

Authors and their order in a specialist medical journal

Tom Treasure MS MD FRCS FRCP

Professor of Cardiothoracic Surgery
University College London, UK

tom.treasure@gmail.com

Introduction

There has been an inexorable proliferation in the number of medical journals over the years. More and more journals have started up with more articles per issue, and more authors per article. The first statement—that there are more journals—is evident on library racks and shelves, and from electronic searches. Two editors of leading journal writing some years ago estimated the number of titles to be in the tens of thousands. (1, 2) Neither provided a number. I think rightly. Attempts at counting fail. What defines a medical journal and where is the threshold beyond which the journal is too insubstantial or the publication too transitory, for its title to be included? Nevertheless, Richard Smith, the Editor of the British Medical Journal showed data indicating an exponential rise in the number of titles through the 1900s approaching 100,000 by the turn of the century. This was predominantly due to the burgeoning numbers of national and international Societies and Associations wanting to publish for their members. Commercial publishers have since taken on many of these titles. The proliferation itself dilutes quality and Smith suggested that “publishers may subtract value by Balkanizing the scientific literature, severely limiting accessibility”.

The dominant general medical journals—The Lancet, the British Medical Journal, the New England Medical Journal, the Journal of the American Medical Association—have published for up to 200 years. Dr Drummond Rennie, sometime senior deputy editor at the New England Journal of Medicine and then at the Journal of the American Medical Association considered the worth of this enormous expansion in medical writing. In preparing an article for The Lancet he had a non-medical secretary pull three dozen articles haphazardly from the library for him to assess the situation. He wrote:

"There seems to be no study too fragmented, no hypothesis too trivial, no literature citation too biased or too egotistical, no design too warped, no methodology too bungled, no presentation of results too inaccurate, too obscure, and too contradictory, no analysis too self serving, no argument too circular, no conclusions too trifling or too unjustified, and no grammar and syntax too offensive for a paper to end up in print." (1)

Rennie’s assessment of the situation doesn’t set the bar very high, but in my analysis I am not assessing the quality, merely the quantity. That there are more journals is clear. For this chapter I have tested my other two statements—that there are more articles per issues and more authors per article—by analysing a sample from the longest standing and internationally the most prominent specialist surgical journal publishing on heart surgery. I will then put the findings in a longer historical context. I will conclude by considering the entitlement to be an author, and the order the authors assume, in what is of its nature a team-based endeavour.

A numerical analysis of journal content and authors

The Journal of Thoracic and Cardiovascular Surgery (JTCVS) is the most esteemed journal in my specialist area (Impact Factor 2.880). As a means of sampling, I have studied the contents of the first issue of the decade from 1970 to 2020. Although only 1/120 of the content is included it is systematic and sufficient for descriptive purposes. I had not seen Rennie’s blistering criticism when I set out on my numerical analysis so I was relieved to find that although sparse, I had at least planned a method.

For each issue I tallied the number of individual articles, the total number of pages and the median number of pages per article. [Fig.1] To add more detail I have charted the number of authors and pages per article. They are displayed in a series of box-and-whisker charts. [Fig.2] My prior perceptions were largely borne out: the journals became fatter and included more articles. The early

long narrative papers of the 1970s were replaced by studies with more data and fewer words. The numbers of authors increased. As reports from individual surgeon pioneers were supplemented by prospective and collaborative studies, more authors had to be recognised. But then the trend to more articles with fewer pages which held for the first four decades reversed.

What had happened was that by editorial policy JTCVS enhanced the educational value of papers by inviting the reviewers and other selected experts, and importantly those known to hold contrary opinions, to provide up to five additional 1-2 page commentaries. To incorporate that policy, I have included the additional pages and authors in the counts, to reflect that new improved model of publishing.

There is another American journal, the *Annals of Thoracic Surgery* which has published cardiac surgery papers since 1965. During the time frame of my analysis, European and Asian journals started up in 1987 and 1998 providing more capacity. There are innumerable specialist journals mainly produced and edited by professional societies but in 2006 a commercially based journal, the *Journal of Cardiothoracic Surgery* opened. Now e-publishing allows for almost limitless acceptance and copious searchable and citable publications, which exist in parallel to the paper journals.

What direction to take?

