Pan American Health Organization

World Health Organization

Regional Office for the Americas

*PAHO/WHO Methodologies for Information Sharing and Knowledge Management in Health*

# 4. HOW TO START WRITING A SCIENTIFIC ARTICLE

This brief methodology is aimed at providing practical advice on "how to start" writing a scientific article. Planning, development and revision of the article are analyzed, with a focus on its key sections. It also provides recommendations on how to respond to the referees' comments.

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| Title | How to start writing a scientific article |
| Version | 2, May 19, 2015 |
| Definition | At the time of starting writing, each person may have its own preferences, but adopting a systematic approach will help to obtain a preliminary structured text capable of being improved during revision. |
| Objective | Introduce a practical way of starting a scientific article together with a sequential order to write its sections. |
| Expected results | Facilitate the drafting of the first version of a scientific article, including a structure enabling to easily incorporate further changes. |
| Premises | • **Type of scientific article:** there are different types of articles, each of them bearing unique characteristics that should be kept in mind when starting writing.<br>• **Journal to which the article will be sent**: it is advisable to know in advance the standards of the targeted journal, which are usually included in the "Instructions for Authors".<br>• **Authorship**: From the very beginning, define the authors and collaborators (the name of the latter should be included in the Acknowledgements paragraph).<br>• **Title**: Do not underestimate the power of a good title for attracting the interest of the target audience. |

Note: *This brief methodology is not intended to be an exhaustive reference on how to write scientific articles since several excellent books and manuals on this topic are available.*

## Procedure

### Phase I — Planning

This phase should establish the structure of the article, its main sections and its length, in compliance with the instructions for authors provided by targeted journal.

Define to what journal you will initially send your article: this is a very personal choice and it usually relies on several criteria. Among them, it is worth mentioning the alignment of the subject matter, the approach of the article and the scope and specialty of the journal, as well as the national or international reach of the journal, its reputation or prestige, language of publication, whether the journal is indexed or not in international databases, and its extent and means of dissemination, its condition of free- or restricted-access publication, main target audience and timeliness to publication.

> → *Check topics of interest on the website of the targeted journal. It may also be helpful to examine recently published articles.*

Revise instructions for the authors: all renowned journals contain a section including this information and getting acquainted with this information in advance will help to produce a better original, with improved possibilities of being accepted by the chosen journal.

> → *Bear in mind the maximum number of words, tables and figures accepted by the journal.*

Define who the authors will be: this may seem obvious, but it is important to define, from the very beginning and undoubtedly, who the authors will be based on their specific participation in the research or writing of the article and who will be mere collaborators (whose names will be included in the Acknowledgement paragraph).

> → *Remember to define the specific order in which authors will be mentioned.*

Choose the time to sit down and write: there is no such thing as “the ideal time”, but it is essential to schedule a specific time to write, and keep to it. Some people are more clear-headed in the morning, others in the afternoon and others in the evening but, in either case, it is advisable to define the right moment and time of the day in which interruptions are not expected to occur.

## Phase II Development

In this phase, the text of the article is written and structured.

Make a bibliographic revision: your research and your article is not a standalone work; on the contrary, it is based on your own experience, an already published project or knowledge, which you should revise and cite to place your research in context.

> *→ Use a bibliographic citation program. It will help you to validate the correctness of the citations and to modify their format in case you need to submit your article to another journal in the future.*

Write a schedule: develop an initial schedule of what you want to state, no longer than one page. Include the main sections of the manuscript on the schedule (in a research article they are usually Introduction, Methods, Results, and Discussion, typically known by the acronym IMRaD). Write an outline of the key concepts for each section, as a reminder.

Set a drafting sequence: a sensible sequence is to write the Introduction first, then the Methods, the Results and the Discussion. Nevertheless, if the research is recent or you are still working on the data, it may also be reasonable to write the Results first.

> *→ It is advisable to write the title and the abstract at the end.*

The Introduction should include the general context of the issue under study, the conceptual framework from which it will be addressed, the specific relevance of the research described on the manuscript and, finally, the specific objectives of the article. Therefore, it has a "general to particular" structure that can be compared to a "funnel" form. As the Introduction describes existing knowledge, it is usually written in present tense.

