




# Scientific Research Writing for Publication: Steps for novice writers


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# Why is writing and publishing important???

- Communicate knowledge to others
- Promotion
- Self satisfaction



# Writing a manuscript consists of answering 4 questions:

- Why did you start (Introduction: background and hypothesis)
- What did you do (methods)
- What did you find (results)
- What does it mean (discussion)



# Format of manuscript

Original research  
Review  
Case report  
Brief communication  
Letter to the editor



# Sections of a scientific manuscript

## IMRaD Principle

(Introduction, Method, Results, and Discussion)

- Title
- Abstract
- Keywords
- Introduction
- Material and methods
- Results
- Discussion
- Conclusion
- Acknowledgements
- References

```
graph TD; A["Introduction  
What is known?  
What is unknown?  
What you want to do?"] --- B["Materials & Methods  
How do you show it?"]; A --- C["Results  
What are you showing now?"]; A --- D["Discussion  
What does it mean?  
Compare to known"]; C --- E["Conclusion  
Your message"]; style A fill:#9999ff,color:#000; style B fill:#9999ff,color:#000; style C fill:#9999ff,color:#000; style D fill:#9999ff,color:#000; style E fill:#9999ff,color:#000;
```

Introduction  
What is known?  
What is unknown?  
What you want to do?

Materials & Methods  
How do you show it?

Results  
What are you showing now?

Discussion  
What does it mean?  
Compare to known

Conclusion  
Your message



# Introduction

1. Statement of the issue
2. Why is your paper needed?
3. Your purpose and hypothesis



# Introduction

- First paragraph introduces the issue your paper will address. The first sentences should be attractive to catch the readers attention
- Second paragraph includes reasonable literature review and why your paper is needed



# Introduction

- Third paragraph includes the purpose of your study. The last and most important sentence in the introduction begins with :  
*"The purpose of this study is....."*
- This sentence includes the hypothesis you are putting or your research question. The editor searches here for your input. It is called the *thesis*



# Materials and Methods

Subjects

Procedures

Terms and measures

Data collection

Statistics

# Subjects

- Design: should be indicated in first sentence:
  - Case report
  - Case series
  - Case control study
  - Cohort
  - Clinical trial
- Collection of data: prospective or retrospective
- Criteria for inclusion and exclusion

# Subjects

- Demographics of studied population is in methods section for retrospective studies and in results section for prospective studies. They include:  
Number, age, sex, symptoms, presentation, choice of controls...

# Procedures

Details of all procedures should be explained in the order they were applied

- clinical
- laboratory investigations
- radiology
- others



# Terms and measures

- Criteria: do not assume that everyone knows what you mean by a certain diagnosis or level of severity
- Definitions

# Statistical tests

- Describe in the order that would be applied to the data
- Identify independent and dependent variables
- Last sentence should include what p value represents as an acceptable level of significance, usually 0.05



# Results



# Results

- Report all results as facts and numbers without interpretation
- Units should be accurate
- Make sure numbers add up correctly
- Data either put as text or tables and figures, do not repeat



# Discussion

**Summarize results**  
**Interpret results**  
**Compare to literature**  
**Implications**

```
graph TD; Discussion[Discussion] --- Summary[Summary of Results]; Discussion --- Interpret[Interpret the Results]; Discussion --- Compare[Compare to Literature]; Discussion --- Implications[Implications & Conclusions];
```

Discussion

Summary of  
Results

Interpret  
the Results

Compare to  
Literature

Implications  
& Conclusions

# Discussion

- First paragraph: summarize your principal and most important findings according to your thesis, do not repeat all data from result section, do not add new data, do not start with literature review
- Second paragraph: interpretation of your results


# Discussion

- Third paragraph: compare and contrast your findings and interpretations with other studies from the literature and suggest reasons. Do not repeat the literature review from the introduction
- Fourth paragraph: clearly indicate what are the important clinical lessons to be drawn from your work or any issues related to pathophysiology



# Discussion

- Fifth paragraph: indicate the limitations of your study without undermining its strength



# Last paragraph of discussion or conclusion

- Summarize your findings and conclusions
- Suggest applications, emphasize clinical implications of the study
- The last sentence should describe what would be needed next



# References



# References

- Include mostly the most recent, the most important and those directly related to your study
- Try not to exceed 30 references for a research study and less for case report
- Format exactly as instructed in authors guidelines



