

8 Assessing all the relevant, reliable evidence

IS ONE STUDY EVER ENOUGH?

The simple answer is ‘hardly ever’. Very seldom will one fair treatment comparison yield sufficiently reliable evidence on which to base a decision about treatment choices. However, this does sometimes happen. Such rare single studies include one showing that taking aspirin during a heart attack reduces the risk of premature death;¹ another making clear that giving steroids to people with acute traumatic brain injury is lethal (see below and Chapter 7, p89-90); and a third identifying caffeine as the only drug known to prevent cerebral palsy in children born prematurely (see Chapter 5, p57-58). Usually, however, a single study is but one of several comparisons addressing the same or similar questions. So evidence from individual studies should be assessed alongside evidence from other, similar studies.

One of the pioneers of fair tests of treatments, the British statistician Austin Bradford Hill, said in the 1960s that reports of research should answer four questions:

- Why did you start?
- What did you do?
- What did you find?
- And what does it mean anyway?

WHY DID YOU START?

‘Few principles are more fundamental to the scientific and ethical validity of clinical research than that studies should address questions needing to be answered, and that they are designed in a way that will produce a meaningful answer. A prerequisite for either of these goals is that relevant prior research be properly identified. . . . An incomplete picture of pre-existing evidence violates the implicit ethical contract with research participants that the information they provide is necessary and will be useful to others.’

Robinson KA, Goodman SN. A systematic examination of the citation of prior research in reports of randomized, controlled trials. *Annals of Internal Medicine* 2011;154:50-55.

These key questions are equally relevant today, yet they are too often inadequately addressed or overlooked completely. The answer to the last question – what does it mean? – is especially important since this is likely to influence decisions about treatment and future research.

Take the example of a short, inexpensive course of steroid drugs given to women expected to give birth prematurely. The first fair test of this treatment, which was reported in 1972, showed a reduced likelihood of babies dying after their mothers had received a steroid. A decade later more trials had been done, but these were small and the individual results were confusing, because none of them had taken systematic account of previous, similar studies. Had they done so, it would have been apparent that very strong evidence was emerging favouring a beneficial effect of the drugs. In fact, because this was not done until 1989, most obstetricians, midwives, paediatricians and neonatal nurses had meanwhile not realized the treatment was so effective. As a result, tens of thousands of premature babies had suffered and died unnecessarily.²

To answer the question ‘what does it mean?’, the evidence from a particular fair treatment comparison must be interpreted

SYNTHESIZING INFORMATION FROM RESEARCH

More than a century ago, the president of the British Association for the Advancement of Science, Lord Rayleigh, commented on the need to set the results of new research in the context of other relevant evidence:

'If, as is sometimes supposed, science consisted in nothing but the laborious accumulation of facts, it would soon come to a standstill, crushed, as it were, under its own weight . . . Two processes are thus at work side by side, the reception of new material and the digestion and assimilation of the old; and as both are essential we may spare ourselves the discussion of their relative importance . . . The work which deserves, but I am afraid does not always receive, the most credit is that in which discovery and explanation go hand in hand, in which not only are new facts presented, but their relation to old ones is pointed out.'

Rayleigh, Lord. In: *Report of the fifty-fourth meeting of the British Association for the Advancement of Science; held at Montreal in August and September 1884*. London: John Murray, 1884: pp3-23.

alongside evidence from the other, similar fair comparisons. Reporting new test results without interpreting them in the light of other relevant evidence, reviewed systematically, can delay identification of both useful and harmful treatments, and lead to unnecessary research.

SYSTEMATIC REVIEWS OF ALL THE RELEVANT, RELIABLE EVIDENCE

Whilst it is easy to state that we should review the results of a particular study alongside other relevant, reliable evidence, this is a challenge in many ways. Reviews are important because people should be able to depend on them, and that means that they must be done systematically, otherwise they will be misleading.