Handbook of Biomedical Research Writing

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This edition is currently being revised. The author welcomes suggestions or corrections at jocelyngraf@gmail.com .

1.0 Introduction to Biomedical Research Writing

This handbook is designed for biomedical scientists and healthcare professionals who need to publish their research in English. It surveys the structure of each section of clinical and basic biomedical science journal articles and texts for correspondence with journal editors.

1.1 **Types of Biomedical Texts**

The following tables list the most common biomedical research texts. They indicate where to get more information about writing each type of text in this book or other sources.

1.1.1 Published Texts

Published texts include all kinds of material found in journals and at conferences.

Full-length journal articles	Research articles with the traditional IMRD structure are covered in chapters 2-5.
Shorter research reports	Shorter articles follow the same structure as full-length ones. They have different names in different journals: "letters," "reports," "brief communications," etc. There is no rule for the length of full-length vs. shorter papers. The short papers in one journal may be equal in length to the longer papers in another journal.
Review	A review does not report on new research. Instead, it surveys a group of articles on one topic and provides a summary and analysis of the topic.
Case reports	A case report tells the story of a rare clinical diagnosis or treatment. See chapter 7.
Case reviews	Case reviews survey a large number of clinical cases.
Critiques of other articles	When authors make an error in published journal texts, another author can provide a short critique in the following issue of the journal. These are often called "letters to the editor."
Other journal content	Journals and professional newsletters accept all kinds of other short articles: opinions, news reports, policy recommendations, even photos and video.
Posters	Posters have become another version of the shorter research report or conference proceedings. See chapters 2-5 for general information about writing up your research.
Presentation Slides	Creating well-designed and well-written slides with PowerPoint

	or other software is challenging. See this website for some good tips: http://writing.engr.psu.edu/slides.html .
Theses and dissertations	When students must write a research paper to graduate with a Master's or doctoral degree, the requirements are usually similar to writing one or more journal articles. One major difference is that students are expected to provide more background information, such as definitions of key terms, and survey the literature more thoroughly in order to prove knowledge of the field. However, most of the content of chapters 2-5 should be applicable to dissertation writing. In addition, there are many books on the market that cover theses and dissertations in more detail.

1.1.2 "Hidden" Texts

These texts are "hidden" because they are not published and it is sometimes difficult to find good examples.

Submission letters	When sending a text to a journal for publication, this letter or email provides basic information to the journal editors. See chapter 8.
Reviewer comments	Senior scholars write comments when they review articles for journal publication.
Response to reviewers	The article other must then respond to the reviewer's comments. See chapter 8.
Conference proposals	In the sciences, conference proposals (written before acceptance) and conference abstracts (often written after acceptance) have much in common with journal article abstracts and short journal articles. For more details, refer to chapter 5 on abstracts.
Application letters and resumes/CVs	Writing cover letters and CVs for job and school applications is a common challenge. However, they are not covered in this book because there are a number of excellent online sources of advice and examples. See the *Chronicle of Higher Education CV* Doctor articles, for example: http://chronicle.com/jobs/tools/cvdoctor/2007/
Other professional correspondence	Every scientist or healthcare professional must write other kinds of formal email, such as recommendations and requests for recommendation. There are also lab equipment and supply ordering, requests to other scholars to share data or specimens, grant applications, and correspondence with government

	agencies. Follow the general letter and email writing guidelines in chapter 8.

1.2 The Parts of a Journal Article

A traditional journal article in the sciences consists of four parts: Introduction, Methods, Results, and Discussion/Conclusion (IMRD). One way to approach these sections is to consider the purpose of each. Here are the questions you should try to answer in the abstract and again in more detail in the rest of the article:

- Why do we care about the problem and the results?
- What problem are you trying to solve?
- How did you go about solving or making progress on the problem?
- What's the answer?
- What are the implications of your answer?

General

Introduction

Introduction: establishes the background of the paper, the nature of the research problem, the importance of the topic, or the newness of the research.

Purpose

Purpose: indicates purpose, thesis or hypothesis, outlines the intention behind the paper.

Specific

Methods

Methods: provides information on design, procedures, assumptions, approach, data, etc.

Results

Results (Product): states main findings or results, the argument, or what was accomplished.

General

Discussion/ Conclusion

Discussion/Conclusion: interprets or extends results beyond scope or paper, draws inferences, points to applications or wider implications or recommendations