

POPULATION & SOCIETIES

No. 450
NOVEMBER 2008

An overall decline in middle-age mortality across Western Europe: lowest death risks for Spanish women and Swedish men

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Middle age (40-70 years) death risks decreased by close to 50% in western Europe (54% for women and 39% for men) during the latter half of the past century. However, mortality patterns evolved differently between countries. Stein Emil Vollset describes these trends and briefly places them in the perspective of changes in lifestyle and improvements in medical care and prevention.

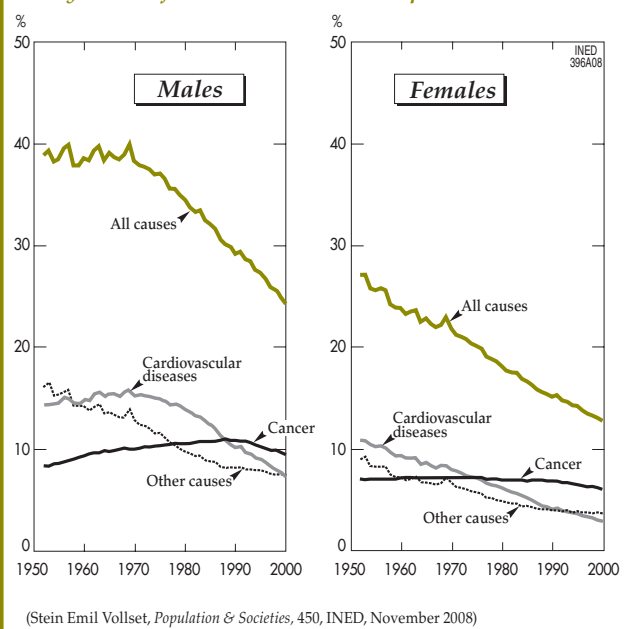
In developed countries, most deaths now occur after age 70 and even after age 80. It is nonetheless interesting to focus on mortality before age 70, since the causes of death at these ages are closely linked to lifestyle and reveal differences that exist between men and women and between countries. For example, a recent study showed that in a Norwegian cohort of men and women followed for 25 years between 1975 and 2000, risk of death between 40 and 70 years of age was 9% for women and 14% for men who had never smoked cigarettes, compared with 19% and 35%, respectively, for women and men who continued to smoke after age 40 [1].

To compare mortality across Europe, we extracted from the WHO mortality database [2] complete data series on cause-specific mortality for the period from 1952 to 2001 for 12 western European countries with a population of more than one million. These countries are Denmark, Finland, France, Germany (1), Ireland, Italy, the Netherlands, Norway, Spain, Sweden, Switzerland, and the United Kingdom. The risks of death from all causes and by major disease groups between ages 40 and 70 were calculated using standard life table methods [3].

◆ A rapid decrease in mortality at ages 40-70

In 1952, for a person aged 40, the risk of dying before their 70th birthday (30q40) was 39% for men and 27% for women. Across Europe, the risk ranged from 28% to

Figure 1 - Trends in death risks between 40-70 years of age by cause of death in western Europe (12 countries)



49% for men and from 21% to 31% for women. Among women, the middle-age death risk declined by 58% between 1952 and 2006, due to an almost linear decrease of 2.9% per decade over the period. For men, the mid-

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(1) Federal Republic of Germany up to 1990, reunified Germany since then.

dle-age death risks remained relatively stable up to the mid-1970s, then fell sharply by 5.2% per decade from 1975, producing an overall decrease of 46% over the period, slightly less than for women.

For the years 1952-2001, Figure 1 also shows trends in middle-age death risks from cancer, cardiovascular disease and all remaining causes combined. The observed decline was due to a fall in cardiovascular disease (for women throughout the period and for men starting around 1970) and in remaining causes. Middle-age death risks from cancer were stable for women and increased for men for the period 1952-1990. After 1990 they decreased for both sexes.

◆ Variations by country and sex

In 2006, for the combined population aged 40-70 of these 12 countries, the death risk was 21% for men and 11% for women (Table 1) [2]. For men, middle-age mortality risks were lowest in Switzerland, Sweden and Norway (16.8% to 18.2%) and highest in Finland, Denmark and France (22.6% to 24.3%). Among women, the lowest risks were seen in Spain, Italy and Switzerland (8.9% to 9.9%) and the highest in Denmark, United Kingdom and the Netherlands (12.8% to 15.5%).

There appears to be only a weak relationship between male and female middle-age death risks (Figure 2). For example, middle-age death risks are practically identical for men in the United Kingdom and Spain, while for women they are much lower in the latter country. Conversely Norway and Finland have very similar female middle-age death risks, while the male risks are very different. As we will see below, these apparent inconsistencies can probably be explained by the decisive influence of lifestyle – which varies between countries but also between the sexes – on mortality at these ages.

