In God We Trust

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SCIENTIFIC WRITING

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MARCH 23

GOALS

01

Types of scientific research

02

Scientific Writing

Why is it imporatnt?

03

Article

Getting to know each part of it and how to write them

TYPES OF STUDIES

Primary Study

- Interviews
- Surveys
- Experiments (intervention)
- Observations

Secondary Study

- Reviews (Overviews)
  - Narrative reviews
  - Systematic reviews & Meta-analyses
- Guidelines
- Secondary Analyses

AIMS OF STUDIES

Descriptive Studies

- To determine distribution of disease/condition
- Focus on person, place and time.
- Create Hypothesis
- Observational

Analytical Studies

- Test a hypothesis which has already been suggested
- Observational or interventional

Descriptive Studies

Case reports

Case series

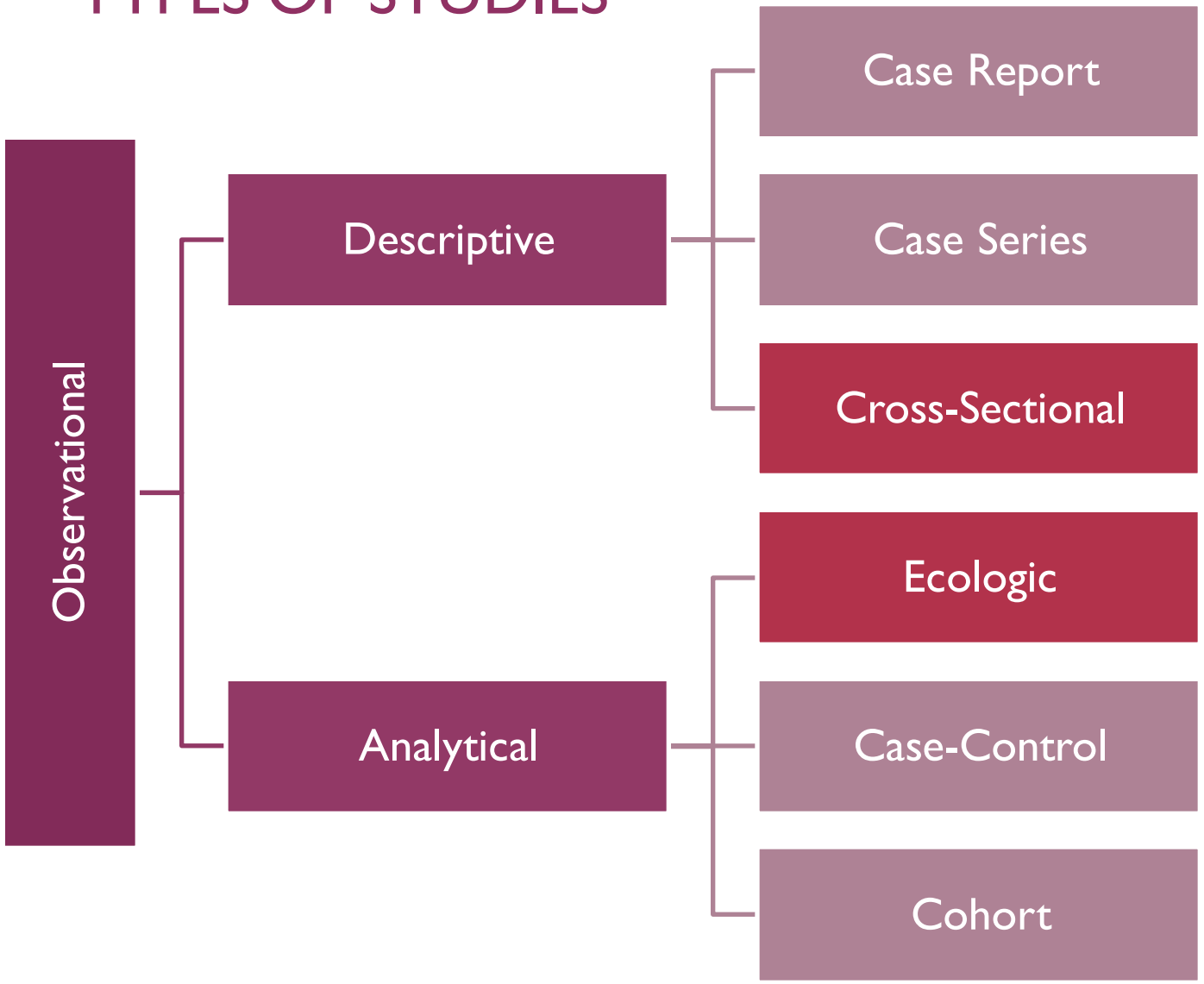
Analytical Studies

Case-control

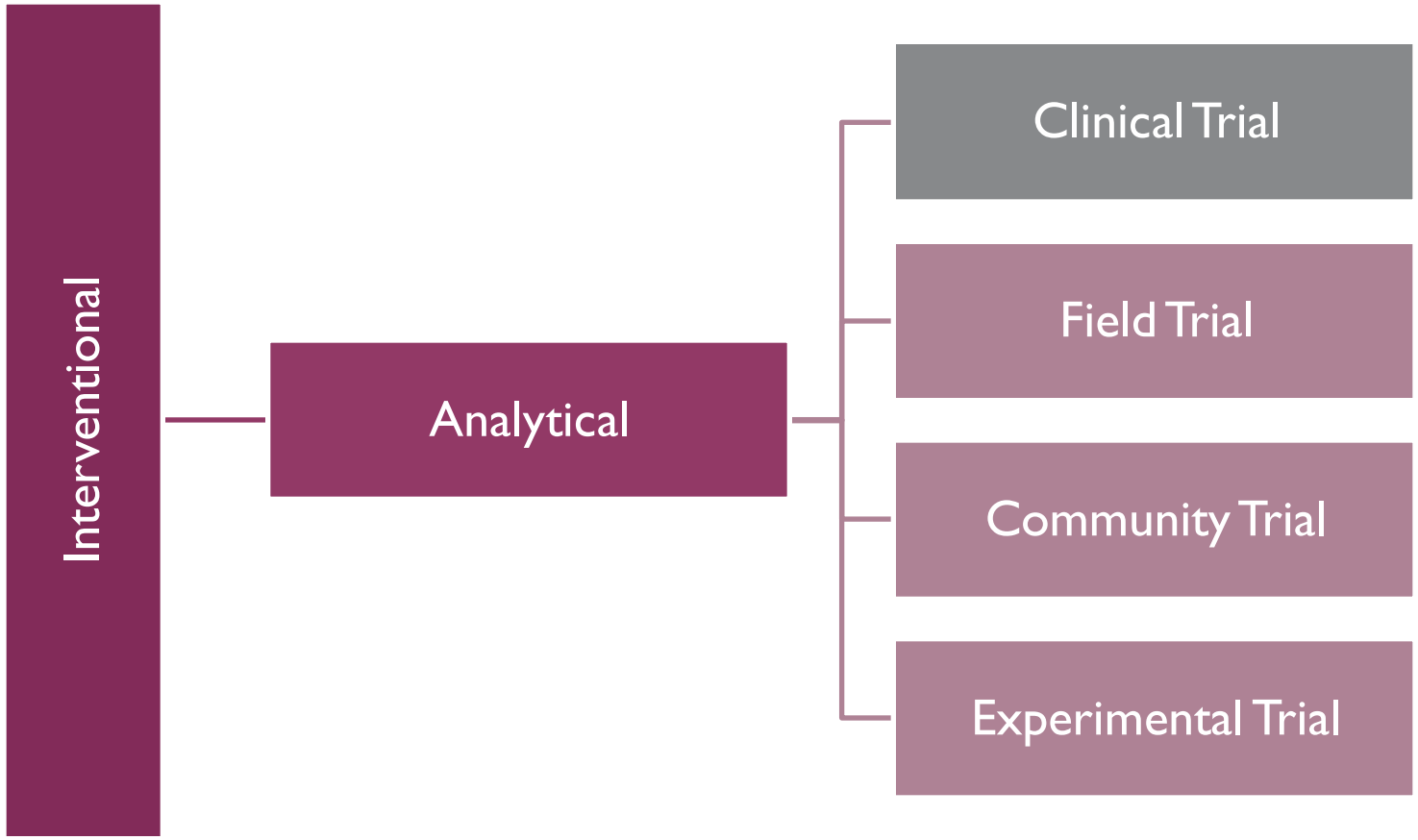
Cohort

Clinical Trials

TYPES OF STUDIES



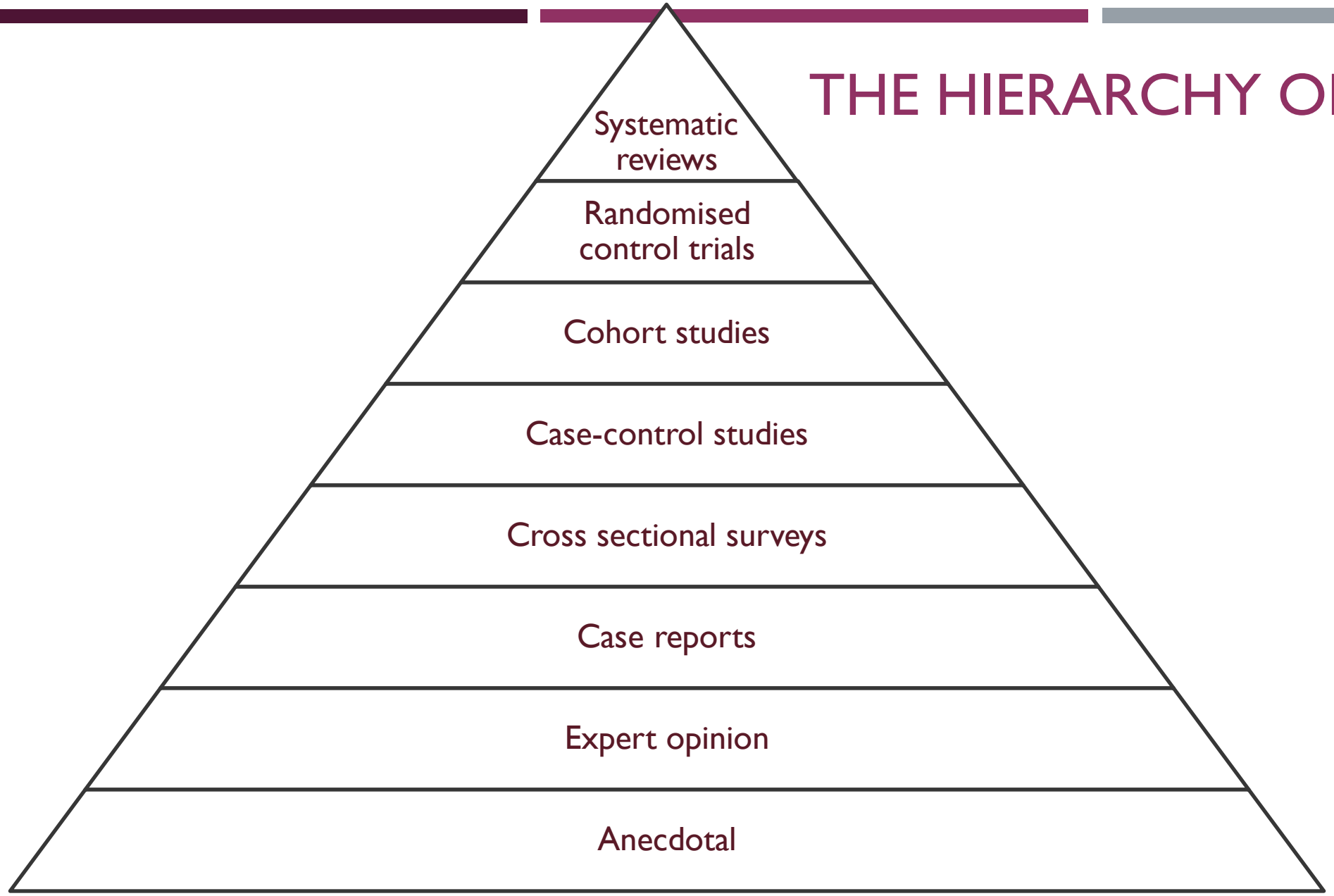
TYPES OF STUDIES



TYPES OF STUDIES

Objective	Design
Description of disease	Case series or report
	Cross-Sectional study
Evaluate a new diagnostic test	Cross-Sectional study
Describe prognosis	Cohort study
Determine cause-effect	Cohort study
	Case-Control study
Compare new interventions	Randomized Clinical Trial
Summarize literature	Systematic review

THE HIERARCHY OF EVIDENCE



Types Of Documents

- Articles
- Reviews
- Books and Bookchapters
- Conference papers
- Editorials

WHY

SCIENTIFIC WRITING

- The purpose of scientific writing is to convey ideas and facts about scientific work.
- Scientists understand and criticize each other's work through their articles.
- Thus, scientific writing should be intelligible to readers at the first reading.

