Authorship: to be or not to be?

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Abstract Authorship policies at medical journals vary substantially and journals can be ambiguous as to what is expected of authors. International Committee of Medical Journal Editors (ICMJE) criteria emphasize two components of authorship—credit and responsibility—in a complex multipart definition. Yet ICMJE criteria are problematic because they also require final manuscript approval. If final approval is ceded to an academic "key opinion leader," it can be rationalized that this requires naming that person as author, when they may have had little role in content creation. We propose a new criterion; an author is someone who has free and unfettered access to all raw data. Such access is essential to independently test or verify hypotheses, but it would also potentially permit data to be manipulated. Unfettered access to raw data is not sufficient for authorship but it is necessary, since the validity of data can be determined in no other way.

Keywords Authorship; criteria; publishing ethics; science communication.

Being a named author on a research paper can have substantial professional rewards, but authorship assignment can be problematic. Because the definition of authorship has long been contentious in science,[1-3] we focus on a simpler question; when should medical writers be listed as authors on scientific articles?

Many studies address authorship in the biomedical literature (Fig. 1). A recent meta-analysis of 55 articles identified criteria for deserved authorship and guidelines for authorship practice.[4] There is even a movement to replace authorship with contributorship, with author contributions specified, as in movie credits.[5] Although this approach has been faulted as foreign to the practice of scholarly journals,[6] many journals already require the contributions of each author to be disclosed.

Authorship policies at medical journals vary substantially,[7] and medical journals can be ambiguous as to what is expected of authors.[8] Although a universally acceptable definition of authorship does not yet exist, two components of authorship are widely recognized; credit and responsibility.[6] The definition of authorship suggested by the International Committee of Medical Journal Editors (ICMJE) includes both elements:[9]

> "Authorship credit should be based on: 1) substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; 2) drafting the article or revising it critically for important intellectual content; and 3) final approval of the version to be published. Authors should meet conditions 1, 2, and 3."

The ICMJE also identifies activities that do not qualify one for authorship, such as acquiring research funds, collecting data, or supervising a research group.[9] Each named author is expected to participate sufficiently in the research that the author can take responsibility for at least some portion of the content.[9] This formulation is an effort to ensure that every author is accountable, responsible, and can act as a guarantor.[10]

The ICMJE definition of authorship has been called both illogical and unethical[11] because, if taken literally, it could preclude authorship in large studies, since the opportunity for most investigators to contribute to manuscript preparation is limited.[11] Articles on nuclear physics commonly have scores of authors because experiments are so costly and time-consuming; for example, one recent article listed 95 authors.[12] A similar situation arises in large clinical trials. The GUSTO trial,[13] which enrolled 41,021 patients from 1,081 hospitals in 15 countries, listed 1,114 "GUSTO Investigators." Although the chair of the writing committee assumed "full responsibility for the overall content and integrity of the manuscript," clearly others were involved in authorship tasks. However, it is unclear how many of the collaborators actually had substantive input into design and conduct of the trial, analysis of the data, or drafting of the final manuscript.[13]

The ICMJE guidelines were written to exclude from authorship people who did not contribute substantively to a project.[14] Nevertheless, pharmaceutical companies can use these guidelines to rationalize inappropriate attribution of authorship.[10] If an academic author makes a "substantive" contribution to design or analysis, and if she is given final manuscript approval, then it can be rationalized that ICMJE criteria require naming that person as an author.[10] In contrast, industry scientists who design the experiment, collect virtually all the data, draft the manuscript, and take the draft through revisions, are precluded from being named on the byline if final approval is ceded to the academic author.[10]

The criteria for authorship used by the journal *Neurology* differ somewhat from ICMJE criteria. *Neurology* requires an author to have made a substantive intellectual contribution to a submitted manuscript, but the requirements are more flexible:[15]

- Design or conceptualization of the study
- **OR** analysis or interpretation of the data
- **OR** drafting or revising the manuscript for intellectual content

Neurology criteria further require that all authors must give final approval to the submitted manuscript and that "any paid medical writer who wrote the first draft or responded to the reviewers' comments must be included in the author byline".[15] The *Neurology* criteria are said to encourage greater transparency and fuller disclosure.[15]

However, the *Neurology* criteria seem lax; it would be possible to satisfy them by merely conceiving of a new study, without either performing that study or writing it up, as long as final manuscript approval was given. It is also unclear what "conceptualizing a study" means; an idea,

however good, is not sufficient to garner authorship without additional work to make that idea come to fruition. Finally, *Neurology* criteria require co-authorship credit for medical writers who draft a manuscript without participating in the research, even if the writer had little control over the final form of the work. This is inappropriate; academic authors are free to disagree with co-authors about a work and to withdraw from authorship. Journals regard this withdrawal as a private matter among authors and do not insist that a withdrawn author be identified.[16] Yet freedom to dissent is explicitly withheld from medical writers who may meet none of the criteria for authorship beyond writing.

The ICMJE criteria are harder to satisfy, but it would be possible to satisfy them by collecting some data, drafting a description of relevant methods for a manuscript, and giving final approval to a finished article. Although a "substantial contribution" is required, this is not defined in practical terms; is an idea substantial? It is also unclear if "final approval" of a manuscript relates to the data or to the words used to describe those data. In short, authors are not asked explicitly to vouch for the validity of the data.