Table 1 - Risk of death between ages 40-70 years (30q40)* in 12 western European countries, 2006

Country	Males		Females	
	(%)	Rank	(%)	Rank
Finland	24.3	(12)	11.4	(6)
Norway	18.2	(3)	11.5	(7)
Sweden	17.5	(2)	11.3	(5)
Denmark	23.5	(11)	15.5	(12)
United Kingdom	20.9	(7)	13.7	(11)
Ireland	19.1	(5)	12.6	(9)
Netherlands	19.1	(5)	12.8	(10)
Germany	22.4	(9)	11.8	(8)
Switzerland	16.8	(1)	9.9	(3)
France	22.6	(10)	10.7	(4)
Italy	18.5	(4)	9.8	(2)
Spain	21.0	(8)	8.9	(1)

* Risk for a person aged 40 of dying before their 70th birthday, expressed as a percentage.

Source: Life Tables for WHO Member States; accessed June 2008 (<http://www.who.int/research/en/>)

(Stein Emil Vollset, *Population & Societies*, 450, INED, November 2008)

◆ A radical change in geographical distribution between 1952 and 2001, for women especially

In the second half of the twentieth century, the geography of middle-age mortality changed differently for the two sexes (Figure 3, top). For men, the overall middle-age death risk showed relatively moderate changes in the rank position of the countries. Norway and Sweden were among the 3 countries with the lowest mortality, both in 1952 and in 2001, while France and Finland have remained among the 3 countries with the highest mortality.

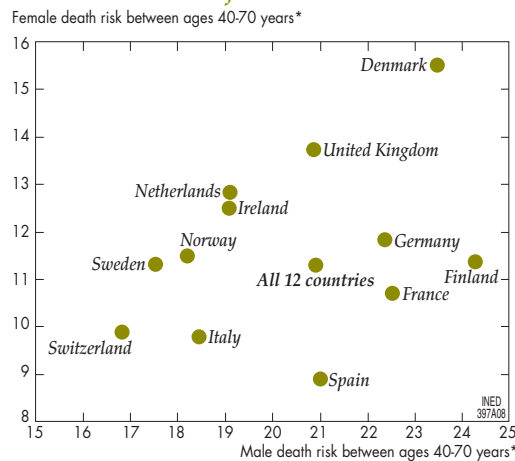
For women, on the other hand, we observe much larger changes in the relative position between the countries. In 1952 the highest female middle-age death risks were found in Finland, Spain and Ireland, and the lowest in Norway, Sweden and the Netherlands. In 2001, the picture was quite different, with the highest female death risks in Denmark, UK and Ireland and the lowest risks in southern Europe, notably Spain, Italy and Switzerland, followed by France.

◆ Contrasting trends in cancer mortality for men and women

A clear north-south gradient was observed for male middle-age cancer death risks in 2001. The highest death risks were observed in France, Italy and Spain and the lowest in Sweden, Finland and Norway (Figure 3, middle). This is quite different from the picture in 1952, when the highest male middle-age cancer death risks were observed in Finland, United Kingdom, and Switzerland, and the lowest in Spain, Sweden and Italy.

For women the picture is more complex. Throughout the period, Denmark had the highest female middle-age cancer death risk and Spain the lowest. In 2001, just behind Denmark, the northern countries (Ireland, the Netherlands, United Kingdom, Norway and Sweden), had the highest risks, with the notable exception of

Figure 2 - Relation between male and female middle-age risks of death in 2006



* Risk for a person aged 40 of dying before their 70th birthday, expressed as a percentage.

(Stein Emil Vollset, *Population & Societies*, 450, INED, November 2008)