How to present our article?

- Publish in journals
- Present in a congress or a seminar

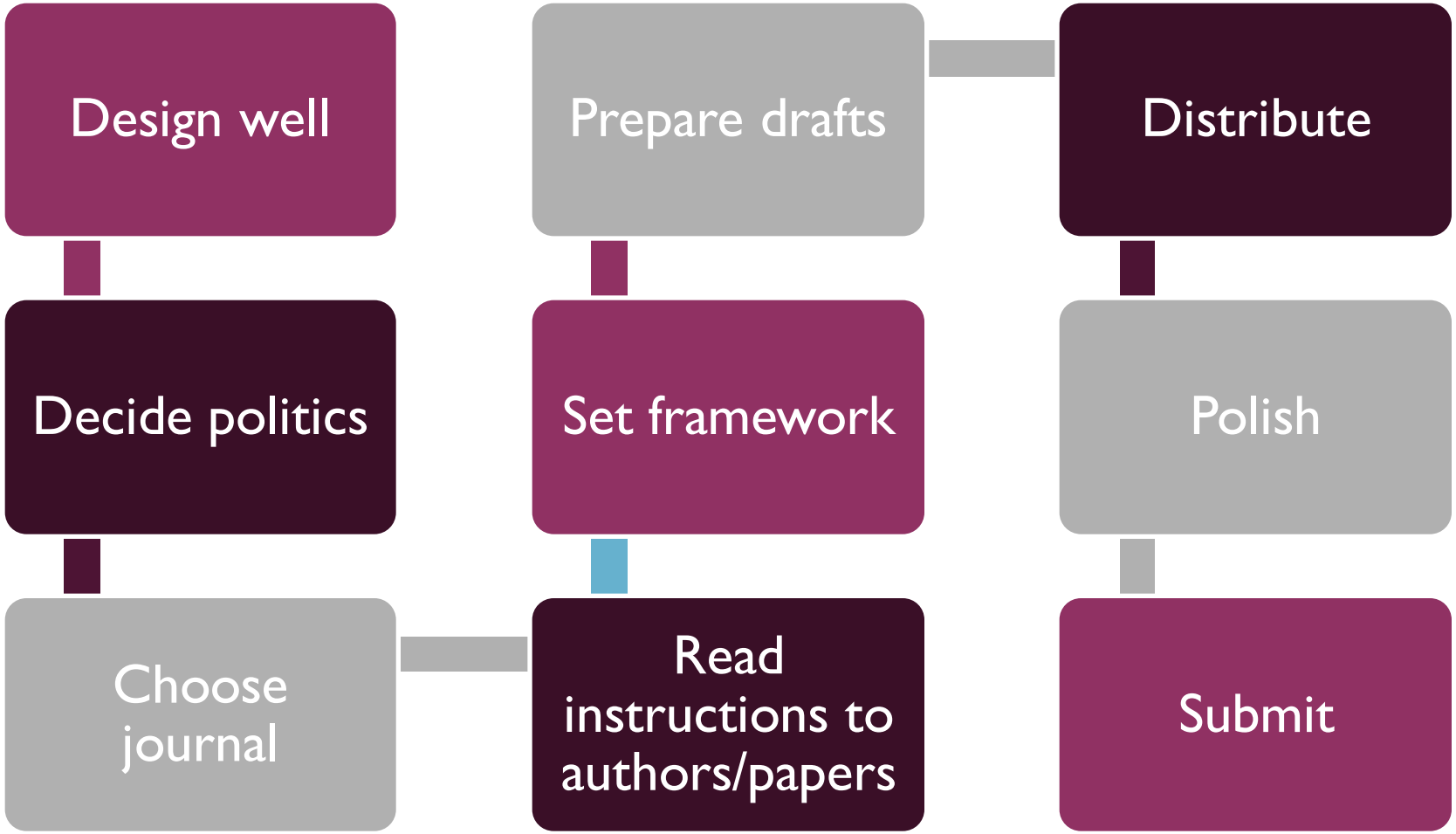
WHY PUBLISH?

- Knowledge contributions
- Ensures scientific rigor
- Allows feedback (improves work)
- Promotes career
  - Document productivity
  - Document impact on field/reputation
  - Advertises your lab for future trainees
- Improves chances of funding
- Fulfills an obligation (public monies)

EVALUATING AN ACADEMIC PERSON THOUGH HIS/HER CV PAPERS

- Number of papers
- Rate of publication
- Quality of journals
- Position in list of authors
- Focus

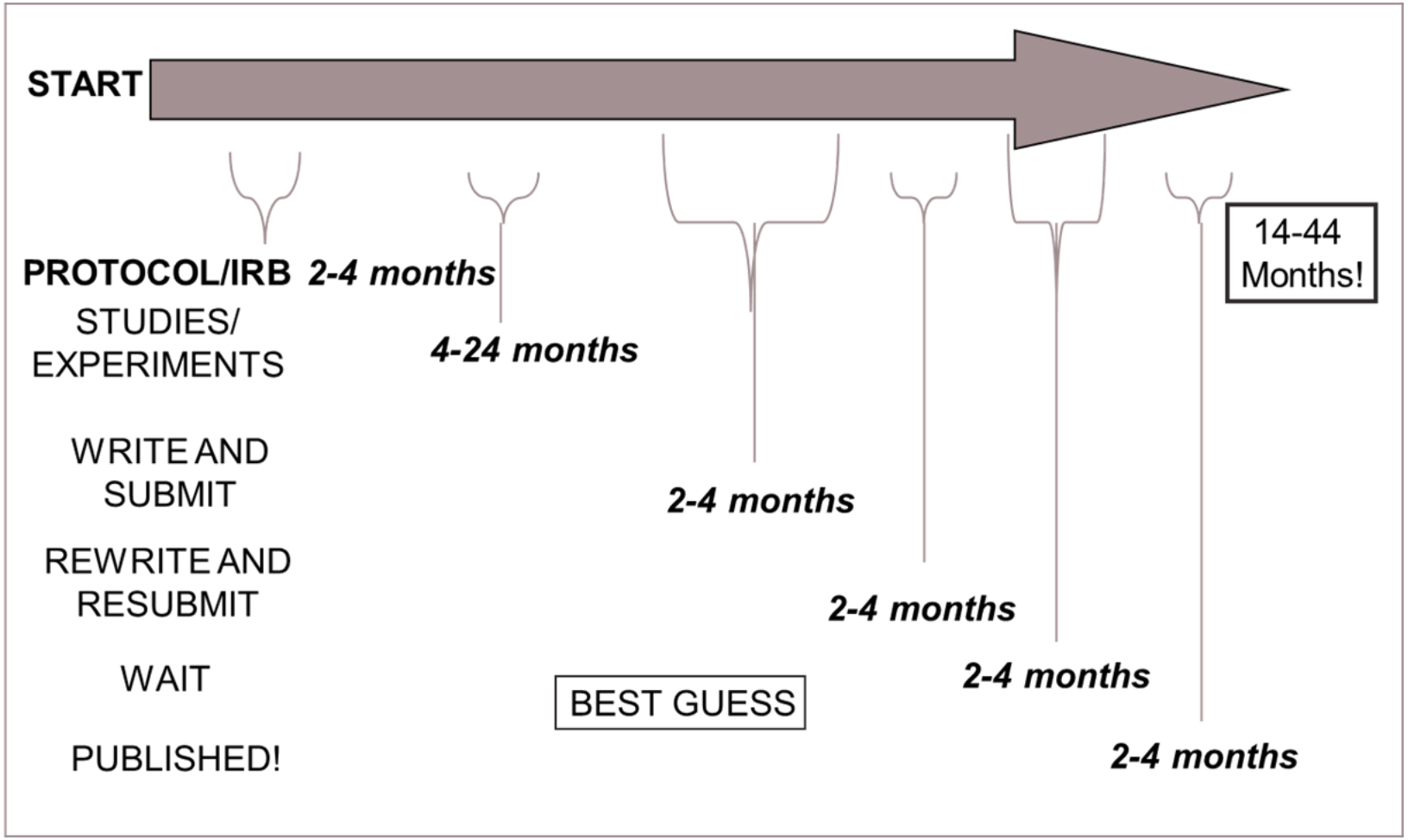
STEPS IN SCIENTIFIC WRITING



WHAT IS WRITTEN WITHOUT EFFORT IS IN GENERAL READ WITHOUT PLEASURE.

SAMUEL JOHNSON

WHAT IS THE GESTATIONAL PERIOD FOR A CLINICAL SCIENCE PUBLICATION?



THE BASIC STRUCTURE OF AN ARTICLE

Title and Abstract

Structured Summary

Introduction

What Question was asked?

Methods

How was it Studied?

Results

What was Found?

Discussion

What Do the Findings Mean?

References

IMRAD

Introduction

Why did you start?

Results

What did you find?

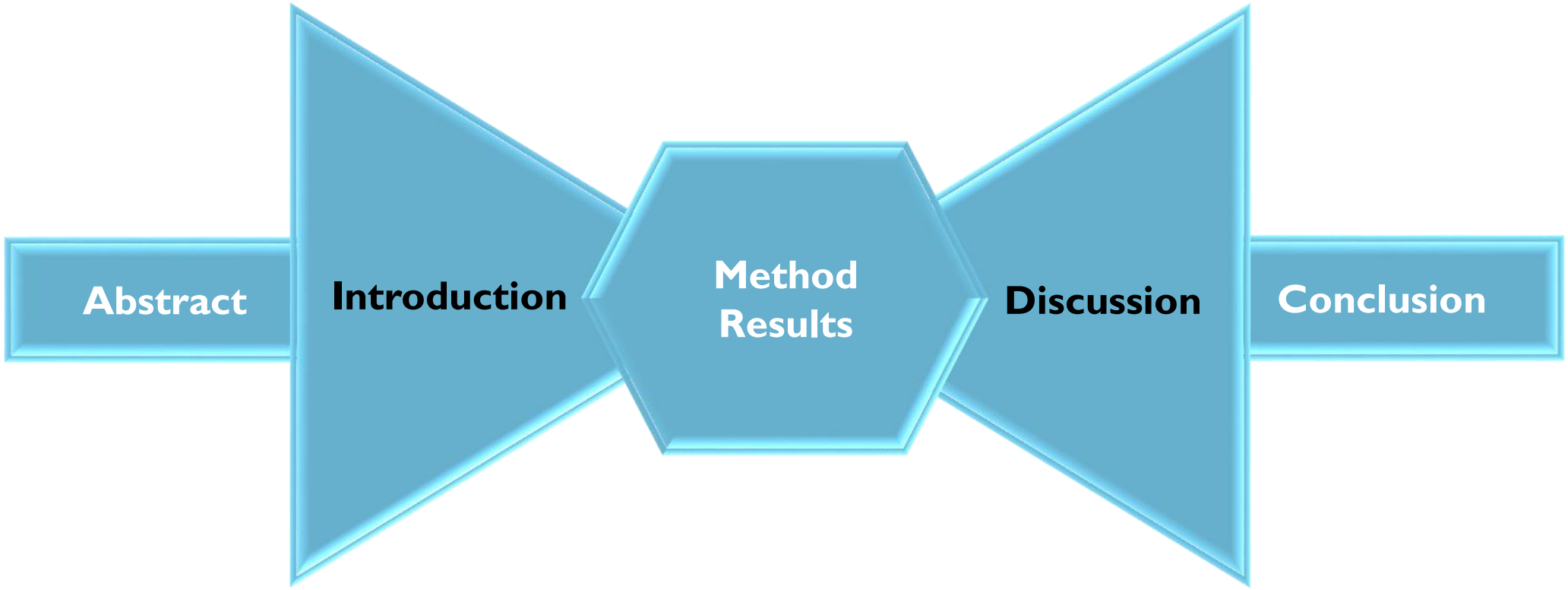
Methods

What did you do?

Discussion

What does it all mean?

"BOWTIE" MODEL FOR A SCIENTIFIC PAPER



A FULL PAPER MAY CONTAIN:

- Title
- Authors and Affiliation
- Abstract
- Introduction
- Methods
- Results
- Discussion
- Acknowledgments (optional)
- References

INITIAL STEPS

1-Understand the type of manuscript you are writing.

2-Re-evaluate your project.

3-Plan the sections and subsections you need.

