

Contents lists available at [ScienceDirect](#)

Vaccine

journal homepage: [www.elsevier.com/locate/vaccine](http://www.elsevier.com/locate/vaccine)

## Writing a scientific paper—A brief guide for new investigators

Caroline L. Vitse, Gregory A. Poland \*

Mayo Vaccine Research Group, United States

### ARTICLE INFO

#### Article history:

Received 21 October 2016  
 Received in revised form 21 November 2016  
 Accepted 30 November 2016  
 Available online xxxx

#### Keywords:

Writing  
 Publishing  
 Research  
 Journal article  
 Journal impact factor

### ABSTRACT

When applying for funding, researchers must demonstrate their productivity. For most funding organizations, a key measure of productivity is the number of papers published. The road to publication is rarely straightforward; few journals provide practical guidance to researchers who are struggling to publish their data. Here, we outline the sections of a research paper and describe practical steps in each part of the publication process as an aid to newer authors.

© 2016 Published by Elsevier Ltd.

### 1. Introduction

A research paper communicates scientific work to a wide audience. Without publishing results, the important data collected, analyzed, and interpreted is inaccessible to the scientific community and hence of little or no value. In order to advance the science, researchers must share their results. Publishing data and results provides an opportunity to explain why the work is important and how it might be applied. To get to the point of publication, authors first must have a firm understanding of what should be included in the paper. This is not always clear, especially to new investigators. Many journals provide general guidelines that explain how a paper should be organized, but these guidelines rarely specify exactly what should appear in each section of the paper. This article is meant to fill those gaps of missing information and provide a checklist and template for newer scientific writers.

### 2. The title page

Choose a title for the paper that succinctly explains the message or “takeaway” point you hope to convey. This assists other investigators in rapidly identifying articles of interest to them. The title should be short (~150 characters)—most journals enforce a limit on the number of characters that can be included in the title. Information regarding title format, length, and style (e.g., some journals

prohibit titles that are in the form of a question or state a conclusion) can be found on each journal’s “Instructions for Authors” page. The title is often used in information-retrieval systems, such as search engines. The goal is to make it easier for other researchers to find—and cite—your work. The Letchford et al. study regarding the advantages of having a short paper title [1] suggests that papers with shorter titles are more frequently cited. The logic behind this is that shorter titles receive more “hits” during a literature search, which leads to more visibility for the paper.

Unless otherwise instructed by the journal, include author names and affiliations on the title page. Most journals require listing the corresponding author’s contact information (i.e., name, email address, mailing address) on the title page.

Keywords, typically provided on the title page, also make your work searchable. These keywords, or Medical Subject Headings (MeSH), can be found using the MeSH browser (<http://www.nlm.nih.gov/mesh/MBrowser.html>). MeSH terms are common in scientific research; using MeSH terms for keywords ensures that you are using the most relevant search terms available. The browser is updated weekly by the U.S. National Library of Medicine in Bethesda, MD. Another option is to use the MeSH On Demand tool, which is available online (<http://www.nlm.nih.gov/mesh/MeSHonDemand.html>). Copy and paste the text of the paper into the text box, and MeSH On Demand returns a list of MeSH terms relevant to the text.

Most journals require an abstract word count, along with the main-text word count (i.e., text from the introduction to the discussion, inclusive), on the title page.

\* Corresponding author at: Mayo Vaccine Research Group, Mayo Clinic, Guggenheim 611C, 200 First Street SW, Rochester, MN 55905, United States.

E-mail address: [poland.gregory@mayo.edu](mailto:poland.gregory@mayo.edu) (G.A. Poland).

### 2.1. Authorship

On its website, the International Committee of Medical Journal Editors (ICMJE; <http://www.icmje.org/>) outlines the four authorship criteria that should be met when listing authors on a paper. Authorship should be based on whether the individual (1) made “substantial contributions to the conception or design of the work, or the acquisition, analysis or interpretation of data for the work; and (2) drafted the work or revised it critically for intellectual content; and (3) gave final approval of the version to be published; and (4) agreed to be accountable for all aspects of the work, ensuring that any questions relating to the integrity of any part of the work are appropriately investigated and resolved” [2]. Many journals require authorship information to be available upon article submission, and some journals will not process the manuscript until the contribution of each author is explicitly listed. It is essential to ensure that each author listed meets each of the four ICMJE criteria before the paper is submitted. So-called gratuitous and honorary authorship is inappropriate and should not be used.

