2010), premature mortality from chronic liver disease and cirrhosis across the Region ranges from less than 1 to more than 70 per 100 000 population (Fig. 47). Underreporting of this disease sometimes occurs, however, because of stigmatization.

It is well documented that people across Europe increasingly drink alcohol earlier in life, consume large amounts and engage in binge drinking: all these behaviours increase the incidence of disease and the risk of death. These trends justify the scaling up of effective interventions across the Region to reduce consumption (21).

Diabetes

Diabetes is a major public health problem in Europe because of its direct and indirect effects on those with the disease. These range from renal, neurological and ophthalmological microvascular damage to vascular damage of the limbs, brain and heart, with various severe consequences. Diabetes is also an important and frequent risk factor for diseases of the circulatory system, with which it shares some risk factors, such as poor diet, lack of physical exercise and obesity (see the section on risk factors below). Although relatively easy to diagnose, diabetes remains largely undetected in many settings; thus, measures of hospitalization and premature mortality from diabetes are suggested as potential tracer indicators of the performance of health systems (22).

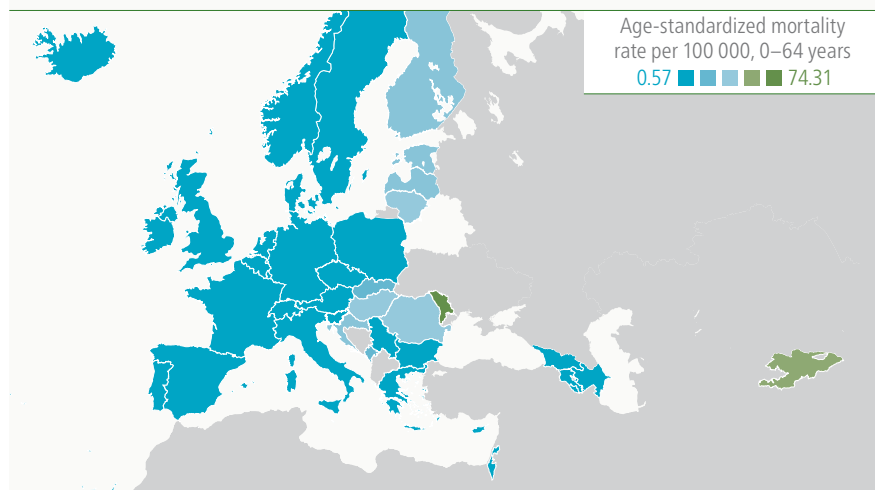
In the European Region, premature mortality from diabetes decreased by 25% from 1995 to 2010, to 4 per 100 000. Countries vary, however, according to the most recent data reported (Fig. 48).

Burden of disease – mortality, morbidity and disability

The principle guiding the burden-of-disease approach is that the best estimates of incidence, prevalence and mortality can be generated by carefully analysing all available sources of information in a country or region and correcting for bias. The disability-adjusted life-year (DALY) – a time-based measure that combines years of life lost due to premature mortality and years of life lost due to time lived in states of less-than-ideal health – was developed to assess the burden of disease. As a

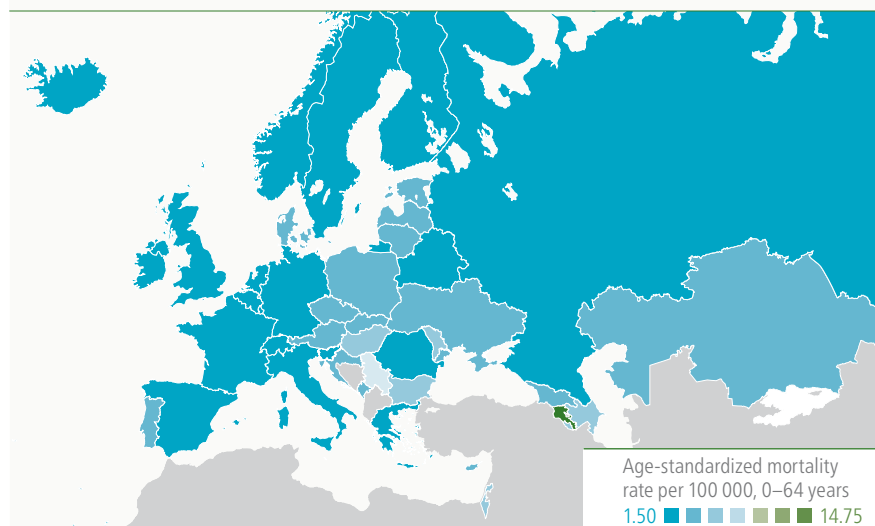
metric of population health and an input to health policies, the DALY makes clear in the way it is calculated that mortality does not comprise the entire burden of disease, and that morbidity and disability have a significant share (23). Moreover, it is a gap measure, meaning that DALYs are lost from what would be potentially ideal or perfect health, if people did not experience any disease or disability and if death occurred at the highest life-expectancy rates observed in the world.

Fig. 47.
Premature mortality from chronic liver disease and cirrhosis
in the European Region, last reported data, 2006–2010



Source: European mortality database (11).

Fig. 48.
Premature mortality from diabetes in the European Region, last reported data, 2006–2010



Source: European mortality database (11).

Two additional considerations make the DALY attractive: as a metric it facilitates cross-country comparisons, and it can be broken down and linked to underlying determinants, risk factors and interventions to assess risk, effectiveness and cost-effectiveness (efficiency). The distribution of DALYs lost or saved can also guide analysis from an equity perspective. Together, this information can contribute to priority setting and increase national or regional evidence on what interventions can avoid the greatest loss of DALYs.

The distribution of the European Region's total burden of disease for 2004 shows a range of 10–28 estimated DALYs lost per 100 population, depending on the country: this represents an almost threefold gap between the best country situation and the least favourable one (Fig. 49). Men lost about 20% more DALYs than women.

Projections of DALYs lost are another input to health policy and priority setting. To allow comparisons of estimates reflecting data from 2004 and projected numbers of DALYs lost for three time periods (2008, 2015 and 2030), data are presented for major causes and countries are clustered by their level of income (Fig. 50).

The data highlight several points. First, the overall number of DALYs lost is twice as high in low- and middle-income countries as in high-income countries in the European Region. This means that the former account for about two thirds of DALYs lost, but only just over half of the Region's population. (See Annex 1 for classifications of countries by income in the European Region.)

