Publishing Your Study: Tips for Young Investigators

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Learning Objectives

• To apply a logical approach to organizing & presenting your work in a manuscript
• To recognize the importance of writing clearly & succinctly
• To be prepared to navigate the tortuous waters of the peer review process
Getting Started

- Define specific aim
- Identify target audience
- Prepare outline
- Check journal’s instructions
- Be familiar with Uniform Requirements for Manuscripts

Title

- Keep it simple & succinct
- Use it to grab attention
  - Pose a question
  - Highlight the main finding

Abstract

- Write last but write well!
- Use structured format whenever possible
- Make sure abstract consistent with results
Introduction

• Succinctly explain rationale for work in 1-2 paragraphs
• Provide just enough information to orient targeted audience
• Cite the most pertinent references
• Clearly state specific aims

Hypothesis/Aims

• **Wrong**
  – “We designed a study to look at the importance of dementia among hospitalized patients.”

• **Right**
  – “We designed a study to determine the frequency of undiagnosed dementia among hospitalized patients, and to compare the in-hospital mortality of demented to non-demented patients. Our hypothesis was that dementia is frequently not diagnosed in the hospital, and unrecognized dementia is a risk factor for death.”
Methods

• Identify study design or type of paper
• Create appropriate subsections
  – define study population or targeted learners
  – describe interventions
  – define study variables & measurement methods
  – explain analysis methods, including statistical power

Design

Wrong
“... a clinical trial on 73 patients to look at their improvement on b-blockers.”

Right
“... a randomized, double-blind crossover clinical trial on 73 patients...”

Definitions of outcomes

Wrong
“The pulmonary outcome was recorded at the end of the treatment period.”

Right
“Poor pulmonary outcome was defined as oxygen dependence at 60 days of age, or death before that time.”
Sample size & statistical power

• **Right**

  - “Assuming a control group response of 20%, and using a two-sided Type I error = 0.05, Type II error = 0.20 (power = 0.8), sample size calculations showed that 40 subjects in each group provided 80% power for an absolute difference of 15% (i.e. treatment group response = 35%).”

Methods cont’d

• Cite references for established methods
• Explain human subject concerns & financial support
• Don’t put results in Methods!

Results

• Create appropriate subheadings
• For original research:
  – characteristics of participants
  – results of main analysis
    • univariate then multivariate
  – results of secondary analyses
Study Sample

- **Wrong**: “47 eligible patients consented to the study.”
- **Right**: “167 potentially eligible patients were identified. 77 of these did not fulfill more detailed eligibility criteria (on treatment at time of visit or home>40 miles from clinic). 43 patients refused consent. 47 patients were available for study entry.”

Descriptive statistics

- **Wrong**: The mean CD4 count was 600 ± 750
- **Right**: The mean CD4 count was 600 (IQR 200 to 1550)
- **Right**: The mean CD4 count (10th-90th percentile) was 600 (55 to 1910)
- **Wrong**: The mean weight was 85 kg ± 1.2
- **Wrong**: The mean weight was 85 kg (CI, 82.6 to 87.4)
- **Right**: The mean weight was 85 kg (SD 12.1)

Statistical summaries/tests

- **Wrong**
  - Type A personality type had a highly significant relationship with mortality from stroke (p=0.00003).
- **Right**
  - Type A (vs. B) personality type had a small effect on stroke mortality (absolute difference 1%, CI 0.8% to 1.2%, p<.001).
Results cont’d

• Use tables & figures to present key information succinctly  
• Don’t repeat in text all data in tables & figures  
• Don’t put methods in Results  
• Save commentary for Discussion

Discussion

• Briefly summarize key findings, emphasizing what’s new  
• Identify strengths & weaknesses  
• Explain strengths & weaknesses relative to other work, noting differences between studies  
• Discuss implications for patient care, education, research and/or health policy

Discussion cont’d

• Don’t surprise reader with results in Discussion  
• Cite all pertinent references & do so appropriately  
• Avoid conclusions not supported by results!
Interpretation

• What is the biologic explanation for what is claimed? Is it plausible in view of current knowledge & similar studies?
• Is the tone appropriate? Does it take into account weaknesses in the design or conduct of the study?
• What does this study add?

