



Writing in the Sciences

Unit 6.1: Alternatives to Original Research: Reviews,
Letters to the Editor, Case Reports



Example of good writing!

“The lesson of optogenetics is that the old, the fragile, and the rare—even cells from pond scum or from harsh Saharan salt lakes—can be crucial to comprehension of ourselves and our modern world. The story behind this technology underscores the value of protecting rare environmental niches and the importance of supporting true basic science. We should never forget that we do not know where the long march of science is taking us or what will be needed to illuminate our path.”

—Karl Deisseroth, November 2010, *Scientific American*
“*Controlling the Brain with Light*” (on Optogenetics)



Review articles

- Goals:
 - Synthesize and evaluate the recent primary literature on a topic.
 - Summarize the current state of knowledge on a topic.
 - Address controversies.
 - Provide a comprehensive list of citations.



Non-systematic vs. Systematic reviews vs. Meta-analysis

- Non-systematic review
 - Sometimes called a “narrative” review.
 - May not be comprehensive.
 - May evaluate the studies qualitatively rather than quantitatively.
- Systematic review
 - Attempts to find and summarize all relevant studies. May even include unpublished work.
 - Follows a rigorous search strategy using pre-defined exclusion and inclusion criteria. Searches multiple databases.
 - Evaluates the quality of each study using rigorous, pre-defined criteria. (often quantitative)
- Meta-analysis
 - A systematic review that additionally uses statistical techniques to pool data from independent studies (sometimes including unpublished studies).



Review articles: structure

- **(Abstract)**
- **Introduction**
 - General background/what's known
 - What's unknown
 - Clear statement of the aim of the review
- **The body of the paper/main analysis**
 - Explain the search strategy (databases, exclusion criteria, and inclusion criteria).
 - Summarize the literature; organized based on methodology or theme.
 - Analyze, interpret, critique, and synthesize studies.
- **Conclusion and future directions**
 - What recommendations can you make?
 - What gaps remain in the literature? What future studies would help fill in these gaps?
- **Literature cited**



Abstract: example

- In principle, given the amino acid sequence of a protein, it is possible to compute the corresponding three-dimensional structure. Methods for modelling structure based on this premise have been under development for more than 40 years. For the past decade, a series of community wide experiments (termed Critical Assessment of Structure Prediction (CASP)) have assessed the state of the art, providing a detailed picture of what has been achieved in the field, where we are making progress, and what major problems remain. The rigorous evaluation procedures of CASP have been accompanied by substantial progress. Lessons from this area of computational biology suggest a set of principles for increasing rigor in the field as a whole.



Introduction: example

- In the 1950s, work by Anfinsen & colleagues conclusively showed that the information determining the three-dimensional structure of a protein molecule is contained in the amino acid sequence. Recognition of this relationship rapidly led to the development of methods for computing structure from sequence. There were many early encouraging reports of partial success, starting in the 1960s and continuing through the 1970s and 1980s. And yet, during this long period, there were very few reports of computed structures in any way competing with those obtained experimentally. The mismatch between apparent success and the lack of useful applications suggested that the traditional peer reviewed publication system is not sufficient to ensure rigor in this area of computational biology. The Critical Assessment of Structure Prediction (CASP) experiments were devised as a means of addressing the specific needs of methods evaluation in structure modelling. CASP is one of a number of ways in which this problem may be addressed. As discussed later, the fundamental differences between computational and experimental biology dictate that new procedures be adopted in the field as a whole.



Tips for Reviews

- Contact a journal editor early in the process to find out if that journal is interested in your review.
- Define a clear, narrow purpose for the review.
- Develop a strategy for searching the literature. (meet with an information specialist)
- Carefully read and organize the relevant papers. (pre-writing step!)
- Write for a wide audience. Write well!



Letters to the editor

- Critique/respond to a specific article that the journal has recently published.
- Must be timely (received within a few weeks of the original paper).
- Must be concise.
 - Generally 200-400 words/1 table or figure/maximum of 5-10 references.



Letters to the editor: structure

- Overview (1 paragraph)
 - Cite the recent article you are replying to
 - Praise the authors for their contribution
 - E.g., "The study is relevant, well-designed, and has an intriguing hypothesis."; "We found the article to be excellent and highly relevant."
 - Succinctly state the main problem/issue
 - E.g., "The paper is misleading due to several problems with the statistical analysis and interpretation."
- Succinct explanation of the issue or issues (1-3 paragraphs)
 - Extremely focused.
- Brief conclusion/parting thought (if space; 1-2 sentences within the last paragraph).



