

## SPECIAL ARTICLE

## The Art and Science of Writing a Scientific Manuscript

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**O**n behalf of the Journal of Nuclear Cardiology (JNC), I wish the Journal Annals Nuclear Cardiology (ANC) and its Editor-in-Chief (EIC), Professor Keiichiro Yoshinaga, MD, PhD, FACC, continued success. The cardiac imaging field is well served by many journals in the United States and abroad and the ANC is its newest member.

Approximately 17% of the manuscripts (MS) received by JNC in 2014 came from Japan, and 40% came from outside the United States. These numbers are increasing. Each journal has its own style and format regarding how the review process is organized but at JNC, the MS is typically assigned to an associate editor (AE) and reviewed by 2 expert reviewers in that area. The EIC makes the final decision based on his own evaluation and those of the associate editor and the reviewers. Very seldom is a MS accepted without revisions, and almost always, revisions improve the message of the manuscript. JNC relies on a group of guest editors (GE) with special experience and expertise and a large editorial board and a pool of excellent reviewers to accomplish its mission and ensure the processes remain fair.

There are hyper-critical reviewers to whom no MS or work (other than their own!) is quite good enough! There are also hypo-critical reviewers to whom every work is good enough. Detecting prejudice (conscious or otherwise) in a review is a continuing challenge for editors. When 2 reviewers render different recommendations (accept/reject, which is common), the experience of the reviewers, the quality of the review,

and the reasons for their respective recommendations are important (1-4).

The design of the paper is the responsibility of the authors. The authors should pick the appropriate Journal and carefully read its instructions to authors.

The overriding priority in the decision-making process of whether to accept or reject a MS is the quality of the science and its novelty of ideas: "We have tried to emphasize that a MS can be grammatically and semantically perfect and still be worthless if it is not scientifically valid. So we stress, first clinical reasoning and analysis of experimental design and data, scientific validity, logical organization, and coherent development, and only then attention to the prose-grammar, semantics, conciseness, lucidity, readability, style" (1).

Attention must be paid to all aspects of the MS: title, abstract, introduction, methods, statistical analysis, results, discussion, tables, figures and references.

Authors should avoid belaboring a point. A good piece of advice is to try making a claim in 100 words, then in 50, and then in 25: precision is the key; excess is the enemy. Authors should avoid jargon and check for numbers that do not add up. They should avoid too many and non-conventional abbreviations. The conclusion should reach beyond mere summary. Relevant, prior literature and research should be reviewed, in order to avoid re-stating someone else's ideas.

The term "novelty" is often used rather loosely, and hence the editors of the JNC modified the definitions from Webster and Oxford dictionaries to meet the particular needs of the Journal and to provide a sound

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editorial framework for the term:

- 1- The research addresses a question that has not been categorically answered by previous work,
- 2- The research is an original work that does not replicate previously performed studies,
- 3- The research provides an answer to a previously unanswered question or provides the solution to an unsolved problem or improves existing methods,
- 4- The research rejects what is believed to be already established,
- 5- The research complements/confirms emerging yet not completely established concepts,
- 6- The research confirms a concept considered established based on incomplete/erroneous data,
- 7- The research provides/rejects proof of an existing application. Almost all large clinical trials fail in this category.

Some manuscripts, despite being novel, are not well packaged, and hence not publishable, either because the English usage is poor, or because the presentation is confusing (or, in some cases, both).

Here are some suggestions for improving the chances of having an MS accepted by the JNC:

- 1- The authors should read the instructions carefully, as each journal has different styles and formats
- 2- Select a proper title: the reader should be able to tell what the study is about (though not the conclusions) from reading the title. Avoid long titles, hyphenated titles, and titles with question marks.
- 3- Provide a clear hypothesis and objectives. An original MS without a hypothesis or objective is much less likely to be accepted. A review MS requires justification for the review and the topics that will be covered.
- 4- Avoid over-reaching conclusions; state what the study shows and not what you would like the study to show.
- 5- Provide a concise background section in the introduction that will justify the hypothesis and the objectives.
- 6- Describe the patient population in clinical research papers or its equivalent in basic research or technical papers. Mention clearly the inclusion and exclusion criteria to determine the generalizability of the findings. Remember that prospective studies score higher than observational studies, and randomized studies score even higher than those.
- 7- Describe the imaging protocols in detail or

provide a citation, but be sure the citation has detailed information and is in an accessible journal.

- 8- Use appropriate statistical methods: having an author with expertise in biostatistics is very desirable.
- 9- Use appropriate tables and figures to summarize the data. The tables should not be cluttered and difficult to read. All abbreviations should be highlighted below and the figures should be clear and of high quality, especially if images are used. Be sure all tables and figures are cited chronologically.
- 10- Start the discussion section with a concise summary of the pertinent new positive and negatives findings (if any) of the study. Provide a comparison to prior studies and an explanation of why the findings are different from prior studies. Discuss the limitations of the findings where appropriate.
- 11- Use short sentences and plenty of subheadings. A sentence should contain no unnecessary words and a paragraph no unnecessary sentences. This requires not that the writer make all sentences short or avoid all detail and treat subjects only in outline, but that every word be essential. Wordiness and/or flowery writing distracts from the central findings and the authority of the author.
- 12- Select a most appropriate bibliography, cited chronologically. Be sure to correctly quote the studies cited. A thorough literature search is essential before a manuscript is drafted.
- 13- Have a colleague or a senior mentor read the paper and provide a critique before submitting it.
- 14- If English is not your primary language, have the MS read and edited by someone fluent in the English language.

JNC has enacted a new initiative called “mentoring at distance.” The idea is that some manuscripts need language editing and others need a lot more, such as reanalysis of data, reformatting of tables and figures, and re-working entire portions of the paper. This service is provided only to those manuscripts deemed to have strong merits but “poor packaging”; those which we believe might benefit significantly from the mentorship of a well-established author.

#### Abbreviations

EIC: editor-in-Chief  
MS: Manuscript= S=  
JNC: Journal Nuclear Cardiology  
GE: Guest editor  
ANC: Annals Nuclear cardiology

Writing a paper for a medical journal has its rewards, as well as its necessary frustrations. Even rejections should be viewed as learning opportunities. My advice is to study carefully the comments by the reviewers and editors, as these are teaching tools—valuable lessons for how to avoid missteps in future submissions. It may be tempting to give up after the first failure, but often, we learn more through our failures than through our successes.

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