Is estimating lifetime cardiovascular risk useful?

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No, but forecasting short term risk throughout life is

One of the exercises we set our medical students when introducing clinical epidemiology is to present the risk profile of a middle aged man and ask them to estimate his risk of death. Eventually someone works out the answer—100%. Death is inevitable, it is when and how the patient dies that are important. So does the QRISK lifetime cardiovascular risk model described in the linked study by Hippisley-Cox and colleagues (doi:10.1136/bmj.c6624) have any more clinical relevance than the lifetime risk of death?

The QRISK lifetime cardiovascular risk model was derived from the QResearch database, an ongoing extract of clinical and administrative data from electronic general practice records in England and Wales, dating back to 1994. The database has generated the world’s largest cardiovascular risk prediction cohort study, which now includes more than three million people aged 30-84 years. The linked study reports that one in two British women have an estimated lifetime cardiovascular risk of over 30% and one in 10 have a risk of 50% or more. For men the equivalent risks are 40% and almost 65%.

Would this information help clinicians tailor treatment any differently for patients at the 50th centile of risk compared with those at the 90th centile? Both risks are substantial because cardiovascular disease is the main cause of morbidity and mortality in Britain. Therefore, the whole population, whatever their individual predicted lifetime risk, should be informed of the high “national” lifetime risk of cardiovascular disease and receive general advice about how to reduce it. Indeed, the major value of lifetime risk calculations is to inform health policy and planning rather than personalised healthcare.

From a clinical perspective, another problem with a personal lifetime cardiovascular risk estimate is how to determine the optimum value to aim for. Counterintuitively, the ideal is probably 100%, with the first cardiovascular event being sudden death while sleeping, some time after making it to 100 years of age. Furthermore, some groups at high risk of premature death, like smokers, may have a lower lifetime risk of cardiovascular disease than non-smokers because cancer kills them first.

So what information about cardiovascular risk would best inform clinical decisions? The clinician’s main role here is to identify those patients at highest risk who will benefit most from specific individualised interventions and to determine when these interventions should be started. We now have a wide range of relatively cheap safe drugs that can more than halve the risk of a cardiovascular event within about five years. However, the absolute benefits of these drugs, and their cost effectiveness, are directly proportional to the patient’s risk of having a cardiovascular event during the same period. The QRISK research group is already a world leader in developing the short term cardiovascular risk prediction tools that clinicians need to identify these high risk patients (www.qintervention.org/index.php). So why do clinicians continue to ask for information about their patients’ longer term risk?

The main reason is the challenge of managing younger patients with multiple cardiovascular risk factors, like the 40 year old male “ticking time bomb” who smokes, is overweight, has a blood pressure of 150/90 mm Hg, and a total cholesterol to high density lipoprotein cholesterol ratio of six, yet has a 10 year cardiovascular risk, according to QRISK’s short term risk calculator, of only 5% (www.qintervention.org/index.php). The 10 year risk is unhelpful for informing this patient what his future may hold, because short term cardiovascular risk is strongly age dependent and does not capture the importance of younger patients’ longer term risk. However, does this patient’s predicted lifetime cardiovascular risk—the risk of having a cardiovascular event if he lives to 95—provide any more useful information?

His lifetime cardiovascular risk, based on a new QRISK lifetime risk calculator, is about 50%, and if he stops smoking, loses 10 kg, drops his systolic blood pressure by 10 mm Hg and his lipid ratio by one unit, this risk will fall to 40%. Unfortunately, this adds little to the predicted 10 year risk. Of far more relevance is the graphic display (www.qrisk.org/lifetime/index.php), included as part of the calculator’s output (examples for two other patients are shown in boxes 1 and 2 in the linked paper). The graphs present a continuous prediction of patients’ cumulative cardiovascular risk throughout their lifetime, based on both current risk profiles and if their risk profiles improve. The most important risk related factor—time—is incorporated into the graph, and it is simple to read off the predicted risk for any time period from a few years to a lifetime.

The new QRISK cumulative cardiovascular risk graph is similar to the heart age forecast tool (www.knowyournumbers.co.nz/heart-age-forecast.aspx), although the latter includes an additional metric—the patient’s estimated “heart age”—to help with risk communication. Cardiovascular risk forecast calculators incorporate both short and longer term risk in one simple display and so have important advantages over separate 10 year and lifetime cardiovascular risk calculators.