

How to Write a Scientific Manuscript

Writing a scientific manuscript can feel like a daunting task. However, **following a structured format can make the process easier and increase the likelihood of publication.** Before writing, identify 1-2 target journals that align with your work and **carefully read their “Instructions for Authors.”** Following these guidelines is critical, as failure to do so is one of the most common reasons manuscripts are rejected. An original research article is typically only **10-12 pages (~2,500-3,000 words)** and organized in the IMRaD format: Introduction, Methods, Results, and Discussion.

Introduction

This section should put your research into context and consist of a succinct **3-4 paragraph (~400 words or ~10-15%** of manuscript text) narrative that sets the stage for the study, justifies its importance, and frames the specific issue addressed or hypotheses tested. Keep the narrative focused on only information pertinent to the study and avoid writing a detailed literature review or providing specifics about your research. **Think of this section as a funnel – start broad by describing the big picture and narrow down to the specific research objectives** one paragraph at a time:

- **First Paragraph** should discuss the problem or issue and explain its significance, particularly in terms of prevalence, incidence, cost, quality of life, and/or mortality. Essentially, this paragraph should convince readers why this is an important issue and succinctly explain the potential for broad impact.
- **Second and Third Paragraphs** should summarize results of previous studies on the topic and highlight areas of disagreement or uncertainty. Be sure to focus specifically on unresolved issues or controversies related to the specific questions that will be investigated in your manuscript. These paragraphs should concisely outline what is known and, more importantly, what is still unknown. A “gap” in knowledge that your study seeks to narrow or fill should be clearly identified.
- **Final Paragraph** should provide a clear description of what your study specifically investigated and why. It should conclude with 1-2 sentences stating the study's purpose and describe the primary and secondary objectives. The purpose and objectives should be identical to those in the Abstract.

Methods

This section is designed to tell readers in **5-6 paragraphs (~800 words or ~20-30%** of manuscript text) exactly what was done to achieve the objectives listed in the Introduction. Well-written Methods sections improve readers' ability to interpret results and assess the quality of the study and conclusions. It should **read like a recipe, so that anyone who reads the manuscript could reproduce your study.** Be sure to discuss study design, participant selection, and procedures using the following format:

- **First Paragraph** should describe the study design (e.g., prospective, retrospective, randomized controlled trial, cohort, case-control) and setting, including a description of the locations where study procedures were performed and study dates.
- **Second and Third Paragraphs** should outline the methods used to select study participants (e.g., inclusion and exclusion criteria). Be sure to state that institutional review board approval was obtained (or waived, when applicable) and describe how participants were consented. Next, describe the specific study outcomes and major independent or predictor variables.
- **Fourth and Final Paragraphs** should explain the specific materials, equipment, or procedures used to evaluate disease/condition or determine outcomes. Be sure to provide information on steps taken to reduce bias. This section should conclude by listing statistical methods and software (manufacturer and version) used to analyze the data. Be sure to also state the P value used for significance testing.

Results

This section should present the study's findings in **6-8 paragraphs (~1,000 words or ~30-40%** of manuscript text) for all outcomes discussed in the Methods section. Results should be **described in a clear, concise format and flow in a logical sequence using a combination of text, tables, and figures**. Data listed in tables should not be simply repeated in the text, but major findings and themes should be described for readers. All tables and figures should be directly referenced in the text. Be sure to state the statistical significance (e.g., P value) of all findings and provide numerators and denominators for all percentages. Most Results sections are structured as follows, although complex information may require the use of subheadings to organize study results in a logical manner:

- **First and Second Paragraphs** should describe characteristics of the study population, including demographics, clinical conditions, and relevant procedures, testing, or imaging. Table 1 should be referenced here.
- **Third and Fourth Paragraphs** should focus on results for the primary study outcomes and feature important information in Tables 2 & 3.
- **Final Paragraphs** should describe results for secondary study outcomes and any other findings. Table 4 and any remaining figures should be presented here.

Discussion

This section should discuss the conclusions and implications of your findings in **5-6 paragraphs (~800 words or ~20-30%** of manuscript text). It is the heart of the manuscript, but should be kept brief. Be sure to **clearly articulate the main conclusions of your study, interpret their meaning, and answer the research questions** posed in the Introduction using the following format:

- **First and Second Paragraphs** should summarize the major primary and secondary findings of your study, but do not simply repeat data from the Results section. Be sure to emphasize advances in knowledge. What did you find and why is it important?
- **Third and Fourth Paragraphs** should situate and compare your findings to other relevant studies. What have other researchers found and why are your results better, different, or confirmatory?
- **Final Paragraphs** should clearly outline the limitations of the study within the context of its objectives. This section should conclude by discussing the statistical and clinical implications (they can be different!) of your findings and linking the conclusions with the goals stated in the Introduction. What research should be pursued next?

Title

The title should be **~10-15 words** and informative and interesting enough to convince readers to want to read the manuscript. An effective manuscript title is concise, descriptive, precise, and searchable by keyword. Omit expressions such as "preliminary observations," as well as empty words and redundancies such as "a study of," and "the nature of."

Abstract

Although this section appears first, it should be **written after the entire manuscript has been drafted**. The abstract is the first, and possibly only, encounter readers have with your work and is meant to be a succinct summary of the major points of the manuscript. It is typically limited to **~250 words** and includes the following four components:

- **Purpose** should provide context for the research and state the specific aim of the study in 1-2 sentences (or ~10-15% of word count). This should be the same purpose stated in the Introduction.
- **Methods** should describe the study procedures, including study design, subject selection, analytic methods, and primary and secondary outcomes in 2-3 sentences (or ~20-25% of word count).

Questions? Contact Holly Zink, Director, Research & Programs, at holly.zink@curesearch.org.

- **Results** should report the main findings and include quantitative values and measures of statistical significance (e.g., P values) for all outcomes in 3-4 sentences (or ~35-40% of word count).
- **Conclusions** should summarize the major conclusions based on study findings and emphasize new or important implications of the study in 1-2 sentences (or ~10-15% of word count).

References

All facts, figures, and other research findings should be cited to ensure previously published work is appropriately recognized. Be sure all references cited in the text also appear in the references section and vice versa. References should be numbered consecutively as they appear in the text and enclosed in parentheses.

Tables and Figures

Tables and figures should be included in the manuscript as a supplement to the text. They should provide the reader with a summary of the study and not simply repeat information listed in the text. Each table and figure should have a short, descriptive title and **be referenced directly in the text and numbered in the order they appear**. Do not include any tables or figures not discussed in the text. Typically, tables in a manuscript present the following information:

- **Table 1** should present demographics of participants.
- **Tables 2 and 3** should present results of primary outcomes.
- **Table 4** should present results of secondary outcomes.
- **Figures** should display information best presented pictorially, including diagrams or sample cases.

Tables should have column headings and numerators and denominators for all percentages. Figures should include captions describing the figure's purpose and all important features. If the figure includes patient information, captions should begin with patient age, gender, and condition/diagnosis. Review the specific journal requirements before submission (e.g., format, size, resolution, color vs. black and white).

Tips to Increase the Likelihood of Publication

- **Follow the "Instructions for Authors,"** including all formatting requirements, as most manuscripts not adhering to the guidelines are returned or rejected.
- **Correctly format your entire manuscript** (including text, tables, figures, captions, and references) using 12-point Times New Roman or Arial font, with left justified text, one-inch margins on all sides, and only one space after sentence punctuation. Number all pages consecutively and adhere strictly to the word limit.
- **Limit the use of abbreviations** and define them the first time they are used.
- **Proofread!** Be sure to use tools, such as spelling- and grammar-check features.