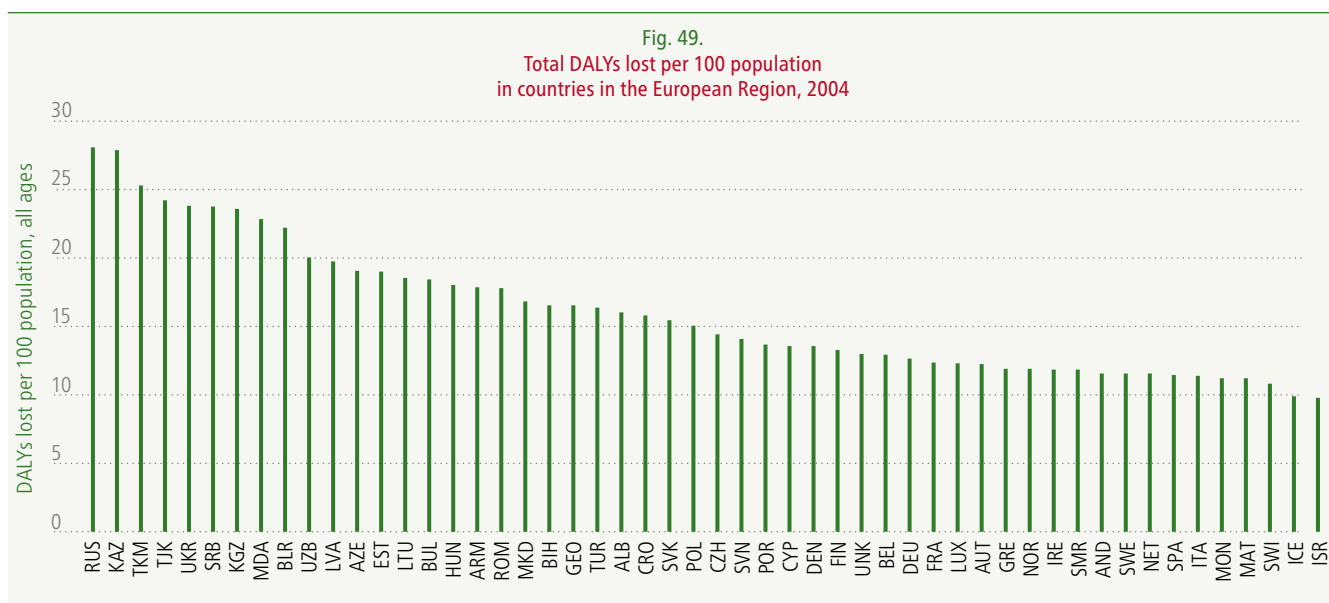
Box 6.
Burden of disease –
key messages

- Mortality does not account for all the burden of disease; morbidity and disability also have their share. The use of DALYs as a tool for assessing health status beyond mortality provides another focus in the evaluation process.
- The European Region's total burden-of-disease distribution for 2004 shows a range of 10–28 estimated DALYs lost per 100 population.
- The burden of disease is unevenly distributed within the Region: the overall number of DALYs lost is twice as high in low- and middle-income countries as in high-income countries.
- DALYs have been attributed to leading risk factors in the European Region, making it possible to identify key areas for intervention, such as nutrition, physical activity and addictive substances, mainly to reduce overweight and obesity, high cholesterol and high blood pressure, and alcohol and tobacco use.

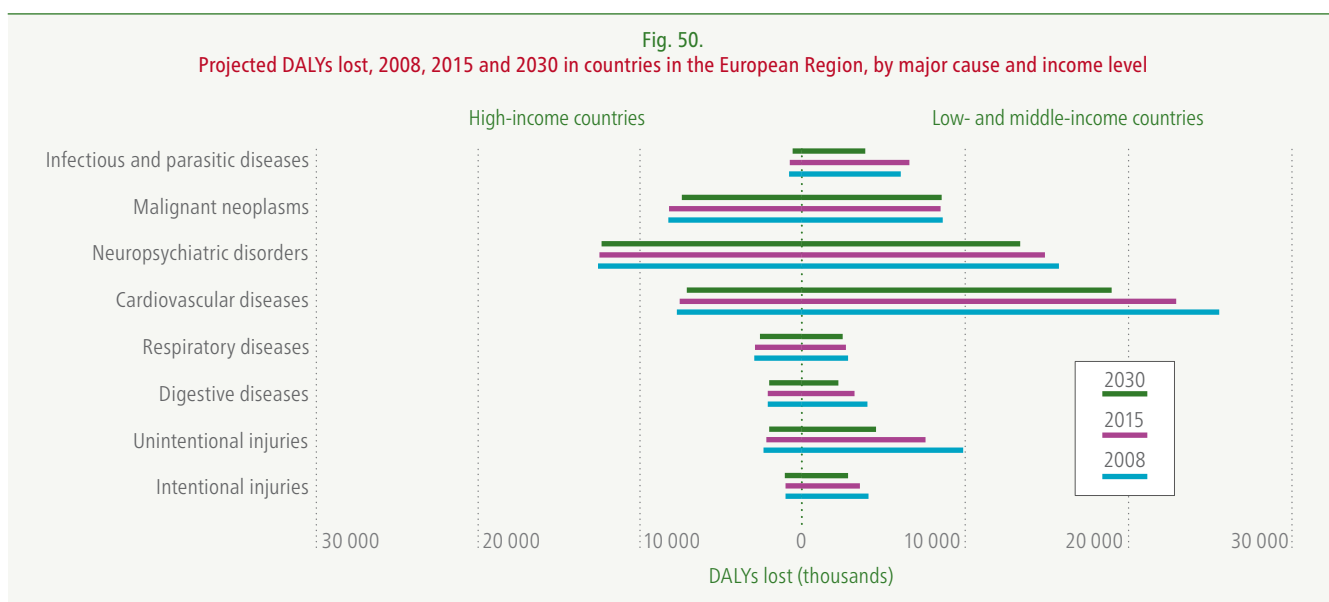
Besides the magnitude, the pattern of the disease burden differs by country income: low- and middle-income countries have high rates of diseases of the circulatory system followed by neuropsychiatric disorders, while high-income countries have high rates of neuropsychiatric disorders followed by cancer and cardiovascular diseases. Cancer accounts for a similar number of DALYs in both groups. With the exception of an expected increase in infectious and parasitic diseases and no change in cancer in low- and middle-income countries, the burden of disease will tend to decrease for all causes. Projections estimate that the levels of decrease will be smaller between 2008 and 2015 and larger between 2015 and 2030, particularly in low- and middle-income countries.

Further, the total number of DALYs lost has been attributed to different leading risk factors in the European Region (Fig. 51). As a result, it is possible to identify the most important areas for

developing cost-effective interventions to address, for example, nutrition, physical activity and addictive substances, mainly to reduce overweight and obesity, high cholesterol and high blood pressure, and alcohol and tobacco use. Further work to combine cost-effectiveness analysis with approaches to consider the distribution of services and benefits across the population, including particular subgroups, would also highlight equity issues (see the section on risk factors below).



Source: adapted from *The global burden of disease: 2004 update* (23).

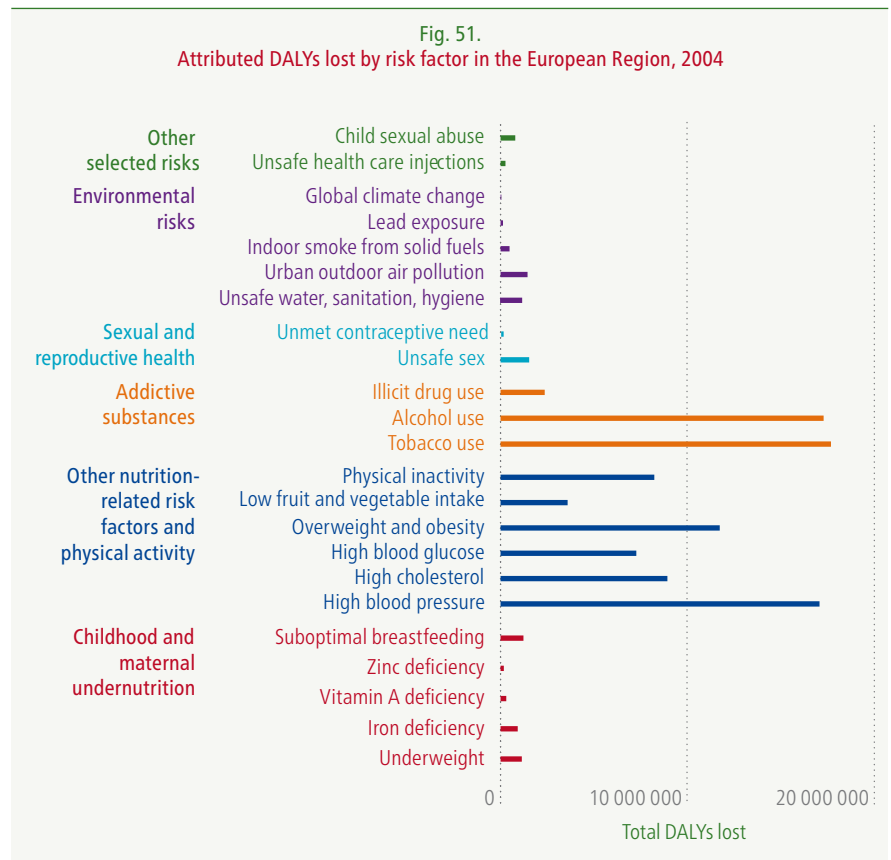


Source: adapted from *The global burden of disease: 2004 update* (23).