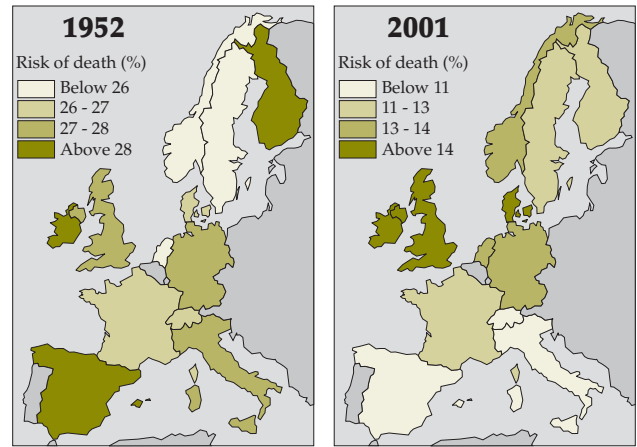
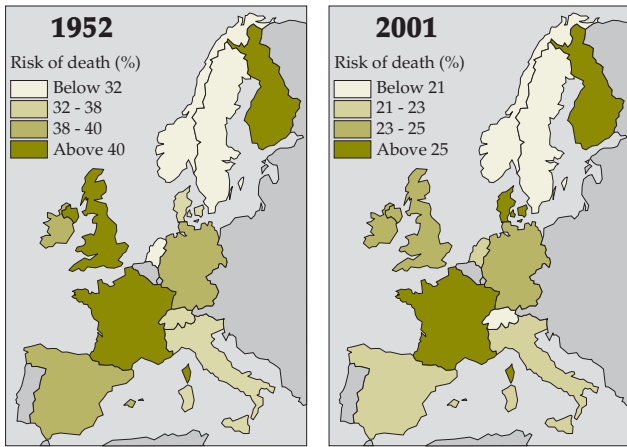
Figure 3 - Risks of death between ages 40-70 years from all causes, cardiovascular diseases and cancer in 1952 and 2001 (%)

Males

Females

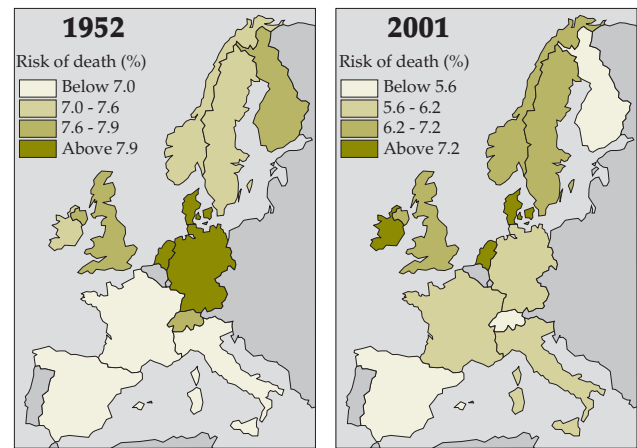
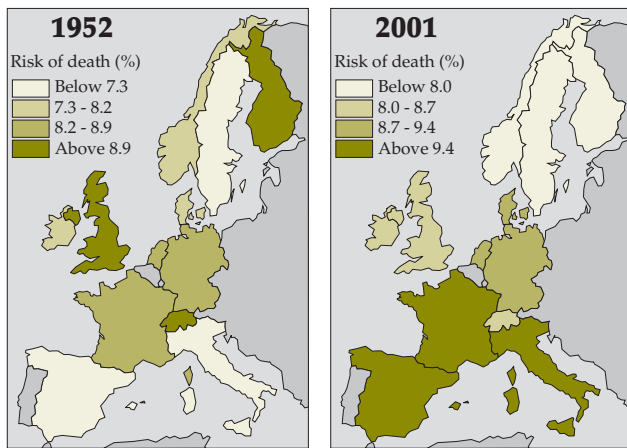
All causes

All causes



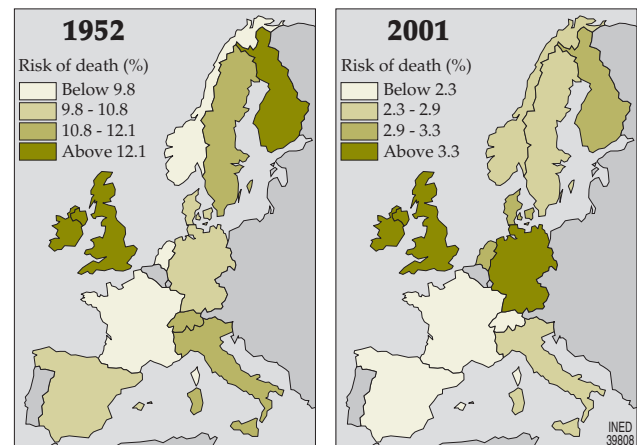
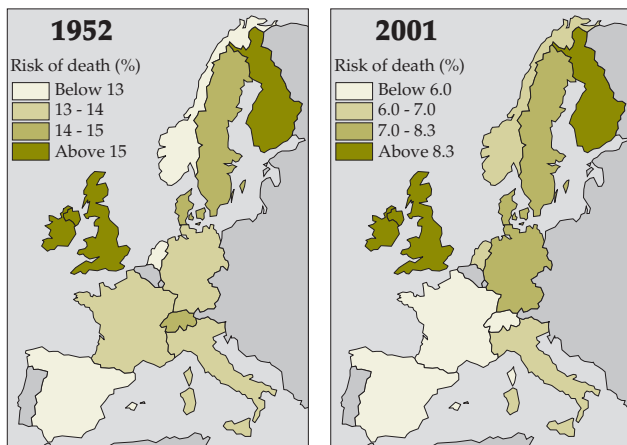
Cancer

Cancer



Cardiovascular diseases

Cardiovascular diseases



Note: The countries are divided into four groups of three. The darkest colour corresponds to the three countries where mortality is highest, and the lightest to the three countries where mortality is lowest. Separate rankings are given for each year, each sex and each group of causes.

