Heart Forecast for cardiovascular risk assessment

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People can foresee the future only when it coincides with their own wishes, and the most grossly obvious facts can be ignored when they are unwelcome. Orwell

Risk communication has long been acknowledged to be fraught with pitfalls and subject to manipulation. The magnitude of harm and the publicity given to a risk can grossly sway perception of the problem. For example, risk of death from terrorism has a low lifetime probability of occurrence (well under 0.01%) but the harm is sufficiently clustered in time and space that it becomes newsworthy and therefore noted; in contrast, cardiovascular deaths have a high lifetime probability of occurrence (~20–25%) but the harm is spread very thinly because each victim dies alone and out of the public eye.

Measures which are seen to be reasonable in preventing these varying classes of event have differing levels of acceptability. While it is widely considered acceptable to curtail personal freedoms to reduce the threat of rare but aggregated attack, restriction of personal choice of food in order to prevent the 2000 times more likely occurrence of cardiovascular disease (CVD) is almost universally considered unacceptable. The problem becomes amplified in primary prevention, where returns from intervention are low and accumulate over the long term, whereas the disutility incurred by forced lifestyle change or the side effects from drug treatment are immediate.

CHOICE OF DENOMINATOR
A change in the time frame or denominator value may also distort the evaluation of a risk. Fifteen per cent over 10 years is almost equivalent to 1.5 in 100 people per year, but may have a very different impact. If you ever want dangerous behaviour to seem safe, express risk per day, per hour or per minute increment in risky action: smokers concerned that 16 per 100 people who smoke will develop lung cancer in their lifetime because of their habit, might take refuge in the fact that this is only a 0.0000000006 chance per minute.

RELATIVE OR ABSOLUTE
Presenting relative risks and benefits as opposed to absolute values using statements such as “this will halve your risk of a heart attack,” tends to increase awareness of treatment benefit even when absolute benefits may be low (half of zero).2–4 Within medicine and science it may be better to discuss effects as proportions, because many interventions (aspirin, statins, antihypertensive drugs, primary angioplasty) exert a risk reduction that is more consistent between patients when expressed as a proportion than when expressed in absolute terms, but this may not be the best way to speak to patients.

RISK COMMUNICATION
Providing a reference to frame risks lies at the core of good risk communication. Visual or diagrammatic representation and personalisation of information is useful.5 Giving patients absolute values with a comparative reference frame improves understanding, although it may reduce the perceived benefit of intervention. Thus a statement such as “15 out of 100 people like you would develop a heart attack if left untreated for the next 10 years whereas if all 100 were treated with a statin only 10 out of a 100 people would develop a heart attack,” is more accurately understood than saying that “statin treatment could reduce your risk of a heart attack by one-third.” The latter is reliant on the patient’s inherent perception of risk and an internal reference frame which varies from person to person. Whether 15 out of 100 is seen as a high, reasonable or low risk can be influenced by benchmarking, either by comparison with other (non-medical) risks, such as 0.05 in 100 chance of dying in road traffic accident in the UK over the same period of time,6 or by comparison with ‘the average’ person.7 Patients do understand risks and trade-offs,4 and concordance with treatment improves with comprehension of risk.1 Patients trust doctors more when presented with numerical information than when given vague interpretations of risk.8 However, there is not yet a consensus in the medical profession that risk reductions must be expressed to patients in absolute rather than relative terms.

The Heart Forecast tool developed by Wells et al tackles some of these problems head on.9–10 Wells et al frame the patient’s individual cardiovascular risk in terms of absolute values and then compare them with an ‘ideal’ person who has no elevation of her/his cardiovascular risk factors. The ideal person is then projected on a graph, as growing older until their age-related risk of a cardiovascular event matches that of the patient. The gap between the patient’s current age and the number of years it would take for an ‘ideal’ person to reach the same level of risk is added on to the patient’s chronological age and presented as the ‘arterial age’ of the patient. This is intrinsically understood in an era when mass media has already popularised similar notions of ‘skin age’ and ‘heart age’. Wells et al efficiently present a great deal of information in a very compact visual format, and excellently emphasise absolute risks. Some may question using the ‘ideal’ rather than the average person as a reference benchmark, which makes the ‘arterial age gap’ rather wider than it

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Editorial

might otherwise be. However, we support their choice, since surely doctors should be offering health not middling cardiovascular decay. Indeed, were the benchmark an average person, we would find ourselves advising half our patients to ‘slob out’ more.

If we have a criticism, it is of Wells et al’s arbitrary choice to curtail the event horizon to 5 years rather than a lifetime. As they rightly point out, using a lifetime horizon it is difficult to meaningfully differentiate between the risks of most patients, and over 95% would merit treatment. Discomfort with the wide-ranging implications of a calculation does not make that calculation itself incorrect.¹¹

More philosophically, knowing one’s risk to be high does not necessarily mean that one will, must or even should take preventive steps. Taking action is dependent on many factors, and a large part of a patient’s resistance to treatment involves the difficulty of implementing lifestyle changes or reluctance to embark on a lifetime of medication. However, if patients, properly aware of their risks, value the utility of unhealthy behaviours (and freedom from the sensation of being medicalised) more highly than that of a probably longer healthy life at some stage in the future, then is that choice not theirs to make, just as is their personal preference between tea and coffee, or between cotton and silk? If, at the end of life, we emphasise freedom to choose how to spend one’s fading hours, should we not allow that same liberty decades before?

Despite the emphasis on total absolute risk rather than single risk factors as the target for treatment, the Heart Forecast tool somewhat undermines this position at the end of the forecast when it allows values of single risk factors such as blood pressure or cholesterol to be tweaked, in order to demonstrate the effects this would have on the risk profile. In reality, patients are not choosing between blood pressures but between behaviours, and whether or not to take medication. It might have been better to demonstrate the effects of realistic and practical interventions on the risk profile, such as implementing 30 min of moderate intensity physical activity per day, or ingesting one, two or three or more tablets per day. This would re-emphasise the absolute risk as the target of treatment, and reorientate patients and practitioners away from the concept of ‘abnormal’ risk factors as targets for intervention, as well as placing lifestyle modification on a par with medical treatment.

Ultimately, the aim of any risk communication aid is to change patient and clinician behaviour. The Heart Forecast tool is excellent in displaying individual CVD risk over time in a user-friendly format in order to promote such changes in practice and behaviour. The wider question of the in congruity between access to different classes of intervention, however, remains. Decisions on whether to eat healthily,¹² and whether to take exercise,¹³ can be made independently by anyone, without medical permission, because adverse effects are few. One possible future would be to extend this freedom to preventive pharmacotherapy with low adverse event rates, allowing it to be accessed at cost by anyone who wants it, given that all lifetime risk profiles are high when compared with the ideal. Funding DF is funded by a BHF Senior Clinical Fellowship FS/10/038/28268 and acknowledges support from the NIHR biomedical research centre scheme. PA is funded by a Wellcome Trust Clinical PhD Fellowship.

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