



Responsible authorship?

9. Authorship and Publication

Researchers share the results of their works with colleagues and the public in a variety of ways. Early results are usually shared during laboratory meetings, in seminars, and at professional meetings. Final results are usually communicated to others through scholarly articles and books. Public communication takes place through press releases, public announcements, newspaper articles, and public testimony. Some of these ways of communicating research results (i.e., of publication) are well structured and controlled; others are informal and have few controls.

Whether structured or informal, controlled or free ranging, responsible publication in research should ideally meet some minimum standards. All forms of publication should present:

Case Study

As his first major grant is coming to an end, several important elements of Dr. Sanjay K.'s research suddenly fall into place. The last series of experiments his graduate student ran clearly link the gene they are studying to a particular type of cancer. His postdoc's work on the proteins associated with this gene could pave the way for possible cures. With these results in hand, he is finally ready to make a strong case for continued support and, happily, his pending promotion. All he has to do now is publish the results.

A week later, Sanjay's optimism starts to fade. As might have been expected, his department chair was delighted with his progress, but then suggested that the first paper announcing the results come out under her name to give it broader circulation. Meanwhile, his postdoc and graduate student have gotten into a heated debate about the order their names should appear on the paper; the university's public affairs office has asked for a summary of the results for a press release; and the technology transfer office has called telling him to hold all publications until they can evaluate the commercial potential of his work.

What should Sanjay do?

Which of these problems should Sanjay tackle first?

Is there anything he could have done to assure that things went more smoothly when he was ready to publish his results?

- ✓ a full and fair description of the work undertaken,
- ✓ an accurate report of the results, and
- ✓ an honest and open assessment of the findings.

In assessing the completeness of any publications, researchers should ask whether they have described:

- ✓ what they did (methods),
- ✓ what they discovered (results), and
- ✓ what they make of their discovery (discussion).

It is, however, not as easy as one might anticipate to meet these expectations.

9a. Authorship

The names that appear at the beginning of a paper serve one important purpose. They let others know who conducted the research and should get credit for it. It is important to know who conducted the research in case there are questions about methods, data, and the interpretation of results. Likewise, the credit derived from publications is used to determine a researcher's worth. Researchers are valued and promoted in accordance with the quality and quantity of their research publications. Consequently, the authors listed on papers should fairly and accurately represent the person or persons responsible for the work in question.

Contribution. *Authorship* is generally limited to individuals who make significant contributions to the work that is reported. This includes anyone who:

- ✓ was intimately involved in the conception and design of the research,
- ✓ assumed responsibility for data collection and interpretation,
- ✓ participated in drafting the publication, and
- ✓ approved the final version of the publication.

There is disagreement, however, over whether authorship should be limited to individuals who contribute to all phases

ICMJE Statement on 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. One or more authors should take responsibility for the integrity of the work as a whole, from inception to published article.

Authorship credit should be based only 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. Conditions 1, 2, and 3 must all be met. Acquisition of funding, the collection of data, or general supervision of the research group, by themselves, do not justify authorship.

Authors should provide a description of what each contributed, and editors should publish that information. All others who contributed to the work who are not authors should be named in the Acknowledgments, and what they did should be described.

<http://www.icmje.org/>

of a publication or whether individuals who made more limited contributions deserve authorship credit.

The widely accepted *Uniform Requirements for Manuscripts Submitted to Biomedical Journals*, authored by the International Committee of Medical Journal Editors (ICMJE), sets a high standard for authorship. It recommends limiting authorship to persons who contribute to the conception and design of the work or to data collection and interpretation and, in addition, play an important role in drafting and approving the final publication. Anyone who plays a lesser role can be listed under *acknowledgments* but not at the beginning of the paper as an *author*.

As influential as they are, the ICMJE recommendations on authorship are not uniformly followed, even in journals that subscribe to the ICMJE *Requirements*. Practices for determining authors vary considerably by discipline and even from laboratory to laboratory. This places most of the responsibility for decisions about authorship on the researchers who participated in the work reported in each



publication. These decisions are best made early in any project, to avoid misunderstandings and later disputes about authorship.

Importance. Authors are usually listed in their order of importance, with the designation *first* or *last author* carrying special weight, although practices again vary by discipline. Academic institutions usually will not promote researchers to the rank of tenured faculty until they have been listed as first or last author on one or more papers.

As with the principle of contribution, however, there are no clear rules for determining who should be listed as first author or the order in which other authors should be listed. The ICMJE *Requirements* simply note that:

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

Some journals have specific rules for listing authors; others do not, again placing most of the responsibility for this decision on the authors themselves.

Corresponding or primary author. Many journals now require one author, called the *corresponding* or *primary* author, to assume responsibility for all aspects of a publication, including:

- ✓ the accuracy of the data,
- ✓ the names listed as authors (all deserve authorship and no one has been neglected),
- ✓ approval of the final draft by all authors, and
- ✓ handling all correspondence and responding to inquiries.