Generalization

• Who does the result apply to, or what outcome does it apply to that wasn’t in the study?
• Is it based on sound biology?

References

• Check for accuracy & completeness
• Use reference manager software
• Follow journal’s instructions
Tables: Presentation or Obfuscation?

Tables

- Include at least one table
- Label rows & columns clearly
- Use tables only when more efficient than using text
- Combine tables with similar content

Table 4. Factors Influencing the Response Rates Determined by Multivariate Analysis

<table>
<thead>
<tr>
<th>Factor</th>
<th>B</th>
<th>P</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>-0.10055158</td>
<td>.0189</td>
<td>0.08046842</td>
</tr>
<tr>
<td>Age</td>
<td>-0.05018079</td>
<td>.4702</td>
<td>0.06934484</td>
</tr>
<tr>
<td>PS</td>
<td>0.07547638</td>
<td>.2268</td>
<td>0.04223795</td>
</tr>
<tr>
<td>Body weight loss</td>
<td>0.17205317</td>
<td>.0681</td>
<td>0.09736182</td>
</tr>
<tr>
<td>Serum albumin</td>
<td>-0.06208576</td>
<td>.4310</td>
<td>0.07856970</td>
</tr>
<tr>
<td>Malignancy</td>
<td>0.15058604</td>
<td>.0428</td>
<td>0.07379298</td>
</tr>
<tr>
<td>Stage</td>
<td>0.04348317</td>
<td>.2615</td>
<td>0.03860276</td>
</tr>
<tr>
<td>Serum LDH</td>
<td>-0.02489134</td>
<td>.6473</td>
<td>0.07614040</td>
</tr>
<tr>
<td>Regimen</td>
<td>0.17391012</td>
<td>.0140</td>
<td>0.07000799</td>
</tr>
<tr>
<td>Serum Alp</td>
<td>-0.02386158</td>
<td>.7571</td>
<td>0.07646266</td>
</tr>
<tr>
<td>Serum CEA</td>
<td>0.09129192</td>
<td>.1924</td>
<td>0.06977260</td>
</tr>
<tr>
<td>Lymphocyte count</td>
<td>-0.04161223</td>
<td>.5.05</td>
<td>0.04712315</td>
</tr>
<tr>
<td>HB concentration</td>
<td>-0.08256861</td>
<td>.2782</td>
<td>0.07735695</td>
</tr>
</tbody>
</table>

Note. B, maximum likelihood of the regression coefficient; P, two-tailed test of significance. A major objective response with combined chemotherapy (P = .0005), in multivariate analysis.
How to present regressions

<table>
<thead>
<tr>
<th>Model: Clinical</th>
<th>Direction</th>
<th>Odds Ratio (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes mellitus</td>
<td>Present</td>
<td>2.0 (1.3 to 3.1)</td>
<td>0.001</td>
</tr>
<tr>
<td>Typical angina</td>
<td>Present</td>
<td>2.3 (1.4 to 3.9)</td>
<td>0.002</td>
</tr>
<tr>
<td>sex</td>
<td>Male</td>
<td>3.1 (1.4 to 4.0)</td>
<td>0.007</td>
</tr>
<tr>
<td>age*</td>
<td>Older</td>
<td>1.4 (1.1 to 1.9)</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Chi-square=31.3

* Increment of 10 years (each 10-year increase in age increases the odds of disease 1.4-fold)

Figures

- Include at least one figure
- Label figures so that readers can easily interpret them!
- Use to highlight key findings where visual image is more powerful than words

Do you like this figure?
An Opening Paragraph

• In the months that have passed since September 2001, there has been increasing recognition and awareness among physicians and other health professionals about the risks of a wide variety of different types of terrorist attacks in the U.S. Attacks using biological or chemical agents known to have high potential for causing epidemic disease were attempted and could be attempted again with a large number of serious consequences for our nation and its citizens. Based on this reason and other reasons, a project was conducted in order to review and synthesize all available published studies and educational curricula on the training of health professionals in how to detect disease and manage patients in the event of an attack.
Constructing Paragraphs

• Decide on main point of each paragraph
• Use a topic sentence, concluding sentence & transitions
• Aim for half page per paragraph

Constructing Sentences

• Easiest order is subject-verb-object
• Keep subject & verb together
• Break up long sentences

