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## Editorials

### The scandal of poor medical research

We need less research, better research, and research done for the right reasons

What should we think about a doctor who uses the wrong treatment, either wilfully or through ignorance, or who uses the right treatment wrongly (such as by giving the wrong dose of a drug)? Most people would agree that such behaviour was unprofessional, arguably unethical, and certainly unacceptable.

What, then, should we think about researchers who use the wrong techniques (either wilfully or in ignorance), use the right techniques wrongly, misinterpret their results, report their results selectively, cite the literature selectively, and draw unjustified conclusions? We should be appalled. Yet numerous studies of the medical literature, in both general and specialist journals, have shown that all of the above phenomena are common.<sup>1 2 3 4 5 6 7</sup> This is surely a scandal.

When I tell friends outside medicine that many papers published in medical journals are misleading because of methodological weaknesses they are rightly shocked. Huge sums of money are spent annually on research that is seriously flawed through the use of inappropriate designs, unrepresentative samples, small samples, incorrect methods of analysis, and faulty interpretation. Errors are so varied that a whole book on the topic,<sup>7</sup> valuable as it is, is not comprehensive; in any case, many of those who make the errors are unlikely to read it.

Why are errors so common? Put simply, much poor research arises because researchers feel compelled for career reasons to carry out research that they are ill equipped to perform, and nobody stops them. Regardless of whether a doctor intends to pursue a career in research, he or she is usually expected to carry out some research with the aim of publishing several papers. The length of a list of publications is a dubious indicator of ability to do good research; its relevance to the ability to be a good doctor is even more obscure. A common argument in favour of every doctor doing some research is that it provides useful experience and may help doctors to interpret the published research of others. Carrying out a sensible study, even on a small scale, is indeed useful, but carrying out an ill designed study in ignorance of scientific principles and getting it published surely teaches several undesirable lessons.

In many countries a research ethics committee has to approve all research involving patients. Although the Royal College of Physicians has recommended that scientific criteria are an important part of the evaluation of research proposals,<sup>8</sup> few ethics committees in Britain include a statistician. Indeed, many ethics committees explicitly take a view of ethics that excludes scientific issues. Consequently, poor or useless studies pass such review even though they can reasonably be considered to be unethical.<sup>9</sup>

The effects of the pressure to publish may be seen most clearly in the increase in scientific fraud,<sup>10</sup> much of which is relatively minor and is likely to escape detection. There is nothing new about the message of data or of data torture, as it has recently been called<sup>11</sup> - Charles Babbage described its different forms as long ago as 1830.<sup>12</sup> The temptation to behave dishonestly is surely far greater now, when all too often the main reason for a piece of research seems to be to lengthen a researcher's curriculum vitae. Bailar suggested that there may be greater danger to the public welfare from statistical dishonesty than from almost any other form of dishonesty.<sup>13</sup>

Evaluation of the scientific quality of research papers often falls to statisticians. Responsible medical journals invest considerable effort in getting papers refereed by statisticians; however, few papers are rejected solely on statistical grounds.<sup>14</sup> Unfortunately, many journals use little or no statistical refereeing - bad papers are easy to publish.

Statistical refereeing is a form of fire fighting. The time spent refereeing medical papers (often for little or no reward) would be much better spent in education and in direct participation in research as a member of the research team. There is,

though, a serious shortage of statisticians to teach and, especially, to participate in research.<sup>15</sup> Many people think that all you need to do statistics is a computer and appropriate software. This view is wrong even for analysis, but it certainly ignores the essential consideration of study design, the foundations on which research is built. Doctors need not be experts in statistics, but they should understand the principles of sound methods of research. If they can also analyse their own data, so much the better. Amazingly, it is widely considered acceptable for medical researchers to be ignorant of statistics. Many are not ashamed (and some seem proud) to admit that they don't know anything about statistics.

The poor quality of much medical research is widely acknowledged, yet disturbingly the leaders of the medical profession seem only minimally concerned about the problem and make no apparent efforts to find a solution. Manufacturing industry has come to recognise, albeit gradually, that quality control needs to be built in from the start rather than the failures being discarded, and the same principles should inform medical research. The issue here is not one of statistics as such. Rather it is a more general failure to appreciate the basic principles underlying scientific research, coupled with the "publish or perish" climate.

As the system encourages poor research it is the system that should be changed. We need less research, better research, and research done for the right reasons. Abandoning using the number of publications as a measure of ability would be a start.

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