

## Education & Professional Development: Short Report

# Writing a Manuscript for Beginners

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### ABSTRACT

**BACKGROUND** Disseminating knowledge through publication of scholarly activity has been a cornerstone of medicine. The shared knowledge provides benefit to our patients and advances the field. The process of writing one's first manuscript may be intimidating. This review provides advice for novice writers to successfully publish their work.

**METHODS** A methodologic process to begin writing a manuscript is detailed, including topic selection, formulating a research question, review of the literature, and study design and methodology.

**RESULTS** Ten simple steps to writing a manuscript, ethical considerations, and insight into the review process are provided.

**CONCLUSIONS** Encouragement for beginners and simplification of what seems as a daunting task are provided.

(Ann Thorac Surg Short Reports 2025;3:814–817)

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**B**enefits of contributing to the scientific literature include the dissemination of the newest information, advances, and techniques; the advancement of existing knowledge, personal academic advancement, and promotion to establish an expertise in a particular area and share personal experience, and to develop collaboration with others with similar interests.

This article provides a beginner's guide to writing a scientific research paper for junior faculty, surgical residents, and medical students. Scientific writing is an acquired skill, and having a framework to approach a manuscript can help with what may seem like a formidable task. A stepwise approach and continuous progress over time are essential to advance a project to print.

### MATERIAL AND METHODS

There are multiple types of publications ([Supplemental Table](#)), but the approach is often similar. Each has specific instructions and word

### IN SHORT

- Ten easy steps to write a manuscript.
- Tips for successful publishing.

limits, and all journals do not accept all types of articles. A scientific mentor may provide advice regarding the type of paper based on context, the current body of literature, and the experience of the mentee. The mentor should assist in the development of a clear research question that can be answered. Details on selecting a research topic, choosing a relevant and feasible topic, identifying knowledge gaps, formulating a research question, reviewing existing literature, study design and methodology, and ensuring ethical conduct of research are included in the [Supplemental Material](#).

### RESULTS

**WRITING THE RESEARCH PAPER.** Writing a manuscript for the first time without an experienced mentor

Accepted for publication Mar 24, 2025.

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who will provide assistance is a daunting task. This summary is written with the intent to educate beginners in tackling the actual writing of their first manuscript with success. These steps will be applicable to basic science/preclinical, retrospective clinical papers, and to a lesser extent, case reports. More complex manuscripts, such as meta-analyses, reviews, and editorials are beyond the scope of this summary.

At the writing stage, you have already posed your hypotheses, tested them, and analyzed your results with the appropriate statistical tests. Ideally, authorship and order of authors are determined and agreed upon in advance of writing.

**STEP-BY-STEP GUIDE.** The following is a list of 10 easy steps (Figure) to write a manuscript.

**Step 1. Identify a Target Journal.** Your mentor will typically have a journal in mind, having considered the target audience and the “fit” of the study to the journal. The paper should fit within the scope of the journal and recently published articles. Although the journal impact factor remains the gold standard when evaluating the success of a journal, there are novel journal metrics that may assist in the selection, including average time to first decision and final decision, acceptance rate and time to publication, publication costs (open access vs subscription model), reputation of the journal and members of the editorial board, and readership of journal.<sup>1</sup>

Some journals with a strong reputation, journal metric profile, and readership may have more stringent requirements for acceptance, larger panels of peer reviewers, lower acceptance rates (even after extensive revisions), and longer time to final publication. Whereas newer open access journals may have higher acceptance rates and shorter times to decision and publication but require author processing charges and may not have an established reputation or readership. Careful assessment of your goals and the nature of your manuscript will help to make decisions on these tradeoffs when selecting a journal.

