

# How to Write Materials and Methods

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# Objectives

- Understand the importance of materials and methods.
- Identify the contents of materials and method.
- Using subheadings of materials and methods section appropriately.
- Being able to identify and avoid common problems in writing materials and methods

# Exercise 1

- Draw a circle on the top of the paper and draw a star on the inner right corner of the circle you drew.
- Compare your drawing
- Comment on the information given

- “The key to a successful Methods section is to include the right amount of detail--too much, and it begins to sound like a laboratory manual; too little, and no one can repeat what was done.” *Successful Scientific Writing, 2nd ed.*

# Full Account vs. Methods

- **A Full Account is . . .**

- A description of every step actually used in the lab to achieve your results.
- Written in sequential or temporal order.
- Intended to tell the complete “story” of your work.

- **A Methods Section is . .**

- •A series of steps already completed and is written in past tense.
- Written in logical order.
- Intended for the reader to replicate the experiment.

- Background
- Aims and objectives
- Materials and Methods
- Results
- And Discussion

- Minor variations exist among different journals
- Subjects and methods
- Patients and methods
- Methods
- Methodology
- (Always check “instruction to authors” or “author guidelines”)

- Why is “materials and methods” is the most important part of a manuscript?
- Validity
  
- What is the main purpose of the “Materials and methods” section?
- repeatability



# The component of this section should compose the following:

- What was done?
- How was it done?
- How will the data be analyzed?
- Which type of study, location of the study, and period and duration of the study?

# When the study has been completed..

- The “materials and methods” is usually the first section to be written during manuscript preparation.
- In chronological order
- Passive voice and third person in the past tense is recommended for writing this section

- “The sample was incubated at 37°C for 3 days.” - NOT: “I incubate the sample at 37°C for 3 days.”

# Materials and methods

- Describe the materials, measures, equipment, or stimuli used in the experiment. This may include testing instruments, technical equipment
- The source population should be defined
- The sampling method used should be described in details

# Materials and methods

- Both inclusion and exclusion criteria used for recruitment of the study group should be clearly stated

# Materials and methods

- Selection of the control group and how they relate to the study group, should be described, e.g. matched by age, gender, ethnicity, clinical condition

# Materials and methods

- Details are important. For animal subjects details such as genus, species and strain, age, gender, nutritional state, physiological or pathological status (e.g. pregnant, castration); diet and name of supplier are expected.

# Materials and methods

- Methods in details
- Precision of measurements
- Statistical analysis
- All apparatus and equipment details (Like?)
- Drug or chemical details (Like?)
- Tissue details (like?)



- For evaluation:
- The method used should be comprehensively described for example,
- Number of observer
- Blinded or not
- Independent or by consensus
- The exact time period between readings
- Grading system
- How were evaluation recorded

# Medical research involving human subjects

- Approval from IRB or ethics committee is required for all studies involving humans, medical records, and human tissues.
- Informed consent from participants of the study should always be sought; if this is not possible, the IRB should decide whether this is ethically acceptable.

# Example : Ethical approval and informed consent from parents

- ..... The study protocol was approved by the hospital scientific and ethics committees. Written parental informed consent was obtained before randomization.

# Common problems

- Insufficient details of methodology
- Misplaced information
- Wrong statistical test used
- Providing irrelevant information

# The Structure of the Methods Section in a Research Paper

- **Design:**

- The type of design used in the experiment.
- Retrospective or prospective.
- Specify the variables as well as the levels of these variables.
- Identify your independent variables, dependant variables..

- **Settings:**

- Describe the place you recruited your participants from.
- Describe the system.

- **Participants**

- Describe those who were involved in the investigation (inclusion and exclusion criteria). Focus on the following criteria depending on the subject:

- Age

- Race

- Gender

- Education

- Describe the place or method the participants were recruited and if they were compensated.

- Do not use the term '*subject*.' The word '*participant*' is preferred



- **Data collection:**
- How did you approach the participants
- When?
- All-sufficient measures of the experiment
- The number of questions or statements
- The interpretation of the format (what the high and low results mean)
- The reliability of the materials
- Describe the process if you have created your own measure
- How the participants responded
- Need to discuss how the data was collected.
- Make sure that any other person will be able to repeat the experiment after your note

- **Data analysis:**
- Which test? Why? In what data? To determine what?
- Statistical package used and its version

- **Ethical consideration**

- The study protocol was approved by the...

- (reference number ...)

Thank you