Although methods are constantly being refined, collating and analysing these types of data at the national, regional or global level can help to build up causal or pathway models for a given disease or set of diseases. Such models can provide insight into areas and levels for intervention and make it possible to identify actions that require intersectoral participation to reduce the overall disease burden, not just mortality.

Risk factors

An important element of disease prevention and control and health promotion is an understanding of the underlying causes, including risk factors, health system determinants and broader socioeconomic determinants (such as the social determinants of health) that shape the level and distribution of disease. For the major groups of diseases causing high mortality, morbidity and disability analysed in the previous sections, two main risk factors contribute to multiple disease outcomes and thus remain a priority to tackle: tobacco smoking and



Source: Global health risks: mortality and burden of disease attributable to selected major risks (24).

harmful alcohol consumption. From a European perspective, their prevalence and levels remain high across all populations, in spite of the knowledge and technology available to address both.

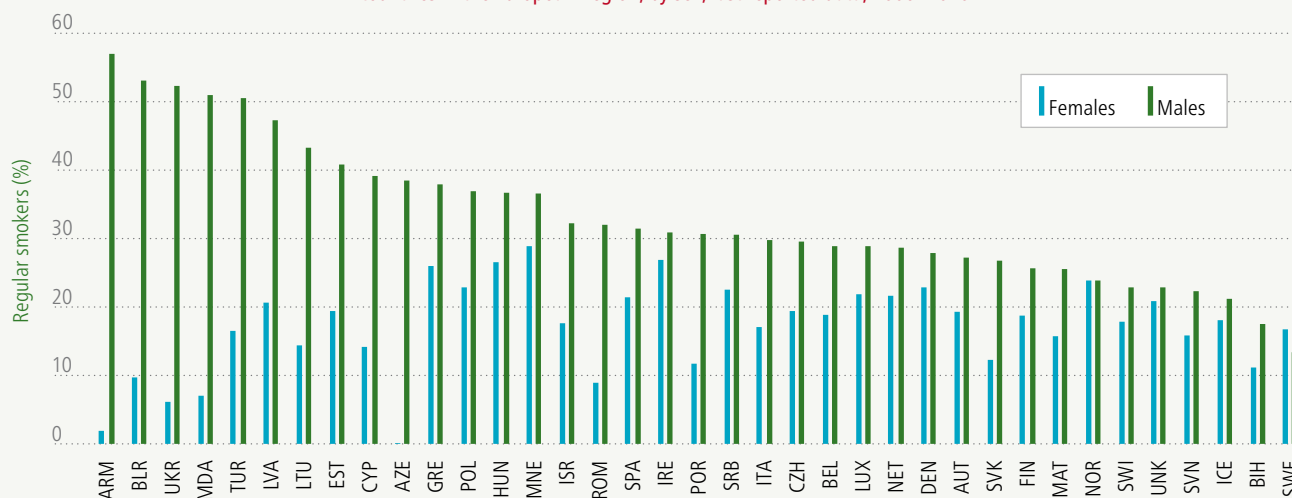
Tobacco smoking

The prevalence of regular tobacco smoking (the main component of tobacco use) in the European Region among the population aged 15 years and over has reached 27% on average (Fig. 52), according to data reported from 37 countries around 2008. In general, twice as many men smoke as women. Nevertheless, trends indicate that prevalence among women is increasing and beginning to converge with that among men (data not shown), particularly in countries with levels around or below the European average for men.

Tobacco affordability, as determined by prices, can help to increase prevalence: higher smoking prevalence is associated with lower cigarette prices. Data from across Europe document that cigarette prices range from US\$ 1 to over US\$ 10 per pack (25). Addressing the aggressive marketing of tobacco products to young people, women and people with lower socioeconomic status requires equally aggressive and coordinated health policies, including those outlined in the WHO Framework Convention on Tobacco Control (26), ratified by 168 countries worldwide. In the European Region, 47 countries and the European Commission are Parties to the Convention.

Fig. 52.

Prevalence of regular smokers among the population aged 15 years and over in countries in the European Region, by sex, last reported data, 2006–2010

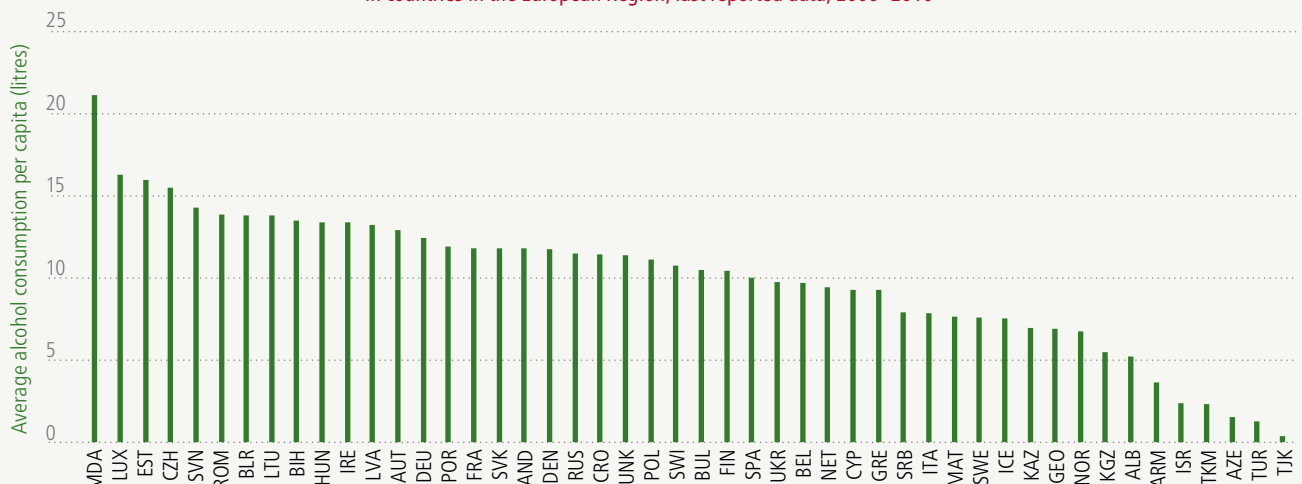


Alcohol consumption

Alcohol consumption is another important factor that determines the frequency and severity of illness; it accounts for nearly 6.5% of all deaths in Europe (27). Estimated per capita alcohol consumption in the European Region remained almost unchanged over the past decade, with an average of 10.6 litres per person in 2007 (Fig. 53), according to data from 48 countries. Nevertheless, estimated average consumption levels vary significantly between countries, from 21 litres to less than 0.5 litres per person.

Not only the volume but also the type of alcohol consumed matters, as the higher the level of alcohol content consumed, the greater the negative health effects. Across the Region, the consumption of beer, wine or spirits varies. Countries with a higher level of spirits consumption also have a higher burden of alcohol-related diseases. As with tobacco use, socioeconomic determinants and alcohol affordability shape excessive alcohol use and binge drinking – defined as heavy (>50 g alcohol) episodic weekly drinking – which has a well-documented negative impact on health (28). Data from individual countries show that the frequency of binge drinking tends to be inversely associated with the price of alcohol. Evidence from across Europe shows that an increase in diseases of the circulatory system and premature mortality can be attributed to very high consumption of alcohol and binge drinking patterns (29,30). For example, a recent study notes that when alcohol prices were reduced – similar to

Fig. 53.
Average alcohol consumption per capita among the population aged 15 years and over
in countries in the European Region, last reported data, 2006–2010



lifting other restrictions on access and use – alcohol-related deaths among adults aged 40–69 years increased by 17–40% (31). According to information collected from across the European Region, successful policy approaches to reducing the deleterious effects of harmful alcohol consumption require a concerted effort involving and aligning several sectors, including the health sector, towards a common objective.

Environmental factors

Differential access or exposure to diverse environmental factors over the course of people's lives is known to determine the occurrence of major health problems – including cardiovascular, respiratory and digestive diseases and neoplasms, as well as external causes of death – and to affect the severity of morbidity and disability. Various factors contribute directly or indirectly to shaping the health profile and disease burden of a population for good or ill:

- access to clean water and good sanitation services;
- poor housing conditions (such as dampness, poor indoor air quality and overcrowding);
- road safety (such as road and vehicle conditions, use of protective equipment and speed limits);
- poor air quality (from, for example, pollution with particulate matter, gases, toxic fumes and moulds);
- work environments (including employment conditions and occupational risks); and
- extreme climate conditions (whether heat or cold).

