

**ASEAN+3 FETN**  
**Scientific Writing Workshop**

**LECTURE 2**  
**BUILDING A FOUNDATION**

**Presented by Dorothy L Southern, MPH**



# Objectives

- Focus on organization of a manuscript: **The IMRAD structure**
- Learn about appropriate **style, vocabulary and punctuation** that increases the clarity and conciseness of a scientific paper.



**What is IMRAD?**

- Introduction
- Methods
- Results and
- Discussion

Links to **Error B2**: Confusing the role of introduction, methods, results, and discussion

# The IMRAD structure

- Began to be used in the 1940s
- In the 1970s, was used by 80% of all journals
- In the 1980s, was the only structure adopted in original papers
- The influence of other disciplines and the recommendations of editors contributed to authors adhering to it
- Peer reviewers and readers love it!

# Why?

- Can find specific information quickly if there is no time to read through the entire article

# Introduction

1. Describe the disease/problem investigated.
2. What is the gap in knowledge?
3. What is the rationale or justification for doing the study?
  - Why is your research question important?
  - What could be the impact of your research?
4. List the objective(s) of the study.



# Methods

## 1. Details about conducting your study

- Who
- Where
- What
- How
  - Data collection
  - Data analysis
- Ethical approval

# Results



- Explain what you found:
  - Move from simple to complex
    - Begin by describing the demographics
  - Write text about each table/figure
    - Describe the principal pattern and features without repeating all the raw data

# Discussion

Your interpretation of the results

- How do your overall results link to your objectives?
- Interpret each of your results
- Limitations of your study
- Conclusion
- Recommendations

# IMRAD puzzle exercise



# “Neonatal outcomes after influenza immunization during pregnancy: a randomized controlled trial”

Mark C. Steinhoff MD, Saad B. Omer PhD, Eliza Roy DCH, Shams El Arifeen DrPH, Rubhana Raqib PhD, Caitlin Dodd MS, Robert F. Breiman MD, K. Zaman PhD  
[CMAJ](#). 2012 Apr 3;184(6):645-53. doi: 10.1503/cmaj.110754. Epub 2012 Feb 21.

# Manuscript puzzle

- Work in groups of 2 people
- Each group will get:
  - 12 pieces of the article and 4 headings
- Put pieces under the appropriate heading to put the report “puzzle” together
- There may be more than one piece of the report under each heading, so pay attention to the order.

# Introduction

- References to other studies to:
  - Create background #5
  - Point out a gap in knowledge #9
- Objectives and/or hypothesis of study clearly stated #3

# Methods

- Describes the data used in the report

- What is the study period? #10

- How did they analyze the data? #11



# Results

- Narrative summarizes the data in the tables

#7 , 8

# Discussion (Interpretation)

- Interpretation of data: #6
- Comparison with other study: #2
- Limitations: #12

# Discussion cont...

- Conclusion: #1
- What does it mean for the future? #4

# Correct order:

- Introduction: 5, 9, 3
- Methods: 10, 11
- Results: 7, 8
- Discussion: 6, 2, 12, 1, 4

# High level outline (HLO)

- Provides templates for sequential development
- Follows the IMRAD format
- See Appendix 6 in the Guide
- See Appendix 7 in the Guide
- Use HLO Handouts

# Handouts: HLOs

- Format for quantitative manuscript
- Format for a outbreak investigation manuscript

# Wrap-up

- When you write your draft manuscript, you are putting together a puzzle
- Check your draft manuscript to make sure the puzzle is put together correctly
- Remember:
  - Error B2, confusing the role of Intro, Methods, Results, Discussion
  - Error A 6 Repeating Information





# To publish you need to find out if your work:

1. Is true?

2. Is new?

**3. Is well-written and concise?**

# Scientific Writing Style

- To use the appropriate style, vocabulary and punctuation that increases the clarity and conciseness of a scientific paper.