The Methods (or Material and methods) section should explain "what, when, with what and how" the work was done, providing enough details for other researchers to replicate the study. It includes all the information on reagents, drugs, subjects, microorganism, statistical treatment of data, surveys, etc.

> *→ In articles describing research in humans, remember to indicate at the end of the Methods section the issues relating to the ethics of the research (authorization provided by the local Ethics Committee to the study, informed consent given by participants, measures taken to guarantee the confidentiality of data).*

The Results section should describe only concrete findings of the study. This section may include tables or figures, as appropriate. These elements should be numbered and their title should be clear and descriptive.
Methods and Results refer to what *you* did and they are usually written in past tense.

> *→ Do not duplicate the information in the text and the tables or figures; instead, highlight in the text the most important information displayed. Remember to mention in the text all tables and figures.*

The Discussion explains the results in the light of previous investigations. Moreover, it should indicate the agreement or disagreement of results with those of other studies, state the limitations of the study, provide the main conclusions (which should certainly agree with the objectives mentioned at the end of the Introduction) and, finally, offer recommendations for future investigations. As appropriate, it is usually written in present or past tense.

> *→ Two frequent mistakes in the Discussion section are to repeat results and to discuss aspects that have not been introduced in the results. Avoid them.*

Start writing: bearing the aforementioned structure in mind, "start writing". Some people may find a "let the words flow" approach helpful, that is, writing without stopping to check specific or minor questions, which may be refined later. Include your notes or personal comments where you find it necessary, i.e. [attention], [insert reference], [check], etc.

> *→ If you get stuck or "blocked", refer to the general scheme. It can help you to resume the common thread.*

Write the title and the abstract at the end, once the main text has been finished. Check that both are clear, precise, concrete and enlightening. The title and the abstract are key sections in an article since they are often the only sections read by most people, and the first ones the journal editor and the referees will read.

Search engines of bibliographic databases do not check the body of the article but only some fields, among them, the title and the abstract. In order to increase the possibilities that your article be retrieved (and cited) by other researchers, write both of them carefully, avoiding jargon, acronyms, localisms, and empty words ("regarding…", "study of…", "… and bibliographic revision", etc.).

> *→ Include keywords taken from the MeSH or DeCS terms in the title. It is advisable to write a short (less than 12 words) straight title which informs about the key content of the article.*

Add a final paragraph with Acknowledgements and a conflict of interest disclosure statement, if appropriate.

> *→ Keywords (up to eight, in general) should be exclusively taken from the MeSH or DeCS terms.*

Include the list of bibliographic references: check that the text is in the correct sequential order, that the format and the number of references comply with the journal instructions, and that citations quoted are relevant, pertinent and current (less than five years)

> *→Preferably, cite primary references instead of secondary sources (articles or documents which, in turn, cite primary references).*

Use the scientific language correctly: bear in mind internationally-used standard systems for scientific writing, such as the International System of Units, the International Nonproprietary Name for pharmaceutical substances, the taxonomy of living organisms, International Anatomical Terminology, names of diseases, etc.

> *→ Keep in mind the standards of scientific language and use them consistently.*

Pay attention to the writing style: scientific texts are not necessarily boring or difficult to read. For the text to read smoothly and easily, use the terminology in a consistent manner, avoid jargon or local vocabulary, and reduce acronyms to the minimum, providing their explanation when they are first introduced.

## Phase III — Revision

During this phase the article should be reviewed to guarantee that it is clear and precise and that it complies with the requirements of the targeted journal.

Review over and over again: this phase should be rather called “revisions” since several revisions are usually required until the final manuscript is ready to be submitted to the journal. Remember that the authors are generally entirely immersed in the topic and the manuscript and may not mistakes detect evident for another person. A “fresh and uncontaminated” look may contribute corrections or valuable suggestions.