Information on pathways from environmental factors to disease impact, and on measures of level and distribution, is vital to improve policies and monitor and evaluate their effects.

A brief discussion of issues relating to monitoring and interpreting data on air quality, for example, hints at the impact such factors can have. Air quality is an important element for good human health and well-being, and extends beyond national borders. Yet air pollution continues to pose a significant threat to health in the European Region. As evidence on the health effects of air pollution mounts, countries across the Region are taking a greater interest in improving their monitoring procedures. As a result, data are increasingly available on concentrations of particulate matter – one of the basic air quality indicators – and its negative effects on health.

Box 7.
Risk factors –
key messages

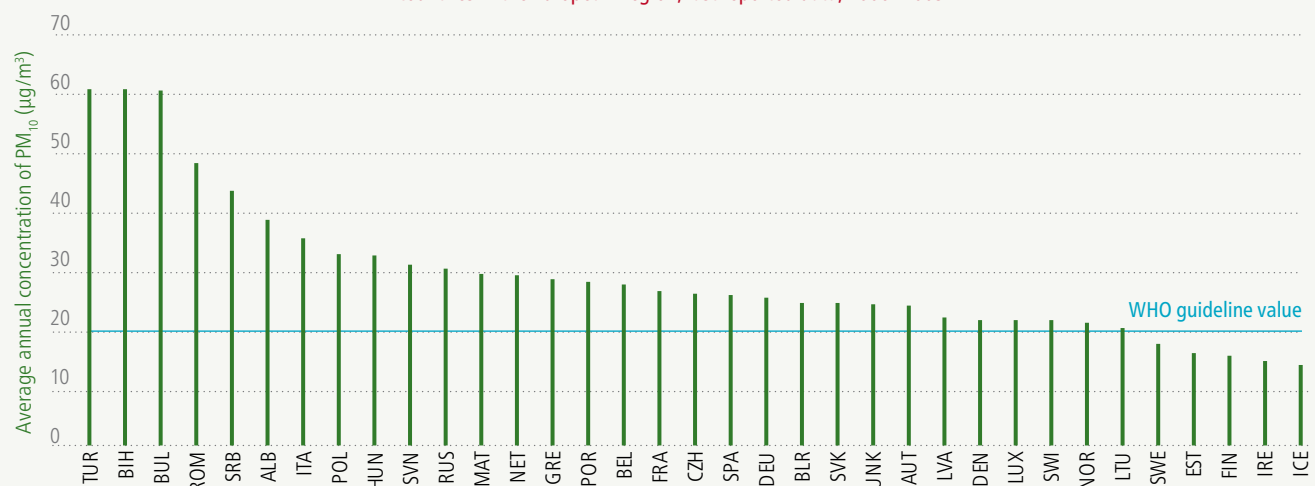
- Two of the main risk factors for major diseases are well known: tobacco smoking and harmful alcohol consumption. Various intersectoral interventions to modify them are available.
- Although diverse tobacco control strategies have been implemented in many countries, smoking prevalence in the population aged 15 years and over reached 27% around 2008. An important factor that tends to affect smoking prevalence is affordability (cigarette prices).
- According to WHO estimates, alcohol consumption accounts for nearly 6.5% of all deaths in Europe. As with tobacco, the affordability and accessibility of alcohol are important determinants of alcohol consumption, particularly the more seriously health-threatening binge drinking.
- Differential access or exposure to diverse environmental factors over the course of a lifetime is a risk factor for major health problems. For example, air quality varies across the European Region, with the median value for country PM₁₀ at 26 µg/m³, exceeding the WHO guideline value of 20 µg/m³.

With better information, policies and guidelines can be proposed, discussed, refined and implemented. For example, WHO (32) suggests a guideline value for particulate matter with an aerodynamic diameter smaller than 10 microns (PM₁₀) at an average annual exposure of 20 µg/m³, as this is associated with potentially increased environmental health risk. Nevertheless, some negative health impacts on respiratory and circulatory system diseases have been observed in Europe at lower average exposure levels (10 µg/m³) (33).

Air quality varies across the European Region, with the median value for country PM₁₀ observed in 2006–2009 at 26 µg/m³, which exceeds the WHO guideline value. Data indicate a fourfold gap in PM₁₀ exposure between countries, from a low of 14 µg/m³ to a high of 61 µg/m³ (Fig. 54). Of the 35 countries with available data, 80% showed levels exceeding the standard threshold, while 15% had values at least double the standard level. Although specific to EU Member States, a recent report on the impact of air pollution on population health indicates that air pollution accounts for on average eight months and, in the most polluted cities, more than two years of life lost (34). One should note that available country data from across Europe provide measurements from capitals or large cities (urban outdoor air pollution) and thus may overestimate the level of poorer air quality to which the entire population in a country is exposed.

The data in this section show some of the most important risk factors, but give only a few examples of the complexity of interactions

Fig. 54.
Average annual air concentration of PM₁₀ in large cities
in countries in the European Region, last reported data, 2006–2009



between a range of risk factors, disease processes and effects on health in Europe. These processes are further shaped by interactions with broader social determinants of health that can either mitigate or exacerbate inequalities in health, as discussed in the following sections.

Social determinants and health inequalities

Inequalities in health imply a difference or a disparity either in access to health-promoting opportunities and health services or in the distribution of disease burden (including morbidity, disability and mortality) and positive health in the context of well-being. These differences can reflect biological or genetic factors: for example, men are usually taller than women. Health inequities are differences in health that are unnecessary, avoidable, unfair and unjust (35). Health inequities are found across countries and between different groups of people in the same country. Evidence shows that factors driving health inequities are systematic and not distributed randomly.

The WHO Commission on Social Determinants of Health (CSDH) defines health equity as “the absence of unfair and avoidable or remediable differences in health among population groups defined socially, economically, demographically or geographically” (36). Numerous studies summarized by CSDH conclude that some of the variations in health across countries or within populations can be identified as health inequities. A proportion of these differences – from 25% to 75% depending on the condition – is due not only to physical health factors but also increasingly to social factors that are amenable to policy. The CSDH report agrees that health inequities mostly point to policy failure, reflecting unfair or unjust disparities in daily living conditions and in access to power, resources and participation in society.

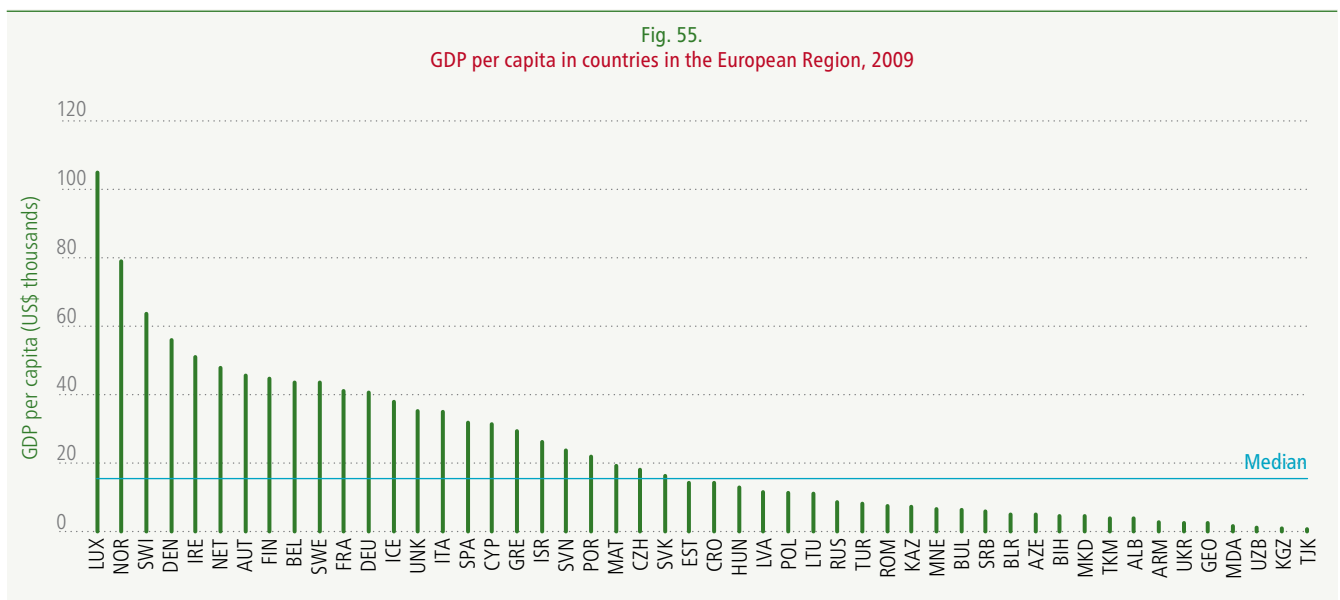
As CSDH found, further supported by a recent report from the WHO Regional Office for Europe (37), the underlying causes of health inequities are complex. Moreover, inequalities often reflect systematic social, political, historical, economic and environmental factors; these interface with biological factors that are accumulated during a lifetime and often transferred across multiple generations. The term “social determinants” is often used as shorthand for all these factors, which are also known as the “causes of the causes” to indicate their fundamental influence on disease causation and distribution of