# Abstract: usually written last

Background and purpose of study

Sample and methods

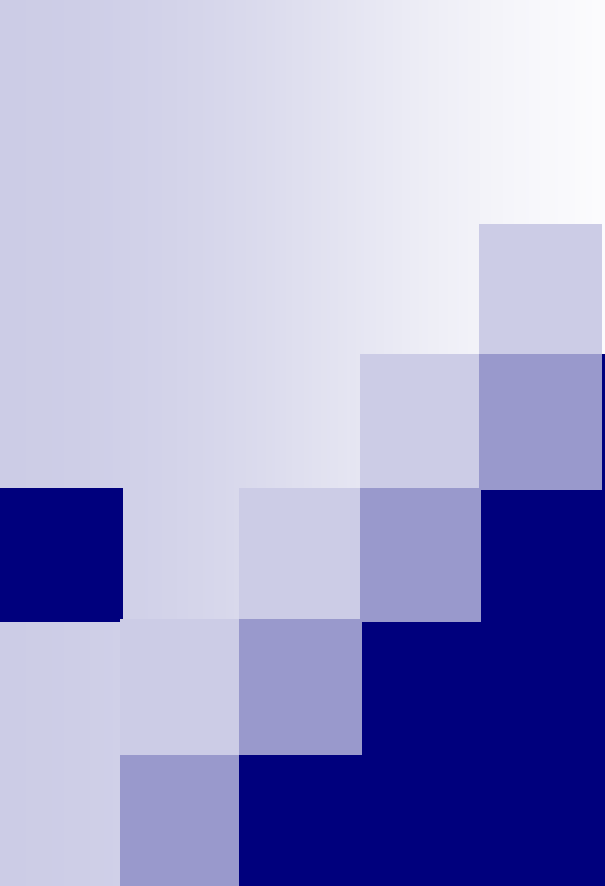
Results

Conclusion on findings should reflect the  
words of the purpose



# Journals may ask for:

- Ethical approval
- Source of funding
- Participation of each co-author



# Steps for scientific manuscript writing

# Decide to write: first steps

- Decide on the topic.

Must be interesting to you: timely and relevant and not outdated topic, presents a new idea

- Identify a target journal



- Put your own timetable



- Begin with a thorough literature search and gather relevant articles (use PubMed)





# Key questions to answer to identify your idea and message

What does previous research say about the issue?

What prompted me to do the work and to write?

What is the work setting and nature of study?

What are my methods?

What are my major findings?

What did I learn that I can tell others?

What do I plan to do next?

How are my findings of benefit to patients, doctors, public, science...?

# Second steps

- Identify 2,3 articles as the most relevant, read them very carefully and use them as your templates
- Put a preliminary title
- Sketch an outline, mainly with headings, not too detailed
- Write your first draft, don't think too much about grammar at this stage

# Further steps

Revise, revise, revise & give to co-authors or supervisor

- Say what you mean, mean what you say
- Words and sentences must be simple, clear and accurate
- Avoid repetitions
- Be careful not to commit any scientific fraud



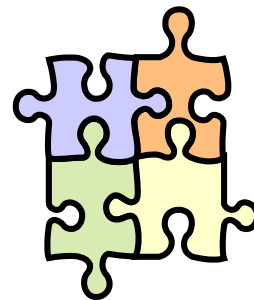


# Scientific fraud

- Falsification: altering truthful information
- Fabrication: inventing information where none previously existed
- Plagiarism: To use someone else's words or ideas and put them as your own without proper reference

# Further steps

- Revise according to author guidelines of journal and proofread
- Proper spelling, grammar and punctuation is essential in last draft





# Authorship

- As a rule the principal writer should be the first author
- The supervisor or head of research team should be last
- Other authors are listed after the first author in order of their level of contribution



## Guidance on the authorship of scientific papers :The International Committee of Medical Journal Editors

Authorship credit should be based on

- substantial contributions to conception and study design, or acquisition of data, or analysis and interpretation of data
- drafting the article or revising it critically for important intellectual content
- final approval of the version to be published.

Authors should meet all three conditions

# Last steps

- Submit and wait
- Expect:
  - Immediate rejection
  - Late rejection with or without reviewers comments
  - Provisional acceptance with reviewers comments
  - Acceptance without changes



# Last steps

- If changes wanted, revise according to reviewers comments and resubmit with cover letter detailing all changes
- If accepted, proof will be sent to you, read thoroughly for any mistakes and send in 2 days
- If rejected, send to another journal after changing format accordingly

