Scientific writing

State Institute of Health & Family Welfare, Jaipur

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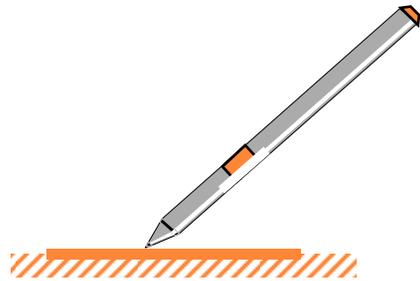SIHFW: an ISO 9001:2008 certified Institution

**Good writing is difficult to define.
It is easier to say what it *is not* than
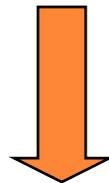*what it is.***

Writers fail to see their mistakes, for:

- Complacent attitude
- Writing courses are considered to be for kids

Doctors are called upon to communicate in different situations

Reports
Article
Proposals
Web page

Lecture
Meetings
Conferences

Specific Audiences

General Audiences

Non-technical Audiences

Basic Elements of Effective Writing

- Know your purpose
- Know your audience
- Choose and organize content around
- your purpose and audience
- Write precisely and clearly
- Design your pages well
- Think visually
- Write ethically

The Three Phases of the Writing Process

The Writing Process	Problem Solving
👉 **Planning**	👉 Orientation
👉 **Composing**	👉 Organization
👉 **Revising**	👉 Execution
	👉 Verification

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Writing Stages

- Getting in the Mood
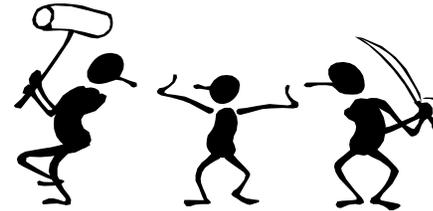
- Writing the First Draft

- Revising, Revising, Revising

- Finishing

Why write /publish research papers?

Ideally –

To share research findings / discoveries with the hope of improving healthcare.

Practically –

To get promoted

To get funding

To get a job

To keep your job!

Things to consider before writing

👉 Time to write the paper?

  👉 Has a significant advancement been made?

  👉 Is the hypothesis straightforward?

  👉 Did the experiments test the Hypothesis?

  👉 Are the controls appropriate & sufficient?

  👉 Can describe the study in 1- 2 minutes?

  👉 Can the key message be written in 1- 2 sentences?

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☞ Tables and figures

- ☞ Must be clear and concise
- ☞ Should be self-explanatory

☞ Read references

- ☞ Will help in choosing journal
- ☞ Better insight into possible reviewers

Choose journal

   Study "instructions to authors"

   Think about possible reviewers

   Quality of journal "impact factor"

Tentative title and summary

Choose authors

(Participation simply in data collection?)

Start by Analyze Your Constraints

Audience

    Who they are
    What they know
    Why they will read
    How they will read

Occasion

    Format
    Formality
    Politics and ethics
    Process and deadline

Purpose

    To inform
    To persuade

But first know your constraints

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Why am I writing:
Know Your Purpose

👉 Proposals?

👉 Interim reports for further funding?

👉 Reporting results for final signoff?

👉 Justification to management?

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Organize the content around the Purpose and the Audience

👉 General overviews to specific details

👉 Specific details to general concepts

👉 Describing events chronologically

Write Precisely and Clearly

☞ Use short paragraphs with a single idea

☞ Short direct sentences

☞ Active voice and action verbs that are clear on what is said and what is being done.

☞ Opinions and viewpoints should be clearly identified

☞ Don't use Doublespeak. Say precisely what you mean.

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I see no reason to write 'metropolis' when they pay me the same to write 'city'.(Mark Twain)

The primary aim of scientific writing

is to inform - not to impress or entertain

Be concise

Use simple short sentences

Use simple short words/ one word

instead of two or three

spelling, punctuation and grammar

abbreviation or acronym

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Design your pages well

- Use Judicious headings to organize the structure

- Break long sections into subsections to keep the readers interest

- Use appropriate fonts

- Use white space to guide the reader to the important areas

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Font – Arial / Times New Roman

Size of font – 11/12

Spacing – 1.5 lines – 2 lines (double spaced)

25-30 lines/page

400-450 words/page

Use good quality paper

Margins – Left 1.5" ; Right 1"Top 1",Bottom 1"

Continuous pagination

Single digit number to be spelled, rest as numeric

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Think Visually

☞ Pictures

☞ Sketches and drawings

☞ Tables

☞ Simple flow graphs

☞ Use color where appropriate

☞ Keep visuals simple, don't make them cluttered

Write Ethically

☞ Present facts accurately

☞ Report unfavorable results along with the favorable

☞ Present the limitations of the design

☞ Give full credit to others (references)

Engineering is not marketing…

Remember

- Writing process has three phases
- Writing has different purposes and goals
- Writing has different formats
- Writing has different audiences
- Writing should be done often

Three aspects of writing that affect assessment by readers

Content

Style- the way you communicate

- Structure
- Illustration
- Language

Form

Format

- Typography
- Layout

Mechanics

- Grammar
- Punctuation
- Spelling

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Content

Be **A**ccurate

Be **B**rief

Be **C**lear

Style

A very complicated way of saying very simple things…Or a very simple way of saying very complicated things

First person
Active voice

Formatting

Formats vary considerably to serve different situations

Formal Reports

Journal Articles

Not all rules of format are constant

Typography, layout, font, sequencing

When you divide a section into subsections, all the pieces should be of the same pie

- Causes of Maternal mortality
  - Sepsis
  - Hemorrhage
  - Obstructed labor

Avoid large blocks of capital letters

~~TYPE IS to READ~~

Type is to read

~~WORDS SET IN ALL CAPS USE MORE SPACE THAN TEXT SET IN LOWERCASE.~~

Words set in all caps use more space than words set in lowercase.

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While writing, attend to:

- Punctuation

- Hyphenation (*role-playing technique, two-way analysis , high-anxiety group, clear-cut case*)

- Italics and Bold-*italics* for emphasis and **bold** for strong emphasis. Avoid ***italic bold***,

- Fonts and Symbol

- Abbreviations and Acronyms(define it in parentheses the first time you use

- Headings-Paragraph Styles, and Lists

- Numbers and Statistics

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Tables

Figures

Use of Words

Grammar

Flow of Ideas

Style for Cited Publications

References & source

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Beginnings prepare readers for understanding the work

- Title
    - Orients reader
        - to document
        - to your area of work
    - Separates your work from everyone else's work
- Summary tells readers what happens in document
- Introduction prepares readers for the middle

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Develop an outline

- Organize the paper/clarify your ideas
  - Maintain fidelity to the original argument matrix
  - Maintain fidelity to the **single, Overriding Communication Objective (SOCO)**
  - Maintain the flow of the story
    - A → B → C…
  - Cover all the essential points
  - Leave out the nonessential points

That is a great idea for a second paper!"

Getting published:
know the answers to

Why (I did the study-Introduction**)**

When (Methods)

Where (Methods)

Who (Methods)

What (I found-results)

How (use/outcome?)

And that people often put as……. IMRaD

IMRaD Outline

- Title page
- Abstract
- Introduction
- Methods/ Ethical clearance
- Results
- Tables/Figures
- Discussion
- References
- Acknowledgements

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Bradford Hill's questions for the IMRD structure

👉 **I**ntroduction

   👉 Why did you start?

👉 **M**ethods

   👉 What did you do?

👉 **R**esults

   👉 What did you find?

👉 **D**iscussion

   👉 What does it all mean?

Parts of a manuscript & order of writing

- Title
- Abstract
- *Introduction*
- *Methods*
- *Results*
- *Discussion*
- Acknowledgements
- References

Writing Order

Methods

References

Ghost Tables/Figures (analytic plan)

Tables/Figures

Results

Introduction (brief literature review)

Discussion

Abstract

Title page

Acknowledgements

Sections of a Paper/Report

- Introduction
  - What we know
  - What we don't know.
  - What we did to find out
- Methods
  - Participant selection
  - Variables & procedures for each objective
  - Analytic methods

- Results
  - Subject recruitment & characteristics
  - Evidence for first objective
  - Evidence for specific objectives
- Discussion
  - Main finding
  - Implications/how does it change scenario
- Limitations
- Summary/conclusion

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Starting points for a manuscript

- Product of the analysis
  - Five tables and figures
- Key points and recommendations
  - Abstract
- Outline of the argument
  - Slide set
  - Poster
- The manuscript will wrap this around few ideas (2 or 3) that will be developed

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Common road blocks in manuscript preparation

☞ Issues relating to the structure

    ☞ Misplaced elements

        ☞ Results in the "discussion"

        ☞ Interpretations in the "results"

☞ Issues relating to ideas

    ☞ Non-sequential ideas

    ☞ Missing links in the development of an idea

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Title

The title is not a section, but it is necessary and important.

The title should be short and unambiguous, yet be an adequate description of the work.

Use descriptive words that you would associate strongly with the content of your paper: the molecule studied, the organism used or studied, the treatment, the location of a field site, the response measured, etc.

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A general rule-of-thumb is that the title should contain the key words describing the work presented.

Title is the basis for most on-line computer searches - if your title is insufficient, few people will find or read your paper/report.

Title is NOT underlined or italicized

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Purposes of the title

Draw the attention of a prospective

reader to the paper

Induce the reader to read the entire

paper or at least the abstract

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Title: Things to do

- Write simple, concise, but informative
- Aim at being interesting and eye-catching
- Be accurate and specific about content
- State subject in full
- Specify study design, animal species
- Ensure grammatical correctness
- State results?

Title: Things to avoid

☞ Use abbreviations (unless well accepted)

☞ Use literary titles

☞ Use interrogative/exclamatory titles

☞ Use all capitals

Examples of titles: What do you think?

☞ Pediatric intussusception: A report of 55 cases

☞ Studies on cobalt estimation in liver disease

☞ Comparative study of two new hypoglycemic drugs

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"Argument matrix"

👉 Provide a framework that:

    👉 Respects the structure of the various sections

    👉 Develops few ideas (2 or 3) logically & sequentially

👉 Use that framework to prepare the outline of the manuscript

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The sections of the paper summarize the life cycle of the investigation

Discussion

Intro (P1, P2)

Identifying data needs

Spelling out the research question

Involving the programme

Formulating recommendations

Intro (P3)

Formulating the study objectives

Drawing conclusions

Methods

Planning the analysis

Preparing data collection instruments

Analysing data

Collecting data

Results

Linear construction to follow one idea throughout the manuscript

☞ Introduction :What was known before, the local context

☞ Methods :The methods used to generate the finding

☞ Results: The facts and figures

☞ Discussion :Integration of all elements making the case

☞ Conclusion :The point made

☞ Recommendation :What the point calls in terms of action

Example of linear construction
to follow one of the ideas throughout the manuscript

☞ Introduction

    ☞ Boosters are important for long term diphtheria protection

    ☞ Methods

    ☞ Case control study to estimate booster efficacy

    ☞ Coverage survey methods

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☞ Results

- ☞ Booster protective efficacy
- ☞ Booster coverage data

☞ Discussion

- ☞ Attribution of high rates to low booster coverage

☞ Conclusion

- ☞ Boosters are key for protection yet are underused

☞ Recommendation

- ☞ Supplemental activities to increase booster coverage

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Argument matrix template

Ideas	Intro	Methods	Results	Discussion	Limitations	Conclus	Recs
Idea #1							
Idea #2							
Idea #3			**1. Direction used to construct the ideas developed (Follow this in the preparation to remain logical)**				

Argument matrix template

Ideas	Intro	Methods	Results	Discussion	Limitations	Conc	Recs
Idea #1							
Idea #2							
Idea #3							

2. Direction that the paper will follow
(That is what the reader will see)

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Uses of an argument matrix

☞ Primary preparation

    ☞ Before a manuscript is started

☞ Secondary preparation

    ☞ To re-organize a draft

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Uses of an argument matrix

👉 Primary preparation

　　👉 Organize ideas before drafting the manuscript

　　👉 Identify ideas

　　👉 Lay out the points according to the sections of the manuscript

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Secondary preparation

- Re-organize the ideas
- Identify the main ideas
- Prepare a blank matrix
- Read the manuscript with a highlighter to identify the elements that belong to the main ideas
- Within each idea, identify the elements that belong to the various sections
- Distribute the elements in the blank matrix
- Identify the holes in the matrix

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Abstracts

☞ What?

   ☞ A succinct, accurate summary of the paper

☞ Why?