In accepting this responsibility, *corresponding authors* should take special note of the fact that they are acting on behalf of their colleagues. Any mistakes they make or fail to catch will affect their colleagues' as well as their own careers.

9b. Elements of a responsible publication

Each element of a publication serves an important purpose and must be carefully prepared to make sure it serves that purpose.

Abstracts. Abstracts summarize the content of publications in sufficient detail to allow other researchers to assess relevance to their own work. Abstracts, therefore, should neither understate nor overstate the importance of findings. Negative results that might be important to other researchers or the public should be mentioned. The data presented in the abstract should be the same as the data presented in the body of the publication—an obvious requirement, but one that studies of publication practices show some authors do not follow (see Pitkin, Additional Reading).

Standards for Reporting Research Results

The CONSORT Statement

Abstract

To comprehend the results of a randomized controlled trial (RCT), readers must understand its design, conduct, analysis, and interpretation. That goal can be achieved only through complete transparency from authors. Despite several decades of educational efforts, the reporting of RCTs needs improvement. Investigators and editors developed the original CONSORT (Consolidated Standards of Reporting Trials) statement to help authors improve reporting by using a checklist and flow diagram. The revised CONSORT statement presented here incorporates new evidence and addresses some criticisms of the original statement.

The checklist items pertain to the content of the Title, Abstract, Introduction, Methods, Results, and Discussion. The revised checklist includes 22 items selected because empirical evidence indicates that not reporting the information is associated with biased estimates of treatment effect, or because the information is essential to judge the reliability or relevance of the findings. We intended the flow diagram to depict the passage of participants through an RCT. The revised flow diagram depicts information from four stages of a trial (enrollment, intervention allocation, follow-up, and analysis). The diagram explicitly shows the number of participants, for each intervention group, included in the primary data analysis. Inclusion of these numbers allows the reader to judge whether the authors have done an intention-to-treat analysis.

<http://www.consort-statement.org/>

To ensure completeness and accuracy, many journals now use *structured* abstracts. This assures that all of the key elements of the publication are mentioned and easily identified. With scientific publications now running in the millions per year in well over 100,000 journals, researchers cannot read all seemingly relevant publications in detail. They must rely on abstracts to point them to important developments and findings.

Methods. Researchers cannot check and build on the work of others without knowing how it was conducted. Methods therefore should be described in sufficient detail to allow other researchers to replicate them. When researchers use well-established methods, this section of a publication can be shortened, provided appropriate references are given to a full description of the methods along with any changes that have been made. New or unique methods should be described in more detail to allow other researchers to replicate the work.

Results. Research results should be reported in sufficient detail to allow other researchers to draw their own conclusions about the work. This does not mean that every piece of recorded data should be reported. Researchers can and must process their raw data before publication (to keep publications to a reasonable size if for no other reason). However, results should not be left out just because they do not agree with the conclusions the authors would like to reach. The results section should represent a complete summary of what was discovered, leaving interpretations for the closing discussion.

Discussion. Researchers can and should evaluate the significance of their findings under *discussion*—also called *conclusion* or *summary*. This portion of a publication helps those who are less familiar with the field understand the importance of the findings. It also provides a venue for identifying unresolved problems and future research needs.

Since the *discussion* is read by individuals who may not be able to evaluate its validity, it is particularly important that authors avoid bias and one-sided reporting in this section. Cautions and other interpretations should be mentioned along with the limitations of the study to provide a balanced view of the reported results. Review articles (articles that survey research findings in particular areas) should make an honest effort to cover all relevant work. It is not always easy to recognize one's own biases, which is a good reason to ask colleagues to read and comment on manuscripts before they are submitted for publication.

Notes, bibliography, and acknowledgments. *Notes, bibliography, and acknowledgments* should be used to place publications in context and to give credit to others for their ideas, support, and work. They serve to:

- ✓ provide support for important statements of fact or assumptions,
- ✓ document the work of others used in the publication,
- ✓ point to additional reading and resources, and
- ✓ recognize the support of funding agencies or colleagues and staff who do not qualify as authors.

Since others rely on and trust this information, it, along with every other element of a responsible publication, should be fair and accurate.

9c. Practices that should be avoided

Competition in research for funding and recognition places considerable pressure on researchers to publish. Ideally, quality should matter more than quantity, but in reality quantity—the number of articles published—is often used as a measure of productivity and ability. However, no matter how important it may be to publish, some publication practices should be avoided.

The Council of Science Editors
A New Standard for Authorship (1998 proposal)
Paul J. Friedman, MD

Publication has become the essential achievement for academic advancement for both clinical and basic scientists, although the type and number of publications demanded may vary widely. Despite a recent increased emphasis on teaching as a meritorious activity, faculty and trainees realistically feel intense pressure to publish. One unfortunate result has been a proliferation of papers and journals and a variety of abuses of trainees, junior colleagues, and patients, and of integrity.

