

### DON'T BE FOOLED BY EYE-CATCHING STATISTICS

'Let's say the risk of having a heart attack in your fifties is 50 per cent higher if you have a high cholesterol. That sounds pretty bad. Let's say the extra risk of having a heart attack if you have a high cholesterol is only 2 per cent. That sounds OK to me. But they're the same (hypothetical figures). Let's try this. Out of a hundred men in their fifties with normal cholesterol, four will be expected to have a heart attack; whereas out of a hundred men with high cholesterol, six will be expected to have a heart attack. That's two extra heart attacks per hundred.'

Goldacre B. *Bad Science*. London: Fourth Estate 2008, pp239-40.

because of the low rate of death from prostate cancer – and unlikely to have grabbed the headlines. The bottom line is that if a headline claim sounds overly optimistic it probably is!<sup>4</sup>

So numbers do matter, and presented well can help people make decisions. Patients should not hesitate to ask their doctor to explain results in a way that they can readily understand – with visual materials for clarity as necessary. If decisions about treatments are to be shared, both doctors and patients need to be clear about what the numbers actually mean.

#### ***Question 4: How can someone know that the research evidence applies to them?***

All decisions rely on previous experience of some kind – individual or collective. Fair tests of treatments such as randomized trials are simply well organized versions of that experience designed to minimize biases. Well organized or not, there will always be some uncertainty about how well previous experience can shape our advice for the next person. So if the patients who had been studied in the fair tests had a similar condition, at a similar stage or severity, to the individual in question, the most reasonable assumption is that the individual would get a similar response,

unless there was a good reason to think they or their condition were substantially different.

Of course, even if the evidence is applicable, a patient might reasonably ask: 'people are all different so surely they may respond differently?' The 'fair test' of a treatment will only tell us what works on average, but rarely guarantees it will work equally well in everyone; and it cannot usually predict who will suffer unwanted side-effects. Research evidence can be used to guide what treatment is likely to be best, and then tried in an individual. With some skin rashes, for example, evidence-based treatment could be applied to one area of the body, using another area as a control (see Chapter 6, p74). By comparing responses in the two areas, both doctor and patient can tell whether it works, or whether there is an adverse effect. Indeed it's common to try a 'test patch' when first using some skin treatments, such as acne treatments on the face.

Mostly, however, we don't have the convenience of such a straightforward comparison. For some chronic and non-life-threatening problems, such as pain or itch, it is possible to try repeated periods on and off a drug in the same patient. This approach is also called an n-of-1 trial, meaning that the number (n) of participants in the trial is one – a single patient. With such tests in individual patients, the principles for a fair comparison that we outlined in Chapter 6 still apply, including an unbiased or blinded assessment of outcome, etc. Ideally, then, we would use placebo controls of skin treatments or pills, but this is often difficult to organize.

For many conditions, however, we cannot 'try it and see': the outcome is too remote or too uncertain. For example, it is impossible to know whether aspirin will prevent a patient's stroke until it is too late. This is a problem in most cases of preventive medicine, and also with treatments for many acute conditions, such as meningitis, pneumonia or snake bite, where we don't have the opportunity to test it in each individual patient and see. So we then have to rely on whether and how to apply the evidence from the experience of studying others.

In practice, if we are happy the evidence applies, it is then important to ask how the severity of the condition in the patient (or the predicted level of risk in those who are still well) compares

with that of the people in the studies. In general, patients with more severe illness have more to gain from treatment. So if severity is equal to or greater than those in studies that showed a treatment to be beneficial, we can generally be confident about the applicability of the evidence. If their illness is less severe (or if still well, they are at relatively low predicted risk) the key issue is whether a smaller benefit than that seen in the studies might still be considered worthwhile.

*Question 5: Won't genetic testing – and 'personalized medicine' – mean doctors can work out the specific treatment needed in every individual and make all this unnecessary?*

Although the idea of being able to work out the specific treatment needed in every individual is undoubtedly attractive, and may be possible for a few conditions, it seems very unlikely that this approach will become the main way of treating people. As we explained when discussing genetic tests in Chapter 4 (p43-44) most diseases depend not only on complex interactions involving several genes, but also on the even more complex interactions between genes and environmental factors.

The results of genetic analyses have been important in informing decisions in families and individuals with inherited disorders, such as Huntington's disease, thalassaemias (inherited blood disorders), and some other (mostly rare) diseases. This genetic information has been a great boon in counselling families with these conditions. However, as far as the more common diseases to which we are all subject are concerned, genetic analysis adds little to information already available from family history and clinical examination. Although this situation is likely to change, our limited current knowledge means that we need to be careful not to overinterpret risks for common diseases predicted on the basis of genetic analysis.

We should declare that none of the authors have had their genetic profiles done, nor are we considering doing so. So it shouldn't surprise you that we would generally advise against genetic testing unless someone has (i) a family history that suggests a specific known genetic disorder, or (ii) one of the few currently known conditions in which a gene or genes clearly predicts who will respond to a treatment.