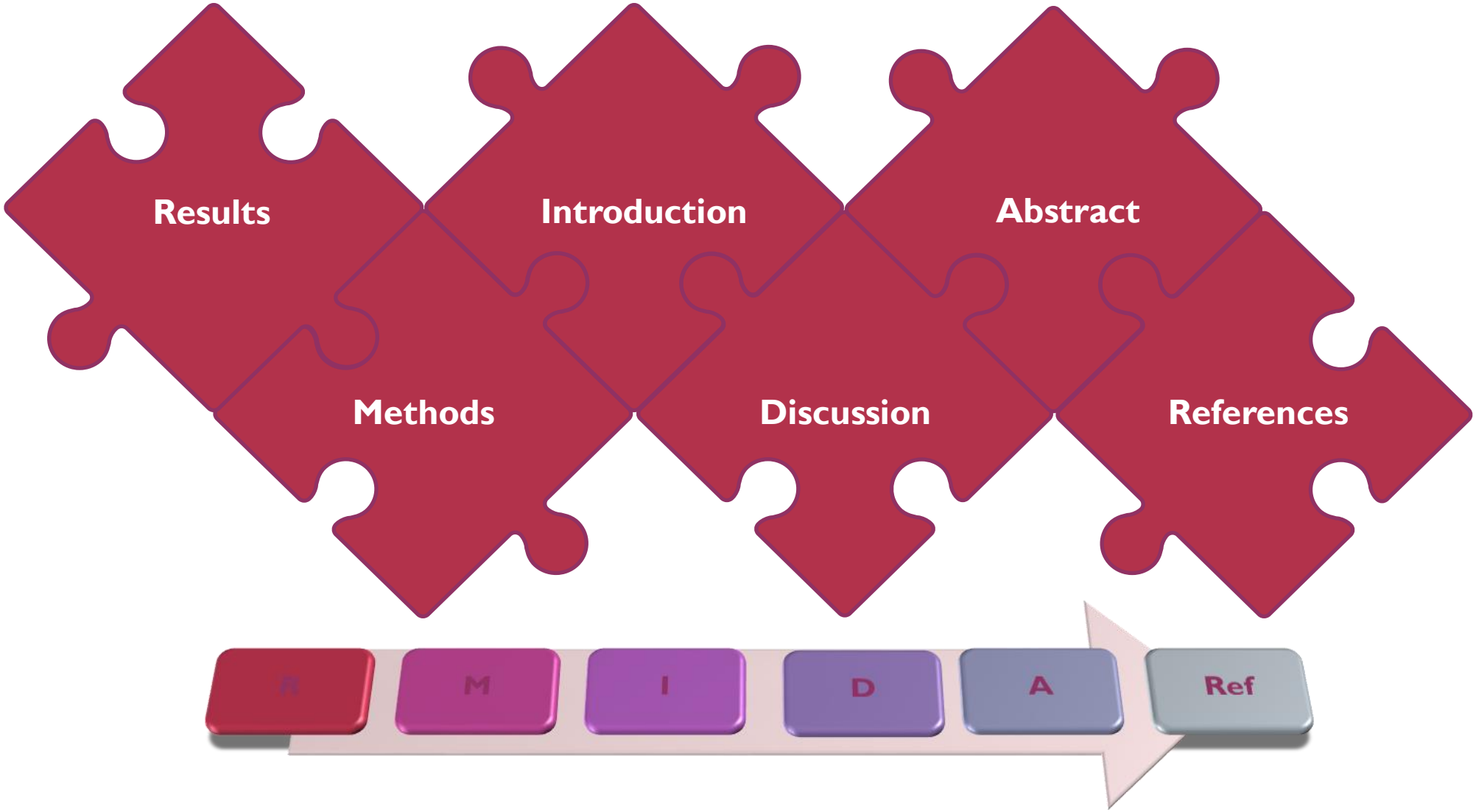
4-Match your content to your readers' knowledge.

5-Keep information specific rather than general.

6-Write in plain language. Keep your sentences short.

7-Use tables, diagrams, flowcharts and graphs.

ORDER OF WRITING?



MORE READING

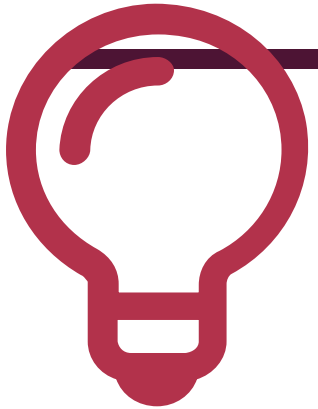
- Hall GM, ed. How to write a paper. London: BMJ Publishing Group.
- Advanced Writing, Floresita V.Bustamante, SAMT
- Essentials of Writing Biomedical Research Papers, Zeiger
- Scientific Writing Easy when you know how. Peat J. BMJ Publishing Group. 2002.
- The Vancouver Group. Uniform requirements for manuscripts submitted to biomedial journals. www.icmje.org

TITLE

"THOUSANDS READ TITLES, FEW READ PAPERS."

TITLE

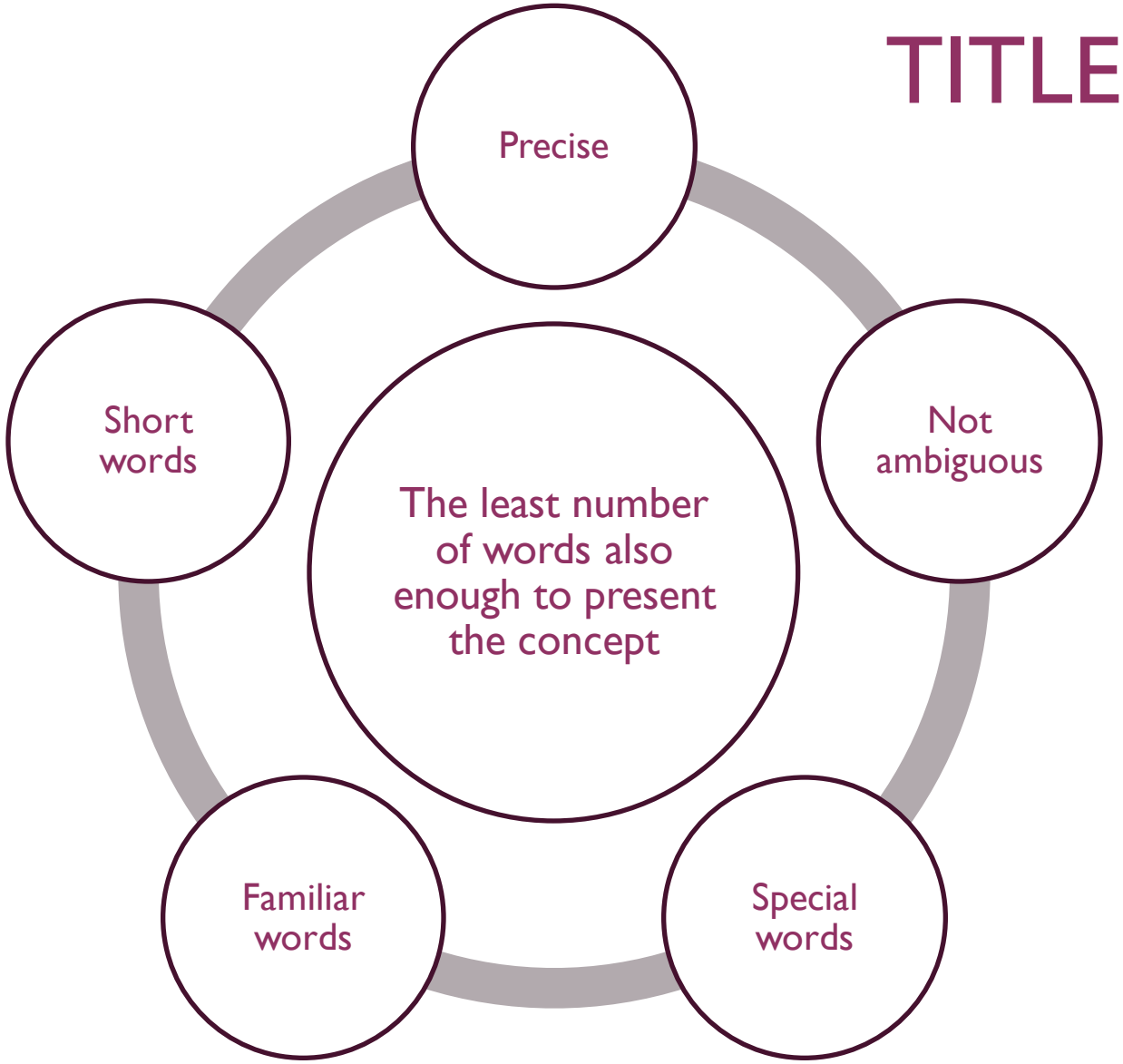
- First & most of the times the only part of an article that readers and editors see and read.
- Key elements that advertises the paper's contents
  - Informative and Specific
- Maybe helpful to choose the title when the paper is complete



TITLE

- Short and simple
- State subject, not conclusion
- Include study design
- Include time and place if necessary
- Begin with a keyword
- Avoid abbreviations
- Remove empty phrases such as " A study of…"
- Use Subtitles (notice number of words) "Exercise and Coronary Heart Disease: Framingham Offspring Study"

TITLE


Precise
Not ambiguous
Special words
Familiar words
Short words
The least number of words also enough to present the concept

TITLE

- Its better to start your title with keywords; To have a good title, you should have your key and principle words connected by conjunctions.

1- Aortic Stenosis ,Von Willebrand Factor , and Bleeding .

"Acquired Von Willebrand syndrome in Aortic Stenosis .

2-"Risk of Bacterial Meningitis in Children with Cochlear Implants.

TITLE

- **Some times its better to use questions in your title; It could be more attracting**

1-" Do Bisphosphonates Make Children's Bones Better or Brittle ?"
2-" Use It or Lose It –Do Effortful Mental Activities Protect against Dementia?"
3-" Behind the Research : Death by Voluntary Dehydration –What the Caregivers Say ?"

Routine suggestions for titles:

- Concise and precise
- Informative and descriptive
- Not misleading or unrepresentative
- Specific – for example, include type of study and numbers (if large)
- Words appropriate for classification
- Interesting not dull

& FINALLY CHECK:

- Is it accurate?
- Is it in any way misleading?
- Does it contain essential key words?
- Is it interesting?

A	Q
~~بيماران~~ **علائم باليني**	بررسي بيماران MS مراجعه كننده به مركز آموزشي – درماني امام رضا تبريز-۱۳۸۸
عوامل **آموزشی**	بررسي عوامل موثر بر رضايت دانشجويان از اساتيد

Mobilizing Informational Social Capital in Cyber Space: Online Social Networks and Knowledge Sharing

- Not clear what will be in paper
- Multiple possibilities presented in title

Rewrite: Online Social Networks and Knowledge Sharing

Knowledge Acquisition Through Computer-Mediated Discussions: Potential of Semantic Network Representations and Effect of Conceptual Facilitation Restrictiveness

- Too long
- Tries to say everything that is in paper

Rewrite : Semantic Network Representations for Knowledge Acquisition in Computer-Mediated Discussions

Affiliation

Example:

...,TABRIZ UNIVERSITY OF MEDICAL SCIENCES
,TABRIZ,IRAN

ABSTRACT

ABSTRACT

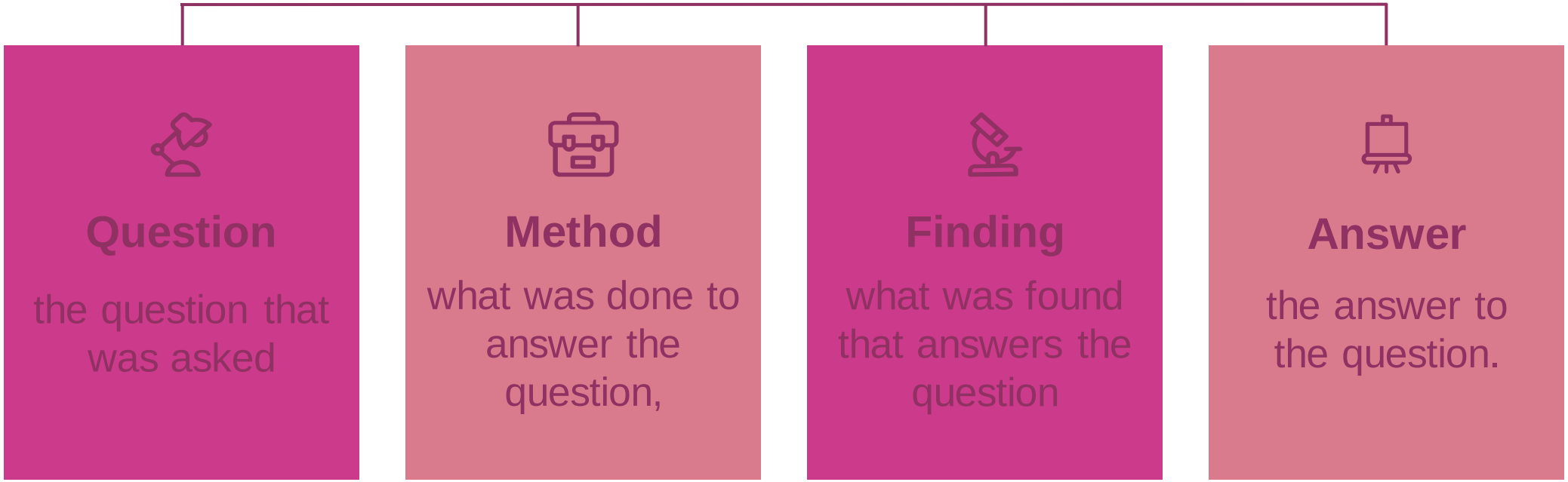
- An overview of the paper.
- Should make sense both when read alone and when read with the paper
- The overview should present the main story and a few essential details of the paper for readers who read only the abstract and should serve as both a clear preview and a clear, accurate recapitulation of the main story for readers who read the paper.

