from bench to bedside

Publishing Your Research

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Outline

- Designing research for publication
  - Documenting your methods and results
  - Reviewing the literature
- Writing & submitting your manuscript
  - Picking a journal
- Publishing and the production process
Designing research for publication
Q: When does the publication process begin?
Q: When does the publication process begin?

A: The day you start designing your study!
Study Design for Publication

- Methods must be defensible
  - Review the literature prior to selecting a method
  - Choose the most appropriate method to the research question & document the source
  - Include comparison to validated methods for novel techniques

- Results should be publishable
  - Include at least one aim that will provide results you can publish even if your hypothesis is incorrect
Conducting the Study

- Document methods and results
  - Keep track of all methods used
    - Include methods and results that didn’t work in your lab or field notebook
    - Save annotated do-files and log files during data analysis
    - Date everything!
  - Document results carefully
    - Make notes about anything that might impact results
    - Go back to these notes during data analysis to identify potential reasons for outliers
Literature Review as Background

- Conduct a literature review prior to the start of any study
- Answer this question - what is novel about your work compared to what has been done before?
- If nothing is novel, don’t do the study unless you are interested in replicating controversial results.
- Organize key papers that influence your work
- Keep track of your search terms and set up an automatic PubMed query to run periodically
- Keep abreast of the literature as you conduct your study
- Establish professional relationships with key researchers doing work like yours – they may review your manuscript!
Literature Review as Method

- **Narrative reviews**
  - Synthesize and comment on a focal aspect of the literature
  - Document search words / MeSH terms used

- **Systematic reviews**
  - Identify, evaluate, and synthesize a focal aspect of the literature, usually through a team approach
  - Document entire process according to PRISMA guidelines (http://www.prisma-statement.org/)
  - Search words and selection criteria
  - Number of publications found (included/excluded)
  - Evaluation of bias / attempt to reduce bias in review
Research Article

- Publication of original research studies
  - Laboratory experiments
  - Epidemiologic studies
    - Observational
    - Interventions, e.g. randomized controlled trials
- Peer-to-peer communication among scientists
- Foundation of “the literature”
- Scientific currency
Research Article Format

- Title, Authors, Affiliations
  - First author: did the work and wrote the paper
  - Last author: typically the project PI

- Abstract
  - Structured or not, depends on journal requirements

- Introduction
  - Summary of the literature as it relates to scientific question being addressed by the research

- Materials & Methods
  - Goal is to allow other researchers to replicate the work
  - Do not include results here
Research Article Format II

- Results
  - JUST THE FACTS!
  - Tables & Figures
    - Easy to read and interpret
    - Able to stand alone

- Discussion
  - Interpretation of results

- Conclusion (optional short section, often omitted)

- Acknowledgments

- References

STROBE

- Strengthening the Reporting of Observational Studies in Epidemiology
- Guidance document
- Checklist of items to include (and where to include them) in published reports of observational epidemiologic studies
- Consult the checklist before you conduct your study!
<table>
<thead>
<tr>
<th>Item</th>
<th>Item Number</th>
<th>Recommendation</th>
</tr>
</thead>
</table>
| Title and abstract          | 1           | (a) Indicate the study's design with a commonly used term in the title or the abstract.  
(b) Provide in the abstract an informative and balanced summary of what was done and what was found. |
| Introduction                | 2           | Explain the scientific background and rationale for the investigation being reported.                                                         |
| Method                      | 3           | State specific objectives, including any prespecified hypotheses.                                                                               |
| Methods                     | 4           | Present key elements of study design early in the paper.                                                                                       |
| Study design                | 5           | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection.             |
| Participants                | 6           | (a) Cohort study: Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up.  
Case-control study: Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls.  
Cross-sectional study: Give the eligibility criteria, and the sources and methods of selection of participants.  
(b) Cohort study: For matched studies, give matching criteria and number of exposed and unexposed.  
Case-control study: For matched studies, give matching criteria and the number of controls per case. |
| Variables                   | 7           | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.       |

http://www.strobe-statement.org/
Additional Guidelines

- CONSORT: randomized controlled trial reporting
- PRISMA: systemic reviews & meta-analyses
- MOOSE: meta-analyses of observational studies

Published guidance documents

Guidance documents under development
Short Communications

- Abbreviated form for a standard manuscript, *e.g.* short research article
- Follows the same format and flow as the full article, but does not include section heads
- Designed for smaller studies with lower impact that are methodologically sound and worthy of publication
  - *Student research often falls in this category*
  - Consult individual journal guidelines
  - Some journals will ask reviewers if they feel a full-length manuscript can be converted to a shorter form
Review Article

- Publication that summarizes evidence or knowledge (read – published original research articles)

- Main types
  - Narrative review: summary and synthesis of the scientific evidence
  - Systematic review: methodologically more rigorous than a narrative review
  - Meta-analysis: statistical synthesis of evidence
The Writing Process
Writing tips: methods & results

- Start writing with your methods section
- If you have text from a proposal, place methods and background material in a draft document before you begin your study
- Update or write your methods and results section(s) as you conclude each experiment or field module or data analysis component
- Particularly with complex studies, keep these components small and modular
- Prepare your table 1 before performing any additional data analysis
Writing tips: introduction & discussion

- Write your thesis statement before you begin your study.
  - This is the last sentence of your introduction.

