

# Effective Medical Writing

Pointers to getting your article published

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## Basic structure and types of scientific papers

### ABSTRACT

The basic structure of a scientific paper is summarised by the acronym IMRAD. Many types of papers are published in medical journals. These include original articles, case reports, technical notes, pictorial essays, reviews, commentaries and editorials. Authors should be aware that each type of paper is specific in nature, serve a distinct purpose, and is judged by different criteria. Authors submitting their work in the most appropriate format will be able to maximise their material and enhance the chances of manuscript acceptance.

**Keywords:** medical writing, scientific paper structure, scientific paper types

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### INTRODUCTION

Many types of papers are published in medical journals. It is important to be aware that each type of paper is specific in nature, serves a distinct purpose, and is hence judged by different criteria. Authors should therefore be clear about the type of paper that they are planning to write, and construct the manuscript according to the prescribed guidelines for the specific type of paper. All journals have their own in-house style, detailed in the "Instructions to Authors" or "Guide for Authors" which can be found either on the website or printed version of the journal.

### BASIC STRUCTURE

The basic structure of a scientific paper can be summarised by the acronym IMRAD.

#### Box 1. IMRAD stands for:

Introduction	(What question was asked?)
Methods	(How was it studied?)
Results	(What was found?)
And	
Discussion	(What do the findings mean?)

This basic structure is common to the standard scientific paper (original article), although there may be minor variations, depending on individual journal house

style. Other components include: title page, abstract, keywords, tables, graphs, figures, acknowledgements, and references. Each of these components of IMRAD will be individually described in detail in future articles in this series.

### TYPES OF PAPERS

Materials published in journals may be classified into a variety of categories. Although its contents may be influenced to a large extent by the type of material submitted to the journal, the editor is chiefly responsible for the types of papers to be published, bearing in mind the need for a balanced mix. The paper types are also dependent on the editorial policy, and the mission and scope of the individual journal.

#### Box 2. Types of papers include:

1. Original article
2. Case report
3. Technical note
4. Pictorial essay
5. Review
6. Commentary
7. Editorial
8. Letter to the editor
9. Others
10. Non-scientific material

### Original Article

This is the most important type of paper. It provides new information based on original research. This category of paper is usually prospective and is supported by in-depth statistical analysis. The conclusions should be supported by the data provided in the results. Some journals subdivide this category of paper into **Major Paper** and **Original Report**. The Major Paper is described in this paragraph.

The Original Report is a focused description of original observations concerning unique features of a disease or disorder. This may refer to a previously-undescribed diagnostic finding, procedure or manifestation of a disease. Unlike a Major Paper, the Original Report is usually retrospective and not subject

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to in-depth statistical analysis. Original Articles should consist of the following headings: structured abstract, introduction, methods, results and discussion (IMRAD).

#### **Case Report**

This is a description of a single case with unique features. These unique features may consist of previously-unreported observation of a recognised disease, the unique use of imaging or diagnostic test to reveal a disease, previously-unreported clinical condition, previously-unreported treatment in a recognised disease, or previously-unreported complication of a procedure. Case Reports are usually short and focused. There is often a prescribed limit to the number of figures and references, and sometimes, also the authorship. Case Reports should consist of the following headings: short unstructured (or no) abstract, brief introduction, case report and discussion.

#### **Technical Note**

Also known as Technical Innovation, this type of article is a description of a specific technique or procedure, modification of an existing technique, or new equipment applicable to a branch of medicine. Discussion is limited to the specific message. There is often a prescribed limit to the number of figures and references. Technical Notes should consist of the following headings: short unstructured (or no) abstract, brief introduction, methods, results and discussion. The methods and results sections may be combined under the heading of technique.

#### **Pictorial Essay**

This is a teaching article that relies on the quality of its images. The text is usually limited with much of the message contained in the figure legends. The message should however be current and practical, and does not introduce new information. Emphasis is placed on the teaching value of the article. This type of article usually allows a large number of figures but a limited number of references. Pictorial Essays should consist of the following headings: short unstructured (or no) abstract, brief introduction, optional subheadings and optional discussion.

#### **Review**

This is a detailed analysis of recent developments on a specific topic. It serves to highlight important points that have been previously reported in the literature. This type of paper does not introduce new information and does not include the author's opinion or personal experience. A large number of relevant references are expected. Reviews should consist of the following headings: unstructured abstract, introduction and subheadings.

Reviews are usually invited by the editor (hence, are also known as Invited Reviews).

#### **Commentary**

This is a short article that describes an author's personal experience of a specific topic. The subject may be controversial and the author's perspective is provided. This type of paper does not introduce new information, and should outline the various viewpoints that exist. It may be based on a current hot topic or may be commissioned to accompany an original paper on the same topic. The number of references and illustrations should be limited to support the author's opinion. Commentaries should consist of the following headings: unstructured (or no) abstract, introduction and subheadings. Commentaries are usually invited by the editor (hence, are also known as Invited Commentaries).

#### **Editorial**

This may take several forms, most often: a short review or critique of original articles accepted for publication in the same issue of the journal, a brief description of a subject that does not warrant a full review, or serve to draw attention to very recent innovations or subjects of general interest to readers. The number and types of editorials vary according to the editorial policy. Editorials are invited by the editor or written by the editor.