AN ABSTRACT …

- Summarizes the major findings in the broad context of the work
- Consists of two or three sentences of topic introduction
- Selected results (not all but the most important)
- Concludes with implications of work

- The abstract should be neither vague and general on the one hand nor fussily detailed on the other. It should be specific and selective.

THE ABSTRACT OF A PAPER SHOULD STATE CONCISELY:



LENGTH OF AN ABSTRACT

- Most journals limit the length of the abstract (usually to 250 words or less) "Uniform Requirements for Manuscripts Submitted to Biomedical Journals"
- For un-structured abstracts, limit the abstract to 150 words or less.
- If no limit is stated, make your abstract no longer than the abstracts in recent issues of the journal.

IN SUMMARY:

- The abstract should provide an overview of the main story and a few essential -details.
- The abstract should be clear both to
  - readers who read the paper
  - readers who do not read the paper.

STRUCTURED ABSTRACT

Like IMRaD in an article;
though it depends on the journal.

IMRAD :

Introduction
Methods
Results
And
Discussion

IN UNSTRUCTURED METHOD :

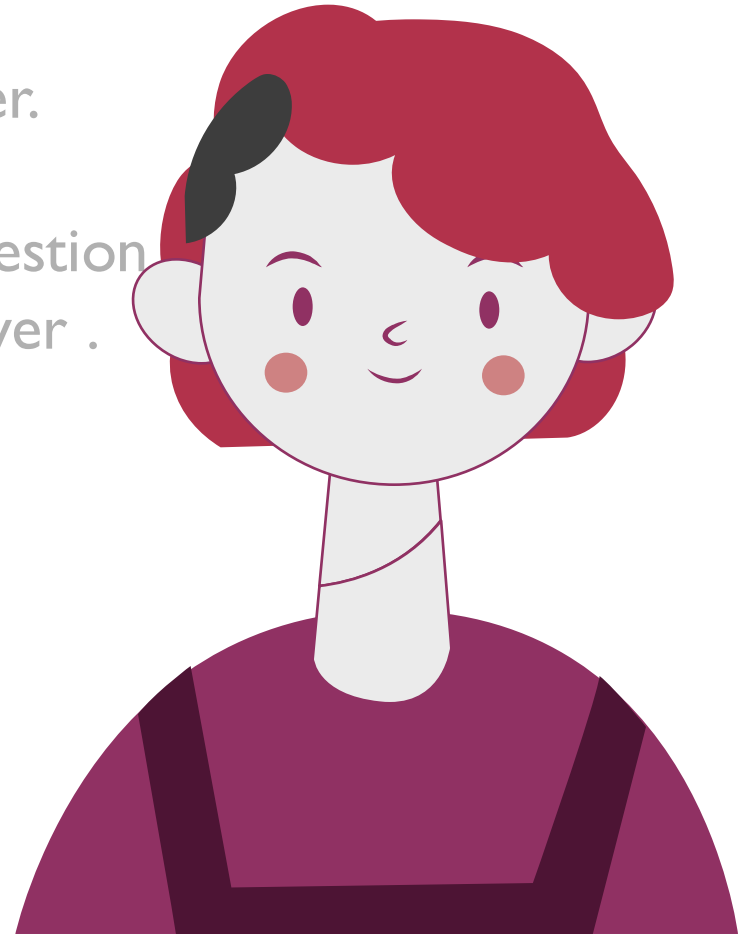
- Write the abstract as one paragraph.
- Use the techniques of continuity to make the paragraph flow.
- Use signals to indicate the parts of the abstract.

- Signal what you found by "**We found that**" or something similar.
- Signal the answer by "**We conclude that**" or "**Thus**" or something similar.
- Signal implications by "**We suggest that**" or something similar.
- The question and what was done can usually be written in one sentence in the form "**To determine X, we**. ..." . If the question and what was done are in separate sentences, use signals such as "**We asked whether**. .." (question) and "**To answer this question, we**. .." (what was done).

✓ Use past tense verbs to state what was done and what was found.

✓ Use present tense verbs for the question and the answer.

✗ Be careful not to omit the question, not to state the question vaguely, and not to state an implication instead of the answer .



ABSTRACT WRITING

To ensure that the question is specific rather than vague:

- Check the question against the answer
- Use the same key terms for the independent and dependent variables
- Keep the same point of view
- To anticipate the answer , use the same verb in the question as in the answer

- If you give a *p* value, also give data (for example, mean(SD) and the sample size *(n)*.

ABSTRACT WRITING

- Write short sentences.
- Use simple words. Avoid jargon. Avoid abbreviations. Keep the abstract short.
- Omit less important information (experimental preparation, confirmatory results, comparisons with previous results, data for less important variables, definitions, background, implications).

- Omit details [unnecessary details of methods, exact data (give percent change), *p* values, "significantly"].
-
- Avoid repetition (use a category term in what was done and name the variables in what was found; state "mean ::t SD" only once).

- Use active voice instead of passive

ABSTRACT WRITING

- Omit unnecessary words
  - use "Thus" instead of "We conclude that“
  - use an adjective or an apostrophe instead of an "of' phrase: for example, "*ductal* rings" instead of "rings of ductus arteriosus," "*rings*' sensitivity" instead of "sensitivity of the rings";
  - do not omit "a," "an," or "the" when they are necessary).
- *Exceptions*

If the journal to which you are submitting a paper requests a different form for the abstract, follow the requested form.

- Select terms that you would look up to find your own paper and that would attract the readers you hope to reach.
- Select current, specific terms, preferably medical subject headings (MeSH), that name important topics in your paper .
- Use phrases as well as single words.
- If the journal asks you to supply only terms that are not in the title of the paper, do so
- If necessary, include a term as an indexing term even if the term does not appear in your paper .

CHECK LIST FOR ABSTRACT

- Background, Methods, Results, Discussion?
- Key features mentioned?
- Anything that does not appear in full text?
- Results in words?
- Conclusion: justified? objective?
- Meaningful interpretation
- Follows the guidelines

COMMON MISTAKES IN ABSTRACT

- Too much background or methods information
- Figures or images
- References to other literature, figures or images
- Abbreviations or acronyms

A POORLY WRITTEN ABSTRACT

Article Title: Elements of an Optimal Experience
Authors: Shall remain unnamed

Abstract

This paper presents and assesses a framework for an engineering capstone design program. We explain how student preparation, project selection, and instructor mentorship are the three key elements that must be addressed before the capstone experience is ready for the students. Next, we describe a way to administer and execute the capstone design experience including design workshops and lead engineers. We describe the importance in assessing the capstone design experience and report recent assessment results of our framework. We comment specifically on what students thought were the most important aspects of their experience in engineering capstone design and provide quantitative insight into what parts of the framework are most important.

Critique:

1. This abstract begins well with a concise statement of the objectives of the paper, but then wanders from good technical writing style from there.

2. The abstract is written in the first person (e.g. "We explain…", "We discuss…", "We comment…", etc.).

3. No results are presented. This poorly written abstract describes only the organization of the paper.

Example:

"Next, we describe… We comment specifically on what students thought were the most important aspects of their experience in engineering capstone design…"

Instead, the abstract should summarize the actual results and how they were obtained.

Example:

"A statistical analysis was performed on answers to survey questions posed to students enrolled in a capstone design course at Georgia Tech. The analysis showed that students thought the most important aspects of their experience in engineering capstone design were quality of the instructor and quantity of student/instructor interaction time."

A WELL WRITTEN ABSTRACT

Article Title: Women Engineers in Kuwait: Perception of Gender Bias

Authors: P.A. Koushi, H.A. Al-Sanad, and A.M. Larkin of Kuwait University

Abstract

The greatest obstacle to the development of policies for the curtailment of gender bias is lack of information on the scope and effects of the problem. This study represents an attempt to quantify attitudes toward gender bias among profession women engineers working in the State of Kuwait. The major findings that emerged were as follows: a) Since 1970, Kuwait has witnessed an enormous growth rate in the participation of women in higher education. b) With respect to the job-related factors of salary scale, professional treatment, responsibility, benefits, and vacation, a clear majority (68%) of the professional Kuwaiti women engineers surveyed expressed a feeling of equality with or even superiority to their male counterparts. c) The one job-related factor in which significant gender bias was found to be in operation was that of promotion to upper management positions. In this criterion, the women engineers surveyed felt "less than equal" to their male colleagues.

Critique:

1. This abstract begins with a succinct statement of the problem and the objective of the paper.

2. Overall results are clearly presented.

HOW TO WRITE INTRODUCTION ?

INTRODUCTION

Before you begin,
answer the basic questions:

- What do I have to say?
- Is it worth saying?
- What is the right format?
- Who is the audience?
- What is the right journal?

Knowledge

Existing state of knowledge

Gaps

Gaps in knowledge which research will fill.

Purpose

State what you Intend to do & the purpose of article

References

Give pertinent references

Rationale

Summarize the rationale for study or observation

Abbreviations

Define specialized terms or abbreviations you want to use

General, concise description of problem

- background to the work
- previous research

Where that work is deficient

- how your research will be better

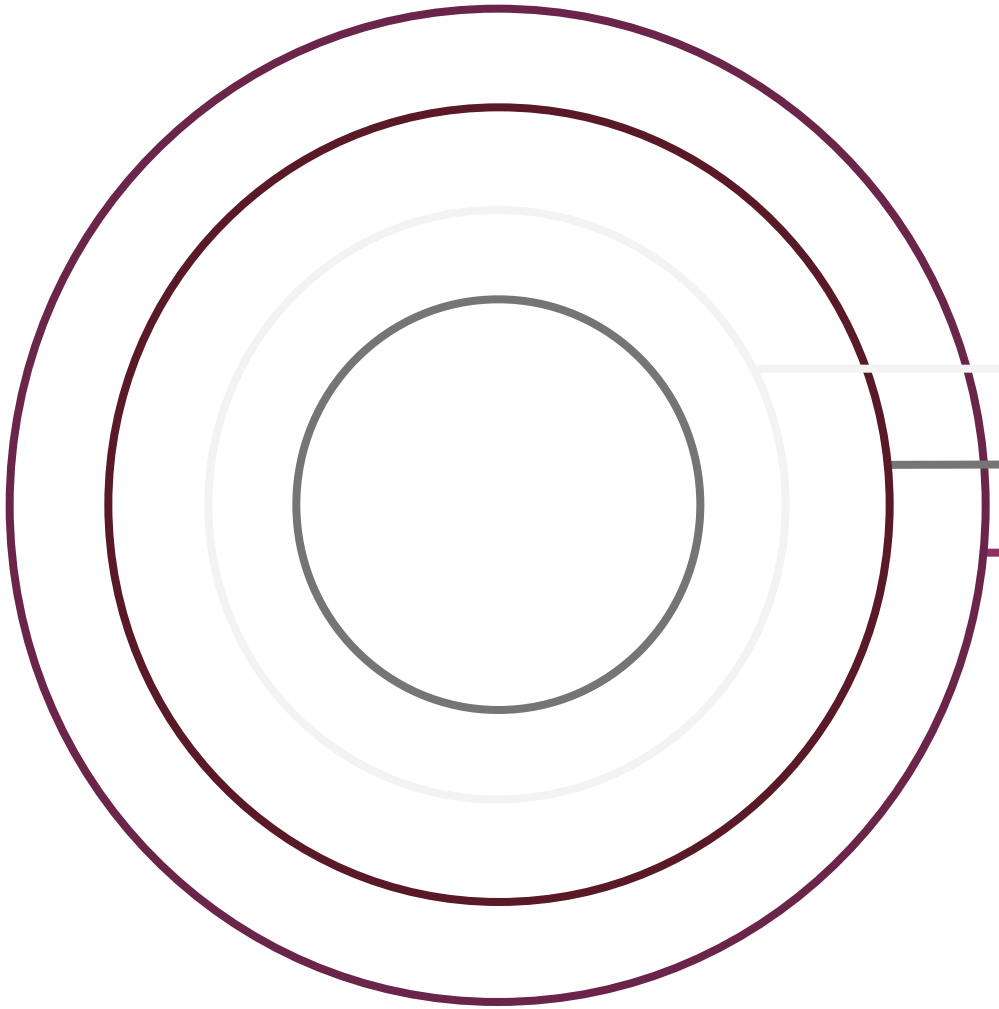
About 3 to 4 paragraphs

State the hypothesis

INTRODUCTION

- Don’t make it a review article
- Don not include methods, results and discussion
- Don’t put down every all previous studies & their data gaps
- Don’t explain pathophysiology irrelevant to your study

PARAGRAPHS



What we know

What we don’t know

Why we did this study

INTRODUCTION

- Tell why you have undertaken the study
- Clarify what your work adds
- Follow the best advice
- Keep it short
- Make sure you are aware of earlier studies
- Tell about importance of your study
- Don’t baffle your readers
- Give the study design
- Think about using journalistic tricks

- The structure should funnel down from a broad perspective to a specific aim.