# How You Write It Matters



“After standing in boiling water for an hour, we examined the contents of the flask.”



“We placed the flask in boiling water for one hour, then examined its contents.”



# How You Write It Matters

In written English

- Punctuation, spelling, grammar errors can alter meaning/understanding
- No benefit from visual or tonal cues so reader can misunderstand the meaning

"Let's eat Grandma!"



Let's eat Grandma.  
Let's eat, Grandma.



*COMMAS SAVE LIVES*



# How You Write It Matters

- Avoid ambiguous phrasing
  - “No one would be better for the job.”
  - “You will be fortunate if you get him to work for you.”
  - “When problems arise, she’s always there.”

# Scientific Writing style

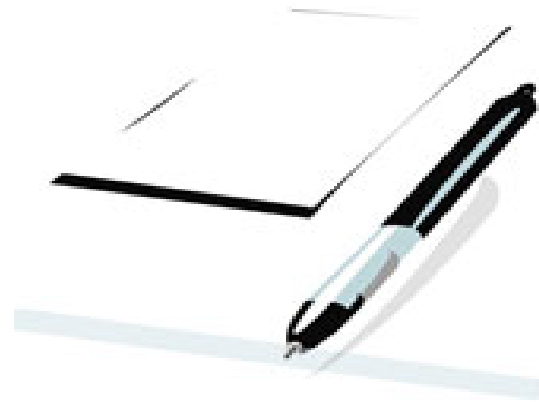
1. Structured
2. Sequential
3. Simple
4. Short
5. Strong
6. Specific



# 1. Structured



‘The preparation of a report has almost nothing to do with literary skill. It is a question of organization.’



# Begin with an outline

- Follows the structure of your paper
  - *Ensures inclusion of all key information*
- Provides a framework to guide the thinking process
  - *Easier to see the flow and logic*
- Uses brief, bullet-point statements
  - *Focuses on thinking skills, rather than writing skills*

## **2. Sequential**

Take the reader by the hand through the sequence of thoughts, step by step, without any missing links in the development of the ideas.

# A key characteristic of good writing is *'reader-centricity'*

- The writer's challenge: to answer readers' questions as they sequentially arise
- Gives the reader information when they need it in a logical sequence that anticipates their questions.
- Facilitates their ability to critique and interpret the information

# Use Chronological Order

Presenting actions or events as they occurred timewise

- Also called temporal (pertaining to time) or linear order
- Facilitates the readers' ability to critique and interpret the information
- Think of sequence words: first, then, next, after that, finally
- See Error B 3



## **3. Simple**

Use simple words to explain what is meant. Don't use technical jargon.

Imagine trying to explain the concept to an ordinary person.

*'Never be ashamed to express a simple idea in simple language. Remember that the use of complicated language is not in itself a sign of intelligence.'*

If you find yourself about to use a word you wouldn't use in every day conversation, go to:

<http://www.plainenglish.co.uk/free-guides.html>

## ***'The A to Z of alternative words'***

published by the Plain English Campaign

The advantages of plain English are:

- it is faster to write
- it is faster to read
- you get your message across more often, more easily and in a friendlier way.

# Keep It Simple

More difficult	Simpler (better)
acquire	To get, buy
beneficial	helpful, useful
cease	To finish, stop, end
demonstrate	To show, prove
equivalent	equal, the same
formulate	plan, devise

## 4. Short

If it's only nice to know, it ought to go!

If it is an interesting sidelight, but is not directly related to the objectives of the paper, it should not be included in the paper.