#### **Letter to the Editor**

Many journals have a Letters or Correspondence section. Letters are usually short and can be written on any subject of interest to the journal reader, including comments on previously-published articles. These comments should be objective and constructive. Authors of previously-published articles commented on by the letter-writer, are usually invited to make a written response (Author's Reply to Letter). This section may sometimes also be used for floating new hypotheses, and for drawing readers' attention to important hazards and points of interest or relevance to clinical practice.

#### **Others**

There are many other types of papers. These depend on the mission and style of individual journals, and contribute to the character of the individual journal. Examples include: historical articles, works-in-progress or short communications, special report, evidence-based practice, health policy and practices, experimental studies, information technology, how I do it, and teaching articles. Articles that have, in the recent past or currently, contributed to the Singapore Medical Journal's character include the following series: Clinics in Diagnostic Imaging, ECG Case, Tips from the Experts, Basic

Statistics for Doctors, Evidence-based Medicine and Healthcare, and TARGET.

#### **Non-scientific Material**

These contributions do not add to the scientific quality of the journal but do add to the journal's character. However, they serve a purpose in informing, educating or providing light-hearted reading to the reader. Examples include book reviews, proceedings of scientific meetings, obituaries, tributes, materia non-medica, speeches, and special communications. Non-scientific articles that have, in the recent past or currently, contributed to the Singapore Medical Journal's character include the following series: Centennial of Medical Education and Medicine in Stamps.

#### **SUMMARY**

The basic structure of a scientific paper is summarised by the acronym **IMRAD**. Being familiar with the various types of papers that may be published in a particular journal is essential for preparation of the manuscript in the correct format. Authors submitting their work in the most appropriate format will be able to maximise their material and also enhance the chances of acceptance.

#### **Box 3. Take home points:**

1. Basic paper structure: **IMRAD**
2. Know the various paper types
3. Maximise your material: submit in appropriate format

**SINGAPORE MEDICAL COUNCIL CATEGORY 3B CME PROGRAMME**  
**Multiple Choice Questions (Code SMJ 200807A)**

- |   | True                     | False                    |
|---|--------------------------|--------------------------|
| <b>Question 1.</b> When preparing a scientific paper for submission to a journal:             |                          |                          |
| (a) Following a prescribed structure is necessary.  | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) Reading the journal's Instruction to Authors is important.                                | <input type="checkbox"/> | <input type="checkbox"/> |
| (c) All papers are judged by the same criteria, regardless of content.                        | <input type="checkbox"/> | <input type="checkbox"/> |
| (d) Authors should be aware that there are different categories of papers.                    | <input type="checkbox"/> | <input type="checkbox"/> |
| <br><b>Question 2.</b> The following statements about the IMRAD structure are true:           |                          |                          |
| (a) IMRAD is an acronym for Introduction, Methods, Results and Discussion.                    | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) The Introduction section describes what was found.  | <input type="checkbox"/> | <input type="checkbox"/> |
| (c) The Methods section describes how the study was done.                                     | <input type="checkbox"/> | <input type="checkbox"/> |
| (d) The Discussion section discusses what the findings mean.                                  | <input type="checkbox"/> | <input type="checkbox"/> |
| <br><b>Question 3.</b> The following types of articles are usually found in medical journals: |                          |                          |
| (a) Original article.   | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) Case report.  | <input type="checkbox"/> | <input type="checkbox"/> |
| (c) Invited review.   | <input type="checkbox"/> | <input type="checkbox"/> |
| (d) Annual report.  | <input type="checkbox"/> | <input type="checkbox"/> |
| <br><b>Question 4.</b> The following statements regarding Case Reports are true:              |                          |                          |
| (a) A previously-unreported disease is described.   | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) A previously-unreported complication of a procedure is described.                         | <input type="checkbox"/> | <input type="checkbox"/> |
| (c) A long list of references is required.  | <input type="checkbox"/> | <input type="checkbox"/> |
| (d) The abstract is usually structured.   | <input type="checkbox"/> | <input type="checkbox"/> |
| <br><b>Question 5.</b> The following statements regarding Editorials are true:                |                          |                          |
| (a) Only journal editors are allowed to write editorials.                                     | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) They may critique an original article published in the same issue.                        | <input type="checkbox"/> | <input type="checkbox"/> |
| (c) They may serve to draw the readers' attention to a topic of general interest.             | <input type="checkbox"/> | <input type="checkbox"/> |
| (d) The number and types of editorials depend on journal policy.                              | <input type="checkbox"/> | <input type="checkbox"/> |

**Doctor's particulars:**

Name in full: \_\_\_\_\_

MCR number: \_\_\_\_\_ Specialty: \_\_\_\_\_

Email address: \_\_\_\_\_

**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 September 2008 issue. (2) The MCR numbers of successful candidates will be posted online at [www.sma.org.sg/cme/smj](http://www.sma.org.sg/cme/smj) by 15 September 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.

**Deadline for submission: (July 2008 SMJ 3B CME programme): 12 noon, 25 August 2008.**