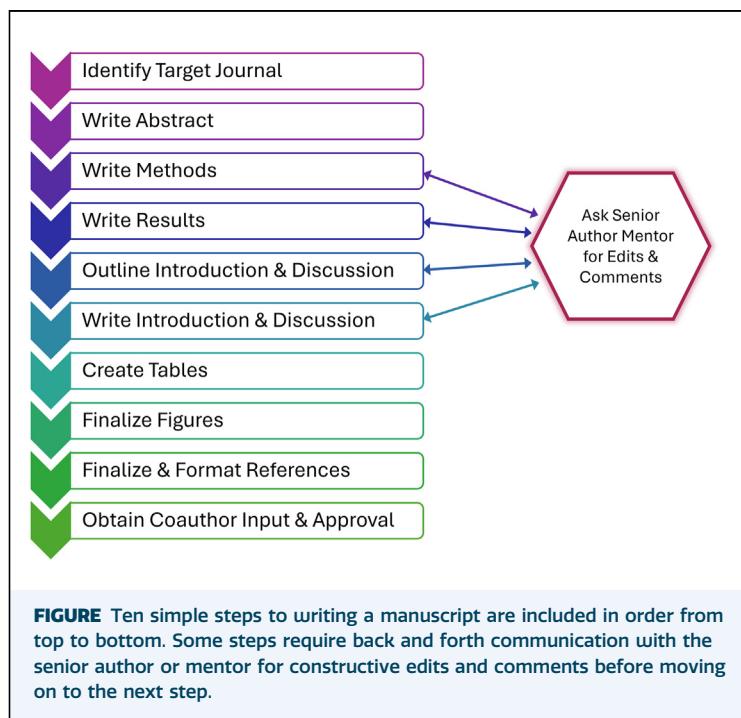
Once the journal has been selected, read the instructions for authors posted on the journal website and follow them *exactly*. Typically, your manuscript will not be sent for review until you have followed the instructions as stated.

**Step 2. Write the Abstract.** An early draft of the abstract can assist in organizing the plan, structure, and content for the remainder of the paper. The results of your work may have already been submitted for presentation at a meeting, in which

case you will already have a first draft of the abstract. If not, the abstract can be written as an abbreviated summary of your work. Typically, it is ~250 words and includes an Introduction/Background, Methods, Results, and Discussion/Conclusion, although some papers may include an unstructured abstract.

**Step 3. Write the Methods Section.** The Methods is merely a summary of each step of the work that was already performed. Thus, it is the easiest to write first. Summarize steps in paragraph form and list each process followed. This can be written after the experiments or data collection are completed, and even before statistical analysis is complete. Include statistical tests used and intended significance cutoffs (*P* values,  $\alpha$  correction, etc). Discuss anonymization of experimental groups, sources of data, steps of operative procedures, drugs or chemicals used, patient data collected, and definitions for study variables in this section as appropriate. Institutional Review Board or Institutional Animal Care and Use Committee approval (as applicable) is reported here. After completion of this section, ask for editing and comments from your mentor or senior author.

**Step 4. Summarize Findings in Results Section.** Summarize results in paragraph form, beginning with descriptive statistics and simple study group comparisons and continuing to more complex analyses. The text should be a simple statement of



data or findings. No commentary or editorial should be included here because that belongs in the Discussion. Include statistical results and any tables and/or figures. Create a draft of each and include a reference in the text. Include every result because this can be shortened later. Results may also be considered for an appendix or online data section, depending on word count restrictions. Data should not be duplicated in a table and in the text. Do not write a paragraph detailing results that are clearly also displayed in a table. Simply make a summary statement and direct the reader to the table. After completion, ask for editing and comments from your mentor or senior author.

**Step 5. Determine an Outline for the Introduction and Discussion.** Discuss an outline of the Introduction and Discussion sections with your mentor. The mentor may offer to write one of these or encourage you to write the first draft. The Introduction is the next easiest section to write. Some prefer to write the Introduction first, after the literature search is done while it is fresh in mind, whereas others prefer to wait until after the Methods and Results.

**Step 6. Write the Introduction and Discussion Sections.** The Introduction should be concise and summarize the previous literature on this topic, the need for further work on this topic, why your work is unique or innovative, and your objective/hypothesis. After completion, ask for editing and comments from your mentor or senior author.

The Discussion should begin with a statement of the objective/hypothesis and provide a concise report of the main findings in a few sentences. Do not restate portions of the Results in great detail. Add additional sections that mention each of the Results and how the work is unique and similar to or different from published literature. If the work is novel, state that this has not been investigated before. Provide plausible explanations for the reported results, particularly when they are different from prior studies. Do this for **every** finding in the Results; this can be shortened later. Bring together what is already known with the findings of the current study. Many journals will also request a summary paragraph of the importance of the work. Avoid overarching conclusions that are not supported by the data presented.

The last paragraph before the conclusions is typically a paragraph listing the limitations. Be extremely humble in listing all of the limitations. You can list them now or after the reviewers point them out and request that you add them. This helps others improve on or add to your work in

the future. After completion, ask for editing and comments from your mentor or senior author.

**Step 7. Make the Tables.** Throughout the writing process, drafts of the Tables are often constructed. Refine them now. Each should have a title and a footnote including definitions of abbreviations. Check the journal restrictions for the number of Tables allowed. Define any symbols and how data are presented (ie, mean and SD, median and interquartile range, n and %). Ensure that each Table is referenced in the manuscript text in numerical order and that the order follows the flow of results reporting from descriptive data to more complex findings.