### 3. The abstract

While the abstract word limit varies by journal (typically 150–300 words), all journals require one. Some journals require a structured abstract, which is typically organized with these headings: Background, Methods, Results, and Conclusions. An unstructured abstract includes the same information as that of a structured abstract, but does not need to include headings. If your paper includes work performed as part of a clinical trial, you must register the clinical trial and include the registry’s URL and the trial’s registration number (<https://clinicaltrials.gov/>). This information should be included in the abstract:

- *Introduction/background*: Give a basic idea of what the scientific issue(s) are and what question(s) you are trying to answer
- *Methods*: Provide a very brief high-level sketch of what subjects or methods you used to investigate the research question
- *Results*: Give KEY results only; What is the “newspaper headline” or main finding(s) of the study?
- *Conclusion*: Describe the significance of your key findings, what they mean, and what their implication is on the field.

### 4. The introduction

The first section of the paper is the Introduction. Here is where you summarize what questions or hypotheses you are pursuing and why. What are the missing gaps in the scientific database that this work fills? This section also gives readers an opportunity to understand the major points of content background in the field.

Typically, the introduction can be organized in the following way:

- Paragraph 1: Context—Explain why this research is important to public health, science, or technology; Tell the readers why this topic is an important one to study
- Paragraph 2: Gaps—Describe what gaps exist in the knowledge base that this research was designed to address; Explain the scientific “hole” in knowledge or controversy that this research is attempting to fill or solve
- Paragraph 3: Hypothesis being tested—Explain what you set out to do and why (what is the hypothesis to be tested?).

The journal you choose for your paper may set limits regarding allowable word count. While this ultimately influences the length

of the introduction and the sections that follow, it’s best to include a brief one-page introduction.

### 5. Methods

This section includes a summary of how the research was conducted; here is where you explicitly state the study design and describe the cohort of subjects or animals used for the research (including age, race sex, number of subjects) [3]. It is important to include a statement regarding informed consent, and whether your institutional review board reviewed and approved the research. You should provide information about the research setting and what laboratory or other techniques were used. The statistical methods and analysis information should appear in this section. If you have previously published the statistical—or other—methods that were used during this research, include a statement declaring that similar (or identical, depending on the research) methods were previously used, and provide references pointing to that work. This avoids the issue of self-plagiarism [4]. The methods should be clear and concise and at a level of detail to allow readers to understand what was done, how it was done, and under what conditions. While it is important to be concise, some journals require very detailed methods to ensure reproducibility; however, many journals that require detailed methods also have limitations on article length. To address this, some of these journals allow these detailed methods sections to be included as supplementary material. *Nature Genetics*, for example, introduced an “Online Methods” section for letters, articles, and technical reports. This section, which includes material previously labeled as methods and supplementary methods, includes hyperlinks and can be downloaded in PDF format from the journal’s website.

#### 5.1. Report the details

Our group previously reported that important factors in analyzing vaccine-related studies are often inadequately reported in publications [3]. As the study suggested, many important details, which may affect the interpretation of vaccine immunogenicity and efficacy data, are frequently left out of research papers [3]. These details should be included so the study results can be replicated and, if appropriate, the results generalized to patients. Needle length and anatomic site of injection, for example, are details that may seem trivial, but proved to be critical in interpreting immunogenicity studies of hepatitis B vaccine. As discovered during hepatitis B vaccine studies, comparing the vaccine’s antibody response rate in subjects who were immunized in the deltoid muscle to the response rates in subjects who were immunized in the buttocks resulted in significantly skewed results. The subjects immunized in the deltoid demonstrated significantly higher antibody response rates in early studies [5], but these studies did not report data on vaccination site, injection technique, or needle length; this led to subsequent studies being unable to replicate the results because subjects were immunized in the buttocks [6,7].

Additional factors known to affect vaccine response, such as storage and handling of temperature-sensitive live viral vaccines, should be acknowledged and documented in all research. As noted in Poirier et al., this documentation is necessary to interpret the results of the study [3]. Subject characteristics (i.e., age, race, sex, and ethnicity), along with any concomitant biologic/drug use in subjects, may also influence vaccine response. These important details about study subjects should be well documented and reported. Table 1 includes a list of primary and secondary considerations that should be reported.

Download English Version:

<https://daneshyari.com/en/article/5536690>

Download Persian Version:

<https://daneshyari.com/article/5536690>

[Daneshyari.com](https://daneshyari.com)