Commentary: Predicting future coronary heart disease deaths in Finland and elsewhere

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Globally, cardiovascular disease will remain the dominant cause of death and disability in the next few decades. In Finland, and in many other industrialized countries, age-adjusted coronary heart disease (CHD) mortality rates have halved recently, mainly as a result of reductions in major risk factors (cholesterol, smoking, and blood pressure), plus additional gains from medical treatments. The pressing question is: given demographic ageing, what is going to happen to disease prevalence and, hence, the population burden of disease?

In this issue, Huovinen et al. have used Bayesian statistics to predict demographic ageing and CHD deaths in Finland, up to the year 2030. The analysis used data from three areas in Finland previously defined through high-quality Fin-risk surveys. This produced a total population of ~400 000 aged 30–99 years. Although the number of fatal CHD events annually was fairly small (~4000), reasonably narrow confidence intervals were achieved. The probability of death was based on a Bayesian age-period-cohort model created using WinBUGS software and R software. If we accept this approach, then the results are interesting. Although the population does not change in size, demographic ageing will be substantial, with the proportion >80 years increasing by 2030 from 5.1 to 9.6% in men and from 10.5 to 14.7% in women (maturation of the baby boom). They considered two alternative scenarios, first assuming that CHD mortality rates will simply continue at present levels. Alternatively, if the recent decline in age-specific death rates between 1970 and 2002 continues, deaths would continue to plummet in the young and middle-aged groups and CHD deaths would predominantly occur above the age of 80 years. In both scenarios, the number of CHD deaths would increase substantially, by ~70% in men and by 50–100% in women. Over 80% of female CHD deaths already occur beyond the age of 80, (compared with only 40% in men, but rising to 76% under the more optimistic scenario in 2030). This would represent a 4-fold increase in deaths in the oldest men (aged 80 plus) and a 3-fold in the oldest women. This would indicate corresponding increases in incidence and, crucially, in prevalence. Hence, major implications for future health service demands in Finland and comparable countries.

The discussion reasonably states that this substantial increase in CHD deaths in the elderly is likely to be valid for the whole of Finland and for many other Western countries. The discussion less reasonably assumes that recent beneficial reductions in major risk factors will continue. Unfortunately, this is unlikely. First, the most recent Fin-risk surveys demonstrate flattening or even rises in blood pressure, cholesterol, and smoking in the younger age groups; older groups may follow suit. Second, we have to acknowledge the powerful influence of global trends in social and economic factors. What happens in the US tends to be seen subsequently in Europe and beyond. Currently, the dramatic rises in obesity (and hence diabetes) threaten to cancel out the benefits of recent positive trends in cholesterol, blood pressure, and smoking in the youngest groups. The party may soon be over.

The good news, however, is that in Finland and elsewhere, premature CHD deaths have halved and are likely to fall further. Thus, more grandparents will survive to enjoy their grandchildren and vice versa. This fits with two concepts popularized by Fries 20 years ago. Firstly rectangularization of mortality. Second, compression: in other words, if age of disease onset was substantially delayed, the period of ill health prior to death might be reduced. This is a more challenging goal than simply extending healthy life-expectancy. Because the CHD mortality rate falls principally reflect reductions in incidence rates rather than improvements in case fatality rates, healthy life expectancy might indeed be expected to increase. However, several years of disease and disability prior to the cardiovascular death will still be the general rule. This morbidity will now occur in old age and be compounded by other disease and frailty, decreasing social support and increasingly costly healthcare.

Having delivered this sobering verdict, Huovinen et al. then happily anticipate revolutionary improvements in prevention and treatment. However, expecting major gains from future treatments may also be optimistic. Even if wealthy countries can afford novel and efficacious CHD treatments in future, the potential benefits will always be limited by four factors. First, up to half of all cardiac deaths are sudden and, therefore, inaccessible to most healthcare interventions. Second, having experienced the first cardiovascular event, even on optimal therapy, life-expectancy is still barely half that of a healthy individual. Third, even the best healthcare systems in the world have difficulty delivering appropriate therapies for >80% of eligible patients. Fourth, patients are human beings and (for a range of rational and irrational reasons) often cease to take long-term therapies. In the UK, we recently calculated that maximizing medications for eligible CHD patients could reduce deaths by ~20 000 annually. Conversely, modest further reductions in risk factors might reduce CHD deaths by 50 000 per year, halving current UK CHD mortality.

Most evidence clearly favours Rose’s population approach to prevention, rather than the high-risk approach, even though some debate continues. Prevention and treatment for high risk in individuals is also resource intensive. Conversely, policy...
change at the national and international level can have a high impact, being effective and cost-effective. Simple diet policy initiatives in countries as far apart as Finland and Mauritius have achieved substantial reductions in population cholesterol levels and corresponding falls in cardiovascular deaths. Furthermore, smoke-free legislation is likely to achieve substantial economic gains not just health benefits.

In conclusion, we are witnessing an important paradox in the majority of industrialized countries (and subsequently in developing countries). Cardiovascular and CHD mortality rates have halved over recent decades. The substantial reduction in tragic premature deaths is a great public health achievement. But because of population ageing, the total numbers of deaths have not declined correspondingly and are likely to increase substantially. The future continuing burden of cardiovascular disease will increasingly affect older groups and will stretch healthcare systems, even in the wealthiest countries.

References