Letters to the editor: tips

- Follow the journal's instruction for letters to the editor!
- Keep the tone as positive and polite as possible.
- Be specific and focused. Remove all unnecessary clutter.
- Clearly articulate how the problem you've identified may impact the main conclusion/take-home message of the original paper.



Case reports

The New England Journal of Medicine

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Volume 283

NOVEMBER 5, 1970

Number 19

NECROTIZING ANGIITIS ASSOCIATED WITH DRUG ABUSE*

B. PHILIP CITRON, M.D., MORDECAI HALPERN, M.D., MARGARET MCCARRON, M.D.,
GEORGE D. LUNDBERG, M.D., RUTH MCCORMICK, M.D., IRWIN J. PINCUS, M.D.,
DOROTHY TATTER, M.D., AND BERNARD J. HAVERBACK, M.D.

Abstract Fourteen young drug abusers with a necrotizing angiitis indistinguishable from periarteritis nodosa were studied. The six women and eight men had used narcotics, stimulants, hallucinogens and depressants. Methamphetamine, alone or in combination with heroin or d-lysergic acid diethylamide, was used commonly.

The clinical presentation varied from a complete lack of symptoms in five patients to pleomorphic systemic signs and symptoms with renal failure, hypertension, pulmonary edema and pancreatitis.

The vascular changes of necrotizing angiitis, including arterial aneurysms and sacculations, were noted in the kidney, liver, pancreas and small bowel at selective angiography. Post-mortem findings in four patients revealed generalized vascular changes of differing age, including chronic and healed lesions.

Because of the multiplicity of injected substances with the high probability of contamination the exact etiologic agent in these cases is not clear; however, methamphetamine appears to be a common denominator.



Case reports: structure

- Abstract

- Introduction

- What is the significance of the case/s?

- Case description/s

- The patient's presenting signs and symptoms; medical and social history; medications; results of exam and lab tests; differential diagnosis; final diagnosis; treatments and outcomes.

- Discussion

- Interpretations
 - What does/do the case/cases suggest?
 - Questions for further research

- References

- Tables/Figures



Others...

- Commentaries
- Opinion pieces/editorials
- Book reviews
- Explanatory pieces/columns

Editorials: examples

AMERICAN Journal of Epidemiology

Formerly AMERICAN JOURNAL OF HYGIENE

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VOL. 132

OCTOBER 1990

NO. 4

Editorial

BE KIND TO YOUR READER

GARY D. FRIEDMAN¹

Let's face it. Much epidemiologic writing is boring. Some dull prose is unavoidable; it is difficult to write an interesting description of a questionnaire, laboratory method, or statistical analysis. There are, however, preventable causes of the tedium that steers epidemiologic journals to the bottom of our reading piles. The two that have impressed me most in my brief experience as an editor for this *Journal* are needless material and wordiness.

NEEDLESS MATERIAL

Only material that is important for the intelligent reader's understanding of the study should be included in the paper. Young investigators are especially prone to

present every detail of the methodology, results that are tangential to your main findings, a detailed literature review, or discussion of every conceivable source of bias.

Here are some examples of needless material that I have seen:

Introduction. Extensive review of the literature, much of which is repeated in the Discussion section.

Methods. Detailed technical descriptions of physiologic or laboratory tests that are incomprehensible to most epidemiologists; extensive listing of data collected that have no bearing on the particular study reported.

Results. Presentation of beta coefficients from multivariate analysis either in addition to the relative risks derived from them, or without giving units of measurement,



Volume 161

Number 5

March 1, 2005

American Journal of EPIDEMIOLOGY

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Bloomberg School of Public Health

Sponsored by the Society for Epidemiologic Research

Published by Oxford University Press

EDITORIAL

Please Read the Following Paper and Write This Way!

After dealing with many wordy manuscripts submitted to the *American Journal of Epidemiology* and badgering authors to shorten them, I was delighted to receive the 2,164-word paper by Lewis et al. (1) that is published in this issue. If you are an aspiring author of epidemiologic papers, please read their paper, which is a model of conciseness and clarity.

It has been my experience that, on average, the British

"good old days," our applications were funded when we listed our specific aims in a few sentences or phrases. Now, my younger colleagues are wary of submitting a grant in which specific aims do not also contain a sales pitch and occupy a whole page. They also fear that, if they clearly describe their study in 16 pages rather than all or almost all of the 25-page limit imposed by the National Institutes of



Citations/further reading

- Robert Iles. *Guidebook to better medical writing*. Iles Publications. 2003.
- Angelika Hofmann. *Scientific writing and communication*. Oxford University Press. 2010.