To write an effective introduction you must:

- Know your audience
- Keep it short
- Tell readers why you have done the study
- Explain why it is important
- Convince readers that it is better than others
- Try to hook them!

The invention of Braille was a major turning point in the history of disability. The writing system of raised dots used by visually impaired people was developed by Louis Braille in nineteenth-century France. In a society that did not value disabled people in general, blindness was particularly stigmatized, and lack of access to reading and writing was a significant barrier to social participation. The idea of tactile reading was not entirely new, but existing methods based on sighted systems were difficult to learn and use. As the first writing system designed for blind people's needs, Braille was a groundbreaking new accessibility tool. It not only provided practical benefits, but also helped change the cultural status of blindness. This essay begins by discussing the situation of blind people in nineteenth-century Europe. It then describes the invention of Braille and the gradual process of its acceptance within blind education. Subsequently, it explores the wide-ranging effects of this invention on blind people's social and cultural lives.

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HOW TO WRITE

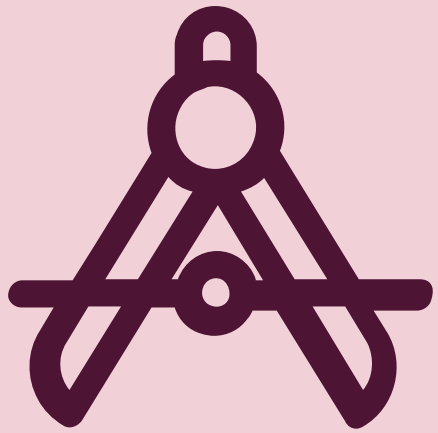
METHODS

METHODS

- Allows reader to judge the quality of the work
- Identifies weaknesses
- Allows repetition of the study
- State the study design & specifications

METHODS

- WWWWWH (who, what, where, why, when & how?)
- Define variables
- Patient/Participants inclusion
- Dates
- Randomisation/Placebo/Blindness
- Ethics/consent
- Treatments
- Statistical methods & power



METHOD …

- Reason for selecting the design of the study.
- Statistical methods used for analysis.
- If standard techniques is used, give appropriate reference, any modifications should be clearly explained.
- If new techniques is used, give validity and reliability measures

WHAT TO INCLUDE IN THE METHODS SECTION

How the study was designed

How the study was carried out

- How the participants were recruited and chosen
- Give reasons for excluding participants
- Consider mentioning ethical features
- Give accurate details of materials used
- Give exact drug dosages
- Give exact form of treatments

How are they grouped

Nụmbers

Informed consent obtained

Criteria

- Ethical approval
- Questionnaires
- Interventions
- Clinical assessments
- Proper references

IN CLINICAL TRIALS

- Precise details of the interventions **intended** for each group and how and when they were **actually** administered.
- Clearly defined primary and secondary outcome measures and,
- Methods of enhancing the quality of measurements (multiple observations, training of assessors).
- interim analyses and stopping rules

In Clinical Trials

- Method used to generate the **random allocation sequence**, including details of any restriction (e.g., blocking, stratification).
- Method used to implement the **random allocation sequence** (e.g., numbered containers or central telephone),
- Concealment
- **Who** generated the allocation sequence,
- **who** enrolled participants
- **who** assigned participants to their groups.

1. Participants
2. those administering the interventions
3. those assessing the outcomes
4. Those analyzing the findings
5. If done, how the success of blinding was evaluated.

- Study design
- Inclusion/exclusion criteria
- Clear definition of the participants
- logical & chronological order
- Measurements
- Sample size
- statistical analyses
- New techniques validation

Could the reader reproduce your study from the details provided?

Sample 1: In preparing the catecholase extract, a potato was skinned, washed, and diced. 30.0 g of the diced potato and 150 ml of distilled water were added to a kitchen blender and blended for approximately two minutes. The resulting solution was filtered through four layers of cheese cloth. The extract was stored in a clean, capped container.
Four individually labeled spectrophotometer tubes were prepared using different amounts (as represented in Table 1) of the following reagents: a buffer of pH 7, a 0.1% catechol substrate, and distilled water. The wavelength of the Spectronic 20 spectrophotometer was set at 540 nm. To calibrate the specrophotometer at zero absorbance, a blank control tube prepared with no catechol substrate and labeled "tube 1" was inverted and inserted into the spectrophotometer. It is important to note that the extract to be tested was added to each tube immediately before placing the tube into the spectrophotometer. 1.0 ml of catecholase extract was pipetted into tube 2. Tube 2 was immediately inverted and placed in the spectrophotometer. The absorbance was read and recorded for time zero (t0), the ten minute mark (t10), and each minute in between. Tube 2 was removed from the spectrophotometer and the same measurements were taken for tube 3 and tube 4 using the same protocol.

Sample 2: A potato and a knife were obtained for this experiment. Also, distilled water, a blender, cheese cloth, a clean container with a cover, and eight spectrophotometer tubes were used. A Spectronic 20 spectrophotometer was used for this experiment, as were buffers of pHs 4, 6, 7, and 8. Catechol substrate, Parafilm coverings, KimWipes, a black pen, and pipettes were also obtained for this experiment. Finally, a pencil and pad were obtained for recording results.

Sample 3: In preparing the catecholase extract, a potato was skinned, washed, and diced. A balance was used to obtain 30.0 g of the diced potato. 150 ml of distilled water was poured into a beaker. The water was added to the diced potato. The cover of a kitchen blender was removed. The potato and water were added to the blender. The solution smelled like potato. The cover was placed on the blender and the power button was depressed. The clock was observed until the second hand circled twice. The power button was pushed again to stop the blender. The resulting solution was filtered through four layers of cheese cloth. The extract was stored in a clean, capped container

HOW TO WRITE RESULTS

RESULTS

Simple → complex

- Describe the population
- Start with positive findings
- Establish how comparable your groups were
- Use a mixture of text, tables and figures
- Mention units of measurement
- Mention what numbers, brackets, etc. refer to
- Bring the P values

RESULTS

Provide only enough interpretation to lead the reader from one experiment to the other

Avoid lengthy analysis and comparison to the work of others

No need to follow chronology of study

Rather, provide a logical progression and tell a story

- Do not compare the present data with previously published results.
- Write the text of the Results section concisely and objectively.
- The passive voice will likely dominate here, but use the active voice as much as possible.

TABLES AND FIGURES

- Consider using a table to present large amounts of data/results.
  - Must refer to all tables in text.
- Use figures to graphically represent significant results.

RESULTS

Use the "Stand alone" tables

Make sure totals add to 100%

Do not repeat the Tables and Figures in text

- Summarize: e.g., there were no significant associations…
- Describe: e.g. there was a three fold increase in the risk of ..

TABLES AND FIGURES

- Each Table or Figure must include a brief description of the results being presented and other necessary information in a legend.
- **Table legends go above the Table**; tables are read from top to bottom.
- **Figure legends go below the figure**; figures are usually viewed from bottom to top

Tables and Figures

- Tables and Figures are assigned numbers separately and in the sequence that you will refer to them from the text.
  - The first Table you refer to is Table 1, the next Table 2 and so forth.
  - Similarly, the first Figure is Figure 1, the next Figure 2, etc.
- When referring to a table *from the text*, "Figure" is abbreviated as Fig., e.g., Fig. 1.
- Table is never abbreviated, e.g., Table 1.

Table number and descriptive title at top

Headings state what the numbers *are*

Table 3. Chi-square test for distorted segregation of genotypes in maize, based on AFLP markers

Marker	Genotype		Total	χ^2
	AA and AB genotype	BB		
Aggcat850	132	98	230	9.51**
Acggcc975	121	109	230	15.38**
Catgcc625	31	199	230	4.07*
Agcctc900	201	29	230	4.71*
Aggctt725	23	207	230	6.90**
Gaccac700	205	25	230	6.12**
Acacag670	137	93	230	7.31**
catcag500	27	203	230	5.39*
catctc575	126	104	230	27.20**

$\chi^2_{0.05,1} = 3.84$; $\chi^2_{0.01,1} = 6.63$; * significant at $P < 0.05$; ** significant at $P < 0.01$

Horizontal rules mark top & bottom of table and separate head from body

Additional explanation in footnotes

No horizontal or vertical rules in body of table

Numbers aligned at decimal point

Table 3. ANOVA Table for Two-Way Anylysis of Variance

Source	DF	Mean Square	*F*-Value	Prob > *F*
Between Subjects				
Treatment	2	315.20	5.3	0.003
Error	70	67.90		
Within Subjects				
Time	1	128.30	7.6	0.003
Time x Treatment	2	95.36	5.6	0.006
Error	70	16.30		

FIGURES

- Used when we want to distinguish a result & make it prominent into readers view
- Figures are visual presentations of results, including graphs, diagrams, photos, drawings, schematics, maps, etc.
- Graphs are the most common type of figure.
- Graphs show trends or patterns of relationship.

Figures

- Avoid clutter (too many numbers & symbols)
- Should provide a clear statistical message
- Vertical ("Y") axis: outcome/dependent variable
- Horizontal ("X") axis: exposure/independent variable
- Name & define each axis
- Give the measurement unit of each axis

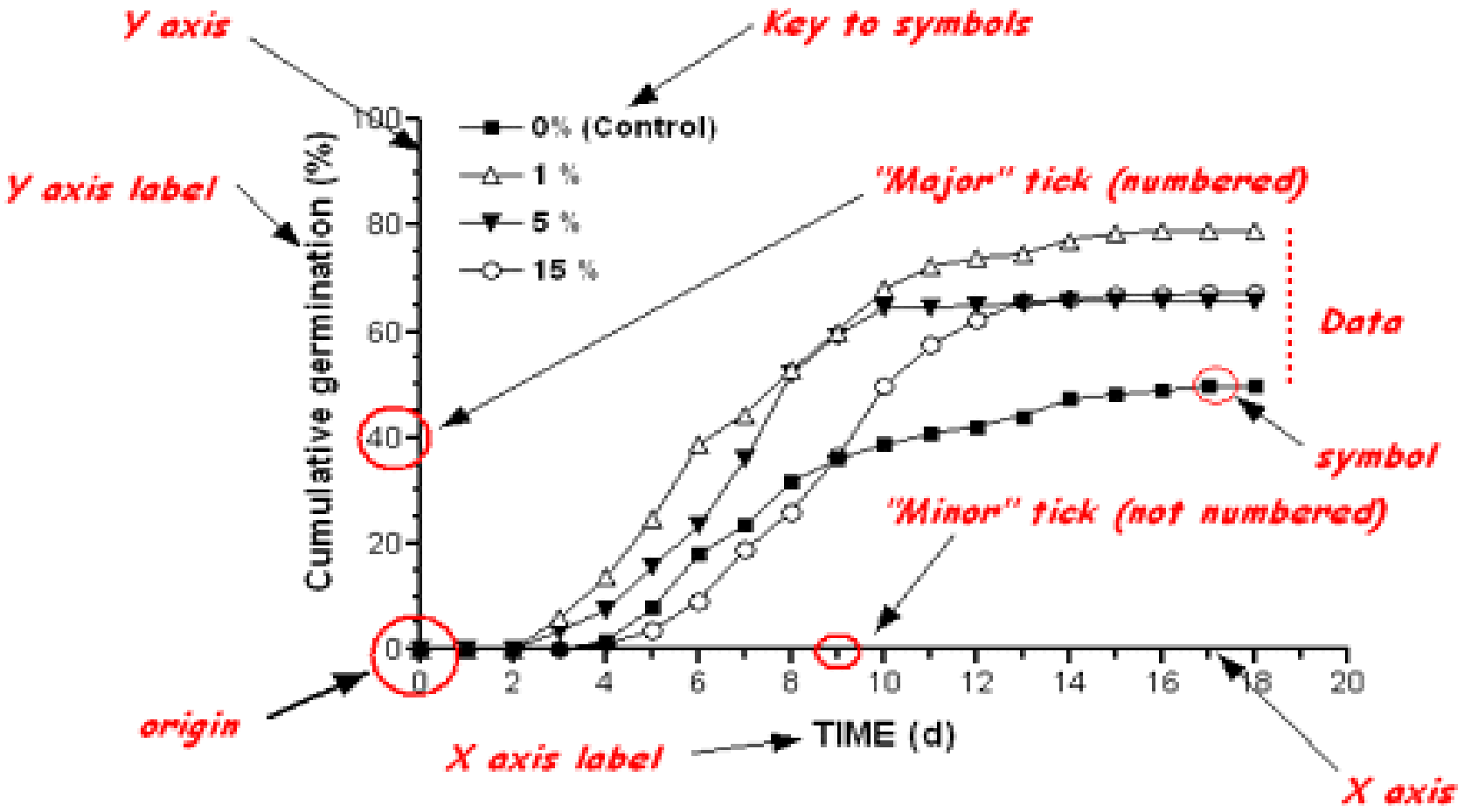


Figure 1. Cumulative germination of *Chenopodium* seeds after pregermination treatment of 2 day soak in NaCl solutions. n = 1 trial per treatment group (100 seeds/trial.)