   ☞ Request to present at a conference

   ☞ Summarize information of a paper

   ☞ Is the only part of the paper that many people read

   ☞ Helps readers browse & decide whether to read the rest of the paper

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The abstract prepared for a conference

- Objective
  - Gain acceptance to present at a conference
- Circumstances
  - Written before the completion of final report
  - May be based upon preliminary analysis
  - Remains in the proceedings
  - May be quoted

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The abstract prepared for a manuscript

☞ Objective

  ☞ Summarize the key elements of a manuscript

☞ Circumstances

  ☞ Finalize after the completion of the manuscript

  ☞ Based upon final analysis

  ☞ Included in several abstracting services (including PubMed)

  ☞ May be the only thing that will be read of your work

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Basic rules of an abstract

☞ Constitutes a summary of the source report

☞ Follows the same order of source report

☞ Does not refer to source report

☞ Includes only information from source report

☞ Fully understood on its own

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Steps in preparing an abstract

- Chose topic
- Review data / report
- Review rules of conference or journal
- Extract ideas and data from report
- Organize extracted material within outline
- Write and revise

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Checklist to choose a topic for an abstract to be submitted to a conference

- Investigation completed
- Analysis completed
- Data tables ready
- Key graphs drawn
- Main conclusion & recommendations clear
- Results discussed with team:
  - Locally (Administrative clearance)
  - Supervisors (Academic clearance)

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Things to avoid when choosing a topic to present at a conference

- Investigation already presented
- Investigation already published
- Incomplete analysis
- Uncertainty on key interpretation
- No agreement to make the results public

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Reviewing data and report

☞ If written report is available:

    ☞ Review report

☞ If written report not complete:

    ☞ Review protocol

    ☞ Analyze data

    ☞ Arrange in text, tables, graphs & charts

    ☞ Identify key pieces of evidence

    ☞ Draw main conclusion

    ☞ Propose essential recommendations

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Review rules of conference or journal

- Structure
  - Imposed
    (Introduction, methods, results & conclusion)
  - None (unstructured)
- Common word limits
  - 250-275 structured
  - 100 unstructured
- Write structured abstract and edit

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Structured abstract

☞ Background

　☞ Little information is available on the knowledge about scientific writing among medical teachers

☞ Methods

　☞ We administered a 10-point questionnaire to test knowledge about scientific writing among medical teachers participants attending a writing workshop.

Results

- 32 medical teachers participated. Of these, only 20 (63%) achieved a score of 50% or above. The younger participants (aged less than 30 years) scored worse than the older participants (aged > 30 years), the average scores in the two groups being 6.5 ± 1.5 and 4.5 ± 1.7, respectively (t-test; $p<0.05$).

Conclusion

- Indian medical teachers lack skills in medical writing and steps to improve this are needed

Unstructured abstract

Little information is available on the knowledge about scientific writing among medical teachers. We administered a 10-point questionnaire to test knowledge about scientific writing among medical teachers participants attending a writing workshop. 32 medical teachers participated. Of these, only 20 (63%) achieved a score of 50% or above. The younger participants (aged less than 30 years) scored worse than the older participants (aged $\geq$ 30 years), the average scores in the two groups being 6.5 $\pm$ 1.5 and 4.5 $\pm$ 1.7, respectively (t-test; $p<0.05$). Indian medical teachers lack skills in medical writing and steps to improve this are needed.

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Structured abstract: Drug trial

Objective: To evaluate the efficacy of a single large oral dose of vitamin A in treating acute shigellosis in children in Bangladesh.

Design: Randomized, double-blind, controlled clinical trial.

Setting: Dhaka Hospital, International Centre for Diarrhoeal Disease Research, Bangladesh.

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Subjects: 83 children aged 1-7 years with bacteriologically proved shigellosis but no clinical signs of vitamin A deficiency; 42 were randomized to treatment with vitamin A and 41 formed a control group.

Intervention: Children were given a single oral dose of 200,000 IU of vitamin A plus 25 IU vitamin E or a control preparation of 25 IU vitamin E.

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Unstructured abstract: Drug trial

Main outcome measures: Clinical cure on study day 5 and bacteriological cure.

Results: Baseline characteristics of the subjects in the two treatment groups were similar. Significantly more children in the vitamin A group than in the control group achieved clinical cure [19/42 (45%) v 8/14 (20%); χ^2 = 5.14, 1 df, P = 0.02; risk ratio = 0.68 (95%

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confidence interval: 0.50 to 0.93)]. When cure was determined bacteriologically, the groups had similar rates [16/42 (38%) v 16/41 (39%); χ^2 = 0.02, 1 df, P = 0.89; risk ratio = 0.98 (0.70 to 1.39)].

Conclusion: Vitamin A reduces the severity of acute shigellosis in children living in areas where vitamin A deficiency is a major public health problem.

Extract Key Information

☞ Read report

☞ Review data

☞ Identify key data elements

    ☞ Key table

    ☞ Key graph

☞ Build a logical argument around key data elements

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Outline abstract

☞ Background / Introduction

☞ Methods

☞ Results

　☞ Findings

☞ Conclusion

　☞ May include a short discussion element

Building an autonomous abstract

☞ Start from the data

  ☞ What are the KEY data elements

  ☞ Summarize for the results paragraph

☞ Draw key general conclusion

  ☞ Strictly based upon the data presented

☞ Formulate key recommendation

  ☞ Direct deduction of the conclusion

  ☞ Strictly based upon the data presented

- Summarize the methods
  - Spell out what is strictly necessary to document to believe the results presented
- Shape the introduction
  - Explain why the study was done
  - Make sure your conclusion matches the objective that you state

Background / introduction of an abstract

☞ Most important information:

  ☞ Reasons that led to conduct the study

  ☞ Objective of the study

    ☞ Research question

☞ If necessary and possible:

  ☞ Documentation of the importance of the topic

  ☞ Key essential background information

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Example of background / introduc~~tion~~ for an abstract

Importance	Order	Topic	Example
+++	3rd	Objective of the study	• We investigated the outbreak to identify its source
++	2nd	Reasons that led to conduct the study	• On XX May 200X, a cluster of gastro-enteritis was reported among guests of a wedding
+	1st	Importance of the topic / key background	• Festivals are common causes of food-borne outbreaks in India

Methods paragraph of an abstract

- Study design
- Definitions
- Participants
- Any interventions, treatments
- Data collection
- Analysis
- Additional investigations:
  - Laboratory methods
  - Environmental assessment

Example of a methods section

We defined gastroenteristis as an acute onset of vomiting or diarrhea in the 24 hours following the banquet. *[Definitions]* We compared the attack rate of illness *[Analysis]* among the wedding guests *[Participants]* according to their consumption of the various food items *[Design]* on the basis of information collected using a standardized questionnaire. *[Data collection]* We collected leftover food items and stool samples for laboratory investigations *[Laboratory methods]* and probed food handlers for preparation methods. *[Additional investigations]*

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Results paragraph of an abstract

- Major summary data
  - Response
  - Characteristics of participants
  - Indicators
  - Statistics
  - Additional investigations
- Directly relating to the objectives
- Directly supporting conclusions & recommendations

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Example of results section

Among the XXX of the XXX guests interviewed (XX%) [Response], the median age was XX years, XX (XX%) were female, [Characteristics of subjects] and XXX were sick (XX%). [Indicators] The attack rate was higher among those who ate the fried fish compared to those who did not (relative risk: XX, 95% confidence interval: XX-XX, attributable fraction: XX%). [Statistics] Staphylococcus toxin was identified in the food leftovers. [Additional investigations] The fish egg-based batter has been left at room temperature 5 hours before cooking by a food handler with chronic staphylococcus infection. [Additional investigations]

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Conclusion paragraph of an abstract

- Key conclusion
    - Integrate multiple lines of supporting evidence (if necessary)
- Key recommendation or action
    - Mention actual or potential effect of the action (If possible)
- Limit to issues directly supported by data
- Remain general and robust if details needs further discussions

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Example of conclusion section

This staphylococcus food-borne outbreak was caused by an infected food handler with poor food hygiene practices. [Key conclusion] Public health authorities should work with food handlers to improve food safety during festivals and large gatherings. [Key recommendation]

Writing the abstract

☞ Make key linkages between ideas

  ☞ Add words or phrases to extracted material

  ☞ Review / rearrange order of ideas & data

☞ Proceed in two steps:

  ☞ Start by writing all what needs to be stated

  ☞ Identify & remove unnecessary elements

☞ Rewrite

☞ Revise

Rule #1: The primacy of data

☞ Do not begin without data

☞ Maximize space devoted to data

☞ Minimize space for words that do not provide data or information:

> ☞ "Additional data will be shown"
>
> ☞ "These results will be discussed"
>
> ☞ "Have not yet been established"

Being specific

☞ Avoid vague, unclear or obvious statements

☞ Strong verbs make strong sentences:

  ☞ "A descriptive study was done"

☞ Specify methods of measurement

☞ Give rates whenever possible

☞ Present data instead of names

  ☞ "A point source was noted"

  ☞ "Case counts rose from July 7, peaked on July 10 and decreased to baseline levels by July 14"

More tactics

☞ Quantify

☞ Avoid repetition or redundancy

☞ Do not add material not found in report

☞ Let the data explain

    ☞ Avoid explanations

☞ Avoid distorting the elementary messages

Revising

☞ Allow plenty of time

☞ Write

☞ Re-write

☞ Share with co-authors

☞ Share with supervisors

   ☞ Revise, revise, revise

   ☞ Conduct final radical wordectomy

☞ Check with editor

☞ Seek clearance

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What Introduction does...

☞ Identifies gap in knowledge

☞ Justify why was research carried out

☞ Reflects the objective of study

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Introduction: The "dos"

☞ Zoom in from the general to the specific

☞ Critically review what is known and unknown

   ☞ Flag the gaps in knowledge

☞ Make it natural that the study had to be done

☞ End with objectives

☞ Document facts with references

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The classical trap

- Never start by saying:
  - Disease X is a major public health problem
- Prefer:
  - Disease X is the Xth leading cause of mortality in the world etc.

Introduction: The "don'ts"

- Write endlessly to fill pages
- General undocumented statements
- Focus exclusively on burden of disease
- Review the literature in details
- Plagiarize, cut and paste
- Provide excessive irrelevant historical details

The effective introduction:
A zoom in, paragraph by paragraph

What is known and unknown globally
The elements that make this issue important

The regional perspective on the issue

The local presentation of the issue

Objectives of the study to address the issue locally

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The ultimate, Nobel prize winning introduction

"We wish to suggest a structure for the salt of deoxyribose nucleic acid (D.N.A.). This structure has novel features which are of considerable biological importance"

Watson JD, Crick FHC.

A structure for deoxyribose nucleic acid. Nature 1953; 171: 737-8

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Methods—Goals

👉 Describe how the study was done with enough detail so that it could be replicated

👉 The reader can understand the representativeness of the sample

👉 Weaknesses and strengths of the study can be determined

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Sub-headings of Methods Section

- Overall study design
- Setting
- Study subjects and sampling
- Data collection/measurements
- Intervention (if any)
- Laboratory methods (environmental investigation)
- Data analysis
- Ethical considerations

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1. Overall study design
Big picture of methods

Example:

"We performed a 2-year longitudinal cohort study (study design) of all patients initiated on ARV from the Zagreb infectious disease hospital, to evaluate factors associated with the development of lipodystrophy ."

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Basic study designs:

  Cross-sectional survey

  Case-control study

  Cohort study

  Trial – Randomized, controlled

  Before-after study

Combinations (describe both)

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2. Setting

Setting can be a separate section, or merged with Study Design or Subjects sections.

Geography
- District, urban, rural

Facility
- Hospital, clinic, VCT sites—private, public, large etc.

Examples of settings

Geography: "The setting of our study isJaipur,Rasthan, the State capital and largest city..."

Facility: "Zanana Hospital are tertiary care facilities located in Central part of City of Jaipur near the areas inhabitated by mixed SE class of people

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3. Study subjects and sampling

Goal: Need to understand what population the sample represents

- General description of the subjects/ case definitions
- Enrollment procedures and criteria and timeframe
- Sampling strategy, sample size
- Who is included in the final analysis - numbers

3a. Study subjects-example

👉 Description

👉 Enrolment criteria

　　👉 Inclusion, Exclusion criteria

　　👉 Time frame

Example – We enrolled <u>all</u> mothers attending ANC clinics in rural Jaipur, Rajasthan (general description), from November 2003 through March 2004 (time). Women were included if they were >18 years of age, this was their first pregnancy, and they did not require immediate medical attention (criteria).

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3b.Subjects – What was the sampling strategy

- Random sample- how selected
- Consecutive, convenience, systematic
- Multi-stage cluster sampling
- Random digit dialing
- Sub-sample of larger study (criteria for choosing?)
- Special sampling procedures
  - Venue-Day-Time
  - Respondent-Driven Sampling

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3c. Whom does the sample represent?

☞ Some understanding of the Population from which the sample is drawn

☞ This is often neglected– but is very important

Example

We randomly selected 4 schools out of 12 public schools in the district. There are also 5 private elementary schools. It is estimated that 80% of school aged children <12 years of age in the district attend school.

Tells you: what proportion of schools were sampled (4 of 19 total); only public schools—(different SES?); some out of school children might be missed.

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3d. Subjects –who was finally included in the analysis?

☞ Depending on study and journal– this description could be Methods, or Results.

