Effective Medical Writing

Pointers to getting your article published

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Abstract and keywords

ABSTRACT
The abstract of a scientific paper represents a concise, accurate and factual mini-version of the paper contents. Abstract format may vary according to the individual journal. For original articles, a structured abstract usually consists of the following headings: aims (or objectives), materials and methods, results and conclusion. A few keywords that capture the main topics of the paper help indexing in the medical literature.

Keywords: abstract, keywords, medical writing, scientific paper structure, structured abstract

INTRODUCTION
Also known as a summary, an abstract can be regarded as an abbreviated and accurate representation of the paper contents, i.e. a mini-version of the entire paper. After the title, the abstract is probably the next most read part of a scientific paper. Normally placed at the beginning of an article, following the title page, the abstract assumes great practical importance because it is often the only part of the article that is read by editors and readers. It also leaves the reader with an impression of what is to come. It is therefore to the author’s advantage to be able to construct as perfect an abstract as possible.

ABSTRACT
According to the International Committee of Medical Journal Editors (ICMJE), the abstract should provide the context or background for the study and should state the study’s purposes, basic procedures (including selection of study subjects or laboratory animals, observational and analytical methods), main findings (giving specific effect sizes and their statistical significance, if possible), and principal conclusions. The new and important aspects of the study or observations should be emphasised.

Abstract example 1:
• Objective
• Design
• Setting
• Participants
• Interventions
• Main outcome measures
• Results
• Conclusion

Abstract example 2:
• Objective
• Data sources
• Review methods
• Results
• Conclusion

Whatever the format, the purpose of the abstract is to give the reader the essence of the research done. If accepted, it will be indexed with the complete paper in major databases, such as MEDLINE/PubMed and Science Citation Index. Researchers often browse quickly through abstracts to keep abreast of the latest developments in their fields and decide whether the rest of the article is worth retrieving/reading/citing. Given its importance, many authors regard the abstract as the most difficult part of a scientific paper to write. Experienced authors...
therefore recommend writing the abstract last, i.e. after completing the body of the manuscript.

Most journals impose a word limit on the abstract. Typically, this is 150–200 words or less for unstructured abstracts, and 200–300 words or less for structured abstracts. A “generic” structured abstract should be divided into four paragraphs with the following headings.

- Aim (or objectives): State the hypothesis being tested or the procedure being evaluated in one to two sentences. (Why was the study done?)
- Materials and methods (or Subjects and methods, or Methodology): Briefly state what was done and what materials were used, including who the study sample or population was, if it was a prospective or retrospective study, and whether or not the study population was randomised. The sample size or patient number should be included. State how the study was performed, what measurements were made, the methods used to assess the data and to control bias, and how the data was analysed. (What was done and how was it done?)
- Results: Provide the findings of the study, including indicators of statistical significance. The data should include actual numbers as well as percentages. (What was found?)
- Conclusion: Summarise in one or two sentences the conclusion made on the basis of the findings. (What was concluded?)

The abstract should be completely self-contained, i.e. contains enough information to be stand-alone. Actual data should be included. References should be excluded. Avoid using abbreviations, unless a long term is used several times in an abstract. Avoid jargon and ambiguous terms. When starting to write an abstract, one can begin by making a list of the most important sentences that were written for each section of the paper, i.e. Aims, Materials and methods, Results and Conclusion. The author usually needs several drafts in order to prioritise and refine the inclusion of essential information in a succinct yet attractive manner. Less experienced authors should seek help from collaborators and guidance from an experienced mentor.

**Box 1. Components of a structured abstract:**

1. Aims (or objectives)
2. Materials and methods
3. Results
4. Conclusion

**KEYWORDS**

Immediately following the abstract, most journals require the authors to provide, and identify as such, three to ten keywords or short phrases that capture the main topics of the article. These will assist indexers in cross-indexing the article and are often published with the abstract.(1) A proper choice of the keywords will help the paper to be located easily during a literature search, particularly an online search. To choose the most appropriate keywords, authors should understand the subject and purpose of paper. The most important concepts should be selected, and then these concepts should be expressed in words which match the retrieval words of readers. Typically, keywords reflect the anatomical region of interest, the modality and procedure used, and the pathological process investigated.

