Addressing Authorship Issues Prospectively: A Heuristic Approach
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Abstract
Collaborative writing in academic medicine gives rise to more richly informed scholarship, and yet challenging ethical issues surrounding authorship are commonly encountered. International guidelines on authorship help clarify whether individuals who have contributed to a completed scholarly work have been correctly included as authors, but these guidelines do not facilitate intentional and proactive authorship planning or decisions regarding authorship order.

In this Commentary, the author presents a heuristic approach to help collaborators clarify, anticipate, and resolve practical and ethically important authorship issues as they engage in the process of developing manuscripts. As this approach illustrates, assignment of authorship should balance work effort and professional responsibility, reflecting the effort and intellectual contribution and the public accountability of the individuals who participate in the work. Using a heuristic approach for managing authorship issues prospectively can foster an ethical, collaborative writing process in which individuals are properly recognized for their contributions.

Collaborative writing is among the most heartening professional experiences in academic medicine, and it gives rise to more richly informed scholarship. Often the process deepens the relationships between coauthors, laying the foundation for future collaborative work.

Despite the positive aspects of collaborative writing, complicated ethical issues surrounding authorship nevertheless commonly arise and can have damaging consequences in the context of team science. Robust international guidelines exist for evaluating a posteriori the validity of authorship on a completed work. These guidelines are invaluable but may be challenging for individuals to apply during the real-time collaborative process, especially those who feel relatively less empowered than others on the writing team. In this Commentary, I shall describe a heuristic approach that can help contributors to a piece of scholarship determine whether they qualify for the role of coauthor and address challenging authorship issues prospectively. I shall illustrate the application of this heuristic approach, offering suggestions aimed at creating an optimal process in which potential authorship concerns are raised and resolved early.

International Guidelines for Determining Authorship
The International Committee of Medical Journal Editors (ICMJE) has articulated that authorship matters because it recognizes the key contributors to a piece of scholarly work and signifies public accountability for what is published. The ICMJE suggests that the validity of authorship for a completed scholarly work may be evaluated on the basis of whether an individual meets four linked criteria. All authors must meet the first criterion, making a “substantial contribution to the conception or design of the work” or “the acquisition, analysis or interpretation of data for the work,” along with all of the three remaining criteria, which are (2) writing the work or “revising it critically for important intellectual content,” (3) approving the ultimate version for publication, and (4) consenting to be “accountable for all aspects of the work,” including its integrity and accuracy. The ICMJE criteria also help define who should be considered a nonauthor contributor, specifying that individuals who meet some but not all of these four criteria “should not be listed as authors, but they should be acknowledged.”

As the decision tree in Figure 1 illustrates, applying the ICMJE criteria to evaluate authorship on a completed work may be reasonably straightforward. Did each named coauthor help design the work, participate in the data gathering, or aid in the interpretation or analysis? Did each named coauthor help write or critically revise the manuscript? Did each coauthor formally sign off on the final version? Did each named coauthor agree to stand accountable for the quality of the work? These questions typically can be answered “yes” or “no,” ruling in individuals who are eligible to be named as authors and ruling out those who are not.

Less straightforward is the application of the ICMJE criteria to authorship issues in two different categories: (1) contributors who were not included as coauthors but may or could have qualified, and (2) contributors who were included as coauthors but just barely qualified. On one hand, consider the undergraduate research assistant who helped gather, enter, and verify data; helped perform initial analyses; and helped draft tables and an early version of the manuscript—then left the institution to attend graduate school. On the other hand, consider the senior laboratory leader who clearly provided a supportive context for the development of excellent scholarship, helped with the initial design of a project and occasionally checked in on its progress, and even was responsible for the team members’ paychecks, but did not participate in the development of the manuscript—and yet presupposed that
he or she would be named as the first or senior author on all manuscripts coming from the laboratory.

In these two examples, both the early- and later-career contributors could qualify fully as coauthors. The undergraduate research assistant could have been eligible to be named as a coauthor if the mentor had chosen to stay in touch after the student left the laboratory for graduate school, permitting or encouraging the student to participate in the process of completing the manuscript. Similarly, the senior laboratory leader could have been unambiguously eligible for the coauthor role if he or she had more deeply engaged with the specific project, working through the findings with the team and then working directly on the manuscript. The ICMJE authorship guidelines, however, are silent on these matters related to intentional and proactive management of authorship roles.

