Why We Write
To disseminate information
To share ideas, discoveries, and perspectives to a broader audience
Job security, requirements
Personal satisfaction, prestige
Research completion
To develop a fundable track record

How to begin
Do compulsive pre-study preparation
Critically read successful papers on the same topic
Develop the study question and hypothesis concisely
Write your results first; these are the heart of your message and drive everything else
Introduction must include the study question your results have answered
Methods must indicate how you derived your results
Discussion must argue the reasonableness of your results
Conclusions must answer the study question in light of the results obtained

General tips
Adhere to scientific and writing ethics
Indicate that the study had proper approvals
Be a responsible coauthor
Let the editor know about other similar submissions
Follow the instructions for authors
Apply research analytical principles to writing: if-then
The Abstract may be all that the reader looks at; make sure it is correct
The Introduction should justify why you did the study; make it intriguing
Be patient - centered and not numbers centered
Avoid emphasis of statistical significance at the expense of clinical significance
Write with vigor
Consider the active voice and be brief but complete
Write vividly
Describe exactly what you mean in specific and concise terms
Write for readers and not to please peer reviewers
Write as if you are talking to an informed colleague
Write as if you are explaining a new technique to an experienced research technician
Avoid self plagiarism
Avoid writing templates from paper to paper
Update the literature review before you submit the manuscript
Be comprehensive in your evaluation of the literature to date
Quote primary resources (not text books)
Be compulsive about and cite the literature of emergency medicine
Don’t provoke the reviewers with misspelling, incorrect formatting, typos
Proof read the final version for logic, accuracy, flow, syntax, spelling etc.
Don’t ignore requests
Comply or justify why not
Why Manuscripts Fail

1. Technical reasons
   The focus of the article is not within the scope of the journal
   The authors did not follow the instructions for authors
   Unclear purpose, poor syntax, extremely verbose, flight of ideas
   Ethical concerns about the study or even the study question
   Lowest denominator paper, with a backlog of higher priority works
   Author unwilling to revise the manuscript to address reviewer’s concerns

2. Cognitive reasons
   The concept is not unique
   The question is trivial
   There are obvious serious uncorrectable scientific flaws in the study itself
   Selection bias is detected; the study is underpowered
   The wrong groups are studied
   The methods are inadequate to answer the study question
   The results are statistically significant but not clinically significant
   The conclusions are overstated or cannot be supported
   The conclusions simply restate the results and do not answer the study question

3. “Degrees” of Manuscript Failures
   “Fatal Flaws”
   Serious errors that cannot be corrected with the data at hand or given the limitations of
   the methods: the question, methods and data collection were wrong from the start.

   “Rejection threshold”
   The cumulative weight of many smaller flaws tips the reviewers towards rejection.

   Rejection = not seriously considered
   The submitted manuscript is not in the scope of the journal
   The submission is deemed unethical
   The science is fatally flawed

   Not accepted= considered, but
   Peer review raises seemingly insurmountable concerns
   There is a backlog of similar manuscripts
   The submission will not enhance the literature
   The relevance is unclear

Common errors in manuscripts

1. In the Title
   The title is misleading
   The title does not set limits

2. In the Abstract
   The abstract results are not the same as the reported results
   The abstract reports different measures than the study itself
   The conclusions of the manuscript are not the same as the conclusions of the paper

3. In the Introduction
   The study question, hypothesis, study objectives are not specified
The study question, study purpose, objectives, hypothesis and goals are confused
The importance, novelty, originality of the study is not shown
The presentation is not intriguing (i.e., the introduction is boring)

4. In the Methods
   Methods are reported that were not used (i.e., template methods from other papers)
   Details of the methods are missing
   Methods are omitted (i.e., some results do not relate to the described methods)

5. In the Discussion
   The logic is loose—a flight of ideas
   The content is too expansive and wanders from the results
   The presentation is biased, and omits key findings from other investigators
   Key results are not eluded to or are poorly explained
   The references are outdated or misrepresented
   Speculation is not identified as such
   Possible implications/the study’s importance are overstated
   The study’s limitations are not described

6. In the Conclusions
   The conclusions simply restate the results
   The conclusions do not answer the study question
   The conclusions do not set limits for application
   The conclusions call for more study

Common errors when reporting RESULTS

1. Errors of Omission: Something is left out, either intentionally without justification, or unintentionally
   A). Not accounting for all study subjects
      The table Ns don’t add up
      Numbers in the paper are not consistent
      Categories equal more than 100%

      Suggestion: Include a schematic summary of the study population. This will account for all patients at each stage of the study, efficiently summarize the study design, and indicate the probable denominators for proportions, percentages, and rates. Double check all tables, the text and the abstract for consistency.

   B) Not naming which statistical tests were used for specific analyses
      Multiple tests are described in the methods: which is used when is not identified

      Suggestion: Indicate the test used after each type of result. If the editor thinks this is redundant, it will be removed in the final edit.

   C) Not presenting the results in a clinically relevant units
      Try to answer “How will medicine be different as a result of this research?”