☞ Indicate the number:

- ☞ Who were screened (recruited)
- ☞ Excluded because failed to meet criteria
- ☞ Refused participation
- ☞ For whom data is not available and therefore not included in analyses.
- ☞ The total number evaluated in the study

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Subjects: use of algorithms to summarize information

Study units (Individuals/groups)

Selection criteria

Eligible to participate   **Not eligible**

Invitation to participate

Participants   **Non-participants**

Randomization

Treatment   **Control**

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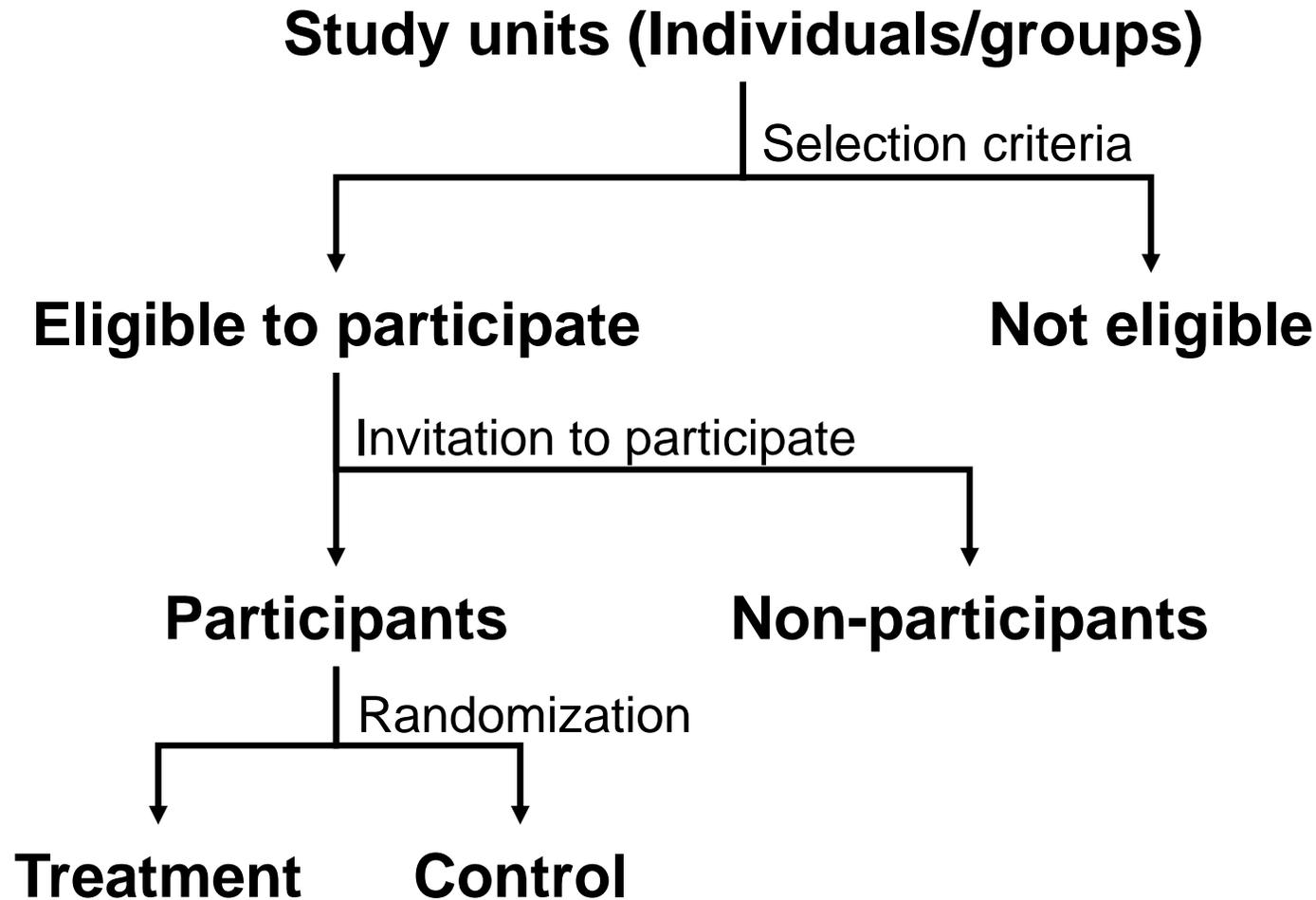
4. Data collection/Measurements

☞ Describes how data were collected

☞ If a qualitative study, describe:

- ☞ Type of interview (in-depth interviews, open-ended, semi-structured)
- ☞ Focus group discussions: recorded, transcribed how many per group
- ☞ How long it took, who performed them, and where
- ☞ Confidentiality, names, etc.

4a. Data collection/Measurements

If a quantitative study with questionnaire was used, describe the interview & questionnaire:

- Interviewer-administered, self-administered
- How long did it take; where done
- How developed – piloted, revised, translated, back translated?

108

- Were any items standardized?
- Was a follow-up questionnaire done – if so, differ?
- Describe general questionnaire domains, e.g.: demographics, symtpom h/o, HIV/AIDS knowledge and attitudies, risk behaviors

4B. Data collection/Measurements

- Clinical evaluation
  - Physical exam- by whom, of what, including any particular measurements?
  - Treatment provided?
- Follow-up exam?
- Include only those measurements that are ultimately presented in Results

5. Intervention

☞ Details of intervention arm(s)

    ☞ Components of the intervention arm(s)

    ☞ "Dose", -frequency with which delivered

☞ Control, comparison or placebo arm(s)

☞ Intervention and Control Activities may be separate sub-headings

111

6. Laboratory

☞ Describe tests used for screening and/or confirmation. Include:

☞ Manufacturer of tests:

   ☞ Product name (Company name, City, State or Country)

☞ References for new, experimental tests

☞ Indicate where performed –which lab

☞ May need to indicate parameters for a positive test (OD cut-off)

6a. HIV testing

☞ Describe testing algorithm used, & what determines a positive result (e.g.. Second rapid test, if discordant, third test)

☞ Test kits used –indicate "3 rapid test kits approved by the National AIDS Organization"

☞ When test results given to client (same day, 1 week?), or if not provided (surveillance)

☞ Pre and post test counseling

☞ What happens to HIV positives – treated, referred?

7. Data analysis, statistical methods

- Discuss where and into what program data was entered; where cleaned; where analyzed

  - "Data were entered on site into Access (where) , transferred to SAS, and evaluated for range and logic checks (cleaned). The data were then transferred to the server at the TUC data management center for further cleaning & analysis using SAS version 9.1 (SAS Institute, Cary, NC)."

7a. Data analysis:Statistical methods

☞ Appropriate statistical tests in order of use & presentation

☞ How data were analysed

☞ Univariate-

   ☞ Distributions of variables were evaluated using means, SD, median, range,and proportions

☞ Bivariate-

   ☞ Differences in proportions were evaluated using chi-square tests, difference in means using t-test.

115

☞ Odds ratios were calcuated with 95% confidence intervals using logistic regression

☞ Multivariate

☞ Which variables were included and criteria – associated in bivariate analysis, and p<.10

☞ Stratification

☞ Male vs. female, young vs. old

☞ Sub-group analyses

☞ Analysis of potential biases

☞ Participants vs. non-participants

☞ Lost to follow-up vs. retained in longitudinal studies

8. Ethical considerations

- This section is usually at the beginning to end of the methods section

- Approval by IRBs

- Special considerations:

  - Vulnerable populations (prisoners, minors)

8a. Examples of ethical considerations: special population

"Subjects aged 15 to 18 years were considered emancipated minors and able to consent to the study. The protocol for this study was reviewed, approved, and monitored by the ethical committees of the Mahidol University and the University of California, San Francisco."

118

Methods: The "dos"

- Use active voice
- Edit protocol (Turn future tense into past tense)
- Structure the section into appropriate subheadings
- Follow format from the journal to which you intend to submit
- Ensure methods are presented for all results
- Quote only the key references that describe the method used

119

Methods: The "don'ts"

☞ Do not use passive voice

☞ Do not provide results

☞ Do not provide excessive details on information collected

☞ Do not list every question on the instrument (list only the broad categories of information collected)

120

Recipe of a good methods section

- Organized, organized, organized
- Specific, specific, specific
- Clear, clear, clear

Which of the results should I extract from the table to mention in the text???

The major existential question for the results section

122

Pre-requisite to writing the results section

☞ Data have been analyzed and interpreted

   ☞ Tables / figures

☞ Highlight the key results.

☞ Summarize tables and figures (not describe)

☞ Have a logical sequence:

   ☞ In parallel with methods

   ☞ Background data –descriptive – bivariate-multivariate.

123

In other words

Use tables to highlight **individual values**

Use figures to highlight **trends or relationships**

Choose your sequential logic

☞ From the simple to the complex

☞ From the general to the specific

☞ From the beginning to the end

125

Potential sub-headings for a results section

- Description of the study population
- **Descriptive epidemiology** in context of agent, host and environment(Time place and person)
- **Analytical epidemiology**

  ---case control-, cohort- studies
- **Experimental studies**

Example of reporting guidelines : CONSORT for randomized controlled trials

- Flow of participants
- Protocol deviations
- Dates of recruitment and follow up
- Baseline demographics
- Number of participants
- Summary of results
- Report other analyses
  - Pre-defined/exploratory
- Adverse events

127

Results: The "dos"

☞ Recycle the "methods" outline (If needed)

☞ Walk the reader through salient findings

☞ Provide numerators and denominators

   ☞ Of the XX subjects, XX (XX%) reported

☞ Caption the information in tables/ figures

   ☞ Cases and controls did not differ with respect to baseline characteristics (Table 1).

☞ Describe the information in simple terms

☞ Back up statements with data in the sentence, tables or say: "data not shown"

128

Use the past tense to report results

- When you report the results belong to the past

- The paper will be read in the future. Hence, "present" will have no meaning

Do not report results in statistical language

- In the simple regression analysis education and pregnancy status give highly significant relationship while language and counseled by give significant relationship. Clinic and complaints show no significance on screening

- Women who were educated, who spoke Hindi and who benefited of a counseling from a physician were more likely to consent to the screening test.

130

P–value or confidence interval? Think of your initial objective!

Test a hypothesis

- Use p-value
- You test the probability of being wrong

Measuring a quantity

- Use confidence intervals
- You want to measure the confidence in the estimate

131

Proper use of statistical terms in the results

☛ Significant

   ☞ Not caused by chance

☛ Correlation

   ☞ Strength of linear relation between two quantitative variables

☛ Random

   ☞ Each element has equal chance of occurring

☛ Sample

   ☞ Part of a population

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Results: The "don'ts"

- Do not use general sentences
- Do not re-explain methods
  - (e.g., criteria used, case definition)
- Do not discuss/ interpret results
- Do not quote references
- Do not spell out every result in the table
- Do not use adjectives and qualifiers
- Do not use "etcetera"

133

Results – Remember

- Less is often better

- Check all numbers against tables & graphs

- Leave "What you did" for the methods

134

Standard Abbreviations

☞ CONSORT—CONsolidated Standards for Reporting Trials

☞ COPE—Committee on publication ethics

☞ STROBE –STrengthening the Reporting of OBservational studies in Epidemiology

135

Discussion

👉 Place of the discussion in the IMRD model

👉 Describing and interpreting

👉 Interpreting epidemiological data

👉 Interpreting in light of initial hypotheses

👉 Constructing an argument in a discussion

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Interpretation

☞ Place of the discussion in the IMRD model

☞ Describing and interpreting

    ☞ Before you interpret, describe

    ☞ Imagine you are talking on the phone

    ☞ The person you talk to has not seen the evidence

☞ Interpreting epidemiological data

☞ Interpreting in light of initial hypotheses

☞ Constructing an argument in a discussion

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Description and interpretation: The bottom line

☞ Follow the sequence

   ☞ Description ("Results" section)

   ☞ Interpretation ("Discussion" section)

☞ Keep the two stages separate

☞ Interpretation requires quality data

☞ How to interpret epidemiological

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Descriptive epidemiology

👉 Incidence, prevalence

👉 Time, place and person data

Interpretation of descriptive epidemiological data to generate hypotheses

Time	Narrow epidemic curve
Place	Cluster of cases @ public tap
Person	Case patients used the tap

Hypothesis:
The public tap was contaminated for a brief duration and caused the outbreak