At the conclusion of the chapter I want to turn our minds to the future and consider how could—and should—specialist journals steer their course. But first, let us look back. Heart surgery has a relatively short history and unlike most specialties—which emerged gradually and insidiously from general surgery—heart surgery was clearly defined as a specialty from early on its development. Its enormous expansion depended on the development of the heart-lung machine. It became established as a reality rather than a dream following the publication of series of successful operations at the Mayo Clinic. (3, 4) As a result, from that point, heart surgery was a clearly defined specialty requiring special equipment and well-practiced skills. This very effectively ring-fenced cardiac surgery as elite and specialised. Heart surgery could not be done occasionally by a generalist. Note also that for the 1950s Kirklin's seven author papers were exceptional. Heart surgery teams need recognition. It was no longer just the surgeon chief who claimed the credit denoted by authorship.

Publishing and authorship in the pre-history of heart surgery

Researching the 50 years from the first tentative proposal of heart surgery in 1898 to its being established in 1948 led to interesting insights into authorship and publishing. Among advances in medicine, surgery of the heart was a relative latecomer. In present day popular perception, it is brain surgery which commands the greatest awe but, in fact, neurosurgery was becoming well established by 1890. (5, 6) The London surgeon Victor Horsley was invited to give the opening presentation at a specially arranged combined meeting of the sections of surgery and neurology at the International Medical Congress held in Berlin that year. Germany was pre-eminent in scientific surgery and had the oldest surgical journal, *Langenbeck's Archives of Surgery*, since 1860. Horsley's paper in the *British Journal of Medicine* is impressive in the range of neurological conditions and the extent of the surgery which he was prepared to undertake. In contrast the heart, which we now regard as a pump routinely amenable to structural repair, was then regarded as beyond "the limits set by Nature to all surgery". (7) Both Horsley and Paget published as sole authors.

Not long afterwards, the possibility of heart surgery was proposed specifically for the then common heart disease called mitral stenosis. This is a narrowing of the mitral valve, a non-return valve through which freshly oxygenated blood passes from the priming chamber (the left atrium or auricle) into the

pumping chamber, the left ventricle. The valve orifice is progressively narrowed from the normal 4-6 cm² to less than 1 cm². It results in worsening disability in adolescents and young adults during a severely shortened life. The possibility of surgical relief was suggested in 1898 by Dr Daniel Samways who wrote “I anticipate that with the progress of cardiac surgery ... mitral stenosis will be relieved”. (8, 9)

In 1902 Sir Lauder Brunton, a leading London physician, wrote “on looking at the contracted mitral orifice in a severe case of this disease one is impressed by the hopelessness of ever finding a remedy [*that is medication*] which will enable the auricle to drive blood in a sufficient stream through the small mitral orifice and the wish unconsciously arises that one could divide the constriction as easily during life as one can after death”. (10, 11) The apparent paradox of the much earlier development of brain surgery compared with heart surgery is explicable. Death was defined by the cessation of breathing and the absence of a heartbeat. If either one stops the other soon follows while brain function could be put on hold by anaesthesia. The return of consciousness was expected but if it was not required for the patient to survive. The concept of brain death was negotiated to legalise heart transplantation in the 1960s.

All of the papers cited in this section were in the general medical weekly journals, the British Medical Journal and The Lancet, written as sole authors. This brought their practice and their proposals to the attention of the medical profession at large. Now the norm is for specialists to send papers to specialist journals, edited by fellow specialists, who send them to be reviewed by specialists. They are unlikely to be seen other than by specialists.

There were a few attempts at heart surgery in the 1920s in Boston and London, in papers written by one or two authors. (12, 13) By the 2nd World War the basic essential had been mastered—which was maintaining breathing despite an open the chest. A young army surgeon put those skills to good use removing bullets and shrapnel, often close to or within the heart of 134 soldiers injured in the D-Day landings, without a single death. (14) This proved the possibility of heart surgery which led to pioneering work of a group at Guy’s hospital 1948-1956. (15) They were unquestionably a “team” with a core group and many collaborating scientists and trainee physicians and surgeons. Of their 106 papers 102 (96%) had 1-3 authors. They publicly declared themselves to be a team but when they published it was nearly always just two authors, a trainee or scientist as first author and one of the seniors backing them up. [Fig.3]

What are the drivers of medical authorship?