legend

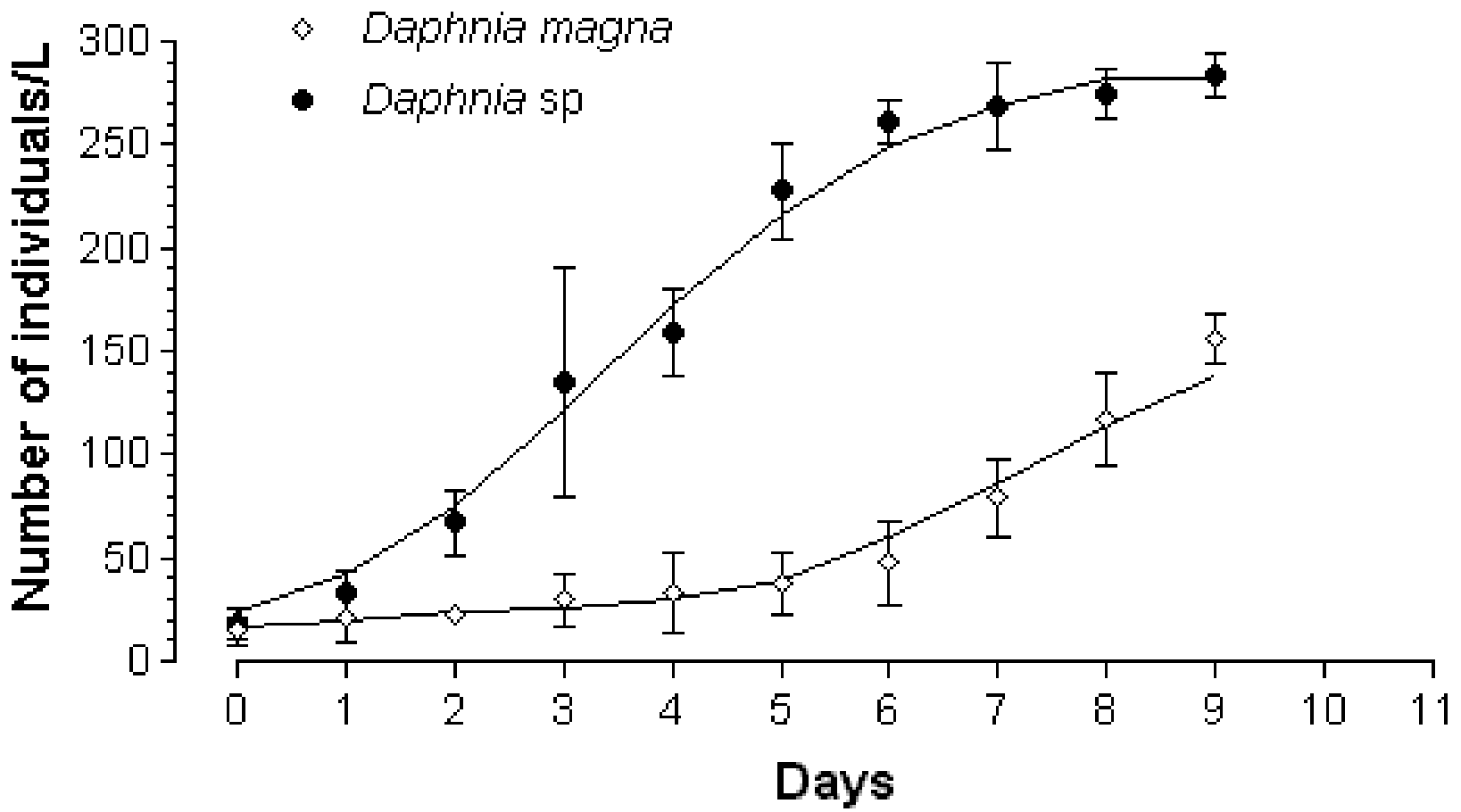


Figure 2. Mean population density (±1 standard deviation) of two species of *Daphnia* following artificial eutrophication of a small farm pond by application of organic fertilizer. Six replicate 1 L water samples were drawn from 50 cm depth at 1100 hr each day.

- Raw data
- Redundancy
- Discussion and interpretation of data
- No figures or tables
- Methods/materials reported

Figure: *Before*

Figure 1. Effect of total alkaloid fraction of methanolic extract on mean survival time

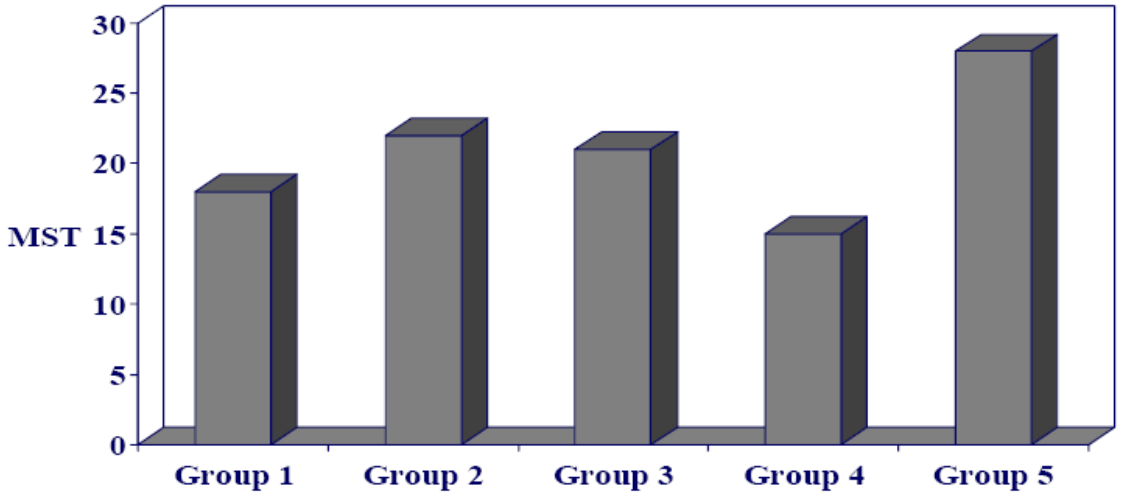


Figure: *After*

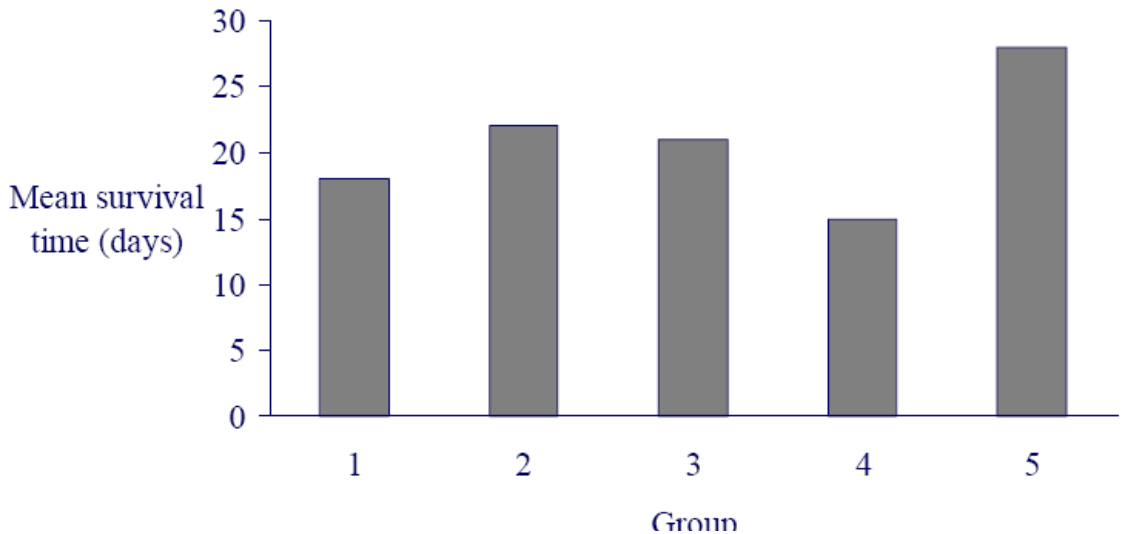


Figure 1. Effect of total alkaloid fraction of methanolic extract of unripe fruit of Solanum pseudocapsicum on mean survival time (MST) in tumor bearing mice.

Figure: *Example*

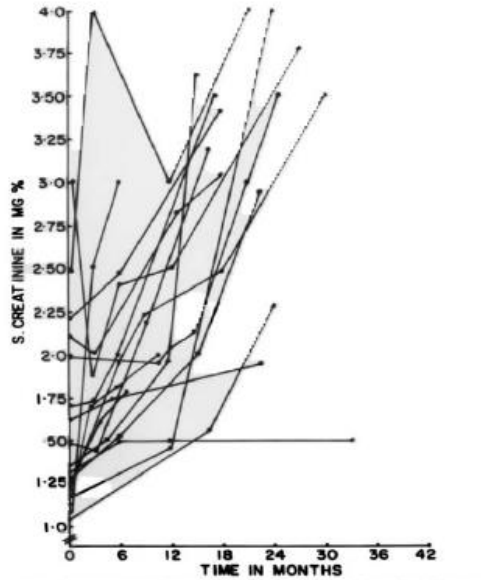


FIG. 2 : S. CREATININE LEVELS ON FOLLOW-UP IN GROUP I PATIENTS

SOMETHINGS TO AVOID !

- × Do not present the same data in both a Table and Figure - this is considered redundant and a waste of space and energy.
- × Decide which format best shows the result and go through it.
- × Do not report raw data values when they can be summarized as means, percents, etc.

NOT

- Use big words that you do not really mean
  - Attributable
  - Causality
  - Preferential
  - Significant (without statistical evidence)
  - Validity
- Mix incidence and prevalence
- Mix frequency, rate, proportion, ratio

STATISTICAL FINDINGS

- For each primary and secondary outcome, a summary of results for each group, and the estimated effect size and its precision (e.g., 95% confidence interval).
- Address multiplicity by reporting any other analyses performed, including subgroup analyses and adjusted analyses, indicating those prespecified and those exploratory

EXAMPLE

A two-sample *t* test was used to test the hypothesis that higher social distance from environmental problems would reduce the intent to donate to environmental organizations, with donation intention (recorded as a score from 1 to 10) as the outcome variable and social distance (categorized as either a low or high level of social distance) as the predictor variable. Social distance was found to be positively correlated with donation intention, $t(98) = 12.19$, $p < .001$, with the donation intention of the high social distance group 0.28 points higher, on average, than the low social distance group (see figure 1). This contradicts the initial hypothesis that social distance would decrease donation intention, and in fact suggests a small effect in the opposite direction.

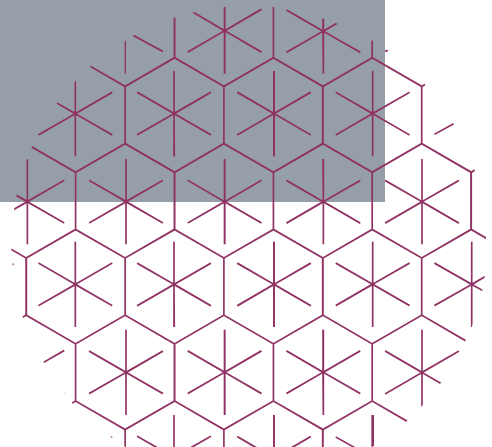
.