140
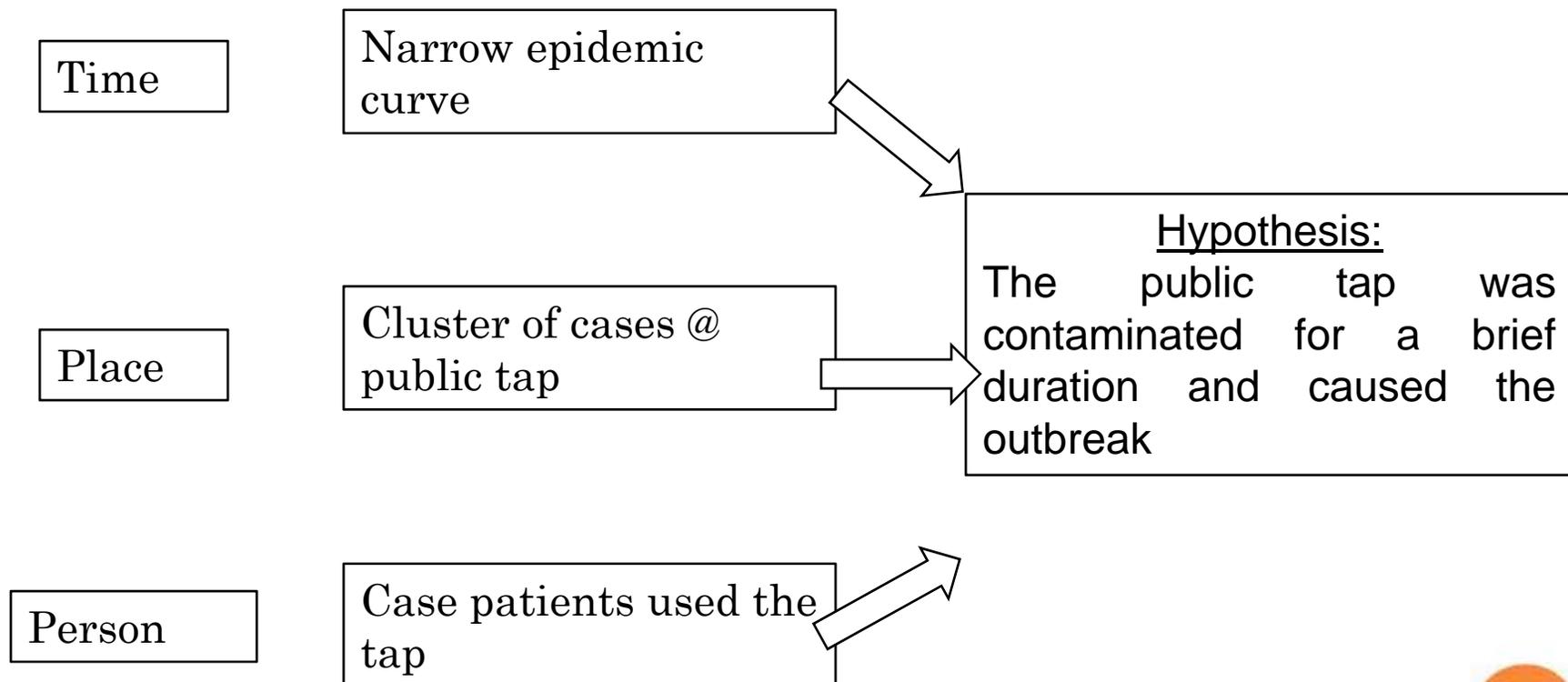
Analytical epidemiology

Count, divide and *compare*

Measures of association

Relative risks

Odds ratios

Prevalence ratios

Interpretation of analytical epidemiological data & additional investigations to test an hypothesis

OR

Strong association water drinking / illness

Epidemiological evidence supported the hypothesis of the tap as the source of the outbreak

AFP

High attributable fraction

Water analysis

Water positive for S. Typhi

Sewage contaminated the tap with S. Typhi and caused the outbreak

Sanitary assessment

X-contamination sewage / water supply

142
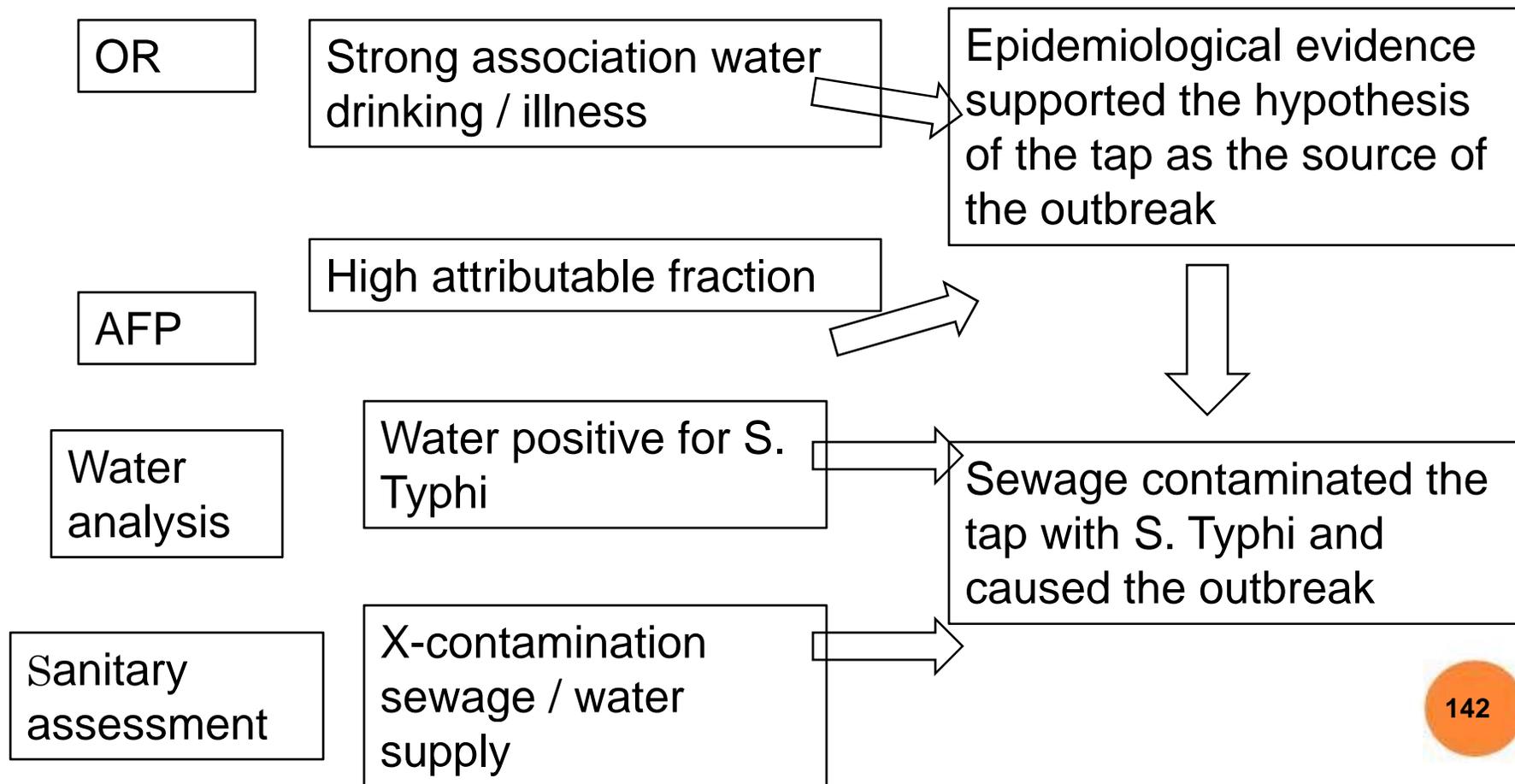
Interpreting epidemiological data: The bottom line

👉 Descriptive epidemiological data generates hypotheses

👉 Analytical epidemiological data tests hypotheses

Can you guess why two different fishermen?

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The discussion bridges the evidence with the next steps in terms of action

Results	Discussion	Conclusions	Recommen-dations
•Facts •Figures	•Interpretation •Build up of a number of points	•Points made on the basis of the evidence	• Recommen-dations pro-posed on the basis of the conclusions

Bridge
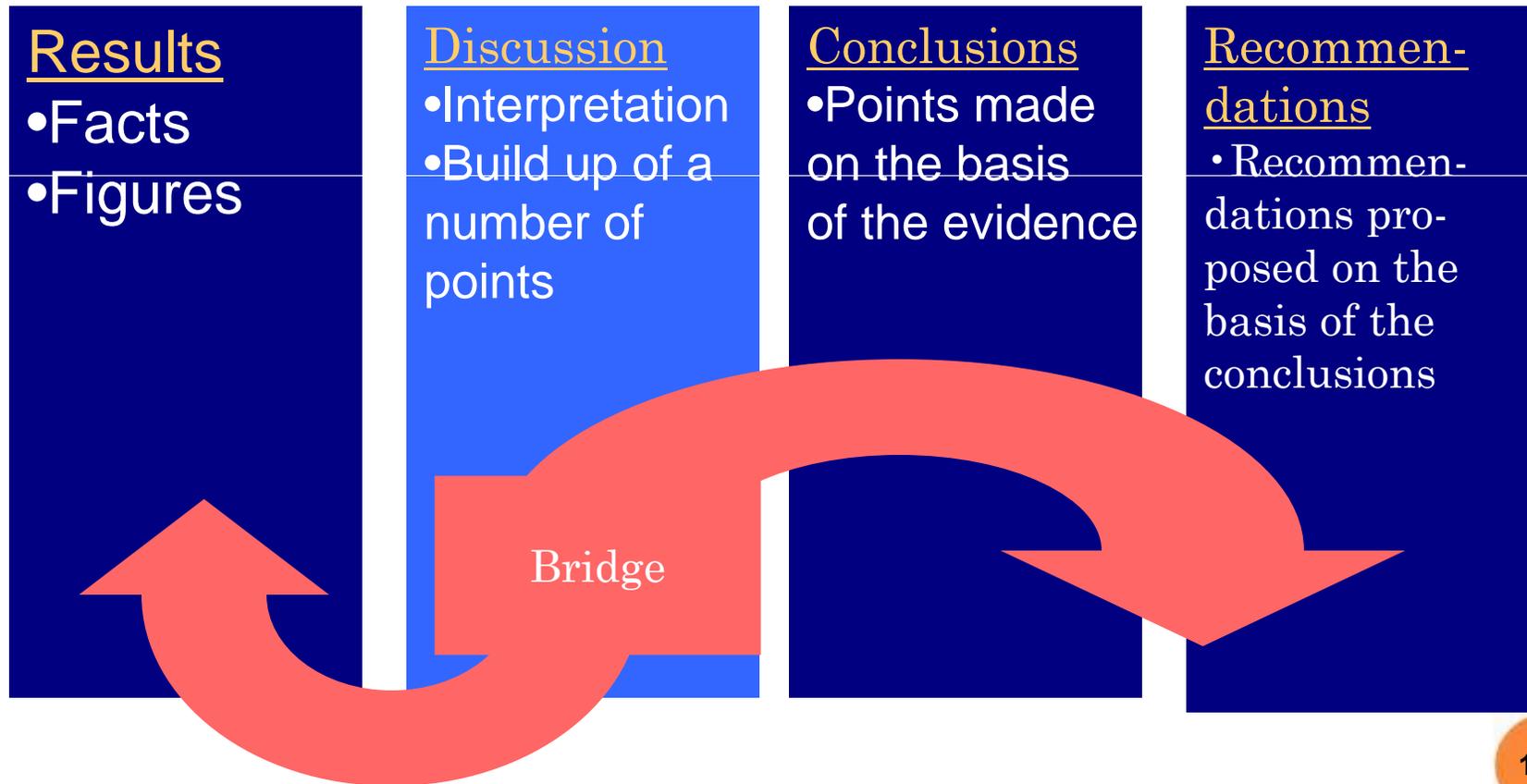
Example of a life cycle for an epidemiological investigation

Hepatitis E endemic in South Asia

↓

Does hepatitis E vaccine works?

↓

What is the efficacy of the vaccine?

↓

Vaccine trial

↓

Surveillance Vaccine cards

→

New cycle can start

How do we use this vaccine?

↑

Consider use of the vaccine

↑

Vaccine efficacy: 95%

↑

Relative risk

↑

Data on vaccination and disease

145
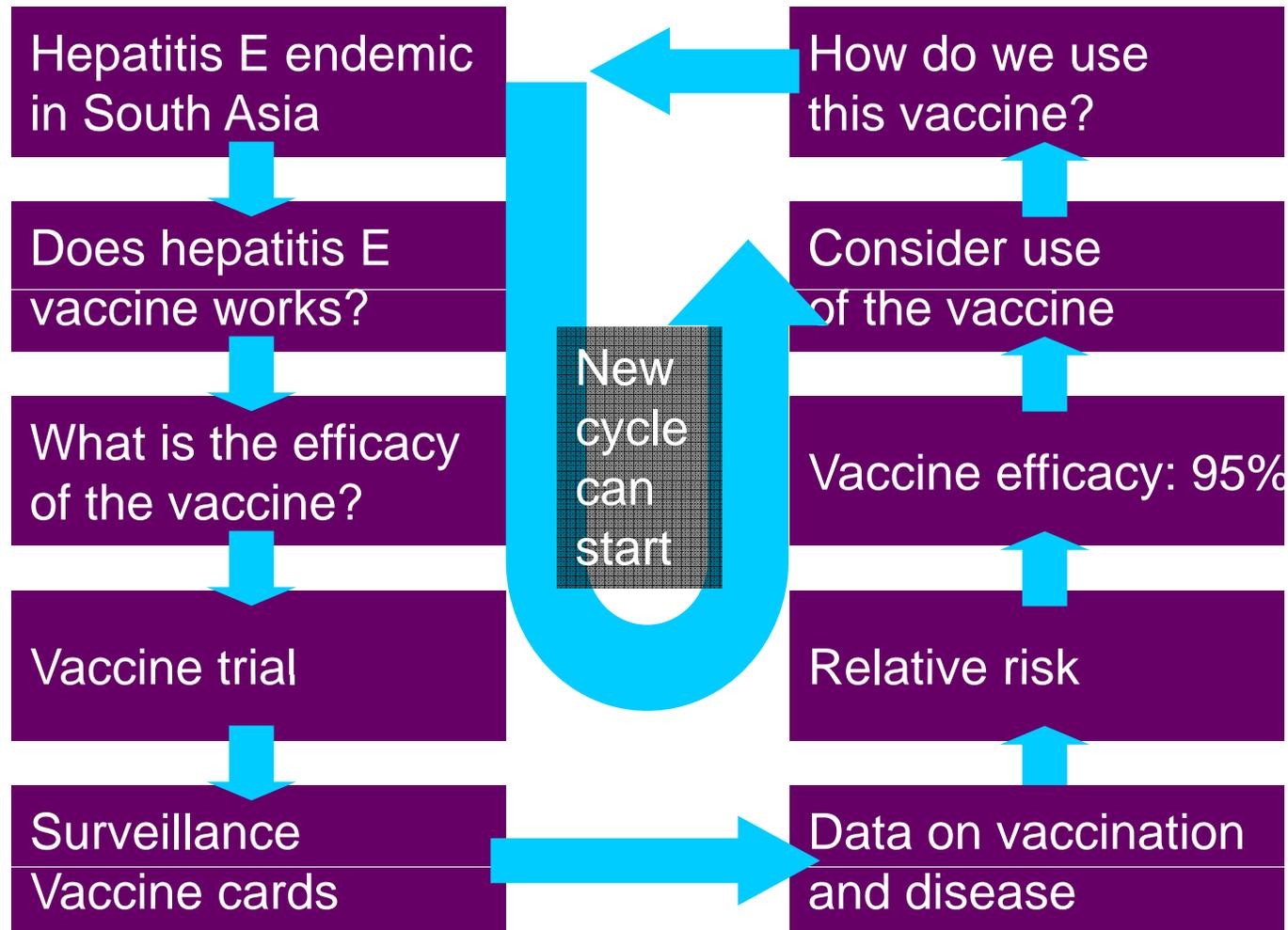
Down and up the investigation life cycle, all processes are thought in parallel