In the early days the surgeons in training did the hands-on work of animal experiments, or when reporting clinical work, the extraction and collating of data from the case notes. Tradition gave them first authorship. Surgeons building their careers and playing an active role would tend to come next. Data presentation and analysis was unsophisticated and if statisticians were involved they generally were in the third tier. The senior is last by convention, sometimes as the originator and lynchpin of the work, but that last author slot may be a sinecure. The Journal of Thoracic and Cardiovascular surgery has published a paper criticising the practice of honorary and gift authorship.(16)

The primary purpose of the very many specialist medical journals is to publish the outcomes of existing treatments, to report new research, to provide expert teaching material and a forum for exchanges of opinion about between practitioners. Surgical specialist journals have similarities with the ubiquitous “trade” journals as exist in building, farming, engineering, catering and hundreds of other fields. They concentrate on the work itself and introduce new but proven ideas which might

have immediate application in practice. This was in essence the function of specialist medical journals. Traditionally, most practitioners saw no need to write articles themselves. The role of the journals was to keep them informed of new developments and the results of established treatments. It then became a requirement for young doctors to publish even though the large majority would spend their careers never doing any original research again. There was a requirement in some surgical specialties, that to be eligible to qualify in the specialty trainees must have published three first author papers. This guaranteed a wave of poor-quality publications of the kind castigated by the editor Drummond Rennie.

Better than youthful papers of little weight, written to tick a box on a CV or resumé, would be for medics in training to be included in formalised analysis of patients' outcomes. They should learn the process of data entry into planned and expertly supervised audits of existing practice and high-quality research towards better treatments. These should include multicentre controlled trials, prospective data entry for statistical analysis, and formalised audits of practice. A great deal of what is practiced at present is unsupported by good evidence and when put to the test many practices have been found to be of no value. (17, 18)

As for authorship, the present systems in its benign form tends to push forward those who need publication for career advancement to the front of the list, and those whose reputations and future funding to hold the senior author slot as the last author. The inclusion, exclusion and order is not always benign and may be exploitative. Most of a list of a dozen authors will not have played much part in study design, data analysis, interpretation or writing. In specialist journals entitlement ranks above research diligence and commitment. This is recognised by serious journals and authors are asked to provide a check list of the contributions made by each person on the list of authors. Drummond Rennie and Richard Smith as editors of the American and British medical journals have promoted these ideas both and have overseen improvements. The changes in editorial practice seen in my analysis of JTCVS are evidence of moves in a good direction.

