What are Your Chances of Having a Heart Attack?

It is never easy to predict the future, but Dr *Peter Brindle*, a GP in one of Bristol's inner-city practices and a Wellcome Trust Research Fellow in the Department of Social Medicine, is trying to find a more accurate and inclusive ways of identifying those at risk from coronary heart disease.

The requirement for a GP to predict an individual's risk of cardiovascular disease is set out in the Department of Health's National Service Framework (NSF) for coronary heart disease. The NSF requests that the future risk of all their patients who are free from cardiovascular disease, such as a previous heart attack or stroke, is assessed so those at highest risk can be identified and given appropriate advice and treatment. This risk-reducing treatment includes drugs to lower cholesterol and blood pressure, as well as aspirin.

There are several methods GPs can use to score an individual's risk. All of them use a combination of different 'risk factors' such as the patient's age,

sex, smoking habits, blood pressure, whether or not they have diabetes, some information about their cholesterol levels, and the results of an electro-cardiogram. These risk factors have been taken from the Framingham Heart Study that collected information from 5,573 men and women who lived in the predominantly white and middle-class town of Framingham in Massachusetts, USA, between 1968 and 1975. But the decrease in coronary heart disease mortality since the 1970s and different population characteristics between Framingham and modern Britain, now means that the accuracy of these Framingham-derived risk scoring methods is uncertain, when applied to the diverse population now living in Britain.

Dr Brindle began to have doubts about the accuracy of the Framingham-based risk scoring methods when using them every day in his practice. So he teamed up with different groups around the country to assess how accurate they really are. Brindle and his colleagues from London University tested the accuracy of the Framingham coronary risk predictions in 6,643 men from the British Regional Heart Study – a British equivalent of the Framingham Study. They calculated each man's coronary risk and then compared these predictions with the actual coronary events that occurred over ten years. During this period, 2.8 % of the men died from coronary heart disease, compared with the 4.1% predicted by Framingham – an over-estimation of 47%. When ➜

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➜ fatal and non-fatal coronary events were combined, only 10.2% of the men experienced an event such as a heart attack or angina, compared with the 16% predicted – an over-estimation of 57%.

These findings are highly significant. If patients are being told that their risk of a future cardiac event is much higher than it actually is, it makes it very hard for them to make an informed choice about whether they want to take a potentially lifelong treatment that requires regular visits to their GP for appropriate monitoring. Furthermore, the belief that they are considered to be at high risk could cause them unnecessary psychological stress, to say nothing of the cost to the NHS of prescribing unnecessary drugs. It is worth bearing in mind that these are people who, as yet, do not have any evidence of cardiovascular disease.

occurred in the 93% of men who had been classified as *low* risk by the Framingham score, meaning that they would have been unlikely to have been offered cholesterol-lowering treatment. According to the guidelines, cholesterol-lowering treatments should only be offered to people who have more than a 30% risk of having coronary heart disease within a ten-year period. But this failure to successfully identify the high-risk individuals says more about the 30% threshold than the inadequacy of the Framingham risk score. When a lower threshold of 15% over ten years was selected, 75% of coronary deaths occurred within the high-risk group that now included almost half the study population. Although lowering the threshold from 30% to 15% reduced the number of people wrongly identified as low-risk, it came at the cost of

applicable to modern British practice. Newer scores are being derived, but these too are based on data collected some time ago, and will not be able to keep up with these trends. Also, methods such as the Framingham score have no way of taking into account the variation of cardiovascular disease within a country, or within different populations such as inner-city practices where the vast majority of patients may belong to a black or minority ethnic group.

In work funded by the Department of Health and the British Heart Foundation, Brindle has founded the Bristol Cardiovascular Risk-scoring Group, which draws together experts in statistics, epidemiology, public health and general practice, in an effort to address these shortcomings. And although he recognises that no

The risk factors are based on data collected in the 1970s from the small town of Framingham, Massachusetts

Brindle's team also found considerable variation in the accuracy of the Framingham risk score depending on where in the country the participants lived. For example, they found that in Scotland, where the risk of coronary heart disease is relatively high, the Framingham score over-predicted by about 28%, but this contrasts with an over-prediction of about 70% in the south of England, where the rate of coronary heart disease is less.

Another finding from the study, which is perhaps of more concern, is that 84% of the coronary heart disease deaths

considerably increasing the numbers of those identified as being at high-risk and eligible for life-long treatment, but who did not go on to develop a coronary disease.

The main problem with the Framingham risk score, and with other similar scores based upon data collected many years ago, is that it can-not keep up with the change over time in the rate of disease in populations. There has been a 50% drop in male coronary heart disease mortality since the 1970s, so it is not too surprising that the Framingham score may not be

cardiovascular risk score can predict the risk of a heart attack or stroke with perfect accuracy, his work and that of colleagues will result in a more accurate and more inclusive way of targeting those of us who might benefit from taking tablets to lower our blood pressure or cholesterol. ■

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