



‘Truth’ in medical journal publishing

The meaning of ‘truth’ as a concept has exercised the minds of philosophers and ordinary mortals alike, perhaps since the emergence of *Homo sapiens*. Richard Smith, when he was editor of the *British Medical Journal*, once astounded his audience of leading fellow medical editors by declaring that ‘The *BMJ* is not in the business of publishing “the truth”.’ He had a point. In the realm of human endeavour, be it science or religion, ‘truth’ invariably evolves and changes over time so that what is accepted as true today is shown to be untrue tomorrow. To paraphrase Harry Emerson Fosdick, the renowned US Baptist theologian of the early 20th century: ‘The fact that astronomies change while the stars abide is a true analogy of every realm of human life and thought, religion not least of all. No existent [theory] can be a final formulation of [scientific] truth.’ Furthermore, research findings published even in the most prestigious journals are often refuted by subsequent evidence right across the range of research designs, from clinical trials and traditional epidemiological studies to the most modern molecular research.¹

The fundamental function of medical journals therefore is to publish not the ‘truth’ *per se*, but rather the current state of knowledge derived from good research conducted and reported with the utmost integrity. ‘Such publishing’, a *PLoS Medicine* editorial admonishes, ‘is predicated, above all, on trust. Authors need to trust that a journal’s reviewers and editors provide a fair review process of their papers. And of course journals need to trust authors to provide a fair, honest, and complete account of their work. Only then can readers have trust in the articles that are published.’² Reviewing their experience during 2009, the editors observe – alarmingly – that ‘it would be hard to conclude that this trusting relationship has not been shaken rather profoundly at times. Editors have sometimes been taken unawares by ghost and guest authors, manipulation of figures, lack of authors’ willingness to share data, failure to register trials, and salami-slicing of data ...’

A fallible gate-keeper

Peer review is widely perceived (and often trumpeted by commercial publishers) as an invariable seal of scientific validity. But while peer review remains the best device we have to date for evaluating research reports, it is not evidence-based, and its imperfections are widely acknowledged and have been empirically demonstrated. Indeed some fundis in medical publishing, like former *BMJ* editor Richard Smith, regard peer review as irredeemably flawed. The sheer volume of submissions to journals makes it impossible for editors and reviewers to detect every dodgy manuscript. On average, for example, the weekly peer-reviewed journal *Science* receives

about 12 000 papers annually. In 2008, the journal was obliged to retract four papers and to correct a dozen others shown to be erroneous.³

Ioannidis,¹ himself an accomplished researcher and epidemiologist, boldly alleges on the basis of statistical reasoning that ‘it can be proven that most claimed (and published) research findings are false’. He and colleagues⁴ further argue that the extreme desire to get published in elite, high-impact journals such as *Science*, *Nature* and the *New England Journal of Medicine* gives rise to an over-zealous manipulation of data by some researchers in a frenzy to achieve unique results. This happens because the elite journals that accept only a fraction of otherwise good papers submitted to them go for the ‘best’ manuscripts, defined as those with the most dramatic results, but which may in fact be outliers and a considerable distance from the ‘true’ situation. The authors looked at 49 most highly cited papers on medical interventions published in high-profile journals between 1990 and 2004, and found that a quarter of the randomised trials and 5 of 6 non-randomised studies had been contradicted or found to be exaggerated by 2005. Findings that have been refuted can linger in the scientific literature for years to be cited unwittingly by other researchers, thus compounding the errors.

Moonesinghe and colleagues⁵ question the veracity of studies that have not been tested by replication. Drawing from genetic studies, one of the most prolific fields of scientific research, they cite a survey of 600 publications showing an association between gene variants and specific common diseases. Of these, 166 were tested three or four times by other researchers, and none but 6 could be replicated consistently. The authors stress that ‘replication – the performance of another study statistically confirming the same hypothesis – is the cornerstone of science, [and] replication of findings is very important before any causal inference can be drawn.’ Failure of replication raises the real likelihood of publication bias, selection bias, type I errors, population stratification (the mixture of individuals from heterogeneous genetic backgrounds), and lack of statistical power in the original study.