IN RESULTS

- Tell a story
- Use the most logical sequence to present the data (not necessarily the order in which you did the experiments)
- Just report the data - do not include interpretation or comparison to literature
- No duplication of data

Guidelines for Writing Results

- Specify the dates of the study
- Provide a schematic summary
- Describe the characteristics of each group
- Indicate if the sample is representative
- Indicate if randomization was successful
- Describe duration and nature of follow up



THE STUDY OUTCOMES

- Present the results for all primary endpoints
- Report statistical findings in detail
- Report actual p values , 95% CI , etc.
- Report the main findings in figures or tables, ***you don't need to also report them in the text***
- Report confounders

A FEW RULES. I

- The first time you use an abbreviation, define it
- When you give the commercial source for a reagent, the first time you cite the source include the location of the company (city and state)
- Make sure the subject and verb agree in every sentence
- No exclamation points!

A Few Rules.2

- Look for redundancy within the manuscript
- Try not to use “it” or “they” - be specific!
- No jargon
- Two shorter sentences are frequently much more effective than a long, complex sentence
- “Data” is plural not singular, i.e., “the data are…” NOT “ the data is…”

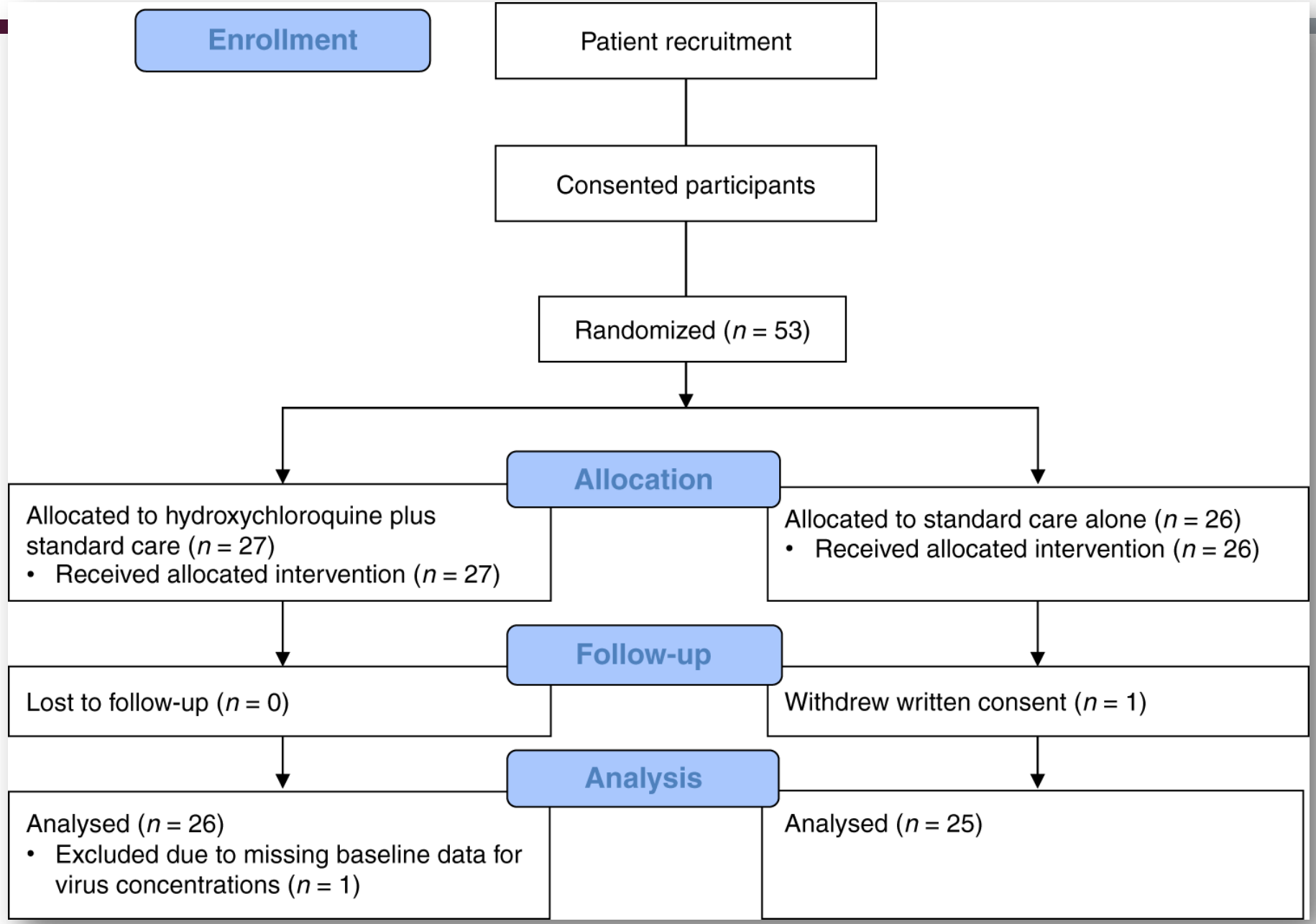
A Few Rules.3

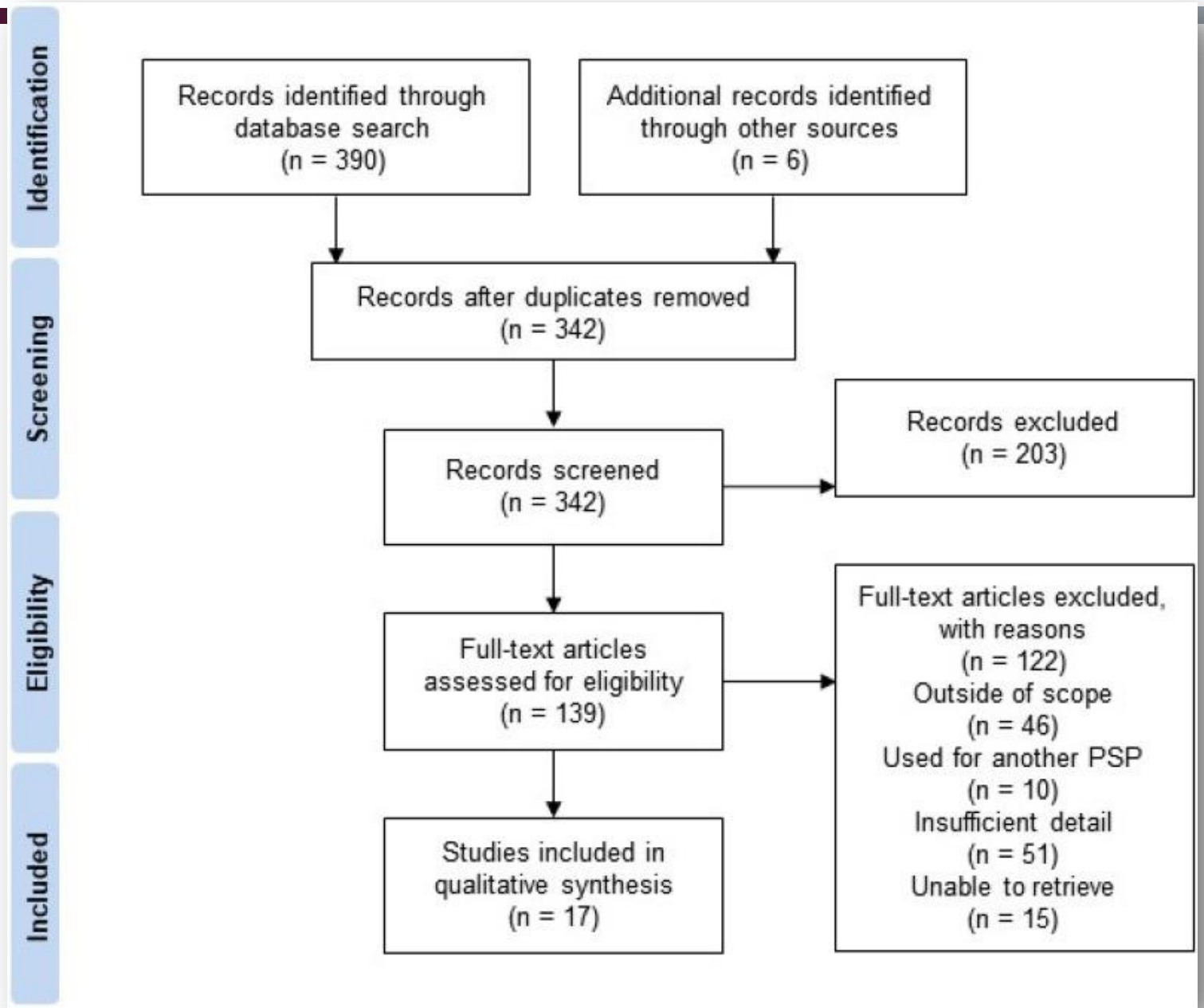
- Capitalize people's names
- Never, ever plagiarize! (even from yourself!)
- Use numbers when expressing measurements, except when the number would begin a sentence

IN CLINICAL TRIALS:
PARTICIPANT FLOW

Flow of participants through each stage (a diagram is strongly recommended).

- Specifically, for each group report the numbers of participants randomly assigned, receiving intended treatment, completing the study protocol, and analyzed for the primary outcome.
- Describe protocol deviations from study as planned, together with reasons.


Enrollment
Patient recruitment
Consented participants
Randomized (n = 53)
Allocation
Allocated to hydroxychloroquine plus standard care (n = 27)
• Received allocated intervention (n = 27)
Allocated to standard care alone (n = 26)
• Received allocated intervention (n = 26)
Follow-up
Lost to follow-up (n = 0)
Withdrew written consent (n = 1)
Analysis
Analysed (n = 26)
• Excluded due to missing baseline data for virus concentrations (n = 1)
Analysed (n = 25)


Identification
Screening
Eligibility
Included
Records identified through database search (n = 390)
Additional records identified through other sources (n = 6)
Records after duplicates removed (n = 342)
Records screened (n = 342)
Records excluded (n = 203)
Full-text articles assessed for eligibility (n = 139)
Full-text articles excluded, with reasons (n = 122)
Outside of scope (n = 46)
Used for another PSP (n = 10)
Insufficient detail (n = 51)
Unable to retrieve (n = 15)
Studies included in qualitative synthesis (n = 17)

- Baseline data provided?
- Primary and other endpoints clear and complete?
- Does the text complement figures and tables?
- Are measures of uncertainty mentioned?

REMEMBER …

- Number of participants (denominator) in each group included in each analysis and whether the analysis was by "intention-to-treat."
- State the results in absolute numbers when feasible (eg, 10/20, not 50%).
- All important adverse events or side effects in each intervention group.

SAMPLE OF QUALITATIVE RESULTS SECTION

[Introductory Context] At the end of the data collection, 131 stakeholders participated in the survey. The respondents were distributed by countries as follows: 29 from the Federation of Bosnia and Herzegovina (22.1% of the total), 38 from Croatia (29.0%), 28 from Serbia (21.4%) and 36 from Slovenia (27.5%). [...]

[Important Finding] The results show that, for most stakeholders, the most important category of WES is regulating services (w = 0.3202), followed by provisioning services (w = 0.3064) and supporting services (w = 0.2209). Cultural services, on the other hand, are of low importance compared to the other three categories (w = 0.1524) (Table 1).

[...] [Important Finding] The four most important WES provided by forests are as follows: soil erosion reduction (mean value of 4.65), surface runoff reduction (4.54), clean drinking water provision (4.50) and habitat provision (4.50). Conversely, the two least important ecosystem services according to stakeholders are recreational opportunities (3.92) and maintaining genetic diversity (3.93) (Figure 1).

- [Interesting Finding] It is also interesting to note that stakeholders from the Federation of Bosnia and Herzegovina and Serbia placed a higher value on cultural services than those from Croatia and Slovenia. For all groups of stakeholders, the consistency ratio (CR) is less than 0.05 (5%).