- Don't repeat any information (Error A 6)
- Use short sentences containing only one idea.
  - The average sentence length should be 15-20 words.
- Split complex sentences.
- If a word or phrase can be removed without altering the meaning or flow of the article, delete!
- Don't use weak opening phrases. (Error E2)

# Don't use weak opening phrases

Examples of the error:	Alternative, better options:
It was found out that...	<i>Delete</i>
One important observation from the findings of this study was that...	<i>Delete</i>
We conclude from our data...	<i>Delete</i>
Moreover, our survey showed that...	<i>Delete</i>
Therefore, this will not be an overstatement that...	<i>Delete</i>
It is known that...	<i>Delete</i>



# Keep It Short

Long	Short (better)
with regard to	regarding
due to the fact that	because
it follows that	therefore
on the other hand	however
is capable of	can
how/why is it that	how/why

# Keep It Short

Avoid redundancy (repeating the same meaning)

“This discovery may pave the way to opening new doors to enabling research into novel antimicrobial classes.”

Instead: This discovery may lead to research into novel antimicrobial classes.

## 5. Strong

- Use the verb as the centre of gravity of your sentence. If the verb is weak, the sentence is weak.
- Avoid: “We did an interview”, instead write “We interviewed”.

# Know Your Voice: Be Active, Not Passive

Passive voice: When the object becomes the focus, the sentence loses action.

## Active

We recorded the LD50.

subject

verb

object

## Passive

The LD50 was recorded.

object

verb

# Be Active, Not Passive

- Passive verbs make writing duller and more difficult to understand
- Active verbs make writing livelier and more interesting
- Fewer words are usually required for the active voice

# Active Voice Is More Transparent

- Passive voice allows the writer to remain anonymous by leaving out the doer.
  - It was found that
  - It is recommended that...
- Active voice lets the readers know there is a person behind the print.
  - We found that.....
  - We recommend that ...

# Use Active Voice

- Most of the time.
  - Aim to make about 60-75% of your sentences active
- When describing action
- When the actor/subject is important

# But...not all passive voice is bad

- It is especially helpful:
  - When the actor is not so important, but the process or principle being described is.
  - When the object is more important than the subject
- Instead of writing “The researcher poured 20 cc of acid into the beaker,” write “Twenty cc of acid was poured into the beaker.”
- Instead of writing “The laboratory technician extracted DNA using a trizol protocol”, write “DNA was extracted using a trizol protocol.”



# When to consider using passive voice

- When the identity of the actor is unknown, doesn't matter, or the writer wants to hide it: *"Mistakes were made."*
- *Links back to transparency (slide 52)*

## 6. Specific

Say clearly and exactly what you want to say.



# Which words are not specific?

We should all try to do a little better, we should all be very watchful of this rule, for it is a rather important one, and we are pretty sure to violate it now and then.

We should all try to do a little better, we should all be very watchful of this rule, for it is a rather important one, and we are pretty sure to violate it now and then.

# Avoid the use of qualifiers

- Qualifiers are words that modify an adjective, but do not carry a specific meaning, such as 'very'.
- The addition of a qualifier adds to the subjectivity, as in 'very important'.



# Avoid the use of adjectives

- Adjectives are words that modify a noun.
- Adjectives often imply substantial subjective and emotional content, both of which should be minimized in technical report writing.
- Example: ‘The Ebola Virus Disease outbreak was very large’.
- What is ‘large’ to one person, may not be ‘large’ to another.
- An alternative better option would be to be specific: ‘In 2015, the Ebola Virus Disease outbreak had affected over 25,000 people, with over 10,000 deaths.’

# **The 6 S's.....see Section 1.3 on page 14 of the guide**

1. Structured
2. Sequential
3. Simple
4. Short
5. Strong
6. Specific

# The 6 S's Activity

Let's look and practice with a real example...

Which "S" is not being followed?



## Example of the error:

One important result from the findings from this study was that of the 813 women that had a birth (live/still) during study period from July 2008 to June 2009, 408 women (55%) in the intervention group and 413 (55%) in the comparison group did not seek antenatal care. Of these women that did need seek antenatal care the most common reason reported for not seeking antenatal care was because both the women in the intervention group and the women in the comparison group did not think that it was necessary to seek care. The next most common reason for not seeking antenatal care was lack of money which was reported by both the intervention group and the comparison group (Table 2).

