

CONSCIOUS WRITING

Best Practices to Guide Decisions of Authorship and Author Order in a Research Manuscript

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ABSTRACT

Over the past 75 years, medical publications have included a growing number of authors. As a result, research teams face challenges in deciding who qualifies for authorship and in what order the authors should be listed. These challenges can lead to tension among research teams that is related to a large number of authors, a lack of knowledge about authorship guidelines, limited experience in research, power dynamics and work culture, and even unethical practices. To overcome these challenges, research teams may look to medical writers and editors for guidance. As a result, medical writers and editors need to be prepared to share best practices for deciding which authors qualify for authorship and which authors should be listed in the acknowledgments. Medical writers and editors also need to be aware of and advise against unethical authorship practices, including honorary authorship and ghost authorship. Medical writers and editors can also guide research teams in best practices for ordering authors, including understanding the meaning of author positions, determining author contributions, planning authorship from the start, establishing authorship responsibilities, agreeing on how to resolve disputes, keeping track of contributions, and documenting discussions about authorship. With this guidance, research teams can adopt best practices for ethically granting authorship and fairly ordering authors based on their contribution to the work.

Until the 1950s, publications were largely written by 1 author.¹ Since then, publications have included a growing number of authors, especially publications in medicine.^{1,2} Between 1945 and 1988, medical publications gained 1.26 authors every 15 years (versus 0.41 authors in other branches of science).² And across the sciences, the greater number of authors on publications has paralleled the rise in international and interdisciplinary research collaborations.³

This rise in the number of authors has created 2 important challenges. First, research teams must decide who qualifies for authorship. And second, they must figure out the order in which to list the authors who contributed to the

work. These challenges can occur in any research team, but they can be exacerbated among junior researchers who are not well versed in best practices for authorship or among teams that have unethical authorship practices.^{4,5} To overcome these challenges, research teams may look to medical writers and editors—internal or external to the team—for guidance.

To help medical writers and editors guide research teams, they need to fully understand the guidelines for authorship. They also need to be prepared to share best practices to help research teams determine who qualifies for authorship and strategies to help them determine in what order authors should be listed.

WHO QUALIFIES FOR AUTHORSHIP?

To determine who qualifies for authorship, many journals provide guidance on their website. Most often, these journals recommend that research teams use the guidelines created by the International Committee of Medical Journal Editors (ICMJE).⁶ According to the ICMJE, each author should fulfill all 4 of the following criteria.

1. The author made substantial contributions to conceiving or designing the work, or to acquiring, analyzing, or interpreting the data for the work; and
2. The author drafted the work or reviewing it critically for important intellectual content; and
3. The author reviewed and approved the final version of the manuscript to be published; and
4. The author agreed to be accountable for all aspects of the work, including being willing to answer questions about the accuracy or integrity of any part of the work.

To ensure that listed authors meet all these criteria, many journals ask research teams to include a description of what each author contributed to the work in the manuscript, which the journal often publishes with the manuscript.

But what if a contributor does not meet all 4 authorship criteria? These contributors should be acknowledged

instead.⁶⁻⁸ For example, contributors who supplied funding, research materials, lab management, administrative support, or writing and editing assistance may not meet all 4 criteria. These contributors should be thanked for their specific contribution (eg, provided funding, critically reviewed the manuscript, collected data) in the acknowledgments section.

Some research teams disregard this guidance and grant honorary authorship.^{5,9} In other words, they give “gift authorship” out of respect or gratitude for someone (eg, supervisor, department head) or “guest authorship” to a well-known researcher to try to amplify the quality or prestige of the paper. In some cases, honorary authorship may also be related to “pressured authorship,” in which a person of authority pressures more junior staff to include them as an author when they do not qualify.⁹ Because these practices are unethical and can be considered research misconduct, medical writers and authors need to be prepared to advise against these practices.

Another type of authorship is ghost authorship. With this form of authorship, a contributor is not listed as an author, even if they made contributions worthy of authorship.^{5,9} This practice occurs for a number of reasons, such as an author electing to exclude themselves or a research team hiring a professional writer. The ethical nature of ghost authorship is complex and should be discussed carefully among the research team and other contributors. For example, if a professional writer qualifies for authorship based on the ICMJE criteria, they should be included in the author list.¹⁰

IN WHAT ORDER SHOULD AUTHORS BE LISTED?

Once a research team determines who qualifies for authorship, they must figure out in what order to list the authors. This process can be challenging, partly because ordering conventions vary between fields, guidelines, and journals. And the ICMJE guidelines do not provide any guidance on how to determine author order.⁶ Some journals offer guidance that can help research teams determine author order. But with professional guidance from medical writers and editors, and some easy strategies, research teams can agree on a fair order to list the authors.

The Emphasis on First and Last Authors

The 2 most coveted (ie, most valuable) positions in a publication are the first and last author positions. The first author is most often the person who has contributed the most to the work.^{7,8,11} This contribution can involve designing the study, performing experiments, collecting data, analyzing data, writing the manuscript, or other tasks related to the project.