Research fraud – common, growing and intractable

While these methodologically flawed papers represent a serious enough threat to the integrity of medical journal publishing, fraudulent submissions using manufactured or plagiarised data pose an even greater and morally more reprehensible challenge. In 2002, the *Lancet* published a paper by R B Singh, a cardiology researcher with a glittering publication record, pronounced by three expert reviewers and a statistician to be ‘excellent work’ which ‘builds upon the



author's previous research'. However, some discerning readers contacted the *Lancet* with concerns about the paper's veracity. The *BMJ* had previously also had grave misgivings about R B Singh's work. Dating from publication of his paper in the *BMJ* in 1992, the journal's editor had developed 'severe anxieties for ten years' about the veracity of that work. A *post hoc* statistical review of some of Singh's published work commissioned by the *BMJ* concluded that the data were either fabricated or falsified. Both the *Lancet*⁶ and the *BMJ* have since editorialised their concern about the work of this researcher.

More recently, Scott S Reuben, a Springfield, Massachusetts professor of anaesthesiology and a deemed pioneer in multimodal analgesia and pain management with over 70 articles in peer-reviewed journals, is said to have fabricated the data in at least 21 and perhaps more articles published in prestigious journals dating back to 1996.⁷ The medical journals concerned have since embarked on a process to retract his articles. His published views, premised on the use of the selective cyclo-oxygenase-2 inhibitor celecoxib (Celebrex) and the neuropathic pain agent pregabalin (Lyrica), both manufactured by the pharmaceutical company Pfizer, had globally become the gold standard in the practice of pain control in certain orthopaedic procedures. Pfizer funded both his research and his numerous speaking engagements at medical meetings, although no one is suggesting that this company is in any way culpable in the alleged fraud. According to a professor of regional anaesthesia at the University of Pittsburgh Medical Center, Reuben's undoing has left multimodal analgesia 'in shambles concerning many of the drugs we use' – particularly celecoxib and pregabalin. 'The big chunk of what people have based their protocol on is gone.'⁷

China, second only to the USA in the number of scientific articles published annually, is emerging as a major node of scientific fraud. Ghost writing of scientific papers for individuals seeking higher degrees or promotion has become a robust cottage industry in China, where, a 5 January 2010 BBC report reveals, 'More than \$100m (£63m) changes hands every year for ghost-written academic papers, according to research by a Chinese university.' The market in buying and selling scientific papers has grown fivefold in the last 3 years. The journal *Acta Crystallographica Section E* recently uncovered extensive fraud in Chinese-authored papers published in 2007, leading to the retraction of some 70 papers.⁸

Big pharma – a poisoned chalice

The relationship between medical journals and the pharmaceutical industry is a vexed one. Richard Smith states

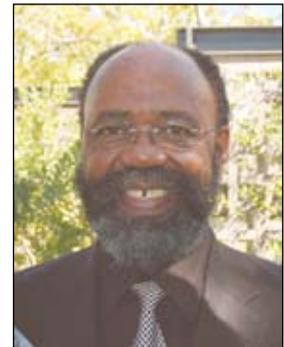
quite bluntly that 'medical journals are an extension of the marketing arm of the pharmaceutical industry'. The huge potential for conflict of interest for journals – such as the *SAMJ* – that depend on pharmaceutical advertising for some or all of their income speaks for itself. However, the bigger challenge – particularly for the more prestigious journals – lies in clinical trials, up to 90% of which are commissioned by an industry regarded by many as having too great an influence over what gets researched, how it is researched, how the results are reported, how they are analysed, and how they are interpreted. Published drug trials are almost always positive; negative trials rarely see the light of day. *Lancet* editor Richard Horton complains that 'Journals have devolved into information laundering operations for the pharmaceutical industry.'⁹

In sum: in modern times the world has witnessed some truly spectacular advances in the understanding and management of human ailments, and it would be utter folly unqualifiedly to rubbish the critical role of medical journals in that narrative. However, a searching and questioning mind is always in order, even in respect of the most current medical 'breakthroughs'.

Journals can unwittingly be perverted by their own interests, and authors can be corrupted by ambition, greed or pressure to 'publish or perish'. Let the old Roman admonition be the reader's motto: *Caveat emptor* – buyer beware!

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