

Editor's Message: How to Get Your Paper Published



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Publication activity is a difficult yet highly rewarding experience. After an appropriate apprenticeship with a mentor who can help you write a case report or brief scientific paper, your thoughts can be widely appreciated by all and ultimately could improve patient care through enhanced knowledge. At the 2004 SCAI Annual Scientific Sessions in San Diego, I was asked to talk to our SCAI fellows-in-training about how to get a paper accepted into a scientific cardiology journal (a process fully described in Kern M and Bonneau HN, *Catheterization and Cardiovascular Interventions* 2003; 58:391–396). I was delighted to receive positive feedback from those who had attended my lecture, and I am pleased to share an abbreviated presentation here.

There are 10 steps in manuscript preparation and submission for publication:

1. Identify a mentor.
2. Identify your project idea.
3. Begin data organization.
4. Establish an abstract from collected data.
5. Initiate a first draft.
6. Revise the first draft with your mentor.
7. Revise a second draft with your mentor.
8. Prepare a final draft.
9. Submit a manuscript to a journal.
10. Evaluate comments for resubmission and submit either for final acceptance or to a new journal.

Don't Go It Alone

This approach to manuscripts applies to both case reports and more formal scientific projects, which are referred to as “data-driven” projects. Working through each step is best done in consultation with an experienced writer but may be attempted by a novice and then reviewed with someone later. On beginning any new project, the writer should always remember the important six phases of a project (see sidebar) Unless the new author-to-be is intrinsically highly talented, learning to write a medical paper is an apprenticeship activity. Most novices cannot filter out the important from the unimportant items. For data-driven projects, it is worthwhile to identify a research team leader who may assist in the collection and organization of data. The writer should become friendly with the study coordinator, who will assist him or her in the initial data collection and study organization, maintenance of the data in separate data files, and

The Six Phases of a Project

- 1 Enthusiasm
- 2 Disillusionment
- 3 Panic
- 4 Search for the guilty
- 5 Punishment for the innocent
- 6 Praises and honors for the nonparticipants

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extra copies. The investigator should examine each set of study data as it is generated.

A Manuscript Is Born

The birth of a manuscript begins with a novel observation or, for a data-driven project, a formulation of a hypothesis. This hypothesis will be the one and usually only one question to ask and answer. For example, “We hypothesize that...coronary flow reserve after angioplasty will be normalized.” What data do we need to demonstrate or refute our hypothesis? The next step is to identify data that will be used to support the hypothesis. Some early-career investigators may be concerned that they cannot collect every data point on every patient and thus may not complete the work. Fear not — many clinical

“Learning how to write a medical paper is an apprenticeship activity.” – Dr. Kern

studies will have some missing data points. Do not be discouraged, continue collecting data, and then organize the data into tables for review with your mentor and study team. A preliminary statistical analysis after several patients' data sets can be performed to identify early results. At this point you can begin thinking about the format and display of data in figures for your manuscript.

The Hardest Part — Writing!

Now comes the hardest part: Writing the first draft is among the most difficult steps for new writers. It is helpful to begin by writing the abstract of the manuscript from the results produced first. Answer the five fundamental questions:

- What question was asked? (background)
- What was supposed to happen? (testing the hypothesis)
- How and in whom was the study done? (methods)
- What did you find? (results)
- What does it mean to others? (conclusion)

It is important to remember that brevity and clarity are essential to an abstract presentation.

Next, write the Methods and state what was done. Presume the reader is not familiar with the study. An IRB protocol often has a good description of the approach. Write the Results. What were the most important findings or differences? Present tables and graphs without redundancy or repetition within the

text. Write the Discussion without references, emphasizing the major findings of the study. Again, the IRB protocol may have already identified much of the discussion and can be used as a reference.

Finally, write the Introduction, again without references for this first draft. Restate the background and hypothesis briefly and why this was an important question to study. When the first draft is completed, review it with your mentor. Remind yourself of the six phases of a project. Ignore these and continue to write your second, third, and fourth drafts as needed.