Being Succinct

• Eliminate unnecessary phrases
  – It is important to note that
  – Based on the fact that
  – In the years that have passed since
  – There are
Being Succinct cont’d

• Replace wordy expressions
  – in order to >> to
  – one of the >> a
  – utilize >> use
  – despite the fact that >> although
  – a larger proportion >> more

• Avoid redundancy
  – if 2nd sentence needed to explain 1st, delete 1st

Active vs. Passive Voice

• Most editors/reviewers believe active voice best for scientific writing
• Active voice much more interesting to read
  – subject performs action vs. undergoes action
  – enhances flow
  – less wordy

Verb Tense

• Introduction:
  – use present tense for current state-of-the-art
• Methods & Results:
  – use past tense for what was done
• Discussion:
  – use present, present perfect (has/have been), or past tense
New Opening Paragraph

- Terrorists could use biological agents to cause a devastating epidemic of disease. Clinicians may be unprepared to respond to an attack. Therefore, we conducted a systematic review of studies on the effectiveness of training clinicians to respond to a bioterrorist attack.

Authors’ View of Steering Paper to Press

Submit Manuscript

Open Acceptance Letter

Purpose of Peer Review

- To enhance quality of papers
- To help editors make decisions about publication of submitted papers
How do editors screen papers?

- Is the topic important & of interest to the journal’s audience?
- Have we recently published articles on this topic? Does the manuscript add something new?
- Is the paper written clearly? Is it logically consistent?
- Is the research design appropriate? Is the study size adequate?
- Are the results appropriately interpreted?

How Do Editors Use Reviewers’ Comments?

- Identify strengths & weaknesses
- Obtain suggestions for addressing weaknesses in methods
- Obtain suggestions for improving clarity
- Put paper in context of prior work & relevant theory
- Guide decisions about acceptance or rejection

Reviewer Recommendations
MS #0106099

- Accept as is
- Reconsider after revision
- Reject
High Quality Review
JAMA 1998;280:231
• Discuss importance of study question
• Discuss originality
• Identify strengths & weaknesses of methods
• Make specific comments on writing, organization, tables & figures
• Make constructive comments
• Substantiate comments with examples
• Comment on author’s interpretation of results

Common Reasons for Rejection of Papers
• Evaluation incomplete/inappropriate
• Intervention described poorly
• Work not innovative
• Referenced poorly
• Problems with writing style
• Inadequate rationale for study
• Objectives not clear

CONSORT Statement on Reporting of Randomized Trials
PLoS Medicine 2010; 7: e1000251
• Checklist of 25 items
  – empirical evidence that not reporting an item is associated with biased estimates of effect, or
  – information essential to judge reliability or relevance of findings
Other Guides

- Observational studies
  - Strengthening the Reporting of Observational Studies in Epidemiology (STROBE): www.strobe-statement.org

- Diagnostic test studies
  - Standards for Reporting of Diagnostic Accuracy (STARD): http://www.clinchem.org/cgi/content/full/49/1/1

- Meta-analysis

Editor’s Letter

- Very few, if any, manuscripts accepted as is
- Editors use different terms to distinguish request for revision from rejection
- Editors should be specific about which comments most important to address
- Editors do not always agree with reviewers
Author’s Response

• Attempt to understand each comment
• Pay close attention to editor’s comments
• Try to respond to every comment by making a change in manuscript
• Prepare cover letter that explains how you responded to each comment
• Explain when you disagree with editor/reviewer, if you feel strongly

Choosing a Journal

• Does the journal reach your targeted audience?
  – Broad vs. narrow audience?
• Are your objectives consistent with the mission of the journal?
• Has the journal published related work?
• Will the journal help to maximize the impact of your work?
  – Consider impact factor & journal’s capacity for drawing attention to your work
  – Don’t be afraid to aim high!
• What is the urgency for publishing the work?

Summary

• Pay attention to organization of paper & each section
• Reinforce text with strategically selected & clearly labeled tables & figures
• Enliven paper with active voice
• Structure each paragraph & sentence to be easy to read
• Succinct!
• Use existing guides to strengthen papers
• Respond respectfully to comments from reviewers & editors
• Expect reviewers to focus on importance, originality, methods, conclusions & clarity