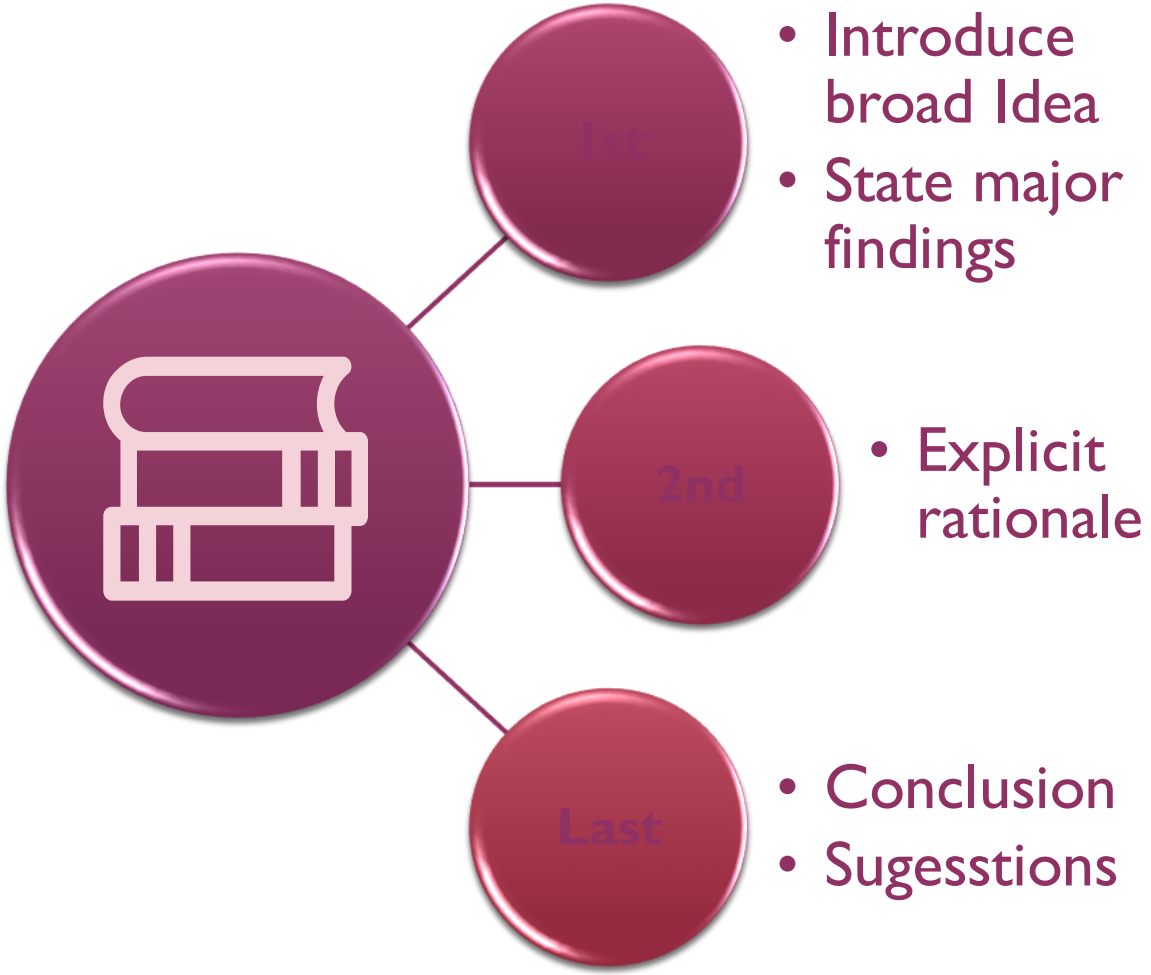
[...] [Summary of Key Findings] The results show that there are interesting differences between countries in terms of the level of involvement of different stakeholders. Respondents from Slovenia are the ones who consider a higher level of involvement of all stakeholders in PES schemes as a key element for their success. […] Respondents from Croatia, Serbia and Slovenia believe that tourism associations should be involved at the level of collaboration (31.6%, 32.1% and 38.9%, respectively), while respondents from the Federation of Bosnia and Herzegovina believe that these associations should only be informed.

How to Write the DISCUSSION

THE FUNCTION OF THE DISCUSSION IS:

- To write Briefly & summarize your principal finding
- Implications of your results for other researchers
- Interpret findings in light of the literature
- Reconcile findings with the literature
- Limitations of your study
- Conclusions

Paragraphs in Disscussion



- Introduce broad Idea
- State major findings

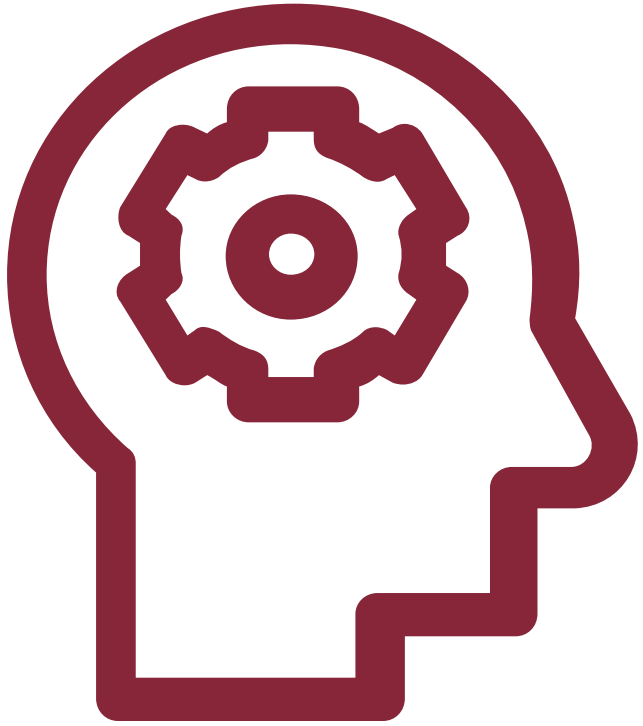
- Explicit rationale

- Conclusion
- Sugesstions

Mechanics of Writing the Discussion

- Construct parallel to results
- Interpretation of data
- Relate your results to the findings of other investigators
- Summary paragraph at end - include significance of results
- Avoid redundancy with results and introduction sections

Discussion



- Do your results provide answers to your testable hypotheses?
  - If so, how do you interpret your findings?
- Do your findings agree with what others have shown?
  - If not, do they suggest an alternative explanation or perhaps a unforeseen design flaw in your experiment (or theirs?)

Discussion

- Given your conclusions, what is our new understanding of the problem you investigated and outlined in the Introduction?
- If warranted, what would be the next step in your study, e.g., what experiments would you do next?

Discussion

- EXPLAIN WEAKNESSES, SHORTCOMINGS.
  BE FAIR: THIS WILL BUILD TRUST.
  DON'T OVER-CRITICIZE YOURSELF
  DON'T GO TO UNNECESSARY DETAILS.

Discuss The Results

- Organize the Discussion to address each of the experiments or studies for which you presented results.
- Discuss each in the same sequence as presented in the Results, providing your interpretation of what they mean in the larger context of the problem.

BUT …

Do not waste entire sentences restating your results; if you need to remind the reader of the result to be discussed, use "bridge sentences" that relate the result to the interpretation:

"The slow response of the lead-exposed neurons relative to controls suggests that...[interpretation]".

Discussion

Reverse of Introduction (pyramid)

Good discussions …

1. Address every key finding of the study
2. Present the finding in terms of what is known
3. State why this study is different
4. State why the results concur/ disagree with current knowledge
5. Justify differences
6. Point out future directions/ continued knowledge gaps

Style

- Use the active voice whenever possible in this section.
- Be concise and make your points clearly.
- Use of the first person is okay, but too much use of the first person may actually distract the reader from the main points.
- 2-3 paragraphs, <450 words

ASK YOURSELF :

HOW

would you change your experiment to make it better?

WHAT

new questions did this experiment make you think of?

IF

you made mistakes in your experimental design, did you discuss them and how to fix it for next time.

EXAMPLE 1

[Key finding] Our 20-year analysis of snakebites in California showed a well-correlated inverse relationship between snakebite incidence and severe drought phases, with a predictable increase of snakebites following precipitation.[Placing findings in context] This is in contrast to popular press reports of increased snakebites with drought conditions , and Central American research that reported increased incidence of snakebite during high temperatures of El Niño Southern Oscillation (ELSO).This study also analyzed the effect of altitude and precipitation on the periodicity of regional snakebites[…]

[…] and [Key finding] found that while climate changes had a predictable effect on incidence, snakebites clustered in regions with the highest precipitation [...] After accounting for seasonal trends, [Restating a key finding] we observed that prior precipitation was a strong predictor of snakebites, with incidence peaks following the heavy precipitation years of 2006 and 2011 […]

[Limitation] We cannot exclude the possibility that changes in the medical culture or technology of snakebite reporting may be a confounding variable. [Recommendation for follow-up research] While we believe these limitations have not impacted the primary outcome of the study, future work could seek to include additional controls.

EXAMPLE 2

[Key finding] Moose in the contiguous United States are considered highly vulnerable to climate change. [Key finding] Their cold-adapted morphology and physiology make them sensitive to increasing temperatures, and they experience particularly high exposure to warm temperatures at the southern edge of their range (Lenarz et al., 2009; Ruprecht et al., 2016; Weiskopf et al., 2019). [Key finding] Our habitat suitability models indicated that moose occurred in locally cooler areas within the Northeast, confirming that they select for cooler areas, even at this regional scale.

[Placing findings in context] Moreover, in many of these areas, at least 50% of days were warmer than previously-identified thresholds at which moose respiration rates begin to increase (McCann et al., 2013; Renecker & Hudson, 1986)...[Key finding] Our results show that temperature is associated with changes in habitat suitability and habitat use at multiple scales; however, it is not clear from our study whether these patterns are true adaptations (i.e., that they confer a fitness benefit).

[Limitation/placing findings in context] Our models are based on occurrence data and thus do not consider the effects of behaviour on other population-level differences, such as population density and reproductive rates (Hoy et al., 2018)... [Restating key findings] This study suggests that adaptive capacity might enable even sensitive species to persist in the face of rapid climate change. [Restating key findings] Our results highlight opportunities for decreasing moose vulnerability to climate change in the Northeast (e.g., through restoring and protecting thermal refuges such as closed-canopy forests or forested wetlands in warm areas, Wattles et al., 2018a)...

[Recommendation for follow-up research] Next steps include incorporating future changes in land cover and forest biomass, investigating interactions with co-occurring species (e.g., parasites, predators and white-tailed deer, Weiskopf et al., 2019), mapping climate change refugia that can be protected from other stressors to enable persistence of moose, and attempting to identify selective gene regions that have evolved to enable moose to persist in warmer condition.

HOW TO WRITE THE REFERENCES?

References

- Aim for about 30 references
- Use recent review papers where appropriate to decrease the number
- Get a hard copy of every reference in the manuscript and make sure the referenced paper says what you say it does! Don’t use abstracts!
- Proof-read the reference list especially carefully as one of your reviewers may be cited!
- Use EndNote or other bibliographic software
- Use the Internet

References

- Appropriate format
- Only 1 or 2 references per point
- Don’t over self-cite
- Avoid textbooks & conference abstracts.
- Avoid referencing to thesis & dissertations
- Avoid using the references list of your reference
- Select carefully, balance authors used

Main Important Referencing Styles

1 Author-Date Style

(Harvard Style)

2 Numeric Style

(Vancouver Style)

Author-Date Style system

In-Text citations

- Cite your sources within your text by giving the author's surname(s), year of publication, and (when appropriate) page numbers
- Examples:

1. Contrary to popular perception, violent crime has been shown to be decreasing (Johnson 2004)
2. James and Peters (2003) have argued that…

AUTHOR-DATE STYLE

REFERENCE LIST BIBLIOGRAPHY

All references are listed in author/date alphabetical order:

Example:

1. HOLLAND, M., 2002. *Guide to citing Internet sources* [online]. Poole: Bournemouth University. Available from: http://www.bournemouth.ac.uk/library/using/guide_to_citing_internet_sourc.html [Accessed 4 November 2002].
2. OXFORD ENGLISH DICTIONARY, 1989. 2nd ed. Oxford: Clarendon Press.
3. UNESCO, 1993. *General information programme and UNISIST*. Paris: UNESCO, (PGI-93/WS/22).
4. WISEMAN, S., ed., 1967. I*ntelligence and ability*. Harmondsworth: Penguin.

Numeric system

In-Text Citations

Each citation in the text is given a number in brackets.

Example:

- Ericson (1) and Milne (2) take the view that… but other authorities (3) argue that…

References are listed in number order in the bibliography, & cited by that number each time they are referred to in the text.

Reference List Bibliography

Example:

1. ERICSON, E.E., 1991. T*he apocalyptic vision of Mikhail Bulgakov's 'The Master and Margarita*'. New York: Edwin Mellen, p.153.
2. MILNE, L., 1977 . *'The Master and Margarita': a comedy of victory.* Birmingham: University of Birmingham, pp.62-3.
3. BARRATT, A., 1987. *Between two worlds: a critical introduction to 'The Master and Margarita'.* Oxford: Clarendon Press, p.96.

Each reference number points to a single reference only

References

- Check specific referencing style of journal
- Should reference:
  - Peer-reviewed journal articles, abstracts, books
- Should not reference:
  - Non-peer-reviewed works, textbooks, personal communications

THANKS

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