*→ Showing the title or abstract to other colleagues or, even, to people alien to the field of knowledge may help to detect lack of clarity.*

Review systematically: check if the manuscript is clear, precise, concrete and complete. Verify whether the information is consistent, without internal contradictions and that each element is correctly placed. Check if figures and tables are self-explanatory and clear, and whether they are cited in the text. Ensure that the drafting (orthography, punctuation, terminology) is right. Finally, make sure the manuscript is compliant with the journal instructions and make a list of the files you will forward to the journal (text, figures, tables, annexes, etc.).

*→ If you are not writing in your native language, it is advisable that you ask an editor or native speaker to review the manuscript.*

Revision following referees' comments: if the article is initially accepted by the journal and forwarded to external referees, they will provide comments to the authors. Reply each of them in an ordered, precise and specific manner. Support your answers with solid foundations, particularly if you do not agree with the referee's comment.

Prestigious journals process many manuscripts on a daily basis and the clearer your answer the simpler for the journal to make a decision on your manuscript and send you the decision letter. Note the changes made in the revised version of your article in the way requested by the journal (in general using "track changes" or other easily identifiable manner).

*→ Provide precise and specific answers to the referees' comments. Avoid answers such as "all requested corrections have been made".*

# Useful resources

Practical resources for structuring and drafting your scientific article.

## Elaboration of scientific articles

Day R y Gastel B. How to write and publish a scientific paper. Washington DC: Pan American Health Organization; 2008.

*An enjoyable book, full of practical advice on how to write scientific articles. A classic work whose third edition is freely available for download at ➔.*

Giba J. Developing skills in scientific writing. Barcelona: Fundación Antonio Esteve; 2015.➔

National Library of Medicine ➔

*Practical examples on how to cite scientific articles, books and other sources.*

End Note ➔

*Bibliographic reference management software; free use restricted version.*

International Committee of Medical Journal Editors ➔

*This site contains useful information on authorship, bibliographic references, conflict of interest in publications, peer review processes, copyright, manuscript preparation, etc.*

Health Science Descriptors (DeCS) ➔

*Virtual Health Library's keyword thesaurus in Spanish, English and Portuguese.*

Medical Subject Headings (MeSH) ➔

*U.S. National Library of Medicine's keyword thesaurus in English.*

Council of Science Editors➔

*The Reference links section contains links to many useful resources for scientific writing.*

Equator Network ➔

*International initiative promoting the use of guidelines for reporting scientific research results.*

## Scientific language

Mednet. International Nonproprietary Names for pharmaceutical substances ➔

*This site, maintained by the World Health Organization, provides official names for drugs (generic names, INN, international nonproprietary name) in English, Spanish, French, Chinese and Russian, as well as biochemical information.*

International Classification of Diseases and health-related problems, 10th revision. Washington DC: Pan American Health Organization; 2008.

*The ICD-10 (CIE-10 in Spanish) is the international standard diagnostic classification for epidemiology, health management and clinical purposes.*

International System of Units ➔

*Names and acronyms of the units of the metric system, required for scientific writing in any language.*

Real Academia Nacional de Medicina. Dictionary of Medical Terms. Madrid: Editorial Médica Panamericana; 2012 ➔

*Paper and electronic dictionary, the latter includes a versatile search engine. Letter A can be consulted for free as a trial.*

### Dicciomed ➔

*Bio-medical, history and etymology dictionary of the Universidad de Salamanca in Spain; useful to solve specific doubts on scientific terms.*

### Cosnautas ➔

*Web site including professional resources for medical translation and writing, including the electronic version of the "Diccionario de dudas y dificultades de traducción del inglés médico" by F. Navarro. The acronyms' dictionary is free, but requires registration.*

## Public Health Scientific Journals

### Pan American Journal of Public Health ➔

*A free-access, peer-reviewed multilingual (English, Portuguese and Spanish) scientific journal published by the Pan American Health Organization, indexed in the most important bibliographical databases.*

### Bulletin of the World Health Organization ➔

*Multilingual scientific journal published by the World Health Organization which maintains an open-access policy and is peer-reviewed and indexed in the most important bibliographic scientific databases.*

### Scientific Library on-line (SciELO) ➔

*Collection of public health journals from SciELO.*