      Suggestions:
      1) When applicable, make the patient the unit of reporting.
         Report the group response, but if appropriate, provide the number of patients who got better or worse after the interventions.
      2) When applicable, include “efforts to yield” measures
         This allows treatments to be compared in similar terms by determining how many units of a resource are needed to produce one unit of an outcome.
3) When applicable, describe the quality of life after treatment
This acknowledges that patients have a say in what types of treatment they desire, and is therefore important in decision analysis or the development of clinical guidelines. It also may make a statistically nonsignificant finding clinically significant.

4) When possible, use a positive frame of reference.

5) Report confidence intervals (CI) for primary outcomes
Confidence intervals report the precision of the estimates of the responses of the entire population, and indicates the size of the treatment effect and therefore if it clinically important.

2. Errors in the Analysis

A) Lack of power
Statistical power indicates the ability of a test to detect a difference if one truly exists. If no difference is found between two groups, it can mean that there is no difference, or there is not enough data to determine if there is a difference (the sample size is too small)

Suggestions: Early statistical consultation with power calculations before the study to determine how many subjects are needed; report power calculations in the methods section of the paper.

B) Failure to adjust for multiple comparisons
The more tests done, the greater the chances of false positives; the likelihood of false positives increases each time comparisons are made.

Suggestions: Early statistical consultation to apply a corrective measure (ie Bonferoni’s correction) or readjusting the p to accommodate for multiple tests in the same data set. Report your attention to this in the methods.

C) Analysis by treatment received and not by intention to treat
The success of an intervention is related to the efficacy of the therapy and the ability to deliver it within the designated clinical setting. Therefore, to accurately estimate its effectiveness, you must account for those patients for whom the treatment is initiated but cannot be completed.

Suggestions: Early statistical consultation. Indicate that the analysis used intention to treat; if data is reported otherwise, this must be explained and justified.

D) Providing no assurance that the data conform to the assumptions of the analysis
Parametric tests (t-test, ANOVA) assume normally distributed data but most biological data are not normally distributed

Suggestions: Early statistical consultation. The assumptions of the data must be declared or easily implied. For biological data, reporting the median and range (or intraquadrile range) is usually better than the mean and the standard deviation.

E) Mixing up incidence vs prevalence
Prevalence = the proportion of the population that has a disease at a particular time
Incidence = the rate at which new disease occurs in a population

Suggestions: Re-visit your study question to be sure you are reporting what you intended.

3) Errors in Interpretation
A) Not recognizing the limits/meaning of p
If $p < 0.05$, the difference between two groups is statistically different from zero. This does not indicate the size of the difference or how precisely the trial was able to estimate a true treatment difference.

*Suggestion:* Consider reporting confidence intervals as well as $p$ values.

**B) Pragmatic vs explanatory studies**

Explanatory studies attempt to understand a disease or therapeutic process and are conducted under tightly controlled conditions.

Pragmatic studies or effectiveness studies are designed to make clinical decisions, and are conducted under clinical conditions; these may be confounded by uncontrollable factors.

*Suggestion:* Do not imply that the results of a pragmatic study suggests a disease or therapeutic mechanism.

**Guidelines for Writing Results - The Study as it was Conducted (Adapted from Lang and Seric)**

1. Specify the dates of the data collection period, and state why these dates were picked.
   - Places the study in time
   - Allows for the consideration of technologic advances in care or differences between what is reported then and what is standard now

2. Provide a schematic summary of the study, showing the number and disposition of participants at each stage.
   - Accounts for all patients at each stage of the study
   - Efficiently summarizes the study design
   - Indicates the probable denominators for proportions, percentages, and rates

3. Describe the characteristics of each group to ensure that no one subcategory includes atypical subjects.
   - Eligible but not approached for participation
   - Evaluated for participation but did not meet the study inclusion criteria
   - Evaluated and met criteria but declined participation
   - Did not complete treatment
   - Completed treatment but were lost to follow up
   - Completed entire protocol

4. Indicate how the sample group represents the population as a whole and similarities or differences between the control groups and experimental groups at baseline.

5. Indicate if allocation (randomization) of patients or masking was successful.

6. Describe duration and nature of the follow up.

7. For observations based on judgment, provide an assessment of consistency of agreement between observers.

**Guidelines for Writing Results: The Study Outcomes**

1. Present the results and absolute changes or differences for all primary endpoints.
2. Report 95% CI for changes or differences in endpoints.

3. Report actual p values for all primary analyses.

4. Whenever possible, report the main findings of the study in figures or tables.

5. When possible, report statistical findings in enough detail to allow reanalysis or metaanalysis.

6. Report any potential confounding or interactive effects.

7. Indicate the degree to which the participants adhered to the study protocol and explain any exceptions or deviations from the protocol.

8. Report all potential treatment related side effects and adverse events.

9. Describe the treatment of outlying values.

10. Account for all observations and explain any missing data.

11. Report any anecdotal evidence or observations that might contribute to a more accurate or complete understanding of the study or its results.

Suggested readings

Very basic guide to pulling together ideas, results and analysis of research. Defines what should be in each paper subsection.

A research classic, this is an excellent, easy read, which discusses the research process from developing the question to publishing the data.

The title is misleading - this excellent book describes not only the meaning of statistical tests but also how to write research, how to interpret it, and how to clinically apply it.