Identifying data needs ← Involving the programme

Spelling out the research question → Formulating recommendations

These two processes (arrows) parallel each other

Formulating the study objectives → Drawing conclusions

Planning the analysis → Analyzing data

Preparing data collection instruments → Collecting data

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A– The protocol preparation phase

1. Formulating the study objectives

⬇

2. Planning the analysis

☞ The formulation of the study objective leads to a hypothesis

☞ The analysis plan envisages what analysis will test the hypothesis

B– The data interpretation stage

2. Drawing conclusions

↑

1. Analyzing data
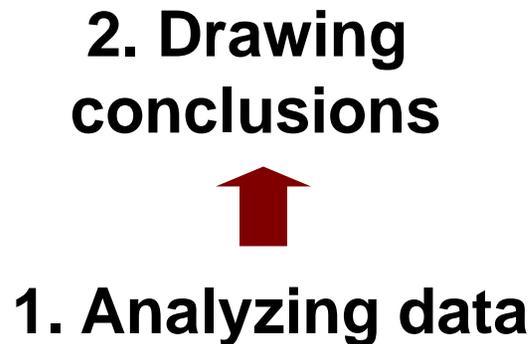
👉 The analysis transforms data into information

👉 Interpretation of the information tests the hypothesis

A– Preparing the protocol for the hepatitis E vaccine trial

1. Formulating the study objectives

2. Planning the analysis

Estimate vaccine efficacy through a comparison of incidence among vaccinated / unvaccinated

Cohort study, calculation of relative risk and vaccine efficacy

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B- Interpreting the data of the hepatitis E vaccine trial

2. Drawing conclusions

↑

1. Analyzing data

☞ Relative risk: 0.05, efficacy: 95%

☞ The vaccine is highly effective

A malaria drug efficacy study, Ivory Coast, 1995

👉 Treatment policy: Chloroquine

👉 Problem statement: None

👉 "We want resistance data"

👉 No hypothesis: No data on clinical outcomes

👉 Study: Resistance = 10%

👉 Interpretation: ???

👉 Recommendation

👉 Obtain surveillance data (e.g., CFR)

Unclear hypotheses: Difficult interpretation

A malaria drug efficacy study, North Bengal, India, 2005

☞ Treatment policy: Chloroquine / primaquine

☞ Problem statement:

☞ Increased incidence, anecdotal report of treatment failures, emergence of Falciparum

☞ Hypothesis:

   ☞ Is chloroquine resistance > 15% threshold (WHO)?

☞ Study: Resistance = 52%

☞ Interpretation: Resistance common

☞ Recommendation: Change first line drug

Clear hypotheses: Easy interpretation

Interpretation in light of initial hypotheses: The bottom line

☞ The protocol envisages hypotheses and determines how they will be tested

☞ The analysis looks at the information to test hypotheses

☞ It is difficult to interpret data unless initial hypotheses were formulated

☞ Data are always interpreted in light of the initial hypotheses / questions

How do we report the interpretation in the discussion?

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Outline of a discussion

☞ Summary of finding
without quantified detailed results — What was found

☞ Making points

    ☞ First point

    ☞ Second point — What can be said

    ☞ (Potentially a third point)

☞ Limitations — What cannot be said

☞ Last paragraph of conclusions and
recommendations — What you make of it

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Suggested structure
for discussion of scientific papers

- Statement of principal findings

- Strengths and weaknesses of the study

- Strengths and weaknesses in relation to other studies, discussing particularly any differences in results

- Meaning of the study: possible mechanisms and implications for clinicians or policymakers

- Unanswered questions and future research

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"Discussion" is a misnomer

- The discussion is NOT a polite conversation around the data

  "Oh! You found this, this is interesting because I found that!"

- The discussion is the section of the paper dedicated to the interpretation of the data

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First paragraph of the discussion: One end of the bridge

Do

☞ Summarize the results in big picture terms

☞ Announce the points that will be discussed

Avoid

☞ Interpreting

☞ Repeating results in great details

☞ Initiating the discussion of the results

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Last paragraph of the discussion: The other end of the bridge

Do

👉 Summarize conclusion points

👉 Propose recommendations on the basis of the conclusions

👉 Add action points

👉 Future studies

👉 Methods to monitor and evaluate intervention proposed

Avoid

☞ Proposing recommendations disconnected from conclusions

☞ Repeating results without adding a layer of interpretation

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Discussion points:
The bridge itself

Do

- Start from results themselves

- Bridge results with conclusions through interpretation

- Review causality

- Review causes / consequences of findings;

- Interpret findings in light of information available

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Avoid

☞ Systematically comparing with other studies

☞ Commenting results

☞ Listing possible explanations without hypothesis testing

Elements to consider before interpreting association as causation

- Chance
- Bias
- Confounding factor
- Causation
  - Strength of the association
  - Dose response
  - Consistency
  - Biological plausibility
  - Exposure/ outcome sequence

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Interpretation of data in a discussion section of a paper

Elements known before
- Biological rationale
- Other epidemiological studies

+

Data from the investigation
- Descriptive and analytical epidemiology
- Laboratory evidence
- Environmental investigations

=

Interpretation to address the hypothesis
- Enough evidence to reject the null
- Not enough evidence to reject the null

Example of integration of various pieces of evidence into an interpretation

☞ Outbreak of cutaneous anthrax following a beef slaughter in West Bengal, India

☞ Cohort study to identify risk factors for infection

☞ Contact with meat is a clear risk factor

☞ Null hypothesis:

　　☞ Eating meat doesn't cause cutaneous anthrax

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Always consider the other hypothesis

✘ Avoid:

👉 We found that…

👉 This could be due to... [this real phenomenon]

✔ Prefer:

👉 The results are …

👉 Two possibilities

👉 This could be due to this real phenomenon

👉 This could be an artefact of the study

👉 Examine both options

👉 See what the data support and conclude

Dealing with an un-expected finding

👉 One unexpected risk factor turns out to be associated with outcome

👉 Absence of context

👉 No other studies

👉 No biological rationale

👉 Treat as a hypothesis generation:

✓ The association between disease X and this risk factor should be examined in other studies

👉 Do not force an explanation/ rationalization

✗ *"This may be due to…"*

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Language used for data Description and data interpretation

Data description: RESULTS

☞ Cases started to occur at 5AM, peaked at 7AM and decreased with a last case at 10AM

☞ Cases clustered around the sweet shop

Data interpretation: DISCUSSION

☞ The shape of the epidemic curve suggested a point source outbreak

☞ We generated the hypothesis that the sweet shop was the source of infection

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Data description: Results

☞ Incidence of malaria was high among all age groups

☞ Cases were more likely than controls to be living under the poverty line

Data interpretation: Discussion

☞ Incidence pattern suggested lack of immunity among adults

☞ Low socio economic status may be a risk factor for illness

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Constructing an argument in a discussion: The bottom line

☞ The discussion brings all the pieces of the puzzle together

   ☞ What was known before

   ☞ What we learned

☞ This interpretation through inter-relation bridges the data with the conclusion

Recommendations--specific

☞ For each problem have a specific recommendation.

☞ The suggestions can be technical or managerial

☞ They can pertain to any of the management areas—

 ☞ Human resource

 ☞ Materials/ logistics& supply

 ☞ Financial

 ☞ HMIS

 ☞ Time

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Practical recommendations

👉 Feasible

👉 ----handled locally, or district or state or GOI

👉 Try to handle within means at the local level.

👉 Remember that NRHM has provision for improving the situation at district and below

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Recommendations-Tips

☞ Based on the conclusions

☞ Practical

☞ Specific

☞ Well organized with the most important first

Standard Text Citation Formats

👉 ICJME

👉 Harvard

Why emphasis on referencing?

No scientific knowledge starts in thin air

Most ideas take pre-existing observations and hypothesis and expand upon them

Connect scientific work to the existing body of thought

Often a starting point

Reference citation

☞ Purpose- to quote work done by other authors on the subject area relevant to study

☞ Referencing helps in identifying the source of information that has been quoted

Citing information from another source

- Cite relevant information

- Provide reference to the information quoted depending upon the citation format e.g (Clarke 2001)

- Cite references in the flow of the text

- Take the information and put it into your own words; avoid paraphrasing since this can potentially lead to plagiarism

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Use of references, section by section

☞ Introduction

   ☞ Support background information

   ☞ Lacunae, gap in knowledge

☞ Methods

   ☞ Previously described technique

   ☞ Statistical methods

   ☞ Use standard statistical software

☞ Results: Usually no references are cited

☞ Discussion: Comparing, interpreting, justifying analyzing

References in methods

Health care spending is considered catastrophic when it exceeds a threshold, defined in relation either to the household's pre-payment income or the household's capacity to pay (van Doorslaer et al. 2007)

All estimates were weighted. STATAtm version 10.0 was used to carry out the analysis (StataCorp LP, College Station, TX, USA).

180

References:
Bibliographic databases

☞ PubMed (Index Medicus)

☞ EMBASE (Excerpta Medica)

☞ Current contents

☞ BIOSIS: Biological abstracts

☞ Cochrane reviews

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References

Do not reference the obvious (e.g., the population of India is rising…) But if it is important to mention that the population has risen x% in y years, then a reference is needed.

Do not forget to reference

The only study… shows a trend…

References

- Need to be accurate
    - Journal offices tend to check citations
    - In the list of references and in the text
- Avoid abstracts
- Papers accepted for publication: In press
- Papers submitted for publication
    - Place in text as unpublished observations /data
- Personal communications
    - Should have written consent

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- www.icmje.org; www.nih.nlm.gov
- Number consecutively in the order of first appearance in the text
- References in the tables and figures should be numbered sequentially with the text
- Identify references in text, tables and legends by Arabic numerals in superscript /parenthesis
- Abbreviate the journals as listed in the Index Medicus

184

Referencing in text

Maternal Mortality Ratio is an integral part of assessment of a country's progress towards overall development as envisaged under MDG's (Millennium Development Goals), where a target of ¾th reduction in maternal mortality levels from 1990 level by 2015 has been set. The tenth Plan targets reduction in MMR to 200/100,000 live births by 2007 and to 100/100,000 live births by 2012.

185

References: ICMJE (Journal) Style

Multiple Authors (Last name First name initial.)

Veroncsi U, Maisonneuve P, Decensi A.

Article Title: Tamosifen: an enduring star.

Journal Title: J Natl Cancer Inst.