# Short

## Example of the error:

~~One important result from the findings from this study was that of the 813 women that had a birth (live/still) during study period from July 2008 to June 2009, 408 women (55%) in the intervention group and 413 (55%) in the comparison group did not seek antenatal care. Of these women that did need seek antenatal care the most common reason reported for not seeking antenatal care was because both the women in the intervention group and the women in the comparison group did not thinking that it was not necessary to seek care. The next most common reason for not seeking antenatal care was lack of money which was reported by both the intervention group and the comparison group (Table 2).~~

# Following the “Short” guidelines

## **Alternative, better option:**

Of the 813 women that had a birth (live/still) during the study period, 408 women (55%) in the intervention group and 413 (55%) in the comparison group did not seek antenatal care. The most common reason reported was thinking it was not necessary. The next most common reason was lack of money (Table 2).

Word count=53

# Who, That, Which

- *Who* refers to people.

Joan is the one **who** baked the cookies.

I cannot trust a man **who** cheats on his taxes.

- *That* introduces essential clauses.

The company **that** manufactures bicycles repairs them too.

I could never buy a car **that** gets poor gas mileage.

- *Which* introduces non-essential clauses.

The article, **which** was written last week, appeared in today's paper.

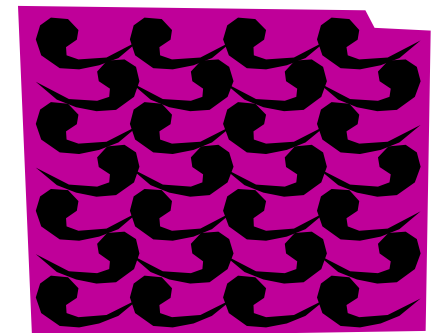
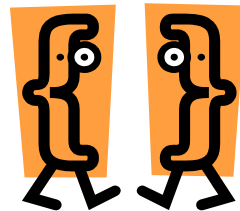
# Other Resources for Punctuation, Grammar and Style

- Punctuation 101: How to get it right most of the time (unless you're British)
- EASE Guidelines for authors and translators of scientific articles to be published in English

[www.ease.org.uk](http://www.ease.org.uk)

# CAPITALS SLOW THINGS DOWN

- LOOK AT A REPORT FROM YOUR ORGANIZATION. IS THE TITLE OF THE REPORT WRITTEN IN ALL CAPITAL LETTERS? ARE THE HEADINGS AND SUBHEADINGS IN ALL CAPITALS? IS THE EXECUTIVE SUMMARY IN ALL CAPITALS? THE REASON THAT PORTIONS OF REPORTS ARE NOT WRITTEN IN ALL CAPITALS IS THAT READING TEXT THAT IS WRITTEN IN ALL CAPITAL LETTERS IS ANNOYING. RESEARCH HAS DEMONSTRATED THAT PEOPLE READ ALL CAPITAL LETTERS MORE SLOWLY THAN THEY READ STANDARD SENTENCE CASE.
- Avoid capital letters. If you want to emphasize any text, use a larger font or **bold**.



# Punctuation

## Period



Use a period at the end of a declarative sentence and in abbreviations.

## Question Mark



Use a question mark after an interrogative sentence.

## Quotation Marks



Use quotation marks for direct quotations.

## Apostrophe

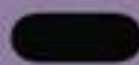
Use an apostrophe in contractions and to indicate possession.

## Comma

Use a comma to separate items in a series, to set off an appositive, or before the conjunction in a compound sentence.



## Hyphen



Use a hyphen to join words serving as a single adjective before a noun, in number words, and to divide words into syllables.

## Exclamation Point

Use an exclamation point to show strong emotion or to give a command.



## Colon

Use a colon to introduce a list and before a final clause that explains something in the sentence.



## Parentheses

Use parentheses around extra non-essential information that is too important to omit.



## Semicolon

Use a semicolon to join two independent clauses that are not connected with a coordinate conjunction.





