

(2.1) Determination of author order

You are finishing a manuscript based on what has been a fairly extensive research project. You have worked on this project over the past two years, collaborating with colleagues in several other departments as well as soliciting important contributions from a couple of radiology trainees. During this two-year period, unexpected hurdles have led to a number of changes to the study, including modifications to the original study design and intended data analysis. Now that the work is complete, as lead investigator you arrange a meeting with the full research team during which you discuss, among other items, the authorship order for the paper. You propose to the group an order that you feel is reasonable, reflecting your views of each person's individual contribution. You list yourself first, as not only the primary investigator but also the individual who primarily drafted the manuscript, and subsequently list the remaining authors by your perceived order of decreasing impact of contribution. You are surprised to hear dissatisfaction by multiple individuals in the group. Lisa, a medical student, indicates that she had dedicated countless hours gathering data, for which she had expected since the beginning to be recognized as second author. Dr. Michaels, a senior radiologist in your division who had helped you in supervising the project and made important contributions to study design, believes that she herself should occupy the last author position as the project's most senior contributor. Dr. Johnson from Pathology feels that the project would not have been possible without detailed pathologic correlative information that he generated, for which he was expecting to be listed as last author. You are unsure how best to proceed in this situation, wishing to keep everyone involved happy. Lisa suggests perhaps providing the journal a detailed summary of each individual's contribution and soliciting the journal's assistance in sorting through the matter. What ethical and professional issues are raised in this case? What steps could have avoided the situation, and how shall you proceed regarding Lisa's suggestion?

Commentary

In this matter, it is important to interact with your colleagues in a professional manner that communicates respect and fairness regarding their contribution. Nonetheless, no strict guidelines exist to determine the author order. Typically, the first author is an individual who served a lead role in the execution of the project and also assumed the primary responsibility for the drafting of the manuscript. The last author is often (although not necessarily) a senior investigator who played a key role in the conception, design, and general oversight of the project. The remaining authors are often then listed in order of decreasing significance of their contribution, beginning with the second author position. However, ranking the relative contributions of the authors can be difficult. Authors contribute to the project in distinct fashions, whether via a large number of hours of labor for actual data collection, unique expertise in the data interpretation, or an intellectual contribution to study design that heavily influenced the overall direction of the project. Given the wide variety of author roles, determining the most appropriate author order may require judgment and discretion, integrated with a precise awareness of how each author contributed.

Within this context, it is advisable to openly discuss with each author his or her anticipated position in the author order at the time of their initial participation in the project. Having such a conversation sets expectations upfront, such that individuals are less inclined to feel that they participated in the project under false pretenses or did not receive fair credit for their work. The lead investigator should conduct such interactions in a professional fashion, recognizing the

potential influence of differences in hierarchy among the study investigators. However, even when such conversations occur appropriately, it is not possible to predict in advance the exact course that the investigation will follow. By its inherent experimental nature, a research project may encounter unexpected obstacles or discoveries leading to alterations of the originally planned methodology and course of action. When this occurs, the actual contributions of the authors at the conclusion of the project may deviate from the original intention. In such circumstances, the ultimate author order should reflect what actually transpired and the work that did in fact occur, rather than the originally anticipated order. Given such a possibility, the authors for the project should periodically revisit the author order during the course of the project and openly discuss whether any modifications to the author order are warranted in view of the course that the work has taken. The authors themselves are best positioned to understand each individual's relative contribution and must exercise their mutual judgment in establishing a mutually agreeable authorship order. Although requiring a time investment, such occasional re-evaluation during the course of the project will reduce surprise or dissatisfaction among the authors when discussing the final author order prior to submission. The investigators may consider keeping a written log of their specific contributions during the course of the research in order to avoid relying on memory alone during such discussions. In addition, some journals request that the authors provide a detailed description of each individual author's contribution at the time of manuscript submission, potentially publishing such information with the remainder of the manuscript, if accepted.

Biomedical journals themselves generally will not become involved in addressing disagreement among authors regarding author order. Rather, journals essentially leave this issue to the authors to work through on their own, typically only proceeding in the review and publication process once all authorship issues, including the author order, have been fully settled by the authors. Accordingly, journals will generally not allow a newly submitted article to enter the review process if lacking a defined author order, and a manuscript already in the revision or production process will typically have this process halted if an authorship issue is brought to the journal's attention. In such cases, review or production of the manuscript may resume once the authors have satisfactorily resolved the issue. Thus, while authors may seek assistance from resources within their own institution for resolving the conflict, the journal itself will not function as a mediator in the matter.

In the present case, you should have discussed the author order with Lisa, Dr. Michaels, Dr. Johnson, as well as the remaining authors, at the time that each individual initially became involved in the project, and also intermittently discussed the author order as the project evolved over the past two years. Lisa's suggestion to now contact the journal and allow the journal to address the issue is beyond the scope of journal offices, and the journal can be expected to decline taking on such a task if solicited by the authors. The optimal author order will depend on nuanced details involving precisely how each individual author contributed, and it is not possible to make this determination based solely on the general overview presented in the case description. Nonetheless, as lead investigator for the project, you will need to manage the situation and hold conversations with the other authors to more clearly define how each contributed, and in doing so, take responsibility for establishing a fair author order. The manuscript should not be submitted for peer review until this important process has been completed.

References

- 1) AMA Manual of Style Committee. AMA Manual of Style: A Guide for Authors and Editors (10th edition). Oxford University Press, March 2007.
<http://www.amamanualofstyle.com/view/10.1093/jama/9780195176339.001.0001/med-9780195176339-chapter-5> Accessed: December 23, 2015.
- 2) International Committee of Medical Journal Editors. Defining the Role of Authors and Contributors.
<http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html>
- 3) Albert T, Wager E. How to handle authorship disputes: a guide for new researchers. Committee on Publication Ethics Web site.
<http://publicationethics.org/files/2003pdf12.pdf>.
- 4) Strange K. Authorship: why not just toss a coin? Am J Physiology Cell Physiol 2008;295(6):C1488-C1498.
- 5) Baerlocher MO, Newton M, Gautam T, Tomlinson G, Detsky AS. The meaning of author order in medical research. J Investig Med 2007;55(4):174.