Rewrite — Again and Again

In the advanced draft stage, reexamine the abstract and rewrite it in no more than 250 words using one to two sentences each for background, hypothesis, methods, results, and conclusion. Then, rewrite the Introduction, which should generally be no more than two to three pages. Add section headings to the Methods section, such as “patient population,” “inclusion criteria,” and “exclusion criteria.” State whether IRB approval was obtained. In this section, answer the most commonly asked questions of your study — that is, how and why were measurements made? How long between steps? What were the controls? What were the drug dosings? Where were there omissions or inclusions of various types of measurements? Consult the Methods sections from similar and previously published studies. Extra methodological detail can be added in an appendix, if needed. Rewrite the statistical methods and provide rationale for sample size collection. State what the significant P values, standard deviation, and other statistics mean. A statistician may be a helpful individual to consult at this point.

With regard to the Results section, organize these into the following five segments. Start with subject groups; present comparisons within and between subgroups. Next, identify the measurement type, such as hemodynamics or echocardiography, and present these results. Describe important changes from the baseline and correlative data. The percent change and absolute change should be included. For clinical studies, emphasize all outcome data whenever possible. Avoid presenting data in both the text and in a graph. Most data are better presented in graph format. Rewrite the Discussion section with emphasis on the five major sections below:

1. Present the major findings first: “These data show that...”
2. Present the scientific significance of the data: “These data imply that...”

3. Compare the data in a scholarly fashion to previous work: "These data are similar to and different from..."
4. Present weaknesses of the current study: "There are limitations to this work..."
5. Conclude with the clinical significance: "These data mean that... and future studies may include..."

These five phrases are commonly used and provide an easy fill-in-the-blanks approach for novice writers.

Invite Feedback

When you have completed all of the above, circulate the near-final draft with tables and proposed figures to your coauthors and indicate you would appreciate their comments by a specific date. If you cannot obtain comments by this date, review the criteria of authorship with your mentor. (For the hangers-on: no pain, no gain.) Additional drafts are usually required. On final revision, keep four thoughts in mind.

1. Limit ambiguity and hyperbole.
2. Keep tense and voice consistent.
3. Do not become attached to your own words (i.e., If you can say the same thing in four words versus ten, go to four).
4. Edit yourself with impunity.

Before submitting the manuscript to your chosen journal, spell out all abbreviations, eliminate redundancies, and add units of measure and statistical markings to all tables and graphs. Figure legends should have sources cited if they are borrowed from other works. References should be correct for the journal format. Take the time to review the presentation so that it is both clear and appropriately brief. Add an acknowledgments statement about the team members and secretarial help. On submitting the paper to a journal, follow the instructions provided to authors. Write a cover letter to the editor; be brief, but tell the editor what is especially new or unusual in the work. Be honest and modest. Make extra copies of your manuscript and keep them in a file for future correspondence. Obtain written permission for submission from each coauthor, and cross your fingers.

Take Heart

On receipt of a second submission, either after rejection or acceptance with a requirement for revision, do not become disheartened. The reasons for rejection are generally because of one or more of the following flaws: invalid statistics; using a method that cannot answer the question asked; an error in the methods; too small a

sample size; drawing the wrong conclusion from the data; poor scholarship; wrong references; citation errors; or problems with grammar, spelling, or structure.

Every Article Has a Home

After overcoming rejection, consider this saying, "Every article has a home." Work on the manuscript again. Read the comments of the reviewers objectively. Ask your mentor what they mean. Ignore any mean-spirited language from the reviewers. Revise the manuscript with attention to which comments can and cannot be addressed and state the reasons why this is so. Write a response to the reviewers in a respectful, clear, and identifiable format, keyed to the changes of the manuscript. Discuss with your mentor whether to submit to the same journal or a different one. On final acceptance of your manuscript, be sure to read the acceptance letter fully, feel good, tell your friends, send copies to your coauthors, call your mentor, and start your next paper.

I hope these suggestions will be helpful and would encourage all cardiology fellows as well as experienced cardiologists to share their ideas with their colleagues, especially SCAI members. After all, if we cannot depend on one another to advance our professional lives, on whom can we depend? We all have benefited from the knowledge that SCAI and its members promote. We must remain committed to the education of cardiologists to better our patients' lives. ■

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