The issue of authorship is even more tangled when considering the issues of guest- and ghost-authorship. These concepts are frequently confused or conflated.[17] Guest-authorship is awarding of authorship credit to an individual who has not satisfied authorship criteria.[18] Guest authors, by taking credit for work that they did not do, commit plagiarism, which is a form of scientific misconduct.[19] Ghost-authorship is not listing as an author an individual who has satisfied authorship criteria.[18] Both practices are said to be common in the medical literature[15] and as prevalent now as a decade ago.[17]

How important are guest- and ghost-authorship? Judging by the volume of literature on these subjects (Fig. 1), both are a relatively minor concern. Yet there was clear evidence of guest- or ghost-authorship in 21% of articles published in major medical journals in 2008, according to a survey of 896 corresponding authors.[20] The prevalence of guest-authorship has not changed since 1996, although the estimated number of ghost-authors has decreased 31% ($p = 0.02$) over the period.[20] A recent study concluded that, though 81% of 399 authors were aware of the ICMJE authorship guidelines, 25% believed that some of their own publications were marred by coauthors who did not make a substantive contribution.[21]

Rather than the complex, multipart definitions used by the ICMJE and *Neurology*, we encourage a simple criterion of authorship. We propose that an author is anyone who has had free and unfettered access to all of the raw data. Such access is essential to an author to independently test or verify hypotheses, but it would also permit data to be manipulated.[22] Therefore, an author is a person who could intentionally manipulate data or who could unintentionally introduce prejudice into the collection, interpretation, or reporting of data.

Unfettered access to raw data is not sufficient for authorship but it is necessary, since the validity of data can be determined in no other way. What are the correlates of this axiom? For a review article, in which "data" are articles selected for inclusion, medical writers who selected the articles to include should always be named as authors. For a randomized clinical trial, anyone who did not have unfettered access to the raw data should not be an author. This criterion would likely preclude most medical writers, but it might also preclude a great many academic authors.

The key issue in determining authorship then becomes; can you defend the data? If you can describe how the data were collected and analyzed and if you can defend the decisions that preceded data collection, then you should probably be an author. If you cannot defend the data, then you definitely should not be an author. The root of authorship is authority, not composition.

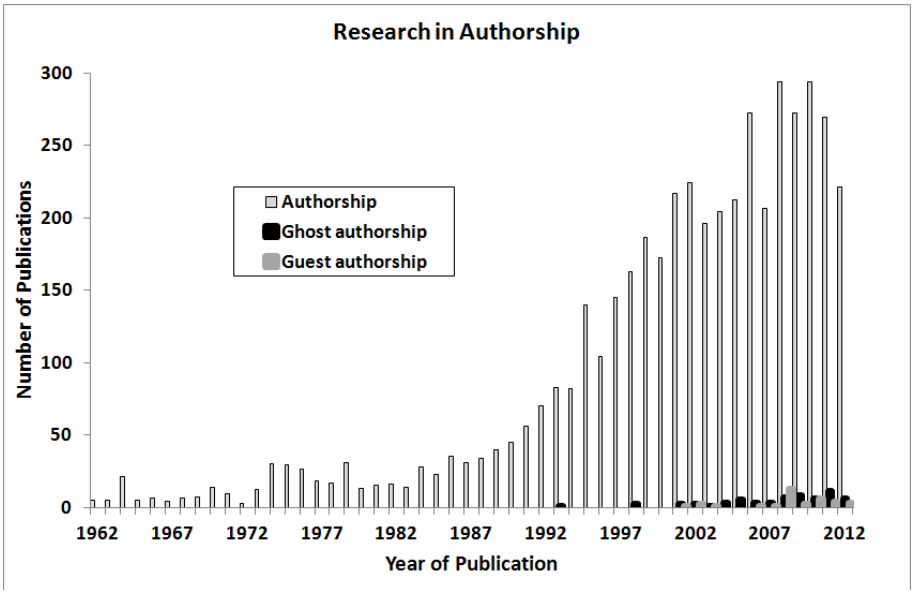

Figure 1. Number of publications related to various forms of "Authorship." PubMed was searched using the indicated search terms and the number of articles published per year is tallied.

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Criticism of peer review and ways to improve it

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Abstract This paper reviews some critical aspects of peer review in developed and developing countries. Though the peer review process is criticised for some of its drawbacks, it is still widely accepted as a tool for preserving the integrity and quality of scholarly communication. Peer review varies widely across journals and countries. Many developing and some developed countries suffer from substandard and biased peer review mainly due to the lack of training in peer review. The peer review process is still slow, expensive, poor in detecting scientific misconduct, and open to abuse. It needs reforming to make it more effective worldwide.

Keywords Peer review; science communication; developing countries.

Introduction

Peer review is essential for quality control in scholarly communication. It has been used as a tool to uphold publishing standards for more than two centuries,[1] and is now based on solid empirical experience of numerous generations of science editors.[2] Unfortunately, standards of peer review vary across journals within and between developed and developing countries. Though its importance has been appreciated by most editors, the perception of its aims varies widely, and not all of them rely on fair, unbiased and truly scientific principles of peer review.[3] Some view the process of analysing and commenting on journal submissions as a tool to disseminate best quality research data.[4] Indeed, the primary aim of peer review is to select and disseminate valid and credible scientific research reports. This is why peer reviewers are often credited as gatekeepers of scientific communication, filtering out low quality and poorly readable contents.[5] Unsurprisingly, the modern-day international scientific community values peer-reviewed literature and discourages publishing in non-peer-reviewed journals.[6]

Criticism of peer review

Peer review did not develop overnight. Publishers and editors from all over the world used it differently in the past decades, gradually improving some of its components, but unable to propose a perfect system of scientific quality control.[7] One of the main opponents of the modern-day peer review, the former chief editor of *BMJ*, Richard Smith, finds