The selected keywords should be checked against established indexing systems or databases e.g. MEDLINE/PubMed. Ideally, terms from the Medical Subject Headings (MeSH) list should be used. If suitable MeSH terms are not yet available for recently-introduced terms, present terms may be used.(1) MeSH is the US National Library of Medicine (NLM)’s controlled vocabulary thesaurus, and is used by NLM for indexing articles from 4,800 of the world’s leading biomedical journals for the MEDLINE/PubMed database. MeSH descriptors are arranged in both an alphabetical and a hierarchical structure, with more specific headings found at more narrow levels of the multilevel hierarchy.(4)

**SUMMARY**

The ideal abstract is a factual, objective and accurate outline of the entire manuscript. It creates a positive impression on editors and reviewers to increase the chance of manuscript’s acceptance, and induces readers to read the entire paper. Selecting keywords is important as they are used to index your paper in the medical literature.

**Box 2. Take home points:**

1. The abstract should be concise, factual and stand-alone.
2. A structured abstract is preferred for an original scientific paper.
3. Keywords are carefully selected for indexing in the medical literature.

**REFERENCES**

### Multiple Choice Questions (Code SMJ 200809A)

<table>
<thead>
<tr>
<th>Question</th>
<th>True</th>
<th>False</th>
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<tbody>
<tr>
<td><strong>Question 1.</strong> The abstract is:</td>
<td></td>
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<tr>
<td>(a) Probably the least read part of a scientific paper.</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>(b) A mini-version of the entire paper.</td>
<td>☐</td>
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<tr>
<td>(c) Usually follows the title page.</td>
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<td>(d) Never indexed in electronic databases.</td>
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| **Question 2.** Regarding the format of abstracts: | | |
| (a) The format and length are exactly the same for all journals. | ☐ | ☐ |
| (b) Case reports usually have structured abstracts. | ☐ | ☐ |
| (c) Invited commentaries usually have unstructured abstracts. | ☐ | ☐ |
| (d) Abstracts are typically 300 words or less in length. | ☐ | ☐ |

| **Question 3.** The following statements about a structured abstract are true: | | |
| (a) They usually consist of four or more sections. | ☐ | ☐ |
| (b) How the study was done is stated in the Materials and methods section. | ☐ | ☐ |
| (c) Actual numbers should not be quoted in the Results section. | ☐ | ☐ |
| (d) The Conclusion should be made on basis of the findings. | ☐ | ☐ |

| **Question 4.** The following items should be included in the abstract: | | |
| (a) Actual data. | ☐ | ☐ |
| (b) References. | ☐ | ☐ |
| (c) As many abbreviations as possible. | ☐ | ☐ |
| (d) Aims of the study. | ☐ | ☐ |

| **Question 5.** The following statements about the keywords are true: | | |
| (a) Keywords aim to capture the main topics of the article. | ☐ | ☐ |
| (b) Keywords help indexing in the medical literature. | ☐ | ☐ |
| (c) Authors should avoid any keyword listed in MeSH. | ☐ | ☐ |
| (d) A scientific paper typically contains 3–10 keywords. | ☐ | ☐ |

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**Doctor’s particulars:**

Name in full: __________________________________________

MCR number: ________________________________________ Specialty: ___________________________

Email address: ________________________________________

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**SUBMISSION INSTRUCTIONS:**

1. Log on at the SMJ website: http://www.sma.org.sg/cme/smj and select the appropriate set of questions.
2. Select your answers and provide your name, email address and MCR number. Click on “Submit answers” to submit.

**RESULTS:**

1. Answers will be published in the SMJ November 2008 issue.
2. The MCR numbers of successful candidates will be posted online at www.sma.org.sg/cme/smj by 15 November 2008.
3. All online submissions will receive an automatic email acknowledgment.
4. Passing mark is 60%. No mark will be deducted for incorrect answers.
5. The SMJ editorial office will submit the list of successful candidates to the Singapore Medical Council.