**Step 8. Make the Figures.** Throughout the writing process, drafts of the Figures are often constructed. Each Figure should have a title and figure legend including definitions of abbreviations. The Figure and the legend should stand alone and be self-explanatory, such that the reader does not have to read the manuscript to interpret the Figure. Check the restrictions for number of Figures allowed, the type of image preferred, and the image quality required. Some journals require their own unique methods of data representation and even define acceptable colors that may be used. Define what any symbols or colors represent and how data are presented (eg, box and whiskers plot). Ensure that each Figure is referenced in the manuscript text in numerical order.

**Step 9. Update and Format References.** A reference list has typically been compiled throughout the writing process. References are listed at the end of the manuscript in order of citation within the text. Check that the in-text citations appropriately correspond with the correct references. Check the instructions and make sure that the references are displayed in proper journal style format. If a reference management software package is used to insert, reorder, and format references, ensure that the software is acceptable with the journal.

**Step 10. Obtain Input and Approval From Coauthors.** After completion of the manuscript draft that is acceptable to your mentor or senior author, ask for editing and comments from the other authors. Many mentors will request that you discuss any additional changes from the other authors together at this point before making further edits. Carefully review the full manuscript for grammar, spelling, and formatting errors. The senior author is typically the corresponding author. After all authors agree and your senior author approves, submit the manuscript!

In summary, writing your first manuscript is exciting and can be conquered in 10 easy steps. Do not be discouraged if your first try comes back with more deleted (or in red ink) than what you originally wrote. With each revision, strive to make the writing clearer and more concise. Activities that can improve your ability to write a good manuscript include volunteer to review for journals in your field, read manuscripts written by colleagues, write grants, and request continuous feedback from a mentor. Each review of your manuscript will provide vital information on how to improve its quality for the next submission. Do not give up in your quest to publish your work. Continue to revise or alter it until it is deemed acceptable for publication.

**UNDERSTANDING THE PEER REVIEW PROCESS.** After submission, most journals will begin with an administrative review to determine whether the manuscript meets the standards to move forward into the peer review process. Following the instructions for authors carefully will ensure your manuscript can proceed directly to the editors. Generally, an editor or associate editor will review the paper for content and fit within the journal scope and then will send it to 2 to 4 reviewers with expertise in the topic area.

Peer reviewers provide constructive feedback and a decision recommendation. When reviews are returned, the editors provide an assessment on whether the manuscript has a high enough priority rating for publication. Revisions are requested to clarify information and/or strengthen the paper; however, the decision to revise and resubmit is not a guarantee for acceptance. Reviewer feedback is meant to be constructive and help prepare the paper for success if published. Be respectful of the reviewers who have carefully reviewed your paper, and keep in mind that they will also be reviewing the revision. Respond to each comment completely and note that the paper will be improved with their suggestions. If you disagree with the comments, then respectfully clearly state why. The reviewers

should be seen as representative of the journal readership, and if they are excited about your work, then it is more likely that your article will be well received and well cited in the literature. Do not be discouraged by multiple rounds of revisions or rejections. Continue to improve your paper and find the right home for your work.

## COMMENT

Summarizing your work in a concise and organized fashion in a manuscript is rewarding and useful. The paper remains a source for future ideas and inspiration and is a useful way to demonstrate your academic productivity for promotion or your area of clinical expertise. It is also useful in the writing of future grant applications and for the education of new members of your research team. Contributions to the literature are vital for the dissemination of advancements in scientific knowledge and the avoidance of repetition of efforts.

**LIMITATIONS.** This guide only provides one method for beginning the writing process. This is a method that has worked for the authors and for instructing others. However, as the writer becomes more experienced, he or she will likely develop unique preferred methods.

**CONCLUSION.** This summary provides 10 easy steps for beginners to write a first manuscript. We suggest that you take the first step boldly and have confidence that with perseverance, success will be inevitable.

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The **Supplemental Material** can be viewed in the online version of this article [<https://doi.org/10.1016/j.atssr.2025.03.013>] on <https://www.annals thoracicsurgeryshortrep.org>.

## FUNDING SOURCES

The authors have no funding sources to disclose.

## DISCLOSURES

The authors have no conflicts of interest to disclose.

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## REFERENCE

1. Martins RS, Ahmed W, Barolia M, et al. Novel journal metrics in cardiothoracic surgery: how different are contemporary metrics from the impact factor? *Innovations*. 2024;19:80–87.