Writing in the Sciences

Unit 6.2: Authorship/Acknowledgements/References



Authorship

1. Who gets authorship?

- Any author listed on the paper's title page ***should take public responsibility for its content.***

2. In what order?

- Order implies authors' relative contributions (with exception of the senior author position)
- The senior author (head of the lab or research team) often appears as the last-listed author
- Papers may have dual first authors
- For fairness, alphabetical or reverse alphabetical order may be used if researchers have contributed equally.
- Large working groups may be cited as a group



Conflicts of Interest/copyright transform forms.

- All authors must disclose relevant conflicts of interest, usually on a specific form.
- All authors must sign a copyright transfer form.
- Some journals require authors to specify exactly their involvement in the manuscript (e.g., study planning, data collection, data analysis, manuscript writing, manuscript editing).



Acknowledgements

- Funding sources
- Contributors who did not get authorship (e.g. offered materials, advice, or consultation that was not significant enough to merit authorship).



References

- Use a computerized bibliographic program.
- Follow journal guidelines (may request alphabetical listing or order of appearance in the text).
- Some journals limit number of references allowed (e.g., 30); figure this out ahead of time!
- Follow journal formatting rules (see: instructions to authors).
 - Example: Efron B. Bootstrap methods: Another look at the jackknife. *The Annals of Statistics* 1979; 7: 1-26.



Writing in the Sciences

Unit 6.3: The Submission Process



Submission process

1. Identify a journal for submission (ideally before writing!)
2. Follow the online “instructions for authors” for writing and formatting the manuscript
3. Submit your manuscript online (corresponding author)
 - All authors must fill out and sign copyright transfer and conflict of interest forms (often done offline)
4. Possible outcomes: accepted; accepted pending minor revisions; rejected but re-submission possible; no resubmission possible
5. Revision and resubmission: re-submit with cover letter that addresses reviewers critiques point by point
6. Once accepted, carefully review final proofs!



Reject, but resubmission possible

- “Your manuscript is not acceptable for publication...However, if you feel that you can suitably address the reviewers’ comments, then I invite you to revise and resubmit your manuscript.”



Resubmission Cover Letter/Response to Reviewers

Dear *Dr. Editor*,

We appreciate your helpful comments and those of the reviewers.
We feel that the manuscript is now greatly improved.

We have made revisions based on the comments/suggestions of Reviewers I and II. The comments of each reviewer are numbered below, with our response (clarifications and changes) following.



Detailed response to reviewers,

Continued

Reviewer I:

1. *There is little discussion of xxx*

We agree with Reviewers I and II that the section on *xxx* was too abbreviated. Therefore, we have added a paragraph that highlights *xxx* (paragraph 33).

2. *Could you comment on xx*

We have added a sentence to paragraph 9 in Methods/Materials that comments on *xx*

Also include a copy of the paper with changes tracked...

osteoporosis. *Osteoporos Int*. 2003 Oct;14:843-7.¶

11. Lloyd T, Buchanan JR, Bitzer S, et al. Interrelationships of diet, athletic activity, menstrual status, and bone density in collegiate women. *Am J Clin Nutr*. 1987 Oct;46:681-4.¶

12. Kirchner EM, Lewis RD, O'Connor PJ. Bone mineral density and dietary intake of female college gymnasts. *Med Sci Sports Exerc*. 1995 Apr;27:543-9.¶

13. Wolman RL, Clark P, McNally E, et al. Dietary calcium as a statistical determinant of spinal trabecular BMD in amenorrhoeic and oestrogen-replete athletes. *Bone Miner*. 1992;17:415-423.¶

14. Winzenberg TM, Shaw K, Fryer J, Jones G. Calcium supplementation for improving bone mineral density in children. *Cochrane Database Syst Rev*. 2006;CD005119.¶

15. Cranney A, Horsley T, O'Donnell S, et al. Effectiveness and safety of vitamin D in relation to bone health. *Evid Rep Technol Assess (Full Rep)*. 2007 Aug;1-235.¶

16. Specker B, Vukovich M. Evidence for an interaction between exercise and nutrition



An interesting tidbit...

- “About 60% of reviewers criticisms pertain to the quality of the writing or tables and graphs; and about 40% pertain to the quality of the scientific work.”

Robert Iles. *Guidebook to better medical writing.*