

## Editorial

# How to structure research papers

Neil Blair Christensen<sup>1</sup> and Satoru Kawakami<sup>2</sup>

<sup>1</sup>Wiley-Blackwell, Tokyo, and <sup>2</sup>*International Journal of Urology*, Department of Urology, Tokyo Medical and Dental University, Tokyo, Japan

Medical research papers follow a structure known as *IMRaD* (Introduction, Methods, Results, and Discussion). Some journals name the chapters differently, or place Methods after Discussion, and there are different opinions about the acceptable length of papers. However, regardless of differences, journals ask authors to provide the same overall chapter coverage. These conventions help authors communicate effectively with their readers. Here we briefly discuss the structure of research papers. We provide some recommended resources at the end for more comprehensive coverage of the subject.

For research papers (Original Articles), *Int J Urol* allows authors a maximum of 3000 words including abstracts, but excluding references, tables and figures. Other medical journals have other restrictions, but often ask you for 3000–4000 words. You may find it helpful to write a preliminary abstract as a structural guide for the larger manuscript.<sup>1</sup> Our chapter word counts below are only for guidance to indicate the relative size of your chapters in comparison to one another.

## Introduction (objectives/aims)

- 400–500 words.
- Help readers understand why your paper is important.
- Within the first few sentences, state the purpose of your study. What is your hypothesis, purpose, experimental design, or procedure? What is your rationale?
- Provide a wider context and summarize what the existing literature documents.
- Make your text concise and brief. Do not use sub-headers. Write in the present tense and active voice when suitable.<sup>2</sup>
- Apply key terminology from your title.
- At the end of your introduction, state the purpose of your study and the rationale of your approach. Readers often go to the end of the introduction for conclusive clarity.
- Answer the questions: why did you do the study; what does it add to the existing literature?

## Methods

- 700–800 words.
- Methods chapters are factual recipes rather than narrative essays. Focus on the essential parameters for replication of your study.
- Save discussions for your discussion chapter. Save results for the results chapter, unless there are some preliminary results that were relevant for shaping your design.
- How was your study done; which materials were used; who were the study sample or population; was it a prospective or retrospective study, and was the study population randomized?

### Correspondence author:

Neil Blair Christensen, Wiley-Blackwell, Frontier Koishikawa Bldg 4, 1-28-1 Koishikawa, Bunkyo-ku, Tokyo, 112-0002 Japan. Email: nchriste@wiley.com

Received 10 November 2008; accepted 10 November 2008.

- What, when, where?
- How was it structured? Measurements, treatments, controls.
- How was it carried out? Protocols that others can replicate.
- How was it analyzed? Statistical tests and summary method of results, but do not present or discuss the results.
- Include ethical considerations, such as patient consent.
- Use figures, tables, and diagrams to present your methods, but do not force their use when you can summarize the methods in just a few sentences. Avoid repetition.
- For non-essential data or content that cannot be captured in your main text or images, such as surgical videos and large data sheets, you may provide Supporting Information.
- Avoid detailing commonly known standard procedures; just refer to their standard names.
- Use sub-headers to outline groups and procedures.
- It can be difficult to write this chapter in the active voice. Write in the past tense, and use the passive voice when necessary.
- Answer the question: what was done and how was it done?

## Results

- 700–800 words.
- Provide a linear documentation of your study results, and highlight significant outcomes, including indications of statistical significance.
- Try to be objective, and save interpretation for your discussion chapter.
- Use figures, tables, and diagrams to present your results, but do not force their use if you can summarize the results in just a few sentences. Figure and tables should be complete and independent. Summarize rather than repeat tables and figures in your main text. Non-essential data can be provided as Supporting Information.
- Highlight what questions were addressed in each result.
- Provide data relevant to your study. Do not change data or its presentation to show things that you did not do.
- Write in the past tense.
- Answer the question: what was found?

## Discussion (conclusion)

- 900–1000 words (Maximum 1/3 of your manuscript).
- Summarize your conclusion on the basis of your findings, but avoid simple repetition of your results. 2–3 sentences. Focus on *why* rather than *how*.
- How do your findings compare to other studies?
- What are the implications to your readers?
- What is the link between the original purpose and conclusion of your study?
- What are the limitations of your study? Include a constructive paragraph (2–3 sentences) to address any limitations of your methods and findings.

- Write in the present tense for conclusions and facts, and past tense when you reference work done in the past by you or others.
- Try to summarize your conclusion and its importance in your last 2–3 sentences. For *Int J Urol*, please write this under a separate *Conclusion* header.
- Avoid ending with an academic cliché, such as ‘Further research is necessary to clarify this complex issue’. Instead, try to address what should be done next.
- Answer the question: what was concluded, why is it important?

## Recommended resources

Bates College. How to write a paper in scientific journal style and format: The structure, format, content, and style of a journal-style scientific paper. [Cited 2 Feb 2009.] Available from URL: [http://](http://abacus.bates.edu/~ganderso/biology/resources/writing/HTW_Guide_Sections_9-30-08.pdf)

[abacus.bates.edu/~ganderso/biology/resources/writing/HTW\\_Guide\\_Sections\\_9-30-08.pdf](http://abacus.bates.edu/~ganderso/biology/resources/writing/HTW_Guide_Sections_9-30-08.pdf)

Caprette DR. Writing research papers. [Cited 2 Feb 2009/] Available from URL: <http://www.ruf.rice.edu/~bioslabs/tools/report/reportform.html>

Day RA. *How to Write & Publish A Scientific Paper*. Oryx Press, Phoenix, AZ, 1998.

Hall GM (ed.). *How to Write a Paper*. Blackwell Publishing, London, 2008.

## References

- 1 Christensen NB, Kume H, Autorino R. How to write titles and abstracts for readers. *Int. J. Urol.* 2009; **16**: 2–3.
- 2 Christensen NB, Sasaki S, Sasaki K. How to write in the active voice. *Int. J. Urol.* 2009; **16**: 226.