To help restore a sense of proportion and confidence in the validity of biomedical publication, this conference proposes a new step in the evolution of the concept of authorship. We propose to publish the contributions of the individuals associated with a manuscript. The information will be solicited on a modified copyright form, which will be filled out and signed by all the authors. We propose a check-off list, such as the following:

- | | |
|---|--|
| <input type="checkbox"/> Authorship contributions | <input type="checkbox"/> Data collection and/or processing |
| <input type="checkbox"/> Concept | <input type="checkbox"/> Analysis and/or interpretation |
| <input type="checkbox"/> Design | <input type="checkbox"/> Literature search |
| <input type="checkbox"/> Supervision | <input type="checkbox"/> Writing |
| <input type="checkbox"/> Resources | <input type="checkbox"/> Critical review |
| <input type="checkbox"/> Material | <input type="checkbox"/> Other |

http://www.cbe.org/services_FriedmanArticle.shtml

Honorary authorship. The practice of listing undeserving authors on publications, called “honorary” authorship, is widely condemned and in the extreme considered by some to constitute a form of research misconduct. However, common agreement notwithstanding, honorary authorship is a significant problem in research publication today (see articles by Drenth and Flanagan, Additional Reading). Researchers are listed on publications because they:

- ✓ are the chair of the department or program in which the research was conducted,
- ✓ provided funding for the research,
- ✓ are the leading researcher in the area,
- ✓ provided reagents, or
- ✓ served as a mentor to the primary author.

Persons in these positions can make significant contributions (see left) to a publication and may deserve recognition. However, they should not be listed if these are the only contributions they made.

Salami publication. *Salami publication* (sometimes called bologna or trivial publication) is the practice of dividing one significant piece of research into a number of small experiments (least publishable units or LPUs), simply to increase the number of publications. This practice may distort the value of the work by increasing the number of studies that appear to support it. It also wastes valuable time and resources. Before an article is published it is reviewed, edited, and in one form or another prepared for publication. After publication it is entered into indexes and databases, such as the National Library of Medicine’s *PubMed*[®]. Libraries and individuals purchase the journal in which it is published. If the same information could be summarized in one article as opposed to two, three, or more, everyone involved, from the publishers to libraries and the researchers who have to keep up to date on current information, benefits. Researchers therefore should avoid trivial or salami publication.

Duplicate publication. Duplicate publication is the practice of publishing the same information a second time without acknowledging the first publication. This practice not only wastes time and resources but can also distort the research record and endanger public health.

Researchers rely on meta-analyses (analyses of a group of similar experiments or *studies of studies*) to improve their understanding of difficult problems. One clinical trial or epidemiological study may not produce clear evidence, but the pooled results of many related studies can. However, if some of the studies in the pooled study (meta-analysis) have been published two or more times without proper notice, the results of the meta-analysis will be unfairly weighted in the

direction of the duplicate publication. Therefore, duplicate publication is not only deceptive but poses real dangers to public health and safety (see articles by Jefferson and Tramer, Additional Reading).

Premature public statements. Academic or scholarly publication practices are designed to assure that the information conveyed to broader audiences through these practices is accurate and fairly presented. While the system is not foolproof and erroneous or biased information is from time to time published, standard publication practices do serve an important quality control role in research. Accordingly, researchers should follow standard publication practices when making research results public and not issue premature public statements about their work before it has been reviewed. From time to time there may be overriding circumstances, such as early indications of a significant threat to public health or safety, but for the most part research results should be made public only after they have been carefully reviewed and properly prepared for publication.

Questions for discussion

- 1 What are the accepted criteria for authorship in your field of research? If there are none, what should they be?
- 2 Should researchers be allowed to omit some details from the methods section of their publications until they have had time to patent their methods?
- 3 What should a researcher do if the journal that has accepted a publication will not let the researcher publish the method or results in as much detail as the researcher feels is necessary?
- 4 What should a researcher do if an undeserving author in a position of some authority demands authorship status on a paper?
- 5 What factors should be considered when making a decision to publish the results of a study in one article versus several articles?

Resources

Policies, Reports, and Policy Statements

- Society for Neuroscience. *Responsible Conduct Regarding Scientific Communication*, SN, 1996. (available at: <http://www.sfn.org/content/AboutSfN1/Guidelines/guidelines.pdf>)
- Michigan State University. *Michigan State University Guidelines on Authorship*, East Lansing, MI: MSU, 1998. (available at: <http://www.msu.edu/unit/vprgs/authorshipguidelines.htm>)
- International Committee of Medical Journal Editors. *Uniform Requirements for Manuscripts Submitted to Biomedical Journals*, 2001. (available at: <http://www.icmje.org/>)
- Council of Biology Editors. *Scientific Style*, CBE, 2002. (available at: <http://writing.colostate.edu/references/sources/cbe/>)

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