

Editorial

Thoughts on Authorship

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The purpose of authorship is to acknowledge the substantial and material contributions of individuals participating in scientific investigation and reporting while avoiding diminution and dilution of their contributions by individuals who have not provided equal or substantial contributions. In general, any scientific investigation requires a given total amount of effort (which obviously varies among studies) and the average contribution directly relates to the number of authors: the larger the number of authors the less the average contribution (see the parse analysis of Davis and Gregorman [9]).

The increase in numbers of authors of medical papers is obvious to anyone who has read medical literature for more than 10 to 15 years. In the 1800s and early 1900s, scientific papers were uncommonly written by more than one author. By the mid 1900s, specialization and technical sophistication likely contributed to the beginning trend toward multiple authors. In some cases, the listing reflected “gift authorship” [11, 12, 18, 19]. In many situations, junior investigators undoubtedly felt compelled to include more senior individuals because they made some contribution either to the study and report or to their career, regardless of the level of contribution. An arising awareness of increasing numbers of authors [10, 17] and gift authorship in particular likely fueled in part the development of international editing and publishing groups (eg, Committee on Publication Ethics, Council of Science Editors) dealing with various ethical issues, including authorship. Several editors of orthopaedic journals also have expressed concerns about authorship [2–4].

In general, we request no more than five authors for an original article or four authors for case reports. Exceptions to these guidelines may include authorship for certain multidisciplinary studies, multi-institutional studies, and Levels I or II studies (prospective studies that involve more planning and organization and rigor). As noted previously, manuscripts reflecting studies with greater total effort, particularly in planning and execution, may readily fulfill the guidelines for greater numbers of authors. In all cases, however, multiple contributions of each author must be documented in our cover letter.

CORR authorship guidelines are based on an amalgamation of those from several international editing organizations (see below), the Professionalism Guidelines of the American Academy of Orthopaedic Surgeons, and various articles in the literature [6, 7, 9, 13, 15]. While there is no one accepted standard for authorship, the elements of scientific investigation and reporting are generally established. Our guidelines reflect a synthesis of recommendations from these various organizations and those in the literature.

American Academy of Orthopaedic Surgeons Guidelines [1]

We support the Professionalism Guidelines of the American Academy of Orthopaedic Surgeons [1]:

“An orthopaedic surgeon shall warrant that he or she has made significant contributions to the conception and design or analysis and interpretation of the data, drafting the manuscript or revising it critically for important intellectual content, and approving the version of the manuscript to be published.”

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Note all of these elements must be met to be considered an author and they apply to all authors, not only orthopaedic surgeons.

Committee on Publication Ethics [5]

The following arise from the Committee on Publication Ethics [5]:

3. Authorship

Definition

There is no universally agreed definition of authorship, although attempts have been made...As a minimum, authors should take responsibility for a particular section of the study.

Action

- (1) The award of authorship should balance intellectual contributions to the conception, design, analysis and writing of the study against the collection of data and other routine work. If there is no task that can reasonably be attributed to a particular individual, then that individual should not be credited with authorship.
- (2) To avoid disputes over attribution of academic credit, it is helpful to decide early on in the planning of a research project who will be credited as authors, as contributors, and who will be acknowledged.
- (3) If professional writers employed by pharmaceutical companies, medical agencies, or other parties have written the paper, then their names should be included, and any conflicts of interest declared.
- (4) All authors must take public responsibility for the content of their paper. The multidisciplinary nature of much research can make this difficult, but this can be resolved by the disclosure of individual contributions.
- (5) Careful reading of the target journal's "Advice to Authors" is advised, in the light of current uncertainties.
- (6) Authors should be vigilant about allowing their name to be used on a piece of work to add credibility to the content.

International Committee of Medical Journal Editors [16]

The following arise from the International Committee of Medical Journal Editors [16]:

II.A Authorship and Contributorship

II.A.1. Byline Authors

An "author" is generally considered to be someone who has made substantive intellectual contributions to a

published study, and biomedical authorship continues to have important academic, social, and financial implications. (1) In the past, readers were rarely provided with information about contributions to studies from those listed as authors and in acknowledgments. (2) Some journals now request and publish information about the contributions of each person named as having participated in a submitted study, at least for original research. Editors are strongly encouraged to develop and implement a contributorship policy, as well as a policy on identifying who is responsible for the integrity of the work as a whole.

While contributorship and guarantorship policies obviously remove much of the ambiguity surrounding contributions, it leaves unresolved the question of the quantity and quality of contribution that qualify for authorship. The International Committee of Medical Journal Editors has recommended the following criteria for authorship; these criteria are still appropriate for those journals that distinguish authors from other contributors.

Authorship credit should be based on (1) substantial contributions to conception and design, or 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.

