The (possibly) deceptive figures of decreased coronary heart disease mortality in Europe

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This editorial refers to ‘Cardiovascular disease in Europe: epidemiological update’1, by M. Nichols et al., on page 3028 and ‘Trends in age-specific coronary heart disease mortality in the European Union over three decades: 1980–2009’‡, by M. Nichols et al., on page 3017

Nichols et al. have presented updated data on the distribution of cardiovascular disease in Europe, and describe the trends observed in coronary heart disease (CHD) mortality in the European Union over a period of 30 years, from 1980 to 2009. The authors analyse sex-specific data from the World Health Organization (WHO), with the intention of determining the burden of cardiovascular disease in European countries, and whether the known overall decrease in CHD mortality has been uniform during this period of time, across countries, sex, and age groups.

Current status of cardiovascular disease in Europe

Unfortunately, cardiovascular disease remains the leading cause of mortality in Europe, accounting for 46% of the total number of deaths, with ~20% related to coronary artery disease and 12% to stroke. It still is the leading cause of death among both men and women. In a few countries, mainly from Western and Southern Europe, however, cancer has become the leading cause of death. Perhaps more importantly still, cardiovascular disease caused the premature death of 1.5 million people before the age of 75.

When comparing the most recent data for age-standardized mortality across European countries, huge differences can be observed, with lower rates in Israel, France, Spain, and The Netherlands, and up to seven-fold higher rates in Eastern countries such as the Russian Federation or Uzbekistan.

Beyond mortality, cardiovascular disease also has a major impact on morbidity, although figures on hospitalization for cardiovascular disease represent a gross approximation of the burden this condition may represent. Between-country and time comparisons are, however, difficult, as the reported rates are not age standardized. Likewise, the methods used to report cardiovascular procedures such as coronary angioplasty differ between countries and make the data less reliable.

Evolution of cardiovascular disease mortality in Europe: differences by country and gender

Overall, the evolution of cardiovascular mortality appears extremely encouraging, showing that, in many European countries, CHD mortality has decreased by >50% in just three decades. In men, the smallest decrease was observed in Poland and Hungary (−7%) and the largest in Denmark (−72%); only one country showed an increase in CHD mortality (Romania); many countries with traditionally high CHD mortality rates, >300 per 100,000 men (mostly from Northern Europe, such as the UK, Sweden, or Denmark) now have rates that would have classified them as ‘low CHD mortality’ countries (<130 per 100,000 men) 30 years ago. Similar trends were found in women, although CHD mortality has increased in Romania, Poland, and Hungary. When looking at trends according to the initial level of CHD mortality, there is little indication that the decrease has been much larger in countries with initially high mortality rates: in men, −37% in countries with an initial rate of ≤130 per 100,000, −36% in countries with a rate from 150 to 300 per 100,000, −47% in countries with an initial rate >300 per 100,000; in women, the figures are −32, −41, and −45%, respectively for initial rates of <100, 100–200, and >200 per 100,000. This suggests that specific efforts are still needed in countries with the highest rates of CHD mortality in order to attenuate the inequalities persisting among European countries. In any given country, however, trends appear rather comparable in men and women, suggesting a lack of gender bias in the results of health policies regarding cardiovascular prevention.

Differences by age and time period

Besides analysing the overall change in CHD mortality in the last three decades, Nichols et al. tried to determine, using elegant statistical techniques, whether there was evidence of any slowing in the...
decrease in CHD mortality in the most recent years of the observation period. More specifically, the authors wanted to test the hypothesis that the rate of mortality decrease might plateau in younger age groups, because of the recent and marked increase in obesity and diabetes in younger people: they found, however, no such evidence. In most countries, there was no evidence of a halt in the general trends of decreased CHD mortality. The annual percentage decrease in CHD mortality was at least as large in the 2000s as it was in the 1980s; moreover, if anything, the annual percentage decrease appeared rather larger in men <45 years of age than in those aged ≥65 years; in women, there was also no indication of substantial differences according to age groups. Nonetheless, the trends seemed to plateau in the under 45 year age group in several countries including Latvia, Lithuania, and the UK (for both men and women); Italy, Poland, and Slovakia (for men only); and Czech Republic, France, and Italy (for women only).