(Stein Emil Vollset, *Population & Societies*, 450, INED, November 2008)

Finland where female middle-age cancer mortality was very low (just above Spain).

◆ A variable decline in cardiovascular mortality

In 1952, the lowest middle-age death risks from cardiovascular disease were observed in the Netherlands and Norway, but these countries were rapidly overtaken by France, in particular, but also by other southern European countries (Switzerland, Spain and Italy) (Figure 3, bottom). In 2001, lowest middle-age death risks were seen in France, Switzerland, and Spain both for men and women. Conversely, the highest middle-age cardiovascular death risks were found in Finland, UK and Ireland for women up to the 1990s and for men throughout the period. In 2001, the situation of Finnish women had improved while German women joined those of the United Kingdom and Ireland at the bottom of the ranking.

◆ A new hierarchy

Table 2 shows the middle-age death risks in 1952 and 2001 for all 12 countries and for those with lowest and highest mortality. We also computed the mortality ratios between the countries with highest and lowest middle-age death risks. In 1952, these mortality ratios were larger for men (1.75) than for women (1.46). In 2001 the situation was reversed: the middle-age death risk for Danish men was 33% higher than for Swedish men, while between Danish and Spanish women, the difference was 85%.

Between 1952 and 2001, Denmark and the Netherlands had the highest loss of rank position for both men and women. For example, both Danish women and men fell 8 places from 4th to 12th position in 2001. The largest gain was observed for Finnish women, who rose 6 places, and above all for Spanish women who jumped from 10th to 1st position (lowest mortality). Gains in rank position were smaller for men, for whom the largest improvements were observed in the United Kingdom and Switzerland.

◆ The influence of lifestyle

Explaining the trends observed and the differentials between the sexes and countries is beyond the scope of this short article and we refer the reader to discussions by others [4, 5]. Certainly, tobacco smoking is an important factor that contributes to the unfavourable trends among women in northern Europe compared with women in the south. For example, a recent comparison between Sweden and Denmark concluded that most of the excess mortality of Danish men and women could

Table 2 - Summary of changes in middle-age death risk in Western Europe*

	Males		Females	
	1952	2001	1952	2001
All countries	38.8	23.6	27.1	12.5
Country with lowest mortality	Norway 28.2	Sweden 19.5	Norway 21.4	Spain 9.9
Country with highest mortality	Finland 49.3	Denmark 25.9	Ireland 31.2	Denmark 18.4
Mortality ratio (1)	1.75	1.33	1.46	1.85
Country with highest rank loss (2)	Denmark 8 (4th to 12th) Netherlands 3 (2nd to 5th)		Denmark 8 (4th to 12th) Netherlands 7 (2nd to 9th)	
Country with highest rank gain	United Kingdom 4 (11th to 7th) Switzerland 4 (6th to 2nd)		Spain 9 (10th to 1st) Finland 6 (11th to 5th)	

*Risk for a person aged 40 of dying before their 70th birthday, expressed as a percentage.
(1) ratio of highest middle-age death risk to lowest middle-age death risk.
(2) rank 1: country with lowest middle-age death risk; rank 12: country with highest middle-age death risk.
(Stein Emil Vollset, *Population & Societies*, 450, INED, November 2008)

be explained by higher tobacco and alcohol consumption in Denmark than in Sweden [6]. Recent studies have shown important reductions in mortality associated with non-smoking, exercise, moderate alcohol consumption, and high fruit and vegetable intake, or a Mediterranean diet. Furthermore, improved secondary prevention and medical treatment of cardiovascular disease have contributed to the decline in mortality from this disease over the past few decades.

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ABSTRACT

From 1952 to 2001, risk of death between 40 and 70 years was reduced by close to 50% in western Europe. Comparing mortality trends in the 12 countries for which complete cause-of-death data are available for the period, we see that the ranking of Spanish and Finnish women greatly improved with respect to women in other countries. A more moderate improvement was observed for men in the United Kingdom and Switzerland. By contrast, both women and men in Denmark, and women in the Netherlands dropped down the rankings and lost the advantageous position held at the start of the period.