The ICMJE guidelines also do not speak directly to the thorny issues that surround authorship order. Authorship order is very difficult to determine on projects with multiple collaborators, such as multisite projects in which several of the authors made similar significant contributions at different stages. Recently, there has been a movement to recognize co–first authors, an important development that has a parallel in the recognition of co–principal investigators by federal funding agencies. Ethical issues around authorship order can be further complicated by seniority and by unconscious and conscious use of power in the collaborative writing team.6–8

**Determining Authorship Prospectively: A Heuristic Approach**

A simple heuristic approach for prospectively evaluating who may be eligible for authorship is presented in Figure 2. This 2 × 2 matrix emphasizes two aspects of collaboration: work effort and professional responsibility. I refer to this approach as balancing the “Little Red Hen” principle and the commitments of professionalism in scholarly collaboration. The Little Red Hen is a classic children’s story in which hard work is rewarded—laziness and a sense of entitlement for unearned rewards are not. Professionalism relates to the notion that scholars have the privilege of pursuing discoveries and new knowledge, but in return they must serve society with integrity. In other words, hard work without true intellectual contribution or societal responsibility is not sufficient to qualify for authorship. Similarly, the appearance of accountability without true intellectual contribution or significant work effort is not sufficient to qualify for authorship.

When approaching the collaborative writing of a manuscript, all individuals with any potential role within the project should be considered in relation to the following multiple-part questions:

- Will the individual engage in significant work effort—that is, will he or she engage in the gathering, analysis, and/or interpretation of data and the drafting or intellectually substantive revision of the manuscript and the completion (i.e., final review and revisions) of the manuscript? Is work effort by this potential contributor toward the execution and completion of the project feasible and intended?
- Will the individual exercise authentic scholarly responsibility for the conception, design, implementation, and/or execution of the work and be prepared to be accountable for it, in the eyes of the profession and the public, especially if questions arise about the quality and integrity of the work? Is professional responsibility by the potential contributor for the project feasible and intended?

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**Figure 1** Decision tree for determining whether a contributor to a collaborative project qualifies for authorship, based on the International Committee of Medical Journal Editors (ICMJE) authorship criteria.5 Figure reprinted by permission of the author.
If the answers to both of these questions are “yes,” the individual should be included among the candidate coauthors for the manuscript. If an authorship role is not desired by the individual, then efforts to redistribute work effort and accountability should be made at the outset of the project. If only one of the two questions is answered affirmatively, the individual should be considered a nonauthor contributor. If this nonauthor designation is not desired by the individual, then efforts should be made to move the individual into a more substantive role, thereby becoming eligible for authorship status. In both cases, proactive efforts are critical to a positive authorship outcome.

One may ask, Why would there be a desired outcome? Why wouldn’t the outcome of authorship arise organically? The responses, in my experience, relate primarily to pragmatic rather than philosophical issues. To be promoted at some institutions, for example, it is important for an early-career scientist to demonstrate independence and to establish that he or she is capable of one’s own team and, furthermore, not with a mentor as a formal coauthor. In this situation, the desired outcome is a manuscript without a mentor as the senior author, so it is critical for the early-career author to develop the paper and distribute the work in such a manner that this outcome will be achieved ethically. Another practical consideration relates to collaborations that may, of necessity, be time bound. A research assistant or a visiting professor who cannot engage longitudinally in a project may serve as a nonauthor contributor, but assurance of authorship for this individual is neither an appropriate nor a desired outcome in this circumstance.

**Determining Authorship Order**

When one person comes up with an idea, does most of the work, generously engages others in the process, and is clearly and substantively accountable for the scholarship, the question of who should serve as first author does not usually arise. Similarly, if a senior laboratory leader has supported important work, provided specific guidance on a project, and worked closely with the team on the analyses, interpretation, and write-up of a project, the question of who should serve as senior author does not usually arise. Moreover, if the collaborative writing team is small and the contributions of each individual are clear, most questions pertaining to authorship order are easily sorted out.

When authorship issues are not addressed early in the process, team members’ relative work contributions are ambiguous or differ from their planned efforts, and promises (or the appearance of promises) are made, however, numerous ethical issues and tensions among the collaborative team inevitably arise. Consider the example of a collaborative writing project undertaken by peers who together decide in advance which team member will perform what work and who will develop which section of a paper. Consider further that the team members agree that one of them will do most of the work and therefore will be the first author, but another member of the group ends up doing much more than all of the others on the team. In other words, what should happen if, at the outset of a collaborative writing process, the team expects that an individual will do actual significant work and exercise authentic professional responsibility (see Figure 2), but in the end that individual does not fulfill these expectations and someone else does? In this circumstance, prior to submitting or finalizing the manuscript, the writing team should discuss revising the authorship order to match the actual process and contributions. Once a manuscript draft has been developed and refined, the team should also apply the ICMJE criteria *a posteriori* to determine whether each individual on the team has done enough work and has taken sufficient responsibility professionally to be eligible to serve as an author (see Figure 1). If conflicts or concerns arise, the writing team should review why the work burden or professional responsibility shifted. The team should consult with a senior colleague or mentor to discuss any remaining concerns, particularly if the hope is to collaborate constructively in advancing scholarship in the future.

**In Sum**

Optimal collaborative writing processes involve open and respectful communication about authorship expectations on the basis of effort and authentic professional responsibility for the scholarship produced by the team. Use of a heuristic approach for prospective authorship planning, as outlined here, at an early stage of the collaboration and use of the ICMJE criteria *post hoc*, if necessary, may help resolve ethical issues that arise related to authorship.

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**References**


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