health within a population or across countries. Moreover, the health system itself is a social determinant of health, as it can either improve or exacerbate existing health inequities. The concept encompasses the full set of social conditions in which people live and work, and has been summarized as “the social characteristics within which living takes place” (38).

In this context, health inequities are an important priority in the European Region. They continue to increase and take many forms, from lack of access to health services to excess premature mortality, hampering social development and well-being. Prerequisites for tackling health inequities include being appropriately informed about their magnitude and distribution, both absolute and relative, and understanding how pathways from social determinants, other intermediary factors and health systems affect the disease burden, health and well-being.

Socioeconomic determinants

Income level, employment status and education attained are among the most important social determinants of health, which in turn influence many other intermediary determinants. The gross domestic product (GDP) per capita is commonly used as a measure of income in a country in a given year, and is often positively correlated with the standard of living.



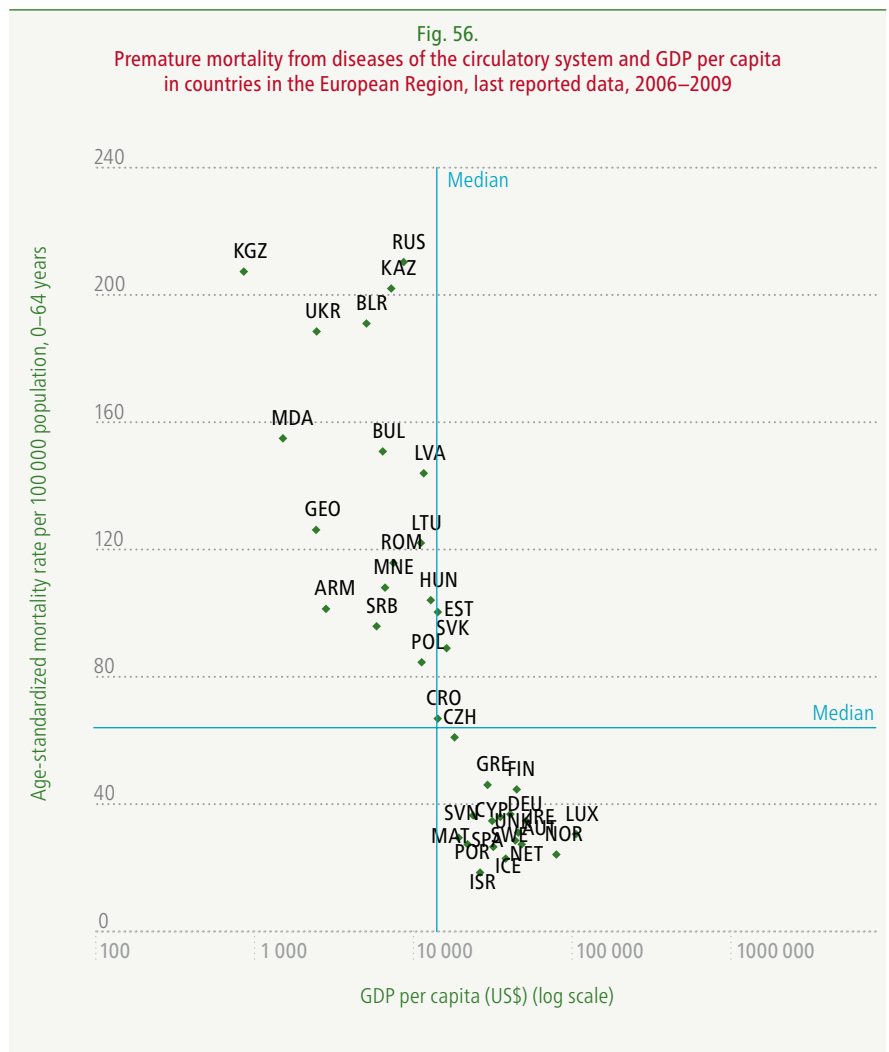
Overall, the European Region is one of the wealthiest in the world, with an annual average per capita income of just under US\$ 24 000 in 2009. Although increasing across the entire Region since 1990, data from 50 of the 53 countries in the European Region indicate that per capita income levels vary widely: from just over US\$ 700 to just over US\$ 105 000 (Fig. 55).

Nevertheless, improvements in income levels seen in the past decades are challenged by the current economic downturn, which is affecting most European countries and has many effects still to be assessed. Moreover, average per capita income does not provide insight into the evolving distribution of income within a country, such as whether income levels and distribution between subgroups in a population are becoming more or less equitable.

The strong association between average per capita income and mortality levels is well established. Fig. 56 highlights one such example: premature mortality from diseases of the circulatory system. In countries with per capita income levels below US\$ 20 000, mortality rates for diseases of the circulatory system exceed the European average, and tend to increase rapidly with lower income. This suggests an important health inequality that deserves greater attention in understanding the causal pathways and social processes that have led to or maintained such mortality rates. Another factor to consider is the extent to which such underlying causes can be considered health inequities. Further, decreasing income and increasing disease burden represent an important challenge because of the scale of the disease burden, and its negative impact on current and future economic development.

Various mortality indicators show similar patterns of health inequalities across the EU. One is “amenable mortality”, which measures deaths that are premature and essentially avoidable by various known public health and health care interventions; this identifies inequity in health and can be an indicator of health systems’ performance. The approach to amenable mortality in the EU illustrates one way to document important health inequalities in the Region, consider associated factors and explore whether the differences are potentially avoidable. For example, analysis shows disposable income (the amount of money an individual or household has to spend or save: in other words, net income after paying all taxes or other mandated social charges) is associated with the occurrence of amenable mortality: the lower the disposable income, the higher the mortality.