When a large, multi-center group has conducted the work, the group should identify the individuals who accept direct responsibility for the manuscript (3). These individuals should fully meet the criteria for authorship defined above and editors will ask these individuals to complete journal-specific author and conflict of interest disclosure forms. When submitting a group author manuscript, the corresponding author should clearly indicate the preferred citation and should clearly identify all individual authors as well as the group name. Journals will generally list other members of the group in the acknowledgments. The National Library of Medicine indexes the group name and the names of individuals the group has identified as being directly responsible for the manuscript.

- Acquisition of funding, collection of data, or general supervision of the research group, alone, does not justify authorship.
- All persons designated as authors should qualify for authorship, and all those who qualify should be listed.
- Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content.

Some journals now also request that one or more authors, referred to as "guarantors," be identified as the

persons who take responsibility for the integrity of the work as a whole, from inception to published article, and publish that information.

Increasingly, authorship of multi-center trials is attributed to a group. All members of the group who are named as authors should fully meet the above criteria for authorship.

The order of authorship on the byline should be a joint decision of the co-authors. Authors should be prepared to explain the order in which authors are listed.

II.A.2. Contributors Listed in Acknowledgments

All contributors who do not meet the criteria for authorship should be listed in an acknowledgments section. Examples of those who might be acknowledged include a person who provided purely technical help, writing assistance, or a department chair who provided only general support. Editors should ask authors to disclose whether they had writing assistance and to identify the entity that paid for this assistance. Financial and material support should also be acknowledged.

Groups of persons who have contributed materially to the paper but whose contributions do not justify authorship may be listed under a heading such as “clinical investigators” or “participating investigators,” and their function or contribution should be described—for example, “served as scientific advisors,” “critically reviewed the study proposal,” “collected data,” or “provided and cared for study patients.”

Because readers may infer their endorsement of the data and conclusions, all persons must give written permission to be acknowledged.

Opinions of Editors on Authorship

According to Cowell [6], Huth [14] in an editorial entitled “Authorship from the Reader’s Side” commented:

“1. An author should have participated in the initiating or planning of a study or have assented to its design if enlisted late in the study. 2. An author should have made some of the reported observations or generated some of the data. 3. An author should have participated in interpreting the observations or data and deriving from them the reported conclusions. 4. An author should have taken part in the writing in the paper. 5. An author should have read the entire contents of a paper and assented to its publication before it is sent to a journal.”

Quite obviously, Huth, an experienced and respected editor, considered authorship a serious responsibility

reflecting greater involvement on the part of authors than required by many journals. I suspect authors of a substantial number of published manuscripts would not meet these criteria.

Cowell [6] also quoted Davis and Gregerman [8, 9] in their assessments of multiple authors:

“In a lighter vein, Davis and Gregerman suggested the use of parse analysis, a system based on the assignment of decimals to each author of a manuscript to reflect his or her contribution to the manuscript. Their own article listed Paul J. Davis, M.D., 0.92, and Robert I. Gregerman, 0.08. Many manuscripts would follow this same pattern, with one individual, having done most of the work, receiving the largest decimal, and the remainder of the authors receiving small portions indeed. How the decimals would be allocated to the 257 authors of a manuscript noted by Science [5] has not been determined.”

CORR Guidelines

Our suggested limit of five authors for most manuscripts (four for a case report) reflects an attempt to emphasize the importance of authorship and the substantial responsibility of each author, and not to impose an arbitrary limit when more participation in a study and report are required and in fact warranted. It would be as unethical to exclude an individual who materially and substantially participated in multiple elements of a study and report as it would be to include those who did not.

Each new submission to CORR must be accompanied by a signed document called, “Copyright Transfer Agreement, Authorship Responsibility, Financial Disclosure, Government Work Statement, and Disclosure Regarding Commercial Interests.” This document includes, among other things, documentation of participation by each author in the study and manuscript. It requires the corresponding author to complete the following documentation:

The following authors have:

- (1) designed the study (note only initials): _____
- (2) gathered the data (note only initials): _____
- (3) analyzed the data (note only initials): _____
- (4) written the initial draft (note only initials): _____
- (5) ensured the accuracy of the data and analysis (note only initials): _____

Each author should have participated in at least three of the five elements.

Authorship is best determined at the outset of a study. As noted in the Committee on Publication Ethics Guidelines, “To avoid disputes over attribution of academic

credit, it is helpful to decide early on in the planning of a research project who will be credited as authors, as contributors, and who will be acknowledged" [5]. We strongly encourage authors to make definitive assessments at the outset of the study, and certainly by the time of submission. There are, however, times when during the course of manuscript processing contributions will change. This is most often the case when reviewers request additional data and either reviewers or editors require substantial rewriting of entire sections of a manuscript. Additional data collection, analysis and interpretation, and substantial rewriting may require the skills of individuals not involved with the initial study design and report. If these individuals meet the guidelines above, they should be included as an author. When authorship is changed for any reason, we require all involved authors to sign a form acknowledging and agreeing to the changes.

I once read scientific writing was a "grave responsibility." The responsibilities involve many ethical issues, only one of which is authorship.

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