# Most frequent reasons for manuscript rejection

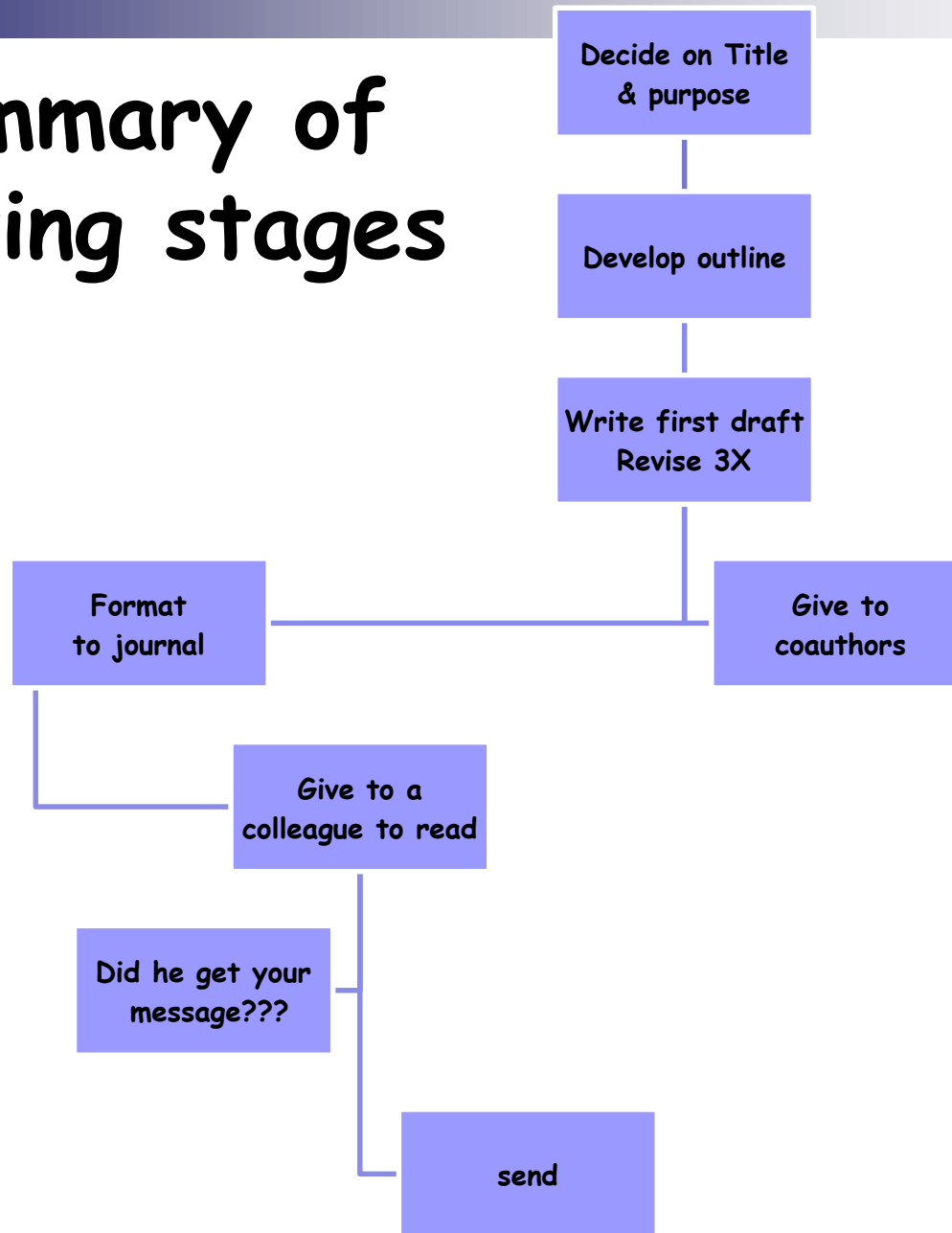
- Problem not stated clearly
- Over-interpretation of results
- Inappropriate methods, sample too small or biased
- Inaccurate or insufficient data
- Inappropriate or incomplete statistics
- Text difficult to follow
- Defective tables or figures
- Incomplete or outdated literature

# What is an impact factor

For a particular journal, the journal impact factor (JIF) is defined as the number of citations within a given year (e.g., 2008) cited to all papers published in that journal during the previous 2 years (i.e., 2007 and 2008), divided by the total number of papers published in that journal during those 2 years.



# Summary of Writing stages



# For Novice writers

- Take a decision to write with persistence
- Get over your internal barriers such as your lack of confidence of being a writer
- Put your own timeline
- Assign a good half an hour each day for writing your paper
- There is no perfectionism, so do not stop in the middle, first drafts do not need good language
- With time you will learn to *"write with a gallop that leaves one's internal critics behind"* (Virginia Woolf)



# Conclusions

- It is essential to disseminate information
- Writing scientific manuscripts is a learned process
- The more a person writes, the better writer he becomes
- Writing needs time, effort and accuracy
- Contribution makes you an expert in the field