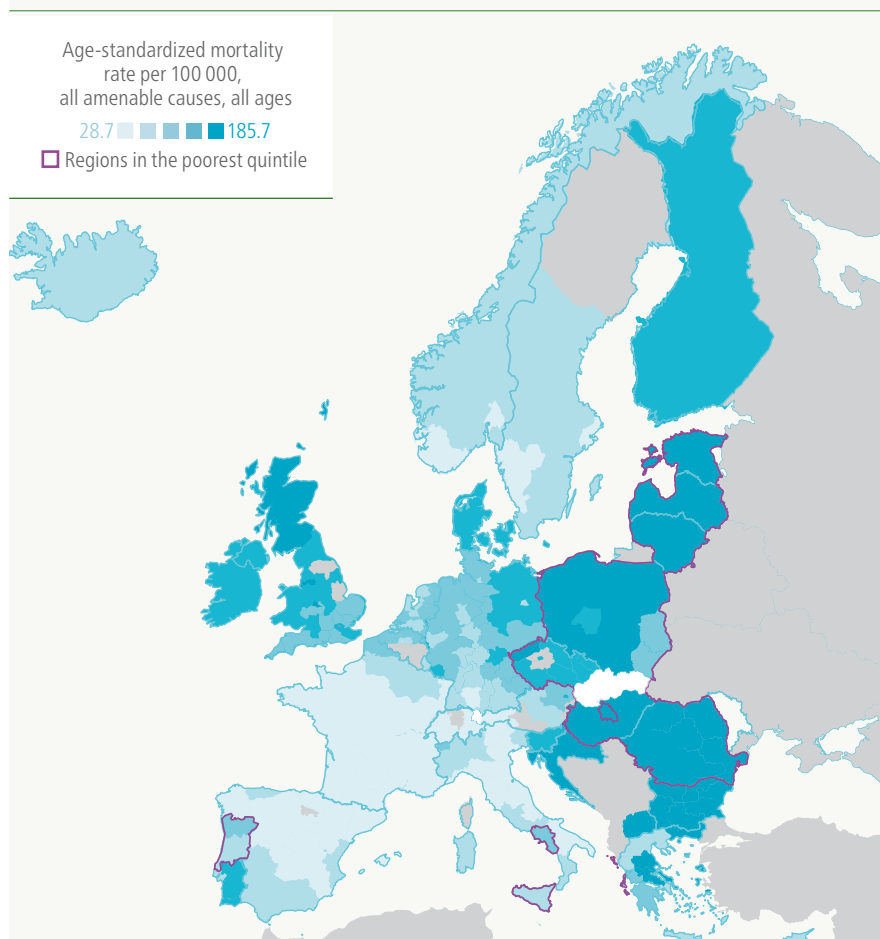
Approaches that enable health inequalities to be visualized can provide further insights. In 2007 the WHO Regional Office for Europe undertook a project with the European Commission called “Inequalities in health system performance and social determinants in Europe – tools for assessment and information sharing” (39), which developed a set of interactive atlases to improve the evidence base for identifying and analysing social inequalities in health (20) (see Box 10 in Chapter 2). Rather than aggregated data at the national level, the project looked at the data from the 281 subnational regions of the EU. Mapping data on amenable mortality (from all causes) for each of these regions shows a geographical gradient, with higher death rates in the eastern and north-western parts of the EU, although some regions in other areas also have high mortality rates (Fig. 57).



Source: European Health for All database (6).

The purple outline marks the EU regions in the poorest quintile (the 20% of the 281 regions with the lowest per capita income). This additional layer tends to validate the association with higher amenable mortality. Nevertheless, some poorer regions have relatively low mortality levels. This requires additional investigation and research to identify other potential explanations. For example, what characteristics of these regions enable them to mitigate the effects of being relatively poorer, and to achieve lower amenable mortality? Are these characteristics related to policies and their effective implementation, involving, for example, a range of stakeholders, intersectoral action or effective public health functions? An understanding of the context, good practices and lessons learned could allow new policy options and strategies to be adapted and introduced in other resource-poor settings.

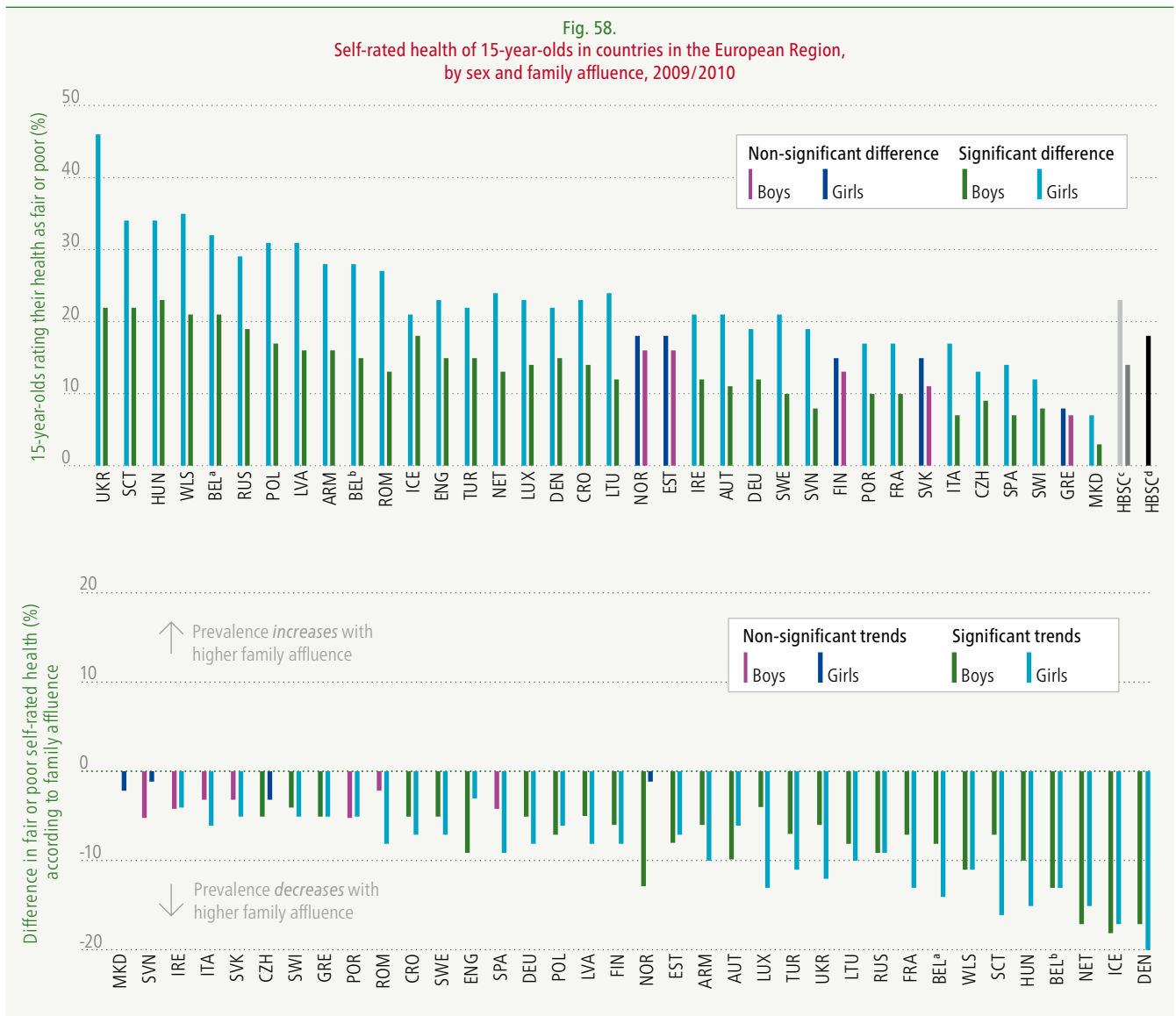
Fig. 57.
All-cause amenable mortality by subnational regions of the EU
and neighbouring countries, around 2006



Source: Inequalities in health system performance and social determinants in Europe (39).

The most recent report of the Health Behaviour in School-aged Children (HBSC) study (40) offers another example of how social determinants can shape the distribution of health. This multicountry study included 15-year-olds' assessment of their own health status (as excellent, very good, good, fair or poor) and analysed those reporting fair or poor health by sex, by family affluence and across countries (Fig. 58). While nearly 20% of 15-year-olds rated their health as fair or poor, girls reported significantly lower levels of self-rated health than boys (on average, 23% and 14%, respectively), a consistent difference in all participating countries. In addition, 15-year-olds in affluent families were 20% less likely to report fair or poor health.

Fig. 58. Self-rated health of 15-year-olds in countries in the European Region, by sex and family affluence, 2009/2010



Source: Currie et al. (40). Notes: ^a Belgium (Flemish) ^b Belgium (French) ^c HBSC average (gender) ^d HBSC average (total)

The overall results point out that perceived relative differences in wealth are associated with self-reported health across Europe, as well as, most likely, gender norms and roles. This draws attention to the apparent concentration of lower levels of self-reported health among adolescent girls in less affluent families. The importance of and challenges in measuring self-reported health within the context of well-being are further addressed in Chapter 3.