Date of Publication: 2007 Feb 21;

Volume: 99

Issue: (4)

Location (Pagination): 258-60.
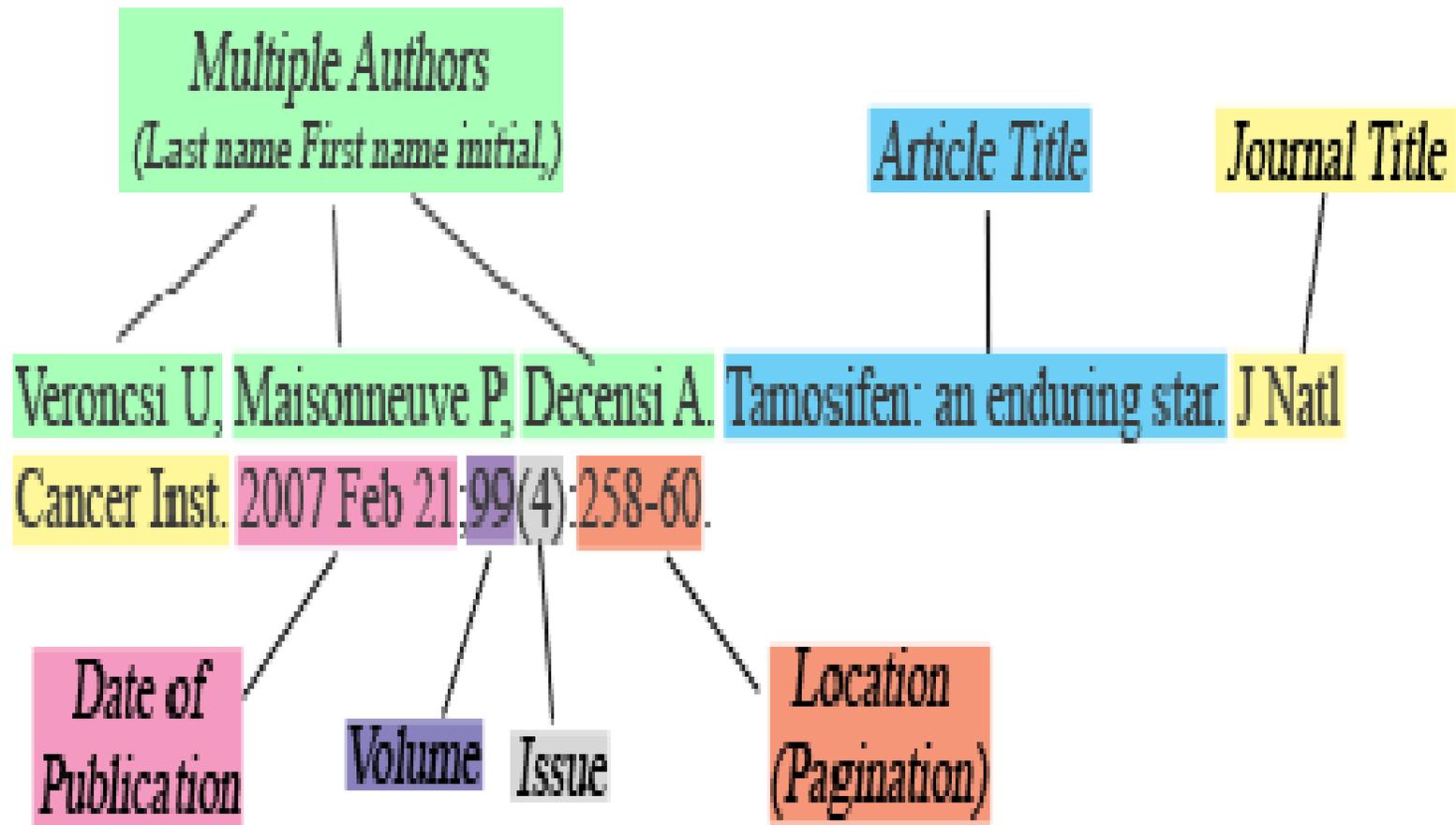
References: ICMJE (Journal) Style

- Sackett DL, Rosenberg WM, Gray JA, Haynes RB, Richardson WS. Evidence based medicine: What it is and what it isn't. BMJ 1996;312:71-2.

- McAlister FA, Clark HD, van Walraven C, Straus SE, Lawson FM, Moher D, et al.The medical review article revisited: Has the science improved? Ann Intern Med 1999; 131: 947-51.

187

References: ICMJE (Book) style

Multiple Authors or Editors (Last name First name initial.) — Belitz HD, Grosch W, Schieberle P.

Book Title — Food chemistry.

Edition — 3rd rev. ed.

Secondary Author — Burghagen MM, translator.

Place of Publication — Berlin:

Publisher — Springer,

Date of Publication — 2004.

Total Number of Pages — 1070 p.
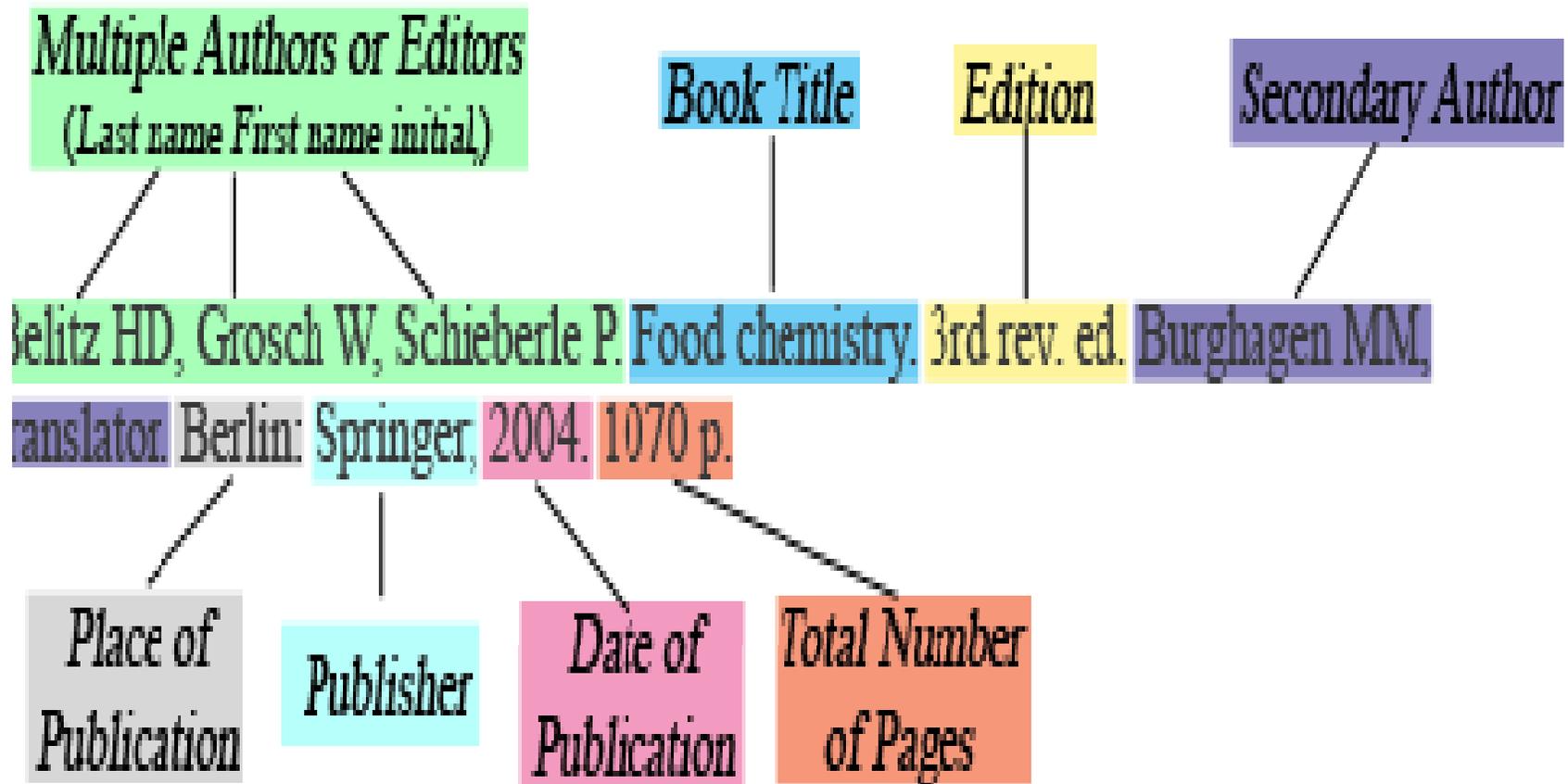
References: ICMJE (Book) style

☞ Guyatt GH, Rennie D (eds). Users' guides to the medical literature. A manual for evidence-based clinical practice. Chicago: American Medical Association Press; 2002.

☞ Rowley AH, Shulman ST. Kawasaki disease. In: Behrman RE, Kliegman RM, Jensen HD (eds). Nelson's textbook of pediatrics. 17th ed. Philadelphia: W. B. Saunders; 2004: 823-6.

189

References: ICMJE Style

☞ Pai M, McCulloch M, Enanoria W, Colford JM. Systematic reviews of diagnostic test evaluations: What's behind the scenes? Evid Based Med & ACP Journal Club 2004 (in press).

☞ Population Reference Bureau.

http://www.prb.org/

(accessed on 4 January 2006).

☞ Tynan T. Medical improvements lower homicide rate: Study sees drop in assault rate. The Washington Post. 2002 Aug 12;Sect. A:2 (col. 4).

190

References: ICMJE Style

☞ Dworkin SF. Somatization, distress and chronic pain. Qual Life Res 1994;3 (Suppl 1): S77-S83.

☞ National Sample Survey Organization (NSSO). Morbidity and treatment of ailments. NSS (NSS 52nd round). July 1995-June 1996, Report No 441. New Delhi: Government of India, Department of Statistics; 1998.

☞ EpiInfo2000. Atlanta: Centers for Disease Control and Prevention; 2000.

191

Journal: Two authors	
Timm, T. and B. Bugjuice. 1989. The role of whisker length in mouse nose-twitch courtship behavior. J Physiol 61(3):113-118.	Timm and Bugjuice (1989)
Journal: Multiple authors	
Bugjuice, B., Timm, T. and R. Cratchet. 1990. The role of estrogen in mouse courtship behavior changes as mice age. J Physiol 2(6):1130-1142.	Bugjuice et al. (1990)

192

Harvard

- Only the last name of the author(s) and the year of publication are given,e.g.,Bugjuice 1970.

- Your Literature Cited section will contain the complete reference, and the reader can look it up there.

- For two author papers, give both authors' last names (e.g., Click and Clack 1974).

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☞ Articles with more than two authors are cited by the first authors last name followed "and others" or "et al.", and then the year.

☞ A string of citations should be separated by semicolons, e.g., (Gumwad 1952:209; Bugjuice 1970; Bruhahauser et al 1973).

☞ If the same author(s) are cited for two or more papers published within the same year, place a small case letter after the year to denote the sequence in which you referred to them.

☞ Example:Bugjuice, B. 1970a. Physiological effects of estrogen on mouse courtship behavior. J Physiol 40(2):140-145.

Bugjuice, B. 1970b. Physiological effects of estrogen analogs: Insincere courtship xxxxbehavior in female mice. J Physiol 40(8):1240-1247.

195

References: Harvard style

Referencing in text

In India, impoverishment due to health payments is substantial; various studies have estimated that between 32–39 million people are pushed into poverty every year due to health payments (van Doorslaer *et al*. 2006; Bonu *et al*. 2007; Garg and Karan 2009; Berman *et al*. 2010).

☞ Berman P, Ahuja R, Bhandari L. 2010. The impoverishing effect of healthcare payments in India: new methodology and findings. *Economic & Political Weekly* **45**: 65–71.

☞ Deaton A, Dreze J. 2008. Nutrition in India: facts and interpretations. Working paper, Princeton University, NJ, USA. Online at: http://weblamp.princeton.edu/chw/papers/deaton_dreze_india_nutrition.pdf, accessed 29 October 2009.

197

Principles of Ethical Research

- Honesty
  - Accurate reports / protocols
  - Identified conflicts of interest
  - No falsification / misrepresentation of data
- Objectivity
  - Not limited to experimental design
  - Consciously look for bias

☞ Integrity

☞ Carefulness

☞ Timely & orderly records of research and correspondence

☞ Openness

☞ Share information, tools & protocols

☞ Accept criticism and new ideas

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👉 Respect Intellectual Property

    👉 Do not use unpublished data

    👉 Give credit where credit is due

👉 Promote social good & minimize social harm

    👉 Use resources efficiently

- Educate / mentor junior colleagues

- Maintain competence & skills

- Avoid discrimination for reasons other than quality

- Obey relevant laws

- Exploit neither humans nor animals in studies

Unethical Research Practices

- Errors of judgment - improper study design, bias

- Changing objectives of study under pressure from funding source

- Intentionally excluding a part of data from analysis

- Hiding details of methodology / results

☞ Fabrication, falsification & plagiarism (FFP) in planning, implementation, or reviewing research or in reporting results

- ☞ Fabrication: recording or presentation of false data

- ☞ Falsification: manipulation of data to produce a desired result

Plagiarism is an unethical practice, lacks originality but is not illegal

Plagiarism (Latin word plagiarius – kidnapper, thief): using someone else's words, ideas, or results without giving credit

Self-plagiarism: re-using own published material (text recycling) & data partitioning

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Publication

The currency of modern science

Reasons for Research Publication

Promotion

Academic degree

Financial Gain

Improve knowledge

Fame

Generate Knowledge

Publication Ethics

☞ The Committee on Publication Ethics (COPE) published Guidelines on Good Publication Practice in 1994 (http://www.publication ethics.org.uk)

☞ Broadly, Publication ethics involve

☞ Research misconduct

☞ Protection of research participant's identities

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Key Issues in Research & Publication Ethics

- Authorship
- Conflicts of interest
- Peer review
- Plagiarism
- Data ownership / retention
- Copyright
- Media/Press coverage

207

👉 Failing to present data contradictory to previous research

👉 Ignoring or bypassing guidelines / rules protecting human participants/ animals

👉 Non-disclosure of conflict of interest

👉 Fabrication, falsification, or plagiarism (FFP)

Authorship

☞ Guidelines by International Committee of Medical Journal Editors (ICMJE)

☞ Include names of all scientific & technical personnel significantly contributing to the intellectual content

☞ Study design

☞ Implementation of study

Analysis and interpretation of data

Writing of paper

Revision and final approval of paper

Author order often implies significance of contributions, but must be mutually agreeable to all involved

Acknowledgment if a contribution, but not large enough to be an author

Bad Authorships

- Gift Authors

  - A personal or professional favour; sometimes reciprocal

- Honorary Authors

  - Sign of respect or gratitude

  - Sometimes an institutional requirement

211

☞ Prestige Authors

> ☞ Someone well known to give paper more visibility or impact

☞ Ghost Authors

> ☞ May help with writing, but no participation in planning, execution or analysis

> ☞ Worst form has even the researchers as the ghosts

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Conflict of Interest

☞ COI arises when behind the conclusions of study - there is most probably more than a scientific reason

☞ Competing interests can involve all participants in the publication process: authors, reviewers, editors and publishers/journal owners

☞ Some journals may require declaration of COI for publications

The existence of conflict of interest is not a crime as long as they are disclosed

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Peer Review

- Improve quality of paper

- Authors not aware of the identity of the reviewers but reviewers aware of the identity of authors – unfair approach

- Blind peer review

- Interaction between the Author, reviewer & editor should be confidential

- Reviewer / editor should not use the information in the paper for own benefit

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How To Avoid Plagiarism?