The last author is usually—but not always—the supervisor or principal investigator who oversaw the project.¹² In some fields, the person who oversaw the project may be

listed as the first author. The person who oversaw the project often receives much of the credit when the project is successful, or the criticism when something goes wrong.

The Importance of Corresponding Author

The corresponding author is the person who takes primary responsibility for communicating with the journal. They ensure that all required information is submitted to the journal, and they receive all updates related to the submission, such as the status, reviewers’ comments, and final decision.⁶ The corresponding author is often the person who oversaw the project, so most research teams will designate the last or first author as the corresponding author.¹³

The Relative Contribution of In-Between Authors

Between the first and last author positions, authors are usually listed according to their relative contribution to the work, from the most to the least.^{7,8} To determine this order, many research teams use a mathematical approach. They will choose which items will appear in the manuscript, determine how much each author contributed to those items, and then rank the items based on their importance to the manuscript. Then, they will calculate each author’s total contribution to the manuscript and order the authors from the most to least contribution.

The Challenges of Equal Contribution

In some cases, research teams believe (or calculate) that more than 1 author contributed an equal amount to the work. And this equal contribution can apply to any position in the author order, including the first and last positions. Some journals will let research teams indicate whether authors contributed equally to the work. But even then, the team has the (sometimes daunting) task of choosing the order of the authors who contributed equally.

This task can be even more challenging when the equal contribution applies to the coveted positions of first or last author.¹⁴ For example, the first “first” author will get more visibility than the other “first” author because the first “first” author is the first—and sometimes only—name a reader will see. This same challenge can occur with the last author position, because the last “last” author often gets the most credit for the work.

What can you do to settle a debate about equal contribution? A simple approach is to just list them alphabetically, although the use of this approach has declined over time.¹⁵ Some research teams will order authors who contributed equally by their seniority in the group, the degree of difficulty needed to carry out a specific part of a project, or a combination of these approaches. And other teams get creative. For example, a researcher at Stanford University

had 2 researchers in his laboratory play 3 games, and the winner was given the first slot.¹⁶ This approach is certainly not conventional, but it added a fun spin to an otherwise daunting task.

HOW CAN TEAMS PREVENT AUTHORSHIP CONFLICT?

Discussions of authorship and author order can lead to conflict among research teams. And this conflict is influenced by a variety of factors, including power dynamics, experience in research, and the culture in the institution, department, or laboratory.^{4,5} To navigate these conflicts, medical writers can guide research teams to use the following best practices.

Plan Authorship from the Start

The best way to mitigate any issues in granting authorship and ordering authors is to plan authorship from the beginning of the project, before the writing or even the research project starts.^{7,8} During an initial meeting with the research team (or an established committee for larger studies),¹⁷ discuss the ICMJE guidelines and define what is considered a contribution that qualifies for authorship in the context of the project. This approach ensures that all potential authors know the expectations—and potential consequences of not meeting them—from the start.

Establish Authorship Responsibilities

In planning authorship, discuss and clearly define the roles and responsibilities of each author (ie, who will do what), with the caveat that these contributions may change as the project evolves. These discussions could be facilitated by creating a modifiable authorship grid that clearly outlines the responsibilities and contributions of each potential author.¹⁸ This grid could be informed by standard taxonomies of author contributions.^{19,20}

Agree on How to Resolve Disputes

Before a potential dispute occurs, discuss how the team will resolve disputes that may arise. This discussion will ensure that the team has an objective approach to manage a dispute. For example, the team could agree to resolve disputes with a neutral third-party, such as an administrator or researcher far removed from the work.¹² Or the team could get creative, as the Stanford researcher did, by having 2 authors play a game to determine the author order.¹⁶

Keep Track of Contributions

As the project and writing progress, keep track of everyone who contributed to the work and how they contributed. Then, at regular intervals or major milestones, discuss authorship and whether your team might need to make

adjustments to ensure all contributors qualify for authorship based on the ICMJE guidelines. If the team is using an authorship grid¹⁸ or other tracking method, be sure to update the tracker with each discussion.

Document Discussions About Authorship

To ensure a smooth authorship process, summarize all discussions in an email or document so they can be tracked. Ask all potential authors to review this document and agree, in writing, with the described details. This approach will ensure all authors stay aware of their contribution to the project. Then, when submitting the manuscript, declare the authorship contributions (and even clarify the order of authors)¹² in the manuscript where appropriate.

CONCLUSIONS

Authorship can be a source of tension among research teams. This tension may be related to the rise in the number of authors, knowledge of authorship guidelines, experience in research, power dynamics and work culture, and even unethical practices among teams. With guidance from medical writers and editors who are well versed in authorship best practices, research teams can adopt procedures for ethically granting authorship and fairly ordering authors based on their contribution to the work.

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