



UAB SCHOOL OF
PUBLIC HEALTH

Knowledge that will change your world

Scientific Manuscript Writing

Bertha Hidalgo, PhD, MPH

Department of Epidemiology

Identifying a data set

- What is your area of interest?
- Do you need a study specific manuscript proposal to obtain the data?
- Do you need IRB approval?
- What is your specific question??

Creating a scientific hypothesis

- Do you know the literature for your area of interest?
- What has been previously published and what are the gaps in the literature?
- How will your question help fill those gaps?
- What type of data do you need? Primary, secondary, quantitative, qualitative, etc?

Determine an analytical plan

- Your dataset should enable you to answer the question you have and help prove or disprove your hypothesis
- To determine an analytical plan, you must get to know your dataset, particularly if you are not familiar with the study or dataset from which your data is coming

Perform data analysis

- Getting to know your data will help you determine what analysis to perform
- Can confirm with previously published studies to see if what you propose makes sense

Tables and Figures

- Once you have completed your data analysis, you can begin writing
- In the ideal situation, you will have positive findings which can be translated to a publishable manuscript.
- Null findings are also findings, obviously, unfortunately, reviewers are often not as likely to accept null findings for publication.

Writing the manuscript

- Revisit your hypothesis and objectives
- Review the literature and select some papers (usually >30) that can be cited in your paper – these will be listed in the references
- Check Guide for Authors for target journal for your manuscript.

Step 1: Prepare the figures and tables

- Tables give the actual experimental results, while figures are often used for comparisons or experimental results with those of previous results or with calculated or theoretical values
- No illustrations should duplicate information described elsewhere in the manuscript.
- Figure and table legends must be self-explanatory

Write the Methods

- Responds to the question about how the problem was studied
- Use references and supporting materials to indicate the previously published procedures. Broad summaries or key references are sufficient.

Write the results

Responds to question: what have you found??

Include statistical tests used and all relevant parameters

If necessary include supplementary information – if allowed by journal.

Write the results

- Use sub-headings to keep results of the same type together, which is easier to review and read. Number these subsections for the convenience of internal cross-referencing, but always taking into account the publisher's Guide for Authors.

Write the results

- For the data, decide on a logical order that tells a clear story and makes it and easy to understand. Generally, this will be in the same order as presented in the methods section.
- An important issue is that you must not include references in this section; you are presenting your results, so you cannot refer to others here. If you refer to others, is because you are discussing your results, and this must be included in the Discussion section.

Writing the Discussion

- Here you must respond to what the results mean. Probably it is the easiest section to write, but the hardest section to get right.
- This is because it is the most important section of your article. Here you get the chance to sell your data.
- Take into account that a huge numbers of manuscripts are rejected because the Discussion is weak.

Writing the Discussion

- Make the Discussion corresponding to the Results, but do not reiterate the results. Here you need to compare the published results by your colleagues with yours (using some of the references included in the Introduction).
- Never ignore work in disagreement with yours, in turn, you must confront it and convince the reader that you are correct or better.

Writing the Discussion

1. Avoid statements that go beyond what the results can support.
2. Avoid unspecific expressions such as "higher temperature", "at a lower rate", "highly significant". Quantitative descriptions are always preferred (35°C, 0.5%, $p < 0.001$, respectively).
3. Avoid sudden introduction of new terms or ideas; you must present everything in the introduction, to be confronted with your results here.

Writing the Discussion

4. Speculations on possible interpretations are allowed, but these should be rooted in fact, rather than imagination. To achieve good interpretations think about:

- How do these results relate to the original question or objectives outlined in the Introduction section?
- Do the data support your hypothesis?
- Are your results consistent with what other investigators have reported?
- Discuss weaknesses and discrepancies. If your results were unexpected, try to explain why

Writing the Discussion

- Is there another way to interpret your results?
- What further research would be necessary to answer the questions raised by your results? Explain what is new without exaggerating

5. Revision of Results and Discussion is not just paper work. You may do further experiments, derivations, or simulations. Sometimes you cannot clarify your idea in words because some critical items have not been studied substantially.

Writing the Conclusion

- This section shows how the work advances the field from the present state of knowledge. In some journals, it's a separate section; in others, it's the last paragraph of the Discussion section. Whatever the case, without a clear conclusion section, reviewers and readers will find it difficult to judge your work and whether it merits publication in the journal.

Writing the Conclusion

- A common error in this section is repeating the abstract, or just listing experimental results. Trivial statements of your results are unacceptable in this section.
- You should provide a clear scientific justification for your work in this section, and indicate uses and extensions if appropriate. Moreover, you can suggest future experiments and point out those that are underway.
- You can propose present global and specific conclusions, in relation to the objectives included in the introduction.

Write a compelling Introduction

- This is your opportunity to convince readers that you clearly know why your work is useful.
- A good introduction should answer the following questions:
 - What is the problem to be solved?
 - Are there any existing solutions?
 - Which is the best?
 - What is its main limitation?
 - What do you hope to achieve?

Write the Abstract

- The abstract tells prospective readers what you did and what the important findings in your research were. Together with the title, it's the advertisement of your article. Make it interesting and easily understood without reading the whole article. Avoid using jargon, uncommon abbreviations and references.
- You must be accurate, using the words that convey the precise meaning of your research. The abstract provides a short description of the perspective and purpose of your paper.

Write the Abstract

- It gives key results but minimizes experimental details. It is very important to remind that the abstract offers a short description of the interpretation/conclusion in the last sentence.
- A clear abstract will strongly influence whether or not your work is further considered.
- However, the abstracts must be kept as brief as possible. Just check the 'Guide for authors' of the journal, but normally they have less than 250 words.

The two important “what’s” in an abstract

1. What has been done?
2. What are the main findings?

Compose a concise and descriptive title

- The title must explain what the paper is broadly about. It is your first (and probably only) opportunity to attract the reader's attention. In this way, remember that the first readers are the Editor and the referees. Also, readers are the potential authors who will cite your article, so the first impression is powerful!
- We are all flooded by publications, and readers don't have time to read all scientific production. They must be selective, and this selection often comes from the title.

Select keywords for indexing

- Keywords are used for indexing your paper. They are the label of your manuscript. It is true that now they are less used by journals because you can search the whole text. However, when looking for keywords, avoid words with a broad meaning and words already included in the title.
- Some journals require that the keywords are not those from the journal name, because it is implicit that the topic is that.

Select keywords for indexing

- For example, the journal *Soil Biology & Biochemistry* requires that the word "soil" not be selected as a keyword.
- Only abbreviations firmly established in the field are eligible (e.g., TOC, CTD), avoiding those which are not broadly used (e.g., EBA, MMI).
- Again, check the Guide for Authors and look at the number of keywords admitted, label, definitions, thesaurus, range, and other special requests.

Write the Acknowledgements

- Here, you can thank people who have contributed to the manuscript but not to the extent where that would justify authorship. For example, here you can include technical help and assistance with writing and proofreading.
- Probably, the most important thing is to thank your funding agency or the agency giving you a grant or fellowship.

Write up the References

- You can use any software, such as EndNote or Mendeley, to format and include your references in the paper.
- Most journals have now the possibility to download small files with the format of the references, allowing you to change it automatically.
- Also, Elsevier's Your Paper Your Way program waves strict formatting requirements for the initial submission of a manuscript as long as it contains all the essential elements being presented here.