- Work on your introduction and discussion sections simultaneously after concluding methods and results.
  - Move material into the discussion section that you want to compare with your results.
  - Keep material in the introduction that helps frame why you conducted this study.
Writing tips: references

- Include parenthetical references as you draft
  - (Davis 2012) or (Davis 2012 TLID) / (Davis 2012 AEM)

- Import your references into a folder in your favorite PDF organizer (such as Papers or Mendeley) or folder in your referencing software program as you cite them

- Give yourself an entire day to do reference formatting before submission

- Have someone check your final draft to be sure you caught all your references
Submitting your manuscript
Choosing a Journal

- **Relevance**
  - Journals will publish guidelines that state what kinds of articles they accept

- **Impact**
  - Impact Factor: higher scores given to journals with greater impact, judged primarily based on article citations

- **Access (pay to publish)**
  - Open Access articles are available to all peers
  - May be cited more often but cost more: $1000-$3000
  - Open Access Journals (e.g. PLoS)
Open Access

**Pros**
- Larger audience (audience unrestricted)
- Potentially less emphasis on novelty or citability of research, and more on methodological soundness
- Potentially faster review

**Cons**
- $$$
- Grant restrictions on coverage of publication costs
- Perception of pay-to-publish (but an increasing number of subscription journals have page charges)
Submission Process

- **Before submission**
  - Review journal guidelines and format your manuscript accordingly.
  - Journals often have different requirements for reference formatting, hence, best to use software programs that include formats for various major journals.

- **Co-author sign-off**
  - Communicate with co-authors prior to submission.
  - Notify co-authors when you do submit.
  - Institutional review sometimes needed before submission.
  - CDC, NIEHS internal review for government databases.
Submission Process II

Submission requirements

- Provide a cover letter or statement
- Electronic submission
  - Start a submission early and save it to help guide your submission process

Day of Submission

- Leave enough time to submit – it takes longer than you expect
- Figures need to follow specific journal requirements
  - Adobe Photoshop good for figure size and formatting changes to meet journal requirements
Submission Process III

Disclosures for co-authors
- Financial conflicts of interest
- Ask your co-authors prior to the day of submission
- Ask them prior to engaging them in the study if you have concerns

Co-author contributions
- Requirements for co-authorship vary by journal
- Provision of this information depends on journal too
- Be sure all co-authors have contributed to the writing / review of manuscript in some way
Article Review

- Editorial decision: before or after peer review, the editor makes a decision about your manuscript (accept/modify/reject)

- Peer review
  - 2-4 reviewers, generally
  - Invited by the editor to review your manuscript
  - Provide opinion based on scientific methodology and merit
  - Recommendation to editor
  - Major and minor points of critique of research and presentation
Article Review II

- Be prepared to offer names of potential reviewers to editor during submission (generally three)

- You may offer names of potential reviewers to avoid
  - Peers you feel cannot judge your research in an unbiased way
Publishing and the production process
Most journals will publish ahead-of-print PDF versions of the Word document you submitted within a few weeks of acceptance.

Be sure the last revision you upload is publication-ready!
- Proof for typos
- Delete outstanding comments from co-authors or editors

Don’t use the proofing process to make substantive changes.
How study.doc becomes study_journal_year.pdf

Journal editor makes decision

Copy editors use submission manager software to access final (revised) files
- You may need to upload additional files or revised figures

Copy editors use automated programs or templates to drop your text into the PDF system
- Some journals will do heavy copy editing (e.g. Lancet), but most won’t change your text

You will be prompted to download and proof your PDF prior to publication, usually via submission manager program
- Copy editors will flag text with questions (Q1, Q2, etc.)
The speed of the process depends in part on you!
Resources
Writing resources

Purdue Language Lab
http://owl.english.purdue.edu/

U.S. Government
http://www.plainlanguage.gov/howto/guidelines/bigdoc/TOC.cfm

Slide adapted courtesy of Susan Davis
Presentation & Grammar Tune-Up, Spring 2011
English as a Second Language

Johns Hopkins ESL Program:

http://www.ltc.jhu.edu/esl/faq.htm
Selected Books

- The Elements of Style — Strunk & White
- A Field Guide for Science Writers: The Official Guide of the National Association of Science Writers — Blum, Knudson & Henig
- Expectations: Teaching Writing from the Reader's Perspective — George Gopen
- The Visual Display of Quantitative Information—Edward R. Tufte
Thank you!