Guidelines for using other's work

☞ Understand idea & express it in own words

☞ If you can not modify: express it within quotations

☞ Obtain written permission from author for using figures & diagrams

☞ In the discussion of results section, it is necessary to provide supportive & contradictory evidences, if any

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Data Ownership and Retention

☞ Almost always owned by the institution not the individual

☞ Investigators are stewards

☞ Data storage is responsibility of the P.I.

☞ Must be maintained for 3 years; 7 is recommended, but longer is not an uncommon practice

☞ If published, original data may be subject to scrutiny

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Copyright

☞ Copyright gives the owner the exclusive right to reproduce, distribute, perform, display or license his work

☞ What can be used without worrying about copyright?

  ☞ Anything in the public domain

  ☞ Anything that falls under fair use

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☛ Government documents

☛ Someone has granted particular free licenses

☛ Decide who may make copies, distribute, sell or rent

☛ Lasts for lifetime of author(s) + 70 years

☛ Usually owned equally by all authors, not their institutions

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Media Coverage

- Major medical breakthroughs attract major media attention

- Quite common major discoveries appear in newspapers before scientific journals

  - Authors should see that they are simultaneously published

  - Should give both strengths and weaknesses of the study, however in practice not balanced

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How to Prevent Research and Publication (R & P) Misconduct?

👉 The widespread R & P misconduct indicates ineffective control measures

👉 Making "policing" of research more effective is not the solution

☞ The following may be useful to address the issue:

1. Education – key step

   ☞ Research training – clear guidance on ethics

   ☞ Make available Institutional Guidelines on Research ethics/ICMR Guidelines

   ☞ Publication ethics – quality rather than quantity

2. The Research

   ☞ Protocol driven

   ☞ Investigators & Collaborators

      ☞ Define roles

      ☞ Agreement on protocol

      ☞ Agreement on presentation of results

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☞ Define methodology for data analysis

　　☞ Statistical advice

☞ Ethical approval

☞ Supervision

　　☞ Training and good communication of staff

　　☞ Ensure good clinical practice

　　☞ Meticulous record keeping

3. The Publication

　　☞ Disclose conflict of interest

　　☞ Approval by all contributors

　　☞ Submit to one journal at a time

　　☞ Assume research data audit

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Who the author(s) would be

☞ First Author-who does the writing & coordinates the team of co-authors. The last author is the senior member of the team & is often the person who conceived the initial idea for the study and/or obtained funding.

☞ I declare that I participated in the (here list contributions made to the study such as design, execution or analysis of the paper) by … and colleagues entitled … and that I have seen and approved the final version.

☞ "I also declare that I have no conflict of interest in connection with this paper other than any noted in the covering letter to the editor"

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Key messages

Title :

☞ Map out your keywords to write a title

☞ References

    ☞ References place the work in the context of the known and the unknown

    ☞ Read instructions carefully

    ☞ Look at recent issue of journal

    ☞ Read ICMJE URM

Introduction:

☞ The introduction explains why you started

☞ It requires 4 sentences

☞ Background

☞ Gap in knowledge

☞ Question

☞ Study design

Methods :

👉 Write the story

👉 Display the evidence with crude simplicity and objectivity

Discussion:

👉 It is harder to be short than to be long

👉 Systematic preparation and iterative rewriting are key to success

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Results :

- Interpret, do not discuss
- Describe, then interpret
- Interpret descriptive epidemiological data to generate hypotheses and analytical epidemiological data to test hypotheses
- Interpret in light of initial hypotheses
- Bring all the pieces of the puzzle in the discussion section of the paper

Scientific Writing: Communicating with Editors

State Institute of Health & Family Welfare, Jaipur

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"There is no way to get experience except through experience."

Getting published: know the answers to

👉 **Why (**I did the study-Introduction**)**

   👉 **When** (Methods)

      👉 **Where** (Methods)

         👉 **Who** (Methods)

            👉 **What** (I found-results)

               👉 **How** (use/outcome?)
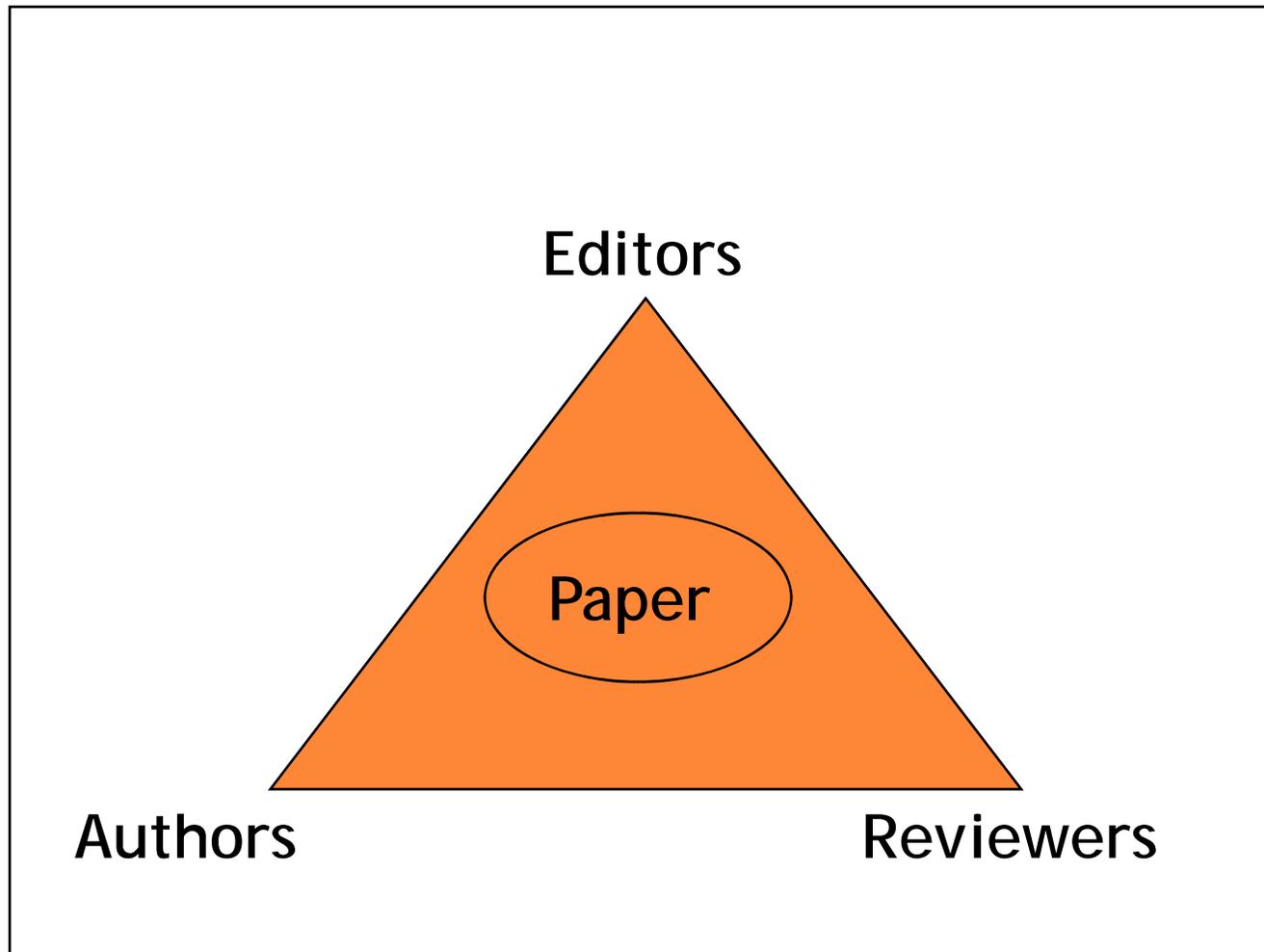
And that people often put as……. IMRaD

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Getting a paper published

Competition for space in journals is intense

Cost of publication is high,

Rejection rates vary
AJP = 50%
Science, Nature = 90%

The players

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Where should I publish: choice of Journal

☞ **Peer reviewed journal**

☞ **Others- Papers, magazines, news letters, book chapters**

What constitutes a good journal?

☞ Impact factor –
average number of times published papers are cited up to two years after publication.

☞ Immediacy Index –
average number of times published papers are cited during year of publication.

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Deciding where to submit

- Match your paper with the personality and scope of the journal
- Match your subject with the journal's target audience
- Consider the impact factor and citation index
- Weigh up the journal prestige, the likelihood of acceptance and the likely time until publication
- Have realistic expectations
- Scan the journals for one that matches your content and study design
- Be strong and, if rejected, select another journal

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Process of Research publication

SIHFW: an ISO 9001:2008 certified Institution
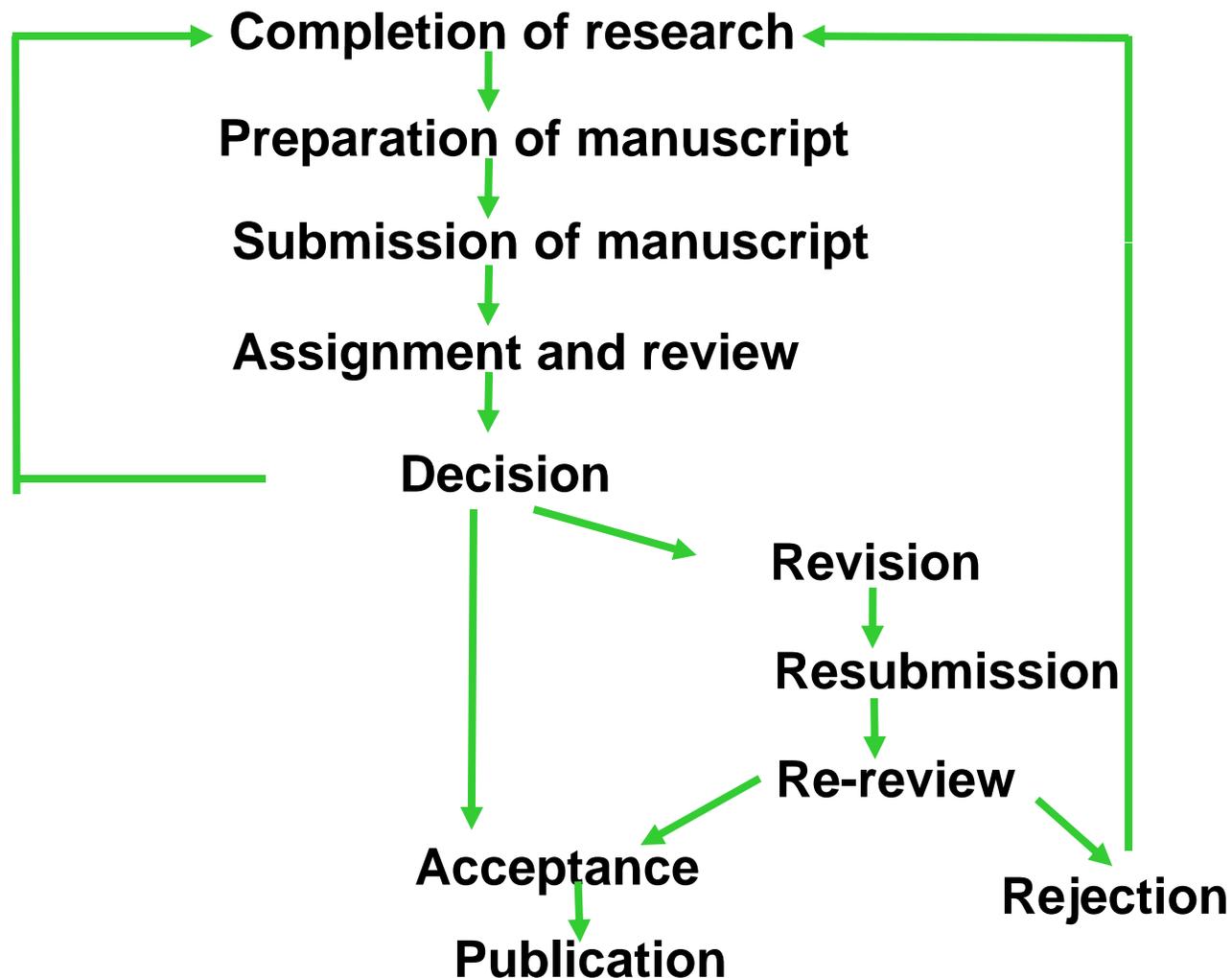
What makes a good research paper?