Unemployment is an indicator that directly reflects the economic opportunities and ability of a country to incorporate its potential workforce, and an important social determinant of health. During the recent economic downturn, unemployment increased to an average level of 8.7% of the economically active population in the European Region in 2009. This followed a decade of decreasing unemployment levels across the Region. At the country level, the highest unemployment level across 45 countries in the Region is 35 times the lowest level (Fig. 59).

Acute economic changes, measured by the unemployment-rate change, provide further insight into the potential impact on the health and well-being of populations, and add to the discussion on potential contributing factors to external causes of mortality (see Fig. 38). For example, an increase in unemployment of over 3% in a relatively short time has been associated with a nearly 5% increase in suicide and self-inflicted injuries among people younger than 65 years (41). Between 2007 and 2009, the average unemployment rate in the European Region increased by nearly 1%, with significant variation across the 38 countries reporting data (Fig. 59). Although unemployment is a blunt indicator, based on recent trends and synthesized evidence, countries with increases of 3% and more are at potentially higher risk of increased mortality from self-harm.

Rising unemployment threatens to pose additional challenges to health systems, including ensuring appropriate services for more vulnerable or poorer population groups. The increased frequency of some health problems may result from additional stress, the adoption of unhealthy behaviours (such as tobacco smoking and abuse of alcohol and other substances) and inadequate health care resulting from overburdened services and delays in seeking care. Moreover, people who want to work yet cannot find it are also at risk of being excluded from a range of other social processes, depending on the context. Regular monitoring of these and other trends should be encouraged, using a whole-of-the-gradient approach, in which the entire population is monitored, not just vulnerable groups.

The health determinants discussed and ways to identify health inequities are only illustrative, given the wide range of potential social determinants of health. Although policy options and actions to reduce health inequities are beyond the scope of this report, systematic and coordinated actions are clearly required, ranging from prioritizing the needs of people with vulnerabilities to addressing the well-being of future populations. Such actions can be categorized as promoting health across all population groups in relation to need, and improving the social determinants of health. Actions for the latter usually lie outside the specific remit of the health sector or health system, but the health sector can champion and contribute significantly to aligned efforts.

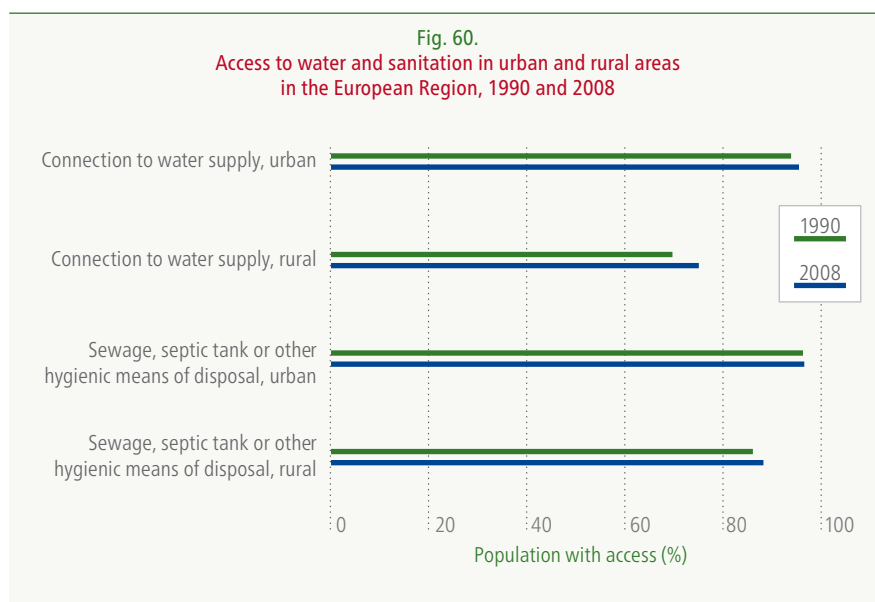
Fig. 59.
Rate of and change in unemployment among the economically active population
in countries in the European Region, last reported data, 2007–2009



Environmental determinants

The environment represents another important health determinant, and the underlying issues are similar to the social determinants of health. Recent assessments on the contribution of environmental factors to health have estimated that they may be responsible for between 13% and 20% of the burden of disease in Europe, depending on their mortality pattern classification, such as population-specific levels of child and adult mortality strata (42).

The availability of water in human living spaces, for both consumption and hygiene, is essential. Overall, access to water in the European Region is among the best in the world. Some issues still arise around the quality of water, however, particularly contamination by pathogens and chemical elements, which are caused by leakage from old pipes, breaks in services or lack of high-quality water protection and chlorination. Data on access to water (the population connected to a water supply system) and sanitation (the population connected to a sewage system or a septic tank or with other means of hygienic sewage disposal) in urban and rural settings were analysed for changes between 1990 and 2008. Overall, the share of the population with access to water in the Region in 2008 was 96% in urban areas, but 75% in rural areas (Fig. 60). Differences between countries range from nearly 100% access in both urban and rural areas to some larger gaps between areas in eastern countries in the Region.



Source: European Health for All database (6).

Inadequate management of human excreta disposal may lead to increased disease risk. In the European Region, 97% of the urban population has improved sanitary excreta disposal, in contrast to 89% in rural areas.

The lack of these services in some parts of the Region has led to increased exposure to pathogens, some causing diseases with high epidemic potential, such as cholera, shigellosis, haemolytic uraemic syndrome, cryptosporidiosis and giardiasis. These infectious diseases have taken their toll, with increased numbers of cases, including some requiring hospitalization, resulting in direct and indirect economic loss. Protection of water resources, further investment in public services and good planning of urbanization of the population will help to address access limitations.

Various socioeconomic, demographic and geographical conditions determine environmental exposures and produce important health inequalities, many of which can be considered to be inequities. The WHO Regional Office for Europe recently assessed the impact of environmental factors on health inequalities in the European Region (43). Key factors include the availability of water and sanitation, housing conditions and the broader environment, including outdoor and indoor air quality and noise. According to the report, socioeconomically determined health inequalities related to noise, second-hand tobacco exposure and housing quality have the clearest effects and show some of the strongest patterns of inequalities at different geographical levels. In addition, gender inequalities are more strongly associated with external causes of injury and poisoning, where male fatality rates are often three or more times those for females.

Health systems as health determinants

An effective health system is a prerequisite for responding to the changing epidemiological situation and health needs and demands of the population. Some key expectations include disease prevention and control, mitigation of disease consequences (including disability) and promoting healthy behaviours and lifestyles, with comprehensive approaches to deal with different health problems throughout the life-course. To achieve its objectives – improving the level of health (“goodness”) and its distribution in a population (“fairness”) – the health system needs:

- to be well organized and functioning, including providing leadership and accountability;
- to ensure financing;
- to maintain its infrastructure, including the workforce; and
- to provide high-quality services.

In times of resource constraints, the balance of appropriate resources – financial, human and material – is essential. The 2009 European health report (2) focused on the importance of strengthening health systems across Europe; this is not the main subject of this report (see Box 23 on recent work on health systems and the contribution to overall well-being). Nevertheless, given the recent economic downturn, this section highlights health care financing and protection from financially catastrophic expenditure (44) as a critical aspect of the way health systems can either mitigate (for example, by being more progressive in financing) or exacerbate (for example, by further widening inequalities, such as those in access to care) economic shocks. At present, measures of the incidence and magnitude of households' direct payments for health care form the basis of metrics for assessing financial protection and comparing health systems (45).