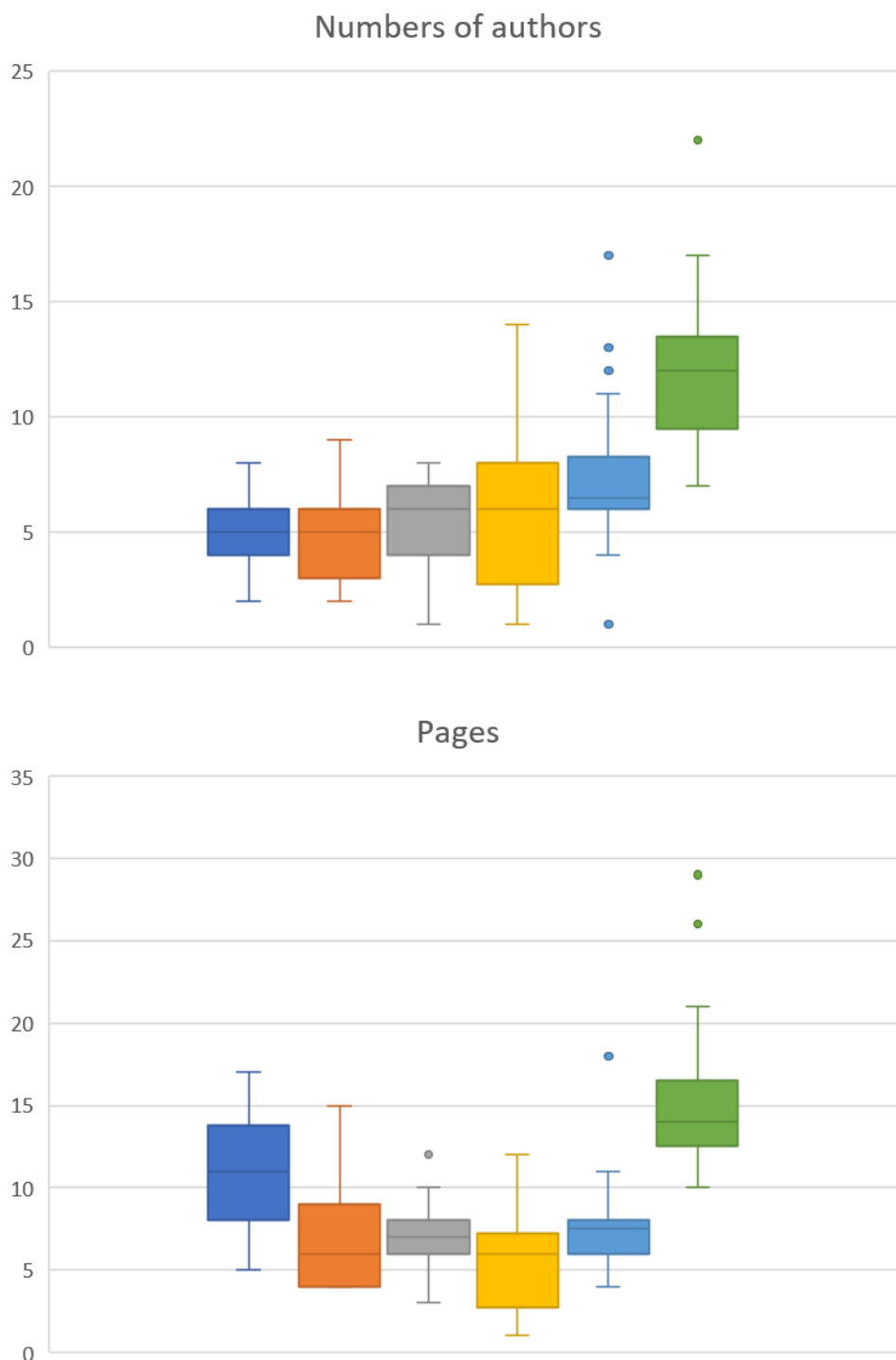
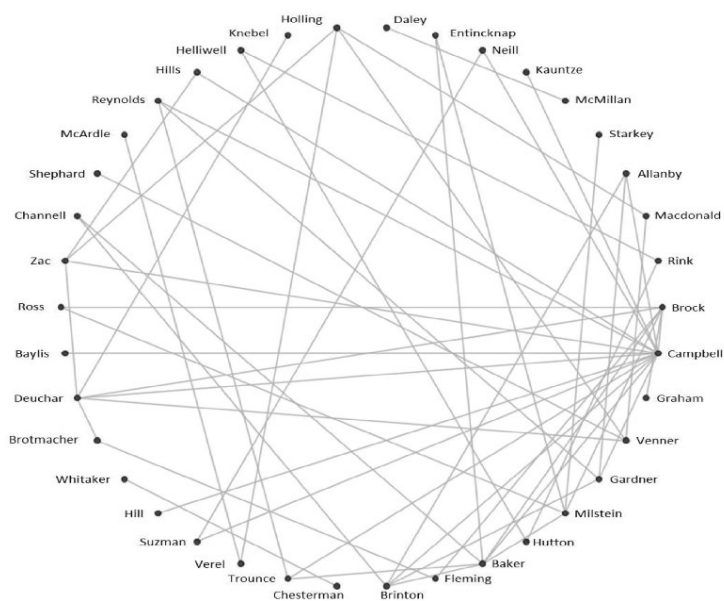


Figure 1 A clustered column chart of the number of articles, total pages and median number of pages per article for the January issues of the Journal of Thoracic and Cardiovascular Surgery for the first year of each decade spanning a fifty-year epoch from 2007 to 2020 which represents the authors professional life time.

Figure 2

The numbers of authors (above) and pages (below) summarised as median and interquartile range. The outliers are $>3/2$ outside the interquartile range and are excluded from the indicated maximum and minimum markers. The sampling times are as in Figure 1 and for the years 2007 to 2020.



A network analysis of
106 publications
Author numbers
1948 to 1856

Authors	Papers	%
1	14	13%
2	71	67%
3	17	16%
4	1	1%
5	2	2%
9	1	1%

Figures 3

A citation network analysis of the 106 publications from members of the “Peacock Club” Guy’s Hospital 1948 to 1956. The numbers of authors were from 1 to 5 for 13%, 67%, 15%, 1% and 2% of the papers. An outlier had 9 authors.

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