These encouraging findings, however, may be deceptive and falsely reassuring as to what we should expect in the coming years. Indeed, as they do recognize, Nichols et al. have studied CHD mortality, which is the result of a truly long-term process made up of the combination of progressive development of atherosclerosis over many years or decades, and the incidence of coronary events, of which most are not, at least immediately, lethal, thanks to the progress made in their management.

Thus, the impact of risk factors such as obesity or diabetes on the occurrence of clinically symptomatic coronary events will take years before it becomes apparent, and the 30-year observation period of the present analysis may be insufficient to draw final conclusions in this regard. In fact, the problem of increasing obesity in Europe is more or less contemporary to the period studied here, and the increase in body mass index from 1980 to 2008 has not been uniform throughout Europe, being substantially greater in Western Europe (+0.6 kg/m² in men and +0.4 kg/m² in women) than in Central (+0.4 and +0 kg/m², respectively) or Eastern (+0.2 and +0 kg/m², respectively) European countries.3 Studying the impact of increasing obesity rates on CHD should therefore need more time, with a necessary time lag between any relevant increase in the risk factor and the time the incidence of CHD is studied. As an illustration, no increased incidence of diabetes mellitus was observed in Sweden in subjects 25–64 years of age from 1986 to 1999, despite an almost 1 kg/m² increase in body mass index.4 It is therefore hardly surprising that no impact on CHD mortality could be documented here. This, however, is not the case for all risk factors; in particular, the positive impact of a reduction in smoking may be much more rapid, as smoking has an immediate effect on thrombosis, beside its long-term impact on the development of atherosclerosis; as a result, the restrictive policies set up in most European countries since 1980 are much more likely to have had immediate effects on the occurrence and complications of CHD,5–7

The second point of interest is the possible discrepancy between CHD incidence and CHD mortality. Indeed, a reduction in CHD mortality is likely to result from both a reduction in CHD incidence and improved treatment of overt CHD. However, both do not necessarily follow the same trends. The difference between trends in CHD mortality and trends in CHD incidence can be illustrated by data we collected in France over the past 10 years (Figure 1). From 2002 to 2008, the incidence of myocardial infarction in France has decreased by 2.5% per year,8 a trend similar to that observed in other countries.9–11 This decrease, however, was not uniform across age and sex groups: a marked reduction was found in older individuals (>65 years of age), similar in men (−23% during the observation period) and women (−24%); in contrast, the decrease was about half in younger men (−10%), and a reverse trend (+7% increase) was found in younger women. This finding supports the initial hypothesis of Nichols et al. of a less favourable trend regarding the evolution of CHD in younger people, probably explained by the emergence of the new risk factors or, in the case of women, by the increased rate of smoking observed in France in the past two decades. In spite of this, the data from the Unité de Soins Intensifs Cardiologiques (USIC) 2000 survey,12 and French registries on Acute ST-elevation and non-ST-elevation Myocardial Infarction (FAST-MI)13,14 document a marked decrease in 1-year mortality.
in patients admitted for acute myocardial infarction, with no hint of a lesser improvement in the younger age groups, whatever the gender. Looking only at decreasing myocardial infarction mortality is therefore deceptive, as it masks the increase in the incidence of myocardial infarction observed in younger women.

In conclusion, although the continuous decrease in CHD mortality during the past three decades in European countries is an undisputed success for cardiologists and for the health policies implemented over this time period, we should not rest on our laurels. First, large inequalities still persist between European countries despite the generally improved trends, and efforts should be deployed to reduce them. Secondly, CHD mortality is the result of a long and mixed process, and analysing CHD mortality only may hide much less favourable trends regarding the incidence of clinically overt CHD. We should certainly not think that the battle against CHD is over; both health policies promoting healthier lifestyles, in particular regular physical activity, healthier diet, and avoiding smoking, and developing treatment strategies for the increasingly frequent metabolic disorders that plague our society are more than ever necessary.

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