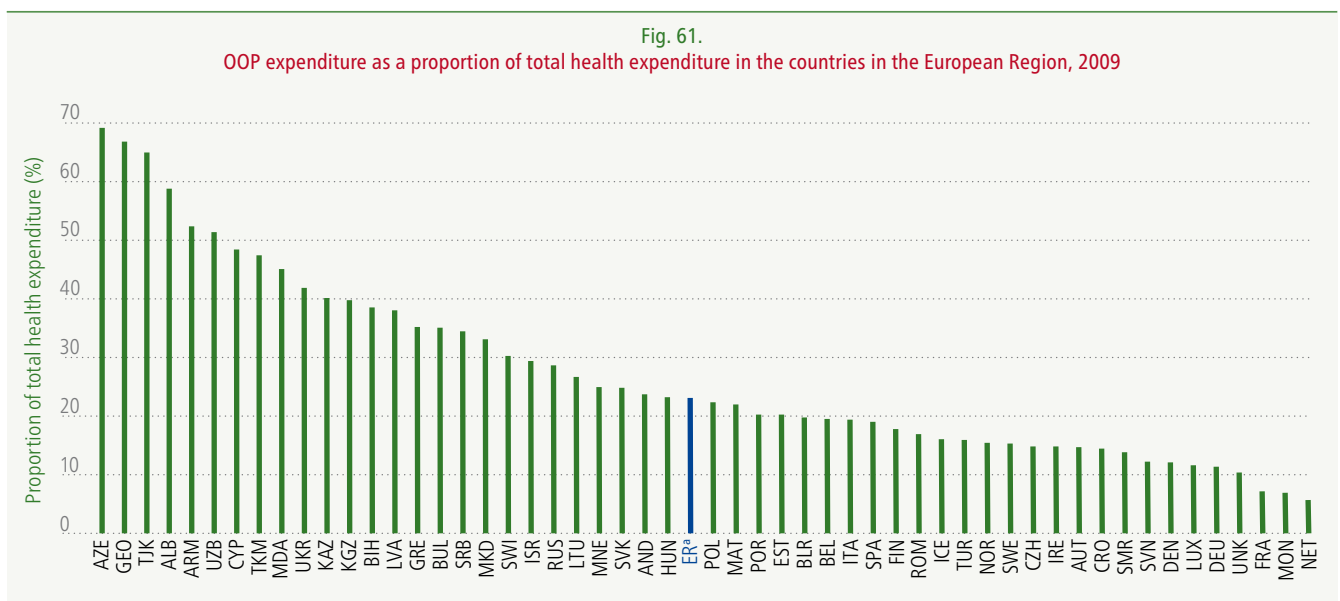
Overall, a country's investment in health comprises the government's response to the needs of the population (public) and households' use of resources (private). Total health expenditure shows countries' efforts at health investment and is usually presented as a percentage of GDP; the average level for the European Region was 8.5% in 2009. Nevertheless, levels of investment in health vary significantly between countries across the European Region, ranging from a high of 12% to a low of 2% (data not shown). Moreover, what matters is not only the level of spending but also the efficiency and equity of the use of resources to increase overall levels of health and improve the distribution of health.

In an economic crisis, when many people and households have less money, they tend to delay seeking health care, particularly when they must pay for services directly. Such payments are called private, out-of-pocket (OOP) expenditure. Particular concern focuses on catastrophic health expenditures, which threaten to impoverish households in countries where health systems rely heavily on household contributions. In the European Region, this is particularly relevant in countries where the rising costs of goods and services have weakened the purchasing power of many families.

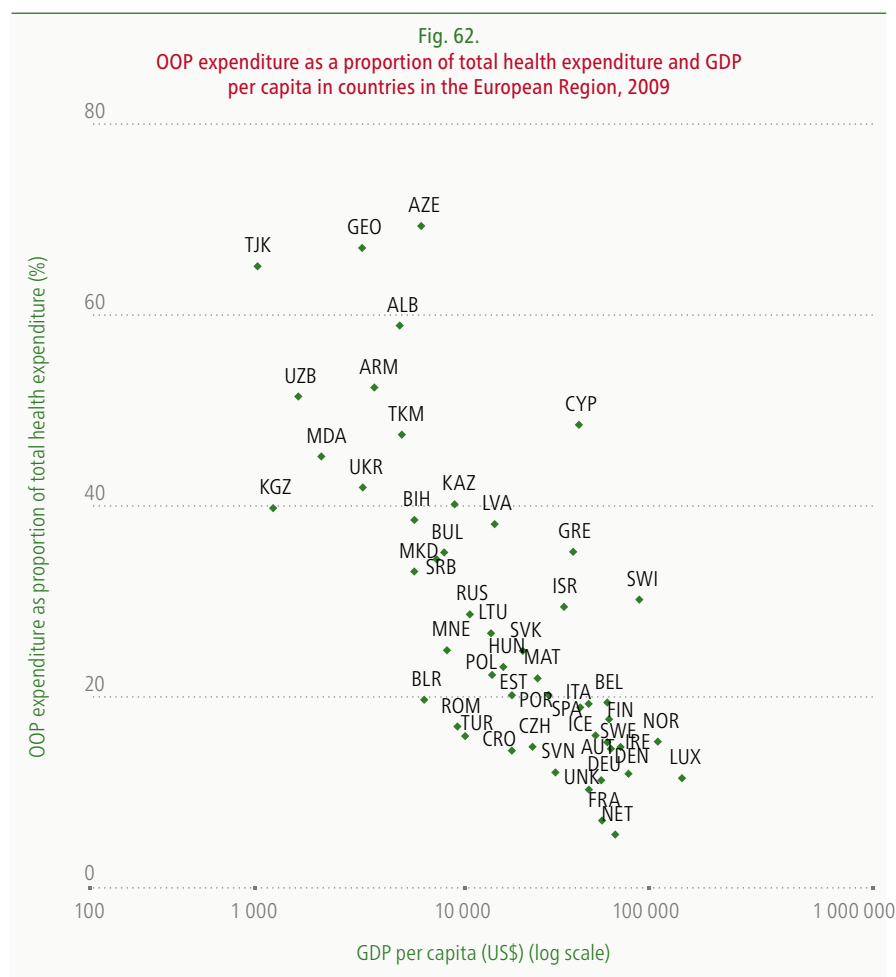
On average, OOP expenditure made up 23% of total health expenditure in the European Region in 2009 (Fig. 61). Nevertheless, this proportion varies widely between countries, ranging from 5.7% to 69.4%: a twelvefold gap. OOP expenditure remains the main source for payments (about 50% or more) in about 10 countries in the Region, while in others pooled prepayment mechanisms (for example, through government taxes or health insurance funds) are the main source of financing and expenditure. Evidence from around the world suggests that reaching two targets could considerably reduce the incidence of financial catastrophe for households: that OOP expenditure comprise no more than 15–20% of total health expenditure and that government expenditure on health comprise at least 5–6% of GDP (45).

The paradox is, however, that countries with the highest private OOP expenditure are also less economically favoured (Fig. 62) and those with smaller government contributions to health expenditure. Although these circumstances make expanding the financial space to increase the public share of health expenditure more difficult, WHO recently outlined policy options and strategies that countries with different economic levels can consider as they explore ways to ensure sustainable and more equitable financing for health (45).

Chapter 1 outlines the health status and trends in Europe based on the most up-to-date data from Member States, highlighting where we as the Region stand, and describes the evolving context in which the Health 2020 policy will be implemented. Agreeing on the



goals and priorities for the WHO European Region – what we are aiming for – is a first step towards establishing achievable targets and monitoring progress at the regional level; this is the subject of Chapter 2.



Box 8.

Social determinants and health inequalities – key messages

- Health inequalities are a major concern in the European Region, as they continue to increase.
- Social determinants of health include socioeconomic, demographic, environmental and cultural factors, along with the health system itself. They encompass the full set of social conditions in which people live and work.
- Income level, employment and education are among the most important socioeconomic health determinants. Although increasing since 1990, income levels in the European Region are still highly inequitable.
- Environmental factors are another major health determinant; key elements include the availability of water and sanitation, housing conditions and the broader environment, including outdoor and indoor air quality and noise. Different socioeconomic, demographic and geographical conditions determine environmental exposures, producing important health inequalities.
- Health care financing is critical in determining how health systems can either mitigate or exacerbate economic shocks experienced by households.