👉 Good science

👉 Good writing-

"having something to say   and saying it as clearly as you can."

👉 Publication in good journals

Science Citation Index

Impact factor

Immediacy factor

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How to get published–*Tips*

- Know the journal, its editors, and why you submitted the paper there;

- Pay close attention to spelling, grammar, and punctuation;

- Make sure references are comprehensive and accurate;

- Avoid careless mistakes; and

  Read and conform to "Instructions for Authors"

Follow Uniform Requirements

☞ First developed in 1978 by Vancouver group

☞ Adopted by International Council of Medical Journal Editors (ICMJE)

☞ JAMA publishes its instructions to authors in January and July each year

☞ Consolidated Standards of Reporting Trials (CONSORT) guidelines

☞ Meta-analysis of Observational Studies in Epidemiology (MOOSE)

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Common problems with manuscripts

Too long

Not clear

Subject not appropriate for journal

Poorly structured

Too much of assumption

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"Those who have the most to say usually say it with the fewest words"

Parts of a manuscript & order of writing

Title

Abstract

Introduction

Methods

Results

Discussion

Acknowledgements

References

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Title

☞ Will determine whether paper gets read

☞ Be short, accurate, and unambiguous

☞ Give your paper a distinct personality

☞ Begin with the subject of the study

☞ Avoid long title (see journal rules)

☞ Avoid abbreviations

Title format:

"The effects of heat on ice"

"Heat melts ice"

"The role of heat in melting ice"

Effective titles:

☞ Identify the main issue of your paper

☞ Begin with the subject of your paper

☞ Are accurate, unambiguous, specific, and complete

☞ Do not contain abbreviations

☞ Attract readers

Abstract

☞ Critical part of paper

☞ State main objective

☞ Summarize most important results

☞ State major conclusions and significance

☞ Avoid acronyms

☞ Write and rewrite until flawless

245

Introduction

☞ Build case for why study is important/necessary

☞ Provide brief background

☞ State hypothesis / central question

☞ Give a one sentence summary of findings

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Methods and materials

☞ Best to begin with experiments/ study still in progress.

☞ Detailed enough so results can be repeated

☞ Reference published methods where appropriate.

☞ Include ethics committee approval

☞ Use descriptive subheadings

Surgical procedures

Histochemistry

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Results

- Briefly repeating protocols can be effective

- Tables and figures must be straight forward and concise

- Present main findings referring to tables/figures.

- Do not speculate or over discuss results.

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Discussion

- First answer question posed in introduction

- Relate your conclusion to existing knowledge

- Discuss weaknesses and discrepancies

- Explain what is new without exaggerating

- Do not repeat results

- Conclusion/summary, perspectives,implications

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References

Relevant and recent

Be highly selective

Read the references

Do not misquote

Use correct style for journal
Vancouver
Harvard

Once you have finished, Organize your paper for–

Visual appeal

   Use ample white space, Number your pages

   Put identification information in a header or footer

   Start each new section on new page

   Write short paragraphs

   Left-justify and double-space the text

   Avoid hyphenating words between lines

   Use subheadings to divide sections

   Use new paragraphs for new topics

Words and expressions to avoid

Jargon	Preferred use
a considerable amount of	much
on account of	because
a number of	several
Referred to as	called
In a number of cases	some
Has the capacity to	can
It is clear that	clearly
It is apparent that	apparently
Employ	use
Fabricate	make

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Revise, revise and revise

- All authors should participate

- Review order of data presentation

- Polish the writing style

- Double check references

- Look for typos

- Double check spelling

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Develop a good writing style

👉 Read well written articles

👉 Try to get good writers to review

👉 Learn from editing changes

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Submission

👉 Read instructions carefully

👉 Fill out all necessary forms

       Copyright transfer

       Conflict of interest

👉 Write cover letter (suggest reviewers)

👉 Confirm receipt after 6 weeks

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Covering letter

☞ An important piece
- ☞ Brief, highlight importance of paper
- ☞ Do not brag, be modest

☞ Be clear and specific. In 4-5 sentences explain
- ☞ *What is already known?* what the state of scientific knowledge was in this area before you did your study and
- ☞ why this study needed to be done.
- ☞ *What this study adds?*

☞ You might use the last sentence to summarize any implications for practice, research, policy, or public health.

☞ Follow instructions of the journal

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Covering letter/checklist

- Signatures of all authors/ corresponding author
- Read and approved the contents
- Information on:
  - Prior publication of part/abstract
  - Presentation at conference
  - Financial or other conflicts of interest
  - Contact details of all authors/corresponding author (affiliation to the institute, email)
- Type of article the manuscript represents
- Any details that journal wants included

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Enclosures

☞ **Transfer of copyright, other forms**

☞ **Permission**

    ☞ **To reproduce previously published material**

    ☞ **From patients for clinical photographs**

☞ **Keep copies of everything you submit**

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Dear Editor

Please find enclosed a paper entitled '………' ,for consideration for publication in your journal.

The data included in this manuscript have not been published previously and are not under consideration by any other journal.

A form with consent to publication signed by the authors is enclosed.

All authors have read this final manuscript and have given their approval for the manuscript to be submitted in its present form.

I enclose:

☞Three paper copies of the manuscript

☞Three copies of the tables and figures

☞A labeled disk containing the electronic version.

As the corresponding author, my contact details are shown on the cover page of the manuscript.

Yours sincerely

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Selection of reviewers

☞ How?

  ☞ Database

  ☞ Known individuals

  ☞ Authors suggestions

  ☞ References

☞ How many?

  ☞ Usually 2-3

  ☞ May go to a statistical or methodological expert

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Editor's expectations of the reviewers' role

☞ Fair, honest, detailed comments

☞ Identification of the strengths and weaknesses of the paper

☞ Constructive criticism

☞ Assistance to improve the paper

☞ Timeliness

    ☞ Within a reasonable period: 3-4 weeks

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Reviewers are asked to comment on the following areas:

- Scientific rigor
- Experimental or study design
- Adequacy of data
- Importance and originality of the results
- Validity of conclusions reached
- Completeness of the literature cited
- Clarity of writing
- Interest to the journal readership

An editorial committee may decide that a paper:

☞ Is acceptable for publication

☞ Is acceptable for publication following minor revisions

☞ Is acceptable for publication following major revision

☞ May be reconsidered for publication following major revisions

☞ May be considered for publication as a letter or a short report

☞ Is unacceptable for publication

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Three scenarios

Acceptance

Rejection

Comments from reviewers

SIHFW: an ISO 9001:2008 certified Institution

Three scenarios

- Acceptance
    - Clarifications on minor points
        - Better photographs
        - Convert table/figure, change text
        - Provide key messages
        - Clarify points
        - Read proofs
        - Local editors
        - Language clarity
- Rejection
- Comments from reviewers

Three scenarios

- **Acceptance**
- **Rejection**
    - **The paper is not acceptable in its present form because of pro forma policy :**choose to resubmit
    - Comments provided can help improve the article
    - Useful to follow the same initial steps
- **Comments from reviewers**

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Major reasons for rejection

☞ Poor experimental design
  ☞ Poor controls
  ☞ Hypothesis not adequately tested

☞ Inappropriate for journal

☞ Poorly written

"The Seven Deadly Sins"
Publish and perish

👉 Data manipulation, falsification

👉 Duplicate manuscripts

👉 Redundant publication

👉 Plagiarism

👉 Author conflicts of interest

👉 Animal use concerns

👉 Humans use concerns

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How do I take a Rejection letter

- Wait for 24 hrs.
- Calm when trying to understand the nature of the rejection
- Why was it rejected (see comments after deconstructing each message)
  - The paper is not acceptable in its present form(format)
  - The paper did not get a high enough priority (alternative)
  - The study is interesting but too preliminary (ensure results are put in total)
  - The study is interesting but is technically flawed(methods ?)
  - The work is more appropriate for a specialized journal (alternative)
  - The study is descriptive
  - The manuscript lacks controls
  - The data is not convincing

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Most studies have some imperfections. The question is the nature and severity of those flaws.
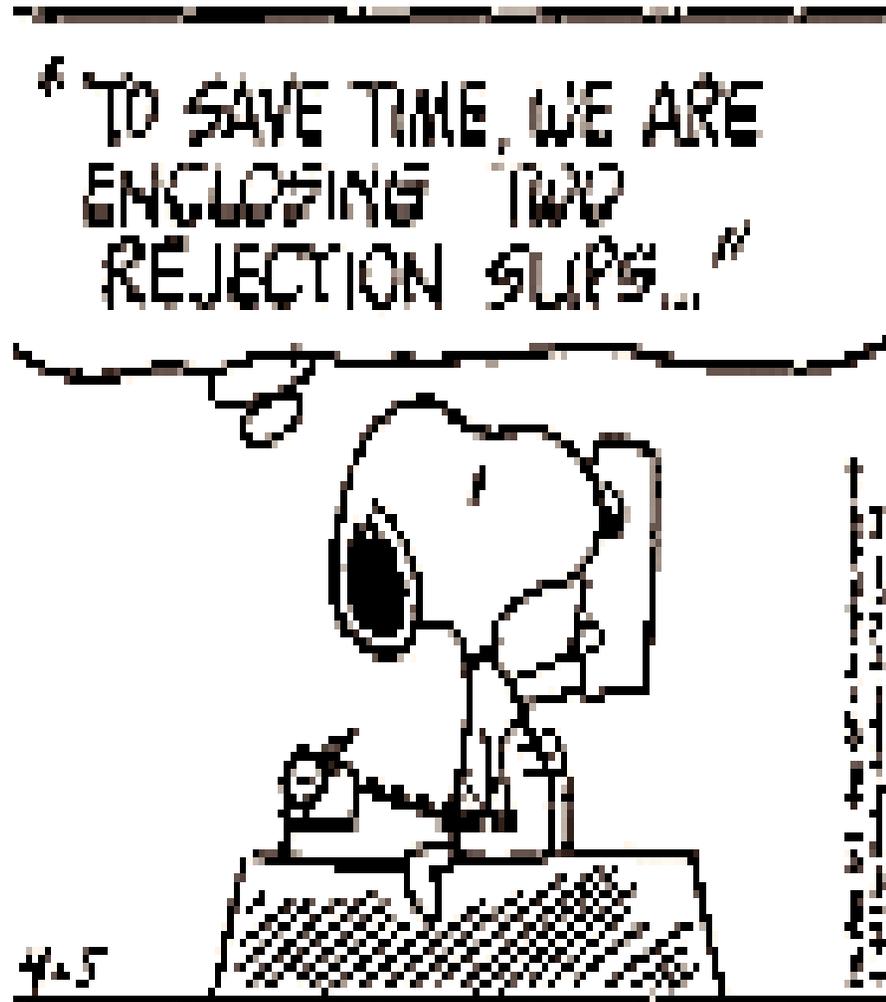
If you disagree with the reviewer, the burden is on you to convince them, not to dismiss them.

If the reviewers misread your manuscript or missed a point, chances are that your writing style confused them.

If your conclusions go against conventional wisdom, then you need to explain and convince why your view is the valid one.

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A typical Rejection letter

Thank you for sending us your revised manuscript. We have now considered this very carefully at an editorial level and I am afraid that we have decided not to accept the paper for publication. I know that you addressed the comments made by the reviewers by making some modifications to the paper. However, our decision not to publish was on the basis that we did not feel that the information was new or would be of great interest to our readership. I apologize for disappointing you.

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Rejection

- Consider should you accept rejection or fight
- Do you have defense
- Disagree to comments-try convincing
- Submit elsewhere
- Appeal
    - Rarely
    - Only if you have a strong case
    - Biased reviewer, wrong major points

Responding to reviewers

- Carefully prepare your responses
    - Address each comment
    - Each change should be stated
    - Be enthusiastic
- Reviewer may be wrong
- Be tactful – thank the reviewers
- Do not respond to reviewers while upset
- Never call the editor
- Get help from other authors

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Prepare your response

👉 Simple and to the point

👉 Polite

👉 Provide enough supporting evidence

👉 Get approval from co-authors

👉 Revise paper, try and make the majority of the changes requested

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Submission

- Covering letter

- Point-wise reply to the reviewer's comments

- Original manuscript

- Revised manuscript

- Send well within deadline

Addressing the points raised by the reviewer (s)

☞ When you will change the manuscript (Preferred)

    ☞ Just say: "We modified the manuscript according to the suggestion on line … paragraph…"

☞ When you will not change the manuscript

    ☞ Explanation / clarification to say you agree but that the manuscript does not need to be changed

    ☞ Explanation / clarification to say you respectfully disagree, with documentation of your point

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Mistakes to look for in the proofs

- Names, initials and affiliations

- Formatting errors

- Symbols

- Reference numbering

- Reference format

Mistakes to look for in the proofs

☞ Tables

  ☞ Alignment

  ☞ Totals

  ☞ Calculations

  ☞ Digit loss

☞ Figures

  ☞ Re-drawn OK

  ☞ No format loss

Returning the proofs

☞ Comments in separate document

☞ Final OK from technical editor

☞ Ready for the publication

Communicating when a paper is published

☞ Notify co-authors

☞ Disseminate abstract

    ☞ List servers

☞ Make press release

    ☞ On the initiative of the journal

    ☞ On personal initiative

Happy writing
Hope, next time you get published, not rejected

Thanks